The Future of Food: Reimagining Climate-Resilient Food Systems in the Post-Pandemic World

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Abstract

Thinking about the future of global food systems has now become more critical than ever. Climate change impacts—among them, shifts in soil quality, precipitation, pest regimes, seasonal growth patterns, along with land degradation and reduction in biodiversity—have impacted agricultural and aquatic food production systems across the world. Indeed, the causal links between climate change and food security are manifesting more clearly, particularly in the developing world, where nutrition deficiency is common, as is the predominance of rain-fed, farm-centred agricultural systems. This report reimagines the future of food, and how countries of the Global South, including India, can build resilient food systems.

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Introduction

There is no dearth of problems associated with nutrition and public health: hunger, malnutrition, food-borne diseases, and food insecurity, among them. The World Health Organization (WHO) has found that every year, nearly 600 million people (7.5 percent of the global population) fall ill from eating contaminated food and 420,000 die because of it. Children under five bear 40 percent of the food-borne disease burden.[1] Almost one-third of the world's population did not have access to adequate food in 2020; 3 billion could not get healthy food. The Food and Agriculture Organization (FAO) has found that around 720-811 million face hunger. Undernourishment rates among children have also been rising alarmingly.[2]

The issues of poor food safety, food insecurity, and unsustainable food systems are closely interlinked. These have been further exacerbated by climate change and the COVID-19 pandemic, and have disproportionately affected some populations more than others. The importance of access to safe and nutritious food therefore cannot be overemphasised.

Food Composition and Human Health

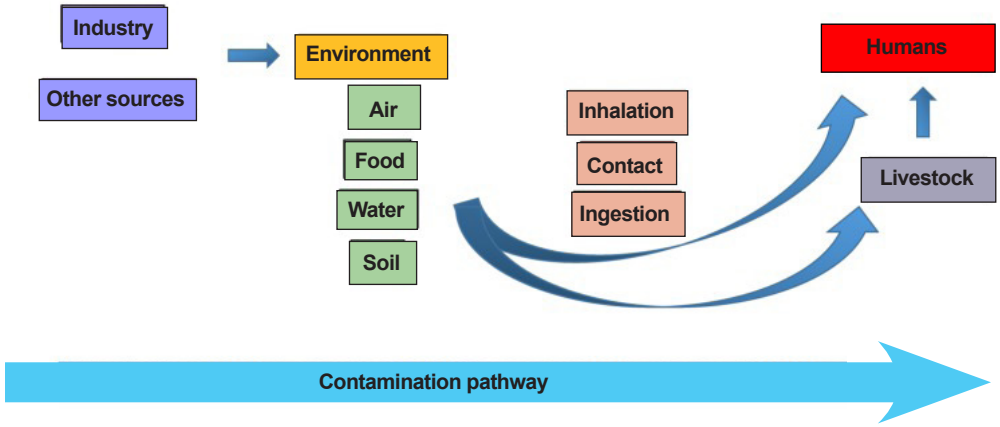
With a rapidly growing human population and burgeoning demand for food, intensive use of agrochemicals—i.e., pesticides and fertilisers—has become the norm to ramp up production of livestock and crops. Without chemical pesticides, and crop protection in general, more than half of the world's crops would be destroyed by insects, weeds, and diseases. Food production per acre would decline rapidly; the area of land used for crop cultivation would have to increase. This, in turn, would have detrimental effects on wildlife habitats and ecosystems and dilute the quality of soil due to erosion (see Figure 1). There is also the likelihood of a rise in food prices and reduced food output.[3]

The use of agrochemicals, however, comes at a perilous cost. Chemical contamination changes the biochemical composition of food, and can lead to a range of diseases from diarrhoea to cancer and neurodegenerative conditions, reproductive and developmental changes, and respiratory damage.[4] In the United States (US), for instance, 35 percent of all cancer cases may be attributed to poor diets (i.e., low consumption of whole grains and high intake of processed food) and the chemical pesticides present in the food consumed.[5] Some 385 million cases of acute unintentional pesticide poisoning occur annually worldwide, of which 11,000 result in deaths.[6]

It is pertinent to note that even as developed countries use 80 percent of the pesticides produced globally, more than half of the recorded deaths due to pesticides are reported in the poorer countries. This underscores the importance of food safety regulations; in the Global South, there is lack of occupational safety standards on food composition, weak enforcement of rules and regulations, and inadequate knowledge of pesticide use.

In Egypt, for example, milk samples tested in 1990 contained between 60-80 percent of pesticide residue, while in the US, 50 percent had such residue.[7] Therefore, the nature of the food being consumed is taking a heavy toll on public health, more so in poor economies. Food and agricultural regulations around the world must pay attention not only to the increasing food demand and the need for growth in production, but also to the safety of the food being produced.

Figure 1: Sources of Chemical Pesticide Contamination in Human Food



Source: Onyeka Kingsley Nwosu and Ayibapreye John, Insecticides, 2021[8]

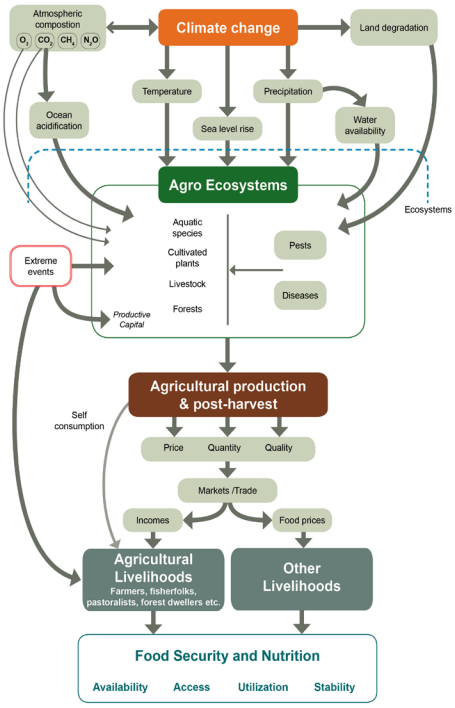
Climate Change and Food Safety

Climate change also affects food safety, with both abiotic and biotic agricultural contributing factors. Abiotic factors such as air pollution, nutrition deficiencies, and extreme changes in temperature impact soil quality and the health and productivity of crops. Biotic ones—e.g., insects, pests, and soil—are equally affected. There are thus cascading risks of food safety, food insecurity, and nutrition. Increases in temperature, followed by droughts, are predicted to change the arable lands grown to wheat and maize, and lead to their increased contamination by aflatoxins—a type of naturally occurring toxin that has the highest percentage of chronic toxicity among such food contaminants. This can compromise food safety and increase food insecurity due to reduced yields.[9]

Climate change also affects ecosystems by upsetting the balance between crops on the one hand, and pests, weeds, and pollinators, on the other (see Figure 2). Due to climate change, pests, for instance, are being found in areas where they would not earlier proliferate, and are appearing earlier in the season than they usually do.[10]

Livestock production is also affected by climate change. A May 2015 heat wave in India led to the death of 17 million birds. In the warmer South European countries, dairy cows are now exposed to heat stress for more than half the day, resulting in losses of milk yields of up to 5.5 kg daily per cow. Droughts over the past decades in African countries have led to increased livestock mortality.[12] Animal health is also affected by diseases that come with flooding and excessive rainfall and prolonged survival of pathogens and vectors.

Figure 2:
Cascading Effects of Climate Change on Food Security and Nutrition



Source: Food and Agriculture Organization, 2015[11]

The outbreak of Rift Valley fever in East Africa in 2015 has been attributed to the prolonged, heavy rainfall caused by *El Niño*-related events. Other diseases such as the West Nile virus, schistosomiasis, Lyme, and bluetongue, are also expected to spread to new areas due to climate change. This, in turn, affects the quality of the meat being produced and compromises food safety.[13]

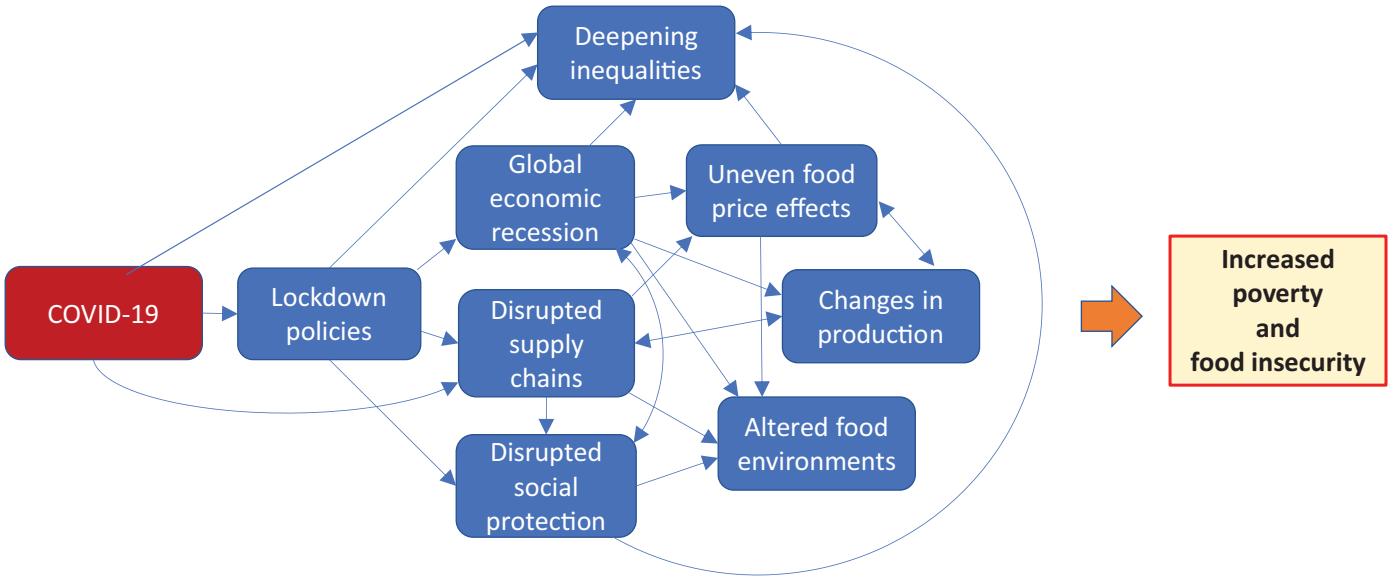
The COVID-19 Pandemic and Food Safety Risks

The agriculture and food sector was severely affected by the COVID-19 pandemic. Disruptions in food supply chains, loss of income and livelihoods, widening inequalities across gender, class, caste, and disparities and fluctuations in food prices, are some of the reasons for the worldwide increase in food insecurity, malnutrition, and hunger during the pandemic.[14] As for food safety, while most studies suggest that the SARS-CoV-2 virus cannot spread through food products and the human digestive system, it can be transmitted during manufacturing and processing. The protocol thus emphasises personal hygiene, sanitation of kitchens, and other food safety measures.[15]

Evidence suggests that since the beginning of the pandemic in 2020, food-borne illness outbreaks have decreased.[16] This can be attributed to the worldwide increase in awareness about, and measures taken towards proper hygiene and sanitisation.[17] However, it must also be noted that the disruptions in global food supply chains caused by the pandemic have made them more likely to breach food safety practices. Standard protocols that were already being taken for granted prior to the pandemic became even more difficult to adhere to. Uncertainty also surrounded the manner in which public health officials were going to contain COVID-19 risks. Some reports also suggest that the pandemic could have led to a rise in the number of food fraud[a] cases around the world.[18] Overall, even as the pandemic has exposed fault lines in global food systems and exacerbated certain challenges to an alarming extent, it has also brought about a new outlook on food safety, food security, food policy, and climate change.

a Food fraud occurs when a food supplier intentionally deceives its customer about the quality and contents of the foods they are purchasing. While food fraud is often motivated by profit, some forms of food fraud can also pose a direct threat to the health of customers and consumers.

Figure 3:
The Dynamics of COVID-19 Threatening Food Security and Nutrition



Source: High Level Panel of Experts on Food Security and Nutrition (HLPE), 2020[19]

Viewing Food Systems through a Gender Lens

Food insecurity and food safety issues disproportionately affect women. Various studies have shown that women play a pivotal role in every process related to food systems—as farmers, traders, wage workers, and consumers. Yet, their contributions are often not valued or credited enough. Current studies show that access and ownership of land and other assets, as well as access to credit, differ by gender. This is attributable in part to gendered obligations of childcare, household work, and other kinds of unpaid labour. Women's ability to recover from shocks and crises brought about by unpredictable weather patterns due to climate change, is compromised by these constraints.[20]

Further, the impact of food insecurity and problems related to food safety are experienced more acutely by women. A report by the UN's Intergovernmental Panel on Climate Change notes that women are more susceptible to chronic disease and higher levels of obesity.[21] Of the 690 million across the globe who are food insecure, 60 percent are women and girls. In almost two-thirds of all countries, women are more likely than men to face food insecurity.[22]

Gender inequalities were further exacerbated by the COVID-19 pandemic. As food systems workers and unpaid care workers, women experienced additional burdens during the pandemic. According to FAO, the risk of domestic abuse among women increased during the pandemic both due to forced confinement, and the economic fallout. Women's agricultural activities were affected more than those of men. Overall, the role of women in food systems as guarantors of household food security and nutrition, and as wage workers, farmers, and food traders, was severely affected.[23]

International Institutions and Protocols

The FAO is the primary international organisation responsible for monitoring different dimensions of the food chain, from farm to fork. It partners with the World Health Organization (WHO) to enforce mandates for enhancing food safety and improving the health of populations across the globe. While WHO deals predominantly with the public health sector, the FAO is concerned with food safety issues along the food value chain. One example of collaboration between the two is the FAO/WHO Codex Alimentarius Commission, which is responsible for implementing the Joint Food Standards Programme and the Codex Alimentarius or "Food Code", a collection of standards, guidelines, and codes related to food safety practices.[24] The FAO also assists governments in drafting, amending, updating, and implementing food safety laws and regulations. Helping countries develop evidence-based food control systems that advance consumer health and prevent food safety emergencies, and aligning national frameworks with Codex Alimentarius standards and guidelines, are some of the ways the FAO can assist national governments.[25]

Recommendations

On 7 June 2022, the *Observer Research Foundation* organised a digital roundtable on "Safer Food, Better Health: Coping with Food-borne Risks to Human Health". The participants agreed that food safety and security were complex issues that cut across sectors. Given the linkages between the economic, political, social, and cultural factors that cause food insecurity and influence food safety, a holistic approach to mitigation is essential.

A panellist advocated a six-fold approach: multi-sectoral and coordinated leadership that calls for effective engagement across different domains and stakeholders; providing sufficient education and awareness about the importance of food safety; carrying out rigorous research to make relevant data available for policymaking; providing adequate funding; building capacity to cope with the rapidly changing nature of global phenomena linked to food safety; and utilising technology to chart out solutions, for data collection and analysis.

The following are some of the specific recommendations made during the panel discussion:

- Attention must be paid not only to the need to grow more food, but also to the safety of food by ensuring food produced and marketed is of high quality. Governments must work closely with organisations like the FAO to enforce appropriate food safety protocols in their respective countries in line with international standards.

- Given that the problem is more pronounced in the developing world, it is imperative that global commitments on climate finance be fulfilled and its architecture be changed to allow increased flow of funds to the Global South.

- Insofar as women are key players in the food value chain, empowering them by providing an impetus for female leadership and community integration, alongside technical assistance and subsidies, can help improve food security and safety.[26]

The panel repeatedly emphasised the need for a concerted effort on the part of governments, international organisations, and the affected groups to mitigate the pernicious effects of food insecurity, and enhance food safety.

Annexe

ORF Digital Roundtable
Safer Food, Better Health: Coping with food-borne risks to human health
7 June 2022

Participants

- Ramesh Chand, Member, Niti Aayog
- Fahmida Khatun, Executive Director, Centre for Policy Dialogue, Bangladesh
- Shweta Khandelwal, Head, Nutrition Research and Additional Professor, Public Health Foundation of India
- Aamanur Rahman, Director, Extreme Rural Poverty Program, CARE Bangladesh

A video recording of the roundtable can be viewed here:
https://www.orfonline.org/research/safer-food-better-health/?lastmonth=pastevents

Endnotes

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