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CONFERENCE

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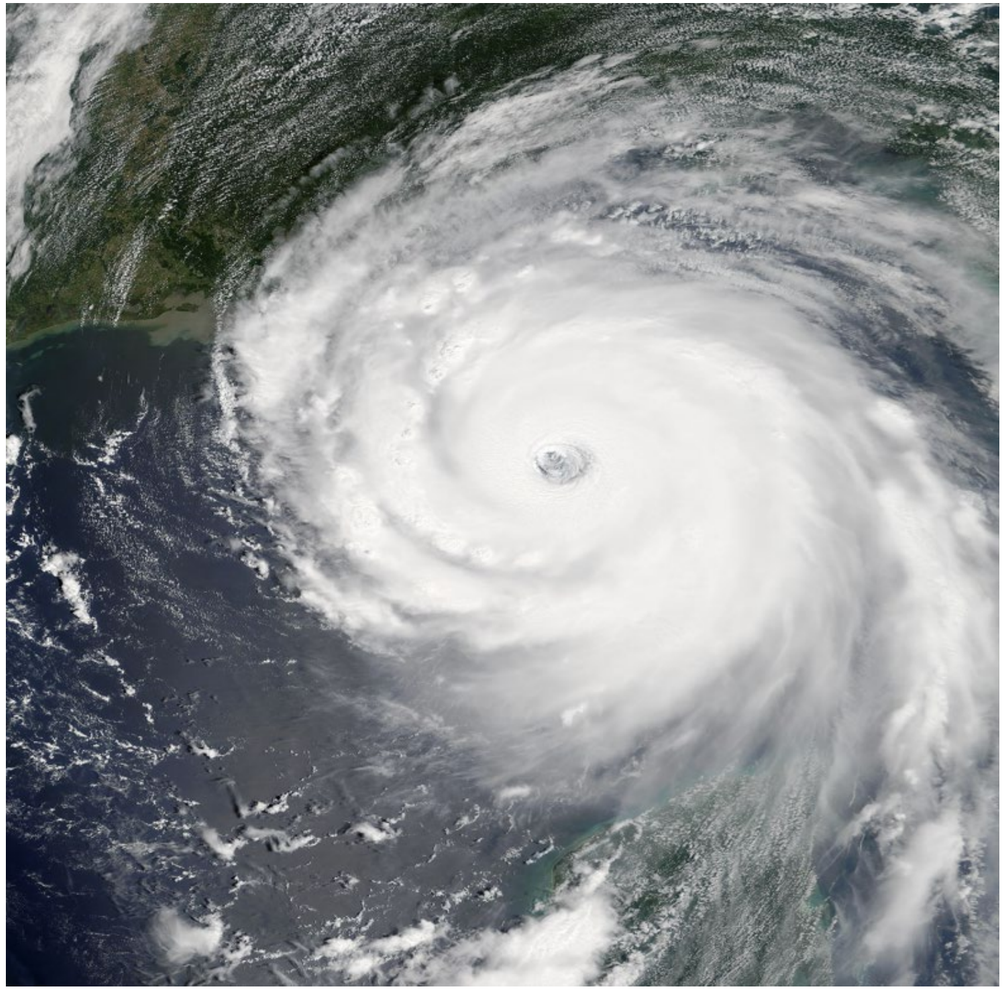
Food and Climate Change; the Need to Act Is Urgent

William H. Dietz, MD, PhD

Redstone Global Center for Prevention and Wellness
School of Public Health
Global Food Institute
George Washington University

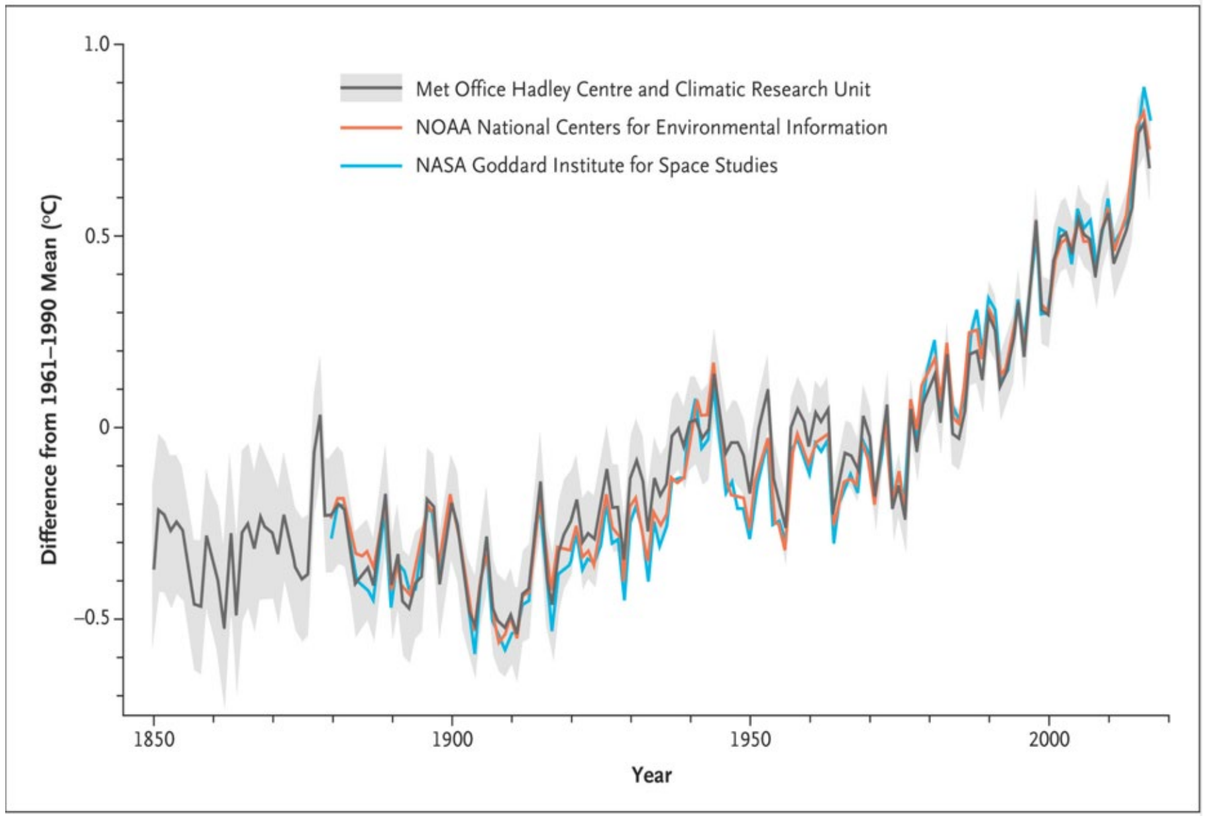
Hurricane Katrina 2005



Drought- U.S. and Eastern Africa

Wildfires in Canada

Changes in Surface Temperature 1850-2017



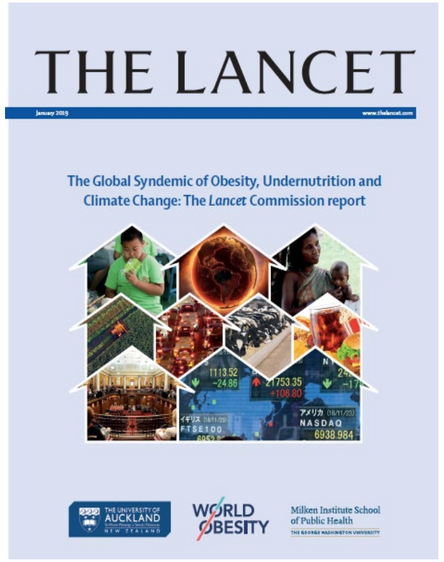
GHG Generation (CO_2 Eq)

Source	US	Global
Agriculture.	10%	20-25%
Fossil fuels	30%	10%
Food waste.	8%	8%

Each 1^0 increase in air temperature is associated with a 7% increase in water vapor

Haines A, Ebi K. NEJM 2019; 380:263

The Global Syndemic(s) of Obesity, Undernutrition, and Climate Change



- The pandemics of obesity, undernutrition and effects of climate change cluster within populations
- All three pandemics interact at both biological and biosocial levels and have synergistic adverse impacts on each other
- Large scale social forces foster clustering, and have a disparate impact on marginalized populations

Swinburn B et al. Lancet 2019; 393:791

Mendenhall E and Singer M,
Curr Opinion HIV and AIDS 2020; 15

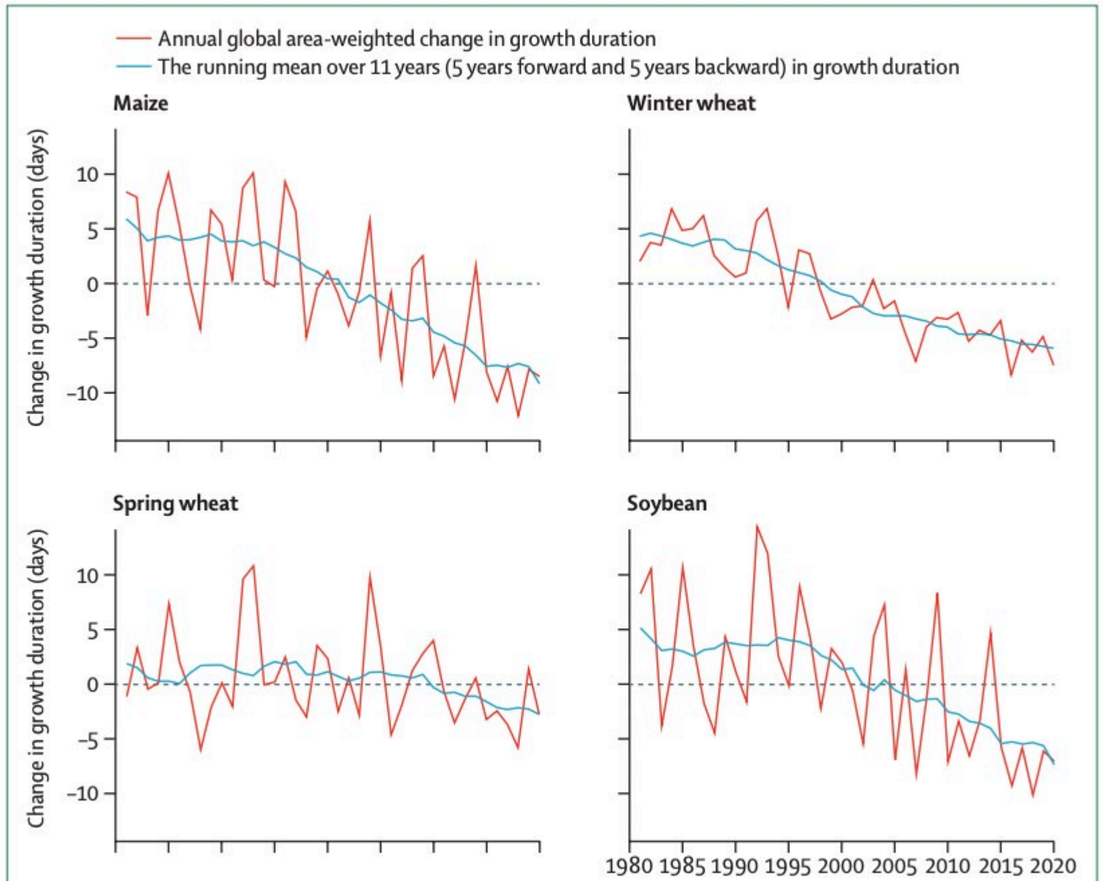
Examples of Syndemic Interactions

- Beef production drives CH_4 and N_2O emissions; red and processed meat consumption causes obesity, diabetes, colon cancer and cardiovascular disease
- Increased GHGs from HICs reduce crop yields and micronutrient content of crops, which contribute to food insecurity and undernutrition in LMICs (and eventually HICs)
- Obesity, stunting, and nutrition insecurity occur in the same children and same population in LMICs

U.S. Emissions from Agriculture - MMT CO_2 Equivalents

	1990	2021
CO_2	**7.1**	**8.3**
Urea fertilizer	2.4	5.2
Liming	4.7	3.0
CH_4	**240**	**278**
Enteric fermentation	183	195
Manure	39	66
Rice cultivation	18	17
N_2O	**290**	**303**
Agriculture soil mgmnt	278	285
Manure	12	17
Totals	**538**	**589**

Declines in Crop Yields 1980-2020



Relative to 1981-2010 average crop yields have declined by 6% for maize 3% for winter wheat, 5% for soybean, and 2% for rice

Every 1^0C increase in Temperature is associated With a 1.6% increase in the Probability of severe food insecurity

Romanello M et al. Lancet 2021; 398:1619

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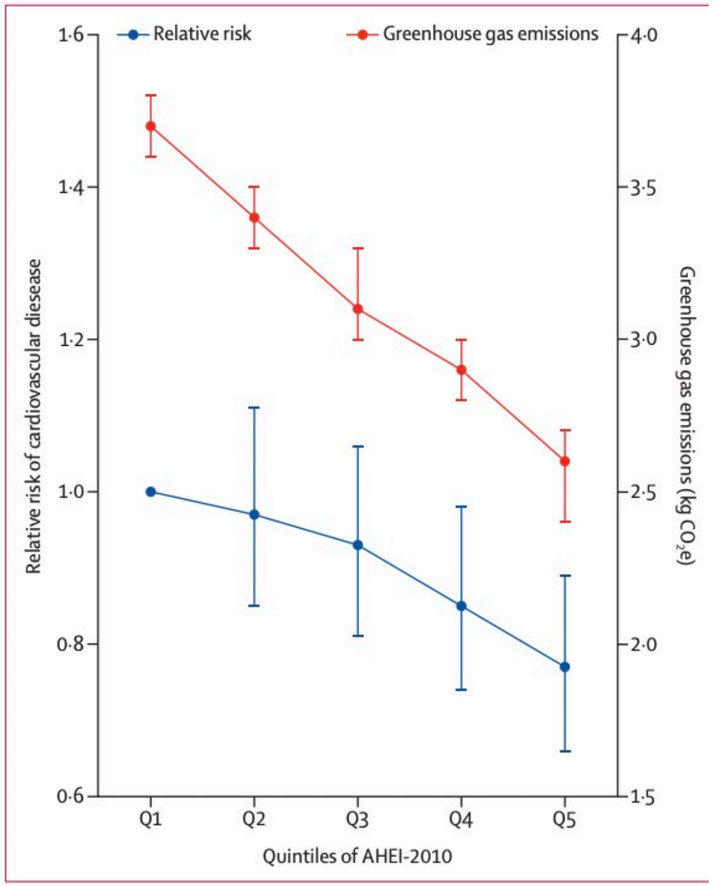
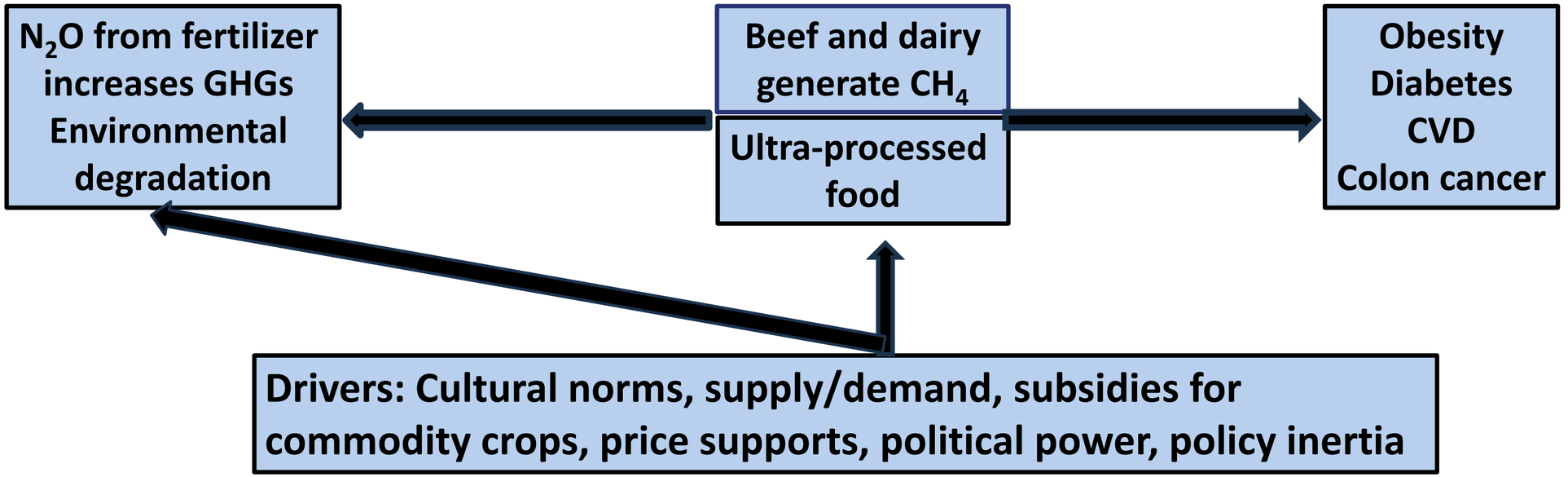
Greenhouse Gas Emissions and Relative Risk of CVD across Quintiles of the Alternative Healthy Eating Index -2010



Food groups that contribute the most to green house gas emissions are all animal-based and include red and processed meat. Meat production also contributes the most to cropland use (59%), irrigation water (26%) and fertilizer (8.5%)

Musicus et al. Lancet Planetary Health 2022; 6:e892

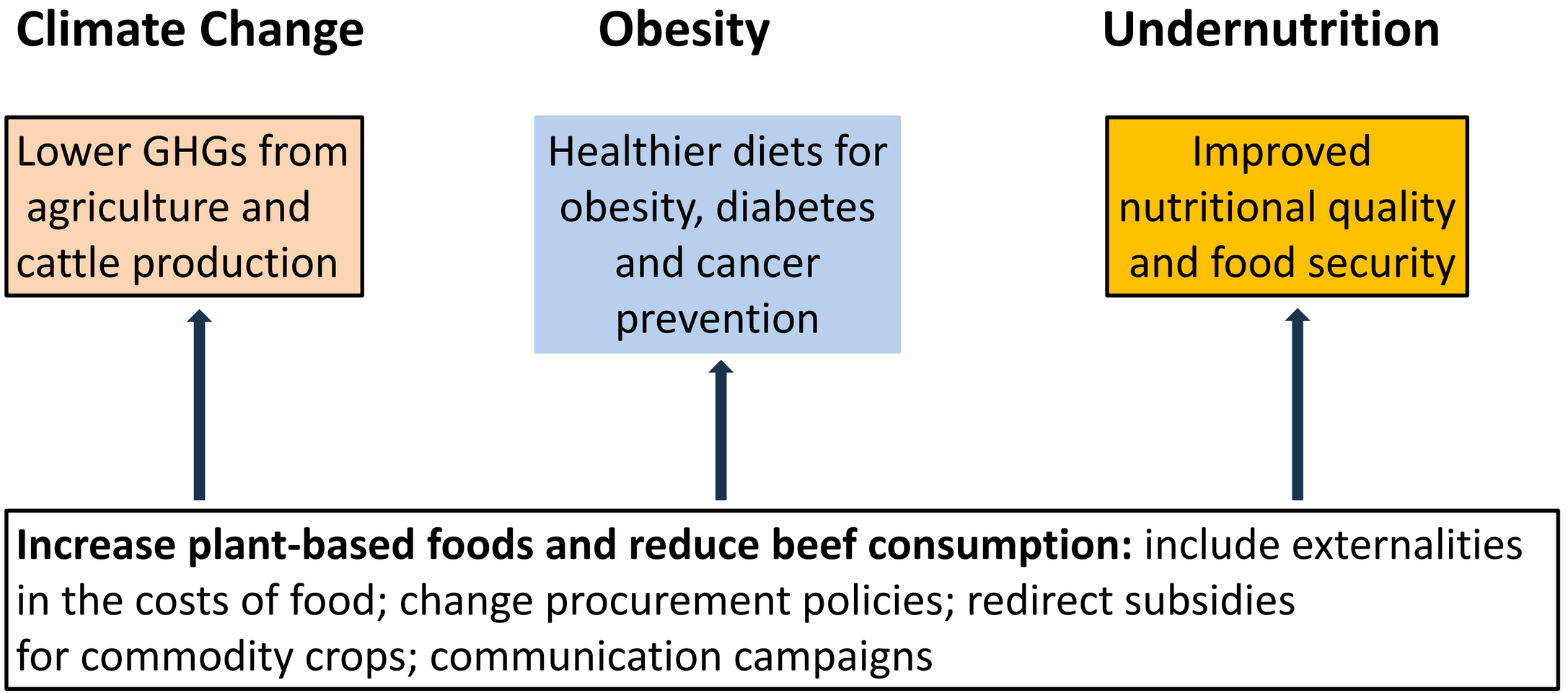
Contributions of the Agricultural and Food Processing Systems to the Global Syndemic



Environmental Impact of 4 Diets in the UK

Group	CH_4 Kg/d	N_2O Kg/d	Land use m^2/d	H_2O use m^3/d
Vegans	4.4	0.7	4.4	0.4
Vegetarians	20.2	1.0	6.0	0.5
Low meat-eaters (28g/d)	29.0.	1.3	8.3	0.7
Medium meat eaters (50-99 g/d)	40.8	1.7	11.3	0.8
High meat eaters (140g/d)	65.4	2.6	16.8	0.9

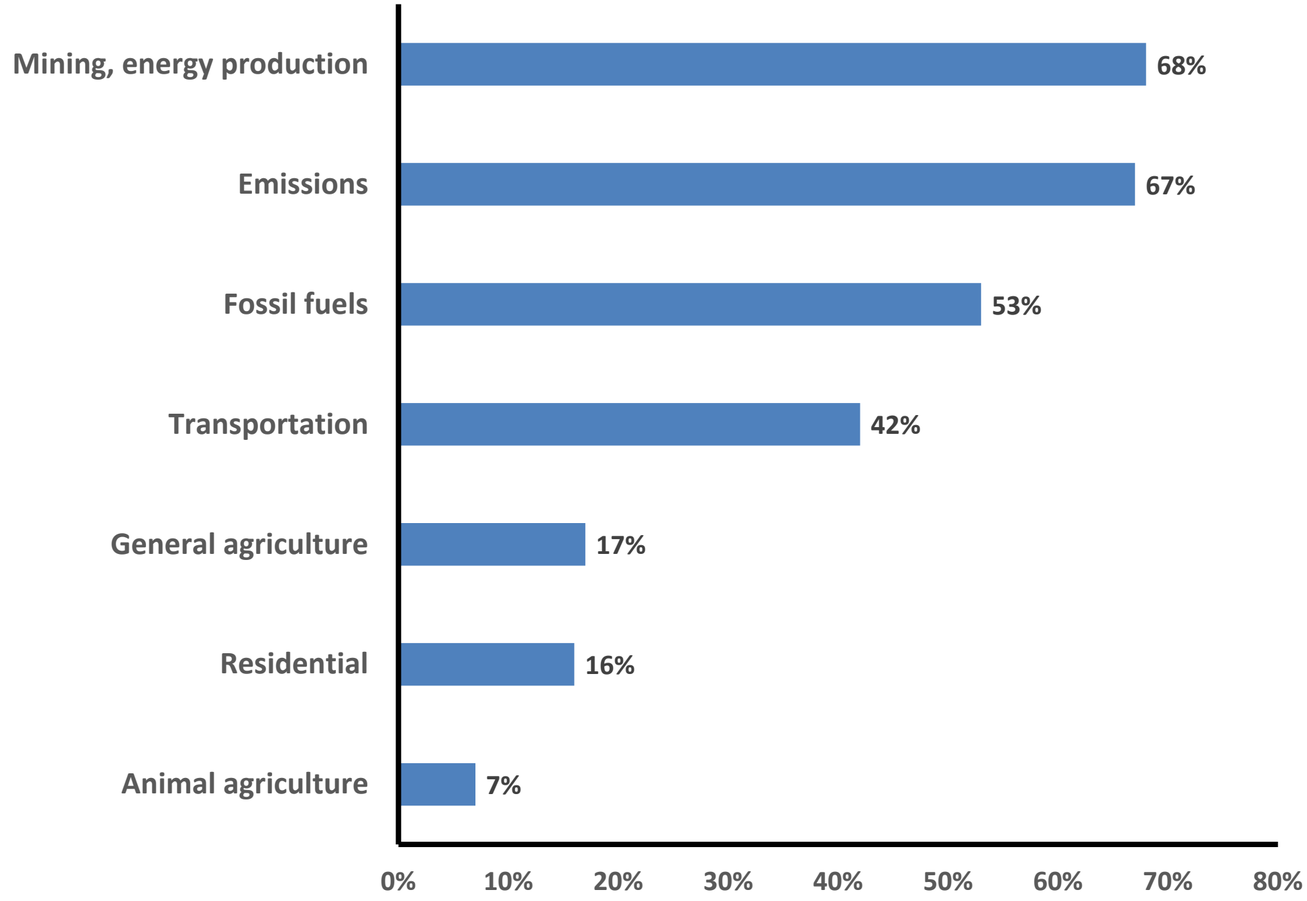
Scarborough P et al. Nature Food 2023; 4: July 565


Climate Change
Obesity
Undernutrition
Lower GHGs from agriculture and cattle production
Healthier diets for obesity, diabetes and cancer prevention
Improved nutritional quality and food security
Increase plant-based foods and reduce beef consumption: include externalities in the costs of food; change procurement policies; redirect subsidies for commodity crops; communication campaigns

Theme Coverage in Climate Articles

100 articles/source

The Wall Street Journal
The New York Times
New York Post
Los Angeles Times
The Washington Post
Reuters
Star Tribune
Chicago Tribune
The Boston Globe
CNN



Arevalo C et al. Faunalytics May 31, 2023

What Are the Biggest Contributors to Global Warming?

Biggest contributor Smallest contributor

% ranked 1st (biggest contributor)	USA	UK	DE	FR	BR
Fossil fuels (coal, oil and gas)	21%	28%	18%	18%	19%
Deforestation	12%	14%	19%	18%	33%
Cars	12%	8%	9%	8%	9%
Overpopulation	9%	9%	10%	9%	4%
Overuse of plastics	7%	9%	4%	10%	7%
Aviation (airplanes)	3%	6%	11%	8%	2%
Chemicals manufacturing	10%	5%	4%	5%	8%
Overconsumption of goods	4%	4%	5%	6%	2%
Industrial meat	**3%**	**3%**	**6%**	**3%**	**3%**
Energy inefficient buildings	4%	2%	1%	3%	2%

https://madrebrava.org/insight/people-don-t-see-industrial-meat-as-a-key-cause-of-global-warming-poll

Rationalizing Meat Consumption: the 4 Ns

Natural: Humans are carnivores, hominids have always eaten meat
Necessary: Humans need meat to survive, our bodies need the protein
Normal: Meat is culturally accepted, I was raised eating meat
Nice: It tastes good, it's delicious

51% of respondents to a Checkoff survey reported concerns with cattle production. 42% of these were concerned about animal welfare but only 5% reported concerns about the environment

Piazza J et al. Appetite 2015; 91:114
Today's Beef Consumer, September 2022

Polarizing Pushback from Big Beef

Pro-reduction

- No organized voice

Beef industry

- Lack of scientific evidence regarding disease risks
- Characterize changes as a “war against beef, individual freedom
- Vegans are extremists, plotting a vegan diet for the world’s population
- Reduction will destroy the meat industry and farmers
- Consumption widely promoted by the fast-food industry

Sievert K et al. Int J Health Policy Mngmnt 2021; 10(12): 793
Sievert K et al. Public Health Nutrition 2012; 25(3):578

The Issue Is Not What to Do But How To Do It

Focus on what we can personally change

Engage family, peers, and organizational networks to build political will

Change our institutions – small p policies

- Use institutional, municipal, state and federal procurement policies to improve health and decrease GHGs
- Implement federal food service guidelines
- Change defaults

Develop local coalitions focused on common targets

Communication campaigns

Steps to Effective Communication

Start with people, stay with people

- Listen; honor values, like health, family, fairness; climate change vs global warming; “Some of us are more concerned than others”

Make it real

- Cite realities: heat waves, early spring, pollen counts, personal stories

Focus on solutions and personal benefit

- Renewable sources are less expensive
- Improved air quality reduces asthma

Inspire and empower

- Individual actions increase engagement and reduce hopelessness
- Provide meaningful steps

https://ecoamerica.org/climate-action-sheet/5-steps-to-effective-climate-communication/

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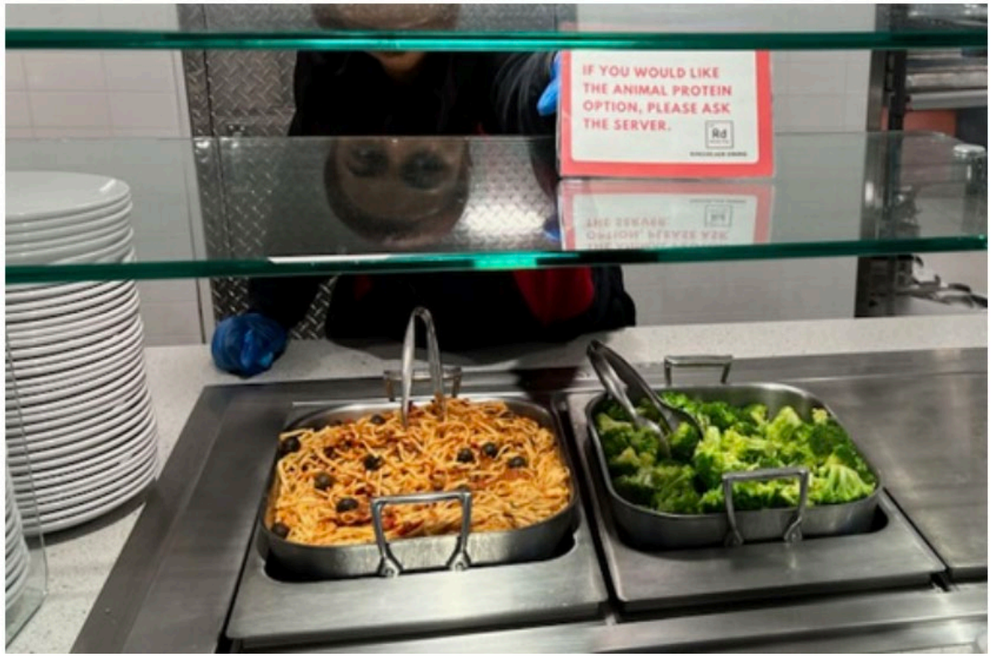
Change Procurement Policy at Institution, State, and Federal Levels

Washington DC joined the Cool Food Pledge (https://coolfood.org/pledge/) when the District passed the Green Food Purchasing Amendment Act in 2021. The Act requires that the District assess its carbon footprint of food and beverage purchases and decrease its carbon footprint by 25% by 2030.

https://doee.dc.gov/release/district-signs-cool-food-pledge-uses-its-purchasing-power-fighting-climate-change

"Serving Up Plants by Default”
Better Food Foundation

Lehigh, Rensselaer Polytechnic Institute and Tulane made plant-based food the only visible meal option for lunch, compared to side by side meat and plant-based option. On control days, 27-31% were taken vs 58-81% when plant-based was offered. Net effect was 24% reduction in GHGs on default days



RPI: Lentil, Olive & Mushroom Spaghetti is the only visible option at the station. Meat option available on request

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Communication Strategies

- Focus on reduction, not elimination, especially for men
- Acknowledge the positive health effects of beef consumption
- Emphasize that beef consumption in North America and Eurasia exceed recommended consumption levels by 6 and 3 times respectively
- Present the case: planetary and human health are adversely affected by beef production and consumption
- Emphasize the effects that reduced beef consumption/production will have on land, water, fertiliser, and GHGs
- Provide compelling examples: GHGs from 1 serving beef = GHGs from 20 servings of vegetables; land that produces 100gm plant protein produces only 4 gm beef protein

Sievert K et al. Public Health Nutrition 2012; 25(3):578
Clark MA et al. Proc Nat Acad Sci 2019; 116:22357

Engage and Don’t Despair

Thanks for Your Attention

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