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Achieving food safety from farm to table: global requirements and the Indian scenario

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It is well recognized globally that food contamination poses considerable risk to public health. Priority is being accorded to measures to improve food safety and to minimize the adverse impact of poor food safety on human health and on commerce. This, in turn, has considerable socio-economic impact. In the modern globalized era, the international obligations relating to ensuring food safety throughout the food chain – from farm to plate -- represent a major challenge. The Government of India is according priority to strengthening the legal and institutional frameworks for improving the implementation of food safety norms to meet national and international benchmarks.

Co-operation of stakeholders

The co-operation of all the stakeholders – the Government, food producers, processors, traders and the consumers – is essential for the successful implementation of the food safety programme. Safe food for all is a shared responsibility of the Government, consumers and the producers, industry and trade. Government is responsible for food legislation and enforcement, advice for producers, industry/trade, consumers, information gathering and research and provision of health related services. Some of the important initiatives in this regard are: (i) appropriate policies, (ii) appropriate legislation, (iii) standards and their harmonization with Codex, (iv) good agricultural practices (GAP), (v) adequate inspection procedures (domestic, import and export, and food-borne illness surveillance) and (vi) efforts to improve public awareness. The producers, industry and trade are responsible for: (i) good practices by primary producers and distributors, (ii) quality assurance and control of processed foods, (iii) appropriate processes and technology, (iv) training of managers and food handlers, (v) informative labelling, and (vi) consumer education. Consumers are responsible for: (i) safe food practices at home, (ii) being aware of their rights and responsibilities, and (iii) community participation.

The importance of food safety

Food safety is central to human health. The quality attributes of a food product have an impact on its value ... whether they are negative such as spoilage and adulteration or positive such as attractive colour, flavor and texture. These are very important to the consumer in the domestic market as well as for international trade. It is even more important to put safeguards in place to avoid acute or chronic food-related illnesses in humans and

animals. Such safeguards play an important role in the national economy by way of reducing the public health costs of food-borne diseases and in earning foreign exchange through enhanced export of safe, high-quality agricultural commodities. Access to food export markets depends on meeting the regulatory requirements of the importing countries. The requirements for food protection measures at the national level and rules under which foods are traded internationally come under the Agreements on Application of Sanitary and Phytosanitary measures (SPS) and Technical Barrier to Trade (TBT). It is assisted by the Codex Alimentarius Commission, an intergovernmental body of 185 member states that coordinates food standards at the international level, having the objectives of protecting consumer health and ensuring fair practices in international trade.

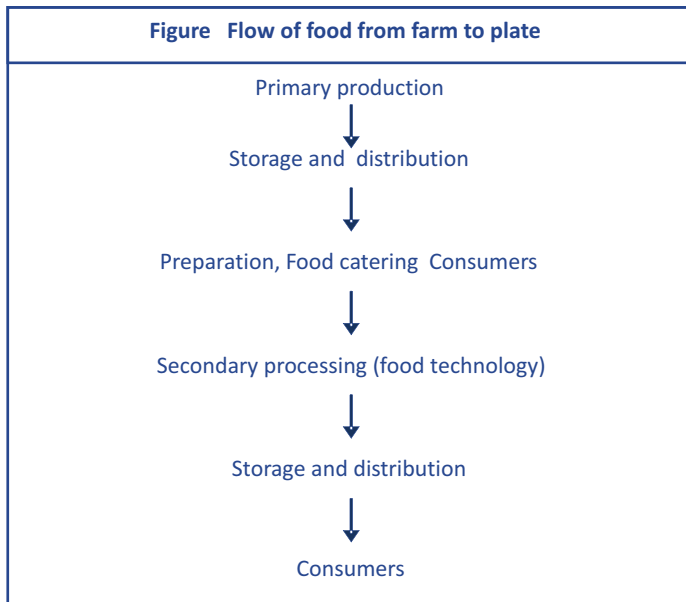
International agencies such as the FAO and the WHO have been advocating the building of strong national food safety control systems, with building blocks such as food laws, food control management, inspection services, and laboratory services in addition to maintaining food-related epidemiological data, and improving information dissemination, education, communication, and training. As far as principles of the food control system are concerned, the issues for consideration include an integrated farm-to-table concept, risk analysis, transparency, and regulatory impact assessment. A national food control strategy should ideally involve a single-agency system with adequate funding and powers rather than multiple agencies. The issues that are specific to developing countries include primary processing and marketing, food processing, regulation of street foods, food control infrastructure and resources.

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Food safety throughout the food chain

The principle stages of the food chain from the farm to the consumer's plate are depicted in the Figure. Food is grown by the farmers in the field, or produced through animal husbandry or fishing. Inputs during the primary production stage may include fertilizers, pesticides, animal feeds, veterinary drugs, etc. The primary processing of food takes place on the farms, in dairies, abattoirs, and flour mills. Thereafter, the food products pass from primary producers (agriculture farms/dairy/poultry/fishery/meat producing farmers/bee keepers), to



distributors, primary and secondary processors (eg. canning, bakery, etc), manufacturers, distributors (importers, wholesalers), retailers including traditional village or urban shandys to super markets, sometimes through service sectors such as restaurants or street vendors to the end consumer.

Agricultural inputs such as pesticides and veterinary drugs involved in food production should be of the right quality, applied in right quantities at the right periods so that they will not pose risks to consumers. Hygiene needs to be strictly ensured throughout the farm-to-table cycle. Special care is needed in regard to foods such as milk, meat, poultry, fish, and vegetables because some of these may be consumed raw and the risk of disease transmission is high. Foods processed and prepared by the food industry need the inputs of modern food safety management expertise to minimize the risk of potential food safety hazards. Adequate care is also needed during food distribution, retailing, catering (including street food vending and domestic food preparation) as well as in preserving cooked food. Thus, each of the players participating in the flow of food from farm to plate has an important role and responsibility in keeping food safe for consumption and ensuring its quality.

The risk factors associated with food handling and processing at various stages include:

- cross contamination,
- unsafe primary sources,
- inadequate cooking,
- improper temperature control,

- contaminated equipment,
- poor health status/personal hygiene of food handlers,
- poor water quality
- pest contamination

Risk Analysis

Risk is defined as the estimated likelihood of an adverse health effect, weighed for its severity, occurring in humans as a result of exposure to a biological, chemical or physical agent in food. Risk analysis is widely recommended by international agencies, including Codex, when taking decisions regarding food management. Risk analysis is a structured systematic process that examines the potential adverse health effects consequential to the hazard or to the condition of food, and develops options for mitigating the risk. It is a process consisting of three components-risk assessment, risk management, and risk communication. Risk assessment involves a complete toxicological assessment, an epidemiological assessment, and an exposure assessment. It is a scientific process consisting of the steps of hazard identification, hazard characterization, exposure assessment and risk characterization.

Hazard identification is the identification of known or potential health effects associated with a particular agent. Hazard characterization is an evaluation of the nature of adverse effects associated with the biological, chemical and physical agent including dose-response relationships, sometimes based on animal studies. Exposure assessment is the evaluation of the degree of intake likely to occur. Risk characterization is the qualitative and or quantitative estimation, including attendant uncertainties of the probability of occurrence and severity of known potential adverse health effects in a given population, based on hazard identification, hazard characterization and exposure assessment. Risk management is the process of weighing policy alternatives in the light of results of risk assessment and, if required, selecting and implementing appropriate control options, including regulatory measures. Risk communication is the exchange of information and options among risk assessors, risk managers, consumers and other interested parties. Thus, in simple terms, if some contaminants or toxicants are found in food, (e.g. small quantities of pesticide residues in grapes which could be removed by washing) one need not worry too much. The danger it poses to human health depends on the nature of the toxin including its toxicity, the level of occurrence, in what quantities such foods are consumed, what is the vulnerability of the population exposed to it, the behaviour of that toxin during processing including cooking, and ultimately the total dietary exposure. It is in this context that the concept of ADI, the Acceptable Daily Intake is used the world over. ADI is- an estimate of the amount of a substance in food or drinking water expressed on a body-weight basis that can be ingested daily over a lifetime without appreciable risk.

Food control

Food control is a mandatory regulatory activity of enforcement by the Government to provide consumer protection and ensure that all foods during production, handling, storage, processing and distribution are safe, wholesome and fit for consumption, conform to quality and safety requirements, and are honestly and accurately labelled as prescribed by law. The confidence of the consumer in the safety and quality of food depends mostly on their perception as to the effectiveness of food control measures. The Government needs to assign a particular department with the responsibility for all matters pertaining to food safety, coordination between departments of the central government,

the state governments and the local governments - their responsibilities and functions.

Appropriate food legislation and its proper implementation by strictly enforcing them is essential. Food standards and codes of practice, authorities empowered to make rules and regulations, systems of coordination between government agencies, consultation process with the industry and consumer organizations, analysis of food laws and regulations addressing food adulteration and contamination, hygiene, additives, labelling, licensing of premises, offenses and penalties for non-compliance, inspection and analysis of foods, are all of paramount importance.

Food standards and their harmonization

Standards of food are a set of requirements that determine what a food product must contain to be marketed under a certain name. Standards have become an integral part of the legal frame - work and help in implementing food controls both at the domestic level and for food entering international trade. According to the World Trade Organization definition "a technical regulation is a document which lays down product characteristics or their related processes and production methods, including the applicable administrative provisions, with which compliance is mandatory while a standard is a document approved by a recognized body that provides, for common and repeated use, rules, guidelines or characteristics for products or related processes and production methods, with which compliance is not mandatory". There is no clear-cut definition of whether 'standards' comprise both regulations, which are understood as sovereign tasks (also referred to as mandatory standards) and public/private voluntary standards. Thus, technical regulations and standards refer to mandatory or voluntary food quality aspects and conformity assessment requirements.

Regulations and standards for food quality are partly mandatory (e.g. minimum quality requirements such as size, colour, weight, nutritional requirements, label content and formats, etc.), and partly voluntary. Voluntary standards include (i) commercial trade and industry standards developed by individual firms (corporate standards) or by business networks and associations in a bid to homogenize product attributes and to facilitate the coordination of market transactions or to differentiate products (e.g., global GAP); (ii) Third-party standard schemes used by trade and industry, usually developed by non-governmental organisations, that address sustainability issues or specific social and ecological issues (e.g., Fair Trade, Rainforest Alliance as used by the spice trade in India).

The setting of food standards is a science-based activity with contributions from experts and specialists in a wide range of disciplines. Science-based standards for food products have been developed based on available scientific evidence, neutral and independent – requiring independent risk assessments/safety evaluations and capable of withstanding rigorous scientific scrutiny.

Standards are needed to protect the health of consumers, to facilitate trade in food products, and to help in implementing food controls. Standards have become an integral part of the legal frame-work within which international trade is being facilitated.

In general, standard-ruling/standard-setting organisations can be categorized as:

- Multilateral organisations, in particular the WTO and the WTO-recognised multilateral standards set by the Codex Alimentarius Commission, the International Plant Protection Convention and the World Organisation for Animal Health; Codex standards serve, in many cases, as a basis for national legislation and the reference made to Codex food safety standards in the World Trade Organizations' Agreement on Sanitary and Phytosanitary measures (SPS Agreement) makes the Codex the benchmark for resolving international trade disputes.
- Regional (or supranational) standard-setting organizations (e.g. trading blocks such as ASEAN).
- National standard-setting organizations.
- Private industry and trade standard-setting corporations or organizations.

Harmonization of food law standards

The different sets of standards and food laws in different countries have given rise to non-tariff trade barriers. This variance in standards became a challenge to exporters and importers who were required to comply with a host of different regulations regarding numerous types of food products. This also created barriers for countries with agriculture-based developing economies that wished to gain access to international food markets in industrialized countries with very strict food safety standards. These compliance and access challenges have resulted in expansion of the international food trade being seriously inhibited. The advantages of harmonization include:

- elimination of regulatory differences through sound science-based decision making,
- bringing a higher level of confidence that risk reduction strategies and food safety measures are effective (a good example is the harmonization of India aflatoxin standards with those of the Codex recommendation),
- the fact that decisions are taken on the basis of scientific evidence and not on any underlying political or economic agenda,
- the fact that they contribute to promoting regional trade benefits to farmers who are marginalised in 'modernised' agri-business value chains.

Moving from endpoint controls to risk-based food safety control systems: risk-based food inspection

Food inspection is an important part of food control. Modern risk-based inspection changes the focus from end-product testing and compliance verification of a product or premises to assessment of the controls that are in place to address food-borne disease risk factors. This prevention-based approach is most suitable where resources for inspection are meagre.

Prioritizing the inspection of food businesses on the basis of potential risk to the population necessitates classifying food businesses according to their risk category. When the number of establishments to be inspected is high, prioritization is necessary. By identifying high-risk food preparation processes, the inspector can focus on those foods or processes.

High-risk businesses are those where the potential exists to put vulnerable groups or large number of consumers at serious risk due to the nature of the food (e.g. ready-to-eat), the manner of food preparation/processing facilities provided, and the adequacy of the control systems in place. Medium-risk businesses are those where, although high-risk ready-to-eat foods are not prepared, the scale of the business is large. Such foods include raw meat, cooked meat/poultry and meat/poultry

products, egg and egg products, etc.

Low-risk businesses are the ones where the potential to cause harm to consumers is low such as in the manufacture of cereal products, jams, oils and fats, packing of tea, herbs, spices, and nuts, etc.

In countries where recent changes in food laws have been made, such as in Vietnam where a law on food safety was passed in 2010, the concept of high-risk category of foods finds a place. The risk category of a particular food business will determine the frequency of food inspection; food businesses categorized as high-risk ones will be inspected more frequently than others.

International food trade and food import-export inspection

In the modern era of globalization, huge quantities of a variety of foods move across continents. Food is the most regulated commodity in the world. International harmonization of food standards, especially the cut-off levels of contaminants, is yet to be fully achieved despite the admirable efforts of the Codex Alimentarius and the international agencies such as FAO/WHO who are providing lot of inputs through bodies like JMPR (Joint Meeting on Pesticide Residues) and JEMRA (Joint Expert Meeting on Microbiological Risk Assessment). A substantial part of the worldwide trade in foods depends on the use of inspection and certification systems. Officially recognized inspection and certification systems are meant to be widely used as means of food control. This would minimize trade disputes arising out of different agencies reporting different levels of contaminants in the same sample. Several principles and guidelines for food import and export inspection and certification systems have been laid down by the Codex and the FAO/WHO.

A Mutual Recognition Agreement (MRA) is the formal recognition that the inspection and certification system of one country is equivalent to that of the partner country. If it is accepted that the inspection and certification system of the exporting country provides same level of regional and international assurance as regards food safety protection as the importing country, the controls in the importing country can be reduced.

Food traceability and product recall

Traceability or product tracing is the ability to follow the movement of a food product through specified stage(s) of production, processing and distribution. Food tracing is necessary for removing a particular product or batch of products from the market at any stage of the food chain. The national food recall systems established by various national governments may include a legislative framework, guidance, training, communication mechanisms, record keeping, evaluation etc.

Developing national food emergency plans

The setting up of national food safety emergency response plans has been advocated by the FAO/WHO to tackle the issue of food safety emergencies. The latter could be natural, accidental or deliberate as well as those relating to rejection of imported food. These controls would assist in planning and issuing early warnings. Several countries in Asia such as Bangladesh, Japan and Thailand have placed such a system in motion. Countries of the ASEAN region are in different stages of development/implementation of their national food safety emergency guidelines and the ASEAN secretariat has established the ASEAN-RASFF with links with the EU-RASFF (Rapid Alert System for Foods and Feeds). Codex guidelines for exchange of information in Food

Safety emergencies are available.

Global reference point for consumers and trade : Codex and the WTO

The Codex Alimentarius Commission is a subsidiary body of the Food and Agriculture Organization of the United Nations and the World Health Organization. The commission, with 185 member nations, is entrusted with the elaboration of international standards of food safety to protect the health of consumers and to ensure fair practices in the food trade. The Codex Alimentarius (Latin food code) is the result of the commission's work, a collection of internationally adopted food standards, guidelines, codes of practice and other recommendations.

The World Trade Organization (WTO) is the international organization that establishes the rules of trade between nations. The WTO agreements are negotiated and signed by a majority of the trading nations and ratified in their national legislatures. The goal is to help producers of goods and services, exporters and importers in conducting their businesses. The SPS and the TBT are two important agreements concerned with food trade. The SPS agreement sets out the basic rules for food safety and animal and plant health standards. It allows countries to set their own standards, subject to certain conditions such as that the standards should be based on science, be applied only to the extent necessary to protect human, animal and plant life or health, and should not arbitrarily or unjustifiably discriminate between countries where identical or similar conditions prevail. The key provisions are harmonization (article 3) and risk assessment (article 5). It encourages the use of International standards, and for the purpose of food safety it depends solely on the Codex standards. The Codex develops standards taking into confidence all its 185 member states and on the basis of proper scientific advice. The scientific advice is the conclusion of a skilled evaluation taking into account the scientific evidence, including uncertainties, based on an analysis of the available scientific knowledge and on scientific judgement. Scientific advice provided by the Codex and the FAO/WHO makes an important contribution to informing and strengthening the decision-making processes relating to food safety. The advice is used by risk managers, policy makers, food safety regulators and others, at both international and national levels.

Internationally accepted provisions for assuring food safety: Good Practices

The concept of Good Practices, such as Good Agricultural Practices, Good Hygiene Practices, Good Manufacturing Practices, and Hazard Analysis and Critical Control Point (HACCP) has gradually gained acceptance, shifting the primary means of achieving food safety to the prevention of hazards, rather than inspection of the final products. The assumptions are that risks arise at different stages, and a preventive approach would minimise the risk to all stakeholders.

Good Agricultural Practices are those which need to be applied on the farm to ensure food safety during pre-production, production, harvest and post-harvest. In many cases, such practices also help to protect the environment and the safety of workers. The elements of the food safety module of GAP include site history and management, planting material, fertilizers and soil additives, water, chemicals (both agri and non agri), harvesting and handling of the produce, traceability, training, documents and records, and review of practices. The focus at the farm level is on environmental hygiene, hygienic production, handling, storage and transportation, maintenance of equipment and personal hygiene.

Good Manufacturing Practices (GMP) may be defined as that part of the food control operation which is aimed at ensuring that products are consistently manufactured to a specified quality appropriate to their intended use. It has two complementary and interacting components: the manufacturing operation itself and the control system and procedure. GMP requirements include:

- personal – qualification, training, hygiene
- plant- construction/design, ground
- sanitary operations- General maintenance, pest control, storage and handling of cleaning portable equipments
- sanitary facilities and control - water supply, sewage, plumbing, toilet, hand washing

Good Hygienic Practices (GHP) refers to all practices regarding the conditions and measures necessary to ensure the safety and suitability of foods at all stages of the food chain. “Practices” simply means the actions or activities that need to be consistently carried out. GHP are basic conditions and activities that are necessary to maintain a hygienic environment suitable for the production and handling of food to ensure safe end-products for human consumption. This programme is a prerequisite that will lay the foundation for enhanced preventive and risk-based approaches to food safety management¹.

GHP addresses the following issues:

- primary production
- design and facilities of food production establishments – location, premises, equipment and facilities
- control systems and operations
- hygienic maintenance including sanitation, cleaning, pest control, and waste management
- personal hygiene - health status, personal cleanliness, visitor policy
- training

Good veterinary practices address the following issues:

- good animal feeding practices – procurement, handling, storage, processing and distribution of animal feed and feed ingredients,
- good treatment practices – treatment of animals and veterinary practice,
- maximum residue limits (MRL) for veterinary drugs in foods

Other good practices include good production practices (GPP), good storage practices (GSP), good distribution practices (GDP), good transport practices (GTP) and good animal husbandry practices (GAHP).

HACCP

The HACCP is a system which identifies, evaluates and controls hazards which are relevant for food safety. A ‘hazard’ is a biological, chemical or physical agent present in food with the potential to cause an adverse health effect. Hazard analysis is the process of collecting and interpreting information on hazards and conditions leading to their presence to decide which are significant for food safety and should be addressed in the HACCP plan. The HACCP plan is a document prepared in accordance with the principles of HACCP to ensure control of hazards that are significant for food safety in the segment of the food chain under consideration.

Indian scenario: past and present

India’s past history of food safety is a glorious one, as evidenced by the traditional cultural practices of “madi” (religious purity), “Shuchi” (cleanliness), “Jhuta” (pollution through saliva) and avoidance of tasting while cooking etc. During the British rule, the Bombay Government was the first to take steps for preventing adulteration of food through the Bombay Act II of 1899. Upto 1912, the law was applied only to ghee. The first prevention of food adulteration act was enacted by the United Provinces in 1912. Public analysts were appointed only in 1933. The Government of India passed the Agriculture Produce (Grading and Marking) Act in 1937. The voluntary ISI (certification marks) Act was introduced in 1952 and the Prevention of Food Adulteration (PFA) Act, compulsory for internal trade, was introduced by the Central Government in 1955. Other Acts that were introduced include, the Fruit Product Order (FPO) in 1955, Export Quality Control and Inspection Act in 1963, solvent extracted oil, deoiled meal and edible flour (control) order in 1967 and the meat products order in 1973.

A workshop on National Strategy for Food Quality Control conducted at the National Institute of Nutrition in 1981 had identified a number of deficiencies and constraints in the Indian scenario. These included:

- Food system problems such as inadequacy of post-harvest drying and storage facilities, inadequate guidance in the use of agricultural inputs such as pesticides and veterinary drugs, unhygienic and insanitary environments and food handling practices, lack of quality control processing, prevalence of a large unorganized sector in the food system with a multitude of middlemen, large-scale distribution of unpacked food in bulk and retail sale, a plethora of itinerant merchants, and absence of control as regards animal feeds.
- Infrastructure deficiencies such as general inadequacy of infrastructure for food quality control implementation in terms of manpower and resources, lack of qualified and trained inspectorate, shortage of well-equipped laboratories and trained staff, absence of advisory and extension services, inadequacy of programming and planning for food quality control activities at state and central levels, lack of coordination coherence between various food quality control activities carried out by different agencies, and inadequacy of many of the provisions under the Prevention of Food Adulteration Act.
- Other related matters such as inadequacy of research and development efforts to improve the food system and inadequacy of innovation, lack of public awareness of food safety matters, inadequacy of programmes to keep consumers informed about nutrition and food safety, and the lack of meaningful cooperation among government, trade and industry. These resulted in a serious credibility gap and inadequate community involvement, consumer education and guidance.

In order to overcome the deficiencies and ensure the availability of good quality, wholesome food to meet the needs of the population, protect national interests in import/export trade, and protect the interests of the producers/consumers, a national strategy involving coherence in various existing food quality control activities in different government agencies was evolved. It was suggested that there should be a single statute and a single implementing agency to provide an overall umbrella of policy and coordination².

In December 2003, a workshop on “National strategy for Ensuring Food Safety” was organized jointly by the Nutrition Foundation of India and the FAO in New Delhi³. It put forth a series of recommendations including the establishment of a new statutory autonomous agency that would be responsible for implementing an integrated science-based system for the control of food safety and quality in the entire farm-to-table food chain in the country. The agency would replace the existing setup of PFA at the national level. This called for the framing of new legislation to establishing the agency with well-defined terms of reference. It also called for steps to develop risk analysis capabilities in the country, equip institutions and laboratories to ensure food safety, upgrade the food quality control systems by the industry and enhance international cooperation and visibility in matters of food safety³. The recommendations of the workshop provided important inputs when the Government of India initiated steps to address the problems of food safety in an integrated and comprehensive manner so as to ensure that the standards of food quality in India compare favourably with global standards, and to bring confidence in the safety of our food supply among both domestic consumers and foreign consumers of food imported from India. These recommendations were also of great interest to food producers, the food industry and consumers.

The Food Safety and Standards Authority of India

The Food Safety and Standards Authority of India (FSSAI) was established by the Government of India in 2007, subsequent to an Act passed by the Parliament of India in the year 2006. This Act consolidated various acts and orders that had hitherto been handled by different ministries and departments. The sixty-year old Prevention of Food Adulteration Act, now obsolete, had been focusing on detection of food adulteration and punishment of law-breakers as a deterrent instead of focusing on preventive measures. The FSSAI, on the other hand, is required to lay down science-based standards for articles of food and to regulate their manufacture, storage, distribution, sale, and import to ensure availability of safe and wholesome food for human consumption.

Several of the food standards have been drawn from provisions of the Prevention of Food Adulteration Act. However, currently a review of these standards is being sought by food producers and manufacturers, taking into account the latest developments in food science, food consumption patterns, new specifications, presence of new contaminants and toxins, and the introduction of new food additives and ingredients. Under Section 16(3)(m) of the FSS Act, 2006, it is also the responsibility of FSSAI to promote consistency with the relevant international standards. This would facilitate trade and ensure availability of safe food to the consumers. The standards and other guidance texts adopted by Codex Alimentarius Commission are the relevant international standards and are also the reference point within the frame-work of WTO. It is incumbent upon member nations to apply the national treatment clause, meaning thereby, all imported foodstuffs will be given a treatment equal to those applicable to the domestic producers, manufacturers, and the market.

However, despite being in existence for the last several years, the FSSAI is yet to be fully geared to meet the challenges of food safety in India. Its functioning needs to be streamlined, ranging from appointment of staff, organizing regular meetings of various scientific panels and harmonization of food laws and regulations to bring them on a par with international standards, promoting good practices, And implementing vital issues like registration of establishments, licensing procedures, etc.. The agency must accelerate progress in making new standards and reviewing existing ones, setting right the implementation

machinery both at the Centre and the States, creating awareness among the stakeholders (just undertaking a few programmes in selected cities is not sufficient), and settling court cases from the PFA era and issues such as writ petitions regarding compulsory registration and licensing of majority of food business establishments including street foods. The roles and functions of the Chairperson and the Chief Executive Officer have not been clarified. In the words of Dr. P. I. Svarthan, the first chairperson of the FSSAI, “the effectiveness of the FSSAI as a regulatory body will be stymied by conflicts between these two functionaries”. Only 3 of the chain of 72 state food laboratories have been accredited and only 36 of them are being upgraded to be capable of analyzing food contaminants. A perusal of the latest available report (2010-2011) of the FSSAI indicates that the percentage of adulteration of food samples as found by the four Central Food Laboratories, namely CFL, Kolkata (4.5%), CFL, Mysore (20.5%), CFL, Pune (51%) and CFL, Ghaziabad (70.6%) vary widely, raising uncertainty about the actual state of food safety.

State governments have been tardy in implementing the Food Safety Act. The information provided by the various State Governments during a meeting convened by the FSSAI recently is summarized in the Table. For example, Andhra Pradesh has 115 food safety officials to implement the provisions of food safety regulations as compared to 424 officials in the neighbouring state of Tamil Nadu which has a much lower population. The number of food establishments registered in Andhra Pradesh is 40,195 as compared to 2,03,869 registered in Tamil Nadu. The number of licences issued in Andhra Pradesh is 20,288 as compared to 1,25,042 in Maharashtra, a progressive State since a long time as far as food safety issues are concerned. Even the scenario in metropolitan areas is grim. The Greater Hyderabad Municipal Corporation has a jurisdiction of 625 sq.km, 78 lakh population, and more than 20,000 food business enterprises ranging from street food establishments to upmarket restaurants, Government and private office/industry canteens, hostels of various categories and temporary eating establishments like those during weddings and special occasions. A study carried out in Hyderabad way back in 1985 had indicated that every year 165 outbreaks and 148 sporadic cases of food-borne diseases occurred. The incidence of food-borne diseases in Hyderabad is 28 per annum per 100,000 population as compared to 10 in the USA. The scenario has not changed since then as judged by newspaper reports on incidences of food poisoning. Despite this, the number of food safety officers in the year 2013 in the city of Hyderabad is a mere 4 with no supporting staff! The food inspectors had booked 45 cases in 2010, 54 in 2011 and 135 cases in 2012 for violations of provisions of the Act. Most of the cases filed are long pending and besides their other duties, these 4 inspectors have to attend the courts regularly to follow up the cases.

Current status of implementation of the Food Safety Act in various States of India

Even six years after the formation of the FSSAI, the current status as regards implementation of food safety activities in India is far from satisfactory. The capacity-building and other activities undertaken by agency are depicted in the Table. Except for Kerala, Maharashtra and Tamil Nadu, all the other States are lagging behind in capacity building activities for food safety and in implementing the registration and licensing requirements. Bihar has not even provided the statistics. The performance of the populous states like Uttar Pradesh, West Bengal and Andhra Pradesh are not upto the mark. As per the international norms, laboratories are required to follow sound scientific practices - Good Laboratories practices, Analytical Quality Assurance

programmes, and collaborative studies, and should be accredited. There are a total of 72 food testing laboratories in the country and only a few of them are accredited. Only half of them have been selected by the FSSAI for upgradation. The performance figures of these laboratories are not available. The number of pending court cases is a big problem and only a few States have provided the details of these.

In the Indian scenario, the regulatory approach as regards food safety can be divided into the following categories:

- no regulations are applied for commodities grown and consumed at the home level.
- regulatory limits have been laid down for foods traded in the domestic market, but these are implemented in a tardy manner.
- stringent regulations for commodities meant for export is actively pursued even with trace-back mechanisms, leading to a scenario where the best of our agricultural

commodities are exported and the remaining lot is circulated in the domestic market.

- there is no regulation for animal feeds, paving the way for contaminants entering the food chain, besides having an economic impact due to productivity losses.

The need of the hour

Currently India is attempting to take steps to ensure that all its citizens have food security as defined by the World Food Summit: "All the people at all times should have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences so as to lead an active and healthy life". In order to attain this goal merely passing a Food Security Act will not suffice; it is essential that food safety aspects are also looked into. Recently there have been reports of pesticide contamination in the mid-day meal supplied under the government programme in a school in Bihar, and of aflatoxins having been detected in food products in Gujarat. When the

Table Status of implementation of food safety in India

State	Population crores	No. of Officers	Registration	No. licence Issued	Appellate tribunal	Steering committee	Food testing lab and accreditation status
Uttar Pradesh	19.95	430	98638	22861	Not established	Established	5 labs, Not accredited
Maharashtra	11.23	358	2,49,830	1,25,042	Established	Established	12 labs
Bihar	10.38	-	-	-	-	-	-
West Bengal	9.13	78	17,621	4,976	Not established	Not established	1 lab, Not accredited
Andhra Pradesh	8.46	115	40,195	20,288	Not established	Not established	5 labs. 1lab accredited
Madhya Pradesh	7.25	282	49,187	10,873	Not established	Not established	1 lab Not accredited
Tamilnadu	7.21	424	2,03,809	29,171	Not established	Not established	6 labs Not accredited
Karnataka	6.11	152	29,304	13,923	Established	Not established	5 labs Not accredited
Gujarat	6.03	191	74,321	27,871	Not established	Not established	
Rajasthan	5.64	196	71,277	23,316	-	Not established	
Orissa	4.19	104					
Jharkhand	3.89	251	3051	1416	Not established	Not established	
Kerala	3.33	118	1,39,094	24,186	No	No	4 Not accredited
Assam	3.11	77	1072	2572	No	No	1 lab
Punjab	2.77	52	47,079	6,601	No	No	1 lab accredited
Chattisgarh	2.55						
Haryana	2.53	55	6275	2662	No	No	
Delhi	1.69	43			established	No	1 lab Accredited
J & Kashmir	1.25	77	1072	2752	No	No	
Uttarakhand	1.01	59	22,017	2724	No	Established	1 lab

Government takes more responsibility for food grain distribution as part of the Food Security Act provisions, appropriate measures of food safety have to be urgently initiated to ensure food safety. An incremental change in focus to safety throughout the food chain is needed. Though vast amounts of food grains are produced in the country, adequate storage structures to keep them free from insects, moulds and environmental contaminants like mycotoxins and pesticide residues are yet to be built. It is important to build capacity for implementing good practices such as Good Agricultural Practices, Good Manufacturing Practices and HACCP as part of preventive strategies, because these represent the benchmark for food safety globally. Risk-based, science-based, and evidence-based decision making should be followed. A beginning needs to be made in adopting risk-based approaches to food control such as risk analysis and food inspection as meticulously followed in the industrialized countries of the West and in ASEAN countries. Categorization of food establishments according to perceived risk needs to be done in order to facilitate risk-based inspection, and for this purpose guidelines have to be established at the national level. The work on harmonization of food laws and standards in India, which is in a preliminary stage, need to be speeded up. The care and attention given that are now being bestowed on agricultural commodities meant for export should

be extended to commodities meant for domestic consumption. It is unfortunate that the 2000-year old foundation for food safety laid down by the great visionary Chanakya, who had framed rules for producing and selling of animal foods, identified adulterants in foods and prescribed punishment for food adulterators, has not been made use of subsequently. India has a long way to go to achieve the food safety standards to ensure safe food to its citizens and fulfill the global requirements.

The author is International Food Safety Specialist, and the article is based on the publications of the FAO/WHO/Codex and the open access information available through the FSSAI, India.

FOUNDATION NEWS

- **Annual Foundation Day and C. Ramachandran Memorial Lecture:** The Annual Foundation Day of NFI will be celebrated on 27th November 2013. On the occasion, Dr Srinath Reddy, (President, Public Health Foundation of India) will deliver the C. Ramachandran Memorial Lecture

- **Symposium on clinical nutrition**
The Nutrition Foundation of India, New Delhi is organizing a one day Symposium on Clinical Nutrition on November 28, 2013. Leading experts in the field of Clinical Nutrition who have worked and acquired vast practical experience in the subject will participate in this symposium. There will be two sessions. Session I will address pediatric nutrition and Session II will be on nutritional interventions in specific clinical settings. The topics include management of protein energy malnutrition in the hospitalized child, nutritional intervention in the very low birth weight infant, nutritional management of the child with intestinal failure, energy and nutrient requirement in individuals at high altitudes, the potential benefit of ketogenic diets in patients with epilepsy and nutritional intervention in the patient with burns.

- **Study Circle Lectures**
"Nutritional interventions in diseases of the cardiovascular system" by Ms Ritika Samaddar (Chief Dietitian, Max Hospital, New Delhi) on 24th July 2013.

"The National Food Security Act, 2013" by Dr Prema Ramachandran (Director, NFI) on 25th September, 2013.

NUTRITION NEWS

National Conference of the Nutrition Society of India: The 45th National Conference of the Nutrition Society of India will be held at National Institute of Nutrition, Hyderabad, on 21st and 22nd November 2013. The theme of the Conference is "Inter-sectoral approach to promote food and nutrition security".

Gopalan Oration: The Thirty-seventh Gopalan Oration will be delivered by Dr Robert Black (Professor Chairman, Edgar Berman Professor in International Health, Baltimore, USA).

Srikantia Memorial Lecture: The Twenty-fifth Srikantia Memorial Lecture will be delivered by Dr. Shiela Vir (Public Health Nutrition Consultant and Director, Public Health Nutrition and Development Centre, New Delhi).

Dr. Rajammal P. Devadas Memorial Award: The Fourth Dr. Rajammal P Devadas Memorial Award will be delivered by Prof. Jamuna Prakash (Department of Food Science and Nutrition, University of Mysore, Mysore).

There will be a debate on "Food Security Bill" and a Symposium on "Food and Inflammation"

Pre-Conference Workshops: The following two pre-conference workshops will be held on 20th November 2013

Workshop-1: Current priorities in nutrition research, methodology and report writing.

Workshop-2: Prevention of lifestyle diseases – Role of food science and nutrition.

For details access www.nutritionfoundationofindia.org