
Editorial

The future of food: responsible production, acquisition, consumption and disposition

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Background

In 2000, leaders of countries penned their unity in ending poverty towards shared prosperity, leaving no one behind. These tall orders were set out in the 17 Sustainable Development Goals (SDGs) aiming to achieve by 2030. However, the SDGs achievements are divided by the economic growth of the countries, between the low-income developing countries and the advanced countries. With the COVID-19 pandemic, affecting all aspects of life and livelihoods, “leaving no one behind” could be out of reach (Qu, 2020; United Nations, 2020).

Food provides nutrients for the growth and repair of human body and for keeping the immune system healthy. Attempts to eradicate hunger and to ensure food and nutrition security exist over human civilization. Human welfare has improved enormously over the past century, thanks to the quantum leaps in technology, innovations in food production systems and rapid urbanization. However, to date, around two billion people are still suffering from micronutrient deficiencies, and almost 800 million are chronically hungry (Food and Agriculture Organization of the United Nations (FAO), 2018). Whilst food security was worsening even before the COVID-19 pandemic, the pandemic has further increased the world population affected by moderate or severe food insecurity, derailing the achievement of the SDGs (United Nations, 2020). To fulfill the vision of the United Nations Sustainable Development Goal (UNSDG) No. 2: Zero Hunger and the FAO's: to create a world free of hunger and malnutrition and one in which food and agriculture contribute to improving the living standards of all, especially the poorest, in an economically, socially and environmentally sustainable manner, much remains to be done and at a higher order. The fulfillment of SDGs in this era of the pandemic, particularly achieving poverty reduction and Zero Hunger may seem difficult to achieve at the current rate. Countries need to remain resilient and proactive with their people. Perhaps this is a calling and time for the advanced economies to step in and extend assistance to the low-income developing economies.

Data and research remain valuable to understanding the impact of COVID-19 on food security and for planning restoration. However, data are difficult to come by from the poorer nations due to a lack of resources (United Nations, 2020). Moreover, the lack of understanding of the realities of food production and food waste of consumers living in the developed economies, where they live further from where their food grows, remains a concern (Parfitt *et al.*, 2010). This raises questions on whether we can sustainably feed a world population of 11 billion as the pressures of the negative impacts of climate change, land and water resources scarcity, and food waste intensify. It is a global issue which concerns many aspects of human living, thus highlighting the importance of the roles of multiple stakeholders and the collective efforts to address it (Shelef *et al.*, 2018). In playing a role to ensure that the global food supply is sufficient to meet the demand of the world's population by 2050, this special issue was arranged to call for papers to investigate and present findings on how food supply



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An overview on articles in the special issue

You will find a wide array of topics related to responsible production, acquisition, consumption and disposition. It is interesting to note that a significant number of papers in this issue encompass food waste studies which is a huge problem globally and presents a grim picture of the need to overhaul food waste practices in order to be on track with the achievement of a “zero hunger” world.

Other papers cover topics related to responsible production, acquisition and consumption. One paper describes how food enriched with nutrients, i.e. foods which have been subjected to bio fortification seem to produce a halo effect in judging the food’s taste. This halo effect seems to also extend to the consumers preference and purchase intention of bio fortified foods. In a Chilean study, however, where meat consumption is high and seems to be linked to masculinity, variables such as sociodemographic variables such as gender and social class affects the decision to stop meat consumption altogether. This information may prove useful to organizations seeking to raise awareness and knowledge on the negative environmental impacts of the meat industry, including improving marketability of lab-grown meat or LGM products.

LGM products are a part of this growing movement on meat alternatives as very much of a “future food” which may carry a number of benefits not only for the consumers but for the environment and society as a whole. A number of studies are beginning to emerge including one in Australia which examines the market potential for LGM in the country. Whilst 49% of consumers indicated some willingness to consume LGM, one particular segment (12%) seemed to be more keen than others. It consists of younger, university-educated consumers who have greater awareness of LGM including its potential self- and society-related benefits. This seems to be also reflected in another study in Brazil, where meat plays a huge part in the country’s socioeconomic identity. Quite interestingly also, this study shows that having prior knowledge and awareness on LGM does not link to the individual’s intention to consume cultured meat. As a growing concept, LGM marketability can be explored further in other countries too, hence providing for a wider global outlook for LGM products market development and responsible food consumption.

Another important aspect entailing responsible food consumption, which is often overlooked, would be how well restaurants are equipped with food allergy knowledge to protect consumers who have allergies associated with food. Are restaurant staff able to articulate and understand food allergy concerns? In Jordan, a study shows that food allergy attitudes and knowledge of restaurant staff varies and is closely linked to parameters such as age, position, their education level and the restaurant’s safety protocols and accreditations. This study goes on to recommend the need to develop capacity building programs for restaurant staff to facilitate food allergy risk management.

Over in Turkey, border closure from the current pandemic has caused quite a problem to the fisheries industry there who rely heavily on exports. It turns out that the disruption in the supply chain has motivated the studies of fish consumption in the coastal areas of Turkey, which is supposed to be higher than the central inner region of the country. Despite the increase in the demand for fishery products around the world, the consumption of seafood has decreased in Turkey. Hence, with the effects of the pandemic, the industry has turned to the domestic market albeit the lukewarm demand.

Undoubtedly, the COVID-19 crisis has also disrupted the agriculture sector. Smart farming is seen as a way forward, especially now to enable farmers to be more connected. A once traditional sector, it may be a while before Southeast Asia’s small-scale farmers adopt

smart farming methods, a study on the latest trends in agriculture and the adoption of smart farming methods shows. Arduous regulations, huge costs and the digital divide seem to contribute to these. Youth participation, (science, technology, engineering and math) STEM learning and regional cooperation are recommendations provided to allow for these farmers to contribute towards sustainable agriculture in Southeast Asia.

As far as ethical food consumption is concerned, a study depicting the possible antecedents and predictors of consumers' buying and ethical food consumption processes within the Italian Solidarity Purchasing Groups (SPGs) show how these are influenced by their attitudes and perceived behavioral control. These attitudes are further influenced by their ethical self-identities, willingness to support the local economy and food safety concerns. These groups are emerging social organizations, which are inspired by ethical food consumption. SPGs are in fact a growing trend, which offer a form of alternative food supply chain encompassing sustainable food acquisition and consumption principles.

Food safety is also often somewhat understood, but there is also a lack of understanding of the possible health risks associated with plant-based foods. This was found in a study aimed at assessing the knowledge of food safety, caloric content, carbon footprint and animal welfare of different foods among citizen scientists. Supporting previous research, the study demonstrates that citizens are unable to accurately estimate the caloric content or carbon footprint of many every day foods. It is suggested that simple interventions such as displaying attractive calorie and carbon footprint information labels and conducting other educational interventions should be able to help with this. Also noteworthy in this study is that whilst social media platforms can be used to recruit participants, the responses varied across these platforms. It has been suggested that Facebook and Twitter may not be suitable platforms for the recruitment of citizen scientists; not only were recruitments low, their estimations were also not reflective of the representative samples from Qualtrics. Facebook and Twitter users are often younger and more educated, hence, not quite representative of a general population. Participants for this study were recruited through social media via Facebook, Twitter and Qualtrics adverts and were then redirected to the citizen science online platform called Zooniverse to explore consumer perceptions of these various aspects of different foods.

Moving on to responsible production, there seems to be a specific lack of holistic sustainability assessment and reporting frameworks for food manufacturers. One study found that there are no related frameworks which specifically fulfill the suitability for food systems and their connectivity with the up and downstream supply chains. This study calls for a more harmonized and integrated sustainability assessment framework throughout the food supply chain to enhance sustainable production and consumption.

A study undertaken in China, meanwhile, validates the effect of face consciousness of consumers on the intention to purchase organic foods and extends this study to reveal that the face consciousness effect is moderated by the purchase situation and advertising appeal and mediated by perceived social value. This study goes on to imply that companies can make more use of altruistic advertising appeals and place more emphasis on linking the consumer to the organic food in ways that would strengthen consumers' intention to buy organic food.

Moving on to food waste, what are our attitudes towards this? With around 690 million people in the world still living in hunger and global food insecurity rising and affecting 25.9% of the world population, a situation aggravated by the pandemic, exactly what are we doing to address this aspect of the sustainable food cycle? A significant portion of the papers in this issue detail studies in this area; most offering practical implications for research, practice and society, which should contribute towards the panacea for global food waste issues.

A systematic literature review on food waste research reveals that there seems to be a focus on the consumer perspective with little emphasis on food organizations and other

stakeholders. It also reveals other research gaps in the literature such as the need to include developing countries in the Asian region as these accounted for more than half of the global food waste. The studies also were not theory-driven and suggested that future research should consider other theories to study the behavior in addition to the theory of planned behavior as human responses to food waste are also varied. It further juxtaposes present studies highlighting the need to clarify how various cultural and socioeconomic aspects influence food waste problems. A similar qualitative study points to the influence of similar factors (food related, sociocultural and personal factors) to food disposition behavior in late adolescents hence also adding on the demographic factor. Another finding suggests responsibility for one's actions, being waste conscious and relying on food reviews along with demographic factors having a significant impact on food waste behavior.

In the UK, food insecurity was experienced by 39% of the participants in a consumer study exploring food insecurity, food waste, food-related behaviors and cooking confidence, following the first COVID-19 lockdown there in 2020. Most of these were younger, with a greater BMI and living in smaller households. Food secure consumers reported wasting a smaller percentage of purchased and cooked foods.

One study exploring food disposition shows a promising trend of consumers inclined to reduce food wastage and take-home leftovers at restaurants after employing a strategic communication tool called the doggy bag concept. The concept of the "doggy bag" was utilized, which is a product-based innovative tool that is designed to promote the habit of bringing home left-overs in Japan. Interestingly, this concept was enacted in Japan in October 2019 by the Food Loss Reduction Promotion Law. This concept is positioned to be one of the main food loss and waste reduction methods in the country.

This similar nudging and educational intervention was applied with hotel guests to be involved in minimizing plate waste at hotel breakfast buffets, where food waste is often an area of much interest and criticism. This study identifies that appropriate messages such as experiential appeal messages positively influence guests' behavior. These studies indicate the positive impact of communication tools to persuade people to actively reduce food disposition in the hospitality industry. These intervention tools should inspire more studies to be done in different cultural contexts to determine how awareness and persuasion influence people's decisions to be part of the sustainable food movement.

Ways to move forward

As the special issue focuses on the future of food in relation to responsible production, acquisition, consumption and disposition, the key tenet is responsibility, which includes responsible behavior individually and responsible action collectively. Although "responsibility" is somewhat ambiguous and context dependent, it is largely accepted as a duty or obligation for which a person or institution is held accountable (Ting *et al.*, 2021). Moreover, the sense of responsibility is found to have a great effect on one's consumption and behavioral outcomes (Evans *et al.*, 2017; Wells *et al.*, 2011). It goes without saying that the COVID-19 pandemic crisis has intensified the need for responsible behavior and action and thus heightened the urgency to reevaluate the current and future of work (Ting *et al.*, 2020). The recent launch of a new journal called *Journal of Responsible Tourism Management* highlights the epoch of responsibility, and why it begins to gather pace again in tourism (Cheer *et al.*, 2021).

While sustainability and responsibility may seem alike in certain fields, such as tourism, they are distinctive in emphasis and approach. SDG 12 denotes that sustainable development in consumption and production requires responsibility. This holds true in food production and consumption as well. Despite the importance of policies and guidelines, and having these tools revised time and again to meet contemporary needs, promoting responsible behavior

and action to all stakeholders is pivotal to implementing any food security or food waste reduction campaigns effectively, and thus making these sustainable in the long run. Irresponsible activities are still rampant today. Many of them go on unpunished or unnoticed and thus nullify the good works of sustainable development. Being responsible underscores the notion of what one can do now, instead of what goals are to be achieved then. It focuses on stakeholders, priorities and contexts in a pragmatic manner, where the process in its entirety is considered. While good governance and technological advancement remain relevant, the future of food also hinges upon the sense of responsibility that individuals and institutions have towards food processes, including its production, acquisition, consumption and disposition.

Some of the issues raised in the articles and the importance of furthering responsible behavior to all stakeholders puts the Education for Sustainable Development (ESD) framework into the picture. ESD is a key enabler of the SDGs and is an important tool urgently needed today to inspire action on key issues such as food sustainability, right from its production to its disposition. Although ESD is supposed to take a holistic approach that enhances the cognitive, social, emotional and behavioral learning aspects, a study conducted by UNESCO has found that ESD, most times, is associated with the teaching of scientific knowledge only with a lack of focus on the other learning aspects (UNESCO, 2020). As such, ESD should be seen as having these cross-cutting competencies and integral to the achievement of all the 17 SDGs, where education not only enhances an individual's successes but also contributes to the survival and well-being of the global community.

Universities are now moving gradually beyond the traditional functions of content delivery and research to mainstreaming ESD in their curricula and operations and use education as a tool for a sustainable future. A number of universities around the world are also hosting collaborative networks called the Regional Centers of Expertise (RCEs) on ESD. These RCEs are formally acknowledged by the United Nations University Institute for the Advanced Study for Sustainability (UNU-IAS) in Tokyo, Japan. RCEs are unique and work on a range of initiatives and programs from organizing sustainable development related workshops and forums, conducting research to community based and school programs that focus on ESD. UNU-IAS launched the ESD Projects in 2003 to contribute to the UN DESD (Decade of Education for Sustainable Development) spanning from 2005 to 2014. Following the completion of the DESD, UNESCO's Global Action Program or GAP (2015–2019) was introduced, and this roadmap has recently given way to the new ESD for 2030 roadmap, which highlights the urgent need to make education as a key enabler of the SDGs. Its objectives are: *To fully integrate ESD and the 17 SDGs into policies, learning environments, capacity-building of educators, the empowerment and mobilization of young people and local level action.*

What is left to do now is to really translate these global objectives into action.

Siew-Wei Yeong

*Regional Centre of Expertise on Education for Sustainable Development, Kuching, Malaysia
and*

Faculty of Pharmaceutical Sciences, UCSI University, Kuala Lumpur, Malaysia

Mukvinder Kaur Sandhu

*Regional Centre of Expertise on Education for Sustainable Development, Kuching, Malaysia
and*

Centre for Pre-U Studies, UCSI University, Kuching, Malaysia, and

Hiram Ting

*Faculty of Hospitality and Tourism Management, UCSI University, Kuching, Malaysia and
Department of Leisure and Recreation Management, Ming Chuan University,
Taoyuan, Taiwan*

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