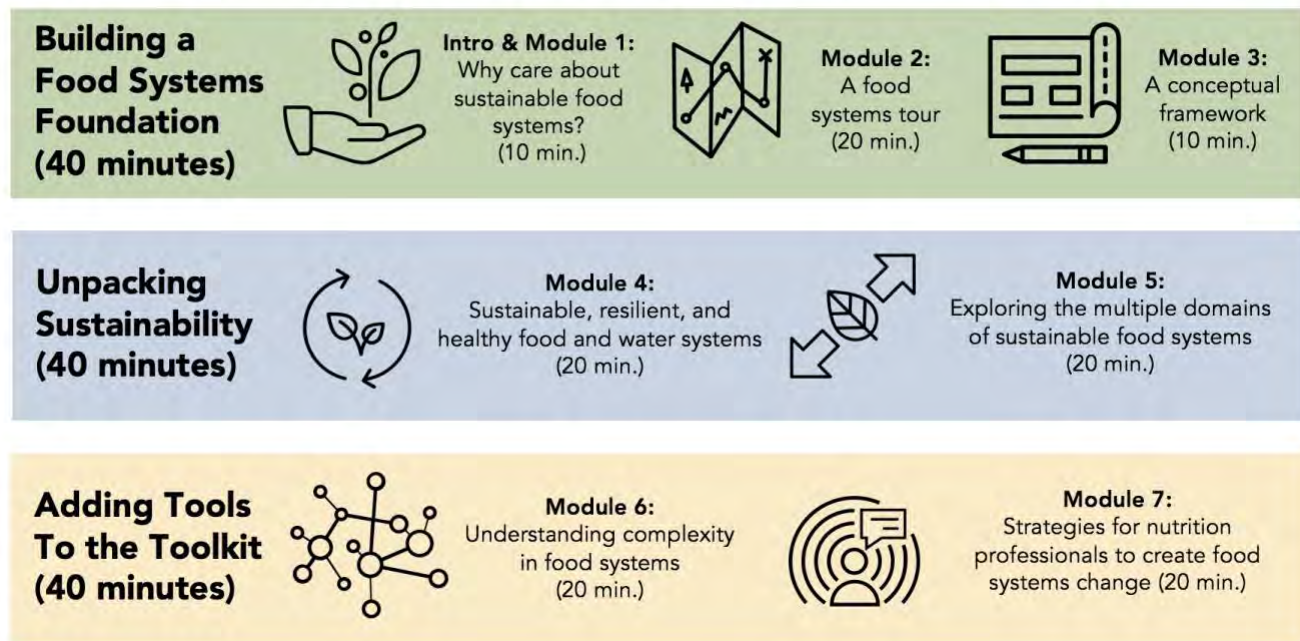


Primer on Sustainable Food Systems for RDNs and NDTRs: Educators' Guide (Competencies and Discussion Questions)

This guide contains two resources to help educators incorporate the Primer into their programs:

- **ACEND Competencies (p. 2-4):** A listing of relevant competencies for a variety of program types, for each module. It's important to note the Primer may serve as an important introductory activity for additional competencies, which may be met through the application of this information into a wide variety of settings.
- **Discussion Questions (p. 5-11):** For each module, this guide includes reflection questions you might use with students or interns as part of a verbal discussion or a written reflection assignment, as well as considerations you might take into account when assessing discussions or written reflections.

Primer on Sustainable Food Systems for RDNs and NDTRs



Learning outcomes for the Primer: (*learning outcomes for each module appear on pages 5-11*)

1. Use a conceptual framework of the food system to describe how the food system influences diets, nutrition and health.
2. Discuss sustainability, resilience, and health in food systems through the lens of environmental, economic, and social factors.
3. Use tools from systems thinking to describe complexities, co-benefits, and trade-offs within food systems.
4. Identify five entry points through which nutrition and dietetics professionals can leverage their unique skills to cultivate sustainable food systems.
5. Locate reliable resources related to sustainable food systems for nutrition and dietetics professionals.

ACEND Competencies

Future Education Model (FEM) Graduate Degree Competencies and Performance Indicators:

Competencies and Performance Indicators		Module						
		1	2	3	4	5	6	7
1.6	Applies knowledge of social, psychological and environmental aspects of eating and food.	X	X	X	X	X	X	X
1.6.1	Formulates food and nutrition services considering psychological and social factors to meet the needs of individuals, communities and populations.				X	X	X	X
1.6.3	Integrates knowledge of maximizing sustainability, food and water waste, reusable/biodegradable items, local and global produce sourcing and access to food.	X			X	X	X	X
1.6.4	Analyzes the environmental factors affecting access to services and/or adequate nutrition.		X	X	X	X	X	X
1.15	Applies knowledge of nutritional health promotion and disease prevention for individuals, groups and populations.		X	X	X	X		
1.15.1	Recognizes and communicates the cause of disease and nutrition risks.		X	X	X	X	X	
1.15.3	Examines the influence of the determinants of health on health and wellness.		X	X	X	X	X	
1.16	Gains a foundational knowledge on public and global health issues and nutritional needs.		X	X	X	X	X	
1.16.1	Examines the trends and current issues that impact public and global health from existing, new and reemerging diseases that spread through immigration, travel and global trade.		X	X	X	X	X	
1.16.2	Examines the impact of global food supply and sustainability and related factors.		X	X	X	X	X	
1.16.3	Examines how globalizing processes impact nutrition, nutrition education and nutrition related diseases in developing countries.		X	X	X	X	X	
2.1	Applies a framework to assess, develop, implement, and evaluate products, programs and services		X	X				
2.3.10	Determines barriers that might influence a client/patient's nutritional status.		X	X	X	X	X	
2.3.22	Identifies barriers to meeting client/patient's nutrition goals and makes recommendations to modify the nutrition plan of care or nutrition intervention, and communicates changes to client/patient and others.		X	X	X	X	X	
3.1.8	Investigates and optimizes opportunities to reduce the environmental carbon footprint of foodservice operations and to enhance sustainability					X		X
3.4	Applies and demonstrates an understanding of agricultural practices and processes		X	X	X	X	X	
3.4.1	Has a working knowledge of different agricultural food production systems and related terminology and concepts including potential nutritional impact.		X	X	X	X	X	
3.4.2	Understands the local and global food markets and applicable nutrition regulations.		X	X	X	X	X	
3.4.3	Identifies and supports partnerships with local and global food growers and producers.				X	X		X
4.1.1	Recognizes how determinants of health, epidemiological findings, health disparities, political interest, availability of resources, and accessibility influence the nutritional health and well-being of a community and population.	X	X	X	X	X	X	X
5.1.5	Reflects on situations and critically evaluates outcomes and possible alternate courses of action.	X	X	X	X	X	X	X
6.1	Incorporates critical thinking skills in practice.	X	X	X	X	X	X	X
6.1.1	Considers multiple factors when problem solving.	X	X	X	X	X	X	X
6.1.3	Engages in reflective practice to promote change and continuous learning.	X	X	X	X	X	X	X
6.3.4	Analyzes and formulates a professional opinion based on the current research and evidence-based findings and experiential learning.							X
7.1.2	Engages in self-reflective practice activities to develop and maintain ongoing competence and professional behaviors.	X	X	X	X	X	X	X

2017 Competencies for Dietetic Internships (DI):

Competencies (CRDN)		Module						
		1	2	3	4	5	6	7
CRDN 1.4	Evaluate emerging research for application in nutrition and dietetics practice.					X	X	
CRDN 1.6	Incorporate critical-thinking skills in overall practice.	X	X	X	X	X	X	X
CRDN 2.4	Function as a member of interprofessional teams.	X			X	X	X	X
CRDN 2.12	Perform self-assessment and develop goals for self-improvement throughout the program.	X				X		X
CRDN 4.6	Propose and use procedures as appropriate to the practice setting to promote sustainability, reduce waste and protect the environment	X	X	X	X	X	X	X

2017 Competencies for:

Coordinated Programs (CP)

Foreign Dietitian Education Programs (FDE)

International Dietitian Education Programs (IDE)

Core Knowledge (KRDN) and Competencies (CRDN)		Module						
		1	2	3	4	5	6	7
KRDN 1.1	Demonstrate how to locate, interpret, evaluate, and use professional literature to make ethical, evidence-based practice decisions							X
KRDN 1.3	Apply critical thinking skills.	X	X	X	X	X	X	X
KRDN 2.2	Describe the governance of nutrition and dietetics practice, such as the Scope of Nutrition and Dietetics Practice and the Code of Ethics for the Profession of Nutrition and Dietetics; and describe interprofessional relationships in various practice settings.							X
KRDN 2.5	Identify and describe the work of interprofessional teams and the roles of others with whom the registered dietitian nutritionist collaborates in the delivery of food and nutrition services.	X			X	X	X	X
CRDN 1.4	Evaluate emerging research for application in nutrition and dietetics practice.					X	X	
CRDN 1.6	Incorporate critical-thinking skills in overall practice.	X	X	X	X	X	X	X
CRDN 2.4	Function as a member of interprofessional teams.	X			X	X	X	X
CRDN 2.12	Perform self-assessment and develop goals for self-improvement throughout the program.	X				X		X
CRDN 4.6	Propose and use procedures as appropriate to the practice setting to promote sustainability, reduce waste and protect the environment	X	X	X	X	X	X	X

2017 Competencies for Didactic Programs in Dietetics (DPD):

Core Knowledge (KRDN) and Competencies (CRDN)		Module						
		1	2	3	4	5	6	7
KRDN 1.1	Demonstrate how to locate, interpret, evaluate, and use professional literature to make ethical, evidence-based practice decisions							X
KRDN 1.3	Apply critical thinking skills.	X	X	X	X	X	X	X
KRDN 2.2	Describe the governance of nutrition and dietetics practice, such as the Scope of Nutrition and Dietetics Practice and the Code of Ethics for the Profession of Nutrition and Dietetics; and describe interprofessional relationships in various practice settings.							X
KRDN 2.5	Identify and describe the work of interprofessional teams and the roles of others with whom the registered dietitian nutritionist collaborates in the delivery of food and nutrition services.	X			X	X	X	X

2017 Competencies for Nutrition and Dietetic Technician Programs (DT):

Core Knowledge (KNDT) and Competencies (CNDT)		Module						
		1	2	3	4	5	6	7
KNDT 1.1	Demonstrate how to locate, interpret, evaluate and use professional literature to make ethical, evidence-based practice decisions related to the dietetics technician level of practice.							X
KNDT 1.3	Apply critical thinking skills.	X	X	X	X	X	X	X
KNDT 2.3	Describe the governance of nutrition and dietetics practice, such as the Scope of Nutrition and Dietetics Practice and the Code of Ethics for the Profession of Nutrition and Dietetics; and interprofessional relationships in various practice settings.							X
KNDT 2.4	Identify and describe the work of interprofessional teams and the roles of others with whom the nutrition and dietetics technician, registered collaborates in the delivery of food and nutrition services.	X			X	X	X	X
CNDT 1.1	Access data, references, patient education materials, consumer and other information from credible sources.					X	X	X
CNDT 2.5	Function as a member of interprofessional teams.	X			X	X	X	X
CNDT 2.10	Perform self-assessment and develop goals for self-improvement throughout the program.	X				X		X
CNDT 4.7	Propose and use procedures as appropriate to the practice setting to promote sustainability, reduce waste and protect the environment	X	X	X	X	X	X	X

Module 1: Why care about sustainable food systems?

Learning outcomes

1. Describe the growing interest in sustainable food systems from individuals, institutions, and policymakers.
2. Identify core skills of the nutrition and dietetics profession that are especially helpful in navigating issues in the food system.
3. Identify ways that familiarity with sustainable food systems can help RDNs and NDTRs meet their goals in a variety of practice settings.

Reflection questions	Items to consider in student responses
1. What skills might you need to strengthen in order to increase your competence in addressing food systems issues? <i>Consider assigning students to read the Standards of Professional Performance in Sustainable, Resilient and Healthy Food and Water Systems¹ and perform a self-assessment.</i>	Research by Hawkins et al., 2015² interviewed registered dietitians who exhibit pro-environmental behaviors and found the following themes: • risk taking and tenacity, • diplomacy, and • utilizing evidence-based research Skills listed in the self-study module include: • helping people navigate dietary choices in complex environments, • fulfilling multiple goals through food and nutrition, • evaluating and translating research, and • collaborating as part of interprofessional teams Other skills might include: • locating resources that include environmental science, economics, and health and racial equity (resources outside of health realm)
2. How might understanding the food system amplify RDN's and NDTR's ability to help clients improve their nutrition and health?	RDNs can make policy and environmental change recommendations that support healthier environments and address the social determinants of health in addition to providing individual recommendations such as nutrition education. RDNs can partner with a wide variety of stakeholders to improve health that also accounts for community and planetary health.

¹ Spiker M, Reinhardt S, Bruening M. Academy of Nutrition and Dietetics: Revised 2020 Standards of Professional Performance for Registered Dietitian Nutritionists (Competent, Proficient, and Expert) in Sustainable, Resilient, and Healthy Food and Water Systems. Journal of the Academy of Nutrition and Dietetics. 2020 Sep 1;120(9):1568-85.

² Hawkins IW, Balsam AL, Graves D. A Qualitative Study of the Skills That Enabled the Pro-Environmental Behaviors of Registered Dietitians. Journal of Hunger & Environmental Nutrition. 2015;10(1):60-71. doi:10.1080/19320248.2014.929546

Module 2: A food systems tour

Learning outcomes

1. Define the concept of a food system.
2. Provide examples of how food supply chains, food environments, and consumer behavior can vary in different geographic settings.

Reflection questions	Items to consider in student responses
1. Why is it important for RDNs and NDTRs to be able to address food system issues?	Comments on the importance of addressing food systems issues might include: • The food system affects many underlying causes of risk for diet-related disease. • The food system shapes whether people can access or afford food. • Decisions made further up in the supply chain affect the nutritional content of foods, especially packaged foods. • Decisions made further up in the supply chain affect the sustainability of foods (e.g., packaging, portion sizes that might affect food waste behaviors). Key concepts: • food supply chain sectors include production, processing, distribution, and access • food waste is integrated into each of the food supply chain sectors. • supply chain disruptions, i.e. limited processing centers related to COVID-19
2. Identify what influences food choice in your geographic area, consider food supply chains, food environments, and consumer behaviors.	Responses should consider the local food environment • affordability • acceptability • food quality and safety • information, guidelines and advertising • policy conditions Responses should also consider inequities in access to food. Research shows: • food deserts are linked to a poor diet³ • food swamps (area of high density of establishments selling high-calorie fast food and junk food relative to healthier options) are strong predictors of obesity⁴ • food deserts and swamps are more prevalent in areas with low socioeconomic status and higher rates of racial-ethnic minorities⁵ • built environments, policies and zoning laws shape health⁶

³ Larson N, Story M. A Review of Environmental Influences on Food Choices. *Annals of Behavioral Medicine*. 2009;38(S1):56-73. doi:10.1007/s12160-009-9120-9

⁴ Cooksey-Stowers K, Schwartz M, Brownell K. Food Swamps Predict Obesity Rates Better Than Food Deserts in the United States. *International Journal of Environmental Research and Public Health*. 2017;14(11):1366. doi:10.3390/ijerph14111366

⁵ Hilmers A, Hilmers DC, Dave J. Neighborhood Disparities in Access to Healthy Foods and Their Effects on Environmental Justice. *American Journal of Public Health*. 2012;102(9):1644-1654. doi:10.2105/ajph.2012.300865

⁶ Fedorowicz M, Schilling J, Bramhall E, Bieretz B, Su Y, Brown S. Leveraging the Built Environment for Health Equity. *Urban Institute*. <https://www.urban.org/research/publication/leveraging-built-environment-health-equity>. Published July 14, 2020. Accessed October 16, 2020.

Module 3: A food systems conceptual framework

Learning outcomes

1. Identify the three major components of food systems.
2. Identify at least three underlying drivers that influence food systems.
3. Describe at least three ways nutrition is important for achieving the Sustainable Development Goals.

Reflection questions	Items to consider in student responses
1. How do food system drivers affect food environments?	Ideas could include: • Environmental: climate change impacts growing conditions, hotter weather might mean shorter growing season or need for irrigation • Innovation, Technology, Infrastructure: post-harvest food waste mitigation • Political and economic: food as weapon in conflicted areas, e.g., food aid in Syria or Saudi Arabia^{7,8} • Economic and Market: livelihoods and income levels, consider rural vs urban issues, minimum wage policies across the globe • Socio-cultural: women's empowerment, access to affordable education, supporting traditional food cultures and cooking skills • Demographic: aging society, urbanization
2. How can RDNs and NDTRs improve the food environment both in the U.S. and internationally?	Responses might include any of the Sustainable Development Goals,⁹ which focus on: • affordability and access to foods, poverty and equity • food security at local, national, international levels • education and policy through federal programs like Child Nutrition Programs • health equity and reduced inequalities • responsible consumption and production of food • environmental health through clear air and water and climate change mitigation

⁷Amos D, Greene D. How Food Aid Is Being Used As A Weapon In Syria. NPR.

<https://www.npr.org/templates/story/story.php?storyId=206555367>. Published July 29, 2013. Accessed October 16, 2020.

⁸ Pelley S. When food is used as a weapon. CBS News. <https://www.cbsnews.com/news/when-food-is-used-as-a-weapon/>. Accessed October 16, 2020

⁹ Transforming our World: The 2030 Agenda for Sustainable Development | Department of Economic and Social Affairs. United Nations. <https://sdgs.un.org/publications/transforming-our-world-2030-agenda-sustainable-development-17981>. Published 2015. Accessed October 16, 2020.

Module 4: Sustainable, resilient, and healthy food and water systems

Learning outcomes

1. Define the concepts of sustainability, resilience, and health on their own and within the context of food systems.
2. Define the concept of equity and discuss how equity is related to sustainability, resilience, and health in the food system.
3. Describe the importance of water for food systems and human health.

Reflection questions	Items to consider in student responses
1. Describe inequities that impact the ability for people and communities to nourish themselves.	Consider inequities that often impact people of different genders, race, ethnicities, low socioeconomic status (SES) • Income, i.e. women earn less than men, Black and Indigenous people earn less than White • People with low SES are more likely to live in food deserts¹⁰ or swamps,¹¹ environmentally contaminated areas, or areas with higher crime rates • Gender disparities in decision-making • Geographic disparities to health services and healthy environments
2. How do nutrition-sensitive interventions (interventions related to agriculture, education or social-services) offer opportunities for RDNs and NDTRs?	Opportunities to expand the traditional scope of the dietitian to consider issues of gender and income equality, natural resource management and sustainable diets, policies and environments that support health
3. Describe threats to safe water and how RDNs and NDTRs can advocate for a healthy water system.	Considerations could include: • related to water use: industry, agriculture, or individual use - o within agriculture: certain foods may require more water (e.g., beef) • related to water quality: waste water, runoff or contamination - o examples of industry contamination: fracking contaminates ground water - o community concerns about lead pipes

¹⁰ Larson N, Story M. A Review of Environmental Influences on Food Choices. *Annals of Behavioral Medicine*. 2009;38(S1):56-73. doi:10.1007/s12160-009-9120-9

¹¹ Cooksey-Stowers K, Schwartz M, Brownell K. Food Swamps Predict Obesity Rates Better Than Food Deserts in the United States. *International Journal of Environmental Research and Public Health*. 2017;14(11):1366. doi:10.3390/ijerph14111366

Module 5: Exploring the multiple domains of sustainable food systems

Learning outcomes

1. Identify the four domains of sustainable, resilient, and healthy food and water systems.
2. Describe principles within each domain.
3. Discuss how human diets affect and are affected by environmental, economic, and social factors.

Reflection questions	Items to consider in student responses
1. Which principle of sustainable, resilient and healthy food and water system is most unfamiliar to you? How can you learn more about this area?	Four principles of SRHFWS • nutrition and health (food quantity and quality) • social, cultural and ethical capital (the social determinants of health, health equity, cultural diversity, worker and animal welfare) • environmental stewardship (biodiversity, land-sharing vs land-sharing, greenhouse gas emissions, water quality issues) • economic vitality (affordable and accessible foods, viability of livelihoods for food producers, community wealth)
2. What ways can RDNs and NDTRs create change using the four principles of sustainable, resilient, and healthy food and water systems? Consider one idea from each domain (nutrition and health, social, cultural and ethical capital, environmental stewardship, and economic vitality). Consider interventions at the individual, policy, systems and environmental levels (I+PSE)	Considerations might include: Related to nutrition and health: • I – cooking classes and whole food preparation education • P – Dietary Guidelines for Americans • S – increase research in areas of sustainable diets • E – align food production and nutrition Related to social, cultural and ethical capital: • I – culturally appropriate recommendations when counseling • P – stronger laws to protect worker and animal welfare • S – promotion of plant-based traditional diets • E – health equity, healthy choice is possible and easy choice Related to environmental stewardship: • I – educate about food labels, decrease food waste • P – subsidization of fruits, vegetables, and pulses • S – expanding local food procurement • E – community support of food scrap composting Related to economic vitality: • I – encourage local food consumption • P – expand programs like SNAP Double Up Food Bucks • S – increase SNAP and WIC retailers in low income neighborhoods • E – creation of cooperatives, Farm to School programs

Module 6: Understanding complexity in food systems

Learning outcomes

1. Define a complex system.
2. Describe at least three characteristics of complex systems.
3. Discuss how systems thinking can be used to approach issues in nutrition.
4. Provide at least one example of a co-benefit and one example of a tradeoff within the food system.

Reflection questions	Items to consider in student responses
1. Obesity is one example of a multi-faceted, complex issue, yet many solutions only consider single solutions (i.e., weight loss diets, bariatric surgery, weight loss medication). What other factors need to be considered in the complex system of obesity?	Considerations include • understanding the limitations of measuring weight, developing alternative measures of health • developing partnerships with interprofessional teams who are knowledgeable about weight inclusive care • understanding other professional languages, weight stigmatizing and neutral languages • understanding determinants of health and the connection to higher weight and chronic disease • understanding social determinants of health and the connection to higher weight and chronic disease • identifying your own skill set and role in the system • role of weight stigma and expanding personal and professional view of health and size awareness
2. Consider your education up until this point. What other systems have you experienced throughout your educational journey?	Ideas could include: • human body as a system at many different levels • health care systems • management systems • agricultural system
3. Describe an agricultural production method you are familiar with, what are the co-benefits? What are the tradeoffs? What are production methods you would like to learn more about?	Ideas could include: • Related to school, home and kitchen gardening: co-benefits seen in improved mental health¹² and greater fruit and vegetable intake,¹³ with trade-offs such as accessibility of garden space and equipment. • Related to mono-cropping: co-benefits seen in efficiency of productivity, with trade-offs such as loss of biodiversity, soil quality, carbon sequestration, and water-holding capacity in surface soils, energy-use efficiency, and resistance and resilience to climate change¹⁴ • Related to local fruit and vegetable production: co-benefits seen in reduced transportation GHG emissions, increased cultural appropriateness, and improved local economy, with trade-offs such as foods limited to seasonality, not all foods available at all times¹⁵

¹² Clatworthy J, Hinds J, Camic PM. Gardening as a mental health intervention: a review. *Mental Health Review Journal*. 2013;18(4):214-225. doi:10.1108/mhrj-02-2013-0007

¹³ Langellotto GA, Gupta A. Gardening Increases Vegetable Consumption in School-aged Children: A Meta-analytical Synthesis. *HortTechnology*. 2012;22(4):430-445. doi:10.21273/horttech.22.4.430

¹⁴ Kremen C, Miles A. Ecosystem Services in Biologically Diversified versus Conventional Farming Systems: Benefits, Externalities, and Trade-Offs. *Ecology and Society*. 2012;17(4). doi:10.5751/es-05035-170440

¹⁵ Nogueira-Mcrae T, Ryan EP, Jablonski BBR, et al. The Role of Urban Agriculture in a Secure, Healthy, and Sustainable Food System. *BioScience*. 2018;68(10):748-759. doi:10.1093/biosci/biy071

Module 7: Strategies for nutrition professionals to create food systems change

Learning outcomes

1. Identify the entry points through which RDNs and NDTRs can leverage their knowledge and skills to cultivate sustainable food systems.
2. Identify cross-cutting skills that are common to nutrition and dietetics practice that can help RDNs and NDTRs to promote sustainable food systems.
3. Locate reliable resources related to sustainable food and water systems for RDNs and NDTRs.

Reflection questions	Items to consider in student responses
1. What will you do to support sustainable, resilient, and healthy food and water systems? Consider actions from individual, community and policy levels.	Actions might be at individual, policy, systems or environmental level. Starting with self-evaluation and improving knowledge might be realistic for students.
2. What resources and partners have you identified in relation to sustainable food and water systems both locally and globally?	Ideas could include: • Specific DPGs or MIGs • Organizations representing public health, agriculture, environmental science, business, city-planning, food justice or health equity, food recovery, etc.