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# PRESENTATION OF THE METHODOLOGY FOR CREATING THE DIGITAL PRODES[1]

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[1] Presentation of the methodological approach extracted from the report (INPE-7032-PUD/035)

## PRESENTATION

The present report refers to the description of 36 slides, in the PowerPoint software format, presenting the methodology to create the DIGITAL PRODES. The methodological procedure, developed at INPE, was possible due to the joint efforts between photo-interpreters and the team responsible for the development of the Georreferenced Information Processing System (SPRING). This methodological procedure made possible to create the DIGITAL PRODES, which objective is to automate the operational tasks of PRODES (Project of Estimating the Gross Deforestation of Amazon region), consolidating a reliable georreferenced database that is easy to use by users. This methodology consists on generating fraction images derived from spectral linear mixing model, with the objective to reduce the data dimensionality to be processed. Following, it is used image segmentation of shade images, followed by the non supervised classification per region and the matricial edition done in the computer screen, in order to map the extension of gross deforestation of Brazilian Amazon occurred up to 1997. With the development of this methodology, it was possible to conceive the digital database of Brazilian Amazon (BADDAM), that it is a growing information source for the technical-scientific community and/or decision makers, involved in the elaboration of politics, analyses, planning and fiscalization of the resources of the Amazon region, with the objectives to preserve and/or for the sustained land use management.

# DIGITAL PRODES

# BADDAM PROJECT

# (Methodology and Application)

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**Divisão de Processamento de Imagem – DPI**
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For each annual survey of PRODES (The Project of Estimating the Gross Deforestation of Amazon Region), new deforested areas are mapped using Landsat TM images. These values represent the increment of gross deforestation in $km^2$ and the mean rate of the gross deforestation in $km^2$/ano. In the manual interpretation of TM images, the accuracy of the area calculation of deforested areas is preserved by performing the adjustment of the previous deforestation polygons over the new images to be interpreted. This procedure causes geometric distortions, so preventing to generate a map showing the extension of gross deforestation. The advantage of using digital processing techniques is the elimination of geometric distortions of the deforestation polygons.

# WHY DIGITAL PRODES ?

- **POSSIBILITY TO PRESENT THE GROSS DEFORESTATION DATA OF BRAZILIAN AMAZÔNIA ON A CARTOGRAPHIC BASE CONTAINING THE SPATIAL DISTRIBUTION OF THE ANTROPIC ACTIVITIES IN THIS REGION.**

- **POSSIBILITY TO UTILIZE THE GROSS DEFORESTATION DATA OF BRAZILIAN AMAZÔNIA TO CROSS OR INTEGRATE WITH OTHER INFORMATION.**

- **POSSIBILITY TO IMPLEMENT AND MAKE AVAILABLE A DIGITAL DATABASE (BADDAM PROJECT) CONTAINING SEVERAL IMPORTANT INFORMATION OF BRAZILIAN AMAZÔNIA FOR THE USERS COMMUNITY.**

**OBSERVATION:**

**THE BADDAM PROJECT WAS CONCEIVED TO BE A BROAD DATABASE INCLUDING SPECIALLY THE INFORMATION GENERATED BY DIGITAL PRODES**

PRODES (The Project of Estimating the Gross Deforestation of Amazon Region) is the largest project of forest monitoring in the world using Remote Sensing techniques. The National Institute for Space Research, INPE, has been performing the interpretation of images acquired by the North American satellite (Landsat) to accompany the evolution of gross deforestation of Brazilian Amazon. This effort generated results, in the tabular form, from 1978 to 1999 period.

# OBJECTIVES OF DIGITAL PRODES

1) TO MAP THE EXTENSION OF GROSS DEFORESTATION OF BRAZILIAN AMAZÔNIA CONSIDERING 1997 AS THE BASE YEAR.

2) TO MAP THE DEFORESTATION INCREMENT AND THE REGROWTH AREAS USING THE 1998 LANDSAT TM IMAGE.

3) TO CHARACTERIZE THE BURNED AREAS OCCURRENCE OVER RECENT AND OLD DEFORESTED AREAS.

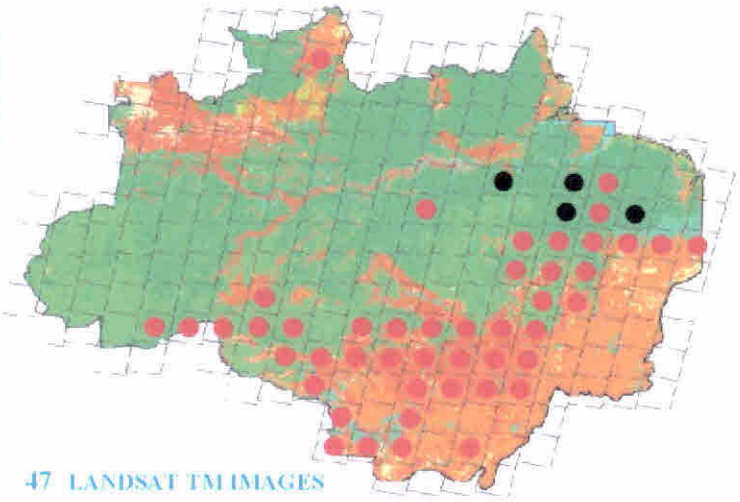
# OBJECTIVES OF BADDAM PROJECT

TO CREATE AND MAKE AVAILABLE A DIGITAL DATABASE FOR THE BRAZILIAN AMAZ(

IN THE DIGITAL PRODES, EACH PROJECT REFERS TO ONE LANDSAT TM IMAGE (229 PROJECTS)

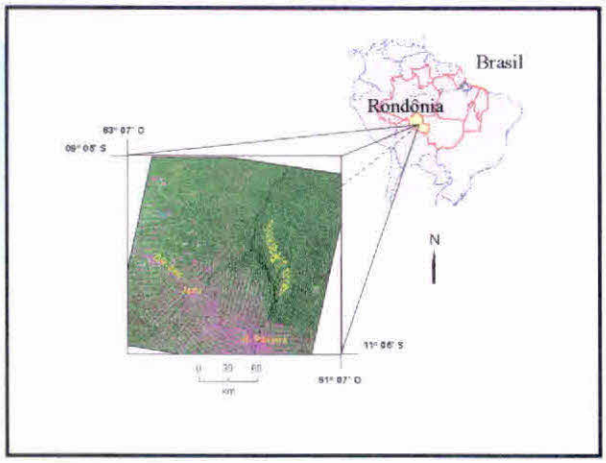

Brazilian Amazon comprises the entire states of Acre, Amapá, Amazonas, Mato Grosso, Pará, Rondônia, Roraima, Tocantins and part of Maranhão and Goiás states, corresponding to approximately 5 million km². The area with forest physiognomy occupies about 4 million km².

CRITICAL AREAS OF DEFORESTATION OCCURRENCE
( CORRESPONDING TO ~ 75% OF TOTAL GROSS DEFORESTATION )



47 LANDSAT TM IMAGES

The Brazilian Amazon region is covered by 229 Landsat TM images. However, 47 TM images of them cover a critical area, where 75% of gross deforestation is concentrated in this region.




For PRODES, this area is considered as having a high degree of difficulty for interpreting the images and calculating the annual rate of deforestation. This is due to the large number of polygons that compose the so called "fishbone" deforestation pattern which make difficult to adjust the deforestation increments over the deforested area identified in a sequential surveys.