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RECEIVED 28 March 2023
ACCEPTED 11 July 2023
PUBLISHED 24 July 2023

CITATION

Kanter R, Kennedy G and Boza S (2023)
Editorial: Local, traditional and indigenous food
systems in the 21st century to combat obesity,
undernutrition and climate change.
Front. Sustain. Food Syst. 7:1195741.
doi: 10.3389/fsufs.2023.1195741

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Editorial: Local, traditional and indigenous food systems in the 21st century to combat obesity, undernutrition and climate change

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KEYWORDS

food systems, traditional food systems, climate change, food biodiversity, underutilized foods, rural development

Editorial on the Research Topic

[Local, traditional and indigenous food systems in the 21st century to combat obesity, undernutrition and climate change](#)

Traditional and indigenous food systems have existed for centuries and were in balance with local food supplies, globally. However, between the mid 20th and early 21st century the green revolution dramatically altered food production, which in turn affected the inclusivity of traditional production systems within food systems and subsequently, traditional dietary intakes. Industrialized food systems, with the aid of global processing, distribution and marketing channels have helped in transforming grains and edible oils into increasingly processed food products as well as animal feed. This change was accompanied by lifestyle changes and spurred a global nutrition transition. Today the world faces a global syndemic of obesity, undernutrition, and climate change. A new call to action to create food systems that nourish people and sustain the planet is needed. Modern food systems have evolved to a point where the cost of a healthy diet is five times greater than the cost of a diet that meets dietary energy requirements from the least costly food products; cereals (FAO et al., 2022). The downside of this approach are diets that are devoid of essential micronutrients and food biodiversity required for health and food production systems that are a major source of global greenhouse gas (GHG) emissions and an unsustainable use of natural resources. Traditional and indigenous food systems have long been recognized as systems that can both support good human nutrition as well as maintain a balance with nature. Our food systems need to be reoriented to be more compatible with the natural environments in which we live and more reliant on a wide range of food biodiversity to meet our nutritional needs. In 2010, the Food and Agriculture Organization defined Sustainable Diets as “*diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources*” (Burlingame and Dernini, 2012).

Traditional and indigenous food systems have existed for centuries and can offer some pathways forward to mitigating the challenges of obesity, undernutrition and climate change. Traditional food systems are characterized as systems oriented toward use of diversified plant, animal and fish species with place-based distribution and marketing channels and geographically defined consumer base. Indigenous peoples were often the custodians of traditional food systems.

There is an underutilized knowledge base around traditional and indigenous food systems. This includes the knowledge of nutritious species, traditional culinary preparations, and cultural practices. Greater agricultural production of underutilized species can result in more sustainable agricultural and food systems which can also help improve livelihoods and food security. Traditional and indigenous cultural practices with respect to both land and water management, as well as culinary practices, contribute to both sustainable food production and consumption. These practices require a greater evidence base in order to be incorporated into public health nutrition initiatives related to improving dietary quality, such as food-based dietary guidelines for example. An increased focus on the importance of local, traditional, and indigenous food systems and nutrition could therefore help countries to improve human nutrition and, ideally, help mitigate the global syndemic of obesity, undernutrition, and climate change. There are 12 articles published in this special issue that consist of 7 original research papers, two systematic reviews, one mini review, one policy and practice review and one perspective piece. Here follows a brief summary of how each one of these articles has made a unique contribution to documenting diverse local food systems and promoting elements within them that can help improve nutrition and health—both human and planetary—in various ways including the livelihood development of knowledge holders.

In a perspective piece, [Burkhart et al.](#) call for the revitalization of local, traditional bananas in the Pacific Islands to help improve the diet and health outcomes in these populations. Traditional banana cultivars have been found to have higher amounts of carotenoids than the most commonly consumed Cavendish banana cultivar. The subsequent revitalization of these banana cultivars can also simultaneously support local food systems and livelihoods in these areas.

[Merchant et al.](#) utilized participatory research methods to assess, amongst adult male and female farmers in Western Kenya, familiarity of African Indigenous Vegetables (AIVs), consumption, and related barriers and facilitators of consuming AIVs, and favorite recipes for cooking AIVs. Results demonstrated that farmers were cooking AIVs, and also highlighted barriers and facilitators of consuming AIVs. In addition, participants were asked to list their most preferred AIVs in terms of both production and consumption preferences. Seasonal differences were either a facilitator or a barrier to AIV availability and thus, consumption. The authors call for policies that simultaneously promote increased farmers' access to key inputs for AIV production and behavior change programs to support increased consumption.

[Bokelmann et al.](#) use the HORTINLEA project which engaged small holder farmers in collaborative research for the purpose of promoting production of local vegetables. The project took place in Kenya and was focused on small-holder farmers and small

enterprises to generate strategies and support the decision making processes that could lead to improvements in local vegetable value chains to improve food and nutrition security. Market access, especially to urban informal markets was noted as one of the most promising opportunities for small-scale producers to expand their market share. In order for this strategy to be successful investments in market hygiene and storage and better rural to urban access are needed. Opportunities to improve consumption of African Indigenous Vegetables (AIVs) were found across multiple pathways leading to food and nutrition security, including own consumption, increased income and women's empowerment and each pathway has merit for inclusion in a holistic strategy. From a value chain perspective, gains in efficiency can come through reducing vegetable loss, that occurs both from pests and disease as well as post-harvest deterioration. Solutions explored included improved vegetable seed and cooling and storage technologies. The final area considered for upgrading the AIV value chain to benefit small holder farmers in Kenya was through financial support to producer organizations and other forms of collective action, especially for women-owned enterprise.

[Ahmed et al.](#) focused on the importance of wild food environments, where communities can procure cultivated and wild foods from within their surroundings. They surveyed 182 adult informants in the state of Montana in the United States of America, divided between urban and rural counties. Over half of these participants reported hunting or foraging on a weekly basis; the majority of which incorporated the foraged wild edible plants and hunted wildlife into homemade recipes. Overall, participants shared myriad environmental concerns that could negatively impact the positive benefits of wild food environments, including changes in weather patterns, land-use and water quality. In parallel with greater conservation efforts and place-based education on wild food procurement, more research is needed to discern how climate change is specifically impacting wild food environments.

[Kuhnlein and Chotiboriboon](#) highlight why and how to strengthen Indigenous Peoples food systems using examples from the Nuxalk Nation in British Columbia, Canada and the Pwo Karen People of Sanephong Community, Thailand. They define Traditional Food Systems of Indigenous Peoples as all foods within the particular culture that are available from local natural resources and culturally accepted, including the sociocultural meanings, acquisition and processing techniques, use, biological composition and nutritional consequences for the people using the food. The people of the Nuxalk Nation inhabit the Bella Coola valley, in a food system where the river and tributaries provided many habitats and food diversity, including five species of Pacific salmon, sea foods, game (rarely found), tree foods, root foods, and a variety of wild fruits and greens. The paper highlights the nutritional and cultural value of the eulachon (*Thaleichthys pacificus* Richardson) fish species, valued for oil, meat and culturally important food, provided as gifts and shared among community members. However the use of traditional food species by Nuxalkmc has been gradually declining. Interviews with three generations of Nuxalk women shows gradually decreasing use of game, berries, greens, roots, and sea foods, with less impact on river fish. A more severe downturn in local food resources was noted in the more recent past (1980 to 2009) due to a decline in fish species. A systematic

attempt to preserve and revive the Nuxalk food system began in the 1980s and continues to document, retain and use traditional biocultural knowledge for long-term nutrition and health benefits for Nuxalkmc.

Using South Africa as the setting, where erosion of traditional knowledge and use of indigenous and traditional foods has occurred for sorghum, [Pereira and Hawkes](#) trace this nutrient dense and resilient traditional food crop through the food system of South Africa. They identify five key entry points ranging from increasing affordability through trade and tax adjustments to increasing consumer appeal. They note a particular need to remove value added tax applied unequally to sorghum as compared to maize and to increasing consumer appeal through innovative product development and inclusion of sorghum in public procurement schemes, such as school meals. The South African government has identified sorghum as a crop of interest due to the nutritional and agroecological potential. The authors conclude with suggesting a cross-country learning exchange to exchange lessons learned on how to proactively engage across sectors and stakeholders within the food system to revitalize traditional grain crops that are both nutrient dense and climate resilient.

[Ekesa et al.](#) explore access to and utilization of wild foods in the Teso and Acholi sub-regions of Uganda. Using a series of focus group discussions with men and women (grouped separately) and the four cell mapping method, participants assessed current (2017) and past (before 1997) availability, consumption, sale, and purchase of wild foods in their communities considering dimensions such as (i) large and small areas of availability; (ii) many and few households; and (iii) more and less frequently consumed, sold or purchased. The study confirmed that wild foods still play a major role within the food systems of the two regions, with over 100 species mentioned, but that species availability has decreased over time for most species, especially animal source foods due to loss of habitat and hunting restrictions. A few communities reported greater availability of wild fruits now as compared to in the past. Fewer species were reported as being consumed, purchased and sold now as compared to the past, largely due to restrictions on hunting wild animals and habitat destruction. The reasons most frequently cited for continued reliance on wild foods were that they were convenient to harvest (grew commonly near homes), were considered local seasonal delicacies, were popular with children and were affordable. In contrast, habitat loss, rarity and expense were the most commonly cited reasons for few households consuming infrequently. The authors conclude with a call to valorize the social and cultural aspects related to wild foods.

[Wang and Mashford-Pringle](#) address the nutrition status and dietary practices of “ethnic minority groups” in China through a literature review. The authors found that, of all fifty-five ethnic minority groups in China, only fifteen have representative dietary intake data reported, only seven have data on both, nutrition status and dietary practices and there are no studies for ten of them (representing more than 800,000 inhabitants). The probability for an ethnic minority to be considered a research subject is related to the population size of the group, as well as with their uniqueness in a specific region. On the substantive content of the research reviewed, ethnic minorities in China suffer from a double-burden of malnutrition and consume unbalanced diets.

[Gutierrez et al.](#) investigated the Kumiai community in San José de la Zorra in Baja California, Mexico, near the Guadalupe Valley to better understand if their traditional food system persists at present. They found that the current Kumiai diet is substantially different and less nutritious from the traditional diet, rich in cultivated foods such as bitter acorn and watercress, they once consumed. However, the Kumiai still prefer cooking with a wood stove and will still have family traditional meals with acorn-based recipes, amongst other locally based ingredients. The current existence of traditional food system knowledge within the Kumiai community offers solutions for both the health of its people and its natural resources.

[del Valle M. et al.](#) conducted a literature review based on the following question: “How can food governance transform food systems to ensure better access to sustainable diets?.” The authors conclude that from the food governance lens it is key to ensure that food systems are sustainable and resilient to crisis. In this, food governance is necessary to have more equitable relationships between the actors involved in food systems. An additional finding is that the concept of agriculture governance, although very relevant to promote an agricultural sector more committed to nutrition and sustainability, has still been scarcely explored. Another aspect that needs to be more developed is the socio-cultural dimension of sustainability. The concept of agency can be useful to advance a better understanding and thus, inclusion of the socio-cultural dimension of sustainability.

[Sobhani et al.](#) assess and compare the sustainability dimensions of the usual Iranian dietary intakes with sustainable optimal diets based on Iranian, Mediterranean, and vegetarian food-based dietary guidelines (FBDGs). The authors found that the Iranian food-based dietary guidelines have improved in terms of sustainability though the years. They also show that substituting the usual Iranian dietary intake with the optimal diet of other FBDGs could lead to very relevant reductions on environmental footprints (water, carbon and land), as well as in cost. In this, the Mediterranean diet was the one with higher improvements in costs, sustainability and nutrition.

[Marchant et al.](#) study the potential of blood-fleshed peach, a heritage cultivar, to support livelihood opportunities in local agriculture in Chile. Ethnographic research using a citizen science approach was used to map the geographic distribution of blood peach in regions of Chile and farmers familiar with blood peach responded to questions on common uses and properties. These findings were complimented with laboratory analysis focused on the antioxidant and polyphenols in fresh blood peach. The geographic distribution was wide, suggesting that blood peach is adaptable to a range of climatic conditions. Farmers interviewed often recalled childhood memories of consuming this fruit, but that the cultivar is now in decline. Some reasons for this are the delicate nature of this cultivar which bruises easily and therefore is difficult to transport and market widely and the current trend in Chile for fruit production aimed at the international export market. There is also a loss of cultural knowledge, with younger generations not recognizing this cultivar in the market and therefore not purchasing the fruit. The antioxidant activity of the blood-fleshed peach is higher than that of white and yellow commercially produced cultivars. The research team subsequently has helped the formation of a community association interested in

protecting the Chilean blood-peach and promoting its production and consumption locally. There are several products that given the high antioxidant property have the potential of reaching health conscious consumers, especially if supported by chefs, restaurants and food entrepreneurs. Success for this cultivar will be linked to rural territories that are interested in promoting the conservation of this cultivar based on the social and economic benefits that can be gained.

The post-COVID food and nutrition security outlook shows an increase in hunger and food insecurity, exacerbated by the economic aftershocks of COVID and increasing global inflation. Related to low global dietary diversity and diet quality, diet-related health costs are projected to reach USD 1.3 trillion per year by 2030 (FAO et al., 2022). Therefore, we hope that the 12 scholarly articles in this special Research Topic focused on local and traditional food systems will positively contribute solutions toward mitigating the concomitant climate and health crises the world is facing.

Author contributions

RK drafted the introduction and conclusion sections of the text, wrote summaries for the articles she worked on when the Research Topic was in progress, and compiled and revised all authors' contributions into the final version of the manuscript. GK

contributed to both the introduction and conclusion sections of the text, wrote summaries for the articles she worked on when the Research Topic was in progress, and provided feedback on the draft manuscript. SB wrote summaries for the articles she worked on when the Research Topic was in progress. All authors contributed to the article and approved the submitted version.

Conflict of interest

GK was employed by Global Alliance for Improved Nutrition.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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