



American Soybean Association

Soybean Fundamentals & Economics



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Soy Biodiesel & ILUC

- Soy production is driven by the meal market.
- U.S. biodiesel production does not drive land use change.
- There is an inverse relationship between U.S. biodiesel production and Brazilian soy area.
- No evidence that U.S. biodiesel production causes land use change.

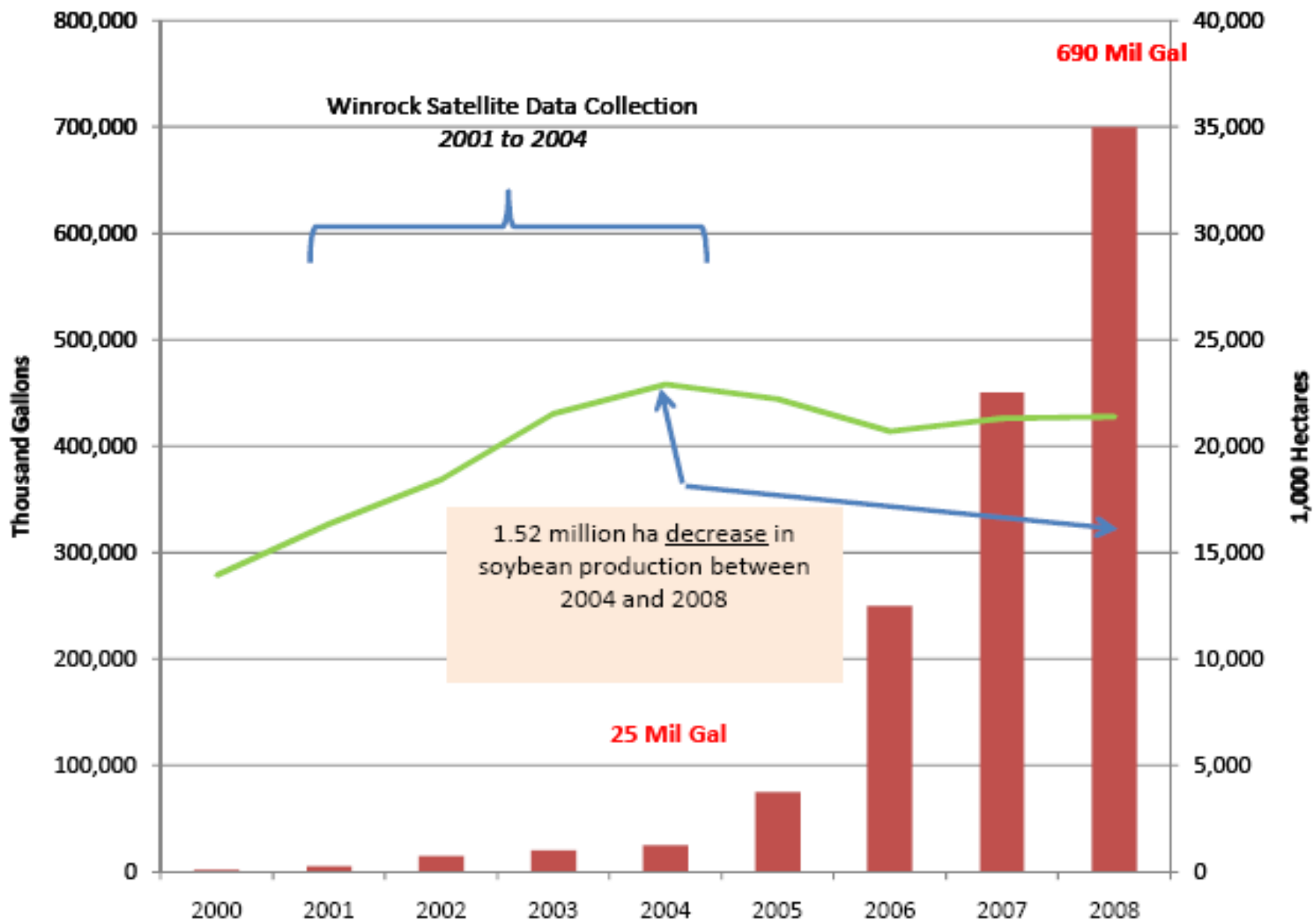


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Brazil Soy Area

- EPA imposes a large indirect emissions penalty on U.S soy biodiesel from land use change that would occur in Brazil.
- We see no evidence that U.S. biodiesel production causes land use change in Brazil . The opposite has been true.
- Brazilian soy area increased from 1998-2004, when there was little U.S. biodiesel produced.
- From 2005-2008, U.S. biodiesel increased from 25-700 million gallons, and Brazil soy area *decreased*.

Brazilian Soybean Acreage



Source: USDA Foreign Agricultural Service PSD online database and National Biodiesel Board

■ U.S. Biodiesel Production (thousand gallons)

— Brazilian Soybean Acreage (1,000 ha)



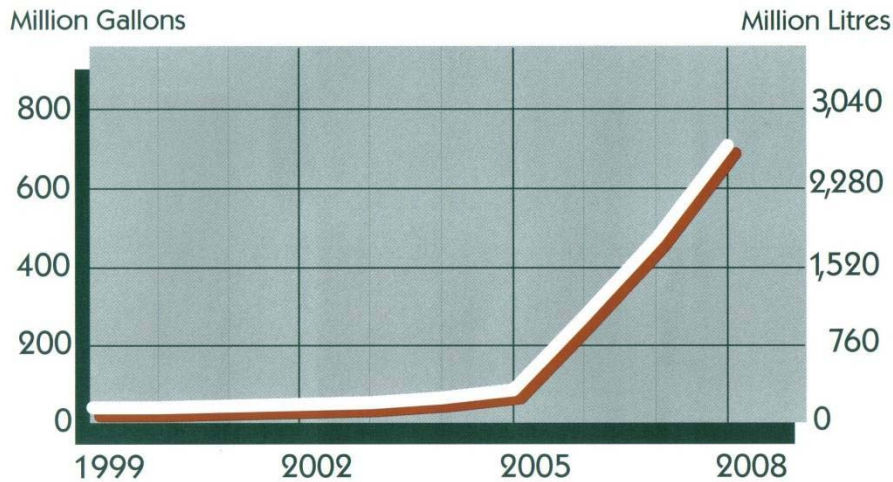
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Exports

- Even as U.S. biodiesel production has increased, soybean exports have continued upward trend.
- Record U.S. soybean exports in 2006 and again in 2008, when U.S. biodiesel production reached nearly 700 million gallons.
- Demand in China is a major driver, representing half of U.S. soybean exports (and growing).

Exports

U.S. Biodiesel Consumption 1999-2008

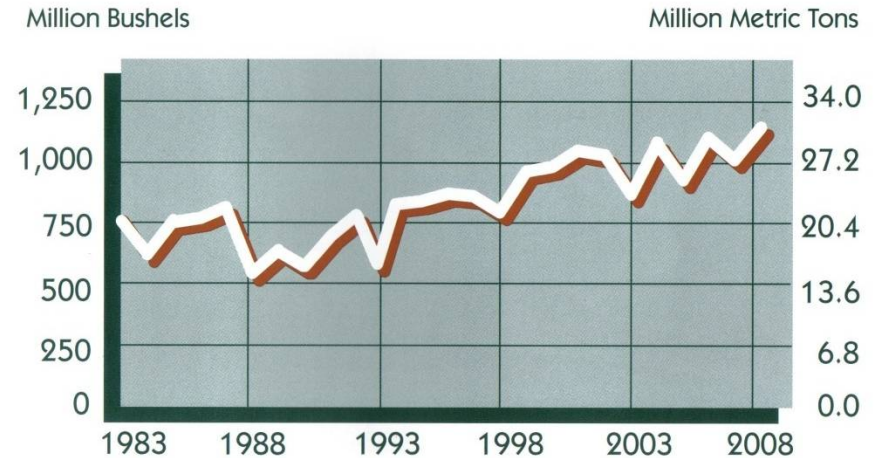


Million Gallons (Liters)

1999	0.5	(1.9)
2000	2.0	(7.6)
2001	5.0	(19.0)
2002	15.0	(57.0)
2003	20.0	(76.0)
2004	25.0	(95.0)
2005	75.0	(285.0)
2006	250.0	(946.4)
2007	450.0	(1,713.4)
2008	690.0	(2,612.0)

Calendar Years

U.S. Soybean Exports 1983-2008



Million Bushels (Million Metric Tons)

1983	743 (20.22)	1992	770 (20.96)	2001	1,063 (28.92)
1984	598 (16.28)	1993	589 (16.03)	2002	1,045 (28.44)
1985	740 (20.14)	1994	838 (22.81)	2003	880 (23.95)
1986	757 (20.60)	1995	851 (23.16)	2004	1,097 (29.86)
1987	802 (21.83)	1996	882 (24.00)	2005	940 (25.59)
1988	527 (14.34)	1997	872 (23.76)	2006	1,118 (30.43)
1989	623 (16.96)	1998	805 (21.91)	2007	1,025 (27.90)
1990	557 (15.16)	1999	975 (26.54)	2008	1,161 (31.60)
1991	684 (18.62)	2000	996 (27.10)		

Flawed N₂O Value

- EPA miscalculates N₂O emissions for soybean production. Correcting this adds 21% to soy biodiesel score.
- Domestic GHG emissions are overstated due to FASOM's incorrect treatment of nitrogen fixing crops. FASOM model not updated with latest guidance from IPCC (which EPA states is methodology being followed).
- *Domestic Agriculture GHG Emission Changes by Scenario, 2022* overstated fertilizer application/soil N₂O emissions for soybean production. It shows an increase in CO₂ emissions by 654,440 tonnes.
- The accurate calculation should show a **decrease** in CO₂ emissions by - 244,560 tonnes. A difference of 899,000 tons per year. Equates to 20.9%.



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N₂O Value

- Soybean production only uses a small quantity of nitrogen so most of the N₂O emissions result from nitrogen fixation and the decomposition of crop residues. IPCC updated N₂O values in their 2006 Guidelines.
- Unlike the emissions estimated by FASOM model, the international N₂O emissions have been calculated manually using the IPCC guidelines. In this case there are no emissions calculated for nitrogen fixing crops, other than those related to fertilizer application and crop residues. This is further evidence of the error in the FASOM estimates for soybean production.



Biodiesel Production

- A bushel yields about 11 lbs of soy oil.
- About 7.5 lbs of oil to produce a gallon of biodiesel.
- One acre of soybeans produces 60-65 gallons of biodiesel.



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U.S. Soybean Yields

- 75 million acres, 40 bu/acre; 20.6 billion lbs of soy oil in '08.
- Yield increased from 28 to 40 bu/acre over past 25 years.
- Seed technology companies project yields to double by 2030.
- RR2 and Liberty Link could provide 10% increase in near term.
- At modest, historical average, we'll see 6 bu/acre increase by 2022. Potentially 600 million gallons of additional biodiesel.
- Yield increases and other feedstocks provide numerous pathways to produce 1 billion gallons of biomass-based diesel without land use change.



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Conclusion

- Past increases in U.S. biodiesel have not caused ILUC.
- Flawed N₂O values for soy production
- Soy economics, yield increases, and other feedstocks will prevent future ILUC occurring as a result of U.S. biodiesel demand.