

# **AIR Work on GTAP and other Thoughts**

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January 26, 2009

# GTAP Work

- Obtained model in October
  - Version used for October ARB workshop (GTAPBIO-AEZ)
  - DG land use credit ~ 33%
- Areas
  - Duplicated the ARB results
  - Yields (mainly coarse grain)
  - Coproducts
- Three concerns right away
  - Results were locked in 2001 (without exogenous yield improvement)
  - Yield improvements looked low (2-3%)
  - DG land use credits looked low

# Yields

- Initial AIR GTAP simulations using price-yield elasticity function to increase yields between 2001 and 2015
- But this ignored non-ethanol related demand increases in US and ROW
- $LUC = f(\Delta \text{yield}, \Delta \text{demand})_{US, ROW}$
- Informa Economics
  - US:  $\Delta \text{Yield} > \Delta \text{ non-ethanol related demand}$
  - ROW:  $\Delta \text{Yield} < \Delta \text{ demand}$  ,  $\text{Yield}_{ROW} \ll \text{Yield}_{US}$
- Purdue method of externally correcting for exogenous yield improvements assumes yields and demand are balanced
- Conclusion: cannot have confidence in GTAP results w/o adequate baseline to 2015 taking into account demand and yield changes in US and ROW

## Distillers Grains Land Use Credits (Study by Argonne)

<b>Table 1 Major Components of Corn DDGs</b>		
Item	Corn grain	DDGs
Dry matter (%)	85.5	89.3
Crude protein (%)	8.3	30.8
Fat (%)	3.9	11.1

DGs much higher in protein and fat than corn grain

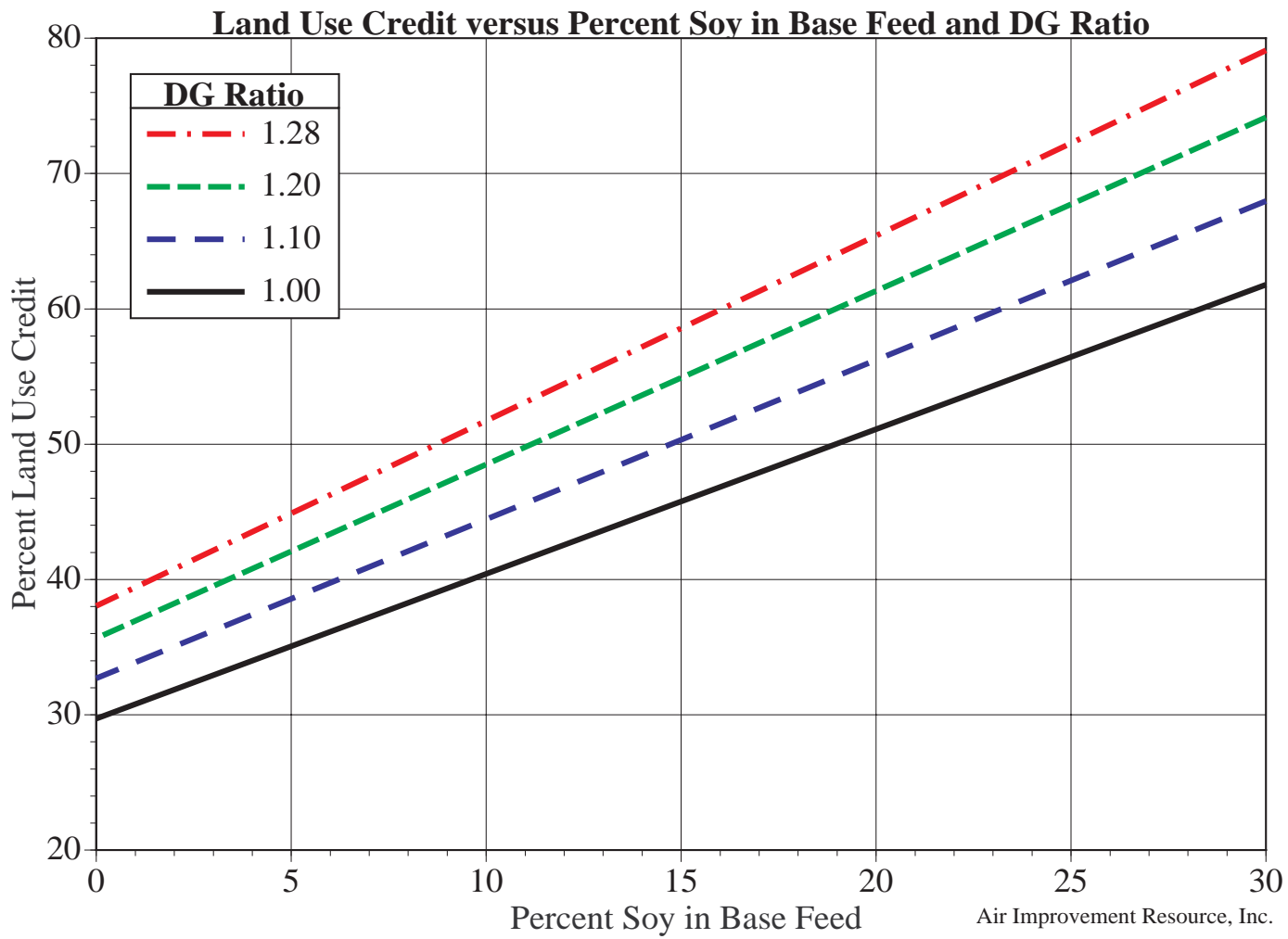
# DG Land Use Credits

Table 2 Displacement Ratios by Type of Component Type (kg of DGs)			
Parameter	Beef Cattle	Dairy Cattle	Swine
Concentrate	1.196	0.731	0.80
SBM	-	0.633	0.095
Urea	0.056	-	-

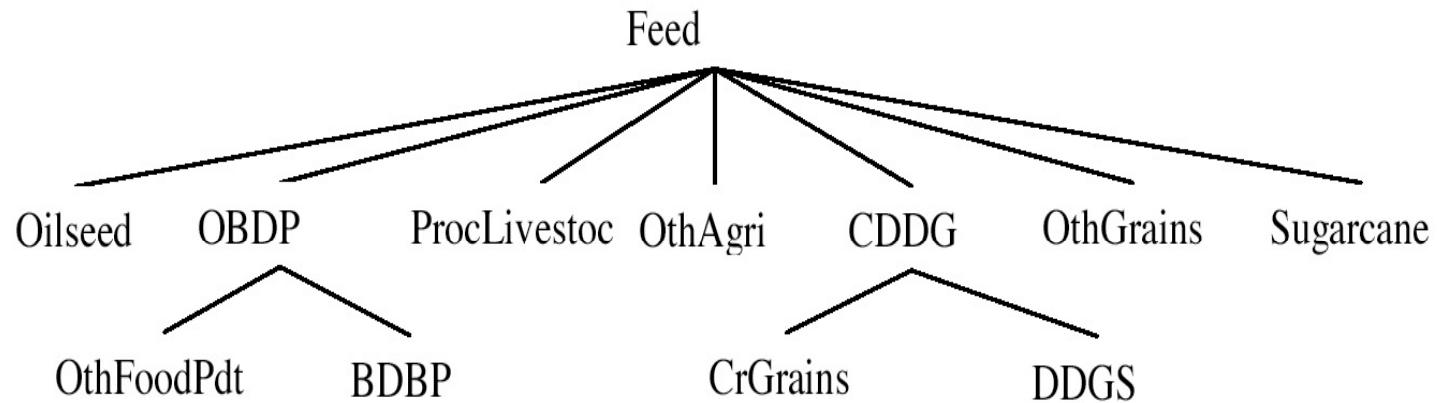
DGs displace a significant amount of SBM in dairy and swine

# DG Land Use Credit Equation and Inputs

- 1 acre produces 151 bu of corn, 393 gal of ethanol and 2512 lbs of DGs
- The 2512 lbs of DGs replace 3216 lbs of feed ( $1.28 * 2512$ )
- 3216 lbs of feed is divided into 2444 lbs of corn meal, 772 lbs of SBM
  - Argonne 24%/76% SBM/Corn split, wtd over beef, milk, and swine
- This requires 0.29 acres for corn, 0.41 acres of SBM, for total of 0.70 acres
- Land use credit is function of mass replacement ratio and soybean fraction



# GTAP DG Credit Method



Have been attempting to modify GTAP so DDGs replace oilseeds as well as coarse grains

# Our Goal

- Get GTAP estimate everything
  - Revise DG credits
  - Incorporate exogenous yield improvements in closure rather than externally
  - Hold U.S. exports constant
  - Increase crop production with projected demand in U.S., ROW