POLICY BRIEF

Embrapa
Acre

Reconciling Cattle Ranching and Environmental Conservation in the Legal Brazilian Amazon

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The Legal Brazilian Amazon covers an area of 5.2 million square kilometers (larger than Western Europe) and represents 59% of the Brazilian territory. The region encompasses nine states and 775 counties (4,5) and is residence for around 12% of Brazil's population[6].

The Amazon biome represents 61% of the Legal Brazilian Amazon while 24% of the area is under the Cerrado Biome (a savannah-type vegetation) and transition areas. Currently, 15% of the Legal Brazilian Amazon is deforested (8% are cultivated pastures, 5% secondary vegetation – degraded areas where secondary forests and Cerrado vegetation are re-growing – and 2% is occupied with cropping)[7]. The accumulated deforested areas in the Legal Brazilian Amazon surpassed 700,000 square kilometers until 2008 ([8]).

The Legal Brazilian Amazon is a region with growing economic, social and environmental relevance in the national and international scenarios. With a cattle heard above 70 million heads and an area of native and cultivated pastures above 61 million hectares [9], cattle ranching has been one of the main focus of the debate regarding the sustainable development of the Region.

In the last 30 years, gains in productivity avoided the need for incorporation of 147.5 million hectares of the biomes Cerrado and Amazon to the cattle production systems in the Legal Amazon to meet the current world demand for meat[10].

Studies conducted at farm level in the State of Acre show that improved mixed grass-legume pastures with grass species of the genera *Braquiaria* or *Panicum* and the legumes *Pueraria phaseoloides* or *Arachis pintoi* managed correctly can allow farmers to sustainably maintain stocking rates of 2.5-2.7 animal units/hectare (1 animal unit is equivalent to 450 kg of live weight), with no need of nitrogen fertilizer, the most limiting and expensive nutrient to agricultural production in the tropics [11,12,13].

Despite the high potential of the region, average stocking rates are around 0.91 animal unit/hectare. Pasture degradation [14] and the low technology level of the cattle production systems in the Region [9] have being pointed out as the main reasons for the mismatch. In 2005 it was estimated that around 40% of the cultivated pasture area in the Western Brazilian Amazon was in moderate to advanced stages of degradation and 21% was in the initial stage of degradation [14]. We believe that this estimate is also valid for the rest of the Legal Brazilian Amazon. It is in fact a national problem. In 2006 Brazil had 172 million hectares of cultivated and native pastures [7]. Most of these pastures countywide are managed extensively with animals harvesting only up to 30% of the forage produced.

Increasing demand of beef and milk as a result of the improvement of income and living conditions of the population in the developing countries in Asia, Latin America and Africa in the next decades will most likely generate strong incentives to increase cattle production in the tropics. In Brazil, and particularly in the Legal Brazilian Amazon where deforestation is consistently dropping, the increase in beef and milk production will have to result mainly from the intensification of cattle production systems through technology innovation for reclamation of degraded areas.

The main technological innovations recommended by Embrapa for intensification of cattle productions systems in the deforested areas of Amazon and Cerrado biomes in Brazil are: i) improved forage grass and legumes species adapted to different environmental conditions to reclaim degraded areas with more productive and higher quality pastures; ii)

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mechanical and manual methods for reclamation of degraded pastures; iii) intensive pasture management methods with rotational grazing associated with use of electric fences; iv) improving animal breeding, nutrition and heath; and v) integrating agriculture, cattle and forest plantation in agroforestry and silvopasture production systems. These innovations can be adopted by small, medium and large farmers across the states of Acre, Amapá, Amazonas, Mato Grosso, Maranhão, Pará, Rondônia, Roraima and Tocantins and would allow farmers to increase the cattle herd by 104 million animal units without any additional deforestation in the Legal Brazilian Amazon.

The introduction of technological innovations in the cattle production systems will result in higher animal and land productivity and will allow providing the market and consumers with products with certification of origin (e.g. no deforestation footprint) and quality (e.g. improved genetics and raising conditions). This should contribute to a better access to markets with higher quality standards and premium prices for certified products, thus increasing profitability in the production chain and making farmers more committed to complying with environmental and social national and international guidelines of sustainable production.

These systems will also provide highly significant environmental benefits from the local to global scales. Adoption of higher quality pastures species and improved pasture management result more nutritive and digestible forage and will provide higher animal gains, thus resulting in lower methane emission per kilogram of product sold in the market [15]. Also, well managed grass-legume pastures do not use chemical nitrogen fertilizers (avoiding N_2O emissions), enhance nutrient cycling (avoiding pasture degradation) and increase the content of organic matter and carbon stocks in the soil, improving the lifecycle of greenhouse gases in the system.

The investment in technological innovations, considering all the existing diversity of climate and soils, is a fundamental issue to make intensification possible. Costs for turning a degraded area into a productive pasture range from US$ 150.00 to US$ 600.00/hectare depending on the level of soil degradation, the species of weeds and the method of reclamation recommended [16]. The cultivated pasture area in the Legal Brazilian Amazon in 2006 was around 42 million hectares [17]. Thus, our estimated cost for the reclamation of all the degraded area of cultivated pastures in the region is around US$ 8.4 billion.

In order to promote intensification, policies aimed at increasing regulation of land tenure, improvement of transportation and energy infrastructure, adequate credit for acquisition of agricultural machinery, implements, and farm inputs to reclaim degrade pasture areas will be needed. Also increasing support for qualified extension services will be a key factor to provide small and medium farmers access to these technologies in order to promote a wide process of transition from the extensive production systems towards intensive and sustainable cattle production systems in the Legal Brazilian Amazon. It has to be noted that, simultaneously to systems intensification, deforestation command and control measures have to be in practice to avoid deforestation.

Further, it is essential the market differentiate and establishes premium prices for farmers producing in more efficient systems with improved use of natural and socioeconomic resources and higher quality meat and leather, and which comply with the environmental and social guidelines in terms of protecting the natural resources and providing adequate payment and good living conditions for their workers.

Finally, there is a growing opportunity for cattle ranchers to benefit from sustainable forest management of the legal reserve areas of their properties (50-80% of the total area must be maintained with the native vegetation in the Amazon biome) to produce certified wood and non-wood products as well as to benefit from payments for production of environmental services (biodiversity, water, carbon stocks among others).

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