

Patterns and causes of deforestation in the Colombian Amazon

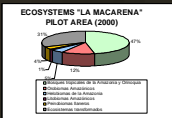
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ABSTRACT

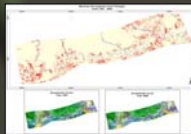
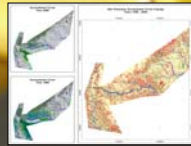
Ecosystem information in Colombia and specially on the Colombian Amazon is poor in comparison with other countries such as the Brazilian Amazon. We examined patterns of ecosystem diversity, deforestation and fragmentation and provided an estimate of their possible causes. Ecological, demographic, and socioeconomic data were analyzed to establish local conditions. Patterns of deforestations did not run parallel to roads but follow rivers. The extent and rate of change varies highly depending on population density. Annual deforestation reate were estimated between 3.73% to 0.97% in high populated areas to 0.31% to 0.01% in relatively unpopulated areas of indigenous population. Changes are related to oil extraction, deforestation, cattle ranching or illegal cropping.

RESULTS

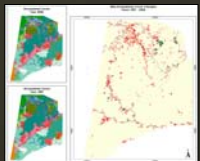


These areas showed much higher transformation at the landscape level: transformed ecosystems increased in extension, size and number of fragments whilst natural ecosystems decreased in extension and size experiencing higher degrees of fragmentation.

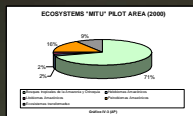
- High fragmentation
- High biodiversity
- High population density
- Rural population: colonization (last 40 years)
- Economy: cattle farming, wood extraction, illegal crop cultivation.
- Low quality of life



Ecosystem cover (loss) ■



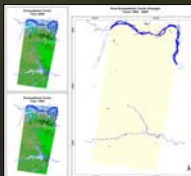
- Medium fragmentation
- Medium biodiversity
- Low population density
- Indigenous population
- Economy: subsistence production, collections of non timber forest products, hunting and fishing
- Low quality of life



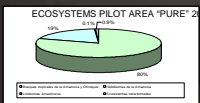
Transformation rates and fragmentation are slightly slower because of indigenous production models (shifting cultivation) that are more adapted to the biophysical conditions of this Amazonian region.



- Low fragmentation
- Low biodiversity
- Low population density
- Legal Status: forest reserve
- Economy: mining and subsistence production.
- Low quality of life



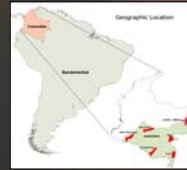
Non-existing infrastructure and the extremely low population densities make this area little susceptible for changes/transformations. There exist a proposal for the declaration of the a protected area in this region.



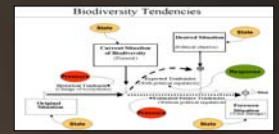
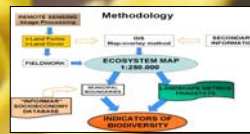
ACKNOWLEDGEMENTS

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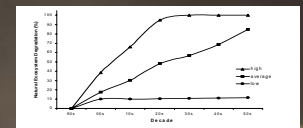
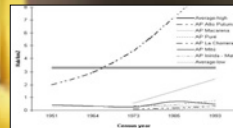
METHODOLOGY AND STUDY AREA



Colombia is the fourth largest country in South America, after Brazil, Argentina and Peru, and covers an area of approximately 1.142.000 km². Colombia is a geographically diverse country. One of Colombia natural regions embraces the Amazonian which covers 7.1% of the whole Amazonian Basin. It is a highly diverse region, where climate, soils and topography determine the habitat and landscape complexity of the area. Tropical lowland rainforest, Tropical ombrophilous alluvial forest, Tropical ombrophilous submontane forest and rocky vegetation are the most important ecosystems. Ten protected areas represent 65.6% of all current protected areas in Colombia. Six pilot areas of aprox. 500.000 ha were analyzed using 1985 and 2001 Landsat Images .



FRAGMENTATION, ECOSYSTEM DIVERSITY CHANGES AND POPULATION DENSITY



Population density is relatively low in the region. 58 ethnic groups are present in this area. The agriculture frontier has been centered around the lowlands at the eastern slopes of the Andes where external production models has been adopted resulting in high ecosystem transformation and fragmentation rates.

Results show significant influence of factors such as rural population density, population growth and quality of life with the percentage of natural ecosystem lost.

Mean patch size values reflect the advance of the colonisation front through the river networks.



Accessibility is really difficult in this area. It has low institutional presence, almost inexistent infrastructure and low quality of life. Main economic activities are intensive cattle raising, timber production, the cultivation of illegal crops and the traditional indigenous agriculture.

CONCLUSIONS

Ecosystem loss rates reported in this project are much higher than recent estimates which suggest an annual rate of change of forest cover of between -0.38% (Achard *et al.*, 2002) and -0.4% in tropical South America (FAO, 2001). This suggests that greater attention at a national and international level should be directed towards the Colombian Amazon. Furthermore, not only the extent and rate of deforestation is worrying but also the degree of fragmentation. This is critically important due to its effect on forest degradation and ecosystem functionality.

Further details: Patterns and causes of deforestation in the colombian Amazon. Ecological indicators 6 (2006) 353-368