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Worldwide

# Animal welfare in layers: Vision of HSI

## CAGE-FREE HOUSING SYSTEMS FOR EGG-LAYING HENS



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**Sara Shields, PhD**  
**Behavior and Welfare Specialist**  
**Farm Animals**



# OVERVIEW

- Natural hen behavior
- Cage-free egg production systems
- Costs
- Changing world markets
- Furnished cages





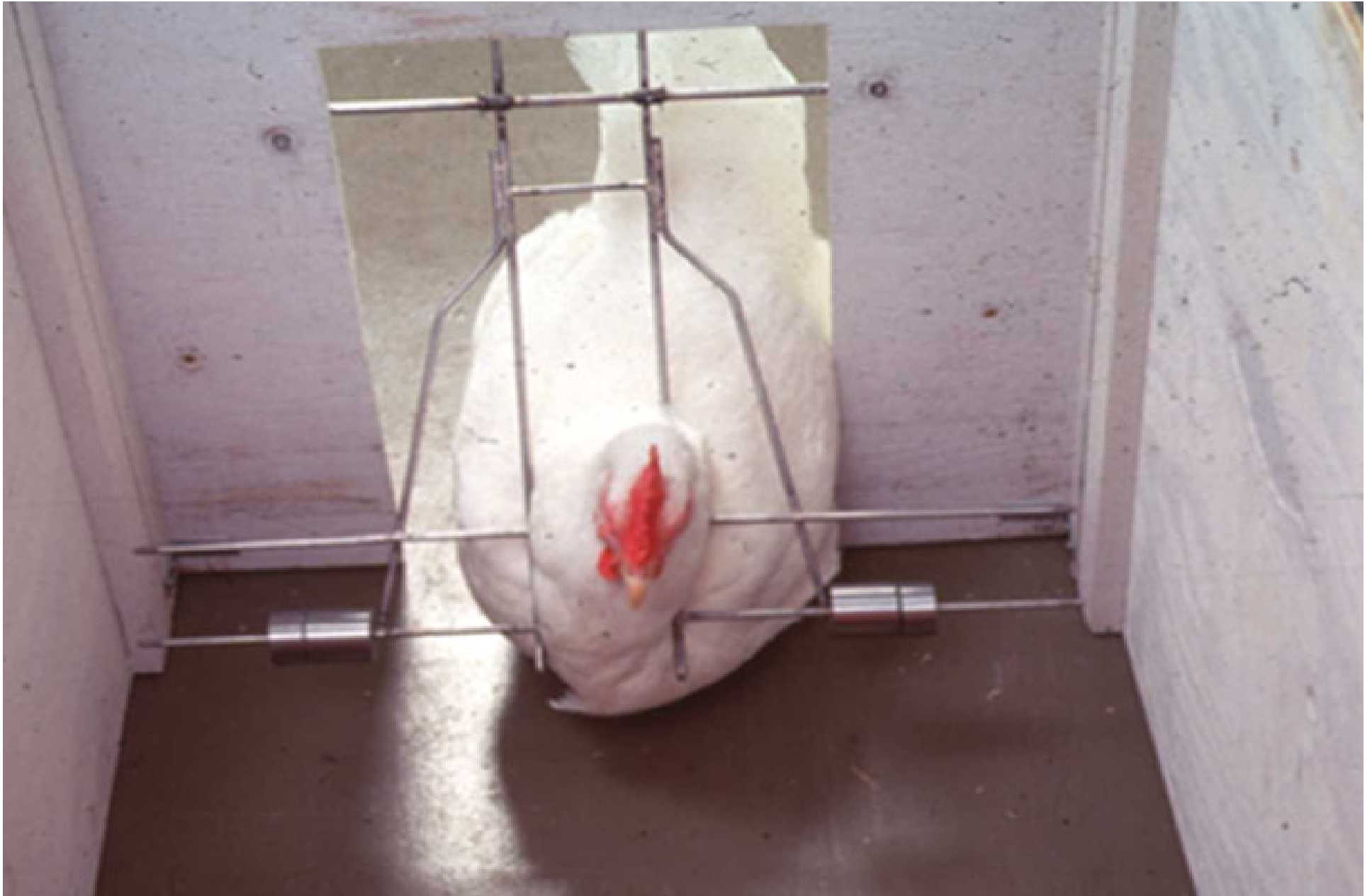








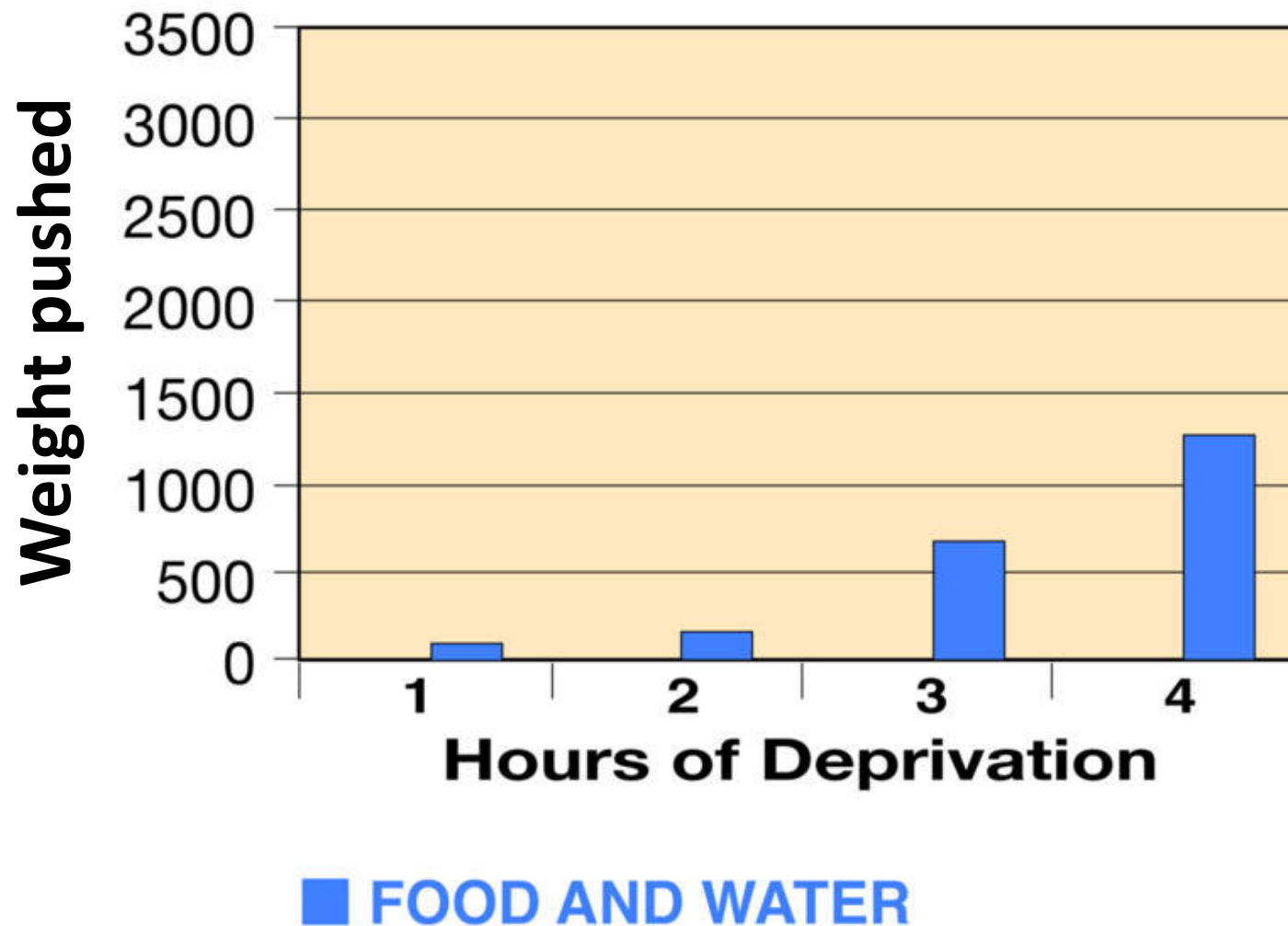




*Cooper JJ and Appleby MC. 2003. THE VALUE OF ENVIRONMENTAL RESOURCES TO DOMESTIC HENS: A COMPARISON OF THE WORK-RATE FOR FOOD AND FOR NESTS AS A FUNCTION OF TIME. Animal Welfare 12(1):39-52*

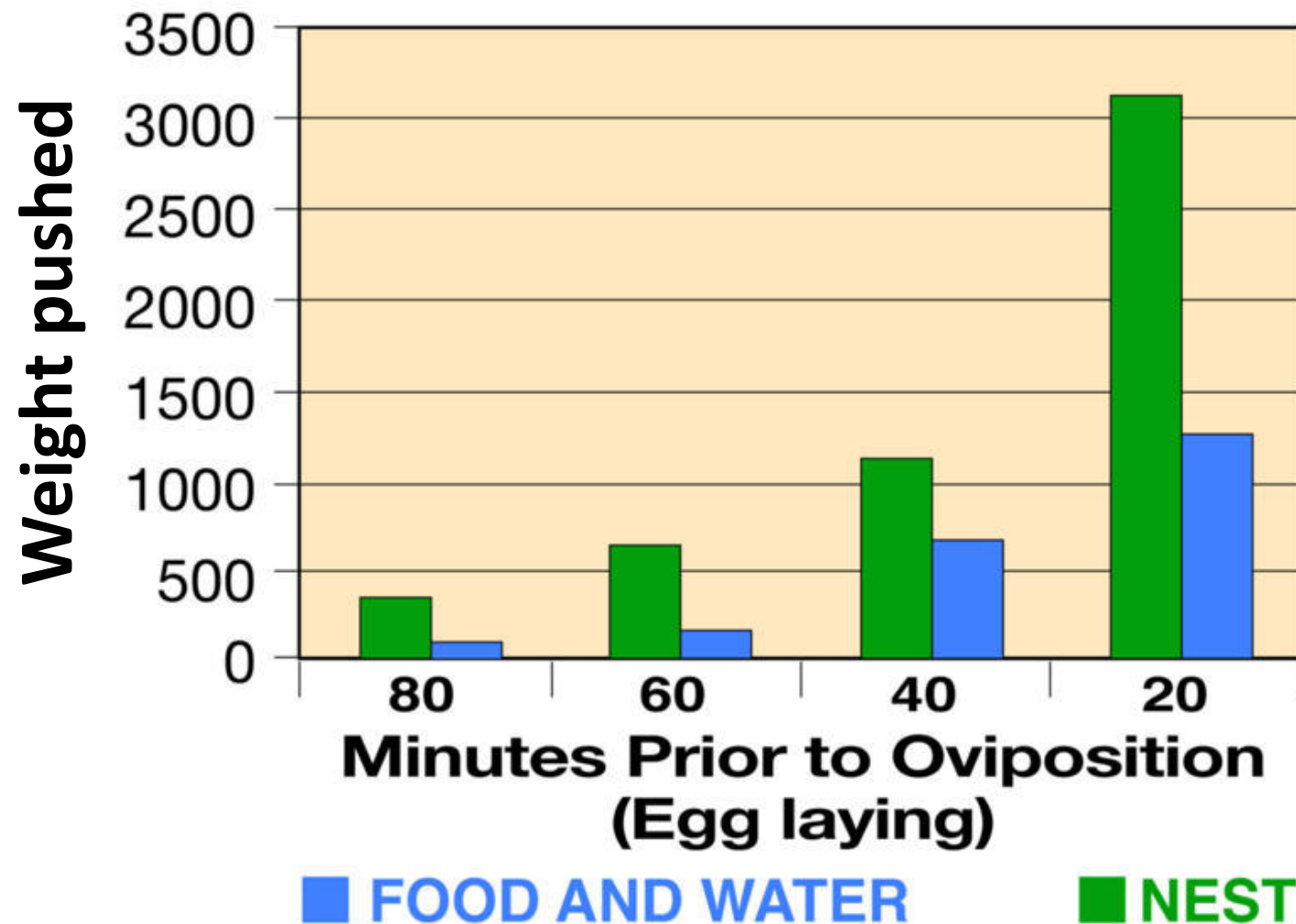


# RESEARCH ON NESTING



Cooper JJ and Appleby MC. 2003. THE VALUE OF ENVIRONMENTAL RESOURCES TO DOMESTIC HENS: A COMPARISON OF THE WORK-RATE FOR FOOD AND FOR NESTS AS A FUNCTION OF TIME. *Animal Welfare* 12(1):39-52

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# Hens push more weight for a nest box than for feed after 27 hours of feed deprivation

*Follensbee M. 1992. QUANTIFYING THE NESTING MOTIVATION OF HENS. Dissertation, University of Guelph, Ontario, Canada*







# **HENS WILL PUSH THROUGH HEAVILY WEIGHTED DOORS FOR ACCESS TO A PERCH**

*Olsson IAS and Keeling LJ. 2002. THE PUSH-DOOR FOR MEASURING MOTIVATION IN HENS: LAYING HENS ARE MOTIVATED TO PERCH AT NIGHT. Animal Welfare 11(1):11-9.*

Photo courtesy of Dr. Linda Keeling  
Swedish University of Agricultural Sciences





# PERCHING MAINTAINS BONE VOLUME & STRENGTH

*Wilson S, Hughes BO, Appleby MC, and Smith SF. 1993. EFFECTS OF PERCHES ON TRABECULAR BONE VOLUME IN LAYING HENS. Research in Veterinary Science 54(2):207.*

*Hughes BO, Wilson S, Appleby MC, and Smith SF. 1993. COMPARISON OF BONE VOLUME AND STRENGTH AS MEASURES OF SKELETAL INTEGRITY IN CAGED LAYING HENS WITH ACCESS TO PERCHES. Research in Veterinary Science 54(2):202.*

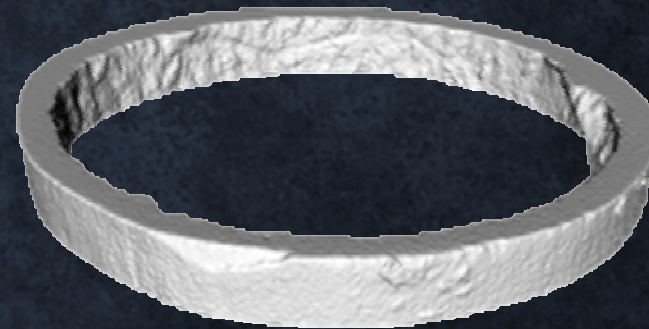
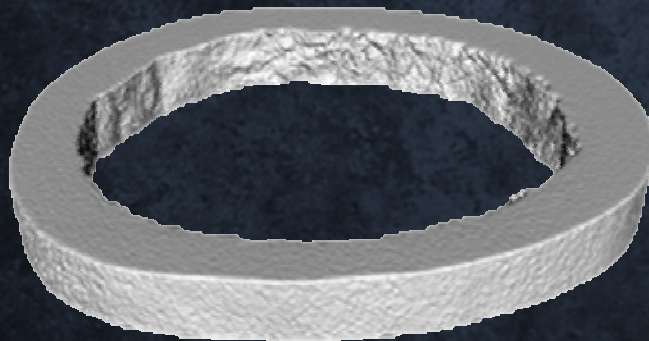
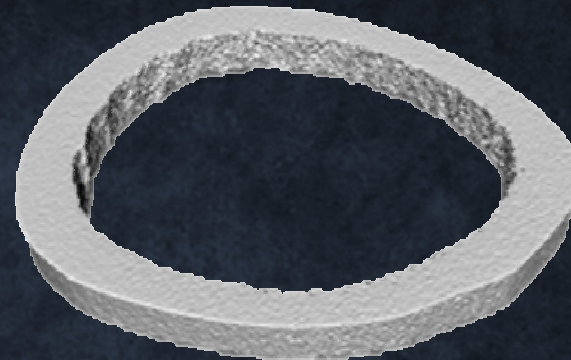
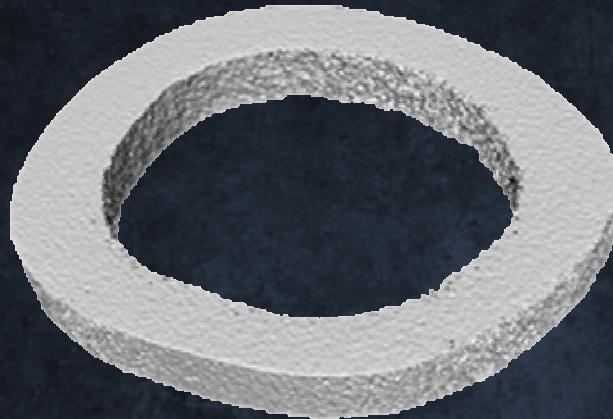
*Duncan ET, Appleby MC, and Hughes BO. 1992. EFFECT OF PERCHES IN LAYING CAGES ON WELFARE AND PRODUCTION OF HENS. British Poultry Science 33(1):25.*



FR

2 mm

CC



Anna Shipov A, Sharir A, Zelzer E, Milgram J, Monsonogo-Ornan E, and Shahar R. 2010. THE INFLUENCE OF SEVERE PROLONGED EXERCISE RESTRICTION ON THE MECHANICAL AND STRUCTURAL PROPERTIES OF BONE IN AN AVIAN MODEL. *The Veterinary Journal* 183:153-60.













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WORLD ORGANISATION FOR ANIMAL HEALTH

*Protecting animals, preserving our future*

## *Terrestrial Animal Health Code; Article 7.1.4*

‘General principles for the welfare of animals in livestock production systems’

“The physical environment should allow the opportunity to perform types of natural behaviour that animals are motivated to perform.”





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# CAGE-FREE PRODUCTION

- Aviary
- Barn
- Free-range



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# DAILY BEHAVIOR PATTERN

**MORNING**

**AFTERNOON**

**NIGHT**



PERCHING



ROOSTING



FEEDING



FORAGING



LAYING



DUSTBATHING













































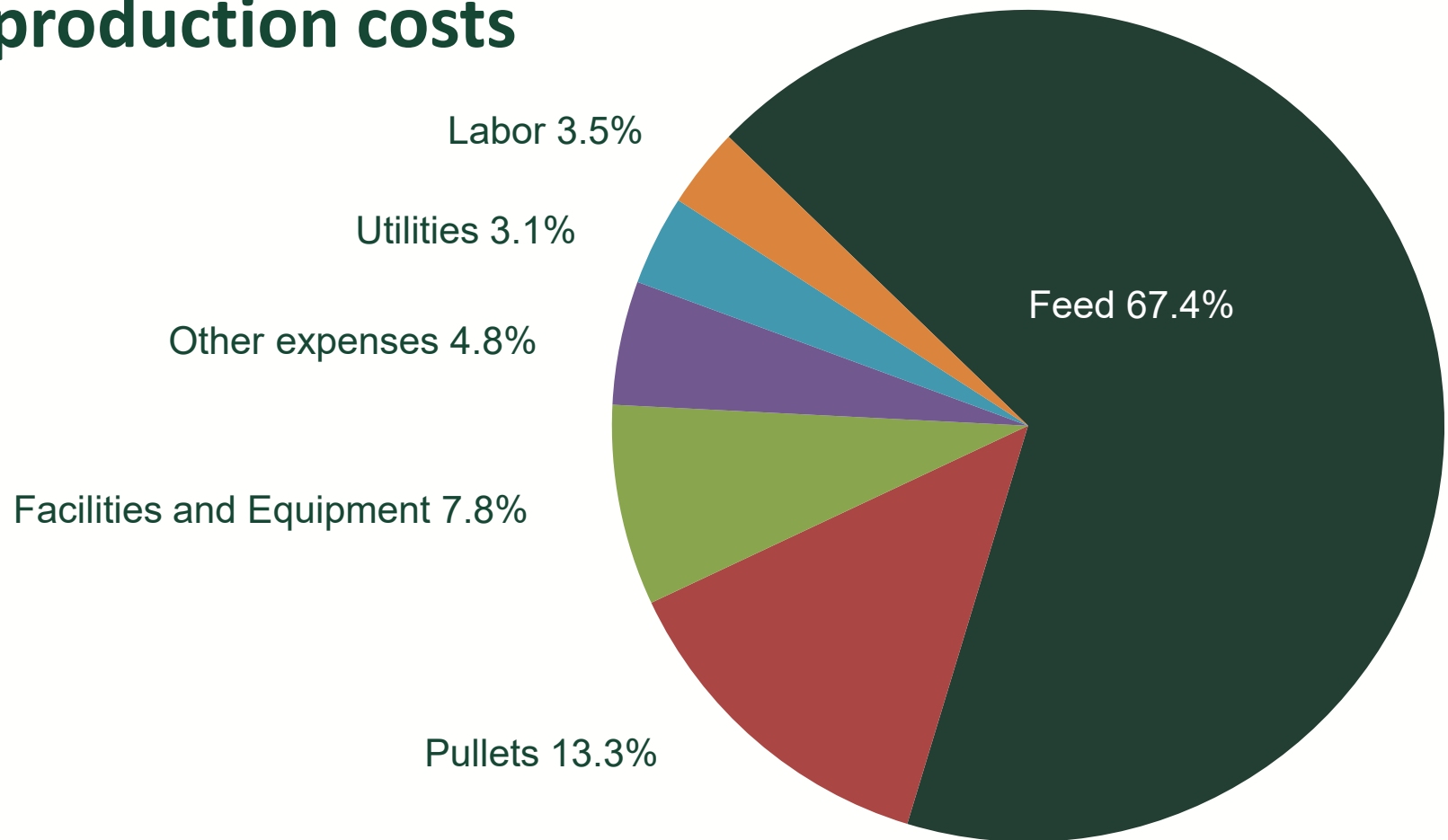


# CAGE-FREE COSTS

- Transition costs
  - Phase-in period
  - Depreciation of current cage structures
- Operating costs



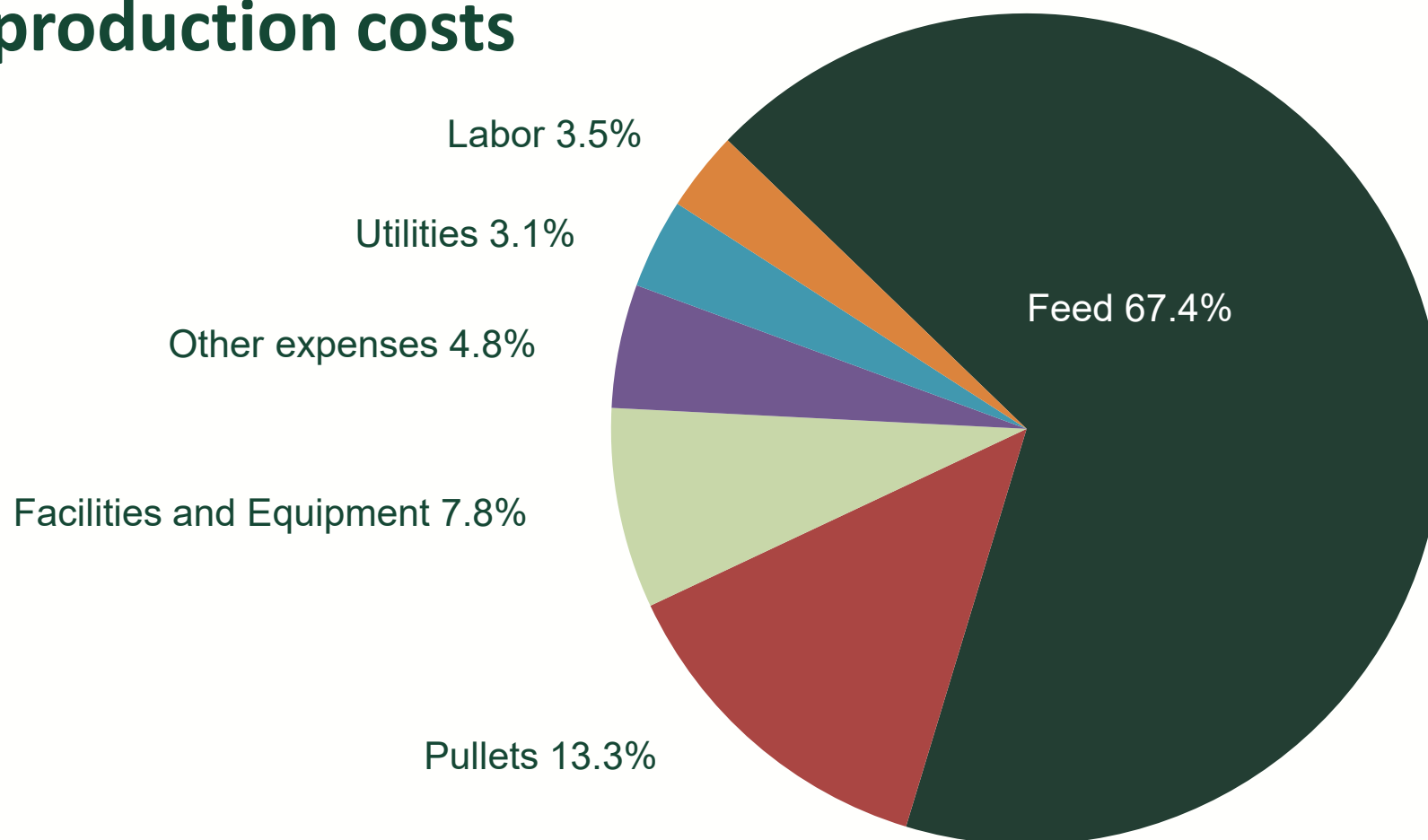
## Egg production costs







## Egg production costs





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## **Retail price =**

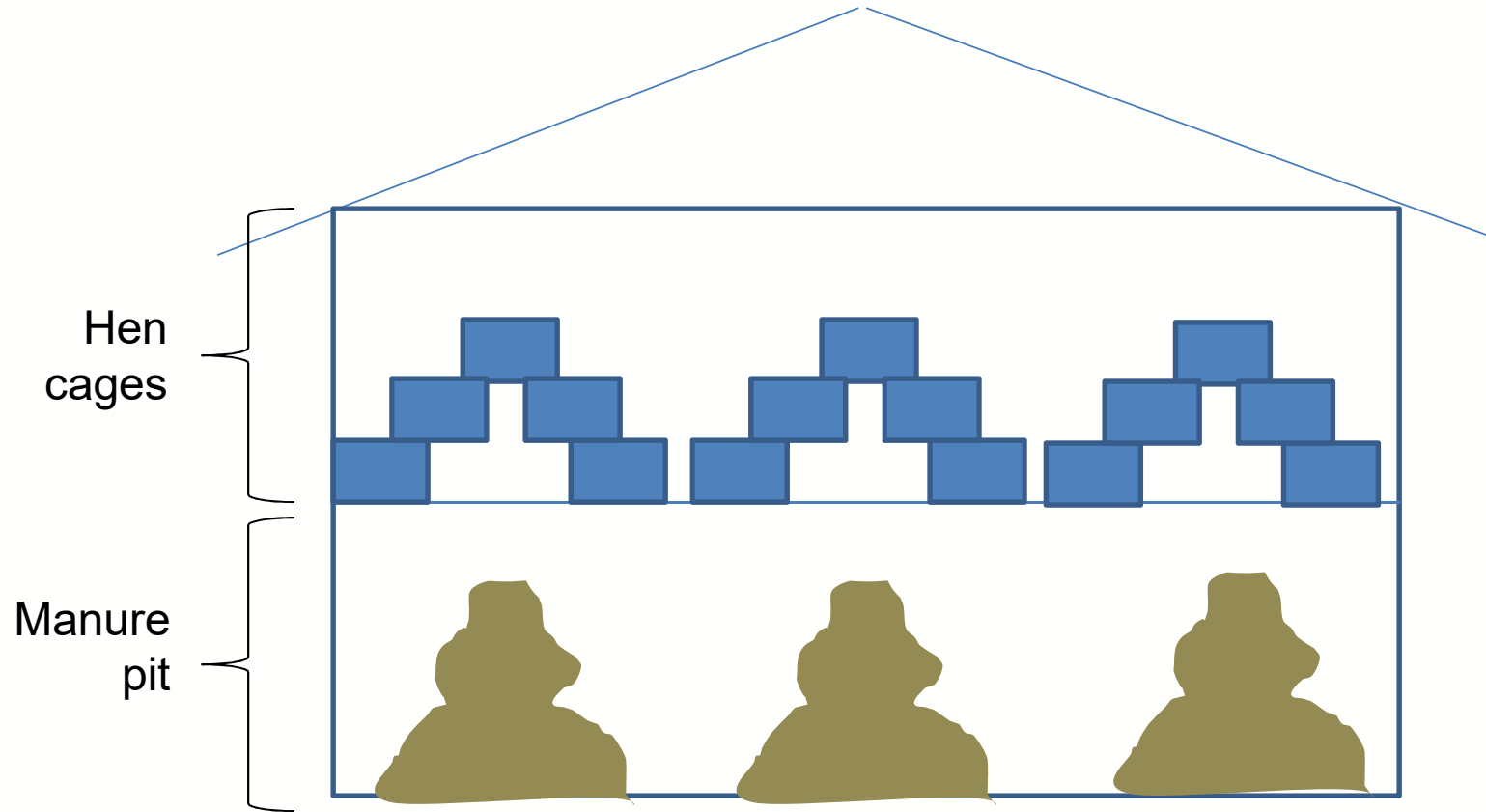
Production costs + transport + storage +  
handling + product losses + packaging +  
marketing and distribution +  
final mark up





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# CHANGING WORLD MARKETS

- Battery cage ban, European Union
- Proposition 2, California, USA
- Prevention of Cruelty to Animals Act, India
- Several states, Canada and Australia
- Battery cage ban, Bhutan
- Government incentive, South Korea







HOTELS & RESORTS



Hilton



Unilever



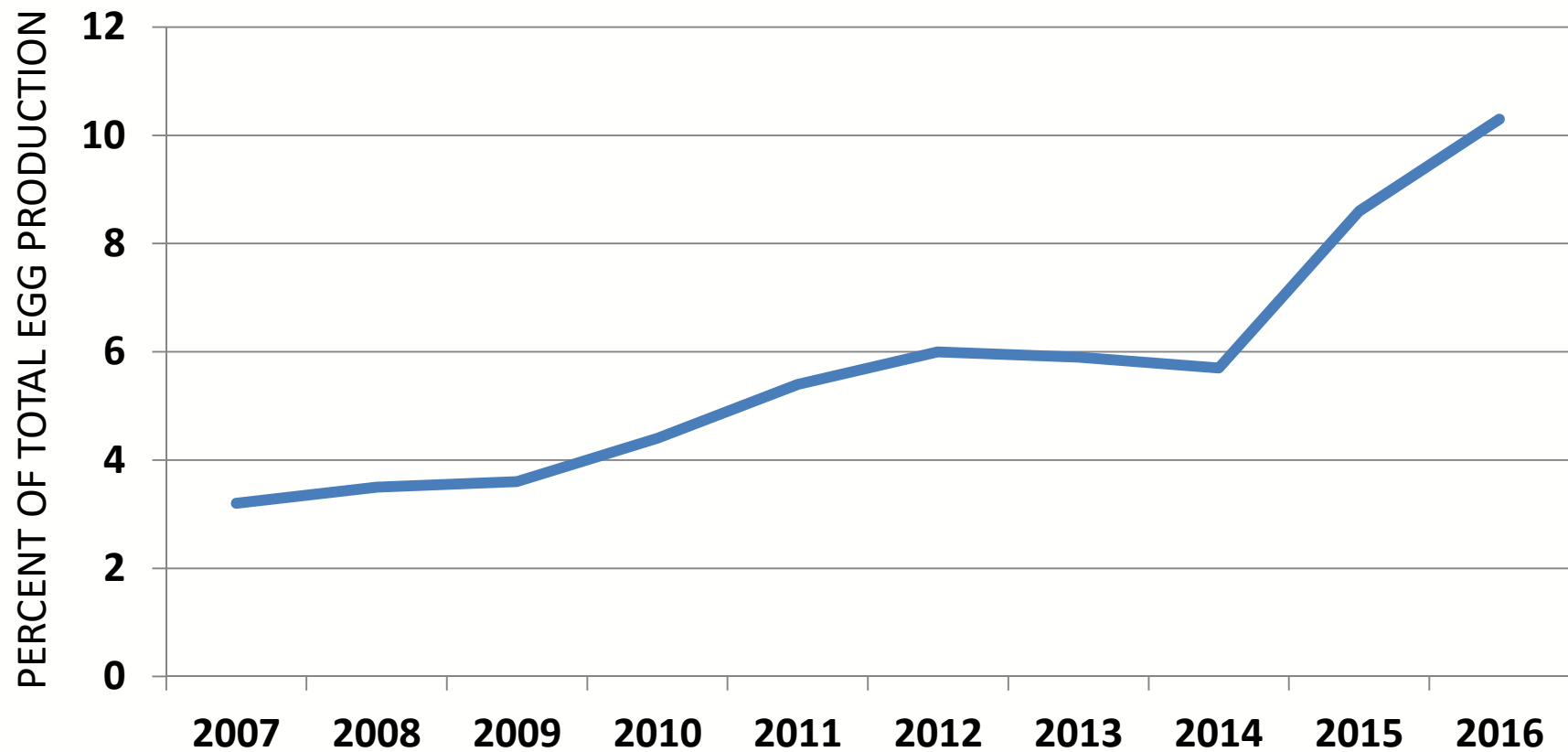
Centerplate







## CAGE-FREE EGG PRODUCTION IN THE UNITED STATES

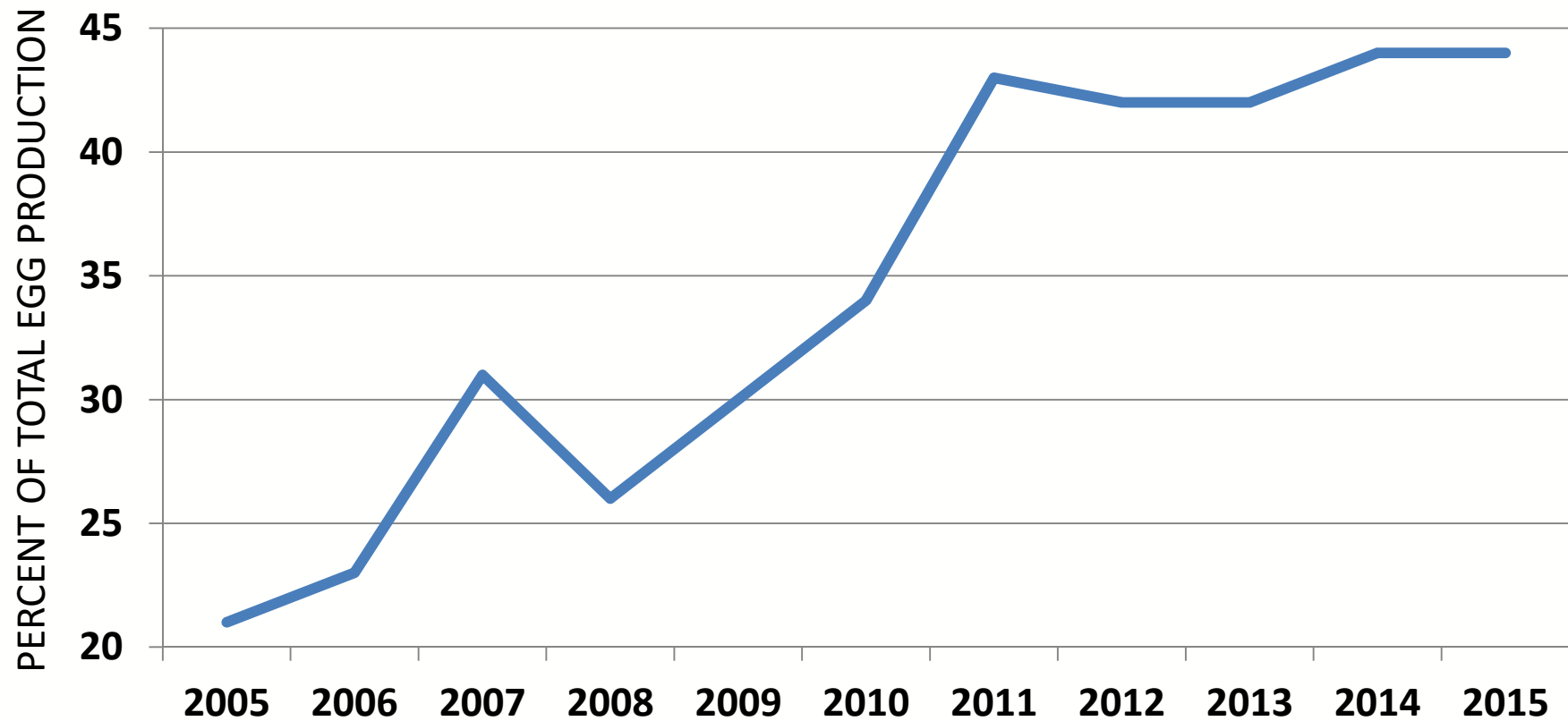


USDA Agricultural Marketing Services estimates





## CAGE-FREE EGG PRODUCTION IN THE EUROPEAN UNION



European Commission CIRCABC



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# What about furnished cages?





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## Dustbathing is inadequate in furnished cages

- Shorter, incomplete bouts (Van Niekerc and Reuvekamp, 2000; Platz et al., 2009)
- Lack of diurnal rhythm (Platz et al., 2009)
- Competition for limited dustbathing space



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**Enriched/furnished cages are  
not good investments**





- **Farming UK News, 2014:**

“...one producer is now clearing out the enriched cages installed just two years ago in a multi-million pound refit and replacing them with barn production.”

- **WATT AgNet, 2016:**

“J.S. West, the first U.S. egg producer to install enriched cages, is converting its houses to cage free.”

- **Meat & Poultry, 2017:**

“All barns at Gemperle Farms, including fully enriched colony barns, will be converted to cage-free aviary and open barn productions.”



## SUMMARY

- Accommodating natural hen behavior is an important part of providing a high-welfare system
- Many alternative, cage-free egg production systems are available
- Cage-free systems are economically viable
- Cage-free is a growing international market trend
- A furnished cage is still a cage



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# Van Beek Group, The Netherlands





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FARM TYPE	MORTALITY AT 60 WEEKS
Caged	5.2 (0.3)
Cage-free (organic)	4.9 (0.5)
Cage-free (not organic)	4.5 (0.6)
Cage-free (overall)	4.7 (0.4)

U.S. Department of Agriculture (2013)

**“...the mortality rates and the prevalence of cannibalism did not differ between these housing systems. To further improve productivity and reduce mortality of hens housed in aviaries we recommend the choice of suitable strains and the implementation of improved rearing conditions including early access to litter.”**

Areni et al., 2005. Productivity and mortality of laying hens in aviaries: a systematic review. *World's Poultry Science Journal* 61:130-142.



**“...mean mortality in aviaries has now declined to a level comparable to cage systems... The comparatively low mean cumulative mortality found in the present study most likely has multi-factorial causes, such as better disease control, adjusted rearing conditions, reduced feather pecking and cannibalism, improved feeds and improved management by farmers due to increasing experience with the system.”**

Heerkens et al, 2015. Specific characteristics of the aviary housing system affect plumage condition, mortality and production in laying hens. Poultry Science: 94(9):2008-2017.





## FOOD SAFETY: *SALMONELLA*

- 2007 European Union Study
  - Compared cage and cage-free systems
  - Over 30,000 samples
  - Over 5,000 operations
  - Significantly higher risk in large, cage farms

European Food Safety Authority. 2007. *The ESFA Journal*

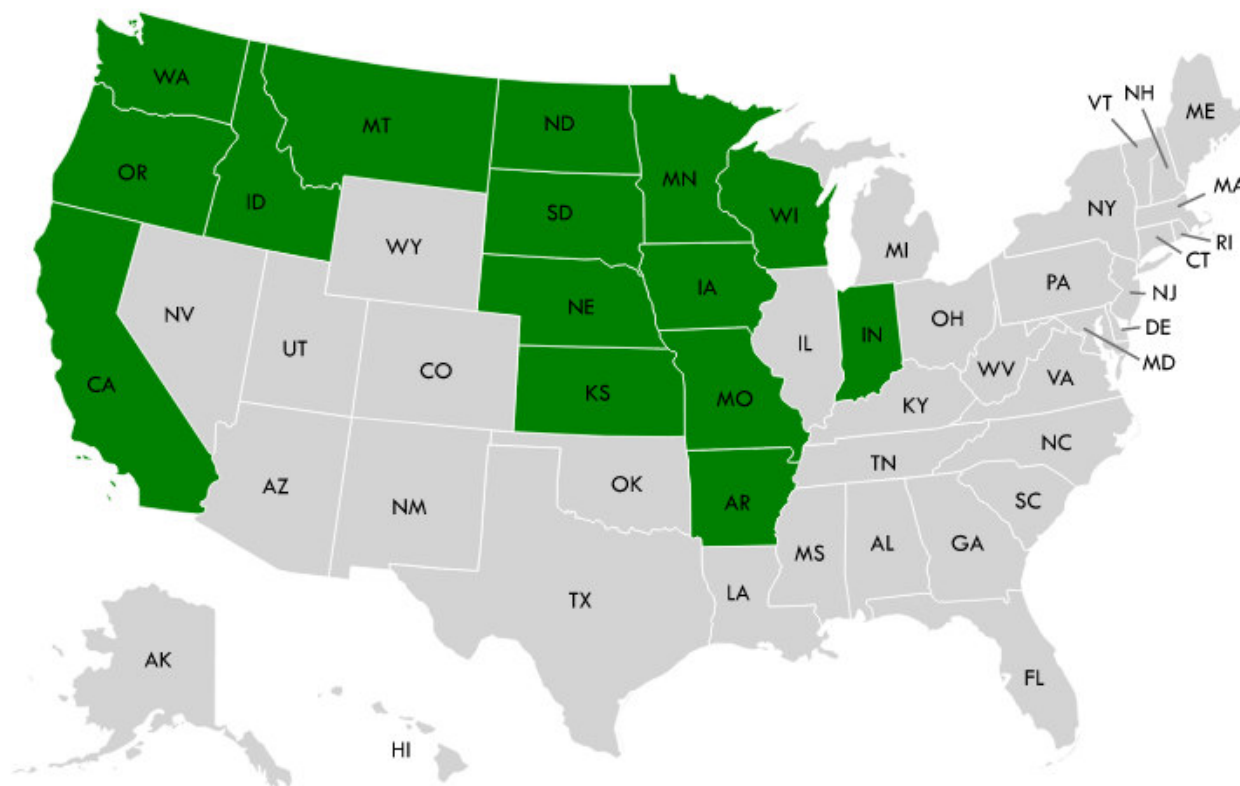
## 2010 US Salmonella outbreak

- Largest in US history
- Sickened 2,000 people
- Traced back to a battery cage farm in Iowa



## HPAI 2014/15 Confirmed Detections

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**211**

Commercial Flocks

**21**

Backyard Flocks

**50,400,000**

Birds Affected

**6/16/15**

Last Detection Reported

# Welfare aspects of housing systems for hens

	Barren Battery Cage	Furnished Cage	Cage-Free Barn/Aviary
Space per bird	432 cm <sup>2</sup>	750 cm <sup>2</sup>	930 – 1400 cm <sup>2</sup>
Running	Not permitted	Not permitted	Free expression
Flying	Not permitted	Not permitted	Free expression
Perching	Not permitted	Constrained	Free expression
Dustbathing	Not permitted	Constrained	Free expression
Foraging	Not permitted	Not permitted	Free expression
Nesting	Not permitted	Constrained	Free expression
Exercise	Not permitted	Constrained	Free expression
Bone strength	Weak	Intermittent	Strongest
Bone fractures	Less common during the laying period, but more common when removed from cages at depopulation	Less common during the laying period, but more common when removed from cages at depopulation	Common during the laying period, but less common during depopulation
Fatty liver hemorrhagic syndrome	More common	More common	Less common
Fear	More fearful	More fearful	Less fearful
Mortality	Variable and dependent on strain and beak trimming status	Variable and dependent on strain and beak trimming status	Variable and dependent on strain and beak trimming status