Improving Beef Production Today to Protect Tomorrow

The National Cattlemen’s Beef Association, a contractor to the Beef Checkoff Program, has contracted with BASF Corporation North America (a world leader in conducting comprehensive life cycle analyses) and the Agricultural Research Service (ARS) of the United States Department of Agriculture (USDA) to conduct the first industry-wide beef sustainability assessment that examines the sustainability of the entire beef supply chain from pasture to plate. The results of this comprehensive study will provide a roadmap for the journey toward a more sustainable beef industry.

The U.S. beef industry is one of the most complex biological, economic and social supply chains in the world. As such, measuring these complex, interrelated systems is difficult but critically important to the future stability and profitability of the entire industry. Increasingly, our customers at home and abroad are asking questions about beef’s impact and sustainability. The results of this one-of-a-kind project will provide science-based answers to those questions, allowing the industry to better tell the story of beef and defend beef’s image globally.

Background

The production of beef in the United States has a long and rich history. Cattlemen and women have played an important role in the economic and social fabric of the country; a tradition that continues today. By scientifically establishing a sustainability benchmark we can better ensure beef production will continue to play a major role in providing a safe, wholesome, nutrient-dense protein to both a national and global population. A sustainable beef industry is critically important as we work toward the goal of feeding 9 billion people by the year 2050, a global population explosion that experts estimate will require at least 70 percent more food with few additional resources.

Increasingly, the story of beef production is being told by people and groups whose interests are contrary to beef producers. The result has been a growing number of questions about how beef is produced in the United States and concern among consumers about the sustainability of our industry. As beef producers, we know our methods are safe, sound and sustainable. For generations we have raised cattle and produced beef on ranches across the country. However, we have lacked the scientific data to back up what we know. The industry-wide beef sustainability assessment will, for the first time, provide sound, peer-reviewed and certified data that proves the beef industry is on a sustainable path.

Until the release of the beef industry’s own sustainability assessment, a great deal of information about global beef industry sustainability had been derived from Livestock’s Long Shadow, a flawed study released by the United Nations (U.N.), Food and Agriculture Organization nearly ten years ago. Livestock’s Long Shadow cast a negative light on beef production in the United States and incorrectly blamed cattle for a number of environmental and social issues. That flawed U.N. study also helped cattlemen and cattlewomen understand the importance of telling the story of modern beef production, giving rise to the funding and implementation of the first-ever U.S. beef industry sustainability assessment.

The meaning of sustainability has been subjected to a variety of interpretations, but it is important to understand that sustainability is a journey of continuous improvement rather than a destination. For the beef industry, sustainability has been defined as the process of meeting beef demand by balancing environmental responsibility, economic opportunity and social diligence throughout the supply chain. By ensuring that these three pillars of beef production are balanced, the industry will be well positioned to continue future growth.
Project Overview

The industry-wide beef sustainability assessment is the largest study of its kind. The project consists of multiple phases, examining all sectors of the production chain. From the cow-calf and feedlot sectors to packing, retail and the consumer in order to create a comprehensive analysis, BASF and USDA-ARS have gathered millions of data points from a wide variety of sources to create a sustainability benchmark for each production sector and the industry as a whole.

The assessment began with a hotspot analysis which combined an examination of available literature and a stakeholder survey, which quantified current perceptions of beef sustainability. The second phase of the study was a comprehensive life cycle assessment (LCA), an ISO-compliant review of the industry’s beef production practices from pasture to plate. The preliminary results of the LCA provide each production sector an overview of improvements since 2005 as well as current areas where progress toward a more sustainable path may be possible.

In early 2013, the social pillar will be included in the results of the assessment. For the first time the beef industry will be able to scientifically calculate its impact on communities. These results have never before been quantified for an entire industry, positioning U.S. beef as a global leader in the conversation on sustainability.

Findings

Pre-harvest (Cow-calf, Feedlot and Feed Production)

From 1970 to 2005, and again from 2005 to 2011, preliminary results show that improved machinery technology, irrigation techniques, fertilizer management, nutrition, animal performance and crop yields have resulted in lowering the environmental footprint of pre-harvest beef production and improving on-farm sustainability. However, the use of ethanol co-products has created some negative impacts since 2005.

Post-harvest (Packing and Case-ready)

Recent advances in the capture of biogas from lagoons and the conversion of that biogas to energy has dramatically reduced the environmental fingerprint of the packing sector. By converting a byproduct of the beef harvesting process into a replacement for energy, the packing sector has decreased use of electricity, natural gas and diesel. Additionally, the installation of closed-loop cooling water systems and wastewater recycling has greatly reduced water emissions.

The case-ready sector’s fingerprint has improved dramatically as a result of advances in “right-size” packaging, water use and increased plant utilization optimization.

Retail and Consumer Segment

The retail and consumer sector data for this study was compiled solely from publicly available sources. Moving forward, actual retail data is expected to be included. The retail sector has an opportunity to contribute to improving the sustainability of beef by conserving energy, reducing beef waste, and promoting improved refrigeration technology to reduce harmful gasses leaking into the atmosphere. The consumer segment offers significant potential for reducing the environmental fingerprint of the beef industry by at least 10 percent through a reduction in plate waste and spoilage and upgrading to energy-efficient appliances.
Conclusion

In early 2013, the LCA will be presented for NSF (National Standards Foundation) certification, an important step in recognizing the beef industry’s sustainability progress. NSF International is the largest accredited, third-party body that certifies products to verify they align with national conformity standards by which to measure a product’s sustainability. Concurrently with the certification submission, operators along the value chain are being engaged to determine immediate improvement opportunities by sector and future research needs.

The LCA’s preliminary data show the industry has been on a sustainable path that will continue to improve over time. Between 2005 and 2011 the beef industry has made notable reductions in solid waste emissions, greenhouse gas emissions, photochemical ozone creation, ozone depletion potential emissions, emissions to water, land use, occupational illnesses and accidents, energy use and resource consumption and toxicity potential (Figures 1 and 2). Because of the increased use of ethanol co-products, emissions contributing to acidification potential have increased.

Moving forward, a science-based identification of those areas where improvements can be made will allow the industry to tell a positive story that will resonate well with our customers who are increasingly interested in how their food is produced and how those production practices impact the world around them.
### Beef Sustainability Research Timeline

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<th>Year</th>
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<td>2006</td>
<td>The United Nations Food and Agriculture Organization released a report titled <em>Livestock’s Long Shadow – Environmental Issues and Options</em>. This report suggested that livestock are responsible for 18 percent of all manmade greenhouse gases which is a larger contribution than all of the world’s transportation.</td>
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<td>2009</td>
<td>Frank Mitloehner, PhD, Associate Professor and Air Quality Specialist in Cooperative Extension, Department of Animal Science, University of California, and colleagues published “Clearing the Air: Livestock’s Contribution to Climate Change,” which identified a major scientific flaw in <em>Livestock’s Long Shadow</em> – an inaccurate and unfair comparison of livestock to transportation.</td>
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<td>2009</td>
<td>The Sustainability Consortium formed in July 2009 as an organization of diverse global participants working to make the world more sustainable through better products, services and consumption. On October 30, 2009, the U.S. Environmental Protection Agency (EPA) published a rule for the mandatory reporting of greenhouse gases (GHG) from large GHG emissions sources in the United States.</td>
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<td>2011</td>
<td>The Beef Checkoff initiated the U.S. Beef Sustainability Project based on defining sustainability to include environmental, social, and economic pillars.</td>
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<td>2013</td>
<td>The checkoff-funded Beef Sustainability Research Summit, including representatives from all segments of the beef value chain, was held in January to discuss the data from the U.S. Beef Sustainability Project, rank the areas where the greatest improvement is needed and can be achieved, and develop working groups to improve the sustainability of beef.</td>
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<td>2013</td>
<td>The producer life cycle assessment tool, a computer-based software program producers can use to enhance the sustainability of individual operations, will be released.</td>
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<td>2013–2014</td>
<td>Extending from October 2012 through May 2014, the second phase of the checkoff-funded Beef Sustainability Research will work with industry experts to explore possible solutions for the sustainability improvement areas identified by the 2011 sustainability assessment, and expand the sustainability project to include regional assessments of cattle-rearing areas within the United States as well as differing management strategies resulting in consumer food choices, e.g. natural, organic and grass finished.</td>
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