



Participatory Urban Upgrading as a Pathway to Landslide Risk Reduction in Informal Settlements: A Case Study from Rio de Janeiro, Brazil

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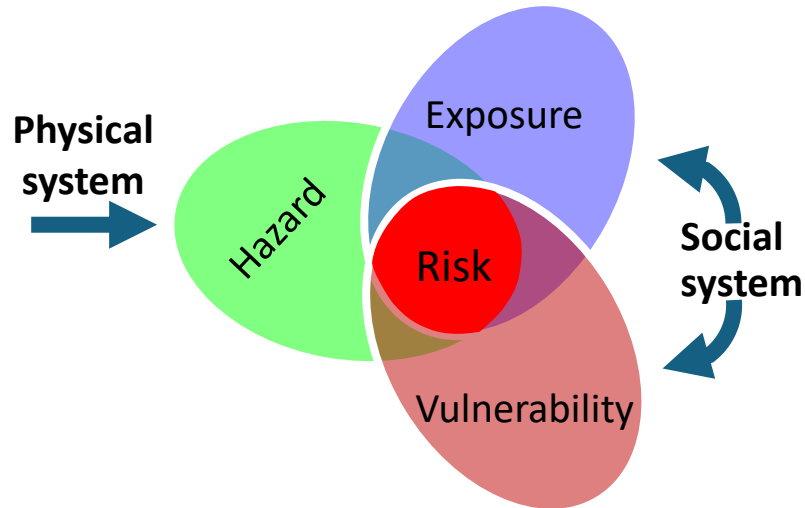
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Federal University of Rio de Janeiro, Brazil

▪ Context/motivation



Socioeconomically vulnerable populations → **social pressure to occupy landslide-hazard areas**, frequently lacking adequate infrastructure (favelas).

- Higher exposure
- ⇒ • Greater vulnerability
- Increased landslide hazard

Sendai Framework guiding principles for DRR (UNDRR, 2015) :

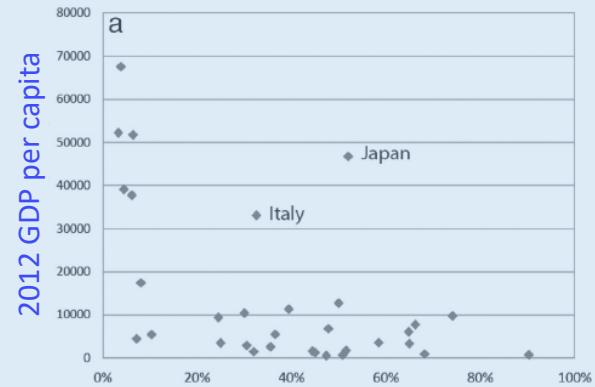
- **interdisciplinary** and **intersectoral** approaches;
- effective **community participation** in the design and implementation of DRR policies and plans;
- consider **local and specific characteristics**;



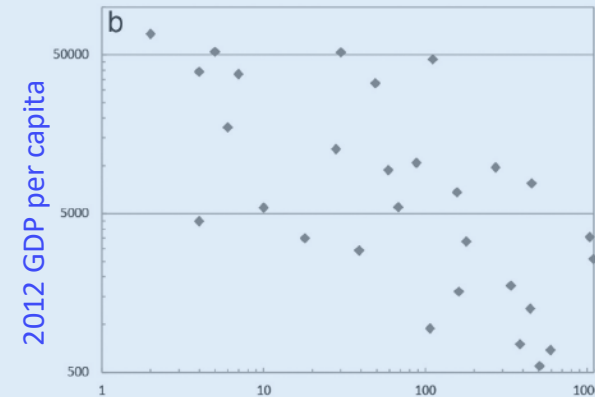
■ Context/motivation

Kirschbaum et al. (2015):
“The richest countries suffered the fewest fatalities, while hundreds died in many of the world's poor countries.”

This statement may be established on other scales, intranational or even intramunicipal spaces.



Percentage of landslide reports over 2007–2013

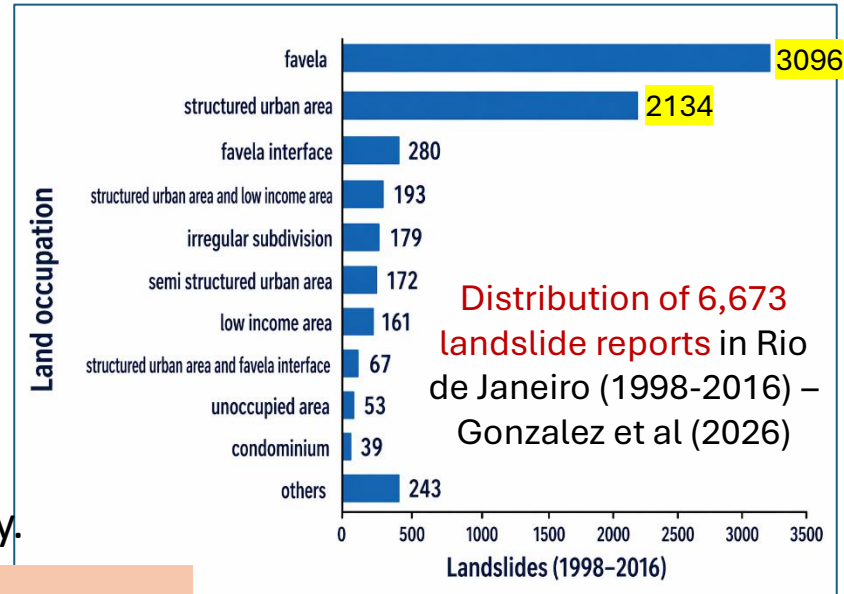


Total fatalities over 2007–2013

Kirschbaum et al. (2015)

Urban Policy Context – Rio de Janeiro

- 21.7% of the city's population lives in **favelas**
- Risk areas management in favelas:
 - **Before the 1990s**: risk areas (landslide or flood) were managed through **forced relocation of population** ⇒ significant **social impacts**;
 - **After the 1990s**: shift toward **urban upgrading and infrastructure improvements** → integration between informal settlements and the formal city.



Favela-Bairro Program (after 1994)

- Improved living conditions
- However:**
- Limited community participation in intervention planning
- Local specificities often overlooked
- Sometimes used to legitimize pre-established decisions

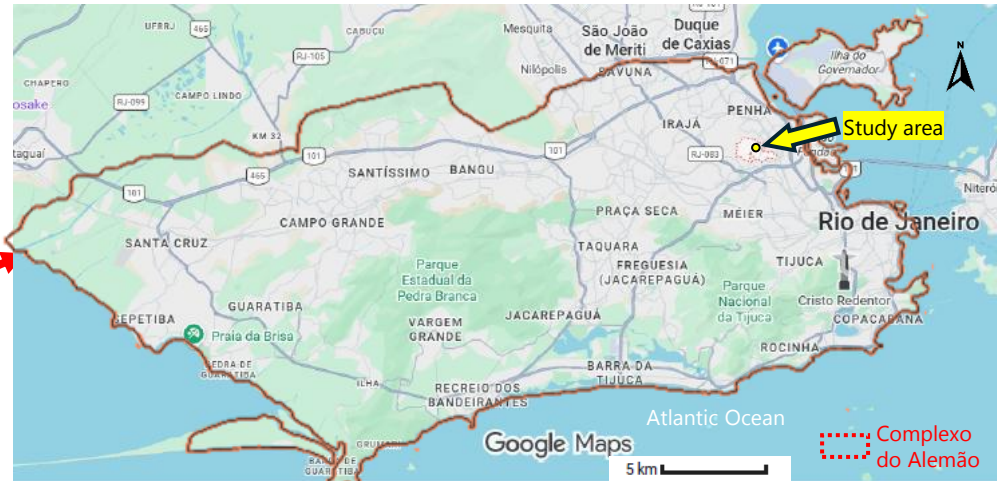
■ Objective

To present and discuss an experience of the development of an **urban upgrading project & landslide risk reduction** in informal settlements, highlighting **community participation**.

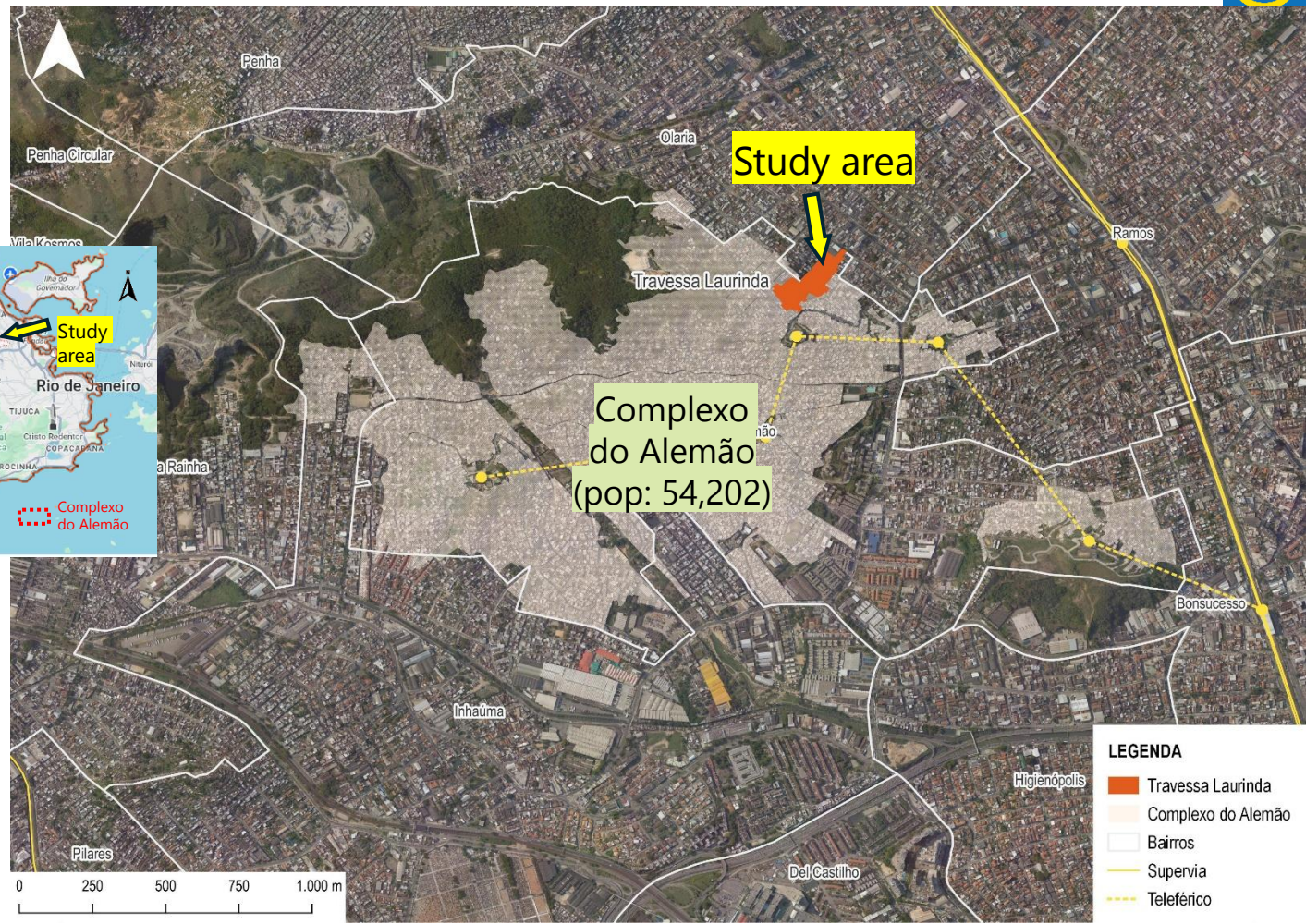
■ Study area

Study area: **Travessa Laurinda, Complexo do Alemão (favela), Rio de Janeiro, Brazil**

Location of the study area in Rio de Janeiro city



■ **Study area**



LEGENDA

- Travessa Laurinda
- Complexo do Alemão
- Bairros
- Supervia
- Teleférico

■ Study area

Study area: **Travessa Laurinda, Complexo do Alemão (favela), Rio de Janeiro, Brazil**



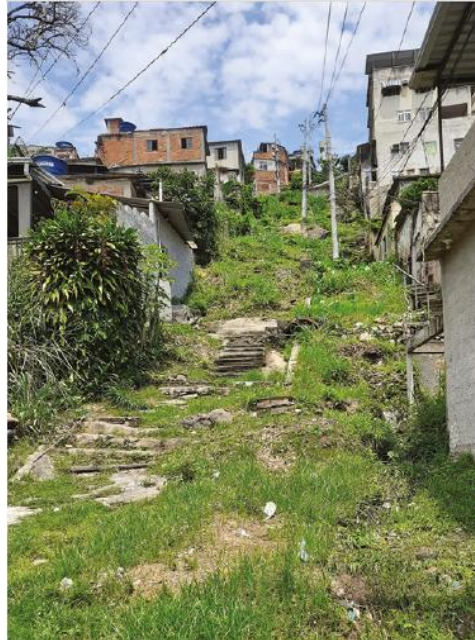
- Area: ~10,000 m²
- ~100 households
- 5 narrow alleys
- precarious infrastructure

■ Study area

Study area: **Travessa Laurinda, Complexo do Alemão (favela), Rio de Janeiro, Brazil**



- Area: $\sim 10,000 \text{ m}^2$
- ~ 100 households
- 5 narrow alleys
- precarious infrastructure



Geotechnical characteristics:

- Steep slopes ($\sim 35^\circ$)
- Highly fractured weathered rock
- Shallow soil cover
- Water seepage through rock fractures, with some springs
- Cuts and fills
- Precarious retaining walls
- Evidence of past landslides



▪ Methodology

2023: collaboration between **FAU** (Architecture and Urbanism) and **POLI** (Geotechnical Eng.) to create an undergraduate subject (8th semester, FAU)/extension project

Interdisciplinary and intersectoral approach to develop the project:

• Schools involved (UFRJ):

- Architecture and Urbanism (FAU)
- Geotechnical Engineering (POLI)
- Urban Planning (IPPUR)

• Actors involved:

- University (UFRJ)
- Local NGOs (Raízes em Movimento; residents' association)
- Community residents
- Municipal government (housing, environment, geotechnics departments)

Participants included:

- Architects
- Geo-Engineer
- Geographers
- Sociologists
- Students
- Residents
- Public officials

■ Methodology

- Project Phases

1. Participatory socio-environmental diagnosis (Aug/23)

- Household survey (60 households)
- Interviews with community leaders
- Focus groups
- Consultation and use of data from municipal agencies

- Identification of:
- Vulnerabilities (physical and social)
 - Community potentials
 - Priority demands



Methodology

Project Phases

1. Participatory socio-environmental diagnosis (Aug/23)

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2. Development of Proposals (Sep–Dec/2023)

- Analysis of collected data → main demands
- Discussion with residents and local leaders



Methodology

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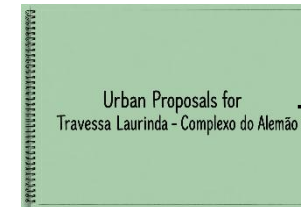
- Analysis of collected data → main demands
- Discussion with residents and local leaders

3. Feedback Phase (Dec/2023)

- Presentation of complete design proposals
- Community discussion sessions (round of conversation)

4. Final revisions (Dec/2023)

- Deliver the final design set to the local organization



→ Local
organizations

Results

Distribution of interviewees according to demands for local improvements

→ 60



Urban improvement proposals focused on:

- Mobility and accessibility
- Solid waste management
- Drainage channels
- Public lighting
- Re-vegetation
- Leisure spaces

At the same time, aiming at:
→ **Landslide risk reduction**

Results

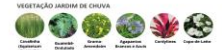
Identification of areas of major concern regarding landslides - spatial distribution of households based on residents' responses about:

- Risk perception
- Presence of structural cracks





01 MIRANTE LAURINDA
Gabriela Raposo de Melo e
Lidiane Helena Avelino

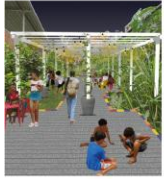


03 CAMINHO DAS PEDRAS
Julia Acosta e
Thaynara Gonçalves

02 ESCADARIA JARDIM
André Martins B. Begonha e
Andrew Frederick G. Monteiro



04 PATAMAR JARDIM
Amélie Böllert,
Anna Clara Clementino
e Patricia Monçores



05 QUINTAL DA LAURINDA
Adrielly De Oliveira Lira e
Carla Nascimento Barros



06 CHEGADA LAURINDA
Amanda Santos e
Mateus Bispo



07 VERDEJAR LAURINDA
Juliana Castelo Branco e
Letícia Lage



08 VILA SOLAR
Carolayne Silva e
Marcelly Nascimento



09 HORTA DRENANTE
Mônica Ferreira e
Rayane Barbosa

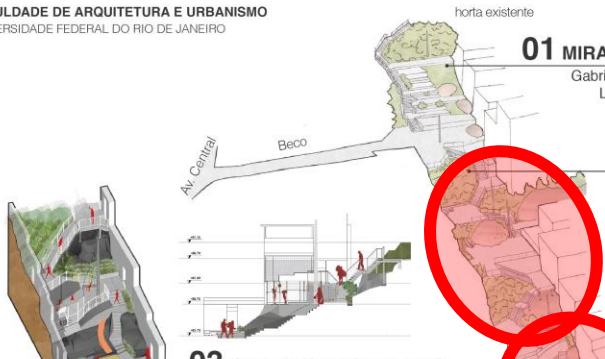


10 PORTA CARGA
Bianca Teixeira e
Julien Fialland



• revegetation,
retaining walls

• Mobility/
accessibility



01 MIRANTE LAURINDA
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04 PATAMAR JARDIM
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e Patricia Monçores

• Re-vegetation



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06 CHEGADA LAURINDA
Amanda Santos e
Mateus Bispo



08 VILA SOLAR
Carolayne Silva e
Marcely Nascimento

• Leisure
spaces for
socialising

07 VERDEJAR LAURINDA
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Leticia Lage



09 HORTA DRENANTE
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Rayane Barbosa



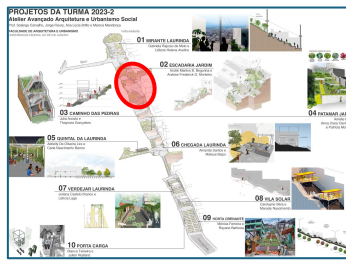
• Re-vegetation;
drainage

• Solid waste
collection



10 PORTA CARGA
Bianca Teixeira e
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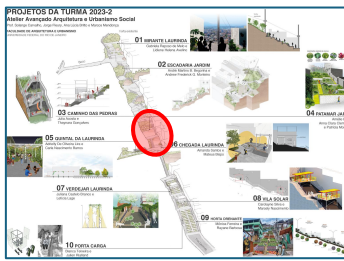
Results



- Mobility/accessibility; drainage; re-vegetation



Results



- Mobility/accessibility; drainage; re-vegetation



Subsequent results

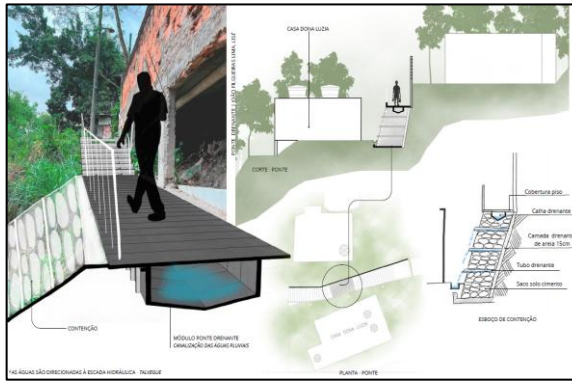
1

Urban Interventions
Proposals **Portfolio**



THIS PROJECT

One of the proposed interventions



Subsequent steps:

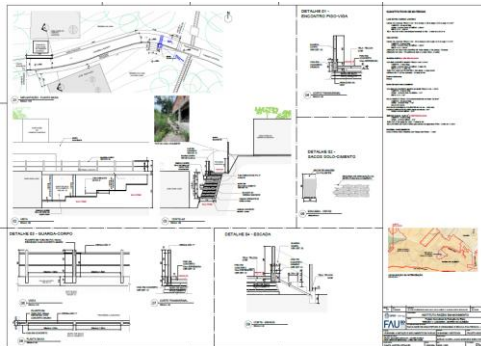
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Project submitted to the government to request financial support for the implementation of a proposal deemed a priority by the community.



3

Elaboration of a final design (executive project).



4

Funding for implementation.

5

Management of civil works by local organization.

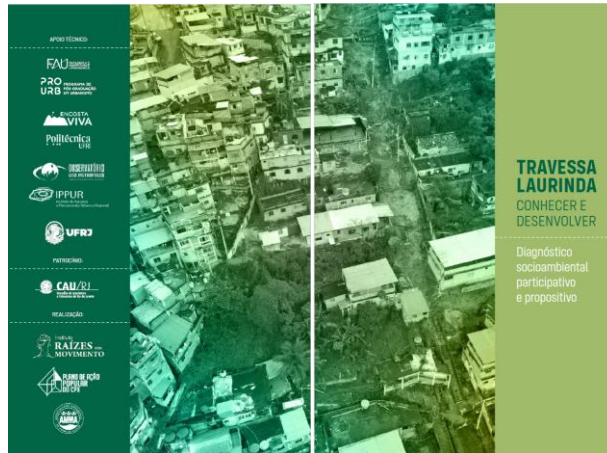


Results – final products

Booklet: Participatory and Propositional
Socio-Environmental Diagnosis



(in portuguese)



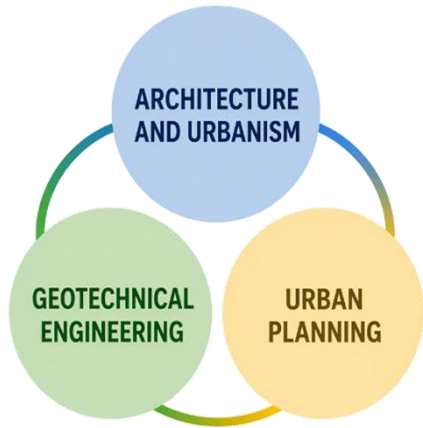
Urban Interventions Proposals **Portfolio**



Final considerations

- Participatory urban upgrading can effectively support landslide risk reduction
- Key success factors:

Interdisciplinarity



Intersectorality



Effective and strong collaboration between stakeholders

- Educational lasting effect: students (also professors) gain direct experience with informal settlement realities (~8% of Brazil's; 22% of Rio de Janeiro's population lives in favelas)

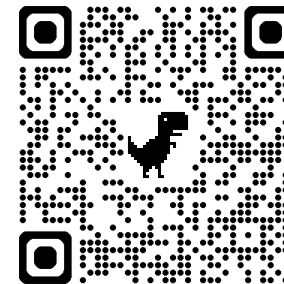
Acknowledgements:



Thanks!



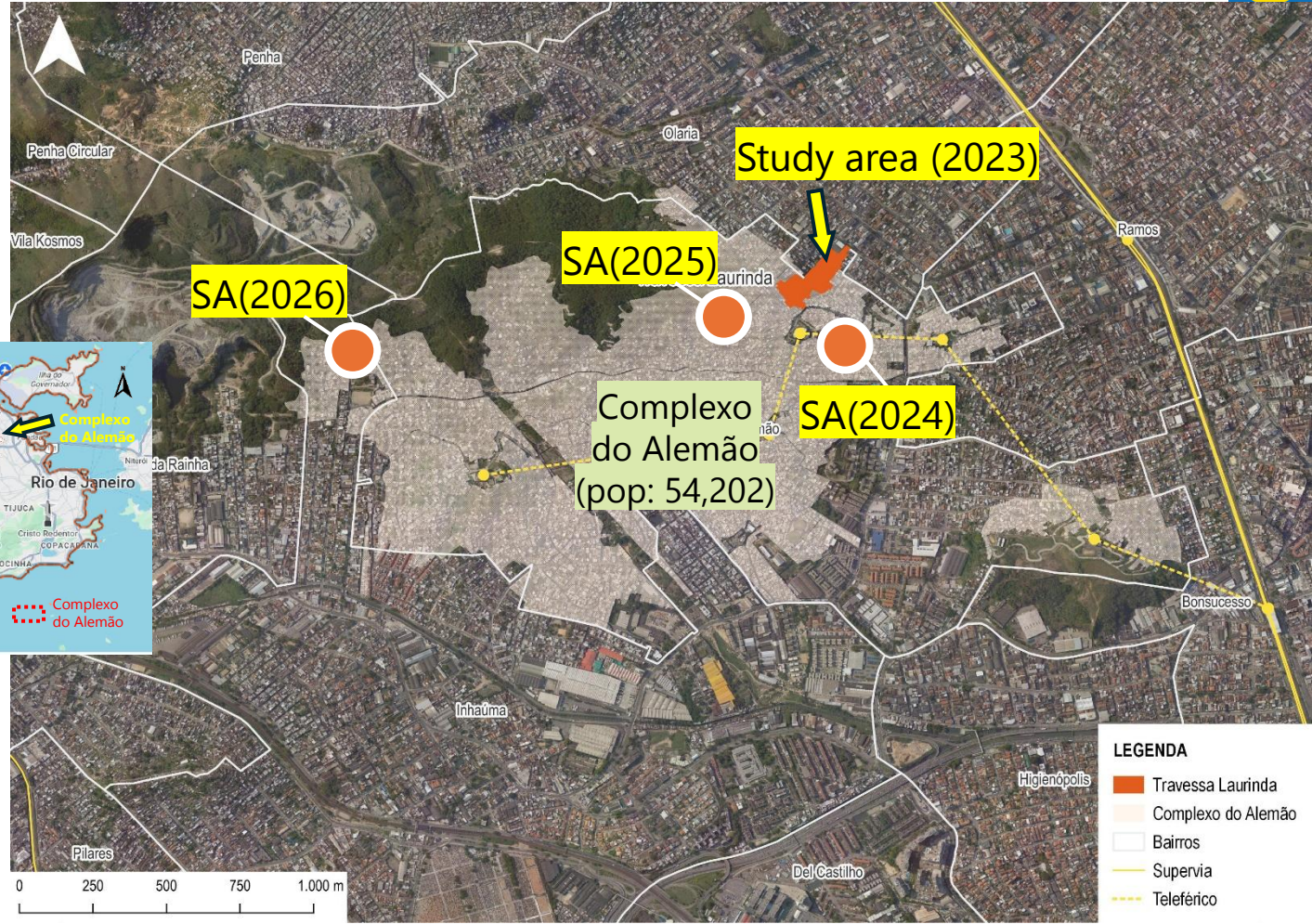
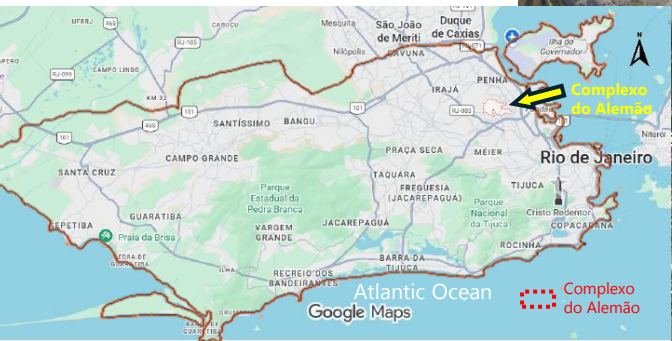
Abstract



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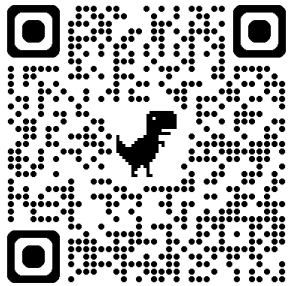
The project is continuing in other areas.



LEGENDA

- Travessa Laurinda
- Complexo do Alemão
- Bairros
- Supervia
- Teleférico

Abstract



How to cite:

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