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TITLE: Tropical forest cover dynamics for Latin America using Earth observation data: a review covering the continental, regional, and local scale.

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KEYWORDS: deforestation, ParLu, Paraguay Land Use, remote sensing, Paraguay, forests, Latin America.

OBJECTIVES:

- Provide a comprehensive overview of the remote-sensing based studies of tropical forest dynamics in Latin America.
- Present a general outline of tropical forest ecoregions and drivers of deforestation in Latin America.
- Assess historical and current deforestation trends in Paraguay.

MAIN RESULTS:

Drivers of deforestation in Latin America

- The constant increase in global population and consumption per capita have direct effects on the forest of Latin America.
- Some of the most prominent drivers in tropical deforestation include large multinational companies, land grabbing, and lack of polices and law enforcement.
- Other drivers include agro-industrial expansion, illegal logging of valuable tree species, and illegal cropping activities.

Categorization of tropical forest studies employing Earth Observation (EO) data

- In Latin America, studies employed EO data for: 1) global and continental characterization, 2) deforestation, 3) degradation, and 4) fragmentation.
- Landsat sensor is the most frequently used satellite in studies that assess forest dynamics.
- Methods employed to map and characterize forest cover include 1) unsupervised classification, 2) supervised classification, and 3) object-oriented classification.

- Methods employed to assess forest cover dynamics include 1) post-classification comparison, 2) continuous time-series, 3) on-screen digitalization, and 4) continuous variables.

Forest cover dynamics within the Atlantic Forest and Chaco areas of Paraguay

- Between 1945 and 1975, intensive wood harvesting activities took place in the eastern region of Paraguay primarily due to the vast amount of forest concentrated there and the fertile land associated with forest land.
- Direct drivers for most of the forest loss: conversion of forests to agricultural lands, timber harvesting, and small-scale colonization into forests by rural settlers.
- External factors affecting forest loss: failures within the environmental policies, confused policies in the agrarian code included that “the forest land was unproductive land and obstacle for development”, this code was only abolish in 2001, and extensive corruption associated with lack of monitoring programs and conservation laws.
- Patterns of deforestation in the Atlantic Forest of Paraguay are circle clearing, fishbone clearing, small-scale clearings, and compact clearings (Figure 1).
- A recent study estimated the forest cover loss between 1990 and 2011 to be approximately 1,550,000 hectares (Figure 2).

IMPACT:

This article identified the most used remote sensing techniques for detecting deforestation and forest degradation in Latin America. This information provided useful data to fill gaps and meet future needs for Paraguay in terms of forest cover monitoring, which constitutes one the basis to effectively implement REDD⁺¹ projects.

MORE INFORMATION:

Full article can be found at <http://dx.doi.org/10.1080/01431161.2015.1058539>

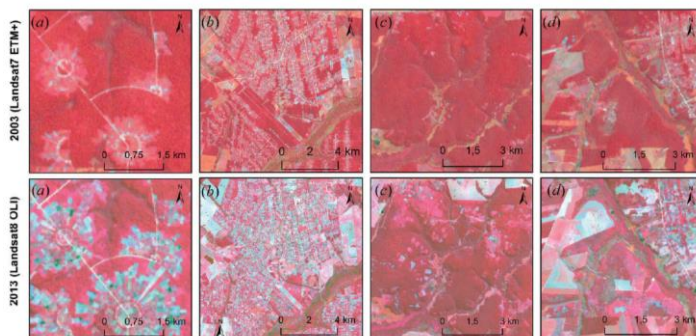


Figure 1. Deforestation pattern examples from the Atlantic Forest in Paraguay based on Landsat images from 2003 to 2007. (a) Circle clearing, (b) fishbone clearing, (c) small-scale clearings, and (d) compact clearings. Patterns were based on Roberts et al. (2002), Huang et al. (2009), and Souza and Verburg (2010).

¹ Reducing Emissions from Deforestation and Forest Degradation

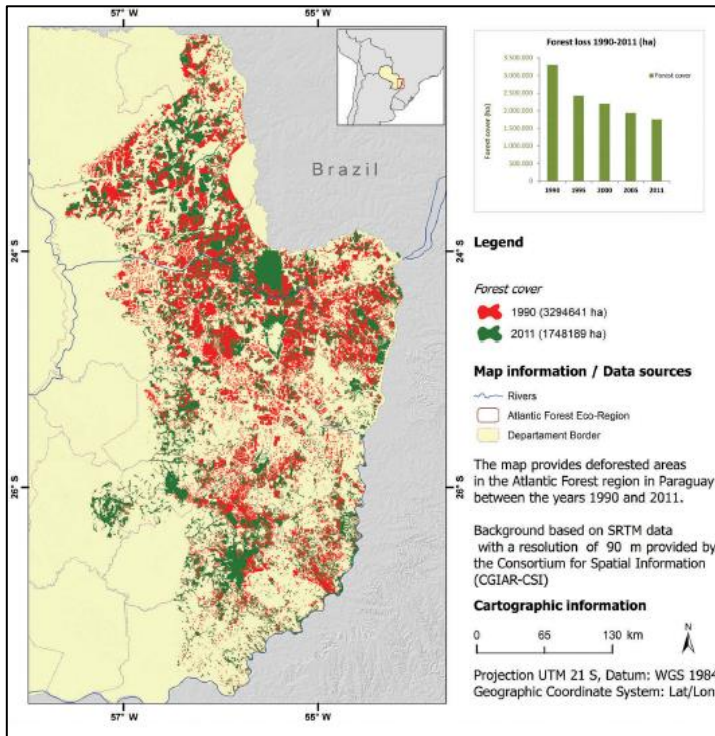


Figure 2. Atlantic Forest loss between the years 1990 and 2011 (Source for the forest cover layer for 1990 and 2011: FFPRI project and the Department of Statistics, Surveys and Census).