



2017 REPORT

ADVANCES IN ANIMAL AG

STRIVING FOR CONTINUOUS IMPROVEMENT



The Animal Agriculture Alliance is an industry-united, nonprofit organization that helps bridge the communication gap between farm and fork. We connect key food industry stakeholders to arm them with responses to emerging issues. We engage food chain influencers and promote consumer choice by helping them better understand modern animal agriculture. We protect by exposing those who threaten our nation's food security with damaging misinformation.



A note from the CEO

As champions for farmers and ranchers, we know sharing the stories of the people and families who raise and produce our food is key to helping consumers better understand where their food comes from. There is a lot of misinformation being shared about food and agriculture – often times by people generations removed from agriculture, further dividing the communication gap between farm and fork.

The Alliance works to bridge that gap and share science-based, factual information about how livestock and poultry are raised on farms across America. Many things have changed in the 30 years since the Alliance was started, but one thing that has and will always remain constant is the animal agriculture industry's commitment to continuous improvement and working collaboratively to secure a brighter future for farmers and ranchers.

This report highlights how the animal agriculture industry shares the same values as today's consumer with its never-ending commitment to animal care, food safety, sustainability and responsible antibiotic use.

Sincerely,

A handwritten signature in black ink that reads 'Kay'.

Kay Johnson Smith
President and CEO



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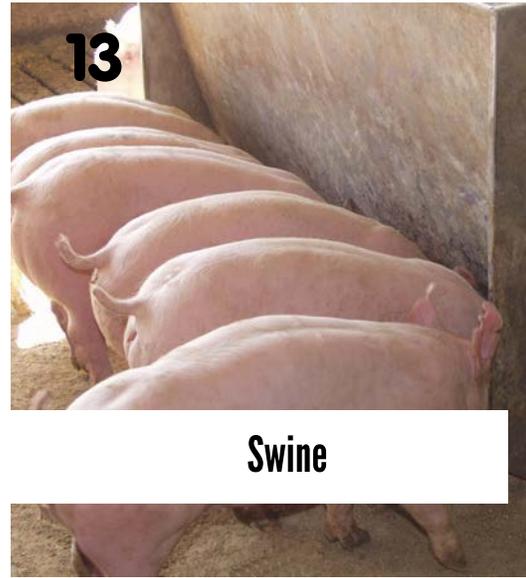
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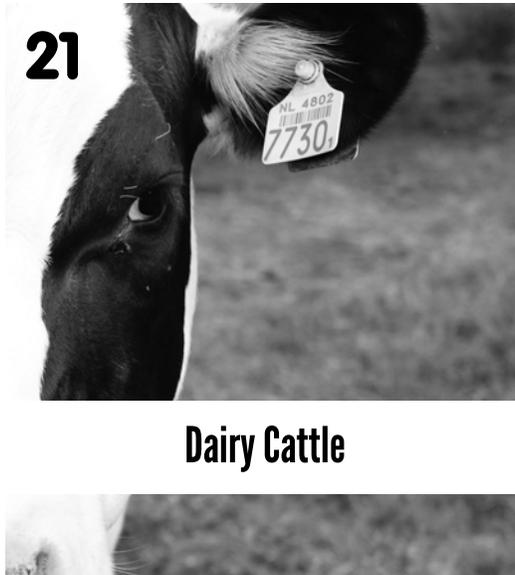
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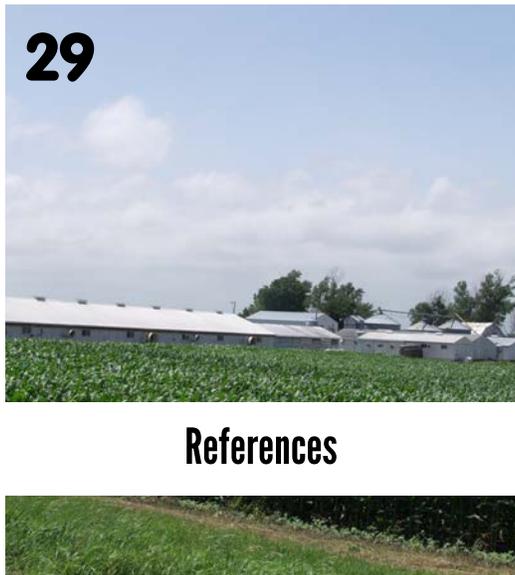
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Executive Summary

Animal Care

Today's farm animals are raised by a broad network of dedicated people who care deeply about animal care. Farmers and ranchers have an ethical obligation to care for animals raised for food, and they take that responsibility seriously. Animal well-being is critical to providing the best quality food products, and animal care is the highest priority for both large and small farms.

Livestock production has changed and evolved over the years, in part because farmers understand that it is in their best interest to adopt practices that lead to healthier animals. To further advance animal welfare and farming methods, each segment of the animal agriculture industry has brought together recognized veterinarians, animal science specialists, nutritionists and researchers to promote the highest standard of animal care and well-being. Each segment of the livestock and poultry industries has species-specific educational programs, guidelines and best management practices focused on proper care, feeding, handling and transportation of animals.

Continuous Improvement

Raising food is a way of life that requires dedication and a lot of hard work. Farmers and ranchers, the two percent of the population that works to raise the food we all eat, recognize that this as both a duty and a privilege, whether for our country or abroad. The rewards of farming and ranching go way beyond financial success—livestock production provides a way of life for future generations and a food source for a hungry world. No one can deny that raising food looks a lot different than it did 50, 25 or even five years ago. To feed a growing population safely and efficiently, and to prioritize the highest standards of animal care, the entire animal agriculture industry has worked tirelessly to identify areas for improvement and to evolve. Whether it is making sure that animals are getting the best care possible, using antibiotics judiciously or making major strides in food safety and sustainability, the entire animal agriculture industry has improved to continuously meet consumer expectations over the years.

Responsible Antibiotic Use

Farmers, ranchers and veterinarians take the issue of antimicrobial resistance (which occurs when a microorganism develops the ability to resist the action of an antimicrobial) and residues (which is the presence of an antibiotic in the product) seriously. Nothing is more important to the animal agriculture industry than public health, animal health and a safe food supply.



The science around antibiotic resistance is complex. Based on several scientific, peer reviewed assessments, it does not appear that there is a direct relationship between antibiotic resistance in animals and transfer of that resistance to humans. Most scientists—and the Centers for Disease Control and Prevention (CDC)—agree that improper use of antibiotics in human medicine is the greatest contributing factor in the formation of resistant bacteria affecting humans. Even so, the government, the animal health industry, farmers, and ranchers have proactively implemented multiple steps to reduce the potential that antibiotic use in food-producing animals could affect human health and to minimize the likelihood of development of antibiotic resistant bacteria.

Antibiotic use practices in food animals are based on years of Food and Drug Administration (FDA) veterinary directives, practical experience, scientific analyses and risk assessments that work to ensure both animal health and public health. In addition to industry efforts to responsibly use antibiotics that are necessary, the FDA adopted Guidance for Industry 209, the Judicious Use of Medically Important Antimicrobial Drugs in Food Producing Animals, which was fully implemented in



January 2017.¹ It called for phasing out the use of medically important antibiotics (those used in human medicine) used for growth promotion in feed and water. Guidance 209 also expressly requires veterinary oversight of medically important antibiotics, though it's important to note that most farmers and ranchers already routinely consult with their veterinarians regarding antibiotic protocols. As a result, the growth promotion uses of medically important antibiotics in feed and water have been phased out, and antibiotics are used in animal agriculture only to address disease threats under the supervision of a veterinarian.

In December 2016, FDA released its antibiotic sales report for 2015, showing that sales of antibiotics for use in animals rose one percent from 2014-2015. However, it is important to be aware that sales data does not represent actual use, and that it is a small part of the story about the public health impacts of antibiotics used to keep food animals healthy. The increase was mostly ionophore and tetracycline classes of antibiotics. Ionophores are not being used in human medicine and FDA has stated that they are not a contributor to antibiotic resistance. Tetracyclines are very rarely being used in human medicine. The report showed that nearly 40 percent of the antibiotics used in veterinary medicine contribute nothing to antibiotic resistance in humans because they are compounds not used in human medicine.²



In April 2016, FDA released the 2014-2015 National Antimicrobial Resistance Monitoring System (NARMS) Retail Meat Interim Report. Highlights included:

- The prevalence of Salmonella in retail poultry is at its lowest level since testing began in 2002. In ground turkey, the prevalence of Salmonella has declined from a high of 19 percent in 2008 to six percent in 2014. In retail chicken over the same time period, it has dropped from 15 percent to nine percent.
- Salmonella resistance to ceftriaxone (an important antibiotic used to treat seriously ill patients) from chicken sources continued to decline steadily from a high of 38 percent in retail chicken meats in 2009 to 18 percent in 2014, and five percent during the first half of 2015. In ground turkey isolates, ceftriaxone resistance was detected in seven percent of 2014 isolates and four percent of 2015 isolates collected through June, which represents an 80 percent decline since 2011 when resistance peaked at 22 percent.
- Fluoroquinolones like ciprofloxacin are classified as critically important for the treatment of Salmonella infections. Ciprofloxacin resistance was absent in Salmonella from poultry and beef, although a single isolate was found in pork.
- All Salmonella from retail meats were susceptible to azithromycin, another important antibiotic recommended for the treatment of Salmonella and other intestinal pathogens.
- Multidrug resistance in Salmonella continued to show a downward drift in chicken and turkey from 2011 levels of 45 percent and 50 percent, respectively, to 20 percent and 36 percent in June 2015.³

While it is important to continue additional progress, these data, which FDA terms "encouraging," demonstrate antibiotics can be used to protect the health of food animals while balancing the responsibilities for antibiotic resistance within both human and animal medicine.

The success of any farm or ranch operation is tied directly to operation quality and livestock well-being. Producers are on the front line, caring for the animals each and every day. They work regularly with veterinarians and outside organizations to adopt responsible codes of conduct regarding animal well-being and food safety. Policymakers and producers alike support accountability and judiciousness when it comes to using antibiotics, and they want consumers to know they are dedicated to continuous improvement in management practices that minimize the need for antibiotics. While prevention, vaccination programs, animal comfort and nutrition are key, continued availability of antibiotics to fight disease in animals is important to consumers because it helps producers raise healthy animals – the building block of a safe food supply.



Food Safety Advancements

Many checks and balances are in place throughout the production chain to ensure the integrity and security of the food supply. The U.S. food system has earned a global reputation for the safety of its products, and government oversight is part of the reason for the success. Various federal, state and local entities contribute to the security of our nation's food safety net through regulation or inspection. The U.S. Department of Agriculture (USDA), FDA, CVM, NARMS and the Food Animal Residue Avoidance Databank all share responsibility for various aspects of ensuring food safety.



The USDA Food Safety and Inspection Service (FSIS) federal inspectors are present at all times during operation in poultry, beef and swine processing plants and at all egg processing facilities. In a federally inspected slaughter operation, animals are inspected and inspectors have the authority to slow or halt production for any violations, food safety or otherwise.

Every farmer and rancher knows that his or her most crucial responsibility is to produce the safest, most wholesome and most affordable food possible. This is not only a responsibility, but a privilege that our American farmers and ranchers take incredibly seriously.

The Sustainability Journey

Sustainability means using natural resources efficiently; caring for the land, air, water and wildlife; and producing safe, abundant food to nourish a growing population—the vast majority of whom enjoy a diet comprised, in part, of meat, poultry, milk and egg products. For generations, farmers have raised animals on farms and ranches across the country. American farmers have sought to farm not only in an ethical manner, but also in an environmentally sound and sustainable manner. After all, our farmers and ranchers want to ensure they can pass their farms on to the next generation.

Livestock production in the U.S. is a model for the rest of the world for several reasons: (1) we use advanced genetics; (2) we promote excellent veterinary care; and (3) we feed our animals optimal diets. The protein groups have made tremendous improvements in all areas of farming, including sustainability. Today, modern farms combine the best of traditional farming practices with the benefits of modern technology and agriculture science.





Poultry

Animal Care

Chickens (Broilers - raised for meat)

Today's chicken farmers and processors produce birds that benefit from modern technology, advances in nutrition, protection from predators and disease, 24-hour access to clean water and feed, adequate room to grow and professional veterinary attention. Before a baby chick is even hatched, it is vaccinated to prevent a number of diseases and illnesses that have the potential to be devastating to the bird's health. Most farmers receive remote alarm notifications through their phones, pagers or other devices which alert them if the chickens are too hot or cold or need more food or water.

The health of broiler chickens in the U.S. continues to improve with scientific advancements in genetics, management and nutrition. Birds go through a medically advanced screening process to ensure the healthiest and strongest go on to create the next generation of chickens. Selection for health and welfare traits is important not only to animal welfare but also to improve husbandry. The screening includes:

- A DNA test to check any genetic disorders down the line.
- A blood oxygen level test to ensure heart and lung health.
- An ultrasound station to examine the birds' breast muscles.
- An x-ray of the bird's joints, to look at the bone formation and joints of each bird to have a precise evaluation of leg health.
- A feed conversion test to determine which birds gain weight most efficiently.

As a result of these industry-adopted developments, quarterly mortality rates remain at historic lows. According to 2016 statistics, today's mortality rate is 4.8 percent compared to 18 percent in 1925.⁴

To assist farmers and the companies who produce and process chickens for food, the National Chicken Council (NCC) developed the NCC Animal Welfare Guidelines and Audit Checklist, which have been widely adopted within the chicken industry. These guidelines were updated in 2017 to cover every phase of the chicken's life and offer science-based recommendations for humane treatment.



Laying hens (Eggs)

Though in recent years many grocers, manufacturers, and restaurants have announced a transition to cage-free egg production, the layer industry has made considerable advancements in three major housing systems – conventional cages, enriched colony cages and cage-free. Progress in food safety protocols and best practices in biosecurity have maintained caged production as the safest, most affordable production system. Colony systems offer "enrichments" such as larger cages, perches, curtained nests and scratch area, all of which allow birds to exhibit some of their natural behaviors. Cage-free aviaries have begun to gain traction in the industry as well. These systems allow birds to move vertically (up and down the system), horizontally (throughout the barn) and also include the enrichments of the colony system.

Hens under the United Egg Producers (UEP) Certified program account for 95 percent of all the nation's laying hens and are independently audited annually based on guidelines recommended by a committee of world-renowned scientists in areas of food safety and animal behavior.⁵ As in all other forms of poultry production, birds are not fed steroids or hormones, but are fed multiple times throughout the day. Other considerations of the UEP guidelines are stocking density, lighting and beak treatment. Responsibility of maintaining this high standard of production is not left to the owner and manager alone, but is extended to employees and contract workers in that they must be trained and agree to sign a code of conduct. The UEP Certified program acts as a guide to producers in their production decisions, leads the industry on the front lines of animal welfare conversations, and prioritizes bird health and well-being.



Turkeys

Each year, about 250 million turkeys are raised on about 2,000 independent farms across the U.S. These turkeys are raised in scientifically-designed, heated houses that provide maximum space and protect them from weather, insects, rodents, predators and people who might spread disease.

Except for breeding and transportation purposes, turkeys are allowed to roam freely within their house.

The National Turkey Federation (NTF) published its first guidelines on the care of turkeys in 1990 and has continued to update its members with new information, with the latest update occurring in 2016. The Animal Care Guidelines provide auditing tools for all segments of turkey production, including, but not limited to: hatching, breeding, transportation, processing and euthanasia of the birds. NTF has developed Animal Care Best Management Practices (AC-BMP) to encourage humane production and slaughter practices. The BMP manuals are widely utilized by in turkey production to provide the tools needed to make improvements with the current state-of-the-art practices and to set the stage for future enhancements. In addition to the BMP, NTF also created a Stewardship Manual and a set of Turkey Industry Principles for producers to reference and utilize as foundational resources.



Contrary to some myths, growth-enhancing additives such as hormones or steroids are never used in chicken and turkeys, or for egg production. In fact, FDA bans the use of such hormones. Genetic improvements, better feed formulation and modern management practices are responsible for the increase in turkey size. Market weights and growth performance of turkeys continue to increase, overcoming challenges that once included early mortality problems, avian influenza, and E.coli bacteria.

Our standards include federal, state and local laws that enhance food safety, animal well-being, protection of soil and water resources, and guide our farmers as good stewards in the communities where we work and live. Our Standards of Conduct align with ethical treatment of animals, production of wholesome quality meat, respect and value of our workers, and the wise use of land and water resources. As an industry, our core mission is to remain ethical in all aspects of our production system, from animal welfare and food safety, to environmental stability and human resources. NTF, with the help of industry veterinarians and generations of experienced turkey growers, has worked tirelessly to remain an honest and transparent voice in the protein production sector throughout the U.S.



Continuous Improvement

A strengthened commitment to investments in science for food and agriculture is essential for maintaining the nation's food, economic and national security. The poultry industry has been on the forefront of sponsoring and supporting increased investments in science for food, animal health and agriculture. Among those efforts are:

- Increased funding for the National Poultry Improvement Plan (NPIP), which is a joint federal, state, and industry partnership to eradicate food safety threats to humans such as Salmonella and to test and monitor highly pathogenic diseases in poultry such as avian influenza.⁶
- U.S. Poultry & Egg Association's research program is celebrating 50+ years of funding research and investing more than \$27 million in research that incorporates all phases of poultry and egg production and processing.⁷
- An update to the U.S. Poultry & Egg Association's Carbon Footprint Estimation Toolkit. The toolkit was created to assist the poultry industry with adhering to EPA's greenhouse gas (GHG) reporting requirement and to reduce the burden of performing GHG emission calculations.

Responsible Antibiotic Use

Antibiotics are just one of many tools farmers use to keep their flocks healthy, in order to contribute to a safe and wholesome food supply. Producers rely on vaccination, biosecurity, good hygiene, best management practices and placing chicks certified free of specific infections through the National Poultry Improvement Plan to help prevent disease, and only utilize antibiotics when needed.

Today, all poultry farms are under a health program designed by a licensed veterinarian. But just like people, animals sometimes get sick, and treating illness is a responsible part of animal care. When this happens, farmers work with animal health experts and veterinarians to determine if an antibiotic is needed. The vast majority of the antibiotics that we use are never used in human medicine, and we're taking steps to phase out those most critical to human medicine.

Chicken producers are committed to innovation, and the work that farmers and veterinarians are doing to ensure the safety and health of their flocks – and thereby our food supply – creates a vast amount of choice for consumers. Whether consumers choose to spend their food dollars on traditional chicken, organic or chicken raised without antibiotics, they can be confident in its wholesomeness and safety.

Food Safety Advancements

One of the pathogens monitored by FSIS is Salmonella, the prevalence of which is monitored on a routine basis both by FSIS and by the poultry and egg industry. And the data for chicken shows tremendous strides made over the past several years:

- 98.5 percent of tests for Salmonella are negative for whole chickens at large plants.
- For the first quarter of 2008 through the first quarter of 2015, the industry has reduced the occurrence of Salmonella on whole chickens by 66 percent.
- The number of plants in Category 1 – establishments at 50 percent or less than the FSIS Salmonella performance standard – for both whole and ground chicken are at an all-time low. Since FSIS began testing chicken for Campylobacter during the third quarter of 2011, the industry has reduced incidence by 30 percent⁸.



In turkeys, USDA Food Safety Inspection Service reported Salmonella continued to decline to 1.7 percent in its most recent analysis updated in 2015.⁹ Since Fall 2011, the National Turkey Federation has continued to aggressively drive-down the occurrence of Salmonella, to achieve the lowest count possible among raw poultry products.

Egg producers with cage, cage-free, free range and organic housing systems have been working toward reducing pathogens like Salmonella Enteritidis (SE) on the farm for more than 10 years. After the initial inspections in 2011, only approximately 2.5 percent of the environmental samples nationwide were positive for SE for egg producers.



The Sustainability Journey

Back in the early days of the commercial poultry industry—around the 1940s—each chicken required approximately 16 pounds of feed to achieve a four-pound weight.¹⁰ Today, that amount of feed has been reduced by more than half—less than seven pounds of feed—to grow the same size bird, all without the use of growth hormones or steroids. While chickens today are bred to grow faster, they're also bred to grow stronger and healthier than ever before. There is a push for "slower-growing" birds claiming they are healthier than today's broilers, but there is no evidence about the potential impact on animal well-being. The sustainability impacts are outlined in a 2017 study released by The National Chicken Council. Here are some of the findings if only one third of the industry switched to "slower-growing" broilers:

- Additional feed needed: Enough to fill 670,000 additional tractor trailers on the road per year, using millions more gallons of fuel annually.
- Additional land needed: The additional land needed to grow the feed (corn and soybeans) would be 7.6 million acres/year, or roughly the size of the entire state of Maryland.
- Additional manure output: Slower growing chickens will also stay on the farm longer, producing 28.5 billion additional pounds of manure annually. That's enough litter to create a pile on a football field that is 27 times higher than a typical NFL stadium.
- Additional water needed: 1 billion additional gallons of water per year for the chickens to drink (excluding additional irrigation water that would be required to grow the additional feed).¹¹

" While chickens today are bred to grow faster, they're also bred to grow stronger and healthier than ever before. "

Similar gains in efficiency have been achieved in turkey production. It once took 29 weeks for a tom turkey to reach a live weight of 35 pounds.¹² Today, the male turkey tips those scales in just 18 weeks reaching 38 pounds. Lower feed requirements reduce the demand for corn and soybeans. This efficiency also aids in lowering the fuel consumption and exhaust emissions of the tractors and trucks that harvest and bring the grain to market.

A study initiated by the egg industry aimed to formally quantify production performance gains and overall reduction in environmental impact. The study, titled "A Comparative Assessment of the Environmental Footprint of the U.S. Egg Industry in 1960 and 2010", was undertaken by the Egg Industry Center (Iowa State University, IA). In developing the 2010 from the 1960 model, the following changes in production performance of pullets and laying hens in the U.S. were observed over time:

- Compared with 1960 laying hens, 2010 laying hens have 26 percent less daily feed use, 27 percent higher hen-day egg production, 42 percent better feed conversion, 57 percent lower mortality, 32 percent less direct water use per dozen eggs produced.
- The total supply of 77.8 billion eggs produced in the U.S. in 2010 was 30 percent higher than the 59.8 billion eggs produced in 1960. However, the total environmental footprint for 2010, in million metric tons of emissions, is 63 percent lower for GHG emissions.¹³

Poultry litter is properly managed to ensure that run-off into nearby waterways does not occur. Farmers recycle the litter in a controlled, environmentally-responsible manner. Poultry farmers have been advancing effective control of nutrients for more than a decade, assisted by USDA-recognized best industry practices. Formal "nutrient management plans" for farmers are also required by state and federal environmental regulations.

A 2013 study by the University of Delaware not only found that the amount of nutrient runoff supposedly caused by chicken litter is 55 percent lower than EPA's outdated and overstated estimates but that the concentrations of nitrogen and phosphorous on the litter are far lower, too. The study concluded that new management practices, better growing environments, feed technology and genetics have improved efficiencies over the last 30 years.¹⁴

U.S. Poultry & Egg Association has long recognized exemplary environmental stewardship by family farmers engaged in poultry and egg production with its Family Farm Environmental Award program.¹⁵





Swine

Animal Care

The industry's flagship education program for farmers and their employees is the National Pork Board's Pork Quality Assurance® Plus (PQA Plus®). As of March 2017, more than 63,000 farmers and farm employees were PQA Plus certified.¹⁶

Healthy pigs equal safe, quality pork. And this starts with a healthy diet for pigs. It is important that pigs are fed a nutritionally balanced diet that is age-appropriate. Nutritionally balanced diets, individually regulated health maintenance and treatment protocols, and stepped-up biosecurity efforts are just a few of the reasons U.S. pig farming is the most modern and well-managed in the world.

Pigs can be raised completely outdoors, completely indoors or with a combination of the two. Experts agree that a pig's environment is important to its health and well-being and decisions regarding optimal housing systems should be considered on a farm-by-farm basis.

Farmers want all pigs to receive adequate food and water and be free of injury, so individual pens called gestation stalls were introduced as a means to help protect and nurture each sow. Gestation stalls allow the farmer to provide individual care for each sow. Likewise, during farrowing, sows give birth to piglets in special rooms designed to provide for the special needs of the animals. These areas typically are separate from other areas of the farm where pigs may be housed and they are rotated to other barns to control the spread of disease.

An important aspect of the farrowing process is the use of farrowing stalls, which are used for many reasons. Consider:

- The stalls reduce the number of piglets that are accidentally laid on or stepped on by the sow.
- Temperature control technology allows piglets to stay warm while sows keep cool.
- The flooring is designed to keep pigs dry to reduce the spread of disease.
- Farrowing stalls allow farmers to assist in the birth process of pigs.
- They give piglets access to nutrition from nursing sows.

The nation's leading veterinarians say individual sow housing is humane and acknowledge there are advantages and disadvantages to any sow-housing system.¹⁷

Continuous Improvement

The entire pork industry has worked diligently to fund research into several key areas over the past several years. These areas include: animal welfare, food safety, public health, animal science, swine health, workplace safety, human nutrition and environmental sustainability.

Over the past 10 years, the National Pork Board has invested more than \$1.5 million of farmer funds into swine-housing research and more than \$3 million in general research to improve animal well-being.

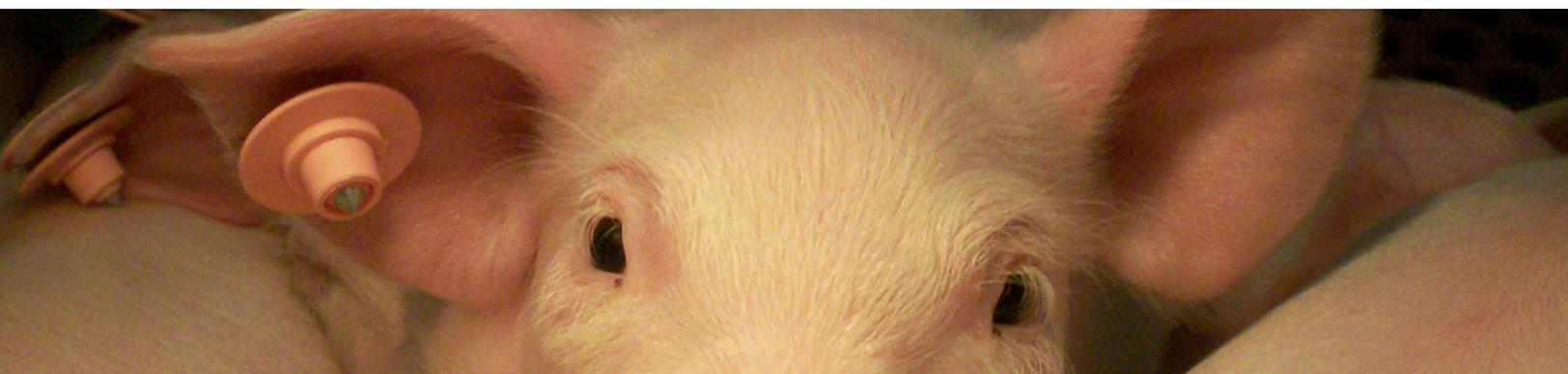
The U.S. pork industry over the past five years has invested more than \$1.3 million in research to support issues associated with pork safety. In 2011, the National Pork Board funded four studies at renowned animal science institutions—Iowa State University, Kansas State University and the University of Minnesota—designed to shed light on ways to better understand and improve food safety.

The National Pork Board has funded research at the University of Arkansas's Applied Sustainability Center to identify and quantify the baseline carbon footprint for pork production.

In 2006, the U.S. pork industry committed \$6 million to fund the pork portion of the National Air Emissions Monitoring Study, which was conducted by Purdue University under the supervision of the U.S. Environmental Protection Agency. The study was conducted specifically to collect scientifically valid data to: 1) accurately assess emissions from livestock operations and compile a database for estimating emission rates; and 2) promote a national consensus for emissions-estimation methods/procedures from livestock operations.¹⁸

Responsible Antibiotic Use

Pork producers, with the guidance of their veterinarians, use a variety of tools such as vaccinations, housing, ventilation and antibiotics, when necessary, to keep their animals healthy. The Pork Quality Assurance® Plus (PQA Plus) certification program and the We Care initiative underscore pork producers' commitment to practices that protect human health, including the stewardship of antibiotics. Pork producers work with veterinarians on evaluating the use of antibiotics as part of their herd health program. This includes evaluating their use to protect animal health, optimize their effectiveness and minimize the risk of developing antibiotic resistance, thereby protecting public health. Specifically, PQA Plus emphasizes five key principles and six guidelines that form the basis of all decisions that producers make regarding antibiotic use.



Key principles:

- Produce safe food.
- Protect and promote animal well-being.
- Ensure practices to protect public health.
- Provide a work environment that is safe.
- Safeguard natural resources.

Food Safety Advancements

Pork producers ensure safe food by focusing on three main areas: (1) using good management practices; (2) managing the health of the herd; and (3) employing new and better technology.

The PQA Plus program includes a component to promote uniform food safety practices on farms throughout the country. The industry's 10 Good Production Practices (GPPs) are the foundation of PQA Plus:

- Establish and implement an efficient and effective herd health management plan.
- Use an appropriate Veterinarian/Client/Patient Relationship (VCPR) as the basis for medication decision-making.
- Use antibiotics responsibly.
- Identify and track all treated animals.
- Maintain medication and treatment records.
- Properly store, label and account for all drug products and medicated feeds.
- Educate all animal caretakers on proper administration techniques, needle-use procedures, observance of withdrawal times and methods to avoid marketing adulterated products for human food.
- Follow appropriate on-farm feed and commercial feed processor procedures.
- Develop, implement and document an animal caretaker training program.
- Provide proper swine care to improve swine well-being.



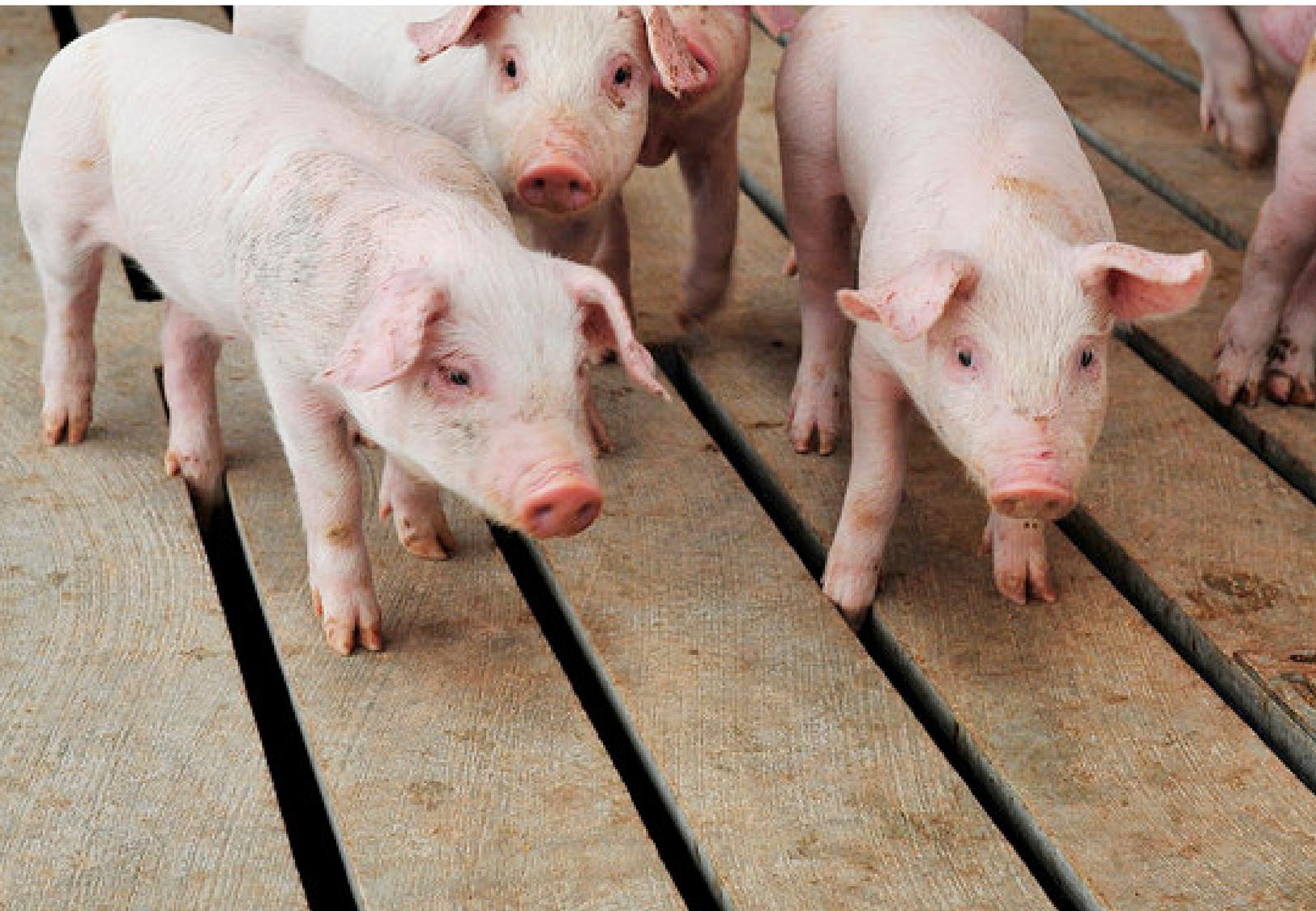
A study referenced and cited by USDA's Food Safety Inspection Service, has found Salmonella on just 1.66 percent of hog carcasses at slaughter. This compares with 6.9 percent in 1997-1998.

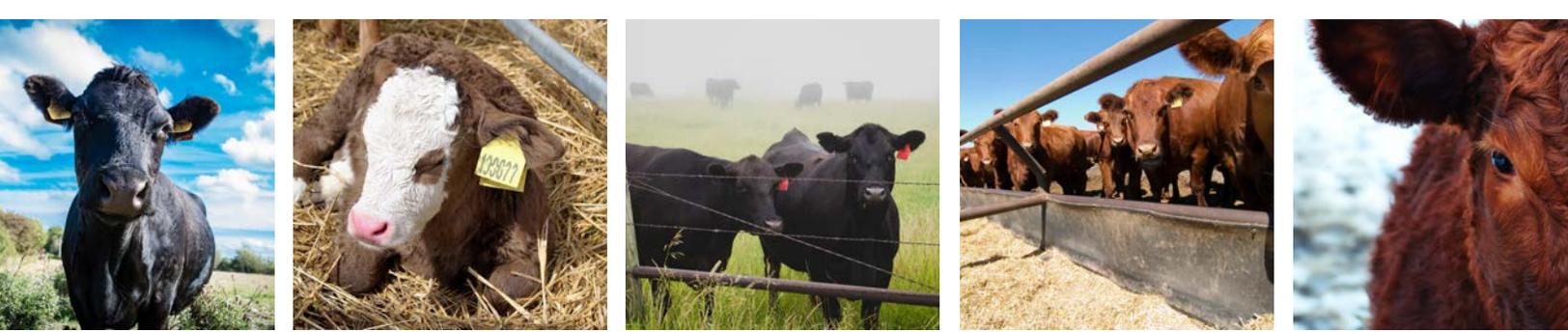
The Sustainability Journey

The relative contribution from swine production to the overall national greenhouse gas inventory is extremely small, about one-third of one percent, according to figures from the U.S. Environmental Protection Agency's annual greenhouse gas reports.¹⁹

By using natural manure fertilizer, farmers not only reduce their environmental footprint by decreasing the use of petroleum-based fertilizers but also greatly improve soil quality. According to a recent survey of hog farmers, more than 60 percent say that crop production is part of their farm's overall operation.

In 1959, it took eight pigs—including breeding stock—to produce 1,000 pounds of pork. Today, it takes just five pigs. And hog farmers today use 78 percent less land and 41 percent less water than they did 50 years ago.²⁰





Beef Cattle

Animal Care

The U.S. beef industry is a highly diverse and segmented industry. Thousands of affiliated businesses including suppliers, veterinarians, packers and processors work alongside more than 600,000 beef and dairy operators to produce, process and market more than 24 billion pounds of beef valued at nearly \$100 million annually.

Proper animal care is the responsibility of everyone in the beef industry. Cattlemen and women recognize ensuring animal well-being is the right thing to do and critical to the success of their individual operations.

The Beef Quality Assurance Program (BQA) was created in 1987 and includes research, training and certification that help farmers and ranchers provide the best care to their cattle. The handling and care of more than 90 percent of cattle in feed yards today are influenced by the farmer- and rancher-created and veterinarian endorsed BQA program. The Producer Code of Cattle Care includes the following general recommendations for care and handling of cattle:

- Provide necessary food, water and care to protect the health and well-being of animals.
- Provide disease prevention practices to protect herd health, including access to veterinary care.
- Provide facilities that allow safe, humane, and efficient movement and/or restraint of cattle.
- Use appropriate methods to humanly euthanize terminally sick or injured livestock and dispose of them properly.
- Provide personnel with training/experience to properly handle and care for cattle.
- Make timely observations of cattle to ensure basic needs are being met.
- Minimize stress when transporting cattle.
- Keep updated on advancements and changes in the industry to make decisions based upon sound production practices and consideration for animal well-being.
- Persons who willfully mistreat animals will not be tolerated.

Continuous Improvement

The beef industry is dedicated to growing beef demand by producing and marketing the safest, healthiest and highest quality beef to satisfy an ever-growing global population. All of this must be done while responsibly managing our livestock and natural resources.

More than 80 percent of research funded by America's beef producers is used throughout the beef supply chain on a daily basis to enhance the safety of beef and beef products.

Farmers and ranchers have invested in a first-of-its-kind comprehensive sustainability assessment to establish a benchmark and continuously identify areas of improvement.

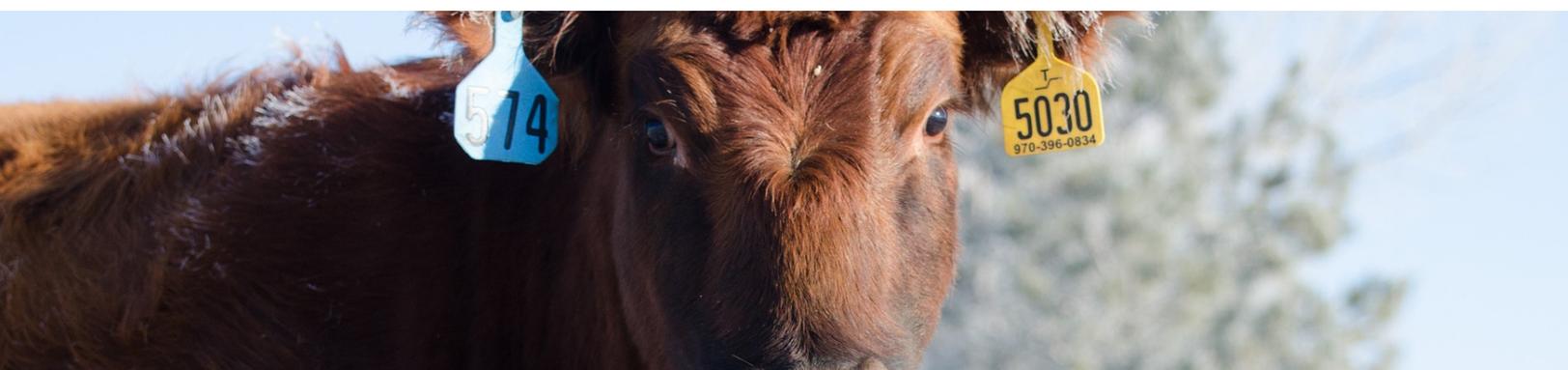
Producers' time-honored traditions of animal care and stewardship are constantly expanding to include the most recent scientific advancements that keep cattle healthy and the beef supply safe. This includes a critical focus on antibiotic stewardship and continuous investment in beef safety initiatives.

Responsible Antibiotic Use

Cattlemen consult with veterinarians to develop a health program for cattle designed to keep the herd healthy and protect the future use of antibiotics for human and animal health. The future effectiveness of these animal health tools is just as important to cattlemen as it is to consumers.

The National Cattlemen's Beef Association "Producer Guidelines for Judicious Use of Antimicrobials" have been in place since 1987 and specifically outline the appropriate use of these products.

- **Prevent Problems:** Emphasize appropriate husbandry and hygiene, routine health examinations, and vaccinations.
- **Select and Use Antibiotics Carefully:** Consult with your veterinarian on the selection and use of antibiotics. Have a valid reason to use an antibiotic. Therapeutic alternatives should be considered prior to using antimicrobial therapy.
- **Avoid Using Antibiotics Important In Human Medicine As First Line Therapy:** Avoid using as the first antibiotic those medications that are important to treating strategic human or animal infections.
- **Use the Laboratory to Help You Select Antibiotics:** Cultures and susceptibility test results should be used to aid in the selection of antimicrobials, whenever possible.
- **Combination Antibiotic Therapy Is Discouraged Unless There Is Clear Evidence The Specific Practice Is Beneficial:** Select and dose an antibiotic to affect a cure.
- **Avoid Inappropriate Antibiotic Use:** Confine therapeutic antimicrobial use to proven clinical indications, avoiding inappropriate uses such as for viral infections without bacterial complication.
- **Treatment Programs Should Reflect Best Use Principles:** Regimens for therapeutic antimicrobial use should be optimized using current pharmacological information and principles.
- **Treat the Fewest Number of Animals Possible:** Limit antibiotic use to sick or at risk animals.
- **Treat for the Recommended Time Period:** To minimize the potential for bacteria to become resistant to antimicrobials.
- **Avoid Environmental Contamination with Antibiotics:** Steps should be taken to minimize antimicrobials reaching the environment through spillage, contaminated ground run off or aerosolization.
- **Keep Records of Antibiotic Use:** Accurate records of treatment and outcome should be used to evaluate therapeutic regimens and always follow proper withdrawal times.



- Follow Label Directions: Follow label instructions and never use antibiotics other than as labeled without a valid veterinary prescription.
- Extralabel Antibiotic Use Must follow FDA Regulations: Prescriptions, including extra label use of medications must meet the Animal Medicinal Drug Use
- Clarification Act (AMDUCA) amendments to the Food, Drug, and Cosmetic Act and its regulations. This includes having a valid Veterinary-Client-Relationship.
- Subtherapeutic Antibiotic Use Is Discouraged: Antibiotic use should be limited to prevent or control disease and should not be used if the principle intent is to improve performance.

Appropriate use of animal health products and technologies such as vaccines and antibiotics are a vital asset to maintaining and improving the health of our nation's cattle.

Food Safety Advancements

The beef industry has a long-standing commitment to providing safe beef products for the domestic and global market. According to the Centers for Disease Control, there has been more than 90 percent reduction in E. coli O157 for samplings in ground beef. In 2010, the illness rate associated with E. coli dropped to less than one case in 100,000 people - meeting the government's Healthy People 2010 goal.

In 1997, the Beef Industry Food Safety Council, or BIFSCo, was founded as an avenue to open dialogue and continue improvement and innovation within the beef industry. BIFSCo facilitates input from cattle producers, packers, processors, distributors, restaurateurs and food retailers around beef safety, which allows for the membership to build each year on safety

improvements from the past. As a whole, the industry invests more than \$550 million each year in beef safety and technology implementation and since 1993, cattlemen and women have invested more than \$30 million in research programs.

Being a part of latest scientific discussions and identifying opportunities, the animal agriculture industry can continually improve beef safety for our consumers is our top priority. It is critical that we continue the conversation with every segment of the beef industry in order to continue providing the safest beef products available.

"Being a part of latest scientific discussions and identifying opportunities the animal agriculture industry can continually improve beef safety for our consumers is our top priority."

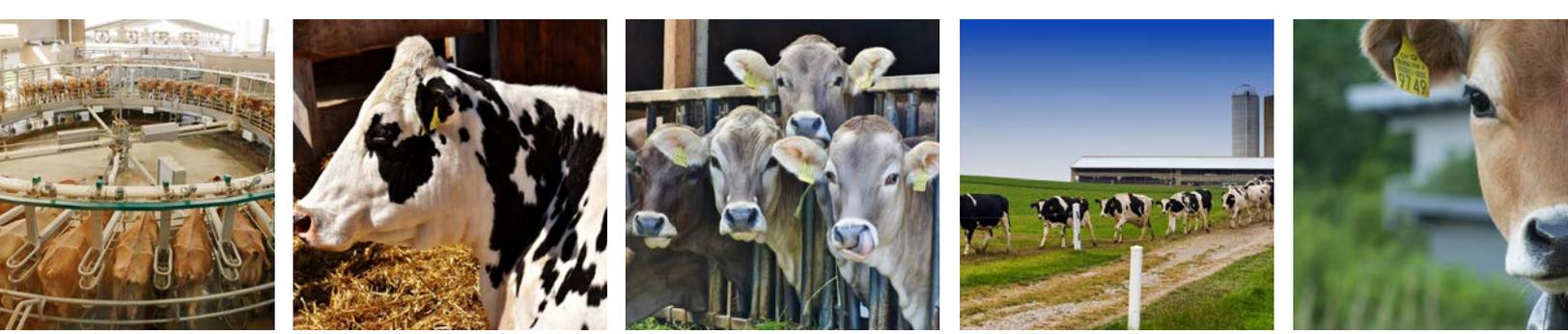


The Sustainability Journey

Beef today is environmentally and nutritionally efficient. U.S. farmers and ranchers raise 20 percent of the world's beef supply with just seven percent of the world's cattle. Each serving of beef requires less land, water and energy than in the past while providing 10 essential nutrients to the diet. Approximately 85 percent of U.S. grazing lands is unsuitable for producing crops. Grazing cattle on this land more than doubles the area that can be used to raise food. Moreover, open space, primarily managed by cattlemen and women, provides habitat for 75 percent of America's wildlife.

To continuously improve, the beef industry also completed a first-of-its-kind life cycle assessment (LCA) — certified by NSF International — that provides benchmarks on economic, environmental and social contributions in the U.S. and a road map for the journey toward more sustainable beef. After two years of data collection and research, the beef industry has proven it's on the right path forward with a seven percent improvement in environmental and social sustainability from 2005 to 2011 and a commitment to finding ways to continuously improve. ²¹





Dairy Cattle

Animal Care

The National Dairy FARM Program: Farmers Assuring Responsible Management™ (FARM program) provides consistency and uniformity to best practices in on-farm animal care and quality assurance through a nation-wide, verifiable program. Today, the FARM participation level has risen above 98 percent of the nation's milk supply.

Dedicated farmers. Healthy cows. Wholesome milk. That's what the National Dairy FARM Program is all about. FARM, or Farmers Assuring Responsible Management, is a program open to all dairy farmers, co-ops and processors across the U.S. that sets the highest standards when it comes to animal care. FARM creates a culture of continuous improvement that inspires dairy farmers to do things even better every day.

How does FARM work? First, animal care guidelines detailed in the FARM Animal Care Reference Manual must be followed for every calf and cow on the farm, and they evolve with the latest research on quality animal care.

The manual, and corresponding training videos, detail the highest standards for animal care when it comes to animal health from birth to end of life, facilities and housing, nutrition, equipment and milking procedures, transportation and animal handling.

Second, farmers are evaluated at least once every three years and provided feedback on how they're doing by veterinarians, extension educators, university personnel, co-op field staff or other qualified evaluators who have completed the two-day, intensive training and have passed a comprehensive exam. The evaluation provides farmers with the information they need to develop action plans for continuous improvement.

Third, the integrity of the program is ensured through third-party verification, which is completed by outside experts who inspect a representative percentage of farms each year. When the dairy industry says it's taking great care of its animals, third-party verification measures it – providing statistically verified data demonstrating that excellent animal care is an expectation of the dairy industry. The results are published each year in FARM's Year in Review report.

Continuous Improvement

Through industry funding and collaborations with allied industry, universities and state and federal government agencies, the dairy industry has a long tradition of cutting edge research on the science and continuous improvement of animal welfare, food safety, nutrition, environmental stewardship and sustainability.

In 2002, the National Milk Producers Federation (NMPF) and USDA's Natural Resource Conservation Service (NRCS) released The Dairy Environmental Handbook. The handbook is a comprehensive resource of the environmental best management practices available to dairy producers. In 2006, the U.S. dairy industry committed \$6 million to fund the National Air Emissions Monitoring Study, conducted under the supervision of the U.S. Environmental Protection Agency, to collect scientifically valid data on air emissions from dairy farms.

In 2009, NMPF with support from Dairy Management Inc., launched the FARM Program: as a nationwide, verifiable program that addresses animal well-being. As noted in the animal care section, more than 98 percent of the nation's milk supply is enrolled in the education, evaluation and verification components of the FARM Program.²²

In 2010, the dairy industry established the Dairy Research Institute® under leadership of the Dairy Management Inc. to expand the commitment of the U.S. dairy industry in scientific research.

In September 2013, the U.S. dairy industry established a voluntary framework and guidelines for traceability of dairy products through the dairy supply chain from the farm through domestic and global distribution outlets. As of year-end 2016, 80 percent of U.S. dairy manufacturers are implementing the voluntary traceability framework and guidelines.²³



Responsible Antibiotic Use

Recognizing that lactating dairy cows are occasionally treated for diseases and to ensure that no animal medications enter the milk supply, all milk is screened before it is accepted into a processing plant.

The U.S. dairy industry conducts almost four million tests each year on all milk entering dairy plants. Milk that tests positive for antibiotic residues is rejected for human consumption and appropriately discarded. The dairy farmer responsible for a positive result must then pay for the entire load of milk. This costs approximately \$15,000, so there is a large financial incentive to make sure that no antibiotic-treated dairy cows are milked. In addition, all milk from that dairy farm is then withheld until a negative antibiotic test result is obtained from the farm.

In 2016, only 0.011 percent of all milk tanker samples tested positive for residues of animal medications. Milk tanker samples testing positive declined by 89.4 percent from 1996-2016, indicating that the program is effective at both detecting and deterring volatile drug residues in milk.

Food Safety Advancements

Milk is one of the most highly regulated food products in the U.S. and 14 dairy foods are the lowest among major food groups in causing foodborne illness.

Of 13,405 foodborne disease outbreaks summarized by the Centers for Disease Control and Prevention (CDC) from 1998-2008, only 161 were attributed to dairy product consumption (1.2 percent). Most foodborne disease outbreaks associated with dairy product are due to the consumption of raw (unpasteurized) milk or raw milk cheeses that have not been properly aged.



The Sustainability Journey

The U.S. dairy industry supports socially responsible, economically viable and environmentally sound dairy food systems that promote the current and future health and well-being of our consumers, communities, cows, employees, planet and businesses.

One landmark achievement in that effort is the dairy industry's ground-breaking greenhouse gas (GHG) life cycle assessment (LCA) for fluid milk—the first for a major agricultural commodity. In conjunction with other research, this study helps validate that the U.S. dairy industry contributes less than two percent of total U.S. GHG emissions.²⁴





Sheep and Lamb

Animal Care

Farmers and ranchers who raise sheep in the U.S. take great pride in the care they provide for their animals.

The Sheep Care Guide, sponsored by the American Sheep Industry Association (ASI), was originally published in 1996. The 2017 edition was updated and expanded to include new research findings regarding animal care. The Sheep Care Guide provides sheep producers with research-based guidelines to assist them in providing optimum care for their sheep in areas such as: nutrition, facilities and handling, animal health, transportation and managing predation.

Some general guidelines that promote overall animal well-being include:

- In order to avoid digestive upset, changes in diet should be made gradually to allow rumen microorganisms to adequately adapt.
- Use feeding and watering equipment designs that will avoid injury and contamination.
- Under most conditions, water should always be available. However, a sheep's water requirement can vary considerably depending on stage of production, weather, and the type of forage being grazed. In some management systems, lush forages or natural sources meet the requirement.
- Some regions of the United States are prone to deficiencies or excesses of certain micronutrients, such as selenium or copper. Producers should be familiar with these situations in their area and provide adequate intake of these nutrients.
- In some regions of the United States, poisonous plants are a threat to sheep health. Producers should be alert to the presence of these plants and the potential for sheep to consume them.

Continuous Improvement

The American lamb industry recently conducted an industry-wide survey of lamb producers in an effort to identify best practices and lay the foundation for continuous improvement. The industry's overwhelming response showed just how dedicated and engaged these family farms and ranch operations are in the work that they do.

The American lamb industry is committed to practices that protect the environment, improve lamb management, foster animal well-being and generate positive social and economic impact on local communities.

Responsible Antibiotic Use

Sheep farmers agree that the judicious use of antibiotics is necessary to alleviate animal pain and suffering and ensure animal health and welfare.

The sheep industry has developed training and information programs to demonstrate producers' responsible use and administration of medications and vaccines, including a valid veterinarian-client patient relationship.

The Sustainability Journey

Sheep farmers are dedicated to not only their animals, but the environment in which they raise them.

Sheep are efficient converters of renewable forage to high-quality food and fiber. In many areas of the country sheep are used to glean crop residues or utilize agricultural byproducts. Targeted grazing has been demonstrated to be an effective vegetation-management tool for restoring landscapes, managing invasive and noxious plant species, managing fire-fuel loads, improving wildlife habitat, and generally enhancing ecosystems.

Sheep also help control weeds on stream banks, croplands, pastures and rangelands, reducing the need for chemical herbicides. In range operations sheep have been successful in suppressing brush for wildfire control. They also are effective in weed and brush control on new forest plantings. Following well-planned range and pasture management, sheep safely and naturally revive lands and benefit wildlife in the process. Sheep harvest the land, recycle vital nutrients back to the soil and provide mankind with nourishment, clothing, and shelter.





Veal

Animal Care

America's veal farmers are committed to ensuring the health and well-being of their calves, taking care of the environment and providing safe, high-quality, nutritious food for consumers. Most veal calves are raised on small family farms, and veal farming families are proud to share more about their ongoing dedication to doing what's right.

The changes that have occurred in the veal industry are significant. With new barns and other building renovations, nearly all milk fed veal calves are comfortably housed in group pens. We are working to achieve 100 percent by the end of 2017, a goal that was set in 2007. Veal farmers grow calves in pens in barns to protect them from harsh weather, to monitor, feed and water them regularly, and to keep their pens clean. Most modern veal barns are also heated during cold months and have year-round ventilation to allow for clean, fresh air. All calves are provided with a dry, clean place to rest and the necessary food, water, and care to protect the health and well-being of each animal.

"Most veal calves are raised on small family farms, and veal farming families are proud to share more about their ongoing dedication to doing what's right."

The Veal Quality Assurance (VQA) program is a set of science-based best practices and standards developed by farmers, veterinarians, and animal care experts to ensure that veal calves receive quality care through every stage of life and are raised using production standards that result in a safe, wholesome, quality product that meets or exceeds regulatory and customer expectations. The VQA program began in 1990 and now certifies over 90% of milk-fed veal production. For veal farmers to become certified, their veterinarians must confirm in writing that they have a valid Veterinarian/Client/Patient Relationship (VCPR). Specifically, the Veal Quality Assurance program is designed to address all aspects of animal care and on-farm practices that will enhance veal calf comfort and quality.

Continuous Improvement

Veal calves require dedicated management that is properly trained in best management practices and procedures as described in the VQA program. Veal farmers work with their veterinarian to develop a robust herd-health protocol specifically designed for group-housed veal calves that includes management practices, vaccines, and when necessary, the judicious use of antibiotics. This program is reviewed with the veterinarian at least every two years.



In 2004, the VQA program was revised to include the Ethical Standards and Code of Conduct for the U.S. veal industry which addresses commitments to animal care, the environment, food safety, employees and the industry. The current version was updated by the VQA Review Committee in 2014. Veal farmers are required to re-certify every two years to confirm their continued participation as the program is updated as well as confirming the existence of a current and valid Veterinarian/Client/Patient Relationship (VCPR).

Responsible Antibiotic Use

Veal farmers have an ethical obligation to provide each animal with appropriate quality care through each stage of life. This is best achieved by establishing on-farm programs and training that seek to maximize animal health while minimizing stress and disease. Timely and appropriate response to treating sickness or disease is important. Veal farmers work directly with a veterinarian to develop a comprehensive herd-health program. This enables veal farmers to provide quality animal care, prevent disease and determine the best option for addressing any animal health concern.



Food Safety Advancements

Veal farmers strive to provide excellent animal care, maintain clean barns and adopt sound practices so consumers can be confident in the food they purchase for their families is safe.

Once calves leave the farm, they are inspected by federal and state agencies throughout each step of the production process to ensure food safety. All state and federal meat inspection is overseen by the USDA FSIS, which regulates food safety standards for raw meat. FSIS inspectors work within meat processing and packing plants to ensure compliance. Only raw meat that meets FSIS standards for safety, wholesomeness and labeling is given a USDA seal.

Veal calves are inspected twice before processing by the USDA. Federally-inspected meat plants are subject to the Humane Slaughter Act, which is enforced by USDA inspectors who are in meat packing plants during every minute of operation.

Veal farmers and processors know our responsibility to food safety begins on farms, continues through our processing facilities, and is serious business based on a simple concept: do what's right at all times to produce a product we feel confident to feed our own families.



The Sustainability Journey

Sustainability is a key component to ensuring today's veal farmers can pass their way of life on to the next generation. To ensure they are tending to the environment in the best way possible veal farmers are expected to: conserve and manage manure and other nutrients as a resource, assure that production and other management practices protect the natural resources including land, air and water, and continually review environmental management activities for improvement and sustainability under the Code of Conduct in the VQA program.



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