The State of the U.S. Food System

Slides Assembled By: Ben Champion

K-State Director of Sustainability

Assistant Professor, Geography

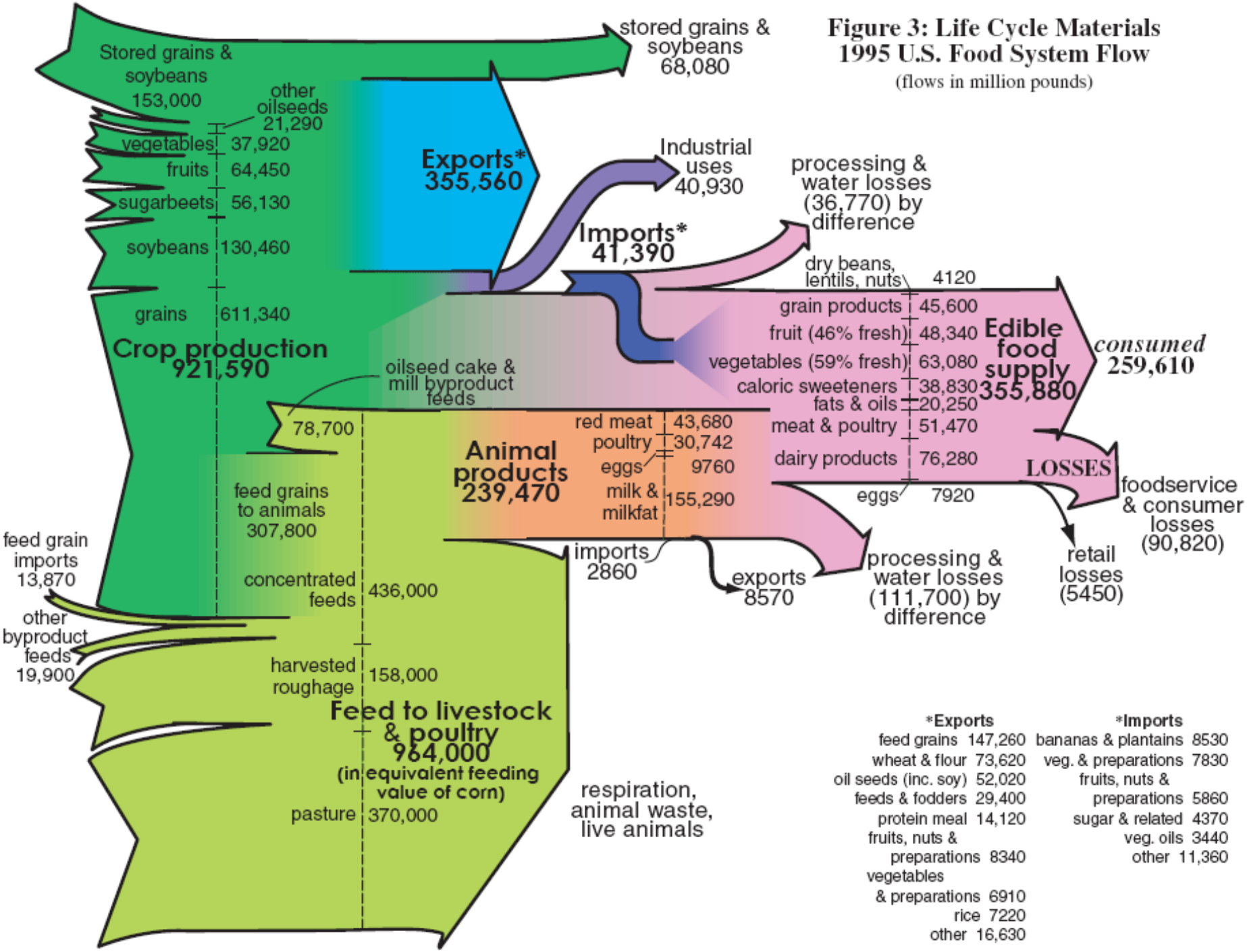
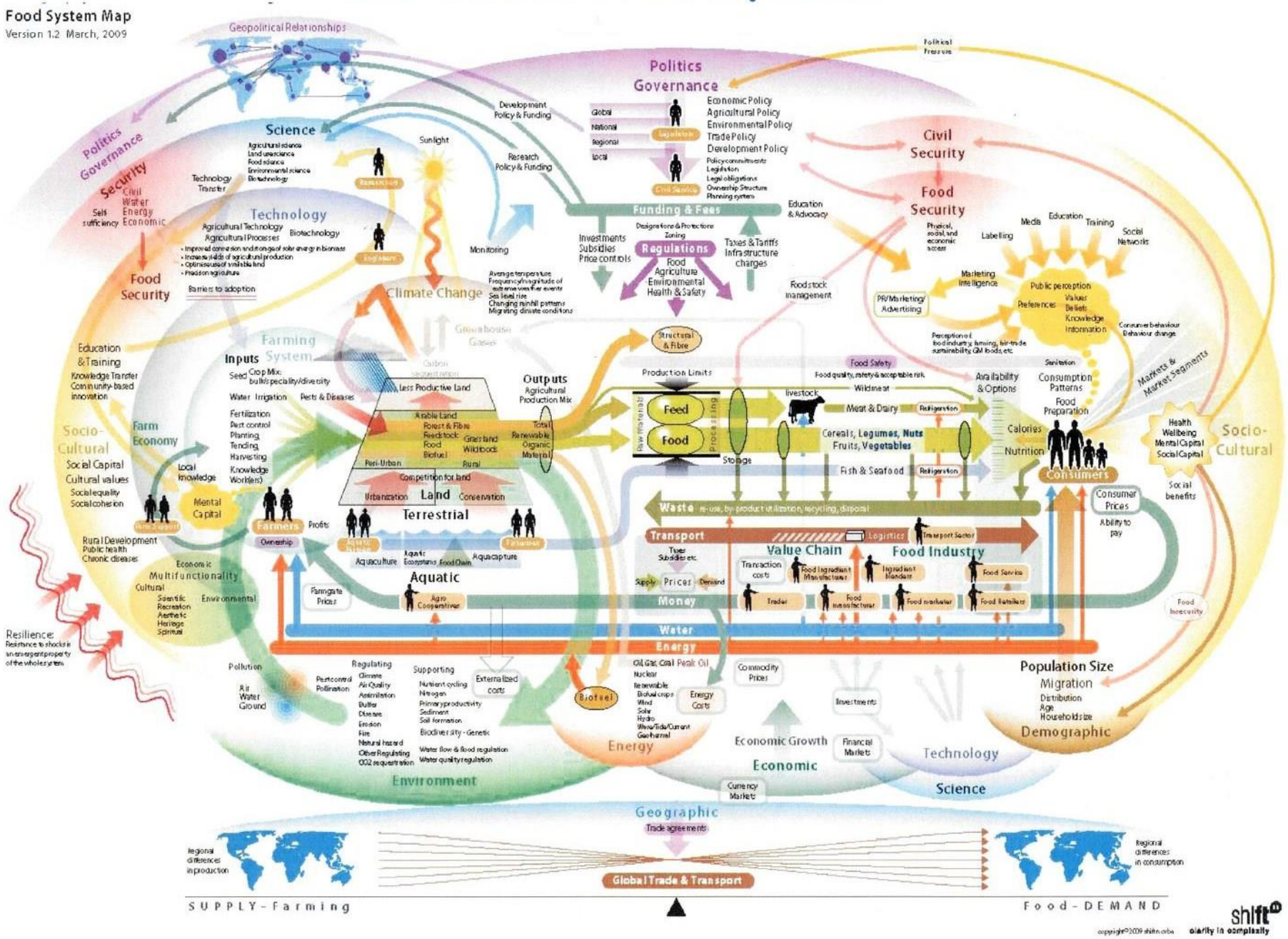
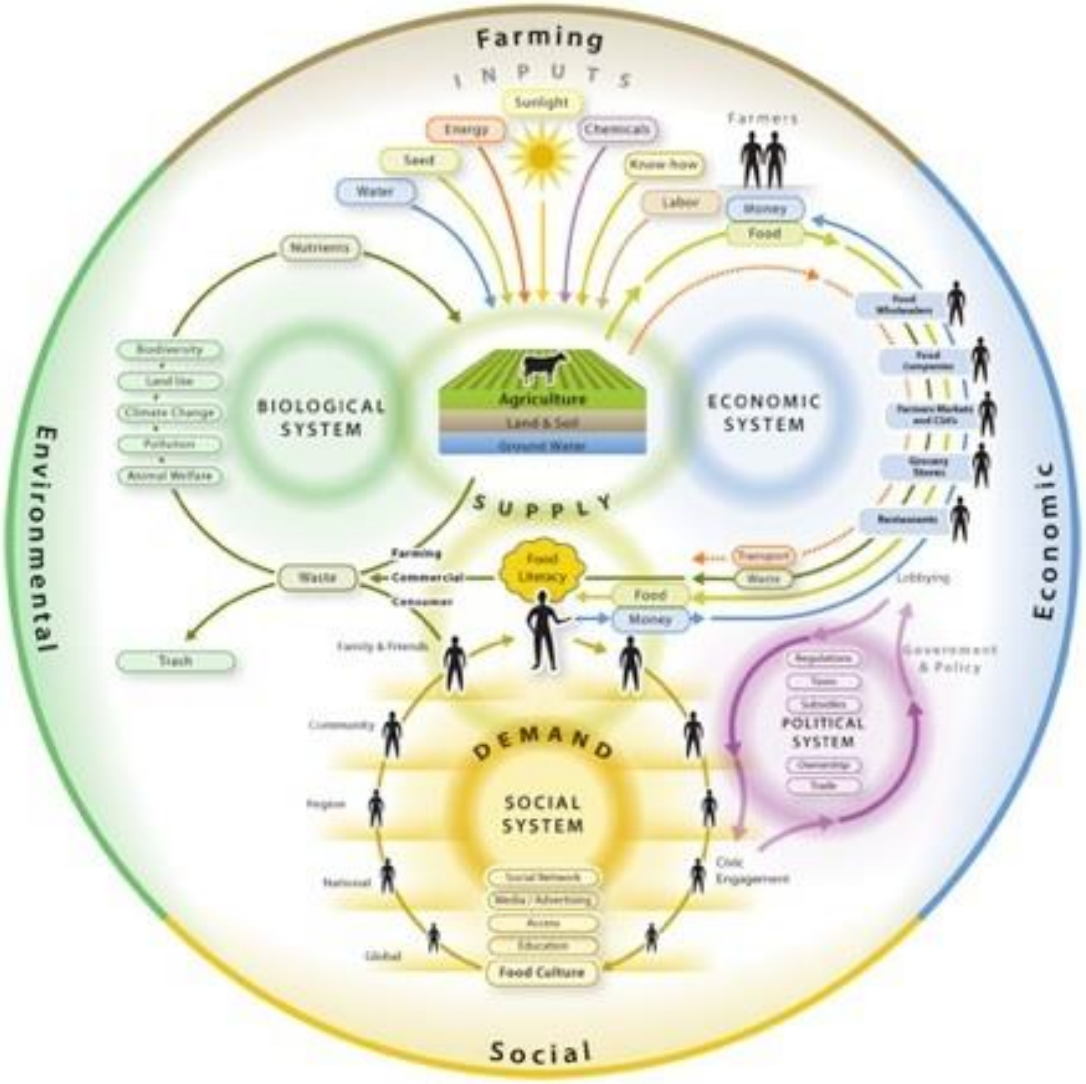


Figure 3: Life Cycle Materials
1995 U.S. Food System Flow
(flows in million pounds)
Stored grains & soybeans 153,000
other oilseeds 21,290
vegetables 37,920
fruits 64,450
sugarbeets 56,130
soybeans 130,460
grains 611,340
Crop production 921,590
stored grains & soybeans 68,080
Exports* 355,560
Industrial uses 40,930
Imports* 41,390
processing & water losses (36,770) by difference
dry beans, lentils, nuts 4120
grain products 45,600
fruit (46% fresh) 48,340
vegetables (59% fresh) 63,080
caloric sweeteners 38,830
fats & oils 20,250
meat & poultry 51,470
dairy products 76,280
Edible food supply 355,880
consumed 259,610
LOSSES
foodservice & consumer losses (90,820)
retail losses (5450)
oilseed cake & mill byproduct feeds
78,700
feed grains to animals 307,800
Animal products 239,470
red meat 43,680
poultry 30,742
eggs 9760
milk & milkfat 155,290
eggs 7920
feed grain imports 13,870
concentrated feeds 436,000
other byproduct feeds 19,900
harvested roughage 158,000
Feed to livestock & poultry 964,000
(in equivalent feeding value of corn)
pasture 370,000
imports 2860
exports 8570
processing & water losses (111,700) by difference
respiration, animal waste, live animals
*Exports
feed grains 147,260
wheat & flour 73,620
oil seeds (inc. soy) 52,020
feeds & fodders 29,400
protein meal 14,120
fruits, nuts & preparations 8340
vegetables & preparations 6910
rice 7220
other 16,630
*Imports
bananas & plantains 8530
veg. & preparations 7830
fruits, nuts & preparations 5860
sugar & related 4370
veg. oils 3440
other 11,360

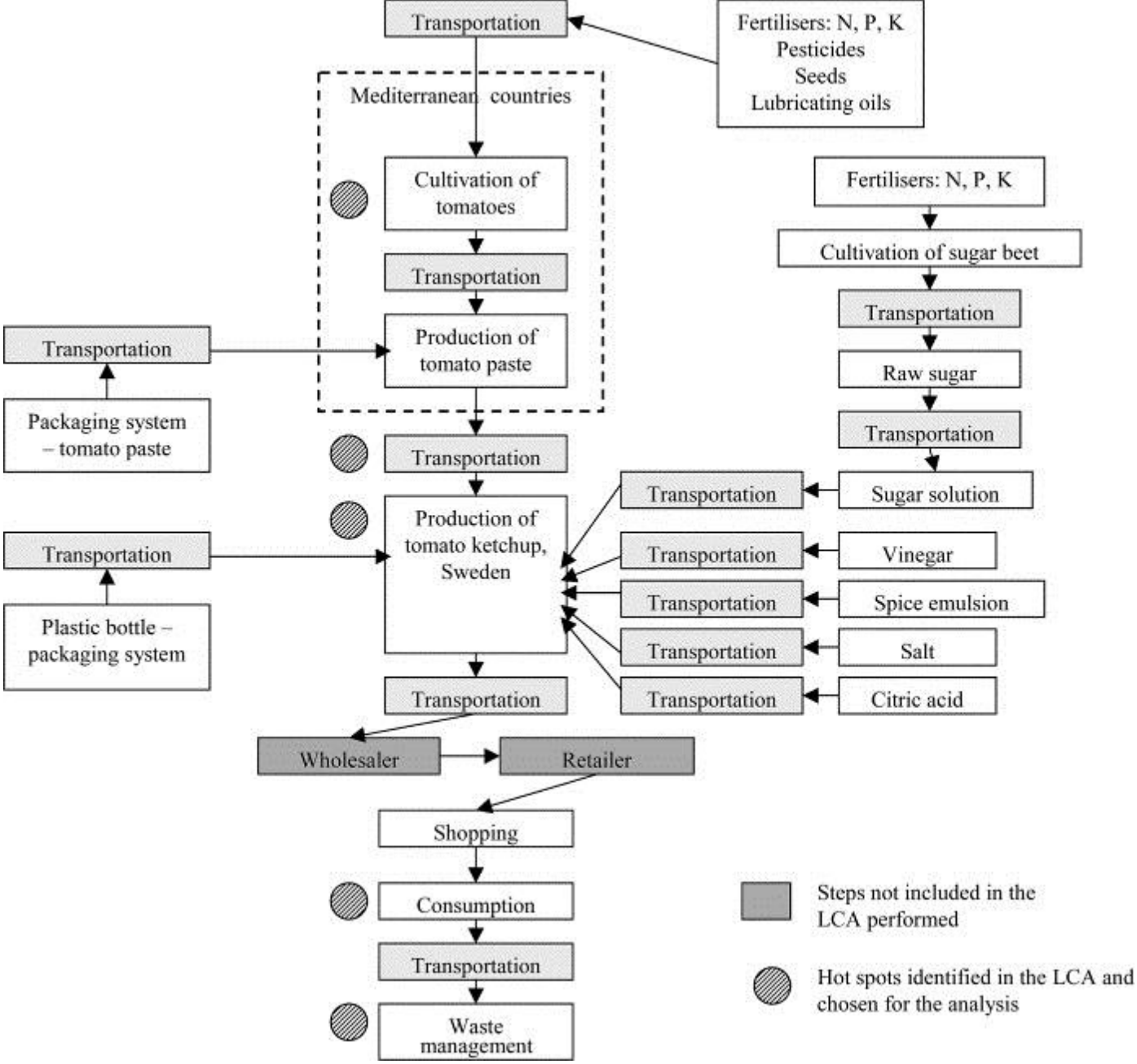
The Global Food System



FOOD SYSTEM MAP

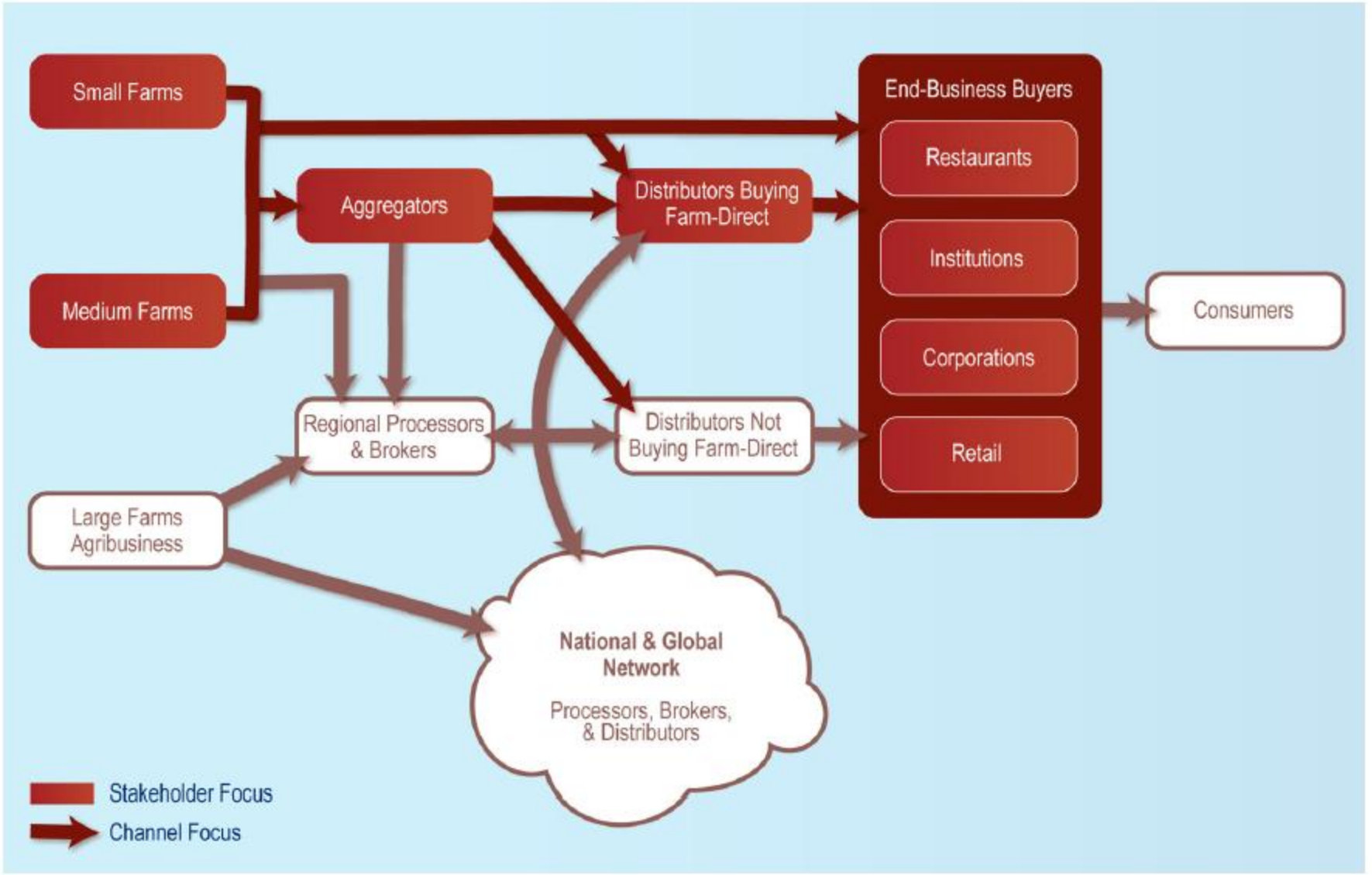


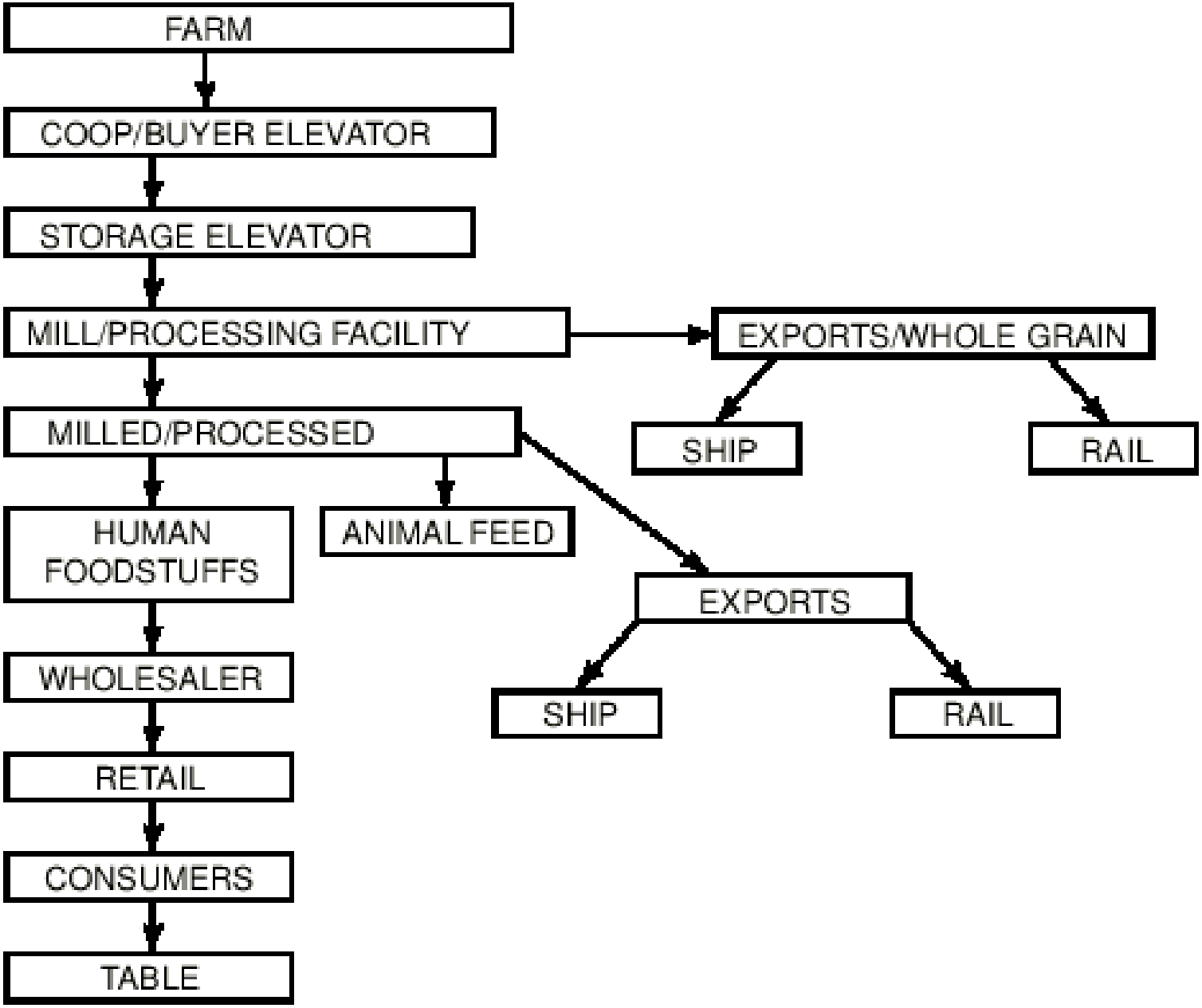
http://www.nourishlife.org/teach/food-system-tools/



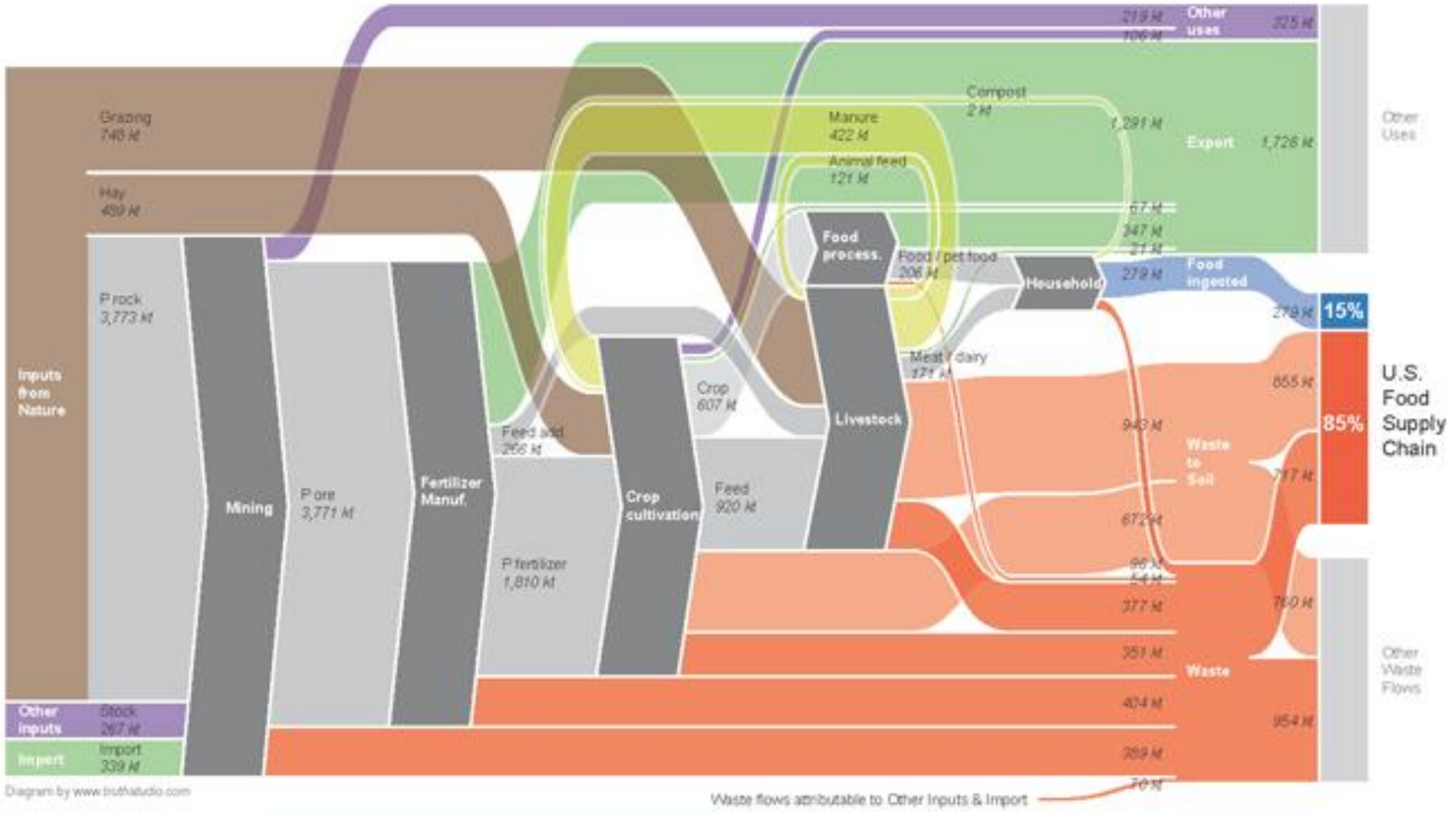
Journal of Cleaner Production
Volume 13, Issue 7, June 2005, Pages 717–731

http://www.goodfoodworld.com/2012/02/you-get-to-decide-what-to-eat-right/food-supply-chain/

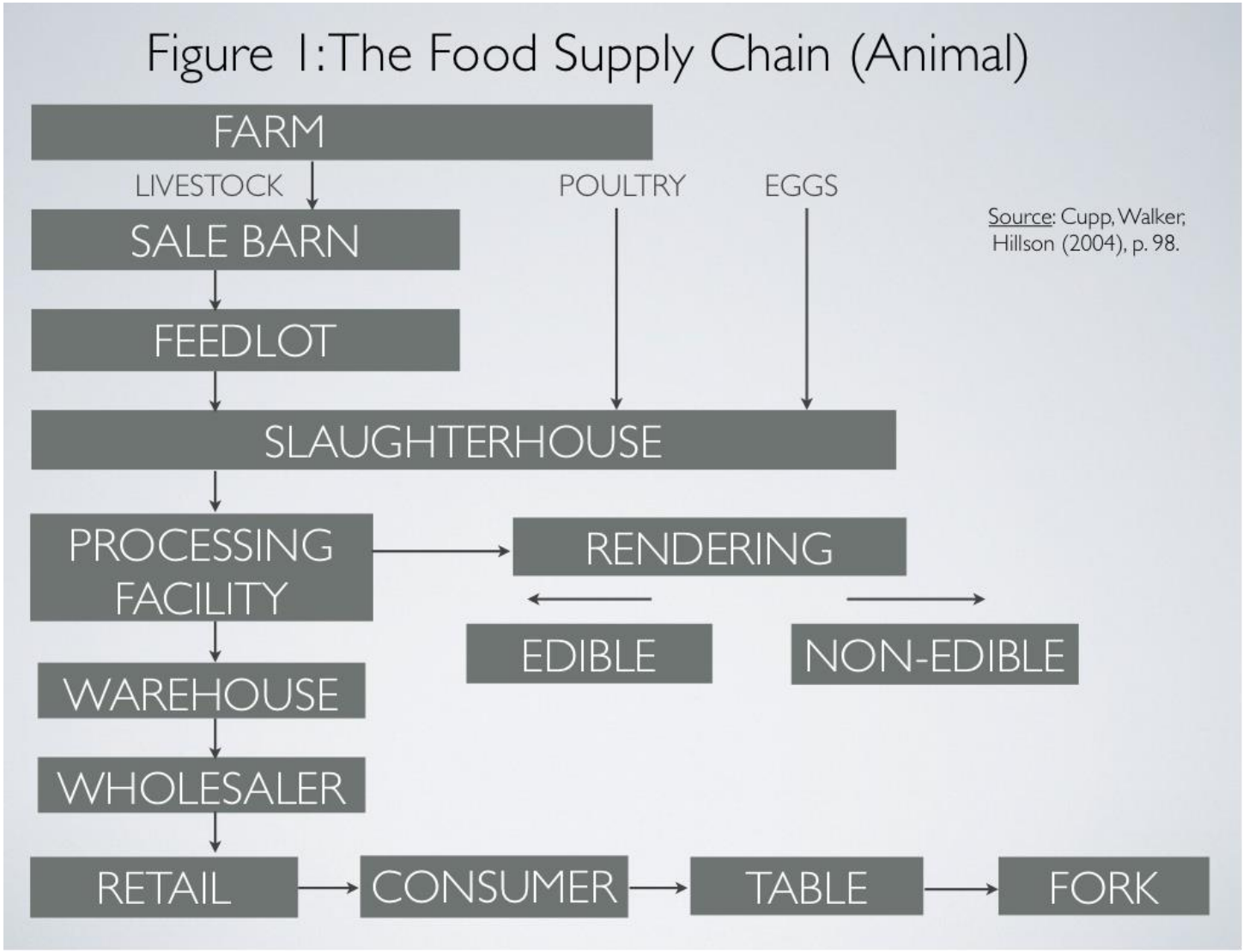




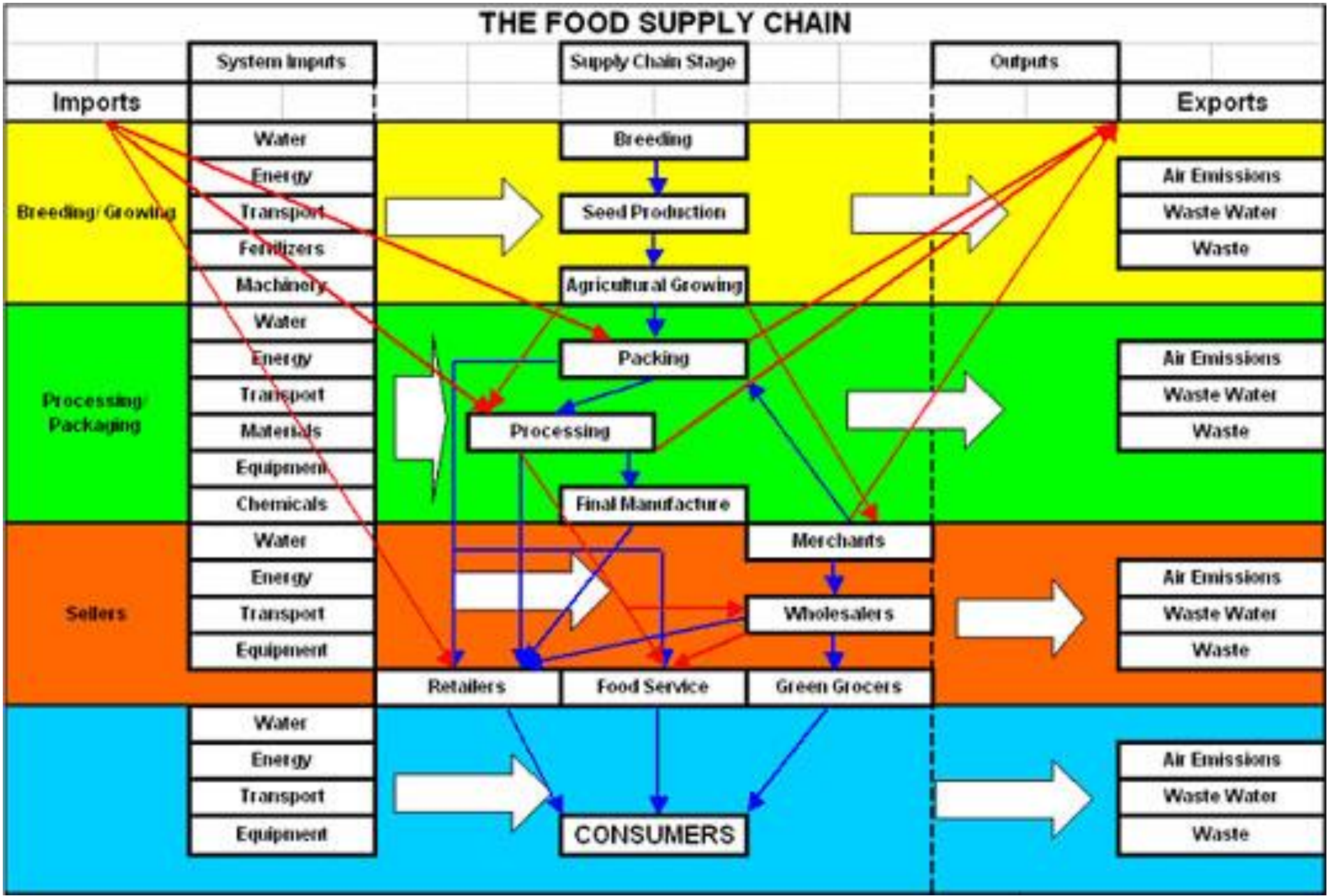
http://www.truthstudio.com/viz_us_impacts_OLD.html



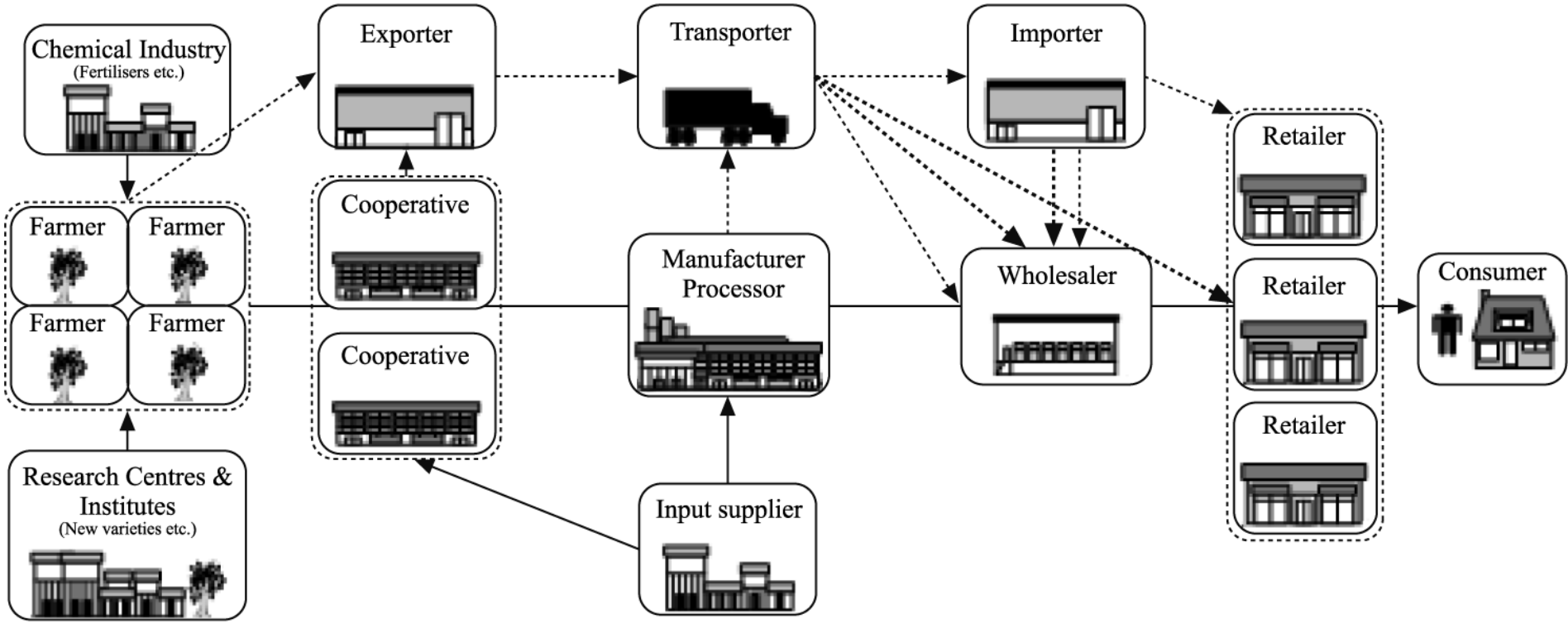
http://www.fas.org/biosecurity/education/dualuse-agriculture/1.-agroterrorism-and-foodsafety/index.html



http://www.foodwaterstorage.com/



A. Matopoulos, M. Vlachopoulou, V. Manthou, B. Manos, (2007) "A conceptual framework for supply chain collaboration: empirical evidence from the agri-food industry", Supply Chain Management: An International Journal, Vol. 12 Iss: 3, pp.177 - 186



Food System

SECTOR: AGRICULTURAL INPUTS

Fertilizer Plant

Monsanto Seed Research Facility

http://www.monsanto.com/newsviews/Pages/Monsanto-Dedicates-Recently-Acquired-Chesterfield-Research-Center.aspx

Food System

SECTOR: AGRICULTURE

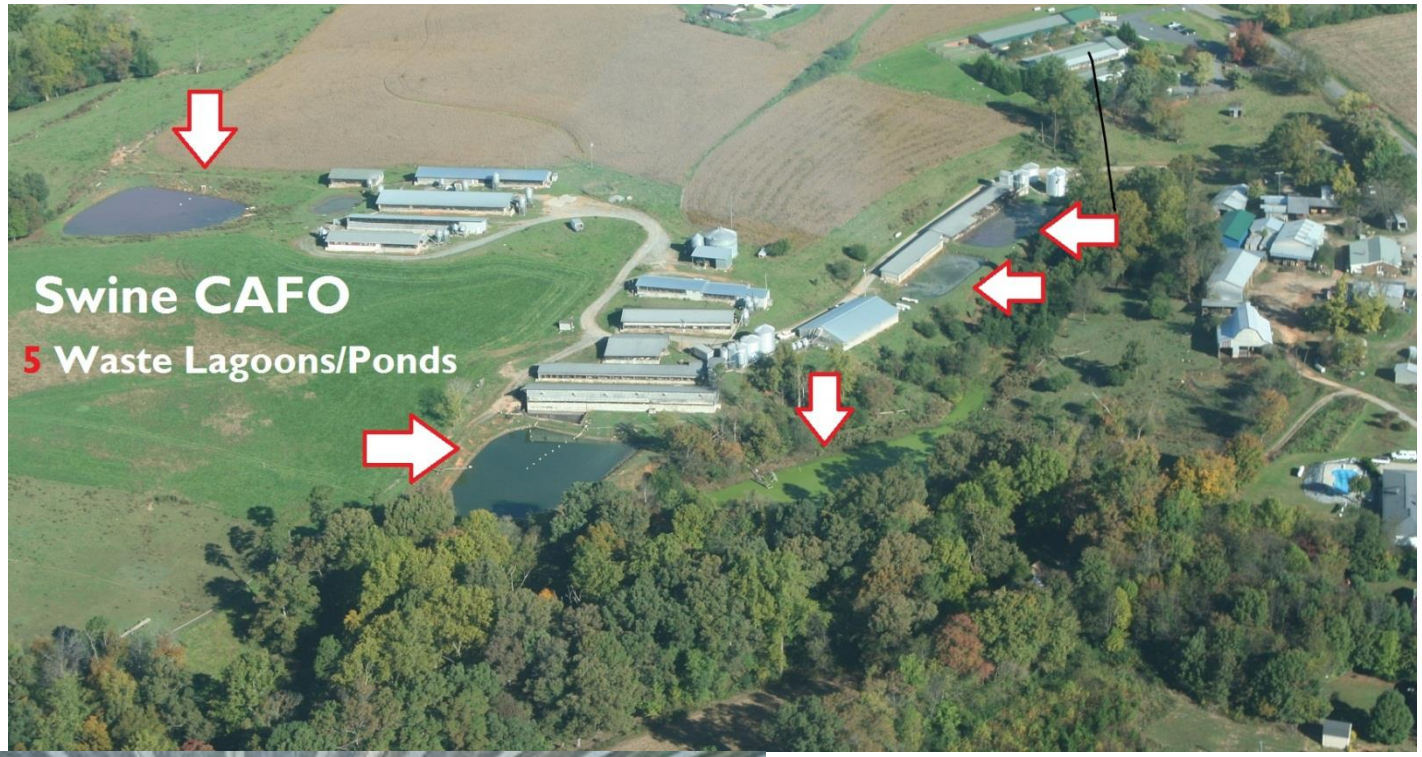
Wheat Harvest

Corn Harvest

Vegetable Harvest

Cow/Calf Operation

Cattle Feedlot


Swine CAFO
5 Waste Lagoons/Ponds


farmsanctuary.org

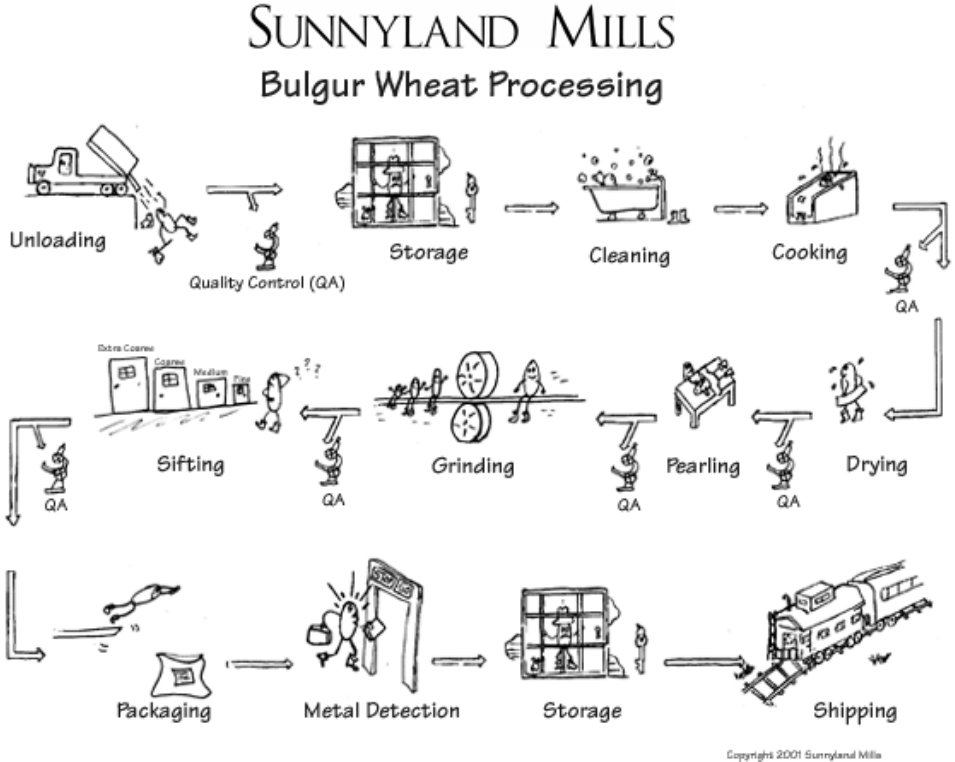
Chicken CAFO’s

Food System

SECTOR: PROCESSING

Beef Slaughter Plant

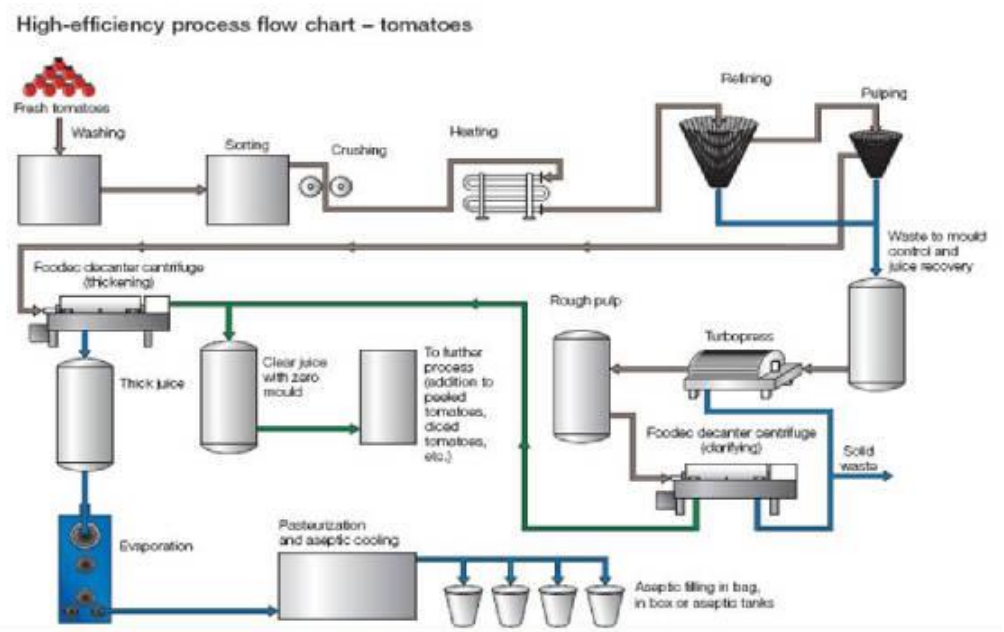
Grain Processing



Food System

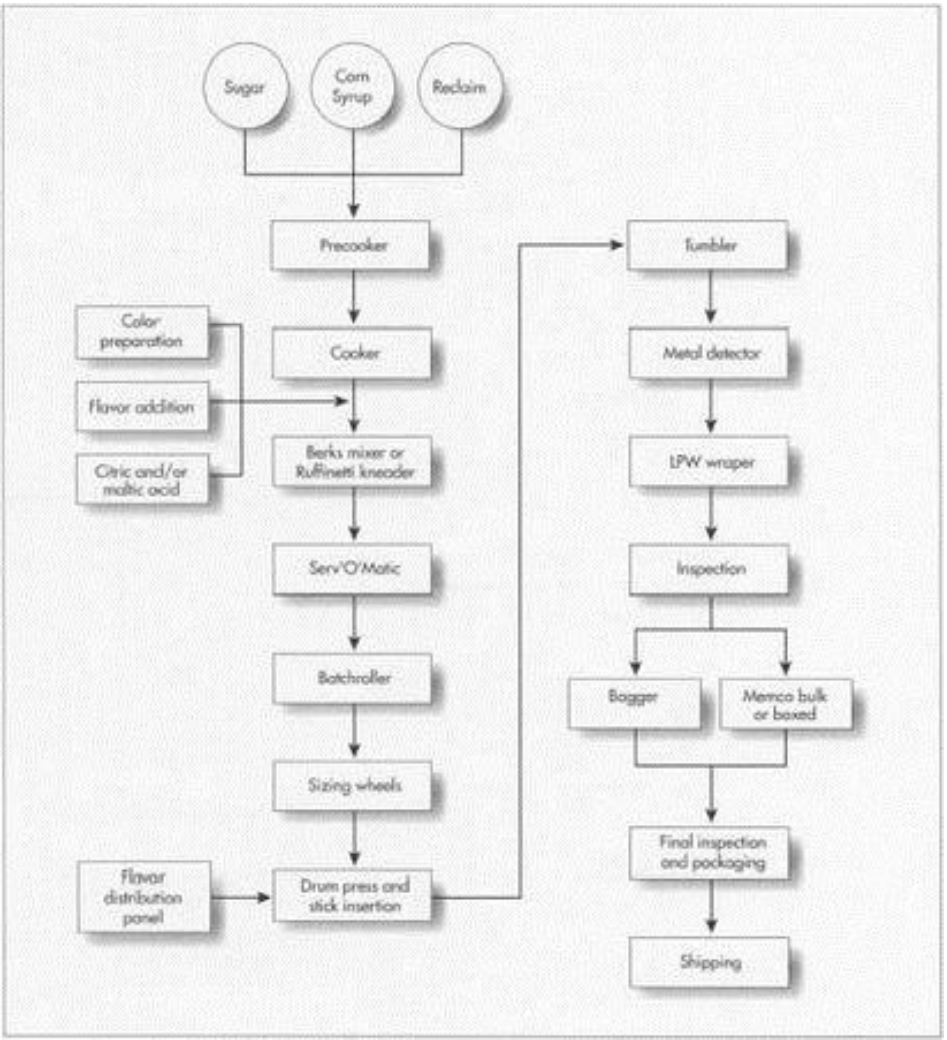
SECTOR: MANUFACTURING

Tomato Processing



Pasta Facility

Lollipop Manufacturing



Food System

SECTOR: TRANSPORTATION

Grain Transport


HANSON

Cattle/Beef


National Beef
national carriers
national carriers

Food System

SECTOR: WHOLESALING/DISTRIBUTION

Wholesalers/Distributors

Distribution Warehouse

Food Service Distributors

Food System

SECTOR: RETAIL

Supermarket

Walmart Supercenters

Small Rural Grocery Stores

Food System

SECTOR: RETAIL

Food Service


Olive Garden
ITALIAN RESTAURANT


chili's


ON THE BORDER
MEXICAN GRILL & CANTINA

North End Redevelopment
Manhattan, KS

TRENDS IN U.S. FOOD SYSTEM SECTORS

Agriculture

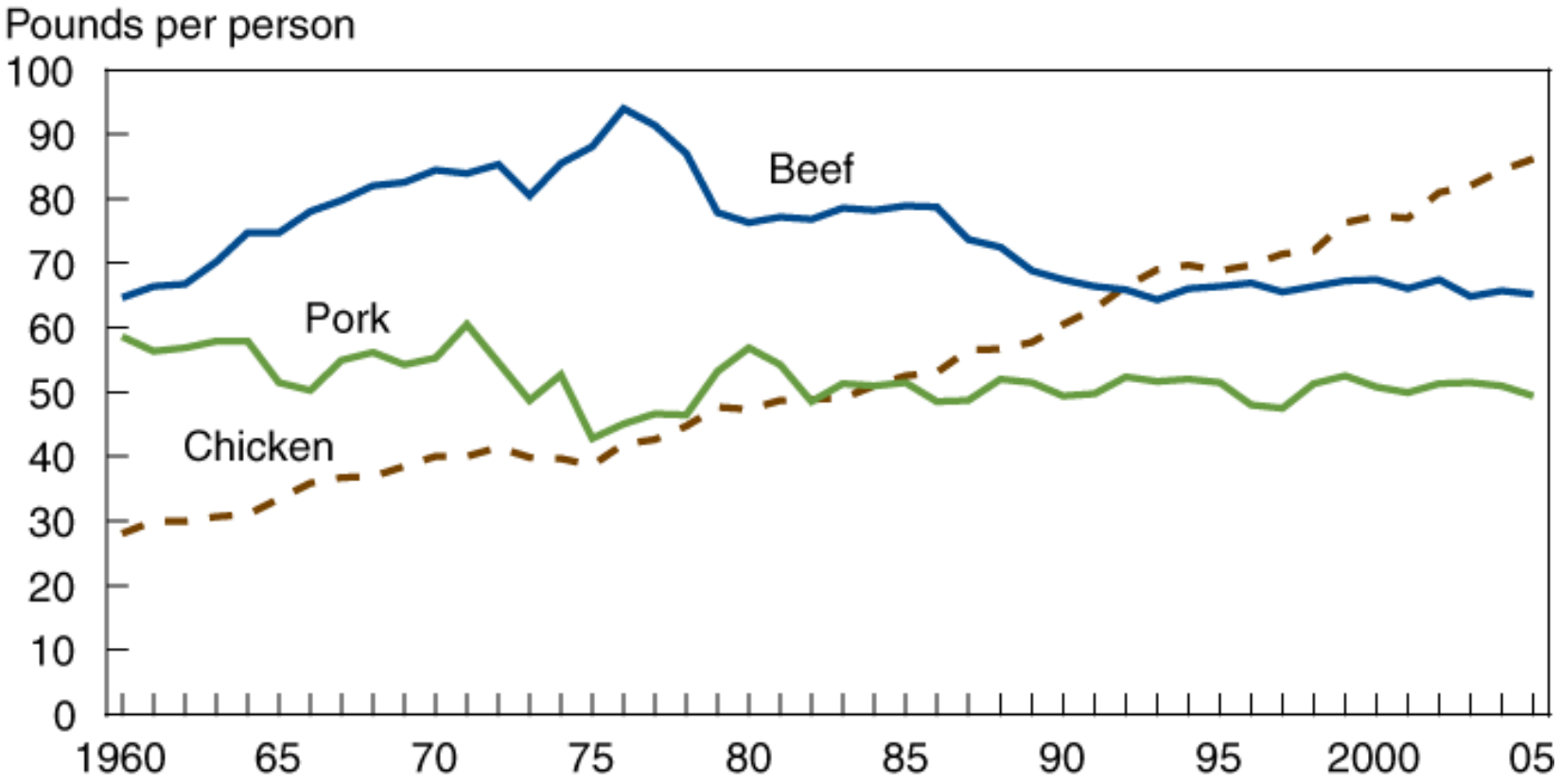
- High levels of consolidation/concentration and increasing
- Contracts growing feature of agricultural production
- Mechanization, technology intensive seeds and animal breeding, high levels of chemical inputs
- Regional specialization due to mix of natural resources, demographics, and policy

Animal Agriculture

Meat Consumption Trends

Figure 1

Trends in per capita consumption, 1960-2005



Source: ERS Food Availability (Per Capita) Data System, at www.ers.usda.gov/Data/FoodConsumption.

Chicken Production

Figure 1
Organization of broiler production

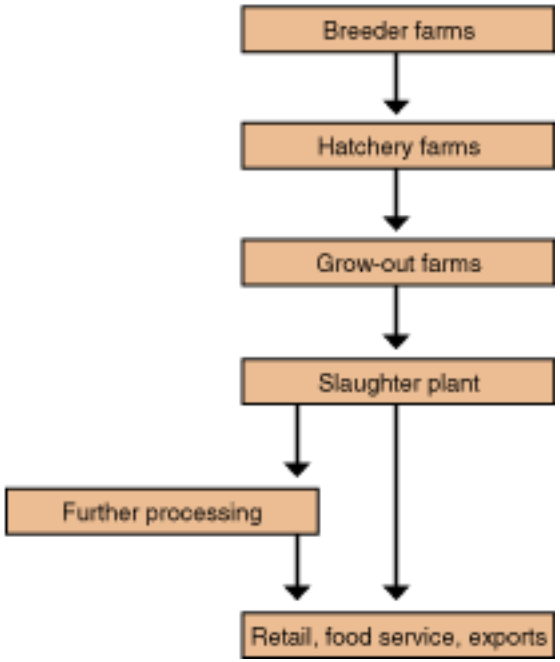
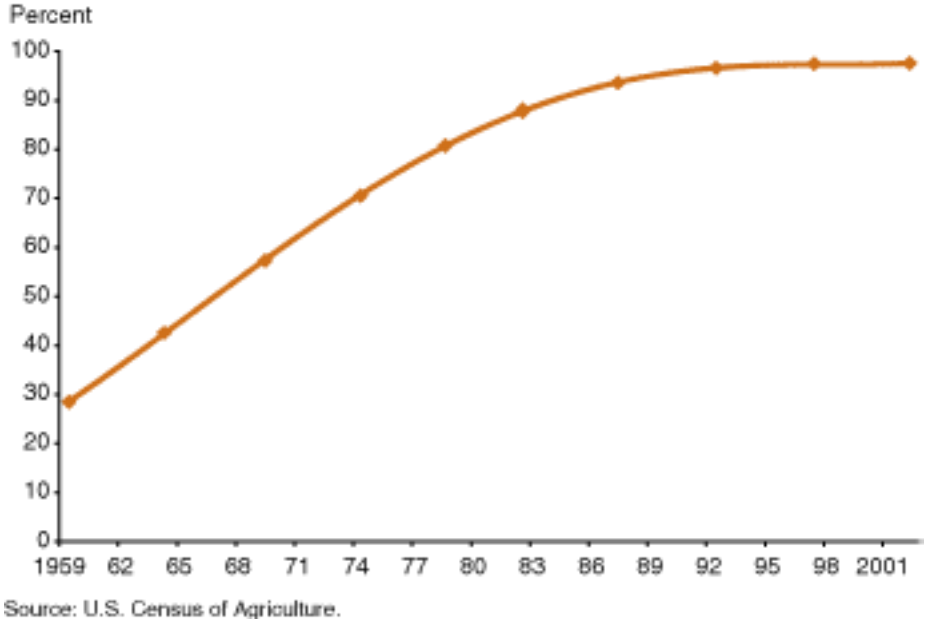


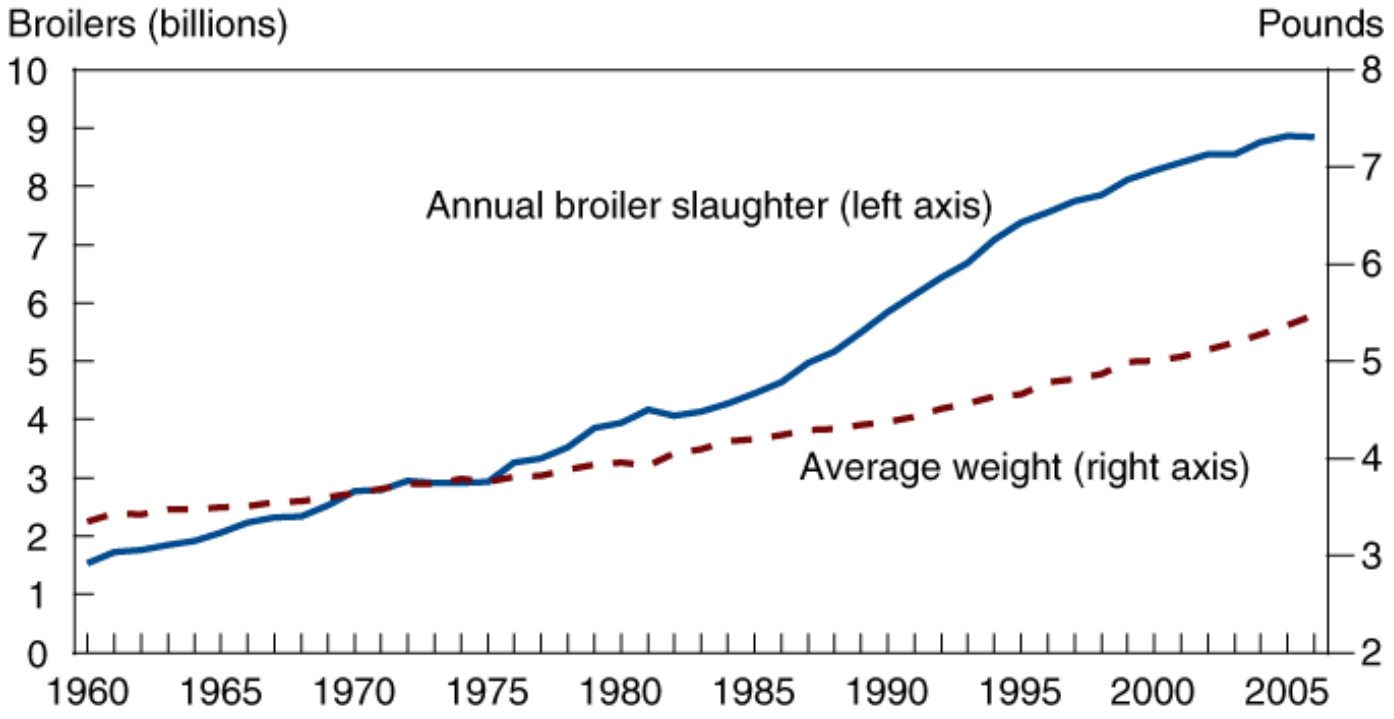
Figure 2
Share of broiler production held by farms selling at least 100,000 broilers



Source: U.S. Census of Agriculture.

Figure 2

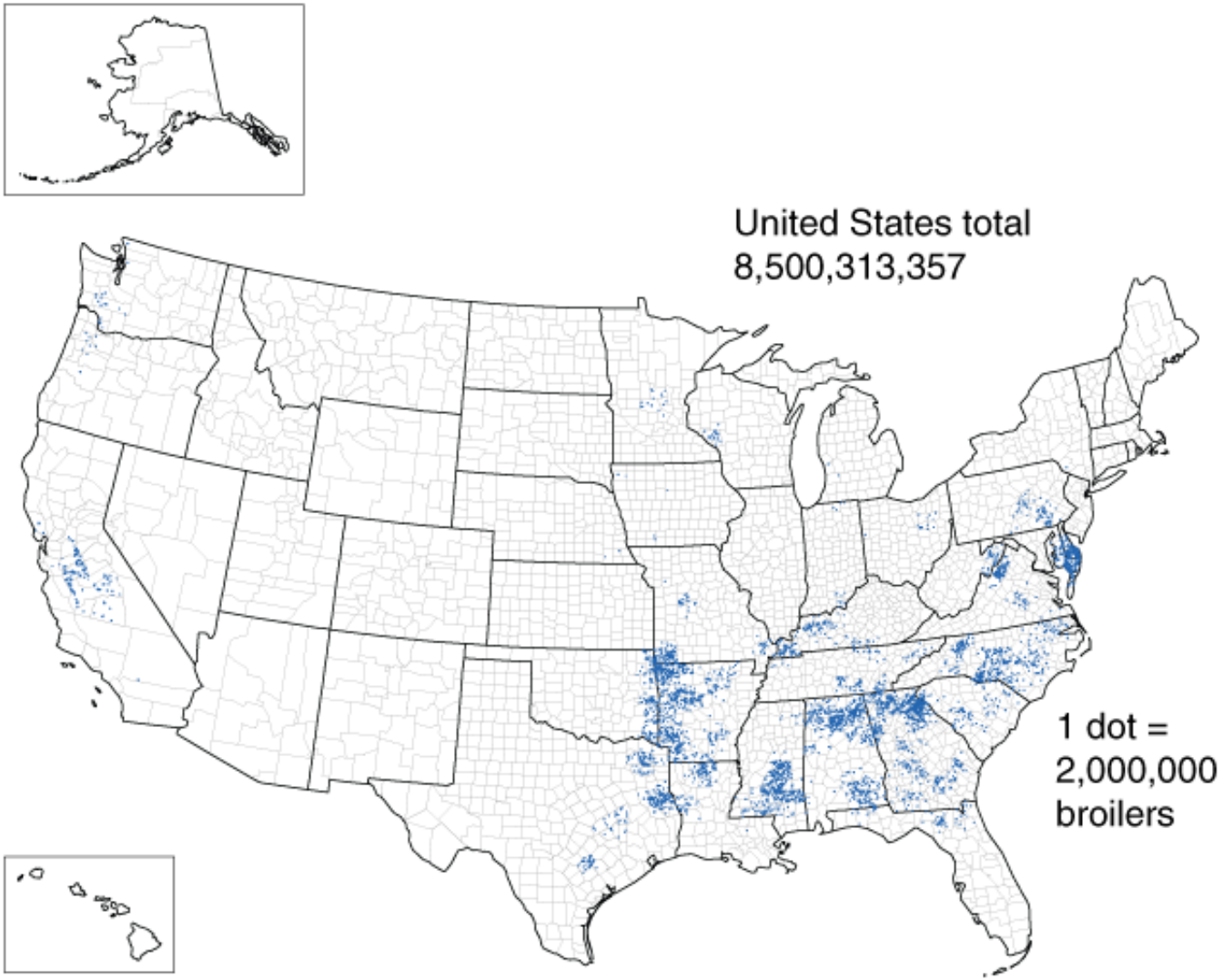
Growth in broiler production, 1960-2006



Source: USDA, National Agricultural Statistics Service.

Figure 3

Number of broilers and other meat-type chickens sold, 2002



Source: USDA, National Agricultural Statistics Service.

Hog “Farming”

Figure 3
Organization of hog production

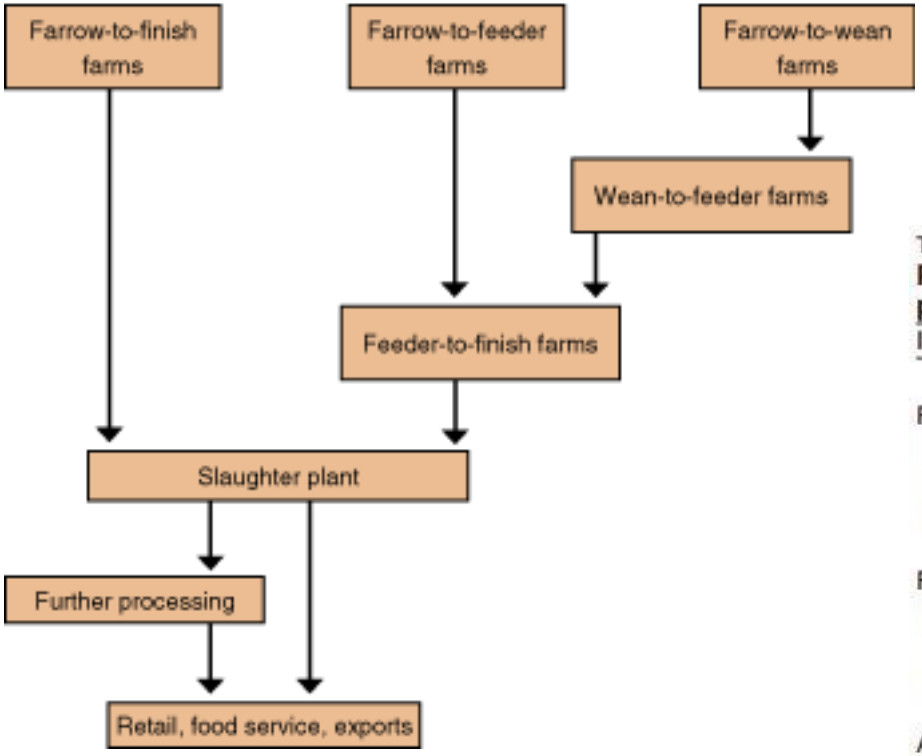


Table 2
Regional hog and pig sales and contract removals by type of hog producer

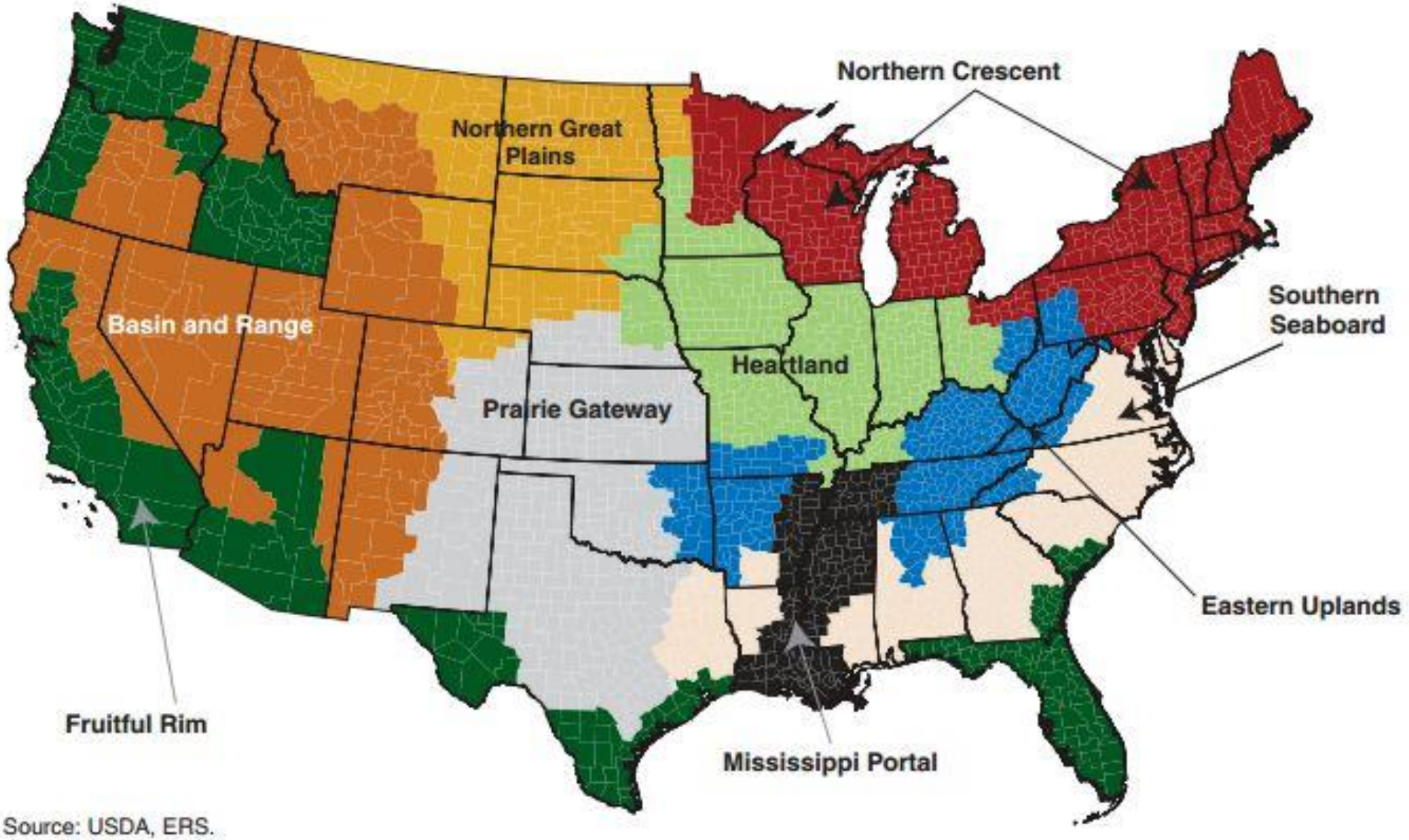
Item/Region	1992	1998	2004
		Average head per farm	
Farrow-to-finish			
Heartland	901	1,288	1,851
Southern Seaboard	1,093	1,163	1,068
West	621	1,305	1,459
Feeder-to-finish			
Heartland	833	1,972	4,152
Southern Seaboard	1,035	10,951	12,057
West	358	3,589	3,255
All hog and pig producers			
Heartland	975	2,098	5,106
Southern Seaboard	1,206	10,021	13,995
West	702	2,231	1,859

Source: USDA, ERS using data from USDA's 1992 Farm Costs and Returns Survey and USDA's 1998 and 2004 Agricultural Resource Management Surveys.

Figure 8

Farm Resource Regions

Hog production has traditionally been concentrated in the Heartland, but during the 1980s and 1990s it expanded rapidly in the Southern Seaboard and more recently in western regions, particularly in the Prairie Gateway and Basin and Range

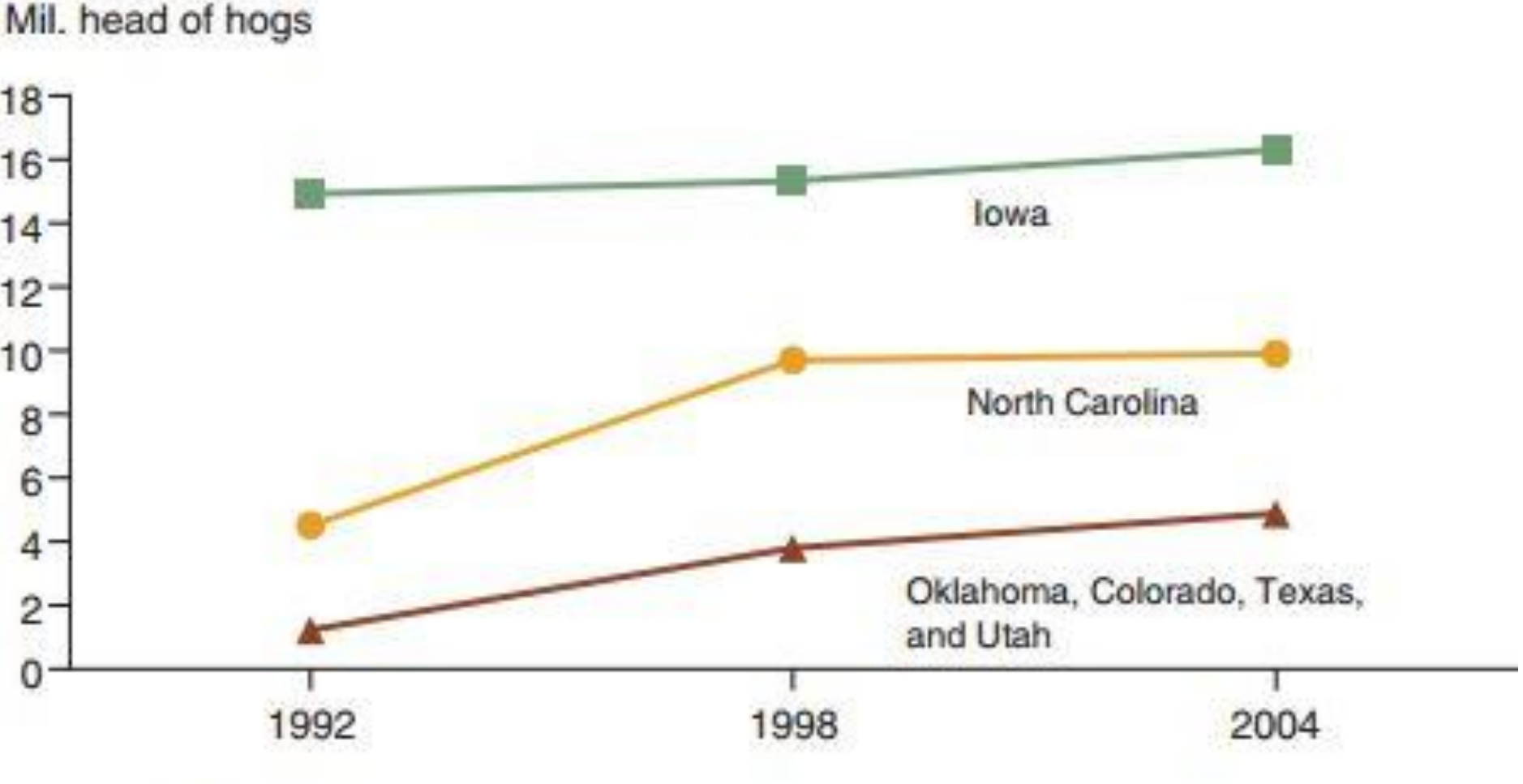


Source: USDA, ERS.

Figure 7

Hog inventories in selected States

Hog numbers grew rapidly in North Carolina between 1992 and 1998 but slowly through 2004. Growth has been steady in Western States since 1992.

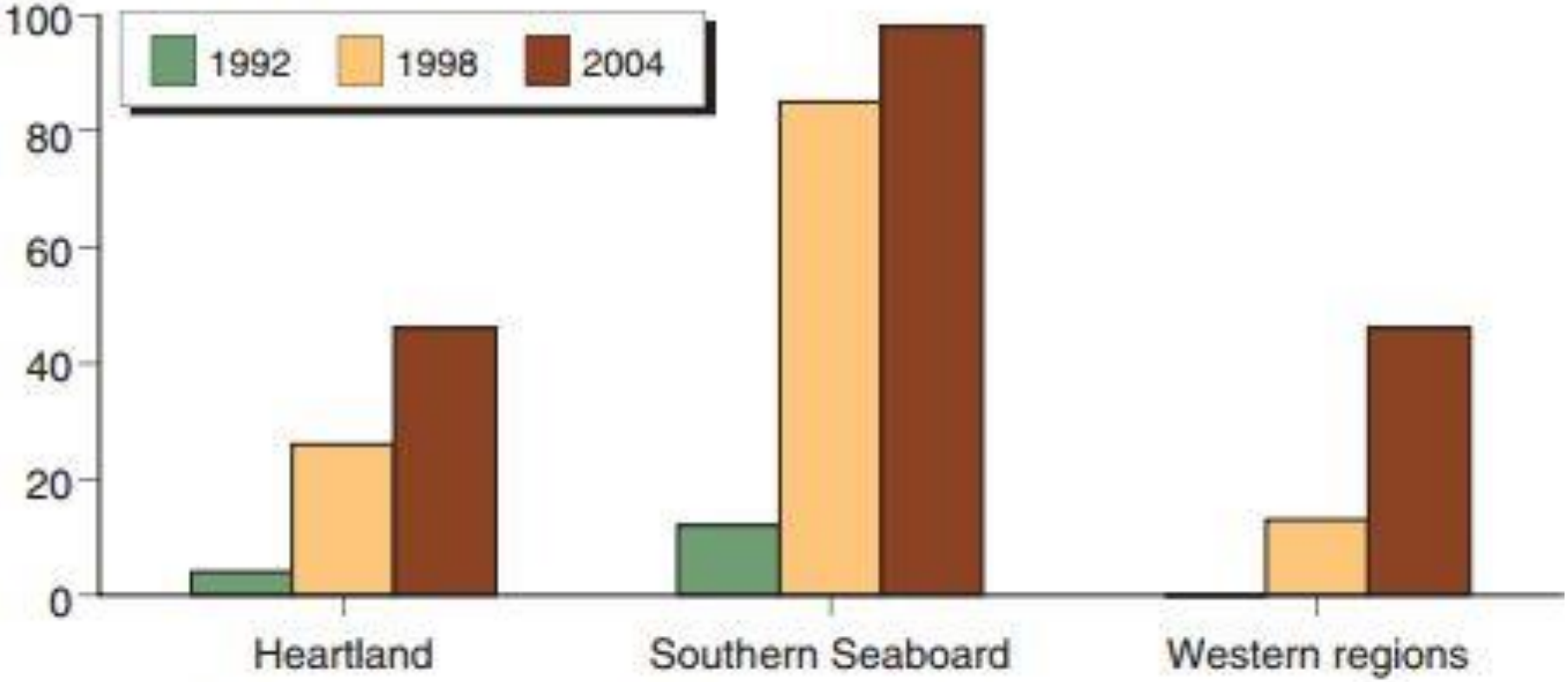


Source: USDA, ERS using data from USDA, NASS, 1995-99.

Figure 9

Market hogs removed under contract by region

The use of production contracts for finishing hogs increased in all regions between 1992 and 2004, and in 2004 accounted for virtually all hogs produced in the Southern Seaboard



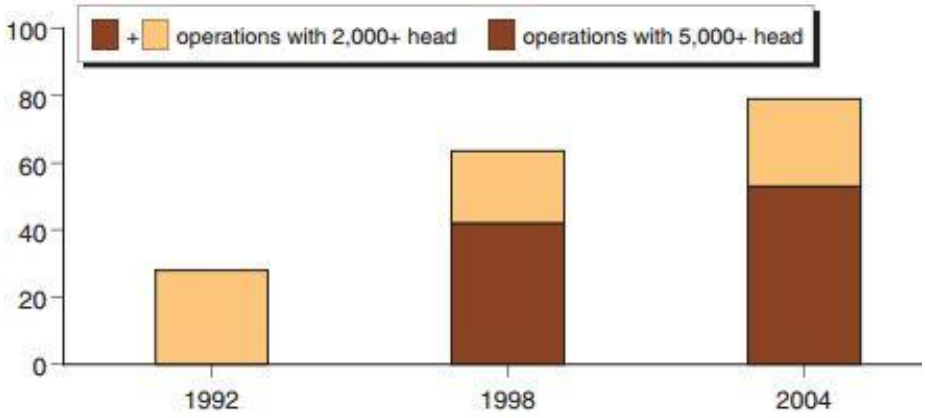
Sources: USDA, ERS using data from USDA's 1992 Farm Costs and Returns Survey and USDA's 1998 and 2004 Agricultural Resource Management Survey.

Figure 4

U.S. hog and pig inventory on the largest operations

Farms with 2,000 head or more accounted for nearly 80 percent of the total U.S. hog and pig inventory in 2004, up from only 30 percent in 1992

Percent of inventory



Note: Operations with 5,000+ head were not reported in 1992.

Sources: USDA, ERS using data from USDA, NASS, 1995-99 and January 2005.

Table 3: Structural change in market hog production, 1992-2004

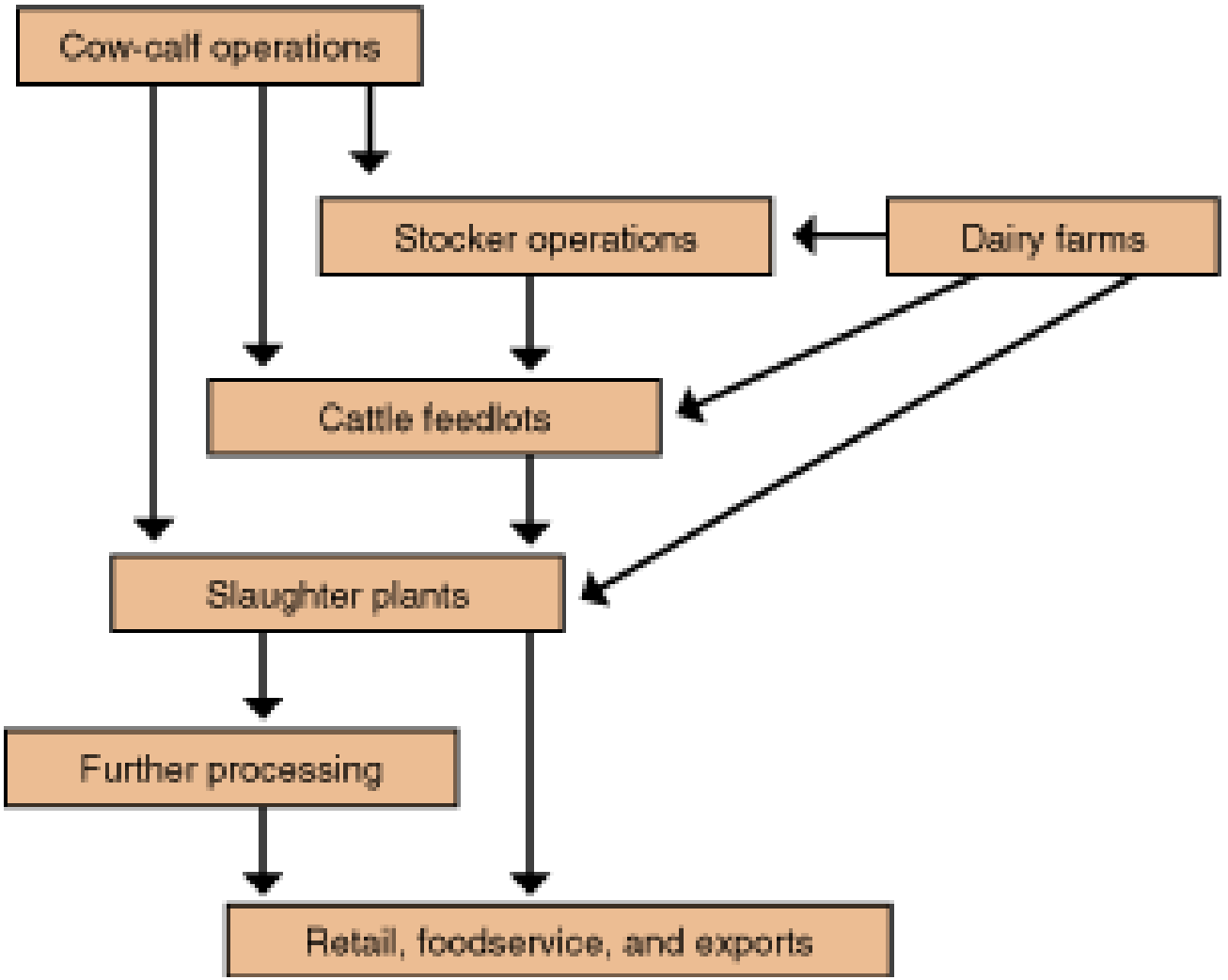
Type of operation	1992	1998	2004
Farrow to finish			
Percent of operations	54	49	31
Percent of market hogs removed	65	38	18
Percent of feed home-grown	55	51	38
Percent of hogs removed under contract	na	na	na
Market hogs removed (head per farm)	886	1,239	1,472
Feeder to finish			
Percent of operations	19	31	40
Percent of market hogs removed	22	55	77
Percent of feed home-grown	45	22	15
Percent of hogs removed under contract	5	40	67
Market hogs removed (head per farm)	945	2,589	4,656

Note: Other operations, such as wean-to-finish, account for small shares of market hogs.
na = Not available.
Source: Key and McBride, 2007.

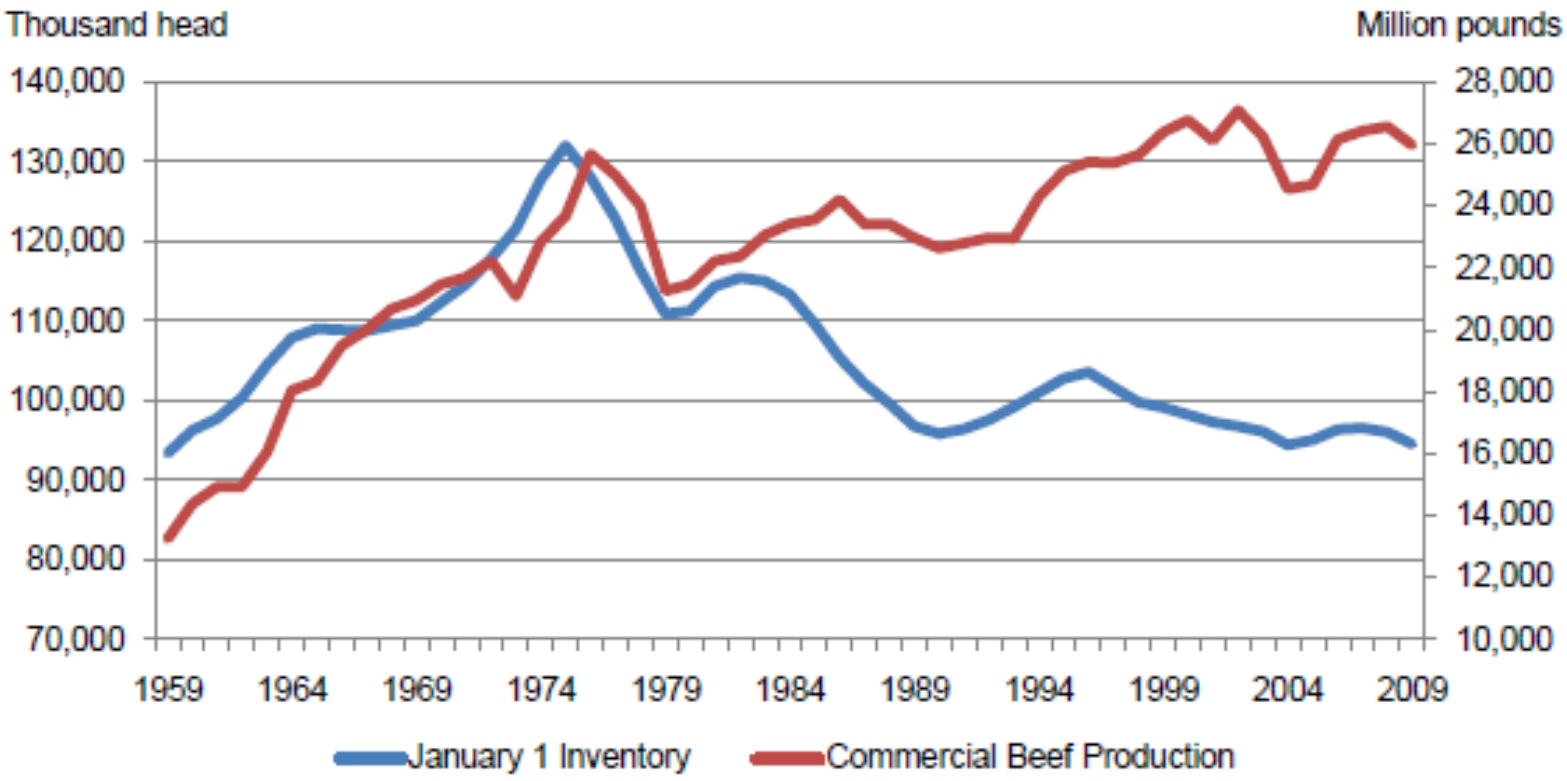
Cattle/Beef Production

Figure 4

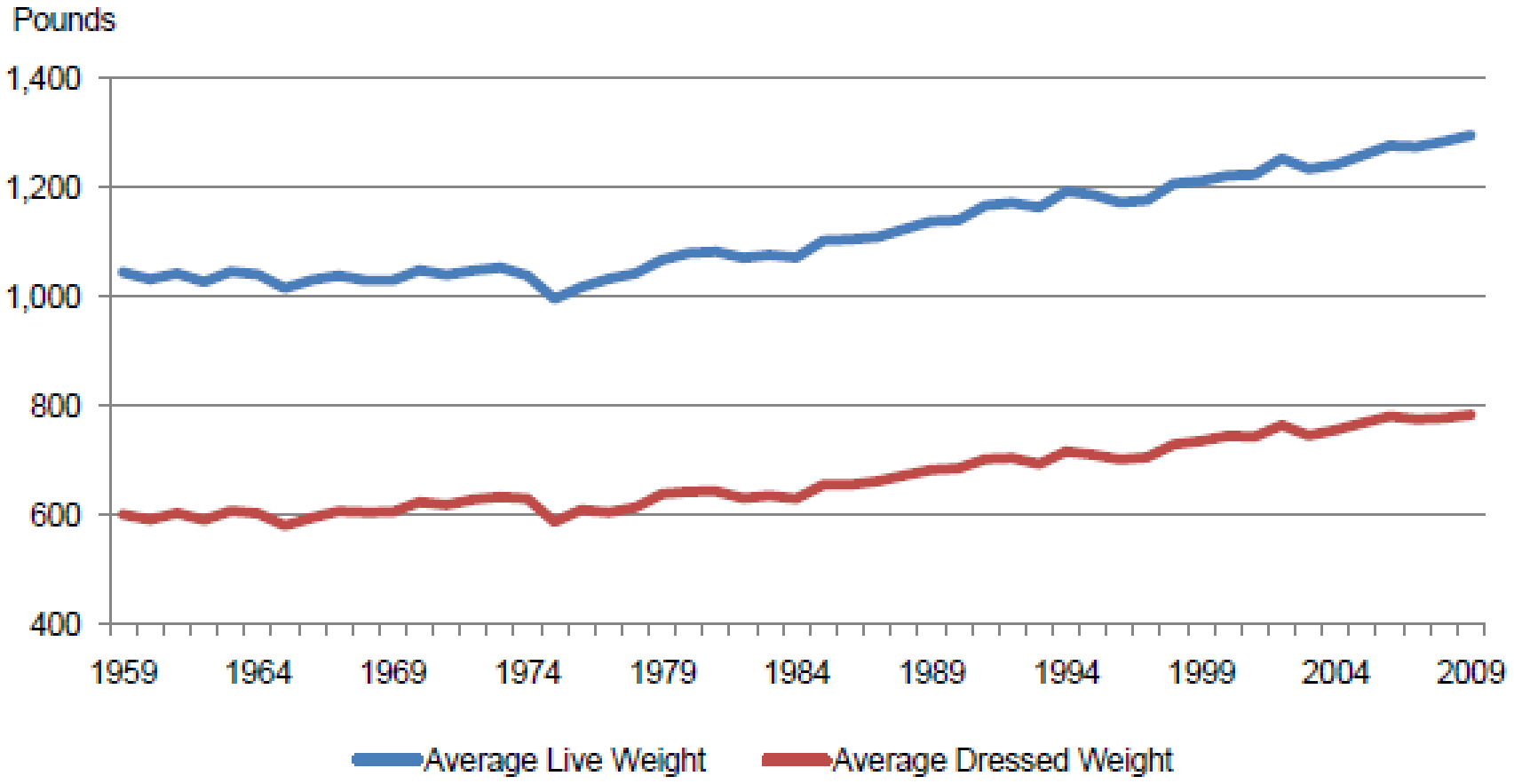
Organization of beef production



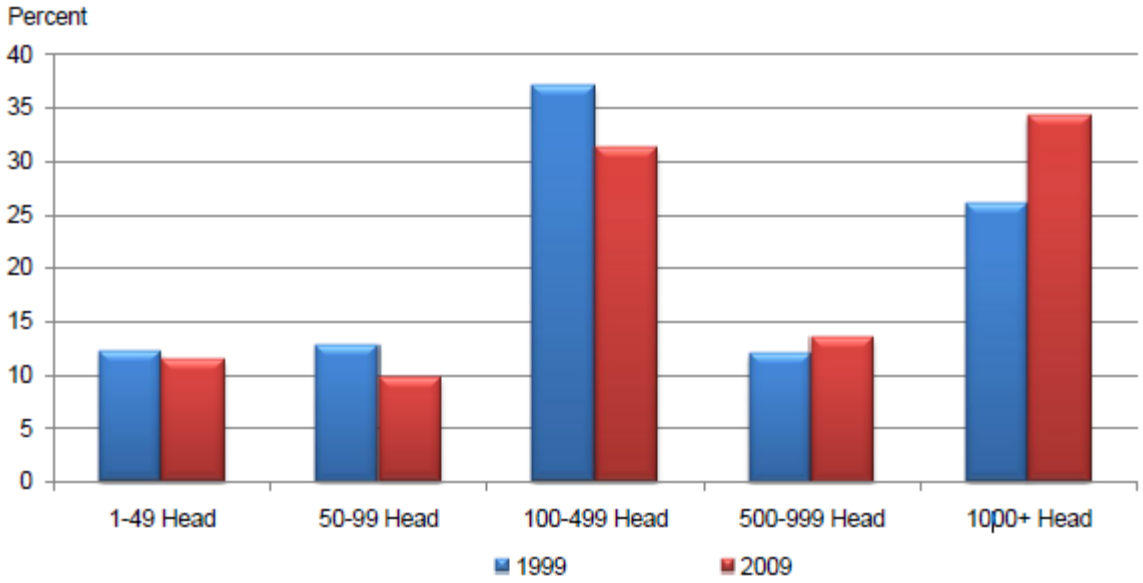
Graph 13. January 1 Cattle Inventory and Commercial Beef Production - United States



Graph 14. Average Live and Dressed Cattle Weights - United States



Graph 3. All Cattle Operations Percent of Inventory by Size Group - United States



Graph 4. Beef Cow Operations Percent of Inventory by Size Group - United States

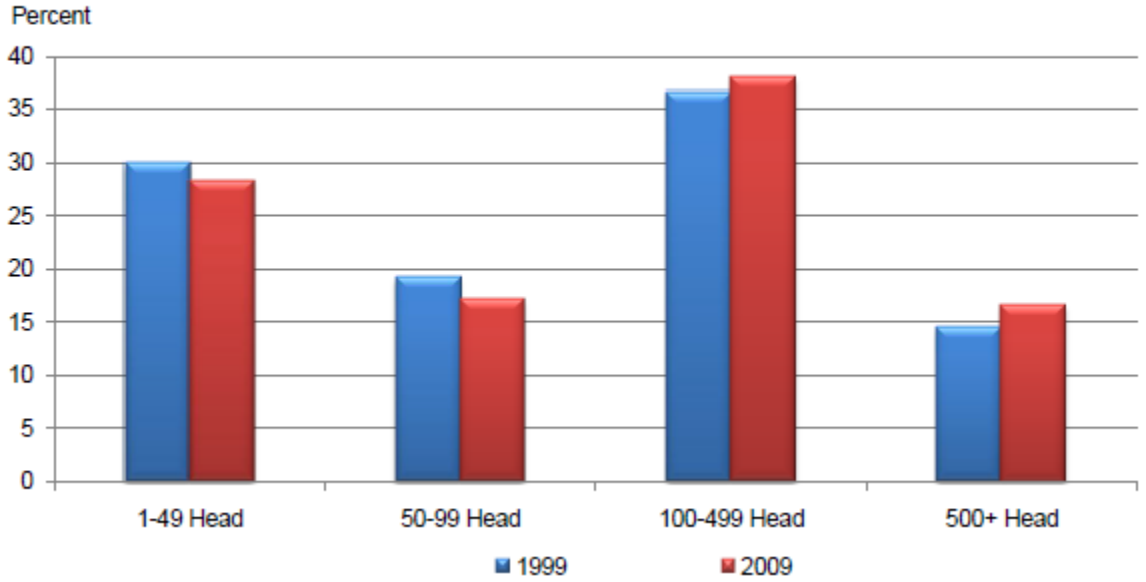
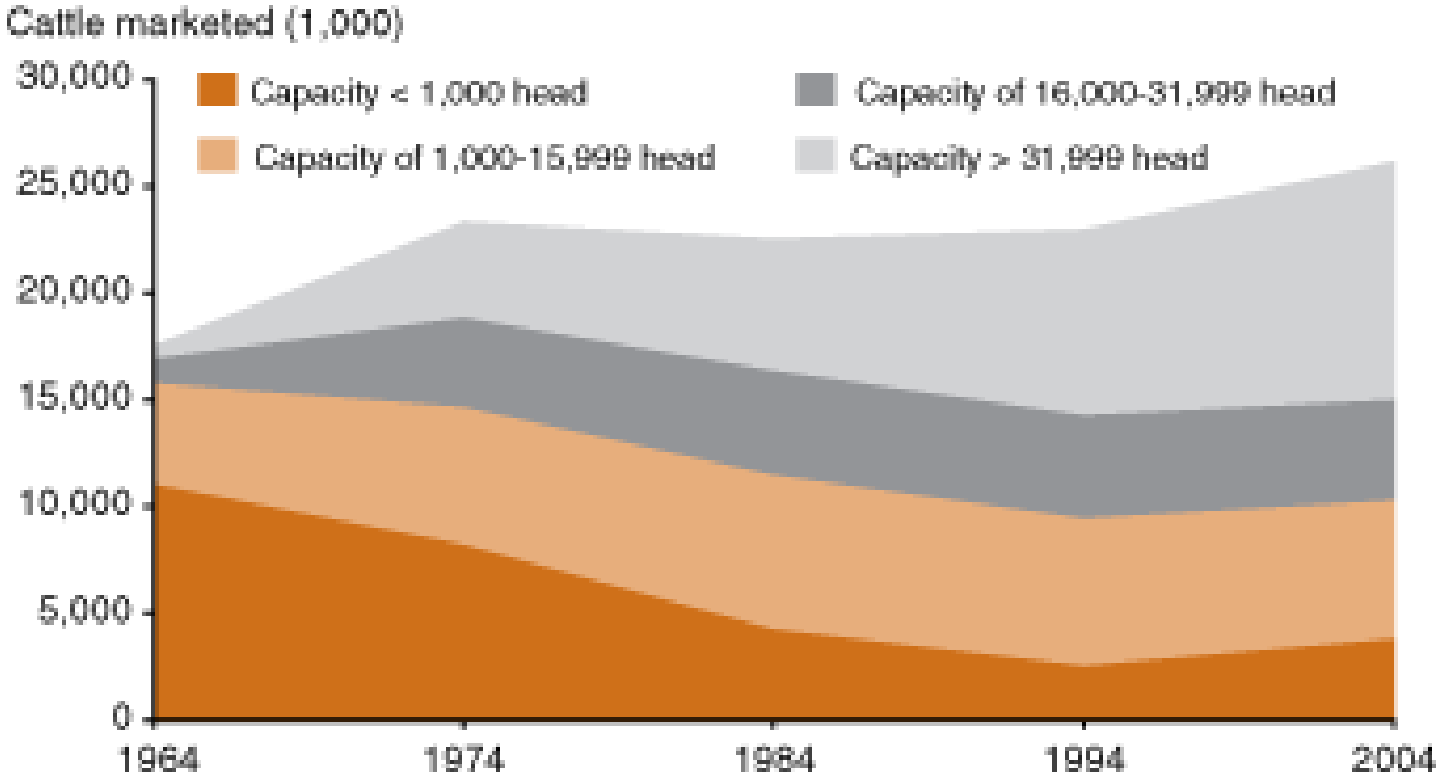


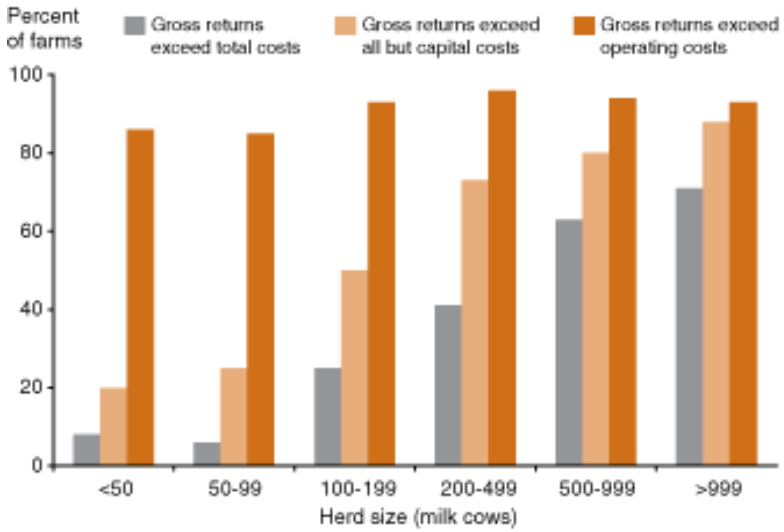
Figure 5
Fed cattle shift to large feedlots



Source: USDA/NASS, *Cattle on Feed.*

Dairy Farms

Figure 7
Financial performance, by size of dairy farm



Source: 2005 Agricultural Resource Management Survey, version 4.

Table 4: Size structure of dairy farms, 1992-2007

	1992	2000	2007
	Percent of cow inventory		
Herd size (milk cows)			
1-49	20.4	12.0	7.4
50-99	29.0	22.0	15.4
100-199	19.0	18.0	13.4
200-499	13.7	16.7	14.9
500-999	8.0	12.0	12.5
1,000+	9.9	19.3	36.4

Note: Herd size refers to all dairy cows on an enterprise, including dry cows but excluding calves, heifers, and bulls.

Source: USDA/NASS *Milk Production*, February Issue (1992 and 2000); USDA/NASS *Farms, Land in Farms and Livestock Operations* (2007).

Summary

Table 2: Consolidation in livestock production, 1987-2002

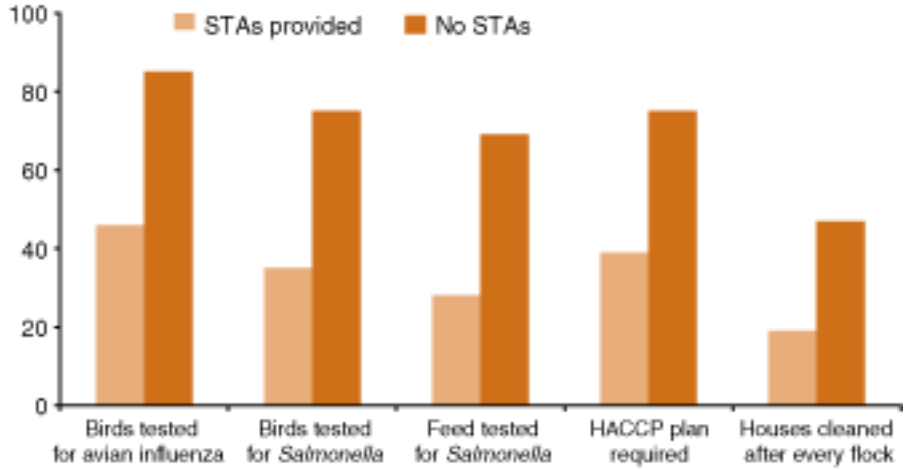
	1987	1992	1997	2002
		Production locus (head sold/removed)		
Broilers	300,000	384,000	480,000	520,000
Fed cattle	17,532	23,891	38,000	34,494
Hogs	1,200	1,880	11,000	23,400
		Production locus (milk cows per farm)		
Dairy	80	100	140	275

Note: The production locus measures the size of farm at which half of production came from larger farms, and half from smaller.

Source: Hoppe et al. (2007).

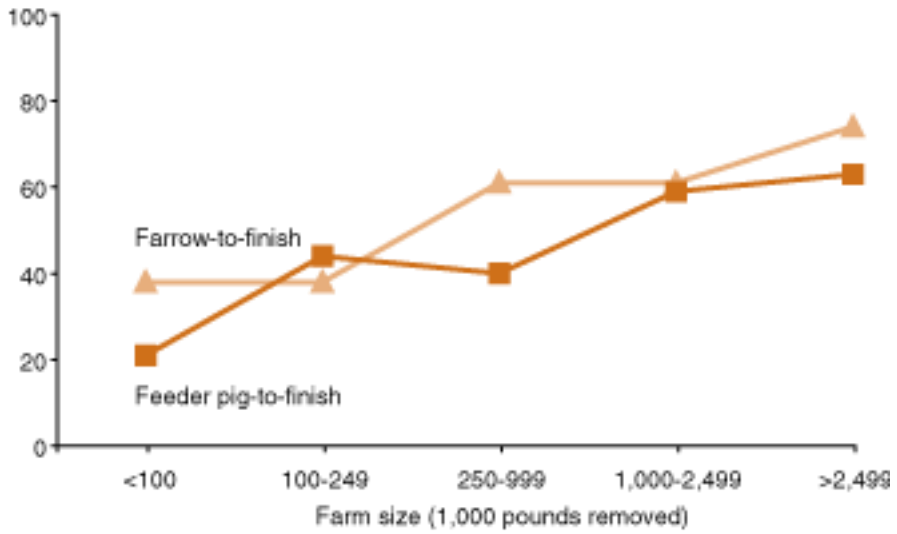
CAFO's and Antibiotics

Figure 10
Testing and sanitation substitute for subtherapeutic antibiotics (STAs) in broiler production



Source: 2006 Agricultural Resource Management Survey, Version 4.

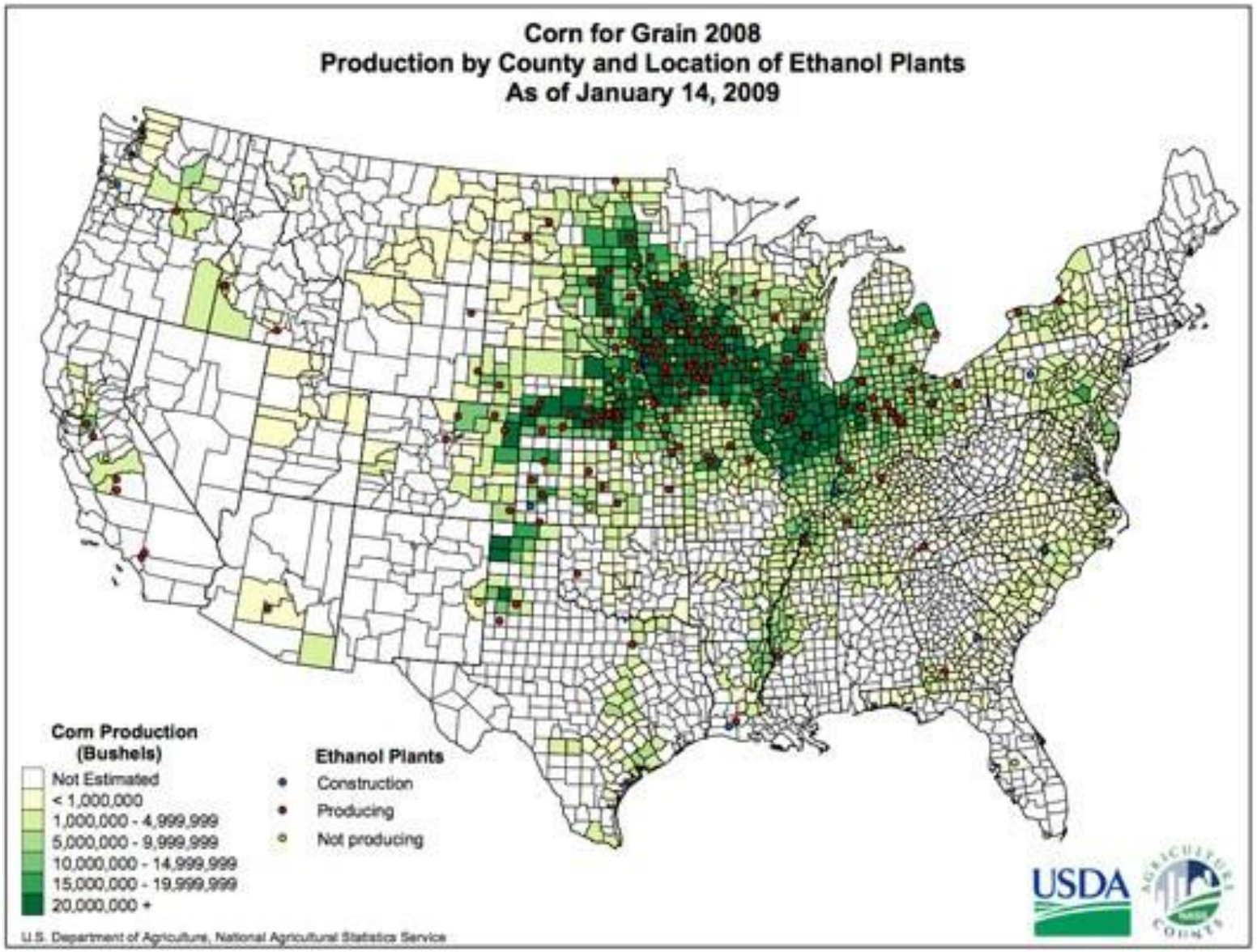
Figure 9
Larger hog farms are more likely to use growth-promoting subtherapeutic antibiotics



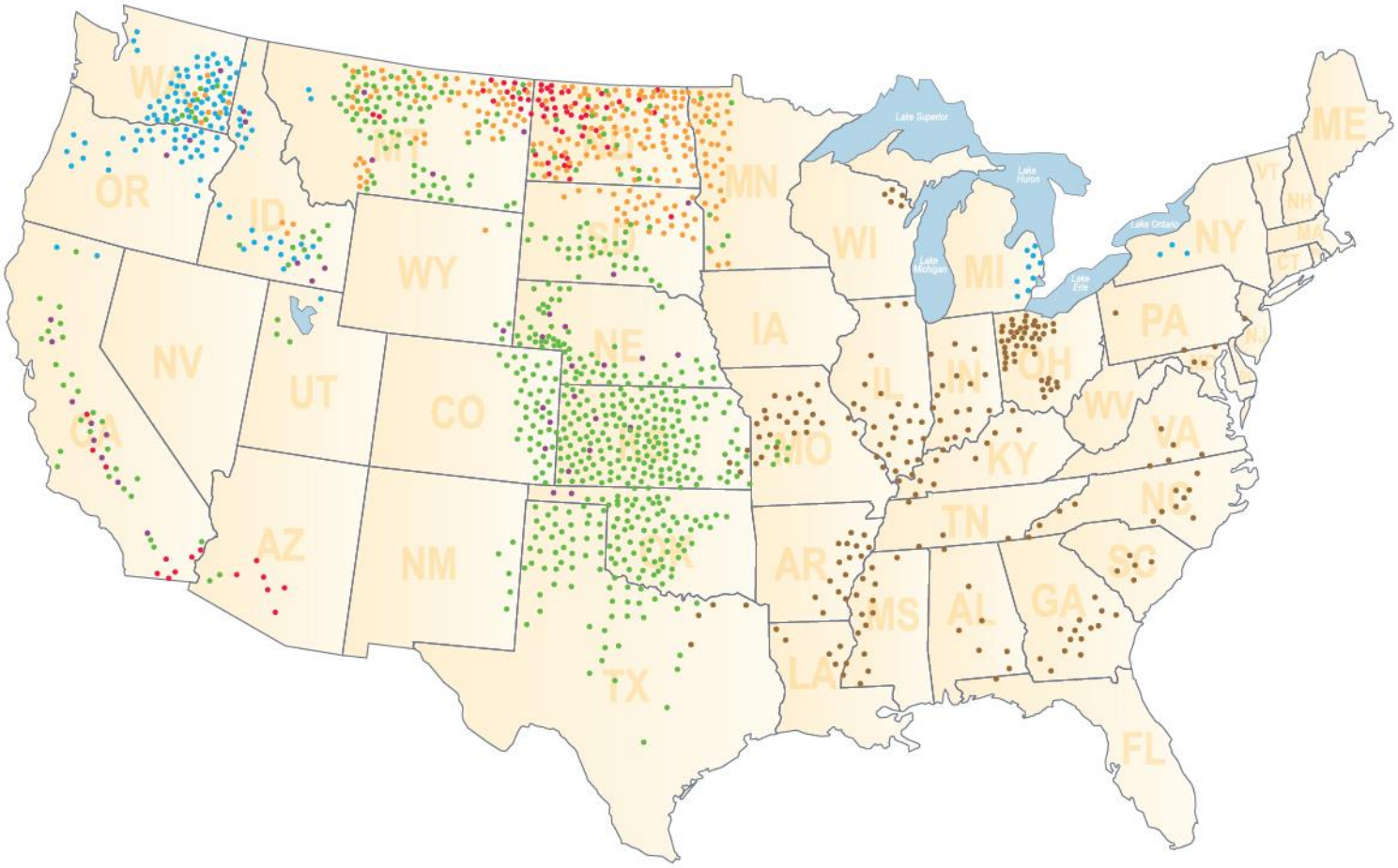
Source: 2004 Agricultural Resource Management Survey, Version 4.

Grain Agriculture

Grain Production

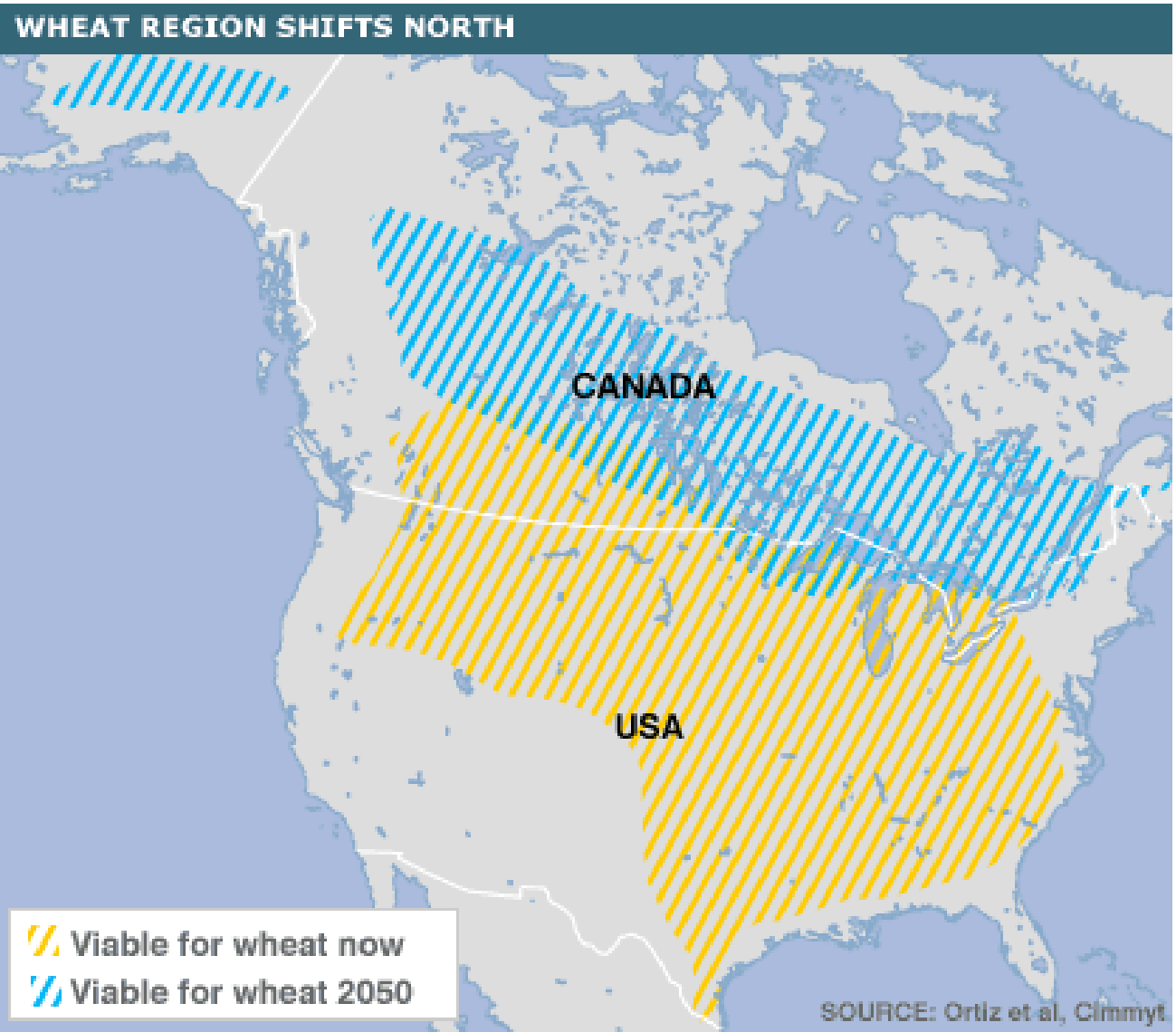


Wheat Production



HARD RED WINTER · HARD RED SPRING · SOFT RED WINTER · SOFT WHITE · HARD WHITE · DURUM

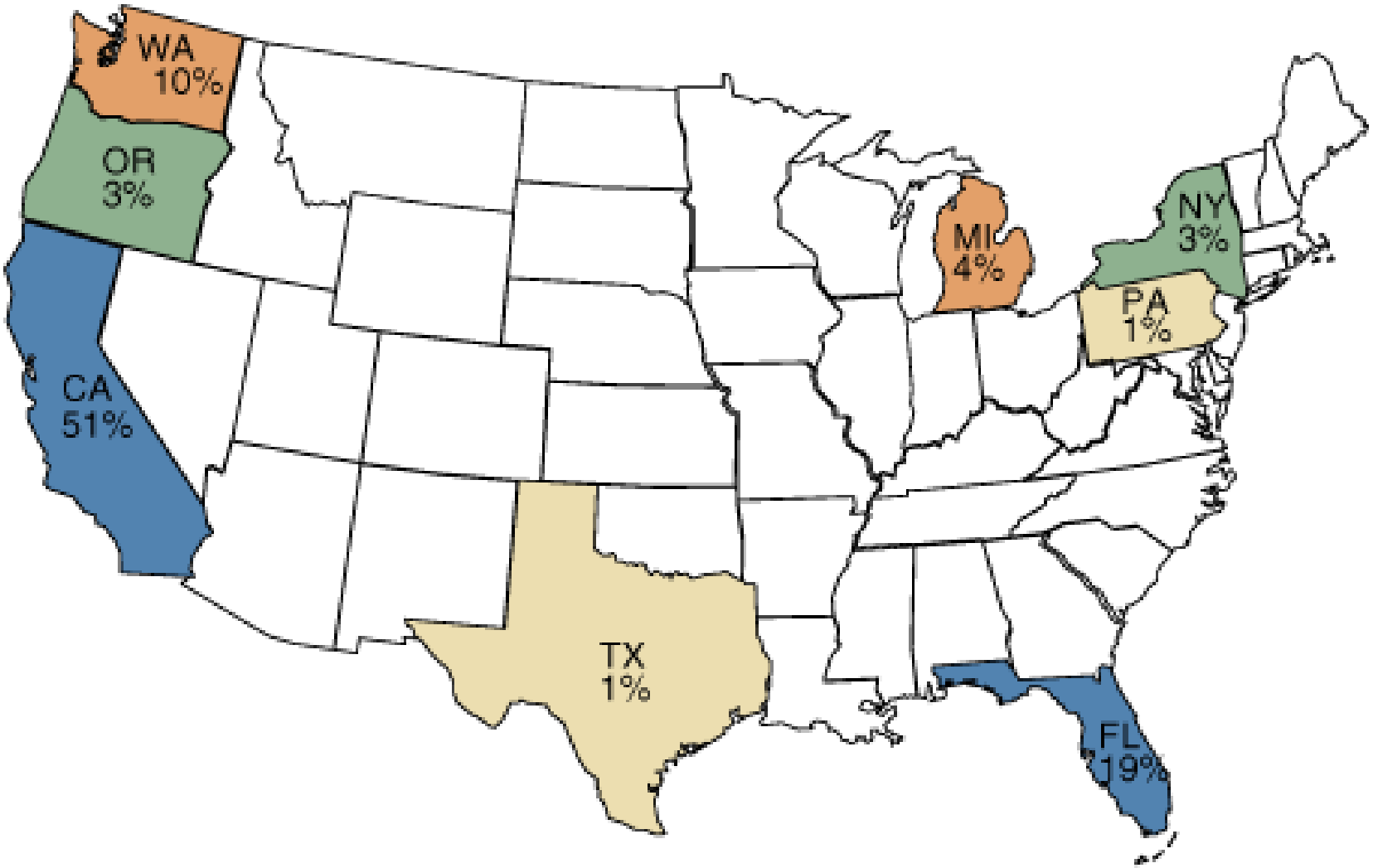
Climate Change and Wheat



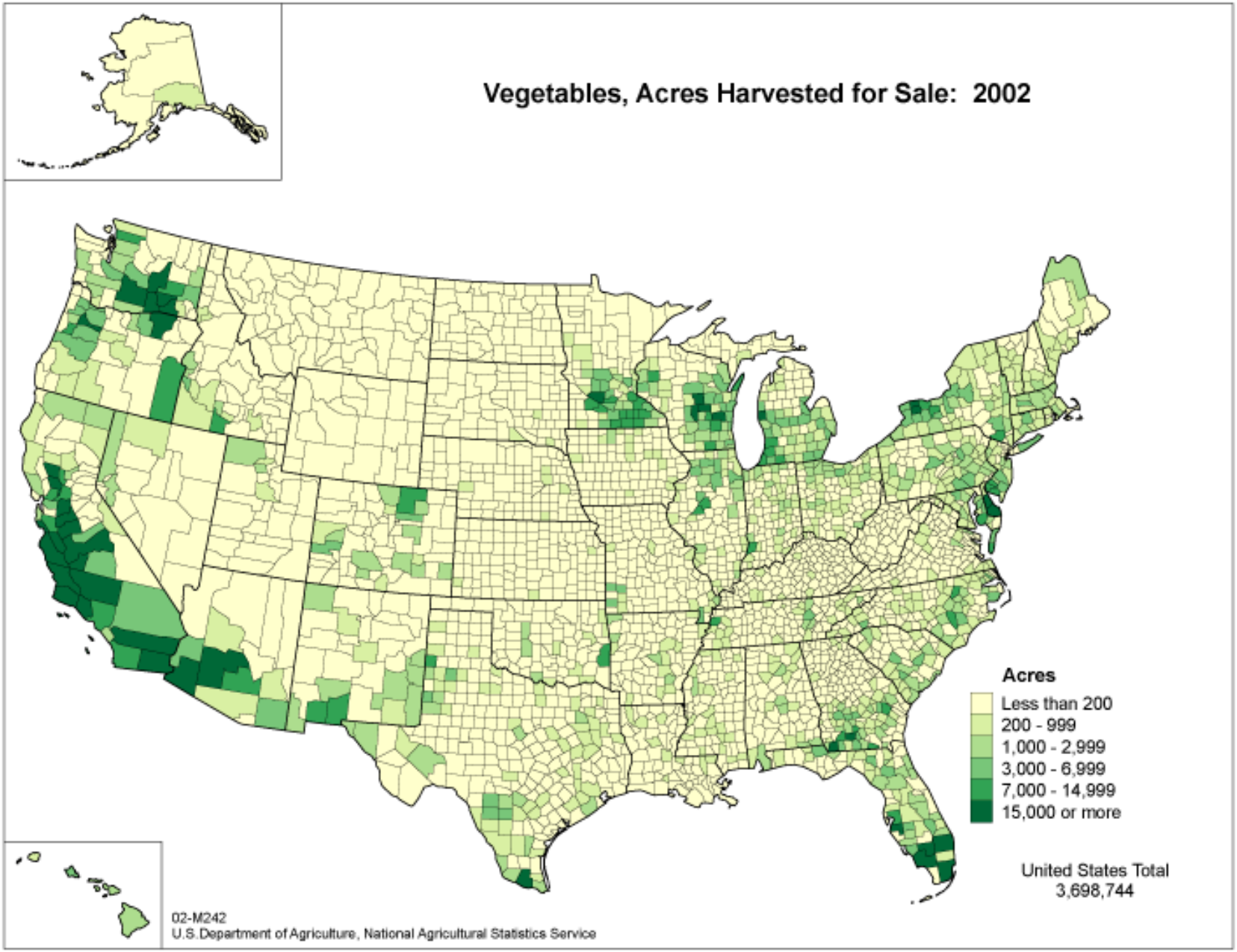
http://news.bbc.co.uk/2/hi/science/nature/6200114.stm

Vegetables and Fruit Agriculture

U.S. fruit: Top producing States, based on 2010 bearing acreage



Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service, *Citrus Fruits 2010 Summary and Noncitrus Fruits and Nuts 2010 Preliminary Summary.*

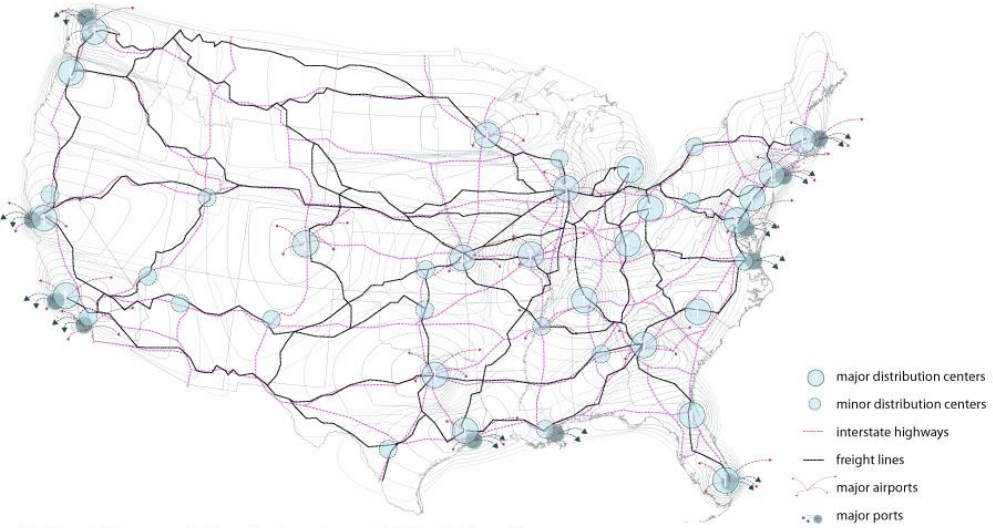

Vegetables, Acres Harvested for Sale: 2002
Acres
Less than 200
200 - 999
1,000 - 2,999
3,000 - 6,999
7,000 - 14,999
15,000 or more
United States Total
3,698,744
02-M242
U.S.Department of Agriculture, National Agricultural Statistics Service

Vegetable and Fruit Production

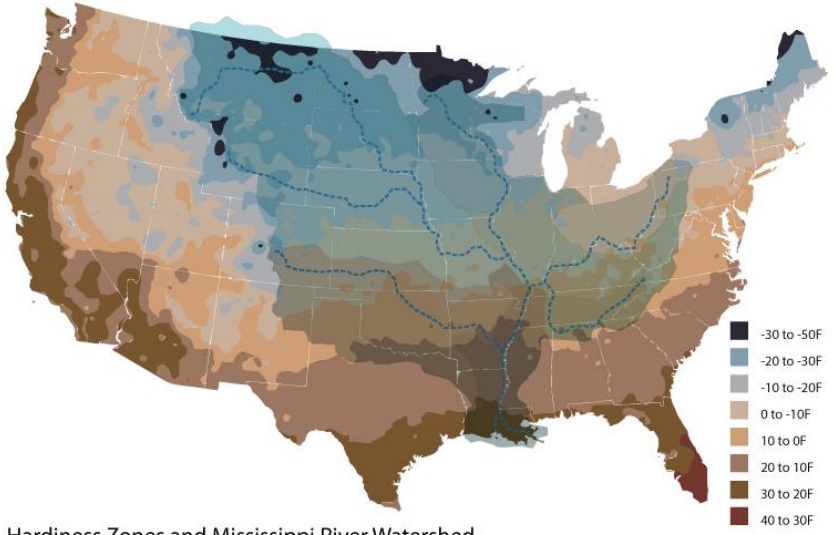
- http://www.ers.usda.gov/topics/crops/vegetables-pulses.aspx

Transportation/Distribution

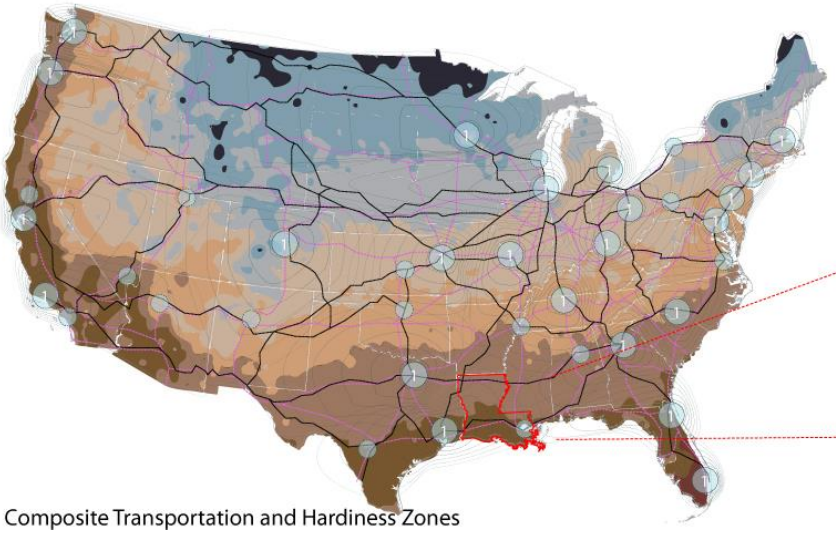
Transportation/Distribution



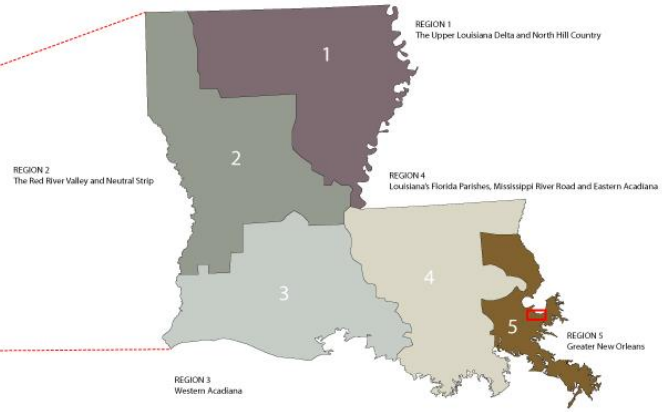
National Transportation Networks and Distribution Zones



Hardiness Zones and Mississippi River Watershed



Composite Transportation and Hardiness Zones



Local Cultural Regions and Study Area

Processing

Grain Processing

FLOUR MILLING **CR4 = unknown**

		Daily Milling Capacity*
1. Cargill/CHS (Horizon Milling)	CR3=55%**	291,500 cwts
2. ADM		277,800 cwts
3. ConAgra		248,600 cwts

Historical CR4

1982	1987	1990	2005
40%	44%	61%	63%

Source: * *Milling and Baking News* 10/10/06 and 2006 *Grain and Milling Annual*
** Total US 24-Hour Milling Capacity is 1,492,456 cwts (*Milling and Baking News* 6/20/06)

SOYBEAN CRUSHING **CR4 = 80%***

Historical CR4

1977	1982	1987
54%	61%	71%

1. ADM
2. Bunge
3. Cargill

CR3=71%**

4. Ag Processing Inc.

Census of Manufacturing

Source: *2002 Census of Manufacturing (released 6/06); **Wall Street Journal 7/22/02

ETHANOL PRODUCTION **CR4 = 31.5%**

	Million Gallons/Year (Capacity)
1. ADM	1070
2. US Biofuels	250
3. VeraSun Energy Corporation	230
4. Hawkeye Renewables	220

Historical CR4

1987	1995	1999	2002
73%	73%	67%	49%

Source: http://www.ethanolrfa.org/industry
Note: Farmer owned ethanol plants accounted for 39% of total capacity.

Animal Processing

BEEF PACKERS **CR4 = 83.5%***

	Daily Slaughter Capacity**
1. Tyson	36,000 head
2. Cargill	28,300 head
3. Swift & Co.	16,759 head
4. National Beef Packing Co.	13,000 head

Historical CR4

1990	1995	1998	2000	2005
72%	76%	79%	81%	83.5%

Source: *Cattle Buyer's Weekly: Steer and Heifer Slaughter reported in *Feedstuffs* 6/16/03. **Feedstuffs Reference Issue 2006 (9/13/06) as reported in *Feedstuffs* 1/29/07.
Note: Smithfield Foods is the 5th largest beef packer after a series of acquisitions.

PORK PACKERS **CR4 = 66% (Estimated)***

	Daily Capacity**
1. Smithfield Foods	102,900
2. Tyson Foods	72,800
3. Swift & Co.	46,000
4. Cargill	36,000

Historical CR4

1987	1989	1990	2001**	2005***
37%	34%	40%	59%	64%

** *Feedstuffs Reference Issue* 2001.
*** 2007 *Feedstuffs* Reference Issue

Source: *Smithfield is reported to process 27 million hogs per year and account for 26% of the total market. From this figure, we estimated the CR 4. *New York Times* 1/26/07 ** Daily Capacity from 2007 *Feedstuffs* Reference Issue.

Poultry Processing

BROILERS **CR4 = 58.5%***

1. Pilgrim's Pride
2. Tyson
3. Perdue
4. Sanderson Farms

Historical CR4

1986	1990	1994	1998	2001
35%	44%	46%	49%	50%

Source: **Feedstuffs* 1/15/07
Note: The CR2 in this sector is 47%.

TURKEYS **CR4 = 55%***

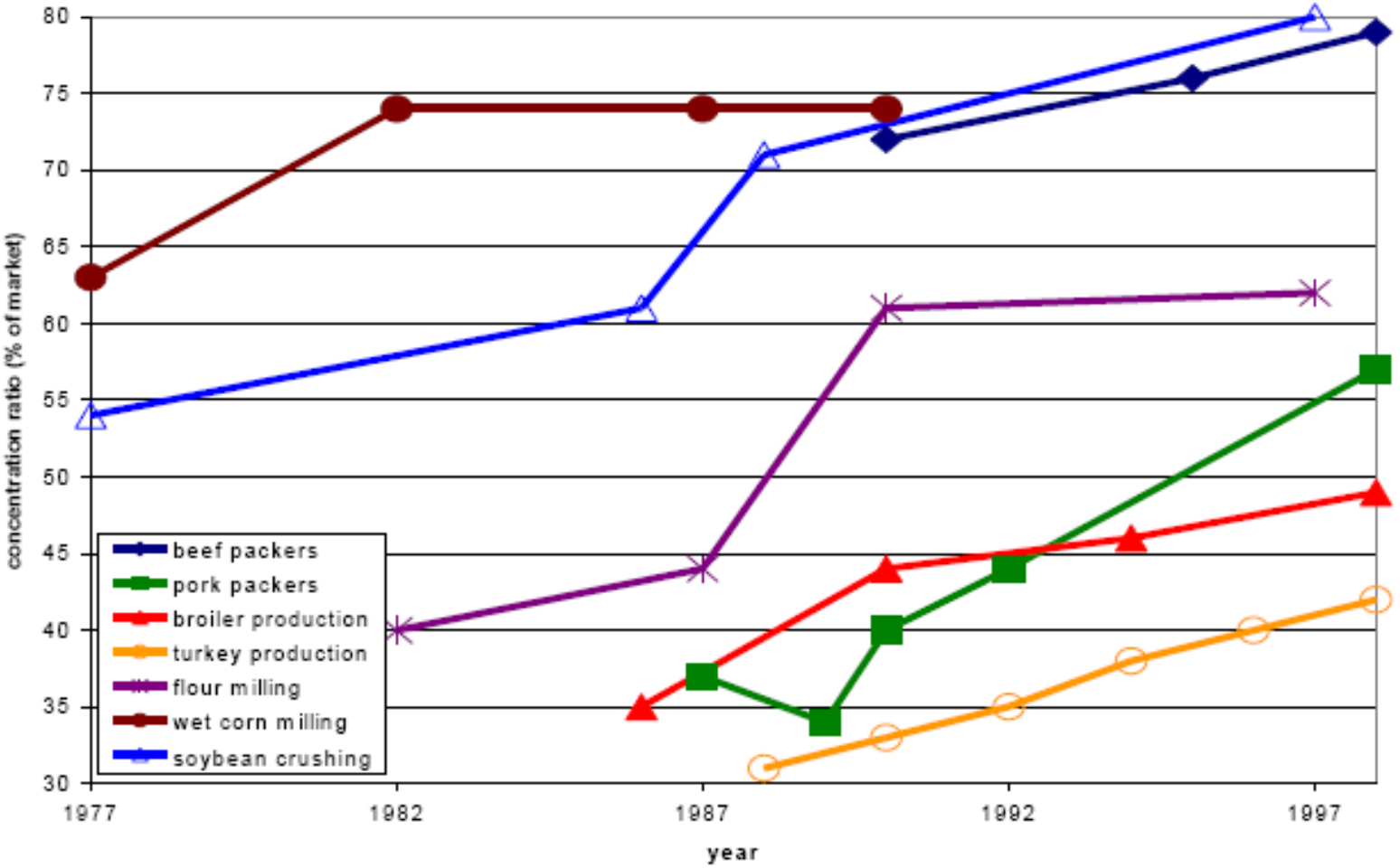
	Slaughter Capacity
1. Butterball LLC**	1,420 Million #s
2. Hormel Foods (Jennie-O Turkey Store)	1,265 Million #s
3. Cargill	961 Million #s
4. Sara Lee	260 Million #s

Historical CR4

1988	1992	1996	2000	2005
31%	35%	40%	45%	51%

Source: **Feedstuffs* 10/9/06 (CR 4 is extrapolated from market share of new company.)
** Butterball LLC was created through a joint venture between Smithfield (49%) and Maxwell Foods (51%) that bought ConAgra's turkey operations.

Figure 6: Four Firm Concentration Ratios for Selected Agricultural Markets



Heller & Keoleian (2000) Life Cycle-Based Sustainability Indicators for Assessment of the U.S. Food System. Report No. CSS00-04

Seed and Chemical Input Industries

Seeds and Crop Inputs

INPUT MARKET NOTES

Corn Seed: CR2=58%*

The CR2 in the U.S. corn seed market has remained relatively stable, changing little from a CR2 of 56%** that existed in 1997. However, while Pioneer dominated the market 10 years ago, now DuPont (Pioneer) and Monsanto have roughly equal shares.

Source: **Wall Street Journal*, 1/22/2007; ** Jorge Fernandez-Cornejo, 2004, USDA-ERS, The Seed Industry in the US.

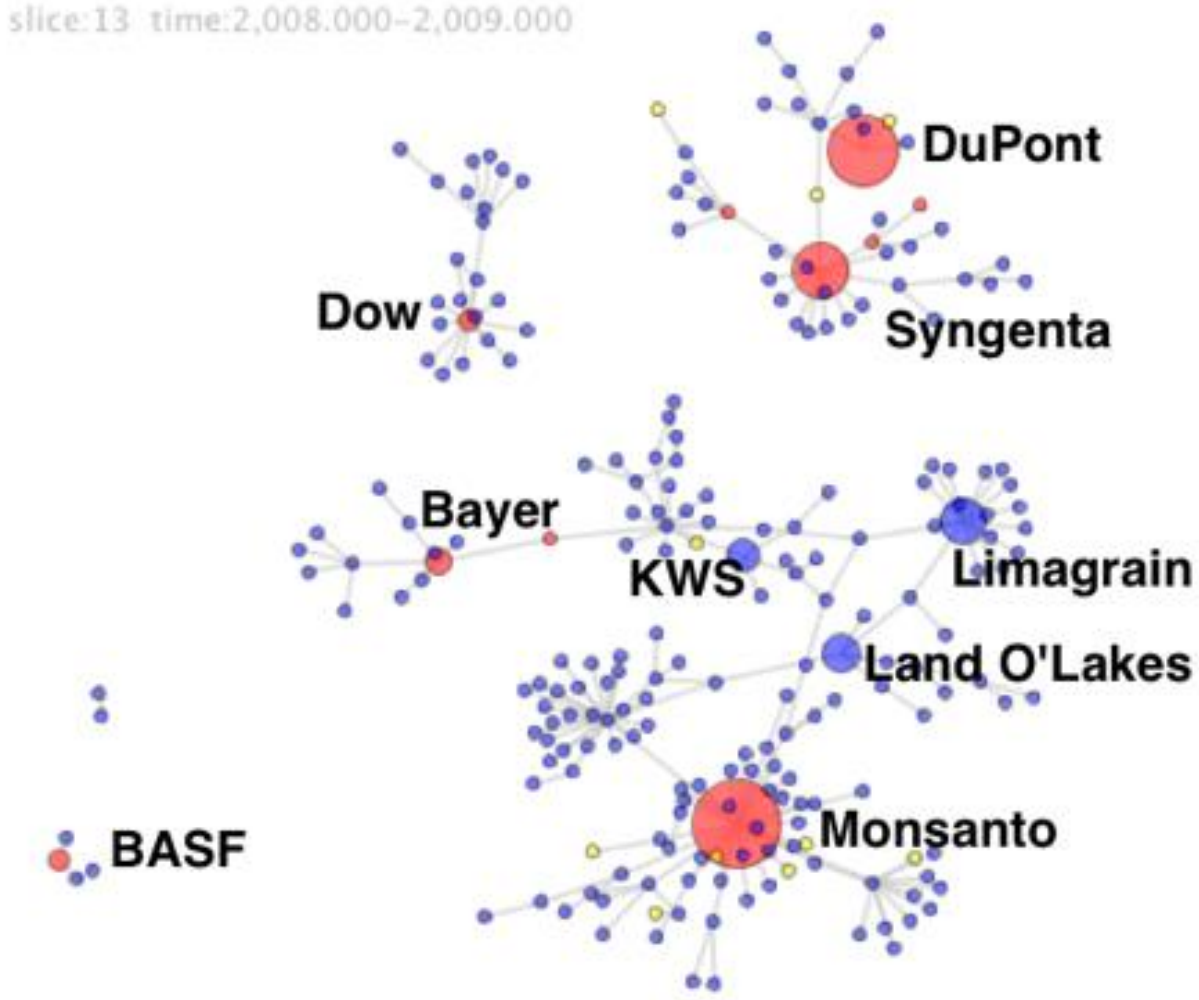
Globally, Monsanto has its genetically modified seeds for corn, cotton, soybeans and canola on more than 90% of acreage that uses GMO seeds. By comparison, Syngenta is in 2nd place with about 4% of global biotech acreage using its seed.

Source: *Financial Times*, 11/16/2006.

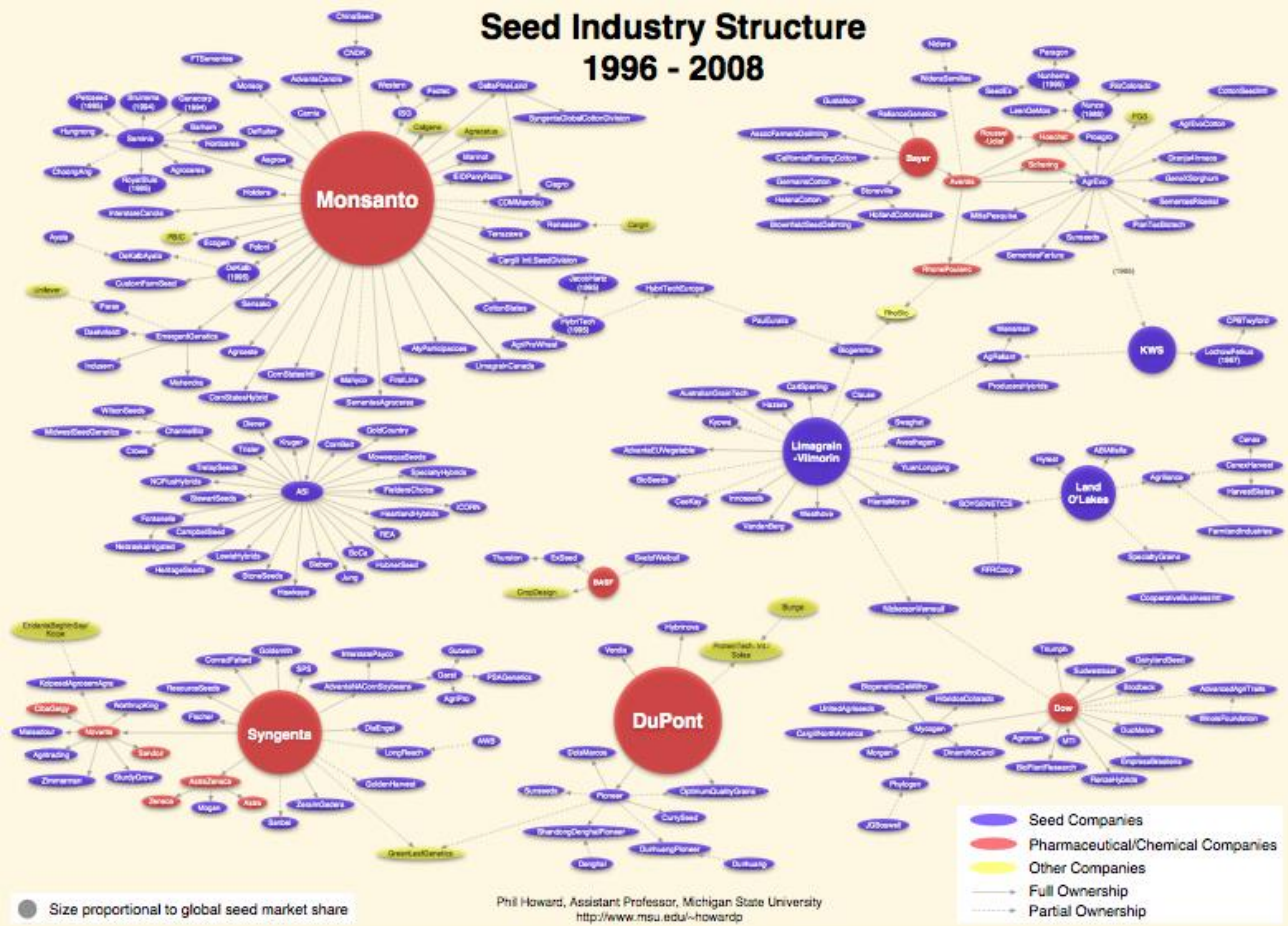
Globally, four seed firms, DuPont (Pioneer), Monsanto, Syngenta and Limagrain have about 29% of the world market for commercial seeds.

Source: *Tracing the Trend Towards Market Concentration*. UN Conference on Trade and Development. 2006.

Seed Company Mergers



- https://www.msu.edu/~howardp/seedanimation.html


Seed Industry Structure
1996 - 2008
Monsanto
Bayer
KWS
Limagrain -Vilmorin
Land O'Lakes
BASF
Syngenta
DuPont
Dow
Seed Companies
Pharmaceutical/Chemical Companies
Other Companies
Full Ownership
Partial Ownership
Size proportional to global seed market share
Phil Howard, Assistant Professor, Michigan State University
http://www.msu.edu/~howardp

Concentrated Intermediaries

Figure 3: *The Novartis/Archer Daniels Midland food chain cluster (situation in 1999)*

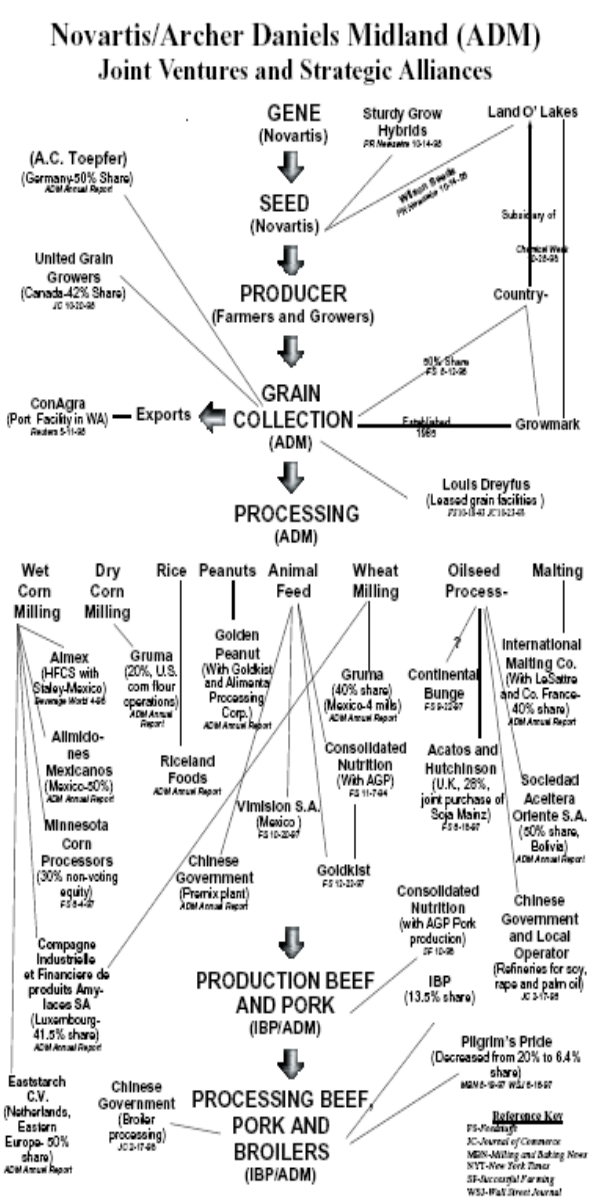


Figure 2: *The Con Agra food chain cluster (situation in 1999)*

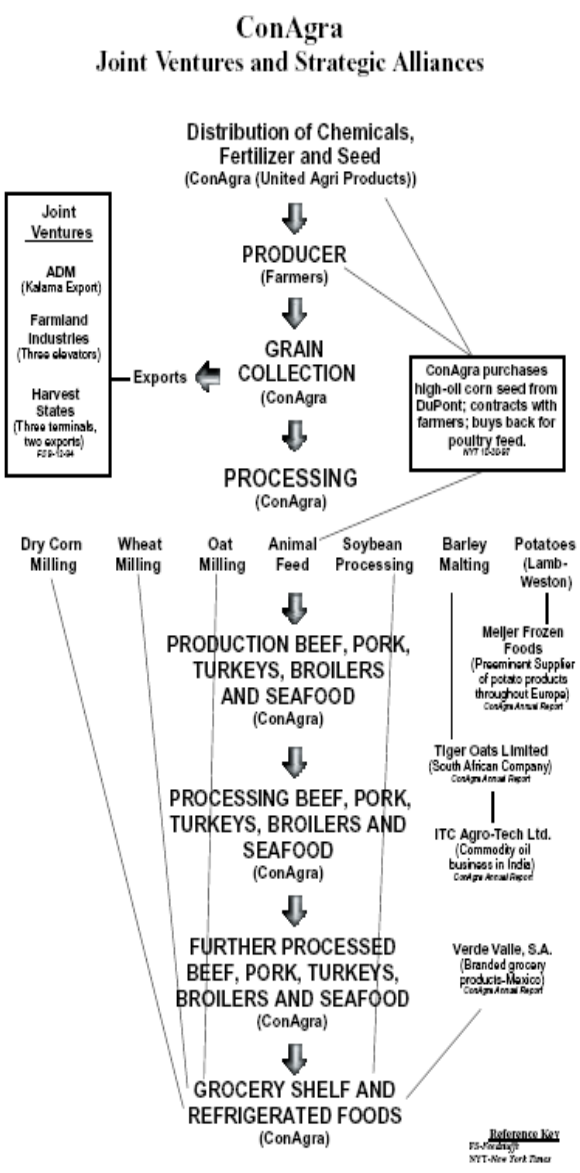
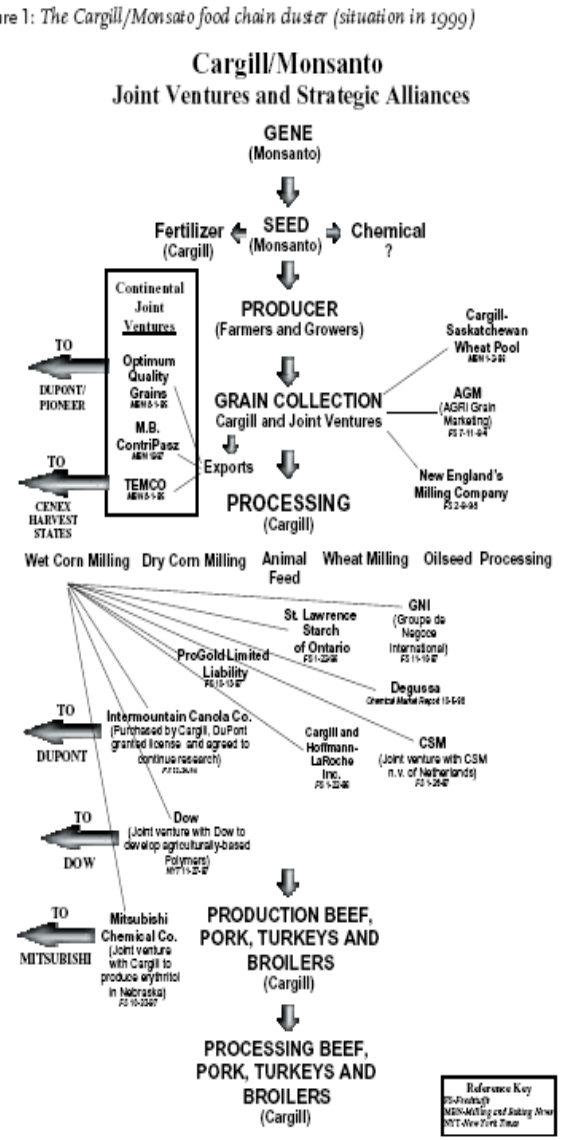


Figure 1: *The Cargill/Monsato food chain cluster (situation in 1999)*



Food Manufacturing

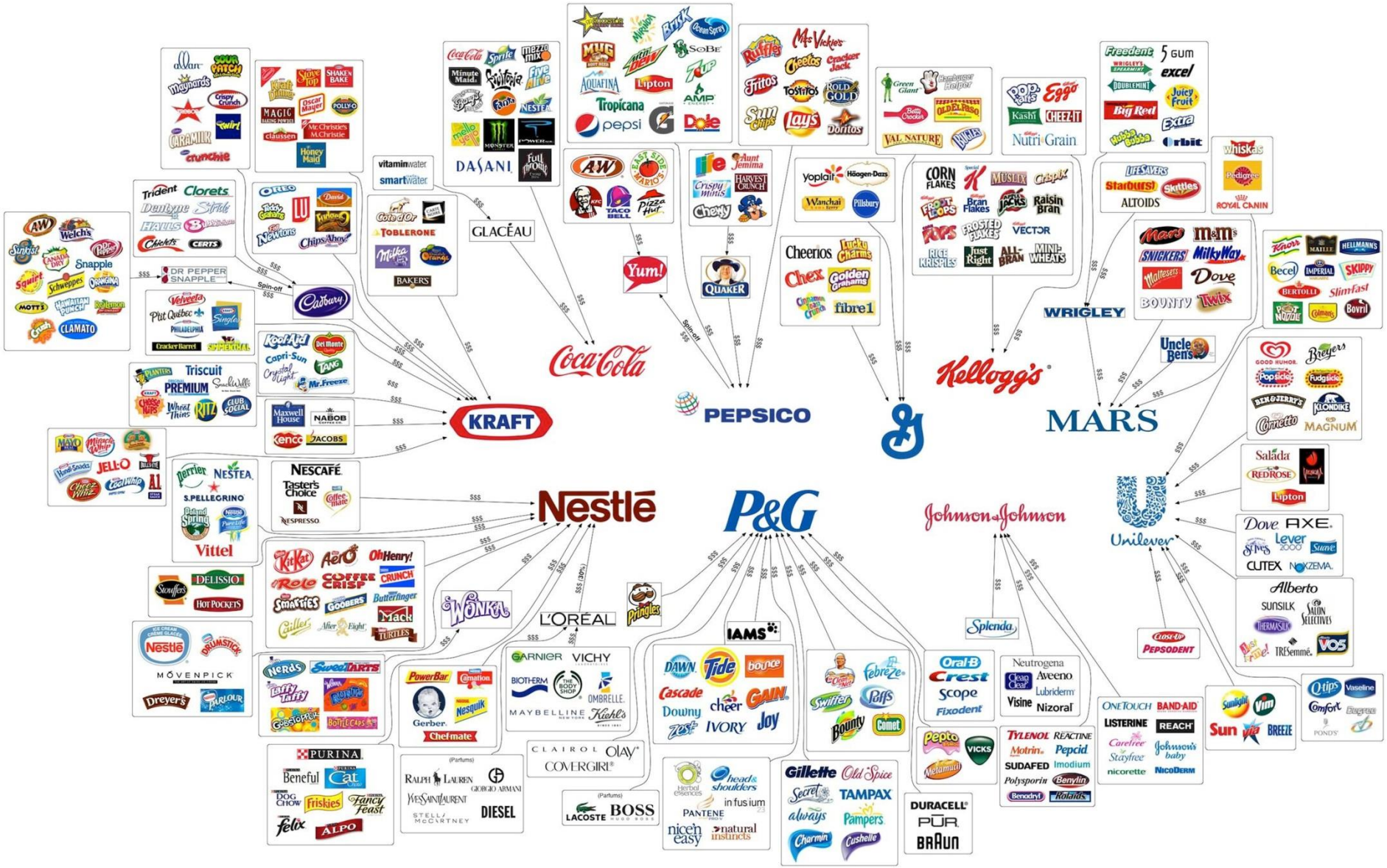
Food Manufacturing

TOP U.S. FOOD PROCESSING COMPANIES:

	Company (Fiscal year in parentheses if different from calendar year)	2005 Food Sales ($ millions)	2002 Food Sales ($ millions)
1.	Tyson Foods Inc. (10/1/05)	23,899	21,285
2.	Kraft Foods Inc.	23,293	21,485
3	Pepsico Inc.	21,186	17,363
4.	Nestle (US & Canada)	19,941	13,110
5.	Anheuser-Busch Cos. Inc.	11,546	10,574
6.	Dean Foods Co.	10,505	8,992
7.	General Mills (5/28/06)	9,803	9,206
8.	Smithfield Foods Inc. (4/30/06)	9,614	7,356
9.	ConAgra Foods Inc. (5/28/05)	8,195	22,521
10.	Swift & Company (5/29/05)	7,847	8,476

Source: Food Processing, Vol. 67(8):34-48, August 2006.

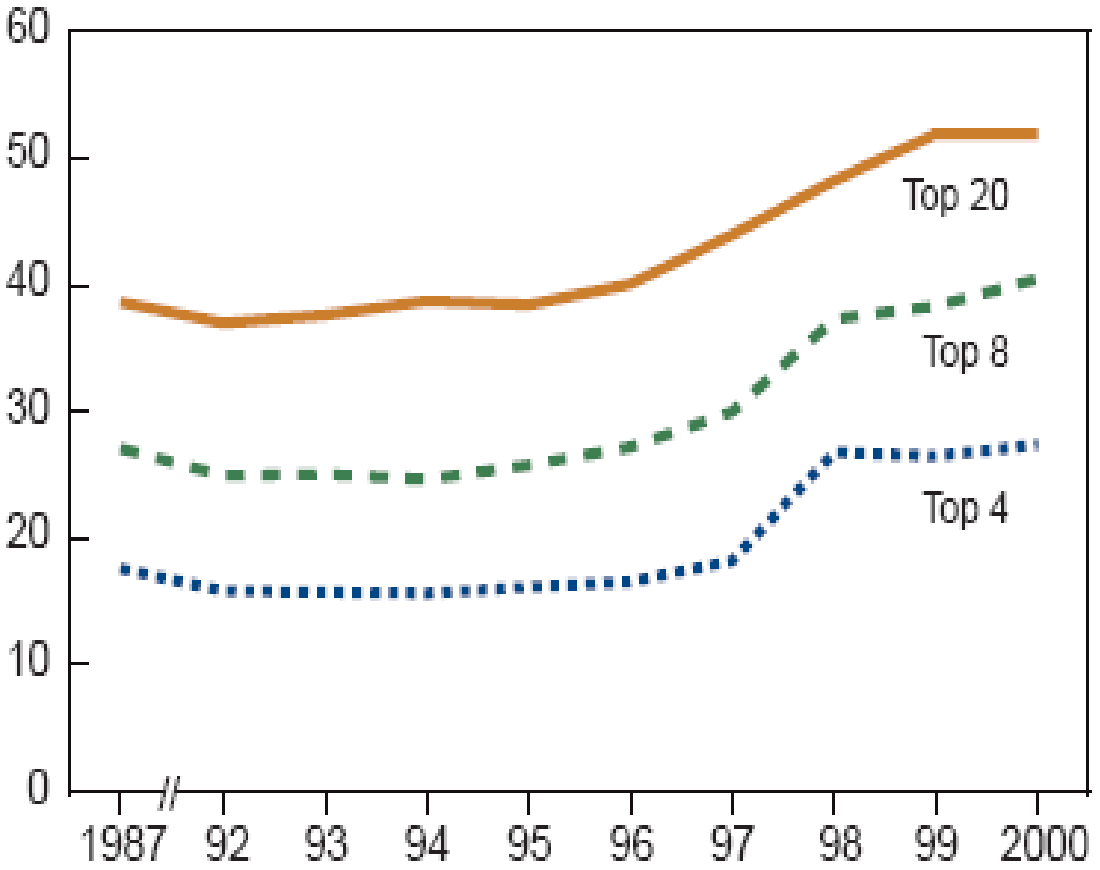
Brand Ownership



Food Retailing

U.S. food retailing concentration

Percent of U.S. grocery store sales



Sources: Monthly Retail Trade Survey, Census Bureau;
Company annual reports.

In USDA ERS US Food Marketing System Report, 2002

Retail Restructuring

- More concentration – guess who?
  - That's right, this time driven by mass-retailers such as Walmart and SuperTarget
  - Although we are starting to see national supermarket conglomerates such as Kroger (owns Dillons) through acquisitions
  - Strong focus on scientific and technologically sophisticated supply chain management
    - The ideal is that when a product is rung up at the cash register, a signal is sent all the way back to the farm to plant another crop

Table 3-5—Sales of the largest 20 U.S. grocery retailers in 2000[1]

Rank (2000)	Company	Sales 2000	1999	1998	1997
			$ billion		
1	The Kroger Company/Fred Meyer	49.0	45.3	43.1	33.9
2	Albertson's, Inc. / American Stores, Inc.[2]	31.5	28.9	16.0	14.7
3	Safeway Stores, Inc.[3]	28.5	25.5	21.2	19.1
4	Wal-Mart Supercenters[5]	22.9	15.7	12.8	11.5
5	**Ahold, USA[4]**	21.8	20.3	16.1	14.3
6	Publix Supermarkets	14.7	13.1	12.1	11.2
7	Winn-Dixie Stores	13.7	13.9	13.9	13.2
8	**Delhaize America (Food Lion, Hannaford)**	12.7	10.9	10.5	10.2
9	**Great Atlantic & Pacific Tea Co.**	8.2	8.0	8.3	8.3
10	Supervalu[7]	8.1	6.3	5.1	4.7
11	H.E. Butt Grocery Company	7.9	7.5	6.9	6.5
12	Shaw's Supermarkets	4.0	3.1	2.8	2.5
13	**Southland Corporation (7-Eleven)**	3.9	3.8	4.1	4.0
14	Raley's	3.8	2.6	2.5	2.0
15	Pathmark Stores	3.8	3.7	3.7	3.7
16	Meijer Inc.[6]	3.5	3.6	3.0	2.8
17	Hy-Vee Food Stores, Inc.[8]	3.4	3.3	3.2	2.9
18	Fleming[7]	3.3	2.2	2.1	2.0
19	Wegman's Food Markets	2.8	2.3	2.4	2.3
20	**Aldi USA, Inc.**	2.5	2.0	2.4	1.8

Source: USDA ERS US Food Marketing System Report, 2002

U.S. Retail Concentration

U.S. FOOD RETAILING **CR5 = 48%***

Supermarket	Sales in Thousands 2006	2005	2004	Change '04-'06
1)Wal-Mart	$ 98,745,400	$ 79,704,300	$66,465,100	48.57%
2)Kroger	$ 58,544,668	$ 54,161,588	$46,314,840	26.41%
3)Albertson's**	$ 36,287,940	$ 36,733,840	$31,961,800	13.54%
4)Safeway	$ 32,732,960	$ 29,359,408	$29,572,140	10.69%
5)Ahold	$ 23,848,240	$ 21,052,200	$25,105,600	-5.01%

Historical CR5

1997	2001	2004
24%	38%	46%

Source: * *Progressive Grocer's Super 50* (5/1/05) *Progressive Grocer* reports only grocery sales from supermarkets and does not report general merchandise, drug or convenience sales. **Note the CR5 is from 2005, and has most likely grown larger given the rates of change from 2004 to 2005.** In February 2005, the top 50 supermarkets accounted for 82% of total supermarket sales nationally.

** Supervalu completed their acquisition of 60% of Albertsons in June 2006. The remaining 40% was sold to Cerebus Capital Management. **Supervalu is now the 3rd largest supermarket.** *Progressive Grocer* 2/1/07.

Global Retail Concentration

WORLD'S TOP GROCERY RETAILERS 2006

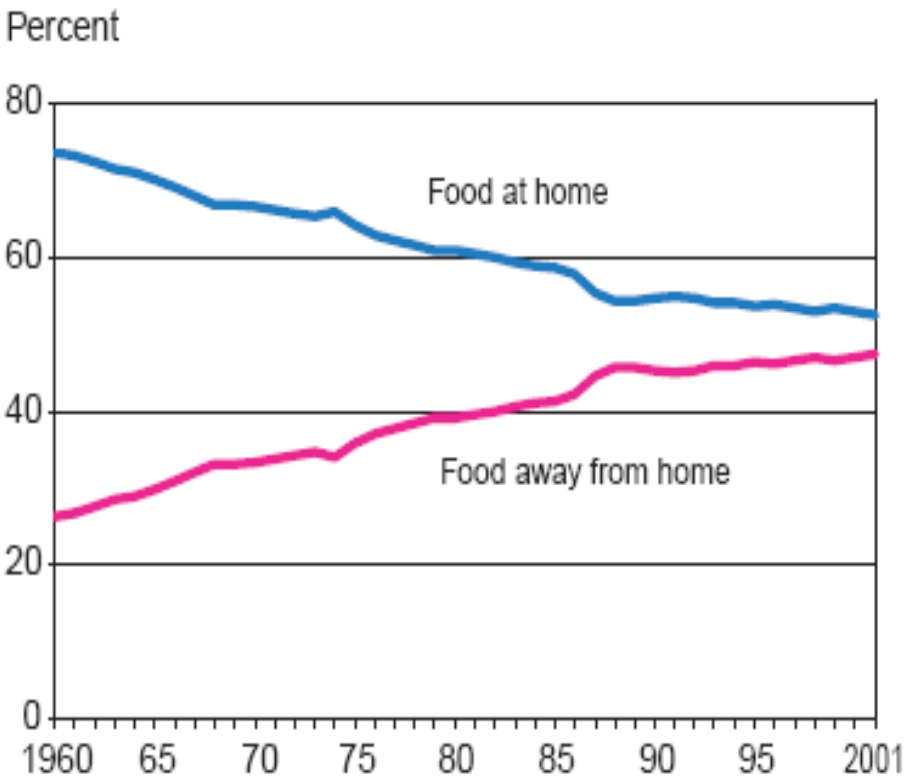
1.	Wal-Mart Stores (United States)	$312.4 billion annual sales
2.	Carrefour (France)	$ 92.6
3.	Tesco (United Kingdom)	$ 69.6
4.	Metro Group (Germany)	$ 69.3
5.	Kroger (United States)	$ 60.6
6.	Ahold (The Netherlands)	$ 55.3
7.	Costco (United States)	$ 52.9
8.	Rewe (Germany)	$ 51.8
9.	Schwarz Group (Germany)	$ 45.8
10.	Aldi (Germany)	$ 45.0

Source: *Supermarket News* 5/29/06

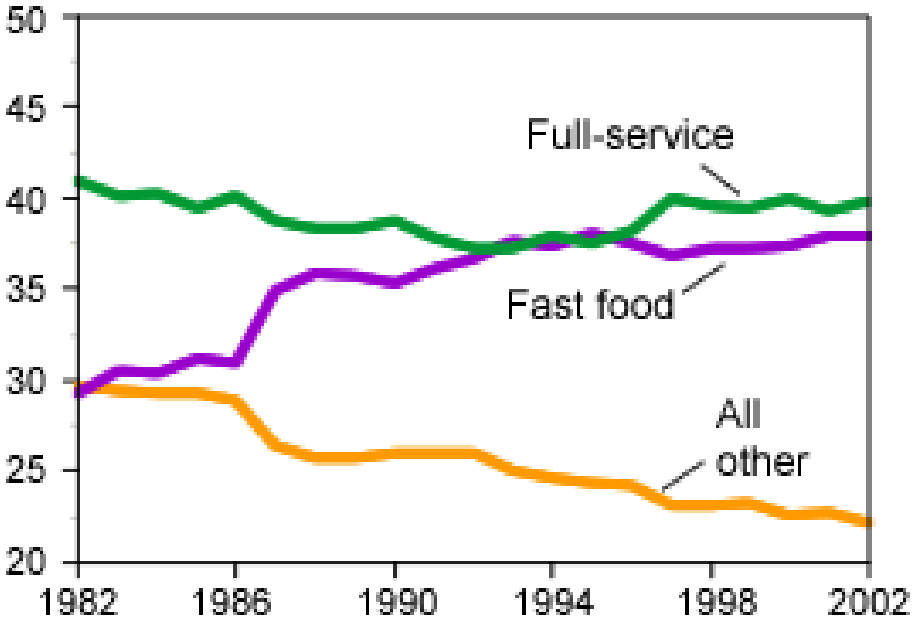
Foodservice - Restaurants

Rise of Foodservice

Share of U.S. food expenditures for food at home and away from home, 1960-2001



Away-from-home market, by outlet type



Source: ERS, USDA.
http://www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/Data/table1.htm

Consumer Food Costs

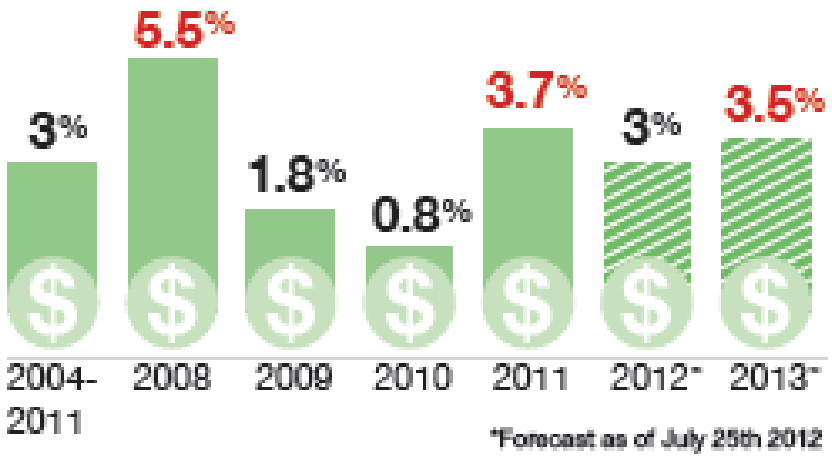
USDA

United States Department of Agriculture

US Drought and Your Food Costs

Note: Graphics represent all food (food at home + food away from home).

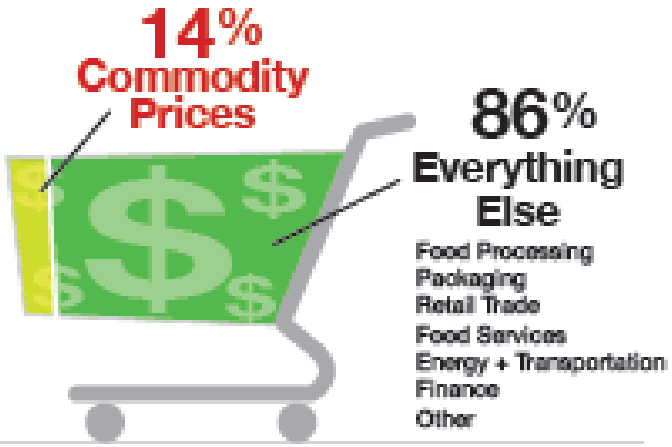
Historical Food Price Inflation



*Forecast as of July 25th 2012

What it means: Food price inflation is expected to be close to the historical average this year and just slightly above that next year.

What Affects Your Food Costs?



What it means: Commodity prices are just one of many factors affecting retail food prices. Commodities make up about 14% of the average retail food purchase, so even if all commodity prices doubled, retail food prices would increase by about 14%."

*For additional information, see USDA ERS resources: http://www.ers.usda.gov/media/131100/err114.pdf and http://www.ers.usda.gov/data-products/food-price-outlook.aspx.

National Farmers Union

United to Grow Family Agriculture

Farmer's Share of Retail Food Dollar

Did you know that farmers and ranchers receive only 15.8* cents of every food dollar that consumers spend on food at home and away from home?

According to USDA, off farm costs including marketing, processing, wholesaling, distribution and retailing account for more than 80 cents of every food dollar spent in the United States.

Bacon
1 Pound

Retail: $4.83
Farmer: $0.84

Top Sirloin Steak
1 Pound

Retail: $8.49
Farmer: $1.98

Bread
1 Pound

Retail: $3.19
Farmer: $0.20

Fresh Carrots
5 Pounds

Retail: $4.39
Farmer: $1.30

Beer
6-Pack Cans

Retail: $6.59
Farmer: $0.06

Cereal
18 Ounce Box

Retail: $4.69
Farmer: $0.10

Tomatoes
1 Pound

Retail: $3.28
Farmer: $0.47

Eggs
1 Dozen

Retail: $2.89
Farmer: $1.07

Flour
5 Pounds

Retail: $3.09
Farmer: $1.00

Boneless Ham
Price per Pound

Retail: $3.99
Farmer: $0.84

Lettuce
1 Head (2 Pounds)

Retail: $2.19
Farmer: $0.40

Milk
1 Gallon, Fat Free

Retail: $4.19
Farmer: $1.90

Potato Chips
Lays Classic, 10.5 oz

Retail: $4.29
Farmer: $0.19**

Fresh Potatoes
Russet, 5 Pounds

Retail: $3.99
Farmer: $0.33**

Soda
Two Liter Bottle

Retail: $1.49
Farmer: $0.11

Farmer's share derived from USDA, NASS "Agricultural Prices," 2012.
Retail based on Safeway (SE) brand except where noted.
*Figure according to U.S. Department of Agriculture Economic Research Service
**Reflects October 2012 prices.

www.nfu.org

December 1, 2012

HYDRATION NATION

2010 per capita beverage consumption in the U.S., by gallon

CARBONATED SOFT DRINKS
44.7 gallons
51.5 gallons in 2005

BOTTLED WATER
28.3 gallons
25.4 gallons in 2005

BEER
20.8 gallons
21.4 gallons in 2005

MILK
20.4 gallons
21.2 gallons in 2005

COFFEE
18.5 gallons
18.8 gallons in 2005

FRUIT BEVERAGES
11.5 gallons
13.9 gallons in 2005

TEA
10.3 gallons
9.9 gallons in 2005

SPORTS BEVERAGES
4 gallons
4.1 gallons in 2005

WINE
2.3 gallons
2.2 gallons in 2005

VALUE-ADDED WATER
1.5 gallons
1.1 gallons in 2005

DISTILLED SPIRITS
1.5 gallons
1.4 gallons in 2005

ENERGY DRINKS
1.2 gallons
0.5 gallons in 2005

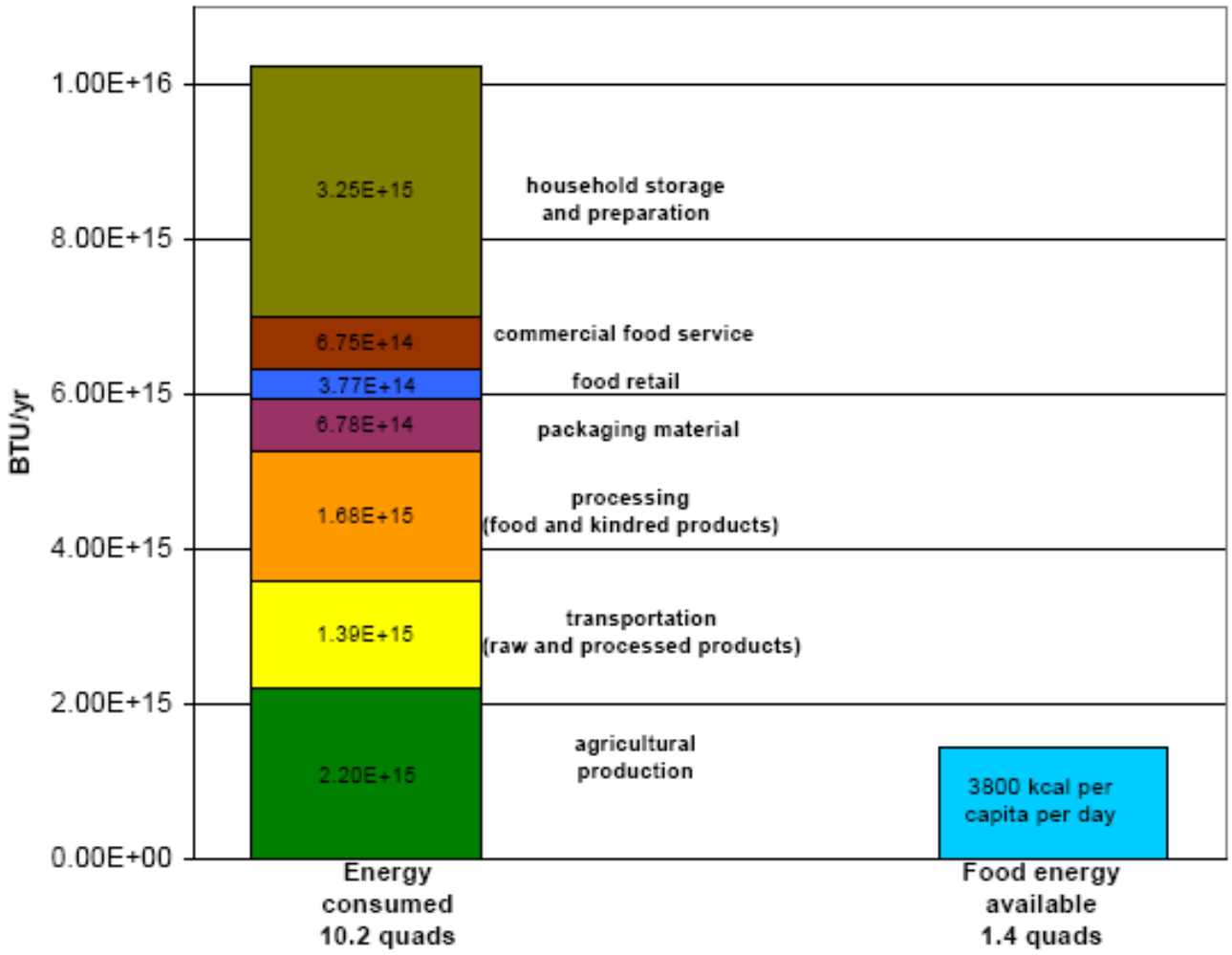
Sustainability Trends

Table 11: Summary of Key Indicators showing Unsustainable Trends of the U.S. Food System

	Economic	Social	Environmental
Production	– Rapid conversion of prime farmland – 84% of farm household income earned off-farm – Increasing number of farms report a net loss (48% in 1997)	– 52% of farmworkers are illegal – age of farm operators increasing; declining entry of young farmers	– depletion of topsoil exceeds regeneration – rate of groundwater withdrawal exceeding recharge in major agricultural regions – losses to pests increasing – reduction in genetic diversity
Consumption	– Costs of diet related diseases increasing	– Obesity rates rising – Diet deviates from nutritional recommendations	– 26% edible food wasted
Total system	– Marketing is 80% of food bill – Industry consolidation in food system threatens market competition	– Relation with food and its origin has been lost	– Heavy reliance on fossil energy – 7.3 units of energy consumed to produce one unit of food energy

Heller & Keoleian (2000) Life Cycle-Based Sustainability Indicators for Assessment of the U.S. Food System. Report No. CSS00-04

Figure 5: Life Cycle Energy Use in Supplying US Food
(see Appendix B for sources and methodology)



Heller & Keoleian (2000) Life Cycle-Based Sustainability Indicators for Assessment of the U.S. Food System. Report No. CSS00-04

Environmental Impacts

- Millenium Ecosystem Assessment summary…
- Soil loss
- Water pollution/dead zones
- Biodiversity loss
- Other?

Agricultural Labor

Most vegetable and fruit seasonal labor is from migrant workers – both legal and illegal

Migrant Labor Statistics

- Supports the $28 billion fruit and vegetable industry in the U.S.
- In 2006, the U.S. Department of Agriculture found that of the 3 million people working in the agricultural industry, 1 million of them were hired farmworkers.
- The 2007-2009 NAWS survey results indicate that 48% of farmworkers do not have legal authorization to work in the United States and only 33% are U.S. citizens
- 68 percent of all farmworkers were born in Mexico
  - From 1942 to 1964, the Bracero Program allowed for over 4 million guest workers to come in from rural, poor areas in Mexico because of agricultural worker shortage in the United States.
  - In 1964, the program was terminated and replaced by the H2 Temporary Guest Worker program with H2A being agricultural workers and H2B being those guest workers who do non-agricultural work.
  - In 2010, the U.S. Department of State granted 55,921 H2A visas.

http://www.ncfh.org/docs/fs-Facts%20about%20Farmworkers.pdf

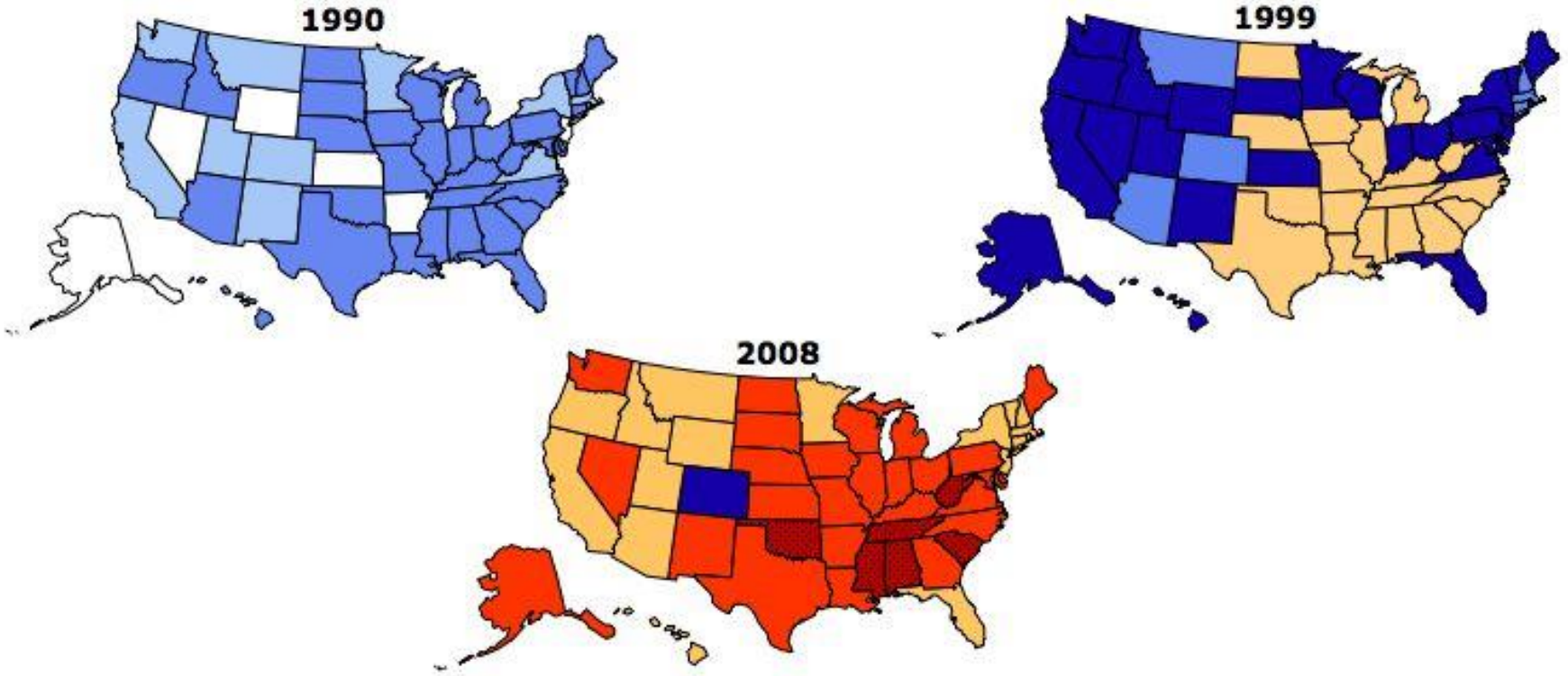
Agricultural Concentration

- Decline in number of farms
- Farmers as percentage of total population
- Proportion of farmers actually producing at any volume
  - Hobby vs. productivist farms

Obesity Trends* Among U.S. Adults

BRFSS, 1990, 1999, 2008

(*BMI ≥30, or about 30 lbs. overweight for 5'4" person)



Source: CDC Behavioral Risk Factor Surveillance System.

Diet and Obesity

"First, the highest rates of obesity occur among population groups with the highest poverty rates and the least education. Second, there is an inverse relation between energy density (MJ/kg) and energy cost ($/MJ), such that energy-dense foods composed of refined grains, added sugars, or fats may represent the lowest-cost option to the consumer. Third, the high energy density and palatability of sweets and fats are associated with higher energy intakes, at least in clinical and laboratory studies. Fourth, poverty and food insecurity are associated with lower food expenditures, low fruit and vegetable consumption, and lower-quality diets."

- Drewnowski and Specter (2004) ***Poverty and obesity: the role of energy density and energy costs***. Am J Clin Nutr, Vol. 79 No. 1: 6-16

Overall Description

- Highly developed commoditized market system
- Significant social and cultural distance between consumptive awareness/decisions and production decisions/activities
- Major unsustainable externalities in environmental, social, and economic terms
- Democratic governance highly questionable
  - Regulators challenged with a highly complex and technically sophisticated system
  - Food system shaped like a lop-sided hourglass
    - Many farmers, few input suppliers and intermediaries, many many consumers
    - Those without money are mostly left out and food insecure

Major Studies Used

- USDA Economic Research Service (ERS)
  - Many summary reports on trends in food systems sectors
- Philip Howard – Michigan State University professor
  - Excellent infographics on concentration in food systems
- Heller & Keolian (2000) Life-Cycle Indicators of Sustainability in the U.S. Food System
  - http://css.snre.umich.edu/css_doc/CSS00-04.pdf

Links

- USDA Economic Research Service (ERS)
  - Chicken - http://www.ers.usda.gov/media/205671/eib38_1_.pdf
  - Pork - http://www.ers.usda.gov/media/244843/err52.pdf
  - Cow/Calf Beef - http://www.ers.usda.gov/publications/eib-economic-information-bulletin/eib73.aspx
  - Livestock sector transformation - http://www.ers.usda.gov/publications/eib-economic-information-bulletin/eib43.aspx
  - Non-USDA report: http://www.ase.tufts.edu/gdae/Pubs/rp/AAI_Issue_Brief_4.pdf
    - Structure and Finances of Farms - http://www.ers.usda.gov/media/184479/eib66_1_.pdf
    - U.S. Grain System –
      - » http://www.ers.usda.gov/publications/err-economic-research-report/err35.aspx

Links

- Philip Howard
  - https://www.msu.edu/~howardp/infographics.html
- Food Circles Project, University of Missouri
  - http://www.foodcircles.missouri.edu/
- Heller & Keolian
  - http://css.snre.umich.edu/css_doc/CSS00-04.pdf