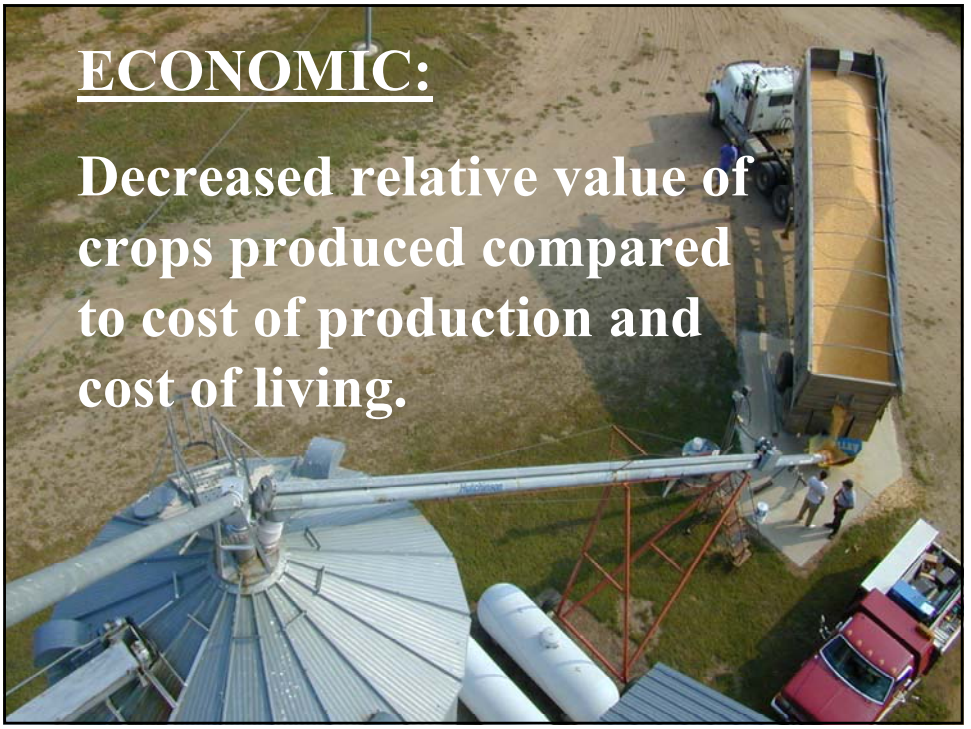

Virginia Tech
Virginia's Land Grant
University

Major Forces Affecting Crop Production Systems

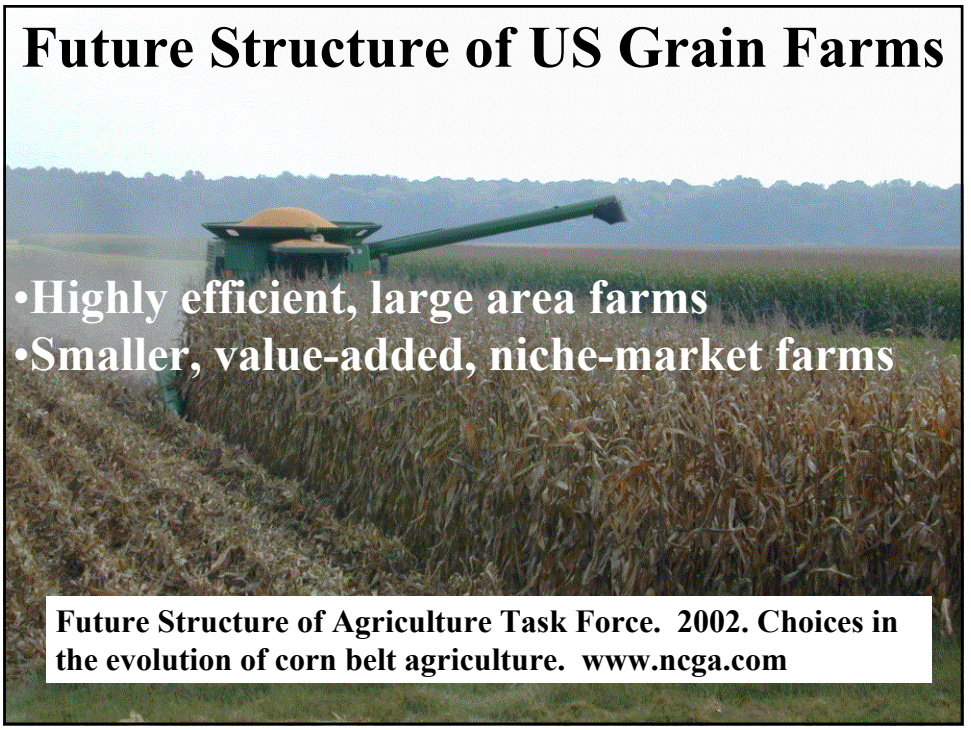
- Economic
- Environmental
- Technology
- Food Safety



ECONOMIC:

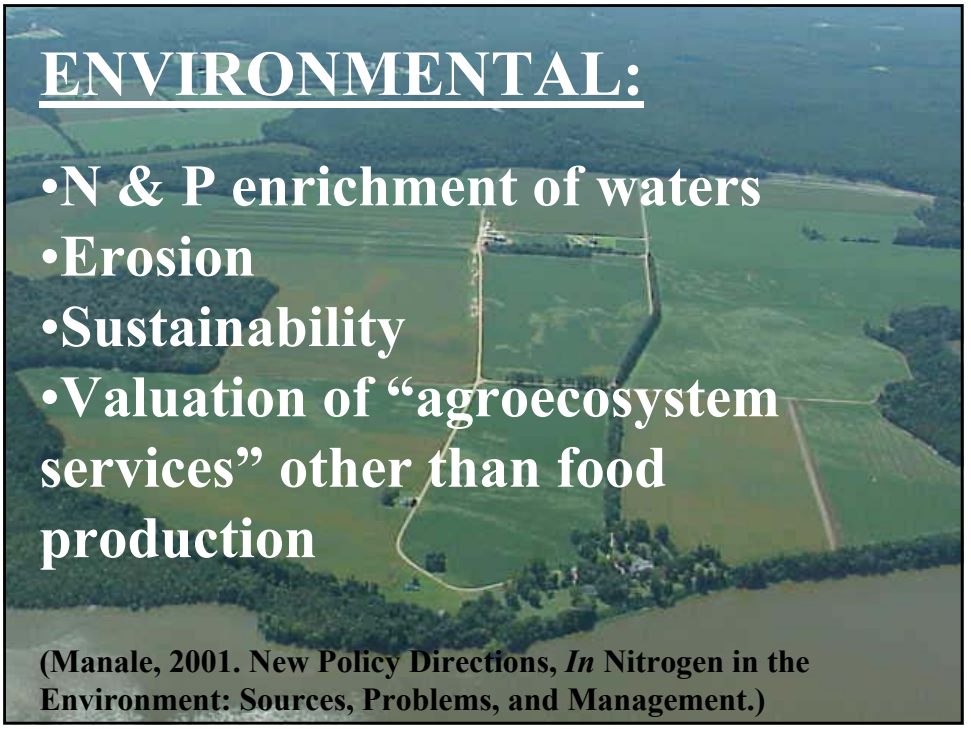
Decreased relative value of crops produced compared to cost of production and cost of living.

Future Structure of US Grain Farms



- Highly efficient, large area farms
- Smaller, value-added, niche-market farms

Future Structure of Agriculture Task Force. 2002. Choices in the evolution of corn belt agriculture. www.ncga.com



ENVIRONMENTAL:

- N & P enrichment of waters
- Erosion
- Sustainability
- Valuation of "agroecosystem services" other than food production

(Manale, 2001. New Policy Directions, *In* Nitrogen in the Environment: Sources, Problems, and Management.)

TECHNOLOGY:

- Increased efficiency
- Decreased environmental impact

YIELD BUILDING FACTORS:

- Genetics
- Plant Population
- Nutrition
- Moisture

NUTRITION

Fertilizer N provides protein basis for 40% of world population (Smil, 2001)

Economic and Environmental Forces: Total N Applications Applied Preplant?

Fertilizer Efficiency

•Timing of application

FERTILIZER EFFICIENCY

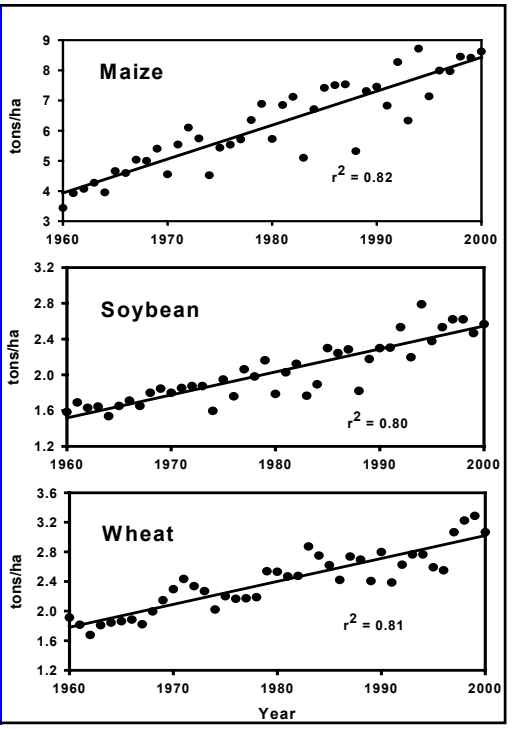
•Placement


Manure Nutrients
•Localized concentrations
•Significant environmental concern

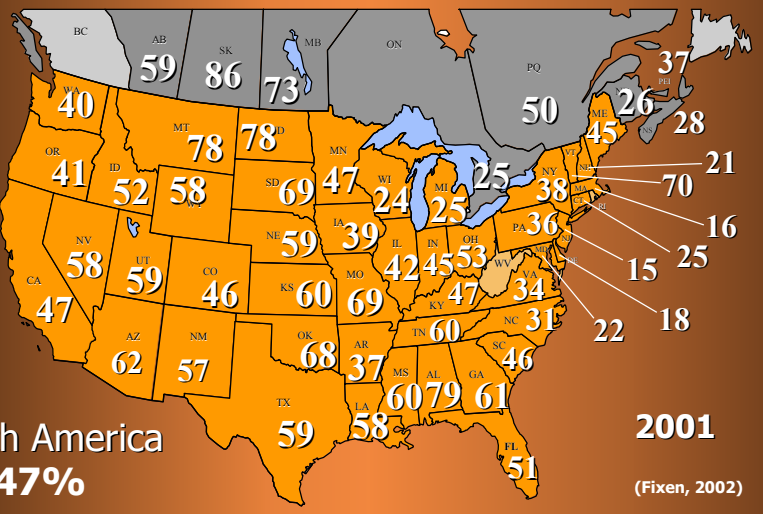

Nutrient Removal Exceeding Application On Many Soils
Fixen, P. E., 2002. Soil Test Levels in North America. Better Crops 86:12-15

United States Average Maize, Soybean, and Wheat Yields, 1960—2000*.

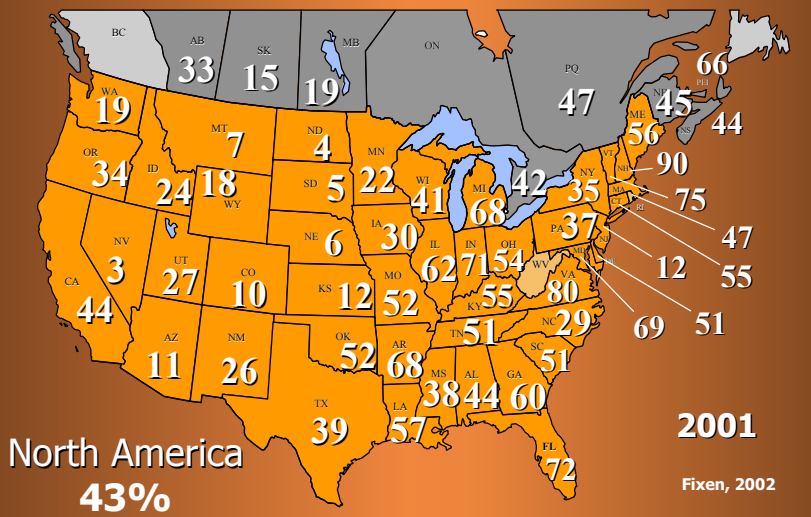
*National Agricultural Statistics Service, 2001.



Percent of soils testing medium or lower in P.



Percent of soils testing medium or lower in K.



Agronomic Systems of the Future

- More efficient
- Less adverse environmental impact
- Improve soil quality
- Optimal fertilization essential