NTR 306: Fundamentals of Nutrition

Chapter 20:

Hunger & the Global Environment

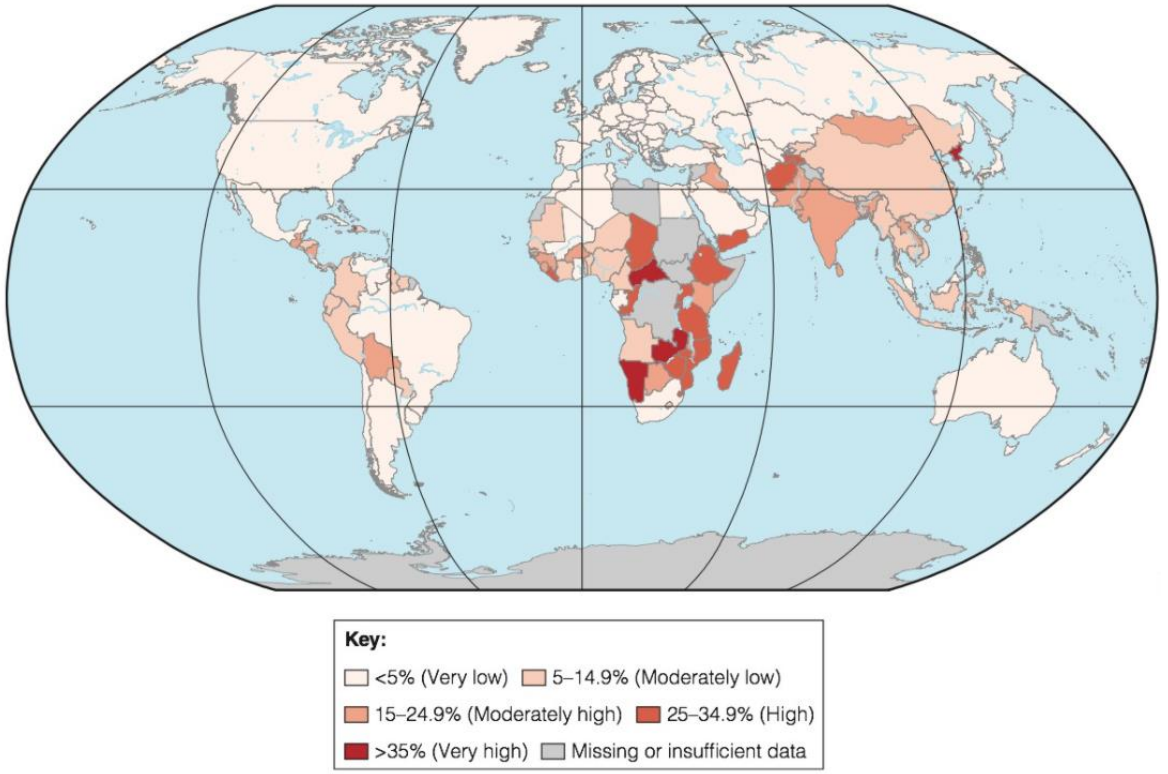
Introduction

- Worldwide: 1 in 9 people experience *persistent hunger*
  - Persistent Hunger vs. Acute Hunger (i.e., appetite control)
    - ✓ *Acute Hunger*: daily perceived hunger fluctuations; acute changes in energy balance (voluntary reductions in food intake)
    - ✓ *Persistent Hunger*: painful sensation/physical and mental weakness from prolonged, involuntary lack of food; chronic malnutrition
  - Every 10 sec, 1 child dies from persistent hunger-related causes
  - Persistent hunger is linked with:
    - ✓ *Poverty*
    - ✓ *Population growth*
    - ✓ *Environmental degradation/inability to produce enough food*

Characterizing Persistent Hunger Around the World

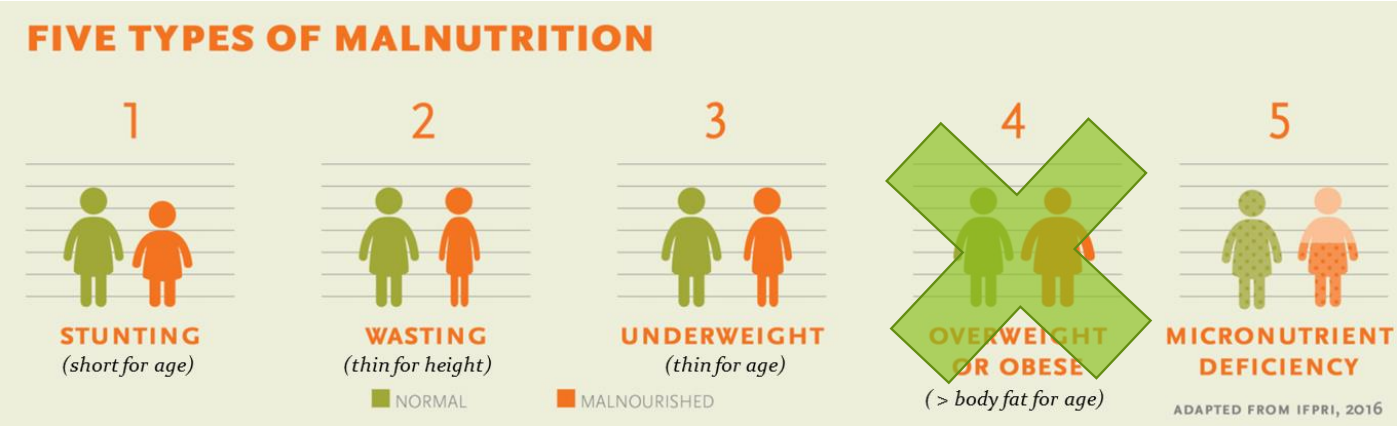
- Primary cause = poverty
  - Developing countries
    - ✓ More prevalent
    - ✓ More severe
  - "Poorest Poor"
    - ✓ Moms
    - ✓ Females
  - Famine: severe food shortage causing widespread starvation and death
    - ✓ *Natural disasters*
    - ✓ *Wars/conflicts*
    - ✓ *Economic/political turbulence*

Hunger Hotspots



Whitney & Rolfes, Understanding Nutrition (15th ed.)

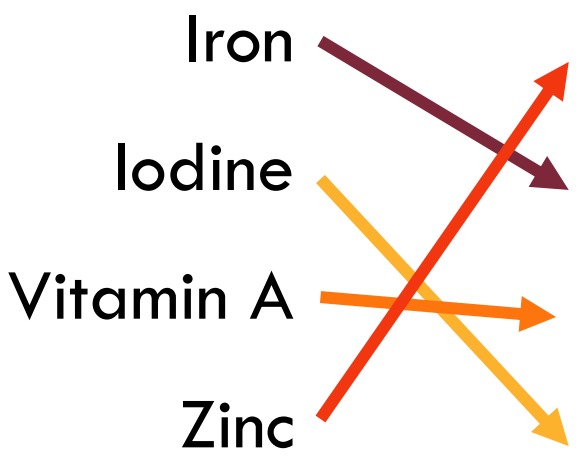
Consequences of Persistent Hunger Around the World



- Acute/Intermittent:
  - **Wasting**: 25% of children in developing countries by age 5
  - **Micronutrient deficiencies**: increased risk of infections, diseases, premature death
- Long-term:
  - **Stunting**: 25% of children in developing countries by age 5
  - **Micronutrient deficiencies**: increased risk of infections, diseases, premature death

Consequences of Persistent Hunger Around the World

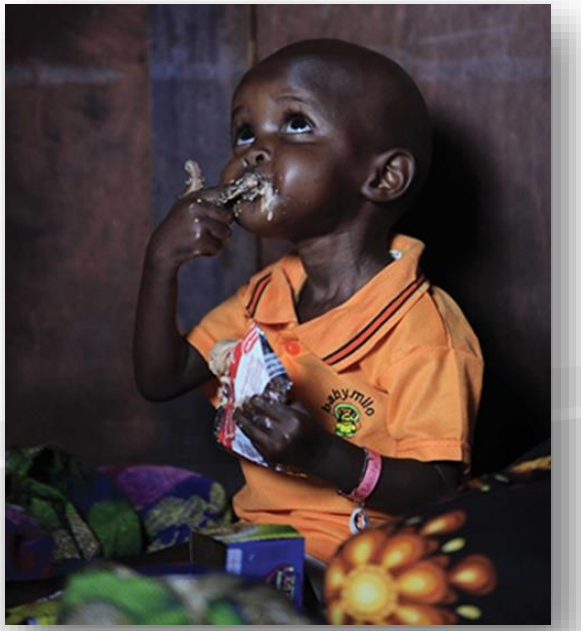
Micronutrients



- Growth failure, diarrhea, pneumonia
- Anemia, preterm births, low birthweight, infections
- Blindness, growth restriction, risk of infections
- Irreversible developmental impairment (brain)

World Rehabilitation Programs

- Provision of fortified foods
  - Ready-to-Use Therapeutic Food (RUTF)
    - ✓ Peanut butter, powdered milk, vitamins
    - ✓ Prevention of malnutrition
  - Oral Rehydration Therapy (ORT)
    - ✓ Treatment of diarrhea
    - ✓ Rehydration
    - ✓ Clean water



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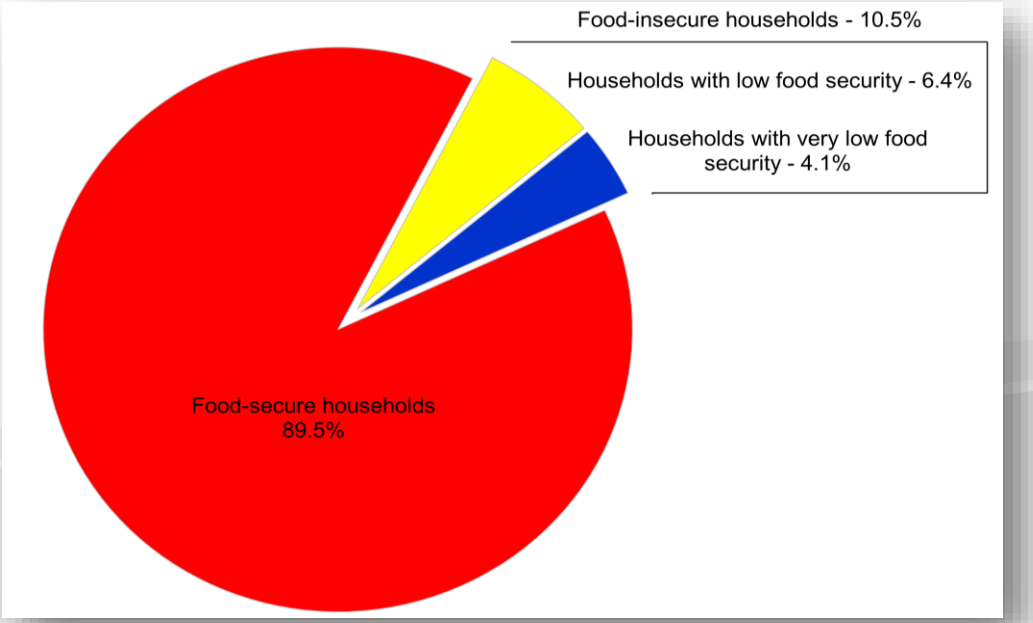
Characterizing Persistent Hunger in the US

- 42 million Americans (6 million children) live in poverty
- Food insufficiency/insecurity = limited access to nutrient-rich foods
  - High Food Insecurity: reduced quality of life, but no reduction in food intake
  - Very High Food Insecurity: disrupted eating patterns **and** reduced food intake
    - ✓ *Eat small meals*
    - ✓ *Skip meals*
    - ✓ *Potentially harmful/unacceptable ways to find food*



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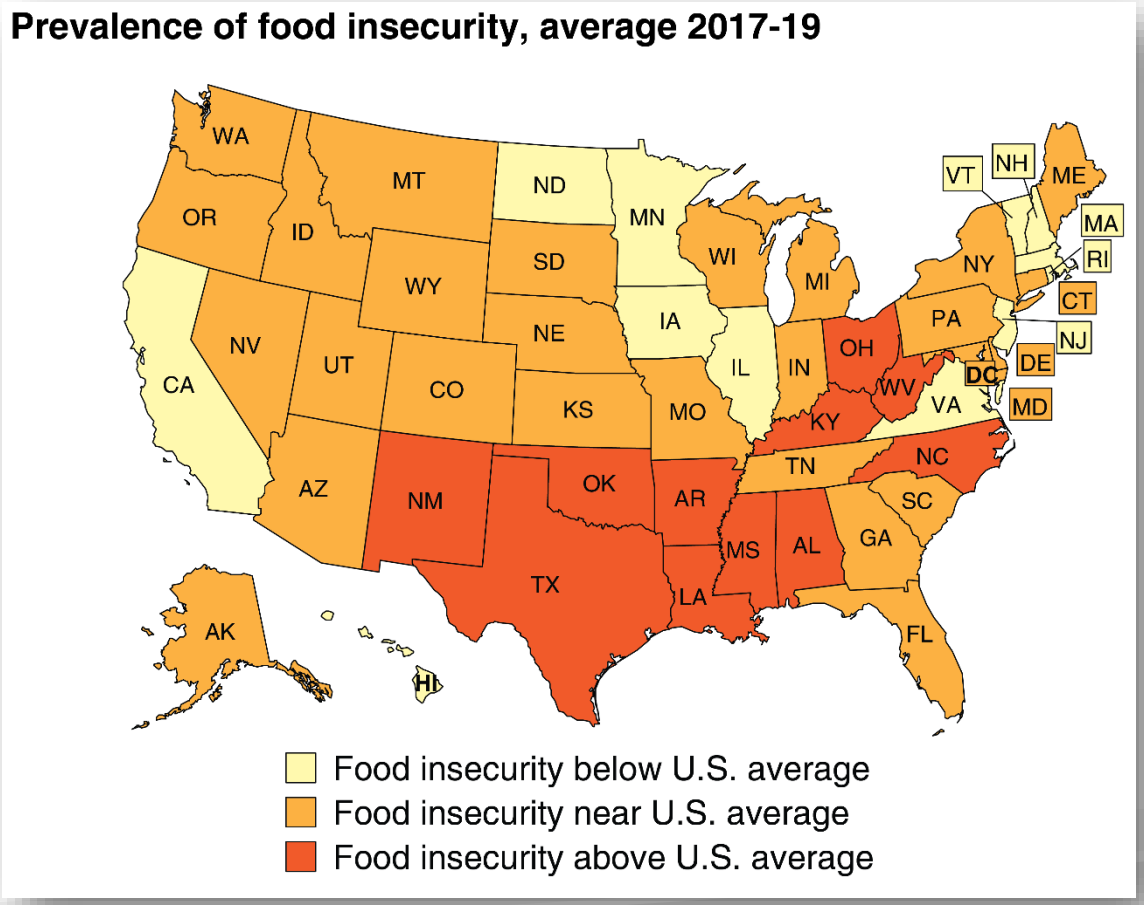
Characterizing Persistent Hunger in the US

- Primary cause = poverty
  - Food vs utilities, housing, medicine
  - Food costs = more flexible and variable
  - Alcohol/drug abuse
  - Lack of awareness of food assistance programs
  - Reluctance to accept help
- Populations most affected:
  - Single parents with children
  - Hispanic and Black population
  - Inner city residents



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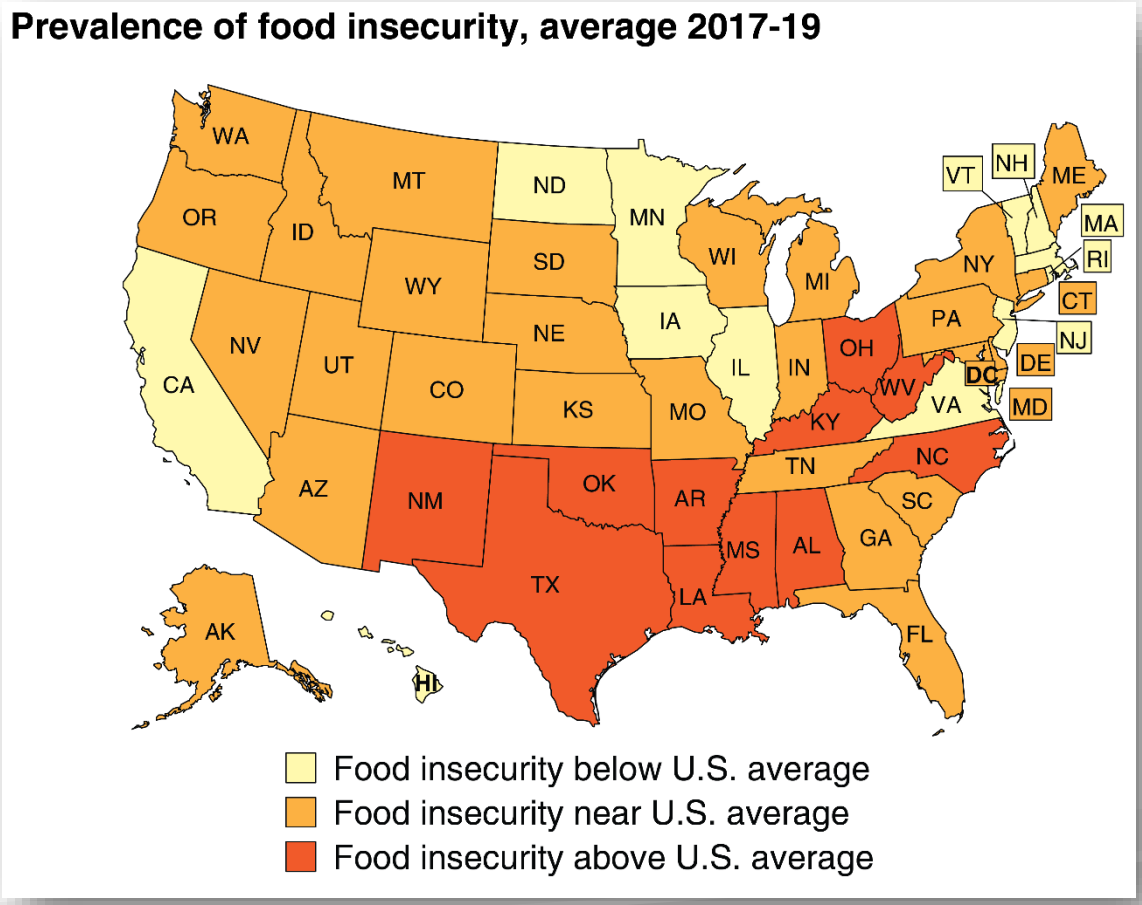
Characterizing Persistent Hunger in the US

- Inadequate dietary intake:
  - nutrient deficiencies
  - chronic health problems
  - poor school performance
  - behavioral issues



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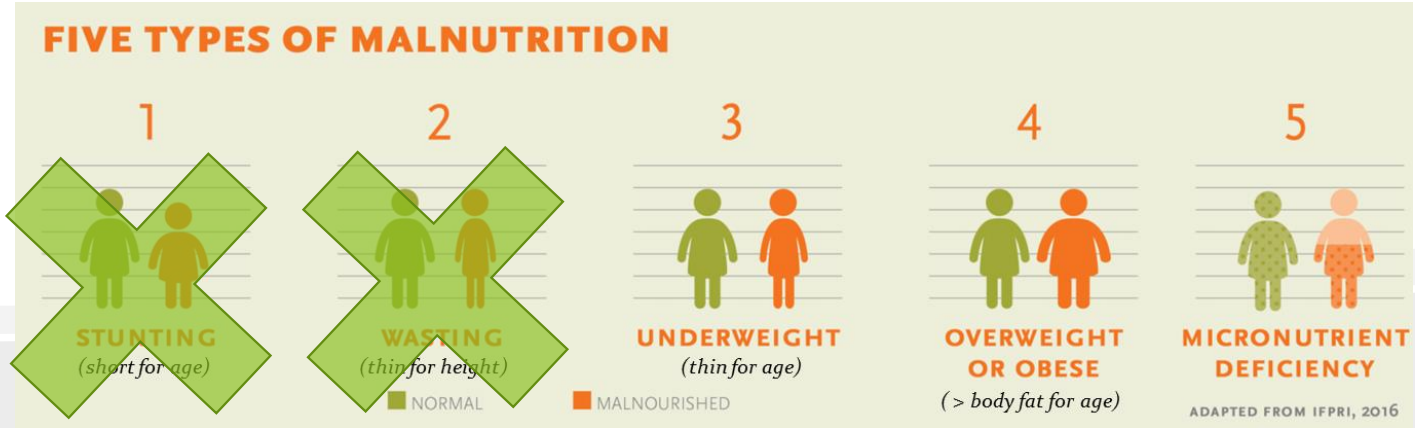
InstaPoll

- What is the health status of the majority of individuals living in poverty in the US?
  - Underweight, but healthy
  - Underweight with increased risk of chronic diseases
  - Overweight/obesity, but healthy
  - Overweight/obesity with increased risk of chronic diseases



“The Poverty-Obesity Paradox”

(Around the World)

Poverty

↓

Food Insecurity
reduced access to all food

↓

Malnutrition
energy deficiency
nutrient deficiency

↓

Underweight,
Chronic Disease

(In the US)

Poverty

↓

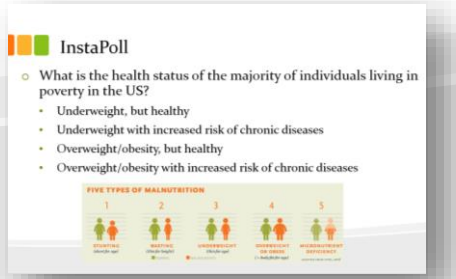
Food Insecurity
reduced access to healthy food
increased access to (unhealthy) food

↓

Malnutrition
energy surplus
nutrient deficiency

↓

Overweight/Obesity,
Chronic Disease



“The Poverty-Obesity Paradox”

- Contributing Factors: food accessibility
  - Food Desert – Area that lacks access to high quality, nutritious foods
    - ✓ *Urban: People live > 1 mile from the nearest grocery store*
    - ✓ *Rural: People live > 10 miles from the nearest grocery store*
  - Food Swamp – Area that has an abundance of nutrient-poor, calorie-dense foods

Convenience Stores/Pharmacies

Fast Food Restaurants

“The Poverty-Obesity Paradox”

Food Availability

Healthy Foods	Grocery Stores (n=44)	Convenience Stores (n=58)
Fruit		
Apples	100%	47%
Bananas	100%	58%
Oranges	100%	43%
Milk		
Skim Milk	91%	35%
1% Milk	82%	35%
Protein-rich Foods		
Eggs	86%	78%
Fish/Seafood (Tuna)	93%	59%
Beans	98%	76%
Peanut Butter	95%	65%

“The Poverty-Obesity Paradox”

Food Prices

Healthy Foods	Grocery Stores (n=44)	Convenience Stores (n=58)
Fruit		
Apples (lbs)	$1.76	+$0.18
Bananas (lbs)	$0.77	+$0.41
Oranges (lbs)	$1.75	+$0.28
Milk		
Skim Milk (gallon)	$3.54	+$0.96
1% Milk (gallon)	$3.60	+$0.49
Protein-rich Foods		
Eggs (dozen)	$2.27	+$0.16
Canned Tuna (5 oz)	$1.58	+$0.10
Beans (16 oz)	$1.64	+$0.22
Peanut Butter (17 oz)	$3.00	+$0.89

Federal Food Assistance Programs in the US

SNAP: Supplemental Nutrition Assistance Program

- Largest federal food program (dollars and people served)
  - 38 million people (~45% are children)
  - $60 billion dollars
- Participation significantly decreases food insecurity
- Funds provided for specific foods for human consumption
  - Some items are excluded
- Few people experiencing homelessness receive food assistance

Federal Food Assistance Programs in the US

WIC: Special Supplemental Program for Women, Infants, and Children

- Low-income, *nutritional risk*
  - Pregnant women
  - Nursing mothers
  - Children (infants - 5 yo)
  - 6.4 million participants
- What's provided:
  - Healthy food
  - 1:1 counseling with nutritionists
  - Recipes, cooking demonstrations
  - Nutrition classes
  - Breastfeeding support

Cereal

- Iron-fortified and low in sugar
- Many are whole grain and high in fiber
- Gluten-free choices

Whole Grain Choices

- Bread (whole-wheat)
- Tortillas (corn or whole-wheat)
- Brown rice
- Oatmeal
- Whole-wheat pasta

Fruits and Vegetables

- Fresh and frozen fruits and vegetables
- Vitamin C-rich 100% juice

Dairy/Soy Choices

- Fat-free and low-fat (1%) milk for women and children 2 to 5 years
- Whole milk for children 12 to 24 months
- Cheese
- Kosher milk and cheese
- Soy milk and tofu
- Yogurt

Protein Foods

- Eggs
- Dry beans, split peas or lentils
- Canned beans
- Peanut butter
- Canned tuna and salmon for fully breastfeeding mothers

Baby Foods

- Baby cereal
- Baby food fruits and vegetables
- Baby food meats for fully breastfeeding babies

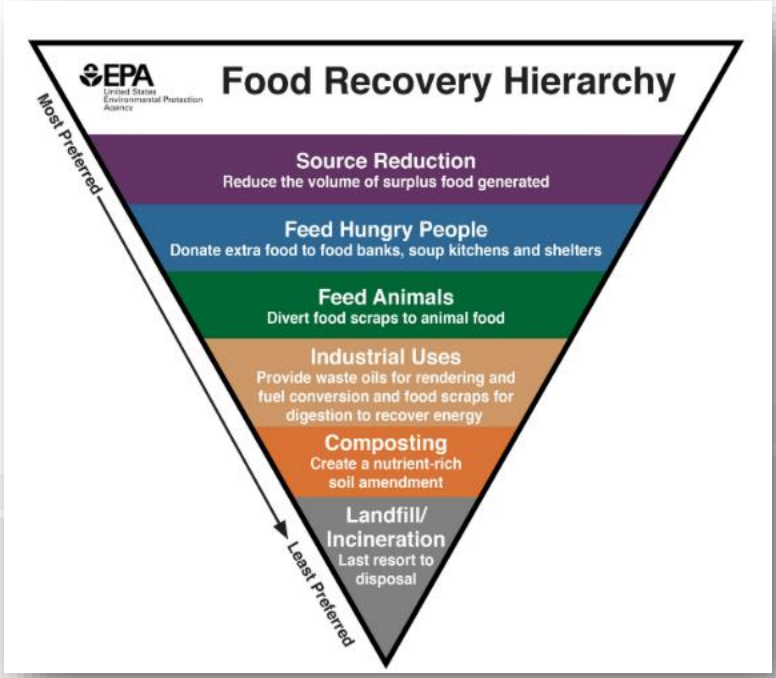
someone from your local WIC office or call the free 24/7 Texas Lactation Support Hotline at 855-550-6667.

Federal Food Assistance Programs in the US

- **National School Lunch/Breakfast Program:**
  - School-age children, low income
  - NSLP: 2nd largest national feeding program
    - ✓ 30 million participants (~60% of all US children)
  - Lunch and breakfast are separate programs (but eligibility is the same)
  - Participants have better nutrient intake than non-participants
- **Older Americans Nutrition Program:**
  - Older adults (anyone 60+), no income eligibility
  - Congregate Meal Program: meals provided in social setting
  - 'Meals on Wheels': meals delivered to home

National Food Recovery Programs

- Food waste in America: ~40% wasted annually
  - Federal legislation to reduce waste
  - Redirect food to hunger relief programs → use food and crop waste to produce energy (kcals)
  - EPA Food Recovery Hierarchy: prioritize actions to prevent and divert food waste
- Feeding America
  - Hunger relief program
  - 200+ food banks; 60,000 food pantries, meal programs
- Community and volunteer efforts
  - Community-based food pantries
  - Soup kitchens



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Agriculture and the Environment

- Consequences of conventional agriculture:
  - Fertilizer use → greenhouse gas emissions
  - Pesticide use → pest and weed resistance→ more chemical use
  - Irrigation→ salt accumulation, decreased water
- Consequences of meat production:
  - Large toll on land and energy
  - Ammonia and methane (animal waste)

Agriculture and the Environment

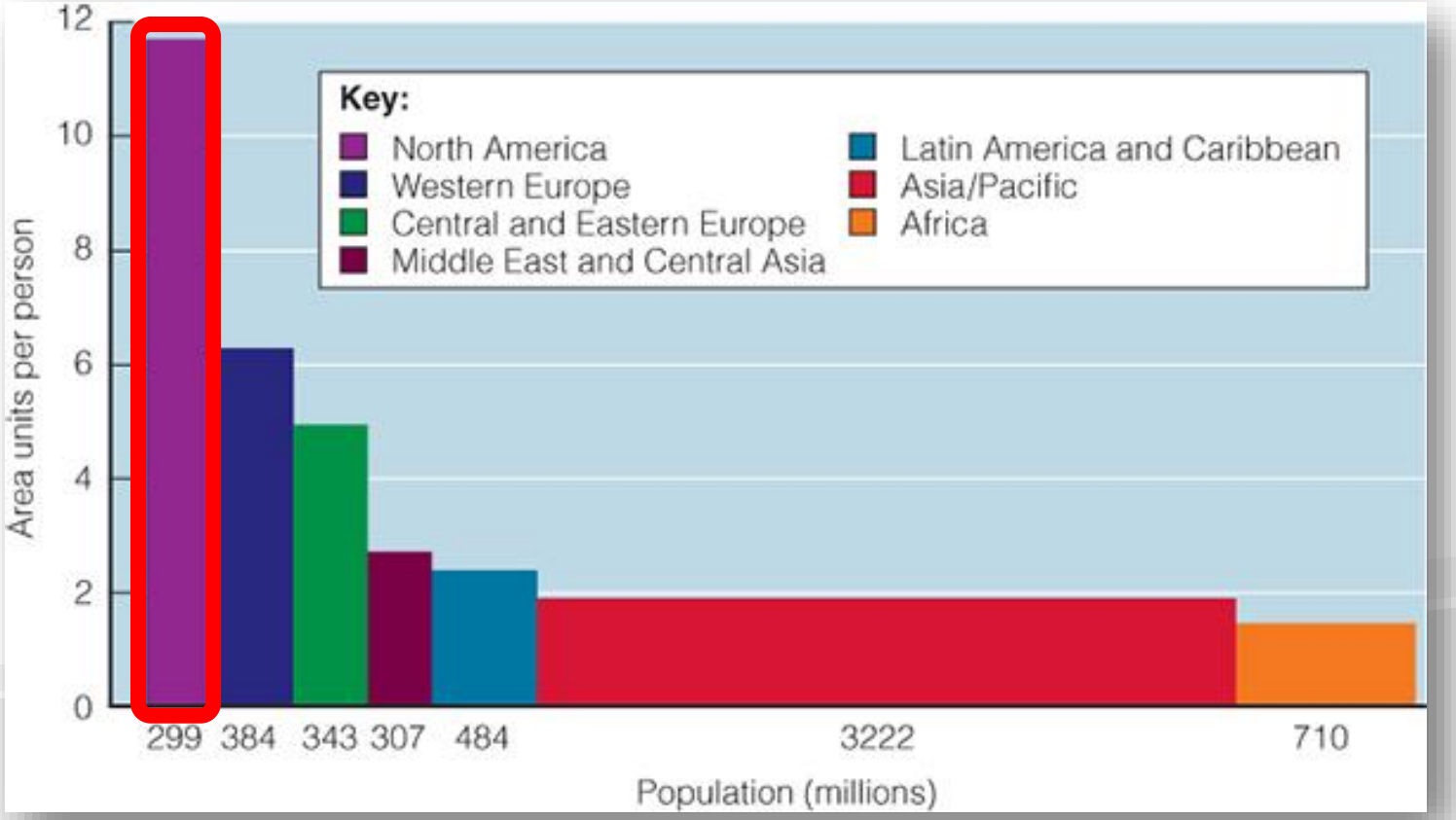
- Consequences of wild fishing and aquaculture:
  - Fish depletion
  - Fishing methods: nets, filament line, ocean floor damage
  - Farm-raised fish consume grain and wild fish
  - Energy-intensive: fuel, refrigeration, transport, etc.

Resource Misuse

- Energy
  - Food industry consumes ~20% of fossil fuels in US
    - ✓ Running farm machinery, producing fertilizers and pesticides, processing, packaging, transportation, refrigeration, storage, preparation
- Water
  - Food industry consumes ~80% percent of water in US
  - Contaminates water supply: wastewater dumped into rivers, lakes, and streams without treatment
- Declining biodiversity, diversity in diets, pollinator populations
- 1/3 of global food supply is wasted
  - Production resources are wasted, too
  - Methane produced from rotting food

Ecological Footprint of North America

- Ecological footprint: a nation's impact on the environment
  - Measures the resources used to support a nation's consumption of food, materials and energy
- Damaged environment cannot support food production!



Sustainable Solutions

- **Consumers have power** as collective individuals!
- Food service managers and dietitians can help conserve resources and **reduce waste**
- **Sustainable agriculture practices** can be as productive as conventional methods

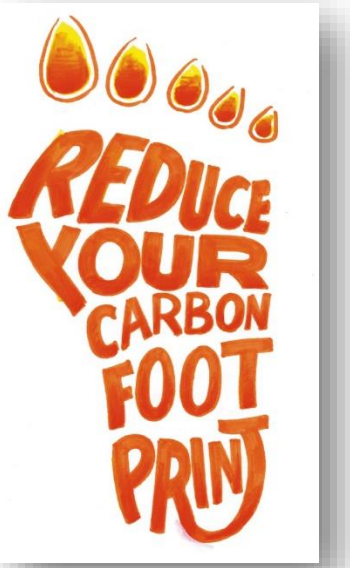
Sustainable Agriculture

Environmental issues	Unsustainable methods	Sustainable methods
Herbicide/pesticide	Spraying herbicides and pesticides over large areas wipes out weeds, pests, and other plants and insects.	Using crop rotations, cover crops, and mechanical cultivation can control weeds. Using resistant crops and rotating crops foils pests that lay their eggs in the soil where last year's crop was grown. Using biological controls such as predators can destroy pests.
Water	Irrigating on a large scale depletes water supplies and concentrates salts in the soil.	Irrigating only during dry spells and applying only spot irrigation conserves water.
Energy	Using only fossil fuels depletes resources.	Using renewable energy technologies such as hydroelectric, biomass, photovoltaics, wind power, solar thermal, geothermal, biogas, and methanol conserves resources. Using machinery scaled to the job at hand, and operating it at efficient speeds conserves energy. Combining operations such as harrowing, planting, and fertilizing in the same operation conserves energy.

Sustainable Agriculture

Environmental issues	Unsustainable methods	Sustainable methods
Soil	Growing the same crop repeatedly on the same land takes nutrients out of the soil, making fertilizer use necessary; favors soil erosion; and invites weeds and pests to become established, making pesticide use necessary. Plowing the same way everywhere, allows water runoff and erosion.	Rotating crops increases nitrogen in the soil so there is less need to use fertilizers. Using appropriate plowing methods reduces soil erosion and problems caused by weeds and pests. Using cover crops, crop rotation, no-till planting, contour planting, ridge till, mulch, terraces, and grass strips conserves both soil and water.
Fertilizer	Using fertilizers pollutes ground and surface water and increases costs.	Reducing the use of fertilizers and using livestock manure more effectively lowers costs. Planting cover crops, such as legumes, after harvest restores nutrients and reduces erosion. Composting all plant residues not harvested into the soil improves its nutrient content and water-holding capacity.
Livestock	Feeding livestock in feedlots concentrates manure that pollutes water and releases methane, a global warming gas. Injecting animals with antibiotics prevents diseases.	Feeding livestock or buffalo on the open range allows their manure to fertilize the ground. Collecting feedlot animals' manure enables it to be used as fertilizer or treated before it is released. Maintaining animals' health can prevent disease.

Sustainable Diets



- Diet composition and environmental footprint study
  - Best options were vegetarian (not vegan)
  - Small amounts of meat and dairy
  - Benefits: minimizes environmental impacts, promotes health
  - Environmental impact: increases global carrying capacity

Sustainable Solutions: What can we do?

- Goal = select a meal pattern that is *both* healthy and sustainable
  - Minimize ultra-processed, packaged foods
  - Include more plant-based and less animal-based foods
  - Meet daily energy needs without excess kcalorie intake
  - Get to know your food: Who's your farmer? How do they grow food?
  - Shop local when possible, if not then regional, then national, then global

Austin Farmers' Markets – Eat Local!