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Deforestation and Land Use Change in the Alto Mayo Valley, North Peru

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Overview

- **Introduction**
  - Location
  - Historical Background
  - Motivation
- **Classification**
  - Methods
  - Challenges
- **Land Use Change**
  - Change Detection
  - Deforestation
  - Scenarios
- **Conclusions**

Study Area

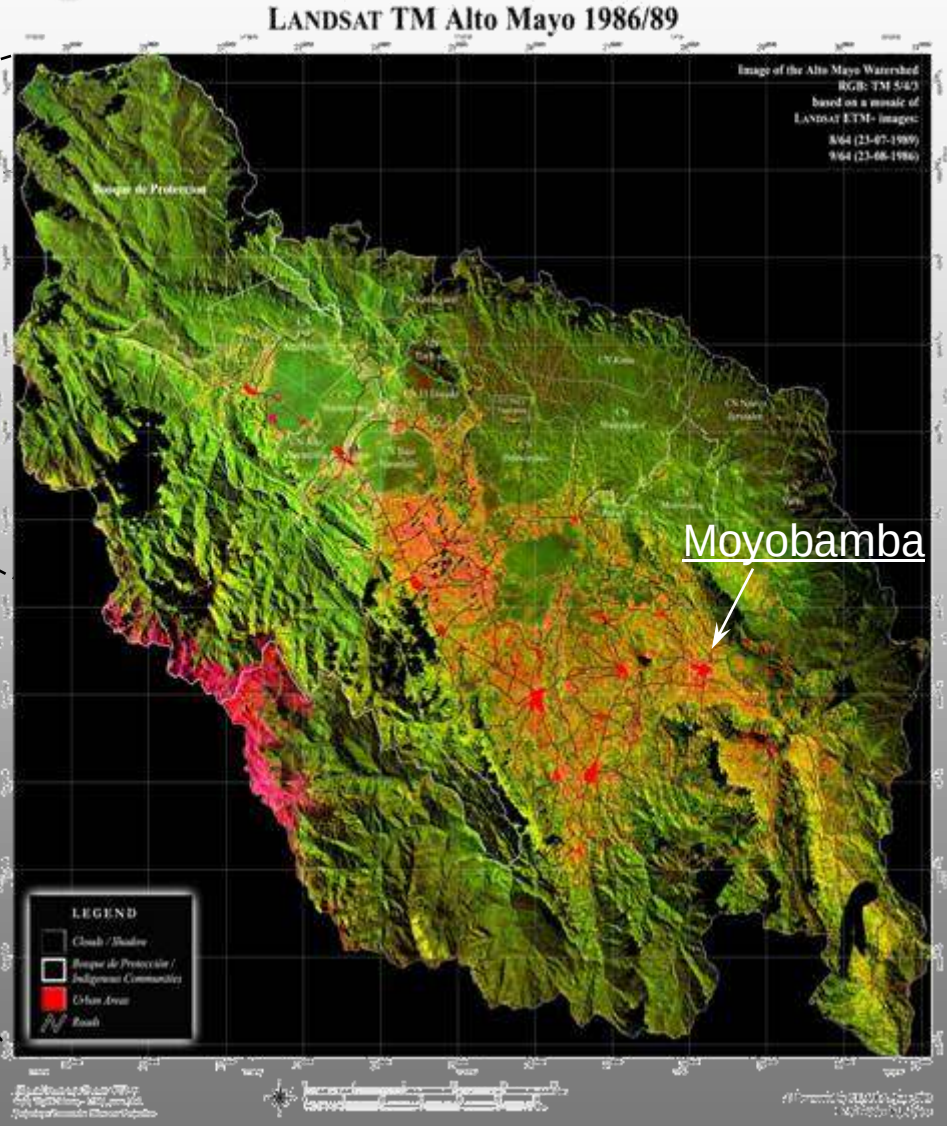


Natural Zonation of Peru:

- Yellow: Coastal plain ("Costa")
- Brown: Andean highlands ("Sierra")
- Dark green: Subandean belt ("Selva Alta")
- Light green: Amazon Basin ("Selva baja")

Study Area





H. Treidel, J. Dietz, R. Schröder, R. Zimmermann (2004) _____ ***F.E.A.R.S.***

Historical background



- Until the 1940's: area almost completely covered by pristine forests
- Until 1975: less than 10 000 inhabitants
- Construction of the "Carretera Marginal" (main road) in 1975
- Population in 2000: > 200 000
- Annual growth rate: > 10%

Motivation

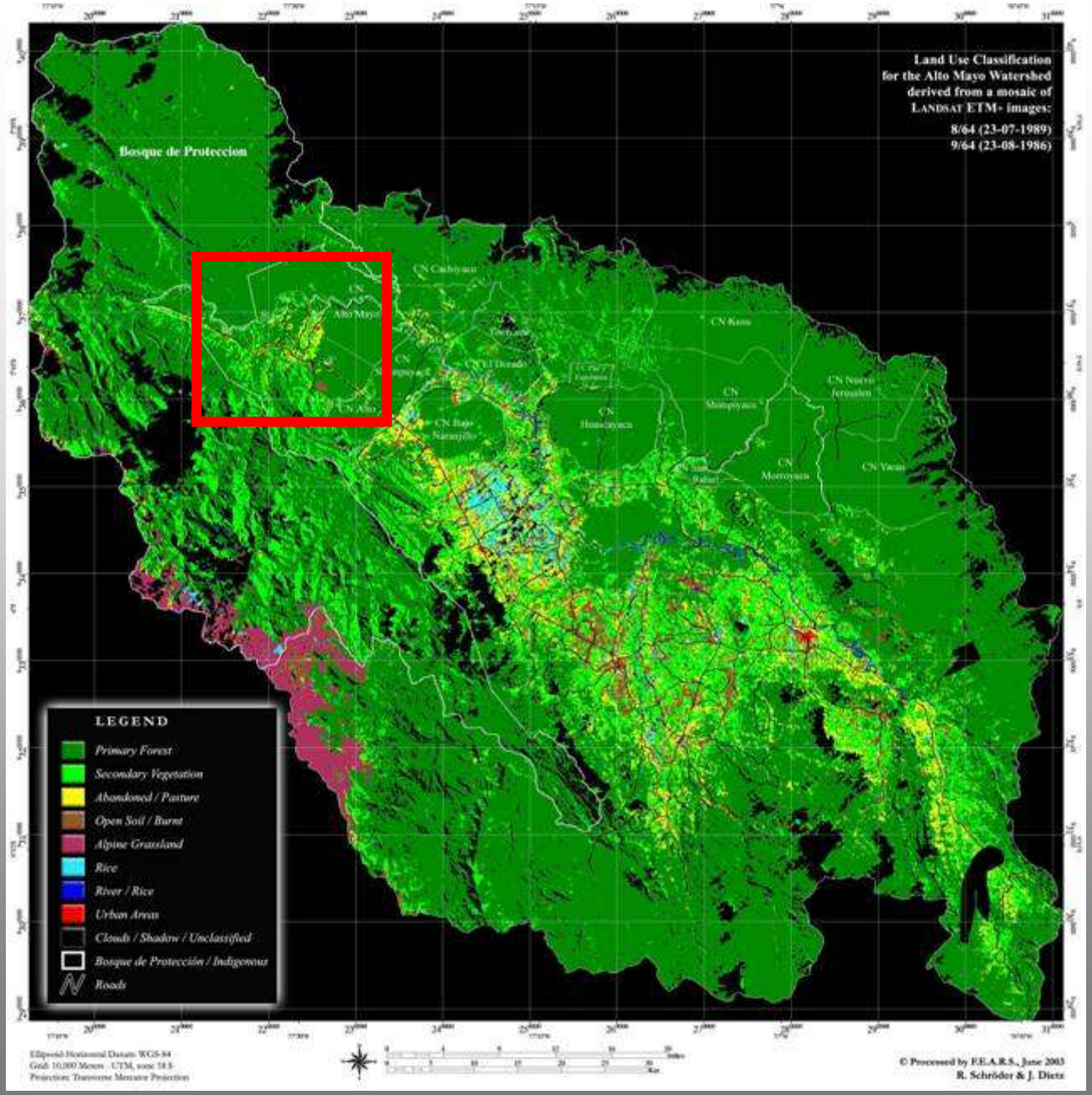


- Main cause of deforestation in the AM: clearing of pristine forests for rice and coffee cultivation by small scale farming.
- Prediction by APECO (1995): decrease of the annual deforestation rate to less than 0.5 % in 2000.
- Calculation of the current deforestation rate in the valley between 1986/89 and 2002 based on satellite imagery (Landsat TM/ETM+).

→ **Identification of Loss in Primary Forest (Cover)**

Multitemporal Study 1986 - 2002

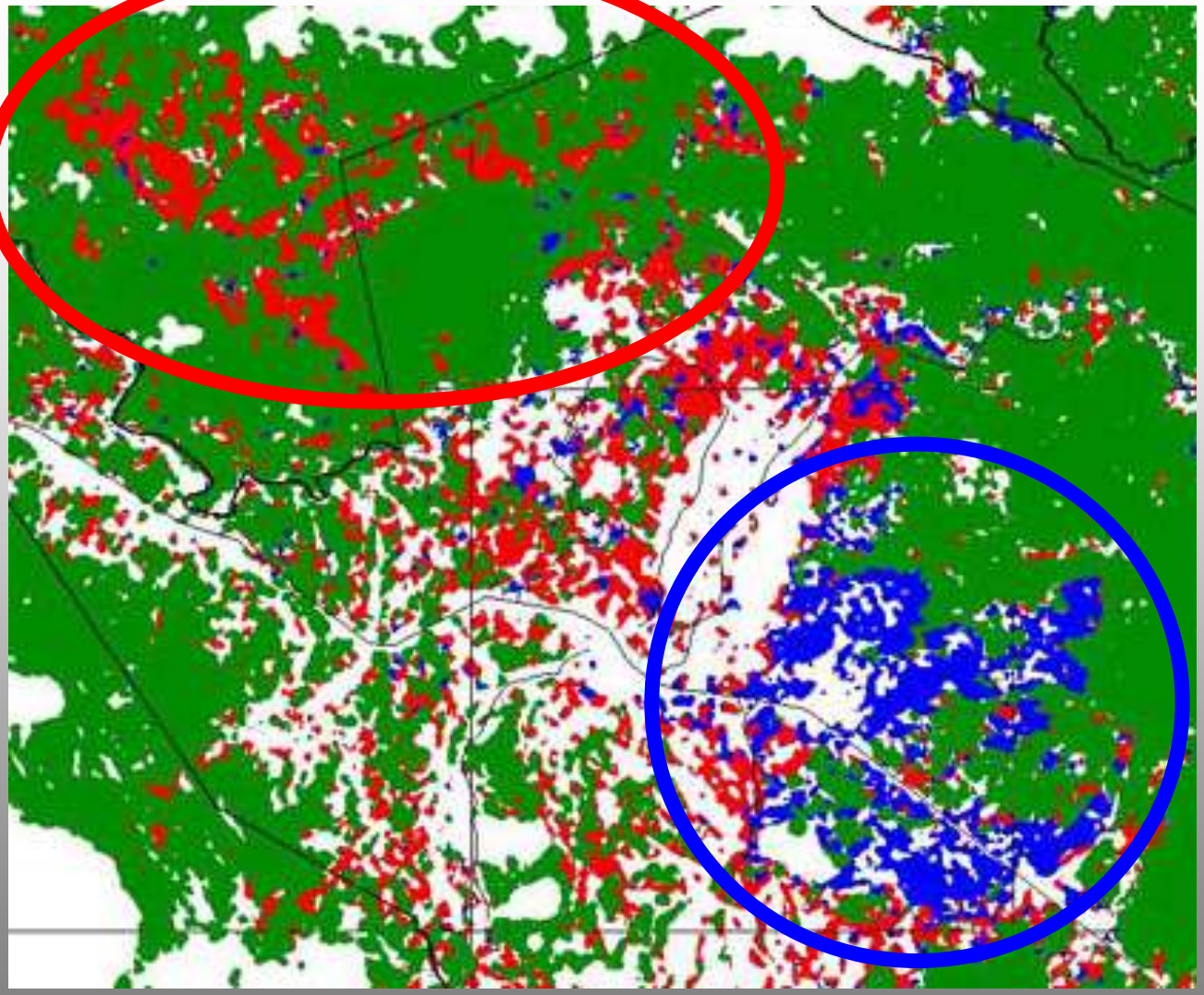
- Satellite Images Landsat TM/ETM+ (1986/89, 1999, 2002) were georeferenced and mosaicked in order to minimize cloud coverage.
- Hybrid classification was applied.
- Due to cloud cover the classification is incomplete: 89% in 1986/89, 66% in 1999 and 57% in 2002 could be classified.
- Classification resulted in 8 classes with robust spectral signatures.



Land Use Classification

Alto Mayo 1986/89

Outlined are boundaries of the Indigenous Communities and the local forest sanctuary ("Bosque de Protección")



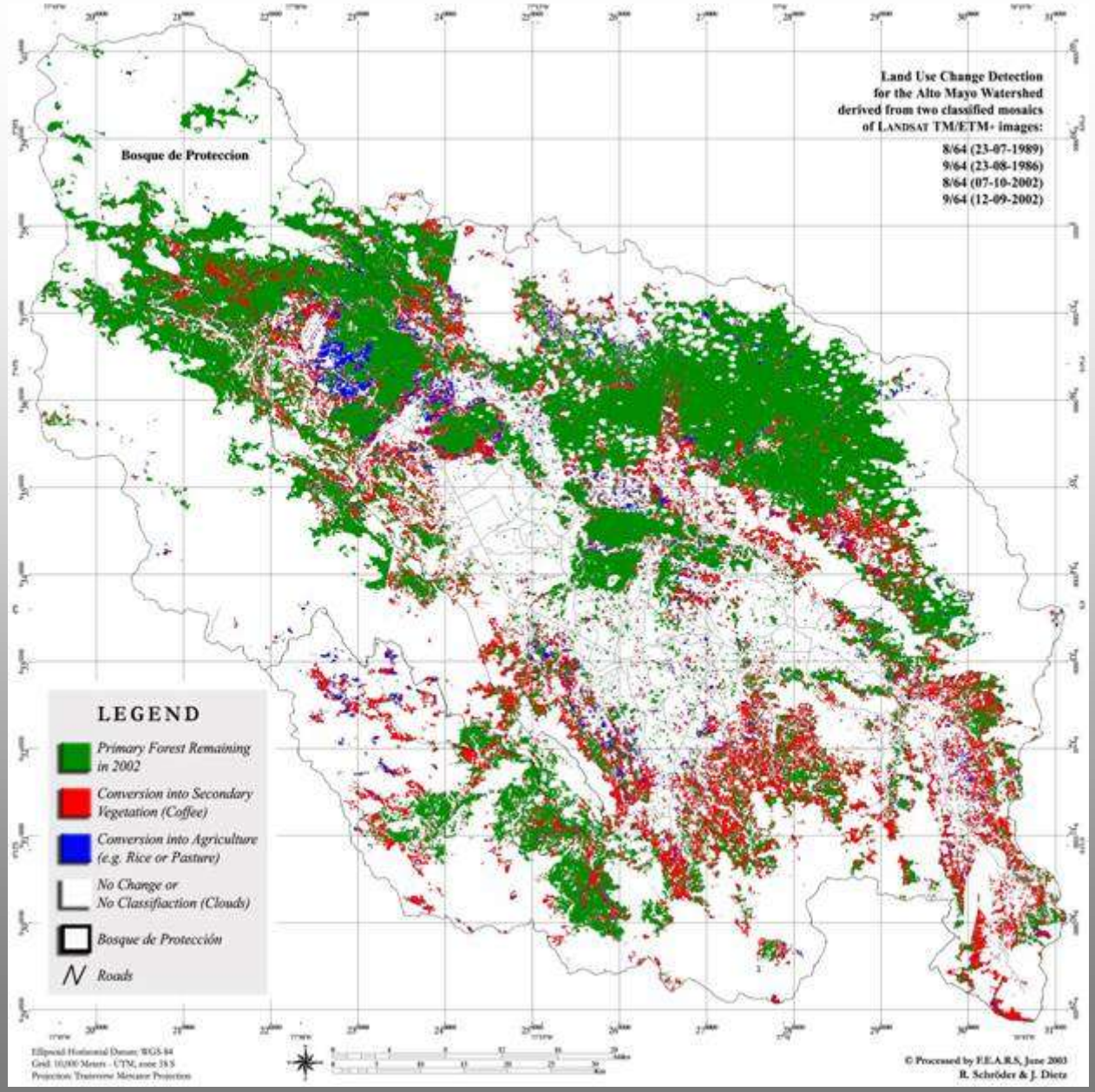
Primary Forest Loss 1989 – 2002

Alto Mayo Valley Northern Part

- **green:** Primary forest remaining in 2002

Conversion of primary forest (since 1989) into agricultural land:

- **blue:** Rice
- **red:** Secondary vegetation (Coffee)
- **white:** No primary forest in 1989



Primary Forest Loss 1989 – 2002

Total Alto Mayo Valley

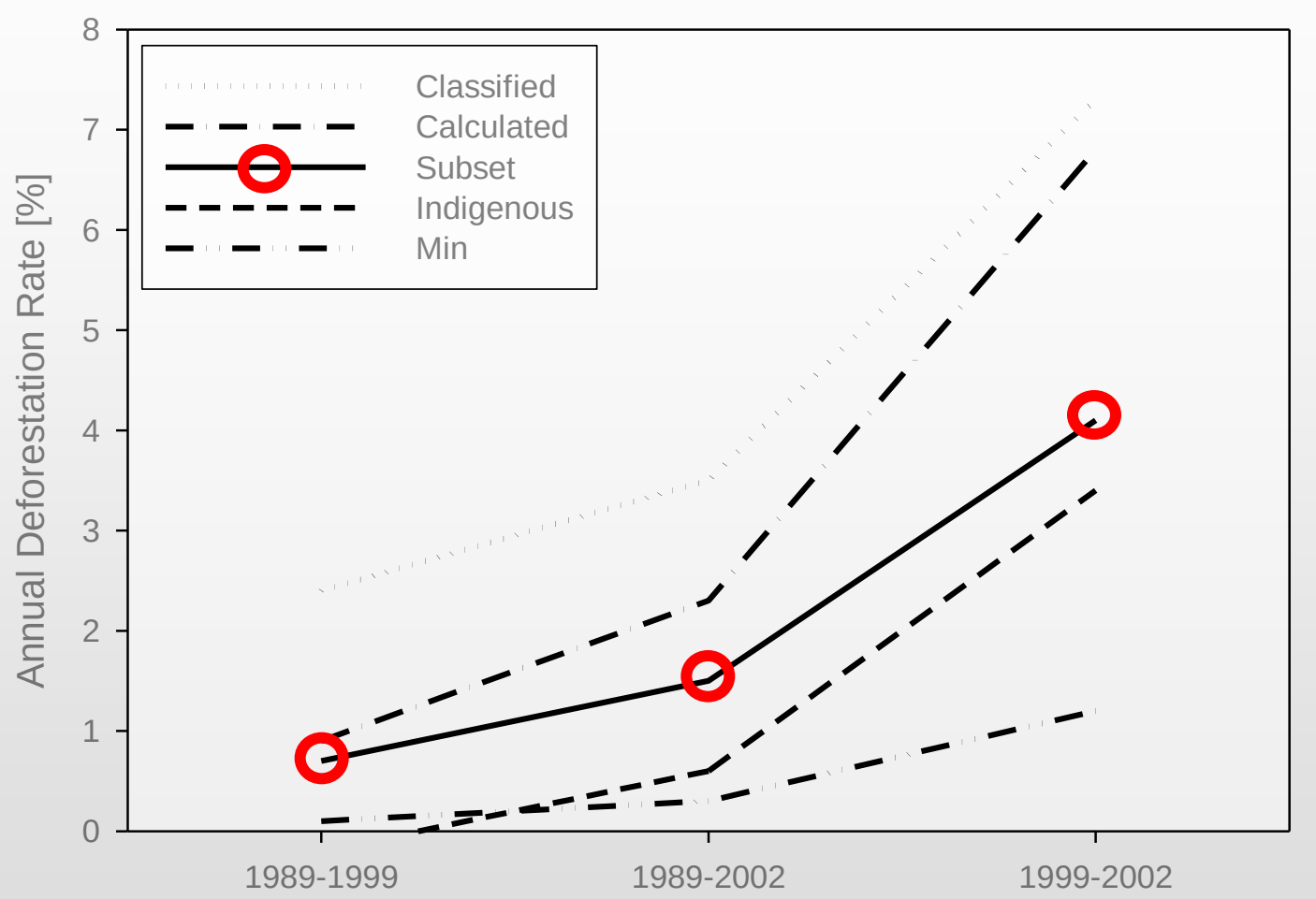
- **green:** Primary forest remaining in 2002

  Conversion of primary forest (since 1989) into agricultural land:

- **blue:** Rice
- **red:** Secondary vegetation (Coffee)
- **white:** No primary forest in 1989 or cloud cover

Annual deforestation rate

and its effects in the Native Communities and in the valley



Annual deforestation rate for all the scenarios and for the management by the indigenous population.

Conclusions

- Annual deforestation rate increased dramatically from less than 1 % in the late 1980's to currently at least 2-3 %
- This clearly contradicts the APECO prediction of a decrease in the annual deforestation rate to 0.5 % until the year 2000
- The APECO study was based on administrative data and statistical material. This does not appear to be an appropriate method!
- Nowadays, adjacent hill areas and the steeper valley slopes are cleared for coffee cultivation. The more accessible areas of the valley had undergone most of the deforestation process already in the early 80's.
- Clearing also effects the pristine forests of the "Bosque de Protección Alto Mayo".
- However, forest management by indigenous tribes may still be a slightly more conservationist approach…

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