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An Introduction to Food Safety and Regulatory Challenges

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Abstract

Food Safety faces several regulatory challenges both at the domestic and international levels. The evolution of food safety as revealed through available documents points towards a persisting challenge that has not been addressed in a manner on par with its impact on society. Food safety challenges differ between developing and developed nations. Food legislation in different countries and different methods of ensuring food safety provide insights on current regulatory frameworks and its challenges. An analysis of national and international perspectives on food safety has a role to play in strengthening existing frameworks. Stakeholders' processes have been recognized as being necessary to the development of public policies seeking to promote systemic innovation in response to complex and multidimensional challenges like food safety.

Keywords

Food safety, food legislation, Hazard analysis critical control point, stakeholders, Codex Alimentarius

INTRODUCTION

Food plays a pivotal role in determining health, nutritional status and productivity of a given population. Hence it is important to ensure that the food we consume is safe and wholesome. The result of failure to ensure food safety is the occurrence of food-borne diseases. It is quite common to find reports in newspapers about health problems caused by contaminated or adulterated food items. All over the world foodborne illnesses are a major problem related to public health. In September 2010 The ministry of health and Family welfare in India stated that more than 30 million episodes of acute diarrhea occur every year in children less than 5 years of age. Such diseases damage trade and tourism as well as result in mortality. It can lead to loss of earnings, unemployment and litigation. In this manner it can impede economic growth. Food safety refers to handling, preparing and storing food in such a manner as to best reduce the risk of individuals

becoming sick from food-borne illnesses. The prevention of contamination and food poisoning is the main aim of food safety. Whether you are handling food at the workplace or at home, it is essential to always apply food safety principles. A large number of potential food hazards exist in a food handling environment and many of them have serious consequences.

Significance

Food regulatory system of a nation is very important in dealing with food safety which is pivotal in protecting the health of citizens and ensuring fair practices in the food trade. Study of food laws and regulatory systems helps to identify important areas which need more attention to achieve safety in whole process of food handling. As food safety is everyone's duty, it helps stakeholders to identify their role in ensuring food safety. It also helps stakeholders in reviewing their awareness level about rights and responsibilities in food control system. Government authorities can review their interaction with stakeholders in food chain which is very important in achieving food safety in their nation. Transparency in such a review process is key to achieving the targeted finetuning of existing systems.

Origin and Evolution of Food Safety

It is interesting to note that there are numerous documented incidents of food-borne illnesses since very early times. The safety of food and water is mandatory for public health. The first documented case of food-borne illness dates back to 323 B.C. According to the study conducted by doctors at the University of Maryland, the ancient ruler Alexander the Great died due to Typhoid fever which was caused due to *Salmonella typhi*. After the Jack in the Box outbreak caused by *Escherichia coli* in the United States and Bovine Spongiform Encephalopathy outbreak in the United Kingdom there arose an increased interest in the implementation of a robust food regulatory system than what was previously employed. In 375 BC the great economist and philosopher Chanakya mentioned food adulteration in his book Arthashastra whereas the Egyptians preserved food thousands of years ago. The modern world seems to have addressed these continuing concerns through Hazard Analysis Critical Control Point (HACCP) system for ensuring effective food security. Today, the IHA serves as the international authority on HACCP systems and regulatory compliance and provides curricula and accreditation for HACCP classes while facilitating an understanding of HACCP philosophies through cooperation with its partners². In developed nations the the first priority was given to reducing risk through elimination of hazards, sustainable management, addressing food terrorism and adulteration. In developing nations there still exists several barriers in the effective implementation of an effective food regulatory system including the HACCP. The major problem faced by these countries is the lack of knowledge and little interest in the employees as well as the consumers in learning about new technologies and methods in food safety and the cost evolved in the implementation of these technologies. In a 2006 survey conducted in Turkey in over 100 food businesses only 7% reported HACCP implementation. Before 2006, Food regulation in India was governed by the Prevention of Food Adulteration Act 1954. After the implementation of Food Safety and Standards Act, 2006 the focus shifted from just curbing food adulteration to a more science based food law with a risk based approach. In the early 1900s, food borne diseases and related mortality rates were at its peak. So in the 19th and 20th century food safety legislation was more abundantly adopted and implemented. There is an interesting story related to food safety and preservation. In the early 1800s Napoleon Bonaparte, ambitious for territory and power, offered a reward to anyone who could figure out how to keep the food safe needed for his soldiers to prevent spoiling as they traveled from countries to countries. The solution suggested by Nicolas Appert was to put the food in jars and cans with a lid on them and boil the food until it was cooked. The solution worked and it was the first version of canning. Even though Appert was not aware that boiling kills germs in food items, he realized that it prevents spoiling. Early assumptions

regarding food safety had several interesting and fact based backgrounds which resulted in the framing of current rules and laws in food safety.

Food Safety in Developing and Developed Nations

Food safety challenges differ from region to region depending upon the income levels, diet, local conditions and governmental policies. In developing countries traders and consumers have a close relationship. There will be a traditional market supplying fresh foods and the storage of prepared and packaged food will be fewer. As a country's economy increases, its investment in agriculture also increases. That can provide consumers with a wide variety of food products. Recently WHO has noted down some trends that are prevalent in both developing and developed nations related to food security. Intensive animal husbandry practices have led to increased production and the emergence of human pathogens like Salmonella and Campylobacter. As a result, several strains of antibiotic-resistant bacteria have emerged. In this era of rising terrorist attacks, Bioterrorism has been used as a way for attacks by intentional adulteration of food products. The WHO states that "the key to preventing food terrorism is to enhance existing food safety programs"³. Due to the advancement in technologies especially in the medical field people are being equipped to fight against the sort of diseases that are fatal. As a result, there will be a massive decline in the death rate. This will increase the chances of food-borne illness affecting every one in ten people. An increase in travel interest can carry diseases miles away from its actual place of origin. This can increase foodborne illness. The changing lifestyles of people and consumer interests impact the frequency and nature of food-borne illness. In both developed and developing nations a larger share contributes to the food budget especially that which is being prepared outside the home. The increased use of chemical fertilizers, pesticides, and untreated sewage in agricultural practices increases the risk of foodborne diseases. Chemical contamination of food is also prevalent. Many pacific island countries reported ciguatera poisoning and botulism as chemical hazards in finfish and fermented food respectively. A disease carried by poultry and live animals also presents risks to food safety. An overall analysis and single referral point system are adequate for minimizing the risks of these hazards.

Food Legislations in Different Countries

Food laws aim to protect consumers' interests, their well-being, and to a degree, facilitate fair trade. Food laws aim to protect consumers' interests, their well-being, and to a degree, facilitate fair trade⁴. The HACCP system and the cold chain system are the mainly used food safety systems worldwide.

Cold Chain System

Cold chain for the food is based on the freezing technology, otherwise known as the refrigeration technology, the supply of raw materials, product processing, storage, transportation, distribution and retail, until it reaches the hands of consumers. It's each link is always in the products required for low temperature environment, to ensure the food quality and safety, minimize loss, prevent pollution of the special supply chain system⁵. The Sanitary Transport Rule, a part of the Food Safety Modernization Act, has an impact on all food processing companies using cold chains. The traceability changes due to the execution of FSMA Rule means to give sufficient data and information in cold chain technologies regarding food supply, storage location etc. Cold chain is common in food as well as chemical industries. Many developing and developed nations highly encourage the use of cold chain technology for the proper maintenance of their food culture.

Haccp System

The HACCP system, which is science based and systematic, identifies specific hazards and measures for their control to ensure the safety of food. HACCP is a tool to assess hazards and establish control systems that focus on prevention rather than relying mainly on end-product testing⁶. The HACCP system can be carried out throughout food chain that is from farm to plate. Along with enhancing food safety HACCP system can increase international trading opportunities and can aid inspection by regulatory authorities by increasing confidence in food safety. For the successful implementation of HACCP system full involvement and commitment of the management bodies and workforce is necessary.

Food safety legislations need to be more innovative, technical, and efficient. So the international food regulatory mechanisms are still in a mode of constant preparation for implementing a more secure and risk-free environment for food safety. The international food safety bodies are now addressing the current issues faced by the food safety system globally for a full-fledged innovation.

Country-Wise Analysis

India

Food Safety and Standards Authority of India is an autonomous body established under the Ministry of Health and Family Welfare, Government of India. It works according to the guidelines prescribed by the Food Safety and Standards Act, 2006. The FSS Act. In India the food products are categorized as Standardized Food Products and Non-Standardized Food Products. Standardized food products require FSSAI license and should meet its prescribed guidelines before manufacture, sale, export and distribution. Non-standardized food products do not have to meet any standards as they are unknown and uncertain. Traditional food products also does not require any standardization as they are being continuously used for years and years. New Draft Regulations have been formulated by FSSAI. Of special interest is Section 22 of the FSS Act, which deals with "Nutraceuticals, Functional Foods, Novel Foods and Health Supplements."⁷.if the foods in these categories have nutritional or medicinal benefits they need to have its scientific evidence. Ingredients like vitamins and minerals must conform to the recommended dietary allowances for Indians, as proposed by the Indian Council of Medical Research. Export certification is mandatory, for a variety of foods, under India's Export Inspection Act. Inspections are carried out under ISO standards.

Canada

Canada is a nation with a population of approximately 32 million. It is considered a world leader in ensuring that food safety and quality in agricultural food products are maintained throughout the food continuum. Responsibility is shared by primary producers, processors, transporters, distributors, retailers, restaurants, and even manufacturers of packaging materials and ice. Refrigerated and frozen foods are also subject to detailed regulatory controls. In Canada these regulatory measures are in place at the national level, and fit hand-in-glove with international community requirements where HACCP-based approaches to hygiene have been established. Canadian legislation affecting the cold chain includes the Canadian Food Inspection Agency Act, Food and Drugs Act, Meat Inspection Act, Canada Agricultural Products Act and the Fish Inspection Act and their respective regulations.

The United States

The population of this modern, food-producing nation is estimated at 298 million in 2006. U.S. federal and state governmental bodies regulate the manufacture, distribution and retailing of chilled (refrigerated) foods. The U.S. Food and Drug Administration (FDA) monitors the manufacture, import, storage and sale of foods that are required to be in compliance with the relevant U.S. Food Code. The 2005 Code provides guidelines

on sanitation and the safe handling of refrigerated and frozen foods. The Code requires that the stored frozen foods be maintained frozen. The potentially hazardous foods shall be maintained at 5°C (41°F). To complement this Code, the new 2005 Sanitary Food Transportation Act has transferred authority for regulating the safe transportation of food from the Department of Transportation to the Department of Health and Human Services. It requires shippers, motor vehicles, rail vehicle carriers and other persons engaged in the transportation of food to use sanitary transportation practices. Other documents speaking to the storage, handling and transportation of cold chain products include the U.S. "Transportation and Storage Requirements for Potentially Hazardous Foods" guidelines.

National and International Perspectives on Food Safety

Food safety is a hidden and often overlooked problem stated by Dr. Margaret Chan, Director General of WHO (Chan 2014)⁸

Food Safety As An International Perspective

The human food chain is longer and more complex than ever before, and demographic, cultural, economic and environmental developments-globalized trade, travel and migration, ageing and populations, changing consumer preferences and habits, industrialization and new technologies, emergencies, climate change and extreme weather events are increasing foodborne health risks⁹. A failure at any stage of food production that is from farm to plate can cause serious health hazards. Even a local food safety problem can become a national emergency. Current surveillance and reporting systems on food borne illness are limited and often go unreported in countries with less laboratory facilities and less developed surveillance systems.

Food safety risks exist at every stage of food production. Unsafe food creates a vicious cycle of disease and malnutrition, particularly affecting infants, young children, elderly and the sick. Food safety is a basic human right and that the risk of any degree is unacceptable. An effective solution for ensuring global food safety is to adopt an international action plan that administers food safety at every step of the way. Even if there are recommendations and plans by experts the best plan remains undetected. The myriad of people involved in the process, knowledge bases, ability to conduct thorough inspections, time to address issues, and challenges presented by those who ultimately handle the food with their different language and educational levels are just a few of the barriers to implementing the best of food safety programs¹⁰.

The challenge of ensuring safe food to the world continues to alter as it is becoming busier. There exists a need for establishing a more consistent and effective food monitoring system.

Article 25 of the Universal Declaration of Human Rights

Article 25 of the universal Declaration of Human rights covers a wide range of rights, including those to adequate food, water, sanitation, clothing, housing and medical care as well as social protection covering situation beyond one's control such as disability, widowhood, unemployment and old age. The general concept of adequate food can be broken down into several elements such as the food supply should be adequate, the available supply should cover overall nutritional needs in terms of quantity and quality. It should provide all essential nutrients, including nutrients such as vitamins and iodine and last but not least, food should be safe and free of all toxins and contaminants and good quality in terms of taste and texture. The UDHR envisages that everyone throughout the world should enjoy the rights contained there in. These rights were absorbed into the legal, administrative and political culture of nations, through recognition followed by implementation in national law and administration, including any necessary political and social reforms. Global institutions had to be set up, some of

them to monitor the implementation of human rights world wide and others such as FAO to provide assistance and cooperation in facilitating the enjoyment of these rights for all. The UDHR was initially an expression of ideal goals to be achieved. The process of transforming these ideals into hard law at the international level started with the adoption of the two covenants in 1966, followed by numerous more specific conventions. While these created obligation for states under international law, the main task was to ensure that rights were incorporated into national and administrative practice and that conditions were created under which it would be possible for states to meet their obligations.

Codex Alimentarius

The global food trade has an enormous impact on both the health of populations and the economies of nations. Food safety standards and regulations are essential to ensure food is safe at all points along supply chains in both international trade and within nations. Trade is closely linked to food safety. Globally accepted standards enable trade by making it more transparent and efficient, giving confidence to all participants and allowing the smooth flow of food products between markets.

The most important global body for food standards is the Codex Alimentarius Commission (CAC). It is the global reference point for food producers, processors, consumers, national food safety agencies and international food trade. CAC is run jointly by the Food Agricultural Organization (FAO) and World Health Organization (WHO) and comprises of 188 member countries and one member organization (the European Union) and 229 observers, which are intergovernmental and non governmental organizations and 16 United Nations agencies. CAC produces the Codex Alimentarius, a collection of harmonized international food standards, guidelines and codes of practices. The food safety measures are based on scientific principles to adopt to the evolving global food trade, the evolution of knowledge and changing consumer needs and preferences. The process involves specialists in multiple scientific areas, experts, technical bodies, consumer organization, production and processing industries, food control officials and traders. A Codex standard has taken on average 4-5 years to develop, but to adopt to the rapid pace of change, the CAC members now meet now annually and evaluation is conducted in a continuous process managed by specialist committees. Since its inception in 1963, the CAC has produced 223 food safety standards, 78 food safety guidelines, 53 food safety codes of practices. In addition, the CAC has set numerous maximum levels, based on scientific principles, for contaminants in food additives and pesticide residues.

The Codex has raised awareness of food safety in member countries and encouraged them to introduce new food legislation, adopt Codex-based standards and establish or strengthen agencies responsible for monitoring compliance with regulations. The standards, guidelines and codes of practice are advisory for member countries and they can choose to adopt them in their own national laws and regulations.

National Perspective on Food Safety

National legal frameworks are a key pillar in an effective food regulatory system. In all countries, food is governed by a complexity of laws and regulations which is set out the government's requirements to be met by food chain operators to ensure the food is safe and of adequate quality. In this modern world of globalization, in a developing country like India one of the issues that need prime attention is that of food safety. India is still struggling with the burden of food-borne illness, lack of sanitation and clean water in addition to the menace of food adulteration. As a solution for this the government of India has implemented the Food Safety and Standards Act 2006 to overcome the flaws in the Food Adulteration Act 1954. Unsafe food containing pathogenic microbes and other toxic chemicals are responsible for a wide variety of diseases which are often fatal. The initial WHO Food borne Disease Burden Epidemiology Reference Group (FERG) figures, from 2010, show that though there were an estimated 582 million cases of 22 different food borne enteric diseases and 351,000 associated deaths¹¹ In India, half of the

food borne illness goes unreported. Infants, children and the aged people are suffering from the worst situation of such harm. The use of pesticides and chemical fertilizers in agriculture has tremendously increased over the past 20 years. As a consequence of this the environmental conditions get dispersed and these chemicals find their way to invade into the food chain.

The Food Safety and Standards Authority of India is established under the Food Safety and Standards Act 2006 for assuring food safety and restricting adulteration and other unfair practices. The Act targets to establish a single reference indicator for all elements relating to food safety and standards from multi-level ,multi-departmental discipline to a single line of mandate. The FSSAI and the state food authorities shall enforce various provisions under the act. ISO 22000 is a standard developed by the International Organization for Standardization dealing with food safety. The ISO 22000 international standard specifies the requirements for a food safety management system that involves interactive Communication, system management, prerequisite programs, and Hazard Analysis and Critical Control Points (HACCP) principles¹².

Food can be made safe by the concerted effort of various stakeholders, governmental departments and the general public. The public should be made aware of the importance of food safety and related risks. The government should implement the present laws as strictly as possible. New challenges in ensuring food safety are still emerging. In India, food safety has an interconnection with the Swachh Bharat initiative of the Indian government that promotes sanitation and cleanliness. Food safety should be ensured through strict practices and methods so that we can assure it as effectively as possible.

The Role of Indian Judiciary in Safeguarding Food Safety

Legislatures act on abstract principles while the judges act on concrete principles. More than the legislature, the judiciary is concerned with stability and change. Judiciary being The protector of rights of the people has intervened into a large number of areas of food safety by considering the constitutionality of the act,issuance of NOC, licenses, prohibition orders, misleading advertisements labeling etc. An appraisal of the role played by the courts since the inception of the FSS Act till today shows the highly active and efficient judiciary committed to the prevalence of safe and standard food to the people. In imparting the functions of judicial process judges interpret and give meaning to the provisions of the Act. That may reflect in the activist and creative side of the judiciary.In Centre for Public Interest Litigation v. Union of India and Others¹³ The honorable Supreme Court held that a paramount duty is caused on the states and its authorities to achieve an appropriate level of protection to human life and health which is a fundamental right guaranteed to the citizens under Article 21 read with Article 47 of the Constitution of India. When there is a right to food, then only the right to safe food comes into picture. Ensuring safe food is the motto and objective of the Food Safety and Standards Authority under the FSS Act, 2006.

Even though the Act had been enacted in the year 2006, it took time to implement the provisions.The PFA Act,1954 was prevailing till that time. The constitutional validity of the act had been challenged in the Association of the Traders carrying the Food business of various Food items being a registered association having its office at 956/71, through,Authorized Signatory Kiran VarshiGada, Adult and Others v. Union of India and Others , the Bombay High Court, upheld the Constitutionality of the FSS Act, 2006.In Center for Public Interest Litigation v. Union of India and Others¹⁴, the judiciary showed it's activist role and ordered the Government of India to strictly follow the provisions of the FSS Act, 2006 as well as the Rules and Regulations framed there under.The Court observed that any food article which is hazardous or injurious to public health is a potential danger to the right to life guaranteed under article 21 of the Constitution of India.

Role of Stakeholders in Ensuring Food Safety

In India, food safety has linkages with the Swachh Bharat initiative of the Indian government that promotes cleanliness and hygiene. Food industry is one of the largest manufacturing industries all over the world. To deal with food integrity a multi-dimensional approach is necessary. A variety of measures have been developed by using actors and other eminent personalities for ensuring food integrity. It is a challenge that requires the effective participation and effort of stakeholders sharing common goals and the government. Information and data that could be relevant to identify potential issues of integrity in food supply chains are often initially only available to industry experts operating at a specific level of the agro-food supply chain¹⁵ Multi stakeholder processes have been recognized as being necessary to the development of public policies seeking to promote systemic innovation in response to complex and multidimensional challenges like food security and safety. Collaboration among all stakeholders is necessary to leverage the right food safety knowledge, risk management methods and interventions across the global food supply chain¹⁶. Oxfam International is a charity organization that works for ensuring food safety, health and gender justice. During a civil war in Yemen that led to the death of thousands of people Oxfam contributed to the welfare of its refugees from neighboring countries. Likewise in South Sudan the Oxfam is working to help the farmers for promoting sustainable agricultural practices and also helps the refugees in neighboring countries for meeting their basic food needs. Government must provide health education programmes and legal education programmes which effectively communicate the principles behind food safety and food hygiene to industry and consumers and ensure that consumers have clear and easily understood information by way of labeling and other appropriate means to enable them to protect their food from contamination ,food fraud and growth or survival of food borne pathogens by storing ,handling and preparing it correctly.on the global level they must also strive to maintain confidence in internationally traded food.The Media has a great role in bringing the basic food needs and related issues to the concern of general public.

CONCLUSION

Food safety can be achieved in a sustainable and effective manner only through increased co-operation between stakeholders.These stakeholders may include international food safety organizations and national regulatory framework for ensuring food safety as well as food producers.The need for disseminating knowledge on food safety and technology support initiatives may indeed be the need of the hour in a world facing rising food prices as well as occasional threats of war,such as the largely unexpected Russia-Ukraine conflict.The international community and large economies such as India need to take the initiative in paving the towards achieving effective food safety systems for a global market.

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