

Reducing the deforestation of the Amazon through farming system intensification

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Abstract: The Amazon has become the last Far West of the planet. Today, the attention is focused on some sectors in which the region plays a major role: the mineral richness of the soil - especially hydro fuels - biodiversity, climate change and the coca plantations. Big portions of the huge forest have been transferred to the agricultural sector. The vigour of colonisation has transformed the Amazon into a major grain and meat provider with relevant environmental impact in terms of deforestation. This increasing demand for food is changing the context of Amazonian agriculture. Big ranches, which are occupying around 80% of the deforested land and initially conceived as mere land investments, are seeing agriculture as a means to raise their value. At the same time, the world has changed. Unsustainable environmental and social practices which were common a few years ago are no longer acceptable. Accordingly, new production strategies, protecting the environment and human work, are starting to spread.

Keywords: amazonian farming systems, deforestation, alternative to slash and burn

The Amazon: The Last Far West of the Planet

Since the last half of the XXth century, the Amazonian forest has become the last frontier. In a few years, 20-25% of natural forestry ecosystems have been transformed in rural landscapes by actors such as industrial holdings, large-scale landowners, small holders, landless farmers, supported by public institutions and environmental NGOs. All this was accompanied by the fight for the possession of land. Big portions of the huge forest, traditionally managed by American-Indian communities, have been transferred to industrial holdings belonging to the agricultural sector or even to groups of farmers. Today, the attention is focused on some sectors in which the basin plays a major role: the mineral richness of the soil – especially hydro fuels – biodiversity, climate change, coca plantations in the Western part and, of course, the deforestation linked to greenhouse gases and climate change. Just as it happened with the other South American biomes, the vigour of colonisation has transformed the Amazon into one of the major agricultural product providers of the Planet, feeding especially the Asian countries. Forestry and agricultural sectors, especially timber extraction (Fig. 1), cattle ranching (Fig. 2) and soybean productions (Fig. 3), are considered as the deforestation motors.



Fig. 1. Timber extraction, Marabá, Brazilian Eastern Amazon



Fig. 2. Cattle ranching, Redenção, Brazilian Southern Amazon



Fig. 3. Soybean plot, Boa Vista, Brazilian Northern Amazon

The increasing demand for food is changing the context of Amazonian agriculture. Big ranches, initially conceived as mere land investments, are now seeing agriculture as a means to raise their value. All the more so since their low-inputs cattle ranching practises reduce soil fertility leading to reduced productivity (Fig. 4). As a consequence, and after occupying around 80% of the deforested land at the beginning of the millennium (Fig. 5), livestock has started to lose its stardom.

As the world has changed in a way that can be felt even in the deepest corners of Amazonia, unsustainable environmental and social practices which were common a few years ago on large-scale farms cannot be performed anymore, at least at daylight. Especially slash and burn of large forest plots - several dozen, if not hundreds of hectares a year (Fig. 6) - are prohibited by law.



Fig. 4. Initial stage of pasture degradation in Eastern Amazon



Fig 5. Pasture landscape in the Trasmazon highway



Fig. 6. Slash and burn practice on a large-scale forest plot in Para State

Accordingly, new production strategies, respectful of the natural environment, of the forest and human work, are starting to gain the field to reduce deforestation. Over the past two decades, agriculture in the Amazon region has changed due to mechanization (Fig. 7). Indeed, when combined with additional inputs (fertilizers, herbicides and insecticides), mechanization allows a more intensive and sustainable exploitation of Amazonian soils. This type of agriculture, which is based on the recuperation and then the maintaining of soil fertility, allows farmers to plant crops on old plots, whose fertility had deteriorated and that had therefore been left fallow. Among the key techniques enabling to maintain soil fertility, one should mention no-tillage and direct seeding (Fig. 8), permanent soil cover, as well as all the physical, chemical and biological processes limiting erosion and element loss.



Fig. 7. Mechanized maize production in Paragominas county



Fig. 8. No-tillage and direct-seeding maize crop in degraded pasture



Fig. 9. Cattle ranching in agroforestry system in Southern Pará

The results obtained on ranches using recuperated pastures show that the density (head/ha) can be multiplied by 1.5 to 2. Moreover, farmers can plant trees and so to diversify production, reducing greenhouse gases and to increase the land value (Fig. 9).

However, to implement this system, the initial investment is high, even it is paid in 3-4 years. A farming equipment (a large and a small tractor, a planter and a harvester) is suitable for a surface area of 500-800 ha/year and costs 80-120,000€ secondhand, plus approximately 15-20,000€ of inputs. So, up until now it has only been affordable by large scale agro businesses and landowners. The great research challenge is elaborating similar farming systems for smallholders and reducing the environmental impact of the inputs, especially herbicides and insecticides.

References

- Klutcouski, J. *et al.* 2001. O Sistem Santa Fé. Embrapa CNPAF, Goiânia, GO.
- Landers, J.N., Santana, G., Rocha, M.T., Manfrinato, W. & Weiss, J. 2001. Environmental Impacts of Zero Tillage in Brazil - a first approximation. Keynote paper in: I World Congress on Conservation Agriculture, Madrid, 1 - 5 October, 2001.

MMA 2001. Causas e dinâmica do desmatamento na Amazônia. Ministério do Meio Ambiente, Brasília, 436p.

Veiga J.B., Tourrand J.F., Piketty M.G., Pocard-Chapuis R., Alves A.M., Thales M.C. 2004. Expansão e trajetórias da pecuária na Amazônia: Estado do Pará. Brasília, Brasil: Editora da Universidade de Brasília, v. 1. 161 p.