Sorry, but giving up meat is not going to save the planet

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The 2050 Challenge
4.5 Billion + population of USA in 10 years

There are more people living inside this circle than outside of it.
2050 Challenge –
Population Growth by Region
Global cropland

Turning Challenges into Solutions
Global Waste: 1 out of 3 calories
40% in US
NORTH AMERICAN* FOOD LOSSES AT EACH STEP IN THE SUPPLY CHAIN

*Percentages calculated collectively for USA, Canada, Australia, and New Zealand.

01. PRODUCTION LOSSES
- GRAIN PRODUCTS: 2%
- SEAFOOD: 11%
- FRUITS & VEGETABLES: 20%
- MEAT: 3%
- MILK: 3%

02. POSTHARVEST, HANDLING AND STORAGE LOSSES
- GRAIN PRODUCTS: 2%
- SEAFOOD: .5%
- FRUITS & VEGETABLES: 3%
- MEAT: 2%
- MILK: .25%

03. PROCESSING AND PACKAGING LOSSES
- GRAIN PRODUCTS: 10%
- SEAFOOD: 5%
- FRUITS & VEGETABLES: 1%
- MEAT: 4%
- MILK: .5%

04. DISTRIBUTION AND RETAIL LOSSES
- GRAIN PRODUCTS: 2%
- SEAFOOD: 9.5%
- FRUITS & VEGETABLES: 12%
- MEAT: 4%
- MILK: .25%

05. CONSUMER LOSSES**
- GRAIN PRODUCTS: 27%
- SEAFOOD: 33%
- FRUITS & VEGETABLES: 28%
- MEAT: 12%
- MILK: 17%

**Includes out-of-home consumption

Source: Food and Agriculture Organization 2011
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<th>A)</th>
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<td>Water, <strong>Pea Protein Isolate</strong>*, Expeller-Pressed Canola Oil, Refined Coconut Oil, Rice Protein, Natural Flavors, Cocoa Butter, Mung Bean Protein, Methylcellulose, <strong>Potato Starch</strong>, Apple Extract, <strong>Salt</strong>, Potassium Chloride, Vinegar, Lemon Juice Concentrate, <strong>Sunflower Lecithin</strong>, Pomegranate Fruit Powder, Beet Juice Extract</td>
<td>Pea, Sweet Potato, <strong>Pea Protein</strong>, Pea Starch, Lentils, Flaxseed Meal, Sunflower Oil Preserved with <strong>Mixed Tocopherols</strong>, Calcium Carbonate, Vegetable Flavoring, <strong>Salt</strong>, Vitamins (Choline Chloride, Vitamin E Supplement, Vitamin A Supplement, Vitamin D3 Supplement, Calcium Pantothenate, Thiamine Mononitrate, Pyridoxine Hydrochloride, Riboflavin Supplement, Niacin, Folic Acid, Biotin, Vitamin B12 Supplement), Minerals</td>
<td>Water, <strong>Soy Protein Concentrate</strong>, Coconut Oil, Sunflower Oil, Natural Flavors, 2% or less of: Potato Protein, Methylcellulose, Yeast Extract, Cultured Dextrose, Food Starch Modified, Soy Leghemoglobin, <strong>Salt</strong>, Soy Protein Isolate, <strong>Mixed Tocopherols</strong> (Vitamin E), Zinc Gluconate, Thiamine Hydrochloride (Vitamin B1), Sodium Ascorbate (Vitamin C), Niacin, Pyridoxine Hydrochloride (Vitamin B6), Riboflavin (Vitamin B2), Vitamin B12</td>
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Can we eat our way out of climate change?

- Omnivore to vegan (per yr) = 0.8 tons CO2e
- One trans-atlantic flight (per passenger) = 1.6 tons CO2e
- Meatless Monday (US) = 0.3% GHG reduction
- Vegan US = 2.6%
STAYING VEG
lessons from former vegetarians/vegans

U.S. POPULATION
17 AND OVER

10% former vegetarians/vegans

2% current vegetarians/vegans

88% never vegetarian/vegan

There are more than 24 million former vegetarians/vegans and fewer than 5 million current vegetarians/vegans.

84% OF VEGETARIANS/VEGANS ABANDON THEIR DIET.

[These figures are devised by extrapolating survey findings to the U.S. population as a whole.]
Climate change and GHG
Emission Intensities
(direct emissions from livestock)

GTAP 2001 data base
Mitigation: interventions to improve productivity

Gill et al. (2010)
Global Warming Potential (GWP_{100}) of Main GHG

- Carbon Dioxide, CO\textsubscript{2} 1
- Methane, CH\textsubscript{4} 28
- Nitrous Oxide, N\textsubscript{2}O 298
Carbon Dioxide and Carbon Flux

Source: Rohde. 2007
GLOBAL METHANE BUDGET

TOTAL EMISSIONS

558 (540-568)

CH₄ ATMOSPHERIC GROWTH RATE
10
(9.4-10.6)

TOTAL SINKS

548 (529-555)

105 (77-133)

188 (115-243)

34 (15-53)

167 (127-202)

64 (21-132)

Fossil fuel production and use
Agriculture and waste
Biomass burning
Wetlands
Other natural emissions

Sink from chemical reactions in the atmosphere
Sink in soils

EMISSIONS BY SOURCE
In million-tons of CH₄ per year (Tg CH₄ / yr), average 2003-2012

Anthropogenic fluxes
Natural fluxes
Natural and anthropogenic
Fossil CO$_2$ has accumulated in the atmosphere as we have exceeded the ability of plants and the ocean to take up new CO$_2$.

CO$_2$ (Carbon Dioxide)

- Photosynthesis
- Methane

Carbohydrates

- Fossil fuels (old photosynthetic carbon - 100 to 200 million years old - not in the carbon cycle)

Oceans
Livestock is a significant source of methane, a potent but short-lived greenhouse gas. from www.shutterstock.com, CC BY-SA

Why methane should be treated differently compared to long-lived greenhouse gases
National-Level U.S. GHG Inventory

Source: EPA (2016)