Learning Objectives

2

Suggested CDR Learning Codes: 8000, 8018; Level 2

1. Define sustainability in the food system.
2. List three indicators of food sustainability.
3. Explain strategies to promote plant-based eating patterns that are linked with sustainability.

Disclosures

3

Sharon reports the following relevant disclosures:

She provides consultant services for a select group of organizations, including American Pistachio Growers, Daisy Brand Cottage Cheese, SOYJOY, and Tomato Product Wellness Council.

What is Sustainability?

4

Online survey: US respondents chose words to describe sustainability:

- "environmentally friendly"
- "natural"
- "organic"
- "green"
- "recycle"
- "renewable"

(Kho, ***Guardian Sustainable Business***, 2014)

What is Sustainability?

5

Street in a Peruvian city

- According to the Encarta World English Dictionary, it means "able to be maintained."
- It can be applied to various subjects, including society as a whole, industry, agriculture, or family values.
- It can be overwhelming, but the root meaning is actually a simple concept that is nearly intuitive to most people.

What is Sustainability?

6

Sustainability is broadly defined as meeting the needs of the present generation without compromising the ability of future generations to meet their own needs.

(Vanderbilt University, 2015)

What is Sustainability?

7

Sustainability could be defined as an ability or capacity of something to be maintained or to sustain itself. It's about taking what we need to live now, without jeopardizing the potential for people in the future to meet their needs. If an activity is said to be sustainable, it should be able to continue forever.

(LandLearnNSW, 2015)

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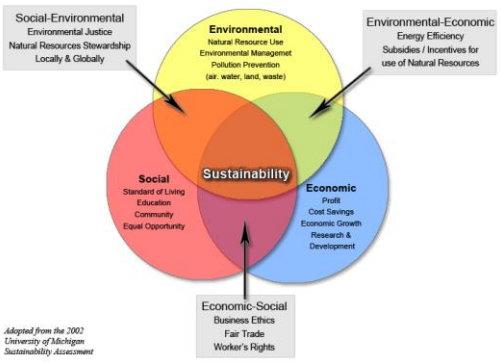
The Three Spheres of Sustainability



Adopted from the 2002 University of Michigan Sustainability Assessment

The Story of an Ant Colony

9

- What does an ant colony need to sustain itself?
  - Access to fresh water
  - Clean air to breathe
  - Healthy food
  - Suitable location for the colony
- The natural world supplied these necessities; the only waste product is fertilizer for the soil. Talk about a sustainable society!

The Story of the Human Colony

10

In our past, we lived more sustainably.

- Nutrients and energy came from nature; waste and dead material returned to earth to form nutrients.
- Humans lived in greater harmony with natural world, taking only what they needed for survival.
- 10 million Native Americans maintained balance with nature.
- See this relationship in indigenous societies.

Image source: Wikicommons

The Story of the Human Colony

11

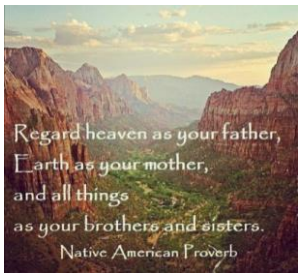


Image Source: Wikicommons

The Story of the Human Colony

12

Modern day Amazonian tribe

Image Source: Wikicommons

Today's Lifestyle

13

In our past, we lived more sustainably. But the way we live today threatens our future:

How are products manufactured, transported, and disposed of?

How are energy systems employed to grow our food?

How is our food grown?

The Global Picture

14

- Current population over 7 billion; 9 billion expected by 2050.
- Studies show Earth's resources are enough to sustain about 2 billion people at European standard of living.
- Average European consumes more resources than poorest 2 billion; but they consume about half the rate of Americans.
- We consume 50% more resources than Earth is producing; in the past 12 months we consumed resources that took 18 months to produce.

(World Population Balance, 2014)

The Global Picture

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- If all of the world's 7 billion people consumed as much as the average American, it would take 5 Earths to sustain them.
- Each American uses 20 acres land and water biocapacity per year.
- Our planet's ecosystems are deteriorating.
- Our climate is changing. Manmade climate risks as conclusive as smoking and lung cancer risk. (Fischer, ***The Daily Climate***, 2014)
- 1/6 of humans go to bed hungry each day.
- 12% of world's land area used in agriculture; production needs to increase by up to 70% globally to keep up with population.

(World Population Balance, 2014)

The Global Picture

16

- Each day, 50 – 100 species of animals and plants are driven to extinction.
- 17 trees are required to make one ton of paper.
- Each year, the US sends 500 million tons of solid hazardous waste to landfills and adds 3 million tons of toxic chemicals to air and water.
- The average American produces 1,609 pounds of waste each year.

(New York University, 2015)

The Global Picture

17

Human activity pushed Earth beyond 4 of its planetary boundaries, including:

- Extinction rate
- Deforestation
- Level of carbon dioxide in the atmosphere
- Flow of nitrogen and phosphorous (used on land as fertilizer) into the ocean

(Javala et al., ***IOP Science***, 2014)

Enter the Food System

18

- How we eat plays a huge factor on the sustainability of the planet's resources.
- Food system in US: 13% of GNP, 17% of workforce.
- Food system sustainability issues:
  - Inputs (fertilizers, pesticides)
  - Processing (minimally vs. highly)
  - Distribution (travel miles)
  - Acquisition (purchasing protocol)
  - Preparation (energy intensive)
  - Consumption (restaurants, home)
  - Metabolism (how do foods impact humans)

What is a Sustainable *Food* System?

19

A sustainable and resilient food system conserves and renews natural resources, advances social justice and animal welfare, builds community wealth, and fulfills the food and nutrition needs of all eaters now and in the future.

(Harmon and Tagtow, 2009)

What is a Sustainable *Food* System?

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One that provides healthy food to meet current food needs while maintaining healthy ecosystems that can also provide food for generations to come with minimal negative impact to the environment. A sustainable food system also encourages local production and distribution infrastructures and makes nutritious food available, accessible, and affordable to all. Further, it is humane and just, protecting farmers and other workers, consumers, and communities.

(APHA, 2007)

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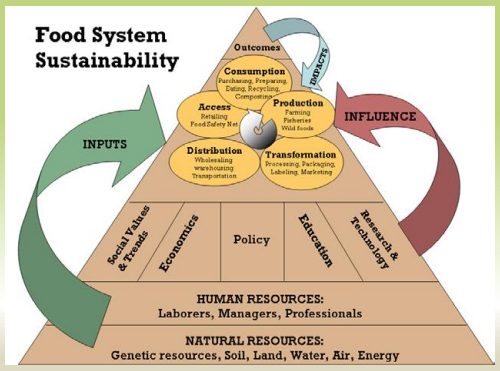

(American Dietetic Association, 2007)

The Western Diet Up Close
Characterized by:

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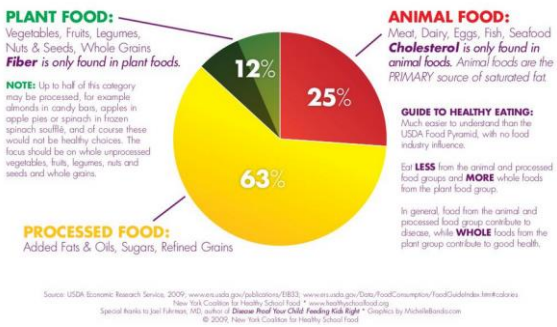
Over Consumption of:
-Refined Sugars
-Salt
-Saturated Fat
-Animal Products

Reduced Consumption of:
-Omega-3 Fatty Acids
-Fiber
-Fruits, Vegetables
-Whole Grains

(Myles, ***Nutrition Journal***, 2014)

U.S. FOOD CONSUMPTION
AS A % OF CALORIES



Source: USDA Economic Research Service, 2009; www.ers.usda.gov/publications/EIB33; www.ers.usda.gov/Data/FoodConsumption/FoodGuideIndex.htm#calories
New York Coalition for Healthy School Food • www.healthyschoolfood.org
Special thanks to Joel Fuhrman, MD, author of *Disease Proof Your Child: Feeding Kids Right* • Graphics by MichelleBarolo.com
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Why Is Western Diet a Problem?

24

- We're eating too much meat and not enough plants!
- Most Americans eat more than 1.5 X average daily protein requirement; and more than recommended amount from USDA Protein Foods group. (USDA Economic Research Service, 2014)
- Reducing consumption of meats (particularly red meat) yields greatest returns in water and energy efficiency. (Marrin, ***Int J Food Sci Nutr***, 2014)

Why Is High-Animal Food Diet a Problem?

25

- Animals are inefficient at converting food into protein.
- Eat plants directly from the soil vs. feeding them to animals.
- Eco-impacts: land use, water consumption, manure, methane, fossil fuel, growth of feed (fertilizers, water, pesticides, fossil fuels).
- Meat production contributes to global warming at far greater rate than grains and vegetables.

(Eshel et al., PNAS, 2014)

Eco-Impact: Intensive Food Animal Production

26

- Concentrate and confine up to thousands or even millions of animals in small areas.
- Generate more than 335 million tons of dry manure waste each year—too concentrated to apply to land.
- Potential for pathogens, dust, arsenic, dioxin, antibiotics, and other pollutants.
- Air quality: ammonia, hydrogen sulfide, carbon dioxide, microorganisms, dusts, endotoxins; linked with respiratory conditions.
- Antibiotic use in feed additives contributes to resistance.
- Inhumane conditions.

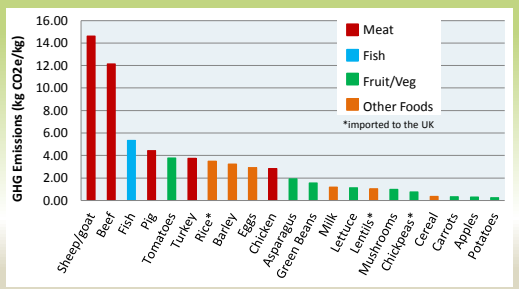
(APHA, 2007)

Environmental Impacts of High Animal Food Diet: Greenhouse Gas Emissions

- Animal agriculture major driver of climate change (14.5% of GHGE). (Bailey et al., 2014)
- Contributes to catastrophe from rising global food demand from growing world population and climate change. (Benton, ***A Global Village,*** 2012)
- Beef releases 5 X GHGE as average of other meats and animal products. (Eshel et al., PNAS, 2014)
- By 2050, Western-style diet would increase yearly GHGE related to food by 80%. (Tilman and Clark, ***Nature***, 2014)

GHG Emissions From Primary Production to Regional Transport Center in UK

Meats are more carbon intensive to produce; red meats, by far, are the largest offenders.



(Oates, Arbtech, 2014)

Environmental Impacts of High Animal Food Diet: Water Use

- We are *eating* our water—agriculture accounts for 70% water use.
- Growing crops for animal feed highly inefficient use of water; places strain on diminishing freshwater reserves.
- 1,600 - 2,500 gallons water to produce one pound of feedlot beef. (257 for soybeans, 501 chickpeas, 146 corn, 290 oats, broccoli 34, tomatoes 26)
- Globally, 27% of water "footprint" of humanity attributable animal food production. (JHSPH, 2015)
- 40% water consumed in US used for animal food production. (Mekonnen and Hoekstra, Unesco, 2011)
- Beef requires 11 X more water as average of other meats and animal products. (Eshel et al., PNAS, 2014)

Environmental Impacts of High Animal Food Diet: Land Use

- Animal agriculture drives escalation of deforestation, seagoing trawlers, refrigerators, fertilizer production, transportation, and industrial food processing plants. (Tilman and Clark, ***Nature***, 2014)
- Beef requires 28 X more land as average of other meats and animal products. (Eshel et al., PNAS, 2014)
- Fishing: 75% world's fish stocks fully exploited, overexploited, or depleted. (APHA, 2007)

Environmental Impacts of High Animal Food Diet: Waste

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- Waste lagoons threaten human health in community, drinking water, antibiotics contamination.
- Waste can pollute waterways; contribute to "dead zones"
  - areas with low oxygen water
  - formed by agriculture fertilizer and waste water
  - boost algae bloom
  - sucks up oxygen
  - marine life struggles to survive
  - Gulf of Mexico Dead Zone is size of Connecticut

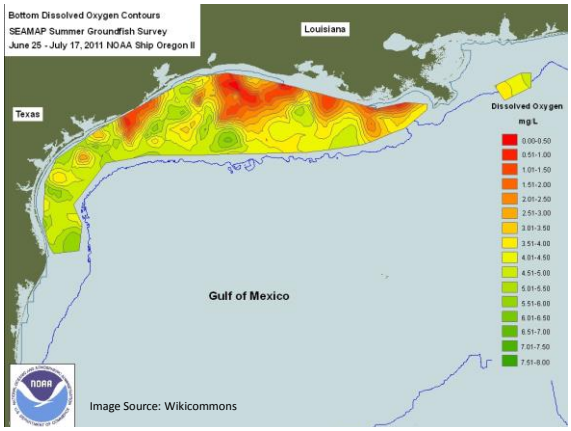

Image Source: Wikicommons

Plant-based Eating Patterns: Better Eco-Impact

33

- Reducing livestock production by 50% in EU will reduce GHGE by 25-40%. (Westhoek et al., ***Science Direct***, 2014)
- Mediterranean diet reduced GHGE 72%, land use 58%, energy consumption 52%, water consumption 33% in Spain, compared to Western diet. (Sáez-Almendros et al., ***Environmental Health Journal***, 2013)
- In a study of different European regions, vegetarian diets achieved greatest reduction in water consumption, compared to current diet in the region ("healthy diet" based on regional guidelines). (Vanham et al., ***Environment International***, 2014)
- Study of 5 Diets: Vegans 42% lower GHGE, vegetarians 28% lower, pescatarians 24% lower, semi-vegetarians 20% lower than nonvegetarians. (Watson and Linda, ***Food Navigator***, 2013)

Plant-based Eating Patterns: Better Eco-Impact

34

- Reducing animal products saves water resources; up to amount needed to feed 1.8 billion additional people globally. (Javala et al., ***IOP Science***, 2014)
- Lacto-ovo vegetarian diet requires less energy, land, and water resources than meat-based diet. (Pimentel and Pimentel, ***AJCN***, 2003)
- Person consuming average diet releases 701 kg of CO_2 per year more than emissions of person consuming only plants. (Eshel, ***Earth Interactions***, 2005)
- Soy-based foods deliver highest protein density per amount of fossil energy inputs.

35

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There is something you can do about it: eat less meat and cheese. When you do eat them, go greener. This EWG guide can help you green your diet and advocate for changes to make our food system better for our bodies and the planet.

HERE'S HOW EATING LESS MEAT MEASURES UP AGAINST OTHER CLIMATE-SAVING ACTIONS:

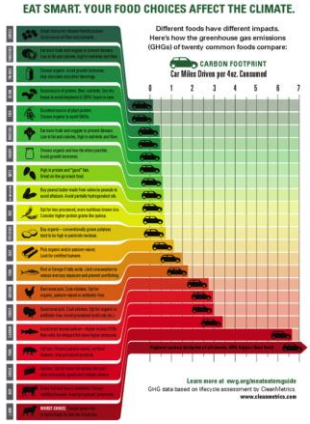
OVER 1 YEAR

IF YOU eat one less burger per week	It's like taking your car off the road for 320 miles, or line-drying your clothes half the time.
IF YOUR 4-PERSON FAMILY skips meat + cheese 1 day a week	It's like taking your car off the road for 5 weeks or shortening everyone's daily shower by 3 minutes.
IF YOUR 4-PERSON FAMILY skips steak 1 day a week	It's like taking your car off the road for almost 3 months.
IF EVERYONE IN THE U.S. ate **NO** meat or cheese just 1 day a week	It's like not driving 91 billion miles – or taking 7.6 million cars off the road.

OVER 1 YEAR

www.ewg.org/meateatersguide

38



BEST CHOICES

- Lentils
- Tomatoes
- 2% Milk
- Beans
- Tofu
- Broccoli

WORST CHOICES

- Lamb
- Beef
- Pork
- Cheese
- Salmon

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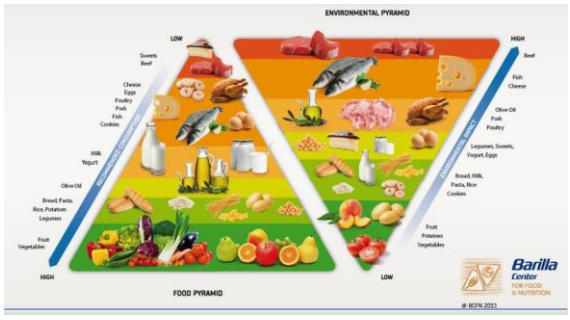
Barilla Double Pyramid



40

Good News!

- 47% eating vegetarian meals a significant amount of time. (Casalena, Vegetarian Resource Group, 2012)
- 77% Americans say sustainability factors into food purchasing decision. (Sustainable Brands, 2014)
- 65% people are trying to eat less meat. (Business Insight Reports, 2012)
- 36% consumers buy meat substitutes, though only 7% identify as vegetarian. (Mintel, 2013)

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Developing a Plant-Based Eating Style

include more plant proteins:

- legumes (beans, lentils, and peas)
- soy foods (tofu, tempeh, soy milk, meat substitutes)
- nuts and nut butters (almonds, walnuts, hazelnuts, pecans, pistachios, macadamias, Brazil nuts, peanuts)
- seeds and seed butters (sunflower, sesame, hemp, chia, pumpkin)
- whole grains (quinoa, oats, brown rice) can be good protein source (up to 11 g protein per cup, i.e. Kamut)
- vegetables, such as peas, spinach, broccoli (can contain up to 6 g protein per cup)

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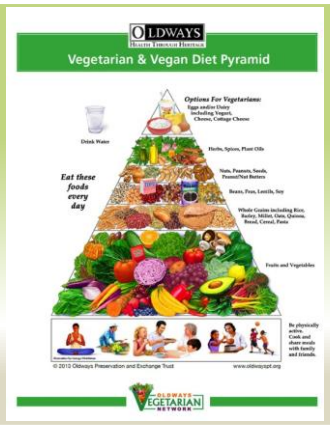

Oldways Vegetarian & Vegan Diet Pyramid

43

Tips For a Healthy Plant-Based Eating Style

Start the day right. Go veggie at breakfast.

Join the Meatless Monday bandwagon.

Shop for plants first. Instead of planning your menu around meat, plan it around plants.

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Tips For a Healthy Plant-Based Eating Style

If you eat meat, use it as a seasoning. Cut down on animal food intake while pushing plants by using meat as a flavoring in dishes instead of main event.

Create a plant-based pantry list. Many plant-based foods like beans and whole grains are shelf-stable, convenient, and economical.

Get cooking! Plan at least one night a week to try a new vegetarian recipe.

45

Tips For a Healthy Plant-Based Eating Style

Keep it simple. Not every meal has to involve cookbooks and cutting boards; it can be as easy as black bean burritos, vegetarian chili, or hummus pita sandwich.

Try ethnic flair. Some cultures know how to do vegetarian meals right!

Convert your favorite dishes. Turn your favorite meat-based recipes veggie for an easy dinner solution.

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Tips For a Healthy Plant-Based Eating Style

Dust off your slow-cooker. Just throw in veggies, herbs, vegetable broth, canned tomatoes, whole grains, and dried beans; then turn the dial on.

Try plant-based dairy products. Try more plant-based alternatives for milk, yogurt, and cheese.

Think "yes". Don't dwell on what you *can't* have, think about what you *can* have!

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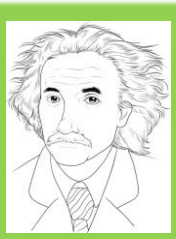

"Nothing will benefit human health and increase the chances for survival of life on earth as much as the evolution to a vegetarian diet."
—Albert Einstein

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Questions

Credit Claiming

You must complete a brief evaluation of the program in order to obtain your certificate. The evaluation will be available for 3 months; you do not have to complete it today.

Credit Claiming Instructions:

1. Go to www.CE.TodaysDietitian.com/Sustainability **OR** Log in to www.CE.TodaysDietitian.com and go to My Account→ My Activities→ Courses (in Progress) and click on the webinar title.
2. Click "Continue" on the webinar description page. Note: You must be logged-in to see the "Continue" button.
3. Select the Evaluation icon to complete and submit the evaluation.
4. Download and print your certificate.

Please Note: If you access the Evaluation between 3-4 pm ET on 1-29 you may experience a slow connection due to a high volume of users