Settler Welfare and Land Cover Change in the Ecuadorian Amazon Communities

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Introduction

Recent studies of deforestation and land use change in the Amazon have used remote sensing imagery as well as household surveys as data sources. Following that lead, this study describes settler welfare and land use in the most intensively colonized area of the Ecuadorian Amazon, using both survey and remote sensing data.

Sample and Methods

- Representative probability sample of farms in 1990 (n=408). Farms Re-surveyed in 1999 (n=778); larger n result of subdivision
- Questionnaires administered to:
  - Household head: Land use and farm production
  - Spouse of head: Socioeconomic, demographic & health characteristics of household members
- 1999 farm household income estimated from:
  1. Agricultural & cattle production: amount of crop harvested or cattle consumed or sold in previous 12 months multiplied by unit price
  2. Extraction of natural resources: cash obtained by selling products such as wood, wild fruits, fibers, etc.
  3. Small animals: number of chickens, ducks, pigs, etc. consumed or sold in previous 12 months multiplied by unit price
  4. Off-farm income (2 sources)
    a) Income earned by household members from off-farm employment in the previous 12 months (temporary migrants or commuters)
    b) Income from remittances in the previous 12 months from individuals that lived in the farm household at some point since 1990 (but not at the date of the interview)

Findings

- Off-farm income: 36% in 1990, 54% in 1999
  - Increasingly regarded as a strategy to diversify risk & income sources
- Median off-farm income in 1999 (US$391; N=419) > income generated by farm production (US$335; N=708)
- Increasing poverty: 1999 median annual household income (US$590) is 13% less than 1990 median income (US$680)
- Farm households surveyed in both 1990 and 1999
  - Average plot size of 37 ha in 1999
  - Household size of 6.6 individuals in 1999
  - Median household income of US $722 in 1999
- Farm households surveyed only in 1999 (subdivisions of original farms surveyed since 1990)
  - Average plot size of 17 ha in 1999
  - Household size of 5.6 individuals in 1999
  - Median household income of US $507 in 1999

Linking Socioeconomic Variables and Deforestation Rates

- Control Variables
  - Income
  - Population
  - Accessibility
  - Education
  - Biophysical factors
  - Infrastructure
- Landscape Pattern Indexes Change
  - Deforestation (%/yr)
  - Regression analysis at the farm level
  - Regression analysis at the parish level
  - Significant socioeconomic variables

Deforestation: Example from Joya de los Sachas

- Landsat TM 1986-1996
- Fieldwork
- Supervised Classification
- Post-classification change detection
- Deforestation rates:
  \[ r = \frac{1 - (A_1 - A_0)}{A_0} \]

Conclusions

- The relationship between deforestation (1986-96) and income in 1990 is not statistically significant. With most farm households relying on off-farm income in 1999, on-farm income sources following land clearing (such as cattle) have decreased in relative importance.
- Demographic and accessibility variables are strongly related to deforestation between 1986-95 in the study area. With smaller plots and still large household size in 1999, deforestation and population mobility have increased as ways to diversify risk and income sources.
- By the end of the 1990s, changes in the way settlers made their living, i.e. increasing mobility to earn off-farm income and extending farm land, had not attenuated poverty in the Ecuadorian Amazon.