Nourishing the Future: Sustainable Food Systems for Nutrition and Dietetic Students

Module 1: Introduction to Sustainable Food Systems

Practice and Resources Booklet

Last revised: October 6, 2025

Nourishing the Future: Sustainable Food Systems for Nutrition and Dietetic Students
Module 1: Introduction to Sustainable Food Systems: Practice and Resources Booklet

Table of Contents

Case Study 1: FEAST **4**
Background 4
Assignment 4
Discussion Questions 4

Case Study 2: ReFED **5**
Background 5
Assignment 5
Discussion Questions 5

Supplemental Activity 1: Consumer Food Waste **6**
Assignment 6

Supplemental Activity 2: Global Systems Thinking **6**
Assignment 6

Learn More **7**
Sustainable Diets 7
Food Waste 7

Glossary **8**

References **9**

Appendix A: FEAST **12**

Appendix B: ReFED **14**

Appendix C: Guiding Principles for Sustainable Healthy Diets **16**

Case Study 1: FEAST

Background

FEAST was established in 2013. Its mission is to promote wellness and enrich lives through the power of healthy foods and human connection. Programs address wellness, family feeding, and perinatal support through education, support, and community engagement.

Assignment

Read the FEAST case study in Appendix A.

Discussion Questions

1. How can human connection and relationships, such as the FEAST program's approach of empowering caregivers, be used by you or your institution to encourage healthy and sustainable behavior changes?
2. FEAST's program strives to support whole people, where people feel safe, supported, and connected to their bodies and themselves
3. In your role(s), how can you adopt a whole person approach to create healthy individuals and communities?

Case Study 2: ReFED

Background

ReFED, with World Wildlife Fund, established the US Food Waste Pact, which is a national pre-competitive collaboration between businesses across the food chain to share data and best practices on reducing wasted food.

Assignment

Read the ReFED case study in Appendix B.

Discussion Questions

1. Dietitians typically address we do eat rather than what we don't. Considering where you work in the food supply chain, how can you help broaden our approach among colleagues and consumers?
2. How might you compel the decision-making leaders in your institution to become signatories of the U.S. Food Waste Pact? What kind of appeals would they be most receptive to?

Supplemental Activity 1: Consumer Food Waste

Assignment

1. Visit ReFED.
2. Track your own food waste for three days (two weekdays, one weekend day), recording the weight of each food group, if possible.
3. Make a pie chart of your food waste by food category.
4. Review the recommendations for reducing wasted food and evaluate them on how easy they are for a consumer to implement in your community.

Supplemental Activity 2: Global Systems Thinking

Assignment

1. Review the Food Systems Dashboard.
2. Choose a country or region from the Global Data map, select country data.
3. Review one to three indicators from each of the main categories: Drivers, Food Supply Chain, Food Environments, Individual, Cross-cutting Issues (using most current data available).
4. Select a few nutrition-related outcomes.
5. Write a description of the food system in your selected country based on the identified indicators and outcomes.
6. How does a systems perspective inform your understanding of community and individual nutrition status?

Learn More

Sustainable Diets

- Empowering Nutrition Professionals to Advance Sustainable Food Systems
- Food Systems Dashboard
- FAO Key Recommendation for Improving Nutrition Through Agriculture and Food Systems
- FAO & WHO Sustainable Healthy Diets Guiding Principles (see pages 10–11, Guiding Principles for Sustainable Healthy Diets; also provided as Appendix C in this booklet)
- ICDA Sustainable Food Systems Toolkit
- One Blue Dot: The British Dietetic Association's (BDA) Environmentally Sustainable Diet Project

Food Waste

- Just Eat It
- FoodForward
- Solutions by ReFED

Glossary

Biodiversity. The variability among living organisms from all sources, including terrestrial and aquatic ecosystems and the ecological complexes of which they are a part. (Millennium Ecosystem Assessment, 2005)

Ecological health. The state of an ecosystem's balance and functionality, where the interactions between living organisms and their environment are sustainable and resilient, thereby able to better withstand disturbances and continue to provide essential services to all forms of life. (The Centre for Conscious Design)

Eutrophication. The overabundance of nutrients in a body of water that results in harmful algal blooms, fish kills, and in some cases ecosystem collapse. (National Center for Coastal Ocean Science, 2007)

Food system. The entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption, and disposal of food products that originate from agriculture, forestry or fisheries, and parts of the broader economic, societal, and natural environments in which they are embedded. (FAO, 2018)

Greenhouse gas emissions (GHGe). The release of gases into the environment that absorb longer wavelength radiation and increase atmospheric temperatures. (Encyclopedia of Physical Science and Technology, 2003)

Planetary health. The health of human civilizations and the state of natural systems on which they depend. (The Lancet Planetary Health, 2017)

Reductionism. The concept that complex systems can be understood entirely in terms of their simpler, constituent parts. (Popan, 2024)

Supply chain. A linked set of resources and processes between multiple tiers of developers that begins with the sourcing of products and services and extends through the design, development, manufacturing, processing, handling, and delivery of products and services to the acquirer. (Ross & Capan, 2018)

Systems thinking. A framework for seeing interrelationships rather than things, for seeing "patterns of change" rather than static "snapshots." (Senge, 2006)

Value chain. The full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use. (Kaplinsky & Morris)

Wasted food. The food that was not used for its intended purpose and is managed in a variety of ways, such as donation to feed people, creation of animal feed, composting, anaerobic digestion, or sending to landfills or combustion facilities. (US EPA, 2025)

References

CBD Biosafety Unit. (2006). Article 2. Use of Terms. Convention on Biological Diversity; Secretariat of the Convention on Biological Diversity. https://www.cbd.int/convention/articles?a=cbd-02

Clark, M., Springmann, M., Hill, J., & Tilman, D. (2019). Multiple health and environmental impacts of foods. *PNAS, 116*(46), 23357–23362. https://doi.org/10.1073/pnas.1906908116

Cook, J. (2013). *A drop in the ocean*. Woods Hole Oceanographic Institution. https://www.whoi.edu/multimedia/a-drop-in-the-ocean/

Crippa, M., Solazzo, E., Guizzardi, D., Monforti-Ferrario, F., Tubiello, F. N., & Leip, A. (2021). Food systems are responsible for a third of global anthropogenic GHG emissions. *Nature Food, 2*(3), 198–209. https://doi.org/10.1038/s43016-021-00225-9

Explaining the Gulf of Mexico Dead Zone. (2025). *Restore the Mississippi River Delta*. https://mississippiriverdelta.org/learning/explaining-the-gulf-of-mexico-dead-zone/

Falkenmark, M., & Rockström, J. (2013). *Balancing water for humans and nature: The new approach in ecohydrology*. EarthScan. https://doi.org/10.4324/9781849770521

FAO. (2022). The State of World Fisheries and Aquaculture 2022: *Towards Blue Transformation (The State of the World)*. Food and Agriculture Organization of the United Nations. https://doi.org/10.4060/cc0461en

FAO, IFAD, UNICEF, WFP, & WHO. (2021). *The State of Food Security and Nutrition in the World 2021: Transforming food systems for food security, improved nutrition and affordable healthy diets for all*. Food and Agriculture Organization of the United Nations. https://doi.org/10.4060/cb4474en

FAO & WHO. (2019). Sustainable Healthy Diets: Guiding Principles (p. 44). *Food and Agriculture Organization of the United Nations & World Health Organization*. https://openknowledge.fao.org/handle/20.500.14283/ca6640en

Halloran, A. (2021). COP26 failed to tackle the biggest GHG emitter: The food system. *Food Planet Prize*. https://foodplanetprize.org/news/cop26-fails-to-systemically-tackle-the-biggest-ghg-emitter-the-food-system/

HLPE CFS. (2017). *Nutrition and food systems: A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security (HLPE Report 12)*. High Level Panel of Experts Committee on World Food Security. https://openknowledge.fao.org/server/api/core/bitstreams/4ac1286e-eef3-4f1d-b5bd-d92f5d1ce738/content

Hoffmann, I. (2003). Transcending reductionism in nutrition research. *The American Journal of Clinical Nutrition, 78*(3), 514S-516S. https://doi.org/10.1093/ajcn/78.3.514S

IFIC. (2023). *Consumer Climate Change Perceptions and Purchase Impacts. International Food Information Council*. https://foodinsight.org/wp-content/uploads/2023/10/Oct23-IFIC-Climate-Change.pdf

Kraak, V. I., & Stanley, K. C. (2023). An economic lens for sustainable dietary guidelines. *The Lancet Planetary Health, 7*(5), e350–e351. https://doi.org/10.1016/S2542-5196(23)00075-X

Lachat, C., Raneri, J., Walker Smith, K., Kolsteren, P., Van Damme, P., Verzelen, K., Penafiel, D., Vanhove, W., & Kennedy, G. (2018). Dietary species richness as a measure of food biodiversity and nutritional quality of diets. *PNAS, 115*(1), 127–132. https://doi.org/10.1073/pnas.1709194115

Murray, C. J. L., Aravkin, A. Y., Zheng, P., Abbafati, C., Abbas, K. M., Abbasi-Kangevari, M., Abd-Allah, F., Abdelalim, A., Abdollahi, M., Abdollahpour, I., Abegaz, K. H., Abolhassani, H., Aboyans, V., Abreu, L. G., Abrigo, M. R. M., Abualhasan, A., Abu-Raddad, L. J., Abushouk, A. I., Adabi, M., … Lim, S. S. (2020). Global burden of 87 risk factors in 204 countries and territories, 1990–2019: A systematic analysis for the Global Burden of Disease Study 2019. *The Lancet, 396*(10258), 1223–1249. https://doi.org/10.1016/S0140-6736(20)30752-2

Ritchie, H., Rosado, P., & Roser, M. (2022). *Environmental Impacts of Food Production. Our World in Data*. https://ourworldindata.org/environmental-impacts-of-food

Ritchie, H., & Roser, M. (2019). *Half of the world's habitable land is used for agriculture*. Our World in Data. https://ourworldindata.org/global-land-for-agriculture

Springmann, M., Clark, M., Mason-D'Croz, D., Wiebe, K., Bodirsky, B. L., Lassaletta, L., de Vries, W., Vermeulen, S. J., Herrero, M., Carlson, K. M., Jonell, M., Troell, M., DeClerck, F., Gordon, L. J., Zurayk, R., Scarborough, P., Rayner, M., Loken, B., Fanzo, J., … Willett, W. (2018). Options for keeping the food system within environmental limits. *Nature, 562*(7728), 519–525. https://doi.org/10.1038/s41586-018-0594-0

The EAT-Lancet Commission on Food, Planet, Health. (n.d.). *The Planetary Health Diet. EATForum*. https://eatforum.org/eat-lancet-commission/the-planetary-health-diet-and-you/

Commission on Genetic Resources for Food and Agriculture, Food and Agriculture Organization of the United Nations. (2010). *The second report on the state of the world's plant genetic resources for food and agriculture*. https://www.fao.org/4/i1500e/i1500e00.htm

The Secretary-General's High Level Task for on Global Food Nutrition Security. (2015). *All Food Systems are Sustainable (Zero Hunger Challenge Working Groups)*. FAO, UNCTAD, UNIDO, World Bank, IFAD & UNEP. https://www.un.org/en/issues/food/taskforce/pdf/All%20food%20systems%20are%20sustainable.pdf

UN Food Systems Summit 2021. (2021). *Food Systems Summit x SDGs*. United Nations; United Nations. https://www.un.org/en/food-systems-summit/sdgs

UNEP. (2021). *Food Waste Index Report 2021*. United Nations Environment Programme. https://www.unep.org/resources/report/unep-food-waste-index-report-2021

Water Science School. (2019). *How Much Water is There on Earth?* USGS. https://www.usgs.gov/special-topics/water-science-school/science/how-much-water-there-earth

Whitmee, S., Haines, A., Beyrer, C., Boltz, F., Capon, A. G., Dias, B. F. de S., Ezeh, A., Frumkin, H., Gong, P., Head, P., Horton, R., Mace, G. M., Marten, R., Myers, S. S., Nishtar, S., Osofsky, S. A., Pattanayak, S. K., Pongsiri, M. J., Romanelli, C., … Yach, D. (2015). Safeguarding human health in the Anthropocene epoch: Report of The Rockefeller Foundation–Lancet Commission on planetary health. *The Lancet, 386*(10007), 1973–2028. https://doi.org/10.1016/S0140-6736(15)60901-1

Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., Garnett, T., Tilman, D., DeClerck, F., Wood, A., Jonell, M., Clark, M., Gordon, L. J., Fanzo, J., Hawkes, C., Zurayk, R., Rivera, J. A., Vries, W. D., Sibanda, L. M., … Murray, C. J. L. (2019). Food in the Anthropocene: The EAT–Lancet Commission on healthy diets from sustainable food systems. *The Lancet, 393*(10170), 447–492. https://doi.org/10.1016/S0140-6736(18)31788-4

Appendix A: FEAST

FEAST
FOOD • EDUCATION • ACCESS
SUPPORT • TOGETHER

4D 4 DIMENSIONS Sustainable Diet Framework

Nutrition | Economic | Sociocultural

FEAST

Established in 2013, FEAST promotes community health through nutritious foods and human connection. FEAST welcomes all individuals to gather around a shared table. Together, communities can pile their plates high with fresh, vibrant fruits and vegetables and learn simple, delicious, athe journey towards a healthy lifestyle.

INSIGHTS

- 60% increase in fruit and vegetable consumption
- 50% of participants report increase in self-esteem
- 90% of participants feel able to understand food labels

RDNS CALL TO ACTION

Take a whole person approach to improving health and wellbeing.

CONTACT

AMY VU
Co-Executive Director
amy@feastforall.org
feastforall.org

CHALLENGE

In a world where access to nutritious ingredients is limited, disproportionately impacting high-poverty and minority communities, FEAST's theory of change is deeply rooted in empowering caregivers as key agents of change.

SOLUTIONS

FEAST believes that equipping caregivers with the knowledge, skills, and resources to make informed food choices and lead by example can catalyze healthy, sustainable lifestyle changes within families and communities.

KEY OUTCOMES

- To increase health and wellness for participants and their families, FEAST's programs focus on three key ingredients: Whole foods, whole people, and whole communities.
- Whole foods include fruits, vegetables, and whole grains, and minimally processed food products made from these ingredients that are affordable and accessible in communities.
- FEAST's programs strive to support whole people, so that people feel safe, supported, and connected to their bodies and selves. This requires time and space for stress-relief, emotional support, and other forms of self-care.
- FEAST's programs work to create whole communities where individuals can come together to give and receive support to one another.

Appendix B: ReFED

U.S. Food Waste Pact

4 DIMENSIONS Sustainable Diet Framework

Economic | Planetary | Sociocultural

U.S. Food Waste Pact: Business Collaboration to Reduce Food Waste

Led by ReFED and WWF, the U.S. Food Waste Pact is a national pre-competitive collaboration between food businesses across the food chain, all working together to share data and best practices on food waste reduction.

INSIGHTS

- Data is critical to any food waste reduction effort. When businesses track how much food they're wasting, they can identify hot spots and direct their efforts to those areas.
- Employees—particularly those on the front lines—are great sources for recommendations and insights into how business operations can evolve to reduce waste, since they are the ones who experience it day in and day out.

RDNS CALL TO ACTION

- Food waste is a systemwide problem, so it will take participation from across the supply chain to reduce it. Communication and collaboration are key and in-house dietitians can play an important role in encouraging businesses to reduce their food waste.

CONTACT

Jackie Suggitt
Vice President, Business Initiatives & Community Engagement
foodwastepact.refed.org

CHALLENGE

Achieving sustainability goals like food waste reduction can be challenging for businesses, as identifying the exact sources of waste within the supply chain is often unclear. Without access to data or the right tools, many organizations struggle to identify where food waste occurs and how to effectively address it. This lack of clarity and access to resources can limit their ability to make progress on sustainability efforts like food waste reduction.

SOLUTION

The U.S. Food Waste Pact is based on the principle that sustainability should be a shared goal, not a competitive one. Through collaboration, businesses can achieve greater impact than they would by working in isolation. The Pact provides valuable support through data tracking, benchmarking, and analysis, thus helping businesses identify areas for improvement. It also fosters a community where companies can learn from each other, sharing best practices and gaining new insights that drive more effective food waste reduction strategies.

KEY OUTCOMES

Target of 50% reduction in food waste by 2030

The U.S. Food Waste Pact builds on the success of the Pacific Coast Food Waste Commitment—a public-private partnership between food businesses and jurisdictions along the West Coast of the United States to cut food waste in the region by half.

16 businesses committed

Already 16 businesses from across the supply chain have signed on, including Walmart, Amazon Fresh, Fresh Del Monte, and more.

Appendix C: Guiding Principles for Sustainable Healthy Diets

SUSTAINABLE HEALTHY DIETS...

REGARDING THE HEALTH ASPECT

1 ...start early in life with early initiation of breastfeeding, exclusive breastfeeding until six months of age, and continued breastfeeding until two years and beyond, combined with appropriate complementary feeding.

2 ... are based on a great variety of unprocessed or minimally processed foods, balanced across food groups, while restricting highly processed food and drink products.[10]

7 ... are consistent with WHO guidelines to reduce the risk of diet-related NCDs, and ensure health and wellbeing for the general population.[12]

8 ... contain minimal levels, or none if possible, of pathogens, toxins and other agents that can cause foodborne disease.

REGARDING ENVIRONMENTAL IMPACT

9 ... maintain greenhouse gas emissions, water and land use, nitrogen and phosphorus application and chemical pollution within set targets.

10 ... preserve biodiversity, including that of crops, livestock, forest-derived foods and aquatic genetic resources, and avoid overfishing and overhunting.

REGARDING SOCIOCULTURAL ASPECTS

15 ... are accessible and desirable.

16 ... avoid adverse gender-related impacts, especially with regard to time allocation (e.g. for buying and preparing food, water and fuel acquisition).

[10] Food processing can be beneficial for the promotion of high quality diets; it can make food more available as well as safer. However, Some forms of processing can lead to very high densities of salt, added sugar and saturated fats and these products, when consumed in high amounts, can undermine diet quality. (**Global Panel on Agriculture and Food Systems for Nutrition.** 2016. Food systems and diets: Facing the challenges of the 21st century. London, UK. http://ebrary.ifpri.org/utils/getfile/collection/p15738coll5/id/5516/filename/5517.pdf)

[11] Potatoes, sweet potatoes, cassava and other starchy roots are not classified as fruits or vegetables.

GUIDING PRINCIPLES FOR SUSTAINABLE HEALTHY DIETS

3 … include wholegrains, legumes, nuts and an abundance and variety of fruits and vegetables.[11]

4 … can include moderate amounts of eggs, dairy, poultry and fish; and small amounts of red meat.

5 … include safe and clean drinking water as the fluid of choice.

6 … are adequate (i.e. reaching but not exceeding needs) in energy and nutrients for growth and development, and to meet the needs for an active and healthy life across the lifecycle.

11 …minimize the use of antibiotics and hormones in food production.

12 … minimize the use of plastics and derivatives in food packaging.

13 …reduce food loss and waste.

14 … are built on and respect local culture, culinary practices, knowledge and consumption patterns, and values on the way food is sourced, produced and consumed.

[12] They include up to 30-35 percent of total energy intake from fats, with a shift in fat consumption away from saturated fats to unsaturated fats and towards the elimination of industrial trans fats; less than 10 percent of total energy intake from free sugars (possibly less than 5 percent) and not more than 5 g per day of salt (to be iodized). **WHO.** 2018. Healthy diet. WHO fact sheet No. 394 (updated August 2018). Geneva, World Health Organization, 2018. https://www.who.int/nutrition/publications/nutrientrequirements/healthydiet_factsheet/en/