Poverty Mapping: Central Peruvian Amazon

Alternative Poverty Mapping Method

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Introduction

This study aims to assess poverty in the Central Peruvian Amazon. The analysis builds on the International Center for Tropical Agriculture's (CIAT) work at this "benchmark" site of the Alternative to Slash and Burn (ASB) program of the Consultative Group on International Agricultural Research (CGIAR).

Pucallpa and its rural hinterland, in the Central Peruvian Amazon, is in the low-relief, humid tropic zone. The area of interest roughly corresponds to the provinces of Padre Abad, Coronel Portillo and Tournavista (Figure 1). Approximately 250,000 people live in the city of Pucallpa and another 75,000 live in the rural areas for which the city serves as the regional capital (INEI 1994). This area forms a functional economic zone that is oriented towards Pucallpa. Three principal transportation axes are the Ucayali River flowing south to north, the Aguaytia River river and the Pucallpa-Lima road, both trending from northeast to southwest. Near the foot of the Andes to the west of the study area there are relatively stronger connections to other cities in the "Selva Alta" and to Lima. The principal economic connection to the north is by the Ucayali River to Iquitos.

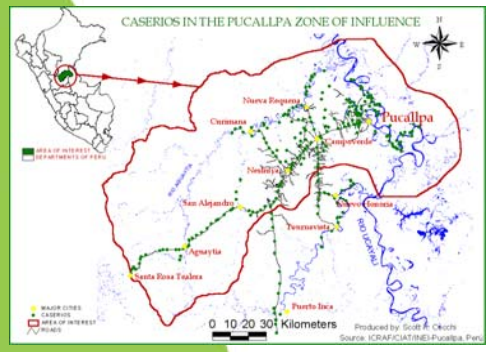

Figure 1. The Central Peruvian Amazon study area. Each village was geo-referenced using global positioning systems (GPS). Census data from the Instituto Nacional de Estadistica e Informatica (INEI) were linked to the each village on the map

Method

Our methods combined field visits to the region, interviews with farmers and both government and non-government officials, analysis of environmental and geographic information, and multivariate statistical analysis of agricultural and population census data. This combination of methods was assembled to give us a comprehensive view of poverty problems in the study area, and permit us to add environmental and geographic dimensions to the more common approach of looking at the demographic basis of poverty.

This study uses a combination of statistical analyses to assess poverty. Direct methods for estimating poverty use an objective indicator that can be observed, such as presence or abscence of measurable assets or household physical infrastructure. Indirect methods estimate values for indicators that cannot be measured directly, such as consumption and income. This study combines analysis approaches by applying multivariate statistical methods to analyze multidimensionality (Principal Components, CATPCA and Cluster Analysis). It provides basic needs typologies to characterize deprivations and complement poverty-line estimates. It also allows us to distinguish between kinds of poverty, relationships between social and productive conditions and interactions between poverty and environmental constraints.

We identified questions from the census for each one of the general socioeconomic categories – basic needs, household resources, well-being, agricultural resources and education. Then, principal components analysis was applied to each variable to create poverty indices reflecting these two themes. The household resources index is a measure of the physical characteristics of the household. To construct the household resources index, we used principal components analysis for categorical variables (PCA-CAT). The other indices were developed using the same principal components analysis approach. We produced five indices. This poster shows three of these indices – the basic needs index, the household index and the education index (Figures 2, 3 and 4).

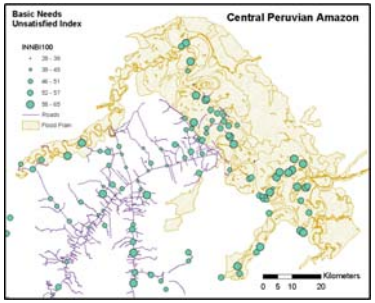

Figure 2. The basic needs index combines information on house construction materials, sewage facilities, number in household per room, school attendance and dependency ratio. Note differences between floodplain and uplands.

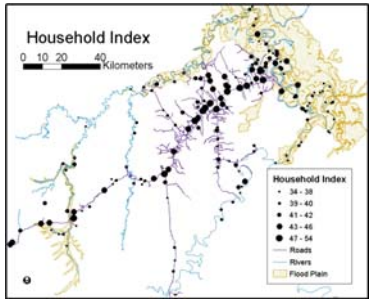

Figure 3. The household index combines information on household type (house, apartment, cabin, shack, etc), tenure, construction materials, water sources, sewage system, electrification, kitchen type, space in the household for economic activity, home appliances, telephone connection, vehicles and persons per room

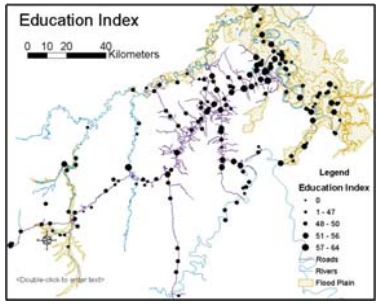

Figure 4. The education index combines information on literacy, education completed, percentage of the population over 24 with post-secondary education and net rates of school attendance for primary, secondary and post-secondary education.

After the indices were created we mapped the values for the villages in the study area, overlaying this distribution on the map of deforestation in the region (Figure 5). By estimating the date that each village was deforested, this analysis helps us assess the evolution of poverty conditions along the deforestation continuum.

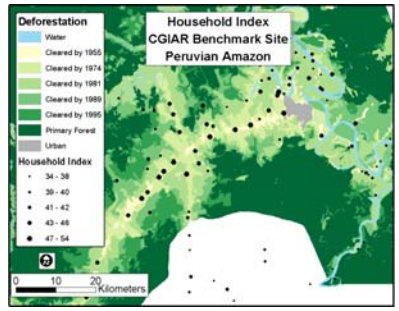

Figure 5. This map shows the household poverty index overlaid on the deforestation map. Changes in land clearing were assessed since 1955 based on aerial photographs and satellite images.

Results

Our statistical analysis showed that using combined direct and indirect methods of poverty estimation allowed us to better discriminate between poverty levels in the study area. Analysis of the geographic distribution of poverty shows some clustering according to distance from major roads and the city of Pucallpa. More basic needs are unmet in the areas on the floodplain of the Ucayali River (Figure 2). This is likely due to the use of the most readily available house construction materials and the lack of sewer systems on the floodplain. The household and education indices show that areas near the main road between Pucallpa and Lima fare better than those areas on the margins of the study area (Figure 3 and 4).

Comparing the indices to the date of deforestation shows that areas most recently deforested have low index numbers, indicating that they are less well off than those areas that were cleared decades ago (Figure 6). The newly settled areas are occupied by recent immigrants practicing slash and burn agriculture. Many of these people have left other parts of the study area or other areas in Peru due to economic hardship. Areas deforested decades ago have had to intensify their agricultural activities in order to endure land degradation. Many of these areas have larger farm sizes and more developed activities. These areas may have had the time necessary to improve their economic situation, while people on the margin lack the time necessary to improve their livelihoods.

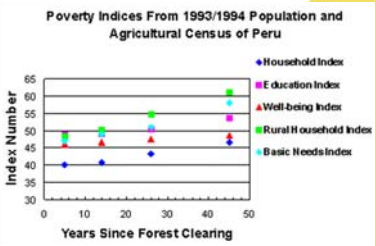

Figure 6. This graph shows the average poverty index number for groups of villages that were established (deforested) at different times over the last half century. High index numbers indicate better living conditions and less poverty. Villages established decades ago have relatively better conditions than those established more recently.

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