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  Steering Committee, KeepAntibioticsWorking.org
  Founder, Food and Environment Work Group, APHA
  Co-founder, Healthy Food in Health Care, Health Care Without Harm

- Formerly, Food and Health Director,
  Institute for Agriculture and Trade Policy, 2000-2013
  Senior Scientist, Public Health Program,
  Natural Resources Defense Council, 1996-2000
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- MPA, Princeton University, 1994
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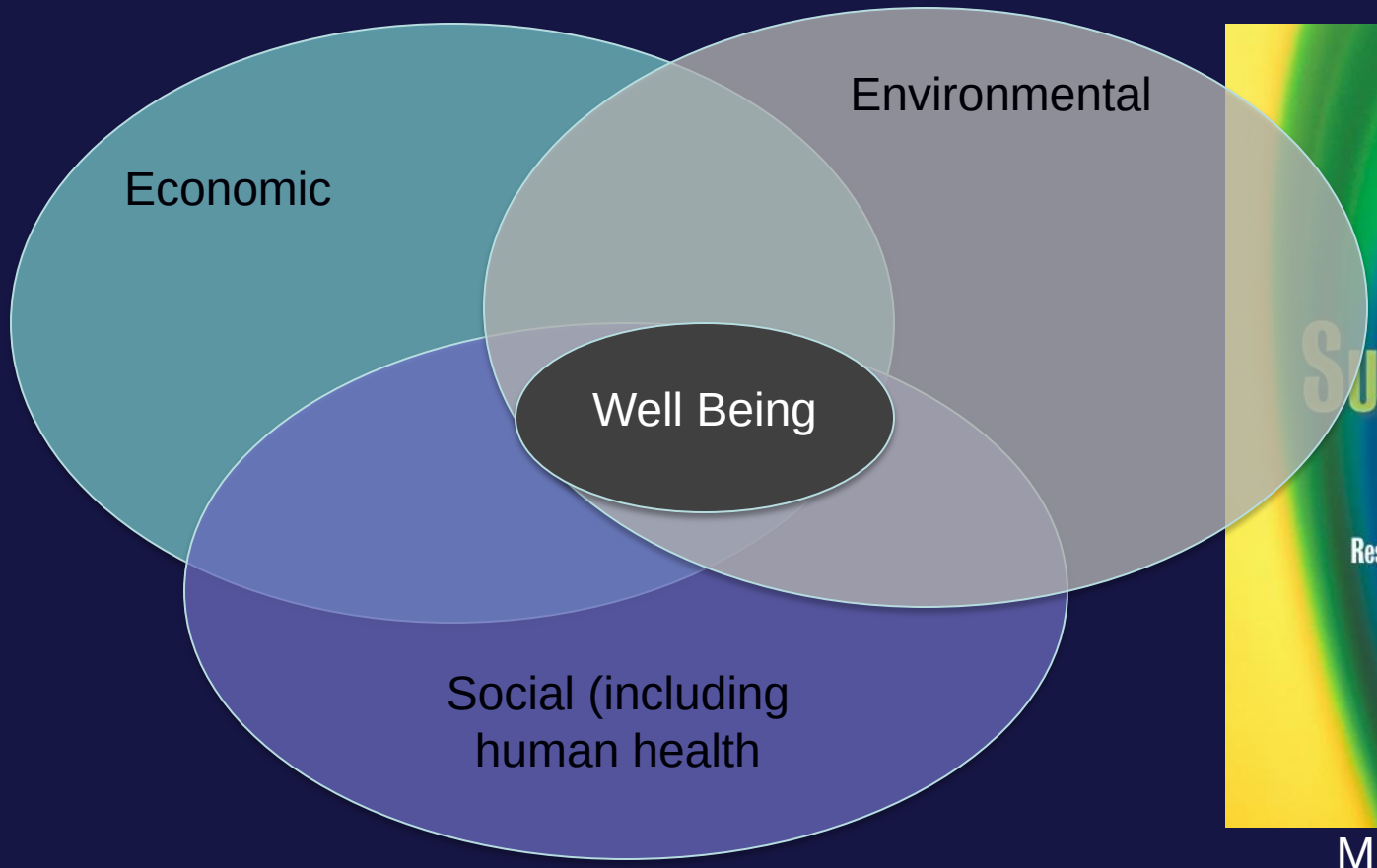

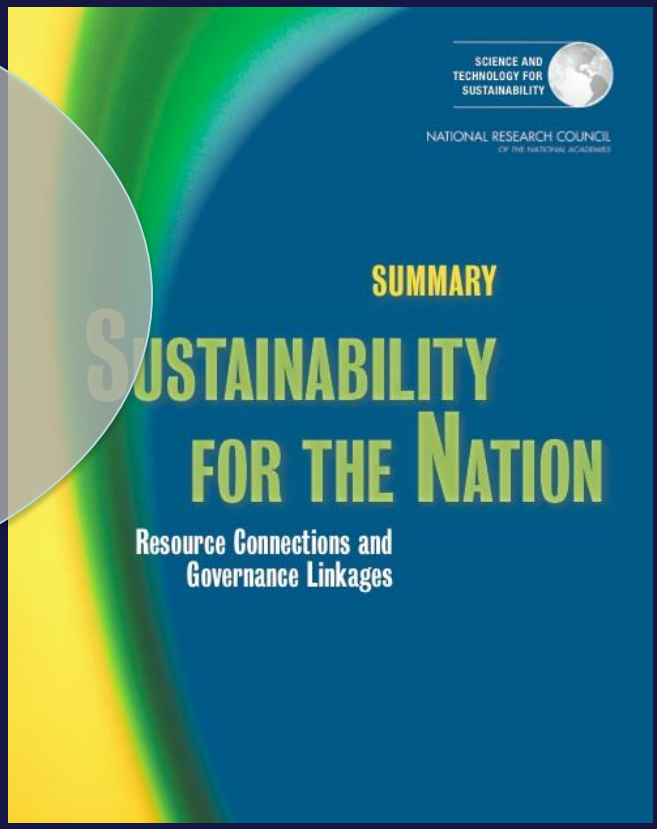

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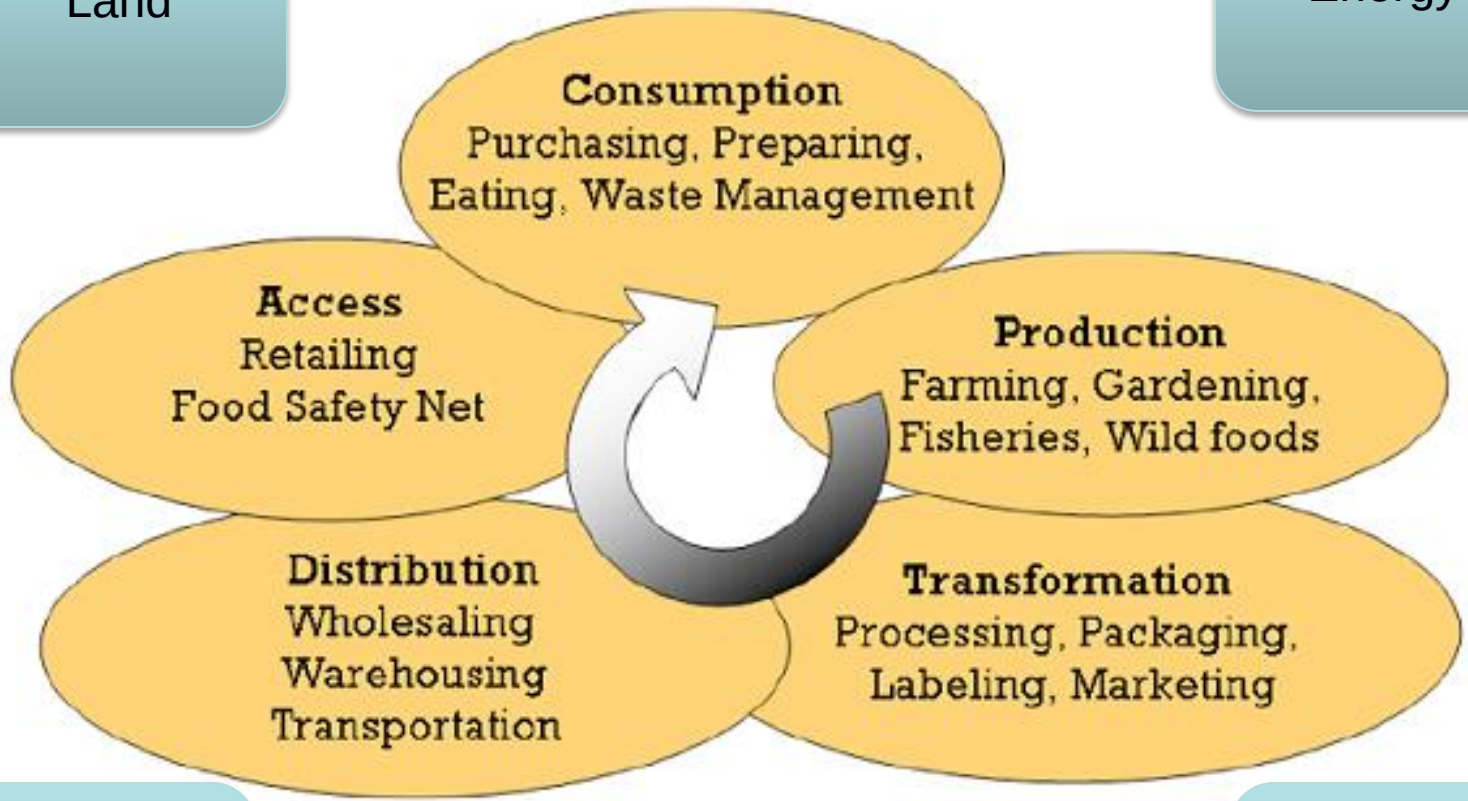
- A central goal of sustainability is to maintain and enhance human well-being.
- Government plays an important role in creating a sense of well-being (“Life, liberty and the pursuit of happiness…”)
- Human well-being includes physical and mental health across the lifespan, from prenatal development to old age. It also includes happiness.

1. What is the relationship between food systems, sustainability, health and well-being?

Land

Energy

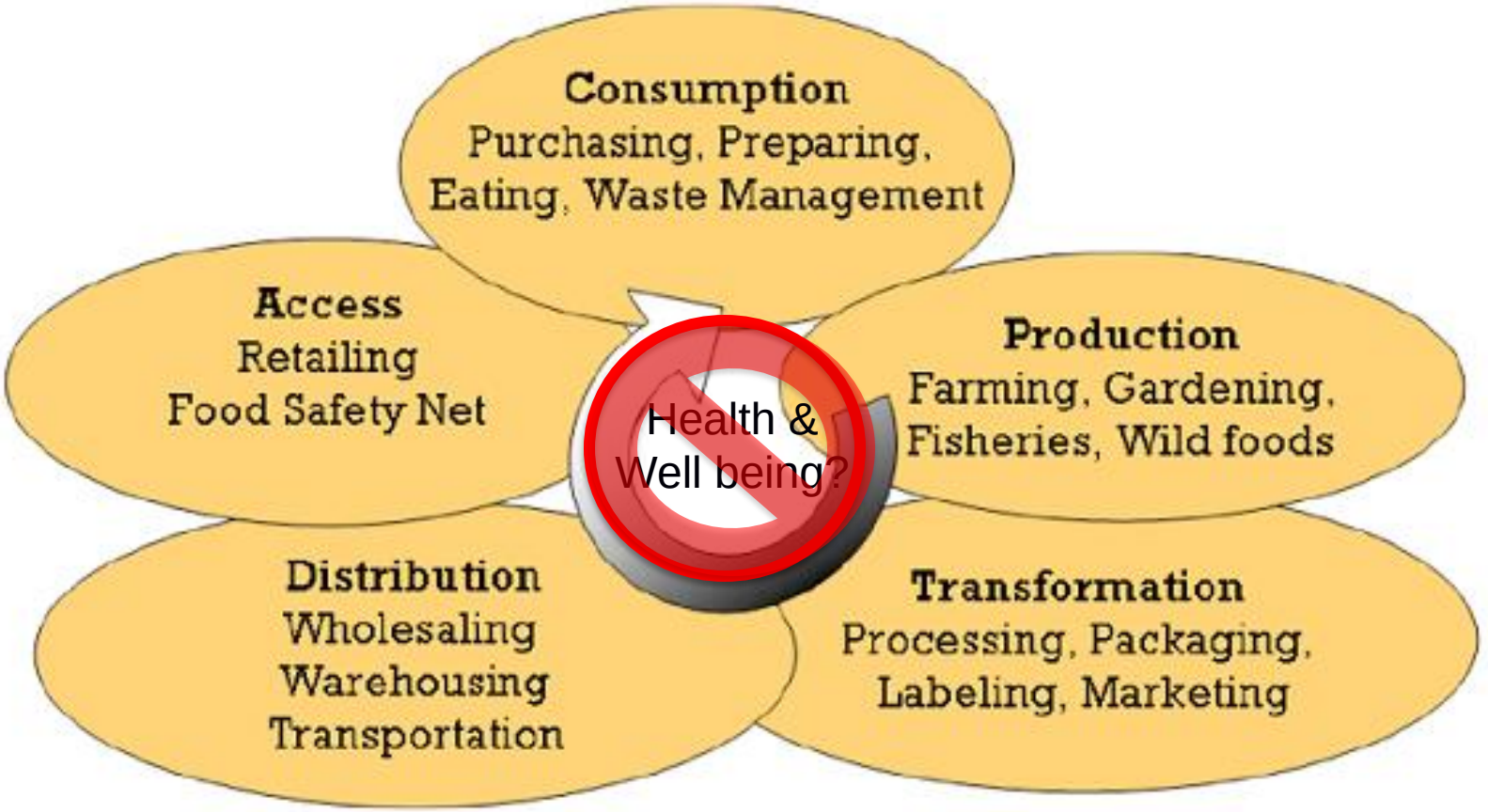


Water

- Top soil
- Antibiotics
- Arsenicals

Nonrenewables

1. What is the relationship between sustainability, health and well-being?



1. How does sustainability in food and agriculture affect human health and well-being?

What farmers grow and where they grow it….

- Affects availability of fruits, veggies, other healthy foods to consumers, in season and out of season
- Affects price of food to consumers, absolutely, and as a function of time, transport
- Nearby farms, backyard gardens can improve nature access, reducing stress, increasing social cohesion, health & well-being (new APHA 2013 policy,http://www.apha.org/NR/rdonlyres/A4F222BF-5B15-4B7D-8C72-DBC410BA87F7/0/B4AccesstoNature.pdf)
- Affects geographic distribution / concentration of farms, animals, manure and farm pollution and runoff (see next slide)
- Affects community resilience in the face of natural disasters, drought (think Tacloban, Fukushima)

1. How does sustainability in food and agriculture affect human health and well-being?

- *Agricultural practices affect:*
  - Nutritional content
  - Contaminant levels in foods, with pesticides, other chemicals
  - Contamination of dried distillers grains, manure, fish, with antibiotic residues, via routine abx use in ethanol, meat and fish production
  - Contamination of meat with antibiotic resistant bacteria, increasing foodborne illness, (and likely chronic disease through disturbance to the microbial flora of the human gut)
  - Creation of farm and other environmental reservoirs of antibiotic resistance genes, genetic determinants and resistant bacteria, increase transmission of resistance to humans
  - Drinking water quality via nitrate contamination, cryptosporidium, other pathogens (Walkerton, ON, Milwaukee, WI)
  - Recreation opportunities (swimming, fishing, etc.) in rivers, lakes, oceans

1. How does sustainability in food and agriculture affect human health and well-being?

- *Food distribution, processing affects*
  - How easily consumers can access fresh, affordable minimally processed food in their own neighborhoods, via farmers markets, CSA shares, and neighborhood stores. Locally marketed foods = $4.8 billion in sales in 2008, farm-to-school programs in all 50 states, but much room for expansion

2. What sustainability initiatives could be developed or expanded to address this critical relationship?

- The AFRI program, initiated by USDA in response to the 2008 NRC report, *New Biology for the 21st Century, reflects some priority recommendations of the latter (e.g. adaptability to changing environments), but lost apparently was focus on sustainability and maintaining functioning ecosystems.*
- Of roughly $100 billion in Farm Bill spending annually, NIFA (National Institute of Food and Agriculture) research & extension programs totaled $1.36 billion in FY2012
  - Expand NIFA's Community Food Project program, 26 projects, $4.87m in 2013 grants, fights hunger & food insecurity through community food systems. http://sustainableagriculture.net/blog/cfp-2013-grantees/

2. What sustainability initiatives could be developed or expanded to address this critical relationship?

- *Increased investment in local and regional farm and food systems, because they create new jobs, increase money spent in local communities and improve access to fresh, healthy foods, could increase both increased both physical and social health determinants*
  - Make SNAP benefits increasingly usable in local markets; more programs to incentivize use of SNAP benefits to buy healthy, fresh foods
  - Extend access to farm credit and insurance to smaller-scale, local farmers, including many farmers of produce. USDA's new micoloan program in 2013 made over 3,000 loans, but room for expansion
  - Create a national program in AFRI to fund research on local and regional farm and food systems; also for research into improving conventional plant and animal breeding research.

For more information: The Local Farms, Food, and Jobs Act of 2013 (H.R. 1414 / S. 679) at www.sustainableagriculture.net

2. What sustainability initiatives could be developed or expanded to address this critical relationship?

Farm bill, Food Safety Modernization Act

- Conservation programs in the Farm Bill under threat. For example, bipartisan calls for Farm Bill conferees to reattach requirements that those producers getting public subsidies for crop insurance also meet standards for soil and wetlands conservation. These programs reduce runoff and farm sourced pollution, affecting water quality and human health. See http://sustainableagriculture.net/blog/compliance-letters/
- There is substantial risk that USDA's implementation of the already-passed Food Safety Modernization Act (FSMA) will actually undercut the Act's vision that "sustainable conservation practices enhances food safety". Wild Farm Allliance explains how species diversity at the farm level enhances food safety, http://www.wildfarmalliance.org/resources/FS_Facts_Tip_FAQ.htm)

For more information: The Local Farms, Food, and Jobs Act of 2013 (H.R. 1414 / S. 679) at www.sustainableagriculture.net

2. What sustainability initiatives could be developed or expanded to address this critical relationship?

The Dietary Guidelines for Americans Committee is examining how to incorporate sustainability into the updated recommendations that they are preparing

1. What is the relationship between sustainability and well-being?

2. What sustainability initiatives could be developed or expanded to address this critical relationship?

3. What are some barriers, and solutions for addressing these barriers?

Barrier: The disconnect between the scale of Farm Bill supported research, its focus (large-scale), and the fact that sustainable food systems and health nexus occurs most naturally at the local, regional scale, and innovation is happening and most needed within communities often distrustful of academe.

Solutions:

- Rebalance small and large scale research in federal grant programs
- Expanded grant programs with the specific intent of building capacity in community-based organizations by requiring that they, and not academic partners, be the principal investigators.

1. What is the relationship between sustainability and well-being?

2. What sustainability initiatives could be developed or expanded to address this critical relationship?

3. What are some barriers, and solutions for addressing these barriers?

Barrier: US farms produce caloric energy (for biofuels, for feed grains), mostly, not food. Sustainability and health is hard to ensure in that scenario.

Solutions:

- Make clear that growing our own fruits and produce should be considered a national health and national security priority for U.S.
- Incentivize, and pay, farmers farmers of healthy food commensurate with what farmers of commodity crops are paid

1. What is the relationship between sustainability and well-being?

2. What sustainability initiatives could be developed or expanded to address this critical relationship?

3. What are some barriers, and solutions for addressing these barriers?

Barrier: The imbalance in federal research between technology based innovation and knowledge based innovation

Solutions:

- Invest in conventional plant and animal breeding programs
- Invest in agroecology research and training of beginning farmers. Collect data on its efficacy, including for healthy food crops. Seek out U.S. replication of models that have worked elsewhere, and scale up adoption of successful domestic models.

1. What is the relationship between sustainability and well-being?

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3. What are some barriers, and solutions for addressing these barriers?

Barrier: Knowledge silos.

- Medical journals don't publish food systems science; Health policymakers don't consider or refer to that science.
- NAS report on sustainable food systems and public health Building on 2007 Wingspread Conference, and 2009 Airlie Conferences. See Story M, Hamm M, Wallinga D. Food Systems and Public Health: Linkages to Achieve Healthier Diets and Healthier Communities. Special Issue: Journal of Hunger and Environmental Nutrition April 2009. http://www.tandfonline.com/doi/
- NIH study section on food systems research.
- Joint RFPs from USDA and NIEHS on the topic

1. What is the relationship between sustainability and well-being?
2. What sustainability initiatives could be developed or expanded to address this critical relationship?
3. What are some barriers, and solutions for addressing these barriers?

Barrier: The medical model is not systems bases, it's reductionist

Solutions:

- Training programs in systems thinking generally, and food systems specifically
- Articulating a new "medical model" that reexamines – among other things – what is considered gold standard research (RCTs for sustaianble food systems? I think not), replacing "evidence based" for "evidence informed" public health food systems interventions, new ideas on appropriate study design for systems research

1. What is the relationship between sustainability and well-being?
2. What sustainability initiatives could be developed or expanded?
3. What are some barriers, solutions to addressing human health and well-being?
4. **What are knowledge gaps to better understanding how sustainability in food, agriculture impact human health?**

- Policy research on sustainable food system
- Research methods development in doing public health and food systems research
- How can sustainable food systems address epidemics of inflammation-mediated chronic disease: diabetes, cardiovascular disease, stroke, neurodegenerative disease, etc?
- How can sustainable food systems support improvements in behavior, school performance, and mental health?
- Connecting the macro and the molecular food “environments”. What’s the connection between sustainable food systems and epigenetics?

The event features panel discussions addressing issues related to sustainability and public health, as sustainability efforts may affect human health and wellbeing in complex, crosscutting ways.

Sustainability for the Nation: Resource Connections and Governance Linkages,* reiterates the importance. The report states agricultural practices influence the nutritional content and contaminant levels in food, as well as its availability and price, etc.
The panel will identify various domains of sustainability with health implications, including urbanization and urban design, energy, food and agriculture, and transportation. The panel will also discuss ways government entities and nongovernmental players can develop sustainability policies that equitably and effectively promote human health and well-being. The STS Roundtable, a key component of the Science and Technology for Sustainability Program, provides a forum for sharing views, information, and analysis related to harnessing science and technology for sustainability. Members of the Roundtable include senior decision-makers from government, industry, academia, and non-profit organizations who deal with issues of sustainable development, and who are in a position to mobilize new strategies and

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Outline

- Health matters -- Acute vs. chronic disease
- Places matter
- Industrialized food animal production as health-impacting
  - Water quality
  - A focus on antibiotic overuse and its impacts

- *Introduction to Panel*
- Howard Frumkin, University of Washington School of Public Health
- *Panel I: Domains of Sustainability with Health Implications*
  - George Luber, Centers for Disease Control and Prevention (Urbanization and Urban Design)
  - Ralph Buehler, Virginia Tech (Transportation)
  - Kira Fortune, Pan American Health Organization (Energy)
  - David Wallinga, Healthy Food Action (Food and Agriculture)
- Q&A and Discussion
- BREAK
- *Panel II: Translation of Sustainability Science to Public Health*
  - Howard Frumkin, University of Washington (Linking Health Agencies and Organizations to Sustainability)
  - Nisha Botchwey, Georgia Tech (Health Impact Assessment as a Sustainability Strategy)
  - Q&A and Discussion

IOM Food Forum and Roundtable on Environmental Health Sciences, Research and Medicine:

Sustainable Diets – Food for Healthy People and a Healthy Planet

May 2013

1. What are the best strategies for quantifying and communicating the complex environmental and public health implications of dietary patterns?

   While scientists have made great strides in measuring impacts eating patterns on land use, water use and quality, climate change , etc., much still needs to be done to more fully capture these "externalities", which are largely left our of today's agriculture, food and nutrition policies.

   In particular, we shouldn't trade the silo of producing meat industrially with no acknowledgement of embedded costs, with the different silo of looking at meat production and consumption only through energy lens while continuing to ignore externalities to water and air quality, to antibiotic effectiveness, and to animal welfare

Thanks to Roni Neff, PhD, Bloomberg School of Public Health

IOM: Sustainable Diets – Food for Healthy People and a Healthy Planet

2. What is a sustainable level of meat consumption, and what role can public health campaigns like Meatless Monday play in changing consumer behavior and health, but also mitigating some of the environmental impacts of meat production?

Meat can provide high-quality protein, but diets higher in red and processed meat can increase many health risks. On the other hand some animal agriculture is necessary for a sustainable food system, however the dominant industrial production model poses serious threats to natural resources, ecosystems, animal welfare, community well-being, and more.

Were the U.S., along with other developed countries, to reduce relative consumption of meat and animal products, it could hold substantial benefits to individual health as well as to ecosystem health. The economic impacts on farmers are unclear, as it is entirely possible families might shift from eating more meat to eating less meat, but meat nonetheless produced more sustainably. School districts and hospital systems with deliberate policies promoting this balanced menu approach offer concrete examples of how this is done.

3. How do we ensure that national nutrition (or agriculture) policy considers issues of sustainability?

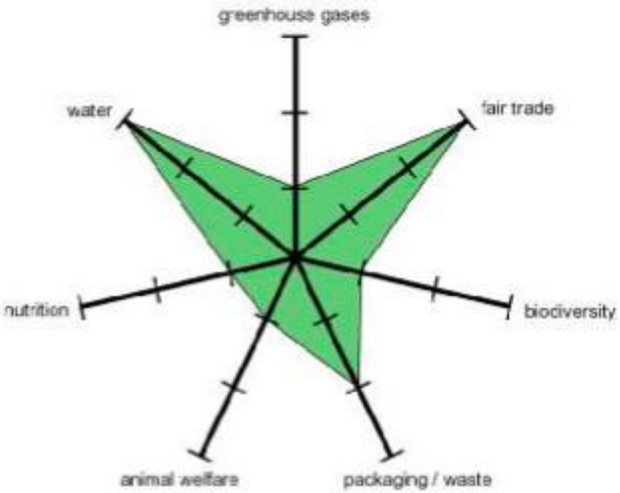
- Labeling that truly informs consumers
- Balancing the tension between upstream policies that make sure the best choices are the most sustainable ("choice editing") and framing which highlights consumer choice while ignoring the policy influenced environment determining those choices
- For upcoming 2015 Dietary Guidelines for Americans – Will they include language about environmental sustainability? Per Dr. Kate Clancy, Dietary Guidance including sustainability framing and language would usefully signal

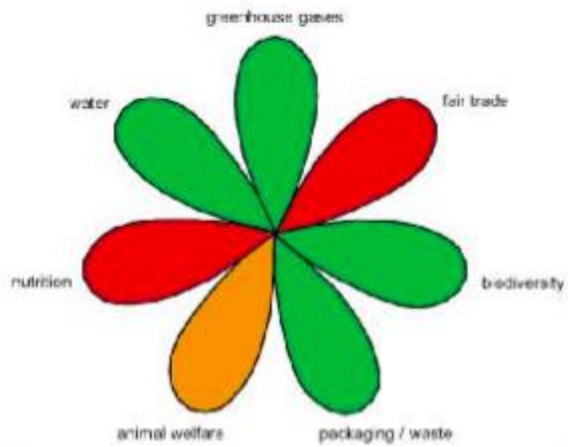
  a) government recognition that linkages between food, environment and health exist, and

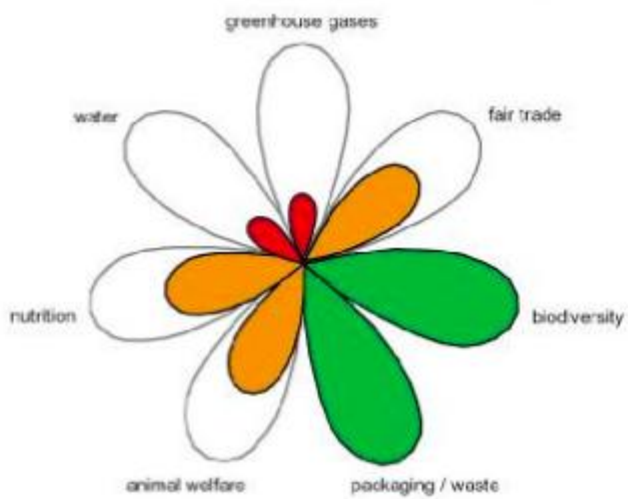
  b) acknowledge its role in creating the best policy informational environment, one that allows the consumer public to exercise its perogative to natural resources through its food choices

Complex labelling is possible:
OmniStandards in a label + traffic lights

source: Sustain ©

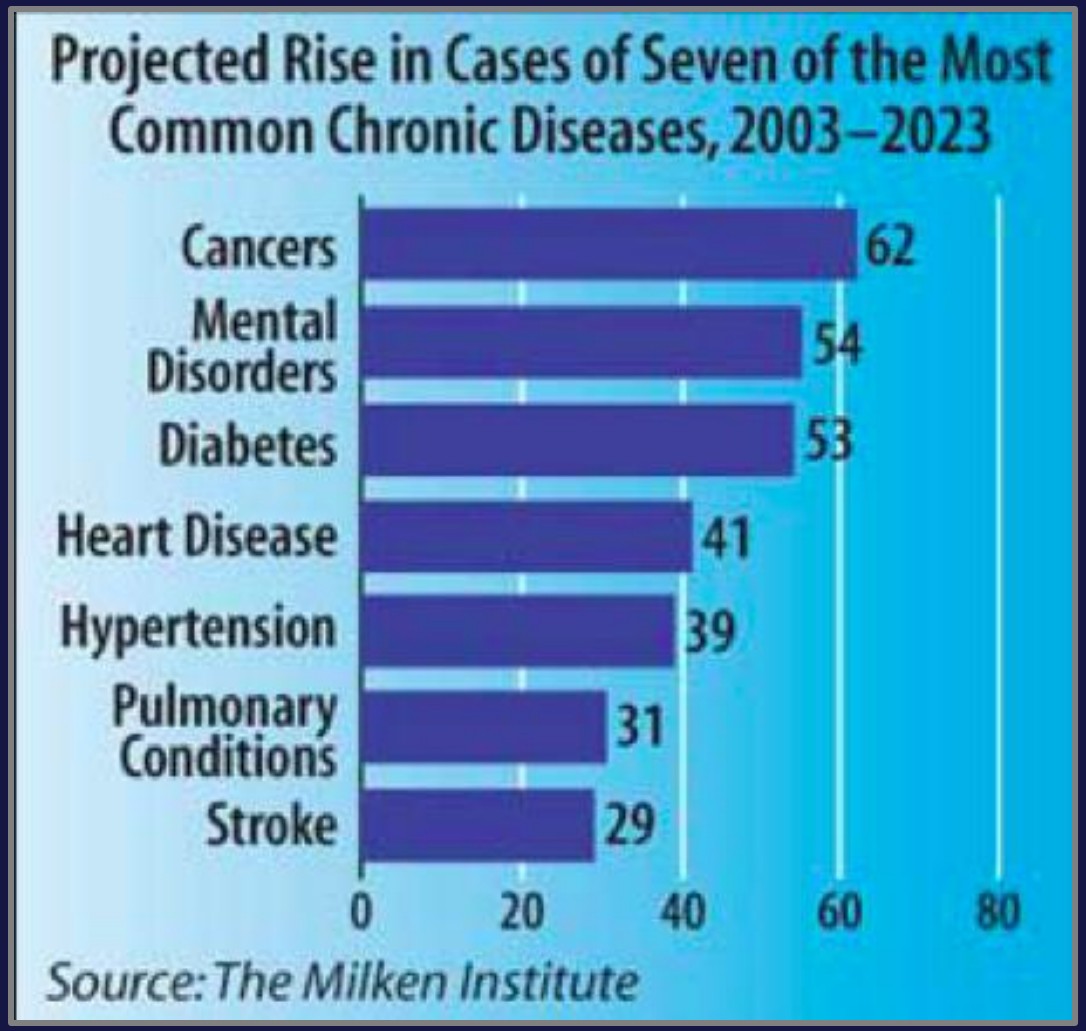






Courtesy of Tim Lang, PhD
IOM Food Forum, May 2013

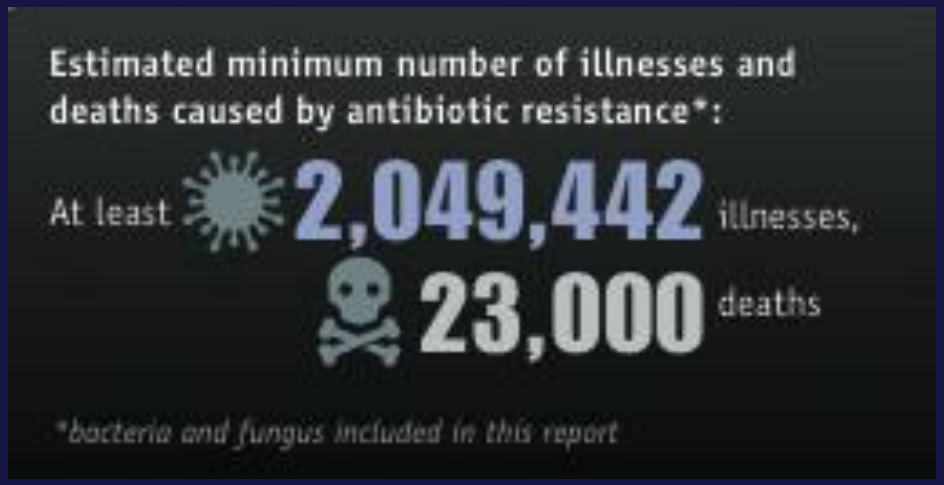
Epidemics of chronic disease



> 45% of Americans (133m) have ≥ 1 chronic condition

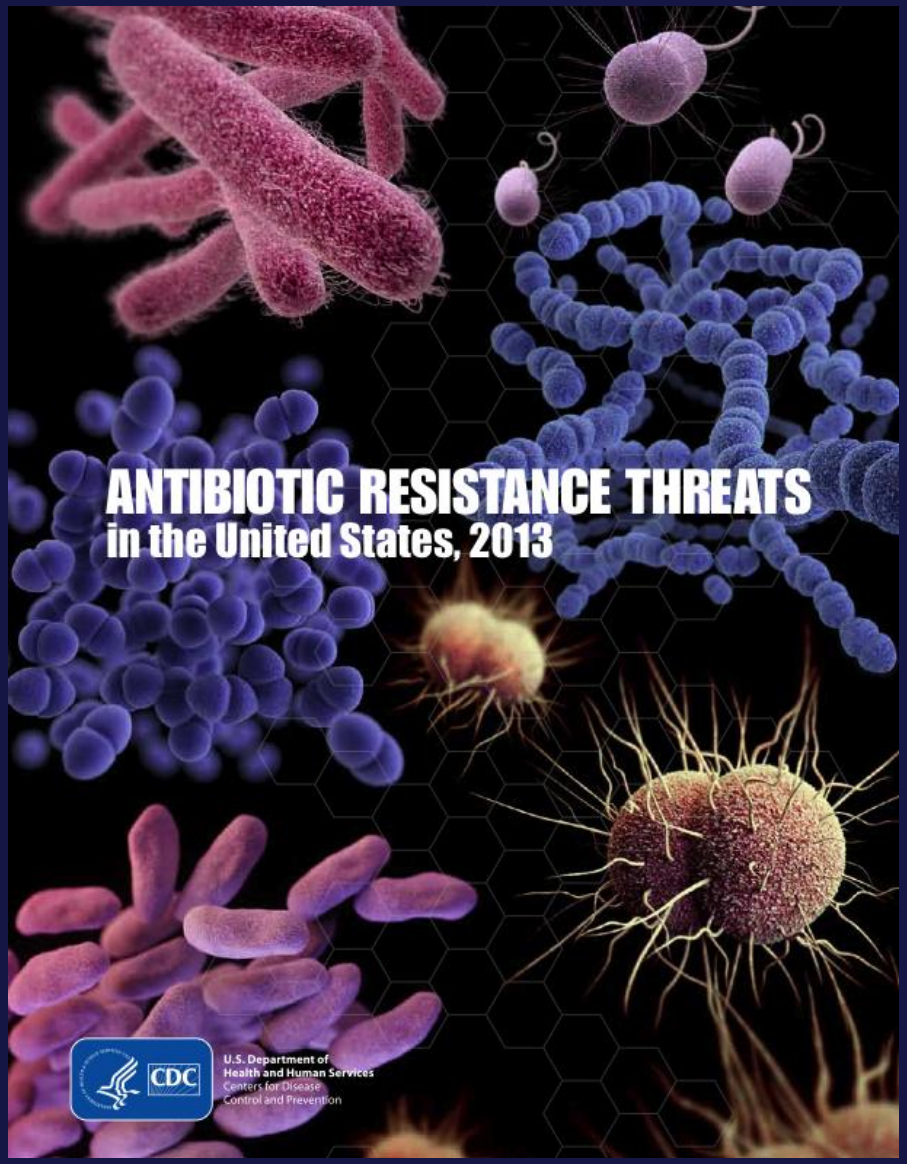
- 26% have multiple conditions

Epidemics of resistant infections



CDC.gov, 2013

Gonorrhea
C difficile
MRSA
Salmonella
Campylobacter
E coli



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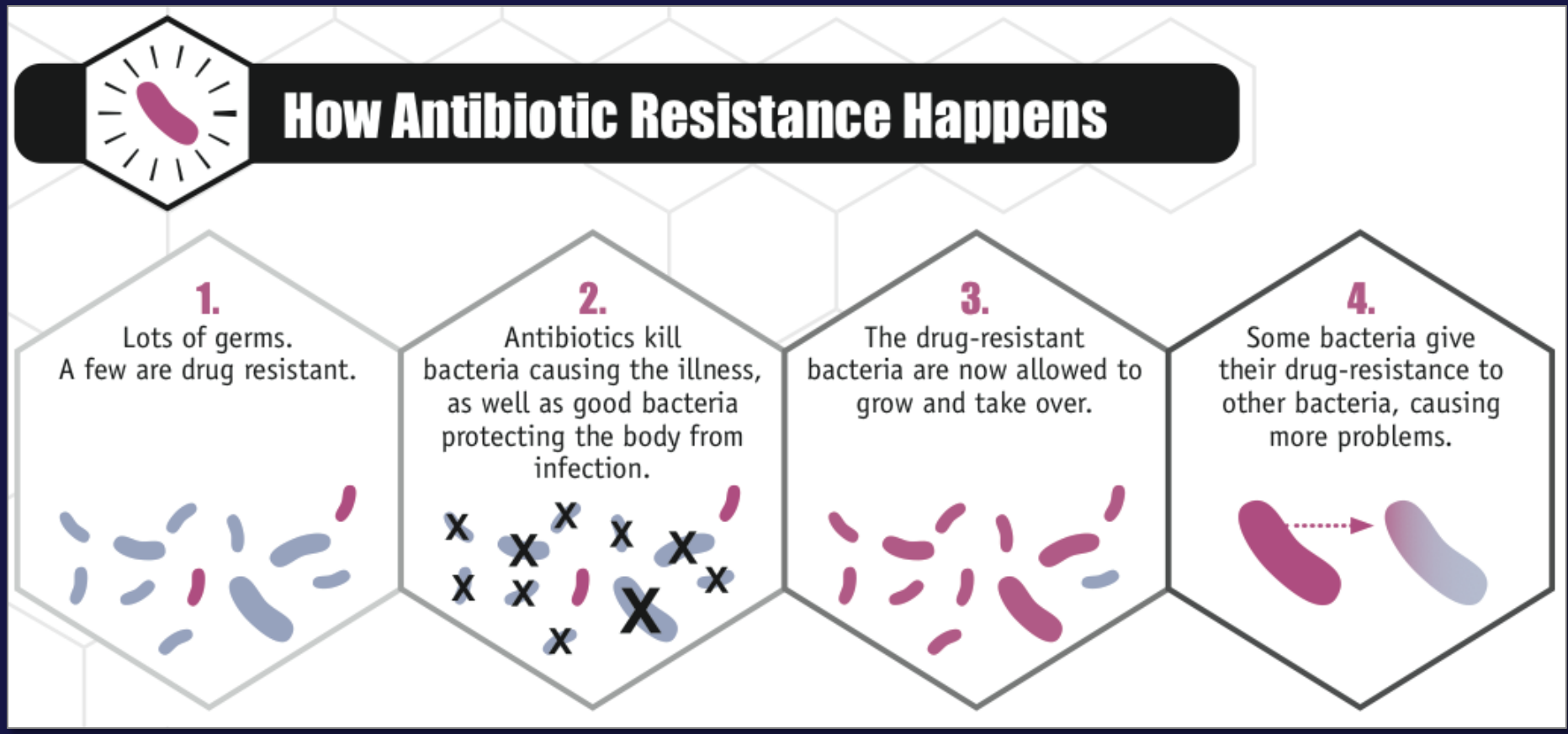


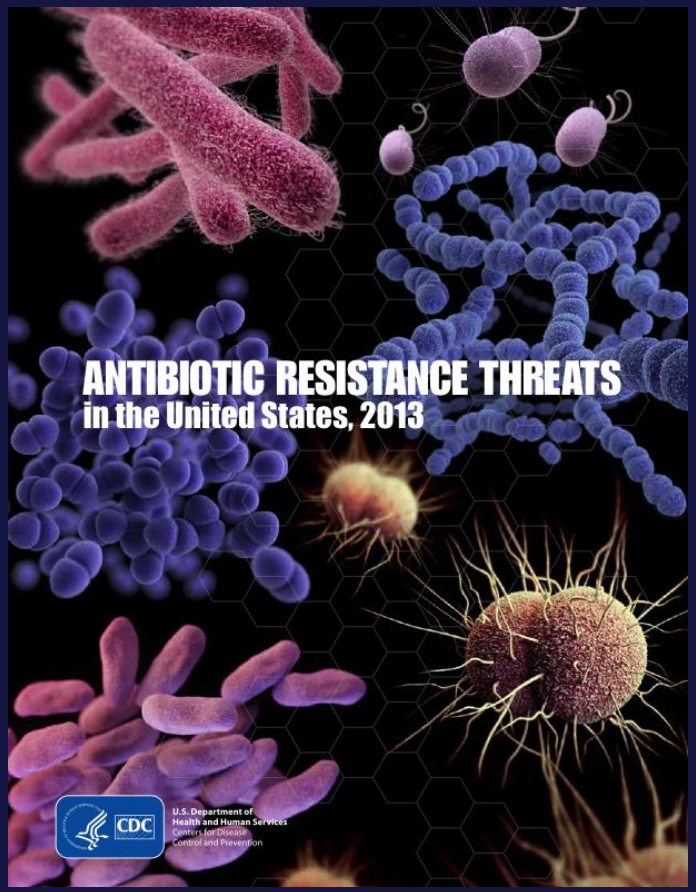
Drug-resistant infections cost Americans up to **$26 billion** per year in additional healthcare costs.

Additional costs (lost productivity, etc.) add tens of billions more

Health matters

	Costs per year
Obesity costs	$170b+
Related disease	
Cancer, diabetes, strok, CV	$300b
Resistant infections	$26b - $60b+
	$500 billion

"Up to half of antibiotic use in humans *and much of antibiotic use in animals* is unnecessary and inappropriate and makes everyone less safe".



CDC, Antibiotic resistance threats in the United States, 2013. September, 2013. www.cdc.gov


29 MILLION LBS
the amount of antibiotics used
on conventional food animals
in the United States each year

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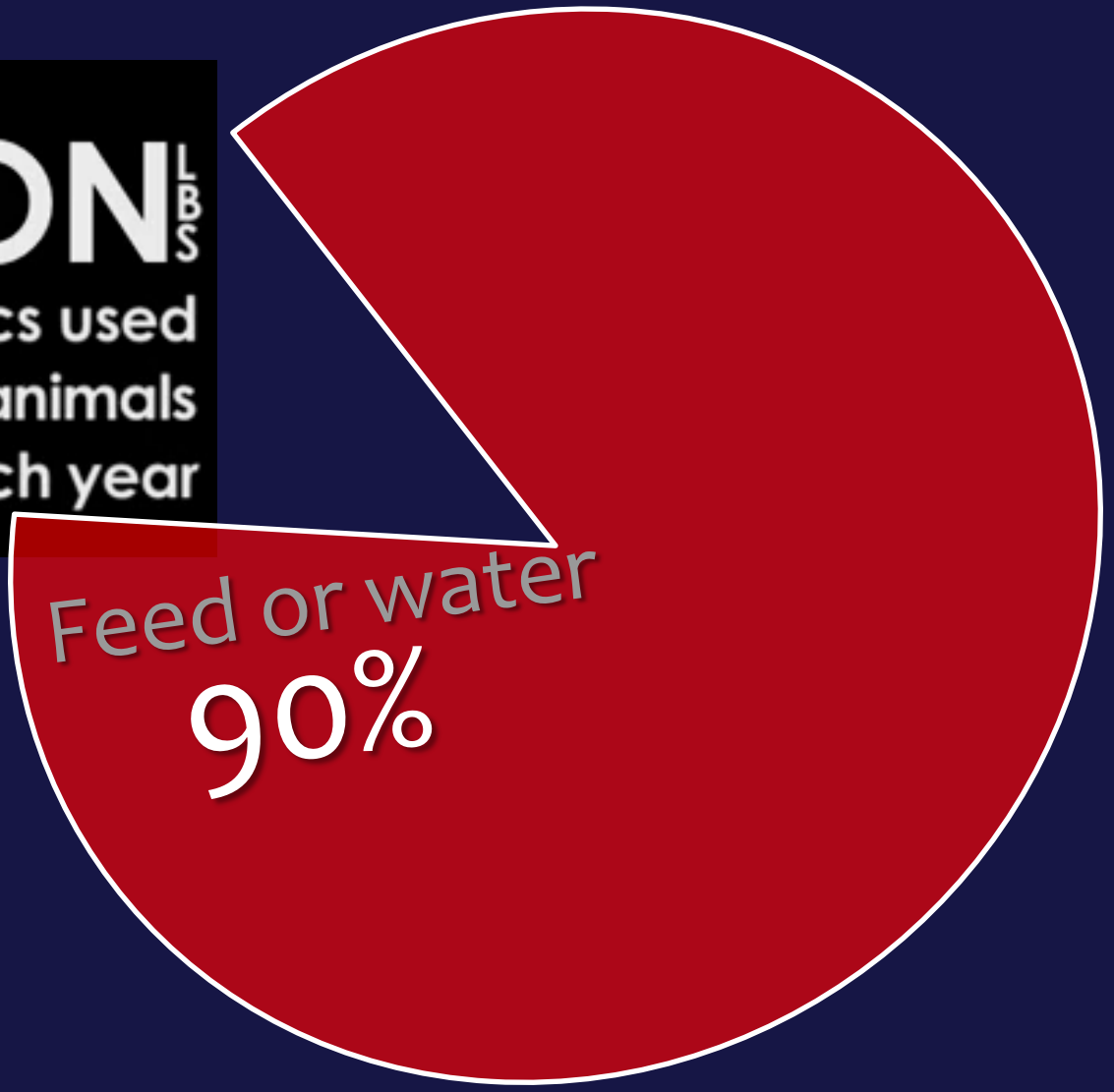


BIMEDA TETRAMED 324 HCA ANTIBIOTIC

Like 0

Online Item #: 0000000086493
SKU: 100386510

$67.39

Qty: 10

ADD TO CART Express Checkout

Description | More Info

For use in the control and treatment of scours in swine and calves. Used for the control of chronic respitory disease and air sac disease in chickens. Used for the control of infectious synovitis in turkeys.

- TetraMed 324 HCA Antibiotic
- Mfr. item number - 1TET023
- 5 lb. tub
- Tetracycline hydrochloride soluble powder antibiotic
- Tetracycline hydrochloride has been demonstrated effective on millions of animals
- Safe, effective treatment for a variety of species
- Treats & controls a number of common diseases
- High citric acid content - clearer, more soluble, stays in solution longer
- Each pound contains 324 g tetracycline hydrochloride
- ANADA 200-374, approved by FDA
- Restricted Drug (California), use only as directed
- Made in the USA
- Weight: Approximately 5 pounds
- Shipping Dimensions: Approximately 8 x 8 x 6.75 inches.

Prefer to place your order by phone?

YOU MAY ALSO LIKE

$5.99
Durvet GoatVac C.D.-T - 10 Doses

$18.99
Bimeda LincoMed 100 Swine Antibiotic - 100 mL

$10.89
AGRIpharm

U.S. Antimicrobials Sold or Distributed for Use in Food-Producing Animals (2011)

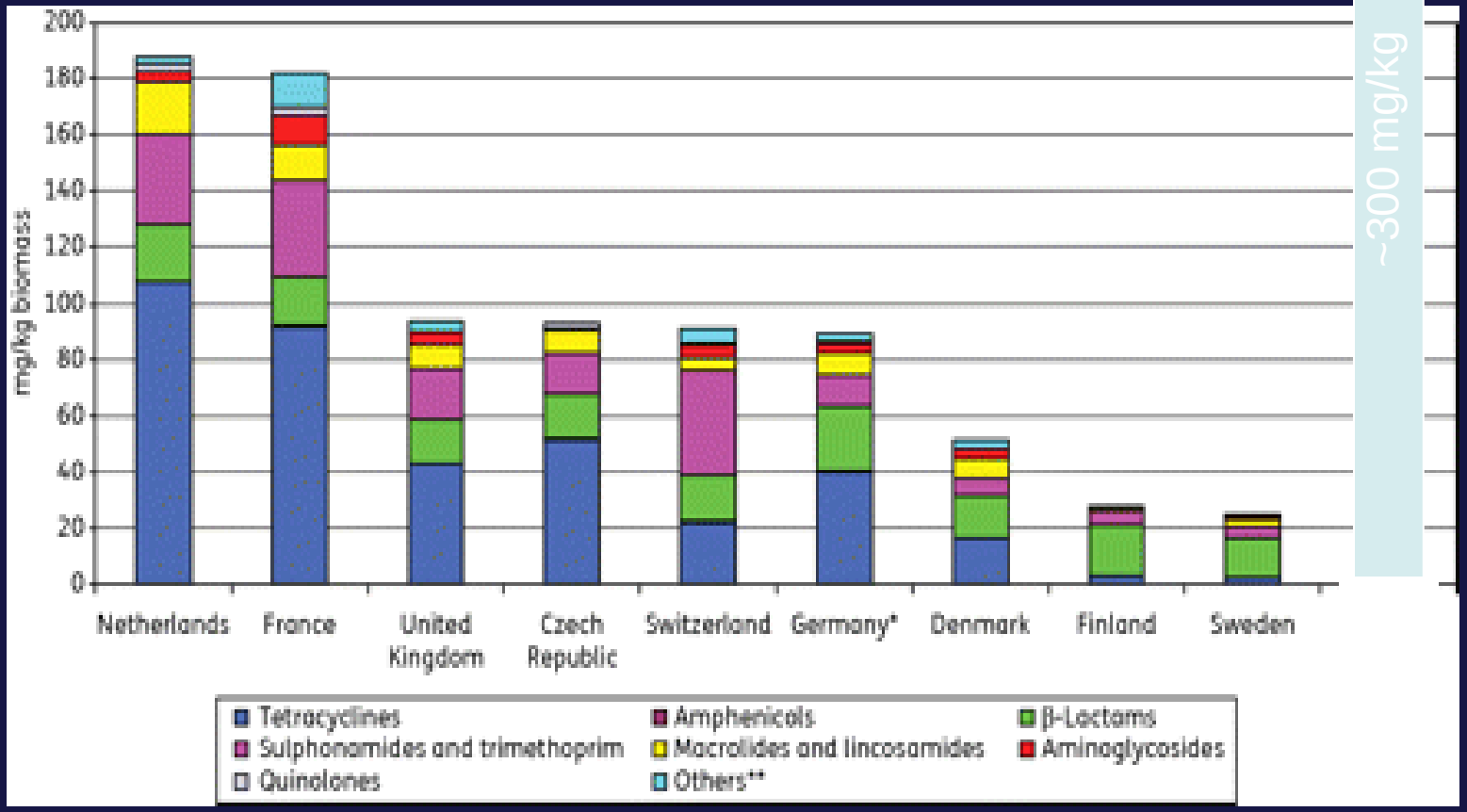
	Killograms	
	Animal	**Human**
Human Only Abx*	0	146,133
Cephalosporins	26,611	496,910
Penicillins	880,163	1,460,421
Sulfas	**371,020**	481,664
Lincosamides	190,101	71,455
Macrolides	**582,836**	164,028
Aminoglycosides	214,895	6,485
Tetracyclines	**5,642,573**	113,832
Ionophores	4,123,259	0
NIR**	1,510,572	

* Lipopeptides, Carbapenems/penems, Oxalozolidinones, Monobactams, Nitroimidazoles, Ketolides

** ***Not Independenttly Recorded.*** Includes more than 348,000 kgs of quinolones, streptogramins and other human antibiotics.

(K Graves 2010) http://jac.oxfordjournals.org/content/65/9/2037.full

Antibiotic use (mg)/ Kg meat produced



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California Endowment

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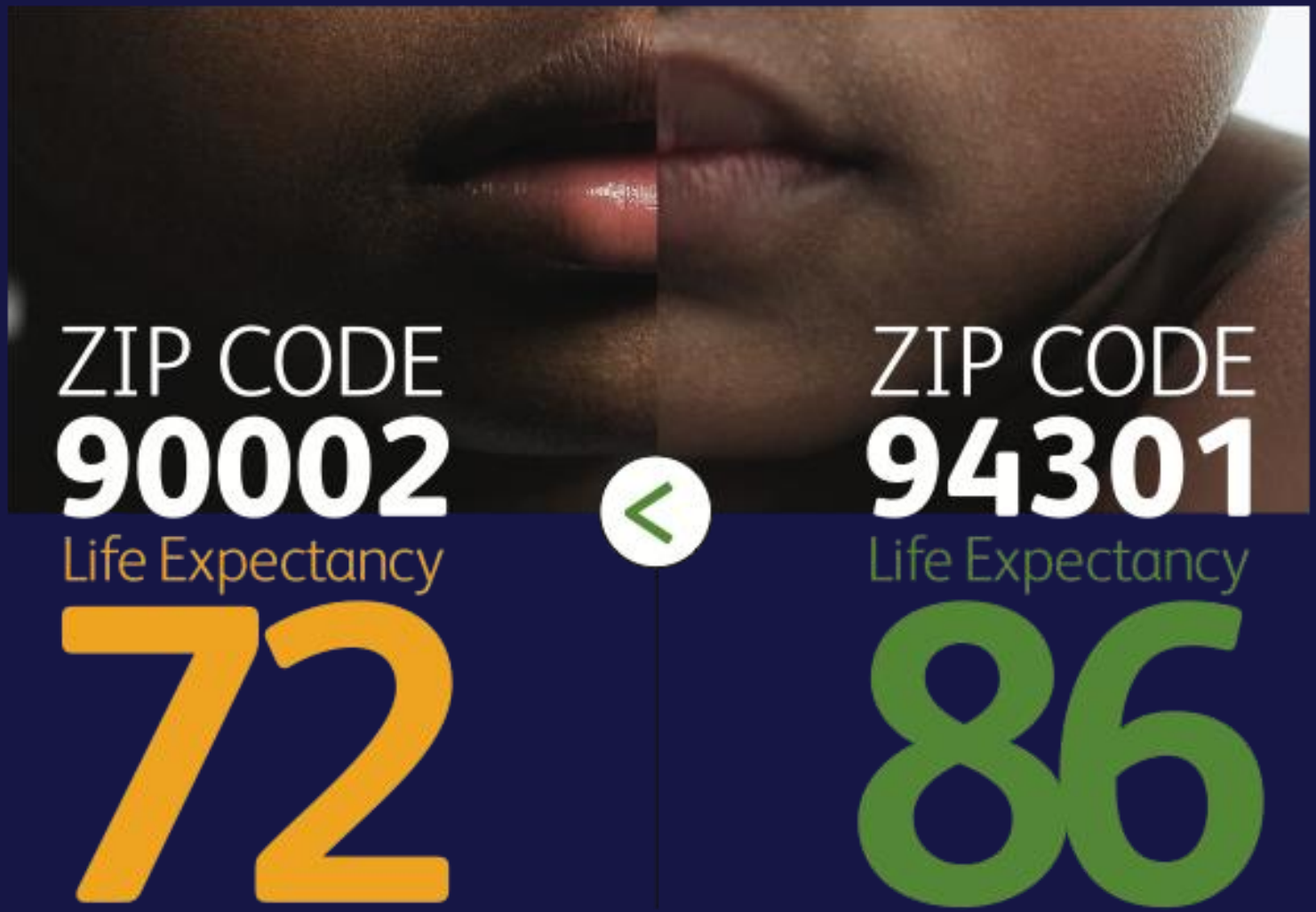
Place matters

Environment matters



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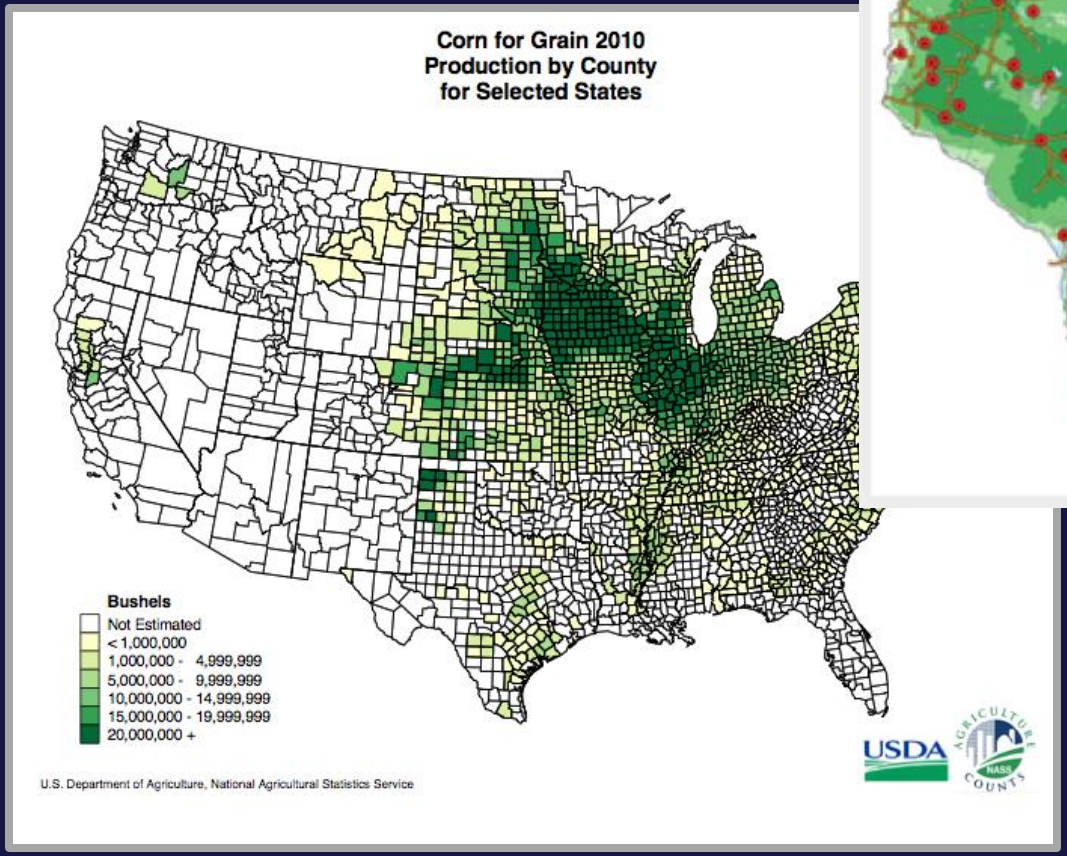
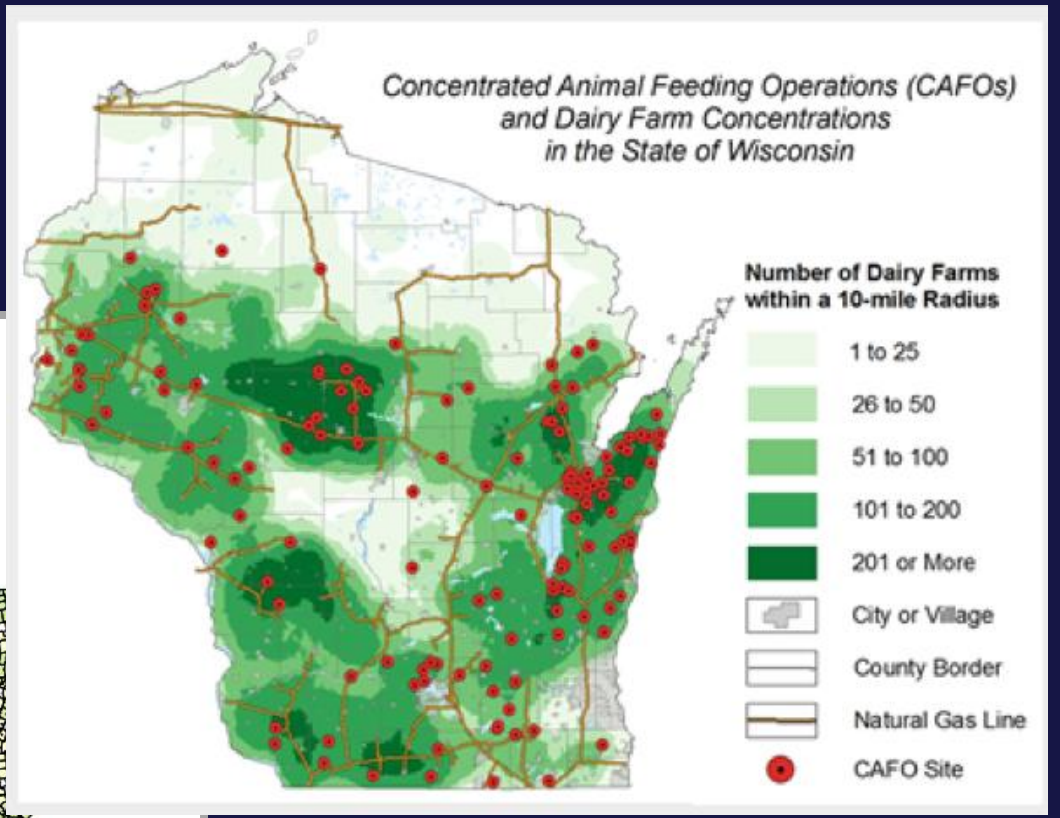
Health happens here, too!





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Industrialized food animal production

Why?

- History
- Research
- Policy
- Globalization

- Farms reduced to factories
- Inputs and outputs
- Disconnect animals, feed, manure

Industrialized food animal production

Inputs
- Feed grains
- Fossil fuels
  - Pesticides
  - Nitrate fertilizers
- Antibiotics, ~~arsenicals~~

Outputs
- Manure
- Nitrates
- Antibiotic residues
- Antibiotic resistant bacteria

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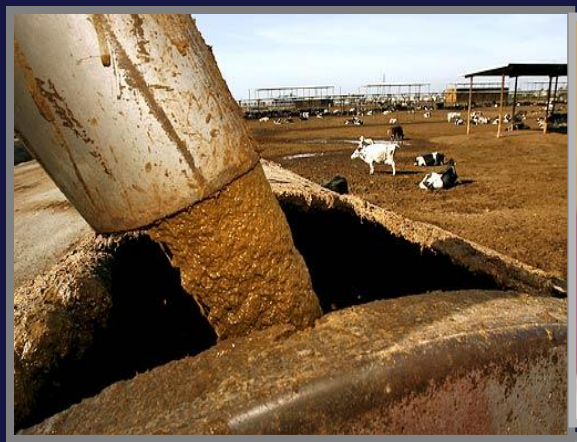
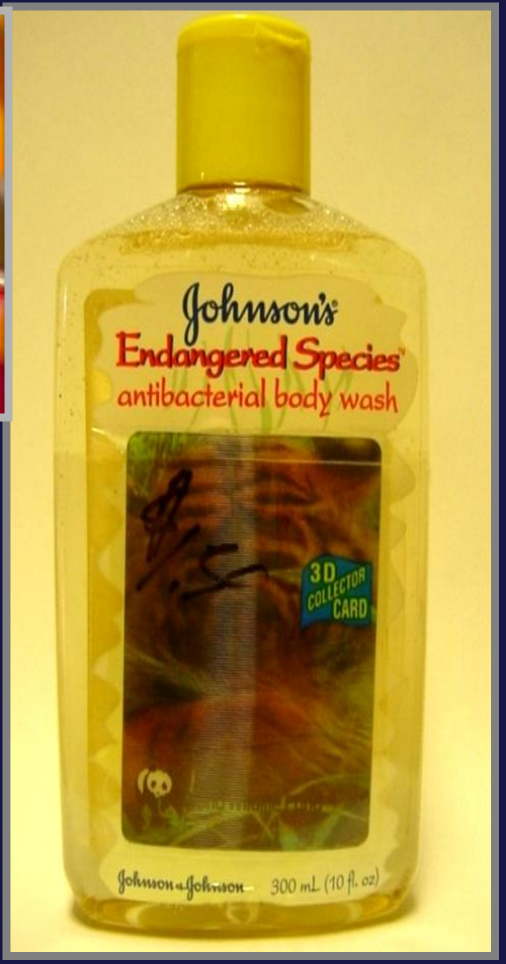
Resistance = Ecological

"We exist in the bacterial world, not bacteria in ours."[1]





[1] Levy 2000. Presentation at the Emerging Infectious Diseases Conference. Available via www.cdc.gov.

Animals get antibiotics and develop resistant bacteria in their guts.

George gets antibiotics and develops resistant bacteria in his gut.

Drug-resistant bacteria can remain on meat from animals. When not handled or cooked properly, the bacteria can spread to humans.

George stays at home and in the general community. Spreads resistant bacteria.

George gets care at a hospital, nursing home or other inpatient care facility.

Resistant germs spread directly to other patients or indirectly on unclean hands of healthcare providers.

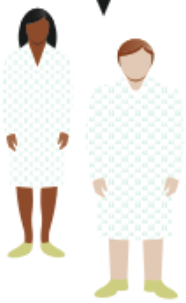
Healthcare Facility

Fertilizer or water containing animal feces and drug-resistant bacteria is used on food crops.

Vegetable Farm

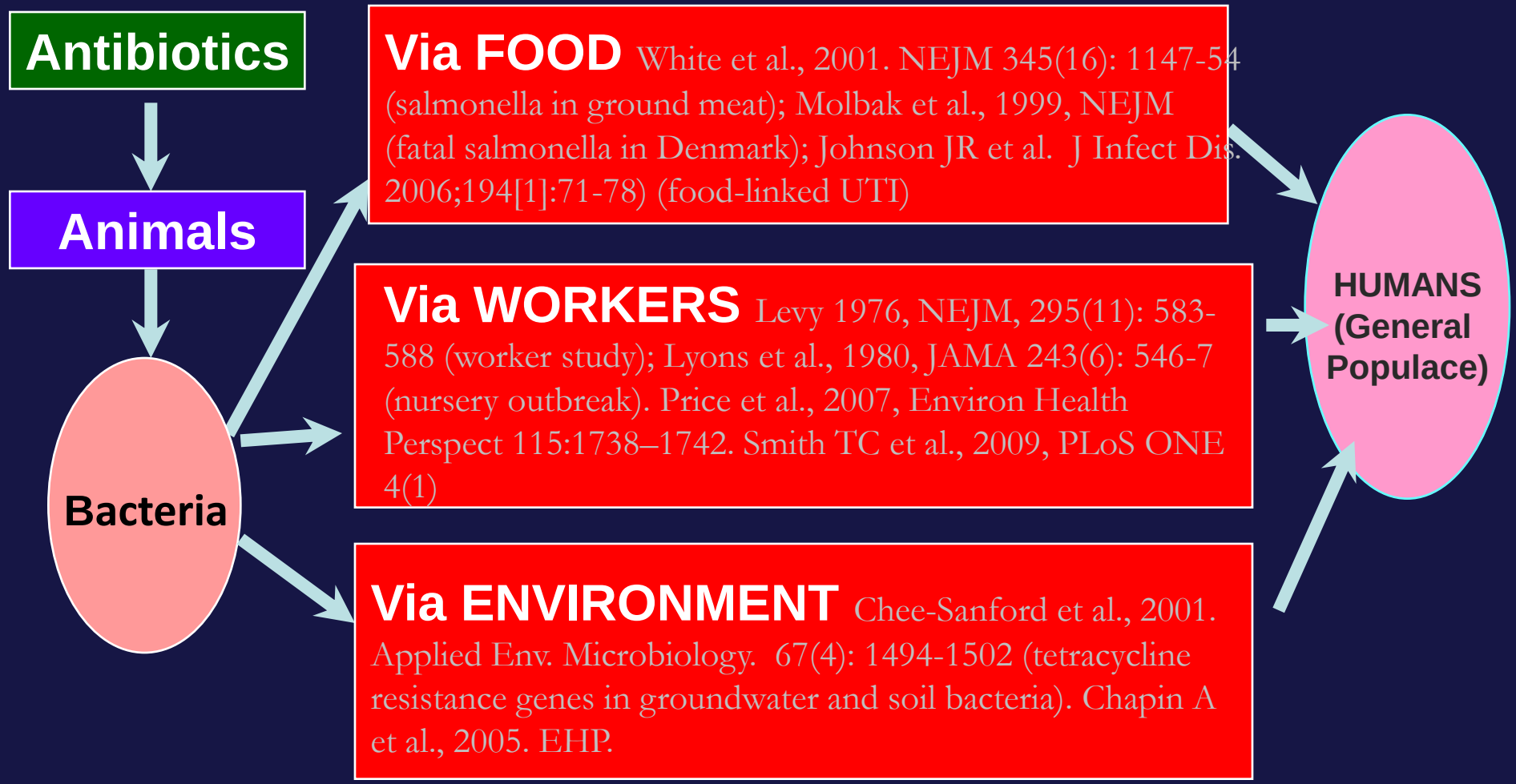
Drug-resistant bacteria in the animal feces can remain on crops and be eaten. These bacteria can remain in the human gut.

Patients go home.



Resistant bacteria spread to other patients from surfaces within the healthcare facility.

Antibiotic use in food animals transmits resistance to people via many routes, including food



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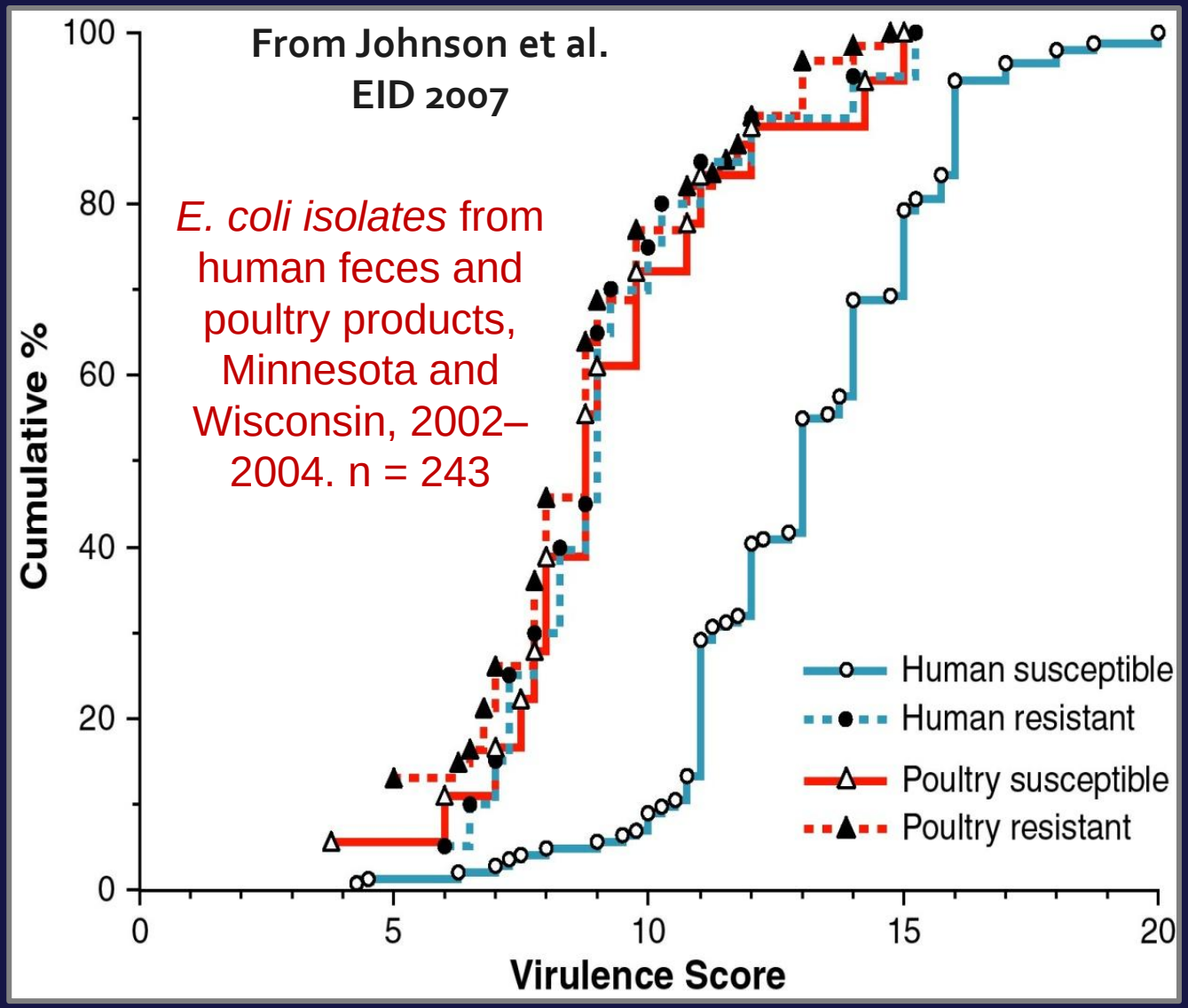
Resistant bugs in MN, WI chicken and people



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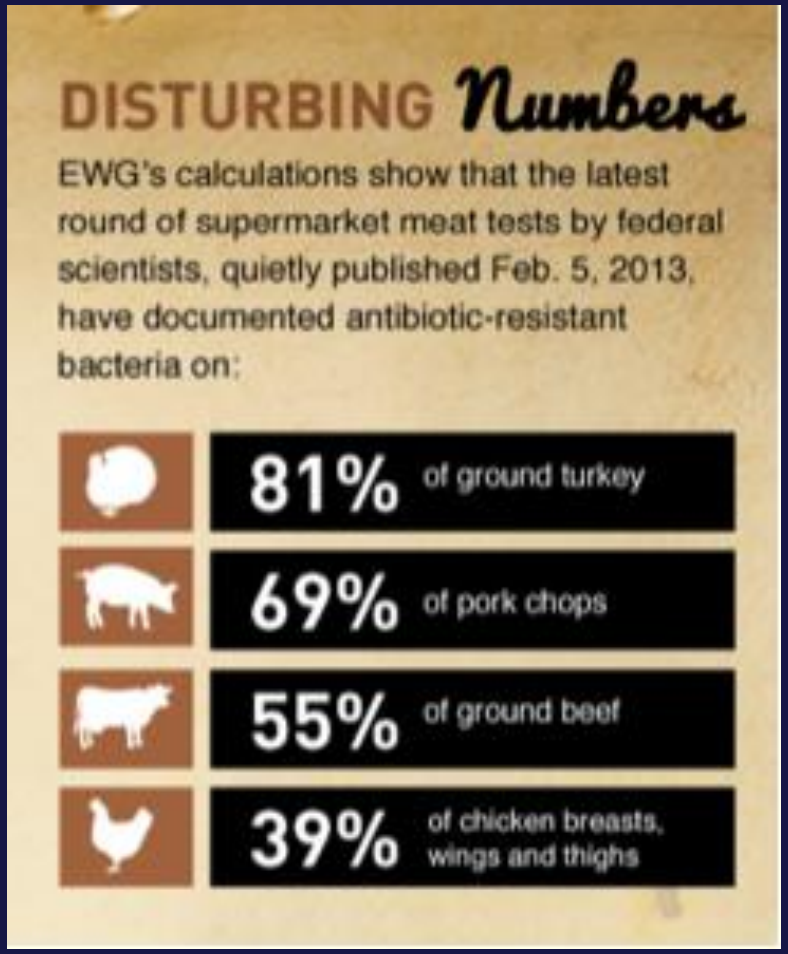
Resistant bugs on meat



NARMS
(National Antimicrobial Resistance Monitoring System)
Feb. 2013

Supermarket meats sampled in 2011 contain significant:

- Resistant Campylobacter
- Resistant Salmonella
- Resistant E coli

Antibiotics in food

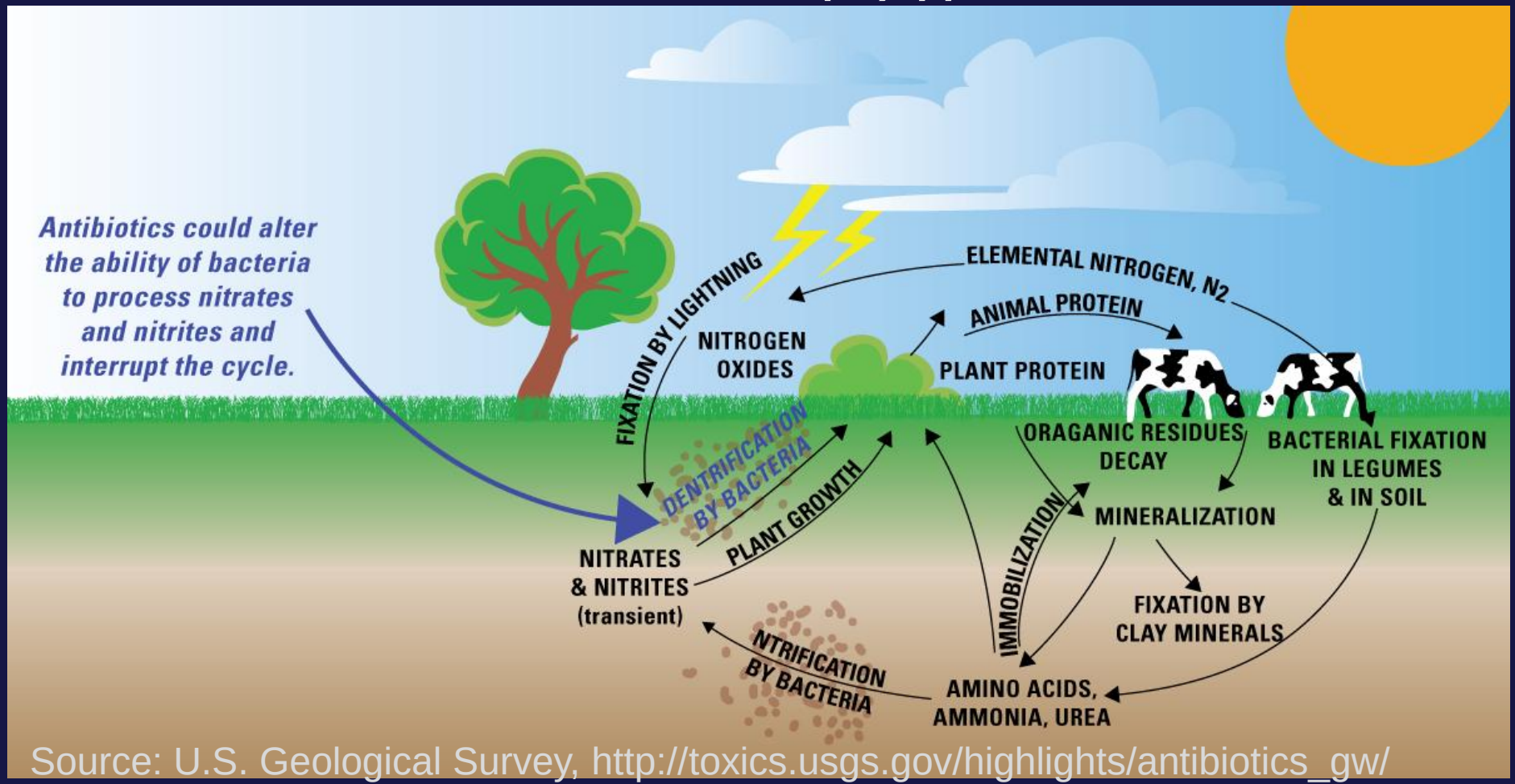
Residues of antibiotics, other veterinary drugs, heavy metals and pesticides from USDA meat samples, from 2010 to end of 2011.

	Name	City	State	Total Violations
1	Ohio Farms Packing Co., Ltd.	Creston	OH	337
4	Green Bay Dressed Beef, LLC	Green Bay	WI	87
7	Cargill Regional Beef	Milwaukee	WI	57
8	VPP Group, LLC	Norwalk	WI	55
14	West Michigan Beef Co. LLC	Hudsonville	MI	30
17	Abbyland Foods, Inc.	Abbotsford	WI	26
22	Long Prairie Packing Co., Inc.	Long Prairie	MN	16
27	Tri-State Beef	Cincinnati	OH	12

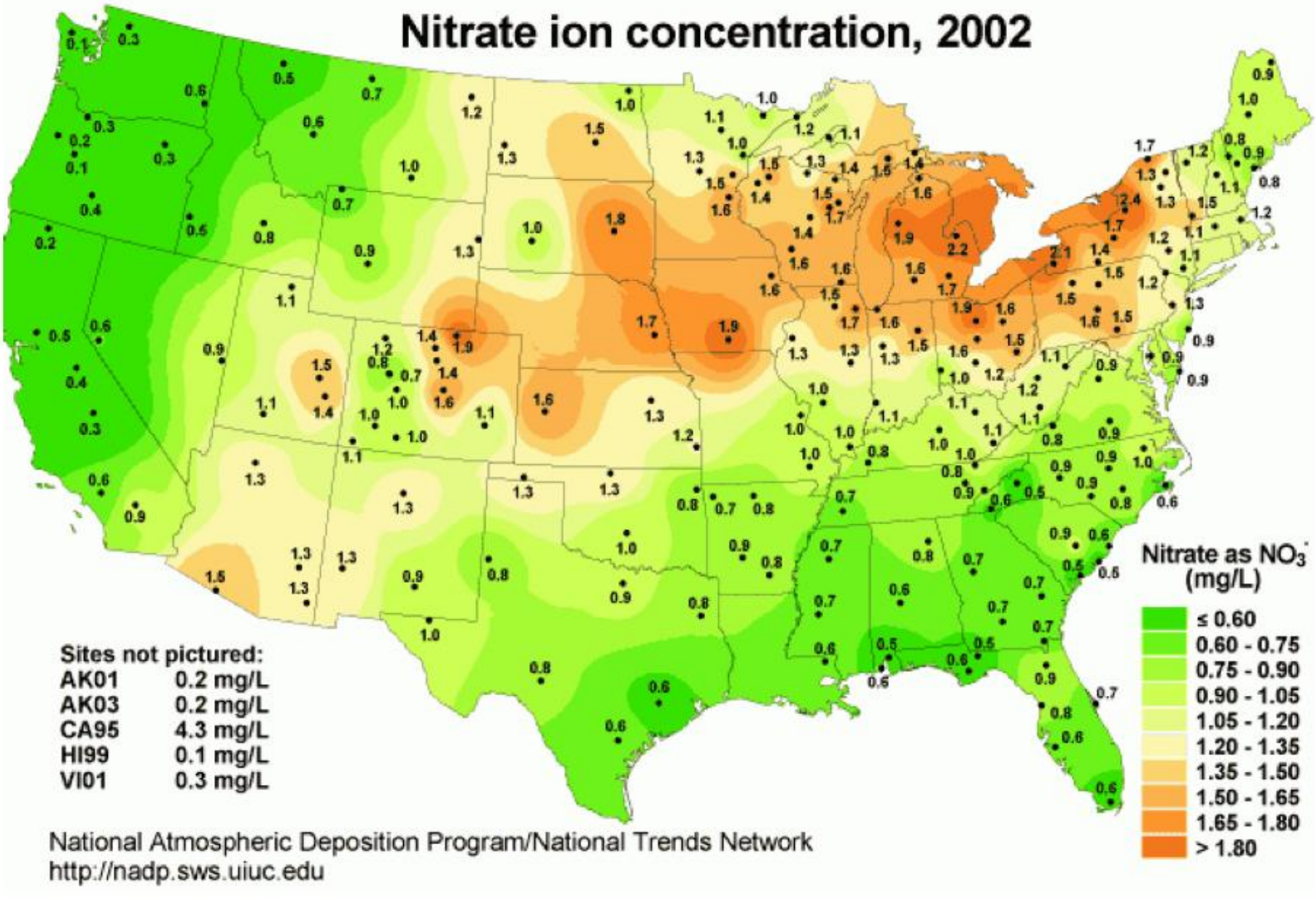
Source: Food and Water Watch, Factory Farm Map, http://www.factoryfarmmap.org/top-residue-violators/

Soil bacteria are part of the microbial ecosystem

Underwood JC et al. ES&T. 2011,, *2011, 45 (7), pp 3096–3101*
Haack SK, et al. ES&T*, 2012, 46 (14), pp 7478–7486*.



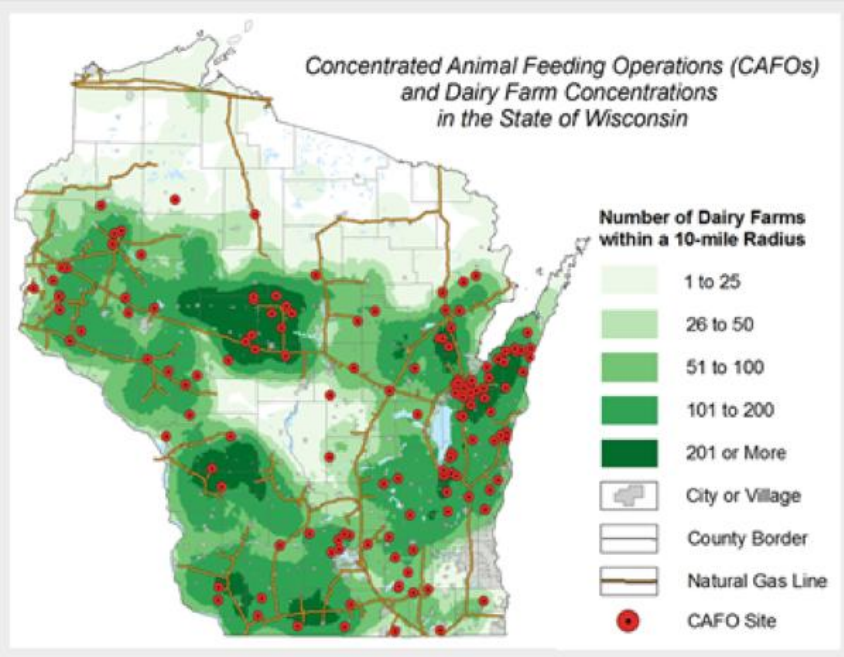
Source: U.S. Geological Survey, http://toxics.usgs.gov/highlights/antibiotics_gw/


Nitrate ion concentration, 2002
Nitrate as NO_3^- (mg/L)
≤ 0.60
0.60 - 0.75
0.75 - 0.90
0.90 - 1.05
1.05 - 1.20
1.20 - 1.35
1.35 - 1.50
1.50 - 1.65
1.65 - 1.80
> 1.80
Sites not pictured:
AK01 0.2 mg/L
AK03 0.2 mg/L
CA95 4.3 mg/L
HI99 0.1 mg/L
VI01 0.3 mg/L
National Atmospheric Deposition Program/National Trends Network
http://nadp.sws.uiuc.edu

Industrialized food animal production

Outputs

- **Manure**
- **Nitrates**
- Antibiotic residues
- Antibiotic resistant bacteria

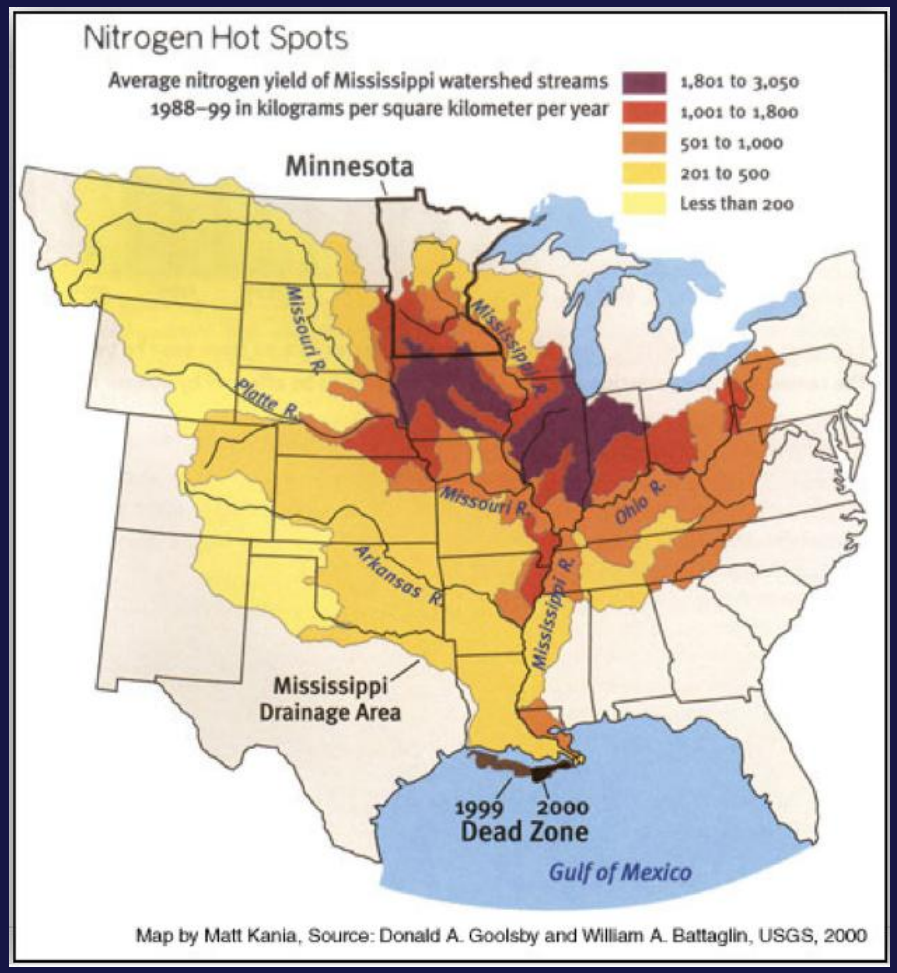


Concentrated manure

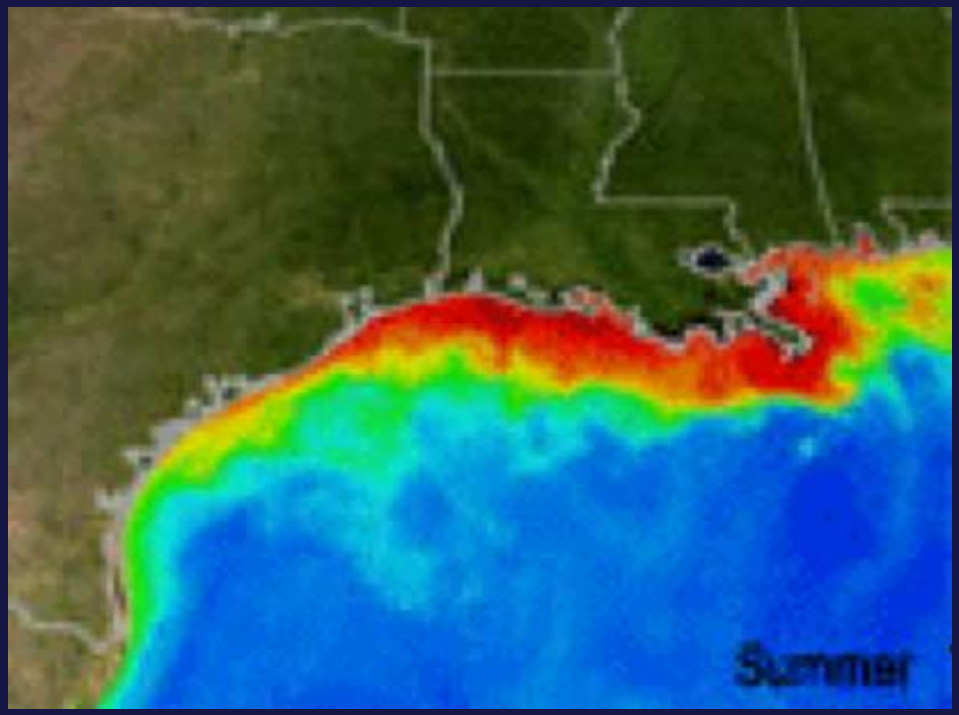
Wisconsin's 257,000 dairy cows, nearly 270,000 hogs, 40,000 beef cattle, 4.9 million broiler chickens, and 3.6 million egg-laying hens on factory farms produce as much untreated manure as 69 million people. (FoodWaterWatch.org)

Potential for:

- Impaired waters
- Pathogens
- Toxic algae
- Other



Reducing on-farm fertilizer use, and manure run-off are essential for shrinking the Dead Zone



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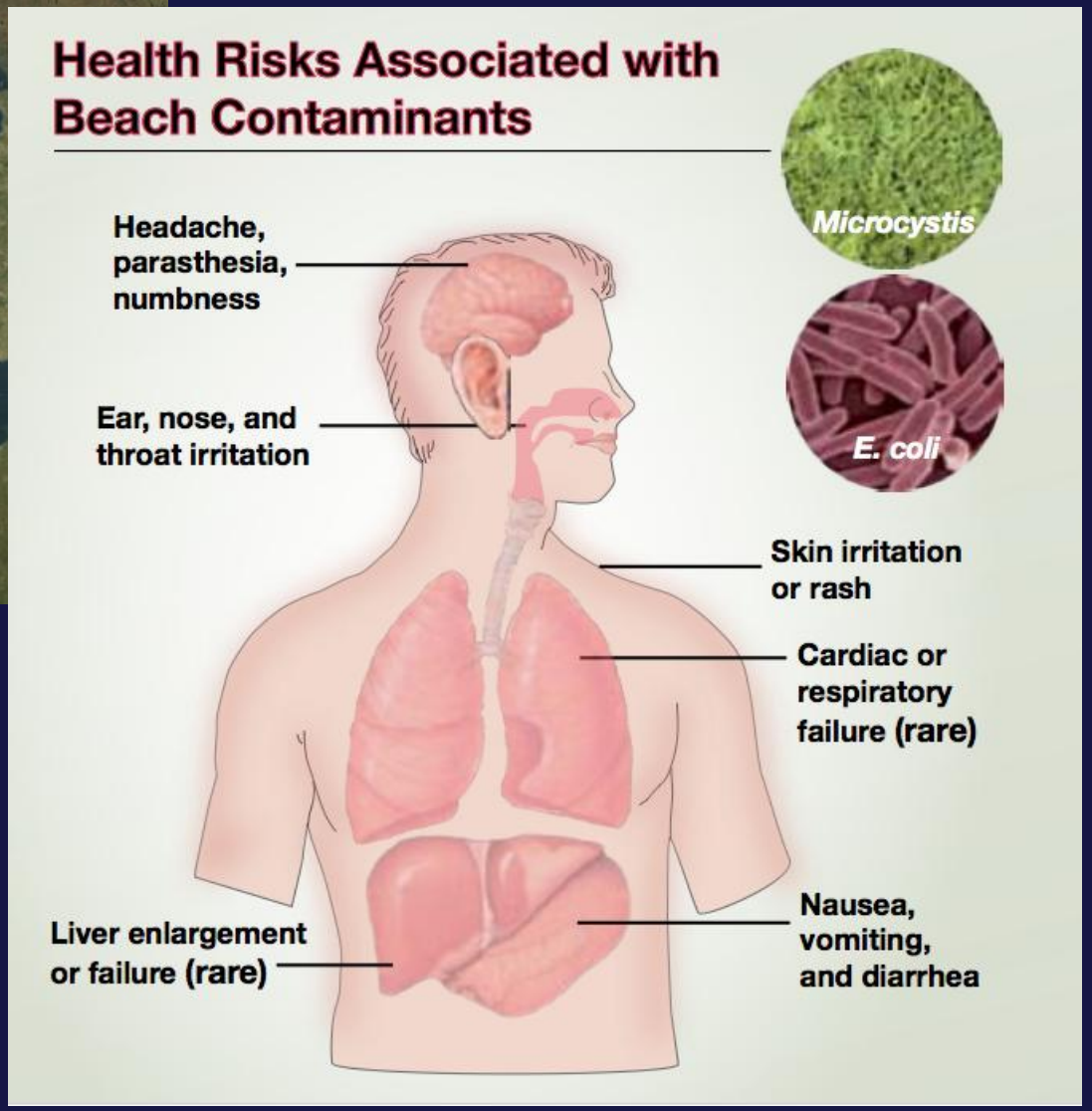
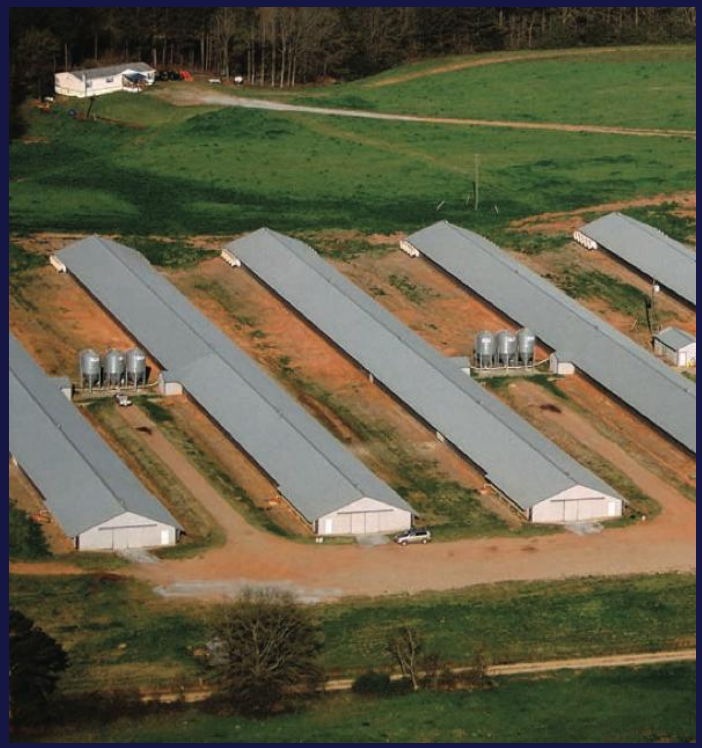
Toxic algae killing Lake Erie



More information:
http://www.glerl.noaa.gov/res/Centers/HABS/habs.html

Water pollution: Out of sight, out of mind?

- No federal agency collects comprehensive data on CAFOs, their size, number or location
- Of CAFOs defined under NPDES, only 41% are permitted
- EPA in Oct 2011 proposed a rule that would have, for the first time, required all CAFOs to submit basic information to EPA including location, permit status, maximum # animals and type. Proposal was dropped in July 2012 under industry pressure.



Food and Water Watch.org, Issue Brief: The EPA's Failure to Track Factory Farms, Aug 2013

Email us:
david@healthyfoodaction.org
rachel@healthyfoodaction.org

On Facebook
or Twitter: @HFAction
@Food__Dr

Join us at HealthyFoodAction.org

For more depth…

Join us in **this Saturday**, in Sturgeon Bay

David Wallinga, MD, MPA, is Director of **Healthy Food Action**. He thinks about food, health and farming using a systems, or ecological, lens. For 13 years, he's also been the physician steering committee member of **Keep Antibiotics Working: the Campaign to End Antibiotic Overuse**. Dr. Wallinga descends from stubborn Dutch farmers in Iowa and Michigan. His medical degree is from the University of Minnesota Medical School.

Tarah Heinzen is a Concentrated Animal Feeding Operation (CAFO) Law Fellow at the Environmental Integrity Project. She graduated cum laude from Lewis & Clark Law School in 2009, where her three woman team won the National Environmental Moot Court Competition. She graduated cum laude from Macalester College in 2003, with a BA in Environmental Studies and Geology.

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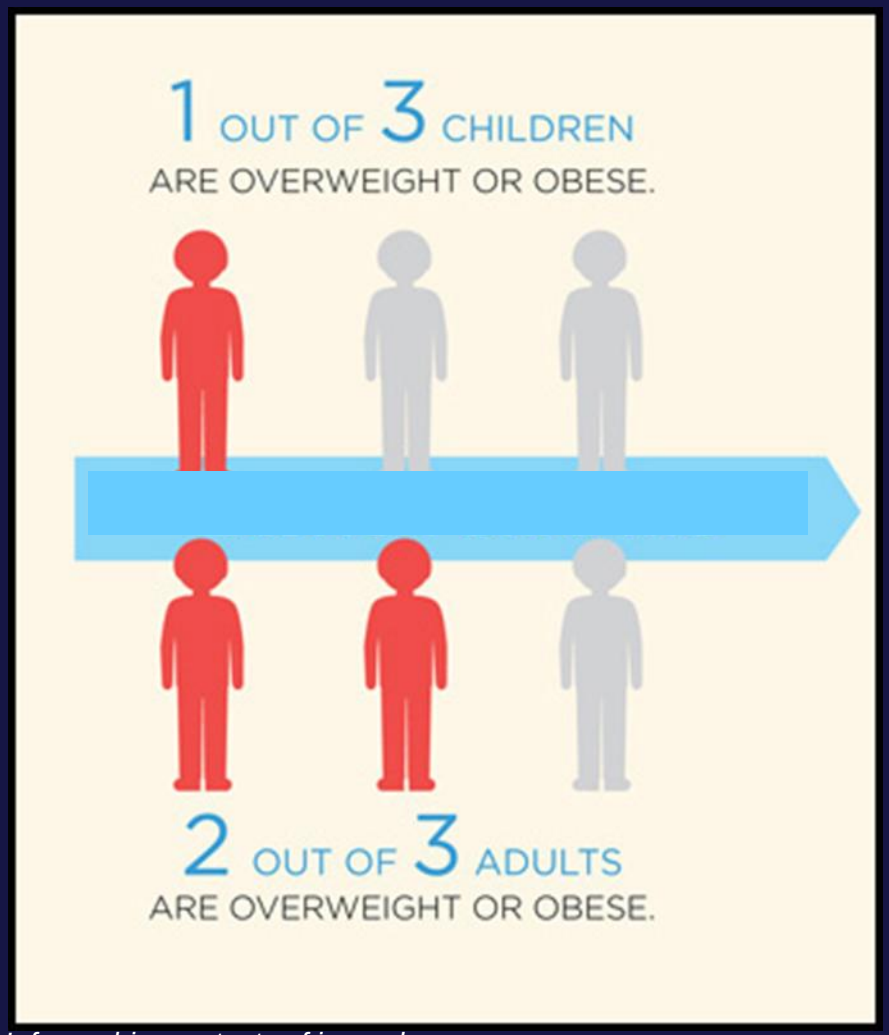
A health system in crisis



Infographic courtesty of iom.edu

Epidemic obesity

- ✓ Heart disease, diabetes, stroke, cancer are 4/6 top causes of death, disease
- ✓ $190B for treatment

Epidemics of antibiotic-resistant infections

- ✓ Over 900,000 infections per year, conservatively
- ✓ Costing society $26-35 billion

Much of it food related

Unhealthy behaviors

Unhealthy food systems / environments

- Wallinga D. Today's Food System: How Healthy Is It? **JHEN**, 2009: 4:251-81
- Story M, Hamm MW, Wallinga D, eds. Food Systems and Public Health: Linkages to Achieve Healthier Diets and Healthier Communities (suppl) **Journal of Hunger & Environmental Nutrition,** 2009;e 4 (3 & 4)
- Wallinga D et al. "Considering the Contribution of US Agricultural Policy to the Obesity Epidemic: Overview and Opportunities." ***Journal of Hunger & Environmental Nutrition***. 2009. 4(1):3-19;
- Wallinga D. Agricultural Policy and Childhood Obesity. ***Health Affairs*** 2010; 29(3): 404-9





Consumption

Access

Production

Distribution / Marketing

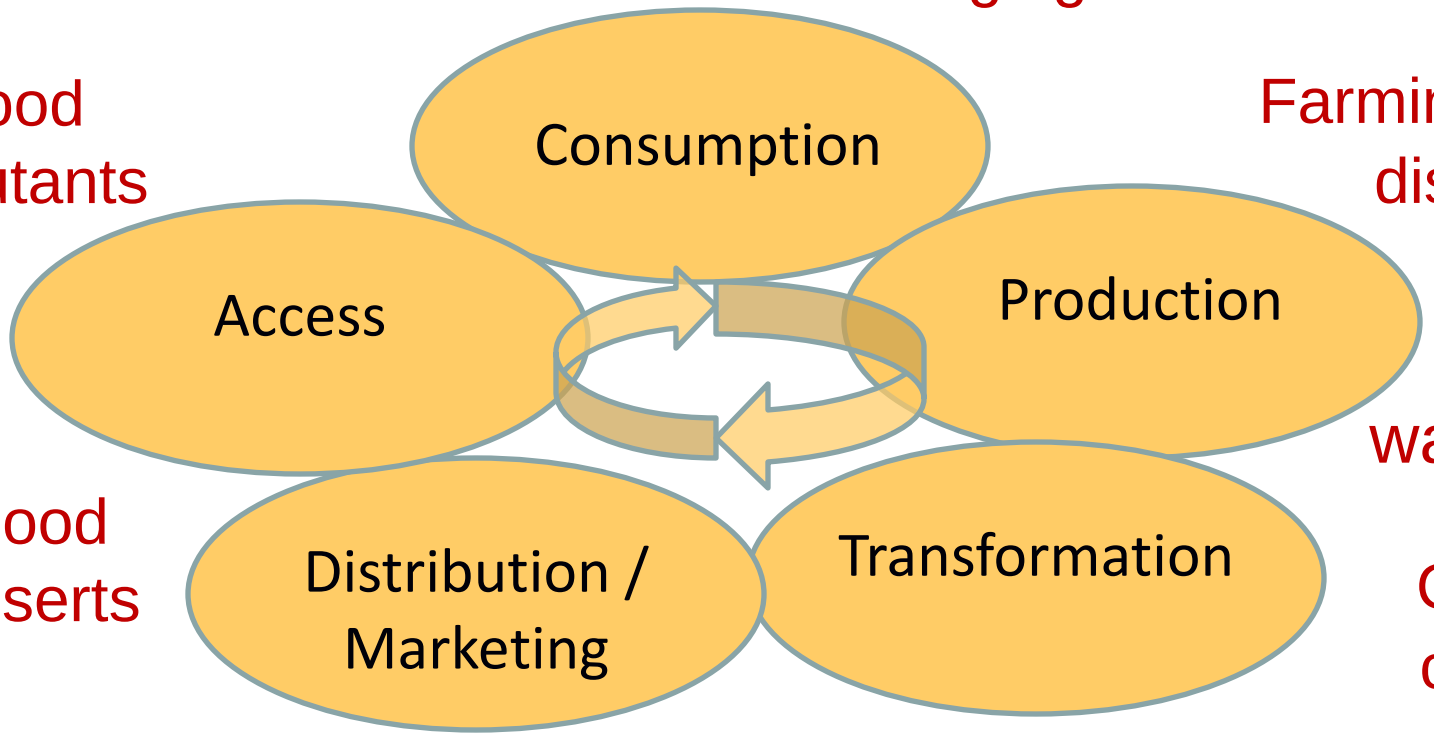
Transformation




The “food system”

HealthyFoodA

Dia-besity



Food outbreaks

Aging farmers

Food pollutants

Farming-related disease

Poor water quality

Food deserts

Climate change

Plastic packaging

Waning community vitality

Scarce rural jobs

Unlivable wages

Fracking

Industrialization = From farms….

- Closed system
- Pastoral
- Diverse
- Local-scale

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Industrialization = From farms to factories

"Industrial agriculture views the farm as a factory with 'inputs' (such as pesticides, feed, fertilizer, and fuel) and 'outputs' (corn, chickens, and so forth).

Union of Concerned Scientists

Public health references: *Horrigan et al. 2002. EHP; Walker et al. 2005. Public Health Nutrition; Lang and Heasman. Food Wars. 2004. Naylor et al. 2005. Science.*

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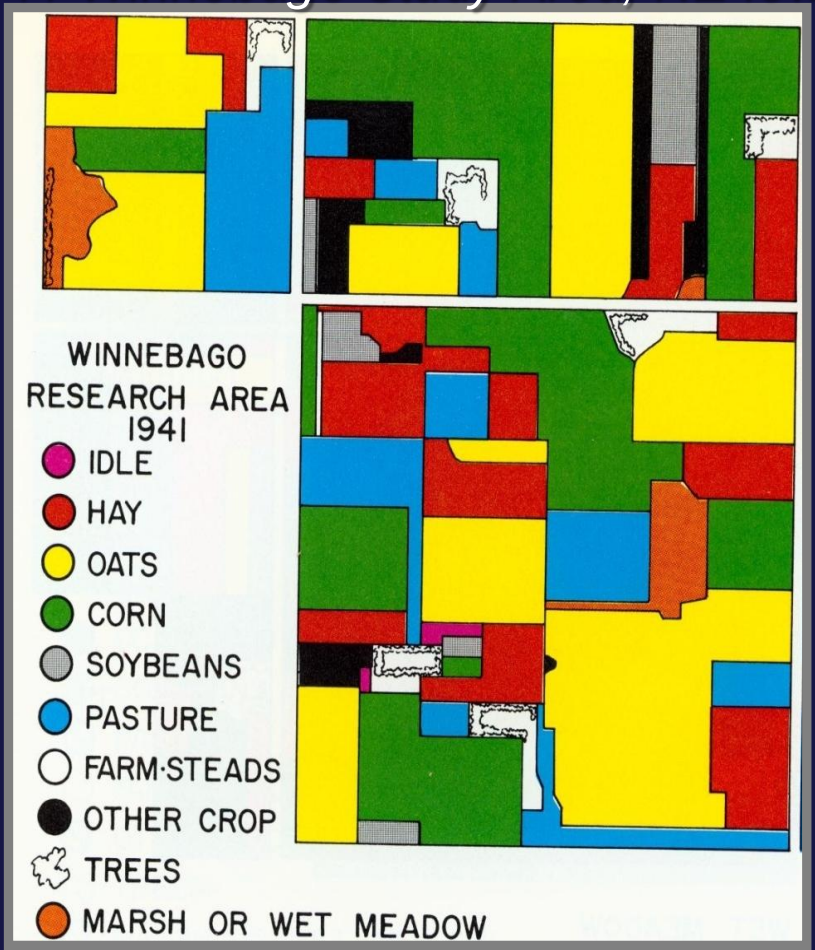
Industrialization

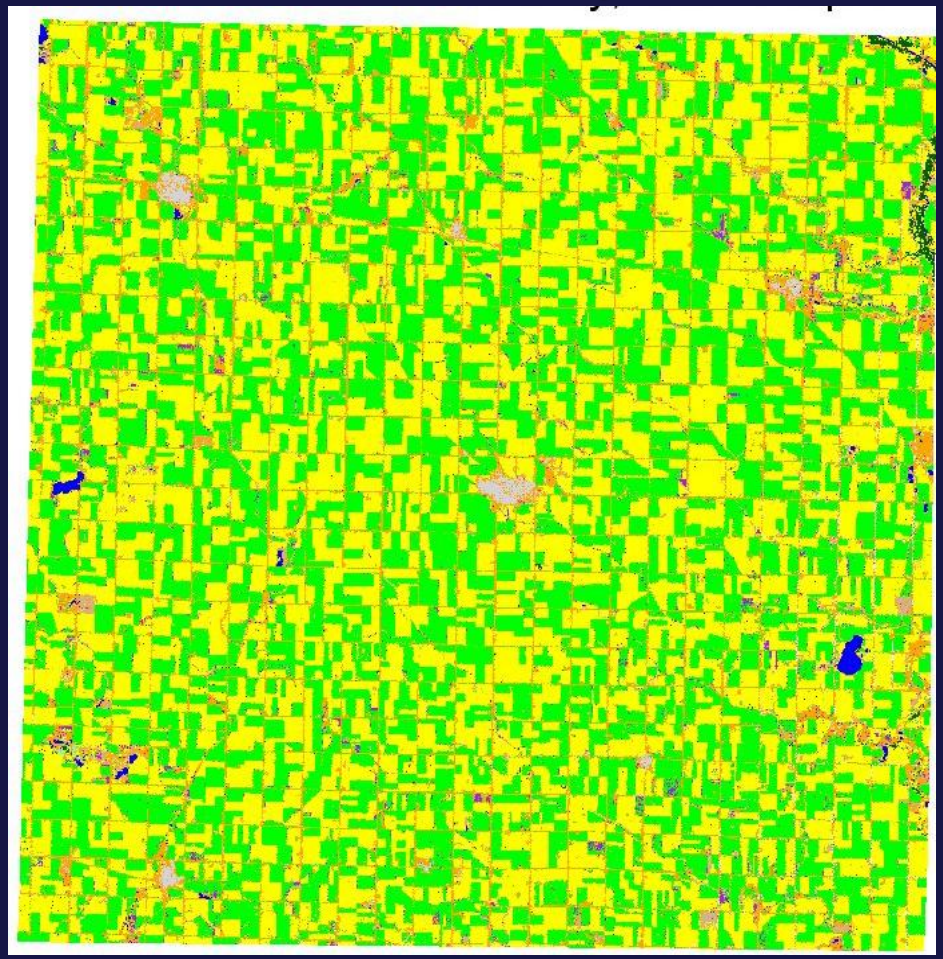
Specialization, scale → **Concentration, less diversity at farm level**

1941 Winnebago Study Area, NE Iowa

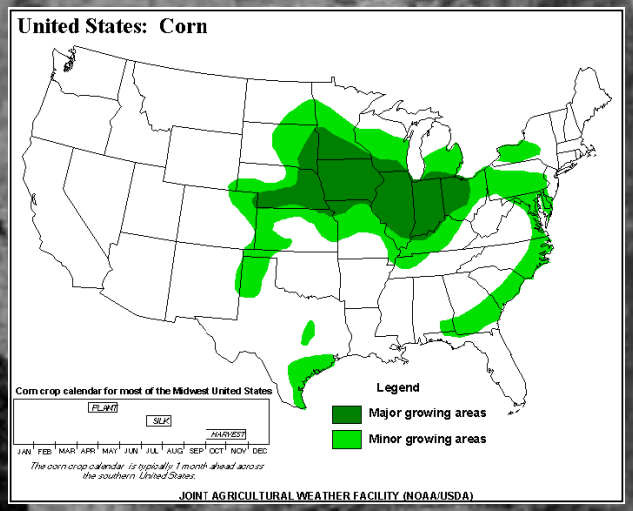


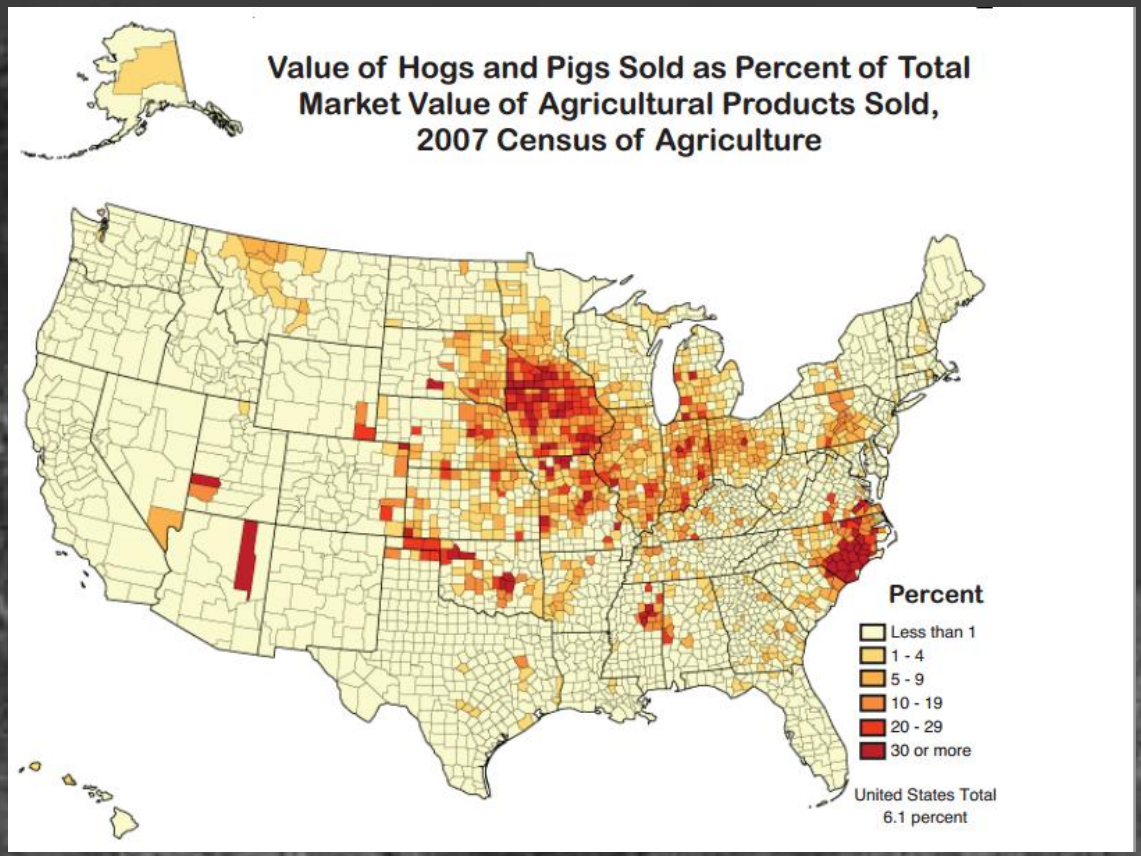
Fischer WA 1974. ISU Library, Ames

2004, Pocohontas County, Iowa



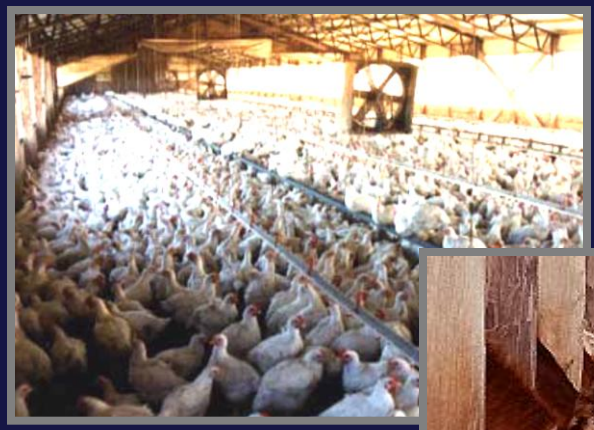
Specialization ⟶ Concentrated production, waste





USDA 2007 Ag Census Maps, http://www.agcensus.usda.gov/

Specialization ⟶ Grains inputs, intensive confined production



Drivers of industrialization

Technology + *Faulty Price Signals* + *Policies*

New breeds, tile drains

Mechanization)

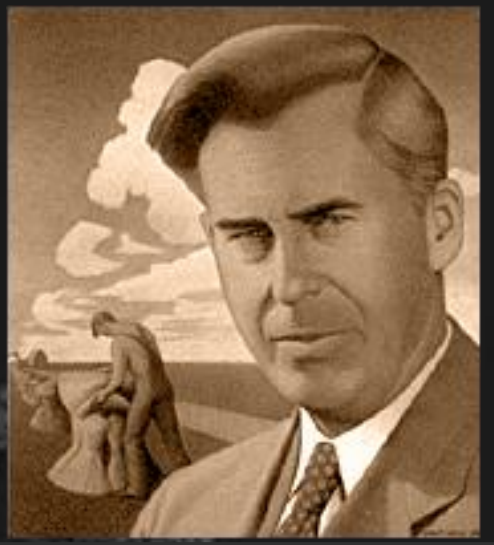
Synthetic chemical inputs

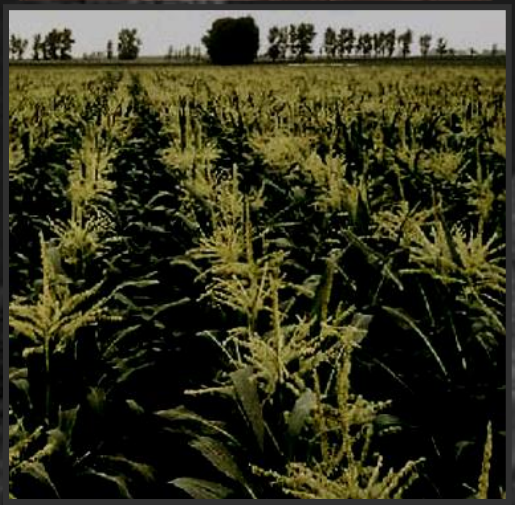
Transport revolution

Focus on production

Regardless of price, commodity farmers will try and grow more and more

Ag policy pre-1974: **Manage oversupply, price volatility**





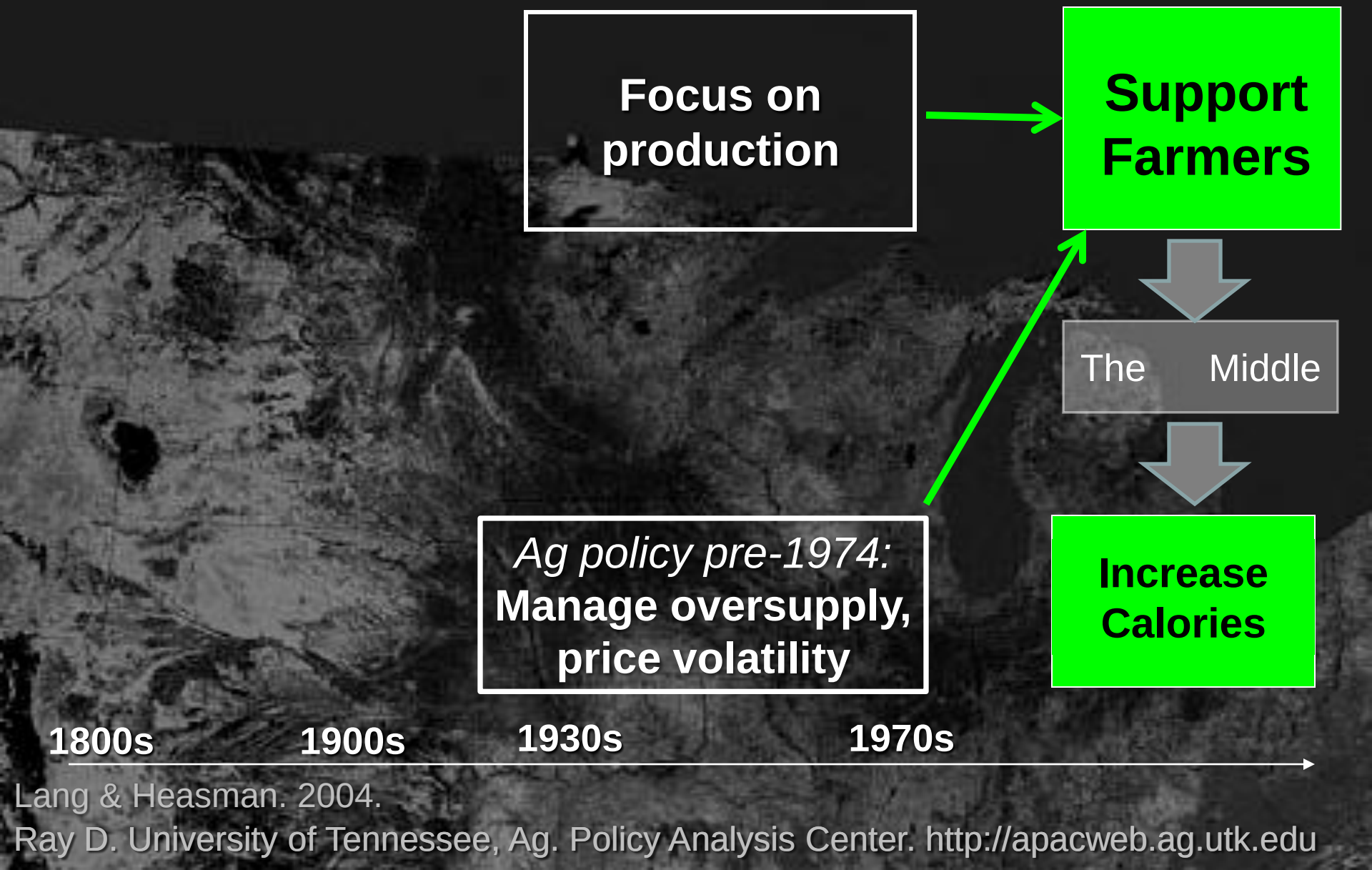
1800s **1900s** **1930s** **1970s**

Lang & Heasman. 2004.

Ray D. University of Tennessee, Ag. Policy Analysis Center. http://apacweb.ag.utk.edu

A historical perspective

Goals for U.S. food production

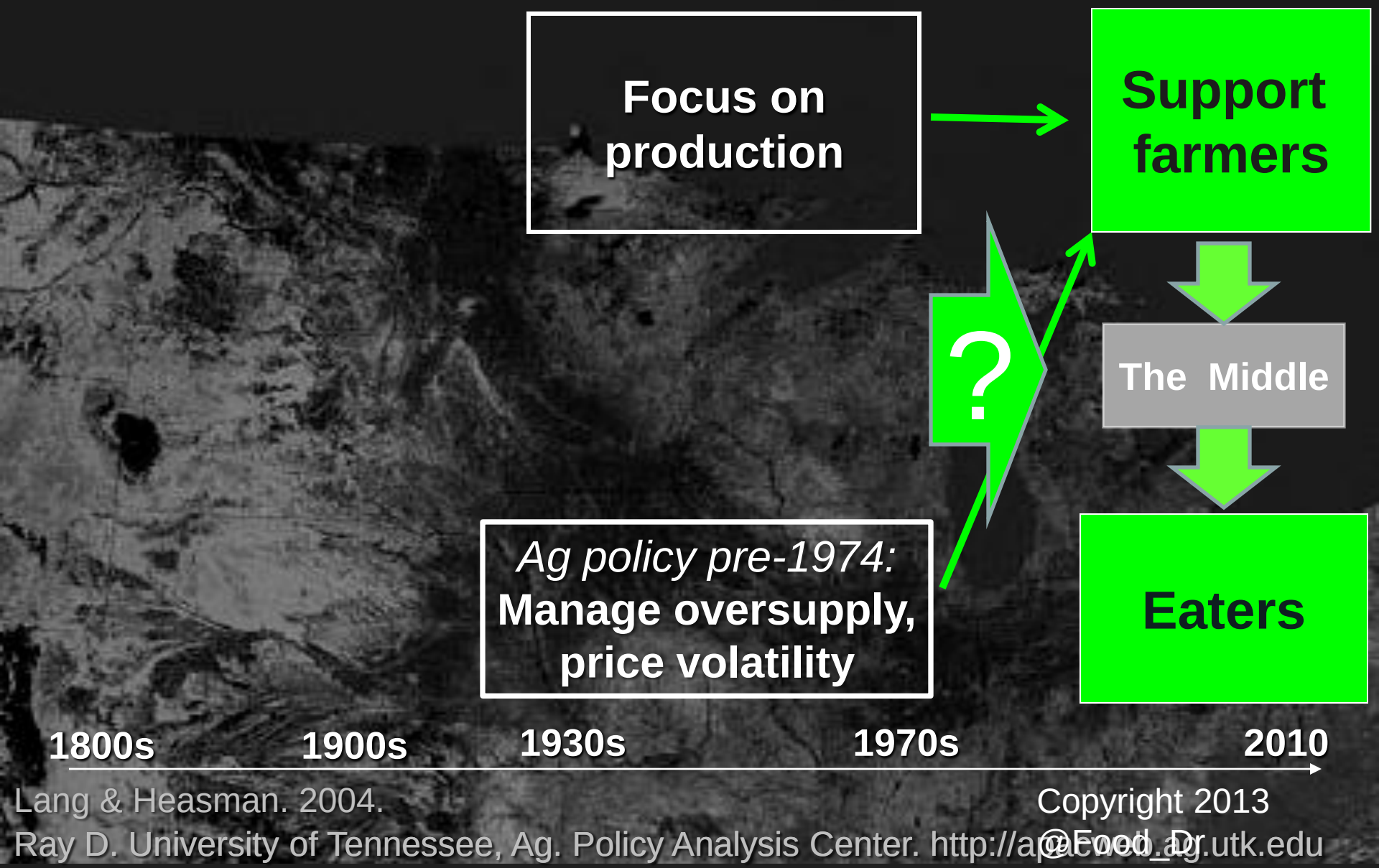


Lang & Heasman. 2004.

Ray D. University of Tennessee, Ag. Policy Analysis Center. http://apacweb.ag.utk.edu

Changing paradigms

A "cheap food" policy. How successful?

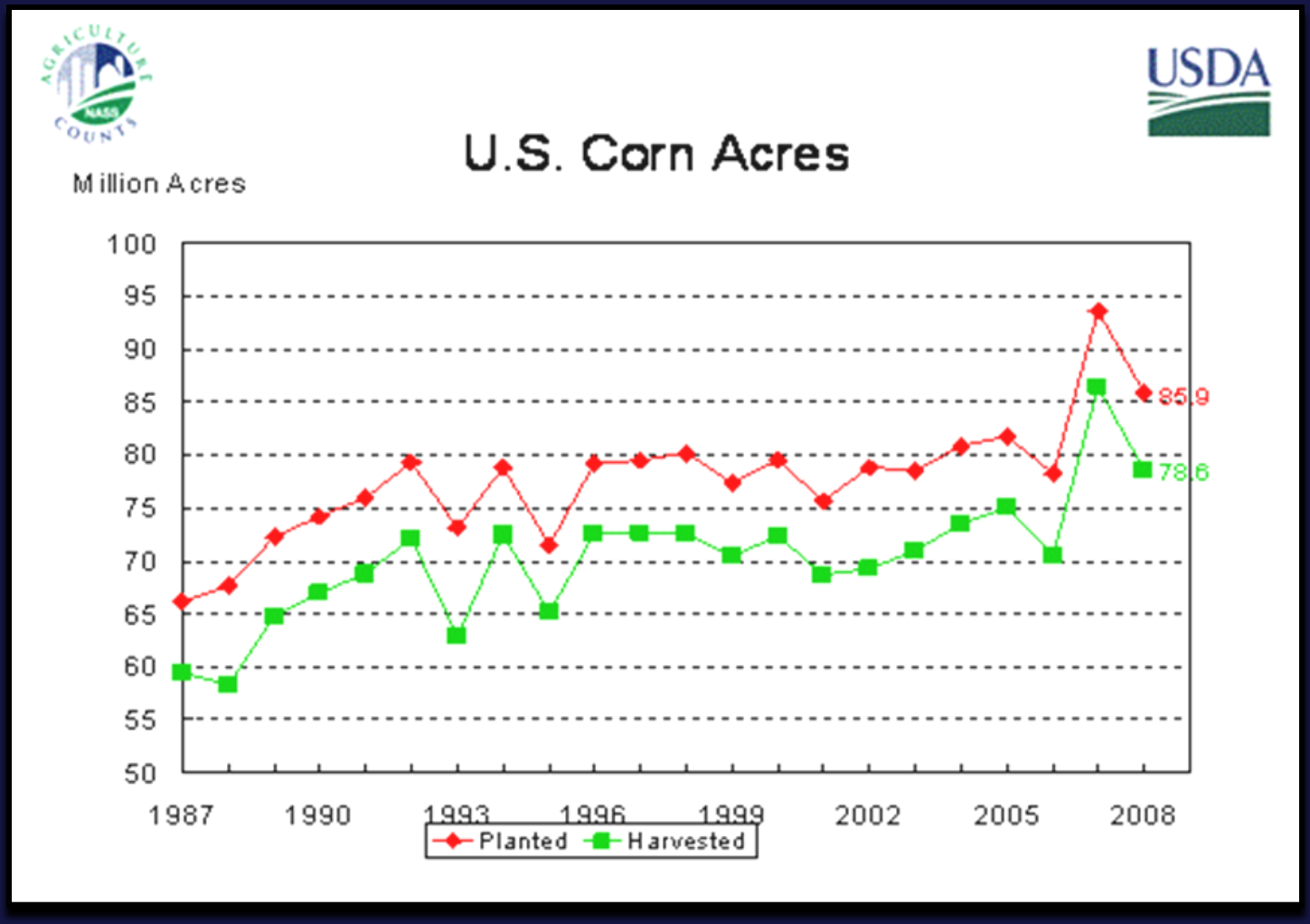


Lang & Heasman. 2004.

Ray D. University of Tennessee, Ag. Policy Analysis Center. http://apacweb.ag.utk.edu

How successful?

Superabundant corn, soybeans



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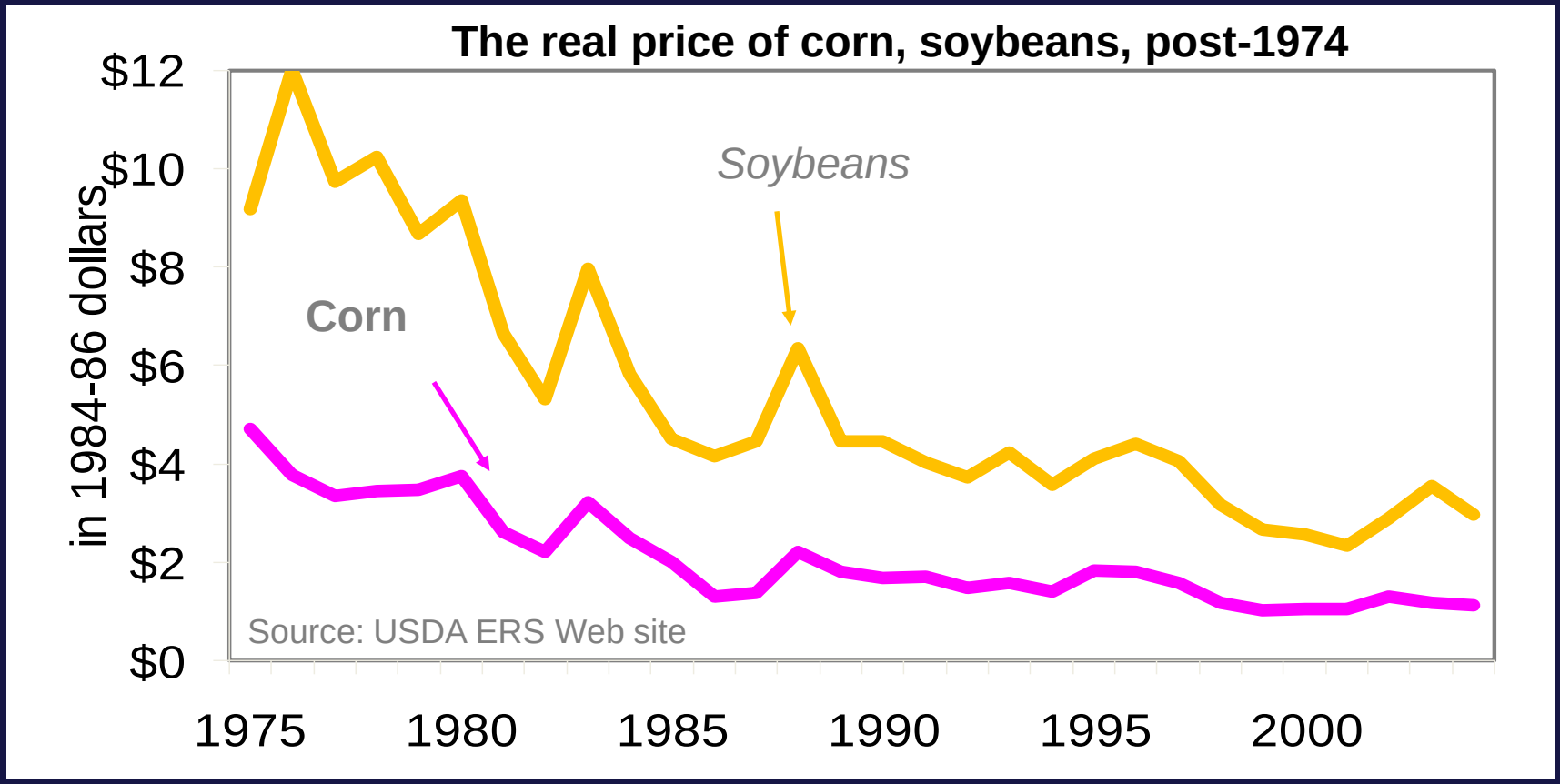
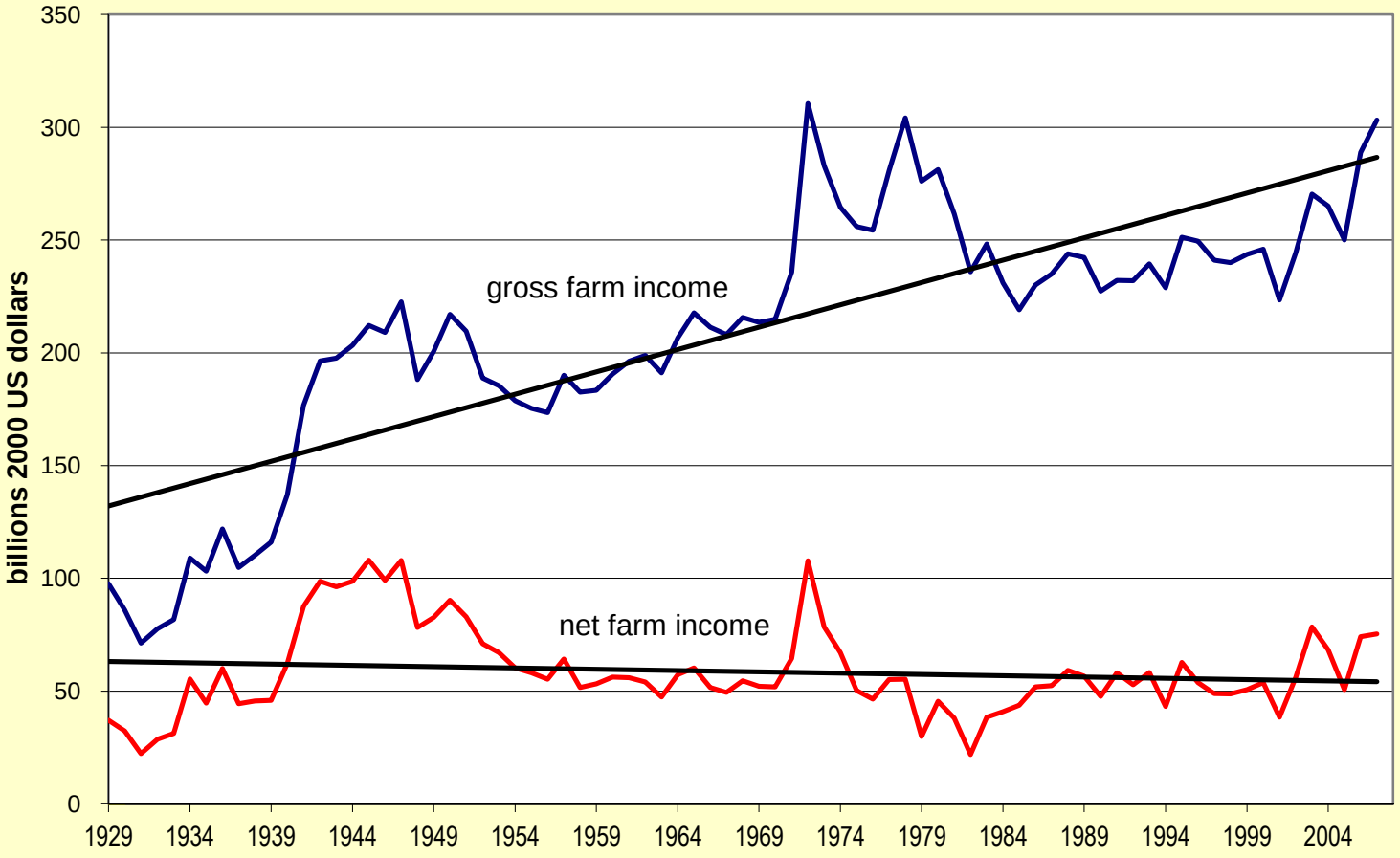
How successful?

Superabundant, "*low-priced*" corn, soybeans



Stagnant or declining real farm income



Source: ERS/USDA, Farm Income and Balance Sheet Indicators, 1929-2008

How successful? How cheap?

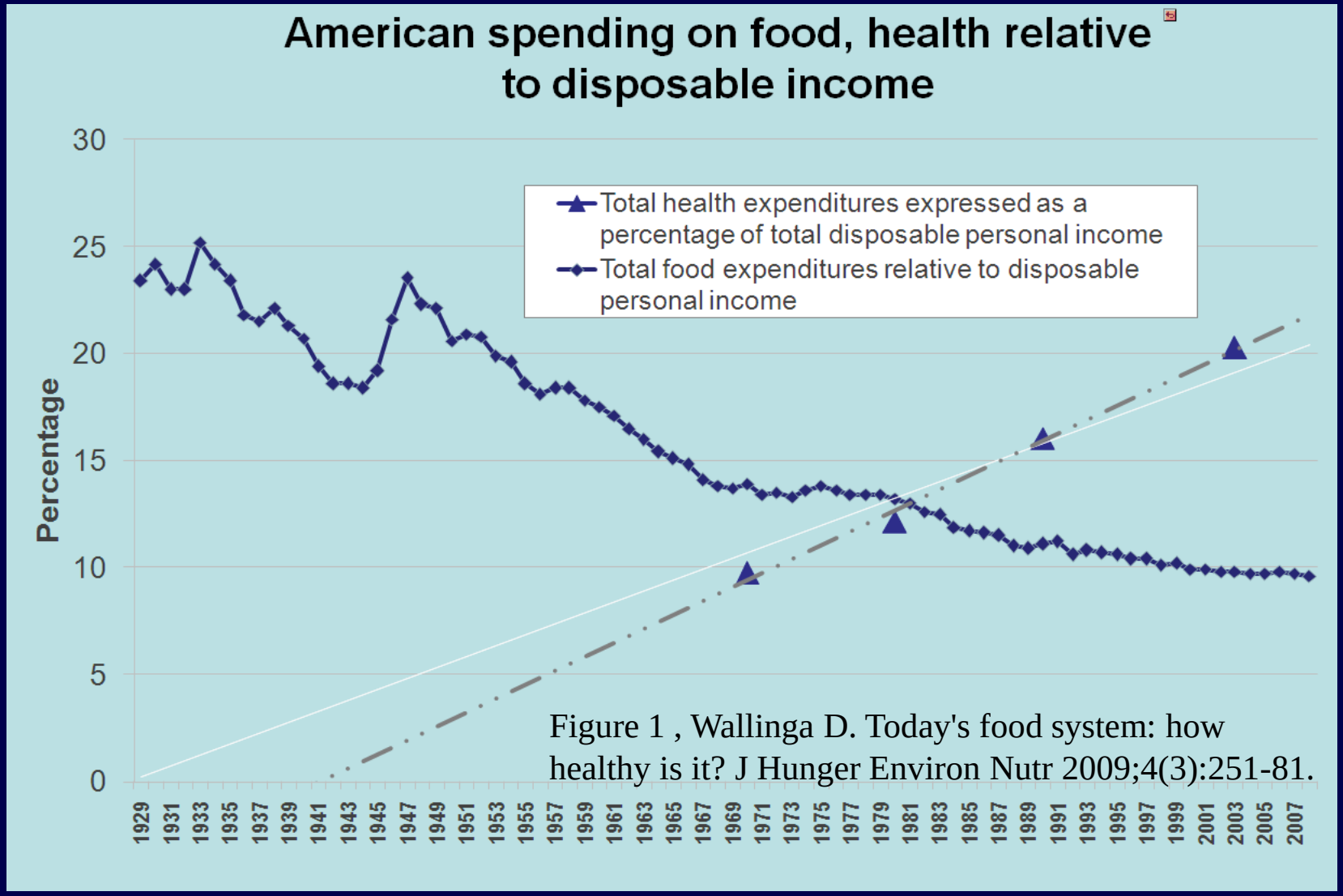


Figure 1 , Wallinga D. Today's food system: how healthy is it? J Hunger Environ Nutr 2009;4(3):251-81.

Industrialized agriculture

Farms as factories, with inputs and outputs

Focus on production

Intensive inputs

Water

Fertilizers

Pesticides

Antibiotics

Calorie output

Corn, soybeans

meat, manure

Air, food outputs

- Carbon, nitrates, methane
- Climate change
- Multidrug resistant foodborne bacteria

Sources: Horrigan et al. 2002.Env Health Perspect; Walker et al. 2005. Public Health Nutrition; Lang and Heasman. Food Wars 2004. Naylor et al. 2005. Science

Industrialized agriculture
Farms as factories

Focus on production

Healthy?

Other externalities

- Loss of diversity
- "Nutrient" runoff
- Impaired waters → Dead zones, fish kills

Sources: Horrigan et al. 2002.Env Health Perspect; Walker et al. 2005. Public Health Nutrition; Lang and Heasman. Food Wars 2004. Naylor et al. 2005. Science

Industrialized food systems

Focus on production

Healthy?

Calorie output

A “default” environment of bountiful, relatively low- priced, ultra-processed unhealthy (calorie rich, nutrient poor) convenience foods

Wallinga D. Agricultural Policy and Childhood Obesity. ***Health Affairs*** 2010; 29(3): 404-9

Drenowski & Spencer. 2004. AJCN; Darmon et al. 2004. Public Health Nutrition; Monsivais P, Drewnowski A. 2007

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Looking closer

Public health impacts

Focus on production

Intensive inputs
Water
Fertilizers
Pesticides
Antibiotics

- Nearly 30 million lbs of abx used in animal ag each year (vs 7.7 mill.)
- 60% are medically important
- 90% are added to feed or water

"To be clear, the Centers for Disease Control and Prevention (CDC) finds that there is a compelling body of evidence"… "to establish a clear link between antibiotic use in animals and antibiotic resistance in humans." **Thomas Frieden, MD,** MPH, Director, Centers for Disease Control, **7/13/2010**

" [T]the overall weight of evidence to date links antibiotic use in food animals with antibiotic resistance in humans." **Dr. Hugh Auchincloss,** National Institute of Allergy and Infectious Disease, **8/30/2010**

Sources: Horrigan et al. 2002.Env Health Perspect; Walker et al. 2005. Public Health Nutrition; Lang and Heasman. Food Wars 2004. Naylor et al. 2005. Science

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Looking closer

Ecological health impacts

Focus on production

Intensive inputs

Water

Fertilizers

Pesticides

Antibiotics

- U.S. agriculture ~ 17% of fossil fuel use
  - Insecticides (↑ *10X, 1949-1989)*
  - Fertilizers ↑ *4X / capita, 1950-98*
- Meat from embedded grain, which itself is fuel intensive

Air, food outputs

- **Carbon, nitrates, methane**
- **Climate change**
- Multidrug resistant foodborne bacteria

Horrigan et al. 2002. EHP; Pimental D, Pimentel M, eds. Food, Energy and Society. Univ of Colorado Press. 1996; Pimentel D. Impacts of Organic Farming on the Efficiency of Energy Use in Agriculture. The Organic Center. 2006. McMichael & Bambrick. 2007. Public Health Nutrition.

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Looking closer

Resilience in the face of extreme events

France (2003)

Temp. ↑ of 3.6 ºC

- Corn yield ↓ 36%
- Wheat ↓ 21%
- Fruit harvest ↓ 25%

In February, the USDA released its draft climate adaptation plan. The plan recognizes the serious challenges faced by farmers as climate-related weather events, like extreme droughts or floods, wreak havoc on agriculture.

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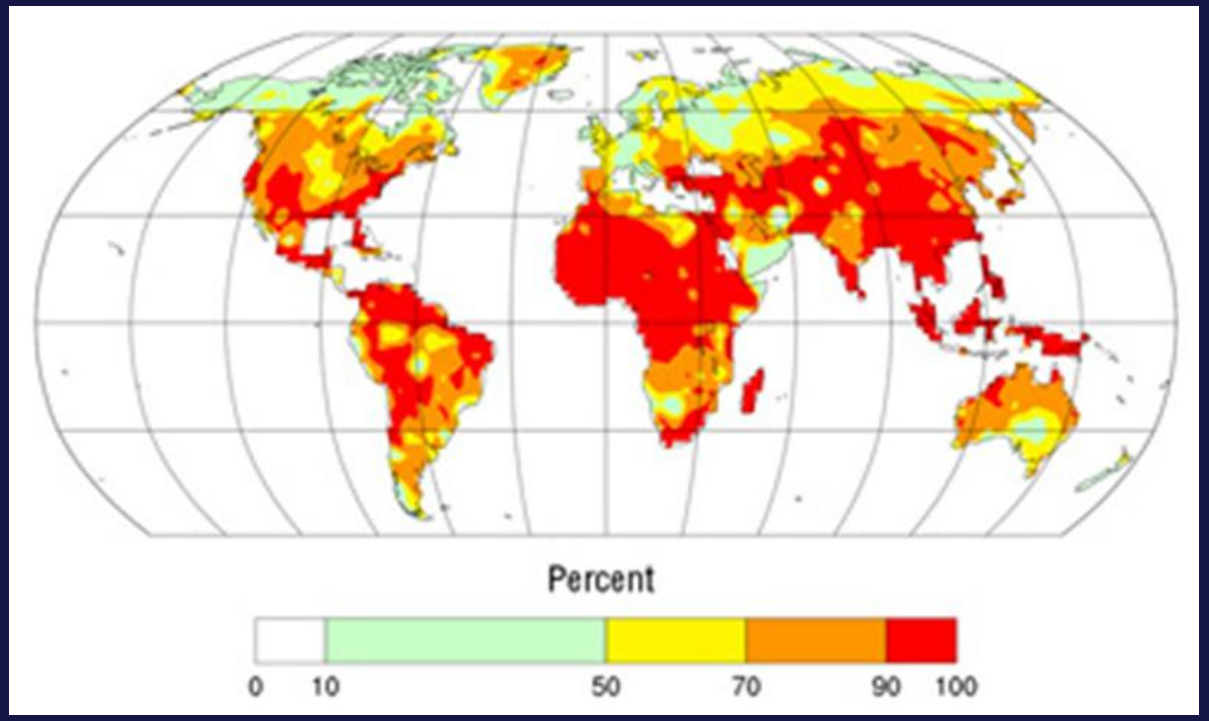
Looking closer

Resilience and food security

Red areas =
50-70% chance **by 2090** that summer *average* temps will *exceed the highest summer temps on record, 1*900 to 2006.
Battisti DS, Naylor RL. *Science* 9 January 2009: 323(5911):240-44.



Looking closer

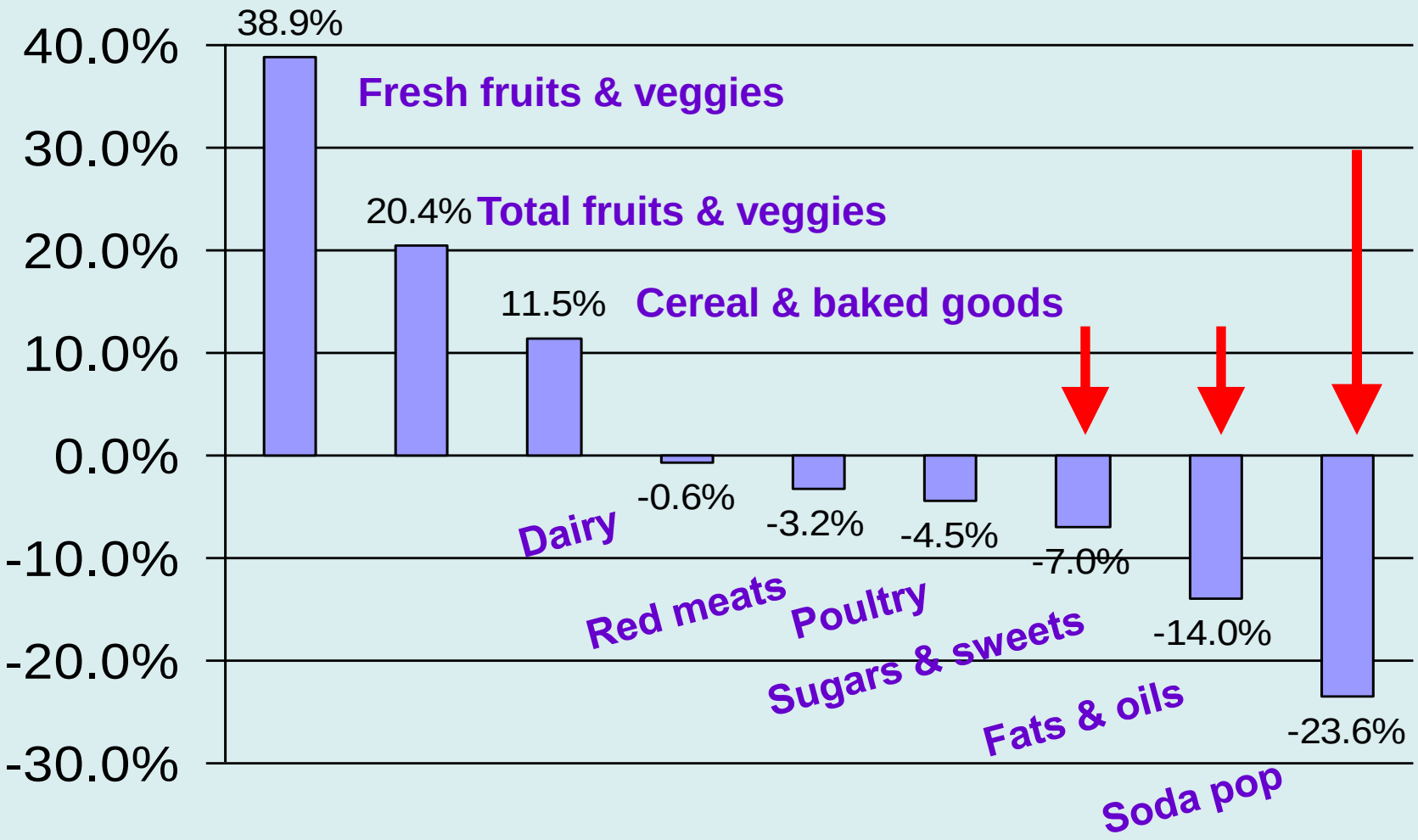
Food environment impacts

Unhealthy foods, diets (calorie dense, nutrient poor) = *More* affordable[1,2], accessible, inflation-resistant[3]

Sources:

1. Drenowski & Spencer. 2004. AJCN
2. Darmon et al. 2004. Public Health Nutrition
3. Monsivais P, Drewnowski A.. 2007.

Change in food prices, 1985 –2000, real $



Wallinga D. Today's food system: how healthy is it? J Hunger Environ Nutr 2009;4(3):251-81.

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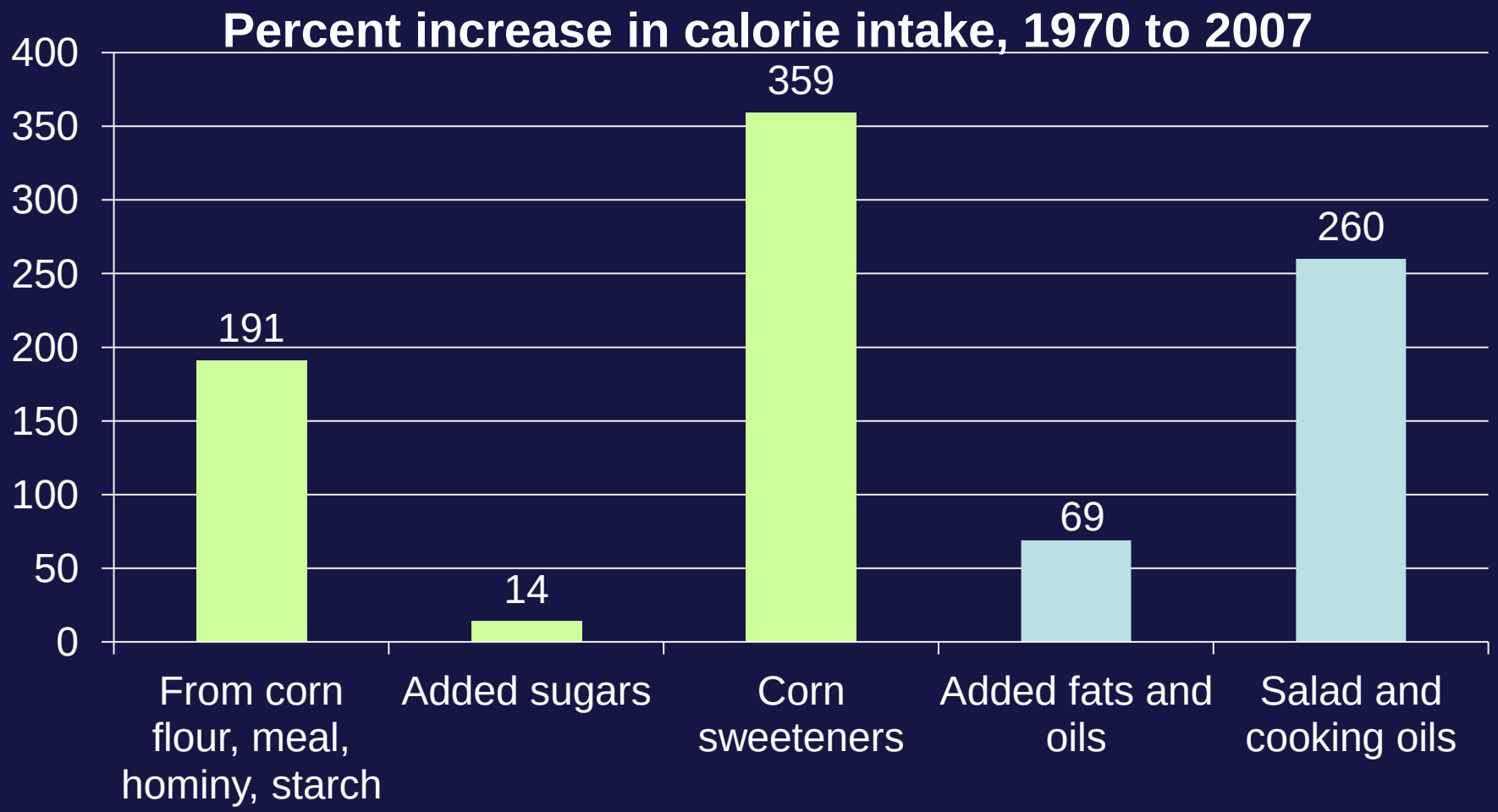
Americans overeat what our farmers are incented to overproduce



Economic Research Service. Loss adjusted food availability [database on the Internet]. Washington (DC): U.S. Department of Agriculture; updated 2009 Feb [cited 10 Jan 2010]. Available from: http://www.ers .usda.gov/Data/FoodConsumption/ FoodGuideIndex.htm

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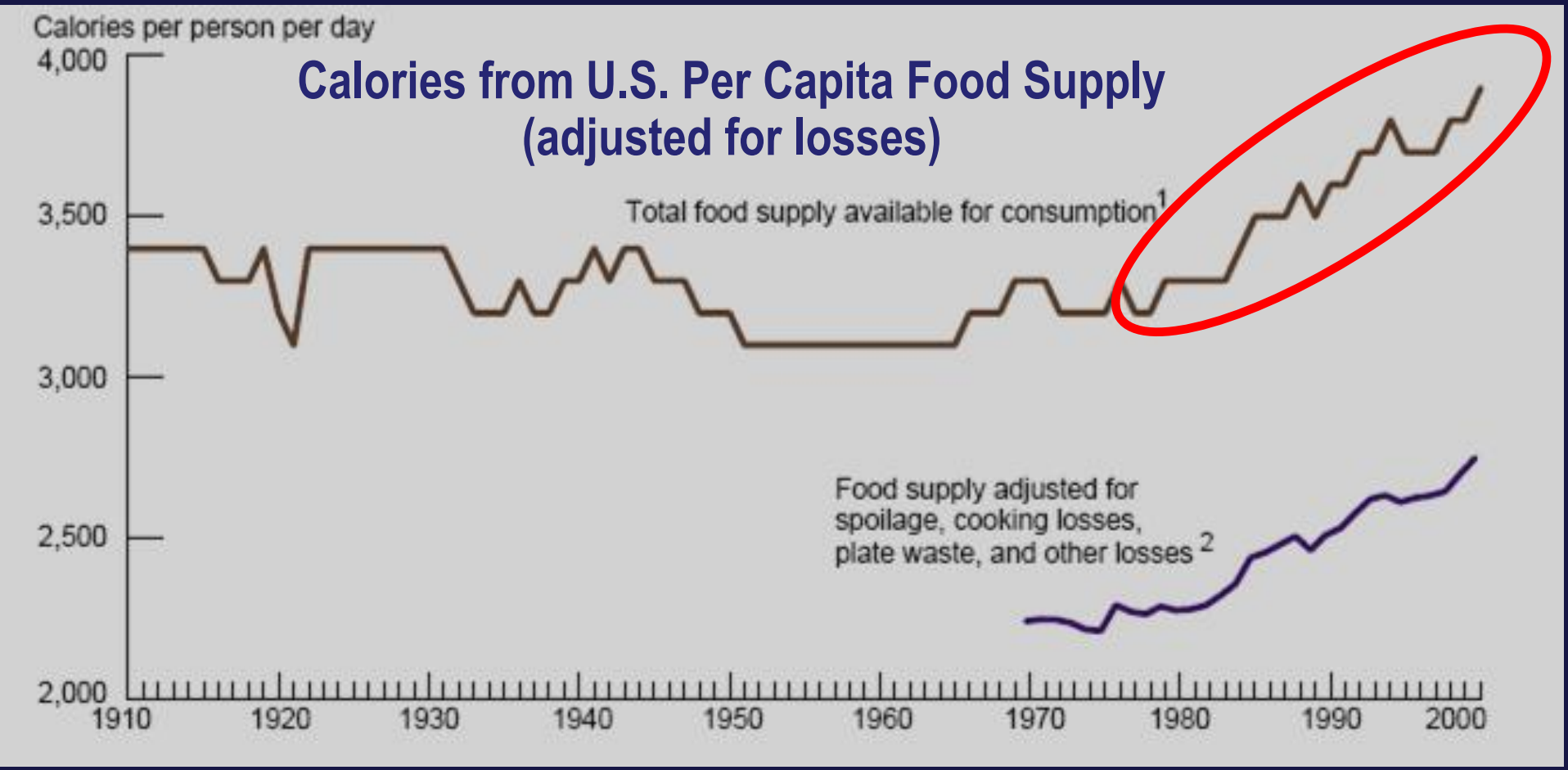
Of 600 calorie excess, relative to 1970

(Putnam et al. 2002. Food Review)



Changing paradigms

Hunger → Chronic disease epidemics

Food Systems

Behavior Change

Healthier eating environments

Healthy?

Farm & food policy

Story M, Hamm MW, Wallinga D, eds. Food Systems and Public Health: Linkages to Achieve Healthier Diets and Healthier Communities (suppl) Journal of Hunger & Environmental Nutrition, Volume 4, Issues 3 & 4. December 2009 (in press)

Changing paradigms

Healthy food ~ Sustainable food systems

American Medical Association, 2009 Resolution
Sustainable Food
www.ama-assn.org/ama1/pub/upload/mm/443/csaph-rep8-a09.pdf

American Nurses Association Resolution
Healthy Food in Health Care
www.nursingworld.org/MainMenuCategories/OccupationalandEnvironmental/environmentalhealth/PolicyIssues/HealthyFoodinHealthCare.aspx

American Dietetic Association, 2007 Position Statement
Food and Nutrition Professionals Can Implement Practices to Conserve Natural Resources and Support Ecological Sustainability.
www.eatright.org/About/Content.aspx?id=8360

American Public Health Association, 2007 Policy Position
Toward a Healthy, Sustainable Food System
www.apha.org/advocacy/policy/policysearch/default.htm?id=1361

AMA Sustainable Food Policy

CSAPH Rep 8, A-09. Our AMA:

(1) supports practices and policies in medical schools, hospitals, and other health care facilities that support and model a healthy and ecologically sustainable food system, which provides food and beverages of naturally high nutritional quality;

(2) encourages the development of a healthier food system through the US Farm Bill and other federal legislation; and

(3) will consider working with other health care and public health organizations to educate the health care community and the public about the importance of healthy and ecologically sustainable food systems.

www.prhe.ucsf.edu/prhe/pdfs/ProfessionalStatementsDatabase.pdf

A common vision

PRINCIPLES OF A HEALTHY, SUSTAINABLE FOOD SYSTEM

In June 2010, the American Dietetic Association, American Nurses Association, American Planning Association, and American Public Health Association initiated a collaborative process to develop a set of shared food system principles. The following principles are a result of this process and have been collectively endorsed by these organizations.

We support socially, economically, and ecologically sustainable food systems that promote health – the current [illegible] natural environment.

A healthy, sustainable food system is:

HEALTH-PROMOTING

- Supports the physical and mental health of all farmers, workers and eaters
- Accoun[illegible] processed, packaged, labeled, distributed, marketed, consumed and disposed

SUSTAINABLE

- Conserves, protects, and regenerates natural resources, landscapes and biodiversity
- Meets our current food and nutrition needs without compromising the ability of the system to meet the needs of future generations

RESILIENT

American Nurses Association

APHA

American Dietetics Association

American Planning Association

www.Planning.org

Triple bottom line

More diverse, local ownership

Fewer food miles

Healthier local economies

More resiliant, adaptive agriculture

Enhanced soil quality

Healthier workers

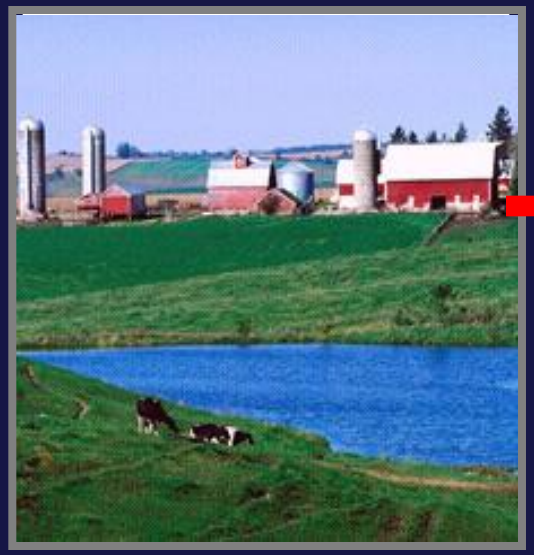
Fewer carbon emissions

Cleaner surface, ground waters

More nutritious meat, dairy?

Less resistant pathogens

Healthier, less stressed animals



Practices

Avoid fossil fuel, antibiotic inputs
Multifunctional agriculture
Pasture-based meat production
High-tunnels

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Can healthy food be produced sustainably, affordably?

The critical role of policy and policy research

- [illegible] support it.
  - [illegible]ructure to support it.
  - Farm p[illegible]it.
  - It neither c[illegible] on cheap, subsidized fossil fuels / an[illegible]

Climate change meets resilience: Real farmers solving real climate problems with sustainable solutions

Posted February 18, 2013 by Andrew Ranallo

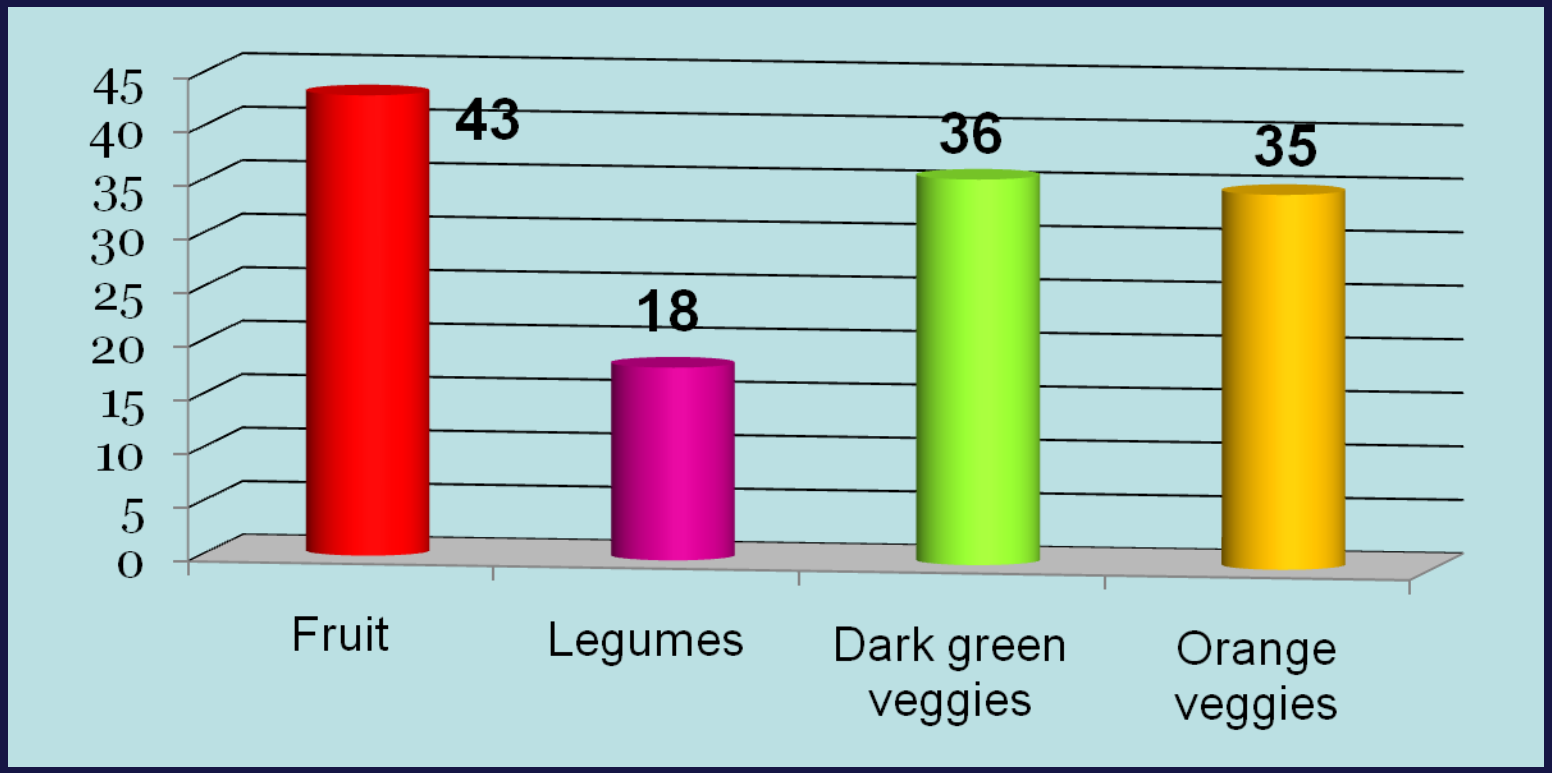
Update: All five videos are now available at the following links:

- Climate change meets resilience
- Building stability through biodiversity
- Finding a balance: A farmer's role in climate change
- In a changing climate, farming's a risky business
- Resilience means taking the long view on climate change

www.iatp.org

HealthyFoodAction.org

Average produce consumption relative to levels recommended for a healthy diet



Sources: Hamm M. JHEN. 2008; Buzby JC, Wells HF, Vocke G. Possible Implications for U.S. Agriculture from Adoption of Select Dietary Guidelines. Huang S, Huang K. 2007. Increased U.S. Imports of Fresh Fruit and Vegetables. www.ers.usda.gov.

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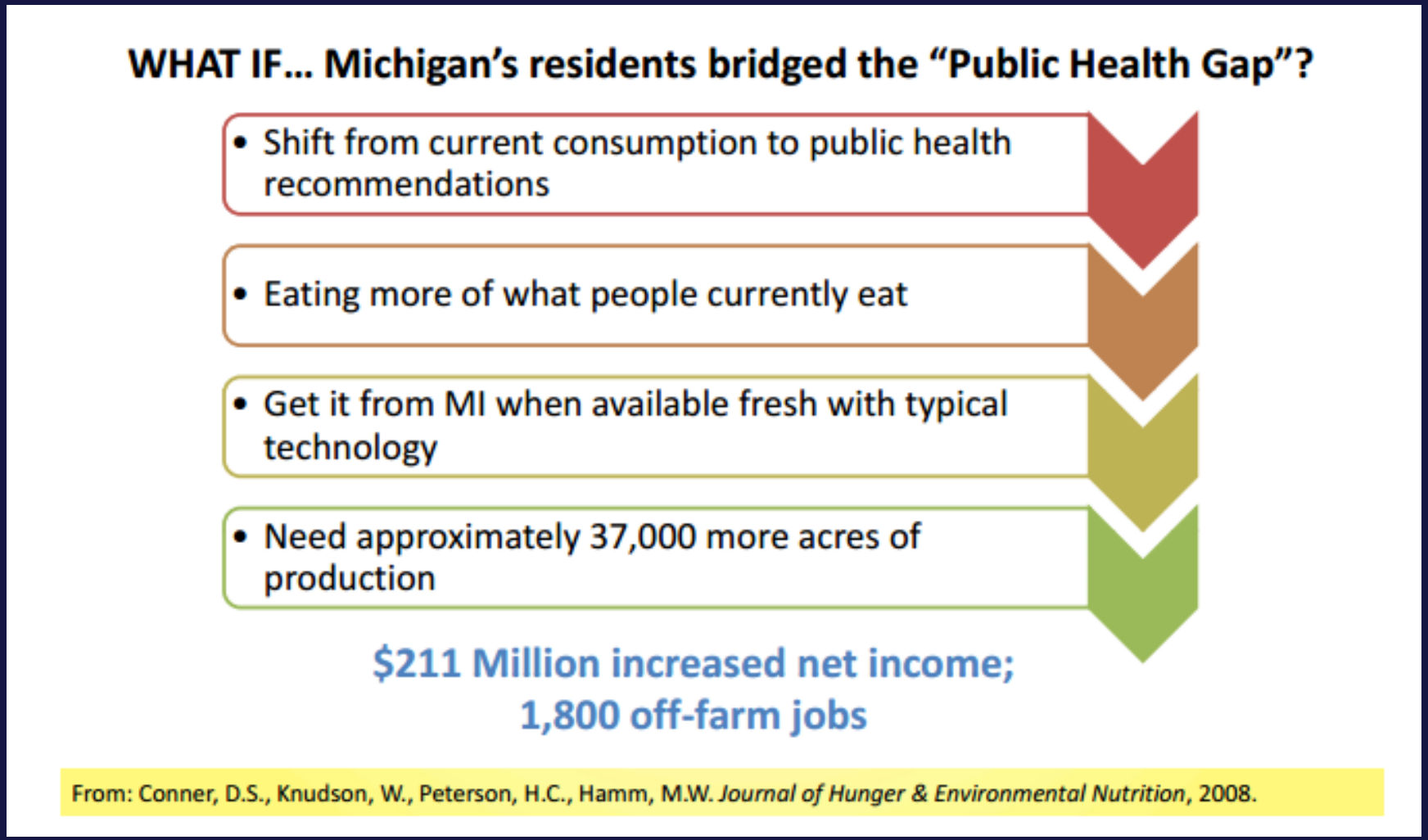
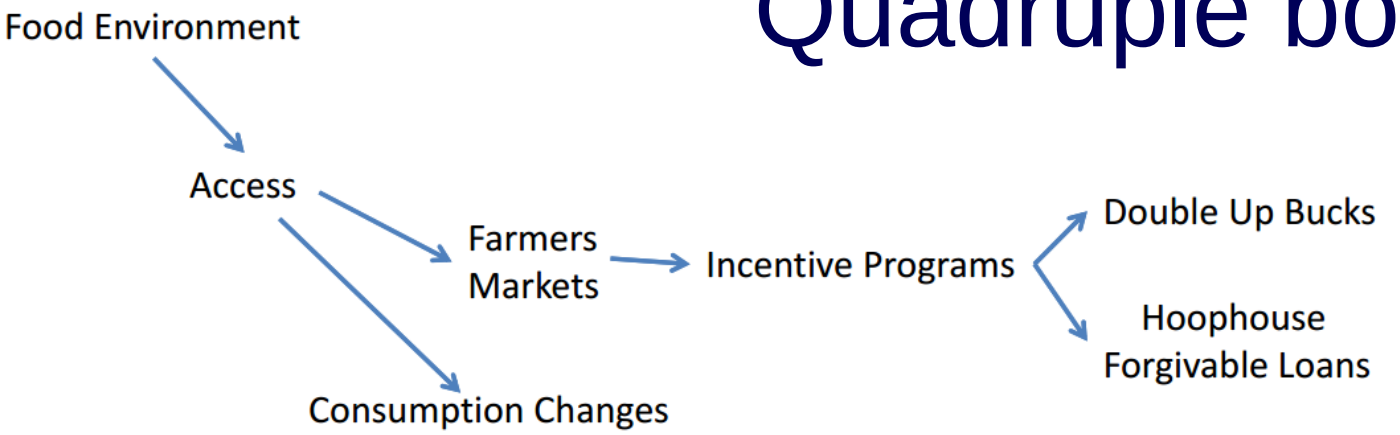
Quadruple bottom line?



See also. Hamm M. Linking Sustainable Agriculture and Public Health: Opportunities for Realizing Multiple Goals. JHEN 2008; 3(2–3).

Quadruple bottom line?



Loan payback to limited income community members over 5 years

Quadruple bottom line?

What if Iowa cities (> 50,000) bought 28 fresh fruits and vegetables from within 100 miles imported from outside the state?

- ⇒ **Diversification and resilience.** It'd involve transitioning 10,548 corn / soybean acres to produce production
- ⇒ **Dollars.** It'd generate generate $39.96 million in farm-level sales; in addition, if farmers direct marketed half the produce to metropolitan consumers, it would require 87 fruit and vegetable establishments, generating $68.3 million in direct sales,
- ⇒ **Jobs:** The latter would 595 job holders at those establishments who would receive $15.2 million in labor incomes. Farm level sales would generate a net 343 additional jobs in on farms, in supplying, and jobs serving households supported by the additional farm jobs.

Swenson D. Measuring the Economic Impacts of Increased Fresh Fruit and Vegetable Production in Iowa Considering Metropolitan Demand. Leopold Center for Sustainable Agriculture, April 2011. www.leopold.iastate.edu/