The Role of Grains in Sustainable Diets

Kevin B. Miller, PhD[1]
General Mills, Golden Valley, MN, U.S.A.

ABSTRACT

There is a need to develop a more resilient food supply that is both nutritious and sustainable. From an agricultural perspective, there is increasing concern about depletion of the resources required to grow crops and raise animals humanely. At the same time, the food industry must ensure it has resilient supply chains that are economically viable. Additionally, strategies must be devised to encourage consumers, who are increasingly aware and interested in the origins of their food, how it is produced, and how individual food choices may impact the planet and future generations, to follow more sustainable dietary patterns. The objective of this issue of *Cereal Foods World* on Sustainable Diets is to share insights that will enable the grains industry to prepare for the shifting food landscape and become part of the solution by simultaneously prioritizing nutrition and sustainability and by making grains even more relevant to consumers.

Traditionally, sustainability has been loosely defined as the impact of actions on the environment (e.g., greenhouse gas emissions) and resources (e.g., water, wood, soil). However, when describing sustainability of foods it is necessary to include a much broader set of contributors than simply the environment and use of resources, including consumer nutrition and health, the relevance of a food to a consumer's diet, and whether a food is accessible and affordable. Feeding our population while protecting the planet brings new challenges and opportunities to the food industry and agriculture sectors. Food production should become the global standard for sustainability, covering all the stages of the food chain and paving the way to formulating a more sustainable food policy. It also should contribute to achieving a circular economy and stimulating sustainable food consumption and promote affordable healthy food for all. Grains, including cereals and pulses, can play important roles in developing and maintaining sustainable diets.

There is a need to develop a more resilient food supply that is both nutritious and sustainable. Academia and industry are united in developing and implementing strategies for a more sustainable food supply. The food industry recognizes that the failure to secure a sustainable supply chain could result in higher commodity prices or difficulties in procuring ingredients in the future. The typical consumer has not embraced a lifestyle that demonstrates a need for sustainable and nutritious foods. Therefore, in the short term it will be necessary for the private sector to identify strategies and adopt practices that improve the sustainability of foods that consumers purchase and enjoy until there is broader demand by consumers for more sustainable foods.

There are three primary stakeholders in the development of sustainable diets: the agricultural sector, the food industry, and consumers. From an agricultural perspective, there is increasing concern about depletion of the resources required to grow crops and raise animals humanely, including fertile soil and water management. The food industry must ensure it has resilient supply chains that are economically viable to maintain investor and consumer confidence. Additionally, consumers are increasingly aware and interested in the origins of their food, how it is produced, and how individual food choices may impact the planet and future generations. As a result, the agriculture and food industry sectors are interested in metrics of sustainability that can be used to help assess the impact of different strategies, track their progress, and potentially help communicate with consumers.

The nonprofit organization EAT seeks to transform the food system and has formed a commission comprised of scientists representing multiple regions of the globe. In 2018 EAT published a report in *Lancet*, "Food in the Anthropocene: The EAT–*Lancet* Commission on Healthy Diets from Sustainable Food Systems," that proposed a diet based on a few key outcomes, including nutrition, health, and the environment (1). The authors modeled a diet that is meant to reflect and summarize their conclusions to transform the food system, the EAT-Lancet Diet. The EAT-Lancet Diet is similar in many respects to diets recommended in existing dietary guidance, including the U.S. *Dietary Guidelines for Americans* (US DGA). Both diets encourage individuals to make the majority of their diet fruits and vegetables, but the EAT Commission's report helps reinforce the role of grains, both cereals and higher protein pulse grains and legumes. In their model of a sustainable diet, whole cereal grains represent 34% of the total recommended caloric intake, while pulses and legumes represent 17% of total calories (2,500 total daily calories in the diet). As a result, the EAT Commission's report should be acknowledged for its role in turning the spotlight back toward the benefits of these grains and the prominent roles they can play in sustainable diets.

Grains are incredibly diverse crops that include cereal grains, such as the commonly consumed wheat, corn, oats, and rice. In this issue, we also include pulses. While traditional cereal grains are a staple of diets around the globe, pulses have the advantage of being a potential solution to help meet the growing demand for foods higher in protein. The role grains can play in feeding the world and providing options for sustainable diets reinforces the need to identify "closed loop" agricultural strategies that maximize yields while minimizing resource inputs. The agriculture and food industries have been slow to adopt some strategies that could advance the food supply toward greater sustainability because there has not been a large market for these products. However, consumer interest in sustainability is on the rise, and it will be important to meet the demand as consumer needs evolve.

The objective of this special issue of *Cereal Foods World* on Sustainable Diets is to share insights that will enable the grains industry to prepare for the shifting food landscape and become part of the solution by simultaneously prioritizing nutrition and sustainability and by making grains even more relevant to con-

[1] Guest Editor. Global Scientific and Regulatory Affairs, General Mills, 9000 Plymouth Ave N, Golden Valley, MN 55427, U.S.A.

https://doi.org/10.1094/CFW-65-6-0060

sumers. To achieve this objective, we have recruited experts on a variety of topics related to sustainable nutrition. Kris Sollid, senior director of nutrition communications with the International Food Information Council (IFIC), and coauthors share consumer insights regarding perspectives on food, nutrition, and sustainability that influence what and how people eat. Sara Rosene, associate principal scientist at General Mills, and Fatma Boukid, Institute of Agriculture and Food Research and Technology (IRTA), share challenges and food solutions to making grains, especially pulse crops, appealing and relevant to consumers. Chris Marinangeli, director of nutrition and regulatory affairs with Pulse Canada, addresses the role of pulse grains as a highly sustainable solution to address the appetite for higher protein foods that can help consumers meet dietary recommendations. Joke Putseys, senior scientist at DSM, focuses on biotechnology-inspired solutions to further increase sustainability in the production and nutrition of baked goods. Jim Eckberg, and Steven Rosenzweig, research agronomists with General Mills, share their experiences examining farming practices that improve the resilience of the land, as well as incomes for grain farmers. Lucie Beckers, research manager of agronomy, and Bram Pareyt, senior research manager of proteins, at Puratos, explain the SpaceBakery concept that is being used to explore closed system plant cultivation and baking on the planet Mars and how it can be leveraged for future sustainable innovation on earth. Anne Vissers, and coauthors share some tools and theories from their work at Campbden BRI to understand cake baking, with a focus on foam to sponge conversion. Cara Cargo-Froom and coauthors explain methods for processing pulses to facilitate and optimize their nutritional functionality and maximize amino acid bioavailability in foods and feeds. Melvin Huber and Kari Jänkälä, chief technical officer of GrainSense, share the advantages of portable near-infrared spectroscopy for analysis of grain crops. Cathy Wilson, director of research collaboration with the Idaho Wheat Commission, closes the issue by sharing the idea of leaving the earth better than we found it and providing case studies to illustrate the concept.

Reference

1. Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., et al. Food in the Anthropocene: The EAT-*Lancet* Commission on healthy diets from sustainable food systems. Lancet 393:447, 2019.