Global food security post COVID-19: Dearth or dwell in the developing world?

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Abstract

Today, global food systems are highly susceptible to food safety risks, economic shocks, price volatility, and natural disasters and pandemics, such as the novel coronavirus (COVID-19). This paper draws from research on food and nutritional security, food fraud and associated economic ecosystem, and the disruptions due to COVID-19 for socio-economic inequality globally. It is concluded that the safety risks have pushed enforcement of measures to reduce food supplies, adversely impacting food availability. Also, COVID-19 is likely to raise fleeting food security and nutritional concerns across the globe, resulting in rises in poverty and food fraud, limiting food supply and access. Accelerated investments intended to develop more inclusive, sustainable, and resilient food systems will help shrink the effect of the pandemic and, hence, offer a way to control the foreseen food security crisis and economic growth.

Abbreviations

COVID-19
: coronavirus

FAO
: Food and Agriculture Organization

FIES
: Food Insecurity Experience Scale

IPC
: integrated food security phase classification

NGO
: nongovernmental organization

SDG
: sustainable development goal.

1 INTRODUCTION

The coronavirus (COVID-19) pandemic, which arose in a few countries in January 2020, reached a most significant peak in a few months, spreading worldwide and creating disastrous impacts. Most nations closed their international borders for passengers and restricted the movement of commodities, which led to difficulty in self-sustenance for the countries that rely on imports to fulfill their food supplies (Hussein & Greco, 2020; Kim et al., 2020). The trade barriers and supply chain

bottlenecks increased food insecurity and hunger by restricting producers' access to agriculture inputs, reducing supply stability (Savary et al., 2020). It has also created uncertainties and unexpected inefficiencies in the global food supply chain. Availability of raw material, labor shortage, market inaccessibility of producers, and transportation restrictions are among the few challenges on the supply side of food supply chains (Kamble & Mor, 2021), and similar constraints exist during procurement.

The pandemic situation made policymakers and supply chain participants realize the need for autonomous and resilient systems. United Nations (2020) reports depict that the prime objective under Sustainable Development Goals (SDG) (i.e., zero hunger by 2030), seems incomplete given the conflicts, climate and economic shocks, and importantly, the COVID-19 pandemic. The countrywide lockdowns and trade and transportation restrictions caused severe disruptions to the fresh food supply chain. Further, the crisis arrived at a time when global food security was already under strain. In turn, the situation has caused a global food security issue (The World Bank, 2020; United Nations Sustainable Development, 2020). A healthy and balanced diet helps maintain immunity; however, due to high costs, this was out of reach for many people with limited financial resources (Hirvonen et al., 2020).

Poor coordination also necessitates developing a robust food supply chain and policy transformations (Swinnen & McDermott, 2020). Food policies must ensure food security in difficult times for diverse, resource-poor economies (Lambert et al., 2020). Worldwide, rural people face food insecurity, including small and marginal farmers, landless farmers, and worker groups. In India, the pandemic resulted in an inability to sell crops and livestock products, reducing daily wages and dietary diversity (Jaacks et al., 2021). In this line, the current paper addresses the status, challenges, and strategies to global food security issues, thereby raising the need for building more resilient and sustainable food systems.

2 FOOD INSECURITY

According to the Food Insecurity Experience Scale (FIES) under the Food and Agriculture Organization (FAO), food insecurity means the lack of regular access to safe, healthy, and nutritious food for expected growth and healthy life. The reasons for food insecurity may include inaccessibility of food and the shortage of resources to access food, as observed at different points on a severity scale. The FAO assesses food insecurity with the FIES framework. The framework shows that uncertainty and compromise on food quality lead to mild food insecurity, insufficient food causes moderate risk, and no food leads to severe food insecurity. Thus, food insecurity disrupts food consumption due to the deficiency of money and other resources. Severe food insecurity is extreme; however, even moderate food insecurity is annoying, and food access is ambiguous.

Core Ideas

- COVID-19 is likely to raise grave concerns for food, nutritional security, and food fraud.
- Agri-food has become the priority industry in the wake of the pandemic.
- Innovations, collaborative, and resilient models will help recover future agri-food systems.

2.1 Prevalence of food insecurity

The SDG estimates show that approx. 26% of the global population did not have a nutritious, secure food source in 2019, and poor people experienced food insecurity (Figure 1).

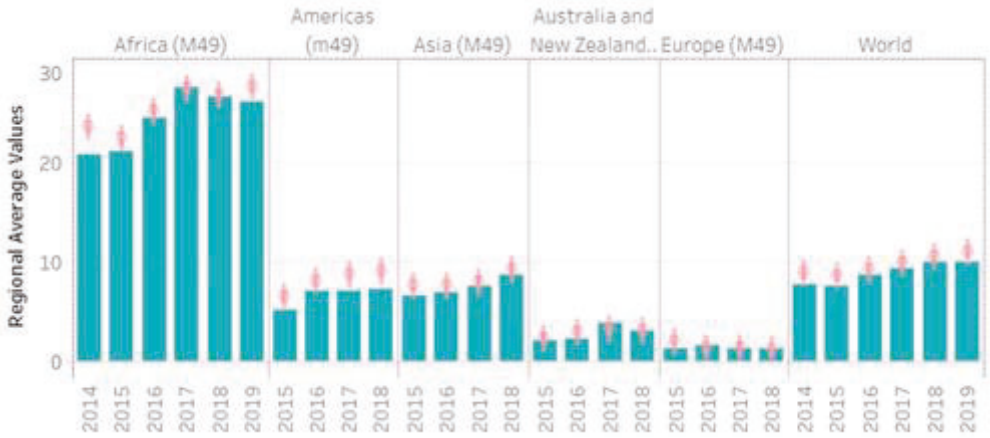

FIGURE 1

Prevalence of severe food insecurity (percentage)

(Source: Indicator 2.1.2 Prevalence of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Scale, http://www.fao.org/sustainable-development-goals/indicators/212/en/)

The World Bank carried out rapid phone surveys in 48 countries and observed that many people either reduce food consumption or do not have food. Also, as per the UN report, around 720 to 811 million people went hungry in 2020, and approximately 30% of the world population lacked adequate food in 2020 due to COVID-19 (The World Bank, 2021). Food prices were drastically raised due to disruptions in food supply chains and higher consumer demand, increasing food insecurity for around 821 million hungry people in low-income countries. Hunger level hiked in 2020; Approximately 2.3 billion people lack access to adequate food year-round, and projections for 2021 also seem to be the same considering the prevalence of pandemics (US Global Leadership Coalition, 2021). Recent projections reveal that hunger may not be fully eliminated by 2030 if sufficient measures are not taken towards food access and inequality (FAO et al., 2021; Ahn & Norwood, 2020). The FAO estimates the extent of global hunger through the prevalence of undernourishment and prevalence of moderate or severe food insecurity among people, with the FIES indicators. Figure 2 shows the global progress for mission Sustainable Development Goal 2 of United Nations Development Programme.

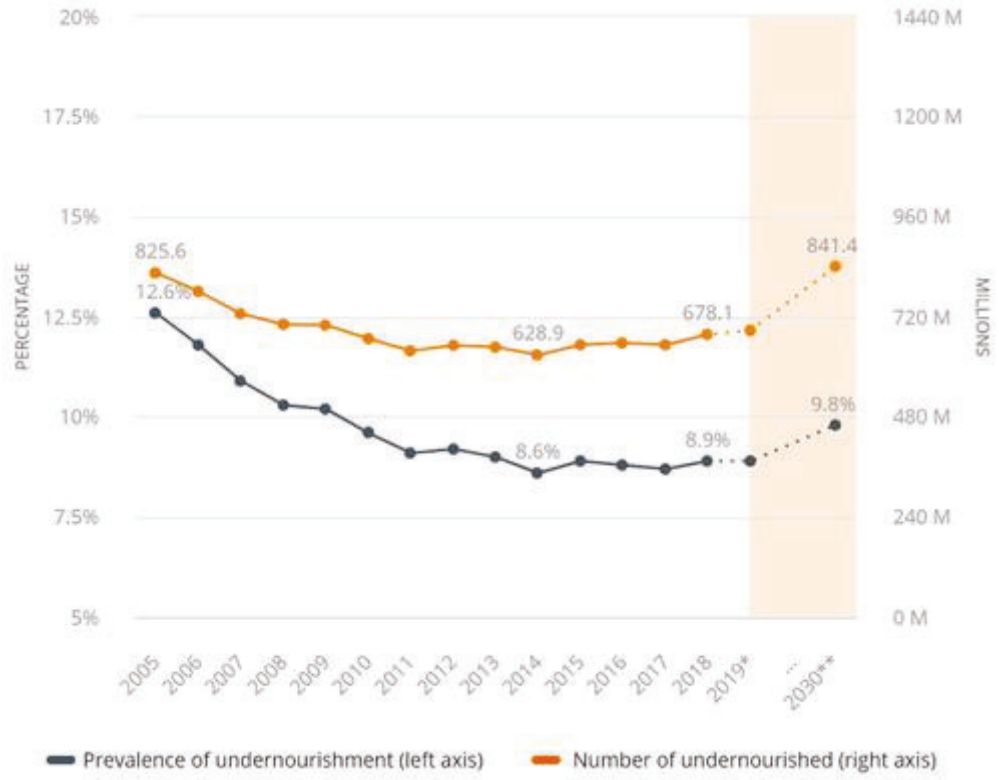

FIGURE 2

Monitoring hunger and global food insecurity

(Source: Hunger and food insecurity, http://www.fao.org/hunger/en/, FAO.

*projected food security and nutrition status globally, 2020; **projected food security and nutrition status globally in 2030, excluding the COVID-19 pandemic)

Dotted lines and empty circles depict the projected values; the shaded area denotes forecasts from 2019 to 2030. Hunger and global food insecurity figures are an alarming situation for the authorities in the next decade.

3 STATUS AND CHALLENGES

Arguably, the nations hold ample food to feed everybody (Udmale et al., 2020) and sometimes face food shortages because of critical circumstances for food production, ecological and labor issues, supply chain disruptions, economic shocks, and pandemics (Food Security Information Network, 2020; Bui et al., 2020). COVID-19 will act as a turning point for global food systems to be sustainable. The key drivers of acute food insecurity include sharp declines in food production, conflict, weather, natural disasters, economic imbalances, and more. (Hamilton et al., 2020). The crisis is affecting food security systems in different ways; that is, availability (food supply), access (reach of food to people), utilization (nutrients intake), and stability (future needs' fulfillment).

There is an impact on consumer behavior towards less nutritious and economical food as well as volatile prices. A significant decline in people's income levels due to pandemics has also put food access at risk, particularly for the poor in most nations. Food safety and hygiene guidelines regarding

processing, retailing, and distribution also threaten food security. Supply chain disruptions and the resulting policy interventions are increased, thus raising food security concerns. The integrated food security phase classification (IPC) study raises a worry about further worsening critical food insecurity problems in the already severely impacted nations. Global trade is another crucial component of food balances and has long-lasting impacts on food security. It has created unprecedented challenges for the poultry industry as well. The impacts on the food industry may rise if food processing does not fully resume. The production of principal crops is likely to remain stable, but disruptions may cause food shortages. The labor shortage is a significant problem given curfews and mobility restrictions, calling for transforming global food systems. (Glauber et al., 2020).

COVID-19 has increased violence and food fraud, including food adulterations, misrepresentation, and increased food crime (Khan et al., 2021). Focused auditing programs on anti-fraud, along with transparency in food supply chains and provisional remote checks of food importers, are requisite to prevent food frauds (Everstine, 2020; Katy, 2020). For years, nutritional security has also been a prime concern, ensuring everyone's right to continued and perpetual access to good-quality and adequate food. Amidst the COVID-19 crisis, global authorities have reinforced nutritional policies (Headey & Ruel, 2020). Further, coping with COVID-19 has necessitated focused food and nutritional education programs to encourage healthy eating habits and monitor nutritional status among people (Lele et al., 2020; Ribeiro et al., 2020).

4 MITIGATION STRATEGIES

Amid these dire scenarios, there are some positive signs, including innovations in social programs and effective collaborations amongst government authorities, nongovernmental organizations (NGO), and industry that have helped make food more accessible. Technological innovations, digital technologies, and e-commerce have helped reshape the food trade and supply chain systems, thus managing the associated risks and building resilience in food systems. Cardwell and Ghazalian (2020), Udmale et al. (2020), and Barichello (2020) suggest various strategies to manage food security, including close monitoring of food prices, ensuring smooth logistics of the regional agri-food supply chain, and an efficient supply system to fulfill food demand. They also recommend protecting the susceptible population and offering employment to migrants, regulating the wild food markets to curb the source of disease, ensuring food access, developing ‘green channels’ for smooth and fast food delivery, and promoting digital technologies to cope with the crisis (FAO 2020; FAO et al., 2020; Klassen & Murphy, 2020). Adoption of digital technologies such as blockchain technology, artificial intelligence, and the internet can lead to applications like smart farming, digital marketplaces, real-time information availability, and digital supply chain traceability, which may lead to reduced food insecurity (Economic Research Institute for ASEAN & East Asia, 2021). Technological innovations can address food security through enhancing productivity, improving access to finance, and managing the environment and resources. Adopting digital technologies to counter the pandemic's after-effects with measures like robots, drones, toll-free numbers, and autonomous machinery may also help combat future crises.

Ensuring food security nationwide also requires dealing with climatic disasters and adopting strategies and mitigation mechanisms (Tirivangasi, 2018). Effective and intensive policy measures are mandatory to guide actions for sustainable agriculture. Innovations are needed to tackle labor shortage, food waste, food delivery, e-commerce, and more, thus improving the shelf life of foods and expanding the market (Campbell et al., 2016; Faraco et al., 2016). Global economies should unite to explore opportunities and transformation strategies towards ample and nutritious food access for humankind. Strong collaborations among government authorities, NGOs, the agri-food

industry, and other food systems participants, along with the circular economy and sustainable practices, is currently needed (Karmaker et al., 2020). Various food, nutritional, and dietary programs at schools and communities are also necessary (Fan et al., 2020). Given health threats, food production and markets diversification, localization of food chains, and robust systems for fortifying dietary issues are needed. Ensuring the functionality of agri-food supply chains, adequate social protection systems for vulnerable groups, and building highly sustainable food systems is requisite.

5 NEED FOR RESILIENT FOOD SYSTEMS

Disruptions in international and domestic markets restrict access to safe food by the consumer, which is further accelerated due to reduced income and fewer financial resources to buy nutritious food (Laborde et al., 2020). A systemic transformation is mandatory for achieving global food supply chains, including a shift from profit maximization models to holistic and embedded business models and promoting fair practices for workers and farmers (Prapha et al., 2020). A supply chain's resilience entails its capacity to restore its output levels after a significant disturbance towards diversification and reshoring of supplier base and promoting an investor-friendly attitude throughout the supply chain (Baldwin & Evenett, 2020; Sarkis et al., 2020). Globally, governments are making efforts to enhance resilience in food supply chains and provide an economic stimulus package to small-scale farmers (Klassen & Murphy, 2020). Improved transportation facilities for adequate food distribution is another strategy towards resilient food sysytems. Savary et al. (2020) and Kamble & Mor (2021) suggest resilient supply chain measures, including international cooperation for food trade, making labor available in food systems, ensuring food security for smallholders, and targeted policies for ensuring stable supplies and access to safe and nutritious food.

The recommendations range from food production sustenance in conventional food baskets, upgrading the infrastructure support, priority research on agricultural diversification, and promoting household gardens for creating resilient production systems to ensure nutritious and affordable food for a long duration. Regional investment in food production may help avoid such food insecurity in the future. Local food supply chains, preferably based on indigenous crops, and location-specific farming approaches focus on sustainability through locally available natural resources and improving household diversity and nutrition deficiencies with local agri-food supply chains (Bhavani & Gopinath, 2020). Also, mechanization of food production and food processing facilities must tackle worker paucity and reduce food contamination risk due to infection at the workplace (Henry, 2020). With a focused and strategic approach of policymakers and supply chain participants, achieving food security for the majority, with the help of robust food systems, may be earned (Prapha et al., 2020).

6 CONCLUSIONS

COVID-19 has created grave concerns about the ability of global food systems to provide local needs under adverse conditions. Despite the anticipated food crisis, the agri-food industry consider the agri-food supply chains an important link towards providing enhanced access to safe, affordable and nutritious food. Another risk to food security is the disruptions in domestic food supply chains, food fraud, and income losses. This emergency necessitates that humans work together irrespective of the sectors and borders to alleviate the impacts on food security. A shift in consumer dietary practices due to rapid changes in the food environment is crucial to avoid a deterioration in nutritional and health status. Further, as the crisis unfolds, we should focus on reshaping the food systems for healthy and nutritious food in line with sustainable development goals. Many nations claim to hold sufficient food stocks, however access to ample and nutritious food is still a challenge.

To address such challenges, food systems need to be sustainable and properly utilized. Given such assurances, the food systems dwell for some time, but the actual figures would appear post COVID-19. Notably, there seems to be a vast scope of research in the area, and academia-industry partnership can be of utmost importance in tackling food security issues.

AUTHOR CONTRIBUTIONS

Anupama Panghal: Conceptualization; Formal analysis; Validation; Writing-original draft; Writing-review & editing. Rahul S Mor: Conceptualization; Formal analysis; Validation; Writing-original draft; Writing-review & editing. Sachin S. Kamble: Supervision; Validation; Writing-review & editing. Syed Abdul Rehman Khan: Investigation; Visualization; Writing-review & editing. Dinesh Kumar: Data curation; Formal analysis. Gunjan Soni: Data curation; Formal analysis.

CONFLICT OF INTEREST

None

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