

ERS Briefing

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Costs, Risks, and Returns In Different Agricultural Production Systems

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Agricultural Production Systems Differentiated by GE Use

□ Three Production Systems:

- **GE**
- **Organic**
- **Non-GE Conventional**

□ Topics Examined for Each System:

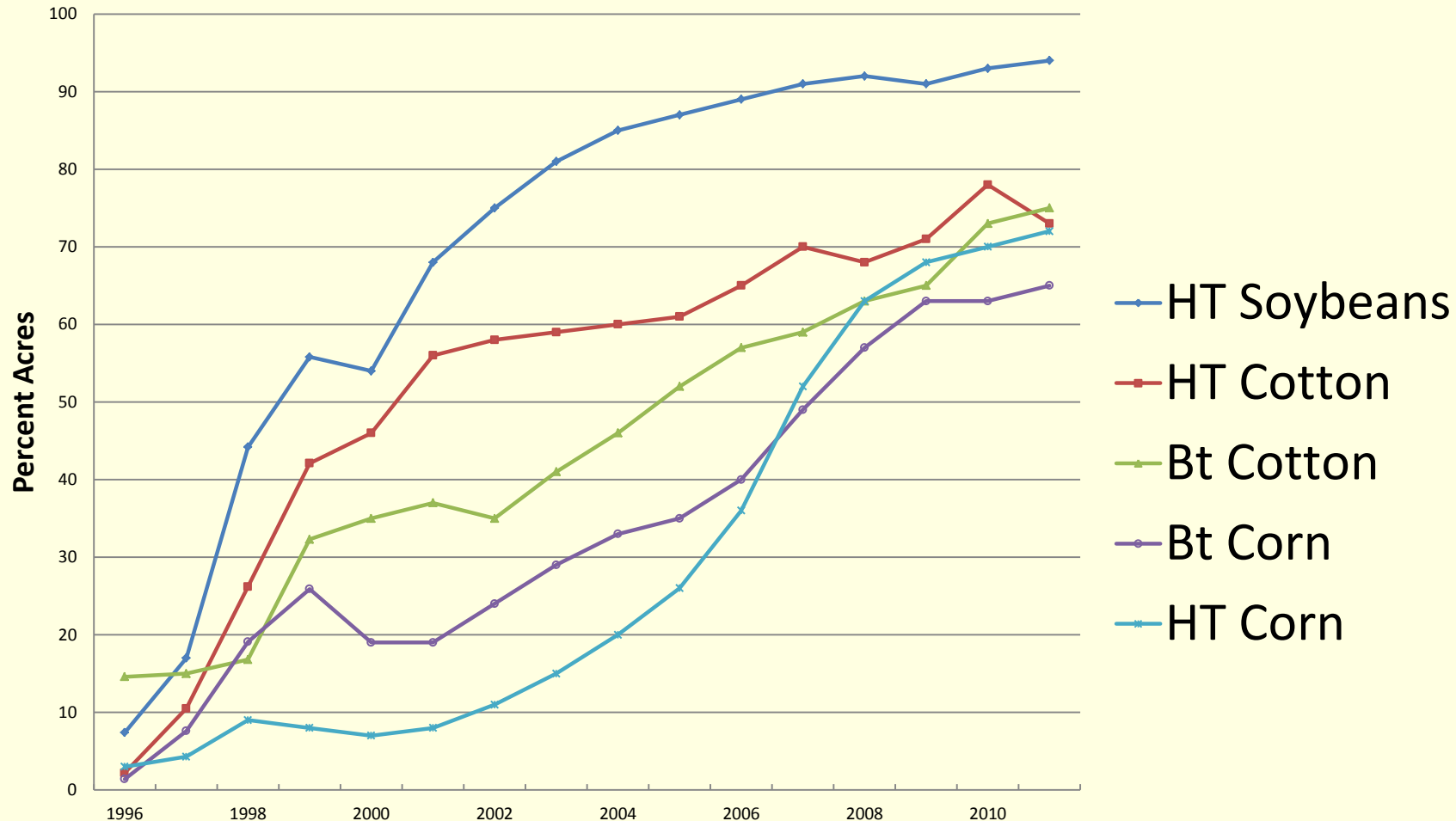
- **Production and Markets**
- **Farm-level Costs and Returns**
- **Producer Risks and Risk Management**

U.S. Crops with GE Traits

- ❑ **Main Crops and Traits:**
 - ❑ **Corn: Bt, HT and Stacked**
 - ❑ **Soybeans: HT**
 - ❑ **Cotton: Bt, HT and Stacked**

- ❑ **Other Crops and Traits include:**
 - ❑ **Canola, Sugar Beets, Alfalfa: HT**
 - ❑ **Papaya, Squash: Virus Resistant**

Most Corn, Soybean, Cotton Acres in the U.S. Planted with GE Seed



Sources: USDA/ERS.

Data for each group include varieties with both Bt and HT (stacked) traits.

Production of Organic Crops in the U.S.

- **National Organic Standard**

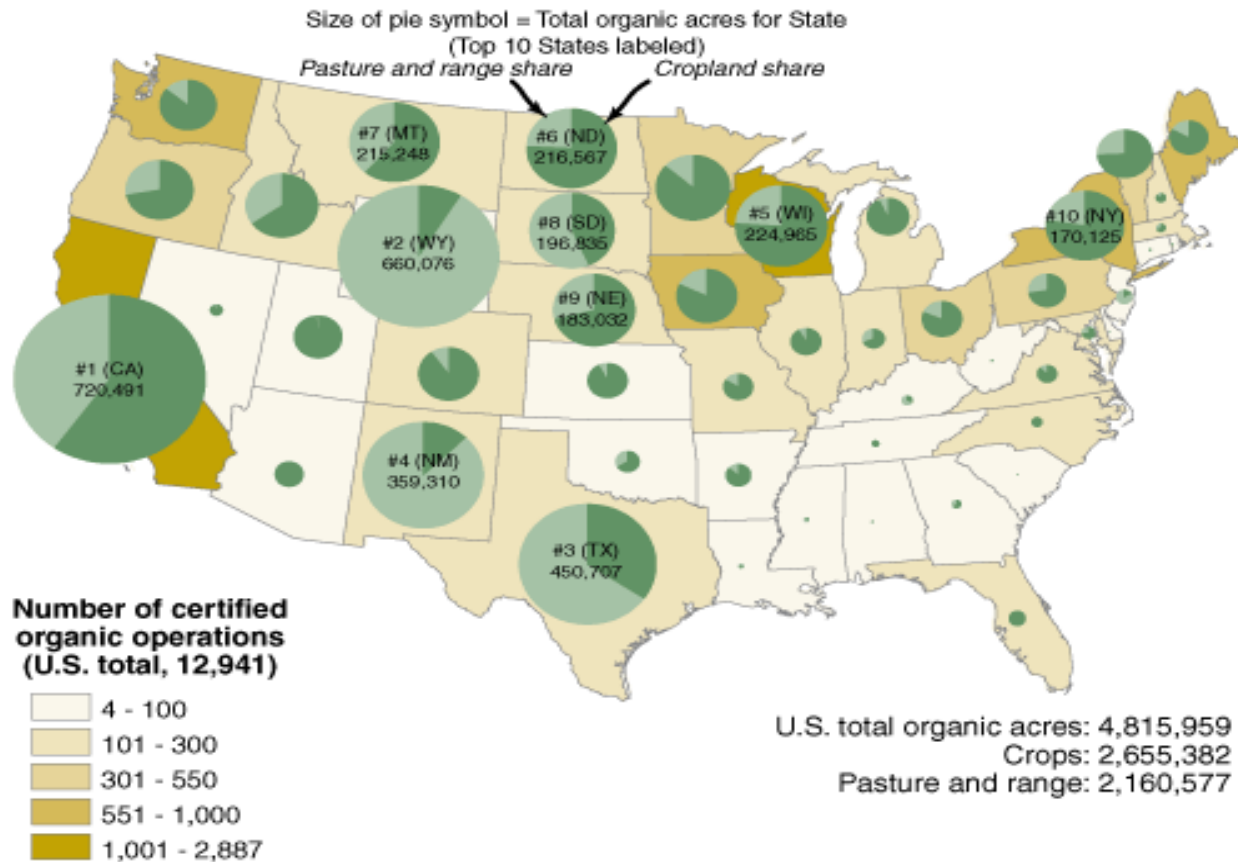
USDA published national standards in 2000



- **§ 205.2** “A production system... integrating cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity.”

U.S. Organic Acreage is Growing but Small—and Spread Across all States & Crops

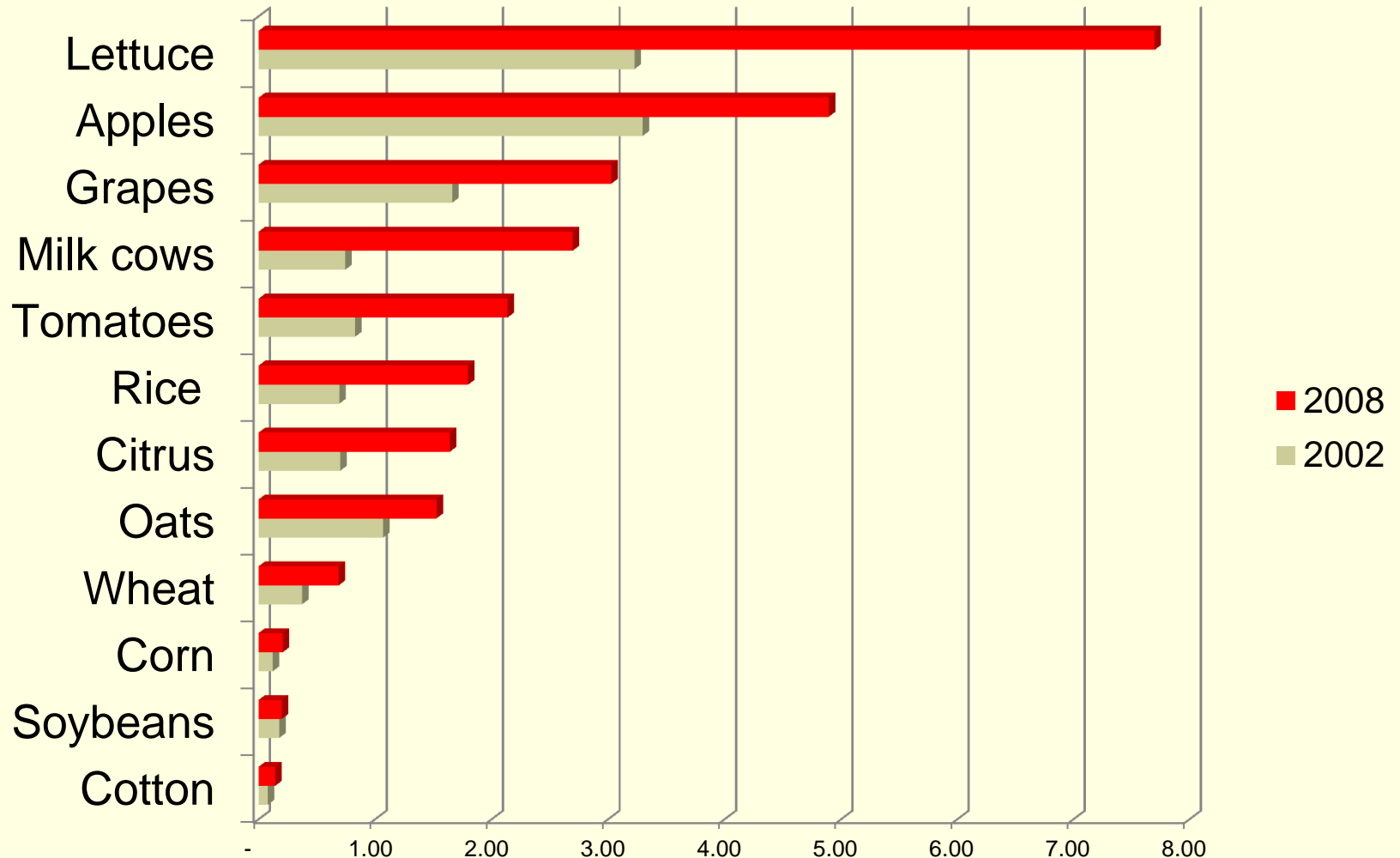
Organic operations accounted for less than 1 percent of total crop acreage in 2008



Source: USDA, Economic Research Service, based on information from USDA-accredited certifiers.

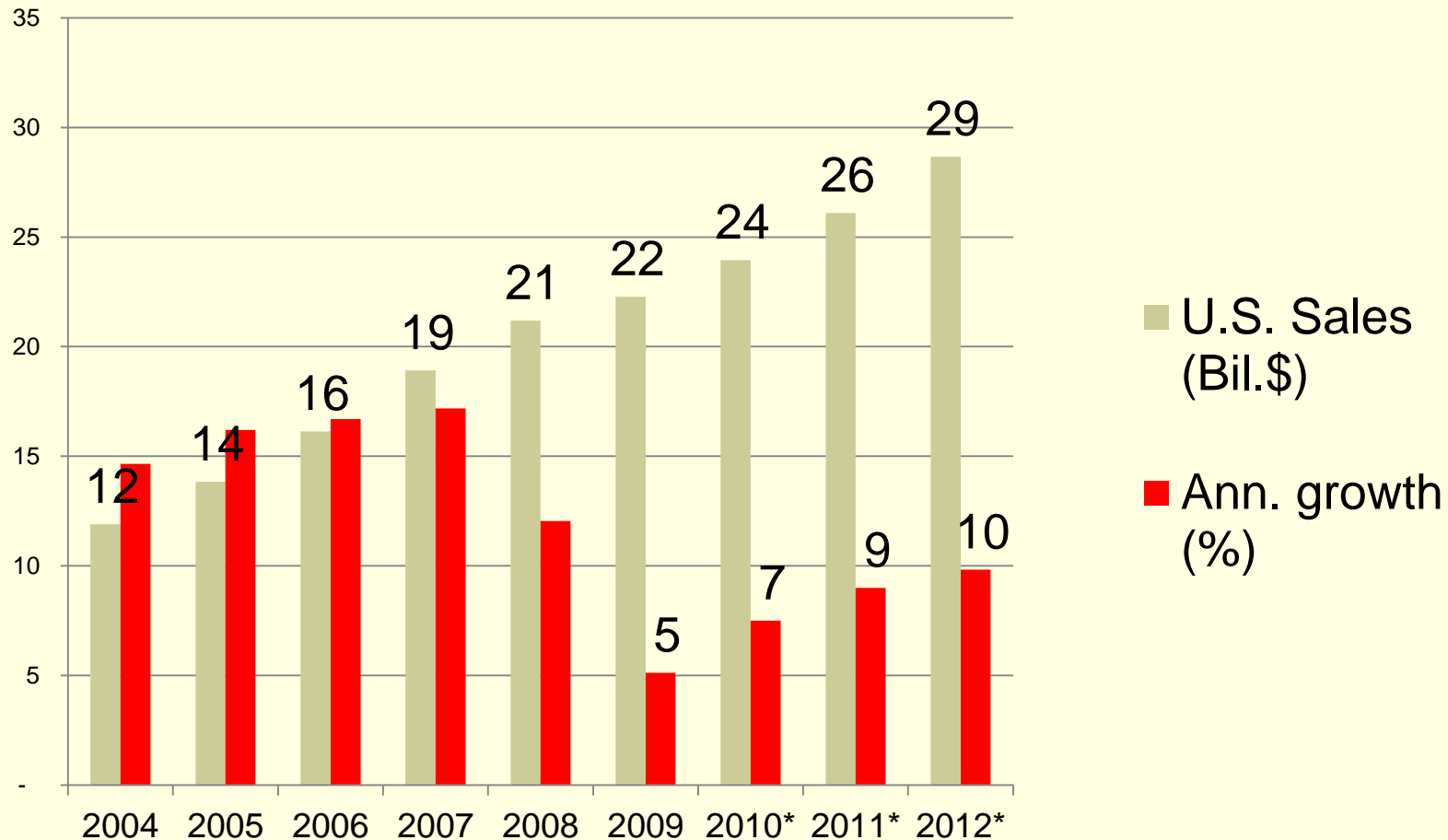
Organic Adoption Highest for Specialty Crops— Percent of total acres, 2002-08

(Source: USDA/ERS based on information from USDA-accredited certifiers)



Markets for Organic Products

U.S. Organic Food Sales, \$24B(2010)¹—Global, \$55B(2009)

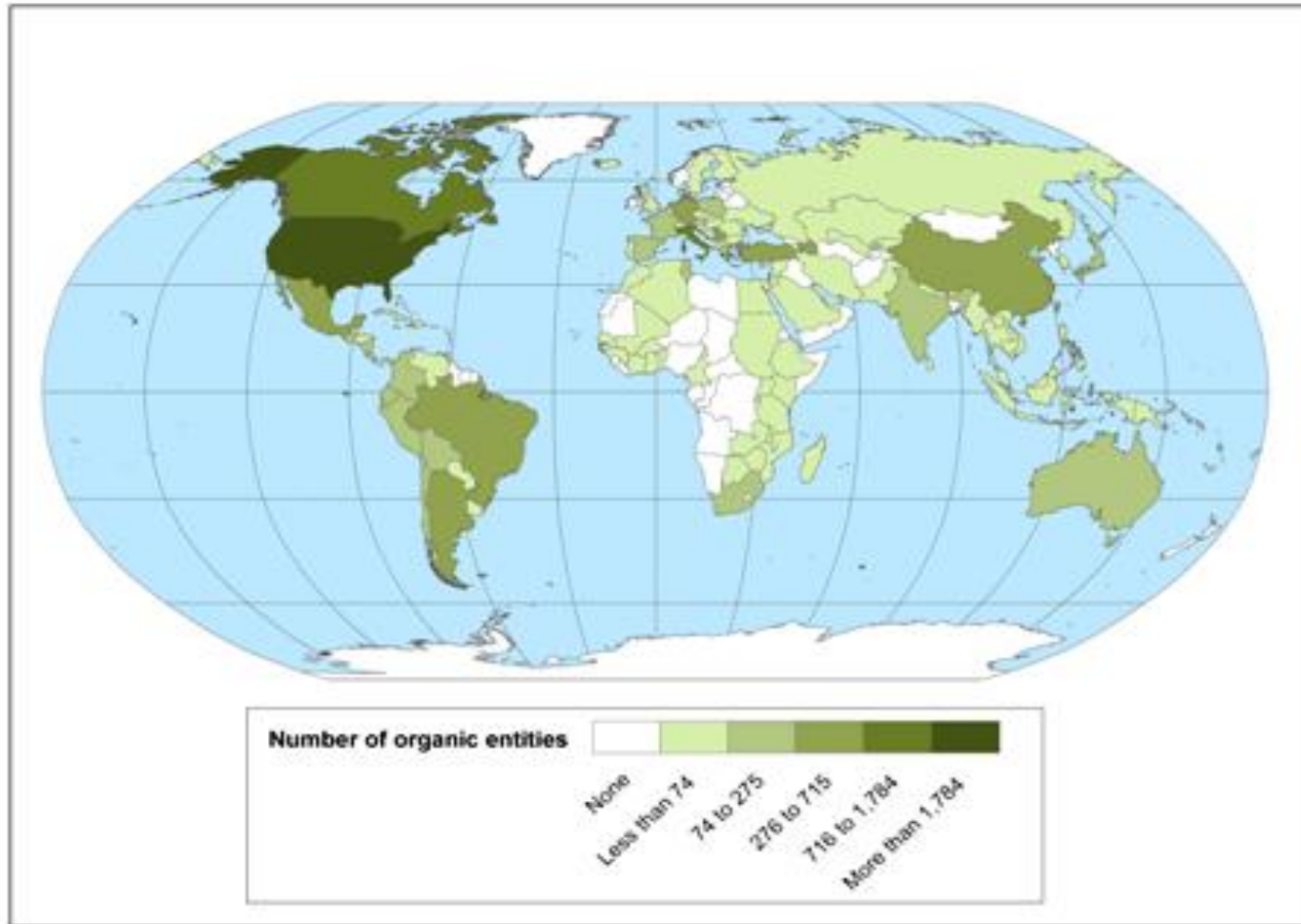


13.5% of total sales.*Estimated. Sources: U.S. Sales, *Nutrition Business Journal*; Global Sales, *The World of Organic Agriculture: Statistics & Emerging Trends 2011*

Organic Imports Help Meet U.S. Demand

In 2007, 27,000 operations certified to USDA organic standard

Source: ERS/USDA based on data from USDA NOP

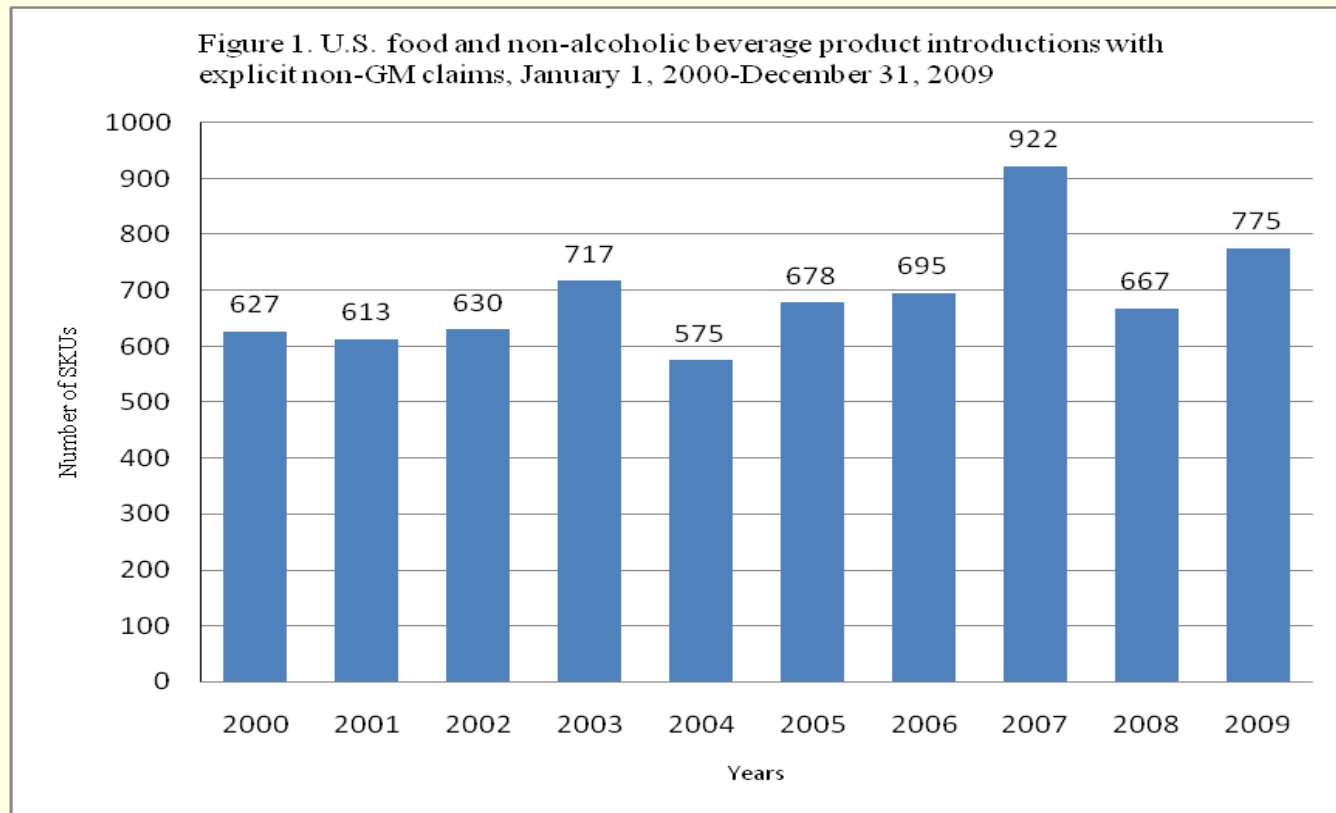


Production of Non-GE Crops in the U.S.

- ❑ The Federal government does not regulate production of non-GE crops in the U.S.
- ❑ Data on production of identity-preserved non-GE crops is limited.
- ❑ Non-GMO soybean futures have been posted on the Tokyo Grain Exchange since 2006. Some U.S. non-GE soybean production is for the Japanese market.

Markets for Non-GE Products

Product Introductions in the U.S., 2000-09¹



¹Between 2000 and 2009, 6,899 new food and (non-alcoholic) beverage products introduced in the U.S. with explicit non-GM labeling—3.9% of total. Source: DataMonitor.

Non-GE Product Verification Emerging

- Non-GMO Project



- Private non-GE standard, label and testing and compliance protocol.
- Widespread use since launch in 2008—over 2,000 products verified (including Whole Foods Market's private label products).
- Product testing and shipment rejection has become more common.

Costs and Returns—Organic and Conventional Systems

- ❑ U.S. estimates from NASS Agricultural Census
(All crops and livestock)
- ❑ U.S. enterprise estimates from ERS surveys
(Snapshot of major crops and livestock)
- ❑ Regional estimates from U.S. long-term trials
(Also measure physical & biological impacts)
- ❑ State estimates from ongoing producer panel
(Tracks performance over time)

Findings—2007 Agricultural Census and 2008 Organic Follow-on Survey

- ❑ **Average Sales**—Organic farms had average annual sales of \$217,675, higher than the average for U.S. farms overall.
- ❑ **Average Costs**—U.S. organic farms incurred production expenses totaling an average of \$171,978 per farm, higher than the average for all farms.
- ❑ **Average Sales Minus Costs**—higher for organic farms, but doesn't reflect profitability for particular farms and production sectors.

Findings—USDA Surveys of Organic and Conventional Producers

USDA's annual ARMS producer survey of major commodities includes organic samples—findings from the 2006 survey show:

- ❑ **U.S. organic soybean producers had lower yields and higher costs** than conventional.
- ❑ **Organic yields were lower** partly because **lower-yielding food grade varieties** were used by most organic producers.
- ❑ **Organic production was also more profitable**, mainly due to organic price premiums.

Findings from USDA's ARMS Survey— Soybean Prices and Yields by System

Findings from the 2006 ARMS survey (based on data from 117 organic and 1,425 conventional farms)

Harvested soy acres (per farm)

Conventional: 272

Organic: 117

Yield (bu/pl. ac.)

Conventional: 47 (mostly GE seed)

Organic: 31 (mostly food-grade seed)

Price (per planted bu)

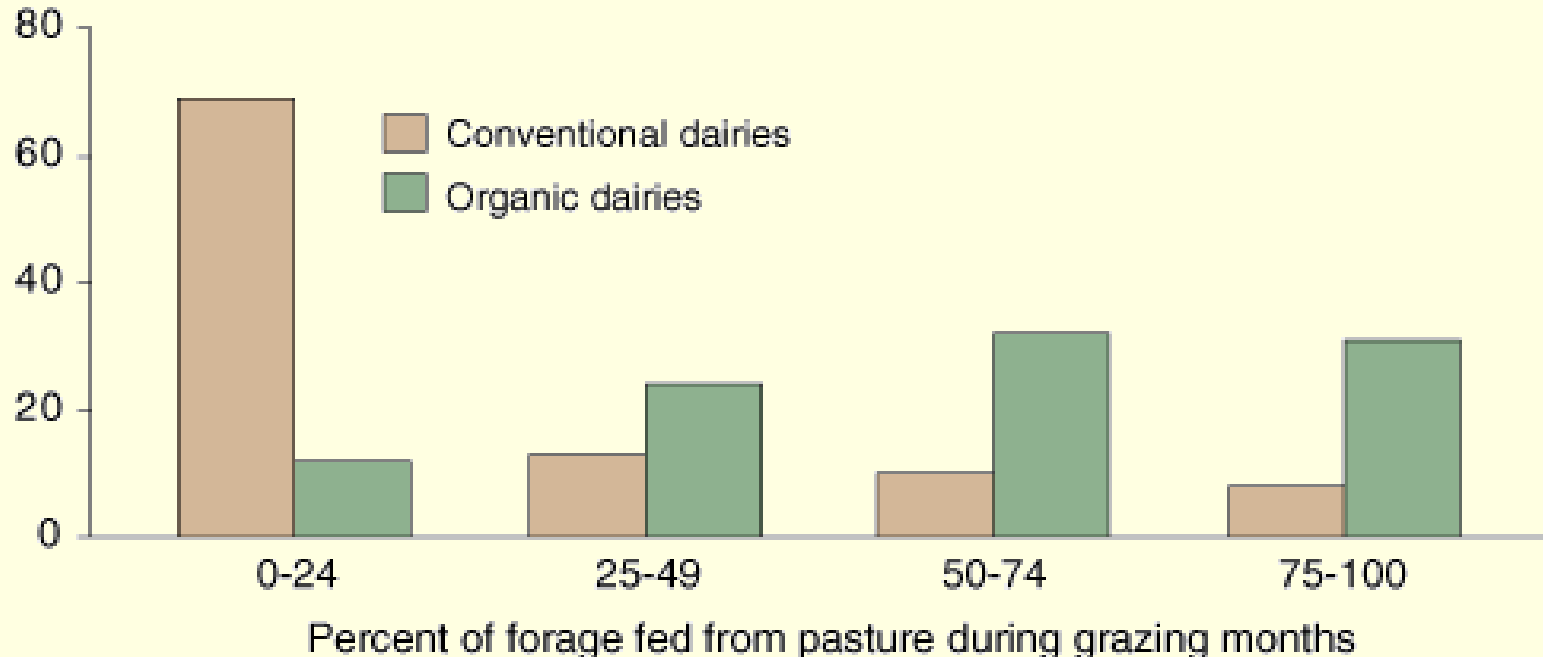
Conventional: \$ 5.48

Organic: \$14.64

Findings from USDA's ARMS Survey— Pasture Use in Organic and Conventional Dairies

Organic dairies used pasture for feed more than conventional dairies in 2005

Percent of farms



Source: USDA, Economic Research Service, using data from USDA's Agricultural Resource Management Survey, dairy version.

Findings—Long-term Organic Farming System Trials in the U.S.

- ❑ USDA Organic Farming Systems Research Conference, March 2011, Washington DC.— major objective to examine findings from trials.
- ❑ Research presented from long-term trials at eight universities and Rodale Institute.
- ❑ **Mixed Findings**—organic yields similar to conventional at ISU and Rodale but lower/mixed in others; organic often more profitable, especially with price premiums.

Findings—Minnesota's Farm Business Management Study

- ❑ Minnesota Department of Agriculture administers a Farm Business Management Study to track farm financial performance.
- ❑ Study examines financial performance—debt-to-asset ratios, liquidity, and debt repayment. Organic producers joined study in 2007.
- ❑ Conventional farms outperformed organic farms in 2009, a reversal from 2007 and 2008. Lower organic price premiums played a significant role in reversal.

Risks and Risk Management in GE Production

- ❑ Major risks to GE producers include the evolution of Bt and glyphosate resistance in insects and weeds.
- ❑ Refuge requirements and natural refuges have helped delay Bt resistance.
- ❑ For HT crops, use of multiple herbicides with different modes of action, increased tillage, and equipment cleaning might prove effective.

Risks and Risk Management in Organic and Non-GE Production

- ❑ ERS study (2005) found that organic producers consider adventitious presence of GE organisms a top production risk.
- ❑ Risks include:
 - ❑ Risks of product rejection
 - ❑ Loss of price premiums
 - ❑ Loss of premium domestic markets

Risk Management Strategies in Organic and Non-GE Production

- ❑ Top farm production strategies include use of buffer strips and delayed planting to minimize overlapping pollination periods.
- ❑ Some practices are used across the supply chain to minimize comingling (product segregation, cleaning equipment, etc).
- ❑ Additional production and handling costs are incurred to help prevent adventitious presence.

Use of Pest Management Practices in Corn (2010) and Soybean (2006) Production

ARMS survey findings (% planted acres):

	Use Buffer Strips	Adjust Planting/ Harvest Date
Soybeans:		
Organic	69	42
Conventional ¹	N/A	13
Corn:		
Organic	69	63
Conventional	5	14

¹Conventional includes GE and non-GE (excluding organic)

Risk Management Tools from USDA's Risk Management Agency

- ❑ The Agricultural Risk Production Act of 2000 recognized organic farming as “good farming practice” covered by federal crop insurance.
- ❑ RMA is working on improvements, but most organic producers still pay 5 percent surcharge and many are unable to obtain coverage that reflects organic price premiums.
- ❑ Beginning in 2008, RMA offered a premium rate reduction to corn producers in most states who plant major GE hybrids—pilot is set to expire at the end of 2011 crop year.

Conclusions

- ❑ **GE, organic, non-GE systems have intersected mainly in corn, soybean and cotton production.**
- ❑ **Adoption varies by system over the last decade—** GE production of these crops has increased rapidly and is now widespread in the U.S. Organic production of these crops has been limited and mostly stagnant in the U.S. despite strong consumer demand.
- ❑ **Production risks also vary by system—**GE risks include evolution of insect and weed resistance; organic/non-GE risks include product rejection, loss of price premiums, and loss of premium domestic markets.