




# Official data and Population & Environment



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# Challenges

- ▶ Statistical data are released using administrative or operational units
  - ▶ Physical data are released using natural units
  - ▶ Population & Environment field deals with both and uses particular geographies as protected areas
  - ▶ How do you can make data suitable to study the impacts of human actions on ecosystems?
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# Solution

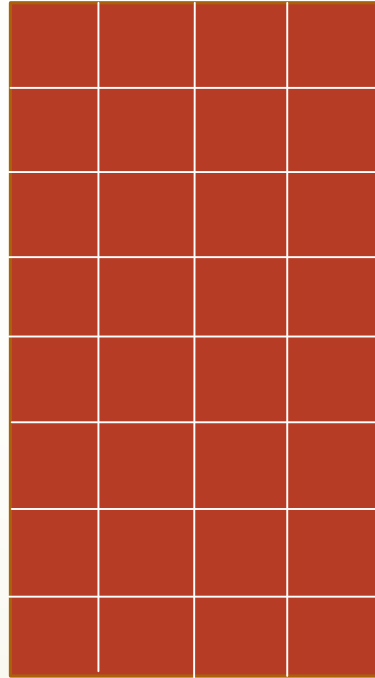
Data input

demographic

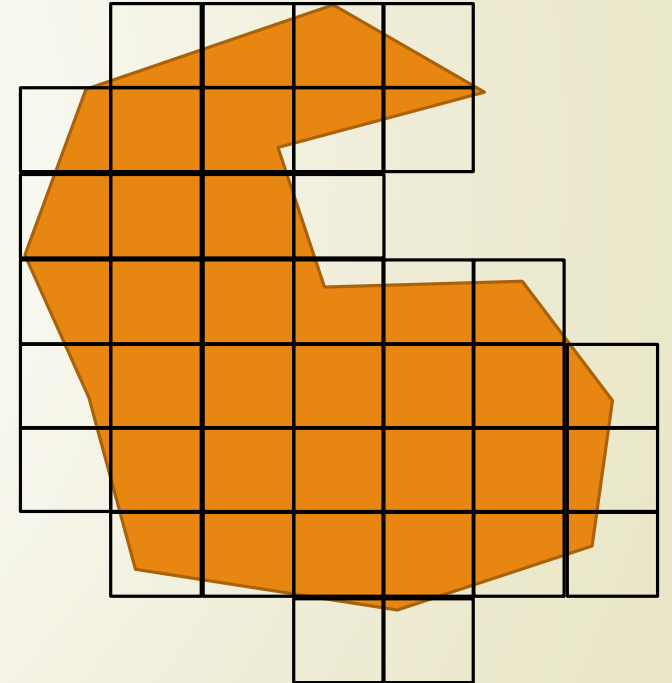
economical

physical

Data  
integration




Analysis and  
report






# Population Data

- ▶ census data geolocated → bottom-up approach
  - ▶ census data in enumeration areas → top-down approach
  - ▶ hybrid approach
  - ▶ 1 km square cell size
  - ▶ confidentiality issues
  - ▶ variables available: total population and total households
  - ▶ countries: European Union, Brazil, Japan, Australia
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# Environmental Data

- ▶ Environmental-Economic Accounting
  - ▶ Integration of economic and environmental data
  - ▶ Organization of the information from a spatial perspective → integration of statistics and geography
  - ▶ The basic spatial unit is a set of square cells organised in a hierarchical structure
  - ▶ One information is land use/land cover data
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# Study Area

- ▶ Brazilian Legal Amazon
- ▶ Northern states of the country
- ▶ Share similar challenges in the economic, political and social fields
- ▶ Area = 5 million km<sup>2</sup> = 60% of the country
- ▶ 23 million inhabitants = 12% of the Brazilian population






# Data and Methods

- ▶ Population
    - ▶ 2010 Population Grid (official) – bottom-up approach
    - ▶ 2000 Population Grid (not official) – top-down approach
  - ▶ Land use/Land cover
    - ▶ 2000 Land use/Land cover (official) in grid
    - ▶ 2010 Land use/Land cover (official) in grid
  - ▶ Data limitation
    - ▶ Different approaches in population data
    - ▶ Land use/Land cover class is the dominant in each cell
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# Data and Methods

- ▶ Zones evaluated
    - ▶ The Amazon Region
    - ▶ conservation units managed by the federal government
    - ▶ In a 10 km buffer from conservation units
  - ▶ 137 conservation units managed by the federal government
    - ▶ 88 Sustainable Use class
    - ▶ 49 Integral Protection class
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	Land use/land cover 2010														Total 2000		
	1	2	4	7	11	3	10	6	8	5	9	12	13	14			
Land use/land cover 2000	1	0,117	0,000	0,000	0,000	C	0,001	0,000	0,000						0,118		
	2	0,002	1,847	0,006	0,001	0,000	G	0,004	0,004	0,000	0,001	0,000			1,866		
	4	0,001	0,017	1,807	0,018			0,001	0,002		0,001	0,000			2,143		
	7	0,003	0,053	0,419	3,223	0,000		0,652	0,001	0,006		0,000	0,000		0,000	4,358	
	11	A	0,002	0,000	0,000	0,451		0,008	0,008	F	0,000		0,000			0,469	
	3	0,002	0,004	0,027	H	0,010	0,005	5,900	0,014	0,001	0,000	0,001				5,963	
	10	0,005	0,201	0,004	E	0,002	0,032	0,568	11,038	0,000	0,002	0,001	0,002			11,854	
	6	B	0,012	0,330	0,917	D	1,634	0,000	1,851	0,002	63,425	0,000	0,005	0,000		0,000	68,177
	8	0,001	0,019	0,000	0,000	0,027		0,021	0,187	0,000	2,414		0,000		0,000	2,667	
	5		0,000	0,001	0,000		0,000		0,000			0,036				0,037	
	9		0,000	0,000	0,000	0,000	0,001	0,015		0,000			0,665			0,681	
	12													1,603		1,603	
	13														0,034	0,034	
	14											0,000			0,029	0,029	
<b>Total 2010</b>	0,142	2,473	3,182	4,890	0,514	9,301	11,269	63,434	2,417	0,044	0,668	1,603	0,034	0,029	100,000		

1: Artificial surface 2: Cropland 3: Managed Pasture 4: Mosaic of Cropland and Forest  
5: Silviculture 6: Forest 7: Mosaic of Forest and Cropland 8: Savannah/Shrubland 9: Wetlands  
10: Grassland 11: Mosaic of Cropland and Savannah/Shrubland 12: Inland water bodies  
13: Coastal water bodies 14: Bare area

# Data and Methods

Dynamics		
	2000	2010
A	Agriculture	Artificial surface
B	Forest or Savannah/Shrubland	Artificial surface
C	Artificial surface	Agriculture
D	Forest or Savannah/Shrubland	Agriculture
E	Grassland	Agriculture
F	Agriculture	Grassland
G	Cropland	Managed Pasture
H	Managed Pasture	Cropland

Dynamics			Population		Land use/land cover
	2000	2010	N	%	(%)
<b>A</b>	Agriculture	Artificial surface	174.365	57,1%	0,01%
<b>B</b>	Forest or Savannah/Shrubland	Artificial surface	10.204	7,7%	0,01%
<b>C</b>	Artificial surface	Agriculture	37.658	109,8%	0,002%
<b>D</b>	Forest or Savannah/Shrubland	Agriculture	155.205	22,1%	4,80%
<b>E</b>	Grassland	Agriculture	-1.851	-1,2%	0,81%
<b>F</b>	Agriculture	Grassland	560	6,6%	0,03%
<b>G</b>	Cropland	Managed Pasture	-45.313	-8,6%	0,96%
<b>H</b>	Managed Pasture	Cropland	-1.073	-8,8%	0,05%



# Results: the Legal Amazon

- ▶ Unchanged = 92.5%
- ▶ Forest = 63.4%
- ▶ Decrease of Forest → changes to Agriculture
- ▶ Increase of Managed Pasture → changes from Forest
- ▶ Increase of Agriculture → changes from Forest
- ▶ Population increase in Artificial surface
- ▶ Population increase in changes from Forest to Agriculture  
→ settlement processes with land incorporation
- ▶ Population decrease in changes from Cropland to Managed Pasture  
→ rural exodus or enlargement of the agriculture frontier



# Results: Conservation Units

- ▶ Unchanged = 99%
- ▶ Forest = 91.8%
- ▶ Increase of Artificial surface → from Forest
- ▶ Increase of Agriculture → from Savannah/Shrubland
- ▶ Increase of Managed Pasture
- ▶ Population increase → Forest and Savannah/Shrubland to Agriculture
- ▶ Population increase → Forest and Savannah/Shrubland to Artificial surface




# Results: buffer from Conservation Units

- ▶ Unchanged = 95%
- ▶ Forest = 79.6%
- ▶ No changes for Artificial surface
- ▶ Increase of Agriculture
- ▶ Increase of Managed Pasture
- ▶ Population increase → from Forest and Savannah/Shrubland to Agriculture
- ▶ Population increase → Cropland to Managed Pasture




# Results: general

- ▶ Population increase → Artificial surface in 2000 and 2010
  - ▶ Inside conservation areas the deforestation is more related to population changes (increase)
  - ▶ Changes from vegetation cover classes to agriculture-related classes are accompanied by an expressive population increase
  - ▶ The buffer area of conservation units are a transition zone between inside the conservation units and the region as a whole → data show it clearly
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# Final remarks

- ▶ The findings confirm previously identified changes
  - ▶ The results dialogue with the bibliography of Amazon Region
  - ▶ Some results instigate a field survey
  - ▶ The methodology is adequate and allows the integration of variables using official data
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Thanks for the attention!

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