



FAIR

FOOD ANIMAL INTEGRATED RESEARCH

2002

ANIMAL PRODUCTS FOR THE NEXT MILLENNIUM
-AN AGENDA FOR RESEARCH AND EDUCATION-



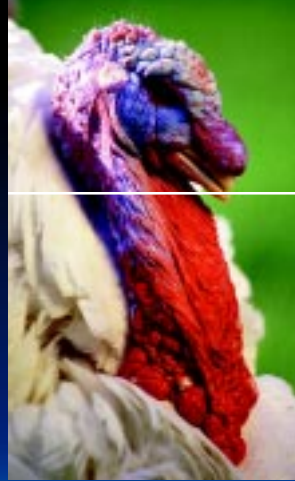
Coordinating Organizations:
Animal Agriculture Coalition
and
Federation of Animal Science Societies



To order additional copies or to obtain more information, contact

FASS

(Federation of Animal Science Societies)
1111 N. Dunlap Avenue
Savoy, IL 61874
(217) 356-3182
FAX: (217) 398-4119



INTRODUCTION

Steering Committee Organizations

- American Dairy Products Institute
- American Dairy Science Association
- American Farm Bureau Federation
- American Feed Industry Association
- American Horse Council
- American Meat Institute
- American Meat Science Association
- American Sheep Industry Association
- American Society of Agronomy
- American Society of Animal Science
- American Society for Nutritional Sciences
- American Veterinary Medical Association
- Animal Health Institute
- Association of American Veterinary Medical Colleges
- Center for Veterinary Medicine
- Council for Agricultural Science and Technology
- Dairy Management, Inc.
- Experiment Station Committee on Organization and Policy
- Extension Committee on Organization and Policy
- Holstein Association USA, Inc.
- Institute of Food Technologists
- Livestock Conservation Institute
- National Broiler Council
- National Cattlemen's Beef Association
- National Meat Association
- National Milk Producers Federation
- National Pork Producers Council
- National Turkey Federation
- Poultry Science Association
- US Poultry & Egg Association
- USDA - Agricultural Research Service
- USDA - Animal and Plant Health Inspection Service
- USDA - Cooperative State Research, Education, and Extension Service
- USDA - Economic Research Service
- USDA - Food Safety and Inspection Service

Sponsors

- American Farm Bureau Federation
- American Feed Industry Association
- Holstein Foundation, Inc.
- National Cattlemen's Beef Association
- National Milk Producers Federation
- National Pork Producers Council
- USDA - Agricultural Research Service
- USDA - Cooperative State Research, Education, and Extension Service

Prepared by FAIR 2002 Writers Committee

Chris Sigurdson, Chair
Purdue University

Maynard Hogberg
Michigan State University

Susan Lamont
Iowa State University

Les Hansen
University of Minnesota

Jimmy Keeton
Texas A&M University

Copy Editor

Amy Kemp
Federation of Animal Science Societies

Design

Rod Roberts
Roberts Design Company

Photo Credits

ARS Image Gallery
©1999 www.farmphoto.com

Other Publications

Synopsis. "Animal Products for the Next Millennium
— An Agenda for Research and Education."
Two-page brochure.

*Proceedings of the Food Animal Integrated Research 2002
Symposium on Food Animal Research Priorities.*
This report contains the formal presentations
made and includes identification of the issues that are important
to the competitiveness and sustainability of food and fiber
production from animals.

FAIR 2002 is the outcome of the second national conclave to establish consensus on animal agriculture research and education priorities for the 21st century. More than 250 leading animal scientists, farmers, ranchers, environmentalists, animal welfare proponents, commodity group representatives, government staff, rural advocates, and agribusiness and food service representatives gathered to determine the most pressing research and education needs of the animal industry.

The science behind animal agriculture affects America's international trade balance, our environment, our neighbors, local economies, and us as individuals. Competitive farmers and ranchers with the right knowledge and tools can ensure that livestock, dairy, and poultry enterprises thrive; consumers get safe and nutritious food; and wildlife benefit from improved animal health and enhanced environmental stewardship. Food animals fare better in the care of knowledgeable producers and processors, and communities reap financial rewards from food-processing industries.

Gains such as these require public investments in research and education that, in turn, fuel the creation of industries and export profits that sustain communities and rural economies across the country. Keeping that edge will require a clear vision for the future and a strategic plan for research investments to attain the next generation of innovations.

Six goals became the foundation for FAIR 2002's research priorities and objectives, the necessary steps to ensure that we raise the best quality animal products in ways that are

economically competitive, environmentally friendly, and socially acceptable. They are

- **Strengthen Global Competitiveness:**
Develop the systems needed to keep American animal agriculture competitive in the global market
- **Enhance Human Nutrition:**
Improve animal food products to help people live better
- **Protect Animal Health:**
Develop strategies and technologies to prevent, diagnose, and treat animal diseases
- **Improve Food Safety and Public Health:**
Safeguard public health and reduce the risk of food-borne diseases
- **Ensure Environmental Quality:**
Devise animal production and processing systems that sustain or improve the environment
- **Promote Animal Well-Being:**
Enhance animal well-being throughout the food production cycle.

These goals address the emerging issues and competitive gaps in a national strategy to keep the American animal industry on top. Tomorrow's problems cannot be solved with yesterday's thinking. Success will require continued public investment in U.S. academic institutions and government laboratories whose record of achievement is the envy of the world.

GOAL ONE

STRENGTHEN GLOBAL COMPETITIVENESS:

DEVELOP THE SYSTEMS NEEDED TO KEEP AMERICAN ANIMAL AGRICULTURE COMPETITIVE IN THE GLOBAL MARKET

Most American livestock producers wage an unrelenting war on cost. While other countries can exploit cheaper labor or more relaxed environmental standards,

U.S. producers are engaged in a constant struggle to reduce expenses and increase productivity and quality.

The global market rewards high quality, low price providers, which the U.S. has been able to supply. But, we cannot rest on

past laurels. Canadian and Brazilian pork producers are mimicking American production systems and reaping the benefits. Australian cattle producers overtook the Americans in the late 1990s, producing beef for \$.28 less per pound than U.S. producers.

Reclaiming market dominance will require new technologies—many at the level of the genome. It also will take new approaches to the raising of animals and the development of a knowledge base to create prosperous animal agriculture systems of the future.

OBJECTIVE 1

Enhance production efficiency and economic strategies at the farm and ranch level

On today's farms, pennies saved become profits earned. Research on different farming systems is needed to achieve efficiencies in reproduction, rate of gain, and handling. Once created in the lab and research barn, these new methods will need to be tested in actual production systems and in commercial trials.

A systems approach of verified management techniques combined with new sensor and information technology promises great opportunities for livestock production.

Monitoring and measuring technology allows centralized supervision of animal health, production efficiency, and environmental impacts.

The field of animal genomics holds great promise for improving animal and human health, food safety, and animal production. Little is known about the genetic maps of animals—valuable information that could be used to improve accuracy of selection and to characterize valuable germplasm populations for safekeeping and future applications.

OBJECTIVE 2

Position producers and processors of animal products to succeed in a global market

Export markets for animal products provide an important opportunity for rural communities to participate in the global economy. A single percentage growth in income overseas corresponds with a 1% increase in the consumption of meat, milk, and eggs.

To market internationally, however, animal producers will need to make informed decisions to accommodate the demands of competitive global markets. They need to know what those markets will buy and in what form.



COMMITTEES, SPONSORS, AND CREDITS

FAIR 2002 Executive Planning Committee

Elton Aberle, Chair
University of Wisconsin

Robert Barnes
Tri-Societies

Mark Cook
Poultry Science Association

Lester Crawford
Georgetown Center for Food and
Nutrition Policy

Kirk Ferrell
National Pork Producers Council

Stanley Gilliland
Federation of Animal Science Societies

Alice Hurlbert
National Turkey Federation

Curt Mann
Association of American Veterinary
Medical Colleges

Kenneth Olson
American Farm Bureau Federation

Steve Pretanik
National Broiler Council

Gary Weber
National Cattlemen's Beef Association

Robert Zimbelman
Federation of Animal Science Societies

FAIR 2002 Program Committee

James Males, Chair
Oregon State University

James Denton
University of Arkansas

Adele Douglas
American Humane Association

Velmer Green
Dairy Producer, Elsei, MI

Colin Kaltenbach
University of Arizona

Dennis Keeney
Leopold Center for Sustainable Agriculture

Lonnie King
Michigan State University

Mohammad Koohmaraie
USDA, ARS, USMARC

Jack Maddux
Maddux Cattle Company, Wauneta, NE

Dennis Marple
Iowa State University

David Meeker
The Ohio State University

Larry Miller
USDA, CSREES

Ken Odde
Pfizer Animal Health

Caird Rexroad
USDA - ARS

Robert Zimbelman
Federation of Animal Science Societies

GOAL TWO

ENHANCE HUMAN NUTRITION:

IMPROVE ANIMAL FOOD PRODUCTS TO HELP PEOPLE LIVE BETTER

Americans like to eat meat. The U.S. Department of Agriculture reports that consumption of red meat, poultry, and fish in 1996 was 191 lbs. per person, only 2 lbs. less than the record set in 1994.

Much is known about the role of animal products in a healthy diet. Children's learning and intellectual development have been directly linked to the benefits of eating the protein found in meat and eggs. Young women need extra amounts of calcium early to offset osteoporosis later in life. Milk products have been documented as the best source of calcium for growing girls, helping them dodge a disease that costs the U.S. \$13 billion and widespread misery in crippling injuries every year. Heavy exercisers need dietary iron. Older Americans with lesser appetites appreciate the large amounts of zinc and other micronutrients concentrated in small portions of beef and chicken.

New research suggests that some compounds in animal products not only fuel the body, but also protect it from disease. Conjugated linoleic acid, CLA, a compound found in meat and

dairy products, has been found to prevent some skin cancers and slow the onset of adult diabetes in laboratory tests. Eggs with added Omega-3 fatty acids yield multiple benefits to health-conscious consumers. Those with compromised immune systems need the zinc, iron, and other elements found in chicken, beef, and pork.



The more we learn about the relationships among human nutrition, health, and the meat, dairy, and egg products Americans love, the better we can help consumers make decisions to improve their lives.

OBJECTIVE 1

Research the contributions of meat, eggs, and dairy products to healthy, balanced diets

More research into the beneficial health effects of meat consumption, especially reduced-fat products, is needed to ensure that consumers are getting the right amounts of all nutrients, not just fewer calories. Additional work needs to be done on the analysis of animal-derived food products and the unique roles they play in the healthy development of men and women of all ages. Nutrition research at university and federal labs has become the touchstone for a public that is skeptical of health claims on food and supplement products. It takes objective science to make a real difference in people's diets.



OBJECTIVE 2

Determine the impact of current and alternative production systems on animal well-being and food quality, including handling, transportation, and slaughter

Sophisticated research into animal immune systems, neuroscience, human-animal interaction, stress biology, and endocrinology not only will endorse or rule out current practices, but will facilitate the design of new production systems and practices. How we raise animals in 50 years could be as radically different as contemporary systems are from those 50 years ago.

Research also will answer questions that have surfaced only recently. Does the industry trend toward larger, more concentrated operations affect animal well-being? What should be done, and at what cost to the animal, the producer, and the public? For instance, animal health and food safety in free-range chickens may suffer from greater exposure to pathogens while other aspects of well-being may only be improved slightly.

Early research also suggests that improvements in animal well-being can protect human health. Investments in animal well-being studies benefit people and animals.

OBJECTIVE 3

Explore ethical issues in animal production and research

Less than 2% of the U.S. population is involved in food production at the farm level. Science will help, but society will make the decisions about animal production and research. Ultimately, we believe that an informed public will make better decisions, but they must have the chance to learn.

A credible education effort should include an accurate representation of public beliefs and values. Studies of public perceptions of animal production practices will guide educational efforts that should help both the public and animal industries.



GOAL THREE

PROTECT ANIMAL HEALTH:

DEVELOP STRATEGIES AND TECHNOLOGIES TO PREVENT, DIAGNOSE, AND TREAT ANIMAL DISEASES



Current and emerging food animal diseases are estimated to cause losses totaling up to 18% of the annual farm gate value of animal commodities, costing producers and the U.S. economy billions of dollars each year.



This represents a major threat to animal production and hurts the competitiveness and profitability of U.S. animal agriculture.

Recent years have seen the emergence of new animal pathogens. The prevalence of international travel and trade has increased the potential for accidentally or deliberately introduced foreign infectious agents that would threaten the stability of the U.S. food supply and international trade. Advances in production systems

have exposed more animals to illness. Other animal diseases have re-emerged as serious threats, as previous methods of control have lost their effectiveness.

To protect the health of food animals and reduce the risks that those pathogens pose to our food supply and international trade, it is imperative that improved strategies and technologies be developed to prevent, diagnose, and treat animal diseases. Research will improve the safety net for both the animals and the public.



OBJECTIVE 1

Detect and control animal diseases that threaten the food supply

Our capability to respond to an outbreak of animal disease will always be dependent on our ability to diagnose the cause swiftly, which requires more rapid and accurate diagnostic tools to help producers and veterinarians appropriately treat animals and improve biosecurity.

Describing the structure of microbial genomes will help develop diagnostic tools and help define how disease agents infect and damage host animals. Novel treatments depend on basic insight into animal and microbial genomes.



To limit effectively the spread of disease agents to animals and from animals to humans, the basic factors important in disease transmissions must be understood better. This knowledge will help to limit the transmission of diseases from wildlife to food animals, within and between farms and ranches, and from foreign countries.

OBJECTIVE 2

Design and demonstrate production systems and management practices that reduce any adverse environmental effects of animal agriculture

New technologies are needed to enhance livestock production and manure handling systems that mitigate odor and stabilize and store nutrients for transportation and use.

Promising technologies include machines that bubble ozone through liquid waste to kill odor-producing bacteria and the genetic modification of feeds to increase the animal's uptake of phosphorus and reduce waste. The use of beneficial microbial populations needs to be explored as a means of stabilizing nutrients and reducing ammonia and odor emission.

Correctly grazing cattle and sheep on marginal lands can improve biodiversity as well as return profits to producers and lower costs for consumers. Developing grazing management systems that match the animals to the landscape and that promote riparian buffer strips and alternative watering systems to keep animals out of streams will allow livestock and the natural environment to flourish together.

Investments in the technologies behind precision crop farming will help determine the carrying capacity of different lands and will benefit producers, land managers, and regulators as animals, watershed, and range land health are monitored and shepherded more rigorously than ever before.

OBJECTIVE 3

Invent technologies that capture value from manure and processed by-products

New technologies are needed that add value to manure and processed by-products, which will turn manure into useable bio-based fuels and other products and reduce their adverse effects on the environment. Producers and scientists already are experimenting with methane-capture systems on hog farms, and poultry producers burn methane and chicken litter to heat buildings and create electricity.

Food processors and other producers of organic wastes need technologies that use their wastes and spare landfills another load of trash. Not only would they save money, turning trash into treasure often offers opportunities for local entrepreneurs.



GOAL FOUR

IMPROVE FOOD SAFETY AND PUBLIC HEALTH:

SAFEGUARD PUBLIC HEALTH AND REDUCE THE RISK OF FOOD-BORNE DISEASES

The Centers for Disease Control and Prevention estimate that food-borne diseases cause between 6 and 80 million illnesses in the U.S. each year, resulting in 9,000 deaths. Tragically, the pathogens that cause most of these illnesses have become household names, such as *Campylobacter*, *Salmonella*, *E. coli* O157:H7, and *Listeria*. The U.S. spends more than \$5 billion per year just to combat eight food-related diseases.



New evidence suggests that some food-borne disease agents also cause long-term illnesses, such as paralysis, asthma, and heart disease.

The situation is complicated further by the accelerated pace and pattern of life and industry. International travel and worldwide exchange of food products are increasing the exposure of people to pathogens. The trend toward larger markets and wider regional distribution of products can put contaminated foods in dozens of locations, complicating response and intervention by public health agencies.

The American population is aging, which introduces a greater susceptibility to food-borne disease. Some cancer treatments and immune system diseases place more of the population at risk. Children also have less ability to defend themselves from food-borne illness.

Experts expect the number of outbreaks to increase as new pathogens emerge and anti-microbial resistance increases.

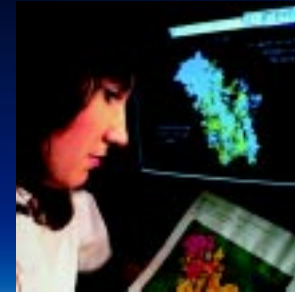
To reduce the risk of food-borne and animal-transmitted diseases, comprehensive research is needed to determine the sources of disease-causing microorganisms, their response to various antibiotics, their susceptibility to production and processing practices, and the effectiveness of food handling practices. The knowledge gleaned from these studies will help manage threats to public health.

OBJECTIVE 1

Develop and demonstrate control procedures to eliminate hazards in animal foods from the farm and ranch to the grocery store

Technologies that prevent the contamination of food animals at the production level are needed to reduce microbial hazards in animal foods. These could be new feed ingredients, vaccines, and modified production practices that render animals as pathogen-free as possible. Innovative decontamination procedures and control agents, anti-microbial food ingredients, and processing treatments are needed.

The development of rapid detection devices for microbial pathogens will allow us to screen raw or processed products for contamination and provide verification procedures for hazard analysis and critical control point (HACCP) programs. Tests and protocols also could be developed for farms and ranches.



Animal, carcass, and food product identification techniques and tracing systems are needed for specific food products. These measures will include electronic identification devices, chemical markers, or other means of ensuring product safety and accountability. Trace-back mechanisms could reduce the spread of transmissible diseases significantly and could help public health agencies protect humans and animals from pathogens.

Public investments in food safety research benefit all because food safety is everybody's business.

OBJECTIVE 2

Improve effectiveness of pathogen destruction technologies

Very few people would drink raw milk today. Pasteurization, the heat treatment of milk to destroy disease-causing microorganisms, is as much an accepted part of milk as its color. Both processors and consumers are looking for the next generation of food protection processes that ensure safety yet preserve taste, appearance, and other qualities. More work needs to be done to adjust processes to consumer tastes and to investigate new methods of fighting food-borne disease. Irradiation, ozone treatments, and similar technologies have the potential to protect public health and preserve food quality.



OBJECTIVE 3

Reduce the threat of antibiotic resistance to public health

During the past decade, the impact of anti-microbial resistance on human health and animal agriculture has become increasingly real. Preservation of the long-term effectiveness of anti-microbial drugs for the treatment of diseases in humans will require the determination of the potential of human exposure to resistant bacteria from the food supply.

Research is needed to determine how antibiotics can be used safely in animal production. Additional research and development of effective substitutes for antibiotics in animal production also will extend the usefulness of human medicines.



GOAL FIVE

ENSURE ENVIRONMENTAL QUALITY:

DEVISE ANIMAL PRODUCTION AND PROCESSING SYSTEMS THAT SUSTAIN OR IMPROVE THE ENVIRONMENT

Business conditions have dictated that many farms and ranches increase in size. Larger units concentrate manure and odors, creating greater issues for environmental management. In response, federal and state legislation has put increasing pressure on animal producers to invest in new technologies and to change management practices to prevent environmental degradation.

Research is needed to identify improved technologies and management practices that will lead to a viable, sustainable environment and minimize any adverse effects of livestock production and processing on environmental quality. Technologies need to be developed to assist farmers in precisely balancing nutrient flows on their farms, with less flow to ground



and surface waters. Necessary research to improve availability of feed nutrients cannot only reduce feed costs, but can also lower the level of nutrients lost to manure. At the same time, more needs to be learned about manure as an energy source.

Pollutants from non-agricultural enterprises also affect animal operations. Plasticizers, dioxins, and PCBs also have been found in animal products, and some can be passed on to consumers. A better understanding of the effects of environmental contaminants on livestock will lead to improved animal health and food safety.



OBJECTIVE 1

Develop better scientific measures and diagnostic tools for testing water, soil, and air quality

Not enough is known about the sources of environmental pollutants that impair water, soil, and air quality.

Origins of nitrogen and phosphorus in water and soil are difficult to identify. The sources can include human septic systems, plant decomposition, commercial fertilizer, or animal manure. Without reliable indicators of source, communities and businesses could spend fortunes attacking the wrong problem.

The health effect of odor, gases, and particulates on animals, producers, and neighbors is a new, but vitally important, research area. Methods to capture and evaluate air contaminants in livestock production systems are needed to study the origin and impact of odors further.



Volatilization of manure components also must be assessed. Concerns about the amount of nutrients that escape as gases from lagoons and pits demand a better understanding of volatilization and redeposition.



OBJECTIVE 2

Improve capacity to deal with new and re-emerging animal disease threats

Threats to human and animal health occur almost routinely as new animal diseases are discovered and old ones resurface. Human deaths from the transmission of animal diseases have grabbed global headlines as governments and regulatory agencies scramble to identify, isolate, and treat these incidents. Unfortunately, it can take weeks and even months before a disease can be diagnosed correctly. Modern patterns of commerce and travel largely contribute to these outbreaks, and the possibility of the deliberate release of animal disease agents cannot be dismissed.

We lack a federal plan for both the accidental and deliberate introduction of catastrophic animal diseases. The responsible federal agencies and university animal disease diagnostic laboratories need increased support to meet these challenges. Additional research also is required to invent the procedures and tools necessary to discover and diagnose new diseases wherever and however they may occur.



OBJECTIVE 3

Develop optimal production practices that promote animal health

The ability of an animal to resist disease is closely related to its genetics, physiology, and nutrition. Determining the exact nature of the relationships in this balanced system will improve disease resistance through genetic selection, feeding for health, and enhancing the animal's immune function.

More effective pharmaceutical tools and strategies, such as new vaccines, anti-microbials, and immune system boosters, will be needed to battle animal disease.

Determining the impact of conventional and alternative production practices on the ability of animals to resist disease will enable the design and use of systems that optimize animal health. Improved biosecurity strategies will protect the U.S. animal agricultural system from the threat of disease via accidental or deliberate introduction of disease agents.



GOAL SIX

PROMOTE ANIMAL WELL-BEING



ENHANCE ANIMAL WELL-BEING THROUGHOUT THE FOOD PRODUCTION CYCLE

The manner in which we raise animals says a lot about us as a society. We have certain obligations to the animals we grow, which include protection from pain, freedom from disease, ample feed, and appropriate shelter from the elements. Although the extent of these obligations may be a social or philosophical issue, it requires good science to discuss accurately. Experience tells us that people can be poor judges of what animals prefer—that what feels right for people may not be best for the animal.

Most producers act as concerned stewards because it is in their best interests to care for their animals. Their operations produce more milk, meat, and eggs when stock is well tended. However, animal stewardship also can make international business sense, as quality concerns close borders to trade.

To remain competitive and keep the trust of consumers, producers and processors need to know what they can do to ensure animal well-being. They want assurances that any changes made to production and processing practices actually will enhance well-being.

Assessing well-being will require systematic studies that account for housing, surroundings, physiology and sensory responses, and behavior.

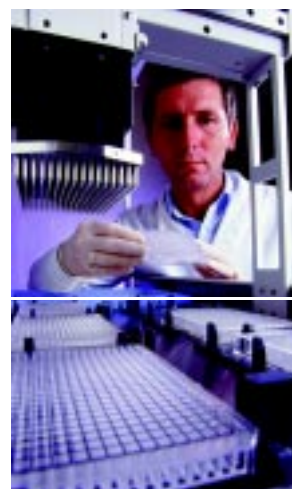


OBJECTIVE 1

Develop better scientific measures to assess animal well-being, including pain, stress, and behavioral needs

Animal well-being can be difficult to gauge, and what people think animals need can be off the mark. Animal scientists have made great strides in learning to interpret the signals from livestock and turning those observations into improvements, but gaps still exist in our understanding, which requires continued research. In the absence of scientific standards, U.S. companies and international trade partners will create their own.

Finding the answers will take an interdisciplinary approach, involving animal scientists, veterinarians, geneticists, producers, and other experts, to resolve an issue that concerns almost every member of the public. Research into additional measures of animal well-being will advance shelter design, feeding methods, slaughter facilities, and transportation means.



OBJECTIVE 2

Create and identify functional foods from animals

Functional foods are those with benefits that go beyond taste. They may be fortified foods that deliver additional vitamins or nutrients to improve health. They may contain compounds that yield disease-fighting attributes we are only beginning to understand, such as the link between eating connective tissue and our immune systems. Research into new foods and the as yet unknown advantages of familiar favorites will not only improve human nutrition but will offer additional markets and economic opportunities for U.S. animal producers and food companies.

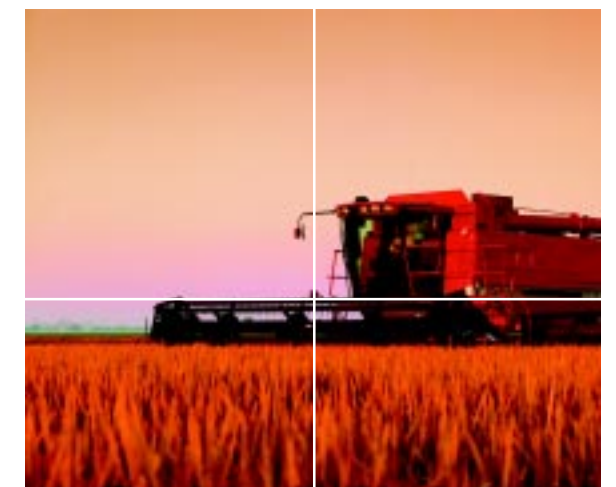


OBJECTIVE 3

Determine how production and processing practices affect food quality

Scientists have always known that how we grow and process animal products can rob food of nutrients, taste, and other quality characteristics. For example, what chickens eat can dramatically affect the taste of the meat, and too much heat in processing can destroy vitamins and create off-flavors in food. Research into better, more efficient production and processing systems will help preserve quality and yield more of the benefits and enjoyment we expect from animal products.

At the same time, certifying how we make food is crucial to how we compete in the open market. Discovering the systems that produce the high quality food products that the global market wants depends on knowing what works well here at home.



CONCLUSION

PUBLIC INVESTMENTS IN ANIMAL AGRICULTURE RESEARCH AND EDUCATION YIELD BENEFITS ACROSS SOCIETY

Social concerns and benefits drive the research priorities identified by FAIR 2002. The improvements promised by public research extend beyond the farm gate and apply to the environment, economic competitiveness in a global marketplace, nutrition, food safety, and public health.

Many of the strategic gaps identified in our knowledge base can only be researched by public institutions that will make the results widely available to the independent producers

and processors who need it most. Simultaneously, these research goals enjoy the support of animal agri-businesses, food retailers, and others who recognize the value of stimulating innovation across the entire industry.

It is the wish of FAIR 2002 participants that these research and education priorities be embraced and promoted by any stakeholder who wants a vigorous animal agriculture industry in America.



Farmers, ranchers, and processors also need better methods to gauge global market signals and reduce the impact of cyclic changes of commodity values on profits. For most, it will come down to better clarity and understanding of market signals.

Open markets will depend on the unquestioned safety of American animal products. Trade barriers are best diminished when challenges are based on science and verifiable research. New means of assuring quality at the production and processing levels will be essential and will require new work on sensors and bio-monitors for processors as well as research into the risks and benefits of production technologies.

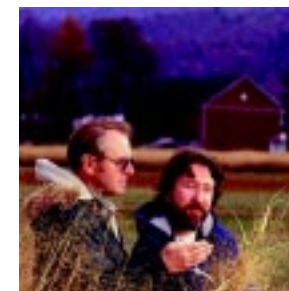
OBJECTIVE 3

Develop innovative animal products for specialized markets to boost local economies

Research into value-added production and processing of premium meat, poultry, and dairy products; ethnic foods; and other specialty market items will create economic opportunities for entrepreneurial producers and communities.

These might also include smaller scale slaughter facilities that aid in product differentiation or supply unique export markets.

Systems also are needed to identify quality attributes that consumers want and to quantify those attributes for application by animal producers.



Discovering those commodities, as well as the non-food uses of animal products, requires a public investment in research projects, the results of which are broadly available to every community. Sophisticated product testing and market development activities at the domestic and international levels are needed to help ensure success.

OBJECTIVE 4

Help producers, policymakers, and other stakeholders decide what animal agriculture will look like in the future

The pace of change in animal agriculture is likely to increase as the 21st century unfolds. Structural changes in the production, processing, and marketing of animal products will be shaped by product demand and supply, the adoption of technology, and society. It will take all stakeholders to determine the future of animal agriculture.

Public support of animal agriculture depends on a broad understanding of production systems and the constructive input of the public on issues that range from size and ownership of farms and ranches to the manner in which animals are raised. Producers have learned to respect consumer demand—now they are asking for help in understanding what the public wants and in educating the public on producer response.

