

# CSES

## Laying Hen Housing Research Project



Coalition for Sustainable Egg Supply

The Coalition for Sustainable Egg Supply is sponsoring a commercial-scale study of housing alternatives for egg-laying hens in the U.S. The study will evaluate the impact of various laying hen housing systems, on food safety, the environment, hen health and well-being, worker health and safety and food affordability. Led by Michigan State University and University of California, Davis, the study examines the impacts of three laying hen housing systems on the elements of a sustainable egg supply.

The first research flocks were placed in April 2010. The research will be replicated over two flocks and is expected to be completed in 2014 with results available the following year.

### Housing Systems

The CSES study is being conducted in houses built to U.S. commercial production scale with commercially available equipment and furnishing, using genetics and management systems typical of the U.S. Each house contains at least 50,000 laying hens. Three different housing systems are being studied at the same location, allowing comparison across the systems under the same environmental conditions:

- Conventional cage housing, which produce the vast majority of eggs currently used by the U.S. food system;
- Enriched colony system (also known as furnished colony system), which is larger than a conventional cage and equipped with perches, nesting areas, and material to facilitate foraging and dust bathing;
- Cage-free (or non-cage) system, where hens roam throughout a defined sector of a building, also equipped with perches, nesting areas and dust bathing material.

### Sustainability Elements:

The CSES research will evaluate the impact of system changes across multiple aspects of sustainability and provide insight into potential tradeoffs between systems.

- **Environment:** Environmental impacts of different laying hen housing systems, evaluating indoor environmental conditions and air quality, gaseous and particulate emissions, feed and energy utilization efficiency, and manure nutrient management. In addition, it will include farm emission modeling, evaluate regional climatic condition impacts and gather data to develop a life cycle assessment of the environmental footprint for different egg production systems.

- **Food Safety:** Evaluate egg quality and egg safety in different housing systems. Egg quality evaluation will include 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 focuses on the effect of housing systems on bird response to *Salmonella* vaccination as well as microbiological evaluation of the hen housing system and eggs.
- **Worker Safety and Health:** Includes both respiratory and musculoskeletal health components. An ergonomic analysis will compare job tasks and impact on workers for each hen housing system. Respiratory health monitoring will include measures of individual exposure to endotoxins and ammonia as well as pre- and post-shift health testing for short-term lung effects.
- **Animal Health and Well-being:** Behavioral observations will provide information on how hens use space and resources in the different house systems. Welfare scoring, skeletal evaluation, stress measurement and health evaluations will provide data for understanding the impact and potential trade-offs of housing systems on specific aspects of hen welfare.
- **Food Affordability:** Evaluate 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 will be used to approximate impacts of changing production systems on consumption of and expenditures on eggs and the implications for households with different incomes.

For more information, please visit [www.SustainableEggCoalition.org](http://www.SustainableEggCoalition.org).

