Public space and climate change adaptation in Latin America

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Landslides: Minas Gerais, Brazil
Fluvial flooding: Higuerote, Venezuela

Pluvial flooding: Barranquilla, Colombia

Open public space as an asset

- Challenge presented by the Colombian Government:
  - How to incorporate adaptation/mitigation projects into their most vulnerable cities?
  - Replicable and scalable framework
    - Open data
    - Remote sensing

Clients:
- IADB-Colombia-Climate Change Sector
- FONADE (National Development Fund of Colombia)
- Ministry of Environment and Sustainable Development in Colombia
GeoAdaptive’s approach

- Understand social and cultural value of the space
- Creating a sense of public ownership
- Securing maintenance and care

- Deal with lack to data
- Accuracy
- Transparency
- Objective Information

- Find creative solutions
- Multifunctional uses
- Flexible and adaptable

- Integrating most agreeable natural science knowledge
- Addressing multiple phenomena and scales
- Modeling and simulate possible behavior

Adapted from C. Steinitz
Project framework

1. IDENTIFY STRESSOR
2. EVALUATE STRESSOR & VULNERABILITY
3. IDENTIFY STRATEGIES
4. IDENTIFY AREA OF INFLUENCE
5. CONCEPTUAL DESIGN

INVENTORY (typologies and vulnerabilities)
Case Library (applicable strategies)
Challenges and opportunities within the urban context

- Natural Hazard: Slow and rapid inundation
- Natural Hazard: Landslide
- Natural Hazard: Sea level rise & storm surge
- Runoff
- Rapid urbanization
- Underutilization and scarcity of public space
- Lack of gray infrastructure
Understanding the urban framework

- Remote Sensing
- Site Analysis
- Zoning Ordinances
- Science & Engineering

- Hydology and inundation
- Urban Heat Island
- Vegetated Groundcover
Impact of climate change

Precipitation
- Reduction ~15% by 2030
- River Flooding
- Flash Flooding
- Erosion

Sea Level Rise
- Increase 10.5 cm by 2030
- Coastal Flooding

Extreme Event
- Frequency increases 50% per 1°C increase of temperature
- Coastal Flooding
- Flash Flooding

Temperature
- Increase 0 – 1°C from 2011 to 2040
- Increase in Urban Heat
Contextual understanding of the urban and landscape systems

- Vegetation Coverage
- Topography
- Impermeability
- Population Density
- Socioeconomic Stratification
Adaptation strategies and interventions

Finance
- Financial capacity of local and national governments

Time
- Implementation time

Space
- Availability and accessibility of space

Impact
- High efficiency through small scale interventions

Natural Hazard
- Vulnerability and impacts of urban and natural systems
Conceptual Intervention: Arroyo 64
Arroyo 64 | Phase 1

[Diagram showing green streets, rain gardens, and rain barrels along a linear path, with an inset diagram highlighting specific urban features and their functions.]
Arroyo 64 | Phase 3
Climate Adaptation

- Low Risk (COP$0 billions/ha)
- High Risk (COP$1.5 billions/ha)
- Low Flood Depth (0.5m)
- High Flood Depth (3.5m)
Climate adaptation strategies

Contextual analysis and hazard modeling

Risk modeling

Flood modeling

Development of implementable policies through a public-private partnership
Thank you

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