

Urban Livelihoods and Flood Vulnerability in a State-Sponsored Resettlement Project in Iquitos, Peru

by

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Abstract

In the Amazon floodplain, the annual flood cycle is an expected part of life; however, anthropogenic climate change is projected to increase the frequency and severity of floods. Further, poor urban residents in the Global South are often disproportionately exposed to floods. Resettlement is increasingly considered a potential climate adaptation policy for high-risk areas, but many past resettlements have failed to improve residents' wellbeing. In Iquitos, Peru, the Peruvian government has set out to relocate 16,000 residents from Bajo Belén, a low-income neighborhood on the Amazon floodplain. Four hundred households have already relocated to a small settlement 15 km outside Iquitos. This research investigates how relocation changed residents' livelihoods and vulnerability to floods, using household surveys and interviews conducted during fieldwork in 2019. Findings indicate that residents in Bajo Belén did not always perceive floods as risky, and that relocation has left residents isolated from services and opportunities.

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Glossary

Term	Definition
<i>almacén</i>	Literally translated, “warehouse.” In this context, often refers to agricultural processing piecework.
<i>bodega</i>	Small shops often operated from the home which sell food, small household items, charcoal, toiletries, and sometimes hot food.
<i>chacra</i>	Land plots, small farms, or gardens, typically outside the city.
<i>colectivo</i>	Small, privately-operated buses which run regular routes for a fare. In Iquitos, where river travel is common, <i>colectivo</i> can also refer to a boat-taxi or boat bus.
<i>independiente</i>	Contract or gig workers. Often employed informally and predominantly men.
<i>minga</i>	A community labor exchange party typical in rural Amazonian communities, which has also been adapted to urban settings.
<i>motokar</i>	Motorized rickshaw taxi. Holds 2-4 people.
MVCS	Spanish acronym for the Ministry of Housing, Construction and Sanitation. In Spanish: Ministerio de Vivienda, Construcción y Saneamiento.
<i>peque-peque</i>	Small, motorized boat.
<i>selva</i>	Literally translated, “jungle” or “rainforest.” In the Amazon, <i>selva</i> is often used to refer to the countryside or rural areas outside the city.
<i>soles</i>	The Peruvian currency, Nuevos Soles (abbreviated S/ or PEN). At the time of this fieldwork, the conversion rate was S/ 1 = \$0.30 USD.
<i>terra firme</i>	The upland, which does not flood.
<i>zona baja</i>	Literally translated, “lower zone.” Refers to the floodplain area of the district of Belén.

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Chapter 1

Introduction

1.1. Introduction

In urban areas in the Global South, poor and marginalized residents are often relegated to the riskiest parts of cities, where they are highly exposed to environmental hazards, such as floods or landslides. People and communities are resilient and often develop strategies to cope with hazards, but poverty makes it more difficult for people to respond to and recover from these events. At the same time, climate change is increasing the frequency and severity of environmental hazards. Around the world, resettlement – preemptively moving people out of risky areas before disaster strikes – is increasingly being explored as a climate adaptation strategy in particularly high-risk places, as well as an opportunity to propel other development and poverty reduction agendas (Correa, 2011; Dronkers, Misdorp, & Spradley, 1990; Tadgell, Doberstein, & Mortsch, 2018). However, resettlement remains highly contested, in large part because there is a well-documented history of state failures in resettlement projects (Oliver-Smith, 1991; Perry & Lindell, 1997). In particular, livelihoods are often neglected in the planning of resettlement projects, which can leave vulnerable populations isolated and impoverished (Cernea, 1997). As resettlement gains traction as an option to avoid the worst impacts of climate change, further research is needed in order to guide future projects and determine if resettlement, in practice, can indeed be beneficial (De Sherbinin et al., 2011).

It is within this context that I conducted a study of a resettlement project in the Amazonian city of Iquitos, Peru. The Peruvian federal government is in the process of relocating residents of Bajo Belén, a low-income, informal urban community, due to flooding. Bajo Belén is situated on the Amazon River floodplain and is inundated during the annual flood cycle. Residents of Bajo Belén are well-adapted to living with flooding and in some ways, even benefit from it (Chávez Eslava, 2017; Desmaison, Astolfo, et al., 2019; Gorenstein, 2018a). However, a lack of essential services in Bajo Belén, such as sewage and waste collection, produces health and safety risks during the flood. The relocation project aims to relocate about 16,000 people and build about 2,500 homes in a new site, dubbed “Nuevo Belén” or “New Belén,” about 15 km outside the city, where residents receive a free prefabricated home. Although the resettlement is voluntary, it is highly controversial among residents, many of whom fear being pushed out of their homes and

cut off from their livelihoods (Kawa, Ulmer, & Silverstein, 2018). Anecdotal reports suggest that less than half of residents want to relocate (Munoz, 2015). About 400 households of the estimated 2,500 have already relocated.

In Bajo Belén, the state justifies resettlement as a public necessity in order to eliminate exposure to floods and improve the living conditions of residents. However, many residents maintain that relocation will not improve their lives. My first research question, therefore, is: **how were residents of Bajo Belén vulnerable to floods, and how has the Nuevo Belén relocation reshaped vulnerability?** In planned resettlement projects, decisionmakers often neglect to plan for livelihood continuity and reconstruction, leaving residents economically vulnerable. My second research question is: **how has relocation changed the livelihoods of residents in Nuevo Belén?** To answer these questions, I draw on household surveys, key informant interviews and participant observation, conducted during fieldwork in Iquitos in 2019, to compare households in Bajo Belén and Nuevo Belén.

I argue that residents view vulnerability and risk differently than the state. While the state unilaterally views the annual flood as dangerous and Bajo Belén as uninhabitable, not all residents see floods as a hazard, and many view their home on the floodplain as an opportunity, not a risk. I also argue that while people are diversifying and adapting their livelihoods to their new environment, resettlement creates vulnerability for many residents by disrupting their livelihood strategies and reducing access to social, human, financial and natural capitals. The Nuevo Belén relocation is a useful case study on vulnerability to environmental hazards in an urban community and provides important lessons for other resettlements.

1.2. Thesis Structure

In Chapter 2, I situate this thesis within literature. I begin with an introduction to the flood cycle in Amazonia and the impacts of anthropogenic climate change. This context will ground subsequent discussions of flood adaptations and vulnerability in Bajo Belén. Next, I discuss frameworks of vulnerability to environmental hazards. I then discuss the livelihoods framework, with particular attention to urban livelihoods and poverty. This framework serves as an important entry point to understanding the impacts of relocation on residents' ways of life. Finally, I discuss scholarship on resettlement to situate Nuevo Belén in the context of other similar projects, and the need for future research in this field.

In Chapter 3, I outline my methodology and research approach. To provide the context for my study site, I sketch out the scene in Iquitos, Bajo Belén, and Nuevo Belén, and show how certain policy shifts in Peru have set the stage for the Nuevo Belén relocation. Next, I outline the process of my fieldwork and my methods. I also discuss how my own identity and positionality as a researcher shaped my experiences during my fieldwork and my interpretation of my findings.

In Chapter 4, I address my first research question: **how were residents of Bajo Belén vulnerable to floods, and how has the Nuevo Belén relocation reshaped vulnerability?** I compare residents' perception of flood vulnerability with the state's perspective. I explore the state's perspective of flood risk and vulnerability by drawing on studies, laws, and other state materials. Then, using household surveys, key informant interviews and participant observation, I show how residents of Bajo Belén and Nuevo Belén respond to floods, perceive flood risk and their own vulnerability. In this chapter and the following one, I include two participant profiles: narratives of specific participants, whose experiences highlight particular themes. I argue that residents have differential experiences of floods and varied perceptions of vulnerability and risk, often at odds with the state's narrative, which influences their choice to stay or to relocate.

In Chapter 5, I turn to my second research question: **how has relocation changed the livelihoods of residents in Nuevo Belén?** This chapter draws on household surveys, key informant interviews and participant observation, and I use Bajo Belén as a 'control' group to compare livelihood changes. I begin by describing and comparing the livelihood strategies, income, and asset portfolios of residents in Belén and Nuevo Belén, focusing in particular on housing as a key asset. I find that resettlement has changed the livelihood strategies of relocated households, that resettlement has isolated households, and has limited their access to important capitals in their household asset portfolios.

In Chapter 6, the concluding chapter, I summarize the main findings from this study, and relate these findings to the existing literature on environmental hazards and vulnerability, urban livelihoods, and resettlement. I then discuss the limitations of the study, and possible directions for future research.

Chapter 2

Literature Review

In this chapter, I outline the bodies of literature that inform this research. First, I summarize how the annual flood cycle shapes landscapes and livelihoods in Amazonia and creates both risks and opportunities for the people who live there. I also briefly discuss anthropogenic climate change and its impacts in the Amazon. Second, I turn to literature on vulnerability to environmental hazards. Third, I discuss the livelihoods framework, with particular attention to urban livelihoods and poverty. Finally, I turn to literature on resettlement to show Nuevo Belén as one of a growing number of such projects worldwide, and discuss common critiques and problems. Together, these bodies of literature provide an understanding of how environmental hazards, vulnerability and urban livelihoods intersect in Bajo Belén and Nuevo Belén.

2.1. The Flood Cycle in Amazonia

This section provides a brief overview of the flood cycle in the Amazon and its impacts on livelihoods. Understanding the flood cycle and its impacts on livelihoods provides context for how residents of Bajo Belén perceive flood risk and opportunity. Flood exposure – both present and future – is also a key part of the state’s justification for the Nuevo Belén project.

The landscape of the Amazon is shaped by the seasonal rise and fall of the rivers. This cyclical process is known as the flood pulse (Junk, Bayley, & Sparks, 1989). Locally the flood season is known as the *creciente* (flood) or *invierno* (winter), while the dry season is known as the *vaciente*, *merma* (dry) or *verano* (summer). Because the Amazon is so vast, areas in the region experience the flood differently and at different times of the year, depending on factors such as their location in the eastern or western Amazon, and location on a northern or southern tributary. In the western regions of Ecuador and Peru, where this fieldwork is situated, the flood occurs from roughly February to May. Water levels vary by as much as 10 meters from the low water to the high water season in the Iquitos area (Arce-Nazario, 2011).

Since prehistory, the floodplain has been an attractive site for riverine dwellers (Denevan, 1996). Riverine livelihoods revolve around the flood cycle. “Each year there is a flood, and all life adjusts to it. It comes not as a disaster, but as a season” (Bergman, 1980; 53). Hunting, fishing, and agriculture are timed to the flood cycle. The annual flood renews the nutrients of the lowland

floodplain soil, as opposed to the *terra firme*, or upland soil, which is acidic and dry in comparison (Denevan, 1996; Hiraoka, 1985). The floodplain is used to crop vegetables and legumes, while the upland is planted with carbohydrates like tubers and plantains (Hiraoka, 1985). The high water season facilitates hunting because the range of terrestrial fauna is reduced (Bergman, 1980). Fishing is an important livelihood strategy on the floodplain: during the *creciente*, most of the floodplain is underwater, fish enter the forests to feed and breed; then once the waters recede, fish are more concentrated and easier to catch (Coomes, Takasaki, Abizaid, & Barham, 2010; Hiraoka, 1985). People who live in the floodplain have developed many flood adaptations, such as raising houses on stilts and even relocating entire villages seasonally or permanently as the river channel changes. In some cases, humans have even accelerated or prompted the shift of a river, thus transforming the floodplain (Coomes, Abizaid, & Lapointe, 2009). Some of these rural adaptations, such as stilts and canoes, have been adapted to city life by rural-urban migrants (Mansur, Brondizio, Roy, Soares, & Newton, 2018).

It is important to distinguish between the typical flood cycle and extreme flood events. While the seasonal flood pulse is a regular part of the ecology of the Amazonian floodplain that riverine dwellers are accustomed to, extreme floods can be dangerous and disruptive. Extreme floods – that is, long floods, high floods, early or late floods – can have a range of effects, both positive and negative, on livelihoods, food security and health. High floods can destroy crops and homes and cause a decline in game animal populations, but may favor fish populations (Bodmer et al., 2017; Harris, 1998). Extreme floods can cause health problems such as respiratory illnesses, influenza, vector-borne diseases like zika virus and dengue fever, and diarrheal and gastrointestinal issues, especially in urban areas, where floods can compromise sewage systems (Andrews, 2018; Langill, 2018; Mansur et al., 2018, 2016). Despite these negative impacts of extreme floods, it is important to employ a nuanced understanding of the multitude of ways, both positive and negative, that floods can impact riverine livelihoods. Even extreme floods can have positive impacts (Langill & Abizaid, 2020). For instance, a high flood facilitates boat transit and fish are more plentiful; while a late flood allows more time to harvest crops or prepare the house (Harris, 1998; Langill & Abizaid, 2020).

Throughout the Amazon, climate models project that flood and drought events will increase in frequency and severity (Duffy, Brando, Asner, & Field, 2015; Espinoza, Ronchail, Marengo, & Segura, 2019; Marengo & Espinoza, 2016; Morales et al., 2020; Zulkafli et al., 2016). The

“seesaw” between intense drought and intense flood is becoming increasingly common and is attributed to anthropogenic climate change (Marengo & Espinoza, 2016). The northwestern Amazon is predicted to have a longer wet season and experience more extreme rainfall; while the southern and eastern Amazon is predicted to become drier due to decreased rainfall and a longer dry season (Cook, Zeng, & Yoon, 2012; Duffy et al., 2015; Espinoza et al., 2019). Record-breaking floods occurred in 2005, 2009, and 2012, while 2005 and 2010 saw droughts (Marengo & Espinoza, 2016). Local observations seem to align with climate models: since 2010, there have been several weather events which would have previously been categorized as “once a century” events (Marengo & Espinoza, 2016). Indigenous Shawi communities in the Peruvian Amazon have also observed a change in weather patterns, such as more intense rainfall (Torres-Slimming et al., 2020). In the Amazon delta, farmer-fishers have observed changes to flood patterns, such as increases in the frequency and duration of flooding during the typical low-water season (Vogt et al., 2016).

In urban areas, floods present a unique challenge, especially in informal settlements. Most informal settlements have experienced rapid population growth and have insufficient infrastructure to cope with flooding (Correa, 2011; Pegado et al., 2012). Poor residents often occupy the most marginal, risky land in cities, where they are highly exposed to flooding (Correa, 2011; de Risi et al., 2013). Housing and tenure insecurity may mean that individuals may not invest in safeguarding their homes, or that they may be afraid to leave in the event of a disaster, for fear of losing their homes (Hardoy & Pandiella, 2009). Furthermore, residents in informal settlements are more likely to make a living through informal means, making their livelihoods precarious and making them less likely to be able to bounce back from a disaster (O’Brien et al., 2017).

In rural Amazonia, life on the floodplain is characterized by dynamism, transience, and movement (Alexiades, 2009; Alexiades & Peluso, 2016; Desmaison, Astolfo, et al., 2019). Historically, rural communities have migrated seasonally or relocated in response to a shifting floodplain (Sherman, Ford, Llanos-Cuentas, Valdivia, & Bussalleu, 2015). However, this is at odds with the permanence and static infrastructure of the urban environment (Desmaison, Astolfo, et al., 2019; López, 2006). Although people use flood adaptations that are adapted to this permanent urban environment, they are limited by the infrastructure. There are few, if any, examples of floodplain cities which have developed sufficient infrastructure to support an urban

population and an annual flood. There are no models for water and sanitation systems, nor efficient street design, tailored to flooding areas (Desmaison, Buondonno & Giachetta, 2019).

2.2. Environmental Hazards, Vulnerability, Adaptation and Risk

Vulnerability has many different and at times, contradictory, definitions, originating from distinct fields such as hazards and disaster studies, food security, sustainable livelihoods, and political ecology (Adger, 2006; Cutter, 1996; Miller et al., 2010). Vulnerability definitions and frameworks can be categorized as biophysical, social, or coupled human-environmental systems (Soares, Gagnon, & Doherty, 2012). The biophysical approach, also called the risk/hazard approach, originates from the disasters literature. The focal point of analysis is the risk or hazard, which is identified and quantified, allowing researchers to identify potential consequences and where they might occur (Eakin & Luers, 2006; Soares et al., 2012). The risk-hazard approach is often used to construct vulnerability indices or to map hotspots to focus resources (Cardona, 2004; Smit & Wandel, 2006).

The social vulnerability approach emerged from the political economy and political ecology fields in response to the limitations of the risk-hazard approach; namely, that it does not account for the role of social and political power structures in determining vulnerability (Blaikie, Cannon, Davis, & Wisner, 1994; Eakin & Luers, 2006; Miller et al., 2010; Tschakert, 2012). Social vulnerability is “the characteristics of a person or group in terms of their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard” (Blaikie et al., 1994: 11). In this approach, it is not only the exposure to a hazard that puts people at risk of harm or loss, but a number of social, economic, historical, geographic and political processes (Heijmans, 2001; O’Brien et al., 2017; Soares et al., 2012). Individuals and groups have differential vulnerability based on their identity and position (class, gender, nationality, etc.) within social and economic structures (Eakin, Lemos, & Nelson, 2014; Field et al., 2012; Pelling, 1998; Smit & Wandel, 2006; Tschakert & Tuana, 2013).

Scholars from the social vulnerability tradition have highlighted the social production of hazards and risk. In this view, disasters and environmental hazards are not merely “natural” events, but are socially constructed: they are the product of social, economic and political realities (Blaikie et al., 1994; Cannon, 1994; Cannon & Müller-Mahn, 2010; Cutter, 1996). For example, an

earthquake is a natural event, but the ability of people to survive or rebuild from the earthquake is mediated by factors like class, race, and wealth (Blaikie et al., 1994). Wealthier people are likely to live in better protected homes, away from steep slopes, and have the financial assets to repair and recover their homes and livelihoods – and those people are likely to be wealthy in the first place thanks to histories of class and racial inequalities. Thus, social systems and power structures determine unequal exposure to hazards and unequal ability to recover from their impacts.

The third approach to vulnerability, the integrated or coupled human-environment approach, asserts that previous vulnerability approaches created a false dichotomy between human and natural systems when the two are in fact inseparable (Adger, 2006; Turner, 2010). In this approach, vulnerability is determined by both biophysical conditions as well as social, political and economic ones (O'Brien et al., 2017). Vulnerability is considered a dynamic process – it changes and shifts, spatially and temporally (Blaikie et al., 1994; Kelly & Adger, 2000; O'Brien et al., 2017). In this thesis, I employ a framework of this type from Turner et al (2003). In this framework, vulnerability is a function of exposure, sensitivity, and adaptive capacity or resilience. Exposure is the presence of people, livelihoods, resources or assets that could be adversely affected by events (Lavell et al., 2012). Sensitivity is the human or environmental conditions that make people more likely to be affected by a hazard. Adaptive capacity is the ability of a system to prepare for or respond to stresses; it is sometimes used similarly to other terms such as coping ability or resilience (Smit & Wandel, 2006).

Vulnerability frameworks are widely used in many fields, but scholars have identified a number of critiques and refinements, two of which are particularly relevant to this research. One critique is that the negative framing of vulnerability portrays people as passive victims (Ford et al., 2018; Hewitt, 1998). Some argue that framing vulnerability as an inherent quality of people positions vulnerability as an individual fault, rather than the consequence of social, political, and economic drivers; others argue that framing people or groups as vulnerable ignores their agency, knowledge and capabilities (Arora-Jonsson, 2011; Tschakert, van Oort, St. Clair, & LaMadrid, 2013). A second critique of vulnerability frameworks is that vulnerability is difficult, if not impossible to measure. Assessments can present vulnerability and risk as an objective value which can be quantified, but social scientists and others who approach vulnerability through the social vulnerability lens argue that in fact, risk is subjective. People perceive and respond to risks

in complex ways that are informed by many factors like culture, personal identity, and local knowledge and past experiences of hazards (Bankoff, 2001; Cardona, 2004; Heijmans, 2001). Many scholars argue that the use of assessments to quantify, map or index vulnerability can be technocratic, hegemonic or reductive (Miller et al., 2010; Tschakert, 2012). Vulnerability assessments conducted by outsiders can produce results that are unrecognizable to those in the community. There is often a difference between the way that communities or individuals perceive and experience their own vulnerability, and the way that the state or practitioners see it (Heijmans, 2001). As Chambers (1989: 1) puts it, vulnerability and security are ‘our’ concepts (from practitioners, outsiders and scholars) and are not necessarily ‘theirs’ (from locals).

2.3. Urban Livelihoods, Assets and Poverty

The livelihoods framework has been important in development studies, rural development, and for practitioners in poverty reduction for decades (Scoones, 2009). Livelihoods are comprised of the “capabilities, assets (stores, resources, claims and access) and activities required for a means of living” (Chambers & Conway, 1991: 6). The concept of livelihoods reflects the recognition that households, especially poor ones, rarely employ just one just activity or business to make ends meet (DFID, 1999; Ellis, 1998). In order to make their living, households employ a portfolio of assets, which may be tangible (natural, physical, and financial capital) or intangible (such as social and human capital) (Chambers & Conway, 1991). Understanding how households employ different livelihood strategies and asset portfolios can help shed light on how they cope with shocks and stresses, such as financial or environmental. The diagram in Figure 2.1 shows the main components of the livelihoods framework.

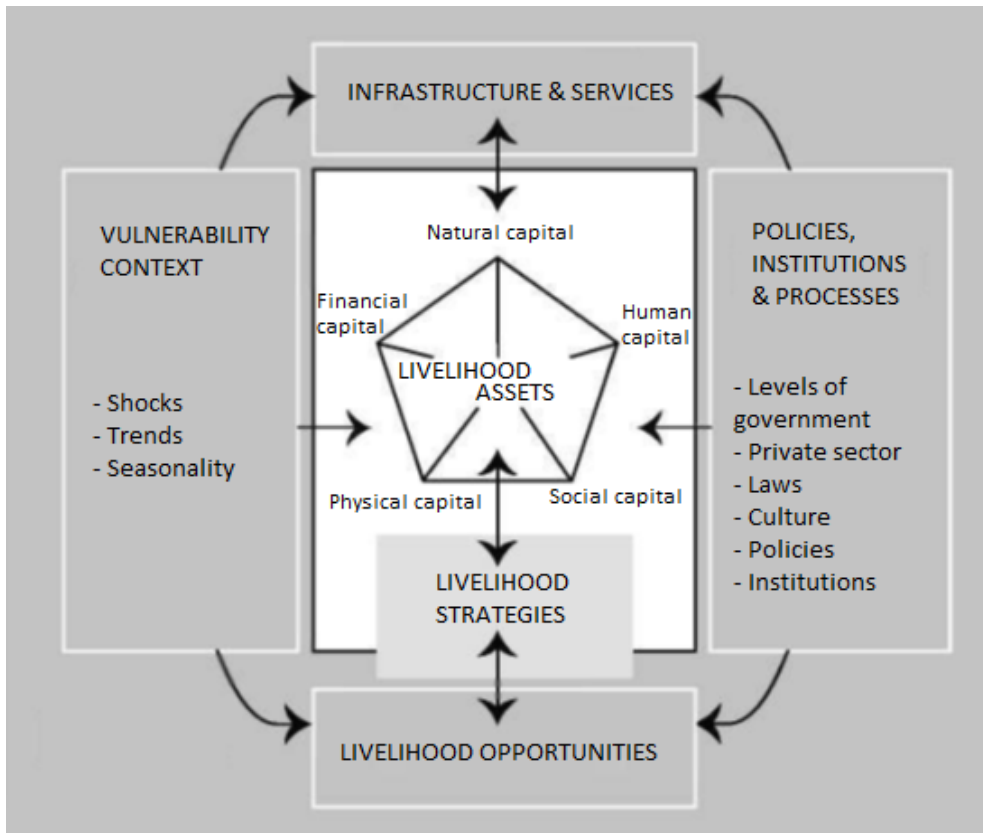


Figure 2.1: Livelihoods framework. Modified from DFID (1999).

Assets (or capitals) are at the heart of the livelihoods framework. Assets are not only the resources that a person may have or lack; they also give meaning to a person's world and reflect the way a person seeks meaning – which in turn influences their livelihood decisions (Bebbington, 1999). Analyzing asset portfolios can shed light on the ways people perceive and address their own poverty and well-being (Bebbington, 1999). The asset approach stands in contrast to a deprivation approach to poverty and is seen as a way to focus on what the poor have, rather than what they lack (Moser, 1998; Rakodi & Lloyd-Jones, 2002).

In the livelihoods framework, vulnerability refers to individuals, households or communities' insecurity in the face of shocks, changes or risks, physical exposure and socioeconomic precarity (Cardona, 2004; Moser, 1996; Wratten, 1995). Shocks, changes, and risks can be ecological, economic, social, or political, and they can be sudden events, long-term trends, or seasonal cycles. As Moser points out, assets provide the capacity to respond to shocks and stressors.

“Analyzing vulnerability involves identifying not only the threat, but also the “resilience” in exploiting opportunities and in resisting or recovering from the negative effects of the changing environment. The means of resistance are the assets that individuals, households, or communities can mobilize in the face of hardship.

Thus vulnerability is closely linked to asset ownership. The more assets people have, the less vulnerable they are. And the greater the erosion of their assets, the greater their insecurity” (Moser, 1996: 2).

Vulnerability is often used as a synonym for poverty, but researchers distinguish the two (Chambers, 1989; Moser, 1998). Distinguishing between poverty and vulnerability can help to make sense of people’s choices. For instance, borrowing money reduces poverty, but debt contributes to vulnerability (Chambers, 1989).

Poverty and vulnerability to environmental hazards are linked (Kasperson et al., 2005; Satterthwaite, 2003). In urban areas, poor people often occupy the most marginal land, where they are most exposed to environmental hazards and disproportionality bear the negative externalities of pollution and production (Hardoy & Pandiella, 2009; Satterthwaite, 2003; Wratten, 1995). Reducing the impacts of natural disasters is closely linked to reducing poverty and economic vulnerability (Moser & Satterthwaite, 2008). For example, McCubbin, Smit and Pearce (2015: 47), in a study from Tuvalu, write that climate change is one of a “constellation of forces” affecting vulnerability, some of which are directly climate-related (such as rising sea levels), and others are socioeconomic factors that are intertwined with climatic factors. Reducing vulnerability to environmental hazards requires directly mitigating the hazard, such as by building sea walls, and working to increase resilience more broadly by strengthening people’s basic livelihoods (sometimes referred to as ‘mainstreaming’ climate adaptation) (Heltberg, Siegel, & Jorgensen, 2009; Huq et al., 2004).

The livelihoods framework helps provide a deeper understanding of the meaning of poverty than merely a measure of a household’s income in relation to the poverty line. As Rakodi (2002: 6) puts it, “poverty is characterized not only by a lack of assets and inability to accumulate a portfolio of them, but also by lack of choice with respect to alternative coping strategies. The poorest and most vulnerable households are forced to adopt strategies which enable them to survive but not to improve their welfare.” Put another way, poverty can be understood not only by a dollar amount or by the assets a household has access to, but by the household’s (in)ability to make investments in their future wellbeing (Reardon & Vosti, 1995). Poverty is dynamic: as households move into and out of poverty, an asset-based analysis may be able to better reflect a household’s shifting wealth than a simple measure of income (Lipton & Maxwell, 1992; Moser, 1996; Rakodi, 1999). In practical terms, an asset portfolio may be more representative of a

household's poverty or security than income, especially in contexts where income is seasonal or informal, or where barter is common.

The livelihoods framework was originally developed in the context of rural and peasant livelihoods, but scholars have shown its utility in urban contexts and have adapted some aspects to better reflect the way that people live in cities (Meikle, Ramasut, & Walker, 2001; Moser, 1998; Rakodi, 1999). Some assets are more important in urban areas, while other assets may figure less prominently in an urban household portfolio; for instance, often urban livelihoods are less reliant on natural capital than rural households are (DFID, 1999). Poverty also looks different in urban areas than it does in rural ones. Avoiding poverty in a city requires a much higher income than in a rural setting, since life in a city requires cash for expenses like public transit, childcare, food, and housing (Meikle, 2002; Meikle et al., 2001).

It is important to caveat here that the dichotomy between rural and urban may be somewhat of a false one, since the two are often deeply interconnected through migrants, remittances, and commodities (DFID, 1999; Wratten, 1995). Further, many smaller cities, towns and peri-urban areas are not easily categorized as rural or urban (Padoch, Steward, Pinedo-Vasquez, Putzel, & Ruiz, 2014; Wratten, 1995). In the Amazon, and in Iquitos, the distinction between rural and urban is even more blurred than in other cities, creating a unique rural-urban interface (Browder, 2003; Godfrey & Browder, 1996). Urban households in Iquitos may depend more on traditionally 'rural' livelihood strategies such as agriculture or fishing than urban dwellers in other places do, and they may be multi-sited or employ rural-urban circular or seasonal migration as part of their livelihood strategies (Alexiades & Peluso, 2016; Gregory & Coomes, 2019; Padoch et al., 2008, 2014; Pinedo-Vasquez & Padoch, 2009).

One asset, housing, is particularly important to discuss in the context of urban livelihoods. In rural areas, land is often regarded as the most important household asset, while housing is perhaps the most important asset for urban poor (Moser, 1998; Payne, 2002). Housing is a basic need which provides shelter and physical wellbeing and protects households from the most extreme poverty (Moser, 1998). The house is also a productive asset that provides space for income-generating activities, such as food preparation, laundering, building projects or renting (Moser, 2009). The location of housing can confer access to services and livelihood opportunities (Payne, 2002). Housing also reduces vulnerability not just for the homeowners: it

may serve as a respite for extended family members facing crisis, or a space for young families with little capital as they make their own income and start their own family (Moser, 2009).

In cities in the Global South, where urbanization has been rapid, and land is scarce and costly, large numbers of people live in informal communities (Hardoy & Satterthwaite, 1989; Hardoy & Pandiella, 2009). Part of the way that informal communities become formal is through land titling. Housing title has been shown to improve a number of socioeconomic outcomes for households and communities (DFID, 1999). At the community level, titling can give communities leverage to advocate for public services. At the household level, a title can increase property values, improve access to credit, and smooth over legal processes, such as allowing a family member to pass on their home to another family member after death (Kerekes & Williamson, 2010). Title may make households more likely to invest in and improve their home, as they feel less vulnerable to being evicted (Moser, 1998). This phenomenon also works in the reverse: people in informal settlements often invest in their homes as a way to prove their residence.

2.4. Resettlement

In this section, I discuss resettlement and situate the Nuevo Belén project in a broader context of other similar projects. Planned resettlement is not a new concept, but across the world, it is increasingly being implemented and considered as a climate adaptation policy. In 1990, the Intergovernmental Panel on Climate Change (IPCC) first outlined three broad adaptation approaches for coastal communities: protect, accommodate, and retreat (Dronkers et al., 1990). Today, a number of countries and local governments worldwide include retreat or resettlement as part of climate adaptation plans (McDowell, 2013). The Nuevo Belén project is one of many such projects that have already been implemented. Resettlement projects exist in Peru and even in the Iquitos area (Bergmann, 2021; MVCS, 2015); elsewhere in Latin America, such as in Guatemala, Argentina and Colombia (Correa, 2011; Oliver-Smith & Arenas, 2015; Staupe-Delgado, 2020); in North America (Cernea & Maldonado, 2018); in Europe (Seebauer & Winkler, 2020); in Asia (Danh & Mushtaq, 2011; Lindegaard, 2019; Xue, Wang, & Xue, 2013); and in Africa (Arnall, 2014; Nikuze, Sliuzas, Flacke, & Maarseveen, 2019).

It is important to clarify the difference between resettlement and displacement, and between different types of resettlements. Displacement and resettlement can be caused by a number of

factors, such as conflict, natural disasters, or development. Resettlement and displacement are terms that are often used interchangeably but are in fact distinct. As opposed to voluntary or economic migration, displacement is involuntary, and often involves coercion or a lack of options (Muggah, 2003). The key distinction in resettlement is that it involves movement of a particular, selected population through planning and control (Chambers, 1969; Muggah, 2003). Resettlement projects can be further categorized into different types. Preventive resettlement is undertaken in anticipation of a disaster or hazard, or when it is impossible to mitigate the risk (Correa, 2011); while post-disaster resettlement occurs after a disaster has already happened. Development-Induced Displacement and Resettlement (often referred to as DIDR) refers to forced resettlement due to large-scale infrastructure projects, such as dams, urbanization or mining (Terminski, 2013). Increasingly, climate-induced migration, resettlement and/or displacement is used to categorize movement forced by environmental change and degradation (Warner, 2010).

Another important distinction is between voluntary and involuntary resettlement. Most scholars and practitioners agree that voluntary resettlement is more likely to have positive outcomes for residents, because the benefits are often better defined in order to incentivize relocation, the process is usually more transparent, and is predicated on residents' right to choose (Arnall, 2019; Eriksen, 1999). However, many scholars also acknowledge that most relocations are not purely voluntary or involuntary (Guggenheim, 1998; Muggah, 2003; Warner, Hamza, Oliver-Smith, Renaud, & Julca, 2009; Wilmsen & Wang, 2015). Even in a voluntary resettlement, there may be pressure or coercion from the state, administrators or even other residents; similarly, involuntary resettlements are not necessarily always coercive (Wilmsen & Webber, 2015; Xue et al., 2013).

Defining what constitutes a "successful" or "failed" resettlement project is another key distinction. A measurable definition of a "failed" resettlement is the retention rate of resettled people, but many scholars define success in resettlement by the outcome on the wellbeing of relocated people, which is more difficult to measure (Cernea, 1997). Success can mean raising living standards and improving livelihoods (or at least restoring them to pre-resettlement standards) (Arnall, 2019; Correa, 2011; De Sherbinin et al., 2011). Others add that success can also be found in the process of resettlement: if residents are involved and engaged throughout the project's planning, resettlement is more likely to address their needs and be successful as residents would define it (Correa, 2011; Wilmsen & Wang, 2015). Failure in resettlement

projects has been well-documented (Oliver-Smith, 1991). Poorly executed resettlement projects can leave vulnerable populations isolated and impoverished; or residents may abandon the project altogether (Arnall, 2019; Cernea, 1997). Resettlement can disrupt the livelihoods of relocated households as well as those who stay behind, through the loss of social connections or economic opportunities (Tadgell et al., 2018). In other cases, the failure of a resettlement project is not due to poor planning or execution but perhaps something more nefarious. At worst, these projects can be merely a means for vote-seeking and political posturing; building a new city for the poor may be a glamorous project for a politician to put their name on, as some participants in this study speculated about Nuevo Belén.

Many scholars have identified livelihood security as an essential factor in ensuring an equitable resettlement that improves residents' wellbeing (Ferris, 2015; Piggott-McKellar, Pearson, McNamara, & Nunn, 2020; Tadgell et al., 2018; Warner et al., 2009). Relocation often disrupts income, and re-establishing or helping develop new livelihood strategies is critical to long-term success of a relocation (Tadgell et al., 2018). Some argue that relocation can be a chance to encourage a transition to more sustainable livelihoods; or can provide new opportunities which were not present at the old location (de Wet, 2001). Some maintain that resettlement can be an opportunity to implement developmental projects such as improving infrastructure, access to public services, or the quality of housing, and ultimately can leave residents better off than before (Cernea, 1997; Correa, 2011; de Wet, 2001). However, it is also important that resettled individuals have *access* to these new opportunities and assets: people are no better off having services such as transportation, electricity and medical care if they cannot afford them or get to them (Piggott-McKellar et al., 2020).

Despite the controversy around and the limited success of resettlement programs to date, scholars anticipate that resettlement will play a role in future climate adaptation plans (De Sherbinin et al., 2011; Ferris, 2015; Gromilova, 2014; Wilmsen & Webber, 2015). It is expected that in order to withstand the effects of climate change, resettlement will be the only option for some high-risk areas (Desmaison et al., 2019; Gromilova, 2014). Therefore, there is a critical need to understand if and how resettlement can improve people's lives, and should be grounded in the lived experiences of the people being relocated (Cernea, 1997; Wilmsen & Webber, 2015). Many scholars have synthesized past resettlement projects in search of best practices (Arnall, 2019; De Sherbinin et al., 2011; Oliver-Smith, 1991; Tadgell et al., 2018). I draw on Arnall (2019), who

identifies three broad principles from development-induced resettlements that should guide future climate change-induced resettlements. First, resettlement should be a last resort that is only utilized when all other adaptation options have been exhausted (Barnett & O'Neill, 2011; Tadgell et al., 2018). Second, resettlement must be voluntary; and third, resettlement should be developmental – that is, it should improve or at least maintain people's wellbeing. My research aims to evaluate the Nuevo Belén project on the third principle: does it improve or maintain people's wellbeing?

In this literature review, I have situated my research within existing scholarship on environmental hazards, vulnerability, livelihoods, and resettlement. I have contextualized this study in other regional research on the Amazon floodplain, which provides an important understanding of the risks and opportunities of living with floods. I have outlined different vulnerability definitions and frameworks, which will help to illustrate how the state views flood risk residents, how residents of Bajo Belén perceive their own vulnerability, and how the relocation may or may not reduce vulnerability. I have detailed how scholarship on livelihoods provides a framework to better understand how people make a living, respond to shocks and stressors, and what they find meaningful about their lives. Finally, I have positioned this research as a contribution to the need for further research on resettlement, and as an evaluation of whether the Nuevo Belén project improves residents' wellbeing.

Chapter 3

Methods and Research Approach

In Chapter 2, I situated my research within existing literature on environmental hazards, vulnerability, urban livelihoods, and resettlement. In this chapter, I first describe how my research will specifically incorporate frameworks and concepts from the literature I described. I then describe my study site – Iquitos, Bajo Belén and Nuevo Belén – before turning to my methods. I detail the process of my fieldwork and post-fieldwork data processing and analysis. Finally, I discuss my own positionality as a researcher and how it may have influenced the data I collected, the interactions I had with participants, and how I interpreted my results.

3.1. Research Approach

In this thesis, I use a vulnerability framework outlined by Turner et al. 2003, which positions vulnerability as a function of exposure, sensitivity and adaptive capacity. While this framework is situated in the coupled human-environment systems approach, I also draw heavily from the social vulnerability perspective, particularly with regard to differential vulnerability to hazards and the social production of risk. In this thesis, I aim to avoid the two critiques of vulnerability mentioned in Chapter 2.2. The first is that top-down vulnerability assessments can be misleading, technocratic, and at odds with local people's perspectives. Therefore, although I do aim to investigate differences in vulnerability between Bajo Belén and Nuevo Belén, I do not attempt to index, measure, or quantify overall vulnerability. I also attempt to avoid another critique of vulnerability, which is making people out to be powerless or victims of a hazard. Instead, I emphasize people's capabilities, power, and agency in making their own choices. For this reason, I did not use the term "vulnerability" in my household surveys or when speaking to participants.

The livelihoods framework is also an essential framework for this thesis. By using a livelihoods framework, I aim to better understand the capitals and assets that people employ to make a living, how they respond to shocks and stresses, and their own understanding of their wellbeing and (in)security. The livelihoods framework also offers a valuable understanding of vulnerability, as understood by the assets and capitals a household has access to, which complements the definition from the hazards and climate change scholarship. The findings I present on Bajo Belén illustrate that this research may serve as a case study on urban livelihoods and vulnerability to environmental hazards.

I also position this research as a contribution to the need for further research on resettlement, and my focus on livelihoods in particular is a response to the recognized importance of livelihood security in a successful resettlement. I position this research as a case study that may inform other resettlement projects and is grounded in the perspectives of the people who are directly affected.

3.2. Study Site Context

Iquitos is the largest city in the Peruvian Amazon; its population was 470,000 in 2019 (INEI, 2020). Framed by the Itaya, Nanay and Amazon rivers, it is the most important port city in the region which links rural Amazonia to national and international markets. The land that is now Iquitos was inhabited and known by Indigenous Peoples, like the Yagua, Iquitos, and Kichwa, for thousands of years. Iquitos was settled permanently in its current location by Jesuits in the mid-18th century and remained a small settlement (a mix of European colonists and missionaries, and Indigenous people from distinct groups) for more than a century (Sotelo, 2018). This changed in the 1860s, when the Peruvian federal government constructed a naval base at Iquitos, in an effort to strengthen its presence in the region (Santos-Granero & Barclay, 2000). Iquitos quickly emerged as an important port for regional exports and became the capital of the department of Loreto in 1897 (Sotelo, 2018).

Iquitos's rapid urban growth was also driven by the extraction of rubber, which was a critical export for the region from 1870 until its collapse in 1914 (Santos-Granero & Barclay, 2000). The rubber industry attracted an influx of migrants, such as men from Andean highland towns and single, young European men, all hoping to make their fortune in rubber (Coomes, 1995; Sotelo, 2018). Men claimed tracts of land for their rubber estates, and soon, a few of the largest estates dominated rubber exports: at the peak of the boom, two dozen estates exported 80 percent of rubber from the Peruvian Amazon (Coomes, 1995). The men who controlled these large estates were known as the river's rubber bosses, or *patróns*. Colonial plazas and European-style buildings quickly sprung up in Iquitos; yet at the same time, an Indigenous population persisted, although they were often relegated to the margins of the growing city.

After the rubber collapse, Iquitos maintained its importance as a port city which connects rural areas to international markets for extractive goods like timber and petroleum (Barham & Coomes, 1994). Today, Iquitos is still relatively isolated for its size: there is no road access to the

rest of the country, only a highway to Nauta, a smaller city to the southwest along the Marañón River (Mäki, Kalliola, & Vuorinen, 2001). Rivers, rather than roads, are the “highways” from smaller villages into Iquitos. By air, Iquitos is served by a small two-gate airport with regular flights to and from Lima, Tarapoto and Pucallpa, and seasonally to Cusco. The city is also becoming somewhat of a tourist hub: Iquitos is the starting point for international backpackers in search of jungle tours or an ayahuasca session with a shaman.

The district of Belén is one of the four districts that make up Iquitos.¹ The *zona baja*, or the ‘lower zone,’ is not a defined administrative boundary, but refers to floodplain area of the district, while “Belén” usually refers to the district. The *zona baja* is located at the shores of the Itaya river, about a kilometer from the downtown central square (Figure 3.1). There is no precise date of the origin of the communities of the *zona baja*; likely, the floating communities have existed as long as Iquitos, but have moved as the courses of the rivers shift over time. Aerial imagery from the 1940s shows evidence of established houses in the *zona baja*. Beginning in the 1960s, Iquitos’ population exploded, due to an influx of migrants from rural areas (Coomes, 1995). These migrants primarily settled in slums, of which Belén was the largest. In 1964, it was estimated that 43% of the inhabitants of Belén were rural migrants (Santos-Granero & Barclay, 2000). As more migrants sought land in the city, conflict increased between slum-dwellers, governments, and private landowners. In response, slum-dwellers associations emerged and mobilized to advocate for the needs of residents. This strong history of community organizing is visible today in Belén’s well-organized neighborhood committees (Santos-Granero & Barclay, 2000).

¹ Peru’s administrative boundaries are subdivided into departments; then provinces; and then districts. Iquitos is in the department of Loreto and the province of Maynas. It is made up of three districts: Belén, Punchana, and San Juan Bautista.

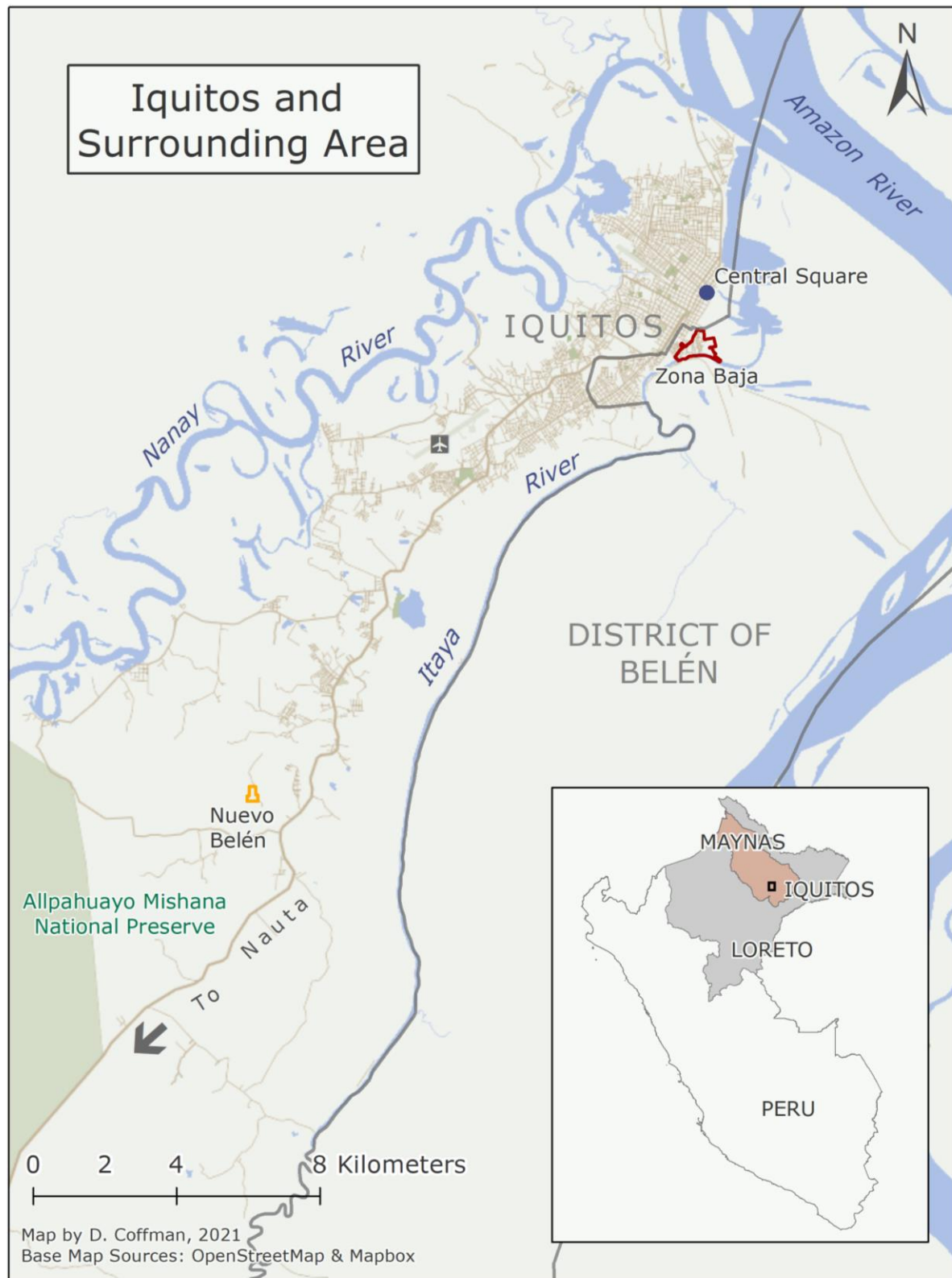


Figure 3.1: Iquitos and surrounding area.

As the largest market in the Peruvian Amazon, the Belén market is an important part of the economy of the district, Iquitos, and the region. The market sprawls across several blocks, just

upriver from the floodplain of the Itaya. The streets are lined with vendors selling local produce, fish, game meat, liquors, medicinal plants, housing materials like roofing thatch, or manufactured goods like electronics, clothing, toys, and household items. As boats arrive in the Itaya port, longshoremen begin hauling goods like yuca, plantains and bananas into the market while middlemen haggle over prices. The market officially opens at 3:00 AM and is a hubbub of activity until mid-morning.



Figure 3.2: Turtle meat and eggs for sale at the Belén market.

The Belén market connects rural smallholders from the Amazon and its surrounding tributaries to urban markets (Doiron, 2013). The market also offers urban dwellers access to harder-to-find items from rural areas, such as the turtle meat and eggs shown in Figure 3.2, or medicinal plants. Increasingly, the market has become somewhat of a tourist destination for those seeking a glimpse at unfamiliar foods from the jungle. The Belén market is also the primary shopping destination for most individuals and businesses in Iquitos. Iquitos has few grocery stores, so most people either shop directly at the Belén market, or at smaller shops that re-sell products

purchased at the Belén market (Doiron, 2013). The market is also an important site of social exchange: people gather and linger in the market to chat, network and organize with neighbors. The market is also a significant, if not the primary, source of employment for people in the Belén district. The most recent census found that 7,550 people, or 31% of census participants in the district of Belén, were primarily employed as market vendors (INEI, 2017). Additionally, 2,018 people (8% of those surveyed) reported agriculture, forestry, or fishery as their primary employment, meaning that their livelihoods are likely closely linked to the market as well.



Figure 3.3: Houses, canoes, and stairs going up to the Belén market in the *zona baja*.

Based on recent estimates, about 71,000 people live in the district of Belén; an estimated 15,000 people live in the *zona baja* (INEI, 2020; MVCS, 2015). The *zona baja* is made up of 8 sectors, called *asentamientos*, “settlements,” or *pueblos jóvenes*, “young towns.” The *zona baja* is home to two health clinics and a number of public primary and secondary schools. Belén is considered one of the poorest areas of the country: the district reports a poverty rate of 38%, and an extreme poverty rate of 14% (MVCS, 2015). The federal Ministry of Housing, Construction and Sanitation (Spanish acronym MVCS) reports that Belén ranks poorly on many socioeconomic

indicators: chronic malnutrition of children (30%); high rates of teen pregnancy (3 out of every 10 births); and 61% of houses lack potable water and sanitation services, causing health issues like diarrhea (MVCS, 2015). As Figure 3.3 shows, houses are typically made of wood and built on stilts to accommodate the flood. A typical home houses 5-7 people, which the MVCS considers overcrowding. Fires can be devastating, as most of the houses are constructed using wood, and the flood waters and lack of paved roads impedes access by firetrucks. Although the *zona baja* is often portrayed by media and governments as a site of poverty and state neglect, residents mobilize collectively to improve their living conditions and invest in their community. Each sector has an elected leader and holds community assemblies, which are an important forum for local governance. Residents often participate in community labor exchange parties, called *mingas*. The *minga* has its origins in rural communities, where villagers work together on agricultural tasks (De Jong, 1987). In Belén, it has been adapted to the urban setting. Neighbors work together to construct footbridges for the flood season, collect trash or tidy the sports field, and the *minga* ends with a communal meal and party. A number of NGOs work in the area, including one which has put on a yearly “Belén festival” for more than a decade. Many households are very established in the area: some participants surveyed for this thesis reported having lived in the *zona baja* for up to 40 years.

3.2.1. Nuevo Belén

When connecting Belén’s history to the current relocation, it is notable that the Nuevo Belén project is not the first attempt to remove residents from Belén. As early as 1955, Peruvian President Manuel Odria – who ruled as a military dictator from 1948 to 1956 – commissioned a panel of specialists to investigate relocating Belén, after receiving a report of fires, poor sanitation and overcrowding (Candela, Contreras, & Lossio, 2017; Kawa et al., 2018). Ultimately, however, that effort went no further than the commission’s investigation.

In 2012, the Peruvian Amazon experienced extreme flooding, characterized by both high waters and an early flood (Espinoza et al., 2013; Marengo & Espinoza, 2016). The province declared a state of emergency, areas of Iquitos that are usually unaffected by the annual flood were inundated, health centers across the province were overwhelmed or damaged, and countless residents across the *zona baja* were homeless as their houses were submerged (Rodrich, 2012).

The 2012 events made national headlines and prompted renewed federal attention on floods, and on the *zona baja*.

Before announcing the Nuevo Belén relocation in late 2014, the state made efforts to improve conditions in the *zona baja* through a program called Belén Sostenible (Sustainable Belén). This in-situ project aimed to improve existing infrastructure in Bajo Belén by increasing access to basic services, constructing adaptable housing units, and upgrading the walkways to improve safety and accessibility (Desmaison et al., 2019). Residents were required to apply for a grant through the MVCS for 21,000 S/ (US \$6,500) – a grant which residents would not be required to repay. Families were required to contribute a one-time payment of 740 S/, about US \$230 (Redacción Gestión, 2013). Belén Sostenible was quietly sidelined in 2013. The MVCS cited a number of technical and social problems with the execution of the project. One such problem cited is the soil in the *zona baja*, which is unstable and has limited load-bearing capacity, further compounded by the accumulation of solid waste (MVCS, 2015). Additionally, there is a limited period for construction, due to the flood and the necessary waiting period for the soil to dry and settle (Desmaison et al., 2019). Further, many families were unwilling or unable to apply for the grant and contribute the initial payment.

Two important shifts in Peruvian federal policy helped set the stage for the relocation. The first key shift was in disaster risk management. In 2011, Peru established its National Disaster Risk Management System (Spanish acronym SINAGERD), which governs national efforts to prepare for and respond to disaster risks. SINAGERD coordinates the national Disaster Risk Management policy (DRM) among national, regional, and local governments. The establishment of SINAGERD and the DRM marked a key change in the approach to disaster management in Peru, through an effort to decentralize disaster management and to focus on resilience and prevention rather than response (OECD, 2020). Decentralization is still incomplete, and many local governments have not yet incorporated DRM into their plans and budgets (ibid). At the federal level, however, the new focus on prevention is evident in a number of programs and laws. One such federal law, passed in 2012, declared it a public necessity in the national interest to relocate populations located in zones of very high risk that cannot be mitigated (Ley N° 29869, 2012).

The second significant policy change was a push for sustainable urban development. In 2012, the Programa Nuestras Ciudades, or “Our Cities Program” (Spanish acronym PNC) was created under the jurisdiction of the MVCS (Decreto Supremo N° 005-2012-Vivienda, 2012). In the justification for the creation of the PNC, the decree states that most cities in Peru are difficult to live in, and that the actions of public and private actors are disjointed and uncoordinated – in other words, that the cities are unplanned, inefficient, and informal. The goals of the program are to promote sustainable urban development, highlighting environmental sustainability, cultural identity, equity, and governance, among other goals. Critically, the creation of the PNC also includes “the promotion of the resettlement of existing cities and/or the foundation of new cities” (Decreto Supremo N° 005-2012-Vivienda, 2012: 2). The combination of the PNC and the DRM set up resettlement as a policy that could accomplish both disaster prevention and urban resilience and modernization. Some experts estimate that there are as many as 15 relocation projects underway across Peru, some of which take the form of planned “new cities” (Bergmann, 2021; Castillo García, 2019; Lavell, Mansilla, Chavez, Cardona, & Perez, 2015).

In December 2014, Congress announced the Nuevo Belén relocation under Law 30291, which declared a state of emergency and a public necessity to relocate residents of the *zona baja* (Ley N° 30291, 2014). The justification cited in the law is the constant flooding from the Itaya river, which renders the *zona baja* “uninhabitable” and poses an “imminent risk to the health and life of the population” (Ley N° 30291, 2014: 1). Following the relocation announcement, the state employed additional reports and studies to justify the decision. One is a technical report by the Peruvian Navy, which predicts that the Amazon River will change its course. The report states that the current location of the *zona baja* was underwater in the Amazon’s main channel as recently as 1948, and the study predicts that within the next 50 years, the Amazon could return to its previous course, merging with the Itaya and flooding Bajo Belén (Servicio de Hidrografía y Navegación de la Amazonía, 2015). As a result, the technical report recommended no further investment in public works in Bajo Belén, and recommended relocation of its residents to higher ground. A feasibility study released in the same year compared the *zona baja*’s vulnerability and positively evaluated the new site, further solidifying the state’s decision (MVCS, 2015).

The site selected for relocation is approximately 15 km west of Iquitos, along the Iquitos-Nauta highway (Figure 3.1). Nuevo Belén is situated about a kilometer from the highway, off an unpaved dirt road. Officially dubbed “Nuevo Belén” (“New Belén” in Spanish), locals often

refer to it as Varillalito, which was the existing name for the area. The new site is situated on sandy, flat terrain (Figure 3.4, Figure 3.5), located on the upland and thus does not flood (the nearest river is the Nanay River, 4.5 km away from the site). The site is located within the “buffer zone” of the Allpahuayo-Mishana National Reserve. In Peru, many conservation areas have “buffer zones,” which are areas adjacent to the protected area which have a semi-protected status, limiting the permissible activities and land uses in the zone (Solano, 2010). According to the MVCS’s feasibility study before the construction of homes, the placement of the settlement in the buffer zone is legally acceptable, and compatible with the “natural condition” of the reserve (MVCS, 2015).



Figure 3.4: Aerial view of houses in Nuevo Belén. Source: MVCS, 2018.

The designs for Nuevo Belén include schools (primary and secondary), a health center, market, park, sports fields, basketball court, playground, plaza, community center, and regular buses to Iquitos. The total projected cost of the entire Nuevo Belén project is S/ 182,037,818, or \$51,343,340 USD (MVCS, 2015). The majority of these costs come from creating the necessary infrastructure for potable water and sanitation and paving a road out to the main highway. Each household will receive a 40 m² house, made of cement and a tin roof, on a 120 m² lot, equipped with electricity, running water and sanitation. Families must exchange the title (or other documentation) to their home in Bajo Belén in order to receive a house in Nuevo Belén. Upon

leaving Bajo Belén and relocating, the MVCS takes control of the land, and the house is either demolished or taken apart for materials. For the most part, the MVCS control of the land seems to be respected in Bajo Belén: vacant lots were not being settled by new residents. All 8 sectors of the *zona baja* are included in the resettlement. No particular sector appears to be a high priority to be the first to relocate: participants I surveyed in Nuevo Belén reported coming from all sectors of Bajo Belén.



Figure 3.5: Houses and a soccer pitch in Nuevo Belén.

Since its announcement, the relocation has been controversial. Residents of Bajo Belén assert that they were not consulted about the project prior to its announcement. Most participants in this study reported that they learned about it from their community leaders, after the law authorizing the relocation had already been passed. They had no opportunity to weigh in on the site selection, the houses, or the design of the new settlement. Residents were concerned about their livelihoods, which often center around the port and the market in Belén, and how they would make a living in Nuevo Belén, which is effectively a rural suburb of Iquitos (Kawa et al.,

2018). Although the relocation is voluntary, residents were concerned that they would eventually be forced out by the state cutting off services and investment in Bajo Belén (Desmaison et al., 2019). Many residents remained skeptical about the true motives for relocation: some had heard that they were being relocated so that the *zona baja* could be drilled for oil or repurpose the land for a tourist attraction (Kawa et al., 2018). While there is no evidence that the *zona baja* will be drilled for oil, there is some truth to the claim of repurposing the land for tourism. In February 2017, the province of Maynas released a feasibility study in which they detail plans to use the land in the *zona baja* for a touristic pedestrian waterfront, complete with gardens, a skate park, an amphitheatre, and dining patios (Municipalidad de Maynas, 2017). In the list of stakeholders for the project, the study notes the current inhabitants of the area live in inadequate conditions and will be relocated. The study details a timeline for the construction to be completed in 2018, but at the time of this fieldwork in 2019, there were no signs that the project was progressing.

Residents were also skeptical that the state would follow through on the promised services; indeed, there is a history of state failures in resettlement projects in the area. In their feasibility study for the relocation, the MVCS lists three other existing resettlement projects near Nuevo Belén: Nuevo Calipso, created in 2012 to house inhabitants of flood-prone areas; Los Delfines, created in 2006 for similar reasons; and El Varillal, created in 1990 (MVCS, 2015). At the time of the study in 2015, none of these settlements had potable water or sewage.



Figure 3.6: A *colectivo* leaving Nuevo Belén.

In December 2016, and continuing into 2017, residents began to move into the first 150 houses in Nuevo Belén. Following the construction of an additional 200 houses, a second wave of families moved in in late 2018 through early 2019. At the time of the fieldwork for this thesis (June – August 2019) about 400 houses had been constructed. Small buses, or *colectivos*, like the one shown in Figure 3.6, ran multiple times a day between Nuevo Belén and Iquitos, making a stop near the Belén market (about an hour-long trip one-way from Nuevo Belén). Most of the public services originally envisioned had not yet materialized: there is no market or health center; and the road into Nuevo Belén remained unpaved. A community center and a sports area with a basketball court has been built, and students can attend primary and secondary school, housed in temporary portable classrooms until the school is built.

3.3. Methods

In this section, I describe the methods I employed to answer my research questions. My research questions both address how relocation may change people's lives, specifically their livelihoods and flood vulnerability, so it was important to hear from both these populations to make comparisons between the two. I conducted equal numbers of household surveys in Belén and Nuevo Belén. Household surveys are an important tool in a livelihoods methodology: they allow the researcher to see into many aspects of the day-to-day lives of participants and gain valuable information on livelihood strategies, housing, demographic information and assets (DFID, 1999). Household surveys provided breadth in my study which will allow me to make comparisons through sampling households across both sites. Key informant interviews also allowed me to achieve depth in particular topics, gain access to a specific perspective, and inform my household surveys. Finally, although my research is not explicitly ethnographic in nature, I incorporated elements of ethnographic research in my methods like participant observation.

3.3.1. Fieldwork

I conducted fieldwork in Iquitos from mid-June to late August 2019. Upon arriving in Iquitos, I hired a local field assistant to assist with interviews, cultural brokering, and to help me understand the local context. I was connected with her through another graduate student who had previously worked in the area. Although she was already experienced in conducting household surveys, I also provided training on the ethics procedures, confidentiality, privacy, and the research objectives of the study.

During my first weeks in Iquitos, I made reconnaissance trips to Bajo Belén and Nuevo Belén to acquaint myself with the context at both sites. I stayed in Iquitos, near the main plaza, which is a short walk or *motokar* ride from Belén and took the *colectivo* on day trips to do surveys in Nuevo Belén. On an early trip to Bajo Belén, my assistant and I reached out to multiple community leaders to gauge interest in my study. I chose Sachachorro and 10 de Octubre as my first two study sectors because their respective community leaders were very receptive to me conducting research in their communities and because the sectors were generally regarded as safer than some other sectors. With their consent, we attended a community meeting in Belén where I introduced myself and my research assistant, the objectives of my research, and the proposed activities. This ensured that community members would recognize me while I was in their community

conducting surveys in the subsequent weeks; to answer questions or address concerns that community members might have; and most importantly, to seek consent from the community as a whole. It was also important to use these meetings to clarify my role in the community. Approaching people by going door-to-door is something that local government representatives or NGOs may also do, and it was important to clarify to the community that I was not part of these groups.

Before beginning the household surveys, I began seeking out key informant interviews. These interviews provided context for my survey results, helped shape the questions that I asked on the survey and provided unique, specialized perspectives on certain issues. I conducted the first interviews before beginning the household surveys and continued to schedule other interviews after I had begun the household surveys. I conducted a total of 11 key informant interviews: two community leaders, one in Nuevo Belén and one in Sachachorro; two public health officials in Pueblo Libre and Sachachorro, respectively; and 6 schoolteachers, 3 in Nuevo Belén and 3 in Bajo Belén. Interviews ranged in time from 20 minutes to an hour. All interviews were conducted in Spanish with my assistant present. Participants agreed to have their interviews recorded for the purpose of notetaking. The key informant interviews were usually scheduled beforehand, which involved visiting the site before the intended interview, and then arranging a time to return. The interviews with schoolteachers were conducted at the respective schools in Bajo Belén and Nuevo Belén; the interviews with the public health officials occurred at the clinics in Sachachorro and Pueblo Libre; and the interviews with the community leaders took place at their homes.

Having received community consent, I began conducting pilot surveys in Sachachorro and 10 de Octubre. Using pilot surveys allowed for finessing and rephrasing questions or eliminating repetitive questions. After the completion of the pilot surveys, Nuevo Liberal was selected as the third sector. A local contact, Raoul, who grew up in Nuevo Liberal, brought me there after we went to the Belén market one morning. I expressed that I wanted to survey at least one sector that was closer to the river and felt that Nuevo Liberal would be a good fit. Raoul knew the community leader, so he and I returned with my research assistant to meet the community leader. As in Sachachorro and 10 de Octubre, my research assistant and I were able to introduce ourselves at a community meeting. Raoul continued to accompany us to Nuevo Liberal as we

conducted the surveys; however, he did not participate in conducting the surveys, since I had committed to participants that their information would be kept private.

In Nuevo Belén, I followed a similar process of introducing myself and my research to the community leaders before starting any surveys. I was unable to attend a community meeting in Nuevo Belén, but the three community leaders met and granted me consent to conduct surveys there. In Bajo Belén, I selected my three study sectors from the eight sectors in the *zona baja*; in Nuevo Belén, however, there are only two “sectors:” houses which were built in the first round of construction, Phase 1 (late 2016/early 2017), and houses built in the second round, Phase 2 (late 2018/early 2019). Residents of Nuevo Belén distinguish between the two phases and treat them somewhat like neighborhoods.

Maps from the MVCS office in Iquitos helped to inform household selection. Figure 3.7 shows the entire *zona baja*, and the three study sectors: Nuevo Liberal, Sachachorro and 10 de Octubre. Ideally, the sampling method would have used randomly generated house numbers to select participants, but this was not possible in Bajo Belén, because many of the raft houses are mobile, and maps do not reflect their current location. In Figure 3.7, the houses that appear to overlap with water are raft houses, particularly those in the southern section of the map. As Bajo Belén is large, it was not feasible for this study to make new maps to reflect the new location of the houses, but I felt it was still important to include households in raft houses in my study. I used random sampling to address this problem. I selected a house at random to start, and then proceeded to survey every 5th house after that one. I proceeded to the house next door if that household was unavailable or unwilling to participate. I aimed to have 10 houses from the 3 study sectors.

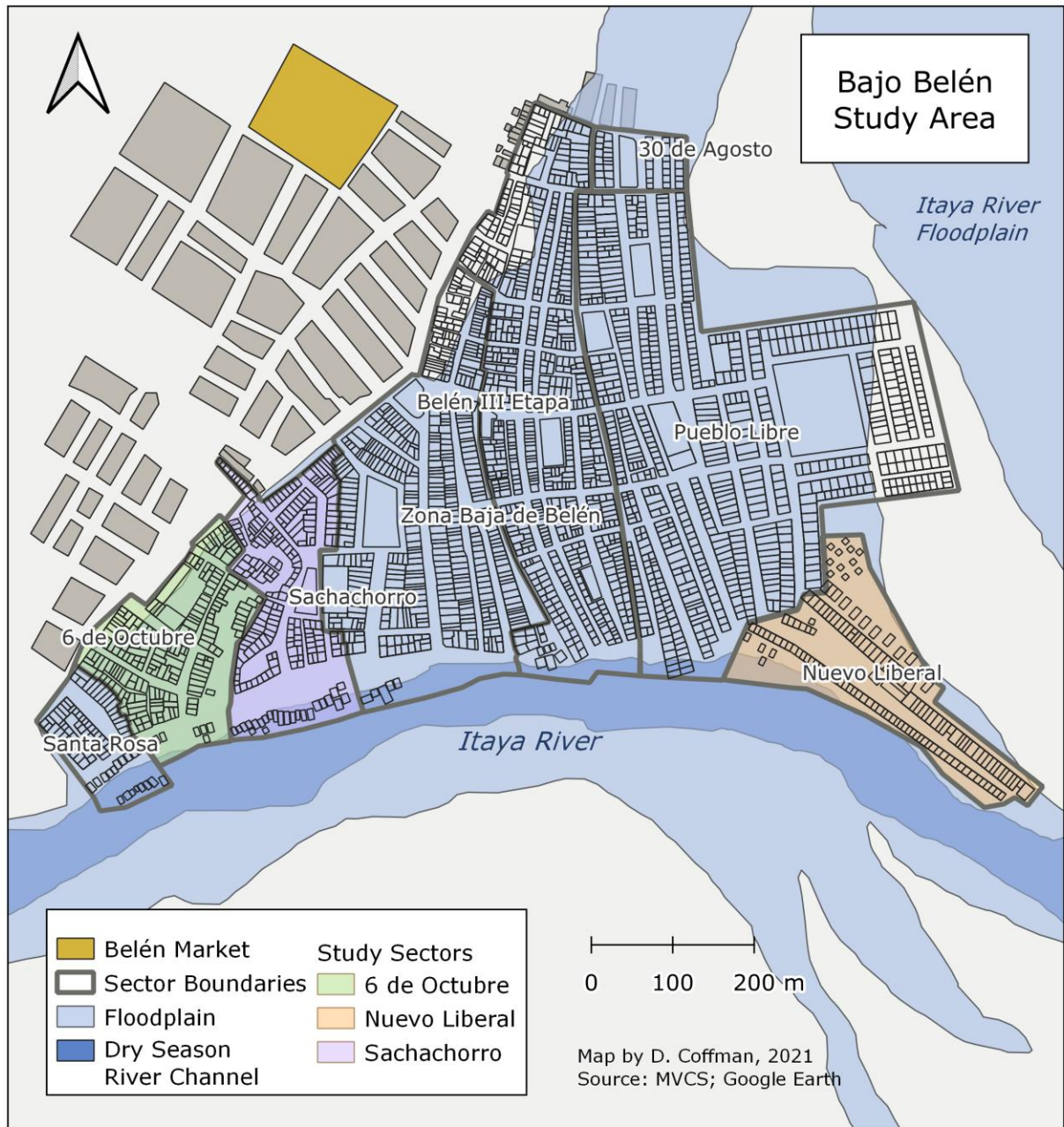


Figure 3.7: Study sectors in Bajo Belén.

In Nuevo Belén, random sampling was used to select households. As mentioned, construction in Nuevo Belén has occurred in two phases. I wanted to ensure that both phases are represented in the survey, because residents in the two phases have had different and distinct experiences. Figure 3.8 shows a map of Nuevo Belén, showing the two phases of houses and the public spaces. Phase 1 is shown in green, and Phase 2 is shown in red. There are about equal numbers of houses in the two phases, so 15 houses from Phase 1 and 15 houses from Phase 2 were selected. Maps of the lot numbers from the MVCS were used to number the houses, and then

houses were chosen using a random number generator. Backup lists of houses for Phase 1 and Phase 2 were generated in case households were unavailable or unwilling to participate.



Figure 3.8: Nuevo Belén.

Any adult (over 18) household members were eligible to participate. The head of household is usually presumed to be male, and I wanted to have participants of all genders and ages, since I wanted to reflect a diversity of opinions, experiences, and perspectives in the long-answer questions in my surveys. However, this approach sometimes presented a problem because some household members were not as knowledgeable about income (for example, a young adult child

was unlikely to be able to accurately estimate their parent’s income). In these cases, I made an effort to confirm the information with another household member or return to the home at another time to fill in the gaps when a household member who could answer the question was present. It was also often difficult to restrict participation to one person, since the surveys were always performed at the participant’s home and often multiple household members were present and wanted to contribute to the discussion. In these instances, I tried as much as possible to record on my survey notes which comments had come from another household member and reiterated the informed consent policy.

Table 3-1: Survey participants by sector and gender.

	Nuevo Belén		Belén		
Sector	Phase 1	Phase 2	Sachachorro	10 de Octubre	Nuevo Liberal
	14	16	10	11	9
Gender	Male	Female	Male		Female
	10	20	10		20

In both sites, more women than men participated in the surveys (Table 3-1). This is likely because I surveyed primarily during the workday, when men may have been out of the house. As this distribution became apparent, I tried to arrange more sample days for weekends or after the end of the workday. Although my research design did not explicitly set out to focus on women, having more female participants may have been beneficial to my research for a number of reasons. First, women are less likely to occupy leadership positions (of the six community leaders I met, none were women), so their particular experiences may not be reflected in large community spaces. Second, because of the high proportion of female participants, my surveys may better address issues that male participants might overlook, such as concern for children’s safety and wellbeing, or isolation in the home in Nuevo Belén.

A total of 60 households – 30 in Bajo Belén and 30 Nuevo Belén – participated in the surveys. Surveys were conducted by the author with the help of a research assistant. At each house, we introduced ourselves and the research and invited them to participate in the survey. If they were receptive, myself or my research assistant read the verbal consent form (Appendix B), and then offered to clarify any questions they might have before confirming their consent to participate. Surveys were printed and the answers written by hand by myself or my research assistant.

Surveys were always conducted at the home of the participant. This was due to the selection process of households (in-person solicitation); and because the survey includes questions about the participant's home, such as household assets or materials of the house, being in the participant's home was very helpful. All surveys were conducted in Spanish. The surveys, which on average took about 30-40 minutes to complete, solicited information on income and activities, housing, community environment and floods, and relocation. Surveys included a range of closed and open questions. A total of 60 households – 30 in Belén and 30 Nuevo Belén – participated in the surveys.

In the section on income and activities, several assumptions had to be made in order to standardize the reported income into a monthly household income, because most people work informally, are self-employed, or have seasonal or occasional income. Income was reported at the individual level and aggregated up to the household level. Daily wage workers were asked how many days a week they worked on a typical week and multiplied their reported daily wage by days per week. People engaged in work-from-home jobs like *bodegas* or selling food usually reported doing this activity 7 days a week. Many people who worked in the market also reported that they worked 7 days a week. Contract or occasional workers were asked how many days a month they worked, and their wage (reported either daily, or monthly). When a range for income was given (e.g., 1000-2000 S/, the average of the range was taken (1500 S/). Follow-up questions were asked to better understand the variation in income; for instance, participants were asked if their income varied seasonally or on days of the week. When an activity involved multiple family members and income was shared, the income was divided evenly between those who engaged in the activity full-time. For example, children who help out in the family bodega were not counted in this if they primarily attend school.

3.3.2. Data Processing and Analysis

Throughout my fieldwork, surveys and notes from interviews were scanned to protect against loss of data. After finishing all surveys and before leaving the field, I reviewed all surveys and interviews with my field assistant's aid to check for completeness. Upon my return from fieldwork, the results of the household surveys were entered into Excel. Following the privacy procedures outlined in the ethics protocol and in order to respect respondent anonymity, the names were removed at the first step of data entry and were not stored the Excel dataset. All

participant names presented in this study are pseudonyms. The open-ended questions were coded using Excel and added to the survey dataset. Ultimately, two datasets were created, one at the individual-level and another at the household-level. Both datasets were maintained in Excel and R (Version 1.2.5033). The two datasets are linked by a unique ID given to each household. Graphs were made using Excel and R. Descriptive statistics and t-tests were performed using R. Maps were made using QGIS 3.20.2 and ArcGIS 10.7.1, with base maps created using Mapbox. Key informant interviews were not transcribed word-for-word, as they were not used for coding. Detailed notes of the interviews were created, and both the notes and transcriptions were used to provide quotes.

Other information which was not systematically collected, such as casual conversations or observations, also strengthened my understanding of the subject and the context. I maintained a field journal during my fieldwork which records some of this information. Where I have used this information, I have indicated so.

3.4. Researcher Positionality

In this section, I reflect on my own positionality and its impact on my fieldwork, and the research I present in this thesis. I draw from the work of feminist geographers who have long emphasized the need for reflexivity: an ongoing, critical process of self-reflection on how identity and power are embedded in the research process and knowledge production (Rose, 1997; Sultana, 2007). Knowledge is situated: it is produced, interpreted and disseminated under particular circumstances by particular people (Haraway, 1988). A researcher's identity (race, nationality, gender, age, class, sexuality) influences the data they collect and the knowledge they produce (Madge, 1993). Researchers must look both inward at their own identity and outward to the world to understand how the knowledge they produce is received and disseminated (Rose, 1997). In fieldwork in particular, it is imperative for the researcher to examine and reflect critically on "the fields of power that connect the field researcher and participants, the participants to one another, scholars in the field, and research participants and audiences" (Katz, 1994: 69). In international fieldwork, where colonial histories and inequalities still exist, the process of reflexivity is particularly important to conducting ethical and politically engaged research (Nagar, 2010; Sultana, 2007).

My identity confers racial, class and economic privileges which affected the way I moved about Iquitos and the way people perceived me and interacted with me. I am a young, white, cisgender woman from a wealthy North American university, and a native English speaker, with a U.S. passport that allows me to travel freely and easily throughout most of the world. In Iquitos, my appearance – that is, my race and my clothing – made me a visible outsider. I speak Spanish, but it is not my native language, and my accent usually identifies me as a foreigner.

In many ways, my identity conferred power over participants; however, in other ways my identity was an equalizer that allowed me to better connect with participants. My conversations with women were likely more open, frank, and honest than they would have been if I were a male researcher. At other times, my participants may have held a position of power over me. For instance, participants may have withheld information and simply told me what they thought I wanted to hear. As a researcher, I can identify and attempt to mitigate the imbalance of power conferred by my identity and that of my participants. However, it is not possible to be a truly ‘neutral’ researcher, and so my identity has influenced this research in both known and unknown ways.

Another important consideration is the identity of my research assistant. Myshellth accompanied me on interviews, surveys, community meetings and other trips. Like me, she is a woman in her 20s. She is a local who grew up in Iquitos. In some regards, Myshellth occupies a position of relative privilege over participants because she lives in an area of Iquitos which is seen as safer and wealthier than Bajo Belén, and because she has a university education from a well-regarded public university in Iquitos. Being from Iquitos but not from Bajo Belén gave her a unique position as both an insider and an outsider when speaking to participants. Had she lived in Bajo Belén, participants may have been more reticent to report sensitive questions, such as their income, to someone who they might already know or encounter in another context. On the other hand, aspects of Myshellth’s identity afforded her a position of power and privilege over participants which may also have influenced the way we were received and the information we collected.

My identity at times limited the spaces I had access to and the data I could collect. For example, because I am both an outsider and a woman, I was often met with cautious or protective attitudes from locals. People were quick to tell me that certain actions or places were dangerous, such as

doing surveys in Pueblo Libre (a sector of Bajo Belén which is regarded as particularly dangerous) or being in Bajo Belén after dark. In some cases, I believe this would have added valuable information to my study (for instance, many families in Nuevo Belén used to live in Pueblo Libre and being able to survey extensively there would have allowed me to make more robust comparisons). However, I did not want to overstep my boundaries or put myself or my research assistant in a dangerous situation by being overly confident in my ability to avoid such a situation.

In addition to determining my access to places and data, my identity and positionality have influenced the way that I understand and interpret my findings. I likely missed or misunderstood some local references or was limited in the way that I could understand the situated local knowledge and realities of participants. Although some disconnect may be an inherent limitation to cross-cultural research, I worked to mitigate and minimize this in several ways. I waited a few weeks after arriving in Iquitos before beginning data collection to become more familiar with the environment and visited communities and attended community meetings before collecting any data. With participants' consent, I recorded my key informant interviews so I could replay anything I did not understand and reviewed all surveys with my assistant. I employed active listening techniques while conducting my surveys and interviews, which can help build trust with participants while also helping to minimize translation and understanding errors. My field assistant was present at all surveys and interviews and was immensely helpful in filling in any gaps in my understanding. Although I have made every effort to minimize errors in translation or interpretation, I take ownership of any that remain.

Chapter 4

Floods and Perceptions of Vulnerability

The Nuevo Belén relocation is presented as a strategy for the state to reduce flood exposure and economic vulnerability through providing residents with secure housing in the upland. The annual flood and its negative effects on health, housing, and sanitation is the state's central argument for the relocation to Nuevo Belén. Despite the incentives offered, the relocation has met with significant resistance from Bajo Belén residents. There is a dissonance between the state's assessment that Bajo Belén is a high-risk, uninhabitable area, and the clear commitment of many residents to stay there despite this risk, and despite the incentive of a house in a flood-free area. Of the 30 households surveyed in Bajo Belén, only 8 households, or about 26% were planning to relocate. Two of those 8 households did not want to relocate but were locked into the decision. For example, one family had exchanged their title for a house in Nuevo Belén, but while waiting for the house to be delivered, they had changed their mind. Why are families resistant to relocation, despite the incentives offered? I posit that residents have resisted relocation because they perceive flood risk and vulnerability differently than the state does. In this chapter I explore the following research question: **how were residents of Bajo Belén vulnerable to floods, and how has the Nuevo Belén relocation reshaped vulnerability?**

I first explore the state's view of vulnerability, using studies and other materials published by the federal government and the MVCS. Next, I describe residents' experiences of the flood and other environmental hazards in Bajo Belén, which sets the stage for comparing the state's view of vulnerability with Bajo Belén residents' own perception. Finally, I discuss how people who chose to relocate may have a different view of their own flood vulnerability, which may have contributed to their decision to leave. In this discussion, I aim to highlight how residents of Bajo Belén see the flood as one part of a broad suite of benefits and drawbacks of living in Bajo Belén. I argue that there are fundamental differences between how residents and the state conceptualize what constitutes a hazard, the social production of risk, and flood adaptation. These differences have important implications for how local people respond to hazards and conceptualize their own vulnerability.

4.1. “Uninhabitable”: The State Perspective on Flood Vulnerability in Bajo Belén

In this section, I explore the state’s perspective on flood vulnerability and disaster risk. How were residents of Bajo Belén vulnerable to floods, according to the state? To understand the state’s perspective, I use a number of reports, laws, and studies. In particular, I draw on a 2015 feasibility study conducted by the MVCS, which thoroughly outlines the purpose and plan for relocation (MVCS, 2015). In the feasibility study, vulnerability is objective and quantifiable. The study assessed both the potential relocation site and the *zona baja* on a number of characteristics. The study gave the *zona baja* a score of low, medium, high, or very high vulnerability for physical, social, educational, and economic characteristics, with a particular focus on the *zona baja*’s capacity for disaster response. Each level corresponds to a numerical score from 0 to 100; the study does not describe how the numerical score is determined. From the state’s perspective, risk can be neatly identified and quantified. Exposure, sensitivity, and adaptive capacity are used to create vulnerability rankings. The rankings – numbers or assessments which appear to be arbitrary – are then weaponized by the state to label Bajo Belén as high-risk and justify the relocation.

The state concludes that the *zona baja* is high risk and dangerous due to its exposure to floods. In the 2015 feasibility study, the *zona* received a high physical vulnerability score based on the location of houses in the floodplain, the material of the houses, and the geological characteristics of the soil. In other studies, the state uses models and projections of exposure to future hazards to determine the vulnerability of the *zona baja*. A 2015 hydrological study conducted by the Peruvian Navy predicts that within the next 50 years, the Amazon could merge with the Itaya, flooding Bajo Belén (Servicio de Hidrografía y Navegación de la Amazonía, 2015). These models and projections are conducted at the federal level and used to make decisions at the local level.

Extreme floods, such as the flood of 2012, have had disastrous consequences for residents of Bajo Belén, and climate models project more extreme and unpredictable flood cycles in the Amazon (see Section 2.1). Yet the feasibility report makes little mention of extreme floods, nor climate change; instead, the relocation is justified on the basis of unsanitary conditions due to the annual flood. The feasibility study states:

“In the rainy season, the area [*zona baja*] is only accessible using improvised bridges and river "canoes." These boats move through the waters that flood the entire *zona baja*, waters that have a high level of contamination due to sewage and the inadequate handling of solid waste from the lack of waste collection in the area. All of this is a consequence of accelerated growth and unplanned development, which, added to citizen insecurity, extreme conditions of poverty and natural hazards, generates serious consequences for the life of the population....Therefore, the decision is made to declare the relocation of the population of the *zona baja* of Belén.” (MVCS, 2015: 26).

This quote reveals that the state sees the root of the problem as being rapid, informal urban growth and poverty, coupled with a lack of adequate sewage and sanitation infrastructure. In another section, the study goes on to describe the population of Bajo Belén as “poorly organized,” and having “disjointed preparation for disasters” (MVCS, 2015:48). In education, the *zona* received a score of high vulnerability, because of the population’s “poor” and “insufficient” training in disaster response. In terms of economic vulnerability, the *zona* also received a high score in the study, citing the high percentage of families living in poverty, low income, and low demand for workers, resulting in high levels of unemployment. The study also noted the economic and commercial activity in the area, but called it “disorganized,” referring to the informal nature of most residents’ work.

This language that labels Bajo Belén “uninhabitable” “dangerous” and “unsanitary” is consistent across other federal laws and publications. Figure 4.1 shows a brochure for the Nuevo Belén project which illustrates the state’s view of Bajo Belén. The text on the left side of the brochure translates to “The New City of Belén project arises from the public necessity to relocate the population of the Zona Baja of Belén, from a place which is uninhabitable and where they face imminent health risk due to the continued floods and stagnant waters in poor hygienic conditions.” The right side details the services to be provided in Nuevo Belén: “water, sewage, health, education centers, home electricity connection [and] police, among others.” In this brochure, it is evident that not only does the state believe that Bajo Belén is unfit for habitation but is attempting to sell this idea to residents themselves.



Figure 4.1: A brochure for Nuevo Belén. Source: MVCS, date unknown.

Finally, the image of Belén as dangerous and uninhabitable that emerges from these studies, reports and documents also reinforces a long-standing historic divide between Amazonia and the center of power in Lima. The feasibility study, hydrological study, and the relocation law all were handed down by the federal government, which is based in Lima. As the former administrative center of the Spanish colonial empire, Lima has for centuries been the center of financial, intellectual and political power in Peru (Bromley, 2003). In contrast, the Amazon

exists as almost a territory of Peru, beyond the frontier of the centralized state (Alexiades & Peluso, 2016). The transience and mobility of Amazonian peoples and places (which is based in indigeneity) is at odds with the permanent, orderly settlements in the state's vision of modernity (Desmaison, Astolfo, et al., 2019). Even in the urban Amazon, many people maintain a strong cultural and livelihood connection to the land and rivers, which continues to render the Amazon, in the eyes of the federal government, as rural, traditional, and "other" (Pittaluga, 2019). For people in Bajo Belén, the Nuevo Belén project is yet another imposition of a way of life designed in and for Lima, not for the Amazon. The state's definition of hazards and risks does not reflect the local context or culture. In the next section, I show how local perspectives gleaned from household surveys show that many residents disagree with the state's assessment of their vulnerability.

4.2. Life During the Flood in the *Zona Baja*

This section details how people in Bajo Belén experience and prepare for floods. Understanding how people live with floods provides a foundation for understanding how they perceive flood risk and their own vulnerability. In this section, I introduce the first participant profile, a participant from Nuevo Liberal, in Bajo Belén.

Participant Profile: Jacinta²

I met Jacinta, age 43, during my fieldwork in 2019. Jacinta lived with her husband, her daughter, son-in-law, and her three other children, ranging from school-age to young adults. They lived in Nuevo Liberal, just next to the dividing line with Pueblo Libre, another sector. The men in the household – Jacinta's husband, Jacinta's oldest son and Jacinta's son-in-law – were all fishers. They fished mainly on the Amazon River, sometimes going as far as the Ucayali, a tributary of the Amazon. Jacinta sold the fish at the Belén market, sometimes with the help of one of her daughters. The family owned a canoe, a peque-peque, and various fishing nets. Jacinta reported that life was much easier during the flood. The fish were more abundant, and the men did not have to travel as far to fish, so their income increased during the flood. At home, Jacinta

² All names of participants are pseudonyms.

liked that during the flood the water was closer to the house for bathing and washing, and that the high water allowed for more direct boat transportation to the market.

Jacinta had been against the relocation from the beginning. She claimed that the former leader of Pueblo Libre, who was an early proponent of the resettlement, tricked and bribed residents in his sector into relocating to Nuevo Belén. Many of the neighbors on the Pueblo Libre side of her house have relocated, disassembled their houses, and brought the materials with them. Where there used to be many other homes was now an empty field. Community meetings were still held, but with fewer households. Still, Jacinta was not convinced to leave. Since her family made their living from fishing, it was important to them to live close to the river and the market. They would always stay in Belén, she said, “por el trabajo – for the work.”

Jacinta’s profile illustrates how livelihoods in Bajo Belén are structured around the flood and the river. Her profile shows a different perspective than the state: for Jacinta and her family, the flood is not an omnipresent danger, but an economic benefit that their livelihood depends upon. The river is a productive natural asset for the household, and through other assets that the household owns, such as their boats, they have made fishing their livelihood. Jacinta’s profile shows some of what is missing from the state’s narrative: floods are not categorically dangerous or bad; for many people, in Bajo Belén, there is more nuance.

The annual flood is an expected part of life, and in Bajo Belén, flood adaptations and preparations are embedded in the urban form. Most houses are constructed on wooden stilts with the main part of the house on the second floor to avoid flooding, while other houses are rafts, such as those shown in Figure 4.2. Public buildings like schools and healthcare facilities in the *zona baja* also follow this model of construction, although they are typically built with a more durable material like concrete. The photo in Figure 4.2 was taken in August, when water levels are low, although the houses sit on the water almost year-round and must be anchored.

Households undertake specific preparations before and during the flood season. Households will reinforce or replace the stilts on their home and move their belongings into the top floor of the house or anchor their house if it is a raft. Families who own a canoe will repair their canoe in preparation for the flood. Some participants said that they stock up on extra supplies, such as food and bottled water, because sometimes it is dangerous or costly to leave the house during the flood season. Families work together with their neighbors to construct wooden bridges to make a

boardwalk for when the streets are flooded. Some such footbridges can be seen in Figure 4.2. These boardwalks and footbridges must be continually replaced and extended as the wood rots and as water levels change.



Figure 4.2: Raft houses in Bajo Belén.

Participants reported a mix of both negative and positive changes to their daily life during the flood season, as shown in Figure 4.3. Note that participants had the option to choose more than one answer, so each answer represents the percent of the participants who mentioned that impact; for instance, 23% of the 30 total participants reported that their income was reduced. Eighty percent of respondents reported at least one negative change to daily life during the flood, while 20% said they experienced no negative changes. The most common negative impact residents named was safety concerns, which included people falling in the river or drowning during the flood, especially children or elderly people. Other negative impacts include transportation expenses, loss of income and limited mobility. Transportation is an added financial burden during the flood season, especially for residents who do not have a boat, as a boat taxi costs 1-2 S/ round trip.

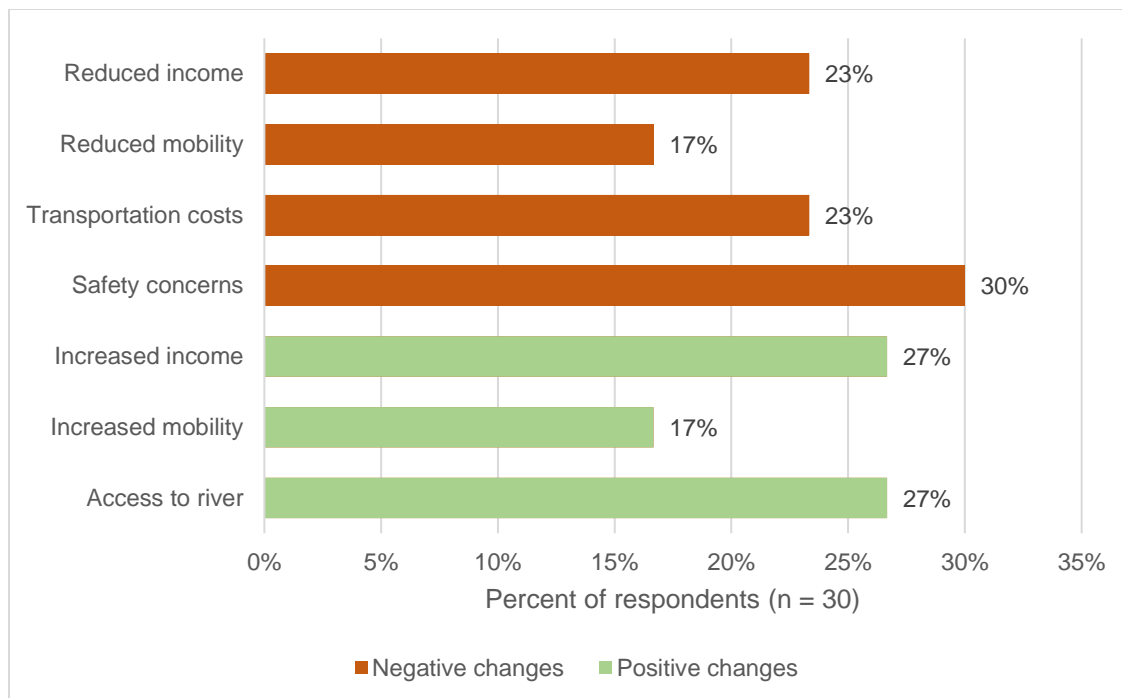


Figure 4.3: Changes to daily life during the flood.

Health impacts are another negative repercussion of the flood, although they were rarely mentioned in the household surveys. According to Felipe, a clinic administrator in Bajo Belén, the clinic sees higher instances of diarrhea, fevers, parasites, gastrointestinal problems, and respiratory issues during the flood as opposed to during the dry season (Participant 67, July 26, 2019). Felipe reported that children and the elderly are particularly affected. A public health employee at another clinic, Lidiya, agreed that her clinic also saw higher instances of these health issues (Participant 63, July 19, 2019). Both Felipe and Lidiya speculated that some of these health problems may arise from bathing or washing in polluted river water. According to Lidiya, the mosquitoes that breed in the standing water in Bajo Belén can cause chikungunya and zika.

More participants reported negative changes to their daily life during the flood: 40% of respondents said that there were no positive changes to their lives during the flood season. Notably, however, some participants reported that their mobility was negatively impacted by the flood, while others reported positive changes. Because the streets are underwater, residents construct bridges to walk around, which limits them to only walking in areas which have bridges. Back alleyways are flooded so residents can often only access homes and buildings via the front door, a small inconvenience that some respondents mentioned. Limited mobility during the flood

is not only an accessibility concern: it also limits socialization, since during the flood, residents are more constrained to their homes. The positive changes to mobility were mostly shared by people who live in Nuevo Liberal. During the dry season, Nuevo Liberal is a peninsula. When the waters recede, residents have to walk a longer, more roundabout route around the peninsula to get to the market or elsewhere in Iquitos, whereas during the flood, people can travel more directly and quickly to Nuevo Liberal by boat.

Income was another category where participants reported both positive and negative changes. Some residents reported a loss of income during the flood. These residents tended to be vendors, *independientes* (contract or gig workers) or *bodega* owners. Some vendors and *bodega* owners sell less, as people are less inclined to leave their houses when mobility is reduced.

Independientes find fewer contracts during the flood season since construction projects are often stalled during the flood. Others reported that their income increased during the flood. For the most part, these responses came from people who work as vendors, fishers or in river transport. Some vendors who have canoes sell their wares from their canoe, going door-to-door. When mobility is constrained and people have difficulties leaving their houses, those with the means to sell by boat can do well for themselves.

Easier access to the river was a positive change for participants who use the river for a variety of activities, like bathing, washing, transportation or swimming. When the water is higher, it is closer to the house, making it easier to collect water or to wash and bathe. People can fish closer to their homes in the high water. The fish are more plentiful, too: “if there’s not a big flood, there are less fish,” one person told me (Participant 11, July 31, 2019). Others simply enjoyed living at the water’s edge for part of the year. According to one person, “in the flood, the *cancha* (sports field) is like a pool!” (Participant 20, August 13, 2019). Another participant said that because he did not do agricultural work during the flood, it was a time of relative calm and rest (Participant 7, July 30, 2019).

Overall, participants’ view of the flood was complex and nuanced. The positive effects of the during the flood were not universal: the flood was the most commonly mentioned disadvantage of living in Belén (Figure 4.4). Three of the participants who named the flood as a disadvantage qualified their answer by saying: “but everything would be still worse living there [in Nuevo Belén]” or “but we’re accustomed to it.” Many participants seemed to view the flood as an

inconvenience which is outweighed by other positive aspects of living in Bajo Belén, such as the proximity to the Belén market, public services, and the rivers.

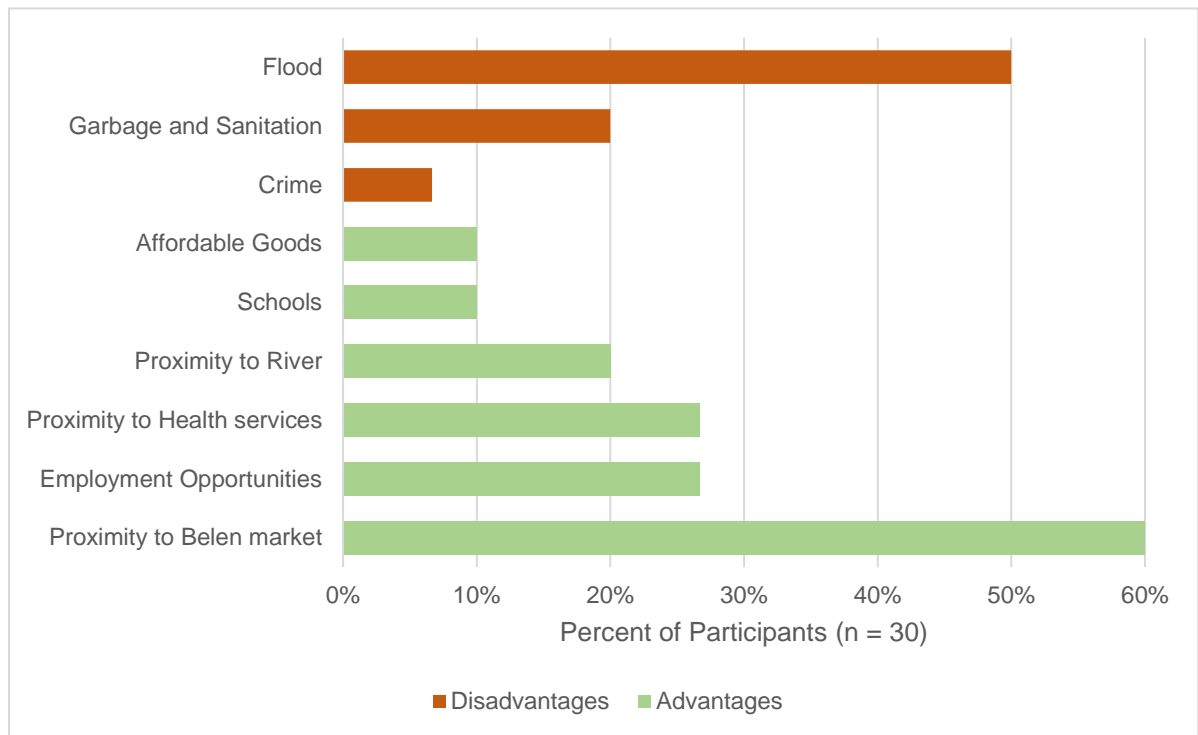


Figure 4.4: Advantages and disadvantages of living in Bajo Belén.

The flood is not the only environmental problem participants deal with in Bajo Belén. Almost every participant named waste collection as an environmental problem in the *zona baja* (Figure 4.5). Like in many other informal settlements in the Global South, there is no regular garbage collection in Belén, and the waste sits in the streets and floats in the river, often attracting vultures. The issue is further compounded by waste coming from elsewhere in the city via the Itaya River, which crosses the *zona baja* before emptying into the Amazon. As described in Section 3.2, neighbors organize regular *mingas*, or community cleanups to remove trash. At times, the municipal government will coordinate with the community to remove the trash bags the community has collected, often by boat, but in general, waste collection is irregular and infrequent during the flood.

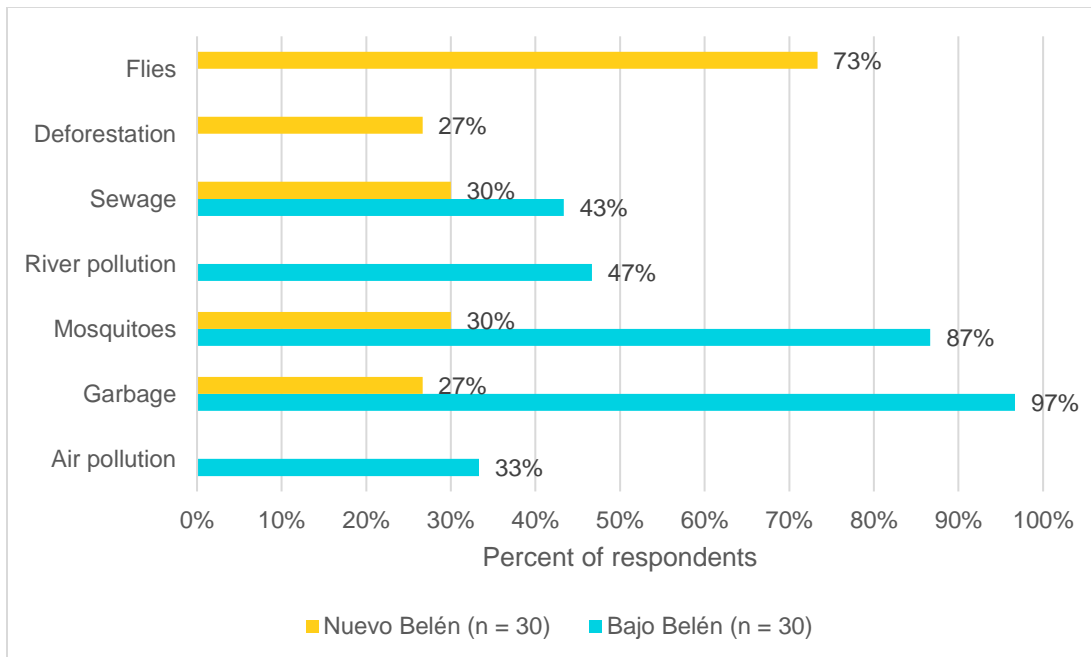


Figure 4.5: Environmental problems in Bajo Belén and Nuevo Belén.

Mosquitoes were the second-most common problem named by participants. Mosquitoes thrive in warm standing water, so they are most prevalent during and around the flood season, increasing the prevalence of diseases like zika virus and dengue fever. Residents mentioned the Ministry of Health conducts city-wide sprays for mosquitoes to attempt to reduce these diseases, and that Bajo Belén has been included in these efforts in the past. Air pollution comes from people burning wood for cooking. Most of the houses in Bajo Belén are made from wood and many people cook using wood or charcoal, which can cause house fires. A number of residents remembered specific significant fires (such as one in 2012).



Figure 4.6: Dugout wastewater channel behind houses in Bajo Belén.

During interviews, multiple public health officials in Bajo Belén expressed frustration with these environmental issues. They viewed the prevalence of waste in Bajo Belén as the result of a culture where people do not take care of their environment or value cleanliness, rather than seen the state’s failure to provide

adequate sanitation services to a crowded and growing population. A clinic administrator in Bajo Belén told me in an interview, “[T]here’s no culture for doing these things [referring to cleaning up litter] ...there has to be education, because it comes from the home” (Participant 67, July 26, 2019). When asked if relocating to Nuevo Belén would improve health outcomes, the same clinic administrator responded, “[Y]es, because their living conditions would be more adequate...it’s not contaminated there; people don’t litter, they can learn better how to take care of the environment and have better health.” These comments are consistent with the language that the state employs when discussing Bajo Belén: dirty, inadequate, and unhealthy. The administrators, like the state, perceive the people who choose to stay as backwards, dirty, choosing to live in poverty and in poor hygiene, among trash and in the flood, rather than taking the opportunity to participate in the government’s program and live in a cleaner, safer place.

4.3. Perceptions of Flood Vulnerability in Nuevo Belén

For people who live in Belén, the flood is an expected part of life for all, an inconvenience for most, and a benefit to some. In this section, I turn to the households who chose to relocate to Nuevo Belén. How did they experience floods in Bajo Belén and how did their experience impact their perspective on their vulnerability? How did the flood factor into their decision to move? To answer these questions, I turn first to a participant profile of a resident of Nuevo Belén.

Participant Profile: Maria

Maria, age 36, lived in Nuevo Belén with her four children. Her husband worked in Pucallpa and sent money for the children, but she was functionally a single mother most of the time. To supplement her income, she sold drinks to passersby from an ice chest in her kitchen.

In Bajo Belén, Maria knew someone whose young son drowned in the flood, and Maria never forgot that experience. The flood season meant constant anxiety about her children falling off the boardwalks or drinking the polluted river water and getting sick. When the relocation was announced, Maria said she jumped at the chance to move, and was part of the first wave of families to go to Nuevo Belén. She convinced her sister and mother, who also lived in Bajo Belén, to come with her. They could not choose the plots of their homes in Nuevo Belén but, as luck would have it, Maria's sister wound up getting the house behind Maria's, so their yards were adjoining. They often babysit each other's children.

For Maria, the move was worth it. She said that she no longer worried about her children during the flood season, and she loved living so close to her family. Maria hoped that the MVCS would replace the portable classrooms with a permanent school in Nuevo Belén and offer adult education classes so she could finish secondary school.

Maria's story illustrates some of the reasons why some families are eager to leave Bajo Belén. People like young children and older adults are more sensitive to the negative impacts of the flood and are less able to cope with the effects on their daily lives. Unlike Jacinta's household, Maria's livelihood was not connected to the river, so for her the flood offered no benefits and presented a great hazard.

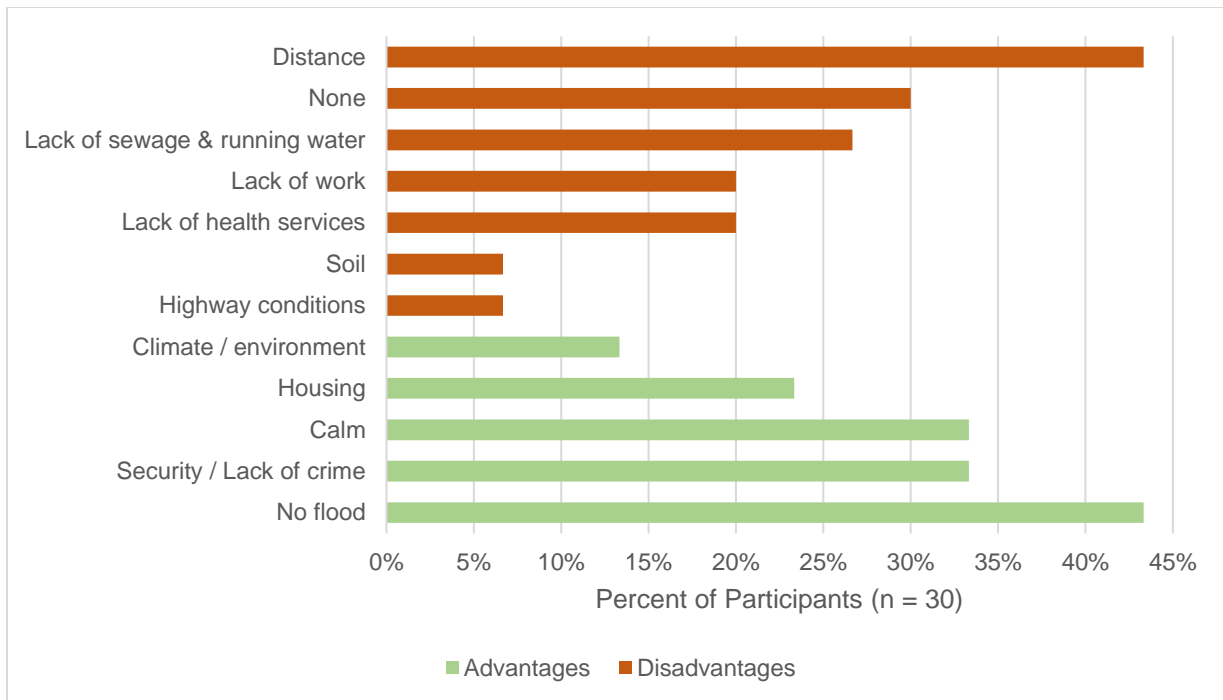


Figure 4.7: Advantages and disadvantages of living in Nuevo Belén.

Living without the flood has clearly influenced people’s decision to relocate. Half of participants surveyed in Nuevo Belén named living on the upland, without the flood, as a benefit of living at the new site, in fact it was the most common benefit people in Nuevo Belén reported. Residents echoed concerns from Belén about the health and safety risks of the flood.

In Nuevo Belén, residents no longer live with the flood, but they still face other environmental hazards. At the top of the list is flies, which are a constant presence, especially around bodegas and outdoor cooking areas. It is unclear exactly why the flies are so prevalent. Some residents suggested that this is because the land used to be a piggery; this information has been cited in other interviews in the area (Gorenstein, 2018b), though this has not yet been confirmed through any government sources. Other residents were concerned about deforestation in the adjoining natural preserve from people in Nuevo Belén and nearby settlements who use the preserve for collecting firewood. Some residents were also concerned that the temporary sewage solution was contaminating the soil or the groundwater. Residents in the second phase do not yet have sewage in their homes. For sewage, pipes installed in the houses drain the water into a septic tank, which is next to the Allpahuayo-Mishana Reserve.

Residents who chose to relocate experienced the flood differently and perceived their own risk differently. Several factors may contribute to this. First, as mentioned, people who are

particularly sensitive to the negative impacts of the flood could be more likely to want to move. Second, certain assets and livelihood strategies better equip people to deal with and benefit from the flood. In Nuevo Belén, only 16% of households surveyed said they had *previously* owned a canoe when they lived in Belén, compared to 50% of households currently in Belén. This suggests that households who can control their own means of transportation by owning a canoe are better equipped to weather the flood and less likely to want to relocate. Finally, the flood presents a regular shock to the household and some households may be better equipped than others to absorb this shock, through location, finances, assets, or livelihood strategies.

4.4. Discussion

This chapter was guided by the question: **how are people in Bajo Belén vulnerable to floods, and how has relocation changed vulnerability?** In this chapter, I have shown that resettlement does effectively reduce vulnerability to floods by removing residents from exposure – but residents of Bajo Belén did not always perceive themselves to be vulnerable to floods in the first place.

Results show that experiences of the flood are varied. For some people, the flood is beneficial to their livelihoods; for many others, the flood presents an inconvenience, but it does not warrant relocation. The inconvenience is outweighed by other benefits that people see in living in Bajo Belén. If everyone found life to be impossibly difficult in the flood it is unlikely that many people would stay in Bajo Belén. On the other hand, for people who decided to relocate, the flood seems to have been a contributing factor in their decision. Risk is mediated through a number of factors, such as age or wealth. For residents with high sensitivity to floods, like young children or elderly people, the flood presents a much higher risk. Households with fewer assets to cope with the flood, such as canoes, or who did not have a livelihood activity connected to the flood, may have been more likely to feel that the costs outweighed the benefits.

At the start of this chapter, I introduced the state's view of floods, an assessment which is handed down by the federal government, through studies, reports, and hydrological models. From the state's perspective, the flood is inherently dangerous, Bajo Belén is a high-risk and unsanitary area and residents must be moved. Public health officials in Bajo Belén concurred with this assessment and echoed this language. Residents, however, disagreed with this assessment of their vulnerability. After comparing the state and residents' perspectives on flood risk, I identify three important points of disconnect.

First, the state does not consider the idea that people are well adapted to living with the flood, and benefit from living on the floodplain. Bajo Belén was largely settled by rural-urban migrants, who bring a long history of living with and adapting to floods (Desmaison, Astolfo, et al., 2019; Santos-Granero & Barclay, 2000). The river is an important asset for many people, who rely on it for their livelihood activities, and as their ‘highway’ that connects them to the world outside Iquitos. The specific local environmental conditions in Bajo Belén and cultural context for living with floods are not considered. The state’s perspective is that people in Bajo Belén live in a high-risk area where they endure floods and poor sanitation and are so poor that they have no choice but to live there. State and local officials miss the fact that living in Bajo Belén has much to offer its residents. It is not the case that residents only stay in such an area because they have nowhere else to go; in fact, Bajo Belén residents continually *choose* to remain there.

Second, the state perspective also neglects to consider the social production of flood risk. Both natural events and human actions determine the effects of a hazard (Blaikie et al., 1994). In Bajo Belén, the flood would present less of a health and safety risk if river water were not contaminated with sewage and waste – both of which are present because of the state’s failure to provide essential sanitation services as it does elsewhere in Iquitos – and if the wooden footbridges were more substantial. The state recognizes that a lack of public services contributes to the negative outcomes of the flood on residents’ health and safety; yet rather than invest in these services, residents are being relocated, and public health officials attribute the unsanitary conditions in Bajo Belén to a lack of personal responsibility and a culture of uncleanness among residents. The state may have chosen to relocate rather than invest in in-situ improvements for a number of reasons. Constructing a new settlement for residents better reflects the state’s vision of urban modernity, rather than supporting the complex informality of Bajo Belén. Investing in keeping people in Bajo Belén would require a fundamental rethinking of how people live with and adapt to hazards. It would also represent a profound power shift if the state were to consult with residents of Bajo Belén in good faith and allow them to determine the best way forward.

Third, the resistance to the Nuevo Belén relocation represents a fundamental disconnect between residents and the state about what constitutes a hazard. Many experts on relocation agree that relocation should be a last-resort strategy only in the face of *hazards that cannot be mitigated* (Piggott-McKellar et al., 2020). In state documents about the relocation, Bajo Belén is

continually referred to as “high risk” and flooding is “unable to be mitigated.” The federal government’s feasibility studies and reports come from Lima, where officials view the annual flood unilaterally as hazards. Residents of Bajo Belén do not universally view the flood pulse as a hazard that cannot be mitigated; instead, it may be a benefit, an inconvenience, or merely a fact of life. The flood is just one feature of many in the place they call home. If future projections of climate change and river shifts do in fact play out, and floods become more frequent and severe, one can imagine a number of scenarios. The state might double down on its categorization of floods as hazardous and use it to leverage an involuntary resettlement of residents. On the other hand, it would present the state an opportunity to consult residents of Bajo Belén in a more genuine way than they did originally, and to allow them to guide the way forward, whether that might be to relocate or adapt.

Chapter 5

The Other Side of Vulnerability: Livelihoods, Housing and Services

In past resettlement projects, relocation has often disrupted livelihoods (Cernea, 1997; Tadgell et al., 2018). Restoring or preserving livelihoods is a critical part of an equitable resettlement that improves residents' wellbeing, yet decisionmakers often fail to consider how people will make a living in a new location. Ensuring the continuity or restoration of livelihoods requires considerable resources to achieve – meaning that livelihoods are not often planned for as part of a planned resettlement (Arnall, 2019). If resettlement is to improve or at least maintain long-term wellbeing, it is necessary to understand how people's livelihoods are affected.

This chapter explores the following research question: **how has relocation changed the livelihoods of residents in Nuevo Belén?** Although this research question is focused on Nuevo Belén, I devote significant space in this chapter to Bajo Belén as well, using it as a 'control' group to understand how residents' livelihoods changed after relocating. I compare participants' livelihood strategies, income, and household asset portfolios in Bajo Belén and Nuevo Belén. I give particular attention to housing as an asset. Finally, I examine the impacts of relocation on residents' access to services and the implications of relocation on social capital and community. As in the previous chapter, this chapter profiles two participants, whose stories serve as illustrative examples of the themes that emerge from the household survey data.

5.1. Livelihood Activities

In this section, I first examine livelihood activities among residents of Bajo Belén, and then compare them to those in Nuevo Belén. The most common activities in Bajo Belén – vending, river transport and fishing and agriculture – all center around the Belén market and/or the nearby Itaya and Amazon Rivers. In Bajo Belén, vending is the most common income-generating activity across individuals, as shown in Figure 5.1. Note that in both Figure 5.1 and Figure 5.3, income-generating activities are reported at the individual level, not the household level. Vending takes on many forms and variations. Some vendors have an established stall at a market, while others are more transient, setting up shop in a different spot each day; others sell from their homes. For some individuals, vending is their primary source of income, while others engage on a more *ad hoc* basis, only when there are goods to sell or when they are otherwise

unoccupied. Most commonly, vendors sell fruits or vegetables, such as *aguaje*, a small, egg-shaped palm fruit native to the Amazon basin, which is commonly eaten raw or processed, such as into juice or ice cream. Others sell fish, which fetches a higher price than fruits and vegetables; prepared meals; or other items like charcoal, firewood, or ice. On average, vendors reported earning 27 S/ a day. Vending is a highly gendered activity. Across both sites, women represent 89% of vendors. It is common for women to sell prepared food such as lunches from their home, which is relatively low-investment activity which allows women to earn income while also engaging in other activities in the home like childcare.

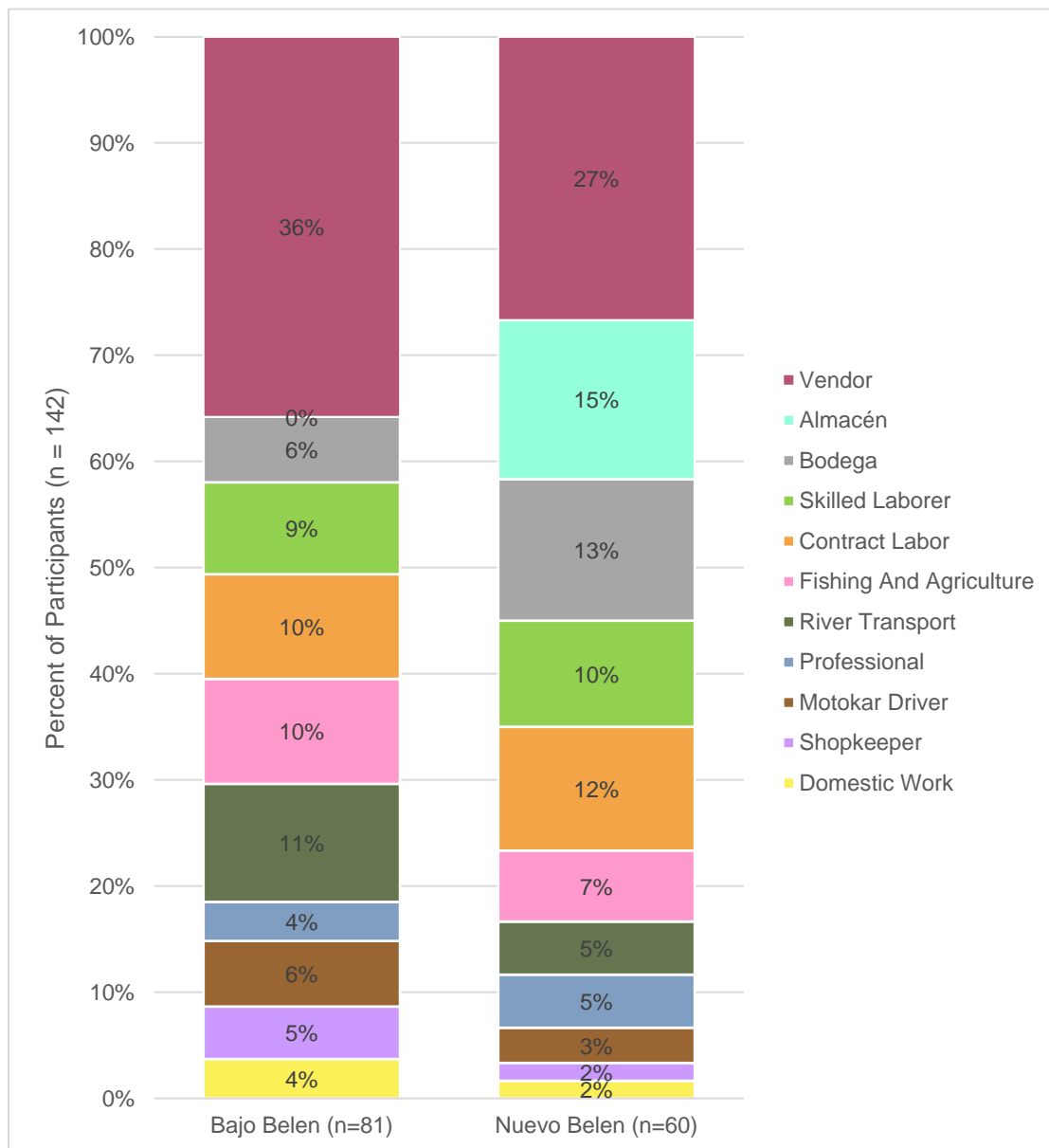


Figure 5.1: Economic activities in Bajo Belén and Nuevo Belén.

In this study, I distinguish between vendors, bodega owners, and shopkeepers, all of which are livelihood activities that appear similar but are in fact distinct. Vendors tend to specialize in a particular product, while bodegas, are stocked like a corner store with many necessities and small items. Bodegas, in this context, are always operated from the home. Shopkeepers, in contrast, always sell outside the home and have a fixed-shop location which may specialize in single product. Bodegas are discussed in more detail later in this chapter.

The second most commonly reported livelihood activity is river transport. Boat-taxi drivers usually operate a small boat with an off-board motor and charge a few *soles* per trip. Boat-taxi drivers may run year-round, transporting people and goods along the rivers, but they are most profitable during the flood season. The third most common livelihood activities reported in Bajo Belén are contract labor, and fishing and agricultural work, all of which are almost exclusively male work. Contract work is referred to locally using the umbrella term *independiente*, to mean an independent or gig worker. This term encompasses a variety of work such as carpentry, laborer, construction, or handyman work. Most *independientes* lack a formal contract; their work may be seasonal or piecework. Agricultural workers may work on a small farm – called a *chacra* – outside of the city, which may be upwards of a day’s travel. Because of the distance, some men reported that they remain there for days, weeks, or even seasonally, migrating back and forth between the city and the countryside.

Next, I compare livelihood strategies in Nuevo Belén with those in Bajo Belén, referring again to Figure 5.1. A few patterns are notable. First, although vending is still the most common income-generating activity for individuals across both sites, the share of people who engage in it is about 9% higher in Bajo Belén than in Nuevo Belén. This decrease is likely attributed to the additional difficulties and costs for residents of Nuevo Belén. Vendors must travel to the Belén market on the *colectivo*, which is a round-trip fare of 5 S/. Recall that on average, vendors reported making 27 S/ daily, so the fare eats up a significant portion of their daily income. Vendors must also carry their wares on the *colectivo*. Finally, in order to arrive at the market on time they must wake up early. In order to allow enough time to set up a stall after the hour-long bus ride from Nuevo Belén, the first *colectivo* leaves for the Belén market at 1:30 AM. For some, this is a small barrier. “You learn to sleep on the bus,” one participant told me, shrugging it off (Participant 57, August 21, 2019). But for others, the compounding obstacles of the commute can make vending no longer a viable means of making a living. Since vending is highly gendered,

this change has particular impacts on women. Women in Bajo Belén often bring their young children to the market and watch them while they sell, or if they sell from home, can multitask. In Nuevo Belén, women must choose to leave their children at home in Nuevo Belén for the day or bring them on their commute to the market, both of which are difficult options.

The second notable difference in activity is bodegas. In both Nuevo Belén and Bajo Belén, many families run bodegas, or small convenience stores, out of their homes. These can range from small shops which sell a few snacks and essentials such as toilet paper, or extensive storefronts that include fresh fruit, charcoal, office supplies and sometimes even hot meals. Often, they are run by women, as they offer women a way to make additional income while they engage in other activities in the home such as childcare and meal preparation, since the storefront does not need to be managed constantly. Other family members often help as they are able; for instance, teenage children help sell when they come home from school, or men who engage in contract labor may help when they do not have any work. In Nuevo Belén, bodegas play an additional role: since Nuevo Belén is isolated from grocery stores or markets, bodegas help to fill the gap of a lack of grocery stores and available food. However, operating a bodega requires a significant investment that some households cannot afford. In addition to investing up front in purchasing the goods to sell, bodegas are also an investment in the space: the bodega takes away from the living area of the house – space that is at a premium in the small houses in Nuevo Belén. In the bodega in Figure 5.2, the household has used the porch space for the bodega and extended the roof to shade it.



Figure 5.2: A bodega in Nuevo Belén.

A third notable change in livelihood strategies can be seen in *almacén* work. Participants described this work as *almacén* work, which directly translates to warehouse, but the work may be better described in English as agricultural piecework. Warehouses deliver the product – commonly, garlic – in bulk to a household. Multiple members of the household prepare the food to be sold; for instance, by peeling the garlic. The warehouse then collects the peeled garlic from the household, which is paid by the kilo. *Almacén* work was not observed at all in Belén, but it is easy to see why it would appeal to households in Nuevo Belén. First family members of various ages can participate in this activity: often, multiple generations were observed contributing to this work. Second, *almacén* work is an activity that family members can contribute a small or large amount of time as they are able (e.g., adults might work the whole day while teens help for a couple hours after school). Finally, people save on transportation since they do not need to leave Bajo Belén to work. In contrast to a bodega, which requires a considerable investment, *almacén* work requires little to no investment in startup capital.

As livelihoods have shifted after relocation, so has the location of work for many participants. As Figure 5.3 shows, a higher percentage share of participants in Bajo Belén reported working in the Belén market or elsewhere in the *zona baja*. A larger proportion of participants in Nuevo Belén worked in the home. In Figure 5.3, “various” includes those who do not have a fixed work site, such as *motokar* drivers or *independientes* who work on contracts or short-term gigs. Nuevo Belén is isolated, and residents who continue to work in the city center must commute. Only 5 households (16.7%) in Nuevo Belén own a motorcycle or a *motokar* – the rest rely on the *colectivo*. Residents who choose to continue the same livelihood strategies as when they lived in Bajo Belén face a longer, more expensive, and burdensome commute.

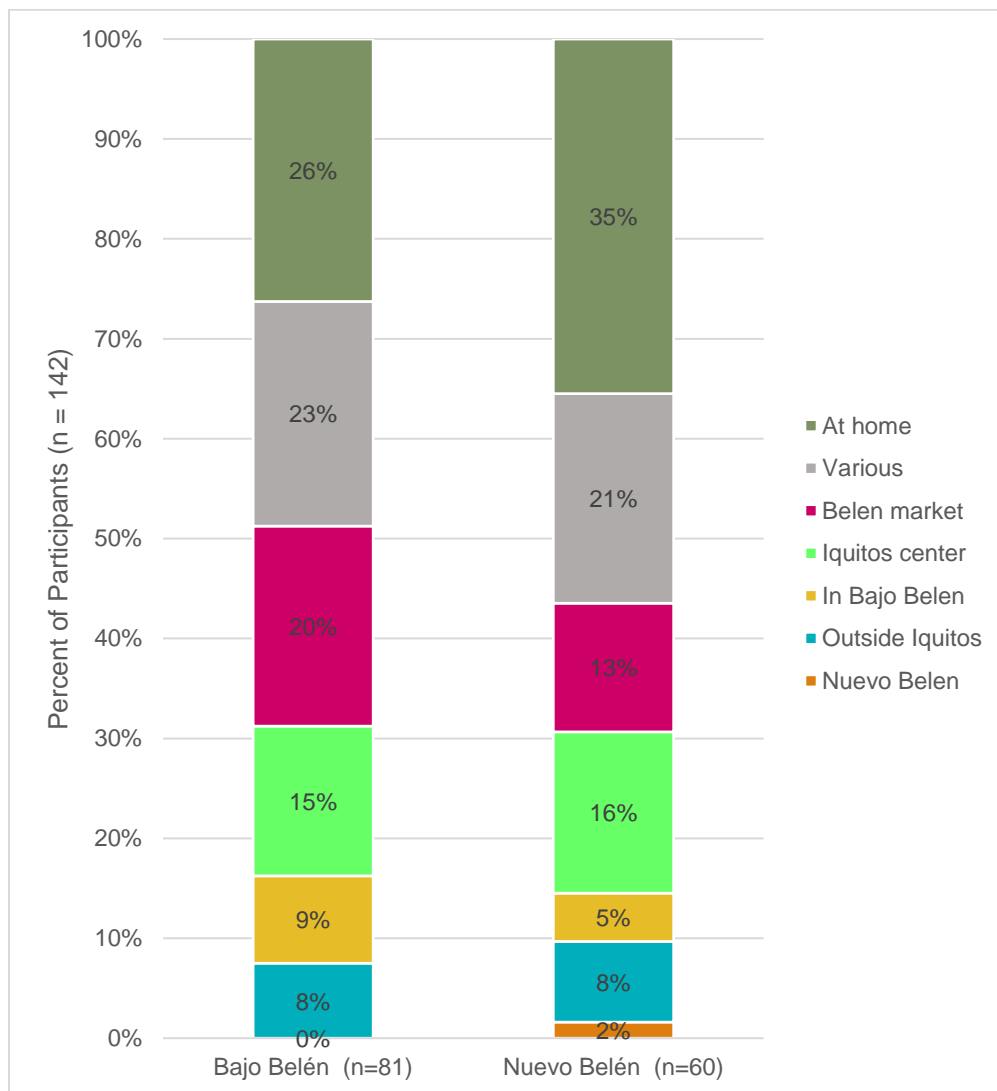


Figure 5.3: Location of work.

I close this section with a profile of a participant, Roberta, whose story which exemplifies some of the livelihood changes participants in Nuevo Belén described.

Participant Profile: Roberta

Roberta and her husband were part of the second phase of housing and when I met them, they had lived in Nuevo Belén for nearly a year. They were both in their late sixties, and her husband had a chronic illness that kept him from working. Roberta supported them by raising chickens in the backyard. In Bajo Belén, she used to make money selling hot meals from her house, but there was so little foot traffic in Nuevo Belén that it was not profitable anymore, and Roberta was hesitant to leave her husband alone all day to sell regularly at the market. Roberta told me that their income had diminished since they moved. Overall, though, she thinks they are better off in Nuevo Belén. Her husband's illness limited his mobility, and in Belén she worried about him during the flood season on the precarious boardwalks. Now, she worried for a different reason: Nuevo Belén was far from a medical center, and they did not have their own transportation. If something happened to her husband, she did not know how she would bring him to a clinic.

Roberta represents one of many women who have lost some of their income through relocation. Previously, she could earn a small cash income while also engaging in caregiving for her husband, but the isolation of Nuevo Belén has now made this difficult, if not impossible for her. Overall, though, she still believes they are better off in Nuevo Belén. In this chapter and the following one, I will return to Roberta's story to explore how other factors might have made relocation enticing for people like Roberta.

5.2. Household Income and Asset Portfolios

Income is not the only or most accurate measure of wealth, but it is still important, especially in urban areas, where households are highly dependent on cash. In this section, I compare household incomes and asset portfolios of residents in Bajo Belén and Nuevo Belén. This section reports on household incomes, although individual income information was also collected. Participants were asked to estimate the income of each member of their household, including themselves. Households then were grouped into terciles based on their monthly income. Household sizes are slightly larger in Bajo Belén than in Nuevo Belén, as well as the mean monthly income and median income (Table 5-1).

Table 5-1: Household income.

	Bajo Belén (n=30)	Nuevo Belén (n=30)
Household size (mean)	6.3	5.4
Median monthly income (S/)	1,560	1,330*
Mean monthly income (S/)	2,192	1,586
Standard deviation	1,373	963
Income terciles		
Mean monthly income (PEN)		
Lower	757	703
Middle	1,707	1,282
Higher	4,113	2,597

*Two households in Nuevo Belén declined to report their exact income and instead chose to report it within a range. These households were included in the terciles, but not in the calculation of the median or mean. They are not included in Figure 5.4.

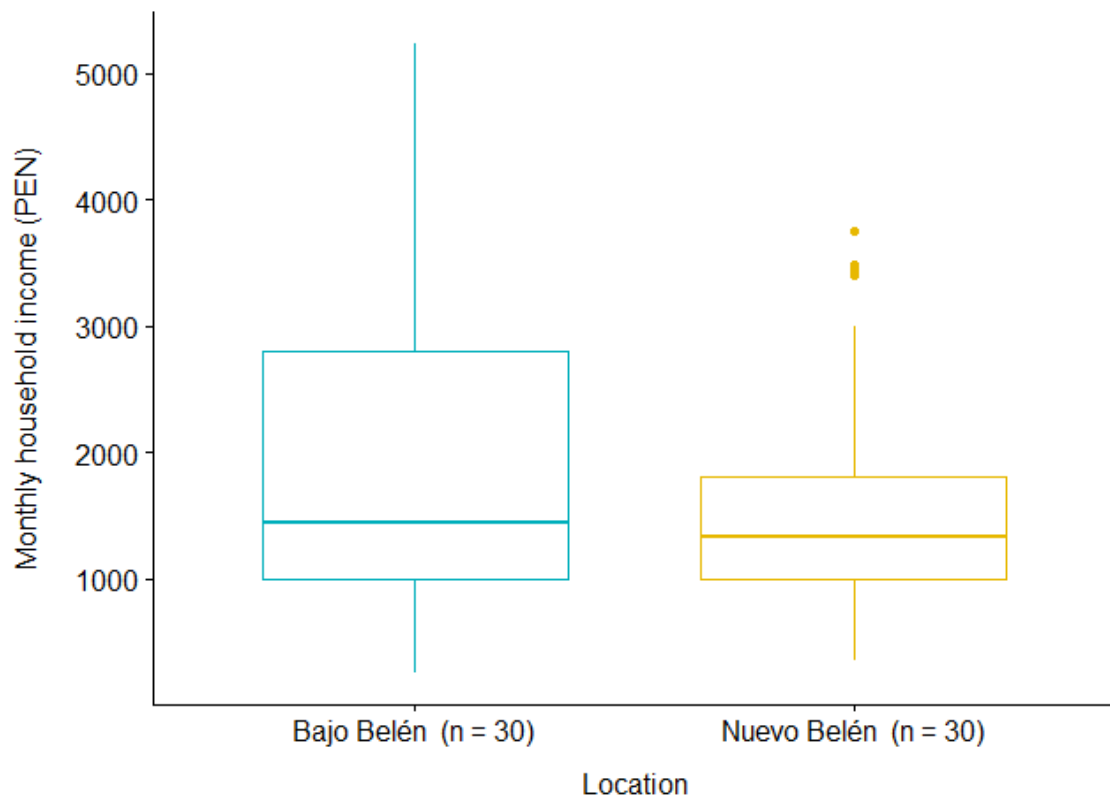


Figure 5.4: Household incomes in Bajo Belén and Nuevo Belén.

Figure 5.4 shows income information from Table 5-1. Incomes in Bajo Belén show a wider inter-quartile range than those in Nuevo Belén, though the medians are relatively similar. Nuevo Belén has 3 higher-income outliers. To test for statistical differences between the income samples at the two sites, an independent t-test was performed. At the 90% confidence level, there was no significant difference between the mean household income in Bajo Belén and Nuevo Belén ($t =$

1.6815, $p = 0.099$, $df = 46.4$). A second t-test was performed on individual incomes. At the 90% confidence level, there was also no significant difference between individual incomes at the two sites ($t = 0.84967$, $p = 0.397$, $df = 135.52$).

Given that the t-test showed no significant difference in the mean household income, I explore other ways to assess if household wealth differs between two sites. One method was simply to ask relocated households if their income has changed since they moved to Nuevo Belén in a qualitative way. Relocated households were thus asked to estimate if their income had increased, decrease, or was unchanged. It is difficult to quantify the magnitude of the change in income, since many households who had relocated in the first wave felt they were not able to accurately estimate their income from two or more years prior. Fifty percent of households reported that their income had decreased and 43.3% reported no change. Only 6.67% (2 households) reported an increase in their income. Both households were in the top income tercile and were also in the first phase of housing in Nuevo Belén, which might indicate that with time, as households become more established in their new home, they are able to recover from the shock of relocating and begin to rebuild their livelihoods. Their perceived rise in income could also reflect that such households may have benefitted from advantages of being some of the first families in Nuevo Belén. For example, a household that owned one of the largest bodegas in Nuevo Belén, and as one of the original families in the new settlement, may have been commercially established and developed a clientele before any competition emerged. The other household that reported an improvement in income was a larger multi-generational household, made up of parents, adult children, and their spouses. A larger household with multiple working adults may be better positioned to capture some of the new livelihood opportunities available to them.

Although having a cash income is important, household income is not the only way to assess the wellbeing, wealth, or security of the household. This is particularly true in this context, where income is varied or seasonal, many people are self-employed, and barter is common. A household asset portfolio can shed light on the livelihood strategies, investments, and vulnerability of the household. Some assets are an indicator of wealth, such as a laptop or washing machine. Others are productive assets, such as a freezer, or may be indicative of a particular livelihood strategy, for example, fishing equipment or a motokar (motorcycle taxi). Participants were asked if they or someone in their household owned each of the household assets listed in Table 5-2.

Table 5-2: Common household assets.

Asset	Description
Canoe	Wooden dugout canoe
Peque-peque	Small boat with a motor
Boat	Boat with a motor; larger than a peque-peque
Fishing materials	Traps, nets
Motokar	Motorcycle taxi; carries 3-4 people. Often a household will lease a motokar rather than own it outright.
Computer	Computer or laptop
Motorcycle	Motorcycle
Sound system	Sound equipment; distinct from a radio – for use with CDs or a cell phone
Fridge	Refrigerator
Gas stove	Gas stove
Radio	Radio
Cell phone	Cell phone (includes smartphone or a simple mobile phone)
TV	Television

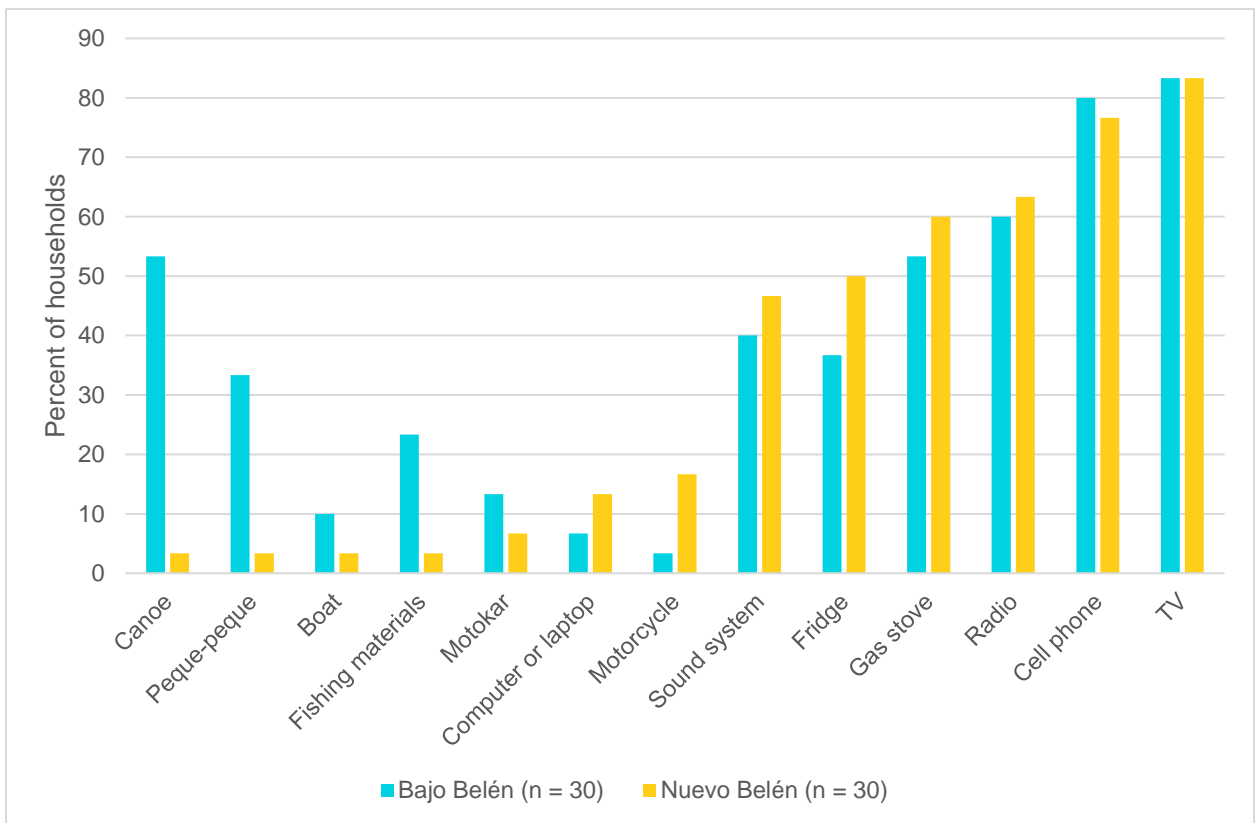


Figure 5.5: Household assets in Bajo Belén and Nuevo Belén.

As discussed in the previous section, households in Bajo Belén are more likely to engage in livelihood activities related to fishing or river transport. As Figure 5.5 shows, they are also more

likely to own assets related to fishing or river travel, such as a canoe, peque-peque, boat or fishing materials like a fishing net or trap. Changes in household asset holdings can be useful to ascertain changes in livelihood strategies for relocated households. Some families in Nuevo Belén reported that they had sold their canoe or boat when they moved, which I conjecture may have given them the chance to put this money towards an asset that was more useful in Nuevo Belén. A motorcycle or motokar is an expensive but particularly useful asset in Nuevo Belén, as it offers freedom to come and go without being bound by the schedule of the *colectivo*. Owning a vehicle also opens the door for other livelihood opportunities, like transporting goods or charging others for its use.

To further explore differences in wealth between Nuevo Belén and Bajo Belén, I used household asset portfolios to construct a wealth index. A wealth index based on physical assets can serve as a proxy for income when income reporting may be unreliable. Income can fluctuate greatly seasonally or during times of hardship or uncertainty, so asset portfolios may be a more accurate measure of longer-term economic security. Assets were compiled into a wealth index using a Principal Components Analysis, or a PCA. A PCA extracts a set of ‘principal components’ from a set of correlated variables – in this case, household assets. Each principal component is the sum of each variable multiplied by its weight, which varies in each principal component. The first principal component explains the maximum amount of variation. Further independent components are created sequentially (Abeyasekera, 2005). The weights for each indicator, or asset, from the first principal component are used to generate a household score, which is then used the wealth index (Howe, Hargreaves, & Huttly, 2008; Mckenzie, 2005). Assets that are more unequally distributed across the sample receive a higher weight in the index (Mckenzie, 2005).

Creating an index from a PCA is an iterative process; it is usually necessary to add or remove variables based on descriptive statistics or on the factor scores in the PCA outputs (Hjelm, Mathiassen, Miller, & Wadhwa, 2017). As a first step, descriptive statistics were carried out, and a correlation matrix was created for the variables of interest. Assets which showed very low correlation with all other assets in the correlation matrix were removed from the index. Some sources recommend that it is best to include assets that 30-70% of households own (Hjelm et al., 2017). In order to include assets which are less common, but in this context may strongly

indicate wealth, such as a motorcycle, the criterion was expanded to include assets owned by 10-90% of households.

Assigning a high weight to an asset which is common in one site but not another site may result in households being assigned an inaccurate position on the index. Therefore, some variables related to housing were excluded because in this context, they often do not indicate wealth. Other researchers often use housing attributes or services as variables in a wealth index, such as housing materials or toilet facilities. However, in Nuevo Belén, these assets are not usually indicators of a household's wealth. A lack of running water does not indicate that a household is low-income, because none of the homes in the second phase of resettlement have running water.

Table 5-3: Assets used to construct wealth index.

Asset	Mean (0 - 1)	Count	Index weight
Gas stove	0.57	34	0.709
Computer or laptop	0.1	6	0.698
Motorcycle	0.1	6	0.698
Refrigerator	0.43	26	0.656
Radio or sound equipment	0.65	39	0.577
Cell phone	0.78	47	0.528
TV	0.83	50	0.443

Table 5-3 shows the assets used to construct the wealth index and their weight in the index. The variables are binary, indicating either ownership or no ownership (the number of assets or other attributes, such as quality of age of the asset, were not accounted for). The count is the number of households that own the asset, while the mean is the percent (e.g., 57% of households own a gas stove). As discussed above, the weights for each asset are from the first principal component. The eigenvalue (or the variance) of the first principal component indicates the percentage of variance explained (Vyas & Kumaranayake, 2006). A higher value is desirable, as it means that the first principal component effectively explains the variance in the dataset. In this case, the variance of the first principal component is 38.77%. This value is fairly high: other studies using PCA to create a similar wealth index report variances of 11% (Vyas & Kumaranayake, 2006) and 27% (Mckenzie, 2005). The first principal component can result in negative or positive values for each household. To make interpretation easier, values were normalized from 0 to 100. To test the accuracy of the index, the total ownership of the assets was summed without weights (e.g. a household that owned all the assets in Table 5-3 would receive a score of 7) and a

correlation was performed to ensure that households that owned a large number of assets scored high on the index.

As Figure 5.6 shows, the distribution of household asset holdings varies across sites. In Bajo Belén, many households scored very similarly on the asset index: most households are clustered in the two middle groups of the index, with a small number of households in the top highest index value groups. In contrast, in Nuevo Belén, households are more evenly distributed. There are roughly equal numbers of households in the low, middle, and high index value groups. Nuevo Belén has more households in the two highest groups. This distribution suggests that there are more households with large asset holdings in Nuevo Belén than there are in Bajo Belén. The distribution also suggests that many households in Bajo Belén have very similar asset holdings, while in Nuevo Belén there is more variation. To further investigate these differences, a t-test was performed. The t-test showed that there was no significant difference in means between the two sites at the 90% confidence level ($t = -1.39$, $p = 0.17$, $df = 51.526$).

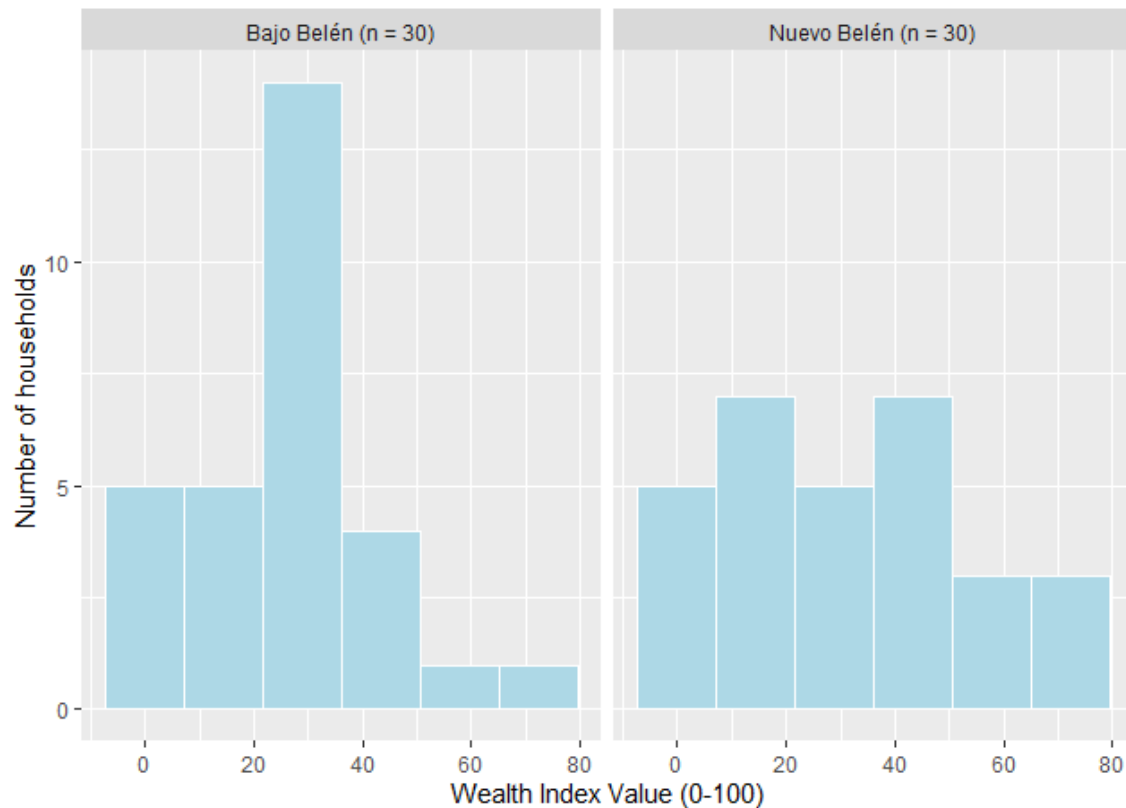


Figure 5.6: Household wealth index comparison.

The results of the income comparison and asset index point to a number of possible interpretations. First, even in areas with high poverty rates like Bajo Belén, there is still variation in wealth and asset holdings. Second, households that relocated were not easily categorized: some were rich, some were poor, some large, some small. If the majority of households in Nuevo Belén were very poor (by a measure of either income or assets), that might suggest that relocation had contributed to their poverty, or that only the poorest households had chosen to relocate – but this is not the case. It is possible, then, that the reasons for relocating were just as diverse as the households surveyed. Third, this section has examined just two of the points on the household asset pentagon: physical and financial assets. Yet we know that households employ a range of physical, natural, social, human, and financial assets to make their livelihoods. Examining other types of capitals and assets (such as natural capital, discussed in Chapter 4, or social capital, discussed later in this chapter) may reveal differences in livelihoods and vulnerability.

This index has some limitations that are important to note. Several households had the same score in the index, which is indicative of clumping, a common outcome in a PCA (Mckenzie, 2005). The clumping outcome might be improved by incorporating more variables into the index. Households could also be further differentiated by creating two separate wealth indices, which incorporate location-relevant variables, such as housing materials or title, and then normalizing and comparing the two indices.

5.3. Housing as an Asset

In a city, housing may be the most important asset in a household's asset portfolio. Housing shields people from the worst impacts of poverty, it functions as a productive asset which can be used for income-generating activities in the home, and can increase household security in the long-term (Moser, 1998). Providing housing is the linchpin of the Nuevo Belén project. Each relocated family receives a small house and plot, and a title to their new home. The relocation offers what seems to be a valuable asset: a free house with a legal property title.

The typical house in Bajo Belén is made of wood with a palm or tin roof such as the house in Figure 5.7. To accommodate the flood, most houses are built on stilts, or sometimes sit atop logs, making the house into a raft that floats on the river. In Figure 5.7, the water line from a past flood on the lower edge of the second floor is faintly visible. The logs on the ground create a

walkway for navigating the muddy ground after the flood waters recede. Locally, wood is known as *material rustico*, while cement is known as *material noble*, which confers the elevated status of using cement. However, wood does confer a number of advantages: wood can be disassembled and easily replaced, and houses built of wood allow air to circulate. The wood begins to rot after a couple of flood seasons and must be replaced. Families that can afford to will invest in making the floors or stilts of their house out of cement instead. This is relatively uncommon in Bajo Belén, as it is a significant investment. As Table 5-4, shows, only 10% of households surveyed had cement columns.



Figure 5.7: Typical stilt house in Pueblo Libre.

Table 5-4: Attributes of housing in Bajo Belén.

	Percent of households	Number of households
Housing Material		
Wood	90%	27
Cement	10%	3
Roof Material		
Tin	93.3%	28
Palm	6.7%	2
House Type		
Stilts	86.6%	26
Floating/raft	13.3%	4

In Bajo Belén, 2/3 of participating households had their own water connection in their home, and even more had their own metered electricity (Table 5-5). For sewage, most households used a latrine toilet and/or a dugout sewage channel (Figure 5.8).



Figure 5.8: A floating latrine behind a house in Nuevo Liberal, Bajo Belén.

Table 5-5: Essential services in homes in Bajo Belén and Nuevo Belén.

	Bajo Belén (n = 30)	Nuevo Belén (n = 30)	
		Phase 1	Phase 2
Water			
Connection	20	10	5
Water tank	-	5	10
Buy bottled water	10	-	-
Sanitation			
Sewage	7	12	5
Latrine	19	-	-
None	4	3	10
Electricity			
Meter	26	14	15
Shared meter	3	1	-
None	1	-	-

In Nuevo Belén, families were promised a house with a connection for running water, electricity, and sewage (MVCS, 2015). However, residents who moved in the first wave of construction reported that they had waited months to get running water and sewage in their homes when they first arrived in Nuevo Belén. At the time of this fieldwork, most residents in the second phase of housing still lacked these services (Table 5-5), meaning that some had already been living there for nearly a year without them. The Ministry of Housing has set up public water tanks, as shown in Figure 5.9, which are refilled a couple days a week, where households can collect water and bring it back to their house. Residents do not pay for these services yet (though they will be expected to in the future) since they are not fully functional – they only pay for electricity.



Figure 5.9: Residents in Nuevo Belén around a public water tank.

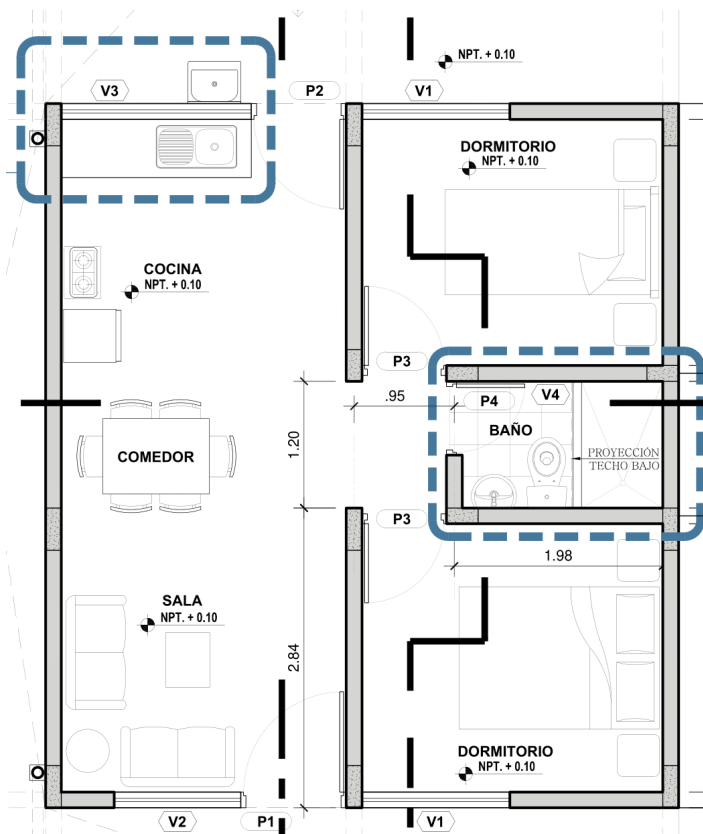


Figure 5.10: Floorplan of a house in Nuevo Belén. Source: MVCS.

Houses in Nuevo Belén are 40m² on a 120m² lot. All houses have the same floorplan: two bedrooms, one bathroom, and a common area and kitchen (Figure 5.10). Families with the financial means had extended or remodeled their homes. Modifications ranged from small, such as painting or extending the front roof, to a complete transformation of the house by adding another floor. Figure 5.11 is an example of an extensive modification of a home. The family has used concrete to create an attached garage and added a second story onto the addition, more than doubling the size of the original house. The most common housing modification was extending the front roof to provide more shade, which could be accomplished quickly with inexpensive materials like palm or plastic. Some households had remodeled their homes to transform them into a productive asset by making space for a bodega or building a chicken coop in the back, while others expanded living space to accommodate multiple generations. Some of the households that resettled brought wood and housing materials with them from Bajo Belén to improve their home in Nuevo Belén. This was not always a cheap endeavor: one participant, who had made significant modifications to his home, reported he had spent 1,200 S/ to move all his belongings and construction materials to Nuevo Belén. One third of households made no modifications to their home. Table 5-6 summarizes the housing modifications in Nuevo Belén. Each line represents one household.



Figure 5.11: An extensive modification of a home in Nuevo Belén.

Table 5-6: Housing modifications in Nuevo Belén.

Household Number	Extended front roof	Added second floor	Painted walls	Extended house	Added cooking hut	Fenced in lot	None
1	✓		✓	✓		✓	
2	✓		✓	✓		✓	
3	✓					✓	
4	✓			✓		✓	
5	✓						
6	✓				✓		
7	✓					✓	
8	✓	✓					
9	✓						
10				✓			
11					✓		
12		✓					
13	✓				✓		
14	✓				✓		
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16	✓			✓			
17	✓			✓			
18	✓						
19	✓						
20	✓						
21							✓
22							✓
23							✓
24							✓
25							✓
26							✓
27							✓
28							✓
29							✓
30							✓
	Number of Households (n = 30)						
	17	2	2	7	4	5	10

As discussed in Section 2.3, a land title is an important part of the house as an asset, as it confers security and legality. The distinction between titled and untitled property is not so clear-cut in this context: in Peru, there is a gradient of formal property rights. The *constancia de morador* is a property title verified by the elected community leader, which is the least formal, and may be translated as a proof of residence. A *certificado de posesión* means that the property has been

registered with the municipality. The municipality, however, is not charged with titling, so an individual may have a *certificado de posesión* without legal ownership of the lot (Hawley, Miranda, & Sawyer, 2018). Finally, a *titulo*, or a title, is full legal ownership of the lot. The title is registered through the Reglamento de Organización y Funciones del Organismo de Formalización de la Propiedad Informal (Spanish acronym COFOPRI), a federal agency under the MVCS which works toward the formalization of informal housing.

In Bajo Belén, only about a third of households surveyed had a title to their home; another third had *constancia de posesion* (Table 5-7). Twenty percent had a *constancia de morador*, and only one household had no title. The two households categorized as “other” are households who had a title to a home in Nuevo Belén but still lived in Bajo Belén. One household was awaiting the construction of their house in Nuevo Belén. The other had split their household, with one family member in Nuevo Belén, while the rest remained in Bajo Belén without title to their lot. This is an unusual situation – participants almost universally confirmed that when a family left for Nuevo Belén, the state repossessed the lot in Bajo Belén, leaving it empty.

Table 5-7: Possession of housing title.

	Bajo Belén	Nuevo Belén	
		Before relocation	After relocation
No title	1	-	-
<i>Constancia de morador</i>	6	6	-
<i>Certificado de posesión</i>	11	12	-
<i>Titulo</i>	10	12	30
Other	2	-	-
Total	30	30	30

All households surveyed in Nuevo Belén had a land title to their home. Households had to exchange a title or documentation (the less formal *constancias* or *certificados* were accepted) for their house in Bajo Belén in order to receive a house in Nuevo Belén. The majority of households who relocated to Nuevo Belén reported that they had had either a *constancia de posesión* or a full title when they lived in Bajo Belén. Sixty percent of households had ‘upgraded’ to a more formal title by relocating to Nuevo Belén.

With regard to their new house in Nuevo Belén, participant satisfaction was varied. Many people who moved to Nuevo Belén reported that the offer of a house with a title was important to them. When asked what their expectations were for Nuevo Belén, about 2/3 of participants responded

that receiving a house complete with services was one of their expectations. One participant reported, “I never imagined that I would have a house like this: a concrete house with running water. The house in Belén was *fea* [ugly or bad]” (Participant 31, August 17, 2019). Other participants were disappointed in the house they had received, especially those in the second phase, who still lacked the essential services they had been promised. A number of participants reported that the houses in Nuevo Belén are hot and poorly ventilated. Cement walls and tin roofs do not effectively circulate air in the house in hot tropical days, while the wooden, elevated houses in Bajo Belén allow air to flow through the house, including from the floor. Several residents in Nuevo Belén complained that their houses were especially hot when closed up at night. Others, although they did not dislike their house in Nuevo Belén, had had a strong attachment to their home in Bajo Belén. This last sentiment was shared with me by one participant who had gone to Nuevo Belén lamenting that it had been difficult for him and his wife to leave their house in Bajo Belén after living there for many years, investing considerable time and money into the house.

For some residents, receiving a new house in Nuevo Belén was a factor that drew them to relocate; on the other hand, participants who did not want to leave Bajo Belén said that their house contributed to their decision to stay. Many felt that the houses in Nuevo Belén were inadequate: too hot and too small. “Although our house [in Bajo Belén] is old, it’s big enough for all of us,” one participant told me (Participant 28, August 15, 2019). Others were wary because they had heard that the latest installation of houses in Nuevo Belén lacked running water and sewage. Some participants in Bajo Belén speculated that people may have decided to go to Nuevo Belén because their houses were falling apart and had no better option. Outsiders, like the state, may view the houses in Bajo Belén as inadequate: in the relocation feasibility study, the houses are described as low-quality and overcrowded (MVCS, 2015). In fact, in many ways the houses in Bajo Belén are well-suited to the local climate, the flood, and the local cultural context, and many households have lived in Bajo Belén for decades and made significant investments in their homes.

5.4. “Everything at Hand:” Services and Community

In the previous sections of this chapter, I have shown how participants make a living and how their livelihoods have changed through relocation and compared income and asset holdings

between households in Bajo Belén and Nuevo Belén. I have also examined the role of housing as enticing some families to Nuevo Belén while simultaneously enticing others to stay in Bajo Belén. In this section, I discuss other factors that people value about where they live, like services and community. These factors not only play a role in determining whether or not people choose to relocate, but also contribute to overall wellbeing and security in the long-term. Of the 30 households surveyed in Belén, 22 planned to stay in Belén, meaning that only about 26% were planning to relocate. Two of those who planned to relocate did not want to. In one case, a family member had made the decision for them, and in the other case, the family was awaiting a house in Nuevo Belén but had changed their mind since committing to the relocation.

I asked residents of Bajo Belén why they had chosen to stay, and asked residents of Nuevo Belén why they thought people had chosen to stay. Figure 5.12 shows the reasons Bajo Belén residents cite for staying, and Nuevo Belén residents' opinions of why their neighbors chose to stay in Bajo Belén. Bajo Belén participants' answers represent both positive attributes of Belén which they did not want to leave, and negative attributes of Nuevo Belén that were unappealing. The most common reason for staying was the distance and isolation of Nuevo Belén. Others mentioned access to specific services and employment in the city. Others were skeptical that the state would not follow through on everything they had promised Nuevo Belén. "[I stayed because] I knew [Nuevo Belén] wouldn't be everything they said it would," said one participant (Participant 18, July 22, 2019).

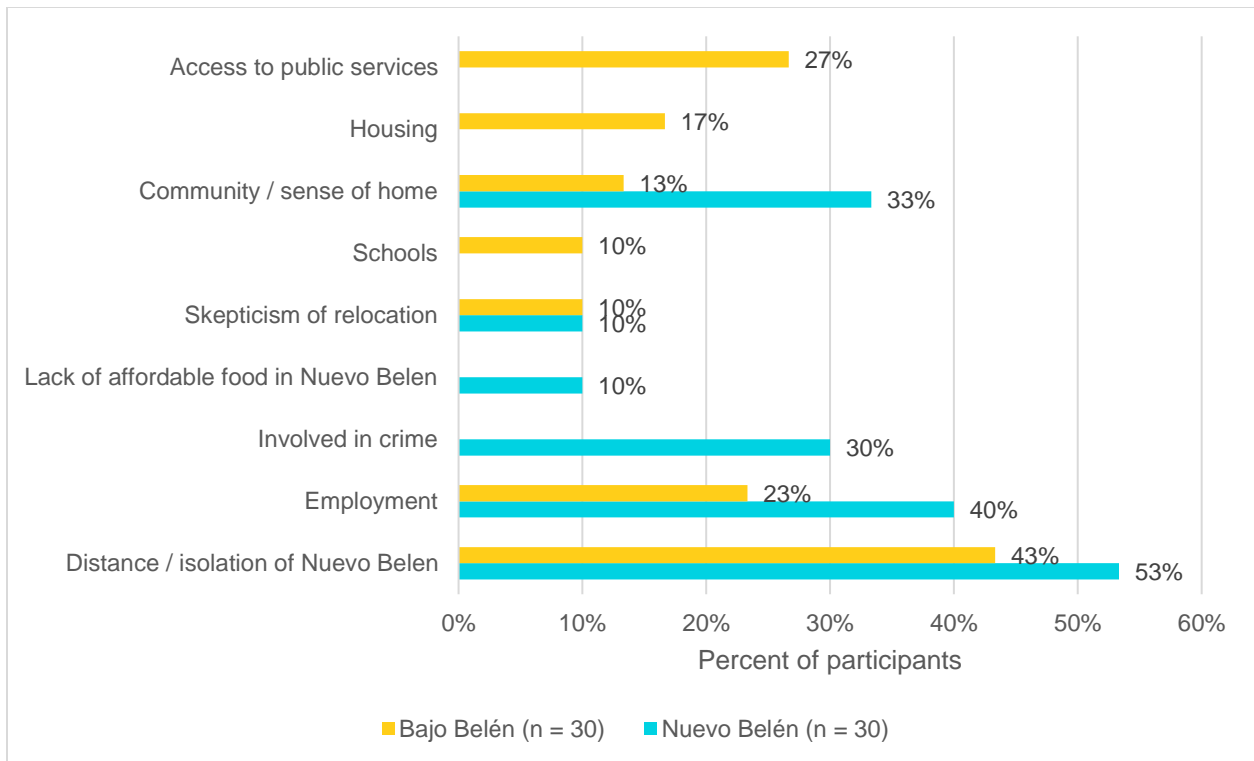


Figure 5.12: Reasons for staying in Bajo Belén.

Access to public spaces and services was an important factor for many participants. In Bajo Belén, most everything can be found within walking distance: the Belén market, health clinics and hospitals, schools, the river, and jobs in the city. A common refrain I heard from participants was that in Bajo Belén, “todo está a la mano,” meaning that everything is close, or literally, “at hand.” In particular, over half of participants specifically named the Belén market as a valued place for them. The market is not only a site of economic opportunity for many vendors but also an important source of affordable food for families who live in the *zona baja* and throughout Iquitos. Another common comment I heard from participants in Bajo Belén was “and what are they going to eat there [in Nuevo Belén], sand?” This jab has a double meaning, referring to the lack of markets in Nuevo Belén as well as the sandy terrain.

The market is also an important site for community-building: neighbors, shoppers, and vendors all gather and kill time together at the market. Fishers, farmers, and hunters are connected to the city, while city dwellers are connected to the familiar foods and people they know from the countryside. Residents of Nuevo Belén also recognized the importance of staying close to these economic opportunities. When asked why their neighbors had chosen to stay in Bajo Belén, most

concurred with Bajo Belén residents, citing the distance, isolation, and lack of work of Nuevo Belén.

Participants in both Bajo Belén and Nuevo Belén recognized the role of social capital – community, neighbors, and a sense of home – in the decision to relocate. For many households, the decision to relocate was not made in isolation and the decisions of others tipped the needle for some people. Recall the household profile of Maria in Chapter 4, who was able to convince her mother and sister to move to Nuevo Belén too. Having the support of family and neighbors nearby can make relocation less isolating and disruptive. Community leaders and neighbors also play a role in the decision to relocate and satisfaction with the decision. In Nuevo Liberal, 56% of participants surveyed planned to relocate. One of the former community leaders in Nuevo Liberal was an early champion of the resettlement – he now lives in Nuevo Belén and is one of the community leaders there. In the other two sectors I surveyed, Sachachorro and 10 de Octubre, the community leaders were opposed to the relocation, and one had publicly advocated against the relocation in front of officials. In those communities, only 10% and 18% of households, respectively, planned to relocate. Although there is not enough data to draw a correlation, this pattern suggests that buy-in from community leaders and neighbors has a strong influence on people’s decision to relocate or not – and later, may influence whether people are happy with their choice in the long-term.

Some participants in Nuevo Belén speculated that people in Belén simply did not understand how life would be in Nuevo Belén or were misinformed. Residents of Nuevo Belén might simply value different things about where they live than residents of Bajo Belén. In Nuevo Belén, residents named the calm, quiet environment as a plus, and relocation might have represented a good offer for people who simply wanted out of the city. Some participants in Nuevo Belén speculated that over time, their counterparts in Bajo Belén would change their minds. “Once there are more vacant lots than there are neighbors [in Bajo Belén], they’ll come,” one woman told me (Participant 32, August 8, 2019). There is a sense that if a critical mass of households relocates, the state will have to respond more quickly to the needs of the population and follow through on the services they promised to residents. On the other hand, some residents of Bajo Belén claimed that residents would become dissatisfied and eventually leave Nuevo Belén, and that some already had left. While this information was difficult to verify, I noted one house in Nuevo Belén that neighbors reported to be abandoned.

One response from the Nuevo Belén participants deserves particular attention: that people stayed in Bajo Belén because they are involved in crime. Some participants referred to these people as *gente de mal vivir*, or bad people who make a living from illicit means, such as selling drugs; as one respondent delicately put it, “they want to live an easy life” (Participant 38, August 17, 2019). One sector in particular, Pueblo Libre, was frequently mentioned. Bajo Belén has a negative reputation within Iquitos for being unsafe, and within Bajo Belén, Pueblo Libre is seen as particularly unsafe. One Nuevo Belén resident reported, “There’s an image of Bajo Belén as a dangerous area. Living here [in Nuevo Belén] gives you a sense of having a change in your life; a better relationship with people from outside; it improves your self-esteem” (Participant 50, August 20, 2019). In Nuevo Belén, the community leader emphasized that the community policed itself and that delinquents, drunks or troublemakers would be ousted, in order to keep Nuevo Belén from becoming like Bajo Belén.

Bajo Belén residents value being close to a variety of services in the city, like clinics and schools, and their counterparts in Nuevo Belén missed them. In Bajo Belén, participants are close to a number of health facilities, such as a clinic in 10 de Octubre, in Pueblo Libre, and a hospital just upland from the *zona baja*. Plans for Nuevo Belén included a health post, a facility smaller than a clinic, typically staffed by a technician or nurse that offers basic services. The health post had not yet been constructed at the time of this fieldwork; another study reported that by the end of 2019, a portable health post was brought to Nuevo Belén but it remained unstaffed (Soto Arias, 2021). The nearest hospital is in San Juan Bautista, about 30 minutes away. “If something happens in the night, there’s no hospital here...the *colectivo* doesn’t run late and an ambulance can’t make it through on the dirt road here at night,” one mother with young children told me (Participant 35, August 17, 2019). The dirt road from the main highway to Nuevo Belén has no lights, making it dangerous to traverse at night – especially for women. These concerns about the lack of an accessible health center echo what Roberta expressed in the third participant profile about her husband, who lived with a chronic illness.

Three participants in Bajo Belén specifically mentioned schools as part of their choice to stay; specifically, they did not believe the Nuevo Belén school was sufficient. The school in Nuevo Belén currently enrolls both primary and secondary students but is still housed in portable classrooms until construction can start (Figure 5.13). The portable classrooms are built with tin roofs and sides, making them almost unbearably hot: teachers I interviewed reported that

students quickly lost focus or fell asleep in class due to the heat. The teachers had been waiting for fans to be delivered; on the day of our interview, the fans had been delivered but not installed. Furthermore, the school, like the houses in the second phase of construction, lacks running water, so there are no drinking fountains. There is an outdoor gathering area which offers some relief from the heat, which the school uses for assemblies or projecting films, but this too has issues. “The school is too close to the houses,” one teacher said in an interview, “and the gathering area is open...it’s distracting, the children can just wander away” (Participant 65, July 21, 2019).



Figure 5.13: Portable classrooms in Nuevo Belén.

Overall, people in Nuevo Belén seemed to feel that their lives had improved in some ways, but they still saw significant disadvantages to living there. In particular, the lack of work in and around Nuevo Belén and the isolation of Nuevo Belén were commonly mentioned. This points to the economic isolation of Nuevo Belén, and the particular difficulty of solving this problem. While residents are no longer exposed to flooding on a yearly basis, relocation has arguably made them more vulnerable to poverty by reducing their ability to secure an income and reducing their access to high-quality public services.

I close this chapter with the final participant profile: Vicente, a moneylender who relocated to Nuevo Belén, whose story illustrates how a household's assets help shield them from the livelihood disruptions of relocation.

Participant Profile: Vicente

Vicente, his wife, and his daughter moved to Nuevo Belén in the second phase of the resettlement program. In Bajo Belén, they had a large, colorful, distinctive house in Nuevo Liberal. Vicente's wife, like many women, sold fish in the market. Vicente sometimes sold with her, but his primary income came from moneylending. He was cagey when asked details about his income and avoided the questions. When I met them, Vicente and his family had only lived in Nuevo Belén about nine months, but already they had made significant renovations to the house, using concrete to double its size. Their house in Nuevo Belén had other amenities that most families did not have, like a couch and a washing machine. Vicente's daughter attended a well-regarded university in Iquitos, and she often used the family's motorcycle to get to and from her classes.

Vicente's story highlights how a wealthy family that was secure in Bajo Belén could remain so in Nuevo Belén. Their wealth helped them weather the negative parts of life in Nuevo Belén. Owning a motorcycle meant they did not have to depend on the *colectivo*, which afforded them a degree of convenience that many in Nuevo Belén did not have. Not only did the motorcycle offer a convenient mode of transportation, but it allowed Vicente's daughter to attend university. Increasing the family's human capital through her education will likely increase the daughter's (and household's) financial capital in the future. Vicente's family's relative wealth has also allowed them to significantly expand their home in Nuevo Belén beyond the small, prefabricated base house. The household could afford to transport some of the materials from their old home in Bajo Belén, as well as buy new materials. Not only do these improvements provide a more comfortable place for the family to live but may make the house a better site for income-generating activities. Vicente's household can be contrasted with Roberta's (page 63), who had few assets besides the house they had received in Nuevo Belén.

5.5. Discussion

In this chapter, I set out to answer my second research question: **how has relocation changed the livelihoods of people in Nuevo Belén?** Relocation has altered the livelihoods of many residents, and families are coping with this disruption in different ways. Some have sought out new forms of income or are diversifying livelihood strategies. Others still maintain the same livelihood strategy, but now have a longer, costlier, and burdensome commute. Based on the importance of vending as a livelihood strategy for women, relocation may be limiting women's livelihood opportunities more than men.

Comparing households across the two sites revealed that households that relocated were not easily categorized: they varied in size, age, wealth, and livelihood strategies. Income and household asset wealth values were not significantly different among households across the two sites. It is possible that there may be other elements that influenced households to relocate which were not well captured here, such as social and family connections. It is equally possible, however, that the reasons for relocating were not universal.

Housing is an important asset for urban poor, and the promise of free housing is the primary appeal of the resettlement. The offer of a house in Nuevo Belén offered some families a degree of security in their housing and an improvement in quality that they struggled to attain in Bajo Belén. Families who already had the financial capital were able to improve their homes considerably in Nuevo Belén, which in turn could sometimes be a productive asset to generate income. However, houses were also part of the reason people wanted to stay in Bajo Belén. This suggests that the equation is not as simple as providing a free house: the quality, location and suitability of the house is important as well. The houses in Nuevo Belén appear to have been constructed with little consultation and little regard for the local climate (hot and tropical) and culture (large, often multi-generational households) (Desmaison et al., 2019). This problem is not unique to Nuevo Belén: in other resettlement projects, residents often contend with housing that may be small, impersonal, lacking privacy or even the most essential services (Nikuze et al., 2019). In turn, houses in low-income or informal settlements like Bajo Belén are written off as unsuitable and low-quality, when in fact, many households have made significant investments in their home and choose to use certain materials not only due to cost, but because they are better suited to the local climate.

Households shield themselves from vulnerability through a portfolio of assets. Nuevo Belén offered households physical capital in the form of a house, and potential future access to financial capital through a housing title. However, many households already had access to a wide variety of capitals in Bajo Belén, some of which Nuevo Belén did not offer them. In Bajo Belén, residents had access to natural capital (the rivers), social and human capital (the Belén market, schools, and economic opportunities in Iquitos), and physical capital (their houses). Many participants were resistant to relocation because they understood that it would limit their access to physical, natural, social, and human capitals, and that relocation had little to offer them as a replacement.

The wealthiest households who have a robust household asset portfolio will likely be able to weather the shocks and the disadvantages of living in Nuevo Belén, like the distance from economic opportunities and essential services, the disruption to their livelihoods, and a house that may not serve the household's needs. Wealthier households have the means to improve their home in Nuevo Belén or use their own transportation to make the commute less burdensome. They are able to make bigger, riskier investments that may turn them a greater profit, such as setting up an expansive bodega in their home. The poorest households, however, do not have these options, and it they stand to lose the most from a relocation project that does not deliver what was promised to them.

Chapter 6

Conclusion

6.1. Key Findings and Conclusions

In this thesis, I set out to examine two research questions: first, **how were residents of Bajo Belén vulnerable to floods, and how has the Nuevo Belén relocation reshaped vulnerability?** and second, **how has relocation changed the livelihoods of residents in Nuevo Belén?** To answer these questions, I drew on literature and concepts from hazards and climate change studies, urban livelihoods and poverty studies, and resettlement, and employed household surveys, key informant interviews and participant observation.

To answer my first research question, I compared the state's perspective on flood risk and vulnerability with residents' perspective, described residents' experiences of the flood, and discussed how relocated people viewed the flood and it contributed to their decision to relocate. My findings indicate that experiences and perceptions of flood risk in Bajo Belén are varied, nuanced, and socially differentiated. Residents who have significant adaptive capacity – those whose livelihoods are tied to the flood, who have the physical and financial assets to cope with the impacts of floods and are well-connected and supported by their community– are less likely to view the flood as a significant threat to their wellbeing. Other residents, however, such as those with high sensitivity, or limited access to the assets that allow them to cope with the flood, perceive it to be a higher risk to their safety. Most residents saw the flood as an inconvenience, or merely a fact of life. Their vulnerability to the negative impacts of flooding was outweighed by the security offered by their access to other assets and opportunities in Bajo Belén. For residents who have relocated, relocation has eliminated their exposure to floods, but they may be made more vulnerable in other ways. Residents who chose to relocate may have been those who were more sensitive to the negative impacts of floods, and/or those who had little adaptive capacity to cope with floods.

My findings also indicate that in Bajo Belén, residents understand flood risk and vulnerability in a more nuanced way than the state does. The state has deemed Bajo Belén to be uninhabitable, unsanitary, and dangerous, and labelled residents vulnerable and impoverished. Residents understand that their security and wellbeing is tied to more than the flood. The divide between the state's perspective of risk and residents' perspective stems from three points of disconnect:

what is considered a hazard; local history of adaptation to floods; and the social production of flood risk.

To address my second research question, I compared livelihood strategies, income, and household asset holdings among households at both sites, analyzed the role of housing as a key physical asset, and broadened the lens to examine other less tangible assets such as community ties and access to services. Findings show that relocation has indeed altered residents' livelihoods. Some residents changed their livelihood strategies, while others persisted in maintaining the same ones as in Bajo Belén. Overall, however, the isolation of Nuevo Belén significantly constrained them, and most residents reported that their income had diminished since relocating. Lack of work and economic opportunities was a common complaint among Nuevo Belén residents – and a problem that has proven difficult to solve in other resettlement projects (Arnall, 2019; Piggott-McKellar et al., 2020; Wilmsen & Webber, 2015). Relocation seems to have made households in Nuevo Belén vulnerable in other ways by distancing them from important assets, like the river, market, and public services.

Housing emerged as an important factor in people's decision to relocate or not – but the offer of a free house in Nuevo Belén was perhaps not as enticing as decisionmakers expected it to be. To be sure, receiving a free house with a title offered some Nuevo Belén residents a greater degree of housing security than they had had in Bajo Belén; but for many residents in Bajo Belén, their houses already served their needs: they were large, well-located, and comfortable in the climate. These findings underscore the importance of high-quality, culturally appropriate, and climate-suitable housing in a resettlement project (Correa, 2011; Cronin & Guthrie, 2011; Oliver-Smith, 1991).

The wealthiest (both in terms of income and in terms of asset holdings) households surveyed here will, in all likelihood, thrive in either location. Household wealth and asset accumulation shields these households from the shocks and stressors of living in Nuevo Belén or in Bajo Belén. In Nuevo Belén, these households have transportation to access economic opportunities and emergency services, and they have the funds to improve their home. In Bajo Belén, wealthier households can mobilize their assets to benefit from or adapt to the flood and are better positioned to take advantage of the other livelihood opportunities nearby in Iquitos. Poorer households, however, experience the negative aspects of living in either site most acutely, such

as lack of transportation or a crowded house in Nuevo Belén, or poor protection from the flood in Bajo Belén.

The Nuevo Belén relocation offers a window into how people understand and reduce their overall vulnerability, and broadly, what people value about where they live. Proximity to services and accessibility to the city at large is a priority for many people in Bajo Belén. For others, the sense of community, their connection to place, and the principle of not wanting to be forced out was a motivating factor to stay. In Nuevo Belén, other themes emerged as important values. For families who wanted nothing more than a house – who did not expect Nuevo Belén to materialize into the full city they were promised – their expectations seem to have been met. Other residents of Nuevo Belén expressed a desire to live in a more rural and tranquil place outside the city.

The findings from this study point to a few broader conclusions about vulnerability to environmental hazards, livelihood changes, and resettlement. First, the Nuevo Belén study illustrates the need to view environmental hazards with a nuanced perspective, rather than to paint them with a broad brush as categorically bad and dangerous. Hazards are made hazardous by social, economic, and political factors (Blaikie et al., 1994; Cardona, 2004; Heijmans, 2001; Heltberg et al., 2009). People experience hazards and perceive risk differently, based on factors like their assets, life experience, livelihood strategies, and age, among others. Understanding that people perceive and experience risk differently helps explain why some people continue to live with environmental hazards (Bankoff, 2001; Tschakert et al., 2017). In Bajo Belén, the flood brings both risks and opportunities (Chávez Eslava, 2017). However, the risks are compounded for people who have limited assets to respond to floods. In this case, the state seems unwilling to grapple with this nuance, as it would require a paradigm shift in considering how people live with hazards, and a power shift in who determines what is a hazard.

Second, vulnerability should be broadly understood as encompassing more than just exposure to hazards (Blaikie et al., 1994). Decisionmakers' narrow focus on eliminating exposure to floods neglects the fact that living on the floodplain offers opportunities and neglects the long history of living with floods in this region (Bankoff, 2001; Chávez Eslava, 2017). Focusing on flood exposure as the sole source of vulnerability also neglects that residents in Bajo Belén have access to many different types of capitals, which help shield them from vulnerability. This broad

understanding of vulnerability is, in this case, understood intuitively by people who live in Bajo Belén, but not recognized by state actors. Vulnerability looks different from the top down than it does from the bottom up, and so understanding it must draw from the perspectives of local people rather than outsiders (Heijmans, 2001; Moser & Stein, 2011).

Third, household asset accumulation is closely linked to reducing vulnerability (Moser, 1996). Assets help people to weather the shocks of living in either Bajo Belén or Nuevo Belén. Strengthening people's livelihoods, reducing poverty, and improving access to services can also help people better adapt to environmental hazards and the coming impacts of climate change (Eakin et al., 2014; Heltberg et al., 2009; Huq et al., 2004; Kelly & Adger, 2000). In Bajo Belén, in-situ investments, such as improving sanitation and waste collection, poverty reduction efforts, or upgrading and reinforcing people's houses, could mitigate some of the negative impacts from the flood, as well as strengthen people's basic livelihoods. Undertaking these efforts would require more than capacity-building at the household or even community level: it would require targeted state investment and consultation with residents, something that the state seems unwilling to embark on.

Fourth, this case study highlights the agency of individuals and households in choosing to relocate. The people who chose to relocate were not powerless in this decision, and many participants expressed genuinely that they believed relocation had improved their wellbeing. In choosing to stay or go, many families made difficult trade-offs; for instance, they might have gained housing security but lost mobility and income; or they might have finally gained peace of mind after living with the constant threat of floods. Tschakert et al. (2017: 6), writing about losses due to climate change, note that "it is through attention to and appreciation for what is meaningful to people that incommensurable needs, values, and often difficult trade-offs can be revealed." The Nuevo Belén project offers an important window into what people value about where they live and how they balance the risks and opportunities that their home offers them.

From these four conclusions, I draw four insights on the best practices of resettlement. First, resettlement, if it is to occur at all, should be truly voluntary (Arnall, 2019; Barnett & O'Neill, 2011). The voluntary nature of the Nuevo Belén project has been a redeeming quality in a resettlement project which has failed residents in many other ways, by not providing them with the promised services, and through a lack of consultation in the planning process. Voluntary

relocation has allowed people who have strong and stable livelihoods in Bajo Belén to remain there and has provided an opportunity for those who feel that Nuevo Belén has something to offer them. Unfortunately, one can imagine that a particularly devastating flood in the future might cause the state to double down on its categorization of Bajo Belén as dangerous and uninhabitable, and relocation could be rendered no longer voluntary.

Second, the Nuevo Belén case study adds to a robust body of literature on livelihood security as a key determinant of the success or failure of resettlement projects (Arnall, 2019; Cernea, 1997; De Sherbinin et al., 2011; Ferris, 2015; Piggott-McKellar et al., 2020; Warner et al., 2009; Wilmsen & Webber, 2015). Planning for how residents will maintain or develop new livelihood strategies is essential if resettlement is to actually improve people's wellbeing. Furthermore, livelihoods should be understood to encompass all five capitals: natural, physical, financial, social, and human; in many resettlement projects, including Nuevo Belén, physical capital (such as a house) is prioritized at the expense of the other four (Piggott-McKellar et al., 2020). People are adaptable to new places and situations – as residents of Nuevo Belén have shown, they will find new ways of making a living. But decisionmakers can and must make it easier for them.

Third, the planning process of such resettlement projects should be participatory, and should meaningfully consult with residents at every stage of the planning process (Abebe & Hesselberg, 2015; Correa, 2011; Cronin & Guthrie, 2011; Ferris, 2015; Gromilova, 2014; Oliver-Smith, 1991; Tadgell et al., 2018). Residents had little to no consultation on the Nuevo Belén project. They learned about it after the law authorizing the relocation had already been passed and had no opportunity to weigh in on the site selection, the houses, or the design of the new settlement. One can imagine that if residents had been meaningfully involved in the planning process from the beginning, they might have headed off some of the critical issues with the project, such as the design of the houses. Piggott-McKellar et al. (2020: 106) write that even the initial process of determining whether an area is too risky for habitation should be conducted through a democratic and inclusive process. In this case, a consultation with residents might have revealed that people view their location on the floodplain not as a hazard, but as an opportunity.

Fourth, resettlement projects must work for the people who are most marginalized (Correa, 2011; Ferris, 2015; Warner, 2010). Negative outcomes of resettlement, like the disruption of social networks and loss of income, are disproportionately shouldered by certain groups and

individuals, such as women, low-income and racialized people (Piggott-McKellar et al., 2020). Decades of livelihoods research has shown that asset accumulation shields people from shocks and stressors (Moser, 1998), a fact which remains true under the circumstances of resettlement. People with wealth, class, racial or other kinds of privilege will likely do well whether or not they relocate. If resettlement projects do not center the experiences of those who are most vulnerable, they risk perpetuating and reinforcing these inequalities (Moser & Satterthwaite, 2008; Piggott-McKellar et al., 2020).

6.2. Limitations and Recommendations for Future Research

This research has some limitations, some of which have been noted in their respective sections. My fieldwork was conducted from June to August, which is the dry season, so I did not experience a flood. My knowledge of floods is limited to what participants shared with me, and what I was able to learn from other researchers. There are also limits to my understanding of the local context, history, and culture during a three-month-long field season. The methods I used in this study reflect my choice to understand the livelihood strategies and vulnerabilities of residents in both sites and be able to compare them; however, other methods and methodologies, such as ethnographic or qualitative methods, might reveal narratives that I was not able to capture.

My research offers a number of directions for further research. A unique feature of Iquitos and other Amazonian cities is a blurred rural-urban divide. Circular migration, multi-sited households and a close connection with rural areas have been, and continue to be, integral to the urban development and life in Iquitos (Alexiades & Peluso, 2016; Padoch et al., 2008, 2014). Nuevo Belén further complicates the rural-urban distinction. Its residents are former city dwellers who moved to an area somewhere between peri-urban and rural. They live on small lots close to their neighbors like they did in the city, yet far from the amenities and services that the city offers. There is enormous possibility for future researchers to study the phenomena of rural-urban connections anew, this time incorporating the perspective of relocated families.

There is evidence that resettlement has differential impacts on women, such as institutional barriers in the resettlement process or difficulty reconstructing livelihoods (Asthana, 2012; Cernea, 1997; Koenig, 1995). On the other hand, women may play a critical role in creating and fostering community in a new location, as they have done in Nuevo Belén. My results hinted at

the gender informs the experience of resettlement, such as the changes to women's livelihoods and women's safety and isolation in Nuevo Belén. A future study that places gender at the forefront might uncover a great deal more.

Research on other resettlement projects has demonstrated that relocation often fragments and destabilizes social ties among relocated communities (Cernea, 1997; Tadgell et al., 2018; Warner et al., 2009). My results suggest that community leaders, neighbors, and family all might have influenced a household's decision to move to Nuevo Belén, but this study did not examine how social ties may have been disrupted or reconstructed after relocation. A deeper analysis of social networks might shed more light on these impacts.

Finally, some impacts of relocation may only be apparent on a longer time scale; for instance, health impacts, household income changes, or the experiences of children who grow up in Nuevo Belén. Studies like this one are only a snapshot in time, and capturing long-term trends, dynamics and changes is something that many livelihood studies have struggled to address (Scoones, 2009). A long-term study might be able to answer some of the questions that linger from this research such as: what does the future hold for Nuevo Belén and the *zona baja*? In Bajo Belén, will residents finally relocate, as one participant predicted, when there are more empty houses than people? If another extreme flood occurs in Bajo Belén, will it prompt the state to declare the relocation involuntary and double down on moving residents? After households have occupied their homes in Nuevo Belén for 5 years, they are allowed to sell their homes – will this mark an exodus from Nuevo Belén, or will people stay? Who will have the means to leave if they want to?

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Appendices

Appendix A: Ethics Approval



UNIVERSITY OF
TORONTO

OFFICE OF THE VICE-PRESIDENT,
RESEARCH AND INNOVATION

RIS Protocol
Number: 37891

Approval Date: 17-Jul-19

PI Name: Dena Coffman

Division Name:

Dear Dena Coffman:

Re: Your research protocol application entitled, "Livelihoods, Climate Adaptation and Relocation in the Peruvian Amazon"

The Social Sciences, Humanities & Education REB has conducted a Delegated review of your application and has granted approval to the attached protocol for the period 2019-07-17 to 2020-07-06.

Please note that this approval only applies to the use of human participants. Other approvals may be needed.

Please be reminded of the following points:

- An **Amendment** must be submitted to the REB for any proposed changes to the approved protocol. The amended protocol must be reviewed and approved by the REB prior to implementation of the changes.
- An annual **Renewal** must be submitted for ongoing research. Renewals should be submitted between 15 and 30 days prior to the current expiry date.
- A **Protocol Deviation Report** (PDR) should be submitted when there is any departure from the REB-approved ethics review application form that has occurred without prior approval from the REB (e.g., changes to the study procedures, consent process, data protection measures). The submission of this form does not necessarily indicate wrong-doing; however follow-up procedures may be required.
- An **Adverse Events Report** (AER) must be submitted when adverse or unanticipated events occur to participants in the course of the research process.
- A **Protocol Completion Report** (PCR) is required when research using the protocol has been completed. For ongoing research, a PCR on the protocol will be required after 7 years, (Original and 6 Renewals). A continuation of work beyond 7 years will require the creation of a new protocol.
- If your research is funded by a third party, please contact the assigned Research Funding Officer in Research Services to ensure that your funds are released.

Best wishes for the successful completion of your research.

Appendix B: Informed Consent



Geography & Planning UNIVERSITY OF TORONTO

Verbal Informed Consent for Surveys

The following information will be provided verbally in Spanish.

Title of Research: Livelihoods, Climate Adaptation and Relocation in the Peruvian Amazon

Investigator: Dena Coffman, Master of Arts student in Human Geography, University of Toronto

My name is Dena Coffman and I am a Master's student in Geography at the University of Toronto in Canada. For my thesis, I am writing about the Nueva Ciudad de Belen relocation project. I would like to ask you some survey questions about your household, how you make a living, and how you are impacted by flooding. This survey will last about 30 minutes.

Your participation in this study is completely voluntary. You may skip any questions that you do not want to answer. You may choose not to participate, and you may withdraw from the study at any time. If at any point after the survey, you decide that you no longer want to participate, I will delete the information you have given me, and it will not be used. I will provide you with my contact information so you may contact me after the survey.

Your identity will be kept confidential: the information you share will not be associated with your name. After we finish the survey, your responses will be stored on a secure computer as per the university policy. The only people who will see your responses to these questions are myself, my research assistant, and my supervisor at the University of Toronto.

The information you share will be used in my thesis and may be used in presentations or reports. Unfortunately, you will not benefit directly from this research; however, it is my hope that this research will be used to better understand the impacts of these kinds of relocation projects.

Consent

Do you have any questions about this research or methods?

Do you agree to participate in the survey?

Contact Information:

If you have any questions or concerns regarding this research study, please contact:

Investigator:

Dena Coffman, Master of Arts Student in Human Geography, University of Toronto

In Peru: XXXXXXXXXX (Peruvian number)

In Canada: XXXXXXXXXX (Canadian number), dena_coffman@mail.utoronto.ca

To report any problems or to ask about your rights as a participant:

Office of Research Ethics

ethics.review@utoronto.ca or 416-946-3273

