Food & Climate Change

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Food System Planning Internship at Delaware Valley Regional Planning Commission

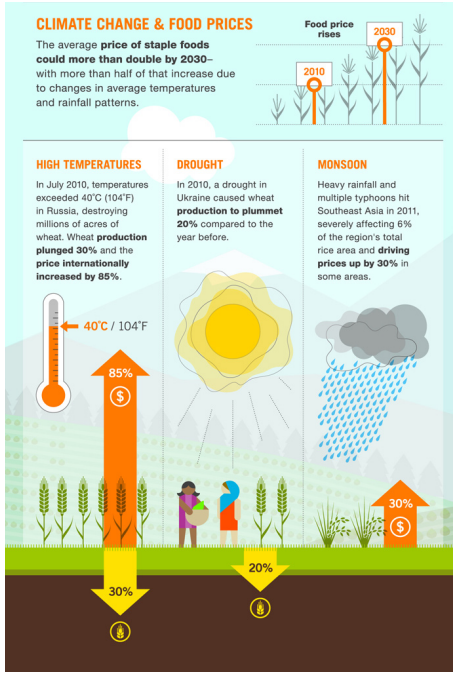
INTRODUCTION

The Delaware Valley Regional Planning Commission is a regional planning agency serving nine counties in the Greater Philadelphia region.
I assisted the Manager of Strategic Partnerships as a Food System Planning Intern. For my main project this summer I wrote a white paper on food and climate change that explains the relationship between the food system and climate change and outlines recommendations TO the citizen, funder, and policymakers THAT WILL help our food system thrive while adapting to and mitigating for the effects of global climate change.

THE CHALLENGE OF ADAPTING TO CLIMATE CHANGE: IMPACTS OF CLIMATE CHANGE ON AGRICULTURE

GLOBALLY

- **Temperature**: uncertainty in degree of temperature changes can lead to crop yield increases OR decreases
- **Precipitation**: increases in precipitation will lead to field flooding, destroy crops, and reduce quality of crops
- **Extreme weather events/volatility**: will increase as a result of climate change
- **Weeds, insects, and disease**: quantity will increase in a warmer climate



http://www.visualnutrition.org/whats-wrong-with-our-food-system-infographic/

IN PENNSYLVANIA

- **Expected average annual temperature change**: + 2.5(degrees) in next several decades
- **Number of days over 90(deg) expected to *double***; Eastern Pennsylvania could have Georgia's climate
- **Impacted crops**: concord grapes, sweet corn, and favorite apple varieties
- **Impacts of livestock**: predicted higher temperatures will cause heat stress on cattle and negatively affect the dairy industry
- **Impacts on economy**: could lead to losses of up to $480 million and 5,300 jobs

These consequences will be occurring while the population in the Greater Philadelphia region alone grows to reach 6.26 million by 2040

THE CHALLENGE OF MITIGATING CLIMATE CHANGE: IMPACTS OF AGRICULTURE ON CLIMATE CHANGE

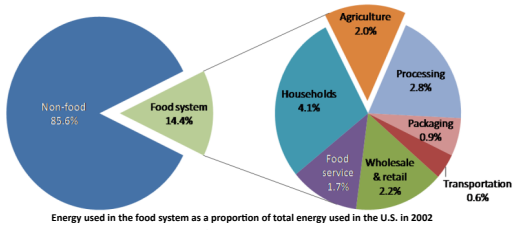
GLOBALLY

- **13.5%** of all greenhouse gas emissions come from agriculture
- **Crop-based agriculture**: relies heavily on fossil-fuel powered machinery and petroleum-based chemical fertilizers and pesticides
- **Livestock-based agriculture**:
  - Cattle consume 10-16 pounds of grain for every 1 pound of beef produced
  - ➔ This means that 55 calories of fossil fuel energy are used to produce 1 calorie of beef
  - Waste from concentrated animal feeding operations (CAFOs) is stored in "manure lagoons" and often emits methane and nitrous oxide

IN PENNSYLVANIA

- In the Greater Philadelphia region, the majority of emissions related to agriculture come from agricultural soils: runoff from manure, fertilizer, and plant residues
- Agricultural soil management accounts for 46% of total agricultural emissions and 1.4% of total statewide gross greenhouse gas emissions
  - Enteric Fermentation contributes 36%
  - Manure management contributes 18%

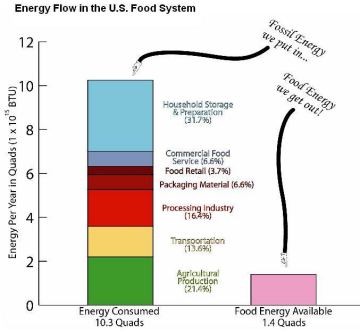
HOW AND HOW MUCH ENERGY IS USED BY THE FOOD SYSTEM?



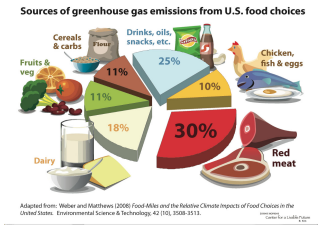
Energy used in the food system as a proportion of total energy used in the U.S. in 2002

Graph by Michael Bomford, based on data in Canning et al. 2010, Figure 7, p. 20.

- Individual households consume more energy in the food system than farms
- Big energy users are food processing, packaging, selling, and preparation



Find the Facts <http://css.snre.umich.edu/facts>



Adapted from: Weber and Matthews (2008) *Food-Miles and the Relative Climate Impacts of Food Choices in the United States.* Environmental Science & Technology, 42 (10), 3508-3513.

SOLUTIONS AND QUESTIONS

http://www.sustainabletechnologyinstitute.org/view/page.basic/class/tag.topic/SustainableFoodSystems

FARMING PRACTICES MATTER

ROLE OF DIFFERENT FARMING PRACTICES IN *ADAPTING* VERSUS *MITIGATING* CLIMATE CHANGE:

(Conservation) Practice	**Adaptation** responding to a changing climate: provides benefits at a local scale, can have short-term effects on the reduction of vulnerability	**Mitigation** practices that help reverse global warming: provides global benefits, has long-term effects due to inertia of the climatic system
Farmer changes the crops grown or relocates	Farmer sees current crops unable to produce sustainable yield; changes crops grown or moves to an area that has a climate better suited for plant growth	
Composting		Composting involves the process of carbon sequestration, which reduces greenhouse gases in the atmosphere by
No-till	No till reduces diesel emissions, conserves a LOT of water – soil holds more water and more nutrients, improves soil quality	
Plants cover-crops	Grain grown over vegetable or fruit plants in the winter… either sold or not… protects the soil Grain grown over vegetable or fruit plants in the winter… either sold or not… protects the soil	
Increased irrigation	May seem a viable adaptation technique in a warmer climate, but water may become even more scarce in the future	
Use of fans in barns	Fans used to keep livestock cool in a warmer climate may drive up energy usage, creating more greenhouse gas emission and higher costs	

DIET MATTERS

- *Buy Local: Is how our food produced more important than where?*
  - *How* food travels is a better predictor of emissions that how *far* it travels
  - ➔Highly processed and packed foods require far more energy than whole foods, regardless of how far they travel
  - ➔Buying locally sourced food supports the local economy and is often better quality because it travels a shorter distance
- Buying from a farmers' market cuts down energy costs
  - Food is minimally processed or whole
  - They are open air and use little electricity
- Eating less meat has been proven to reduce humans' carbon footprint

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