

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

Sandra R. Baptista

Postdoctoral Research Fellow

The Earth Institute at Columbia University

Center for International Earth Science Information Network (CIESIN)

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Landscape Ecology in Latin America: Challenges and Perspectives

Ecologia de Paisagens na América Latina: Desafios e Perspectivas

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

October 4-7, 2009

Campos do Jordão, São Paulo, Brazil

Introduction

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



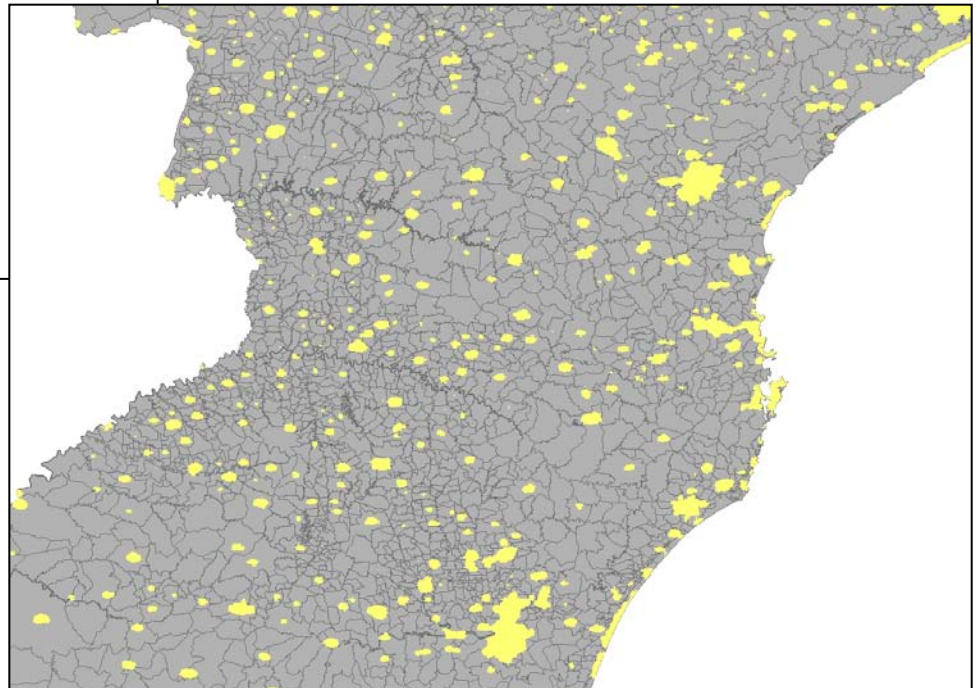
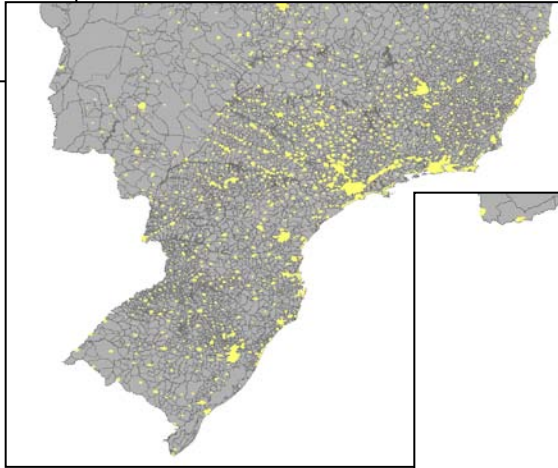
Anthropogenic Landscape Heterogeneity

Human modification of landscapes and ecosystems within the city-region



<http://sedac.ciesin.columbia.edu/gpw/>

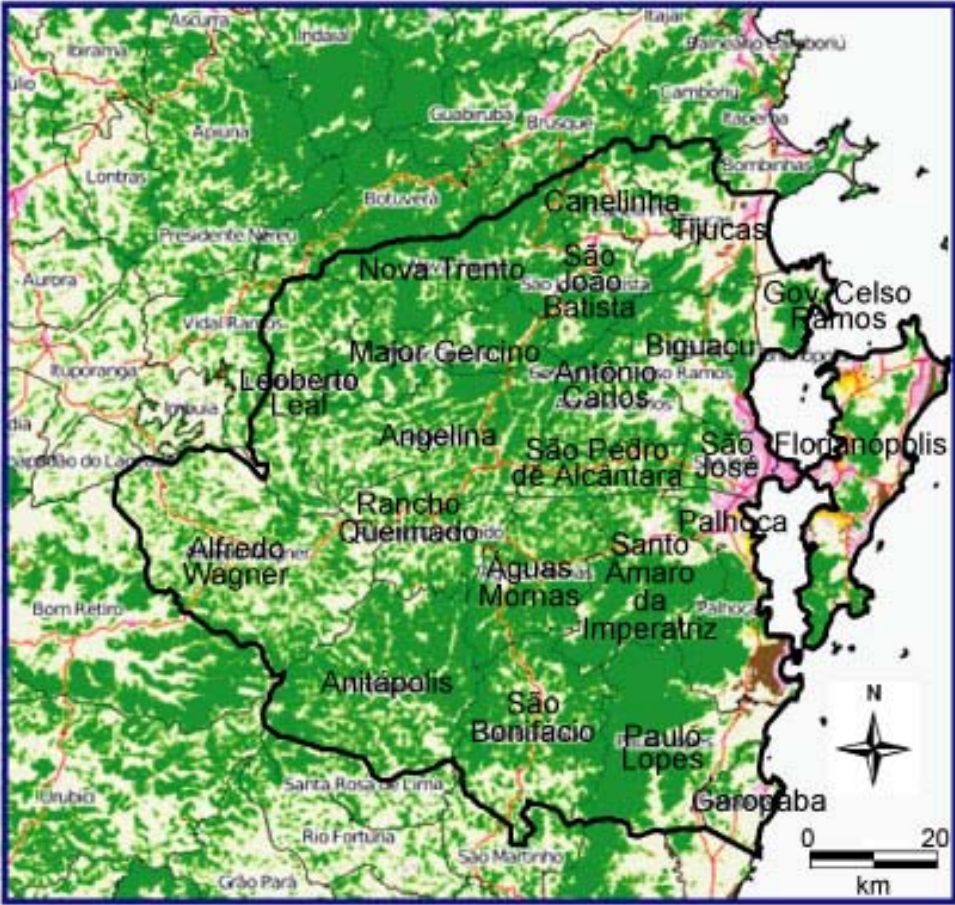
Gridded Population of the World, version 3 (GPWv3) and the **Global Rural-Urban Mapping Project (GRUMP)** are the latest developments in the rendering of human populations in a common geo-referenced framework, produced by the Center for International Earth Science Information Network (CIESIN) of the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



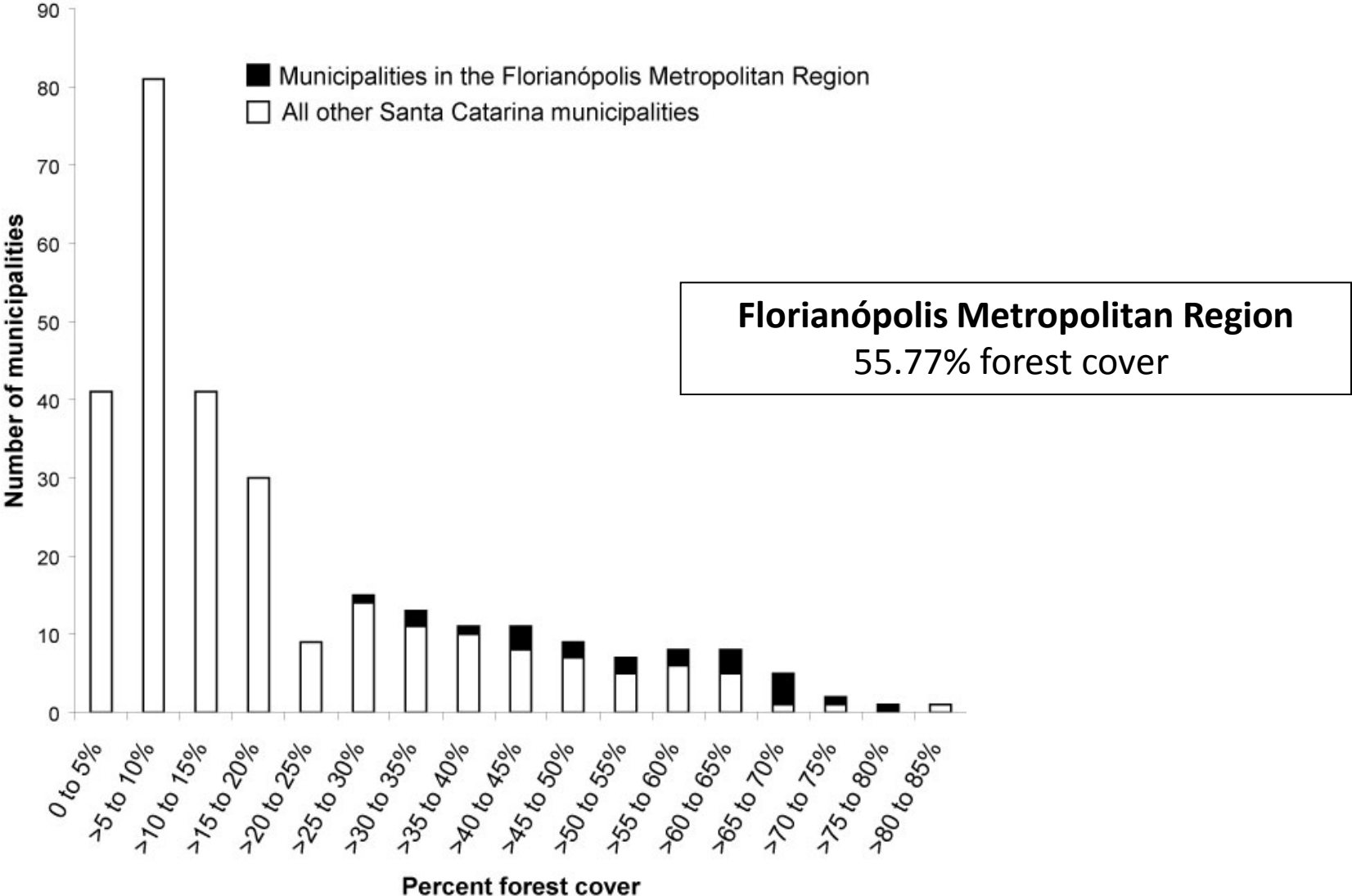
LEGEND

- FMR Boundary
- Major Roads
- Forest

- Urban Areas
- Mangrove
- Restinga or Dune

Percent forest cover in Santa Catarina's 293 municipalities, 2005

Remote sensing data reported by Fundação SOS Mata Atlântica and INPE



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)
- ◆ **Aerial photographs** (1938, 1957, 1977, 1979, 1994, 1998, 2001)
- ◆ **Interviews** (semi-structured and informal)
- ◆ **Participant observation**
- ◆ **Site visits** (direct observation)



Publications:

Baptista, SR (in press) Metropolitan land-change science: a framework for research on tropical and subtropical forest recovery in city-regions. *Land Use Policy* (Special issue on Forest Transitions).

Baptista, SR (2008) Metropolitanization and forest recovery in southern Brazil: a multiscale analysis of the Florianópolis city-region, Santa Catarina State, 1970 to 2005. *Ecology and Society* 13(2):5. [online]
<http://www.ecologyandsociety.org/vol13/iss2/art5/>.

Baptista, SR and TK Rudel (2006) A re-emerging Atlantic Forest? Urbanization, industrialization and the forest transition in Santa Catarina, southern Brazil. *Environmental Conservation* 33(3):195-202.

Dissertation:

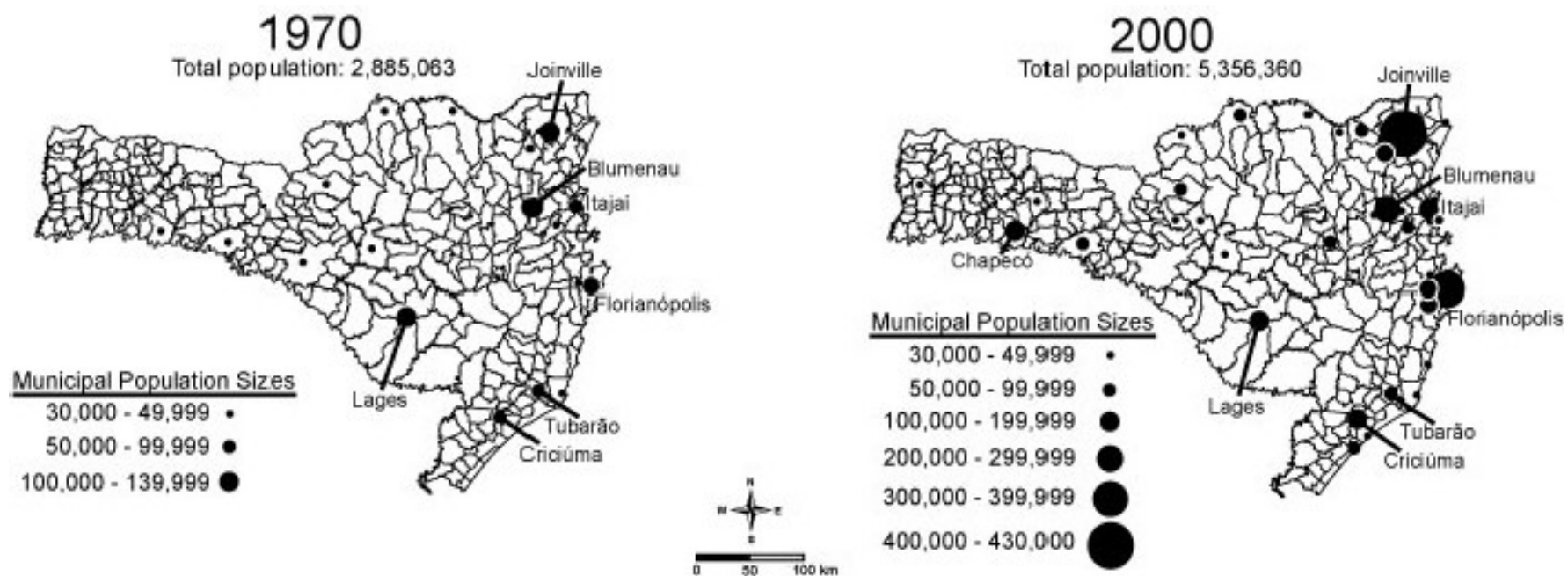
Baptista, SR (2008) Forest recovery and just sustainability in the Florianópolis city-region. Ph.D. Dissertation, Rutgers, The State University of New Jersey, New Brunswick, United States. [online]
<http://hdl.rutgers.edu/1782.2/rucore10001600001.ETD.17433>.

Santa Catarina State

Population Distribution

(municipalities with 30 000 or more inhabitants)

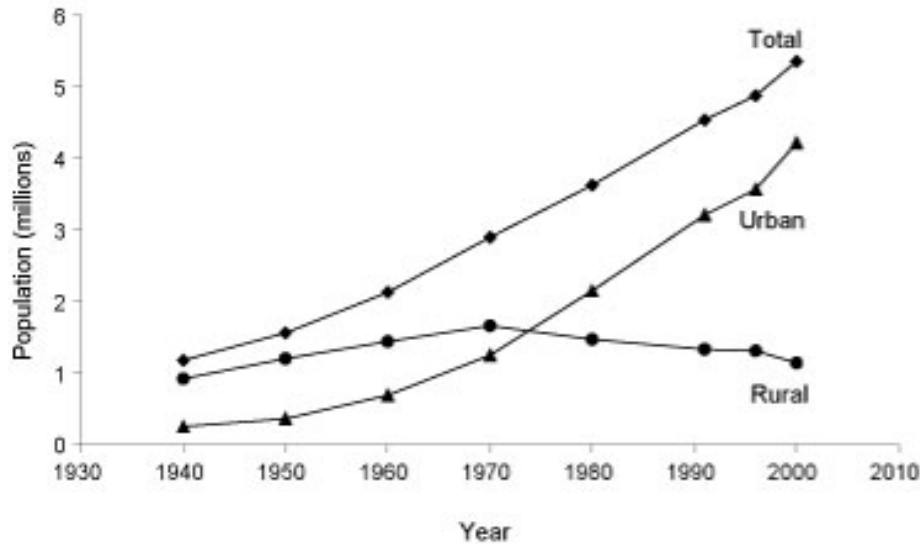
Instituto Brasileiro de Geografia e Estatística (IBGE) Demographic Census Data



Demographic trends

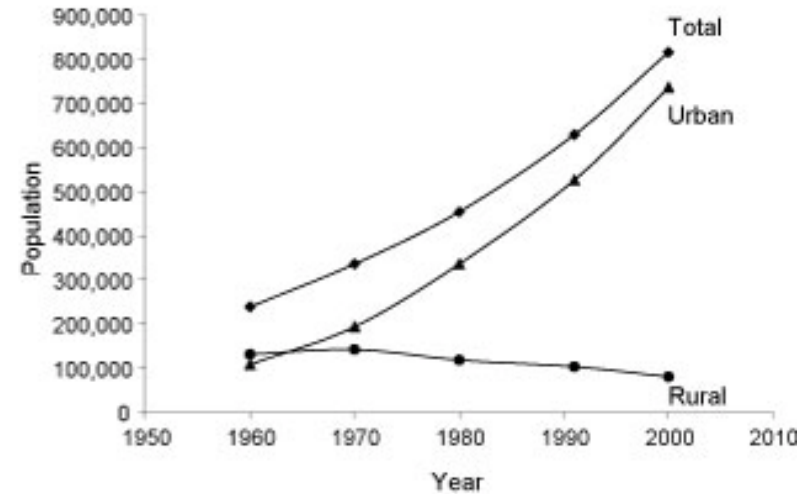
~78% urban in 2000

Santa Catarina



~90% urban in 2000

Florianópolis Metropolitan Region



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:

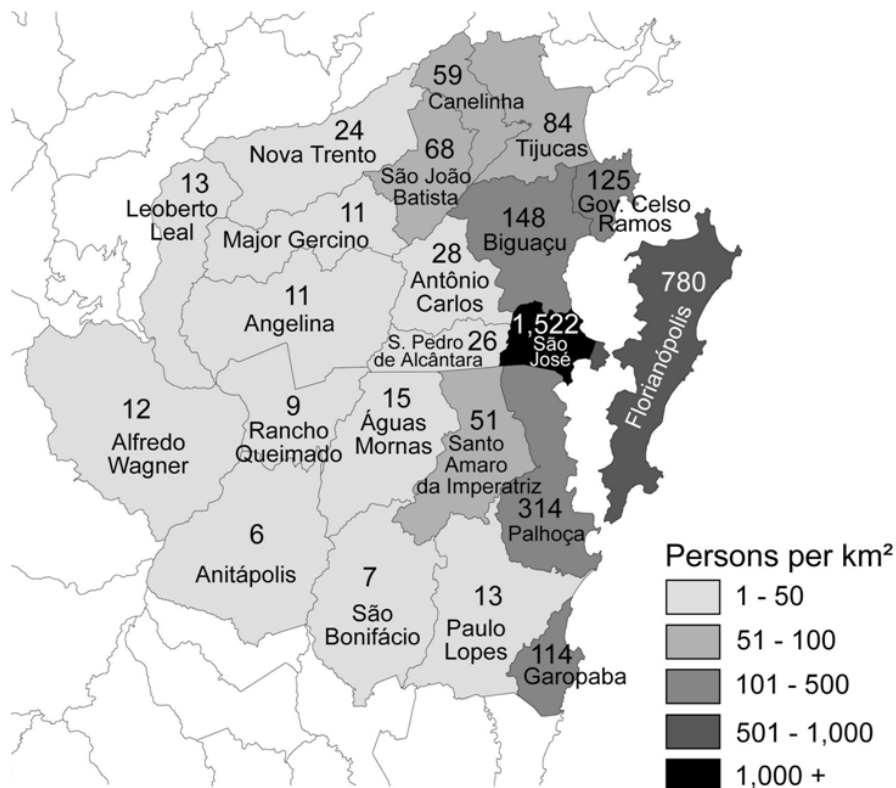
- Florianópolis ~396,723
- Metro region ~940,339

Source: IBGE (1964, 1974, 1983, 1996, 1997, 2001, 2007)

Rural-urban migration (“rural exodus”)

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

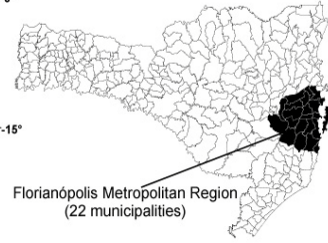
Population Densities in the FMR 2000



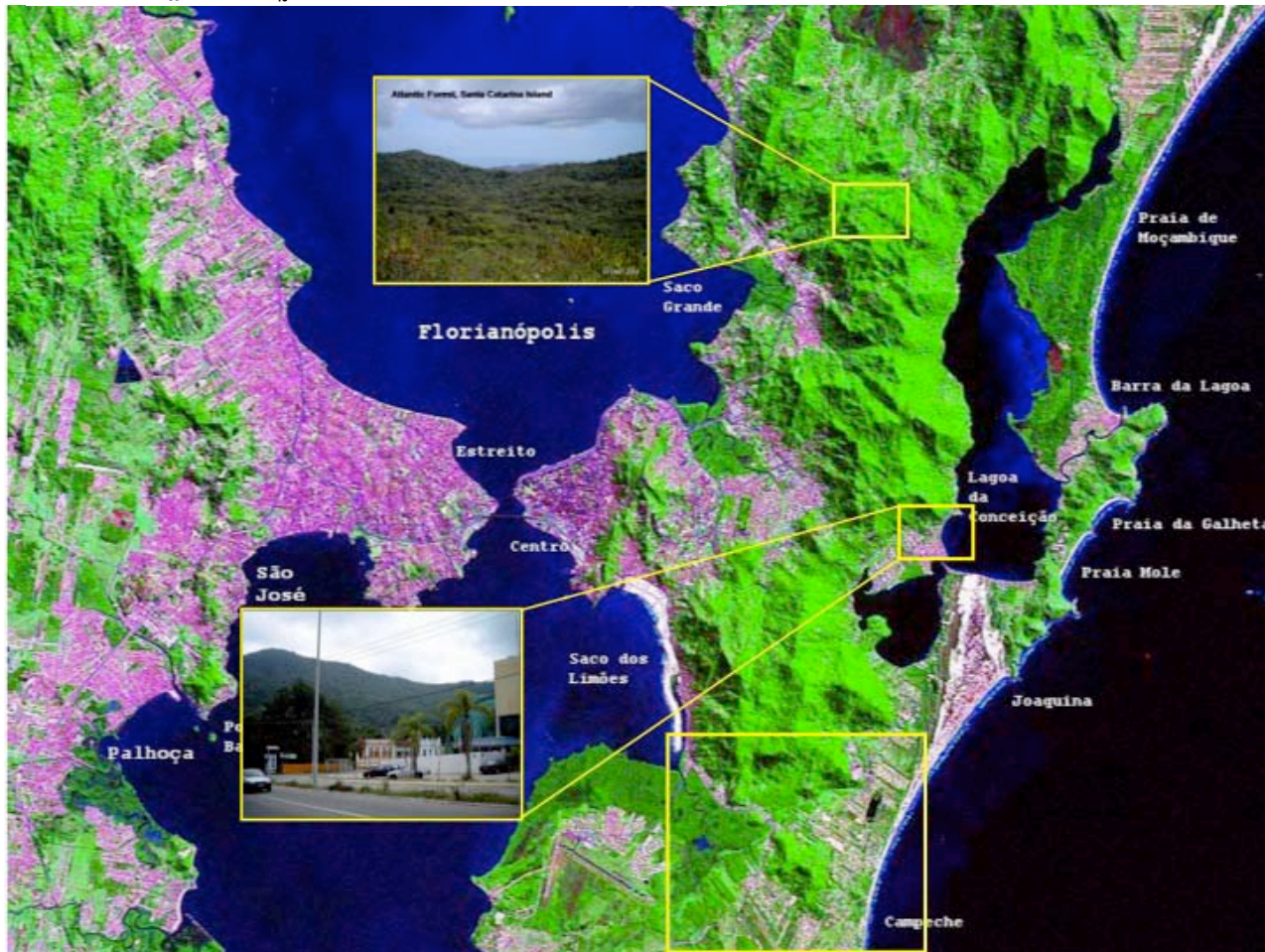
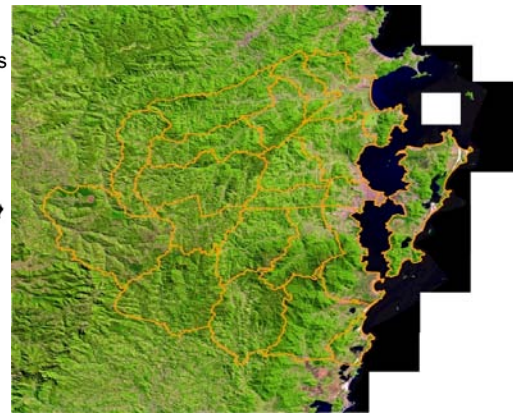
<u>Município</u>	<u>Pop. 1991</u>		<u>Pop. 2000</u>
Alfredo Wagner	9,795	(-938)	8,857
Major Gercino	3,785	(-642)	3,143
Leoberto Leal	4,268	(-529)	3,739
Angelina	6,268	(-492)	5,776
Anitápolis	3,564	(-330)	3,234
<u>São Bonifácio</u>	<u>3,373</u>	<u>(-155)</u>	<u>3,218</u>
TOTAL:	31,053	(-3,086)	27,967



Santa Catarina's 293 municipalities



Florianópolis Metropolitan Region (22 municipalities)



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



Photos by S. Baptista

Source: Instituto de Planejamento Urbano de Florianópolis (IPUF)

Campeche Development Plan (1992, 1995)

Planners proposed development to accommodate 450,000 residents.



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

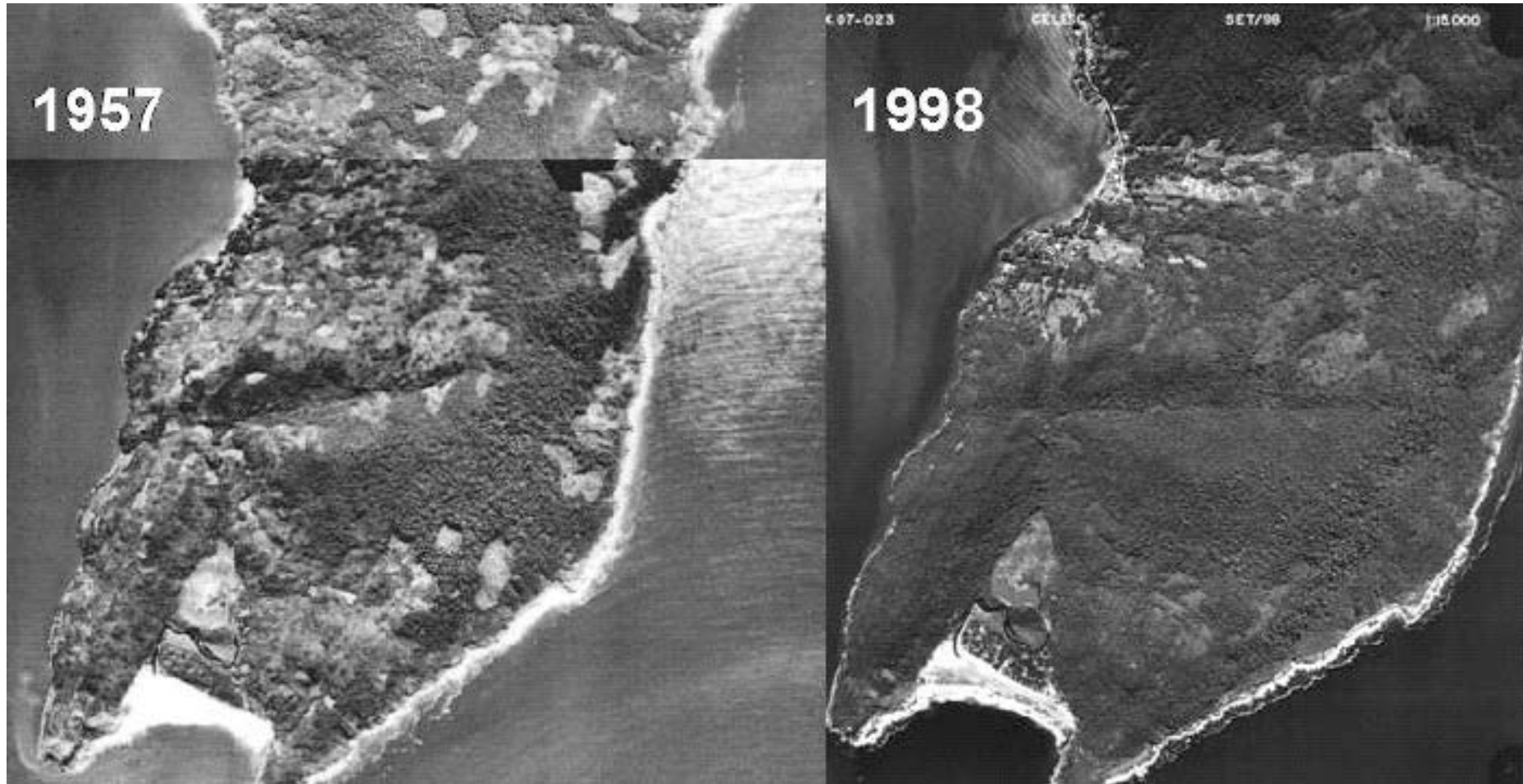


Source: Instituto de Planejamento Urbano de Florianópolis (IPUF)



Photos by S. Baptista

Forest recovery after agricultural abandonment and protected-area creation on Santa Catarina Island

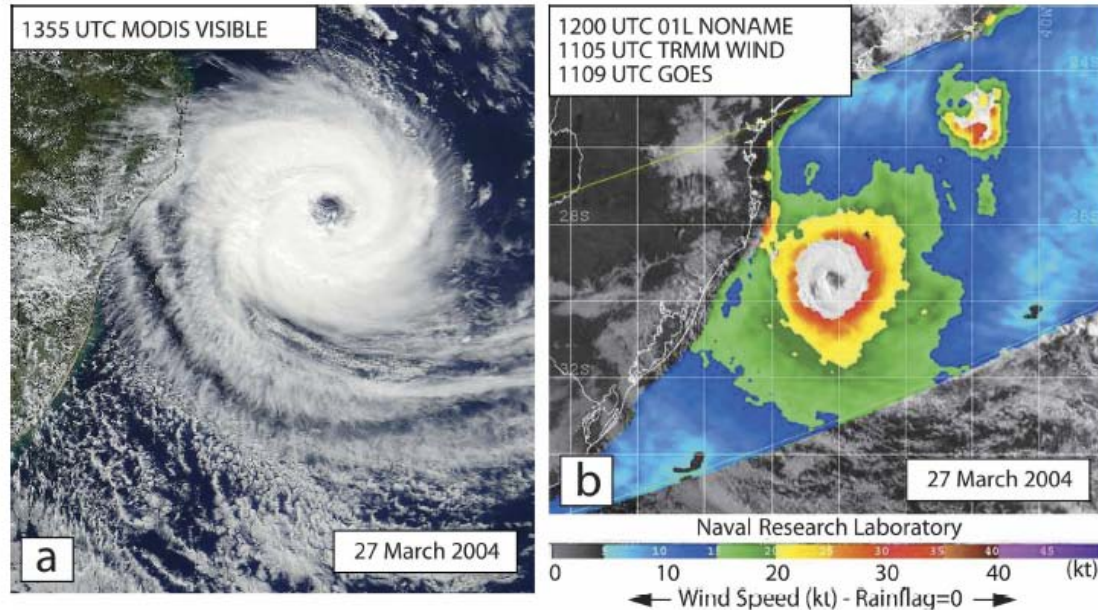


Source: Instituto de Planejamento Urbano de Florianópolis (IPUF).

Exposure and vulnerability to climate risk in the coastal municipalities of Santa Catarina

Cyclone/Hurricane Catarina

March 2004



Source: McTaggart-Cowan, R., L. F. Bosart, C. A. Davis, E. H. Atallah, J. R. Gyakum, and K. A. Emanuel. 2006. Analysis of Hurricane Catarina (2004). *Monthly Weather Review* 134: 3029–3053.

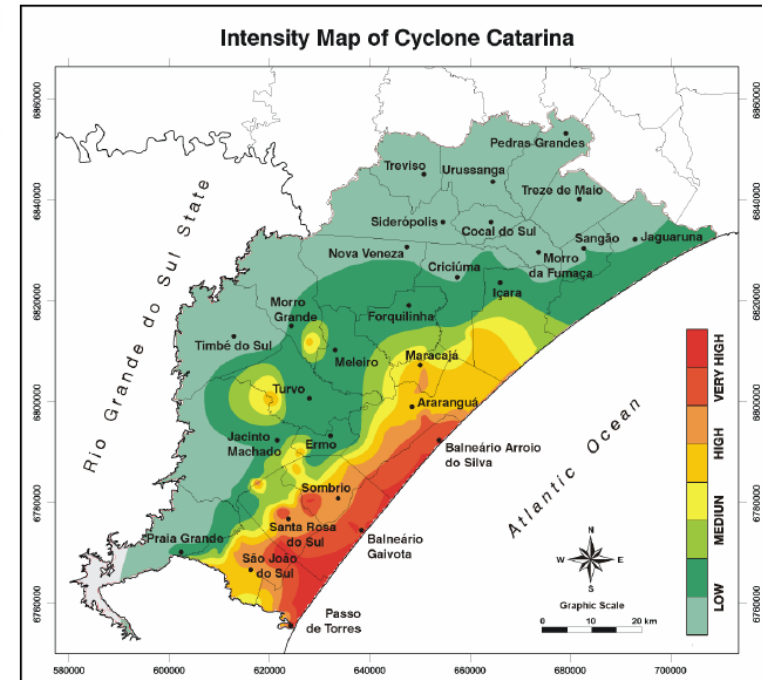
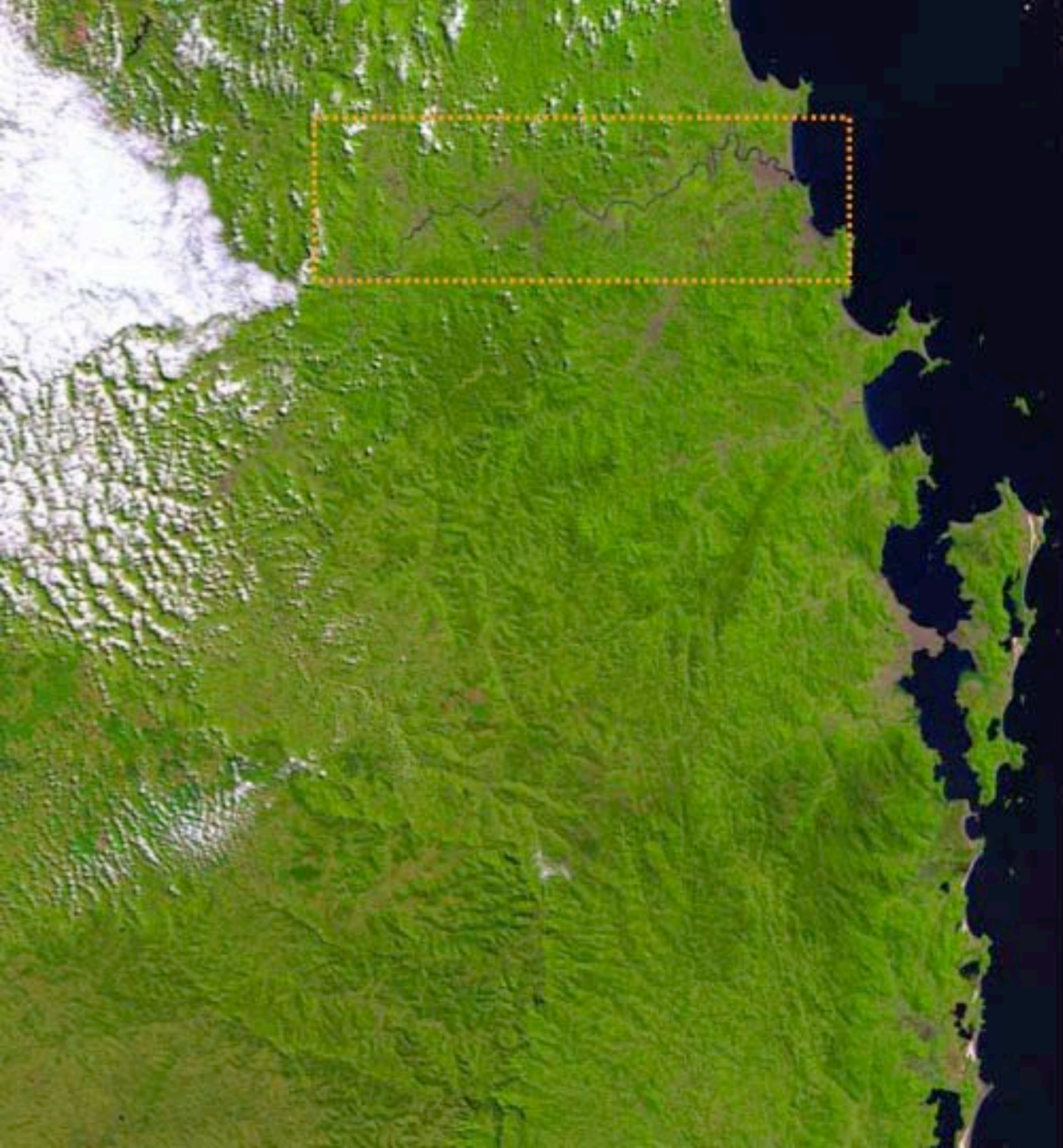


Figure 3 – Intensity map of cyclone Catarina.

Source: Marcelino, E. V., F. de M. Rudorff, R. F. Goerl, I. P. V. de O. Marcelino, and E. F. Gonçalves. 2004. Cyclone Catarina: intensity map and preliminary damage assessment. In: *Simpósio Brasileiro de Desastres Naturais*, 1., Florianópolis, GEDN/UFSC, pp. 734–748 (CD-ROM).



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/>



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Floods in Santa Catarina, Brazil

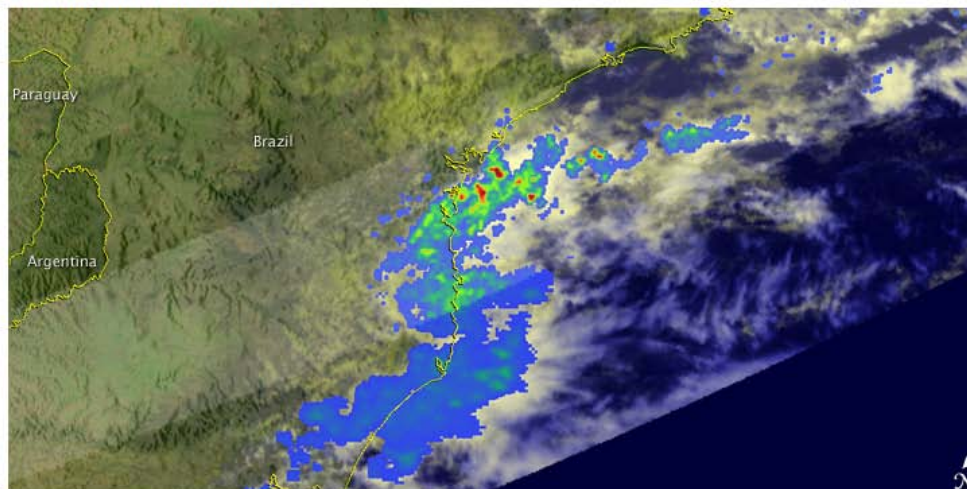


Image taken 11:50 a.m. local time (13:30 UTC) on November 22, 2008
Source: <http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=36035>

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

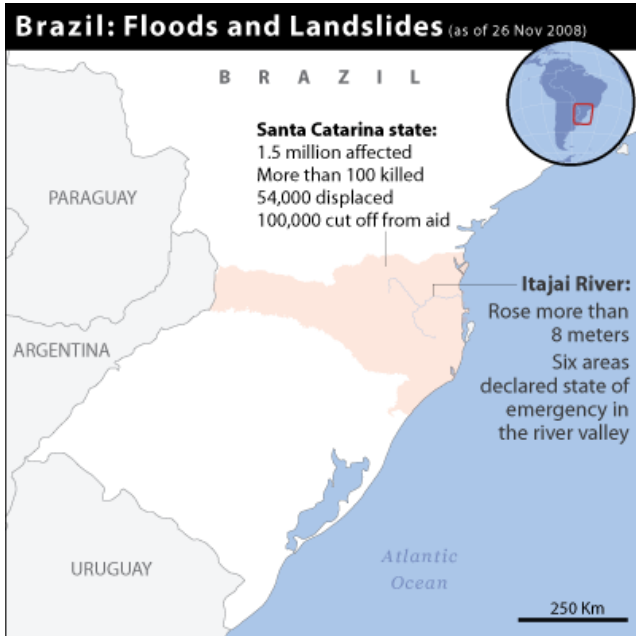
Fatalities: by Dec. 14, 2008, the number of confirmed deaths, mostly from landslides, had reached 128.

Human health impact: 242 confirmed cases of leptospirosis.

Joinville



Itajaí



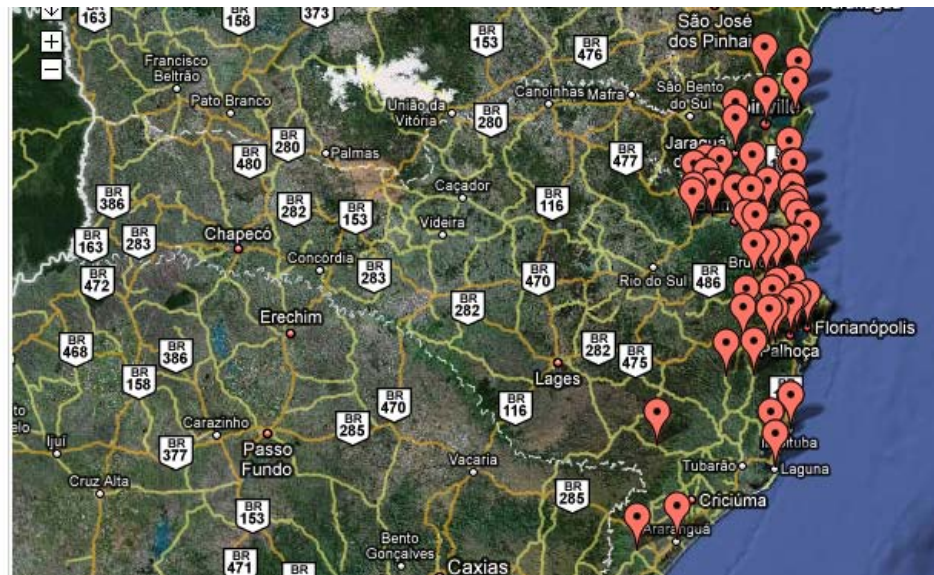
The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Narrative and statistical source: Reuters. Brazil Troops Quell Looting After Landslides. 26 Nov., 2008. Data sources: UNCS, GAUL. Map created 26 Nov., 2008

Source: <http://reliefweb.int>

Source: Santa Catarina government /AP Photos



Source: *Diário Catarinense*, 25 Nov. 2008



<http://www.terra.com.br/noticias/infograficos/chuvas-sc/index.htm>

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

CONSTRUCTING THE 'RIGHT TO THE CITY' IN BRAZIL

EDÉSIO FERNANDES
University College London, UK



Implementing the urban reform agenda in Brazil

EDÉSIO FERNANDES

Edésio Fernandes is a jurist and an urban planner. He is an Associate Lecturer at the Development Planning Unit, University College London and at the Institute for Housing and Urban Studies, and is also a member of the teaching faculty at the Lincoln Institute of Land Policy, Cambridge, Mass. During 2003, he was Director of Land Affairs at the Ministry of Cities' National Secretariat for Urban Programmes in Brazil, and in that capacity he coordinated the initial formulation and implementation of the National Programme to Support Sustainable Urban Land Regularization.

Address: edesiofernandes@compuserve.com

ABSTRACT This paper describes the urban reform legal and institutional innovations since the promulgation of the 2001 City Statute and the National Council of Cities in 2003. The paper notes the need for a combination of legal reform, institutional social mobilization at all levels to take advantage of the reform, and thus to reverse the spatial and institutional characterizations of most urban development in Brazil in recent decades.

KEYWORDS urban reform / urban planning / land tenure / social inclusion

1. INTRODUCTION

Since the late 1980s, there has been some important process of urban reform that has been promoted in the country. Significant legal and institutional changes have been introduced at the national level, creating a legal framework that was consolidated with the enactment of the 2001 City Statute, and in 2003, the installation of both the Ministry of Cities and the National Council of Cities.

Not unlike most low- and middle-income countries, Brazil is in the uncomfortable position of being "the wheels with the car moving", given the environmental problems that have accumulated over the years and governmental neglect. This has been further exacerbated by the effects of the changes in the urbanization process in the global economy. The importance of getting the regulatory and institutional framework cannot be underestimated. The promotion of urban reform and it requires continuity and systematic responses at all levels in order to address the scale of the existing urban problems. Fundamental factors such as capacity building, institutional reform, policies according to a clearly defined agenda, necessary resources. There is still a long way to go and many serious obstacles to overcome.

2001 City Statute

Urban reform towards social inclusion – a promising arena for disaster risk reduction and adaptation to climate change.

reduction and adaptation to climate change.



Participatory budgeting: a significant contribution to participatory democracy

Yves Cabannes

Available online at www.sciencedirect.com

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Land Use Policy 25 (2008) 239–250

Land Use Policy

www.elsevier.com/locate/landusepol

Urban land policy and new land tenure paradigms: Legitimacy vs. legality in Brazilian cities

Joseli Macedo*

Journal of Regional Planning, University of Florida, P.O. Box 115766, Gainesville, FL 32611-5766, USA

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Plano Diretor Participativo e a construção do espaço público nas cidades brasileiras a partir do Estatuto da Cidade: possibilidades e limites.

Maria da Graça Agostinho Faccio

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This article provides an overview of land use policies and urban development in Brazil, especially during the period when the process of urbanization. Since most land use policy is enacted at the national level, a synopsis of Federal legislation and land tenure is presented, including a recent law known as the City Statute, which institutes new mechanisms for the regularization of informal settlements in urban areas. A description of how urban planning tools have been used in isolation and in combination with land use policies, to regularize informal settlements and tenure paradigms that focus on legitimacy rather than legality. The paper concludes with an analysis of the impact and security of tenure for the urban poor in Brazil.

© Urban policy; Urban land use legislation; Urban tools; Urban development; Brazil

the paper is that new land legitimacy rather than legality in Brazilian cities. These new laws are the result of the evolution of urban planning and the institution of necessity driving the evolution of urban planning. Even though Brazil has the right to property, formal title, particularly for low-income, defined as "the mode by which the set of relationships and or its product" (Payne, 1997, p. 3), are cities change. Land tenure in developing countries, stem from unequal resource distribution (UNDP, 2005).

+1 352 3923308.

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high levels of income inequality,¹ access to urban land becomes all but impossible for low-income families.

The 1967 and 1988 Brazilian Constitutions set forth the concept that land should have a "social function", but not until in 2001 the legislation adopted that made it possible to put this concept into practice.² The repercussions of this recent legislation are still undetermined; nonetheless, it is already possible to evaluate the performance of some urban planning tools that were actually implemented at the local level while the legislation was being discussed at the national level, a debate that lasted 13 years. The implementation of these urban planning tools and also a change in perception and attitude triggered by the 1988 Constitution gave impetus to new land tenure paradigms. Today, there are legitimate ways of occupying land in Brazil which do not fit the traditional definition of legal property, that is, verifiable through a title deed, but that

¹ According to UNDP's 2005 Human Development Report, the Gini index for Brazil is 59.3 (survey year 2001). Countries with a Gini index higher than 50 are considered to have high inequality (UNDP, 2005).

² The concept of "social function" of property will be discussed later in this paper within the framework of Brazilian legislation.

Participatory Municipal Master Plans



Estatuto da Cidade e Plano Diretor

Uma conquista da luta pelo direito à cidade

O Plano Diretor é uma lei municipal elaborada com a participação de todos. É o instrumento básico da política territorial que vai dizer como será o desenvolvimento do município. Nele deve estar explicitado o projeto de cidade que queremos ter. Podemos dizer de forma resumida que ele:

- é resultado do planejamento do futuro da cidade;
- organiza seu crescimento e transformação;
- define as ações prioritárias;
- dimensiona as metas a serem buscadas;
- regulamenta os instrumentos urbanísticos para normatizar o processo de construção e o mercado imobiliário;
- estabelece o sistema de gestão democrático.

O Plano Diretor é parte integrante do processo de planejamento municipal; por isso o Plano Plurianual, as Diretrizes Orçamentárias e o Orçamento Anual devem incorporar as diretrizes e as prioridades nele contidas, como determina o art. 40 do Estatuto da Cidade.

Veja como isto é importante: o Plano Diretor definirá as principais obras e programas urbanos que o município vai realizar no período de sua vigência, ou seja, em torno de dez anos.

O Plano vale para todo o município, ou seja, para as rurais. Deve indicar qual é o destino de cada parte do esqueleto, é claro, que essas partes formam um todo; lamentar, no âmbito de cada município, os instrumentos previstos no Estatuto da Cidade para garantir a propriedade e da cidade e ordenar o crescimento do

O que é o Estatuto da Cidade?

O Estatuto da Cidade é uma Lei Federal (10.257) que criou e desenvolveu o capítulo Da Política Urbana da Constituição Federal (artigos 182 e 83), estabelecendo a política urbana em todo o país.

Seu objetivo é possibilitar que as cidades brasileiras cresçam de forma mais ordenada, proteger o meio ambiente e garantir os direitos urbanos fundamentais, como a moradia digna e os transportes sustentáveis. Para isso, o Estatuto estabelece um conjunto de regras para organizar o território do município, que devem ser aplicadas de acordo com a realidade local.

Todos os municípios devem planejar o seu futuro e fazer seu Plano Diretor. Mas o Estatuto da Cidade obriga que cerca de 1683 municípios aproveem seu Plano até outubro de 2006 e outros tantos são obrigados a fazê-lo, embora sem prazo determinado por lei.

Ministro das Cidades
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Vereador Jorge Bernardi - Curitiba/PR
Vereador André Queiroz - Louveira/SP

Coordenação geral da elaboração da Cartilha
Vereador Carlos Comassetto - Porto Alegre/RS

Equipe técnica

Coordenação técnica e edição
Nabil Bonduki

Textos
Nabil Bonduki e Paula Santoro

Supervisão
Grupo de trabalho da FRENAVRU:
Paulo Soares, Jaime Rodrigues e Maria Fátima Tardin

Projeto gráfico e editoração eletrônica
Antonio Kehl

Ilustrações
Murilo Silva e Cintia Vianna

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Iara R. Xavier

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

Contatos FRENAVRU:

Vereadora Neusinha Santos freneusinhasantos@cmbh.mg.gov.br / frenavru@hotmail.com

fone: (31) 3555-1150 / 3555-1149

<http://www.cidades.gov.br/planodiretorparticipativo>

Brazil's Ministry of Cities



A FRENAVRU - Frente Nacional de Vereadores pela Reforma Urbana, o Confea - Conselho Federal de Engenharia e Arquitetura e o Ministério das Cidades, no âmbito da Campanha do Plano Diretor Participativo, estão empenhados em garantir que os vereadores possam contribuir da melhor maneira possível no processo de elaboração e aprovação dos Planos Diretores Participativos em todo o território nacional, garantindo o conteúdo mínimo definido pelo Estatuto da Cidade. Esta cartilha objetiva capacitar os vereadores e as Câmaras Municipais para essa tarefa, que é uma das mais importantes a cargo do poder público para garantir um futuro mais promissor para as cidades brasileiras.

Ministério das Cidades



CONFEA



Thank you!

sandra.baptista@ciesin.columbia.edu

