Food Security, Climate Change and Health

DID YOU KNOW?

Ozone pollution not only contributes to respiratory and cardiovascular disease, it is also harmful to plants — especially soybeans, wheat, oats, green beans, and peppers — and already causes millions of tons of crop losses each year.

Climate change impacts food security and nutrition in many ways. Food security is "access by all people at all times to enough food for an active, healthy life."[1] It requires that food is available and accessible, that it can be utilized to nourish the body, and that a nutritious food supply is stable. In this brief, we focus on the impacts of climate change on food security in California and the U.S.

Food security is a fundamental human need[2]

- In the U.S., about 14% of households are food insecure and 48.1 million people live in food insecure homes, including 7.9 million children. Nearly 6 million Californians are food insecure.
- Food insecurity is more common in people of color and those living in poverty. Twenty-six percent of U.S. Black households and 22% of Hispanic households report food insecurity. Thirty-four percent of low-income households in the U.S. are food insecure.
- Food insecurity includes under-consumption (more common in developing nations) and over-consumption (more common in developed countries).
    - Under-consumption contributes to poor physical and mental development and diminished physical capacity. Globally, about 2 billion people — over 10% of the global population — are undernourished.
    - Over-consumption is a major contributor to development of chronic diseases such as obesity, cardiovascular disease, and diabetes.

Climate change threatens food security in many ways:[3 4]

Climate change can adversely affect not only agricultural and food production, but also its processing and distribution.

- Food production is adversely impacted by declines in crop yield, animal health, and the health of fisheries:
    - Crop yields are reduced by extreme heat, drought, and extreme weather events, all of which are increasing in frequency and severity due to climate change.
    - Warmer temperatures are leading to fewer "chill hours", required for production of nuts, tree fruits, and avocados.
    - Warmer temperatures cause higher ground-level ozone concentrations. Ozone pollution not only causes respiratory and cardiovascular disease, it is also harmful to plants — especially soybeans, wheat, oats, green beans, and peppers — and already causes millions of tons of crop losses each year.
    - Heat stress causes illness in livestock, and reduces milk and egg production.

FAST FACT:

The typical American meal includes ingredients from at least five foreign countries, contributing to transportation GHGE, especially if food is shipped by air.

- In California's recent drought, thousands of head of livestock were culled due to lack of forage grass.
- Fish yields - already declining due to overfishing and ocean dead zones - are further impacted by ocean acidification associated with rising carbon dioxide levels, and by drought as streams where fish spawn are dried up.

- Climate-related increases in crop damage due to higher weed growth and more pests may result in higher use of toxic herbicides and pesticides, with increased risks of pesticide-related illness for agricultural workers, farm communities, and consumers.
- Warmer temperatures increase the growth of *Salmonella*, *Camphylobacter*, *Rotavirus*, and various *Vibrio*, as well as the incidence of harmful algal blooms, thus increasing the risk of bacterial and biotoxin contamination of food.
- Increased atmospheric carbon dioxide results in a reduction in the levels of protein and micronutrients (e.g. calcium, zinc, iron) in important crops like barley, sorghum and soy.
- Extreme weather events can prevent transportation of food products, disrupting food supply chains and increasing loss due to spoilage.
- Population growth will drive global food demand, at the same time that global food production will decrease due to climate change. The Intergovernmental Panel on Climate Change (IPCC) estimates that global food production will decrease by 2% per decade, while global food demand increases by 14% per decade.[5]

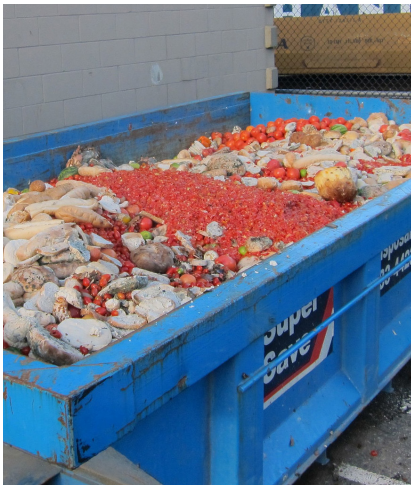
Agricultural practices drive climate change

Unfortunately, the link between climate change and our modern industrial agriculture practices creates a vicious cycle that that harms health through food insecurity and worsening global warming. For more, see Food & Agriculture, Climate Change and Health

- Agriculture contributes about 9% of total U.S. GHGE, 52% of methane emissions, and 84% of nitrous oxide release.[6] Methane and nitrous oxide are both potent short-lived climate pollutants with global warming potentials far higher than that of CO_2.[7 8]
  - When fertilizer use, refrigeration, transportation, and land use changes (such as deforestation and soil depletion) are taken into account, our food and agriculture systems account for about 1/3 of all U.S. GHGE.[9]
  - The application of nitrogen fertilizer accounts for nearly 80% of domestic nitrous oxide emissions.[10]
  - Livestock — especially cattle — accounts for nearly ½ of methane emissions from agriculture, and about 18% of global GHGE.
- Conventional agricultural practices are extremely water intensive. Agriculture uses about 70% of the world's freshwater supply.[11] In California, 80% of water is currently used for agriculture, though water management practices can significantly improve water efficiency.[12 13]
- Food production and processing are energy intensive, accounting for 17% of U.S. fossil fuel use.[14] The typical American meal includes ingredients from at least five foreign countries, contributing to transportation GHGE, especially if food is shipped by air.[15]

FAST FACT:

Nearly 40% of food — worth about $165 billion — goes to waste each year. Every year 30 million tons of food waste ends up in landfills, where it produces methane.



- Nearly 40% of food — worth about $165 billion — goes to waste each year. Every year 30 million tons of food waste ends up in landfills, where it produces methane, a potent climate pollutant. [16]

Climate change, food security, and health equity:

Social and economic inequities, as well as individual characteristics, place some individuals and communities at greater risk for the effects of climate change on food security:

- **Poverty:** Low-income people have less ability to absorb rising food prices. As food prices rise, they face greater food insecurity, and may be forced to choose between food and other necessities such as shelter and transportation. Because people turn to cheaper, low-nutrient, processed foods with more fat, sugar, and salt, food insecurity is associated with higher risks for diabetes and hypertension.[17]
- **Occupation:** Declines in food production result in significant job and economic losses in farming communities. In California, 92% of farmworkers are Latino and 73% of all farmworkers earn less than 200% of the Federal Poverty Level.[18]
- **Cultural Practices:** Many indigenous communities practice traditional hunting, subsistence farming and fishing, and are thus vulnerable to climate change impacts on local game, farming and aquatic habitats. For example, rising sea levels will threaten freshwater and saltwater fishing habitats for many indigenous communities along the Gulf Coast. Rising temperatures are affecting the availability and nutrient content of wild berries for Alaskan Natives.[19]

What can physicians do to address climate change, nutrition, and food security?

- Talk to patients about the risks of climate change, food insecurity, and health and environmental impacts. Encourage patients to:
  - Reduce meat consumption and increase consumption of fruits and vegetables.
  - Buy or produce food locally through community gardens, backyard gardens, and farmers markets.
  - Reduce food waste at home and when eating out. Forty percent of food waste occurs at the consumer level.
- Educate your colleagues and community on the links between climate change and food security, and climate solutions with health co-benefits.
  - Encourage planning departments to create and zone for more urban and community gardens and farmers' markets.
  - Encourage schools, businesses, hospitals and clinics to procure food locally and sustainably.
  - Encourage local public environmental health departments to work with schools, restaurants, and hospitals to reduce food waste and divert edible food to local food banks.
  - Advocate for local composting programs for residents and businesses.

- Promote mitigation and adaptation strategies related to climate change and food security.
    - Implement policies that focus on local food production and procurement, to decrease emissions related to production and distribution of food and increase availability of affordable healthy foods in all communities. See Food and Agriculture Co-benefits sheet for more information.
    - Implement policies to divert edible food from food waste streams to programs that reduce food insecurity, and prevent large-scale food waste.
    - Advocate for reduced federal subsidies for commodity crops, such as corn, which is a staple to cheap, high sugar, low nutrient foods.
    - Advocate for policies that make local, healthy food available to all, such as allowance for SNAP EBT at farmers markets.
- Support policies and programs in your community and in your health system that authentically engage and partner with community residents in addressing climate and health problems, including the social and economic vulnerabilities to food insecurity for individuals and communities.
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    - Close the wage and employment gaps that exist among communities of color and low-income communities. In particular, advocate for just wages for farmworkers, including migrant workers, who usually earn below poverty wages and cannot afford to purchase the very food they grow.

DID YOU KNOW?

The Intergovernmental Panel on Climate Change (IPCC) estimates that global food production will decrease by 2% per decade, while global food demand increases by 14% per decade.

For More Information

- CalCAN: California Climate and Agriculture Network: http://calclimateag.org
- California Food Policy Council: http://www.rootsofchange.org/who-we-are/networks/california-food-policy-council/
- Re-Fed: Reducing Food Waste: http://www.refed.com/?sort=economic-value-per-ton
- Equitable Development Toolkit: Local Food Procurement http://www.policylink.org/sites/default/files/edtk_local-food-procurement.pdf
- Sample Policy: Los Angeles Good Food Purchasing Policy http://goodfoodla.org/policymaking/good-food-procurement/
- Los Angeles Food Policy Tracker: http://goodfoodla.org/2016/03/07/los-angeles-food-policy-tracker/
- American Community Gardens Association: https://communitygarden.org
- San Francisco Urban Agriculture Program: http://sfrecpark.org/park-improvements/urban-agriculture-program-citywide/

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Citations

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