Demography, Socioeconomics, Geography: Endeavoring to Explain Land Cover Change In and Around the Cuyabeno Wildlife Reserve, Ecuador 1986-2002

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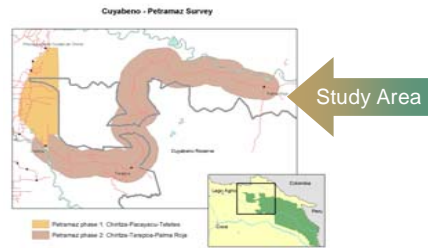
Introduction

The literature on land cover change in national parks and protected areas is fairly limited, prompting Sanchez-Azofeifa (2001) to comment that "information is sparse on the nature, dynamics, and spatial dimension of land use and land cover change processes that contribute to park vulnerability." This work aims to provide information about the landscape changes in and around the Cuyabeno Wildlife Reserve as well as extend study of landscape change in parks and protected areas by examining possible socio-economic, demographic, and geographic drivers.

Background

- Cuyabeno Wildlife Production Reserve
  - Home to indigenous groups (Siona-Secoya, Cofan, Quichua, Shuar)
  - Established 1979; expanded 1991
  - Boundary adjusted 1993; ceded area termed Patrimony Forest
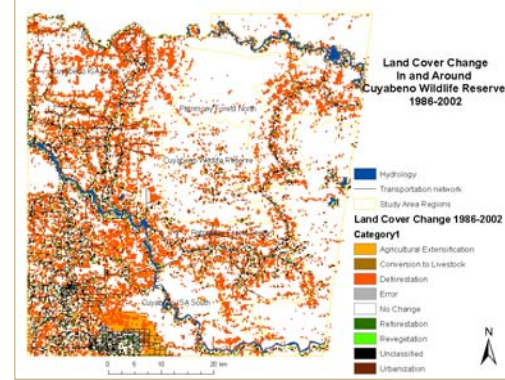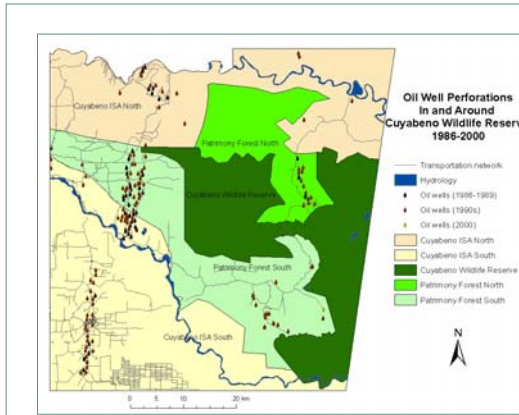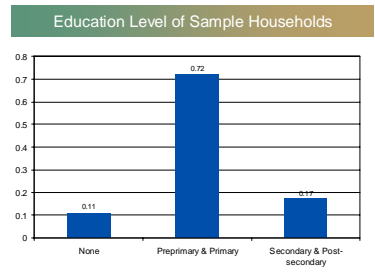 - Patrimony forest lands settled by colonists awarded communal titles; extractive activities limited
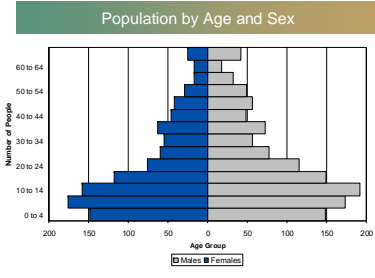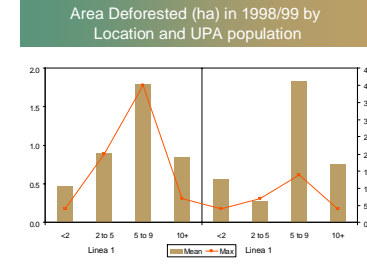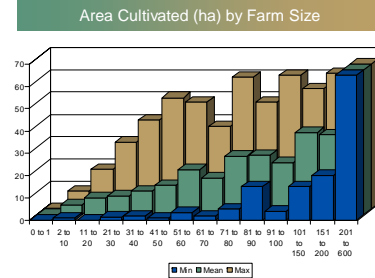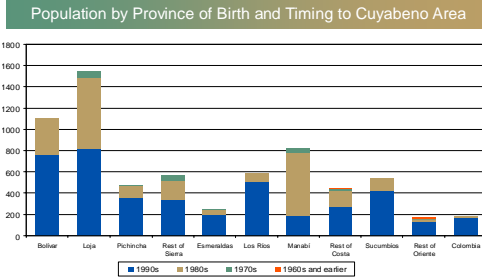

Cuyabeno - Petramaz Survey

Study Area

Data

- 1998/99 cross-sectional survey of nearly 700 households in Patrimony Forest
- Satellite image time-series of land use/cover dynamics (1986, 1996, 2002 Landsat TM images)
- GIS database: Roads, communities, oil wells, administrative boundaries, etc.
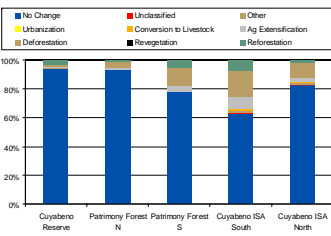
Methods

- Survey data analysis
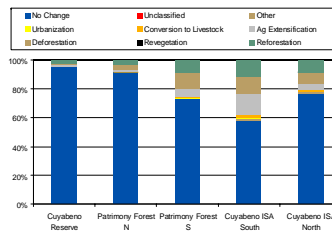- Post-classification change detection
- Poisson regression

RESULTS

Population by Province of Birth and Timing to Cuyabeno Area

Area Cultivated (ha) by Farm Size

Area Deforested (ha) in 1998/99 by Location and UPA population

Population by Age and Sex

Education Level of Sample Households

Oil Well Perforations In and Around Cuyabeno Wildlife Reserve 1986-2000

Land Cover Change In and Around Cuyabeno Wildlife Reserve 1986-2002

Percent Land Cover in Study Area Regions 1986-1996

Percent Land Cover in Study Area Regions 1996-2002

Multivariate Modeling

Model type: Poisson
Dependent variable: Amount of forest cut in the previous year (1998/99) for UPA (*unidad de producción agropecuaria*) in the Patrimony Forest regions of the study area. N=652

Independent Variable Set	Definition	Expected Effect on Deforestation
Geographical Accessibility	Type of access: vehicle, fluvial	(+)
Household Composition & Life Cycle	Age of household head	(-)
	Time since settlement	(-)
	Population density on UPA	(+)
	Total number of children	(+)
	Total number of adults	(+)
	Total number of men	(+)
	Total number of women	(+)
Socioeconomic Factors	Years of education of hh head	(+)
	HH Has Electricity	(+)
	UPA area	(+)
	Number of hired labor-days	(+)

Results:

Number of children on UPA significant at .10 level (coefficient: 0.178)
Vehicle access important at 0.15 level (coefficient: 0.521)

Conclusions

Geography:
- The bulk of the migrants surveyed originated in the Sierra
- Deforestation and agricultural extensification associated with roads & locations of oil well perforations
- Cuyabeno ISA South experienced the greatest amount of deforestation over both time periods

Socioeconomics:
- Though education levels are low overall, education is not shown to affect choice to deforest

Demography:
- # children a significant indicator of amount of forest cut in the previous year

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