ASAS "Snack and Fact" Briefings

The Contribution Of Animal Production To Global Food Security

Presented by American Society of Animal Science (ASAS)

Oct. 28, 2013 / 12:00 pm to 1:00 pm
1300 Longworth House Office Building • Washington, DC

The Role Of New Technologies In Global Food Security—
Improving Animal Production Efficiency And Minimizing Impacts

Approximately 870 million people or 12.5 percent of the global population are undernourished. As the world population grows, food security on a global scale becomes a greater priority. High quality protein is essential in human diets, and animal protein fills this need for the poor and the rising middle class in developing countries. Thus, it is vital that the U.S. maintains its leadership role in improving global production efficiency of livestock and poultry in an environmentally and economically sustainable manner.

Development and adoption of new technologies has greatly enhanced livestock production output and efficiency while decreasing resource use and output of waste (Figure 1). **To meet the projected global food demand by 2050, new knowledge of animal genomics, physiological processes, nutrient utilization, and animal well-being must lead to new technologies and management practices that are economically, environmentally, and socially sustainable.**

Animals require specific nutrients in the correct amount and proportion to optimize productivity. Research has matched dietary nutrients with those required by the animal, resulting in marked decreases in excretion of excess nutrients as waste and a reduction in potential environmental impacts.

Growth-enhancing compounds increase efficiency of livestock and promote accumulation of lean muscle mass resulting in more animal protein from fewer animals. This, in turn, lessens the impact on the land, natural resources, and a lower carbon footprint of livestock (Figure 2). These compounds have been used for more than 30 years and are proven safe and effective resulting in economic benefits to consumers and producers. In addition, livestock waste treatment technologies now generate power and fuel as well as decrease overall emissions of greenhouse gases.

Reproductive technologies such as artificial insemination, embryo transfer and in vitro fertilization have improved management and control of fertility and have increased the availability of genetically superior animals.

Biotechnologies lead to animal products with biomedical applications such as production of therapeutic proteins in milk or blood, or the generation of organs for human transplantation.

Global food security depends on developing technologies for improving production and production efficiencies of livestock while adapting to and mitigating climate variability; protecting crops, livestock, and ecosystems from pests and diseases; and improving the nutritional quality and safety of meat, milk and eggs for consumers worldwide. *The economic benefits of agricultural research are estimated to outweigh the costs by a factor of 32 to 1.* Using the beef industry as an example, technological developments during the last 40 years are estimated to be worth over $12 billion annually. **Continued federal investment in animal agricultural research will allow prices for meat, milk, and eggs affordable for all.**

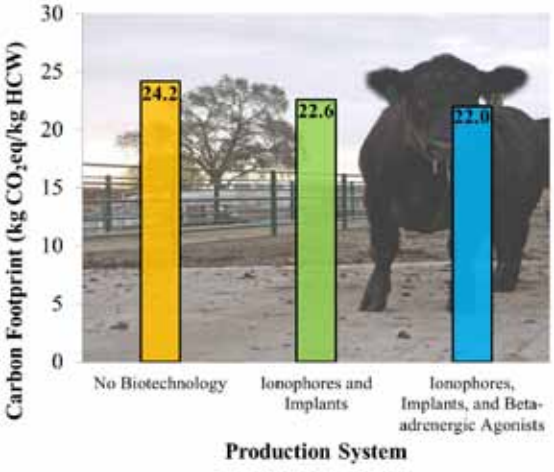

Figure 1: The carbon footprint (expressed in kg of carbon dioxide equivalents per kg of hot carcass weight) of three different Angus beef production systems differing at the stocker and feedlot stages (Stackhouse et al., 2012).

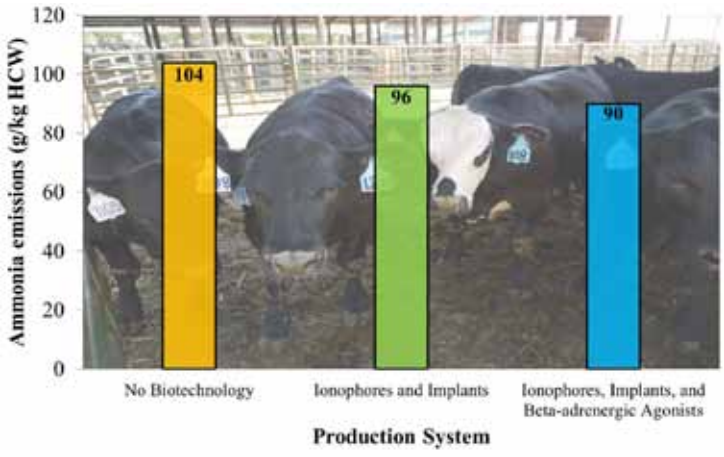

Figure 2: The ammonia emissions (expressed in g of ammonia per kg of hot carcass weight) of three different Angus beef production systems differing at the stocker and feedlot stages (Stackhouse et al., 2012).

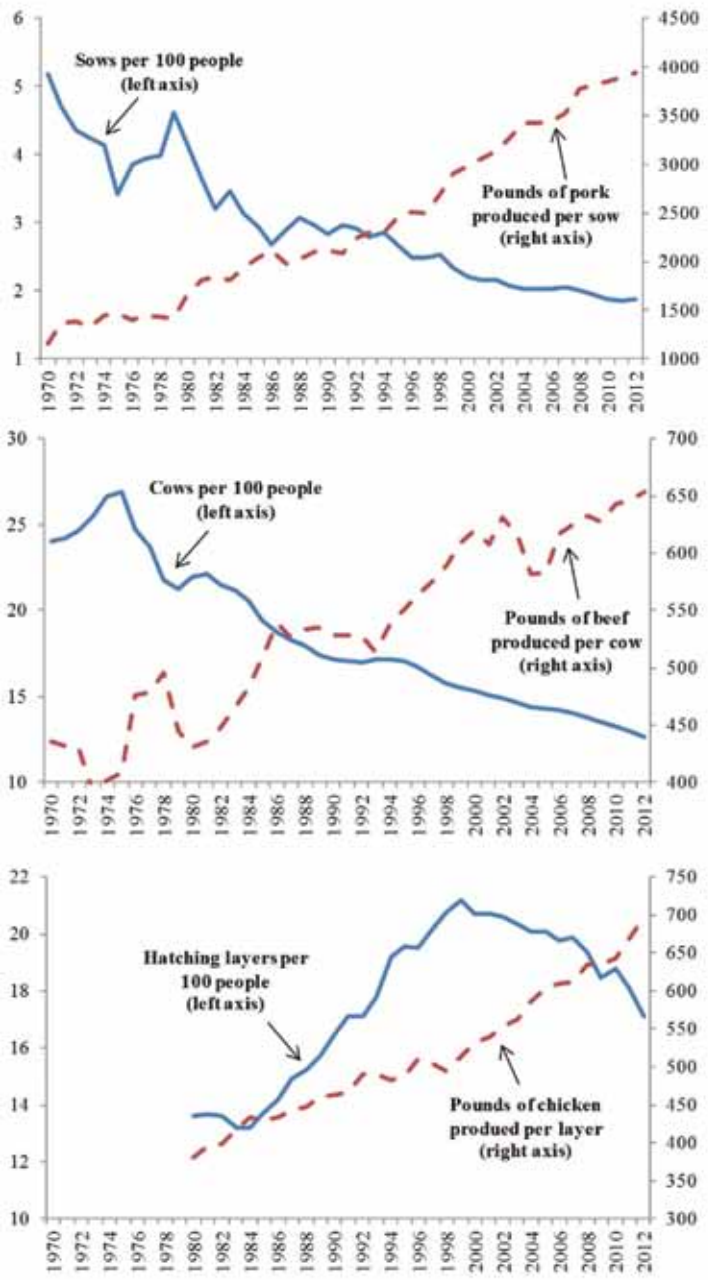

Figure 3:Changes in efficiency of pork, beef, and chicken breeding stock (top to bottom) from 1970 to 2012 (USDA data sources maintained by LMIC, 2013).

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12:00 to 12:05
Welcome
Walt Smith and Lowell Randel; FASS Science Policy Directors

12:05 to 12:10
Introduction & Goals
Dr. Rod Hill (University of Idaho), ASAS Public Policy Committee

12:10 to 12: 30
New Technologies Vs Global Food Security—A Dilemma Of Global Proportions
Dr. Clint Krehbiel (Oklahoma State University)

12:30 to 12:50
Cattle Biotechnologies Reduce Environmental Impact And Help Feed A Growing Planet
Dr. Frank Mitloehner (University of California-Davis)

12:50 to 1:00
Wrap-Up and Discussion
Dr. Deb Hamernik; Chair, ASAS Public Policy Committee

PRESENTERS:

CLINTON R. KREHBIEL is Regents Professor and Dennis and Marta White Endowed Chair in Ruminant Nutrition and Health at Oklahoma State University. Dr. Krehbiel holds an A.A.S. degree from Hutchison Community College (1986), B.S. (1988) and M.S. (1990) degrees from Kansas State University, and a Ph.D. degree (1994) from the University of Nebraska. Dr. Krehbiel was a postdoctoral fellow at the Roman L. Hruska U. S. Meat Animal Research Center, Clay Center, NE. He spent 3.5 years on the faculty at New Mexico State University before joining the faculty in the Department of Animal Science at Oklahoma State University in January 2000. Dr. Krehbiel holds a split appointment between teaching (~20%) and research (~80%). His research interests include understanding relationships involving ruminal fermentation, gastrointestinal tract metabolism, and net nutrient flux to improve animal health, growth, feed efficiency and end-product quality of beef cattle. Dr. Krehbiel has authored or co-authored over 400 refereed journal articles, book chapters, abstracts of papers presented at scientific meetings, research reports of the Agricultural Experiment Stations, and papers published in conference proceedings. He teaches graduate courses in Rumenology, Laboratory Techniques in Animal Nutrition, and co-teaches a Protein Nutrition course. Clint and his wife Shelly have three daughters, Madison, Megan, and Emma.

FRANK MITLOEHNER is an expert in agricultural air quality, animal-environmental interactions, and agricultural engineering. He is a Professor and Air Quality Specialist in Cooperative Extension. Since he joined the faculty in the Department of Animal Science at the University of California-Davis in 2002, Dr. Mitloehner has generated and published data that are rapidly changing how livestock facilities in California and throughout the US are regulated. Dr. Mitloehner is Principal Investigator of a broad range of studies, has authored 73 publications in refereed journals, and obtained approx. $11M in extramural grants. Dr. Mitloehner has recently been elected chairman of a global United Nations FAO project to benchmark environmental footprint of livestock production. He serves as workgroup member on the President's Council of Advisors on Science and Technology (PCAST) and as member on the National Academies of Science Institute of Medicine committee on "A Framework for Assessing the Health, Environmental, and Social Effects of the Food System". Dr. Mitloehner received his MS degree in Animal Science and Agricultural Engineering from the University of Leipzig, Germany, in 1996 and his PhD degree in Animal Science from Texas Technical University in 2000. His undergraduate and graduate instructional areas include livestock production, environmental physiology, comparative anatomy and physiology, and grant writing.