Human and Biophysical Dimensions of Land Use/Cover Change in Amazonia:

Towards a Multi-scale Synthesis
LC-09

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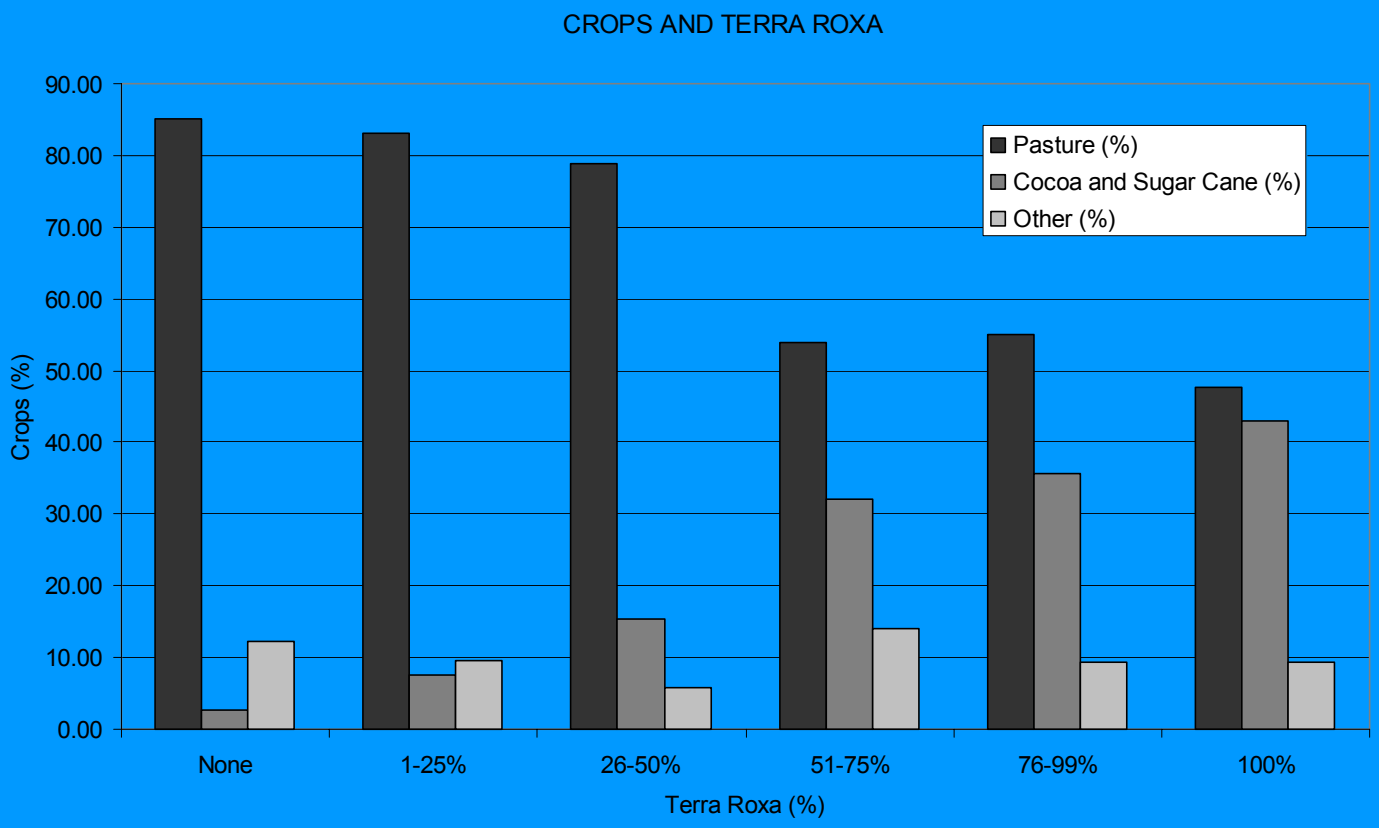
The study areas

1. Altamira
2. Marajo
3. Tome-Acu
4. Igarape-Acu
5. Yapu
6. Rondonia
7. Santarem

Population and Environment Findings

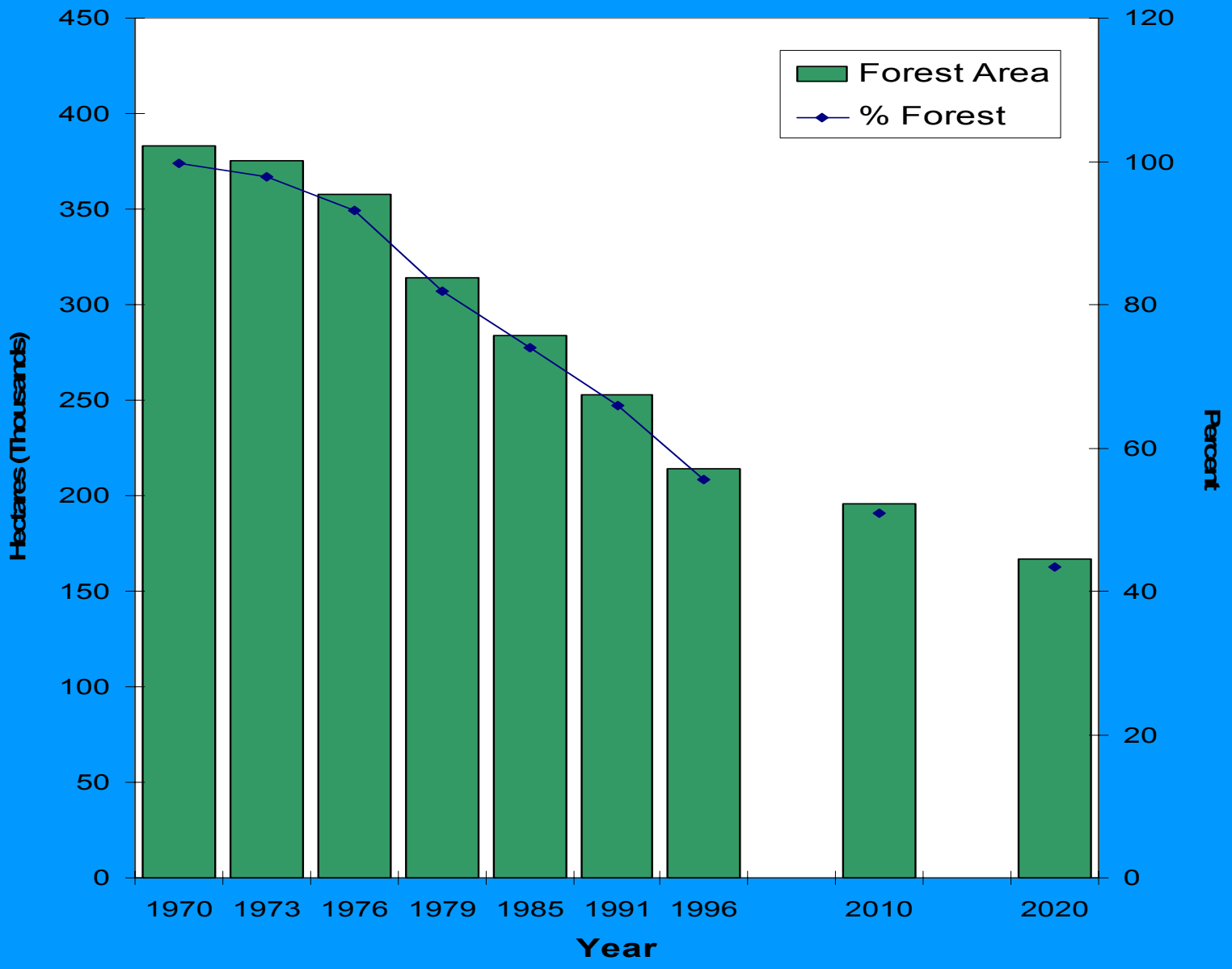
- Farmer persistence is affected by soil quality on the property. Farmers on good soils persist, while high turnover characterizes those on poor soils
- Crop choice is affected by proportion of good soils. Those on poor soils evolve towards above 80% of property in pastures, while those with over 50% of good soils on properties, have balanced portfolio of cash crops, pasture, and staple crops
- 75% of Amazon soils are of poor quality, thus the importance of identifying them in advance of settling farmers on those soils is clear. This has so far never been done
- Use of satellite remote sensing and field studies can help identify the better soils and direct future settlement of farmers. This can lower the cost of economic development by government

Figure 12



Source: Survey in Altamira 1998, N=402

Forest in Study Area - Observed, 1970-96 & Predicted for 2010 & 2020 Based on Farm Level Projection



Change detection techniques findings

- The change detection based on spectral mixture analysis of multi-temporal images provides the flexibility of some specific change purposes, such as forest degradation (Lu et al., 2004 (forthcoming), CJRS).
- Change detection based on biophysical parameters are especially useful for detection of vegetation changes (Lu et al. 2002, ASPRS conference)

Biomass Estimation findings

- TM/ETM+ data are more suitable for SS biomass estimation, instead of mature forest biomass estimation (Lu et al., in press, CJRS).
- Incorporation of spectral responses and texture improves biomass estimation performance (Lu et al. 2002, In: *Advances in Spatial Data Handling*)