

Cultivating Sustainable, Resilient, and Healthy Food and Water Systems: A Nutrition-Focused Framework for Action



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UNDERSTANDING FOOD AND water systems is critically important for the practice of nutrition and dietetics. This is especially true as growing populations, rising per capita demand for nutrient-rich foods, and climate change pose mounting challenges for meeting global nutrition targets.

Food and water systems include the resources, people, and activities involved in the production, processing, packaging, distribution, purchasing, preparation, consumption, discard, and safety of food and water, as well as the complex relationships among these processes.¹⁻³ The concept of sustainable, resilient, and healthy food and water systems (henceforth “sustainable food systems”) describes systems where “individuals have equitable and optimal access to food and water, both now and in the future.”^{4(p475)} Sustainability is multidimensional, with sustainable food systems at the intersection of multiple domains including nutrition and health; environmental stewardship; economic vitality; and social, cultural, and ethical capital.⁴

Sustainability considers both the long-term viability of the food system and current issues, such as the global burden of hunger and malnutrition,⁵ unequal economic access to nutritious foods,⁶ high rates of food loss and waste,⁷ the precariousness of freshwater supplies for agricultural irrigation,⁸ and equity issues for food systems workers.^{9,10} Registered dietitian nutritionists (RDNs) and nutrition and dietetics technicians, registered

(NDTRs) are trained to address the nutritional manifestations of these issues, and can also lead and support collaborative efforts along the spectrum of prevention¹¹ to address underlying issues that affect current and future populations.

The vision of the Academy of Nutrition and Dietetics (“Academy”) is “a world where all people thrive through the transformative power of food and nutrition.”¹² The Academy’s Strategic Plan includes a commitment to a global, system-wide impact and collaboration “to solve the greatest food and nutrition challenges now and in the future.”¹² In this light, the actions needed to support sustainable food and water systems are not a specialized practice area, they are central to the profession. [Figure 1](#) describes key Academy publications that demonstrate the evolution of thinking within this area.

The importance of nutrition within sustainable food systems also aligns with global agendas, including the United Nations Sustainable Development Goals. Goal 2 of the Sustainable Development Goals is to “end hunger, achieve food security and improved nutrition and promote sustainable agriculture.”¹⁸ Nutrition is critically linked to the success of all 17 Sustainable Development Goals, as it intersects water and other natural resources, livelihoods, and education. A global scope is appropriate, given that many food systems issues cross geopolitical borders. For example, policies or consumer trends in one country may affect food production or prices in another, and the effects of food systems on water quality or greenhouse gases may extend far beyond one’s country of practice.

The challenges of sustainable food systems require the development of

workforce capacity and collaboration across sectors.¹⁹⁻²² RDNs and NDTRs are key connectors who work in diverse roles throughout the food system, from production to consumption, and throughout health care, public health, and community settings. This article provides a framework for action for how RDNs and NDTRs—individually, as a profession, and in collaboration with other sectors—can cultivate sustainable food systems.

FRAMEWORK FOR ACTION

This framework for action was developed from a roundtable meeting of experts and subsequent stakeholder input. The 2-day roundtable, titled “Sustainable Food Systems: Creating a Nutrition-Focused Framework for Action,” was convened in November 2018 by the Academy of Nutrition and Dietetics Foundation (“Foundation”) as part of the Future of Food initiative, which is funded through an educational grant from the National Dairy Council.²³ The 24 participants included credentialed nutrition and dietetics practitioners and external stakeholders representing expertise in clinical nutrition, foodservice, community nutrition, agriculture, food supply chains, environmental science, economics, racial equity, and food policy.

Before the roundtable, participants reviewed foundational work in this area, including the Academy publications in [Figure 1](#) and the United Nations High Level Panel of Experts conceptual framework of food systems.¹ The roundtable included in-person presentations, virtual remarks, and a series of small-group discussions led by a trained facilitator. Participants identified “entry points”

Publication	Description
2017: "Visioning Report 2017: A Preferred Path Forward for the Nutrition and Dietetics Profession" ¹³	This visioning report from the Academy's Council on Future Practice identified five key priority areas to help meet the future needs of the profession and society. One of the five priority areas was "food and nutrition systems and sustainability," and the report recommended that the Academy build capacity to integrate "nutrition expertise with local and global agricultural practices and food systems." ^{13(p118)}
2017: "Food insecurity in the United States" ¹⁴	This position paper stated, "it is the position of the Academy of Nutrition and Dietetics that systemic and sustained action is needed to achieve food and nutrition security in the United States. To achieve food security, effective interventions are needed, along with adequate funding for, and increased utilization of, food and nutrition assistance programs; inclusion of nutrition education in such programs; strategies to support individual and household economic stability; and research to measure impact on food insecurity- and health-related outcomes." ^{14(p1991)}
2015: "Linking agriculture, nutrition, and health: The role of the registered dietitian nutritionist" ¹⁵	The Academy's Foundation convened a conference to reach consensus among nutrition leaders regarding the need for registered dietitian nutritionist (RDNs) and nutrition and dietetics technicians, registered at the intersection of agriculture, nutrition, and health. Attendees reached consensus that "the Academy and its members have a responsibility to contribute to eliminating malnutrition, reducing chronic disease, and ensuring nutritious and safe food systems for all populations." ^{15(p1712)}
2014: "Standards of Professional Performance (SOPPs) for RDNs (Competent, Proficient, and Expert) in Sustainable, Resilient, and Healthy Food and Water Systems" ⁴	The SOPP included a framework that positioned sustainable, resilient, and healthy food and water systems at the intersection of four pillars: nutrition and health, environmental stewardship, economic vitality; and social, cultural, and ethical capital. The SOPP established a framework for professional skill development in this area, and provided a glossary of terms and case examples of SOPPs for various types of practitioners. A revised SOPP in this focus area is due to be released in 2020.
2013: "Nutrition security in developing nations: sustainable food, water, and health" ¹⁶	This position paper stated, "it is the position of the Academy of Nutrition and Dietetics that all people should have consistent access to an appropriately nutritious diet of food and water, coupled with a sanitary environment, adequate health services, and care that ensure that healthy and active life for all household members. The Academy supports policies, systems, programs, and practices that work with developing nations to achieve nutrition security and self-sufficiency while being environmentally and economically sustainable." ^{16(p581)}
2007: "Healthy Land, Healthy People" ¹⁷	This primer paper was developed by the Sustainable Food Systems Task Force, which was convened by the Academy (formerly known as the American Dietetic Association). The paper identified opportunities to link the roles of RDNs and nutrition and dietetics technicians, registered (NDTRs) with the principles of sustainability and identified educational opportunities for members.

Figure 1. Key Academy of Nutrition and Dietetics publications on sustainable food and water systems.

for RDNs and NDTRs to accelerate progress towards sustainable food systems; categorized entry points by their centrality to the profession's core skill set; ranked entry points by their impact and feasibility; identified the implications of each entry point for education and training, research, and practice; and brainstormed potential partner organizations and resource needs. These facilitated discussions were used to generate a preliminary framework for action, which was revised during a 10-month period based on two rounds of feedback from participants and input from key internal and external stakeholders (see Acknowledgements).

This framework for action identifies five “entry points” through which RDNs and NDTRs can cultivate sustainable food systems, both within individual practice settings and as part of multisectoral collaborations. This work requires coordination between the cross-cutting areas of education and training, research, practice, and policy (Figure 2).

The entry points target areas of high potential impact and provide a roadmap for prioritizing the development of new education and training opportunities, research agendas, roles and responsibilities for practitioners, and policy priorities in order to achieve greater systemic impact as a profession (Figure 3). Each entry point can be scaled to address issues at the individual, community, institutional, and population levels and throughout global settings.

The entry points draw upon knowledge and skills that are central to the profession, as well as skills that, for a given individual or for the profession at large, may require additional development and collaboration. It is not intended that an individual practitioner needs to develop expertise in all of the entry points, or that the framework should be operationalized exclusively by RDNs and NDTRs. Achieving sustainable food systems is only possible through collaboration within and beyond the profession (Figure 4).

Shape and Deliver Dietary Guidance

Dietary guidance can occur at the population level (eg, food-based dietary guidelines), but it is also embedded in decisions at the institutional level (eg, food procurement, menu planning) and individual level (eg, nutrition education, medical nutrition therapy). Sustainability is increasingly being incorporated into food-based dietary guidelines,³⁰ and preliminary definitions of sustainable diets have been developed by several groups, including the Food and Agriculture Organization.³¹ The rapid evolution of research in this area, combined with the heterogeneity of food production and supply chain practices, make it challenging to produce a single definition of sustainable diets. However, core skills of the profession are relevant to this challenge: staying abreast of an evolving evidence base; providing clear guidance amidst complexity and uncertainty; and working with individuals,

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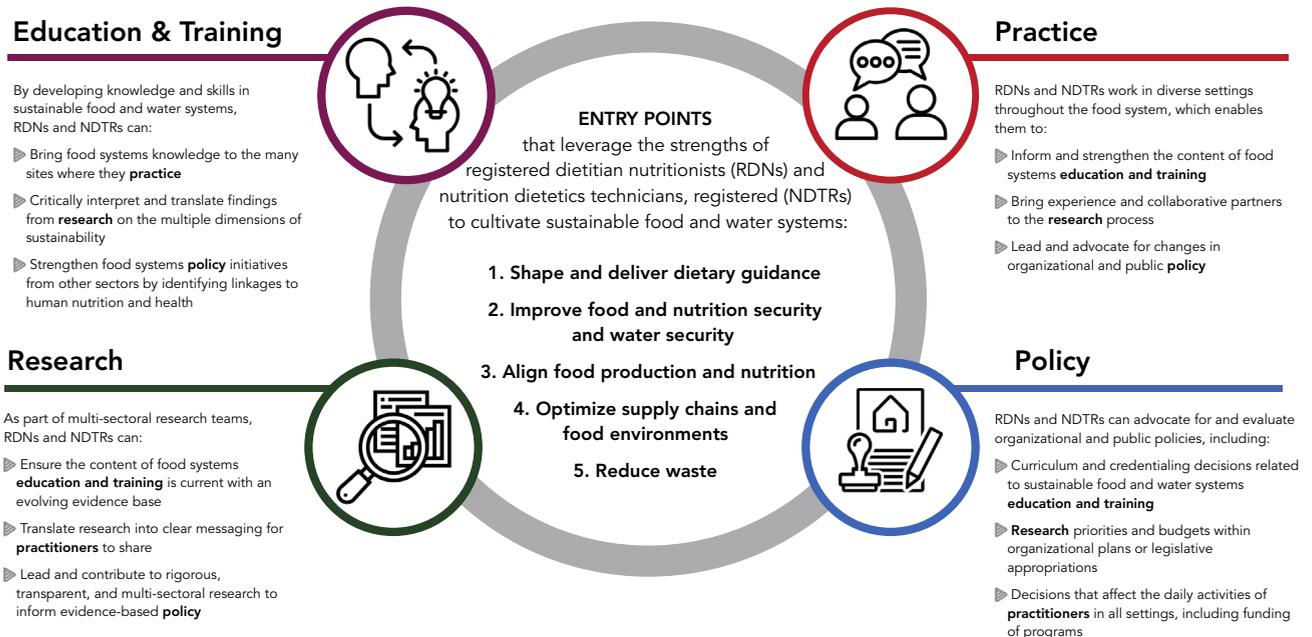


Figure 2. Although there are innumerable ways that registered dietitian nutritionists (RDNs) and nutrition and dietetics technicians, registered (NDTRs) can cultivate sustainable food and water systems, this framework for action highlights five “entry points” that leverage the strengths of the profession throughout the food system. Effectively engaging in these entry points requires coordination of efforts across education and training, research, practice, and policy. The descriptions under each cross-cutting area describe potential synergies between these interconnected areas. Icons are from the Noun Project.²⁴⁻²⁷

	Shape and deliver dietary guidance	Improve food and nutrition security and water security	Align food production and nutrition	Optimize supply chains and food environments	Reduce waste
EDUCATION & TRAINING	<p></p> <p><i>Illustrative examples of content areas that may be useful for students and credentialed nutrition and dietetics practitioners who wish to grow their knowledge in sustainable food and water systems.</i></p> <ul style="list-style-type: none"> ▶ Issues and indicators related to the multiple dimensions of sustainability (eg, implications of plant-based, animal-sourced, and cell-cultured foods on nutrition and health and environmental, economic, and social factors) ▶ Strategies for critically interpreting and translating evidence when providing sustainability-related dietary guidance to individuals, groups, and populations 	<ul style="list-style-type: none"> ▶ Resources and strategies for working and advocating with vulnerable populations (which may include low-income households, people of color, food systems workers, communities impacted by environmental injustices) ▶ Existing programs (federal, state, municipal, and private) that provide benefits and services to under-resourced individuals ▶ Methods for advocating for changes in structural factors and social determinants of health to reduce the number of under-resourced individuals 	<ul style="list-style-type: none"> ▶ Connections between agricultural biodiversity and human health ▶ Ways that human, animal, soil, water, and plant health are connected by the flow of nutrients through food systems ▶ Synergies and tradeoffs of various forms and scales of food production (including crop, livestock, and marine systems) ▶ Potential benefits and drawbacks of existing and new agricultural and biotechnologies, as well as new ways of collecting and using data to produce and distribute food 	<ul style="list-style-type: none"> ▶ Logistical and business considerations of food supply chains and various food environments (including restaurant, retail, healthcare, workplace, school, and other foodservice settings) ▶ Behavioral economic strategies for influencing the choices of businesses and individuals 	<ul style="list-style-type: none"> ▶ Sources of waste (food, water, and other resources) throughout the food supply chain and in foodservice and retail settings, healthcare institutions, workplaces, and homes ▶ Drivers of and strategies for reducing waste, including food loss and waste^a ▶ Ways the waste management hierarchy (ie, reduce, reuse, recycle) can be used in a variety of settings to prioritize prevention, followed by donating where possible, then recycling food scraps and unavoidable waste (ie, compost, anaerobic digestion)
RESEARCH	<p></p> <p><i>Illustrative examples of research questions relevant to each entry point. Credentialed nutrition and dietetics practitioners are positioned to lead and support multi-sectoral research on these topics and beyond.</i></p> <ul style="list-style-type: none"> ▶ Which research methods and metrics are most appropriate for assessing the nutritional, environmental, economic, and societal implications of agricultural and supply chain practices and dietary patterns? ▶ Where are there synergies and tradeoffs between the dimensions of sustainability? ▶ How might these dynamics differ by geographic region and scale? ▶ How can research from different sectors be integrated in a rigorous, transparent way to inform evidence-based practice and guidelines? 	<ul style="list-style-type: none"> ▶ What is the extent of food and nutrition insecurity and water insecurity among vulnerable populations? ▶ How do food security screening tools influence outcomes in a variety of patient care settings? ▶ What are meaningful metrics to measure the impact of structural factors (eg, wages, built environment) on food and nutrition security and water security? ▶ What is the relative effectiveness of various approaches to improving food and nutrition security and water security? 	<ul style="list-style-type: none"> ▶ How are food production practices (eg, those related to soil health or marine environments) related to nutritional status (of crops and people)? ▶ How does climate change affect nutritional status (of crops and people) and human health? ▶ How do food production practices, supply chain practices, and dietary patterns affect climate change? ▶ How can nutrition-sensitive interventions^b influence nutritional status, human health, and sustainability? ▶ What is the relative effectiveness of behavior change, economic incentives, and new technologies to promote adoption of more sustainable food production and supply chain practices? 	<ul style="list-style-type: none"> ▶ How can environmental cues (eg, product placement, signage) facilitate healthy, sustainable choices? ▶ What are mechanisms through which large-scale food procurement decisions in commercial and non-commercial foodservice settings can improve both nutritional outcomes and sustainability? ▶ How can changes in ingredients, packaging, transportation, advertising, and other factors within supply chains and food environments promote both nutrition and sustainability? ▶ What are barriers to implementing changes in food supply chains and food environments? 	<ul style="list-style-type: none"> ▶ What nutrition education messaging can effectively shift attitudes and behaviors to reduce waste of food among different audiences (eg, addressing a culture of abundance, challenging the idea that fresh is always best)? ▶ How is the rescue of surplus food linked to food and nutrition security? ▶ What is the relative effectiveness of strategies (eg, policies, behavior change) and technologies (eg, nutrient biodigesters, waste tracking software) to reduce waste of food, water, and other resources in a variety of settings?

Figure 3. Illustrative examples for each entry point. Each of the five entry points (column headings) has implications for the development of new opportunities in education and training, research, practice, and policy (row headings). These examples are not an exhaustive set of priorities for the profession; rather, they are intended to spark inspiration for the development of new opportunities and collaborations. Icons are from the Noun Project.²⁴⁻²⁷ ^aPer the United Nations Food and Agriculture Organization, “food loss” occurs during production, post harvest, and processing, and “food waste” occurs at later stages of the food supply chain (eg, retail and households).⁷ Food waste includes both edible portions (“wasted food”) and inedible portions (“food scraps”). ^b“Nutrition-sensitive interventions” refers to interventions that do not have an explicit goal of improving nutrition outcomes (eg, programs in agriculture, early child development, education, and social safety nets), but have potential to improve nutrition outcomes and enhance the effectiveness of nutrition-specific interventions (eg, support for exclusive breastfeeding, micronutrient supplementation, treatment of malnutrition).²⁸ ^cThis could include agricultural practices that promote biodiversity (eg, cover crops, buffer strips); plant breeding to select for genetic traits that improve nutritional content or help plants adapt to changing climates, pests, or disease; and in some settings, encouraging production and consumption of neglected and underutilized species,²⁹ especially those that are nutrient-rich and climate-resilient. ^d“Triple bottom line” refers to performance measures that take into account not only financial dimensions, but also social and environmental dimensions. These three dimensions are also commonly referred as the “three Ps:” profit, people, and planet.

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	Shape and deliver dietary guidance	Improve food and nutrition security and water security	Align food production and nutrition	Optimize supply chains and food environments	Reduce waste
PRACTICE	 <p>Illustrative examples of skills and actions that RDNs and NDTRs can bring to the many settings where they work. Some of these examples leverage core components of the professional skillset, while others may require additional training.</p> <ul style="list-style-type: none"> ▶ Help individuals, communities, institutions and policymakers navigate food choices amidst complexity, uncertainty, and multiple societal goals, including sustainability ▶ Deliver dietary guidance that draws information about sustainability from the best available evidence ▶ Share clear, evidence-based messaging about sustainability with the public through a variety of communication platforms ▶ Deliver information about sustainable food systems with cultural competence 	<ul style="list-style-type: none"> ▶ Connect under-resourced individuals with existing programs and services ▶ Lead, support, and advocate for new services to meet immediate needs (eg, “food pharmacies” in healthcare settings, or mobile markets in community settings) ▶ Connect public sector, private sector, and policy actors to improve underlying structural factors that affect food and nutrition security and water security (eg, environmental regulations, wages, transportation, safety) ▶ When designing and implementing interventions, seek accountability for equity and cultural competence. 	<ul style="list-style-type: none"> ▶ Enhance knowledge of food production among professionals and the public through hospital gardens or teaching gardens ▶ Promote practices that support biodiversity, including genetic diversity of plants and animals^c ▶ Ensure that efforts to promote the environmental sustainability and economic viability of food production practices align with nutritional priorities ▶ Ensure that efforts to improve the sustainability of food production practices are based on multi-sectoral collaboration 	<ul style="list-style-type: none"> ▶ Oversee sustainability initiatives in commercial and noncommercial foodservice settings ▶ Draw from the best available evidence to implement and evaluate changes in food supply chains and food environments (eg product placement, signage) to facilitate healthy, sustainable choices by individuals, institutions and businesses. ▶ Advocate for nutrition and sustainability as part of the “triple bottom line”^d throughout the food supply chain and in food environments 	<ul style="list-style-type: none"> ▶ Identify ways to prevent waste of food (eg, room service meal delivery options that improve patients’ oral intake and decrease discards) ▶ Support efforts to rescue food that hasn’t reached the end of its life ▶ Identify ways to divert food scraps and unavoidable waste from landfills (eg, compost, anaerobic digestion) ▶ Use technologies for waste tracking, waste reduction, and food rescue ▶ When providing nutrition education, incorporate food safety and waste reduction messaging to shift perceptions, behaviors, and skills in order to reduce unnecessary food discards
POLICY	 <p>Illustrative examples of policy issues relevant to each entry point. Note that the word “policy” is used broadly to refer to systems, organizational policy, and public policy (at the federal, state, or municipal level, and across global settings).</p> <ul style="list-style-type: none"> ▶ Policies related to food labeling including nutrition labeling, health claims, and environmental claims ▶ Guidelines related to food, nutrition, and health (eg, the Dietary Guidelines for Americans, Healthy People 2030) ▶ Quasi-official guidelines or institutional policies related to the sustainability of dietary patterns (eg, the Nordic Nutrition Recommendations) 	<ul style="list-style-type: none"> ▶ Policies that affect structural factors such as poverty (eg, race and gender wage gaps, wages for migrant agricultural laborers) and built environments (eg, funding for public transportation) ▶ Federal nutrition assistance programs, including WIC (funded through annual appropriations), SNAP (funded through the farm bill), and the National School Lunch program ▶ Municipal policies that affect access to food and water (eg, healthy retail incentives in urban areas) ▶ Organizational policies (eg, breastfeeding promotion, prioritizing food procurement from companies that provide fair wages) 	<ul style="list-style-type: none"> ▶ Policies (such as the farm bill) that affect the composition of the food supply (eg, crop insurance, commodity subsidies, grants for specialty crops) ▶ Policies (such as the farm bill) that subsidize, incentivize, or provide research or extension funding for sustainable agricultural practices (eg, carbon sequestration, cover cropping, riparian buffers to protect water quality) ▶ Policies that promote the economic viability of small- and mid-sized producers and processors (eg, access to markets, help achieving food safety standards) 	<ul style="list-style-type: none"> ▶ Policies affecting labels on products (eg, nutrition facts labeling, ingredient labeling, front-of-package labeling, eco-labeling) ▶ Policies affecting labels in food environments (eg, menu labeling for calories or other nutrients) ▶ Policies affecting food marketing and advertising (eg, restricting marketing of unhealthy food to children) ▶ Policies that incentivize or disincentivize the purchase of specific foods (eg, fruits and vegetables, sugar sweetened beverages) 	<ul style="list-style-type: none"> ▶ Policies that can prevent waste of food (eg standardized food date labeling to reduce consumer confusion, funding research and programs to improve food preservation through packaging or decay sensors) ▶ Policies to facilitate food rescue efforts, including tax incentives or liability protection for businesses donating food ▶ Policies to facilitate food scrap composting (eg, organic waste bans to prevent large entities from landfilling organic waste) ▶ Organizational policies such as green meetings or ensuring availability of recycling and composting

Figure 3. (continued) Illustrative examples for each entry point. Each of the five entry points (column headings) has implications for the development of new opportunities in education and training, research, practice, and policy (row headings). These examples are not an exhaustive set of priorities for the profession; rather, they are intended to spark inspiration for the development of new opportunities and collaborations. Icons are from the Noun Project.²⁴⁻²⁷ ^aPer the United Nations Food and Agriculture Organization, “food loss” occurs during production, post harvest, and processing, and “food waste” occurs at later stages of the food supply chain (eg, retail and households).⁷ Food waste includes both edible portions (“wasted food”) and inedible portions (“food scraps”). ^b“Nutrition-sensitive interventions” refers to interventions that do not have an explicit goal of improving nutrition outcomes (eg, programs in agriculture, early child development, education, and social safety nets), but have potential to improve nutrition outcomes and enhance the effectiveness of nutrition-specific interventions (eg, support for exclusive breastfeeding, micronutrient supplementation, treatment of malnutrition).²⁸ ^cThis could include agricultural practices that promote biodiversity (eg, cover crops, buffer strips); plant breeding to select for genetic traits that improve nutritional content or help plants adapt to changing climates, pests, or disease; and in some settings, encouraging production and consumption of neglected and underutilized species,²⁹ especially those that are nutrient-rich and climate-resilient. ^d“Triple bottom line” refers to performance measures that take into account not only financial dimensions, but also social and environmental dimensions. These three dimensions are also commonly referred as the “three Ps:” profit, people, and planet.

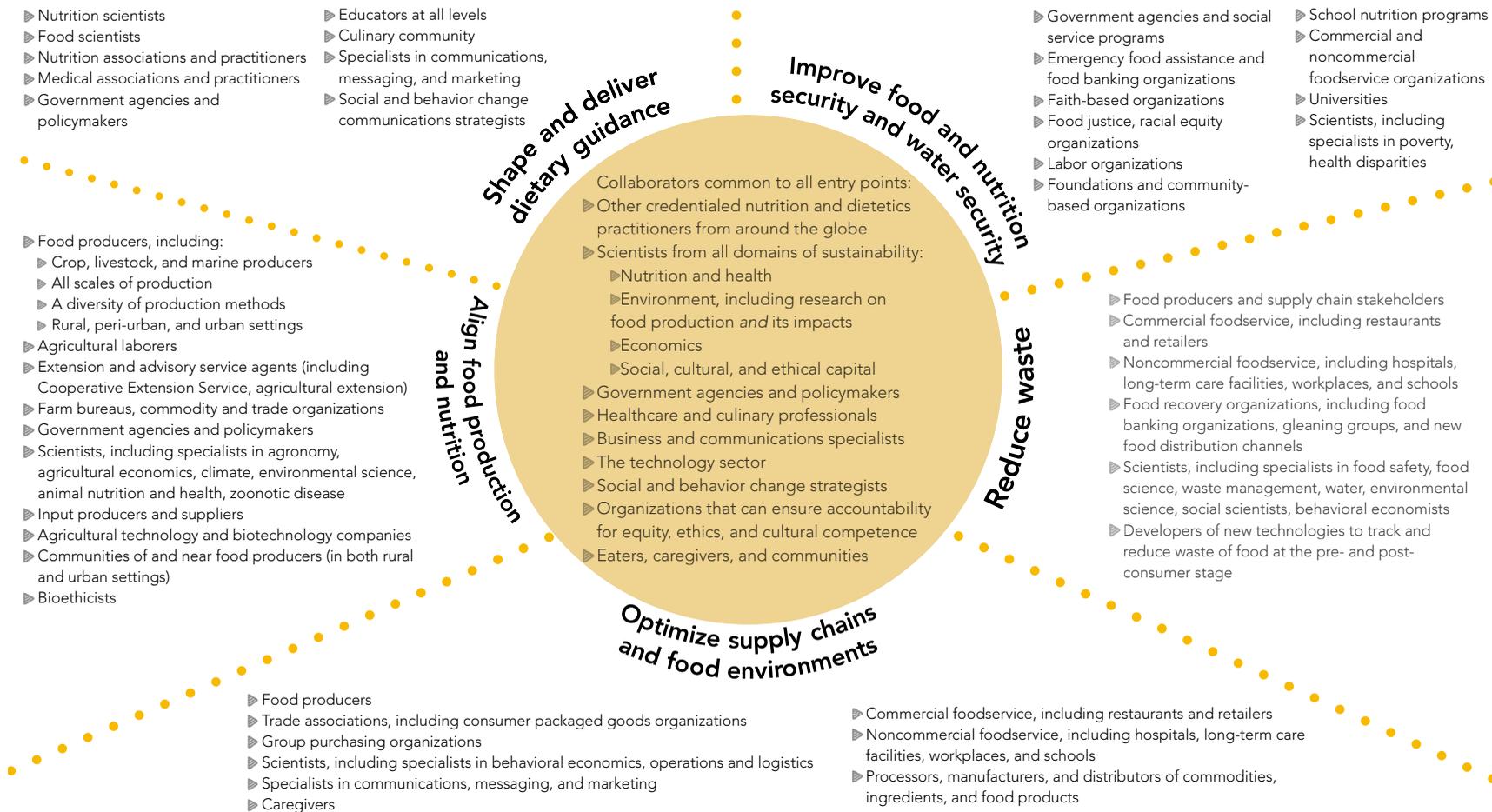


Figure 4. Examples of possible collaborators for each entry point (peripheral lists) and collaborators that are common across all entry points (center list). This is not an exhaustive list of all possible collaborators, and the collaborators are not exclusive to each entry point. These collaborators are also not limited to a specific geographic setting, given that issues in sustainable food and water systems transcend borders. There are many ways to interact with these collaborators: registered dietitian nutritionists (RDNs) and nutrition and dietetics technicians, registered (NDTRs) can learn from these collaborators; share nutrition knowledge; and partner in the creation of new efforts in education and training, research, practice, and policy.

communities, and populations to identify food and nutrition solutions that work for their goals, context, and resources. Because RDNs and NDTRs are skilled in translating population-level guidance into recommendations that are appropriate for subpopulations and individuals, they are critically important in efforts to create and disseminate dietary guidance that incorporates sustainability. RDNs and NDTRs can develop further competence and leadership in this area by bringing nutrition expertise to multi-sectoral research collaborations; drawing from the best available evidence when providing sustainability-related dietary guidance; and sharing clear, evidence-based messaging about the sustainability of dietary choices with professionals and the public through a variety of communication platforms.

Improve Food and Nutrition Security and Water Security

Malnutrition is linked with hunger and food insecurity, and these issues are also connected to water security. The United Nations Committee on World Food Security states, “food and nutrition security exists when all people at all times have physical, social and economic access to food, which is safe and consumed in sufficient quantity and quality to meet their dietary needs and food preferences, and is supported by an environment of adequate sanitation, health services, and care, allowing for a healthy and active life.”³² United Nations Water defines water security as “the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability.”³³ Sustainability underpins many concerns related to the availability, access, utilization, and stability of food and water supplies.³⁴

When working with populations experiencing food and nutrition insecurity or water insecurity, RDNs and NDTRs can connect individuals to

existing services. They can also lead, collaborate on, and evaluate policies and programs to address underlying structural factors that affect vulnerable populations. In the context of food systems, vulnerable populations may include low-income households, people of color, and communities impacted by or susceptible to environmental injustices (eg, exposure to environmental contaminants or displacement due to climate change). Due to the complex interrelationships among the nutrition-related manifestations of food and nutrition insecurity and water insecurity and the deeper structural issues that influence them, this work requires systems thinking; collaboration with frontline communities experiencing systemic injustices; and collaboration with those working on health disparities, racial equity, and the social determinants of health.

Align Food Production and Nutrition

Food production practices, including those in crop, livestock, and marine systems, are critically important for nutrition because they determine the quantity, quality, diversity, and safety of foods available for human consumption. Food production practices can also influence human nutrition and health through effects on climate change,^{35,36} antimicrobial resistance,³⁷ and zoonotic disease from human-animal contact.³⁸ There is increasing multisectoral collaboration to ensure that food production practices support a nutritious food supply and promote human health, while protecting environmental, economic, and societal resources. Whether these multisectoral efforts take the form of research studies, policy advisory councils, entrepreneurial opportunities, or community-based programs, it is important to ensure representation from critical stakeholders—food producers provide important perspectives, as do RDNs and NDTRs.

Optimize Supply Chains and Food Environments

RDNs and NDTRs work in settings where food is processed, packaged, distributed, and made available to individuals, including food companies,

restaurants, commercial and noncommercial foodservice settings, school nutrition programs, and food rescue organizations. These settings are important points of intervention for simultaneously promoting nutrition while investing in capacity for sustainable food production and supply chain practices.³⁹ RDNs and NDTRs influence decision-making both downstream (eg, modifying the built environment to influence individual behavior) and upstream (eg, identifying improvements in the sourcing, ingredients, processing, packaging, distribution, or sale of food that may mutually benefit nutrition and sustainability).

Reduce Waste

RDNs and NDTRs can reduce waste of food, water, and other resources (eg, unnecessary packaging) in homes, health care institutions, and throughout the food supply chain and food environments. Wasted food represents missed opportunities for nutrition⁴⁰ and unnecessary waste of resources used to produce and distribute food.⁴¹ Because wasted food is at the intersection of food safety, dietary intake, and individual and organizational behavior, RDNs and NDTRs are uniquely positioned to champion this critical issue. They can be catalysts to lead, train, and collaborate with culinary and foodservice professionals and others in a variety of waste reduction efforts. Waste reduction efforts should follow the Environmental Protection Agency's waste management hierarchy of reduce, reuse, and recycle. In the context of food, this means prioritizing the prevention of unnecessary discards, followed by food rescue (eg, donation) where possible, and then diverting unavoidable waste and food scraps from landfills (eg, composting, anaerobic digestion, animal feed). Waste reduction messaging within nutrition education may include root to stem cooking, interpreting date labels, food safety information about when to remove affected portions of a product rather than discarding it completely, and including healthy canned and frozen options rather than exclusively prioritizing fresh produce.

CROSS-CUTTING AREA: EDUCATION AND TRAINING

As the profession of nutrition and dietetics evolves, education and training requirements also evolve to encompass new skills and competencies necessary to enter the field and advance as an existing professional. Many competencies central to sustainable food systems have broad applicability to the profession, such as systems thinking, critically interpreting research, and interprofessional collaboration. The most recent accreditation standards from the Accreditation Council for Education in Nutrition and Dietetics released in 2017 include two competencies specific to sustainability. CRDN 3.9 addresses demonstration of ability to procure, produce, and distribute goods and services while “promoting responsible use of resources,” and CRDN 4.6 states that graduates should be able to “propose and use procedures as appropriate to the practice setting to promote sustainability, reduce waste and protect the environment.”^{42,43}

Educators have the unique challenge of finding suitable practice settings and mentors for competencies related to sustainable food and water systems. New resources from the Foundation’s Future of Food initiative include a food insecurity and food banking curriculum⁴⁴ and a sustainable, resilient, and healthy food and water systems curriculum.⁴⁵ Whether using these curricula or incorporating sustainable food and water systems into dietetics education in other ways, preceptors must feel equipped to supervise student learning in this area, which can pose a challenge if familiarity with sustainable food systems is not widespread among current practitioners. Hence, there is a need to provide education and training on sustainable food and water systems throughout the career trajectory, from dietetics interns and students to preceptors and practitioners.

Continuing education in this area should provide opportunities for all practitioners to develop broad knowledge of sustainable food systems and, for those with an interest in developing deeper expertise, opportunities for more specific knowledge (eg, sustainable food procurement policies, use of waste tracking technology). Some specific content areas

may be relatively new for the profession, and the framework for action provides a roadmap for the development of new materials. A highly complementary resource is the Standards of Professional Performance for RDNs (Competent, Proficient, and Expert) in Sustainable, Resilient, and Healthy Food and Water Systems, which can be used to guide the development of training and work opportunities.⁴

CROSS-CUTTING AREA: RESEARCH

The multidimensionality of sustainability poses unique challenges for conducting and interpreting research on sustainable food systems. Complex problems cannot be solved by a single discipline, and research in this area is not only multi- but also inter- and transdisciplinary.⁴⁶ Outcomes that cross scientific disciplines, such as “greenhouse gas emissions per calorie” or “blue water consumption per serving of food,” can be challenging to construct and interpret.

RDNs and NDTRs have much to contribute to sustainable food systems research. They are well trained in valuable skills, including assessing nutrient adequacy and nutritional status, identifying food safety considerations, and understanding drivers and consequences of food access, consumption, and waste. In addition, as frontline workers throughout the food system, they recognize the inherent expertise of community members affected by food systems issues and can ensure community representation in research efforts.

To ensure that research on sustainable food systems has interpretability and value to the profession and the public, RDNs and NDTRs in research settings may need to work beyond the traditional scope of interprofessional collaboration. For example, research collaborators may include not only colleagues in health care, but also food science, agronomy, soil science, marine science, animal science, climatology, waste management, operations research, economics, behavioral science, ethics, public health, and health disparities. This has implications for education and training; for example, a nutrition researcher collaborating with a soil scientist does not need to have primary expertise in soil, but needs to

have enough knowledge of soil science terminology and methods to facilitate communication. The increasing trend (and future requirement) of credentialed practitioners to obtain a graduate degree may provide additional opportunities for cross-disciplinary competence.⁴⁷

Credentialed nutrition and dietetics practitioners need to be able to identify evidence-based resources and critically interpret research findings. Research translation to RDNs and NDTRs is especially important for research conducted with methods that may be less common within the field—for example, life-cycle assessment, systems modeling, risk assessment, policy analysis, qualitative research, or community-based participatory research.

It is also important to create new ways of assessing the strength of the evidence for issues where research methods typically regarded as high quality may not be feasible. For example, while it may be possible to conduct a randomized controlled trial on whether seafood consumption improves nutrition outcomes, a randomized controlled trial would not be a feasible or insightful method to assess environmental impacts of various aquaculture practices. The importance of accurately interpreting nontraditional methods reinforces the need for multidisciplinary collaboration within research teams and workgroups conducting systematic reviews and creating evidence-based practice guidelines. New tools to assess risk of bias may need to be developed or incorporated into existing systematic review methods. Ultimately, the challenges of interpreting a wider range of research methods and determining clear implications for the profession should not be a reason to refrain from engaging in this work, but rather this should further motivate involvement from the profession.

CROSS-CUTTING AREA: PRACTICE

RDNs and NDTRs are positioned in a wide array of roles where they can positively influence the food system. Approximately 50% of practicing RDNs work in hospitals, outpatient clinics, and long-term care facilities, while the remaining 50% work in a variety of

other practice settings, including community nutrition, food and nutrition management, business and consultation, and research and education.⁴⁸ Primary work settings for NDTRs are also clinical in nature, with >50% of NDTRs working in inpatient acute care facilities and long-term care settings.

There are opportunities to support sustainable food and water systems in all practice settings. For example, while programs such as hospital gardens, composting programs, and “food pharmacies” were once unheard of in health care settings, their growing presence is making clinical practitioners an even greater asset than traditionally thought.

For the 50% of the profession working outside of clinical settings, there are many opportunities to influence sustainable food and water systems. RDNs and NDTRs are increasingly positioned in restaurant, supermarket, and other commercial foodservice settings where they can influence culinary professionals, food purchasers, and the public. They can also contribute to sustainable food and water systems through their work with communities, businesses, policymakers, and government programs, and through nutrition education performed in a variety of settings.

CROSS-CUTTING AREA: POLICY

There are opportunities to promote sustainable food systems through both organizational and public policy. Examples of organizational policy include curricular decisions related to sustainable food systems education, modifying workplace environments to facilitate sustainable behaviors (eg, waste reduction), expanding video-conferencing options to minimize air travel, and prioritizing food procurement from companies providing fair wages.

Public policy affects environmental, economic, societal, and health-related factors within the food system. Although not all RDNs and NDTRs specialize in public policy, all practitioners are affected by, and can participate in, policy advocacy efforts. The Academy has developed strong organizational support for advocacy efforts and participation in legislative initiatives at the national and state level.

Blankenship and colleagues⁴⁹ have described the Academy's breadth of advocacy efforts related to sustainable food systems.

This framework for action illuminates a broad scope of policy issues that are relevant to the profession in the context of sustainable food systems. The Farm Bill, for example, includes provisions that are directly and indirectly relevant to nutrition.⁵⁰ Approximately 80% of the 2018 Farm Bill funding was allocated for the Supplemental Nutrition Assistance Program (SNAP). SNAP has direct implications for food insecurity, and SNAP-Education is an important vehicle for promoting nutrition literacy. In addition, Specialty Crop Block Grants enhance the competitiveness of fruits, vegetables, and nuts, which influences the composition of the food supply through economic incentives for producers. The Specialty Crop Research Initiative has a more circuitous, but still important, relationship to nutrition, as it includes research funding for perennial crops, which can influence soil health, crop yields, and carbon sequestration.⁵¹

To effectively engage with public policy issues relevant to sustainable food systems, members of the profession can engage with external stakeholders through coalitions, food policy councils, and other policy advisory bodies. These opportunities are mutually beneficial: external collaborators can provide guidance in navigating new content areas, and RDNs and NDTRs can identify opportunities to strengthen the impact of policies from other sectors on nutrition and human health.

CONCLUSIONS

RDNs and NDTRs bring a unique skill set to a variety of settings throughout the food system. The vision of sustainable food systems cannot be achieved by the profession alone, but it also cannot be achieved successfully without credentialed nutrition and dietetics practitioners.

This framework for action has two major components. The five “entry points” identify high-impact avenues for RDNs and NDTRs to cultivate sustainable food systems. The four cross-cutting areas of education and

training, research, practice, and policy provide a structure for coordinating and scaling up contributions to each entry point, by individual practitioners and by the profession as a whole.

The challenges of sustainable food systems are evolving rapidly. As Fred Kirschenmann wrote, “sustainability is a process, not a prescription . . . it is a journey we embark upon together, not a formula upon which we agree.”⁵² Ideally, revisiting this framework in the future will yield an expanded set of priorities to further advance the profession's contributions in this area.

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STATEMENT OF POTENTIAL CONFLICT OF INTEREST

M. L. Spiker performed this work as part of an Academy of Nutrition and Dietetics Foundation Fellowship funded through an educational grant from the National Dairy Council. When part of this work was performed, M. L. Spiker was also supported by a Johns Hopkins Center for a Livable Future-Lerner Fellowship. M. L. Spiker has received travel support for speaking engagements from the American Frozen Food Institute (2015) and from the Academy of Nutrition and Dietetics Foundation through an educational grant from Bayer Crop Science (2019). During the time of writing, A. S. Hege and A. Knoblock-Hahn held contract roles with the Academy of Nutrition and Dietetics Foundation that were funded through an educational grant from the National Dairy Council. K. Sauer is co-director of the Center for Food Safety in Child Nutrition Programs at Kansas State University, funded by the Office of Food Safety, Food and Nutrition Services, US Department of Agriculture. No potential conflict of interest was reported by the remaining authors.

FUNDING/SUPPORT

The roundtable and associated travel costs were funded through an educational grant to the Academy of Nutrition and Dietetics Foundation from the National Dairy Council.

ACKNOWLEDGEMENTS

The authors thank the following individuals for attending the roundtable meeting and providing valuable feedback on the framework for action: Hope Barkoukis, PhD, RDN, LD, FAND, Case Western Reserve University; Deanne Brandstetter, MBA, RDN, CDN, FAND, Compass Group, North America; Chiquita Briley, PhD, LSU AgCenter; Katie Brown, EdD, RDN, National Dairy Council; Joanne Delaney Burke, PhD, RD, LD, University of New Hampshire; Mary Lee Chin, MS, RDN, Nutrition Edge Communications; Joanna Cummings, MS, RD, CNSC, OHSU-Lao Nutrition Education & Research Partnership and Oregon Health & Science University; Janice Giddens, MS, RDN, National Dairy Council; Elise Golan, PhD, US Department of Agriculture; Michael Hamm, PhD, Michigan State University; Amanda Hege, MPH, RDN, LD, University of Kentucky; Kendra Kattelmann, PhD, RDN, LN, FAND, South Dakota State University; Jerod Matthews, Sr, Feeding America; Sarah Peterson, PhD, RD, Rush University Medical Center; Tia Rains, PhD, Ajinomoto Health & Nutrition North America, Inc; Terri J. Raymond, MA, RDN, CD, FAND, Academy of Nutrition and Dietetics; Wendy Reinhardt Kapsak, MS, RDN, Produce for Better Health; Diego Rose, PhD, MPH, RD, Tulane University; Kevin Sauer, PhD, RDN, LD, FAND, Kansas State University; Jennifer Schmidt, MS, RD, Schmidt Farms Inc; Dave Seddon, MBA, RD, LD, PeakCore and Maine Farm and Sea Coop; Alison Steiber, PhD, RDN, Academy of Nutrition and Dietetics; and Kathy Wilson-Gold, MS, RDN, LD, FAND, KWG & Associates.

The authors thank the following reviewers for providing feedback on the manuscript: Nicole Arcilla, MS, RDN, LDN, Restaurant Associates, a sector of Compass Group USA; Liesel Carlsson, PhD, PDt, Acadia University and Blekinge Institute for Technology; Martha Marino, MA, RDN, CD, Carnation Farms and Chair of Agriculture Subgroup for the Food and Culinary Professionals DPG; Roni A Neff, PhD, SCM, Johns Hopkins Bloomberg School of Public Health and Johns Hopkins Center for a Livable Future; Punam Ohri-Vachaspati, PhD, RD, Arizona State University; Emily Parent, MFCS, RD, LD, Chair of Supermarket Retail Subgroup for the Food and Culinary Professionals DPG; Sarah Reinhardt, MPH, RD, Union of Concerned Scientists; Judy Rodriguez, PhD, RDN, FAND, University of North Florida; Carol Shanklin, PhD, RDN, Kansas State University; Marianne Smith Edge, MS, RDN, LD, FADA, FAND, The AgriNutrition Edge and Former President of the Academy of Nutrition and Dietetics; and Angie Tagtow, MS, RD, LD, Äkta Strategies, LLC.

The authors thank the following Academy and Foundation staff for providing feedback on the manuscript: Jeanne Blankenship, MS, RDN, Academy of Nutrition and Dietetics; Nicci Brown, MS, RDN, CD, Academy of Nutrition and Dietetics Foundation; Susie Burns, Academy of Nutrition and Dietetics Foundation; and Mary Beth Whalen, Academy of Nutrition and Dietetics Foundation; members of the Academy of Nutrition and Dietetics Foundation Board of Directors; and members of the Academy of Nutrition and Dietetics Council on Research.

AUTHOR CONTRIBUTIONS

M. L. Spiker, K. Brown, J. Giddens, A. S. Hege, K. Sauer, D. M. Enos, and A. Steiber were involved in planning and executing the roundtable meeting. M. L. Spiker and A. Knoblock-Hahn wrote the first draft of the manuscript. All authors provided critical revisions on subsequent drafts of the manuscript.