

Agroecological Zoning for Biofuels: The Brazilian Experience

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Brazilian Agricultural Zoning

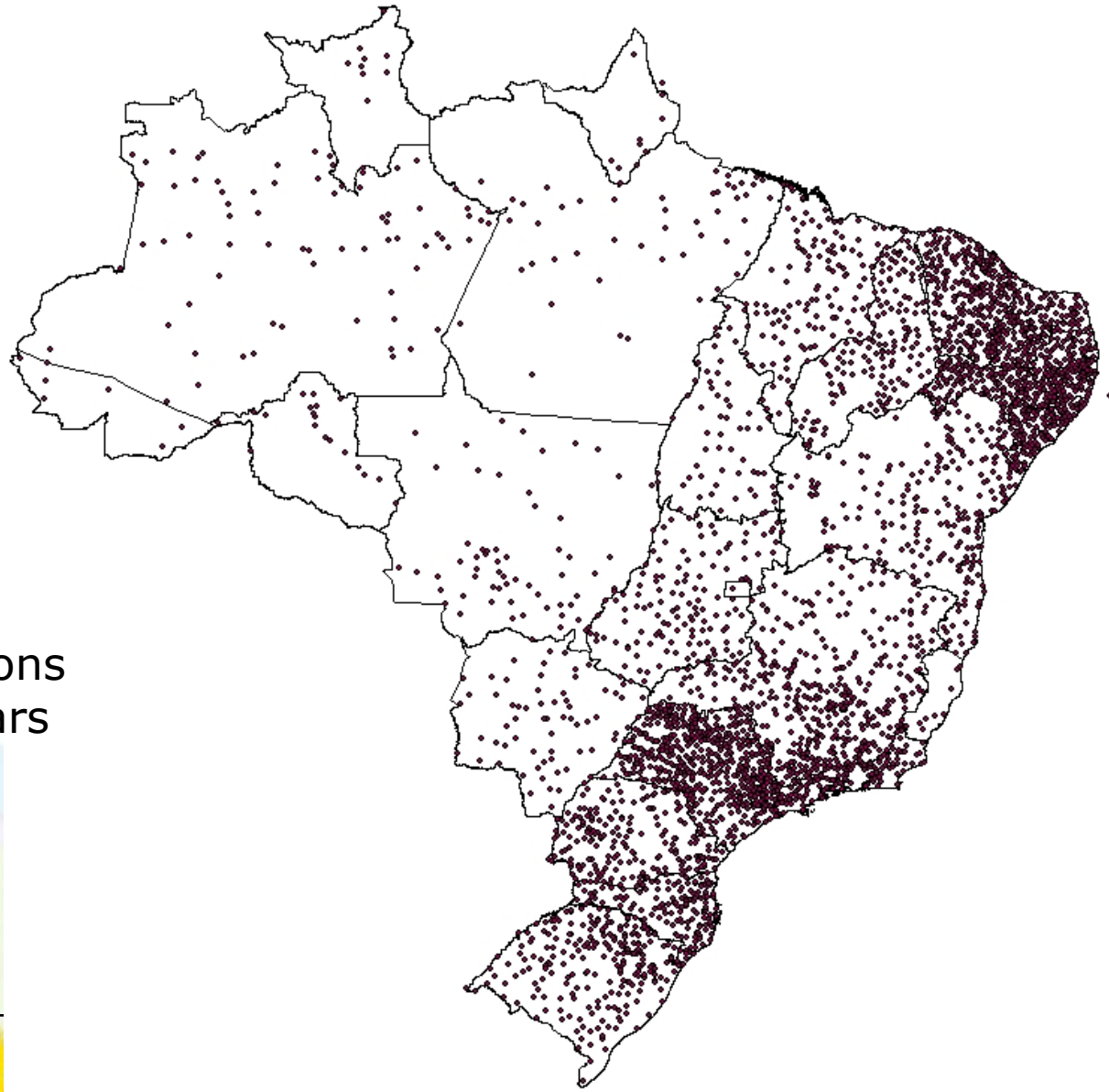
- Since 1995 the Brazilian Government started an official program to regulate loans for farmers on technical criteria
- Mostly based on climate risk and soil properties;
- Brazilian Agriculture Zoning requirements:
 - to be applied in all Brazilian counties as an indicator tools to decide who can get the public loans for agriculture;
 - to recommend the best sowing dates, taking in account the differences among crops and soil types;
 - to assure at least 80% of success when following the recommendation.



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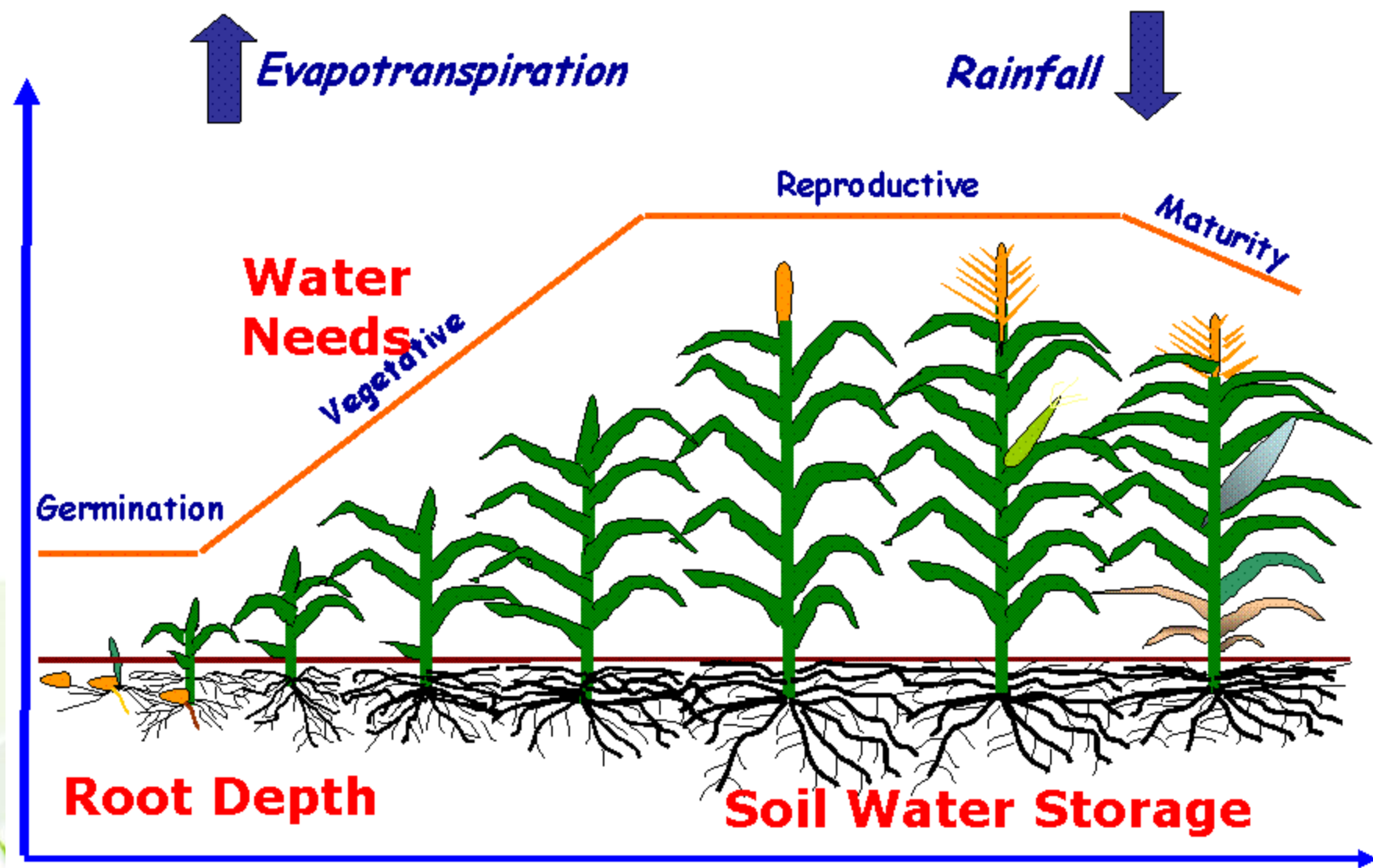
Weather Network



3.582 weather stations
with at least 15 years
of daily data



Crop Data: a pillar for agro-ecological zoning



Example of Output Map

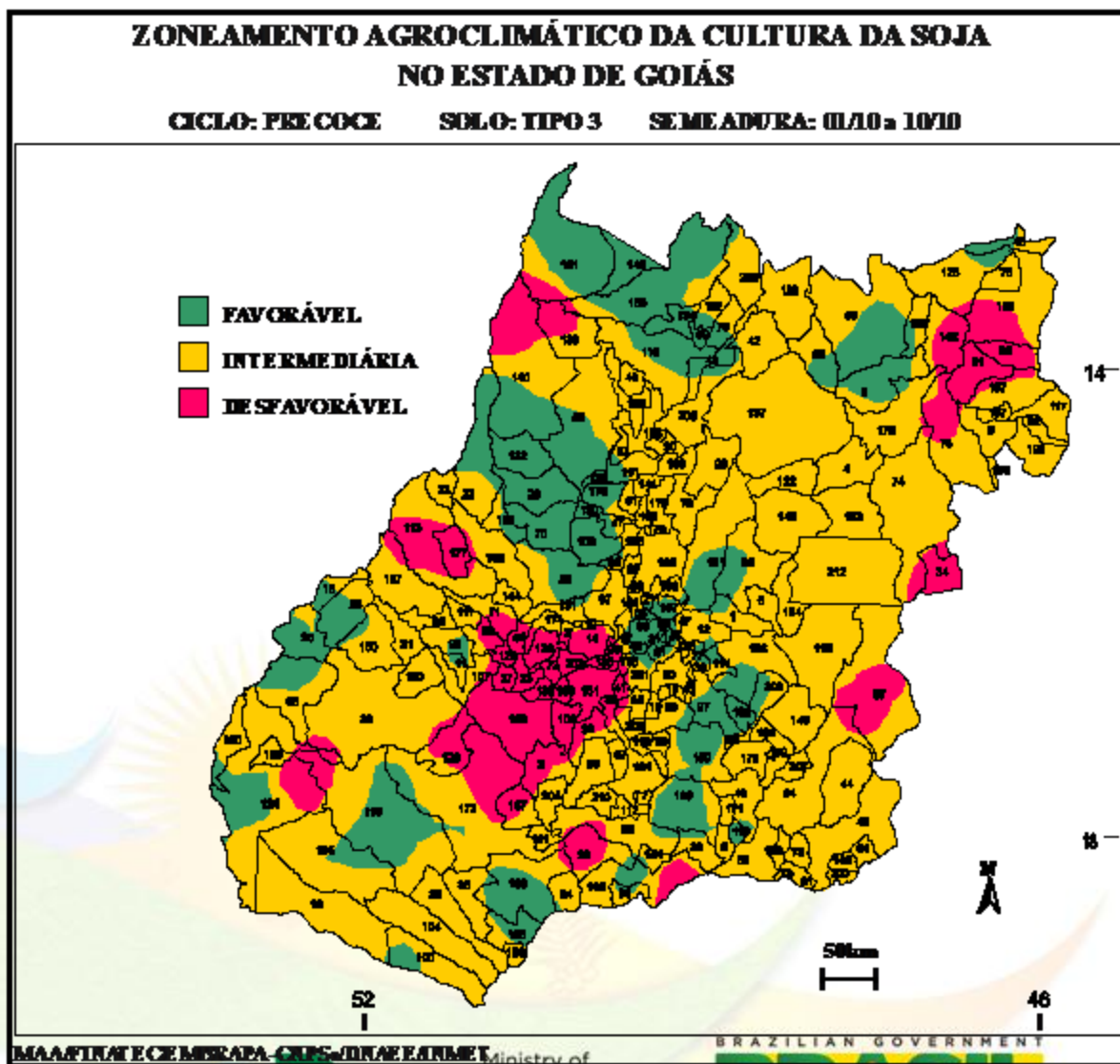
Soybean

Early Cultivar

Clay Soil

Period: Oct 1st - 10th

Goiás (341,000km²)



Example of Output Map

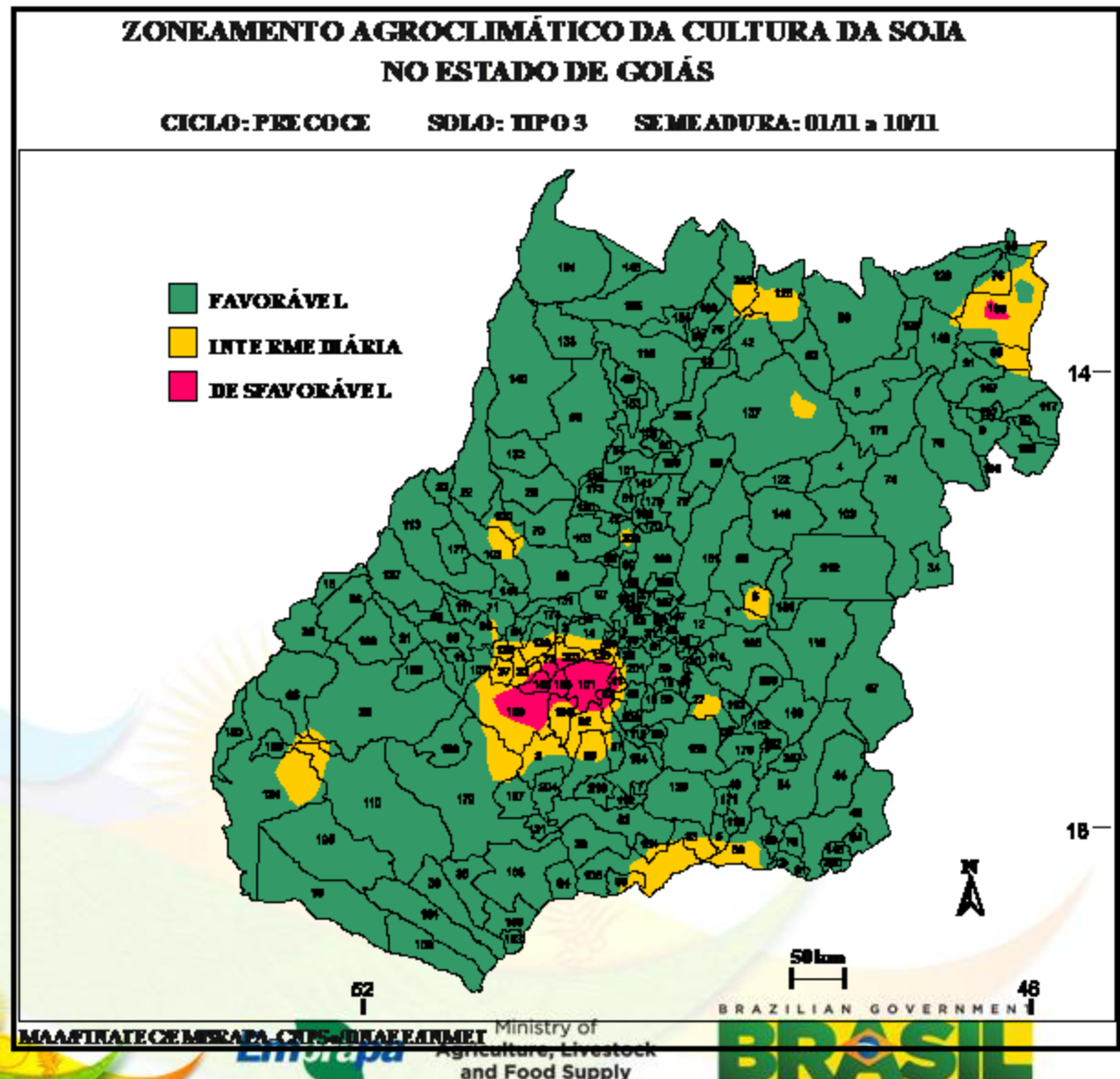
Soybean

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Period: Nov 1st - 10th

Goiás (341,000km²)



Example of Output Map

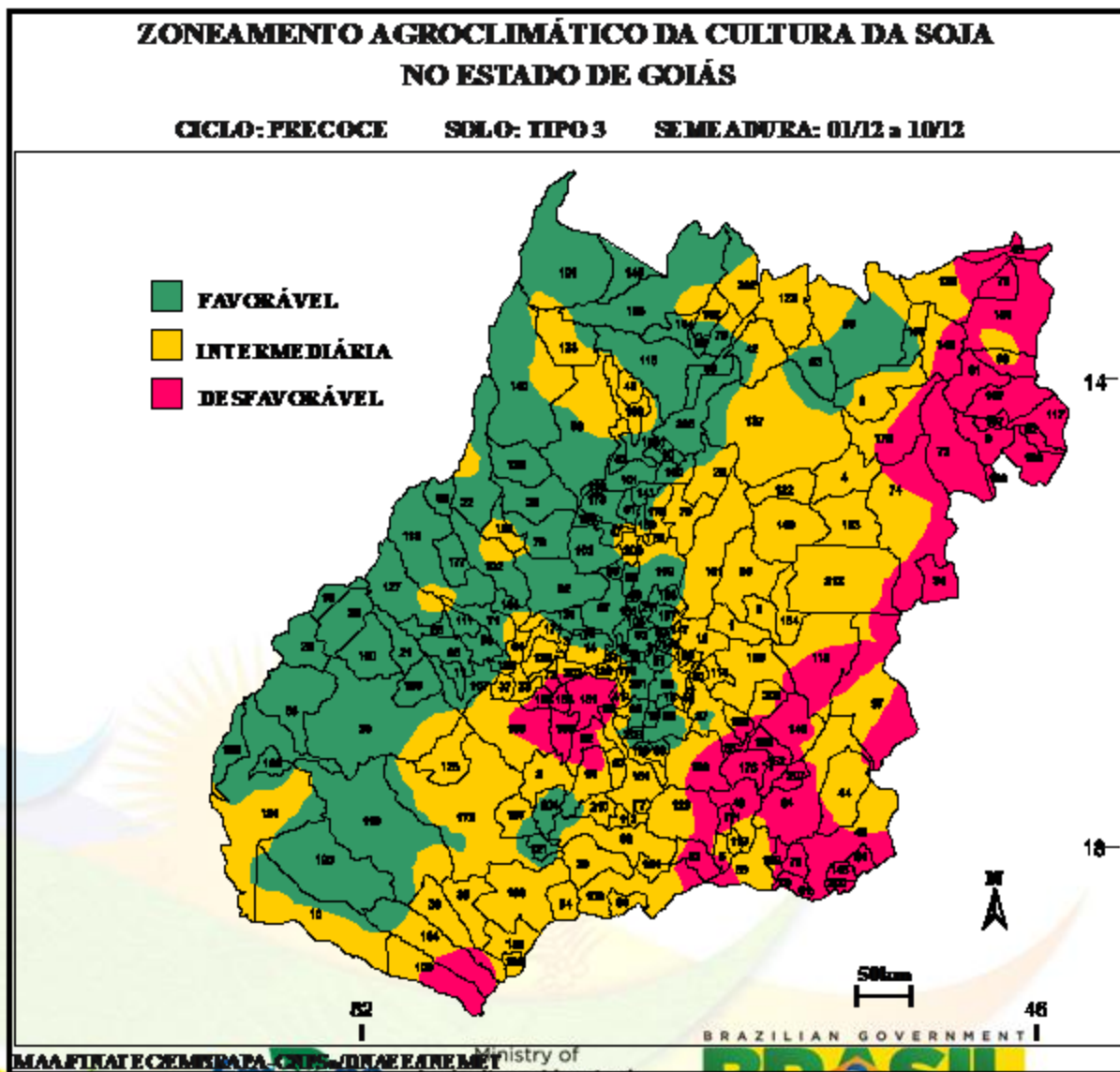
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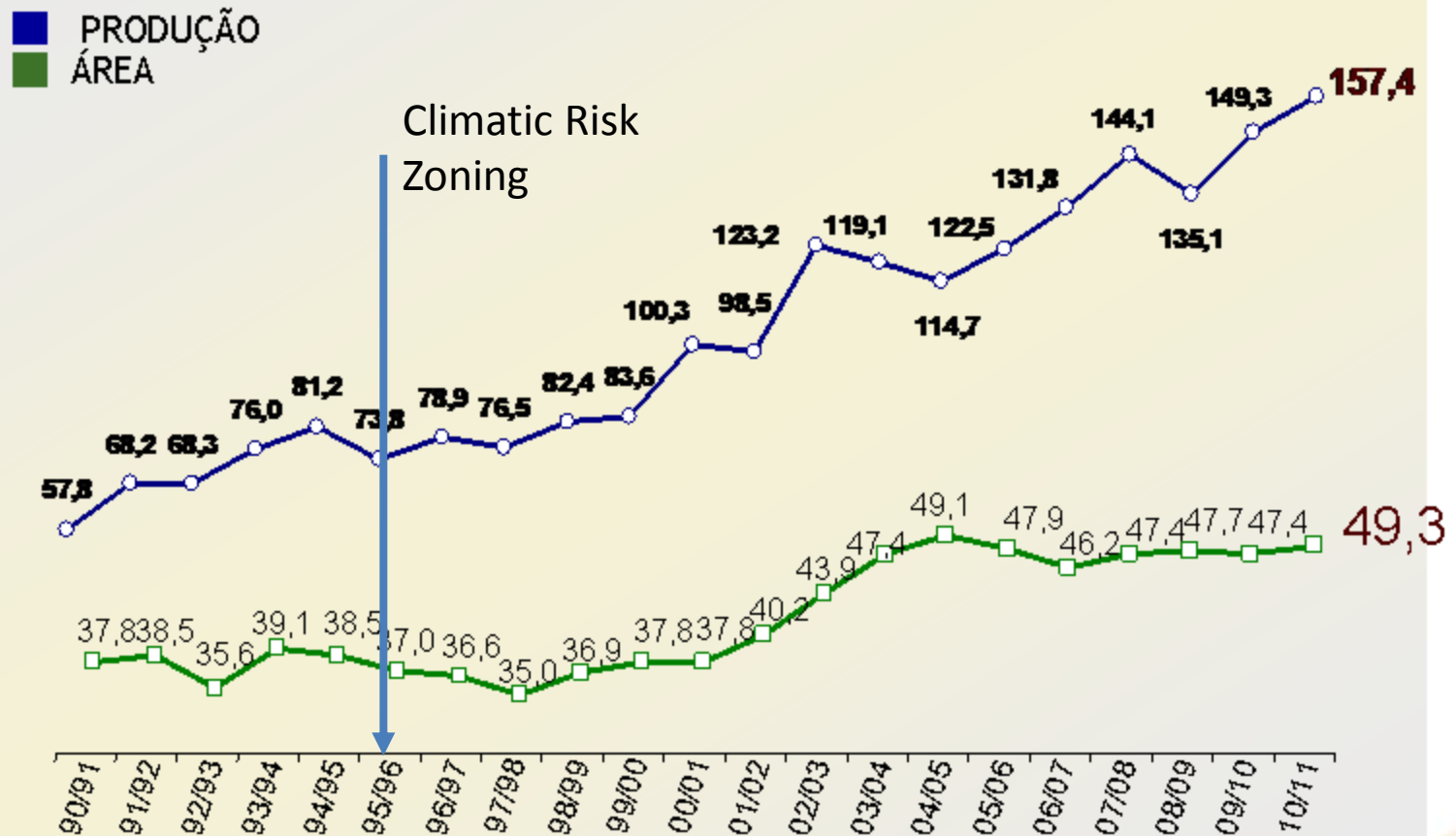
Period: Dec 1st-10th

Goiás (341,000km²)



BRAZIL

Evolution of production and planted area Harvests 1990/91 to 2010/2011



Source: CONAB - Survey: April/2011 - 7º Survey.

AGRICULTURAL RESEARCH - INNOVATION - QUALITY OF LIFE

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Agroecological Zoning

- ❖ It represents the improvement of “climate risk zoning”, including environmental concerns.
- ❖ Agroecological zoning was implemented for sugarcane and palm tree, the most strategic crops for biofuels production in Brazil.



❖ **Goals of Sugarcane Agroecological Zoning:**

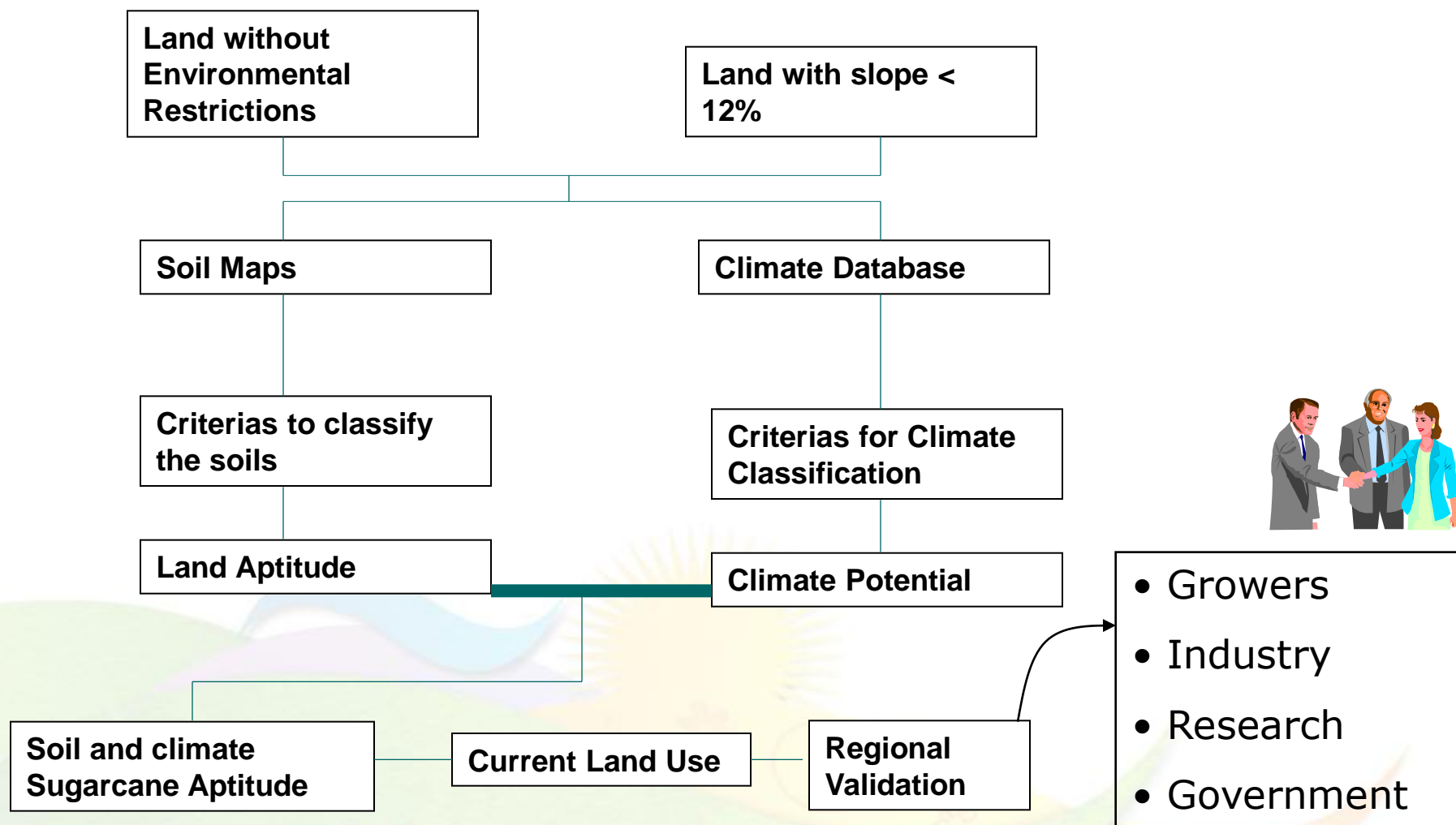
- **Identify areas with high climate and soil suitability, for mechanical harvesting, currently used for pastures, observing environmental issues.**
- **Main environmental restrictions:**
 - **no new projects in Amazonia, Pantanal and in Alto Paraguai River Basin;**
 - **pastures used lands;**
 - **no deforestation for new plantations;**
 - **mechanical harvest;**
 - **no need of irrigation.**



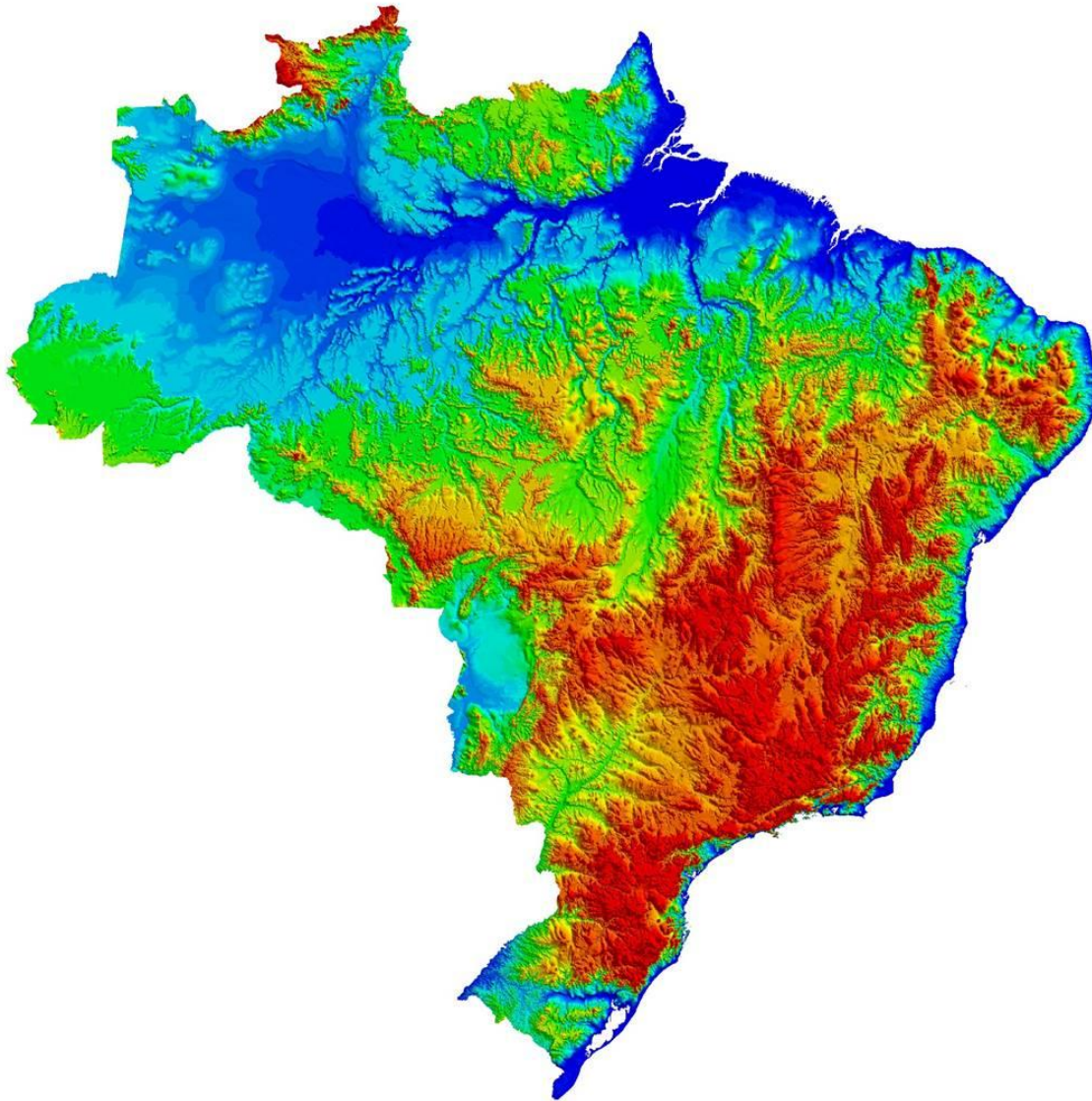
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Agroecological Sugarcane Zoning Flowchart

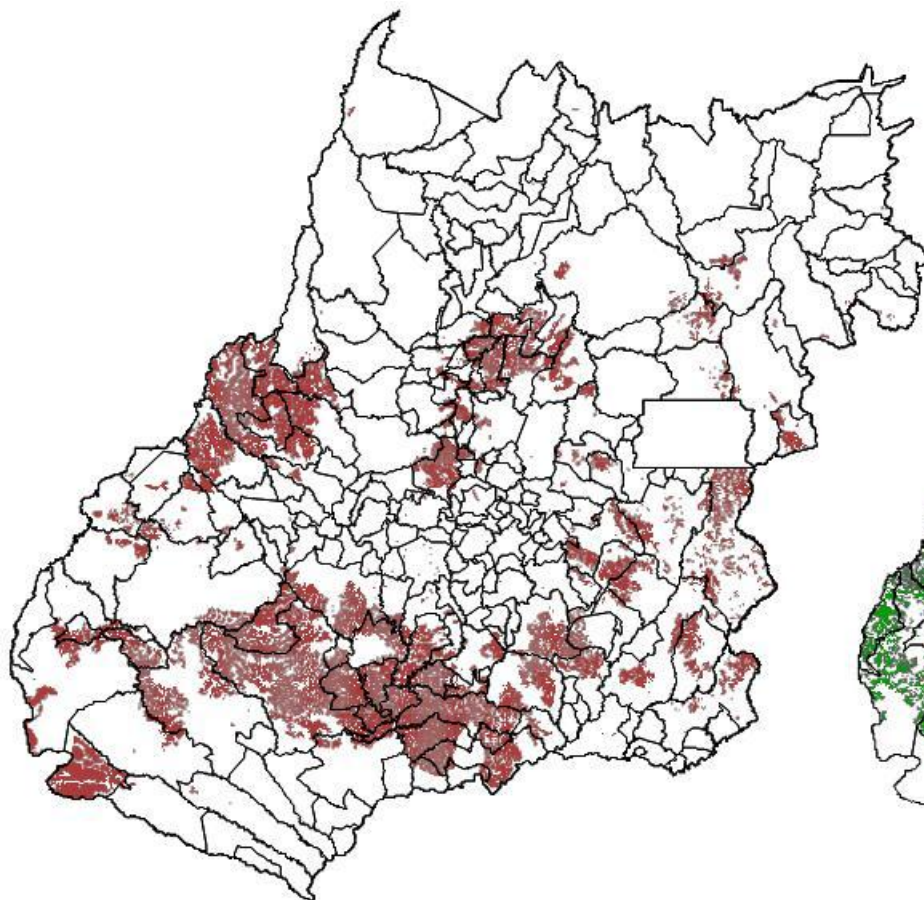


Data Source for Slope Evaluation

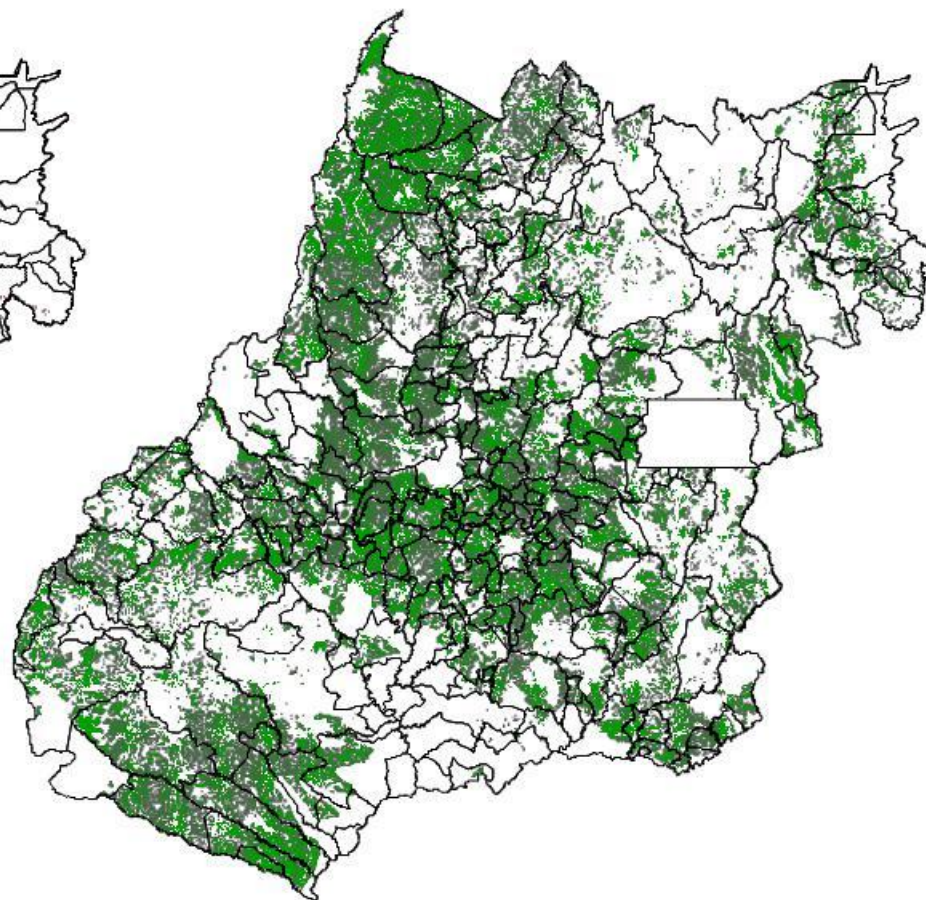


SRTM - 90m resolution

Land Use – Goiás



AGRICULTURE
5 million ha



PASTURES
13 million ha

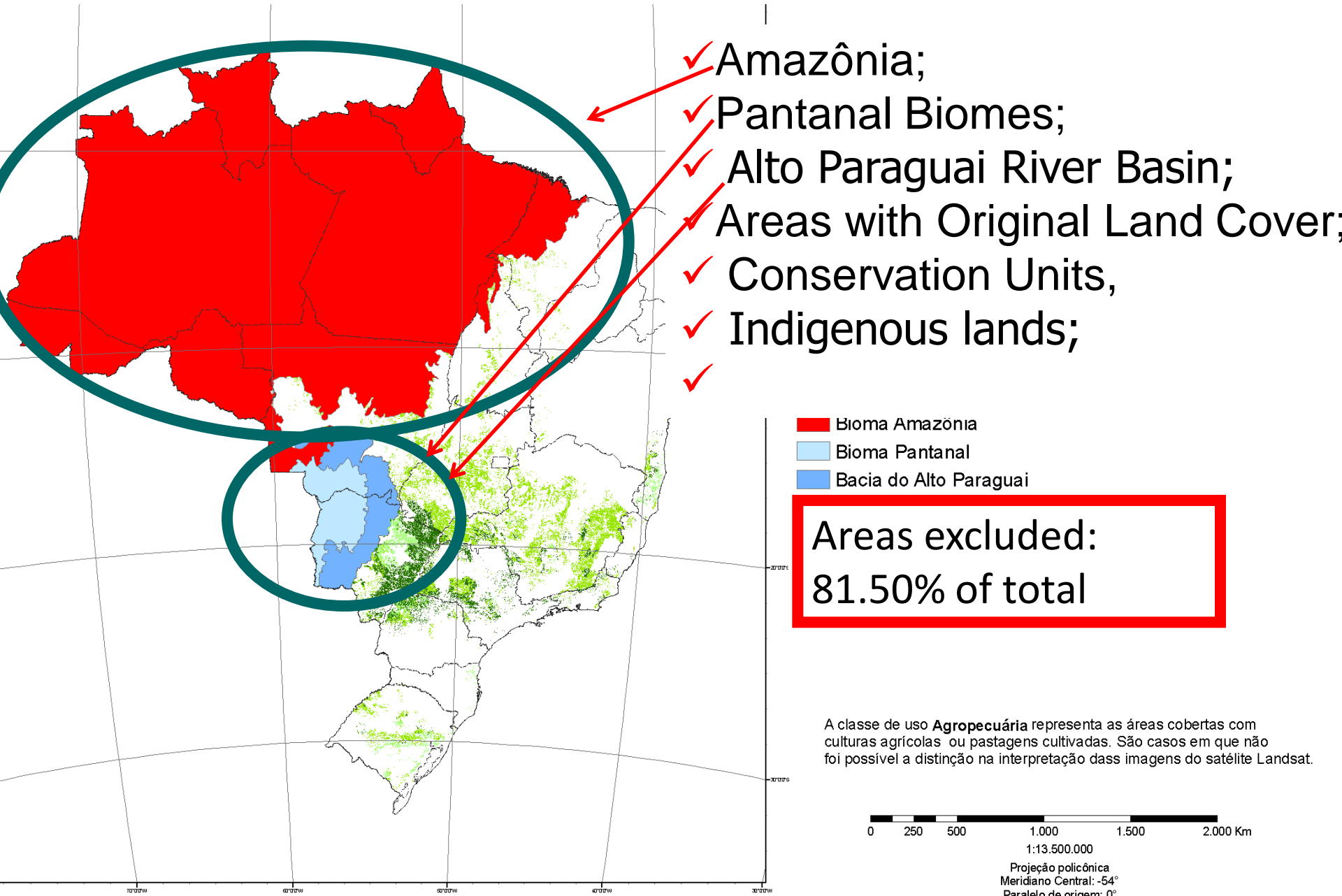


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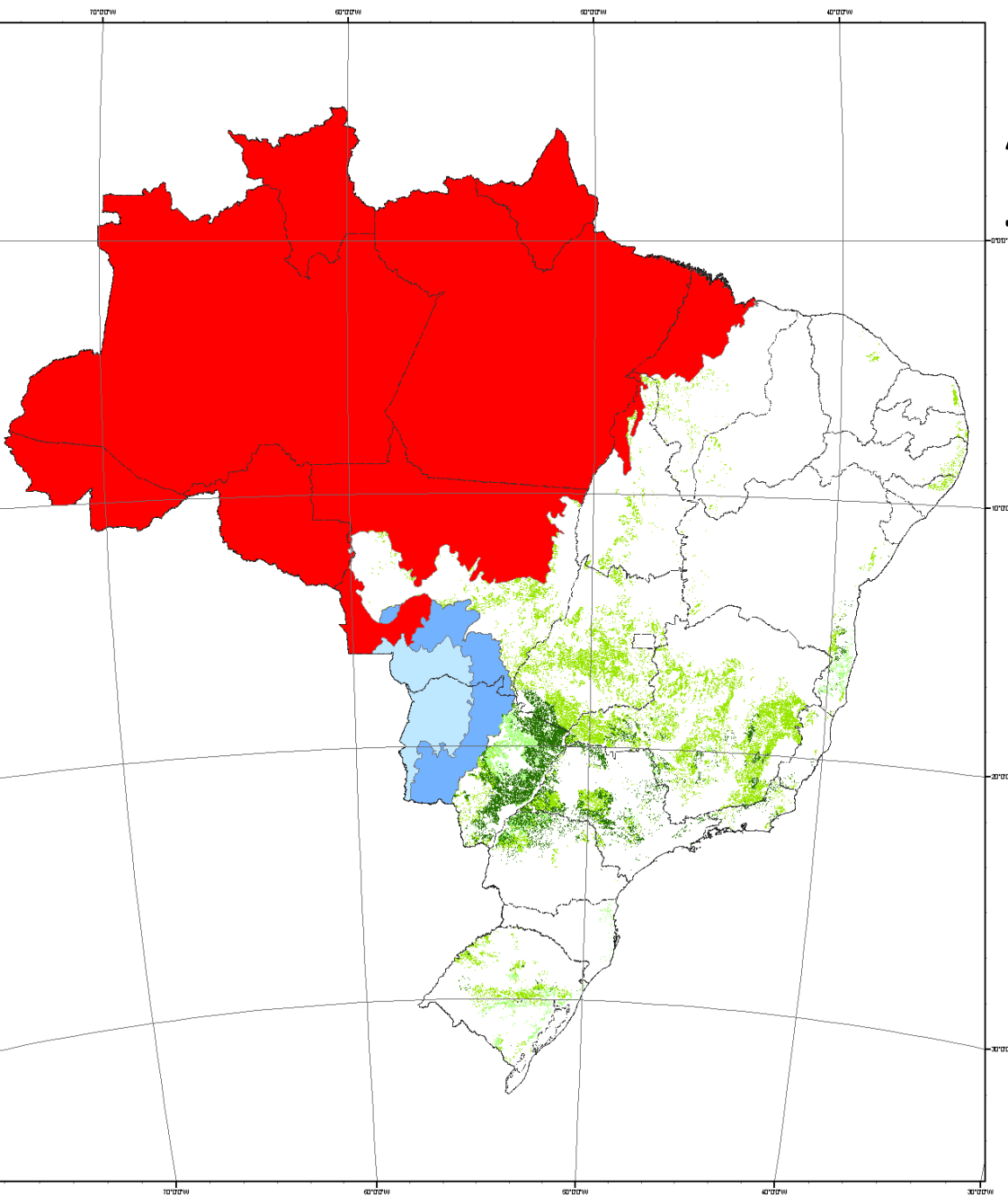
Source: <http://www.mma.gov.br/portallbio>

Environmental restrictions: Areas Excluded



Suitable Areas Currently Used for Pastures

Agregated Results for Sugarcane



Legenda

- Limite Estadual
- Bioma Amazônia
- Bioma Pantanal
- Bacia do Alto Paraguai
- Áreas com aptidão agrícola ALTA
- Áreas com aptidão agrícola MÉDIA
- Áreas com aptidão agrícola BAIXA

A classe de uso **Agropecuária** representa as áreas cobertas com culturas agrícolas ou pastagens cultivadas. São casos em que não foi possível a distinção na interpretação das imagens do satélite Landsat.

0 250 500 1.000 1.500 2.000 Km

1:13.500.000

Projeção policônica
Meridiano Central: -54°
Paralelo de origem: 0°

Sugarcane Agroecological Zoning Results

Potential areas in Brazil by level of aptitude and land use (ha)

Potential	Potential by land use (ha)			Total
	Ap	Ag	Ac	
High (H)	10.251.027	585.989	7.191.388	18.028.403
Medium (M)	22.818.770	2.015.247	16.340.890	41.174.906
Low (L)	3.062.029	490.027	733.152	4.285.208
H+M	33.069.796	2.601.235	23.532.277	59.203.309
Total	36.131.825	3.091.263	24.265.429	63.488.517

Pastures



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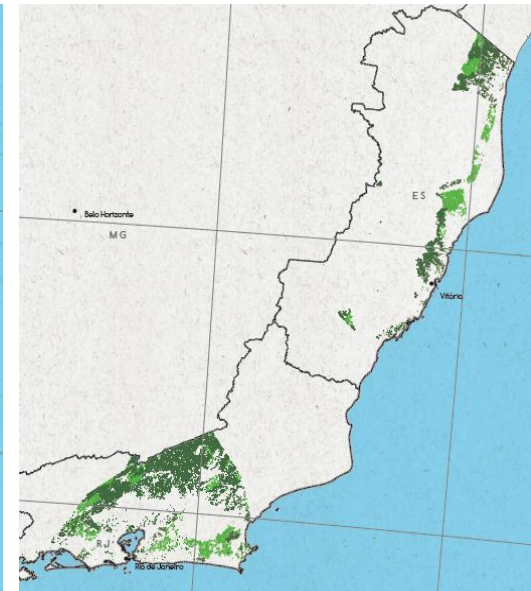
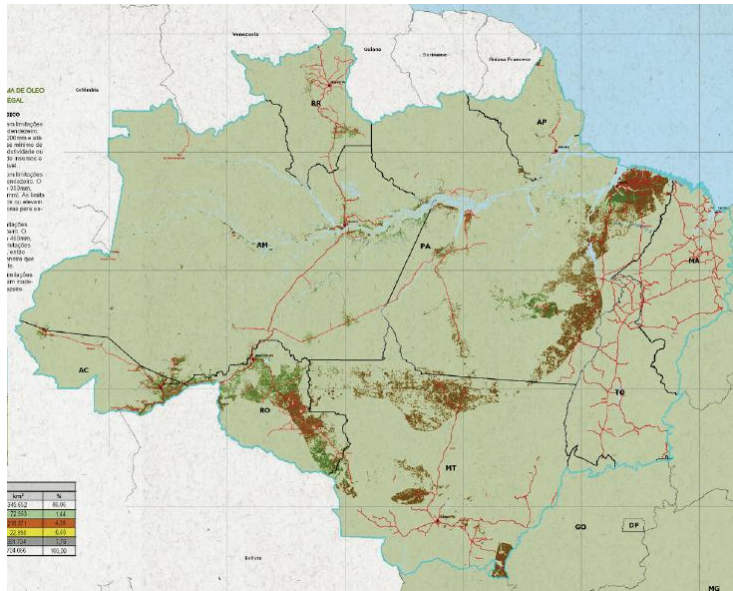


❖ **Goals for Palm Tree Agro-ecological Zoning:**

- **Identify degraded areas, in Amazon Region and in the East Coast of the Country, suitable to grow palm trees. Emphasis in degraded pastures land.**
- **Main environmental restriction: deforestation is not accepted (palm trees can be planted only in areas deforested up to May, 2009).**



Agroecological Zoning Results for Palm Oil



- More than 30 million hectares identified.



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Concluding Remarks

- Biofuels may contribute to rural development, energy security enhancement and, GHG emission reduction;
- Zoning and appropriate technologies may lead to yield and agricultural efficiency increase, with low (and known) environmental impacts and risks;
- Based on those concepts, Brazilian agriculture has experienced significant advances, but there is still substantial room for improvement.



Thank You!!

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