



Hen Housing Research Frequently Asked Questions – Final Results March 2015

General

Who are the members of CSES?

The Coalition is made up of leading animal welfare scientists, academic institutions, non-government organizations, egg suppliers, and restaurant/foodservice and food retail companies.

Members include the American Humane Association; Bob Evans Farms; British Columbia Egg Marketing Board; Burnbrae Farms Limited; Cargill Kitchen Solutions; CCF Brands; Cracker Barrel Old Country Store; Daybreak Foods, Inc.; Egg Farmers of Canada; Egg Farmers of Ontario; Flowers Foods, Inc.; Forsman Farms; Fremont Farms of Iowa; General Mills; Herbruck Poultry Ranch, Inc.; Iowa State University; McDonald's USA; Michael Foods, Inc.; Michigan State University; Midwest Poultry Services; Ohio Egg Marketing Program; Poultry Science Association; Purdue University; Sparboe Farms; Sysco Corporation; Tyson Foods; United Egg Producers; University of California, Davis; and University of Guelph.

The coalition leadership committee includes McDonald's, Cargill Kitchen Solutions, the American Humane Association, Michigan State University, the University of California, Davis and The Center for Food Integrity.

The United States Department of Agriculture Agricultural Research Service serves as a coalition member advisor. The Environmental Defense Fund and American Veterinary Medical Association are also serving as non-member advisors to the coalition.

What was the objective of the CSES Research?

The objective was to evaluate various laying hen housing systems by considering the impact of multiple variables on a sustainable system.

Why was the research conducted?

Commercial scale systems-based research in this area was lacking. Engaging in a holistic,

commercial-scale study to evaluate various laying hen housing systems and potential impacts on food safety, the environment, hen health and well-being, worker health and safety and food affordability, provides food system stakeholders with science-based information on sustainability factors to guide informed production and purchasing decisions.

Which housing systems were included in the research?

The three housing systems researched were conventional cage, enriched colony and cage-free aviary.

Why were these three hen housing systems chosen for the research?

The conventional cage system was chosen because the vast majority of eggs used by the U.S. food system at the time the research was planned and today originate from this system. The enriched colony and cage-free aviary systems were chosen as the most modern alternative types of systems that were available at the time and that were also beginning to be adopted by U.S. egg producers.

Why wasn't free-range or pasture-based researched?

Since fully indoor housing systems were the most common systems used in commercial egg production in the U.S. at the time the research was planned, that was where we focused our efforts. This also had the benefit of reducing variability by providing a relatively similar level of environmental control (light, temperature) in all three systems.

Was the conventional cage system similar to those used in the industry?

The conventional cage system was comparable to other conventional cage systems widely used in the industry. In this case there were six hens per enclosure, with each hen provided 80 square inches to meet customer requirements. The industry stocks conventionally raised hens at a variety of densities depending on customer requirements and other factors. For example, the United Egg Producer Animal Husbandry Guidelines allow for a range of 67 to 86 square inches per hen. Other producers not following these guidelines may use tighter stocking densities.

What were the housing densities?

This study was a holistic evaluation of housing systems and their impact on the full range of sustainability aspects, not a housing density study. Each system used hen stocking levels that follow established guidelines for each type of housing. The conventional housing stocking level followed United Egg Producer guidelines and was 80 square inches per bird. The enriched colony stocking level followed the current EU standard as well as the standard used by the American Humane Association and was 116 square inches per bird. The cage-free aviary

stocking level followed United Egg Producer guidelines for white hens and was 144 square inches.

What areas of sustainability were evaluated?

The research assessed five areas of sustainability: Animal Health and Well-Being, Food Safety, Environment, Worker Health and Safety, and Food Affordability.

Why were Lohmann LSL hens chosen for the research?

The Lohmann LSL strain of White Leghorns was selected in consultation with a primary poultry breeder and identified as a strain that could perform well in all three of the housing systems. If different breeds or strains had been used in the different systems, this would have added a variable that would have had a significant confounding effect upon every other aspect of the research.

Who conducted the research?

Lead researchers from Michigan State University, University of California, Davis, Iowa State University, and USDA Agricultural Research Service all participated in the research. Specialized ergonomics research was provided by Cargill Kitchen Solutions.

Where was the research conducted?

The research was conducted on a commercial farm in the Midwest, with all three housing systems in the same location.

How long did the research take?

The research project was conducted over three years and two separate flocks, and the final research results were released publicly in March 2015.

Who funded the research grants?

The funding for the research came from CSES and was administered by The Center for Food Integrity with oversight from a Research Committee. The Research Committee was comprised of academia, technical experts from CSES member companies and outside advisors.

What was the dollar amount of the grants?

A total of \$6 million in research grants were awarded to Michigan State University and University of California, Davis, with roughly \$3 million going to each institution.

How big were the research houses?

They are commercial scale houses. The conventional flock contained nearly 200,000 hens, and

the cage-free aviary and enriched colony flocks contained nearly 50,000 hens each.

Why were two flocks researched?

The researchers were aware that there could be variation between flocks due to factors like management changes, environmental conditions, flock disease outbreaks, or other unforeseen circumstances. Therefore, data were collected over two flock cycles to increase confidence in the system differences identified.

Did the management changes that took place in the aviary and enriched colony systems between Flocks 1 and 2 affect the research results?

Both management and the workers learned more about how to successfully manage each of these new systems, and study design adjustments were made where appropriate. Acknowledgements have been made in reports and publications where house management likely influenced specific study results.

What about those operations that have already converted or are planning to convert to cage-free aviary or enriched – what good does this research do them?

Just as management and workers in this commercial-scale research learned more about how to successfully manage each of these new systems, the research can offer guidance to those who have already chosen to change to either cage-free aviary or enriched colony.

Research-Specific

Where can I find more information about the research results?

In addition to a final summary report of the findings, some of the final research results were peer-reviewed and published in the March 2015 issue of *Poultry Science*, with additional results scheduled to be published there in the fall of 2015. Other results are being published in other scientific journals.

What factors were evaluated for Animal Health and Well-Being?

Behavioral observations were conducted to provide information on how hens use space and resources in the enriched colony and aviary systems. For all three systems, Welfare Quality scoring, bone quality analysis, stress measurements and health evaluations were carried out to provide data for understanding the impact of housing systems on specific aspects of hen welfare.

What Food Safety components were evaluated?

Food Safety research evaluated egg quality and egg safety in different housing systems. Egg quality evaluation included assessment of the physical quality of eggs, including attributes such

as shell thickness, and also egg content quality including membrane strength and elasticity. The egg safety evaluation focused on the effect of housing systems on bird response to *Salmonella* vaccination as well as microbiological evaluation of the hen housing system and eggs.

What Environmental components were evaluated?

Environmental impacts of different laying hen housing systems were assessed, evaluating indoor environmental conditions and air quality, gaseous and particulate emissions, feed and energy utilization efficiency, and manure nutrient management. In addition, research included farm emission modeling.

What factors were evaluated for Worker Health and Safety?

Worker Health and Safety research included both respiratory and musculoskeletal health components. An ergonomic analysis compared job tasks and impact on workers for each hen housing system. Respiratory health monitoring included measures of individual exposure to endotoxins and ammonia as well as pre- and post-shift health testing for short-term lung effects.

What factors were analyzed in the Food Affordability component?

Food Affordability research evaluated the ways in which different production systems impact costs of egg supply from the farm. Estimates of cost and price effects of the different systems can be used to approximate impacts of changing production systems on consumption of and expenditures on eggs and the implications for households with different incomes.

Generally, how did you determine what research areas to study?

The overarching areas selected for study have all been identified as significant for the sustainability of animal agriculture production systems. Within each of these overarching sustainability areas, research teams with the relevant expertise were selected by Michigan State University and the University of California, Davis. Those teams then determined what specific types of research questions would be addressed and the research methods that would be used.

In general, what did the research find?

The research found there are positive and negative impacts and trade-offs associated with each of the three hen housing systems relative to each of the five sustainability areas. Depending on the goals of a food system stakeholder, the trade-offs may be weighed differently. As a result of the Coalition's work, the industry will benefit from science-based information on sustainability factors to guide production and purchasing decisions.

Can this research be applied to the entire North American egg industry?

This research represents a snapshot in time – it assesses elements of hen housing and egg production using a single hen breed/strain, in a particular region of the U.S., over the course of three years and two flocks, in these particular housing systems. While it highlights the trade-offs involved and can assist in supporting informed decision-making, caution should be exercised in applying the research results to other scenarios with different variables.

What are next steps for the research and CSES?

The Coalition's holistic, commercial-scale study of housing alternatives for egg-laying hens and the impacts of each option on various elements of sustainability resulted in science-based information which will guide future production and purchasing decisions. As completing this sustainability research was the primary goal of the Coalition for Sustainable Egg Supply, this is the only research project that will be led by the group.