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Agricultural Production and Forest Preservation in the Brazilian Amazon

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Cornhusker Economics

Agricultural Production and Forest Preservation in the Brazilian Amazon

Market Report	Year Ago	4 Wks Ago	4-20-18
Livestock and Products, Weekly Average			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight.	*	126.00	*
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb.	*	185.82	188.49
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb.	149.00	145.41	145.71
Choice Boxed Beef, 600-750 lb. Carcass.	215.63	224.18	211.78
Western Corn Belt Base Hog Price Carcass, Negotiated	53.77	51.24	58.36
Pork Carcass Cutout, 185 lb. Carcass 51-52% Lean.	74.51	70.70	67.26
Slaughter Lambs, woolled and shorn, 135-165 lb. National.	157.27	146.46	149.52
National Carcass Lamb Cutout FOB.	359.09	379.20	373.54
Crops, Daily Spot Prices			
Wheat, No. 1, H.W. Imperial, bu.	2.70	3.97	4.30
Corn, No. 2, Yellow Columbus, bu.	3.24	3.44	3.57
Soybeans, No. 1, Yellow Columbus, bu.	8.73	9.38	9.42
Grain Sorghum, No.2, Yellow Dorchester, cwt.	5.11	5.61	5.81
Oats, No. 2, Heavy Minneapolis, Mn, bu.	2.82	2.59	2.72
Feed			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton.	125.00	*	*
Alfalfa, Large Rounds, Good Platte Valley, ton.	67.50	97.50	*
Grass Hay, Large Rounds, Good Nebraska, ton.	65.00	92.50	87.50
Dried Distillers Grains, 10% Moisture Nebraska Average.	103.25	151.00	170.00
Wet Distillers Grains, 65-70% Moisture Nebraska Average.	41.00	50.25	55.00
* No Market			

Brazil has become a strong competitor in world soybean production. In 2014, Brazil produced 28% of the world's soybeans, while the United States produced 34%. Brazil increased its production sharply during the 1990s and 2000s, partly due to the expansion into the Amazon forest region. Soybean was one of the main commodities that led to this expansion. In 2016, the Legal Amazon region produced 33% of the Brazilian soybean production compared to 15% in 1990 (Figure 1).

From 1990 to 2009¹, the northward expansion of agriculture resulted in deforestation of an area almost two times the size of the state of Nebraska, around 130 thousand square miles. The destruction of the forest resulted in average emissions of 750 million tons of CO₂ per year², attracting attention as a significant contributor to greenhouse gases and thus to the climate change we are experiencing.

Since 2005, the Brazilian government has been implementing policies that have led to a decrease in deforestation rates. In spite of that, deforestation rates are still at a dangerous level. In 2016, 3,047 square miles were cut in this region. A further reduction in deforestation and related CO₂ emissions would benefit the entire world, but Brazilian farmers would have to forego the benefits they obtain from production on newly deforested acres. Our research has studied the amount of this income foregone.

¹This information is available at <http://www.obt.inpe.br/prodes/dashboard/prodes-rates.html#>.

²This information is available at http://www.inpe.br/noticias/arquivos/pdf/Emissoes_CO2_2009.pdf.

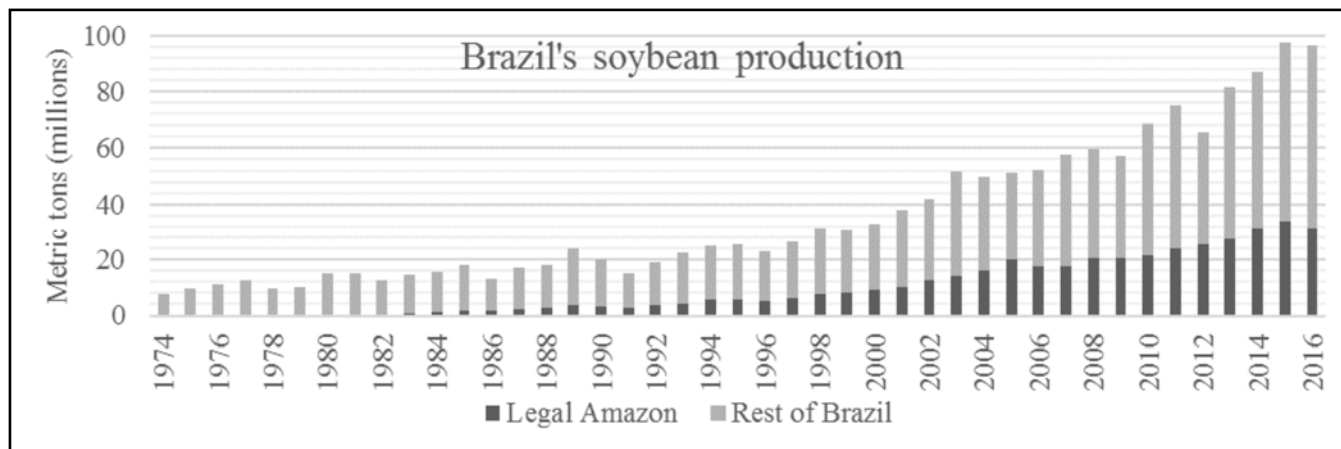


Figure 1. Brazilian soybean production, 1974 to 2016.

Source: Brazilian Institute of Geography and Statistics (available at www.sidra.ibge.gov.br).

The results of our study are reported in “Tradeoff between agriculture and forest preservation in the Brazilian Amazon”³. This research identifies the agricultural income foregone as a result of preserving one hectare of forest rather than converting it to agriculture. We found that on average across the region, \$796.81/hectare (\$323/acre) in agricultural income would have to be given up every year to keep one hectare preserved in forest. This agricultural income foregone translates to about \$16.42 per ton of CO₂ that would remain sequestered in the forest rather than released into the atmosphere. These cost estimates vary across the Amazon (Figure 2), and are highest in the state of Mato Grosso, located at the southern portion of the region. This highly productive state produced 27% of Brazilian soybeans in 2016, and was also responsible for 34% of Legal Amazon deforestation from 1990 to 2016.

Could agricultural innovations help to decrease deforestation in this region?

This study reports that agricultural innovations have led to an ability to increase total agricultural production at the rate of 4.9% a year, with no additional inputs, while simultaneously decreasing deforestation at the same rate. There are three implications. First, these innovations contributed to forest preservation. Second, by boosting agricultural productivity these innovations are also increasing the opportunity cost to preserve the forest, since more agricultural production must be foregone. Third, this rate of productivity gain will mean that Brazil's competitiveness as a soybean producer will continue to grow. Soybean yields almost doubled between 1990 and 2015, from 26 bu/ac to 45 bu/ac, while in the US yield increased from 34 to 48 bu/ac.

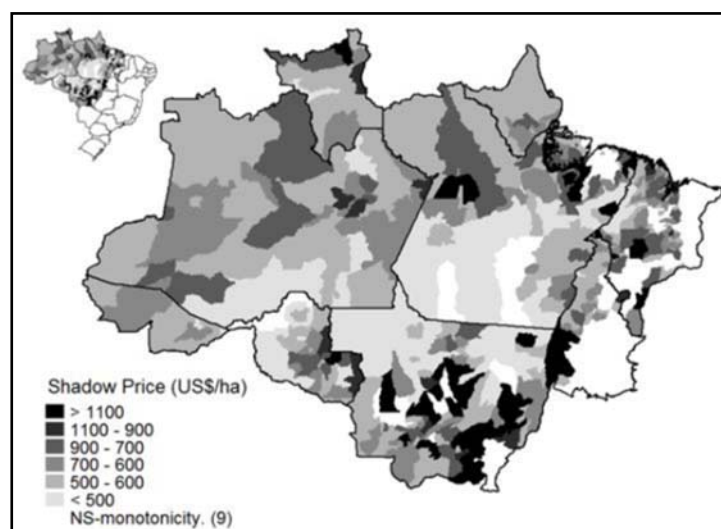


Figure 2. Estimated income foregone (\$/ha) to preserve a hectare of Amazon forest in the Legal Amazon of Brazil, 2006.

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³Details of this research are reported in "Tradeoff between agriculture and forest preservation in the Brazilian Amazon", at <http://www.locus.ufv.br/handle/123456789/10580>.