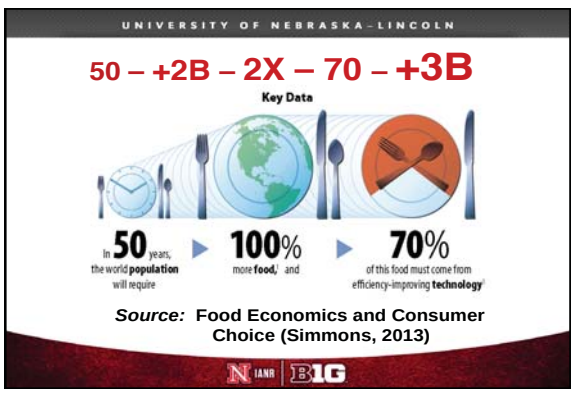
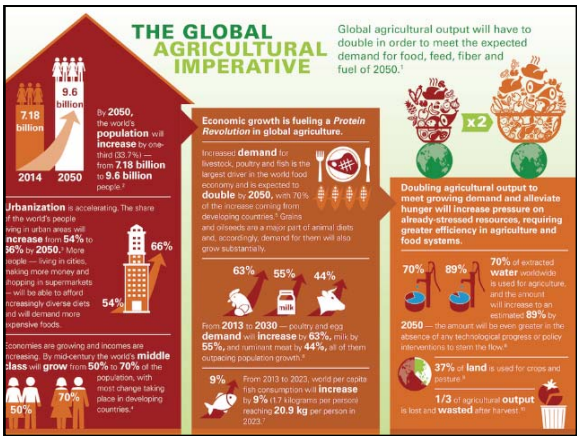
WHY DOES CONSUMER OPINION TRUMP SCIENCE (ANIMAL WELFARE, GMOS, FOOD ANIMALS VS PETS)?

Dr. Ronnie Green

Harlan Vice Chancellor of the Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln




THE GLOBAL AGRICULTURAL IMPERATIVE
Global agricultural output will have to double in order to meet the expected demand for food, feed, fiber and fuel of 2050.
7.18 billion
9.6 billion
2014
2050
By 2050, the world's population will increase by one-third (33.7%) — from 7.18 billion to 9.6 billion people.
Urbanization is accelerating. The share of the world's people living in urban areas will increase from 54% to 66% by 2050. More people — living in cities, making more money and shopping in supermarkets — will be able to afford increasingly diverse diets and will demand more expensive foods.
66%
54%
Economies are growing and incomes are increasing. By mid-century the world's middle class will grow from 50% to 70% of the population, with most change taking place in developing countries.
50%
70%
Economic growth is fueling a Protein Revolution in global agriculture.
Increased demand for livestock, poultry and fish is the largest driver in the world food economy and is expected to double by 2050, with 70% of the increase coming from developing countries. Grains and oilseeds are a major part of animal diets and, accordingly, demand for them will also grow substantially.
63%
55%
44%
From 2013 to 2030 — poultry and egg demand will increase by 63%, milk by 55%, and ruminant meat by 44%, all of them outpacing population growth.
9%
From 2013 to 2023, world per capita fish consumption will increase by 9% (1.7 kilograms per person) reaching 20.9 kg per person in 2023.
x2
Doubling agricultural output to meet growing demand and alleviate hunger will increase pressure on already-stressed resources, requiring greater efficiency in agriculture and food systems.
70%
89%
70% of extracted water worldwide is used for agriculture, and the amount will increase to an estimated 89% by 2050 — the amount will be even greater in the absence of any technological progress or policy interventions to stem the flow.
37% of land is used for crops and pasture.
1/3 of agricultural output is lost and wasted after harvest.


UNIVERSITY OF NEBRASKA–LINCOLN
Competition for Limited Resources
IANR
B1G


UNIVERSITY OF NEBRASKA–LINCOLN
Understanding and Assessing Climate Change
Implications for Nebraska
go.unl.edu/climatechange
IANR
B1G

Plant hardiness zones are shifting toward the poles as the climate changes

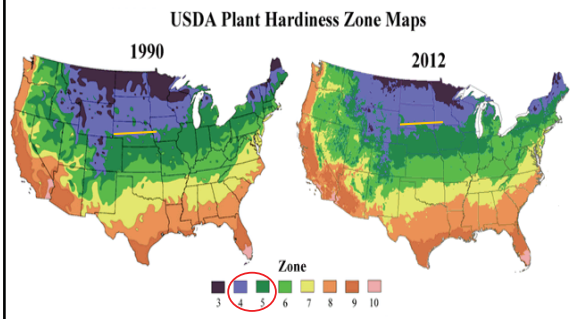
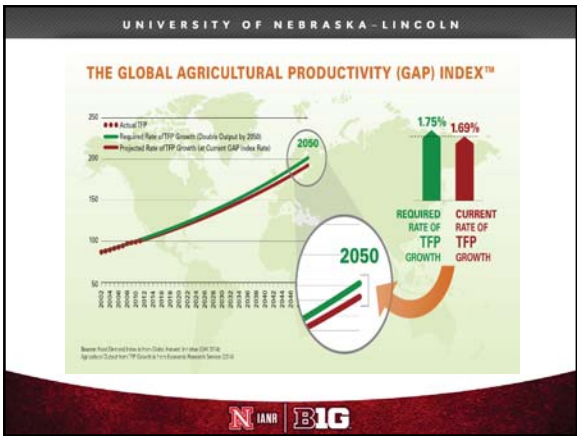
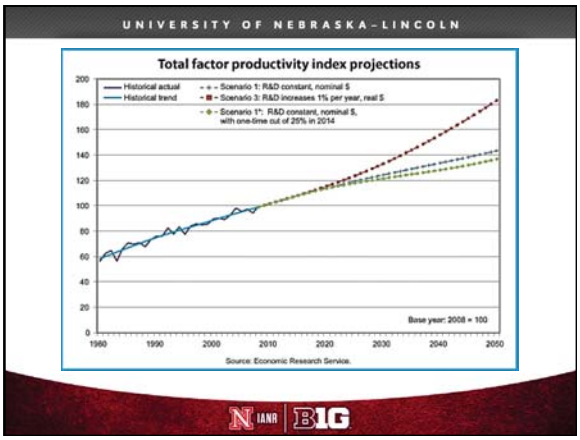


Figure 1. Comparison of the 1990 and 2012 USDA Plant Hardiness Zone Maps. Image credit: USDA and Arbor Day Foundation.





UNIVERSITY OF NEBRASKA–LINCOLN

IANR | B1G

UNIVERSITY OF NEBRASKA–LINCOLN

GROWING A HEALTHY FUTURE

FOOD • FUEL • WATER • LANDSCAPES • PEOPLE

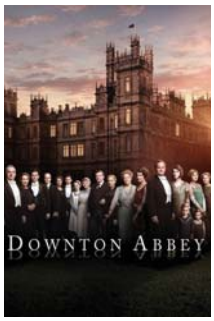
- PCAST (Ag Research, Antibiotics)
- AGree
- Chicago Council on Global Affairs
- STEM Ag and Food Council
- Council on Competitiveness
- Foundation for Food and Ag Research
- NAAAS (Animal Ag / Science)
- NNMI (Food Factory of the Future)

IANR | B1G

UNIVERSITY OF NEBRASKA–LINCOLN

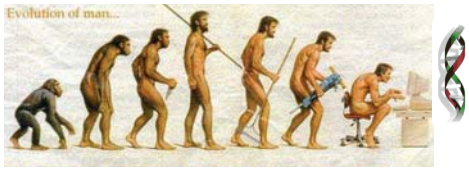
IANR | B1G

UNIVERSITY OF NEBRASKA–LINCOLN



UNIVERSITY OF NEBRASKA–LINCOLN

In reality we must continue to evolve….



http://www.naute.com/images/evolutionofman.jpg

UNIVERSITY OF NEBRASKA–LINCOLN

"I believe and in my opinion"
has replaced
"I know or the facts clearly prove"

UNIVERSITY OF NEBRASKA–LINCOLN

Unlike *know*, *believe* covers a wide range of credulity. ***Know*** is more constrained; its verity must be demonstrable. ***Believe*** needs no more than the statement "I believe" something to be true, leaving it to the listener to supply the factual base — no matter how slim or wobbly — for where to place the belief on the continuum that ranges from pure speculation to pure fact.

UNIVERSITY OF NEBRASKA–LINCOLN

- Disconnect from nature and nurture
- Radical lack of understanding of real biology and science
- Lack of understanding of cause and effect
- Fiercely held anti-belief systems against:
  - BIG
  - CORPORATE
  - INDUSTRIAL / "BIG-AG"
  - CAPITALISM/PROFIT

UNIVERSITY OF NEBRASKA–LINCOLN

- Selective belief in science
  - e.g. climate science vs biotechnology
- Willingness to sacrifice human life for "beliefs"
  - Anti-vaxxers
  - Food Safety
  - Anti-technology
- Lack of understanding of animal well-being and health (particularly relative to human health)
- Social elitism in place of freedom of choice

UNIVERSITY OF NEBRASKA–LINCOLN

Has the Food Movement's Moment Finally Arrived?

What happens when you put Mark Bittman and Michael Pollan in a room with a couple of hundred well-heeled foodies—and a few dozen conventional farmers.

By Andrew Leviler

Mark Bittman, Sam Kass, and Michael Pollan face the omnivore's dilemma.

IANR | B1G

UNIVERSITY OF NEBRASKA–LINCOLN

IANR | B1G

UNIVERSITY OF NEBRASKA–LINCOLN

Giving up beef will reduce carbon footprint more than cars, says expert

Study shows red meat dwarfs others for environmental impact, using 28 times more land and 11 times water for pork or chicken

Beef production results in five more tonnes warming emissions than chicken or pork. Photograph: Alamy

Beef's environmental impact dwarfs that of other meat including chicken and pork, new research reveals, with one expert saying that eating less red meat would be a better way for people to cut carbon emissions than giving up their cars.

The heavy impact on the environment of meat production was known but the research shows a new scale and scope of damage, particularly for beef. The popular red meat requires 28 times more land to produce than pork or chicken, 11 times more water and results in five times more climate-warming emissions. When compared to staples like potatoes, wheat, and rice, the impact of beef per calorie is even more extreme, requiring 160 times more land and producing 11 times more greenhouse gases.

IANR | B1G

UNIVERSITY OF NEBRASKA–LINCOLN

Cattle

Every year in the United States, approximately 35 million cattle are raised for beef,[105] 9 million cows for milk,[106] and 450,000 calves for veal.[107]

Most cattle raised for beef are castrated, de-horned, and branded,[108] painful procedures often performed without any anesthesia.[109,110] For seven months, calves graze on the range[111] before they are transported to feedlots,[112,113] where they are fattened on unnatural diets.[114] Within six months, they reach market weight of 544 kg (1,200 lb)[115] and are trucked to slaughter. As with other animals to be killed for food, cattle are not given any food, water, or protection from the elements during the journey.[116]

Cows in the dairy industry endure annual cycles of artificial insemination, mechanized milking for 10 out of 12 months[117] (including 7 months of their 9-month pregnancies), and giving birth. Many are routinely given hormones to increase milk yield.[118] According to John Webster, "[t]he amount of work done by the [dairy] cow in peak lactation is immense. To achieve a comparable high work rate a human would have to jog for about six hours a day, every day."[119] In the U.S. industry, cows, overwhelmingly Holsteins,[120] produce an average of 729 days of milk,[121] which corresponds to 2.4 lactations, before they are considered "spent" and are sent for slaughter at an average of less than 5 years of age.[122] Cows can naturally live more than 20 years.[123]

IANR B1G

UNIVERSITY OF NEBRASKA–LINCOLN

IANR **GROWING A HEALTHY FUTURE**

FOOD • FUEL • WATER • LANDSCAPES • PEOPLE

IANR B1G

UNIVERSITY OF NEBRASKA–LINCOLN

A PUBLIC VOICE

ASSOCIATION OF PUBLIC AND LAND-GRANT UNIVERSITIES

HOME :: A PUBLIC VOICE

Public Universities & Veterinary Medical Colleges Groups Announce Creation of Task Force on Antibiotic Resistance in Production Agriculture

November 5, 2014–APLU and the Association of American Veterinary Medical Colleges (AAVMC) today announced the creation of the Task Force on Antibiotic Resistance in Production Agriculture.

The task force is comprised of representatives from U.S. agriculture colleges/land grant universities and veterinary colleges as well as key representatives from the production animal agriculture community and the pharmaceutical industry. The goal of the task force is to help advise the federal government on a research agenda and also help publicly disseminate information on the use of antibiotics in production agriculture. Officials from key federal agencies are expected to serve as observers to the task force and leaders from public universities in Mexico and Canada will serve as ex officio members.

Scientists and the public have grown increasingly concerned about the evolution of antibiotic resistant bacteria in veterinary and human medicine. The World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC) have expressed serious concerns as well. Some bacteria have

IANR B1G

UNIVERSITY OF NEBRASKA–LINCOLN

Critical Role of Animal Science Research in Food Security and Sustainability

Committee on Considerations for the Future of Animal Science Research

Science and Technology for Sustainability Program
Policy and Global Affairs

Board on Agriculture and Natural Resources
Division on Earth and Life Studies

NATIONAL RESEARCH COUNCIL
OF THE NATIONAL ACADEMIES

IANR | B1G

UNIVERSITY OF NEBRASKA–LINCOLN

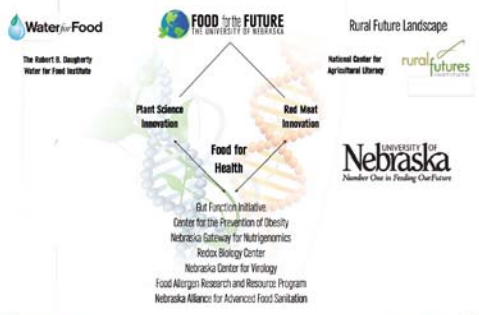
Critical Role of Animal Science Research in Food Security and Sustainability

Committee on Considerations for the Future of Animal Science Research

- Societal concerns on technology adoption
- Efficiency of nutrient utilization and gene expression
- Non-human use feed ingredients as alternatives
- Reduce sub-therapeutic antibiotic use
- Animal welfare and well-being capacity
- Geographically appropriate climate-change adaptive strategies
- Reduce greenhouse gas emissions
- Enhance biogeochemical recycling – i.e. water and fuel use
- Global ag development for animal protein production

IANR | B1G

UNIVERSITY OF NEBRASKA–LINCOLN



IANR | B1G

UNIVERSITY OF NEBRASKA–LINCOLN

GUT function initiative

Translating discovery
Into Innovation

Focus on Fundamental Discovery
How does the gut ecosystem
develop and function in individuals?

→Host factors
→Microbial factors
→Dietary factors

Translation

→novel anti/pro-microbials
→prebiotics and functional foods
→animal breeding (markers)

IANR B1G

UNIVERSITY OF NEBRASKA–LINCOLN

Nebraska
Center for
VIROLOGY

IANR B1G

UNIVERSITY OF NEBRASKA–LINCOLN

Center for Plant Science Innovation

IANR B1G

UNIVERSITY OF NEBRASKA–LINCOLN

Innovation Campus

Phase 1 Building – 380,000 sq. feet

UNIVERSITY OF NEBRASKA–LINCOLN

Innovation Campus

Phase 1 Building – 380,000 sq. feet

UNIVERSITY OF NEBRASKA–LINCOLN

NEBRASKA INNOVATION CAMPUS

UNIVERSITY OF NEBRASKA–LINCOLN

IANR | B1G

UNIVERSITY OF NEBRASKA–LINCOLN

NIC Partners

IANR | B1G

UNIVERSITY OF NEBRASKA–LINCOLN

QUANTIFIEDAG

- Specializes in improving animal health, focusing on radio frequency ear tag technology and data collection platforms for the BEEF and PORK industries.
- 2014 graduate of the NMotion Accelerator, a 13-week, mentor-driven startup accelerator.

IANR | B1G

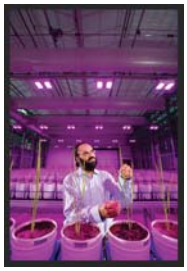
UNIVERSITY OF NEBRASKA–LINCOLN

METAGENOME ANALYTICS

- A start-up bioinformatics company led by Andy Benson, W.W. Marshall Distinguished Professor
- MGA partners:
  - Khalid Sayood, professor of electrical and computer engineering
  - Rohita Sinha, postdoctoral researcher
  - Ufuk Nalbantoglu, Erciyes Univ in Turkey
  - UNL graduate The "Ty" Nguyen of Professional Computer Solutions

IANR B1G

UNIVERSITY OF NEBRASKA–LINCOLN

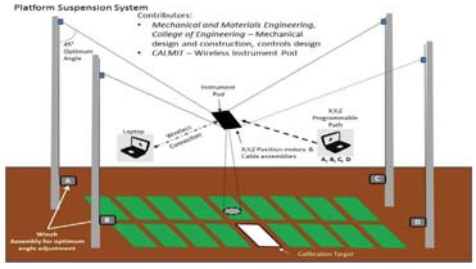


PHENO-Summit
October 2015

NEBRASKA INNOVATION CAMPUS

IANR B1G

UNIVERSITY OF NEBRASKA–LINCOLN



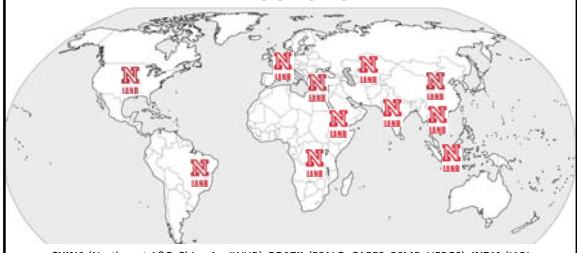
IANR B1G

UNIVERSITY OF NEBRASKA–LINCOLN

And We Need to Work Globally!

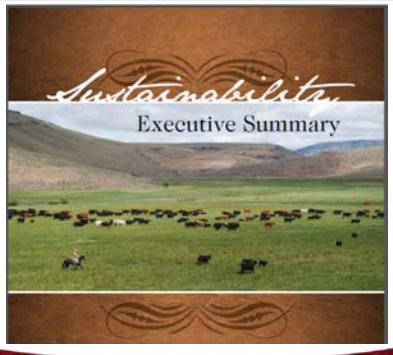
UNIVERSITY OF NEBRASKA–LINCOLN

Where We Are



CHINA (Northwest A&F, China Ag, IWHR), **BRAZIL** (ESALQ, CAPES, BSMP, UFRGS), **INDIA** (IARI, MSSRF, JAIN, NIFTEM), **TURKEY** (Ataturk University), **NETHERLANDS** (UNESCO-IHE), **ETHIOPIA**, **MIDDLE EAST** (USAID/MENA, NASA Drought), **TANZANIA** (CIRCLES), **VIETNAM** (LMPPI-Harvard Kennedy School). **INDONESIA** (Bogor, USBI),

UNIVERSITY OF NEBRASKA–LINCOLN



UNIVERSITY OF NEBRASKA–LINCOLN

UNIVERSITY OF NEBRASKA–LINCOLN

ABSTRACT: A methodology was developed and used to determine environmental footprints of beef cattle produced at the U.S. Meat Animal Research Center (MARC) in Clay Center, NE, with the goal of quantifying improvements achieved over the past 40 yr. Information for MARC operations was gathered and used to establish parameters representing their production system with the Integrated Farm System Model. The MARC farm, cow–calf, and feedlot operations were each simulated over recent historical weather to evaluate performance, environmental impact, and economics. The current farm operation included 841 ha of alfalfa and 1,160 ha of corn to produce feed predominately for the beef herd of 5,500 cows, 1,180 replacement cattle, and 3,724 cattle finished per year. Spring and fall cow–calf herds were fed on 9,713 ha of pastureland supplemented through the winter with hay and silage produced by the farm operation. Feedlot cattle were backgrounded for 3 mo on hay and silage with some grain and finished over 7 mo on a diet high in corn and wet distillers grain. For weather year 2011, simulated feed production and use, energy use, and production costs were within 1% of actual records. A 25-yr simulation of their current production system gave an average annual carbon footprint of 10.9 ± 0.6 kg of CO_2 equivalent units per kg BW sold, and the energy required to produce that beef (energy footprint) was 26.5 ± 4.5 MJ/kg BW. The annual water required (water footprint) was 21,300 ± 5,600 L/kg BW sold, and the water footprint excluding precipitation was 2,790 ± 910 L/kg BW. The simulated annual cost of producing their beef was US$2.11 ± 0.05/kg BW. Simulation of the production practices of 2005 indicated that the inclusion of distillers grain in animal diets has had a relatively small effect on environmental footprints except that reactive nitrogen loss has increased 10%. Compared to 1970, the carbon footprint of the beef produced has decreased 6% with no change in the energy footprint, a 3% reduction in the reactive nitrogen footprint, and a 6% reduction in the real cost of production. The water footprint, excluding precipitation, has increased 42% due to greater use of irrigated corn production. This proven methodology provides a means for developing the production data needed to support regional and national full life cycle assessments of the sustainability of beef.

J ANIM SCI 2013, 91:5427-5437

UNIVERSITY OF NEBRASKA–LINCOLN

Findings

The EEA portfolio shows the present-day U.S. beef value chain is more sustainable than in 2005 (Figure 4). While there was a 6 percent increase in the price of beef between 2005 and 2011, there was a simultaneous decrease in the overall environmental and social impacts from the U.S. beef value chain of approximately 7 percent. Following weighting and normalization, the EEA portfolio showed a 5 percent improvement in overall sustainability.


UNIVERSITY OF NEBRASKA–LINCOLN
GROWING A HEALTHY FUTURE
IANR
FOOD • FUEL • WATER • LANDSCAPES • PEOPLE
IANR
B1G

NOTES