

Agricultural Research and Productivity for the Future: Livestock Issues

Jeff Armstrong
Michigan State University



Outline

- Importance of agricultural research, Extension and education
 - Michigan – autos, food, water & natural resources!
- Importance of animal agriculture
 - \$132 b economic impact
- Major challenges
 - Basic / fundamental research
 - Wicked problems
 - Funding
- Recommendations & Consequences



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Swine Flu

Swine Flu

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Swine Influenza (Flu)

Swine Flu website last updated April 27, 2009 1:00 PM ET

Human cases of swine influenza A (H1N1) virus infection have been identified in the United States. Human cases of swine influenza A (H1N1) virus infection also

U.S. Human Cases of Swine Flu Infection

(As of April 27, 2009 1:00 PM ET)

State	# of laboratory confirmed cases
California	7 cases
Kansas	2 cases
New York City	28 cases
Ohio	1 case
Texas	2 cases
TOTAL COUNT	40 cases

International Human Cases of Swine Flu Infection

President Obama on “Swine Flu”

He said the issue **demonstrated the need for a renewed emphasis on scientific research and education** -- both high priorities for his agenda. **"If there was ever a day that reminded us of our shared stake in science and research, it's today,"** he said. "We are closely monitoring the emerging cases of swine flu in the United States, and this is obviously a cause for concern and requires a heightened state of alert. But it's not a cause for alarm."

RESEARCH PRIORITIES

Farm Animal Research in Crisis

Inadequate funding threatens vital agricultural and biomedical research with farm animals.

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PRODUCTIVITY LAG for Fundamental / Disciplinary Research – Decades!!!!!!

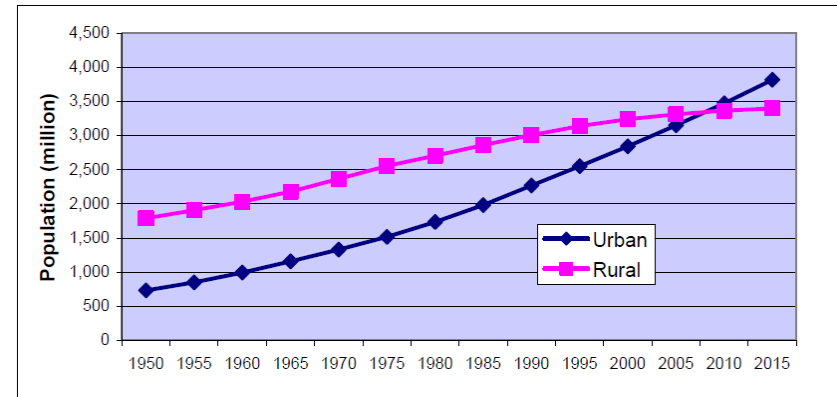
ivate sector does invest in agricultural research and development. but. under-



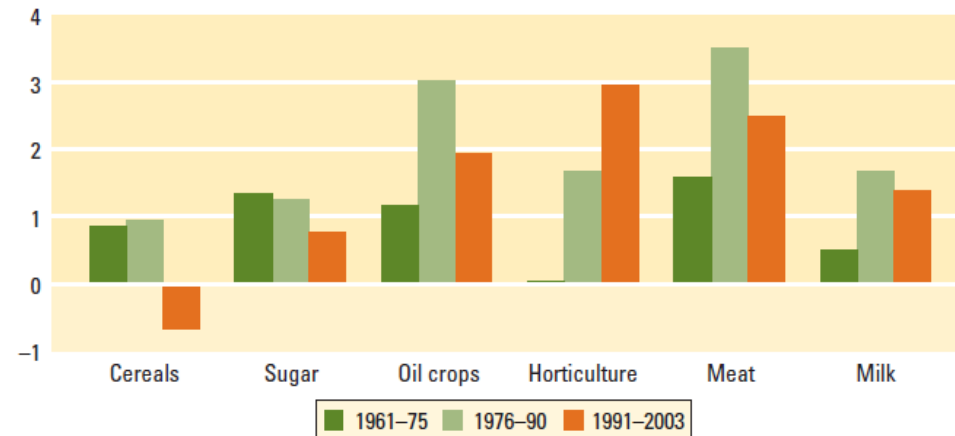
level of congressionally authorized funding in the farm bill (e.g., \$700 mil-

Effect of Urbanization

- By 2010 over half of the population will live in urban areas
- Higher demand for meat, fruit, and vegetables
- More grain demanded as it takes 3 lbs to produce 1 lb of beef
- All create greater demand on water and other resources
- Demand for animal & worker welfare
- Concerns for environmental impact → more regulations



Annual growth rate of kilocalories/person/day, %



Source: FAO 2006a.



Wicked Problems!

SILENT' BUT' DEADLY

SILENT' BUT' DEADLY

Did you know that farmed animals produce more greenhouse gas emissions (18%) than the world's entire transport system (13.5%)? Or that nitrous oxide from animal manure is around 300 times as damaging to the climate as carbon dioxide? Or that methane (cow and sheep farts/burps to you and me) has 23 times the global warming impact of carbon dioxide?

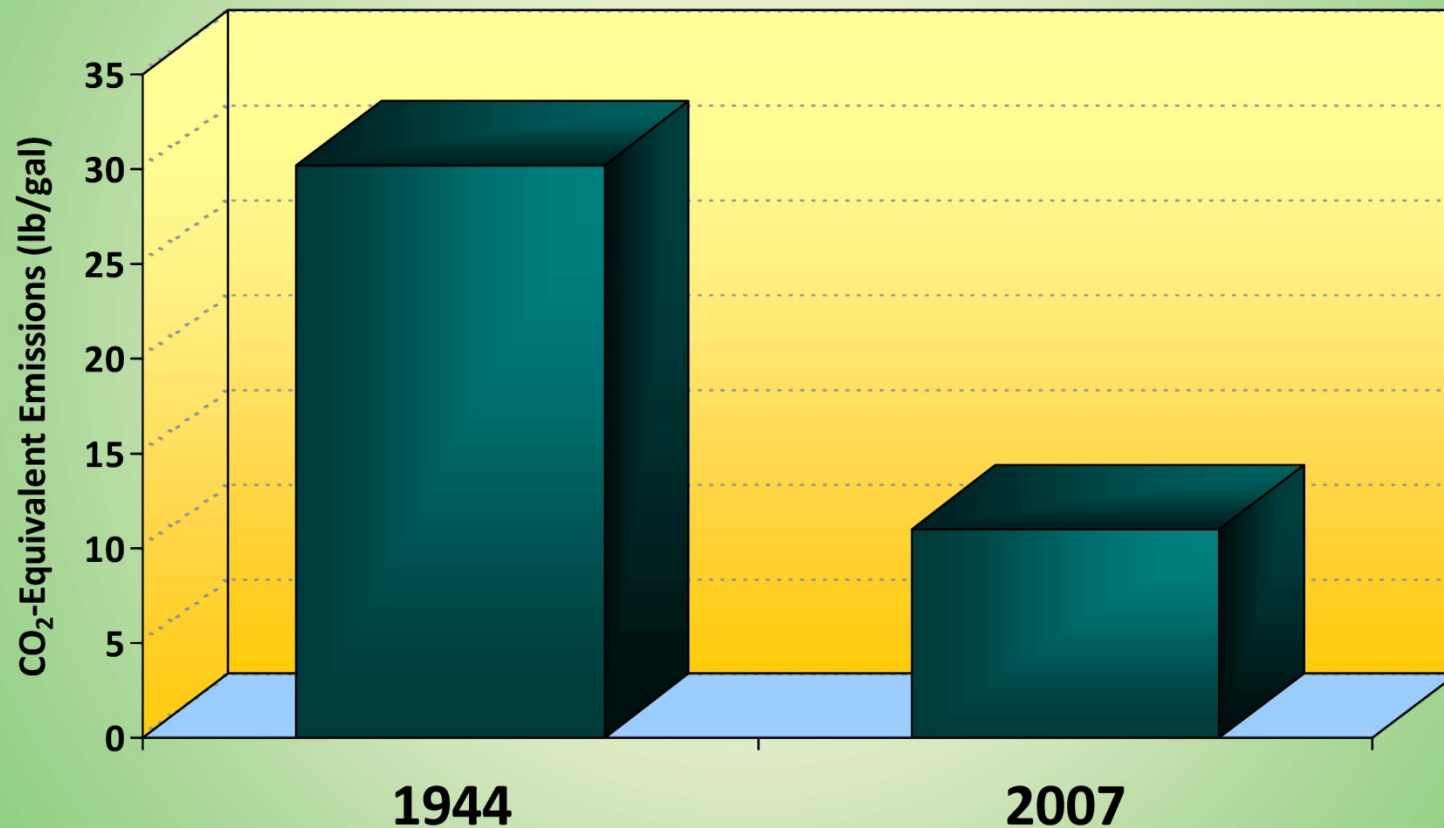
Makes you think doesn't it?

Vegetarian Society (2008) <http://www.vegsoc.org>

A Common Global Goal - A Sustainable Food Supply / Industry

- Environmentally & Ecologically (planet)
- Culturally (people, ethics)
- Socially (people, ethics)
- Economically (profit)

Carbon Footprint of a Gallon of Milk Has Been Reduced by 2/3 Since 1944



Adapted from Capper *et al.* (2008) ADSA-ASAS Annual Meeting, JDS 91 (E-suppl1) LB3

An example of new framing

Animal Welfare

- The treatment of agricultural animals is an issue
- Public perceptions of agriculture have changed
- The intensity of animal ag will continue
- Public assurance from “farm to table”
 - Certification and assessment
 - Third-party verification
- Science has advanced meaningful information about animal management systems and effects on animal well-being

Housing systems



Enriched Cages

- Nests
- Dust Baths
- Perches



Allows for expression of hen behavior

Hen welfare in different housing systems

	Cages	Enriched	Non-cage
Internal Parasites	Green	Green	Red
Mites	Green	Yellow	Red
Bone Breakage	Green	Green	Red
Cleanliness	Green	Yellow	Red
Foot health	Green	Yellow	Red
Cannibalism	Green	Green	Red
Perching	Red	Green	Green
Foraging	Red	Red	Green
Nesting	Red	Yellow	Green
Dustbathing	Red	Yellow	Green
Air quality	Green	Yellow	Red

Perception and Science

Ballot Initiatives:
Now imagine the
contribution of science
to the discussion!



YES! ON PROP 2

JOIN
the Campaign

SUBMIT

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PROP 2 PASSES!

It's an historic day for farm animals in California.



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my.yesonprop2.com

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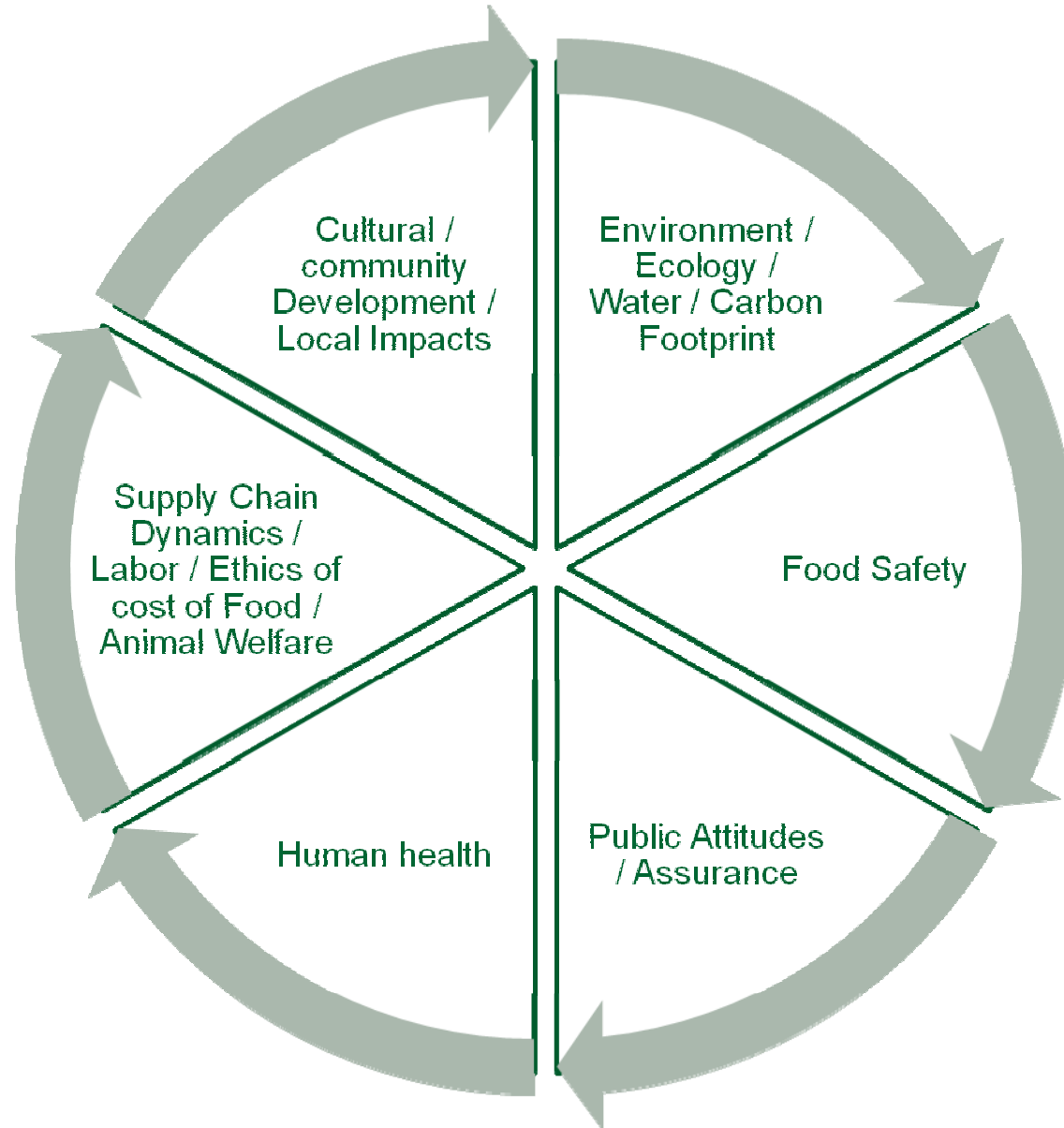
LATEST

GET OUT

Serious Problem For All

- Socio-political intensity for changing farm animal production systems
 - Actions out-running the ability to assess impacts
- Lack of whole system studies on how changes imposed affect entire system
 - To date patchwork and narrow emphasis on features of production systems
- Lack of constructive public/political discourse and social trust

Holistic View of Sustainability



Funding

Crisis

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RESEARCH PRIORITIES

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Copies of Paper Provided – Please Review Recommendations

ate may be debatable; still, it clearly illustrates the huge disparity in total budget available for research grants focused on animal agriculture, about 1/918th that for human health. The private sector does invest in agricultural research and development. but. under-



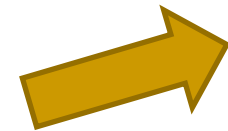
Furthermore, as of 1 October 2008, the NRI was replaced by a new competitive grants program for agriculture, the Agriculture and Food Research Initiative (AFRI), which has a greater level of congressionally authorized funding in the farm bill (e.g., \$700 mil-

Recent Years

Health Research (NIH)



Science Research (NSF)



Agricultural Research



Source: Dave Meeker – National Renderers Assoc.

CREATE-21 / Agriculture and Food Research Initiative (AFRI)

- Created by 2008 Farm Bill
- Authorized for ~\$700 million; funded at ~\$205 million
- For every \$120 for NIH, we invest only \$1 for AFRI (competitive funding)
- Less than 22% of qualified research proposals in AFRI are funded
- Agriculture and food sciences receive only about 1% of total federal R&D



Enhanced Competitive Grant Funding

(\$Millions)	2008	2009	2010	2011	2012	Total
Organics		18	20	20	20	78
Specialty Crops	30	50	50	50	50	230
Beginning Farmer		18	19	19	19	75
Biomass R&D		20	28	30	40	118
Total	30	106	117	119	129	501

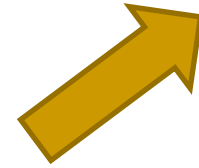


This Year

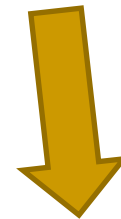
Health Research (NIH)



Science Research (NSF)

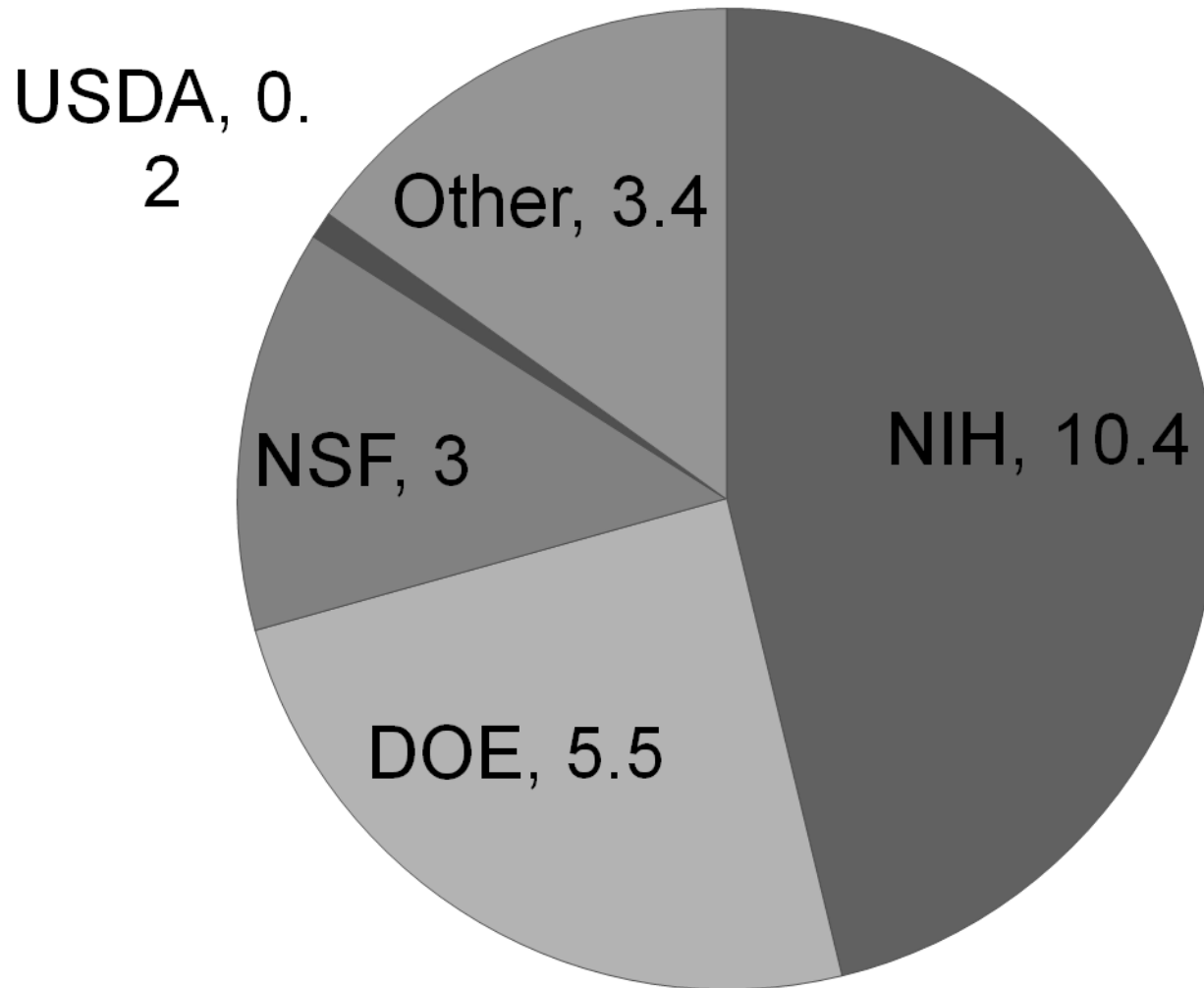


Agricultural Research



Source: Dave Meeker – National Renderers Assoc.

The Stimulus Package by Agency, \$ B



2009 Stimulus Package (add-ons)

After a coalition of farm, food and Land Grant organizations lobbied hard to include \$200 million for agricultural research in the stimulus bill, the final Senate version provided \$50 million. But when House, Senate and administration negotiators pared the final American Recovery & Reinvestment Act down to \$787 billion, they eliminated the ag research funding entirely.



Source: Dave Meeker – National Renderers Assoc.

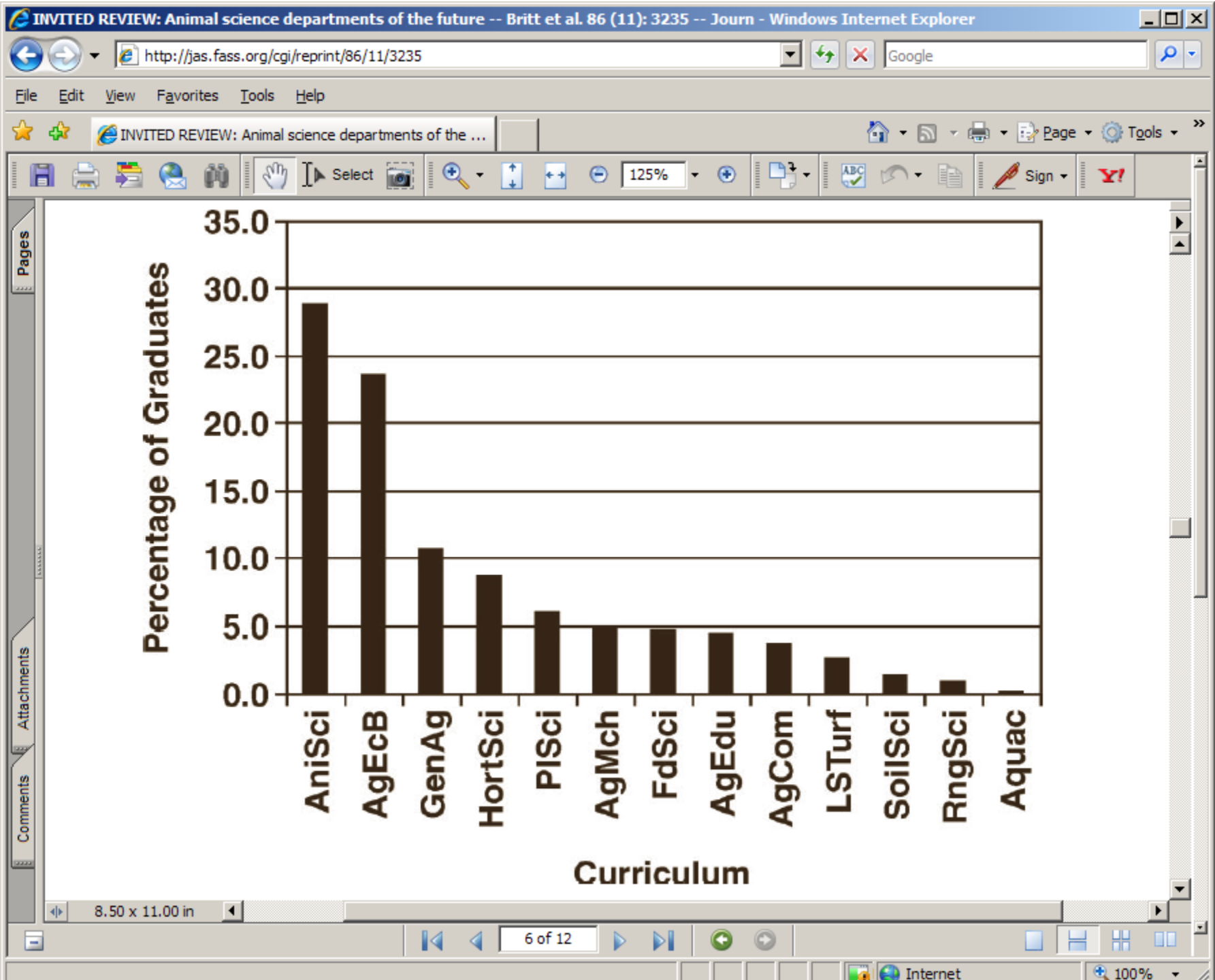
Why Don't We Fund It?

Two other points:

- Poor Understanding of Time Lag to Productivity Gains
- Poor Understanding of Wicked Problems

Animal Science Departments of the Future (Britt, 2008, JAS 86:3235)

- Departments in all LG universities
 - (28 colleges of Vet Med in US)
- Largest major in colleges of agriculture
- More than 85% indicate their species of most interest is horses, companion animals or exotic animals
- Predominately female -- ~70%



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RPA's sixth letter to presidents of Land Grant Universities:

August 23, 2007

Dr. Stan L. Albrecht
President
Utah State University
M116, UMC 1400
Logan, UT 84322

Dear Dr. Albrecht:

Responsible Policies for Animals' (RPA's) five previous mailings to you and your predecessor about the need to end Utah State University's service to the flesh, milk & egg industries documented the industries' enormous harm to human health & quality of life, waste and contamination of water & topsoil, nonhuman animals' moral right not to be used by human beings, and other public interests. **Also crucial to consider:** *harm to instructors and students from "animal science."*

The industries use "animal science" instructors, students & graduates as pawns for profit. *Utah State uses them for tuition and for industry, government, and alumni support. It's expected that industry will exploit whom it can. It's shocking for an institution whose fundamental responsibility is truth-seeking to turn its back on the truth at instructors' & students' expense.*

Most instructors & students probably want their work and their university to serve the public interest. Sadly, "animal science" mocks that sincere desire, substituting destructive popular interests: hamburgers, cheese pizza, scrambled eggs, and the rest. And endorsing flesh, milk & egg production - contradicting established facts - puts "animal science" instructors & students in the position of deceiving rather than educating or serving others.

When you think of "animal science," think of farmers in Tanzania attacking each other with machetes. *"Animal science" is a significant cause of global climate change, which is melting the snow atop Mt. Kilimanjaro. Farmers near the mountain now fight over the reduced water*

SPAR

students promoting animal rights

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Protest The Circus This Friday!

Posted in [Uncategorized](#) by [admin](#)

April 23rd, 2009

[MSU Student Group Blasts Proposed University Policy At Upcoming Board Of Trustees Meeting](#)

[Group Says Animals Are Routinely Beat and Neglected in Animal Circus Industry](#)

For Immediate Release:
April 23, 2009

Contact:

Mitch Goldsmith 517 XXX XXXX

East Lansing, MI. — With signs reading, "Stop Elephant Abuse, Boycott the Circus" Students Promoting Animal Rights members and supporters will rally outside the Board of Trustees Friday meeting in opposition to a proposed "animal care" policy drafted by a university committee chaired by Interim Assistant Vice President for the Regulatory Affairs Office JR Haywood. SPAR President Drew Winter, Vice President Mitch Goldsmith and Faculty Advisor Beth Rhodes will later make a presentation to the Board revealing academic studies, position papers, affidavits and the latest Ringling Brothers Barnum and Baily animal abuse trial updates which all demonstrate that animals in circuses suffer routine neglect, psychological and psychical abuse at the hands of circus employees.

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CONNECTING FARM TO FORK



Sorting out cage-free dilem

With consumers increasingly considering "social responsibility" issues when making food purchasing decisions, egg producers are following scientific guidelines to house their hens in a humane and responsible environment.

By **JEFFREY D. ARMSTRONG***

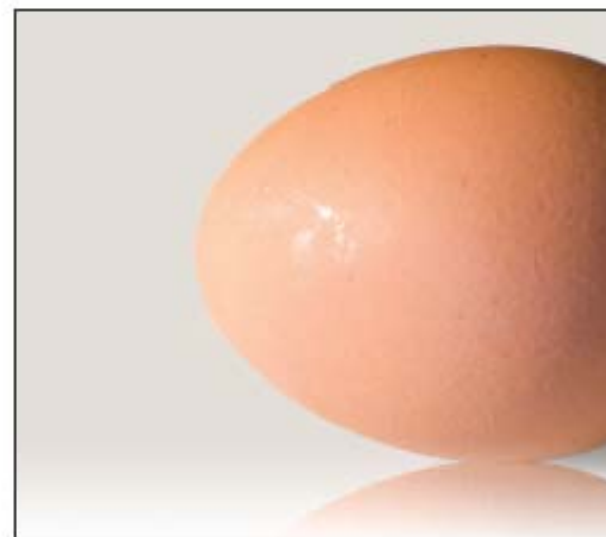
CONSUMER choice has great influence over the food system, and consumers are increasingly including animal welfare, environmental concerns, genet-

science-based set of guidelines for laying hens raised under caged conditions (*Feedstuffs*, March 15, 2004). Concurrently, it established the UEP certified program that is regularly audited by the U.S. Department of Agriculture and Validus.

services sort through these issues and make informed purchasing decisions.

During this meeting, the University of Notre Dame provided a behind-the-scenes look at its decision-making process for food procurement. Representing the key decision-makers (Social Responsibility Committee) were Jocie Antonelli, manager of nutrition and safety, and Dan Crimmins, director of purchasing. Antonelli is a registered dietitian and is responsible for the nutrition and safety of food served at Notre Dame.

Notre Dame has 11,200 stu-



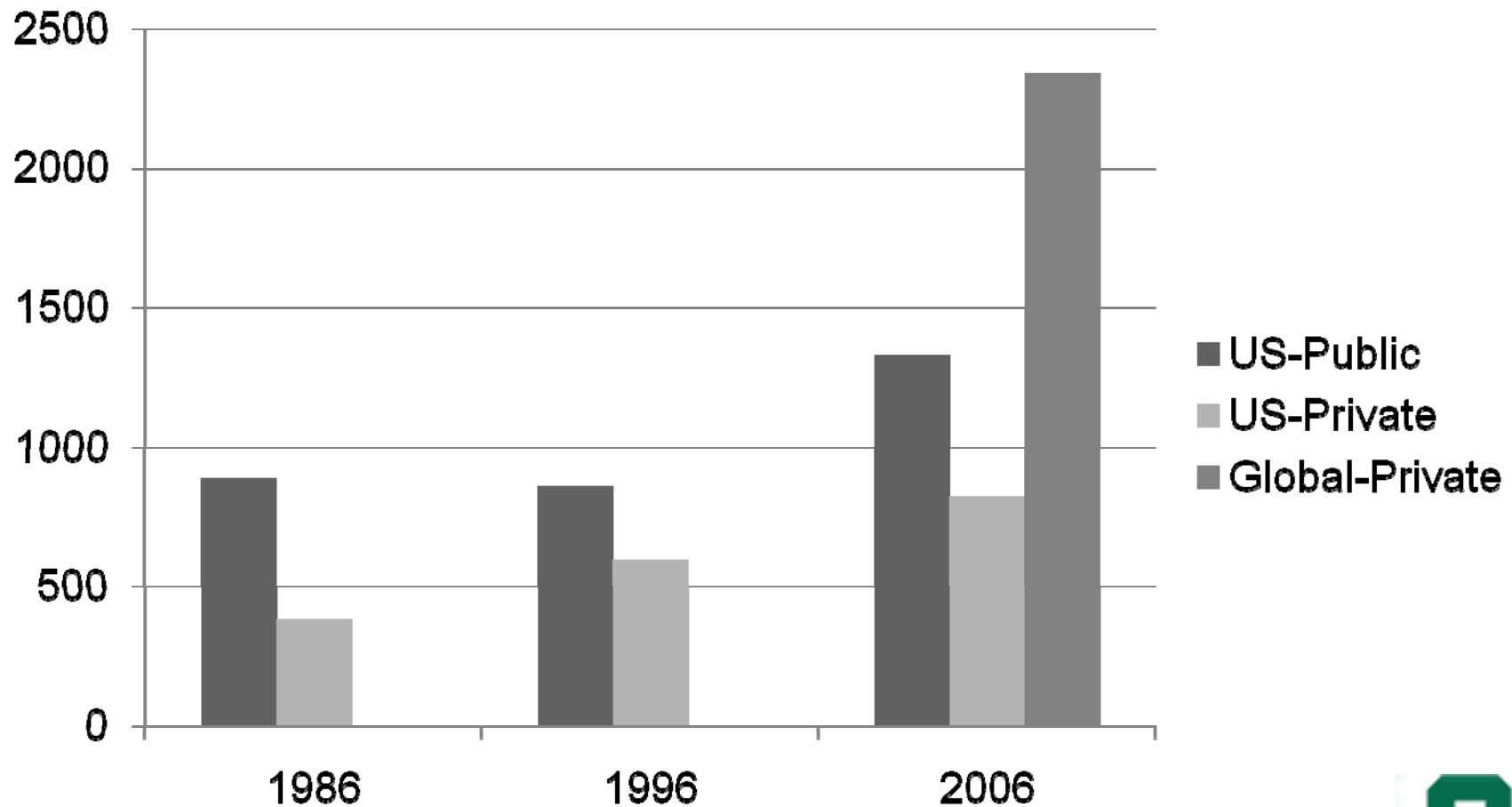
Farm Animal Research in Crisis

- Last 20 years, 44% decrease in research support from federal and state agencies
- Last 30 years, faculty positions in larger land grant universities decreased by 50%
- NSF Survey of Earned Doctorates indicates that awarded doctorate degrees in ANS declined 30% from 1985 to 2004

Farm Animal Research in Crisis

- \$32 m or .04% of the USDA budget allocated to competitive programs for animals
- Health and Human Services -- \$29 b of \$716 b to NIH (~80% competitive programs)
- Formula funds flat – declining
- 1972 NRC warned – “grossly inadequate supportagriculture”

Public and Private Animal Research Expenditures (Source: ERS)



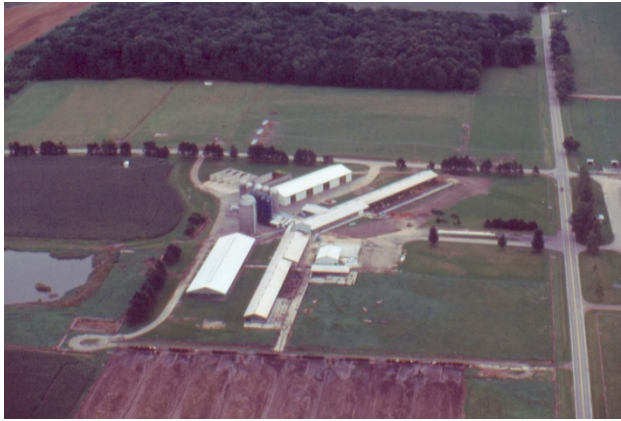
Concerns – State Level Funding

- In general, investment required for animal agriculture-based LG programs – 3-4X higher
- Before the economic crisis
 - Estimate crop & specialty crop-based “commodity” support at 2-4 times that of animal-based support
 - National – many funds limited to promotion of product
- Since the economic crisis
 - Too early to determine

Facilities & Operation

- Traditional strong support from alumni and commodity groups for new facilities (e.g.)
 - Mid 80's - \$4 million plus beef facility NC State
 - Mid 90's - \$70+ million Animal Industry Initiative MSU
 - Recent - \$3 million from WK Kellogg Foundation for Pasture-based dairy (with robotic milking)
- Replacement / maintenance – ?????
- Operation
 - Estimate – 2-4x per FTE greater cost
 - Largest number of students – greatest cost









Recommendations

- Authorize and fund AFRI at 1.4 b
 - New Under Secretary – great opportunity!
 - Stop being ignored – billions not millions!
 - Includes research, Extension and education
 - Disciplinary / fundamental and “wicked problems”
 - Special attention to minority serving institutions
- Enhance partnerships with NIH, NSF, etc.
- Establish competitive, multi-year centers with commodity groups, corporations & foundations (e.g. NSF & Gates Foundation)

Recommendations

- All or part of formula funds linked to increased multi-institutional efforts
- Enhanced collaboration among LG system, veterinary colleges and ARS
 - Facility crisis is looming
- Eliminate ear marks
 - only after formula stabilized and AFRI funded
- No substitute for public funding for:
 - “wicked problems” and fundamental research

Failure to Act / Reverse Crisis in Funding

- US continues to fall behind in productivity and use of technology
- US food animal production moves off shore
 - Farm Foundation report
- Advances in food system and medical fields (pandemics?) lost or ceded to others
- Sustainable food, fuel and fiber production driven by emotion rather than science
- Loss of colleges of agriculture in LG
 - Already starting (U Mass proposal)



Desired Future

- Better adapted to “wicked problems”
 - GHG and Climate Change
 - Energy and Energetic Efficiency
 - Alternative Feed and Food Sources
 - Enhanced Animal Health and Food Safety
 - Adaptation of Animals to Changing Environments
 - Basic Biology of Animal Well-Being
- Strong disciplinary research programs
- Positive impact on human and animal health and quality of life

Agriculture is permissive to health, economic vitality and social stability --- without a strong US agriculture, heroic measures to improve human health would not advance.

Fuller Bazer, Texas A&M University



Questions / Discussion?

MICHIGAN STATE
UNIVERSITY

