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Mini Review Article

Socioeconomic analysis of food quality and safety assurance

B. A. K. Sinha[1*]

[1]Faculty, Bihar Institute of Public Finance and Policy (BIPFP), A Research Institute of Finance Department, Government of Bihar, Gardanibagh, Patna - 800 001, Bihar, India

Abstract

The Sustainable Development Goals (SDG) also linked to food and its quality and safety. Food quality and safety assurance systems are indispensable pillars of modern public health and global commerce. Beyond their primary function of preventing foodborne illness, these systems cast a long and complex shadow across the socioeconomic landscape. This paper explores the multifaceted implications of food quality and safety assurance, arguing that while they are crucial for economic development, consumer trust, and public well-being, their implementation creates significant challenges related to equity, market access, and social justice. This paper analyses the economic and social dimensions of food safety, contrasting healthcare savings and trade benefits with the financial burdens on small-scale producers. It highlights how foodborne diseases and stringent standards disproportionately affect vulnerable populations. Examining trade agreements, consumer behaviour, and governance, the study argues that food safety is a profound socioeconomic issue. Effective policy must balance rigorous standards with inclusive support, ensuring equitable benefits and transforming potential barriers into catalysts for sustainable development.

Keywords: Consumer behaviour, Foodborne disease, Food safety standards, Malnutrition, Nutritional deficiency

Highlights

- Rising food prices hit the poor hardest, worsening their struggle, especially during COVID-19.
- Big firms afford quality costs; small farmers struggle to reach premium food markets
- Consumers are attracted by the brand value of the product, certified and pay more amount compared to normal products
- Low-income groups worldwide face a higher burden of foodborne diseases than others
- WHO, FAO, WTO and UNICEF set standards, aid trade, and offer global support to developing countries.

INTRODUCTION

Food is essential for living things. The birds fly millions of kilometres distance for their liking foods. The civilisation resided where foods was available in plenty and they fought among themselves for their survival. However, over the period of time, humans made a transformational change in food habits as well as food production. They use pesticides, fertilisers, poisons, etc. to gain maximum production of the food items. Therefore, the quality of food and its safety assurance is a million-dollar question. In a line, food is needed for survival, but assured quality food and its safety is fundamental for humans to live long and healthy life.

At a time when global food security is of utmost importance, the Global Food Security Index (GFSI) shows that the global food environment is deteriorating (Asmawi et al., 2025). After hitting its peak in 2019, the GFSI has since declined amid skyrocketing food prices and hunger on an unprecedented scale. Based on 11 years of data (2011-22), the index highlights that the food system has been weakening over the years, with shocks in 2020-22, including the COVID-19 pandemic and high commodity prices, showcasing this fragility. These shocks exacerbate the systemic issues that are threatening food security and weakening the resilience of the food system (The Global Food Security Index, 2022). Despite adequate global food production, millions of people go hungry or are malnourished because safe and nutritious food is not available, not accessible or, more often, not affordable. (Food & Agriculture Organization, International Fund for Agricultural Development, United Nations Children's Fund, World Food Programme, & World Health Organization [FAO, IFAD, UNICEF, WFP &WHO], 2025). Fig. 1 clearly indicates that the access to food, especially quality food, is directly linked to better economic conditions. The data portrays that the North America has the highest score, followed by Europe, while sub-Saharan Africa faces the food crisis yet, and scored less than the global average in the list of GFSI.

*Corresponding Author, E-mail: bakshi.bipfp@gmail.com

Further, the nutrients, minerals and vitamins come from quality food. Its imbalances or absence in food leads to malnutrition. Malnutrition is a global phenomenon. Broadly, the definition says the food quality and its safety denote to the collection of practices and principles designed to protect the food supply from biological, chemical, and physical hazards that can cause illness or harm (Alsharif & Shu, 2022; Awuchi, 2023). While the immediate goal is public health, the architecture of food safety assurance, comprising government regulations, industry standards like Hazard Analysis and Critical Control Points (HACCP), international agreements, and consumer expectations, has profound and far-reaching socioeconomic consequences (Unnevehr & Jensen, 1999; Jena, 2019).

Historically, food quality and safety were managed at the local level, especially at the household or community. But, in the global era, the food quality and its safety are complex issue. The whole food supply chain has been significantly transformed over the period of time. One batch of spoiled food can be aggravated in multiple countries, which requires strong international food safety quality and assurance systems.

The food quality and safety assurance systems play a pivotal role. On one hand, they are a growth engine for an economy, a prerequisite for participation in global markets, and a cornerstone of consumer confidence and public health. They directly reduce the cost occurred from Food-Borne Disease (FBD), unlock global markets, and facilitate innovation in the food sector. On the other hand, they play a role as challenging barriers for the most vulnerable actors in the food system. The high-cost involvement can eliminate small and marginal farmers from profitable food supply chains. Strict import standards of developed nations can act as non-tariff barriers that stifle economic growth in developing countries, and the benefits of safe food may not reach the low-income consumers, who need them most.

Therefore, understanding the socioeconomic implications of food safety is not merely an academic exercise; it is essential for crafting policies that are both effective and equitable. This paper will navigate this complex terrain by first dissecting the direct economic costs and benefits of food safety systems. It will then explore the critical social dimensions, focusing on issues of equity and vulnerability. Subsequently, the analysis will shift to the international stage, examining the role of food safety in global trade. Finally, the paper will consider the influence of consumer behaviour and governance, concluding with policy recommendations aimed at harnessing the benefits of food safety while mitigating its adverse socioeconomic consequences. This study is based on secondary data compiled from prominent international sources. These include the Global Food Security Index-2022, the World Health Organisation (WHO), the World Bank, and the Food and Agriculture Organisation (FAO).

Economic dynamics of food quality and safety assurance: Market dynamics

The economic impact of food quality and safety assurance is a complex interplay of avoided costs, direct investments, and created opportunities. The adoption of higher standards of food quality and safety assurance is a powerful financial gain by accessing the premier food market, as well as the significant economic hurdles involved for small investors or farmers.

Healthcare cost: The entire world faces FBD since long back and its economic consequences are huge. According to the World Health Organisation (WHO), FBDs are a major concern for public health, affecting more than 600 million people annually and causing approximately 0.42 million deaths. Children under five years of age are the most vulnerable (Havelaar et al., 2015). A total of 110 billion US dollars is lost each year in productivity and medical expenses resulting from unsafe food in low- and middle-income countries. (World Health Organisation [WHO], 2024). Therefore, FBDs impose a devastating economic burden through both direct and indirect channels. The cost of treating these illnesses, including doctor visits, medication, and hospitalization, places a significant strain on national healthcare systems, particularly in low- and middle-income countries where health infrastructure is already fragile.

Productivity cost: FBDs also cost on labour productivity through affected individuals' absences at work, and premature deaths eliminate workers from the economy entirely. The World Bank estimates that the total productivity loss associated with FBDs in low- and middle-income countries is over 95 billion US dollars every year. This figure doesn't even account for the productivity loss of caregivers, often women, who must leave work to care for sick family members (World Bank, 2018).

Market and trade disruptions: Market dynamics work on confidence and trust of quality and safety

assurance. If it disrupts, the whole global market can have catastrophic economic consequences that ripple through the entire supply chain. This outbreak destroys consumer confidence and can lead to immediate trade restrictions. These events demonstrate how quickly market value and access can be annihilated by a safety failure.

Cost of assurance of food quality and safety: Both the public and private sectors play a crucial role in implementation and maintenance of food safety and quality assurance systems that requires significant investments. The cost involves research and development, compliance, operational expenses, etc. It requires modern machinery, capacity building of staff, testing and certification that lead to huge cost. The large business houses afford it; however, for small and medium-sized business players, particularly smallholding farmers, may face difficulty to access the premier market. However, the government involves in framing an institutional framework for food safety and security, including legislation and regulations.

Consumer trust and branding: Consumers are the king in the economy. The consumers are very much concerned about the transparency and assurance of the quality of food and its safety. A company creates its brand value through investment in quality and safety front for targeted consumers in the market. Organic food market can be a classic example of food market, where consumers attract by the brand value of the product certified and pay more amount compared to normal products.

Cost efficiency: The food safety involves the whole food supply chain that needs careful handling of food products. It involves good care during production, storage, and process, which leads to cost efficiency through reduction in food waste, its sustainability and durability.

The social implication of food quality and safety assurance: Equity issue

Apart from the economic impact of the food quality and safety assurance, social implications of food safety assurance are of a more complex nature. The distribution of risks and rewards is far from even, often reinforcing existing social inequalities. In the Indian context, there has been diversification of Indian diets away from foodgrains to high-value products like milk and meat products and vegetables and fruits. The small and marginal farmers have low capital and meagre resources so adapting this change is very difficult for them. The increasing middle- class due to rapid urbanization, increasing per-capita income, increased participation of women in urban jobs and the impact of globalization have been largely responsible for the diet diversification in India. Since risk is high for diversification, necessary support in infrastructure and marketing are needed. Price policy should also encourage diversification. Small and marginal farmers can get higher incomes with diversification (Ganguli & Sinha, 2014).

Access to quality and safe food: Foodborne diseases are likely to spread and target to the vulnerable population and deprived sections of society who lacks to access the quality and safe food. This section of the population does not afford the kind of nutrient their body need due to lack of income. Many studies found that the Low-income populations, both in developing and developed nations, bear a disproportionately high burden of FBDs. (Quinlan, 2013; Kirk et al., 2016). The numerous factors are responsible but top three are – (i) Affordability of healthy diet; (ii) Health and nutrition status; and (iii) Inadequate infrastructure and health awareness.

Affordability of healthy diet: The fresh, nutrient, safer and fortified foods are costly, and low-income people cannot afford. Therefore, they are relying on the unsafe, informal food market for their energy requirement which may not healthy and it may be cause of FBD. It further drags them in a lower-income group. Fig. 2 portrays that the affordability of healthy diet at their income levels. Globally, 2.6 billion people are unable to afford the healthy diet regularly, while in India 586 million people are under this category.

Health and nutrition status: Malnutrition and underlying health conditions can weaken the immune system, making individuals more susceptible to pathogens and more likely to suffer severe outcomes from an FBD.

Table 1 presents the nutrient deficiency over the period of time through different indicators. Low weight, anaemic, over weight are significantly cause of food accessibility, quality and food habits. The data provides that the gradual progress on every indicator except obesity. However, it shows that the more and more intervention is needed to curb it further.

Inadequate infrastructure and health awareness: The vulnerable populace lack in access to clean water,

Table 1. Global demographic indicators: Food-related deficiency (in percentage)

Selected Indicators	2012	2020	2025	2030
Low Birth Weight	15	14.7	10.5	10.5
Exclusive Breast Feeding (<6 months)	37	47.8	50	70
Stunting (<5 years)	26.4	23.2	16.8	14
Wasting (<5 years)	7.4	6.6	5	3
Overweight (<5 years)	5.3	5.5	5.3	3
Anaemia (women aged 15 to 49 years)	27.6	30.7	13.8	13.8
Obesity (adults)	12.1	15.8	12.1	12.1

sanitation, even proper refrigeration, which increases the risk of food contamination during preparation and storage. In addition, lower literacy and unawareness about healthy habits, clinginess, proper food habits, safe food handling practices and less access to healthcare information can further exacerbate risks.

This heavy risk to the vulnerable population drags them to FBD is not just a health issue but a social justice issue, perpetuating a cycle of poverty and poor health.

Gender-based implications: The other social dimension of food safety and access of quality food is gender based. Women are primarily managed and preparing the food at the household level. They also provide care to the sick family members and; therefore, they are on the front line of food safety (Mkandawire et al., 2022; Achiro et al., 2023). The significant share of labour force are women, engaged in food processing and horticulture sectors where they may be exposed to foodborne hazards. Women, who are looking after sick family members, lose their economic and educational opportunities (Ellena & Nongkynrih, 2017). Further, women normally need more iron and calcium nutrients as their body needs. The compromise of quality food on account of 'family members first and women in the family last' drag them more vulnerable to FBDs. A FAO's report on food security and nutrition found that around 26 per cent of women prevalence of moderate or severe food insecurity, compared to 24 per cent of men (Burki, 2022).

Global food supply chain: A quality and safety assurance issue

The global accessibility of goods and services portrays complex international regulations to operate the market. The food market is not an exception of the international safety standard and global trade policy. The most standard international food trade policy is World Trade Organisation's (WTO) Agreement, which is known as Sanitary and Phytosanitary Measures (SPS Agreement). The standards fixed by this agreement follow the scientific principles in favour of developed countries, which is based on complex food safety regulation, is tough and also costly for developing countries. It is not because of they are unsafe but the cost of equipment, laboratories, etc. to prove they are safe (Das, 2008; Faour-Klingbeil & Todd, 2018).

However, the dietary habits, food preferences, and risks varied substantially across the country. Therefore, safety standards may be according to the need of a particular country, not by force to adopt the high-cost model.

These challenges are pertinent and need to be addressed by the international development organisations such as – FAO, WHO, World Bank, UNICEF, WTO, etc. These institutions should help the countries by capacity building. They should support these countries technically and financially and also enhance their infrastructure related to food safety.

Consumer behaviour and food safety governance

Consumer behaves differently as per their income group and situations. Therefore, the consumer's behaviour is most essential to assess, because the food that is in the centre point of the discussion is ultimately consumed by a consumer. The socioeconomic puzzle involves the interplay between consumer demands, which increasingly shape markets, and the governance structures that regulate them. Fig. 3 shows the Global Food Security Index, 2022. The map clearly talks about the food security across the country and economic regions.

Consumer's behaviour: Consumption basket has sharply transformed to an unprecedented manner. The consumers are now concern about the quality, ingredients, energy sources, nutritional values, organic status, etc. It propels the divide in market to pay higher prices for premium for safety assured food. Several factors affecting the trend of food safety. Firstly, Information and Technology (IT) plays a crucial role through the digital marketing, which spreads correct and incorrect advertisements about food. The technologies like QR codes and blockchain are enabling unprecedented traceability, allowing consumers to track a product's journey from farm to fork (Westerlund et al., 2021; Charlebois et al., 2024). Secondly, the rich group consumers always in a favour

Socioeconomic aspects of global food system

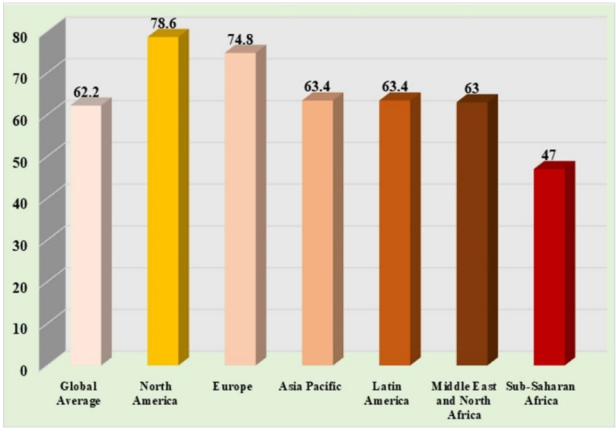


Fig. 1. Global Food Security Index by region (2022)
Source: Global Food Security Index, 2022

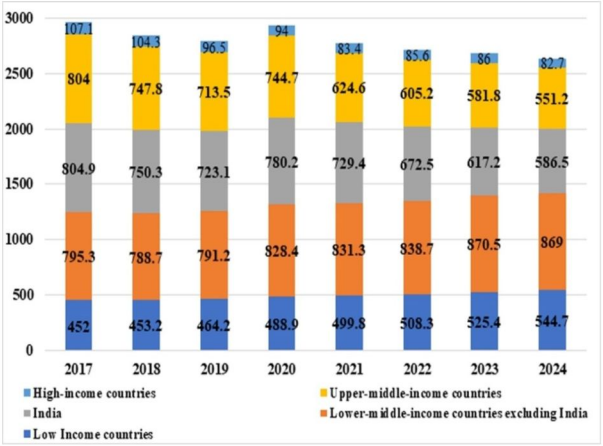


Fig. 2. Affordability of healthy diet by economic region (in million)
Source: Food and Agriculture Organisation, United Nations, 2025

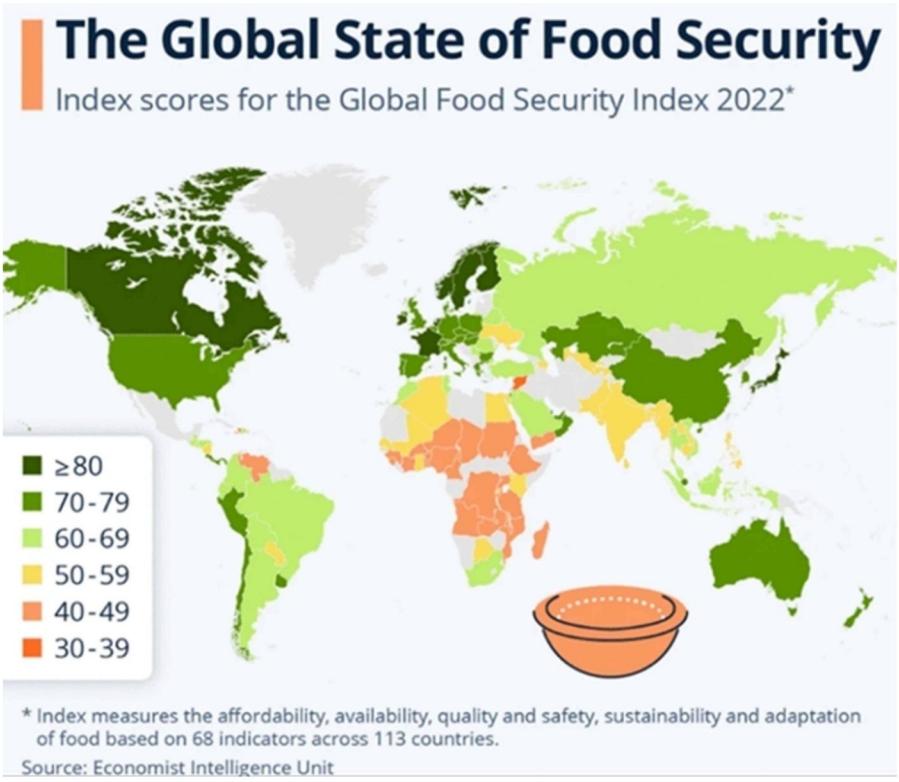


Fig. 3. Global Food Security Index 2022 (in percent)
Source: https://link.springer.com/article/10.1007/s43995-025-00144-x/figures/1 and Global Food Security Index, 2022

of buying third party certificated foods from trusted brands for its quality and safety. Thirdly, many studies have found that consumers are willing to pay a premium for safer, higher-quality food, creating a powerful market incentive for producers to invest in assurance systems (Ortega et al., 2015; Ebata et al., 2025).

Food safety governance: In order to ensure and enforce effective food safety, a robust governance system is needed on multi-stakeholder approach. Therefore, the government plays a crucial role for setting rules and regulations for ensuring essential safety standards, conducting surveillance, enforcing regulations, and managing public communication during crises. However, many other stakeholders are also be coordinated. Further, International institutions-such as the WHO, FAO, WTO, and UNICEF-are essential for setting global standards, enabling trade negotiations, and providing technical and financial assistance. Their work in promoting science-based standards and building capacity in developing nations is vital for creating a more equitable global food system (Unnevehr, 2003; Eruaga, 2024).

Conclusion and policy suggestions

The socioeconomic impact of food quality and safety assurance are as complex as the global food system itself. These systems are not neutral technical frameworks; they are powerful forces that shape economies, influence social structures, and define international relations. The analysis has shown that while the economic and public health imperatives for robust food safety are undeniable, the current trajectory of implementation risks deepening the divide between the 'haves' and the 'have-nots'. The wealthy consumer gains access to ever-more-transparent and certified food, and the large-scale producer gains access to premium global markets. Meanwhile, the low-income consumer faces a disproportionate risk of illness, and the smallholder farmer faces the threat of market exclusion.

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REFERENCES

Achiro, E., Okidi, L., Echodu, R., Alarakol, S. P., Nassanga, P., & Ongeng, D. (2023). Status of food safety knowledge, attitude, and practices of caregivers of children in northern Uganda. *Food Science & Nutrition, 11*(9), 5472–5491. https://doi.org/10.1002/fsn3.3504

Alsharif, H. Z. H., & Shu, T. (2022). Research on food safety information training system based on component algorithm. *Food Science and Technology, 42,* e052221. https://doi.org/10.1590/fst.52221

Asmawi, M. Z., Sulwani, M., & Ibrahim, I. (2025). A comparative study of global food security index (GFSI) between Malaysia and Vietnam. *Journal of Umm Al-Qura University for Engineering and Architecture.* Advance online publication. https://doi.org/10.1007/s43995-025-00144-x

Awuchi, C. G. (2023). HACCP, quality, and food safety management in food and agricultural systems. *Cogent Food & Agriculture, 9*, 2176280. https://doi.org/10.1080/23311932.2023.2176280

Burki, T. (2022). Food security and nutrition in the world. *The Lancet Diabetes & Endocrinology, 10*, 622. https://doi.org/10.1016/S2213-8587(22)00220-0

Charlebois, S., Latif, N., Ilahi, I., Sarker, B., Music, J., & Vezeau, J. (2024). Digital traceability in agri-food supply chains: A comparative analysis of OECD member countries. *Foods, 13*, 1075. https://doi.org/10.3390/foods13071075

Das, K. (2008). Addressing SPS challenges in India. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1587351

Ebata, A., Espinoza, M., & Ton, G. (2025). Food safety certification in urban food markets: The willingness to pay for safer meat in Peru. *Food Security*. Advance online publication. https://doi.org/10.1007/s12571-024-01512-6

Ellena, R., & Nongkynrih, K. A. (2017). Changing gender roles and relations in food provisioning among matrilineal Khasi and patrilineal Chakhesang Indigenous rural people of North-East India. *Maternal & Child Nutrition, 13*, e12560. https://doi.org/10.1111/mcn.12560

Eruaga, M. A. (2024). Enhancing global food safety standards through international collaboration and policy harmonization. *International Journal of Scholarly Research in Multidisciplinary Studies, 4*(1), 020–032. https://doi.org/10.56781/ijsrms.2024.4.1.0027

Faour-Klingbeil, D., & Todd, E. (2018). A review on the rising prevalence of international standards: Threats or

opportunities for the agri-food produce sector in developing countries, with a focus on examples from the MENA region. *Foods, 7*(3), 33. https://doi.org/10.3390/foods7030033

Food and Agriculture Organization, International Fund for Agricultural Development, United Nations Children's Fund, World Food Programme, & World Health Organization. (2025). *The state of food security and nutrition in the world 2025: Addressing high food price inflation for food security and nutrition*. FAO. https://doi.org/10.4060/cd6008en

Ganguli, B., & Sinha, B. A. K. (2014). Family farming feeding the world caring for earth. In *Proceedings of Bihar State Productivity Council Conference* (pp. 47–74). Bihar State Productivity Council.

Global Food Security Index. (2022). https://impact.economist.com/sustainability/project/food-security-index/resources/Economist_Impact_GFSI_2022_ Global_Report_Sep_ 2022.pdf

Havelaar, A. H., Kirk, M. D., Torgerson, P. R., Gibb, H. J., Hald, T., Lake, R. J., Praet, N., Bellinger, D. C., de Silva, N. R., Gargouri, N., Speybroeck, N., Cawthorne, A., Mathers, C., Stein, C., Angulo, F. J., & Devleesschauwer, B. (2015). World Health Organization global estimates and regional comparisons of the burden of foodborne disease in 2010. *PLOS Medicine, 12*(12), e1001923. https://doi.org/10.1371/journal.pmed.1001923

Jena, P. R. (2019). *Socio economic implications of food safety standards in India* (Working paper).

Kirk, M. D., Angulo, F. J., Havelaar, A. H., & Black, R. E. (2016). Diarrhoeal disease in children due to contaminated food. *Bulletin of the World Health Organization, 95*, 233–234. https://doi.org/10.2471/BLT.16.173229

Mkandawire, E., Bisai, C., Dyke, E., Dressel, A., Kantayeni, H., Molosoni, B., Kako, P. M., Gondwe, K. W., & Mkandawire-Valhmu, L. (2022). A qualitative assessment of gender roles in child nutrition in Central Malawi. *BMC Public Health, 22*, 1392. https://doi.org/10.1186/s12889-022-13749-x

Ortega, D. L., Tschirley, D. L., & others. (2015). *Consumer demand and willingness to pay for safe food in Accra, Ghana*. International Development Working Papers.

Quinlan, J. (2013). Foodborne illness incidence rates and food safety risks for populations of low socioeconomic status and minority race/ethnicity: A review of the literature. *International Journal of Environmental Research and Public Health, 10*(8), 3634-3652. https://doi.org/10.3390/ijerph10083634

Unnevehr, L. J. (2003). *Food safety in food security and food trade*. International Food Policy Research Institute.

Unnevehr, L. J., & Jensen, H. H. (1999). The economic implications of using HACCP as a food safety regulatory standard. *Food Policy, 24*(6), 625-635. https://doi.org/10.1016/S0306-9192(99)00057-9

Westerlund, M., Nene, S., Leminen, S., & Rajahonka, M. (2021). An exploration of blockchain-based traceability in food supply chains: On the benefits of distributed digital records from farm to fork. *Technology Innovation Management Review, 11*, 6–18. https://doi.org/10.22215/timreview/1446

World Bank. (2018, October 23). *Food-borne illnesses cost US$110 billion per year in low- and middle-income countries* (Press release). https://www.worldbank.org/en/news/press-release/2018/10/23/food-borne-illnesses-cost-us-110-billion-per-year-in-low-and-middle-income-countries

World Health Organization. (2024, October 4). *Food safety* (Fact sheet). https://www.who.int/news-room/fact-sheets/detail/food-safety

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