Metropolitanization and forest recovery in Santa Catarina, southern Brazil: a multiscale analysis

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Symp. 13 – Landscape change and forest transition theory: towards a multiscale approach

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Introduction
A multiscale analysis of anthropogenic landscape dynamics in the Florianópolis city-region, Santa Catarina, Brazil
Anthropogenic Landscape Heterogeneity

Human modification of landscapes and ecosystems within the city-region

Photos by S. Baptista
Gridded Population of the World, version 3 (GPWv3) and the Global Rural-Urban Mapping Project (GRUMP) are the latest developments in the rendering of human populations in a common geo-referenced framework, produced by the Center for International Earth Science Information Network (CIESIN) of the Earth Institute at Columbia University.

Atlantic Forest remnants in Brazil, Santa Catarina, and the Florianópolis Metro Region in 2005

Source: Adapted and translated from maps available online from Fundação SOS Mata Atlântica,
URL: http://www.sosma.org.br
Percent forest cover in Santa Catarina’s 293 municipalities, 2005
Remote sensing data reported by Fundação SOS Mata Atlântica and INPE

Florianópolis Metropolitan Region
55.77% forest cover
City-regions as coupled social-ecological systems within regional and global contexts

Research Questions

- As cities and metropolitan systems in Latin America continue to expand, what are the expected consequences for ecosystems, climate and people?

- As population increase, economic expansion, and urbanization have occurred in metro Florianópolis, what has happened to the city-region’s landscape and ecosystems?

- As landscape transformations have taken place, what has happened to the socioeconomic status of people in the region? How have demographic, economic, and environmental changes impacted the living conditions of different segments of society from the poorest to the wealthiest?

- How have policies and institutions at international, federal, state and municipal levels influenced land-use patterns, environmental quality, and social justice/equity concerns?

- How can the processes and institutions that have contributed to deforestation, forest degradation, biodiversity loss, inequality, and injustice be reoriented towards social and land-use dynamics that instead restore forests and replenish biodiversity while fostering human well-being, social equity, and justice?
Dissertation Fieldwork and Methodology

Research activities and sources of evidence:

- **Census data** (demographic and agricultural)
- **Bibliographic documents** (books, articles, theses, reports, maps)
- **Interviews** (semi-structured and informal)
- **Participant observation**
- **Site visits** (direct observation)
Publications:


Dissertation:

Santa Catarina State
Population Distribution
(municipalities with 30 000 or more inhabitants)

Instituto Brasileiro de Geografia e Estatística (IBGE) Demographic Census Data
Demographic trends

~78% urban in 2000
~90% urban in 2000

In the context of rapidly growing medium-sized cities
From 1970 to 2000:
• Florianópolis grew from 138,556 to 342,315
• Metro region grew from 335,706 to 816,315

Estimates for 2007:
• Florianópolis ~396,723
• Metro region ~940,339

Rural-urban migration ("rural exodus")

Municipalities in the FMR that experienced declines in population between 1991 and 2000

<table>
<thead>
<tr>
<th>Município</th>
<th>Pop. 1991</th>
<th>Pop. 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfredo Wagner</td>
<td>9,795</td>
<td>8,857</td>
</tr>
<tr>
<td>Major Gercino</td>
<td>3,785</td>
<td>3,143</td>
</tr>
<tr>
<td>Leoberto Leal</td>
<td>4,268</td>
<td>3,739</td>
</tr>
<tr>
<td>Angelina</td>
<td>6,268</td>
<td>5,776</td>
</tr>
<tr>
<td>Anitápolis</td>
<td>3,564</td>
<td>3,234</td>
</tr>
<tr>
<td>São Bonifácio</td>
<td>3,373</td>
<td>3,218</td>
</tr>
<tr>
<td>TOTAL:</td>
<td>31,053 (-3,086)</td>
<td>27,967</td>
</tr>
</tbody>
</table>
1957

Submunicipal level

Rio Tavares and Campeche

Mosaic of woodland, pasture, cropland, and fallows.

Source: Instituto de Planejamento Urbano de Florianópolis (IPUF)
Campeche Coastal Plain, Santa Catarina Island

1979  2001  2004

Campeche Development Plan (1992, 1995)
Planners proposed development to accommodate 450,000 residents.

Source: Instituto de Planejamento Urbano de Florianópolis (IPUF)

Photos by S. Baptista
Rio Tavares Mangrove

Urbanization along roads on Santa Catarina Island’s bayside and surrounding a mangrove (mostly commercial and lower income residential land use)

1957

1998

Source: Instituto de Planejamento Urbano de Florianópolis (IPUF)
Forest recovery after agricultural abandonment and protected-area creation on Santa Catarina Island

*Source:* Instituto de Planejamento Urbano de Florianópolis (IPUF).
Exposure and vulnerability to climate risk in the coastal municipalities of Santa Catarina

Cyclone/Hurricane Catarina
March 2004


Itajaí River Valley

Landsat 7
Path 220, Row 079
March 29, 2003
Source: http://glovis.usgs.gov/
Itajaí River Valley
Landsat 7
Path 220, Row 079
March 29, 2003
Source: http://glovis.usgs.gov/

Image taken 11:50 a.m. local time (13:30 UTC) on November 22, 2008
Source: http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=36035

Tropical Rainfall Measuring Mission (TRMM) satellite
TRMM is a joint mission between NASA and the Japanese space agency, JAXA.
Extreme rainfall event in the Itajaí River Valley
November 20-23, 2008

Fatalities: by Dec. 14, 2008, the number of confirmed deaths, mostly from landslides, had reached 128.

Human health impact: 242 confirmed cases of leptospirosis.

Source: Diário Catarinense, 25 Nov. 2008

Source: Santa Catarina government /AP Photos

Climate risk management strategies -- “climate-proofing”

High-end real estate on hill slopes of Lagoa da Conceição

Location matters, but so does:
- housing quality
- infrastructure provision
- access to resources, institutions, information

Need for improved disaster response, recovery, and anticipatory strategies in the context of sociospatial inequalities.

Informal settlement on hill slopes of Saco Grande

Photos by S. Baptista
Implementing the urban reform agenda in Brazil

EDESSIO FERNANDES
University College London, UK

ABSTRACT: This paper discusses the urban reform legal and institutional innovations since the 1980s. The main legal and institutional innovations are the 1982 Land Reform Law, the 1986 Law of Cities, the 1990 Law of the National Council of Cities, and the 1996 Law of the National Council of Cities, which have contributed to the development of the urban reform agenda in Brazil. These legal and institutional innovations have contributed to the development of the urban reform agenda in Brazil. The paper concludes with an analysis of the land use policy and urban development in Brazil, especially during the period when the urban reform agenda was introduced. The paper concludes with an analysis of the land use policy and urban development in Brazil, especially during the period when the urban reform agenda was introduced.
Building adaptive capacity: multiscale institutions and local governance

Participatory Municipal Master Plans

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Marcio Fortes de Almeida
Secretaria Nacional de Programas Urbanos
Raquel Rolnik
Presidente do CONFEA
Marcos Túlio de Melo
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Coordenação geral da elaboração da Cartilha
Vereador Carlos Comassetto - Porto Alegre/RS

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Para obter arquivo digital desta cartilha e outras informações sobre o tema, acesse
www.cidades.gov.br/planodiretorparticipativo

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Brazil’s Ministry of Cities
Thank you!

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