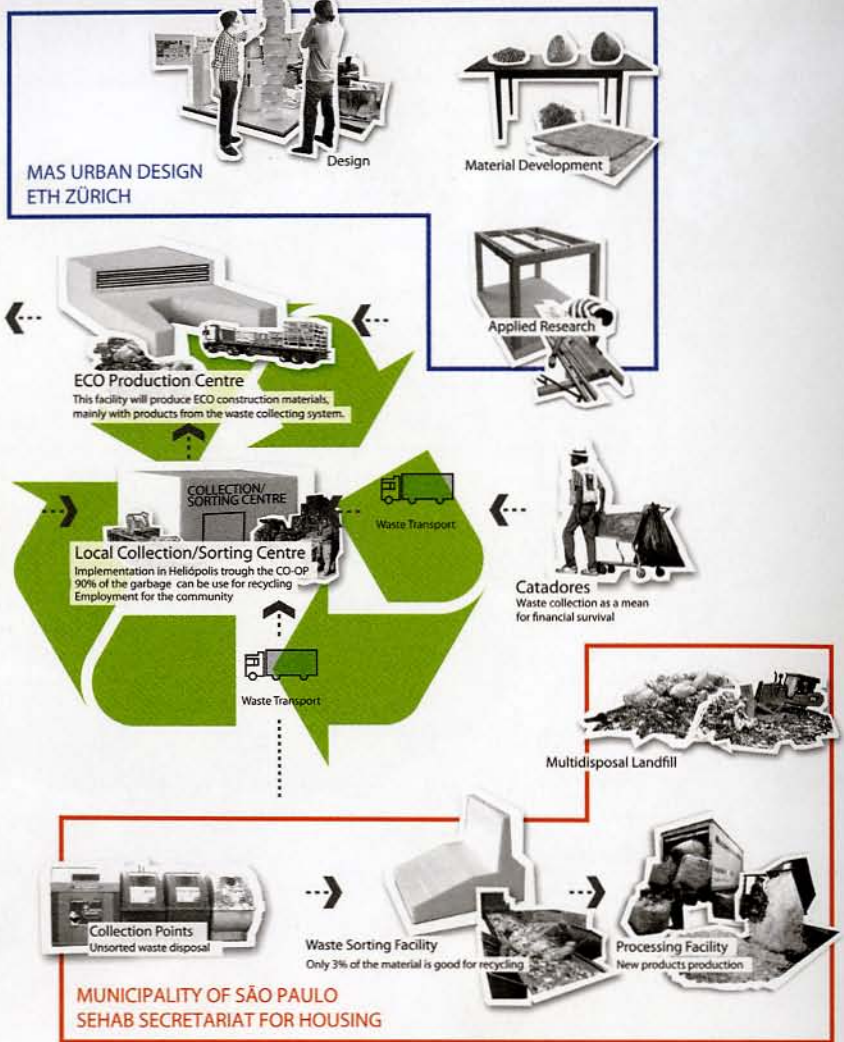


RECYCLING SYSTEM ACTOR DIAGRAM

The waste collection and recycling system of the Municipality of São Paulo (red) will be extended through cooperative models that will be incorporated in the local community of Heliópolis in collaboration with the MAS Urban Design and Reserach Studio of the ETH Zürich.



Building Materials/
Construction Systems



Urban Mining

Designers: Marc Angéilil and Rainer Hehl, with Tomas Polach, Rafael Schmidt, and Julia Sulzer, Urban Design, Department of Architecture, ETH Zürich. Collaborators: Vanessa Padiá, Elisabete França, Maria Teresa Diniz, and Ligia Miranda de Oliveira, Secretariat for Housing, Municipality of São Paulo (SEHAB), Heliópolis settlement community. Heliópolis, São Paulo, Brazil, 2011–present

Informally settled by rural migrants in 1970s, Heliópolis is the largest favela in São Paulo, with 70,000 residents living on an area of land less than a third that of New York's Central Park. Urban design researchers from the science and technology university ETH Zürich, partnering with the city's Municipal Housing authority (SEHAB), propose to engage local residents to recycle discarded materials, which will be combined with either concrete or polymer to create new materials used to make prefabricated elements for favela upgrading. Part of an effort by the World Bank Institute, the Carbon Finance Capacity Building program promotes sustainable development and reduced CO₂ emissions in the Global South's megacities. São Paulo, one of four pilot cities, is focusing on decentralized waste management for two of its informal housing settlements, Heliópolis and Paraisópolis. The planned first phase for the Urban Mining program will restructure local waste collection and build a recycling and prototyping center for composite materials and building systems.

Concrete, a familiar construction material in the favela, when combined with industrial and urban waste products, such as polystyrene, expanded clay, recycled plastic, or natural fiber, is lighter in weight and improves insulation and tensile properties. Polymer mixed with recycled paper, plastic, or textiles produces a material that is lightweight, flexible, weather-resistant, structurally sound, and durable for easier maintenance, transport, and use. The composite materials allow for a modular building system which can be used to construct affordable self-built housing units, collaboratively designed with residents. In addition, collecting and using waste material for upgrades adds to the local economy and generates income for its inhabitants—a model sustainable upgrading system for other informal settlements. CS

- A. Recycling system diagram illustrates key collaborators and outcomes, Heliópolis settlement, São Paulo, Brazil.
- B. Rendering of self-built vertical housing units proposed for Heliópolis.
- C. Rendering of prefabricated composite structural components.
- D. Rendering of modular building system.

