

# Poultry Industry Insulated Structures Data



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**March, 2007**

**Honeywell**

# Poultry Industry Opportunity

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- Poultry House Insulation Retrofit Market Size
  - approx. 50,000 poultry houses in the U.S.
- Spray foam insulation (ROI) less than 3 years on average in most poultry house applications
- Spray foam insulation reduces heat transfer by 75-80%
- Lack of adequate roof and wall insulation leads to poor production and high mortalities



Source:  
Auburn University  
in cooperation with  
U.S. Egg & Poultry Assoc.  
Newsletter

# Typical Poultry House Facts

- **Typical poultry house footprint: 50' x 500'**
  - **Typical wall surface area: 8,800 sq. ft. to 9,600 sq. ft.**
  - **Typical ceiling: 20,000 sq. ft. roof: 30,000 sq. ft.**

## Typical construction cost of a poultry house

- **New structure: \$250,000**
- **Retrofit structure with insulation \$6,000 – \$40,000**



# Optional Poultry Temperature Ranges

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- Deep internal body temperatures of chickens is over 106°F/41°C. Birds generate heat when they eat. Fully-feathered birds actually produce excess heat, which their body must shed, thereby warming their surroundings. For this reason little supplemental heat is usually needed except in early brooding period.
- The problem is keeping birds from over heating, not their getting too cold. Birds stop eating when too hot, decreasing production and yields.
- Broiler & Pullets:  
at birth 92°F/33°C leveling to  
73°F/23°C after 4 weeks
- Laying Hens: 78°F/26°C - 82°F/28°C



***Insulation helps provide a Controlled Environment***

# Heat-related Poultry Mortality Rates

- Outside average maximum temperature 91° F/32.8 °C
- Southeast region with fan-ventilated structures

	Inside Max Temperature	Mortality Rate
• House with insulated roof	92°F/33.3°C	0.5%
• House with no insulation	99°F/37.2°C	14.3%



Source:  
Auburn University  
in cooperation with  
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# Radiant Heat and Mortality

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- Sunny day metal roofs reach 150°F/66°C
- Mortality losses higher from radiant heat in lower-latitude areas with more sun directly overhead
- Ventilation systems cannot handle heat loads from non-insulated roofs
- Radiant roof heat affects birds before ventilation can come into play in many instances
- 105°F/41°C test chamber
- 22% mortality at normal air temperature
- 40% mortality rate when radiant heat applied



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Auburn University  
in cooperation with  
U.S. Egg & Poultry Assoc.  
Newsletter

# Retrofit for Energy Savings

- **Spray Foam Insulation Retrofit – Curtain Wall**  
**Sidewalls: Annual per house fuel, performance and profitability 2005/2006**

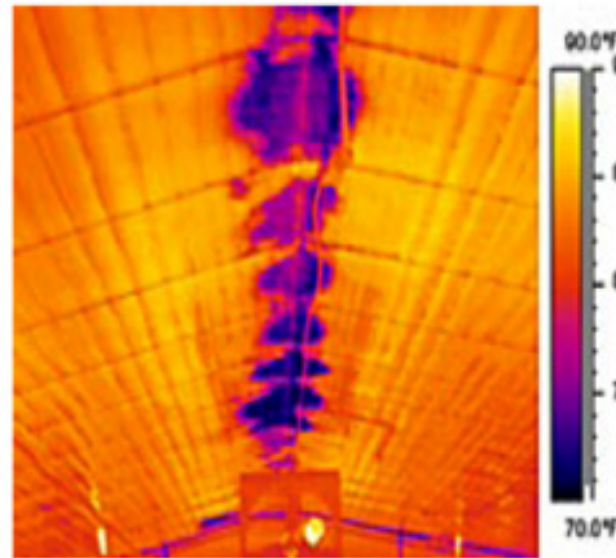
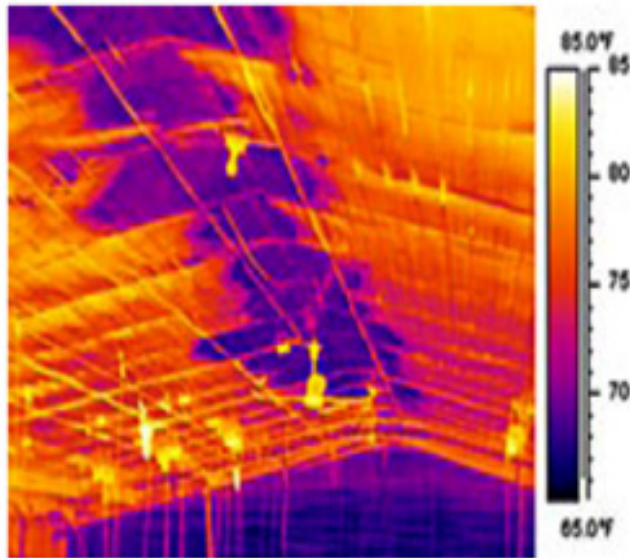
<u>Fuel &amp; Production</u>	<u>Untreated</u>	<u>Treated</u>	<u>Improvement</u>
Livability	92.35	93.34	0.99
Live-weight pds.	715,738	736,355	20,617
Avg. daily gain	0.933	.0961	0.0028
Feed Conversion	1.8653	1.8313	0.0340
Propane gals.	5,300	3,450	1,850
<u>Cost &amp; Return</u>			
Treatment Cost	\$0	\$6,000	-\$6,000
Production value (@\$.05)	\$0	\$1,031	\$1,031
Fuel savings (@\$1.30)	\$0	\$2,405	\$2,405
<b>Total Improvement</b>	<b>\$0</b>	<b>\$3,431</b>	<b>\$3,431</b>
<b>Years to pay back:</b>			<b>1.74</b>

Construction: Older 40x500 curtain-sided dropped-ceiling houses, retrofitted with tunnel ventilation Evaporative cooling system, vent doors and mid-1990s controller

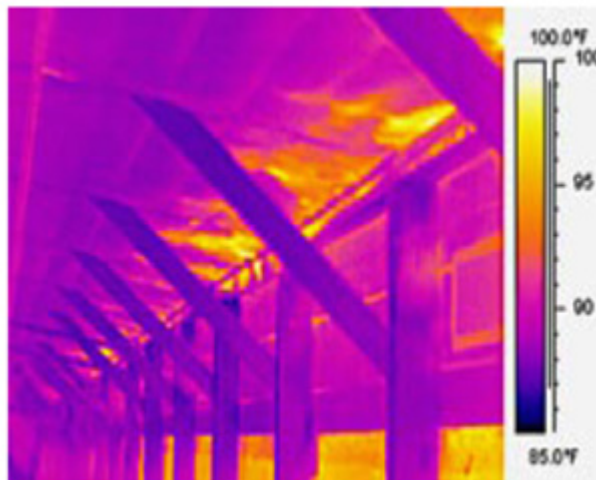
Source: Auburn University in cooperation with U.S. Egg & Poultry Assoc. Newsletter

# Cellulose Insulation Shift Creates Thermal Shorts

- **Ceiling and Walls Thermal Imaging**



Winter shot during brooding at two different houses when building is being heated



Summer shot of side curtain walls with temperatures in the 90's

Source:  
Auburn University  
in cooperation with  
U.S. Egg & Poultry Assoc.  
Newsletter



# Poultry House Insulation Recommendations

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- **#1 insulation priority - house tightness**
  - create a controlled environment
  - reduce energy consumption
  - keep rodents out
- **0.12 static pressure or better recommended**
- **Smoke testing recommended to I.D. air leakage**
- **Upgrade all insulation to a minimum R-8 walls, R-12 ceiling, install white reflective roof coating**
- **Converting curtain wall to solid insulated walls is imperative to bring heating fuel cost down**

Source: Auburn University in cooperation with U.S. Egg & Poultry Assoc. Newsletter

# Top 10 Broiler Companies (Ready to cook pounds in millions)

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- Tyson Foods: 151.30
  - Pilgrim's Pride Corporation: 109.06
  - Gold Kist: 61.79
  - Perdue Farms Inc.: 51.32
  - Sanderson Farms: 30.39
  - Wayne Farms LLC: 28.95
  - Mountaire Farms Inc.: 23.44
  - Foster Farms: 16.51
  - OK Foods Inc.: 15.80
  - Peco Foods Inc.: 15.60
- Total 504.16 MM lbs**



Source:  
Watt Poultry USA  
2-24-05

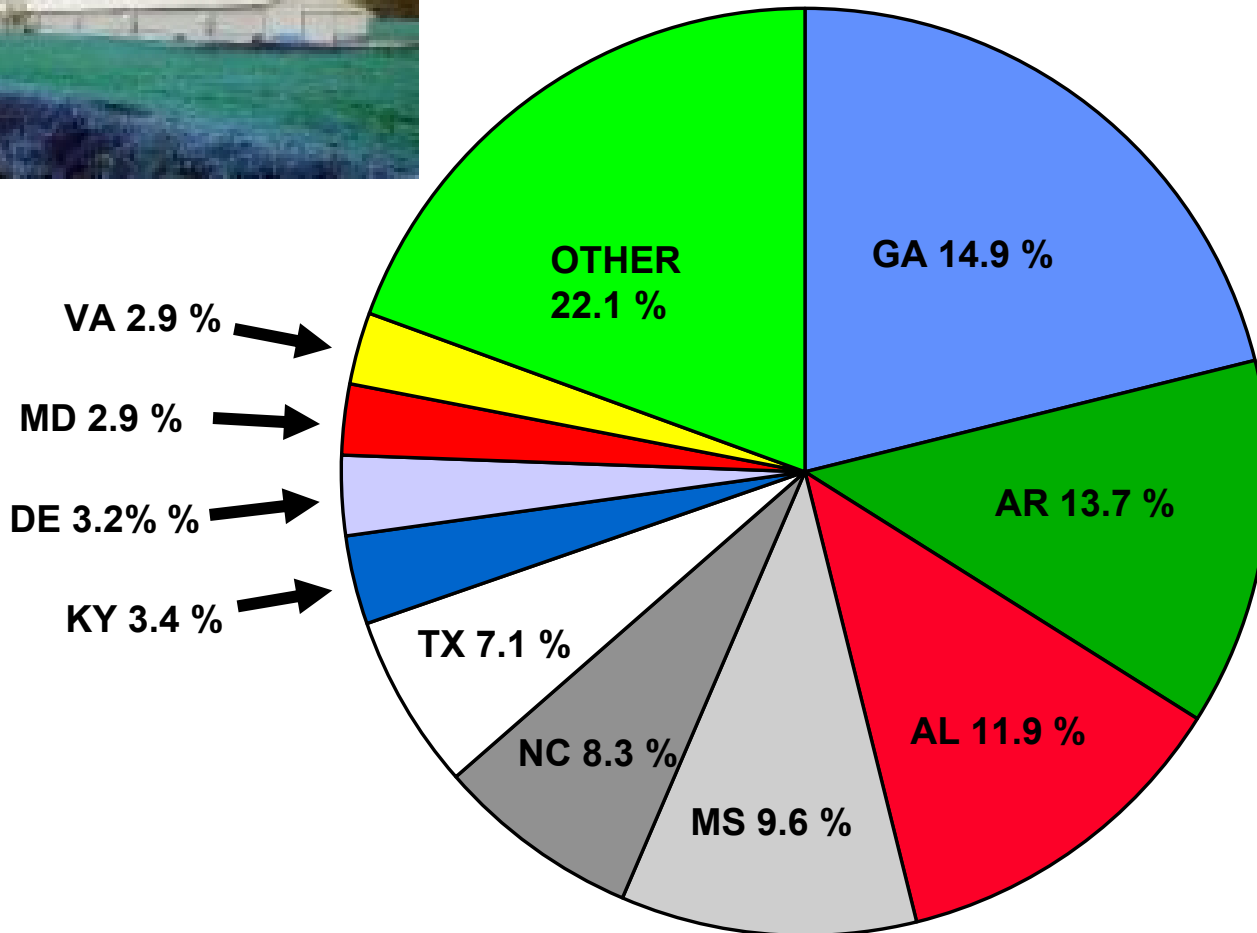
# 10 Leading Broiler Production States

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**Source:  
2005 Agricultural  
Statistics Board  
NASS, USDA**

# 10 Leading Broiler Production States

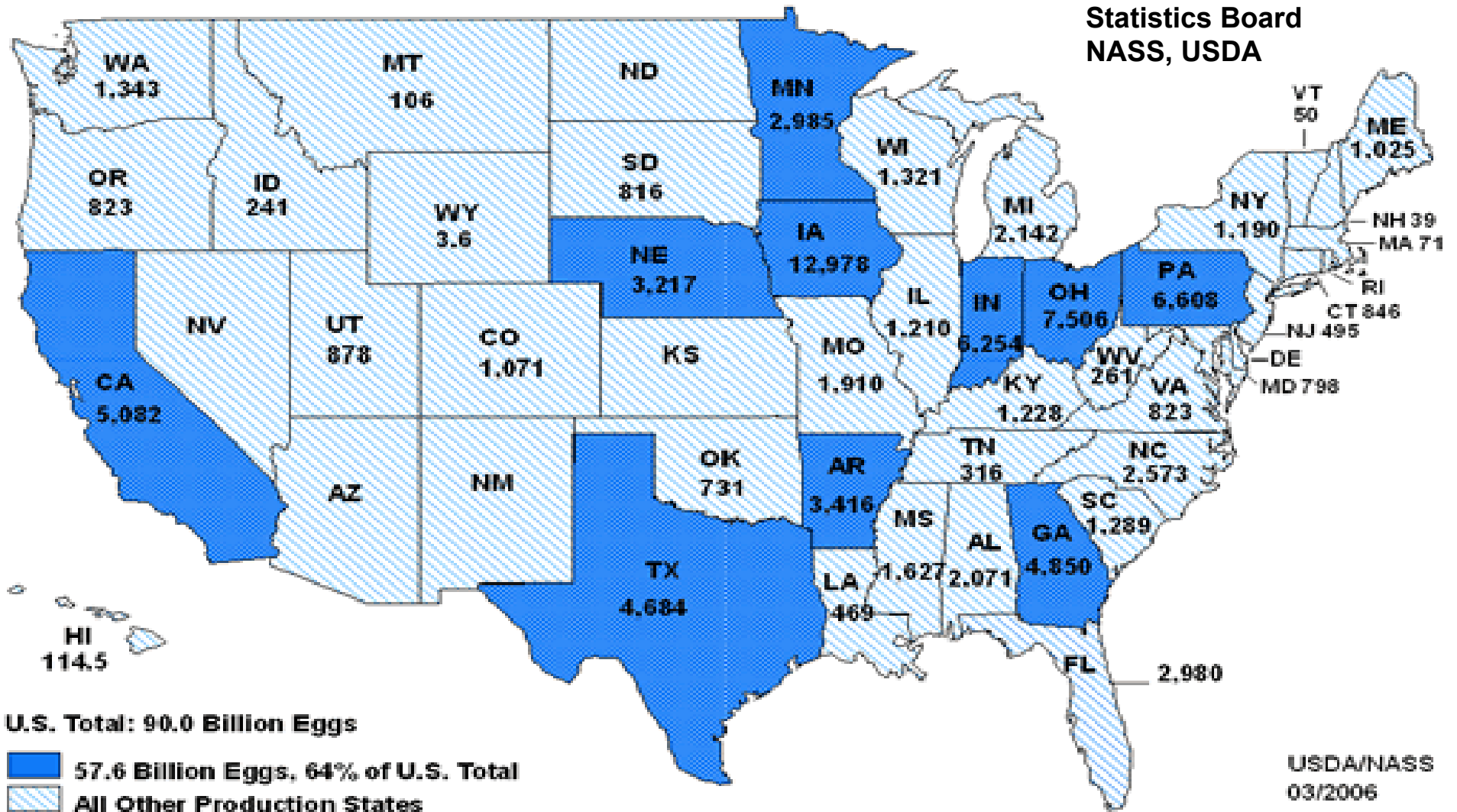


Source:  
2005 Agricultural  
Statistics Board  
NASS, USDA

# 10 Leading Egg Production States

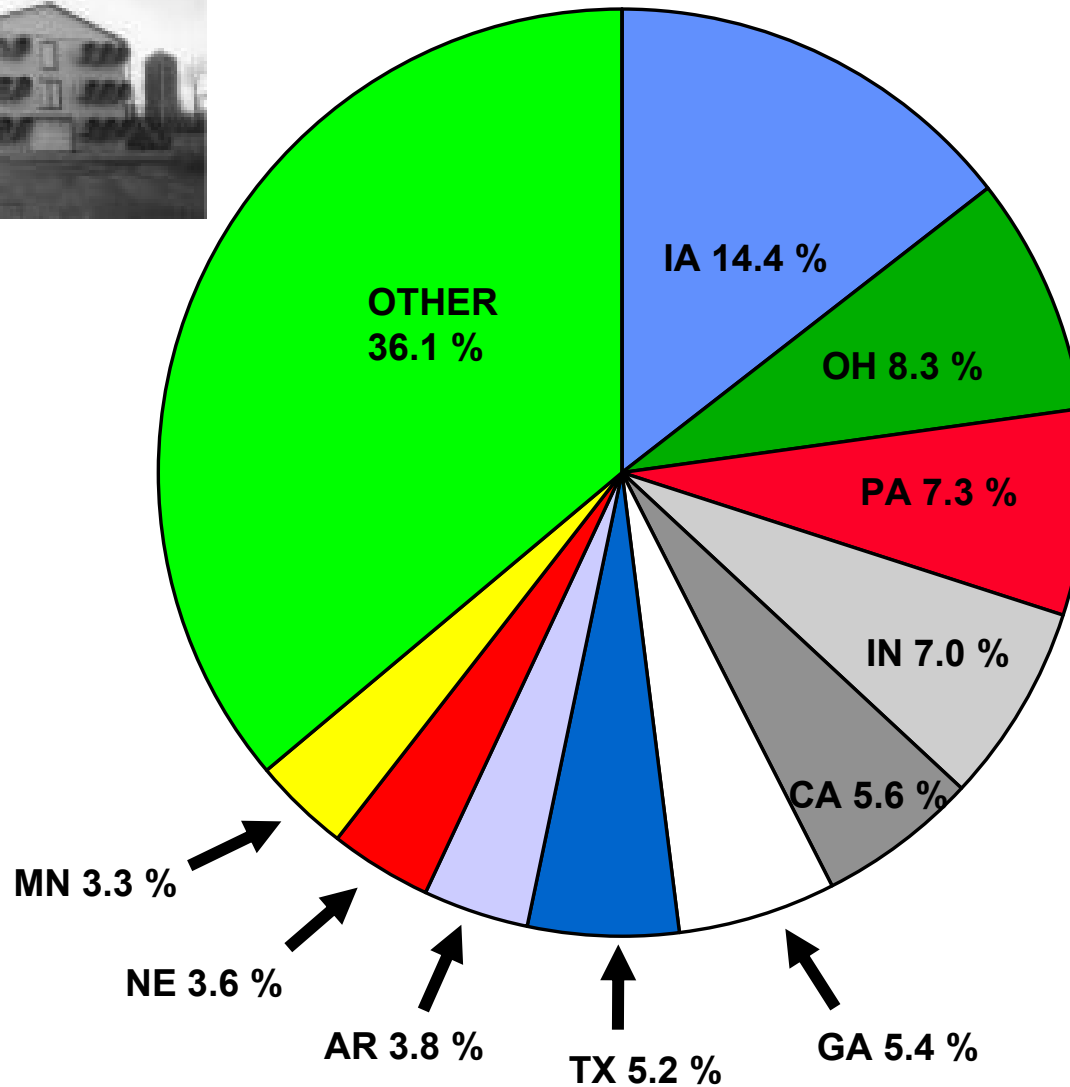
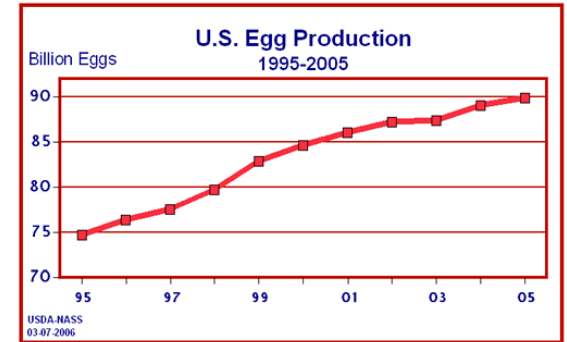
ANNUAL EGG PRODUCTION BY STATES  
NUMBER PRODUCED, MILLION, 2005

Source:  
2005 Agricultural  
Statistics Board  
NASS, USDA



# 10 Leading Egg Production States

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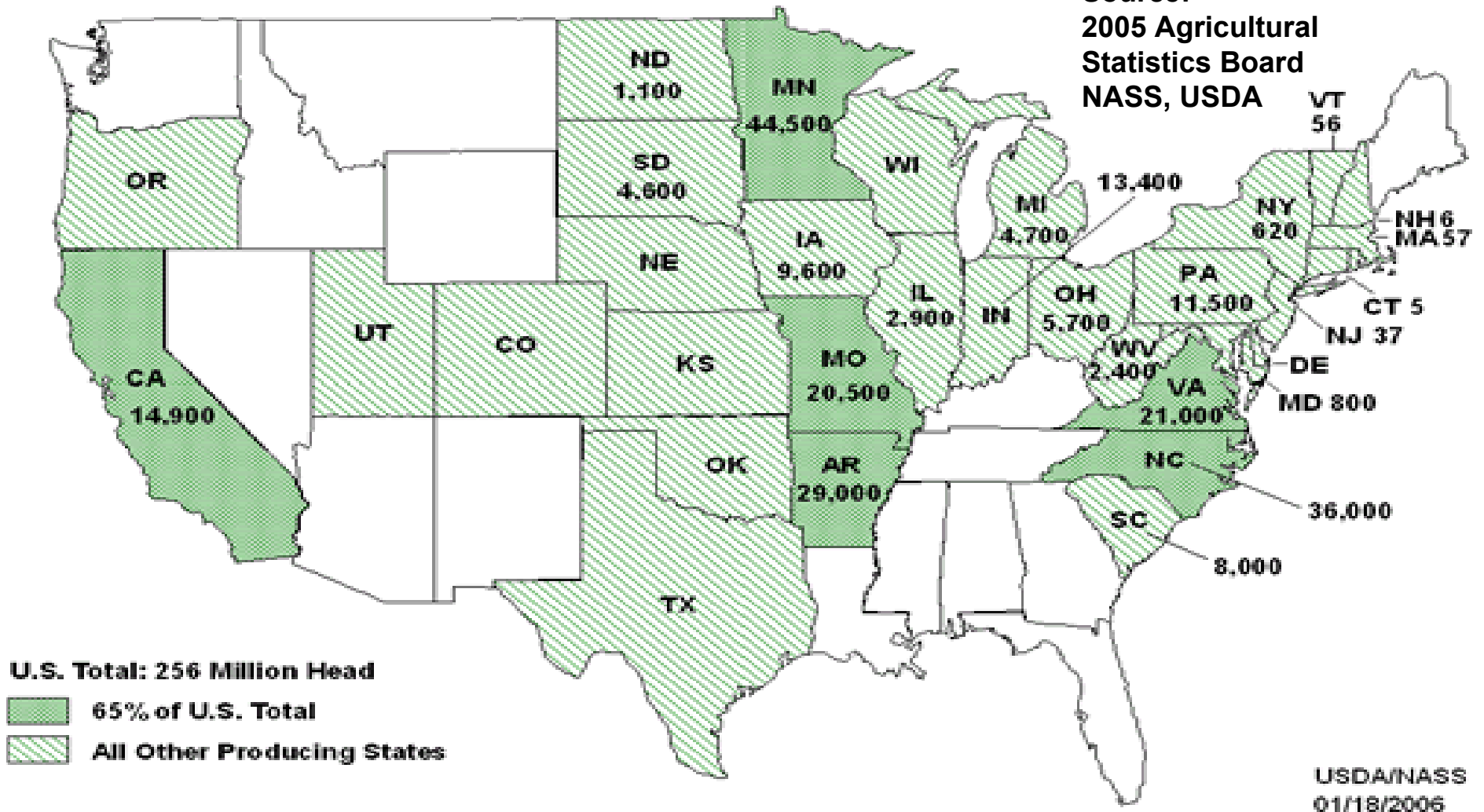


Source:  
2005 Agricultural  
Statistics Board  
NASS, USDA

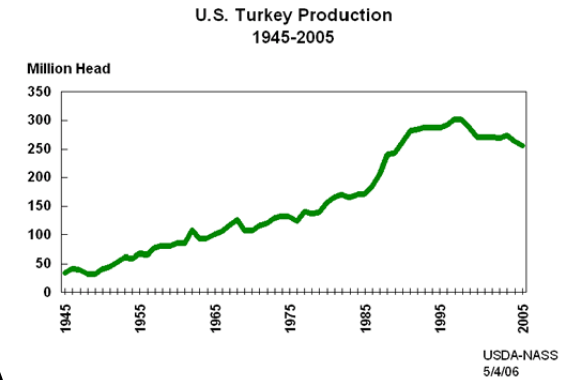
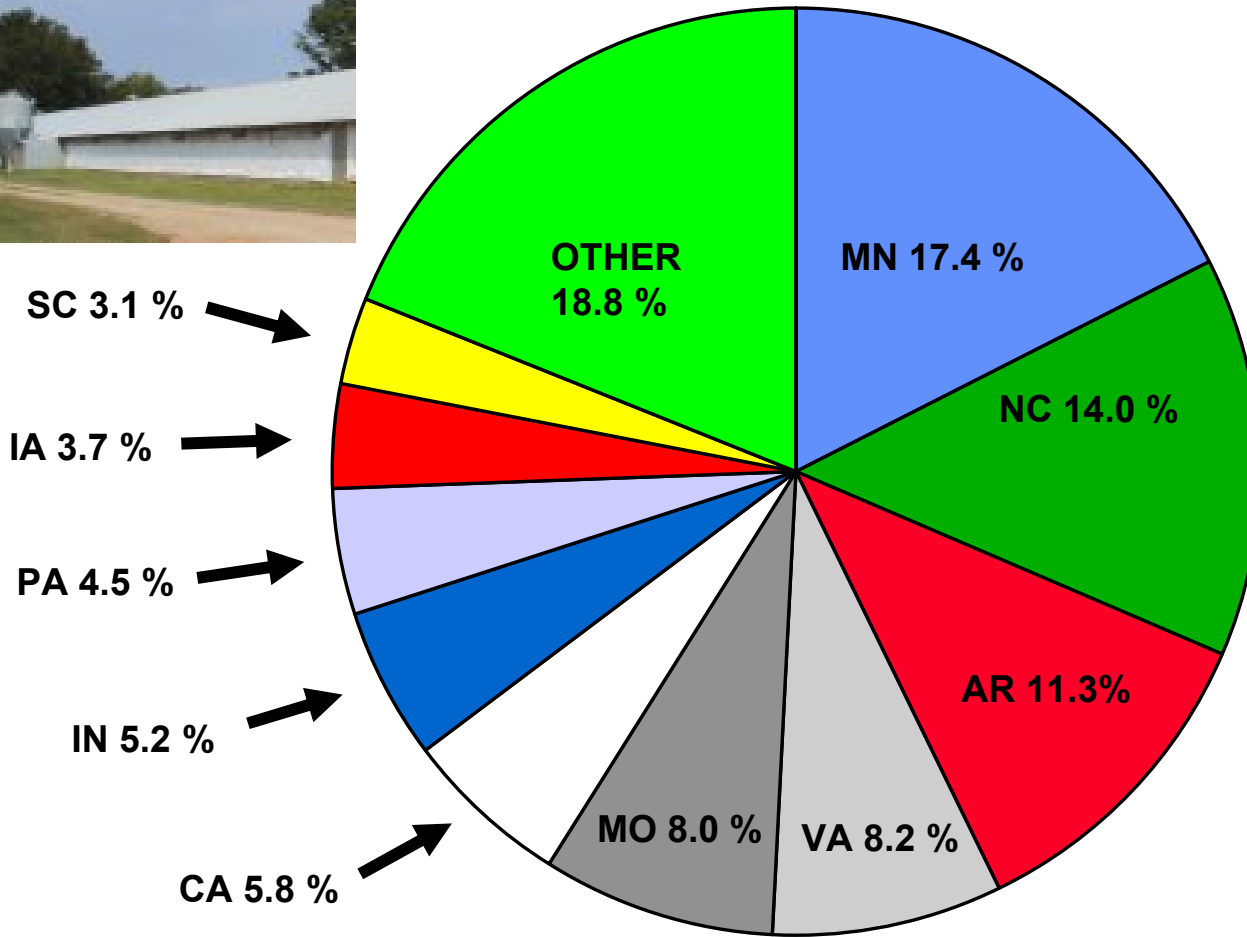
# 10 Leading Turkeys Raised States

NUMBER OF TURKEYS RAISED, SELECTED STATES, 2005  
THOUSAND HEAD

Source:  
2005 Agricultural  
Statistics Board  
NASS, USDA



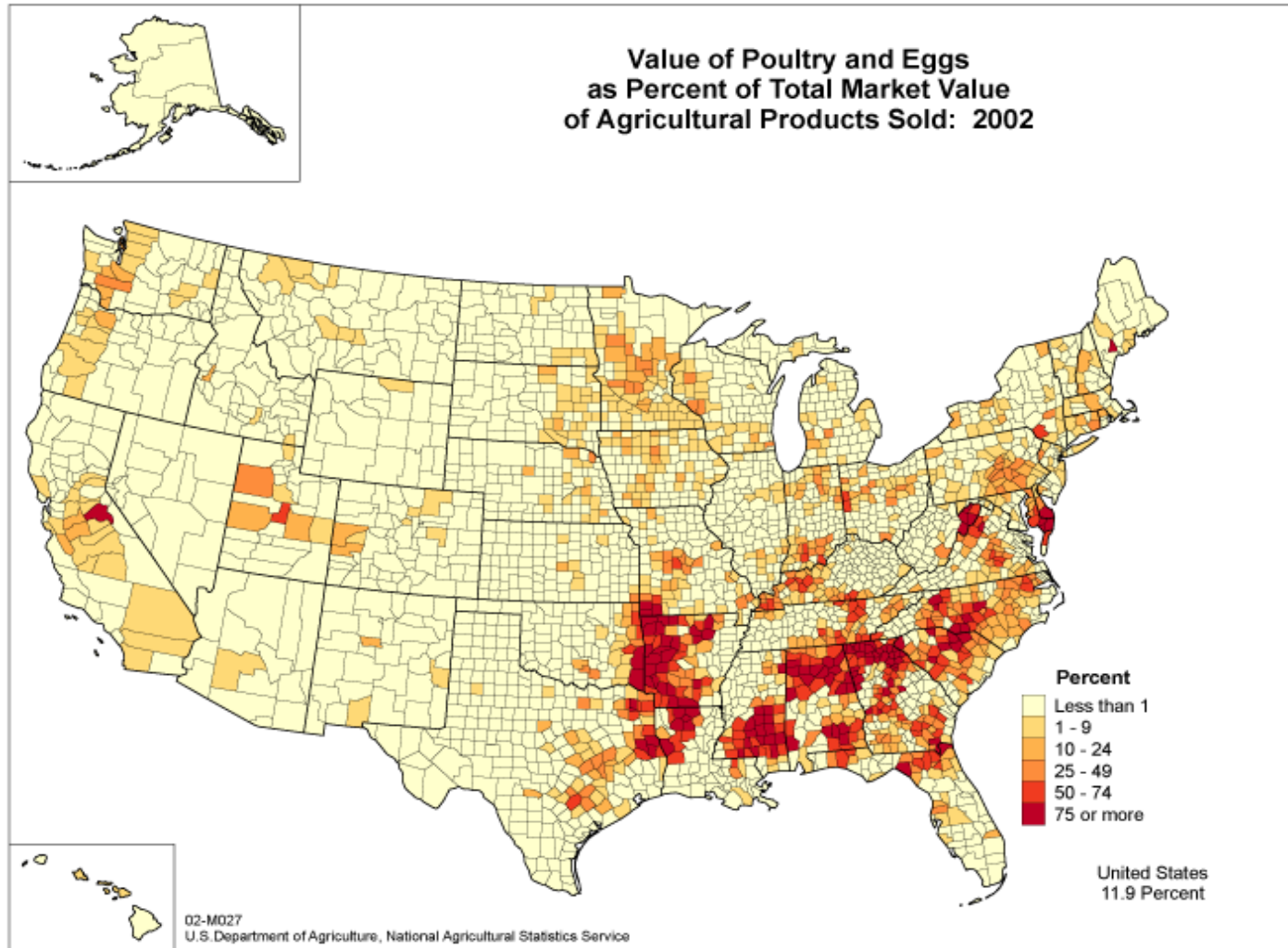
# 10 Leading Turkeys Raised States



Source:  
2005 Agricultural  
Statistics Board  
NASS, USDA

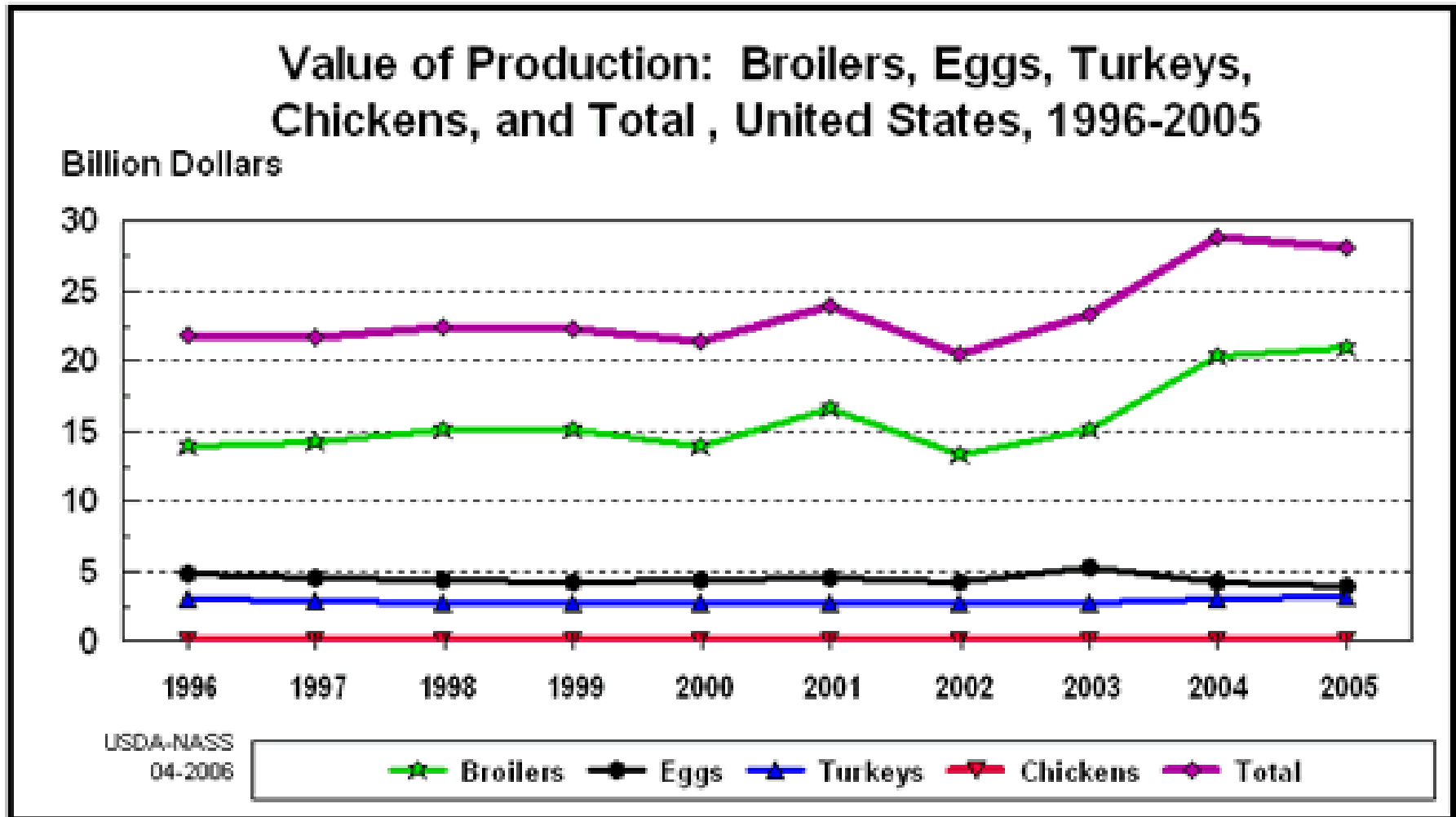


# Poultry Production by County

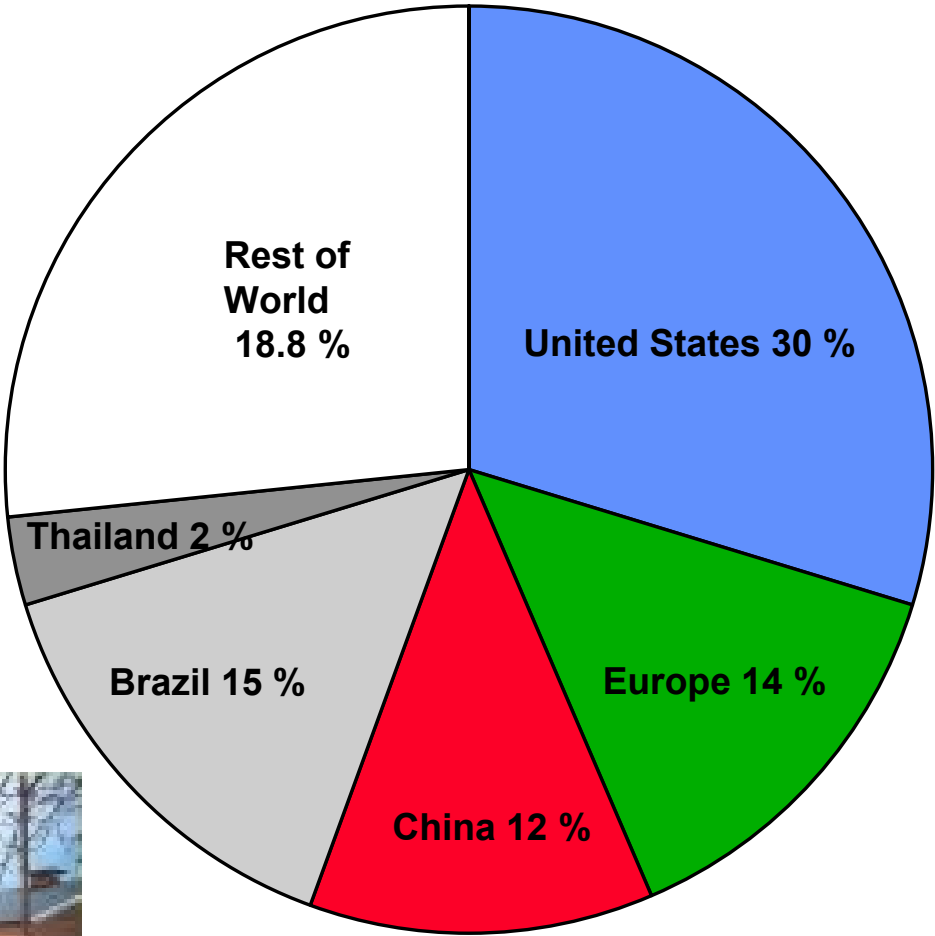
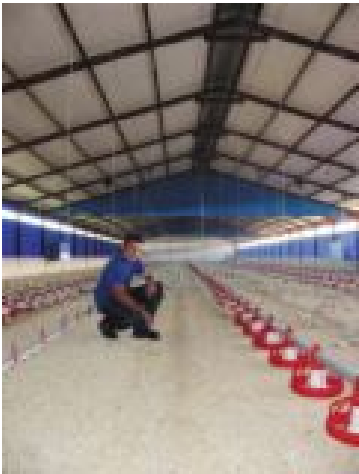


Source: Agricultural Statistics Board NASS, USDA

# U.S. Poultry Value of Production



# World Poultry Production



Source:  
2003 Agricultural  
Statistics Board  
NASS, USDA

# World Poultry Facts

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- **Argentina:** The country's 38.5 million people consumed an average of 170 eggs per person in 2004 compared to 144 in the previous year and 148 in 2001.
- **Australia:** From a low of 149 eggs per person in July 2003, it has since risen to 165 by August 2004 and the industry has set a goal of 200 eggs by 2010.
- **Austria:** Consumption has risen to 226 eggs per person for a population of 8.1 million people. A new Animal Welfare Act came into force this year under which production from traditional cages will be prohibited by 2009, while enriched cages have been given a 15-year phasing-out period from 2004. The net effect of these changes will result in a 15-20% cut in egg production, while the self-sufficiency level will fall from 75% to 60%.
- **China:** Egg production in China has increased by more than 10% a year in the last 20 years and in 2002 amounted to 25.7 million tons while per capita consumption stood at 19.13kg. Fewer than 50 farms have more than 100,000 layers.
- **France:** Total egg consumption averaged 253 eggs per person last year.
- **Germany:** The past few years have seen Germany's level of self-sufficiency in eggs drop from just over 75% in 2000 to an estimated 68% this year. Should there be a complete ban on cages, then the level of self-sufficiency would drop to between 30 to 40%, while imports would increase accordingly. Per capita egg consumption peaked at 227 eggs back in 1997 and is estimated at 207 eggs per person this year.
- **India:** With a population of more than a billion people and eggs supplied from 7,500 farmers, the per capita egg consumption equals about 45 eggs per person.
- **Japan:** Per capita egg consumption for a human population of 126 million stands at 336 eggs.
- **Mexico:** The country's largest egg producer owns 14 million layers, while the average flock size is 200,000. Egg consumption is more than 340 eggs per person.
- **Norway:** While the average flock size had increased, the estimate for this year was still only 3,000, with the largest farm having 30,000 birds.
- **Pakistan:** There are 25 million layers with the largest commercial flock having 600,000 layers. Per capita egg consumption equals about 53 eggs per person per year.
- **Russia:** There are 425 industrial egg enterprises each having 300,000 birds or more. However, only 182 were performing at their production potential, while 129 were achieving less than 50%. Currently, per capita egg consumption equals about 253 eggs per person.
- **Spain:** The country has about 50 million hens. Shell egg consumption averaged around 240 eggs per person.
- **Sweden:** The switch from traditional cages has been completed in just three years. In the past five years, the price gap between cage and barn eggs had diminished such that in 2005 the premium over cage eggs had been halved when compared with 2001.
- **United Kingdom:** The country has 30 million layers and is the 5th largest in Europe. Consumption has risen to 174 eggs/person, mainly as a result of the promotional efforts under the Lion Quality Scheme. In 2004, the market split by production systems was 66% cage, 24% free-range, 7% barn, and 3% organic. - *United Voices, January 11, 2006, the newsletter of the United Egg Producers*

# System House - Marketing Strategic & Tactical Options

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- **Poultry Industry Direct Mail Campaign**
- **Poultry Industry Magazine Advertisement**
- **SPF System House Sales Person**
- **I.D. Agricultural Rep or Distributor to Pursue Business**
- **I.D. SPF Contractors to Pursue Business**

# Reference Website

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- **Spray Polyurethane Foam Alliance**  
<http://www.sprayfoam.org>
- **Auburn University**  
<http://www.aces.edu/dept/poultryventilation/Insulation.php>
- **USDA – National Agricultural Statistics Service**  
[http://www.nass.usda.gov/Census\\_of\\_Agriculture/index.asp](http://www.nass.usda.gov/Census_of_Agriculture/index.asp)