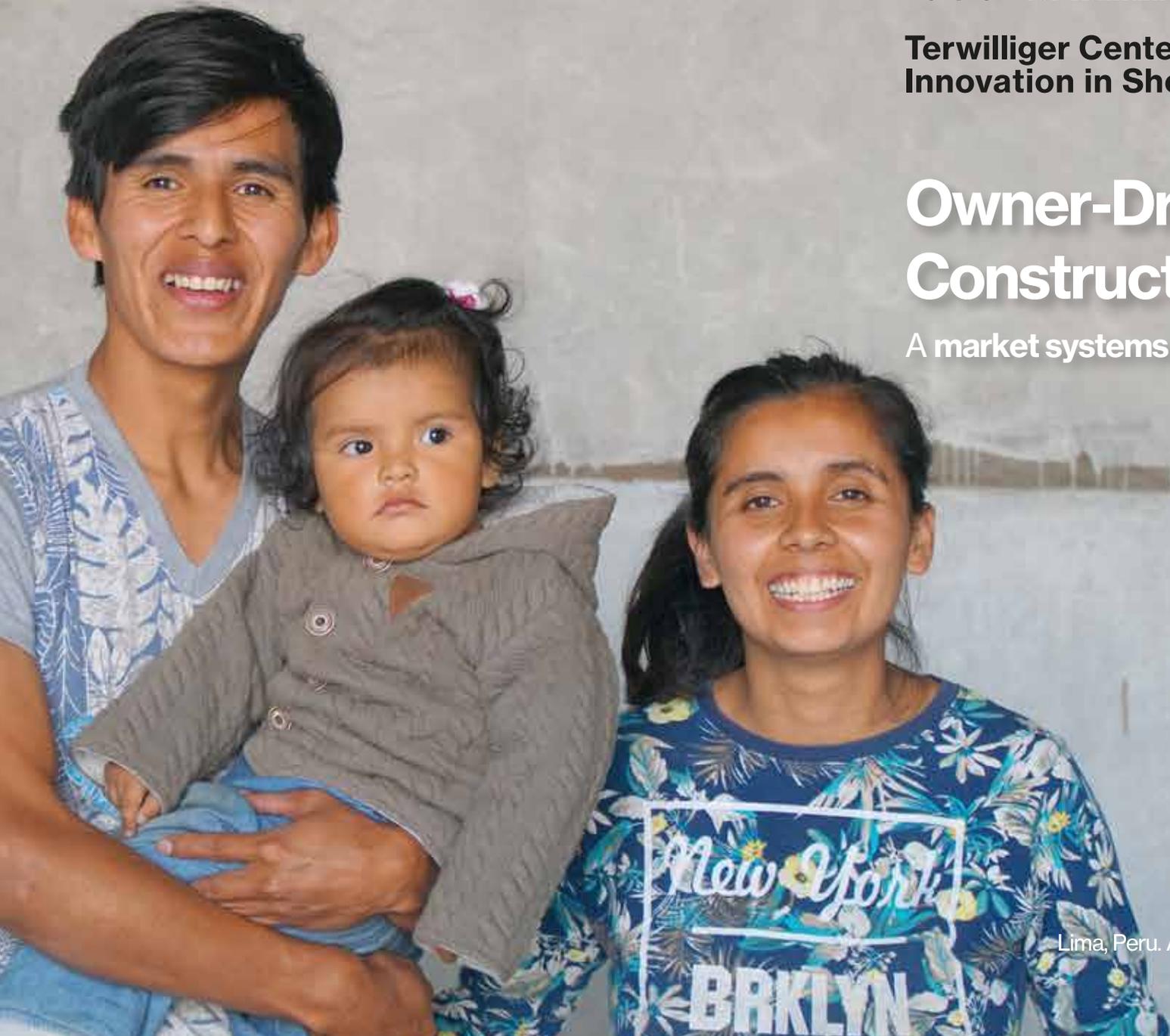




**Terwilliger Center for  
Innovation in Shelter**

# **Owner-Driven Construction**

*A market systems view*



Lima, Peru. August 2019.



# 7 out of 10 Peruvians need to improve their housing conditions<sup>1</sup>. That is more than 21 million people.

There is a national priority to find quality and scale-up solutions.

1. Habitat for Humanity (2018), "The impact of credit for Micasa housing improvement", Peru.

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COVER PHOTO: TCIS Peru  
PAGE PHOTO: 1 and 2, 2019. Habitat for Humanity, San Genaro 2 Sector 4-Chorrillos

# Introduction

Hilario arrived in Lima in 1984, dreaming of building a house. In San Juan de Lurigancho, he bought sandy land and intended to build his house. This wasn't an easy task. He lacked expert construction knowledge, the land's terrain was steep and it was difficult for him to access building materials and loans. Hilario, like many families in metropolitan Lima, had to build his house little by little with the support of his wife and children. In much of Peru, it's a process that can take over 30 years and involve additional costs and unsafe conditions.

In this publication, we propose a radical change in the informal housing construction process in Peru. We discuss the interrelated dynamics that exist between families such as Hilario's, small neighborhood hardware stores and local construction workers. **We understand how these communities are shaped over time.** Their members are millions who, in search of stability and shelter, built the communities that now cover the valleys surrounding the main cities of the country.

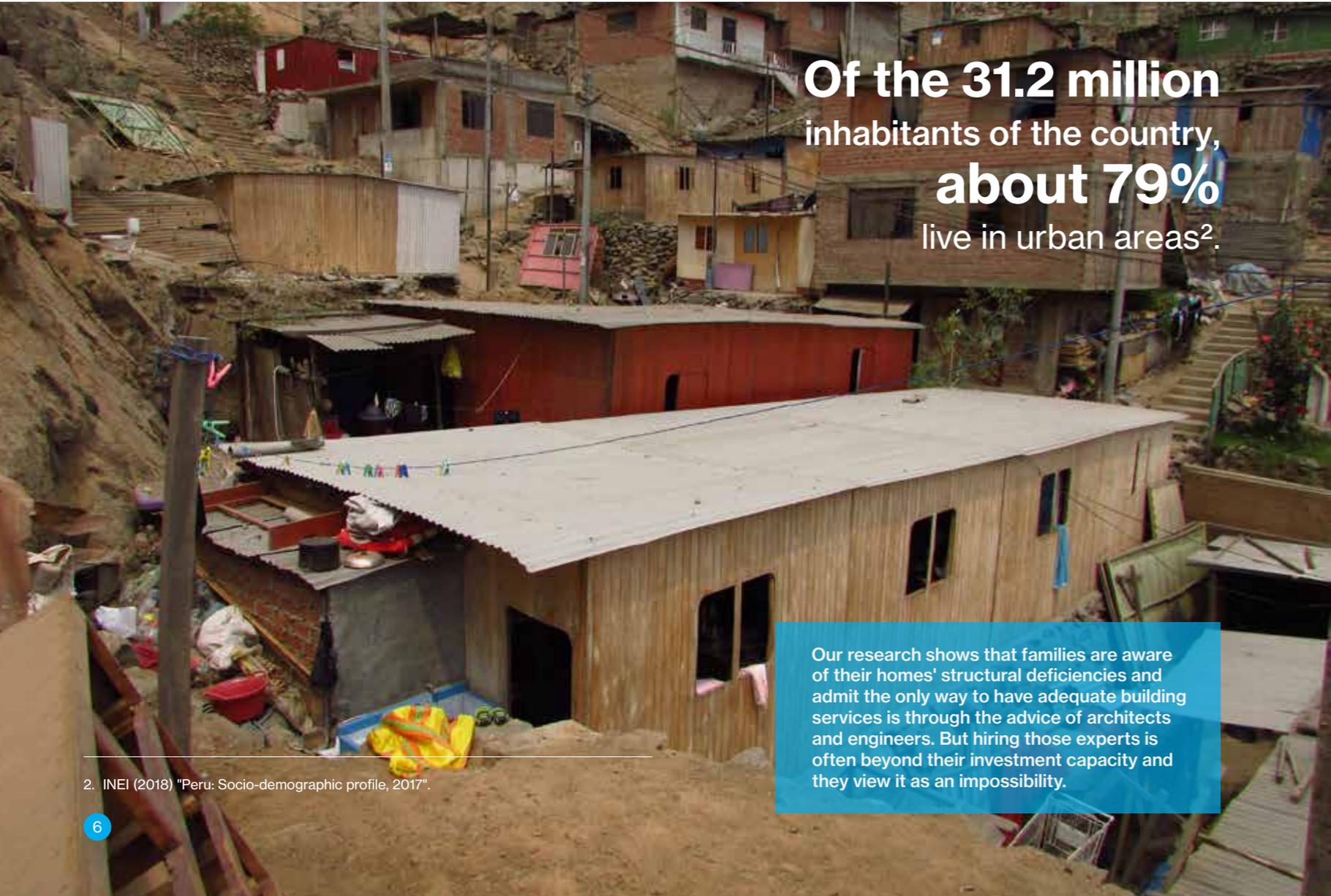
We want families that are beginning their house-building process to make informed decisions and, therefore, optimize their investments.

This work was carried out by a group of specialists from Habitat for Humanity International in Peru and maintains the same spirit of our previous publications: promote access to information that is easy to absorb and with simple terms.

We thank the interviewees who provided their time and shared valuable information with the researchers. This report was sponsored by the Hilti Foundation.

We dedicate this effort to the sector decision makers who seek to offer housing products and services to the families that build their most important asset, a place to call home.

# 1 The housing quality problem



**Of the 31.2 million inhabitants of the country, about 79% live in urban areas<sup>2</sup>.**

Our research shows that families are aware of their homes' structural deficiencies and admit the only way to have adequate building services is through the advice of architects and engineers. But hiring those experts is often beyond their investment capacity and they view it as an impossibility.

2. INEI (2018) "Peru: Socio-demographic profile, 2017".

## The housing situation in Latin America and the Caribbean

The Inter-American Development Bank in its latest publication<sup>3</sup>, refers to the growth of the urban population in the last 60 years of Latin America and the Caribbean. Some cities have become five times larger, and the region's total urban population has increased from 108 million to 500 million. This population explosion, initiated during the 20th century, presents enormous challenges for governments in terms of housing forecasting and urban development.

The big problem is not the quantitative, but the qualitative housing deficit, which represents 94%, in the region's urban areas. According to the IDB report, to reduce the qualitative housing deficit the challenge is how to:

- provide quality access to solve the property formalization problem.
- improve the quality of owner-driven construction developed by the most vulnerable populations.

In the case of Peru, about 75% of the population builds, remodels, improves or expands their homes without the assistance or supervision of an engineer or architect<sup>4</sup>. The families gradually build their homes with the support of a mason and with their own economic resources. These processes are carried out in phases and take an average of 30 years<sup>5</sup>.

### HOUSING DEFICIT IN LATIN AMERICA AND THE CARIBBEAN



3. IDB (2018). "Housing. What's next?: From thinking unity to building the city"

4. IDB (2015). "An emerging market: Discovering opportunities at the base of the pyramid -Peru"

5. More information about this process was collected in the study: "Housing situation for the base of the pyramid in Metropolitan Lima," available in: <https://www.ctivperu.org/-cual-es-la-situacion-de-la-vivienda-para-la-base-de-la-piramide>

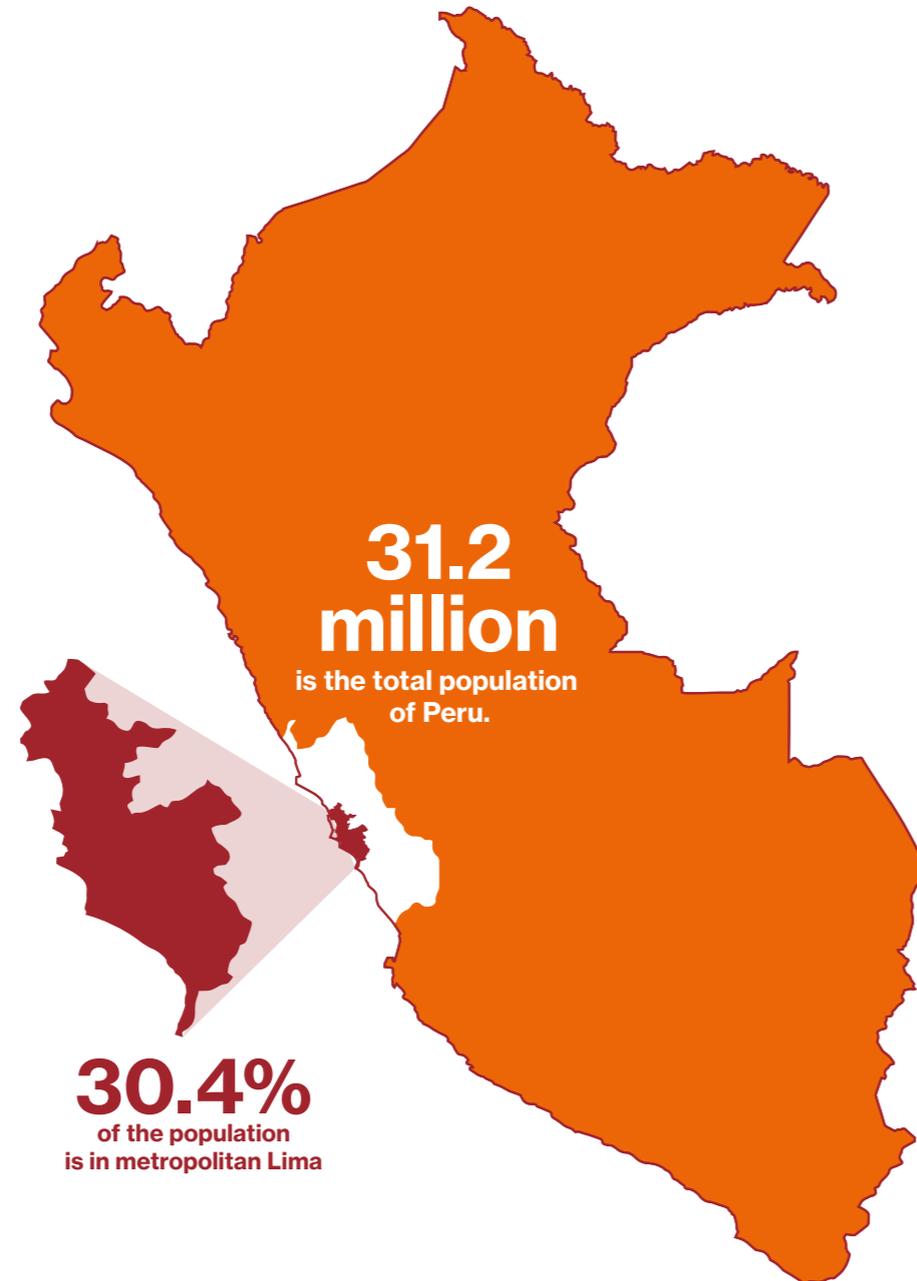
## SEISMIC RISK

Disaster risk is added to the problem of lack of quality in owner-driven construction processes, especially in a country like Peru, located within the Pacific Ring of Fire, an earthquake and volcanic zone with a high frequency of volcanic events. According to the Global Facility for Disaster Reduction and Recovery, the concentration of the population in cities and their exposure to seismic risks constitute the greatest disaster risk in the country.



**76%**  
of the total population  
is at **SEISMIC RISK**

Of the 31.2 million inhabitants of the country, approximately 79 % live in urban areas according to the National Institute of Statistics and Informatics (2018). The largest metropolitan area of Lima is home to 30.4 % of the population, which makes it the most dominant and important city in Peru.

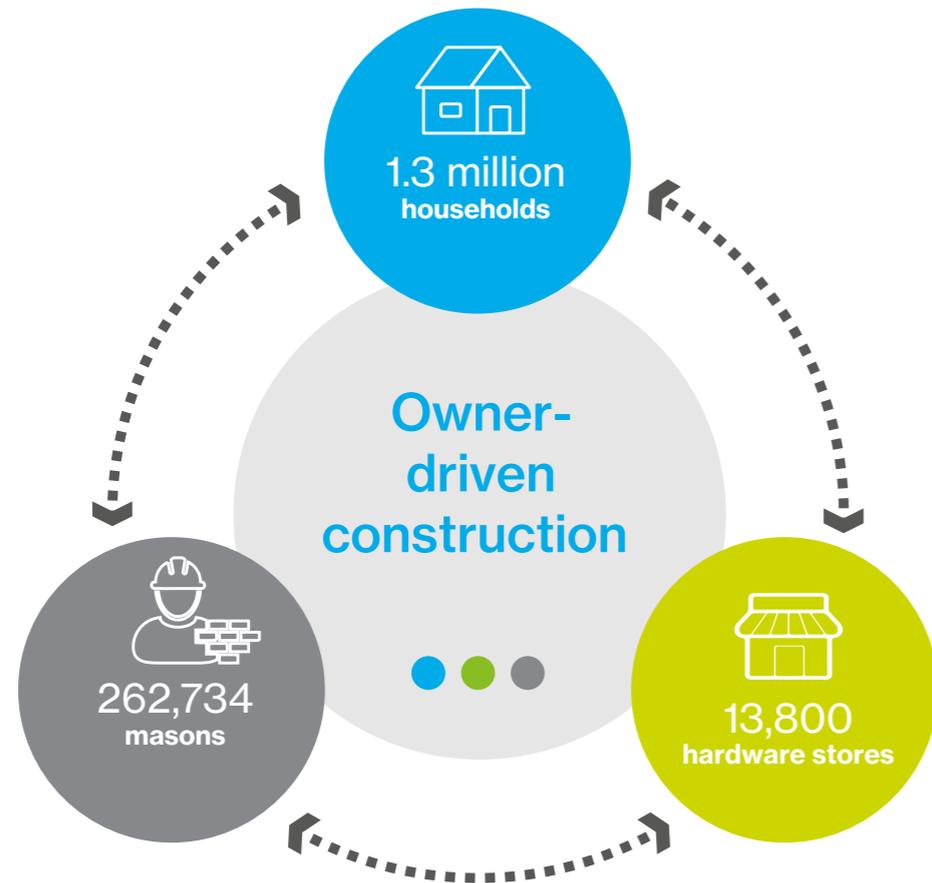


## 2 Owner-driven construction



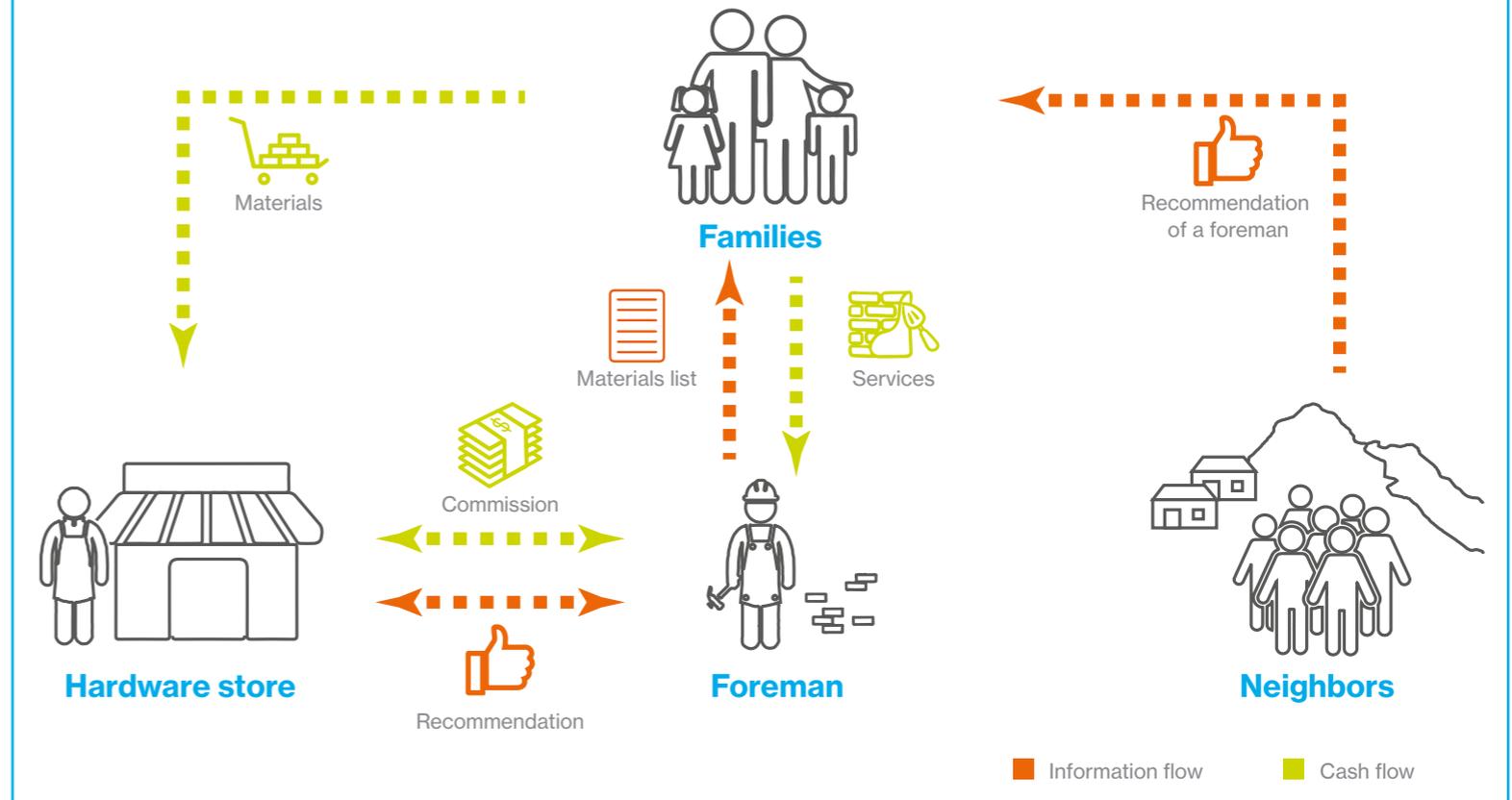
San Juan de Lurigancho, Lima, Peru (03-18-2017). A construction worker during Sunday communal work. © Habitat for Humanity.

In 2017 and 2018, Habitat for Humanity conducted research in Peru to understand how the construction sector at the Base of the Pyramid works in metropolitan Lima. Our research found the existence of an owner-driven construction process, which is formed by more than 1.3 million houses that are built in incremental stages, 13,800 neighborhood hardware stores offering construction materials and more than 262,734 construction workers<sup>6</sup>.



6. The number of houses is an approximation of the number of families in metropolitan Lima (INEI, 2017 census). The number of hardware stores is IPSOS data collected in the study "Profile of the hardware store and the hardware store owner." Finally, the number of construction workers is an approximation for metropolitan Lima based on information at the Peru level from the study performed by ILO and Habitat for Humanity "Decent work and adequate housing for households at the base of the pyramid" (2019).

## OWNER-DRIVEN CONSTRUCTION Cash and Information flows



Owner-driven construction is the metaphor used to exemplify the way in which the three main actors in the market interact daily:

- families at the base of the pyramid,
- neighborhood hardware stores, and
- construction workers (foremen and masons).



7. Refer to report: Habitat for Humanity International (2018). <https://www.ctivperu.org/>

A study by Arellano Marketing 2013 has estimated that the BoP families from metropolitan Lima mobilize around US\$1.5 billion dollars annually in housing related expenses. These numbers are consistent with the \$56.7 billion mobilized annually across Latin America and the Caribbean for BoP housing, according to IDB.<sup>8</sup>

Information is not always accessible, which often generates unnecessary expenses for the families.

For example, some uninformed families choose price over quality when buying materials for construction or make excess purchases of some products based on a construction worker's "estimate."<sup>9</sup>

According to the Peruvian Chamber of Construction, in either case this information asymmetry could generate a 40% cost overrun for BoP families. Further details regarding transaction costs for BoP families is in section 4 of this report.

#### Perceptions and habits of BoP families

- Reluctance to using new materials and techniques due to lack of knowledge and training opportunities.
- Appearances are more important than structure. Families generally verify construction work based on the quality of the plaster and the aesthetics of the construction.
- Communication between masons and their clients is asymmetric. Clients rarely report "problems" related to construction.
- Decisions have a strong gender component. Women take the supervisory role in the process and men make the financial decisions.
- Fatal events are expected, families minimize risks and see them as inevitable.

8. Figure taken from the publication "Several paths to a housing: new business models for the base of the pyramid in LAC" of the IDB. "<https://publications.iadb.org/publications/spanish/document/Varios-caminos-hacia-una-vivienda-Nuevos-modelos-de-negocio-para-la-base-de-la-pir%C3%A1mide-en-Am%C3%A9rica-Latina-y-el-Caribe.pdf>" IDB

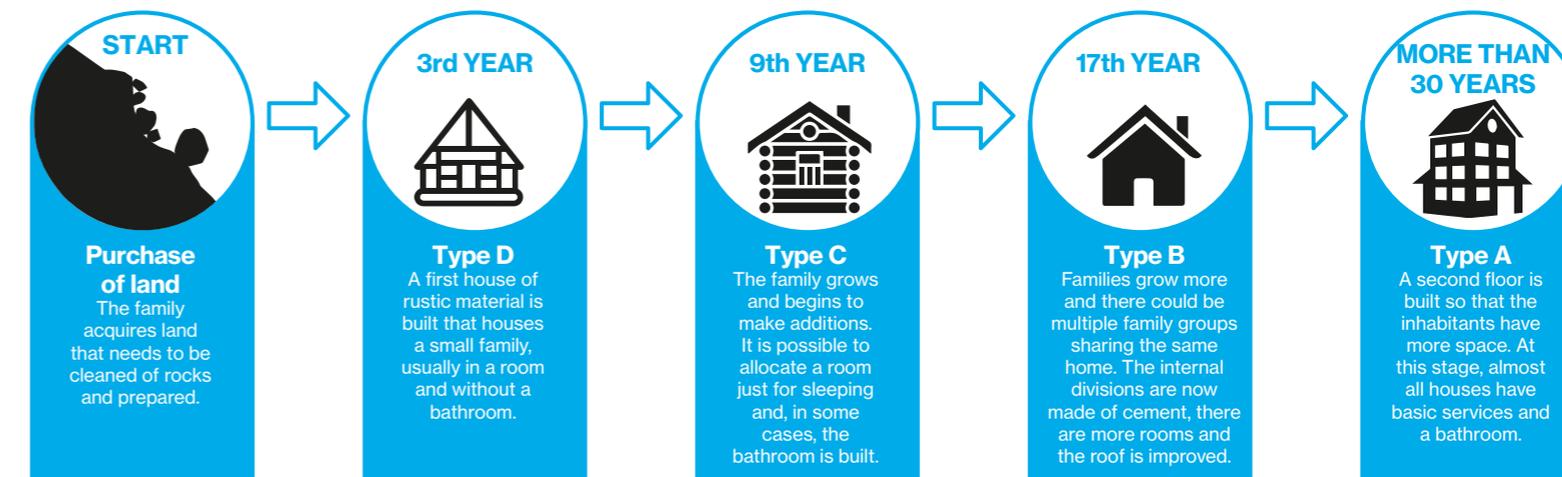
9. In the study conducted by HFHI, it was evidenced that many of the purchases of building materials made by the BoP families are too much since the required quantities are estimated by the building master who in this System assumes the role of architect, civil engineer, electrical engineer and sanitary engineer. Generating a bias regarding the real needs of the housing and a loss of efficiency.

# 3 The family life cycle

## Seven stages in three decades

It might be difficult to imagine that building a house can take 30 years, but for BoP families, it is perceived as a normal occurrence and represents the completion of one of their main lifetime achievements. It could even be considered that owner-driven construction does not necessarily end since, as the decades progress, families grow, and additional floors are added to host new members.

In the study "Housing Typologies for the Base of the Pyramid"<sup>10</sup>, four housing typologies were clearly identified that revealed how the family builds over time, buying materials and adding floors and rooms to progressively house a greater number of family members.



The process begins by locating and preparing the land, then building room by room and structure by structure depending on available resources. With time, a second, third or fourth floor will be achieved according to the growth of the family. This process of decades that faces the limitations mentioned earlier is what we call owner-driven construction<sup>11</sup>.

10. Housing building processes (building, remodeling, improvement, or expansion) that occur in stages, without the assistance or supervision of an engineer or architect, through the support of a master builder and with financial resources from the same family. HFHI (2018).

11. Housing construction processes - building, remodeling, improvement and extension - done in stages, without the assistance or supervision of an engineer, architect, with the support of a master builder and with the family's own financial resources.

## Estimation of cash flows of BoP families according to their housing typology

Foregoing considerations<sup>12</sup>.

Features		Metropolitan Lima	San Juan de Lurigancho	Source
	# of type A/B	1,185,673	125,349	2017 Census, INEI
	# of type C	125,909	29,372	
	# of type D	74,020	8,047	
	Cost of moving from D type housing to C type	\$ 1,250		"Housing at the Base of the Pyramid in metropolitan Lima" - HFHI (2018)
	Cost of moving from C type housing to A/B type	\$ 21,200		
	Time elapsed from D type housing to C type	6 years		
Time elapsed from C type housing to A/B type	17 years			
	# of hardware stores (there is no information that segments how many attends, to a greater extent, BoP families)	13,800	732	SJL: "Housing at the Base of the Pyramid in metropolitan Lima" and field work- HFHI (2018)
	Annual hardware store income	\$ 39,312	\$ 37,899	ML: "Profile of the hardware store and hardware store owner" IPSOS
	# of masons (on average each worker has a client portfolio made up of 93 % of the BoP families)	262,734	31,819	"Decent work and adequate housing for households at the base of the pyramid" - ILO & HFHI   "There are 957,000 masons in Peru"
	Annual income of masons (it is considered that on average one works 6 months a year)	\$ 1,998	\$ 1,956	SJL: Field work - HFHI ML: SODIMAC fairs 2018 - HFHI
	Annual expenses on owner driven construction - BoP Families (average investment when moving from a C type housing to an A/B type)	\$ 1,247		"Housing at the Base of the Pyramid in metropolitan Lima" - HFHI (2018)
	% of cash flow- families			95%: "Reduction of the use of cash in Peru" - ASBANC 81%: SODIMAC fairs 2018 - HFHI 100%: Field work - HFHI
	% of cash flow - hardware stores	95%	100%	
	% of cash flow - masons	95%	100%	

12. It is assumed that the transition from one type of housing to another is consecutive. There is no jump between typologies.

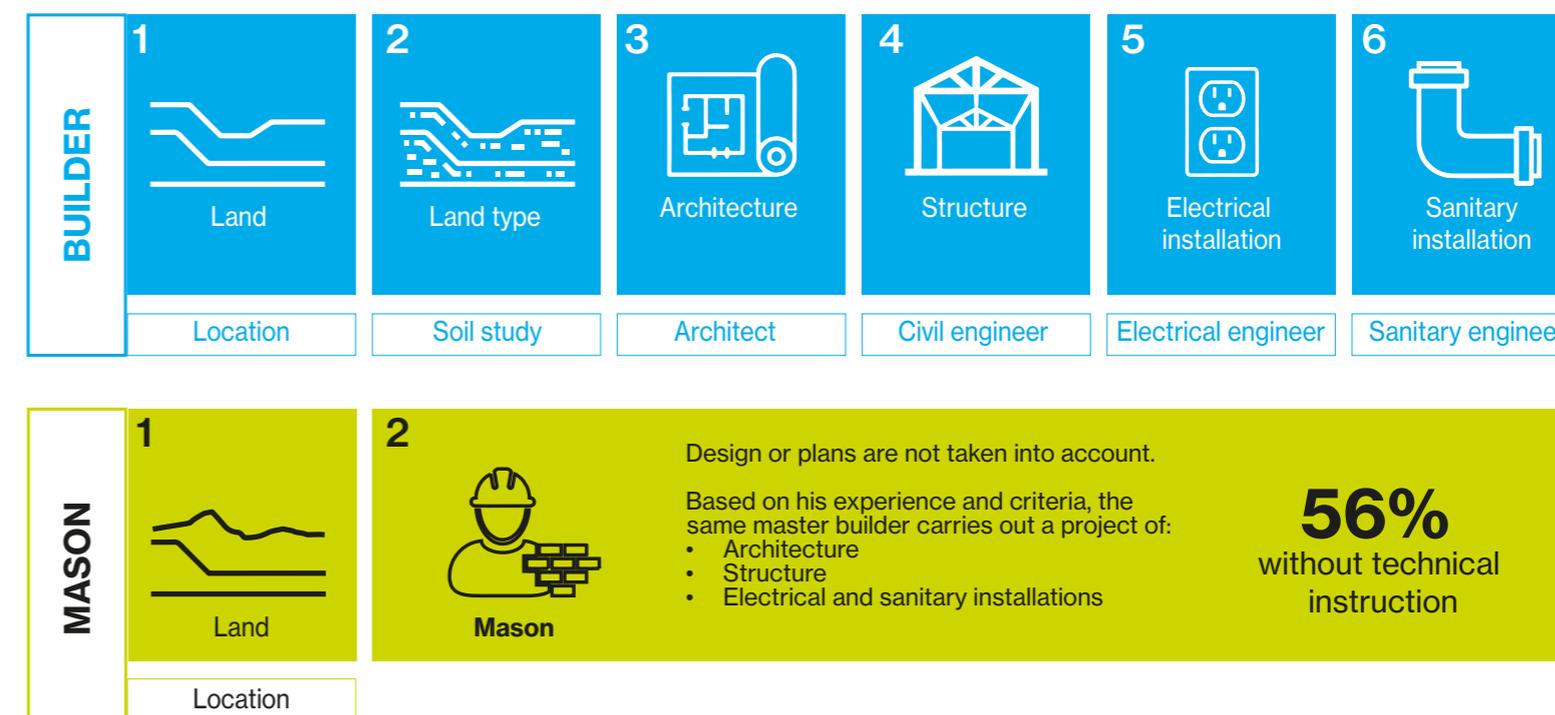
## A lot done with very little

### Who is responsible for what?

The analysis of owner-driven construction versus that of traditional building is a simple way to understand the limitations and risks of building homes for the BoP.

As seen in the graphic below, the owner-driven construction process overlooks each of the stages of planning a construction and it doesn't involve the participation of professionals that guarantee a safe construction. Additionally, only 44%<sup>13</sup> of the master builders participating in owner-driven construction indicate having technical education.

### COMPARATIVE BUILDING PROCESS



13. HFHI (2019). An approach to the world of workers and their environment.

# 4 Those who have less, usually pay more

## Transaction costs



It is common for family members, due to their lack of building knowledge, to have communication problems with hardware store staffers and masons. Our research shows that the purchases of building materials made by BoP families are inadequate since the required quantities are estimated by a mason, who in this system assumes the role of architect and civil, electrical and sanitary engineers.

### Building in areas of difficult access

Building a cement wall requires water, and to bring a square meter of water to the hillside areas can cost between PEN 15 and 18. The additional costs undertaken for construction materials and water delivery could exceed 100% of the initial cost of materials and supplies<sup>14</sup>.

14. This information was collected by Habitat for Humanity in the fieldwork carried out in the case of San Juan de Lurigancho (2019).

**3 out of 10 people**  
in metropolitan Lima live on the hillsides  
**(2.8 million people)**

according to the 2016 study by the School of Architecture and Urbanism at Pontifical Catholic University of Peru.



Construction worker during his workday  
©Habitat for Humanity.

# 5 Owner-driven construction opportunities

## How do we improve the quality of homes that are already built?

While 94% of the houses built have quality and structural problems, 90% of housing solutions promoted for BoP families are focused in construction and delivery of new units. Our analysis of information gathered in the field shows the problem facing families doesn't involve finances or access to construction workers and materials in their communities. The problem is the quality of what it is built. Low-income households that hire the services of construction workers are part of a vibrant, informal and unregulated market.

Understanding their practices is essential when coordinating efforts to improve the quality of housing construction and solve the challenge to ensure each Peruvian has a decent place to live.

Four areas of work were identified as part of the qualitative revision of the owner-driven housing system in order to improve the quality in the houses already built.

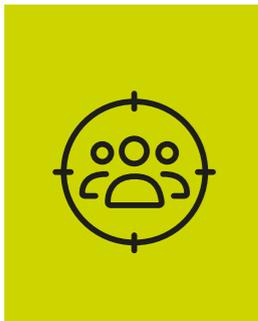


### Let's teach safe construction and business management

If families and construction workers are trained, they can make informed decisions about what it means to build safe and quality housing.

- Families need to know the correct building sequence to build and optimize their investment.
- Construction workers can convince families to build in the correct sequence and increase the perception of what safe building means in the community.

*Companies with efficient products and techniques can find a partner in Habitat's Terwilliger Center to deliver their message to these families and construction workers.*



### We look for opportunities within the construction cycle

The owner-driven construction process offers opportunities in information and cash flows. With companies interested in promoting their housing products and services for low-income families and construction workers, we can identify at which stage to intervene, and propose, and implement initiatives that increase the quality of what it is built.

*The BoP families represent a large market for the sale of construction products and services. While this market requires different and informed approaches, the Terwilliger Center can provide advice and support to those who wish to venture into this niche.*



### Let's improve the scale and sustainability in training

Swisscontact Perú, through the project "Construya Perú", promotes the building of safe housing with a socially inclusive approach. The project's target groups are homeowners and construction workers. The interventions of Construya Perú strengthen and articulate training institutions, municipalities and the private sector to achieve the institutionalization of an offer of training and labor certification in the market system. The teaching methodologies are interactive and adjusted to the needs of a true adult education

With a different approach, but similar intentions, SODIMAC Perú organizes capacity development fairs throughout the country in which they display vendors and promote their circle of specialists. Through this initiative, they promote the program called Ambassadors of Progress, in which they select prominent masons and "professionalize" them with training in personal development and business skills.

*The Terwilliger Center connects partners interested in participating in the training processes for construction workers with actors who are already developing programs, in order to escalate efforts.*



### Let's find counterfeit materials

Access to construction materials in the informal market is easy and fast; however, this does not guarantee the quality of the products offered. The black market and the rising costs of good quality products are a barrier to adequate construction quality at the BoP.

According to CAPECO, US \$ 700 million in black market construction materials are sold every year, representing 16% of the market.

Among the main counterfeit construction materials are electrical installations, sanitary joints, cement, bricks and construction iron.

*In order to identify counterfeit materials, families need to know better quality products and their benefits. The Terwilliger Center, in partnership with companies, facilitates actions aimed at guiding families on how to recognize original products.*



## RECOMMENDATIONS

Finally, we propose general lines of work that we want to explore with our partners.

- ♦ Prioritize innovative efforts in solutions that facilitate and reduce the cost of strengthening structures for informal sector housing.
- ♦ Influence the improvement of the regulatory framework to encourage the professionalization of the mason's career.
- ♦ Facilitate the scale of commercially viable models through the acceleration of companies oriented to study the stages of owner-driven construction and develop sustainable solutions for each stage.
- ♦ Encourage the design of a control and incentives system, such as certifications, so that informal distribution networks improve the quality of the products offered.
- ♦ Promote awareness-raising strategies for opinion leaders and the media about the risk that threatens 76% of housing in the event of an earthquake.

Chorillos, Lima, Peru (07-16-2019)  
Two master builders and a salesperson are interviewed regarding the use of digital platforms in owner-driven construction processes. © Habitat for Humanity

La Molina, Lima, Peru (03-09-2019)  
Round of questions for the audience during Habitat's participation at SODIMAC's Great Construction Training Fair

## GLOSSARY

Owner-driven construction	Owner-driven construction (building, remodeling, improvement, or expansion) that occurs in stages, without the assistance or supervision of an engineer or architect, through the support of a mason and with financial resources from the same family. (Habitat for Humanity International, 2018).
Owner-driven construction system	Metaphor used to exemplify the way in which the three main actors in the progressive house-building market function and interact daily: 1) the families at the base of the pyramid; 2) neighborhood hardware stores; and 3) construction workers (foremen and masons) <sup>15</sup> .
Hardware store	Commercial establishment dedicated to the sale of building materials, usually of a smaller scale, with a limited assortment. The hardware stores are small and are located near conglomerations of homes or "niches." They are also known as "neighborhood hardware store."
Hardware supermarket	Large establishment (between 500 and 4,000 square meters) where hardware products are sold (IPSOS, 2015).
Inclusive business	Inclusive businesses can be defined as "economically profitable, environmental and socially responsible business initiatives, which under a logic of mutual benefit contribute to improving the quality of life of low-income communities, through its participation in the value chain of a business, whether as suppliers, distributors, or consumers of goods and services." <sup>16</sup>
Market system	Exchange agreement through which goods and services are provided, while support functions and rules are performed and defined by a variety of market actors. It focuses on interventions that modify the incentives and behavior of companies and other market agents (public, private, formal and informal) to ensure a beneficial and lasting large-scale exchange for low-income segments (HFHI, 2018).
Construction workers	People working in the building, civil engineering, demolition and maintenance industries. They are specifically responsible for building, repairing, maintaining, renovating and demolishing houses, office buildings, factories, hospitals, roads, bridges, among other things. (ILO, 2015).

15. Habitat for Humanity International (HFHI).

16. SNV (2010). Inclusive Businesses: creating value in Latin America, 2010.



**16%** of  
**owner-driven construction**  
is managed only by the homeowner.

Source: IDB (2015) A Growing Market: Discovering opportunities at the BoP in Peru.

**57%** of  
**owner-driven construction**  
is managed by women, who are  
**40 years** old on average.

Source: IDB (2015) A Growing Market: Discovering opportunities at the BoP in Peru.

Habitat for Humanity's Terwilliger Center for Innovation in Shelter works with housing market ecosystems supporting local actors and expanding their innovative services, products and financing. The program aim is to make housing markets work more effectively for people who need decent and affordable housing, thus improving the quality of life of low-income households.

In 2017 and 2018, the Terwilliger Center, as part of its Market Systems Development Project in Peru, conducted a series of quantitative and qualitative exploratory research and studies to generate inputs for the center's development of business proposals for actors in the housing value chain. This report is one of the products that derived from these investigations.

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