Abbreviated Methodology

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Constructing Empirical Decision-Making: A Participatory Methodology for Measuring the Impacts of Upgrading in Brazilian Informal Settlements

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Project Overview

This study was funded by a National Science Foundation Social, Behavioral, and Environmental (SBE) Postdoctoral fellowship awarded to Kristine Stiphany (#1313395). The methodology below extends that of the Latin American Housing Network (LAHN) at The University of Texas at Austin. The primary purpose of this study is to measure the impacts of redevelopment (upgrading, regeneration, housing "rehab") on established informal settlements in São Paulo, Brazil, and to examine the use of digital technologies for improving citizen participation in urban development and reducing sociospatial segregation. Although informal settlements have attracted scholars to the Global South for decades, the nature and extent of their redevelopment has received less attention, particularly from community perspectives. Although a number of upgrading approaches have been implemented over the years, there are very few studies about the impacts of redevelopment on the upgraded communities. Given that many informal settlements have been upgraded in large Brazilian cities, their post-redevelopment condition is important for planning and policy making in the future. This study compares the post-upgrading conditions in two São Paulo case studies.

Phases, Cases, and Methods

Within the overall grant period (2015–2017), the phases of community collaboration, fieldwork, and application to design were undertaken in two of São Paulo's largest informal settlements. The influence of community collaboration on design phases are covered elsewhere.

Two settlements were selected out of the city's approximately 1942 *loteamentos* and 2,108 *favelas*, based on the heterogeneity of their housing stock and how many times they have been upgraded. The two settlements were Heliópolis and São Francisco, located 11km and 22 km southeast of the city center, respectively.

The second reason these two settlements were selected is that they are the only two settlements to have been upgraded successively since 1986, during which time they were both redeveloped at high levels—Heliópolis has been upgraded with 36 projects, and São Francisco with 24. That the two settlements shared an identical past increased the chances that we would be able to make a robust comparison between communities where phenomena that occurs across the city reaches an apex.

A third criterion for selection was that the two settlements had previously been studied ethnographically, in the context of doctoral dissertation fieldwork (Stiphany, 2015). This meant that a base level of trust and exchange had already been established, increasing the likelihood that a collaborative project would not only be established, but would also be maintained over its two-year duration and beyond (which, in fact, it has.) In distinction to the previous ethnographic study, the current study undertook a random selection of households, thus exposing the research to a broader set of actors and groups relative to the previous study's snowball sampling method.

A third settlement, Nova Jaguaré, was considered because it also had high levels of upgrading, and three of the five development approaches were present. Additionally, it has not been previously studied, which would provide a different kind of comparison. However, this settlement was ultimately dropped because of high levels of organized crime incidents in the area, and because it was located in the city's north zone, far from Heliópolis and São Francisco. Although crime was also present in Heliópolis and São Francisco, previous contact with these

communities facilitated the extent to which the research teams could undertake a random sample and work around these activities.

The settlement histories have been covered elsewhere.[1] Both Heliópolis and São Francisco are large areas, each approximately 1 million square meters, yet varying significantly in density—as Heliópolis has approximately 150,000 inhabitants and São Francisco, 40,000. Following three decades of upgrading, the housing stock of both communities is comprised of incremental housing types as well as non-incremental housing types *Cingapura* and Urbanization of *favelas* housing. We did not set out to study *Minha Casa Minha Vida*, a program launched in 2009 that builds mass housing in the periphery, because we believed its approach to be antithetical to upgrading. However, upon discovering that a sizeable portion of residents currently living in the case studies have opted into the MCMV, we changed course and did study n=100 families that will ostensibly move to a MCMV house in the near future.[2]

Digital Database Construction

The translation of field data into forms that can be visualized involved merging techniques across software, including Geographical Information Systems (GIS), Computer Aided Design (CAD), Revit, and Rhino, as well as varying rendering and film techniques using VRay and Adobe Creative software.

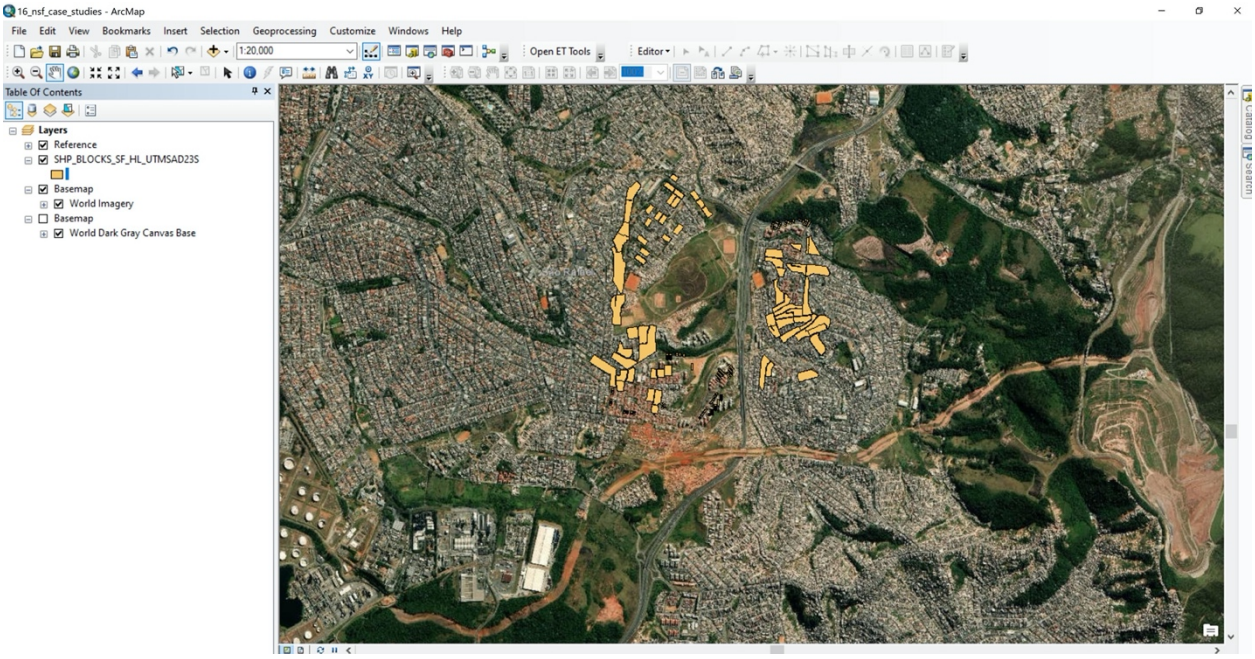

Figure 1 Translation of CAD-drawn survey blocks into geolocated shapefiles for São Francisco

[1] Stiphany, K. (2015) Learning Displacement: Self-Building, Educational Infrastructure, and the Politics of Redevelopment in Brazilian Favelas. Doctoral Dissertation. The University of Texas at Austin. Also see: Stiphany, K. and Peter M. Ward (Under Review) Autogestão in an Era of Mass Housing: Brazil's Minha Casa Minha Vida Program. Special Issue: Housing Policy in Latin America and the Caribbean. International Journal of Housing Policy.

[2] See: Stiphany, K. and Peter M. Ward (Under Review) Autogestão in an Era of Mass Housing: Brazil's Minha Casa Minha Vida Program. Special Issue: Housing Policy in Latin America and the Caribbean. International Journal of Housing Policy.

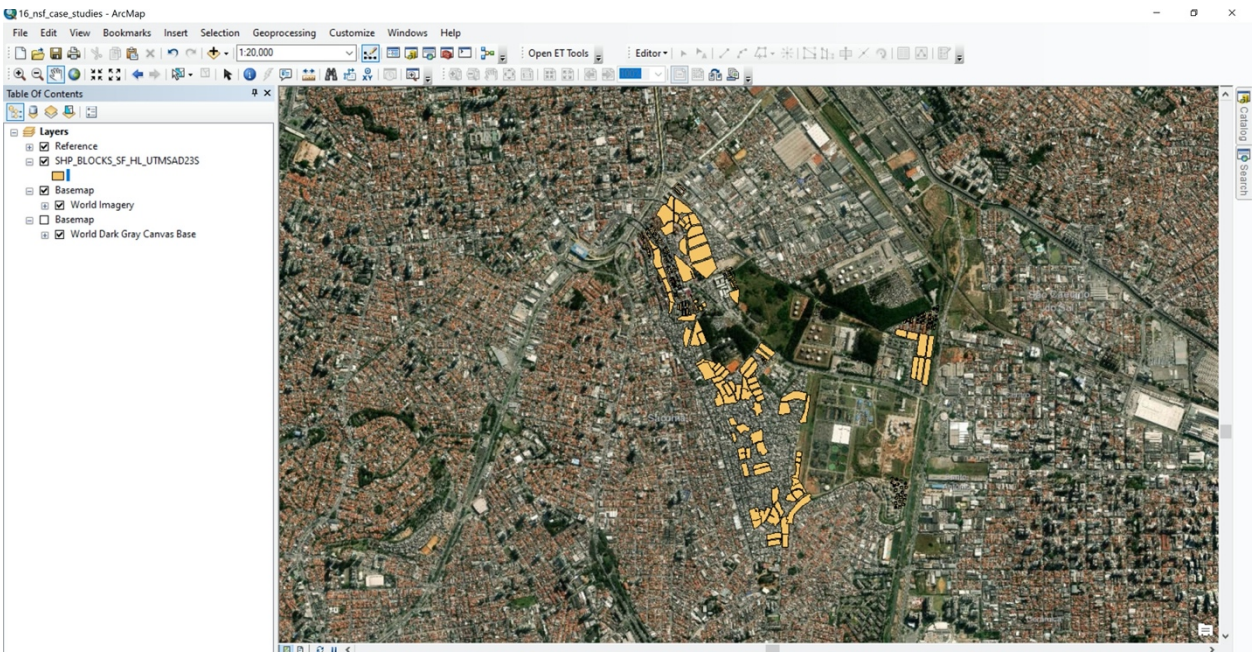

Figure 2 Translation of CAD-drawn survey blocks into geolocated shapefiles for Heliópolis

CAD drawings were obtained from the City of São Paulo and ground-truthed to construct a digital base map of case community blocks, lots, and building footprints. Each community's blocks were numbered and used for random weighted selection. The selected blocks were converted into shapefiles and geolocated. These shapefiles are the foundation for the construction of ComuniDADOS. Data from lot-level study, within each block, will aggregate to these blocks.

Survey

The survey instrument extends the methods of the Latin American Housing Network (LAHN), and combines a household survey about the sociotechnical dynamics related to the build out of a lot, house, or apartment unit. The survey instrument was informed by three workshops undertaken in collaboration with community partners and residents at the study's front end. These workshops expanded our understanding of how upgrading was experienced by community organizations and residents in the case communities.

The survey has two parts: a social survey that was conducted with an iPad, and a parallel Post Occupancy Evaluation (POE), undertaken using photography, field measurements, and an analog (paper) survey. POE is an instrument used within the field of architecture to measure physical features of a building and its occupancy over time. This combined approach was undertaken by two teams (one per case), each composed of one researcher and two community partners. Each team remained consistent over the fieldwork period of ten months.

Figure 3 Workshop one: understanding upgrading from community perspectives

Figure 4 *Cingapura* housing type

Coding Case Study Communities Relative to Incremental and Non-Incremental Housing Development Types

To guide fieldwork, each case community was coded relative to one of four development approaches present in the two case study communities. The total number of blocks was counted and numbered 1 – n. Each block was then identified as (1) self-built; (2) assisted self-building; (3) *Cingapura*, and (4) Urbanization of *Favelas.* Each of the units within the types was counted and numbered 1 – n.

Figure 5 Housing Type Distribution across the two case studies

Sample Size

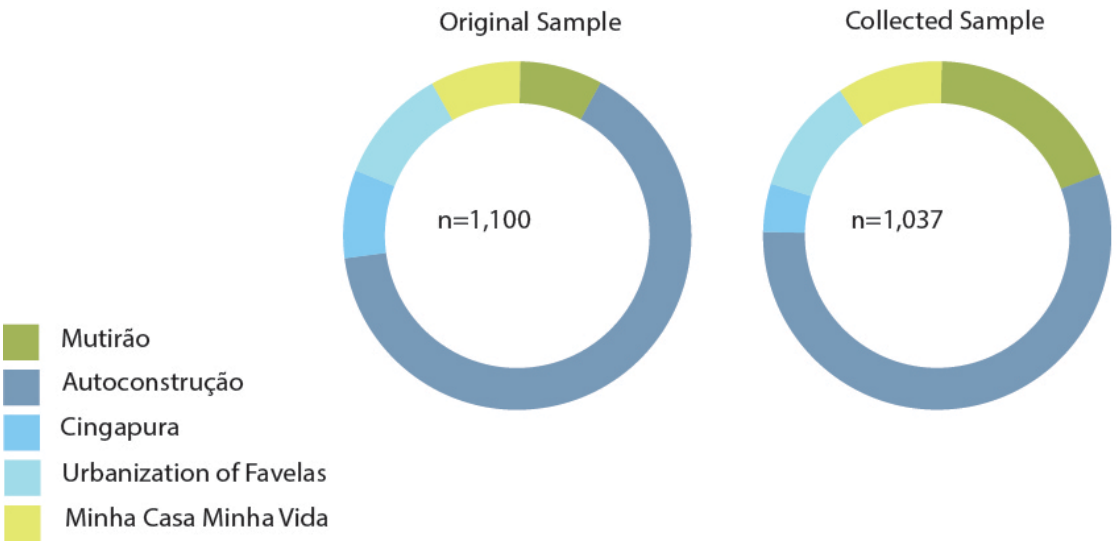

Figure 6 Housing Type distribution relative to weighted and adjusted sample sizes

This study's original sample size is 1,183 households. The sample size was weighted relative to the proportion of each development type (number of units) in each community. The sample size was then adjusted for the following reasons.

1 – The assisted self-building (*mutirão*), core-house type was oversampled due to the presence of multiple sub-types.

2 – The self-building (*autoconstrução*) was under sampled to account for the increased sample of the *mutirão* and because *autoconstrução* was expected to feature a consistent level of heterogeneity.

3 – The *Cingapura* was oversampled in Heliópolis. Although a cookie-cutter type, this was warranted because the *Cingapura* was modified and situated within highly differentiated contexts in Heliópolis.

4 – The Urbanization of *Favelas* was oversampled in Heliópolis, due to the presence of four very different sub-types.

Fieldwork logistics

Once I created maps that identified the zones of relevant housing types in each community, I organized the fieldwork logistics relative to these housing types, working from formal housing (easier to document) to informal incremental housing (more complex), in order to plan the fieldwork over a period of six months (which ultimately extended to eight).

Within each housing type, I numbered each block in order to randomly select blocks for survey, and then proportioned those blocks into clusters, and made maps of the clusters to be completed during a particular time period. These maps facilitated the extent to which the researchers could focus on accessing the correct building and undertaking the field-based random selection process.

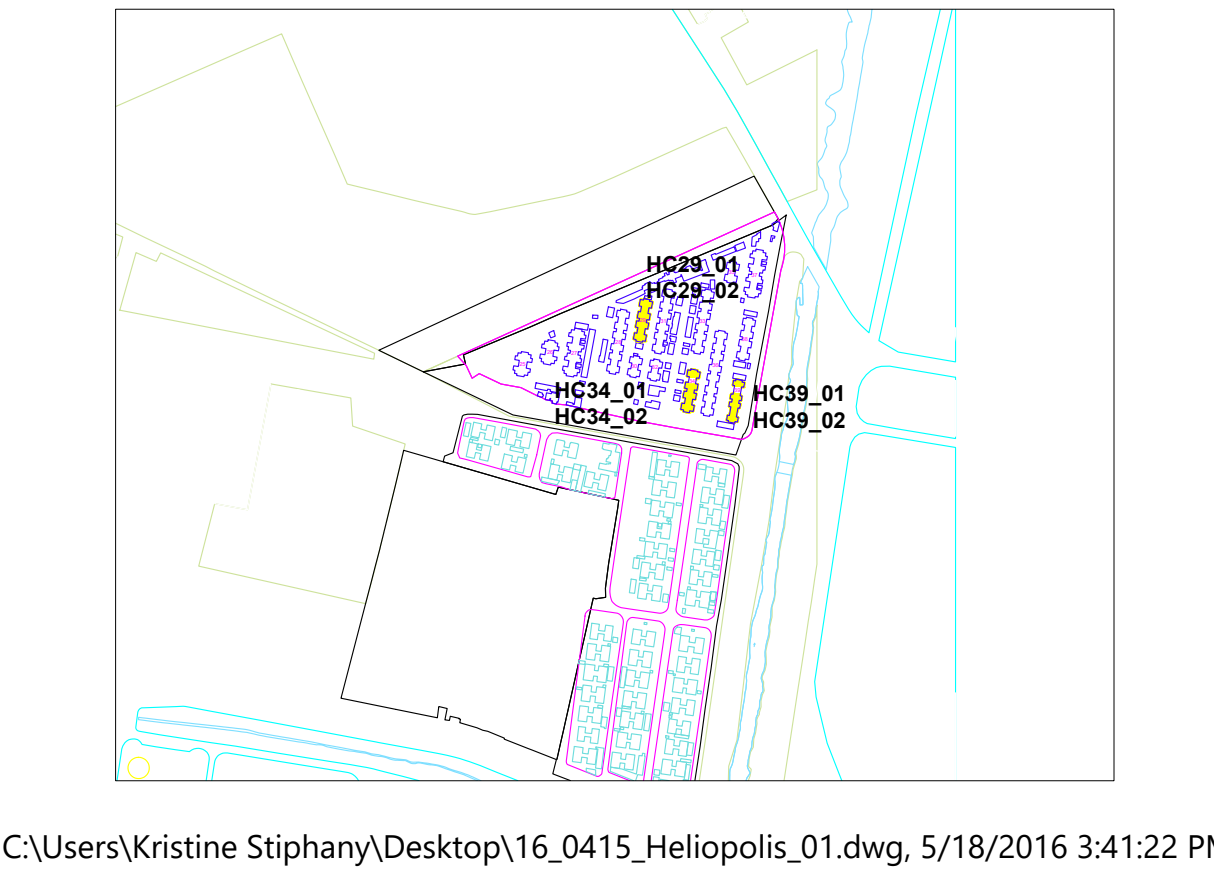

Figure 7 Field guide map for six records in a cluster of *Cingapura* housing in the Heliópolis *favela*. HC = Heliópolis / *Cingapura*. 34,29,39 are *pre-field* randomly selected block numbers. 01 and 02 are unit numbers, whose location was randomly selected *in the field*. The double random selection for informal settlements is a Latin American Housing Network method, adapted in this study to also accommodate social housing units.

Block and Lot Selection – Two Step Random Selection Process

Within each development type, blocks were randomly selected using an Excel script and coded as such in the base file and on the printed field maps. In the field, starting at a randomly selected point every nth lot was selected within a randomly selected block. This point triggered a protocol for selecting eight lots or units within each block of approximately 40 lots/units. For example, if selected lot one accepts, skip 5 lots to the right. If selected lot one is absentee or denies, skip to the immediately adjacent lot on the right.

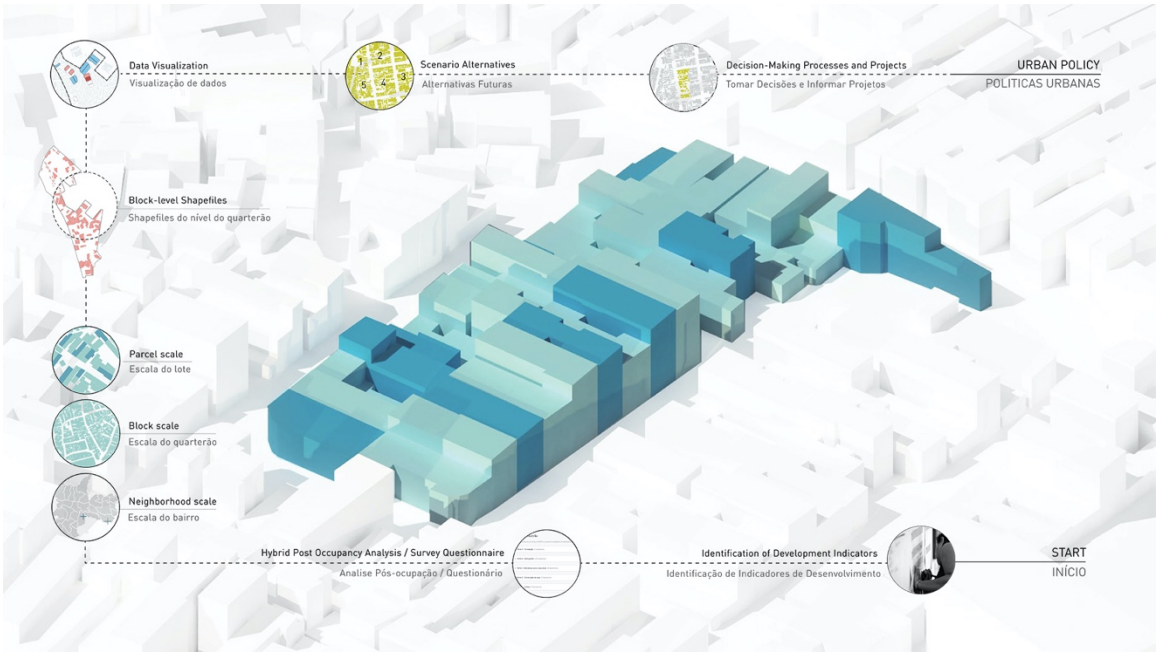

Figure 8 Two-step random selection process

Fieldwork Protocol

Preparation for the fieldwork involved four training sessions, in addition to an online Institutional Research Board (IRB) training session. Two sessions were undertaken at the study's office space in central São Paulo. The third and fourth were undertaken in the field, with families willing to serve as the study's pilot. Each team was equipped with the following: an iPad with a Qualtrics offline application (due to poor internet connectivity), two cameras, and a clipboard with the post-occupancy survey in paper format. This permitted team member A to enter all survey responses digitally, while team members B and C simultaneously photographed and undertook the measurements and observations necessary for the post occupancy survey. Team member A made an axonometric drawing of each surveyed unit/lot. The axonometric drawing and photographs were used to digitally model each surveyed unit/lot, by a research assistant who was not in the field.

Figure 9 Field photography and sketches

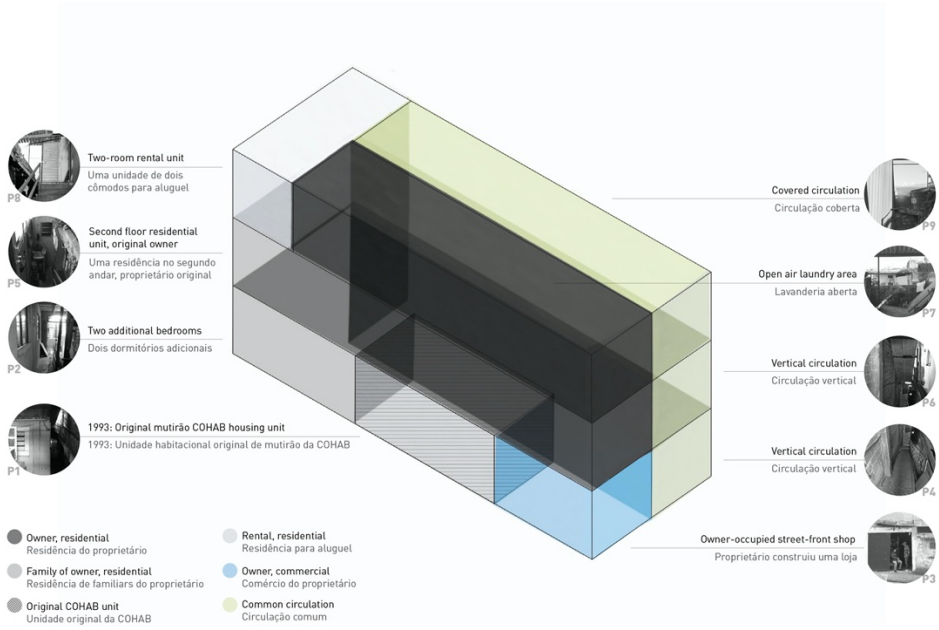

Figure 10 Use of field sketches to construct 3D volumetric models

The teams were equipped with project business cards to hand out, and when necessary, navigated participants to the project website. The project website proved important for legitimizing the research and providing potential respondents with information about the study's intention, PIs, and future goals. In many cases, the website got the

team past the door. Fieldwork was undertaken during the late afternoon and evening. Each interview took 45 minutes to one hour.

Data Check

At the conclusion of each field day, field researchers connected to the internet, which triggered the upload of Qualtrics data records from the iPad, and they manually uploaded field sketches, photographs, and field notes to a University of Texas Box folder. The next morning, a non-fieldwork research assistant undertook a data check to ensure all components were correctly uploaded, and to correct any discrepancies (e.g. photographs of poor quality).

The teams met every other week to review fieldwork challenges and opportunities, the majority of which stemmed from locating the original owner relative to those occupying the lot and understanding how many households occupied a lot and in what capacity (owner/renter/other). The field drawings were fundamental for this reason, as they significantly reduced confusion as to tenure.

Post fieldwork coding and analysis

A coding guide was developed based upon the LAHN. The data were coded by the PI and checked by the person who undertook the interview (Tam member A) for clarification.

Figure 11 Lot- and unit-level qualitative studies (Five-step scale: “precarious” to “very good”)

Data Visualization

Following data analysis, key variables were spatialized using the ComuniDADOS tool, which was constructed by Nathan Brigmon and Kristine Stiphany parallel to fieldwork.

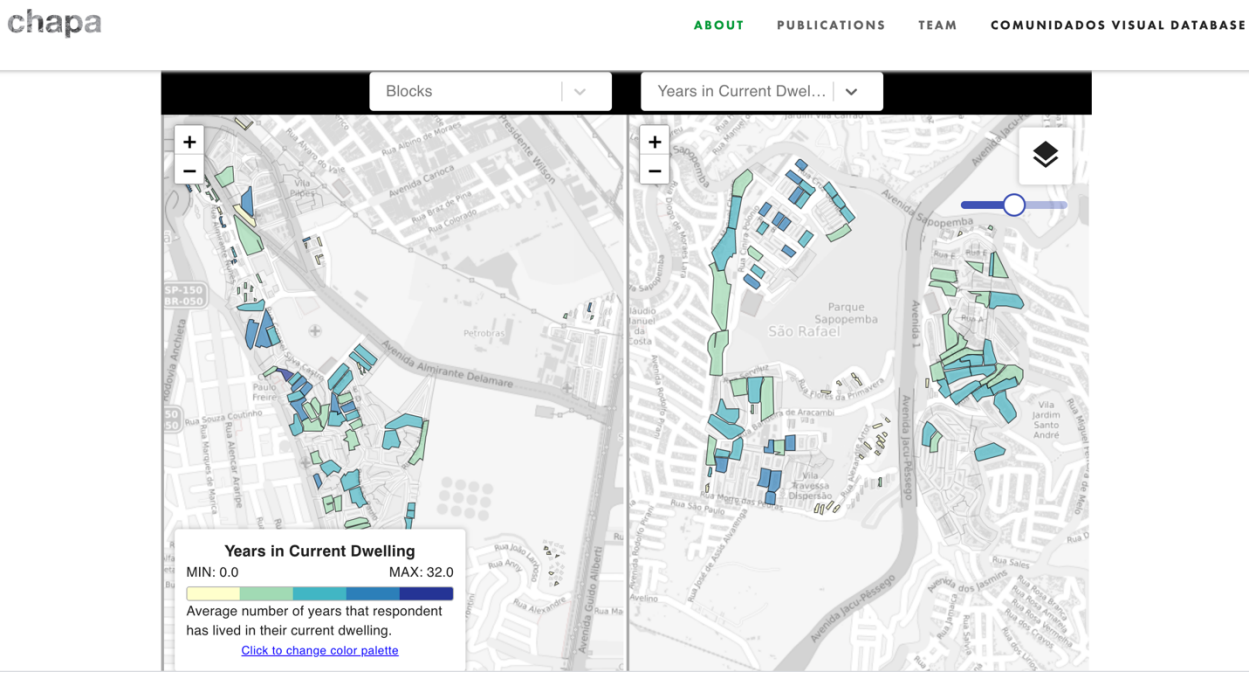

Figure 12 Lot level data aggregated to the block