

Land Use Choices in the Tropical Forest Frontier: the Potential Role of Malaria

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"As the combination of economic failure and malaria led to the extension of 'latifundia' in the Campagna Romana, the same factors lead, in the Amazon, to the accumulation of land by cattle growers and the final transformation of the tropical forest into pastureland." (Nájera 1994: 28)

Objectives:

- Assess Nájera's statement in the context of the Brazilian Amazon
- Offer a preliminary appraisal of the potential role of malaria in land use decisions adopted by small farmers

Background:

- 77% of deforested areas in the Amazon have been converted into pasture
- 99% of all malaria cases in Brazil are registered in the Amazon; 60% in settlement areas
- Land use literature has only one reference to the potential impact of malaria on land use decision (Browder, 2002), without attempting to evaluate it



Figure 1. Land use in the Brazilian Amazon

Hypotheses:

- Low malaria \Rightarrow increase in pasture areas
- High malaria \Rightarrow decrease in pasture areas (unless small farmers give up their land to large cattle ranchers)

Study Area & Data:

Machadinho settlement project, RO (western Amazon), where data was collected in 1985-7, and 1995

- Malaria rates:
 - Spatially estimated (kriging)
 - Clustering pattern for high & low rates (spatial association)

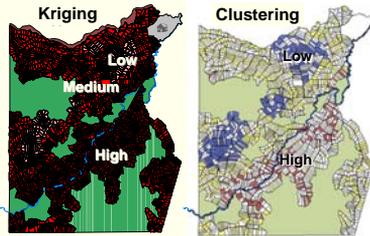


Figure 2. Malaria rates in Machadinho, 1987

- Declared pasture area
- Ownership of the plot by only one person between 1985 and 2001
- Time of arrival in Machadinho
- Region where the settler used to live in the 12 months prior to the arrival
- Soil quality (common knowledge disseminated by the Technical Assistance and Rural Extension Company – EMATER)
- Number of goods

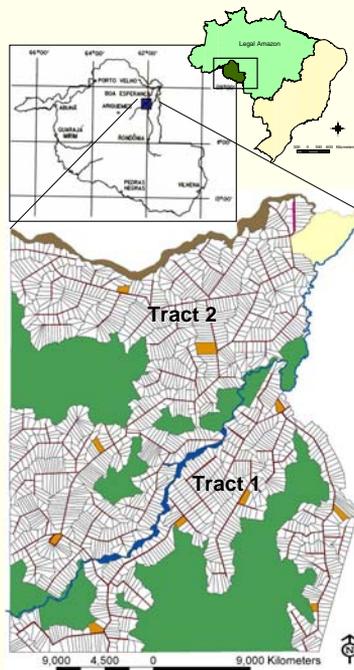


Figure 3. Machadinho Settlement Project. Physically divided by the Machadinho River into Tract 1 and Tract 2, with an area of 119,700 ha (34,465 of these are protected forest reserves). The project has 1,742 plots (average size of 40 ha).

Results & Discussion:

- Plots that revealed no significant clustering pattern and those that were significant clusters of low malaria showed larger pasture area than those that were significant clusters of high malaria rates
- Plots with poor soils also show a positive correlation with the amount of pasture area in 1995
- Plots that had a pattern of high malaria rates in 1987, regardless if this pattern was captured by spatially estimated rates or by clustering assessment, have a significant negative correlation with pasture area in 1995. Similar effect is observed by a stepwise linear regression model
- Nájera's statement does not seem to apply to the Brazilian Amazon

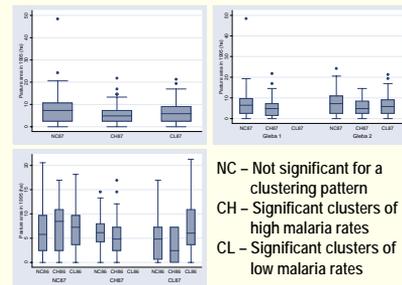
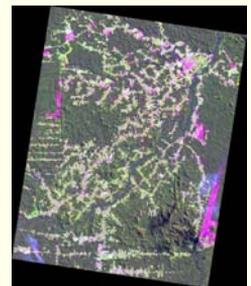


Figure 4. Pasture area (ha) reported by settlers in Machadinho in 1995, by Tract and clustering patterns of malaria rates in 1987 and 1988

Future Research:

- Self-reported land use information replaced by remote sensing data
- Local perception of soil quality replaced by a detailed soil survey



Acknowledgments:

Office of Population Research and Center for Health and Wellbeing, Princeton University; the Andrew W. Mellon Foundation for support via the Program on Migration and Urbanization at Princeton University; and the International Development Research Centre (IDRC), Grant No. 94-0206-00.