



**Mixed crop-livestock  
detection/mapping using remote  
sensing**



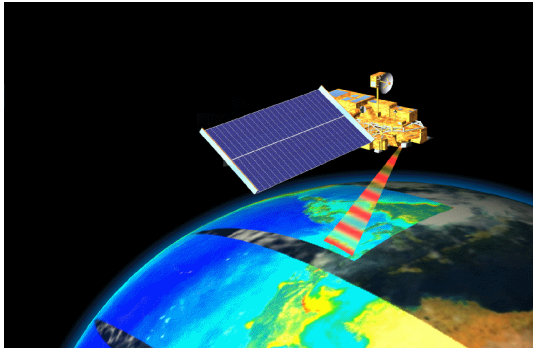
**Rubens A. C. Lamparelli**

**Jansle V. Rocha**

**Victor Manabe**



# Terra – Aqua Satellites



- Terra (1999)

- Local Crossing  
equatorial at 10:30 hrs a.m

- Very high temporal resolution  
(daily)

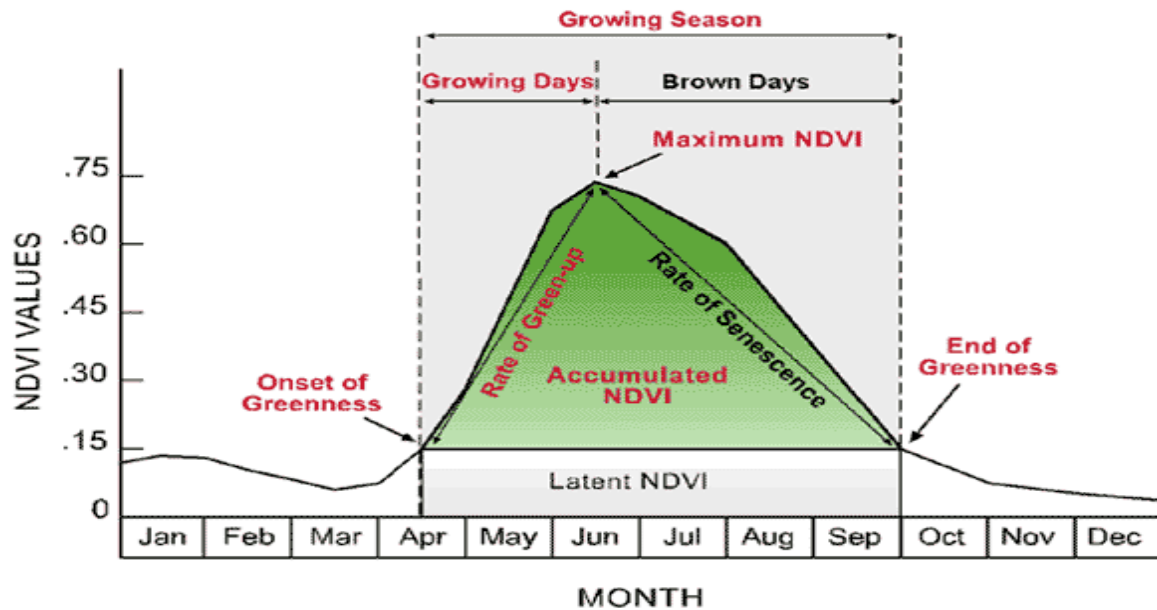
- Aqua (2002)

- Local Crossing  
equatorial at 01:30 hrs p.m

- not so much in terms of spatial  
resolution (250 x 250 m)

- Among some sensors onboard of the both satellites, for us, the most important is MODIS (**M**oderate **R**esolution **I**maging **S**pectroradiometer)
- Products - NDVI

# Vegetation Index

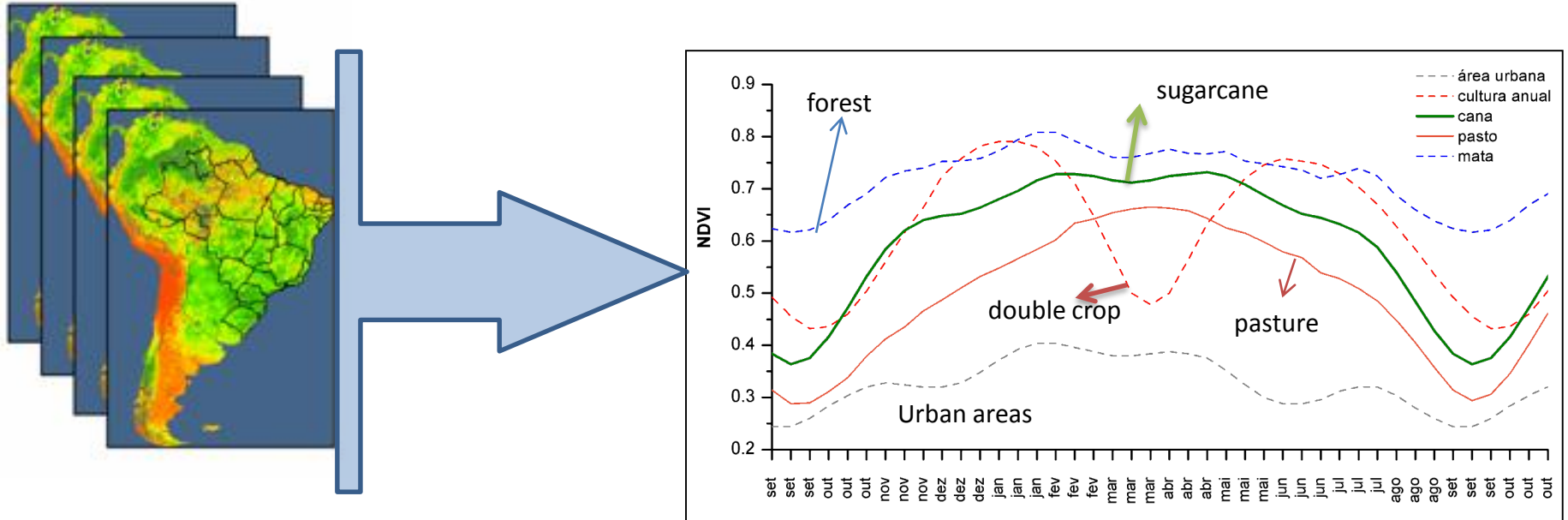


$$NDVI = \frac{\rho^{NIR} - \rho^R}{\rho^{NIR} + \rho^R}$$

Normalized Difference  
Vegetation Index

# Phenology

# Modis time series

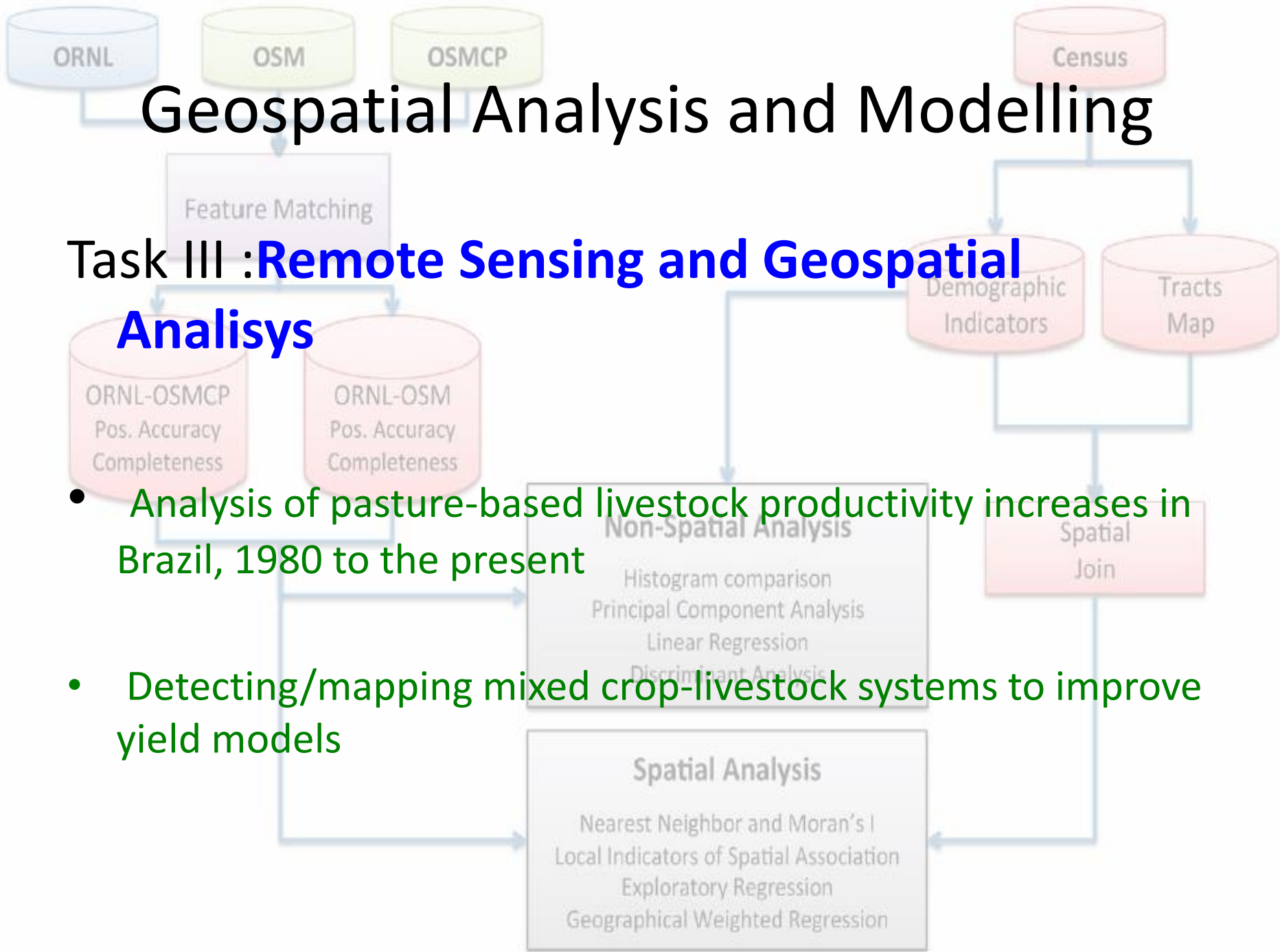


- Different targets generate different profiles

# Geospatial Analysis and Modelling

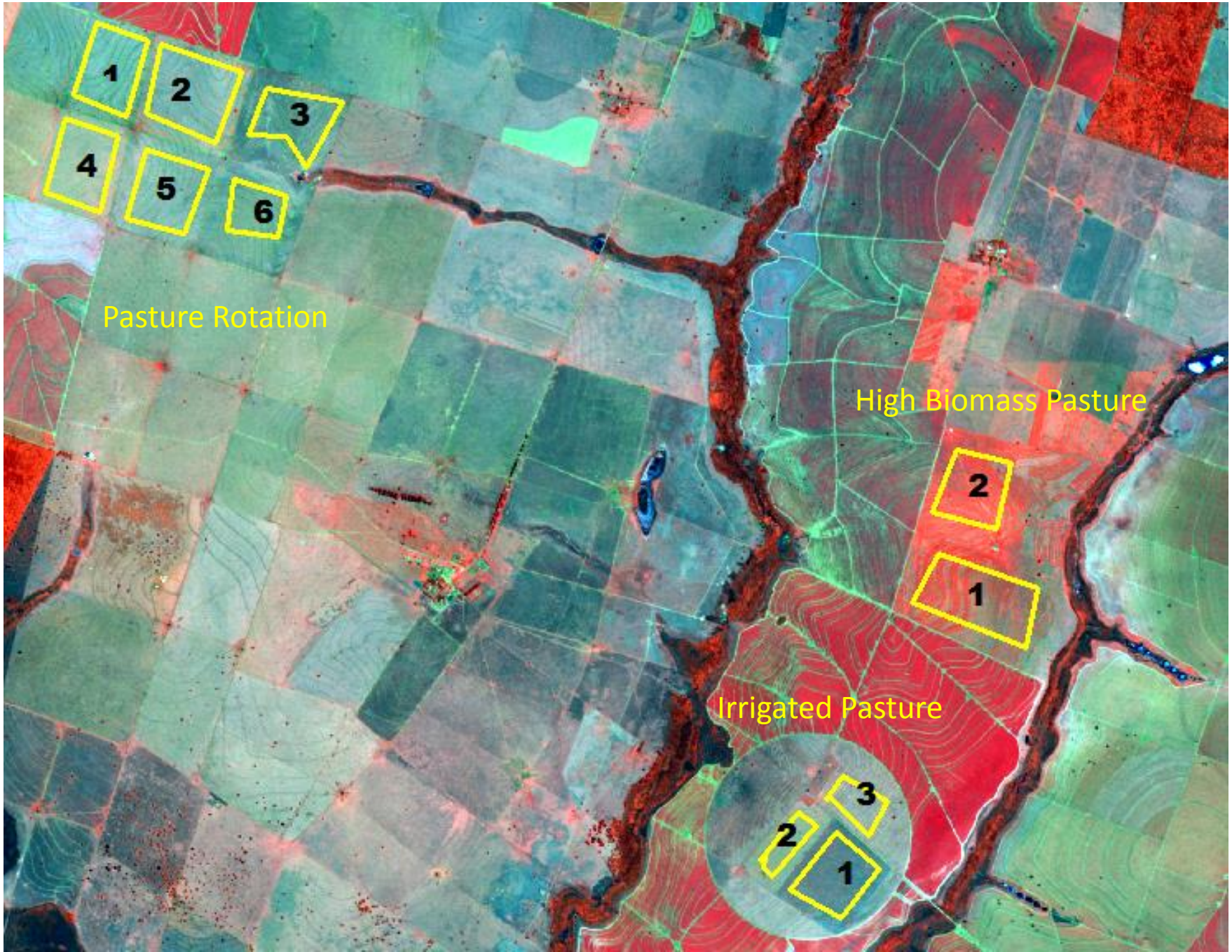
## Task III : Remote Sensing and Geospatial Analysis

- Analysis of pasture-based livestock productivity increases in Brazil, 1980 to the present
- Detecting/mapping mixed crop-livestock systems to improve yield models



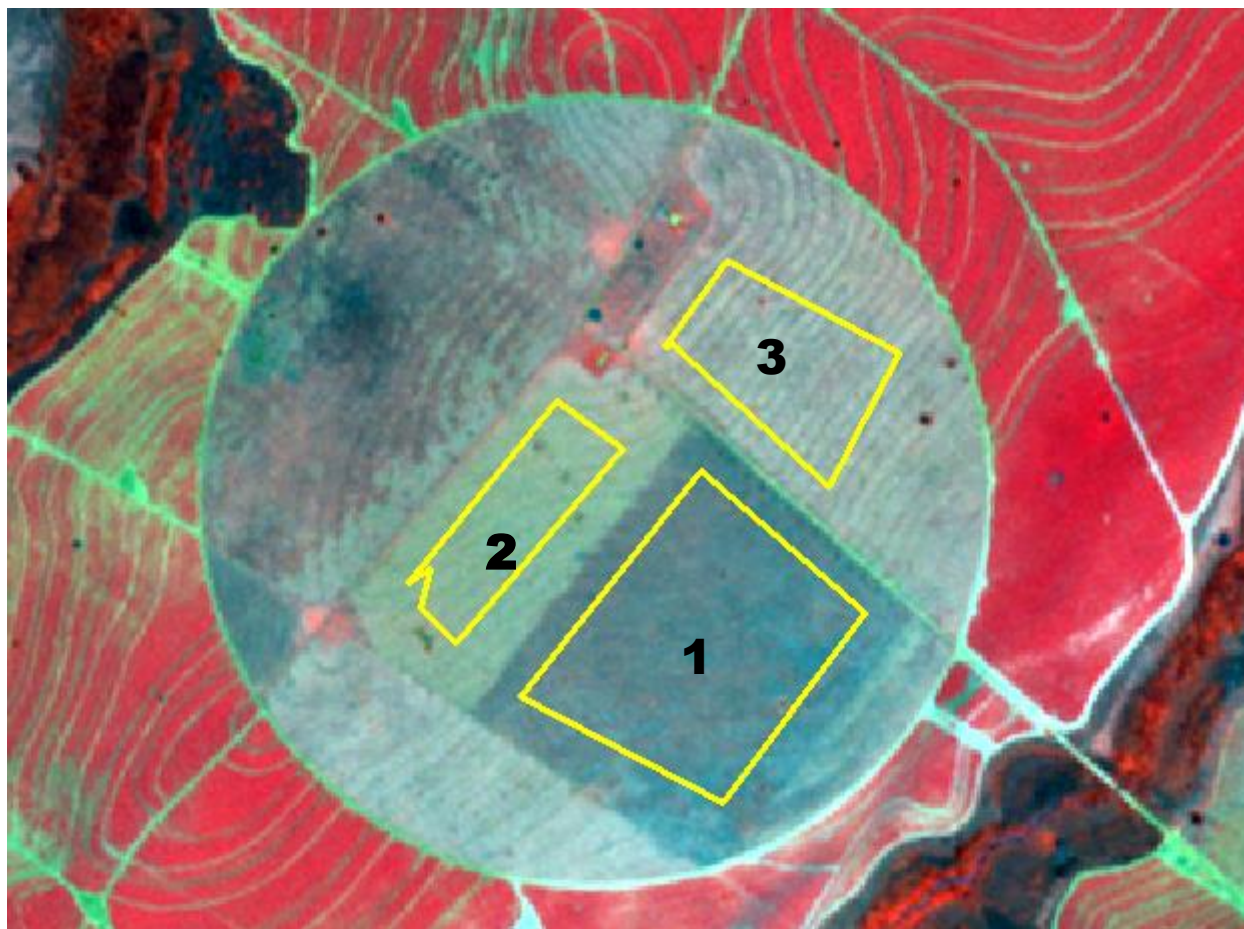


# Pasture intensification in São Paulo State





# Irrigated Pasture



# Pasture Rotation





# Integration Crop-Livestock-Forest

Brazil – References  
from Embrapa Dairy Cattle

The screenshot displays a web browser window with the address bar showing the URL `www.cnpqgl.embrapa.br/nova/iLPF.php?codigo=`. The browser's toolbar includes icons for back, forward, refresh, and home, along with a search bar. Below the address bar, there are several tabs: 'Aplicativos', 'Guia rápido', 'Últimas notícias', and 'Importado do Firefox'. The main content area is titled 'Integração Lavoura-Pecuária-Floresta' and features a list of project names on the left and a satellite map of Brazil on the right. The map shows numerous red dots representing project locations across various Brazilian states, including Amazonas, Pará, Maranhão, Ceará, Piauí, Pernambuco, Bahia, Minas Gerais, Espírito Santo, Rio de Janeiro, São Paulo, Paraná, Mato Grosso do Sul, Mato Grosso, Goiás, Tocantins, Rondônia, and Roraima. The map also shows neighboring countries: Bolivia to the west and Paraguay to the south. The Google logo is visible in the bottom left corner of the map area. At the bottom right of the map, there are links for 'Dados do mapa', 'Termos de Uso', and 'Informar erro no mapa'.

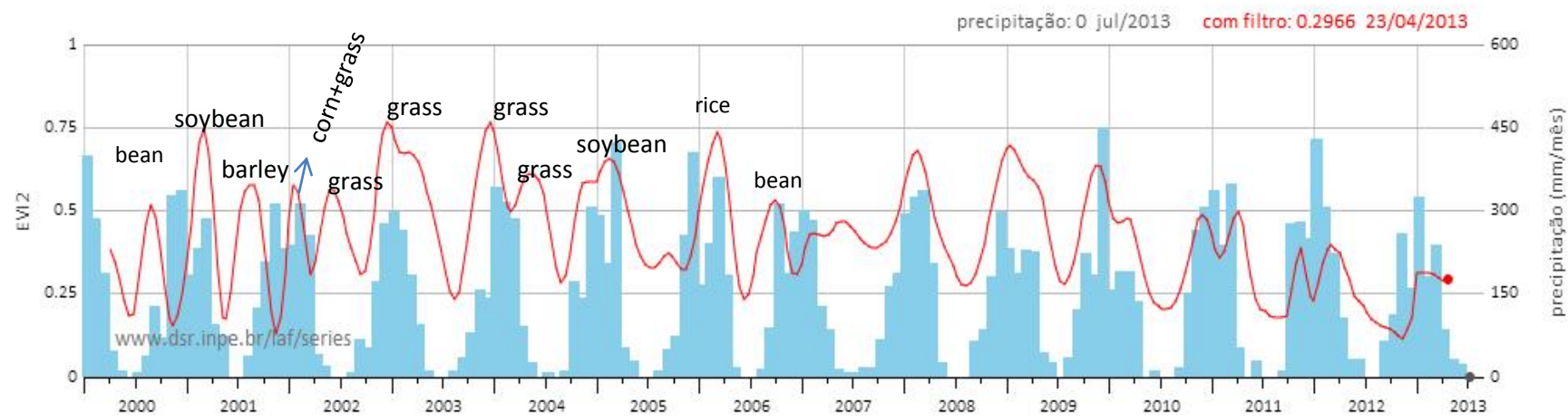
**Integração Lavoura-Pecuária-Floresta**

- Aspasia
- Brotas Pasto 1
- Brotas Pasto 3
- Brotas TUME
- iLPE-ESTRATÉGIAS PARA MANEJO DE PASTAGENS EM RONDÔNIA
- iLPF Água Santa/RS 1
- iLPF Água Santa/RS 2
- iLPF Alegre/ES
- iLPF Alegre/RS
- iLPF Alto Alegre/RR
- iLPF Amapá/AP
- iLPF Ampére/PR
- iLPF Arapongas/PR
- iLPF Araripina/PE
- iLPF Augusto Pestana/RS

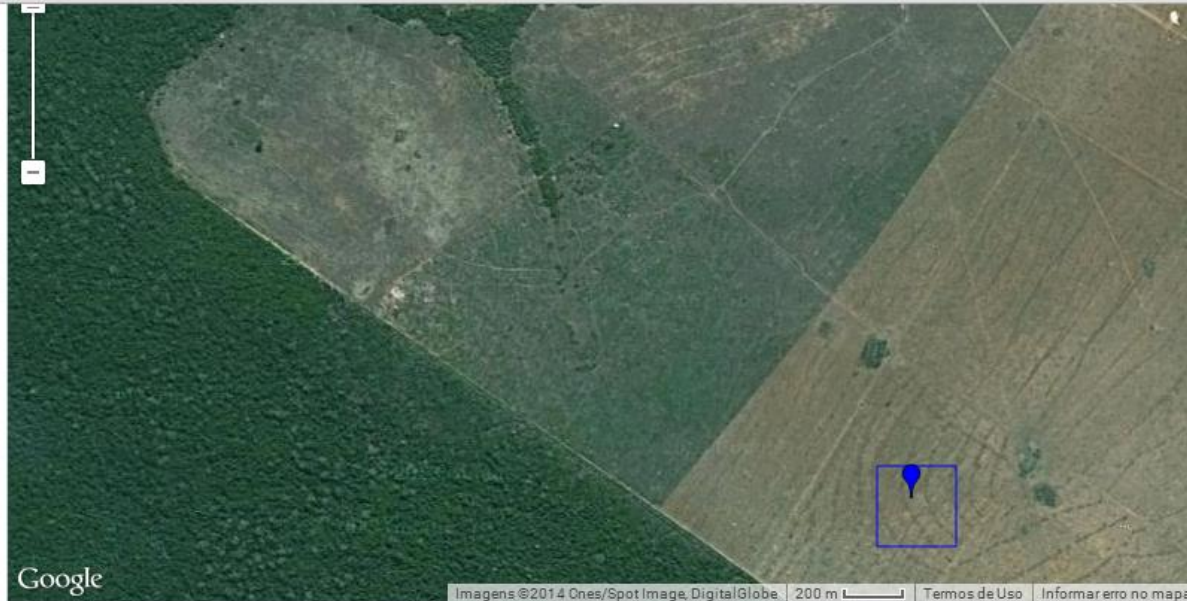


✖ 16 29 26.59 S, 49 18 12.74 O

Santo Antônio de Goiás - GO    Dados no gráfico: sem filtro com filtro precipitação



Dados da estatística: sem filtro com filtro precipitação    Período: ano calendário ano safra

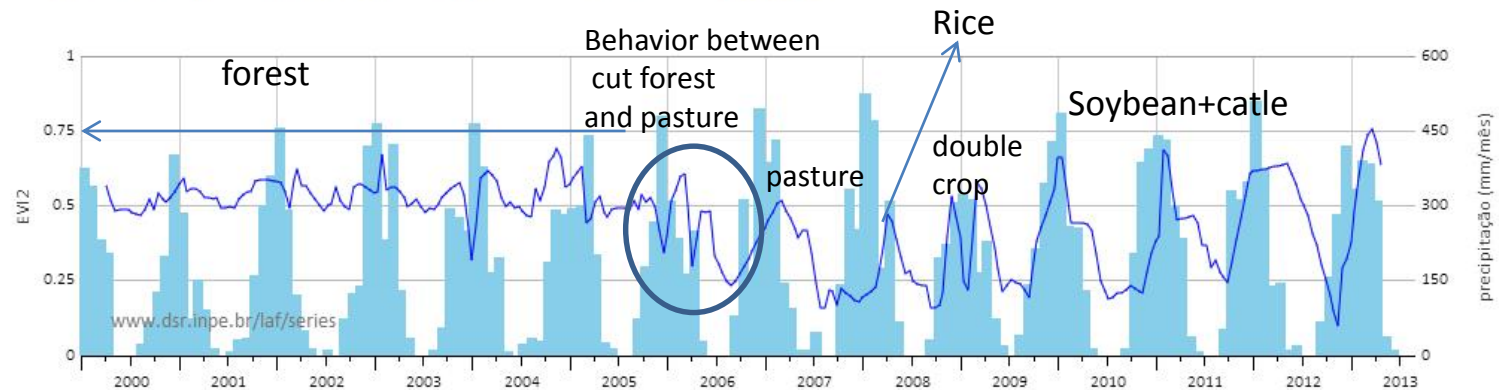


Forneça uma descrição para o ponto



× 11 10 03.90 S, 55 01 08.54 O

Itaúba - MT Dados no gráfico: sem filtro com filtro precipitação



Dados da estatística: sem filtro com filtro precipitação Período: ano calendário ano safra

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
mínimo	0.4667	0.4961	0.5090	0.4183	0.4380	0.4448	0.2564	0.1673	0.1672	0.2027	0.1733	0.2648	0.0987	0.3601
máximo	0.5593	0.5977	0.5995	0.5954	0.6799	0.6931	0.5793	0.4967	0.4479	0.5773	0.6945	0.5998	0.6399	0.8131



11 55 55.27 S, 55 00 18.09 O GMS



Buscar um local no mapa

Nome do município selecionado

Forneça uma descrição para o ponto



11 52 30.89 S, 55 04 43.82 O

Santa Carmem - MT Dados no gráfico: sem filtro com filtro precipitação

