MAPPA
Methodology for Identifying and Characterizing Precarious Settlements
Project MAPPA

Partnership between the Federal University of ABC (UFABC) and the Company of Housing and Urban Development of the State of São Paulo (CDHU)

Consists on the development of a set of methodologies and procedures to address demands for updating and enhancing the Housing Plan 2011-2023 for the State of São Paulo developed by the Housing Department and CDHU.

- Recognizes precarious settlements (*favelas and informal settlements*) as one of the most relevant housing problems of São Paulo
- Establishes a programmatic line focused on their upgrading.
BUT...

- Official Brazilian assessments on housing needs/housing deficit rely on census microdata: rich dataset, but very poor spatial resolution.
- Data on precarious settlements is insufficient/not accurate.

To update/improve São Paulo’s Housing Plan:
- Necessary to produce/improve information on precarious settlements
- Explicitly consider the territory when assessing the housing deficit

Related efforts
CDHU developed and coordinated a collaborative mapping initiative that integrates and standardizes municipal information on Precarious Settlements of metropolitan regions in a single web-based platform.
MAPPA PROJECT – GOALS:

1) Improve information on precarious settlements – By integrating:
   - knowledge of municipal and state actors involved with the collaborative mapping;
   - academic experts in the field of housing;
   - Spatial Models/ Procedures that rely on integrating different types of data (e.g., census data, cartographic databases, remotely sensed data, and other open source data)

2) Assess housing deficit/housing inadequacies inside and outside precarious settlements – joining a household-based approach (traditional, microdata) with place-based approach (precarious settlements database)
   - Relate the multiple dimension of housing needs to the type of action needed
1. Models for IDENTIFICATION and classification of TYPOLOGIES of precarious settlements

2. Procedures to QUANTIFY the total number of households in precarious settlements

3. Multidimensional assessment of HOUSING DEFICIT inside and outside precarious settlements
Definition of different typologies → takes into account the differences in their urban fabric.
Subsidise the development of housing policy strategies
- Ongoing process of collaborative mapping
- Diversity of typologies
**TEC 1**

**Hillslopes**
- Occupation of steep and rugged terrain and/or its foothills;
- city blocks in irregular shape and/or open blocks;
- narrowing of internal roads in relation to the formal city;
- predominance of pedestrian paths, alleys and staircases;
- lot dimensions often smaller than the surrounding;
- lot boundary not always delimited/defined;
- housing in different stages of consolidation and degrees of precariousness;
- frequent incidence of landslides.

**TEC 2**

**Stilt houses**
- Occupation along rivers;
- Environmentally sensitive areas;
- Lack of defined city blocks;
- Lack of basic infrastructure or very poor existing infrastructure;
- Extremely precarious accesses (roads/paths);
- high occupancy density (houses do not have setbacks);
- High density and housing precariousness;
- Areas prone to floods and fire/electroshock risks.
**TEC 3**

**Wetlands** (occupation over permanent preservation areas adjacent to rivers or on embankments built over mangroves and sandbank ecosystems)
- Environmentally sensitive areas;
- Landfilled areas of mangroves and sandbanks;
- Linear occupations along rivers;
- Variable density and degree of precariousness;
- Areas subject to floods

**TEC 4**

**Disordered occupation** (no regular layout)
- High density of occupation and distinct spatial pattern from the surroundings;
- Absence of a regulatory layout and uniformity of urban elements;
- Streets with a different pattern from the surroundings in terms of dimensions and regularity;
- Housing clusters with different lots dimensions accessed only by pedestrian paths;
- Lots with different dimensions and geometries, smaller than the surroundings;
- Housing in different stages of consolidation and different degrees of precariousness, often occupying the entire lot;
- Possibility of including risk areas (high slope) and permanent preservation areas of margins of rivers.
**TEC 5**

**Occupation ordered by regular layout**

- Low or medium slope;
- clearly defined blocks, contoured by vehicular streets;
- may present distinct needs for infrastructure and equipment;
- blocks with smaller area than the surroundings;
- lots may have subdivisions in their backyards;
- construction standards of popular housing, often occupying the entire lot.

**TEC 6**

**Sparse or poorly consolidated occupation**

- Lesser degree of consolidation comparing with the other settlements;
- usually on areas of environmental preservation;
- blocks are poorly defined;
- lacking basic infrastructure and urban services;
- in some cases, vehicular roads structure the occupation, or houses are accessed by trails;
- empty spaces (unoccupied lots) predominate among the housings;
- constitute land reserves for clandestine real estate market.
Creating and integrating variables that are considered most suitable to characterize the different typologies of precarious settlements
Logistic regression models (LR) to generate surfaces of probability regarding the presence of each typology of precarious settlement (or the absence of PS).
NON-P: PROBABILITY SURFACE
Identifying and Classifying Precarious Settlements

This stage consists in analysing the surfaces of probabilities to classify the spatial units of analysis as non-precarious (NON-P) or as one of the defined typologies of precarious settlements (TX).

This classification process is guided by a classification tree framework whose parameters need to be gradually defined by the analysts.
Final Remarks

- Surfaces of probability and classification maps ➔ additional layers of information, complementary to other information on precarious settlements. The convergence/divergence between the different layers of information indicates a lower/higher uncertainty about the presence of precarious settlements.

- Ongoing efforts to develop a more general methodology to be applied to other Brazilian regions ➔ Project conducted by IPEA - Institute for Applied Economic Research, financed by the National Secretariat of Housing (SNH), Ministry of Regional Development.
  - Exploring alternative types of data, such as Federal register for Social Programs (CadUnico), constantly updated.
Thank You!

Contact:
Flávia Feitosa
flavia.feitosa@ufabc.edu.br