International Journal of Early Childhood Special Education (INT-JECSE)
DOI: 10.48047/INTJECSE/V14I1.500 ISSN: 1308-5581 Vol 14, Issue 01 2022 PP: 4075-4080

THE IMPACT OF FOOD SAFETY REGULATIONS ON AGRICULTURE

Balwant singh Rawat,
Associate Professor, School of Agriculture, Graphic Era Hill University,
Dehradun Uttarakhand India

ABSTRACT
There is no globally accepted set of standards for food safety or related risk. Because of this, food trade may drop and trade tensions may persist. These differences may lead to a more productive discussion on food safety on a global scale. When it comes to people's health, food safety is crucial. Food security is a cornerstone of human dignity. Governments have a responsibility to guarantee that the food they offer is healthy and safe for their citizens. The interconnectedness of the world and the fast transformation of its food systems make this an arduous task. No one could have foreseen the rapid transformation of the food sector over the last two decades, in terms of both supply and demand.
Keywords: Food safety, international trade, regulation, Salmonella, BSE, produce.

INTRODUCTION

The National Sustainable Agriculture Coalition (NSAC) works with farms of different sizes and food producers to increase the availability of healthy food at prices people can afford. The loss of topsoil, the loss of species diversity, the loss of natural resources, the loss of consumer choice, Some of the issues plaguing the world's food system include the decline of farming and rural communities and the increasing concentration of wealth, power, and ownership within a few number of corporations and individuals.. Sustainable food systems work to counteract these trends by fostering more public involvement, enhancing the flow of information, and reviving direct connections between customers and farmers. Reconciling individuals with the food they consume requires fixing problems connected to food safety.

The National Sustainable Agriculture Coalition (NSAC) is dedicated to preserving organic and sustainable agricultural methods for the future, and fostering the development and improvement of local food systems, via the establishment and enforcement of federal food safety regulations and procedures.

A number of measures are taken to ensure that the high standards to which our food is produced, transported, stored, prepared, and eaten are maintained. These include taking part in the creation and implementation of Food Safety Modernization Act regulations, inspection protocols, and guidance documents; keeping an eye out for any proposed changes to these rules; and ensuring that small and medium-sized farms and food businesses have access to top-notch food safety education and training. NIFA collaborates with other government agencies, educational institutions, and business sector partners to educate everyone who comes into contact with food in order to stop the spread of food-borne illnesses.

Now that more countries are involved in the food supply chain, everyone must be concerned about food safety. Due to globalization, there are no longer any restrictions on the transport of food from one country to another. Lower prices, year-round availability, and better quality and more diversified food selections are just a few of the numerous benefits of international trade for consumers. Globalization of the food supply, however, may exacerbate, revive, and disseminate further existing food safety concerns. Increased production costs, damaged reputations, and restricted access to international markets are all consequences of concerns about food safety.

As international commerce grows, the cost of identifying and eliminating potential food safety risks may increase. Food safety incidents are quite rare compared to the volume of trade, and the great majority of foods sold throughout the world are safe for human consumption. However, it may be challenging and need public or government investment in addition to private sector efforts to address concerns about food safety during international commerce. This study analyzes the issues surrounding food safety and proposes solutions to these difficulties.

There's a widespread belief that expanding international trade and boosting food safety standards are mutually incompatible goals. When it comes to consumer product safety, both small businesses and

DOI: 10.48047/INTJECSE/V14I1.500 ISSN: 1308-5581 Vol 14, Issue 01 2022 PP: 4075-4080

huge conglomerates face similar challenges. In the event of a food safety issue, a company's image and revenues might take a major hit, whereas the opposite would be true for exporters whose products can be demonstrated to be safer. Our research indicates that governmental and private sector actions, more scientific understanding of food safety, and greater international communication will all contribute to long-term improvements in global food safety.

LITERATURE AND REVIEW

Igor Bogunovic et al (2020) This research aims to better understand how different types of traditional land use in the Istria region of Croatia affect soil characteristics, overland flow, and sediment loss by simulating rain in the area. Soil bulk density (BD) was found to be substantially greater in the agricultural plots than in the viticultural and oenological ones. Soil water content (SWC) and mean diameter (MWD) showed no significant variation. The olive orchard had considerably greater levels of water stable aggregates (WSA), soil organic matter (SOM), and total nitrogen (TN) than the other land uses. Neither runoff nor soil loss was detected in the experimental cropland. The olive orchard had the highest rates of runoff (Run) and sediment loss (SL) compared to the other plots. This was probably brought about by the use of herbicides, low levels of vegetation, and the integration of hydrophobic organic matter into vertic soils by tillage methods. The bulk of the runoff and erosion variables were explained by factor 1, as shown by principal component analysis. Olive orchard plots had far lower erosion and nutrient loss rates compared to vineyard and cropland. The availability of phosphorus, water holding capacity, and sediment content were shown to have a negative effect on WSA, as indicated by Factor 2. In order to maintain plant cover and prevent erosion, management strategies in the study area should till the soil no more than once every few years.

Puja Dudeja et al (2017) When it comes to the middle stages of the food chain, traditional food safety measures take a piecemeal approach. An integrated farm-to-fork strategy has gained popularity in response to rising reports of foodborne diseases and the accompanying economic losses. This necessitates adhering to food-safety guidelines from planting to harvesting to storing to transporting to processing to eating. Each link in this network must be fortified if the whole is to survive. The strength of a chain depends on the weakest link in it. The whole food chain may be jeopardized by the failure of just one link. Farmers, transporters, wholesalers, retailers, food company owners, food handlers, and customers are all part of the food chain and must take responsibility for their actions. Good agricultural practices on the farm are essential for ensuring the safety of plant-based foods for consumers.

A Amarender Reddy et al (2017) Food is subject to a wide variety of rules and legislation across the world. The implementation of standards and food safety criteria, as well as variations in national food control systems including monitoring and sampling, detection and analytical procedures, and trade restrictions. It is not uncommon for nations to impose non-tariff obstacles to trade in the form of norms that are not grounded on science. In this research project, we analyze the effects of India's food safety regulations on the country's agricultural exports to foreign nations. The effects have been evaluated using data from 2010 to 2014 on fisheries, meat, grains, and vegetable exports from India. The investigation took into account, and found statistical significance for, a proxy index for food safety requirements. We conclude that there is need for improvement in the execution of India's food safety policy before it can be considered a worldwide model.

Dongsheng Sun et al (2021) Consumers in China are becoming more wary about the safety of their food as a result of recent instances like the discovery of melamine in newborn milk powder. Chinese food imports may be affected by new rules and restrictions enacted by the Chinese government in response to these problems. In this research, we provide a detailed account of the constraints imposed by China's evolving food safety legislation and provide a quantitative estimate of their impact on food imports. We outline the panorama of non-tariff measures triggered by changes in China's food safety standards and provide evidence that China has been constructing a more all-encompassing regulatory framework, with food safety legislations becoming more severe and harmonized. The impact of food safety rules on China's food imports is then evaluated using a new dataset of import refusals. Our research shows that China's constantly shifting food safety policies have a chilling impact on international trade, reducing imports from countries with weak food safety regulations by an average of 2.24% and imports from countries with good food safety standards by just 0.78%. China's expanding food safety requirements are creating a larger divide between the country and countries

DOI: 10.48047/INTJECSE/V14I1.500 ISSN: 1308-5581 Vol 14, Issue 01 2022 PP: 4075-4080

with lower standards. Business import value growth in China has slowed significantly as a result of border rejections. For every 1 percentage point increase in the rate at which imports are rejected for reasons of health and safety, the average growth rate of import value is lowered by 4.51 percent. Due to their increased social responsibilities and reputational concerns inside the Chinese policy framework, state-owned enterprises (SOEs) are hit harder than non-SOEs by China's import rejection regulations.

Reddy AA et al (2017) Food is subject to a wide variety of rules and legislation across the world. Limitations on international commerce may result from differences in national food control systems, including those for monitoring and sampling, detecting and analytical procedures, and applying standards and food safety criteria. Occasionally, nations will adopt standards that aren't backed by research and amount to nothing more than a tariff-free trade barrier. In this research project, we analyze the effects of India's food safety regulations on the country's agricultural exports to foreign nations. Impacts have been evaluated using trade data for fisheries, livestock, grains, and vegetables exported from India between 2010 and 2014. The investigation has taken into account a proxy index for food safety requirements and shown that it is meaningful. Our research shows that India's food safety policy has to be better enforced in order to catch up to worldwide best practice.

DIRECT COSTS OF FOOD-SAFETY PROBLEMS TO PRODUCERS

It's conceivable that people responsible for a health crisis caused by tainted food won't have to pay for it all. This phenomenon is called "externality." These spillover effects are the result of providers' and consumers' lack of knowledge. There are at least two further options in addition to using market forces (such as reputation and demand) to make those accountable for food-safety concerns pay for some of the expenses related to the issues. The expense of discarding recalled products and the risk of legal action is two such instances.

Producers and suppliers may be encouraged to improve food safety by the possibility of legal culpability, but in reality, those at fault are seldom punished in court or in settlements.

REFORMING THE LEGAL FRAMEWORKS REGARDING FOOD SAFETY IN AGRICULTURE TO BETTER REFLECT THE ECONOMIC FACTS OF THE INDUSTRY

The following are some recommendations for improving the regulatory frameworks already in place to ensure the safety of agricultural foods.

Efforts should be made to ensure that national food safety legislation are harmonized to meet the standards established by the Codex Alimentarius Commission and similar international bodies.

Some examples of capacity development assistance that may be needed by developing countries include training of employees, improvements to laboratory facilities, and the installation of food safety monitoring systems.

The latest innovations in traceability, monitoring, and enforcement should be included into food safety laws. The following practices may encourage everyone to take responsibility for maintaining secure food supplies: Farmers, food processors, regulators, and consumers are all urged to work together in order to improve the food system.

Governments may encourage farmers and food processors to follow food safety regulations by providing incentives including cheaper financing, tax breaks, and greater access to markets. Incorporating these recommendations into existing regulatory frameworks has the potential to improve public health protections while also enhancing the agriculture sector's economic viability.

FAO'S WORK ON FOOD SAFETY AND QUALITY LAWS & REGULATIONS

Assisting countries in developing, revising, or enforcing national food safety and quality legislation and implementing regulations in conformity with international law and best practices is one way FAO works to enhance the system of food control and surveillance. Teams of legal advisers work closely with food safety experts to tailor their services to the requirements of each member state's legal system.

There is an acknowledged need to aid nations in developing science- and evidence-based food control systems that protect consumers' health, increase access to healthy food, and reduce food waste; to aid nations in harmonizing their legal frameworks with the international food safety and quality benchmark, the Codex Alimentarius standards, guidelines, and related texts; to encourage the use of risk analysis as a means of enhancing food-safety monitoring system; and to aid nations in developing risk analysis approaches.

DOI: 10.48047/INTJECSE/V14I1.500 ISSN: 1308-5581 Vol 14, Issue 01 2022 PP: 4075-4080

FOOD SAFETY HAZARDS ON THE FARM

Potentially harmful hazards may be broken down into three groups: biological, chemical, and physical.

Biological hazards

Illness-causing bacteria, viruses, and parasites are all examples of biological dangers. Zoonoses are diseases that have been transmitted from animals to humans. Diseases known as zoonoses may spread from animals to humans via several routes, including physical contact or consuming tainted products. The difficulty of zoonotic disease management on farms is increased by the fact that certain animals may be asymptomatic carriers and the virus may be transmitted intermittently.

Several zoonotic diseases and the animals that are often responsible for spreading them are listed in Table 1. Pathogens transmitted via the gastrointestinal system of animals, and hence in animal feces, are responsible for the vast majority of food-borne zoonoses that produce gastroenteritis-like symptoms in humans. These disorders tend to be self-limiting and relatively mild, although they may sometimes progress to more severe ailments or even cause death. Those at highest risk include infants, the elderly, those with impaired immune systems, and pregnant women. Two of the most critical things you can do to protect your family's health are to cook meals properly and avoid cross-contamination with raw, high-risk foods. While it may be unrealistic to expect complete eradication of these viruses at the farm level right now, there are things that can and should be done to reduce the risk of faecal contamination in food and water.

Chemical hazards

Foods may potentially include chemical residues if safety measures aren't performed all throughout the food chain. Unsafe chemical levels in food may originate from a lack of attention paid to the management of chemical residues in animal feed, veterinary drugs, detergents, disinfectants, etc. on farms. As a result, comprehensive chemical residue management methods need to be put in place before feed delivery if residues are to be eliminated from purchased feed.

Farmers should require vendors to declare in writing that all chemical use was done so in accordance with local, state, and federal regulations. Drug residues in animals may be reduced by careful management of drug storage, dosing, and withdrawal. To prevent contamination of food supplies, agricultural chemicals such as detergents, disinfectants, and pesticides are kept and used in a responsible manner. Proper storage may also prevent contamination from related compounds like fuels, lubricants, fumes, and so on.

Physical hazards

Stones, dirt, metal, glass, plastic, broken animal needles, and other similar physical dangers abound. The key to avoiding such pollutants is the farmer's vigilance. The supplier's food safety management system(s) is/are responsible for preventing such risks in bought feed, etc.

Table 1. Animal-related pathogens that may infect humans by eating contaminated food

DOI: 10.48047/INTJECSE/V14I1.500 ISSN: 1308-5581 Vol 14, Issue 01 2022 PP: 4075-4080

Organism	Associated animals	Associated foods	Disease in humans
Bacteria			
Salmonella	Pigs Cattle Poultry	• Poultry • Lower prevalences in pork, beef, raw eggs & dairy products	Gastroenteritis Complications: invasive disease, persistent abdominal symptoms, reactive arthritis
Campylobacter	Poultry Cattle Pigs Sheep	• Poultry (most commonly) • Beef • Pork • Lamb • Raw milk & raw milk products	Gastroenteritis Rare serious sequalae: reactive arthritis, Guillain Barre syndrome
Listeria monocytogenes	Widespread in nature: found in soil, foilage, animal and human faeces	• Ready-to-eat (R-T-E) foods, including poultry and meat R-T-E products • Raw vegetables • Raw milk • Soft cheese	Less serious cases: gastroenteritis and flu like symptoms Serious cases (Listeriosis): meningitis (brain lining infection), septicaemia (blood infection), abortion or still birth in pregnant women
Yersinia enterocolitica	Pigs	• Pork	Gastroenteritis Rarely: postenteritis arthritis
Escherichia coli O157:H7	Cattle Sheep	• Beef, especially ground beef (mince) • Lamb • Raw milk • Raw vegetables fertilised with animal manure • Contaminated water	Haemorrhagic colitis (bloody diarrhoea) Haemolytic uraemic syndrome (kidney failure)
Mycobacterium tuberculosis	Cattle	• Raw milk & raw milk products	Tuberculosis
Brucella abortus	Cattle	• Raw milk & raw milk products	Brucellosis
Parasites			
Cryptosporidium parvum	Cattle	• Contaminated water	Gastroenteritis type symptoms
Giardia	Cattle	• Contaminated water	Gastroenteritis type symptoms
Viruses	All species	• Various	Various

FOOD SAFETY MANAGEMENT AT THE FARM LEVEL

Prerequisite procedures and a Hazard Analysis and Critical Control Point (HACCP) approach are used in the food sector to guarantee the safest possible food production. What are meant by "prerequisites" are the actions done to guarantee that a processing or handling facility is fit for the production of safe food. Infrastructure, utilities, human resources, machinery, pest management, sanitation, and the efficiency of supply delivery and stocking are other crucial considerations. Before HACCP can be implemented, the standards that provide the groundwork for its successful implementation must be in place.

If a risk assessment reveals the existence of one or more risks during food processing, HACCP should be implemented. A major threat is one that not only has a high probability of happening, but also has far-reaching consequences if it does. The Hazard Analysis and Critical Control Point system is the gold standard for making sure food is safe for human consumption. Beyond the first processing steps, it is required in the European Union for use in the food business. Meat markets, grocery stores, and restaurants are all included in this category.

When all 7 of the HACCP principles are followed, HACCP programs have the best chance of succeeding (Anon., 1997a):

1. Conduct a hazard analysis, which involves identifying possible trouble spots and describing fixes.
2. Determine the Critical Control Points (CCPs), or the points in the process when control may be applied and is necessary to avoid, eliminate, or minimize a dangerous level of a food hazard.
3. In order to avoid, eradicate, or diminish the incidence of the identified food safety hazard, it is necessary to define critical limits, which are the highest or minimum value(s) to which a hazard must be managed at a CCP.
4. It is important to set up monitoring methods in order to determine whether a CCP is under control and to give an accurate record for future verification.
5. Have a plan in place for what to do if you miss your goal or fall short of your threshold.
6. Make sure the HACCP approach is working as intended by designing checks to evaluate its performance.
7. Develop a method of keeping track of what goes on.

Until the results of a study of their effectiveness in primary production (on farms) are in, the European Commission does not require HACCP-based methods. The European Union urges farmers and ranchers to use HACCP wherever they can.

CONCLUSION

Private standards have emerged as an important part of food safety regulation in global agri-food systems during the last 15 years. The possible effects on the structure and manner of operation of global agri-food value chains have sparked heated discussion amid claims that private food safety standards pose a danger to developing nations and the more marginal producers within them. Developing countries have challenges when adhering to private food safety standards, which raises important questions about the role of national and international government bodies in regulating food safety. Accordingly, it is suggested that all involved parties collaborate to improve the existing legislative frameworks for regulating agricultural food safety by giving priority to evidence-based and risk-based approaches, stakeholder engagement, and capacity development.

REFERENCES

1. Bogunovic, Igor & Leon, Telak & Pereira, Paulo. (2020). Agriculture Management Impacts on Soil Properties and Hydrological Response in Istria (Croatia). Agronomy. 10. 10.3390/agronomy10020282.
2. Dudeja, Puja & Singh, Amarjeet. (2017). Food-safety issues related to plant foods at farms. 10.1016/B978-0-12-801773-9.00013-3.
3. Reddy, A Amarender & Cadman, Timothy & Jain, Aanchal&Vajrala, Anjani Sneha. (2017). Food Safety and Standards in India. 10.13140/RG.2.2.27987.68649.
4. Dongsheng Sun, Yifang Liu, Jason Grant, Yanyu Long, Xiaojuan Wang, ChaopingXie, Impact of food safety regulations on agricultural trade: Evidence from China's import refusal data, Food Policy, Volume 105, 2021, 102185,ISSN 0306-9192, https://doi.org/10.1016/j.foodpol.2021.102185.
5. Reddy AA, Tim Cadman, A Jain and AS Vajrala (2017), Food Safety andStandards in India, ICAR-Indian Agricultural Research Institute, New Delhi India andGriffith University, Nathan, Queensland, Australia, pp. 38.
6. Pereira, Paulo. (2019). Soil Degradation, Restoration and Management in a Global Change Context.
7. Jurkovic´RS, Pasaric´Z. Spatial variability ofannual precipitation using globally griddeddata sets from 1951 to 2000. InternationalJournal of Climatology. 2013;33(3):690–8.
8. Schilling J, Akuno M, ScheffranJ,Weinzierl T. On raids and relations: climatechange, pastoral conflict and adaptation innorthwestern Kenya. In: BronkhorstS,Urmilla B, editors. Climatechangeandconflict: where to for conflict sensitiveclimate adaptation in Africa? Berlin:Wissenschaftsverlag; 2014.pp. 241–68.
9. Lipper L, Thornton P, Campbell BM,Baedeker T, Braimoh A, Bwalya M, et al.Climate-smart agriculture for foodsecurity. Nature Climate Change. 2014;4(12):1068.49. Butler CK, Gates S. African range wars:climate, conflict, and property rights.Journal of Peace Research. 2012;49(1):23–34.
10. Davis J, Lopez-Carr D. Migration,remittances and smallholderdecision-making: implications for land useand livelihood change in Central America.Land Use Policy. 2014;36:319–29.
11. JensenND,BarrettCB,MudeAG.Indexinsurance quality and basis risk: evidencefrom northern Kenya. American Journal ofAgricultural Economics. 2016;98(5):1450–69.
12. Ko¨hler-Rollefson I. Innovations anddiverse livelihood pathways: alternativelivelihoods, livelihood diversification andsocietal transformation in pastoralcommunities. Revue ScientifiqueetTechnique–Office Internationaldes Epizooties. 2016;35(2):611–8.
13. Greiner R, Puig J, Huchery C, Collier N,Garnett ST. Scenario modelling to supportindustry strategic planning and decisionmaking. Environmental Modelling &Software. 2014;55:120–31.
14. Vervoort JM, Bendor R, Kelliher A, StrikO,Helfgott AER. Scenarios and the art ofworldmaking. Futures. 2015;74:62–70.
15. Rogelj J, Schaeffer M, FriedlingsteinP,Gillett NP, Van Vuuren DP, Riahi K, et al.Differences between carbon budgetestimatesunravelled. Nature ClimateChange. 2016;6(3):245