Confederation of Indian Industry

GS1 India

FACE
CII-Jubilant Bhartia
Food and Agriculture Centre of Excellence

Food Traceability in India

A study report by CII FACE & GS1 India

2017-18

Table of Contents

Preface 2

Executive Summary 3

Overview of the Indian Food Industry 4
- Supply chain complexity
- Growing consumer needs
- Online food retailing

Global Perspective 8
- Food safety and traceability
- Regulatory requirements
- Industry requirements
- Food recall

The Survey 16
- Objective
- Methodology
- Findings
- Conclusion

Traceability in Food Supply Chain 21
- Technologies supporting traceability
- Global standards in traceability
- Implementation requirements
- Using global standards – An example
- Global case studies

Way Forward 33

References 35

Appendix 36

Preface

Globalisation of food production and distribution is resulting in increased complexity in managing food safety concerns. This has led to frequent food alerts and consequent major food recalls, deeply impacting consumer confidence and inviting increased regulatory oversight with stipulation of stringent requirements for food businesses.

Consumers today are also a lot more conscious of their health & wellness and are demanding information on food freshness, storage & transportation conditions, food additives, etc. This places an added responsibility on food businesses for providing ready access to trusted product information to consumers on food safety.

An essential requirement under food safety is the need for implementing 'farm to fork' traceability, which facilitates preventive and remedial measures to be undertaken in food safety regimes. This is also mandated by FSS (Food Recall Procedure) Regulation 2017 for food businesses in India.

To assist the Industry in implementing food safety while minimizing its exposure & liability to losses, and possible litigation, CII along with GS1 India conducted a study to evaluate the state of traceability in the Indian food industry, identify gaps, and recommend the way forward.

The study entailed assessing current practices in food supply chains from visibility and traceability perspectives, across food categories. Industry awareness and preparedness for undertaking product recalls were also captured along with prevalent global best practices.

This is perhaps the first such study report compiled for the Indian food industry. We hope companies and other stakeholders will take cognizance of its findings and implement its recommendations to deliver enhanced food safety and increased consumer confidence in food products.

Meetu Kapur
Executive Director
CII FACE

Ravi Mathur
CEO
GS1 India

Executive Summary

With rising incidences of unsafe food in global supply chains, food safety has become critical for both businesses and consumers.

Worldwide, the role of traceability as a means of enabling food safety is being increasingly acknowledged by industry and regulatory bodies.

Vendor-neutral technologies & open standards that allow track & trace across food supply chains are required to be adopted by food businesses to mitigate risks and undertake effective product recalls.

CII FACE and GS1 India undertook a comprehensive study across food companies in India to understand their approach towards food safety and level of preparedness in implementing robust traceability systems.

The study entailed identifying small & large food businesses across select food categories to solicit their inputs on food quality/safety and challenges faced. Inputs were collated on current practices on traceability & recall, being essential components of a food safety regime.

Intensive discussions were held with personnel across departments of food businesses, covering production, quality control, logistics, marketing, and distribution.

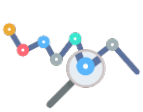
Survey findings revealed that a majority of businesses don't have an effective traceability system across their food supply chains. This could be attributed to perceived cost of the infrastructure requirement, inadequate knowledge/awareness, and general apathy towards food safety.

At best, most FBOs had only implemented a track & trace system up to one-level down in their supply chain, i.e., till their distributor level. Beyond this, no credible system existed till the food was sold/consumed.

Detailed findings of the study are documented in this report, along with a roadmap for implementing traceability system, which is based on global standards and enable compliance with multiple regulatory requirements in a uniform and consistent manner.

The report also captures information on prevalent global best practices and global regulatory requirements on food safety and traceability.

In conclusion, the adoption of GS1 global traceability standards as a means to enable food safety is recommended for Indian food companies.



Overview of the Indian Food Industry

The Indian food industry is growing steadily with increased contribution to the world food trade each year. During FY 11-16, India's exports of processed food and related products (inclusive of animal products) grew at a CAGR of 11.74% to US $16.2 billion with Middle East and Southeast Asia being the main export destinations.[1]

In the domestic market, the processed food sector is valued as a high-growth and high-profit sector. Accounting for 32% of the country's total food market, the food processing sector ranks 5th in terms of production, consumption, and exports.

Further, India is world's 2nd largest producer of fruits and vegetables, and single largest producer of milk in the world with the production estimated at 137.7 MT. The segment contributes about 25% to the country's farm Gross Domestic Product (GDP).

Domestic Indian food and grocery market is the world's 6th largest, with retail contributing 70% of the sales. The online food ordering business in India is in its nascent stage, but witnessing exponential growth. India was the 5th largest market in Asia Pacific for online grocery retailing at US$135 million in 2016.[2]

Since the Indian food industry caters to huge number of consumers in India as well as abroad, it becomes imperative to ensure safety in food supply chains.

Supply chain complexity

Supply chains today are incredibly complex and often span across the globe. For example, wheat flour produced in Northern India is used in making burger buns in the Western regions of the country, which are exported to be used in burgers in Middle East and Africa.

Similarly, fish caught in the open seas is filleted in China, frozen and sent to cold stores in South Korea, from where it is sold and delivered to factories around the world.[2]

This interlinked web of suppliers has evolved to make the best use of resources, such as raw materials and labour. As a result, 21st century supply chains have evolved into worldwide inter-connected supply-and-demand networks with profound interdependencies, comprising vastly more complex operations and greater exposure to the vulnerabilities of our uncertain world.[3]

This leads to problems concerning food safety and quality, including food spoilage and wastage that are expensive and have adverse effect on consumer confidence.

The International Institute of Refrigeration (IIR), US, indicated that about 300 million tonnes of produce is wasted annually through deficient refrigeration worldwide. In the US alone, the food industry discards USD 35 billion worth of spoiled goods annually.[4]

Minimising the extent of losses and ensuring food safety requires greater use of collaborative partnerships, creating elongated networks of organisations comprising multiple stakeholders, which require more sophisticated management, control, and communication than ever before. This can be achieved through a traceability system where each trading partner can share event-specific information with others in the supply chain.

Growing consumer needs

Inability to control supply and demand chains in an efficient manner may lead to making the food we eat a lot less secure than we would like to imagine. The more unsettling fact is that our food supply chain has grown so complex that it has become almost impossible for food producers to guarantee safety of their products.[5]

This makes consumers demand more and more information about the product and its journey in the supply chain, putting added responsibility on manufacturers and other food business operators to meet this consumer need.

Consumers care about what they eat, how their food is produced, and the impact that food production and consumption have on the environment and society. Consumers' concerns about the methods of food production (organic, inorganic, genetically modified) and the conditions under which the food is grown have also increased in the last decade.

This increase in concerns is primarily motivated by foodborne disease outbreaks involving agents, such as Escherichia coli, Salmonella, and chemical contaminants.

Factors that contribute to potential hazards in foods include improper agricultural practices; poor hygiene at any stage of the food chain; lack of preventive controls in food production, processing or preparation operations; misuse of chemicals or food additives; use of contaminated raw materials, ingredients or water; inadequate or improper storage; chemical contaminants, including biological toxins; food fraud and economically motivated adulteration; etc.

This list has been further extended to cover genetically modified organisms, allergens, veterinary drugs residues (antibiotics) and growth promoting hormones used in the production of animal products.

To address these concerns, it's vital to establish a transparent traceability system capturing complete product information at every stage of production & distribution. Each trading partner herein assumes responsibility for adhering to global best practices, which provide visibility to product at each point in the supply chain and facilitate easy & quick recall of products in case of exigencies.

A transparent traceability system also limits the risk to brand owners by making intermediaries responsible for contaminations arising from poor hygiene conditions in the transportation and storage by lending visibility and creating a documented record. This holds importance when viewed in light of the fact that most contaminations happen at storage and transportation stages.

Besides, a traceability system also lays the foundations for establishing authenticity of high-end products, such as civet coffee, basmati rice, etc.

Online food retailing

Online food retailing adds another layer of complexity to food supply chains. In the absence of touch & feel of food products, consumers need access to complete product label information, digitally, which is accurate and reliable.

To understand the challenges of online food retail businesses in providing this information and ensuring food safety, it's important to understand their business models. Below listed business models are most prevalent in India:

- **Inventory-based model:** Such companies have their own inventory and manage it based on everyday demand, for example, BigBasket.com.
- **Hyperlocal model:** These companies receive orders, buy items from offline retailers, and then deliver them to consumers. For example, Grofers.com, ZopNow.com, GrocerMax.com, NaturesBasket.com, and Liscous.com.
- **Mixed model:** Companies, herein, use inventory as well as hyperlocal models. In order to maintain costs, the inventory is relatively smaller and has only frequently demanded products.

Each model has its own supply chain challenges, such as:

- More unique items per order than in a typical online transaction
- High customer expectations for short order-to-delivery cycle
- Maintenance of consistent temperature that contribute to product quality for the freshest deliveries to end consumers.[6]

Also, online retailers need to display transactional information of products to consumers. This includes expiry date and batch number. Since the online catalogue only includes a product's master data, consumers are not sure of the freshness/shelf life of products while ordering.

An efficient traceability system not only provides transactional information of products but also information on their supply chain journey, which helps in assuring consumers of food safety.

Further a traceability system, encompassing all supply chain partners and complete product information captured at each stage of its journey, proves vital in addressing most of the above challenges and consumers' concerns. This is especially pertinent for online food retailing.

Global Perspective

Food safety and traceability

Food safety refers to handling, manufacturing, storing and transporting food in a way to best minimise the risk of consumers becoming affected from foodborne illnesses. The principles of food safety aim to prevent food from becoming contaminated and causing food poisoning. This is achieved through a combination of methods, which are:

- Proper cleaning and sanitisation
- Maintaining a high level of personal hygiene
- Storing, chilling, and heating food correctly with regards to temperature, environment and equipment
- Implementing effective pest control
- Comprehending food allergies, food poisoning, and food intolerance

Despite following best practices in all the above areas, food businesses cannot guarantee food safety. This is why there is a prevalent need and growing demand for food businesses to implement a transparent, standards-based traceability system, spanning across the supply chain, as a risk management tool.

Traceability enables food companies and authorities to quickly respond by identifying and removing any unsafe food from the supply chain. It also helps in identifying the origin of raw materials, ingredients, etc., used in processed foods.

Traceability is defined by the International Organization for Standards (ISO) as "the ability to follow the movement of feed or food through specific stage(s) of production, processing and distribution" and also referred to as the "one-step-back and one-step-forward principle."[7]

Traceability system allows an organization to document and/or locate a product, creating visibility, through the stages and operations involved in the manufacturing, processing, distribution, and handling of food, from primary production to consumption. It can also facilitate identification of the potential cause of nonconformities in a product, and improve the ability to withdraw or recall such a product, if necessary, so as to prevent unsafe food from reaching consumers.

This will allow food businesses, including trading partners, to have complete transparency over the product's supply chain journey through capturing relevant information at each stage by each trading partner.

Below is a list of some often-recognized benefits of an effective traceability system:

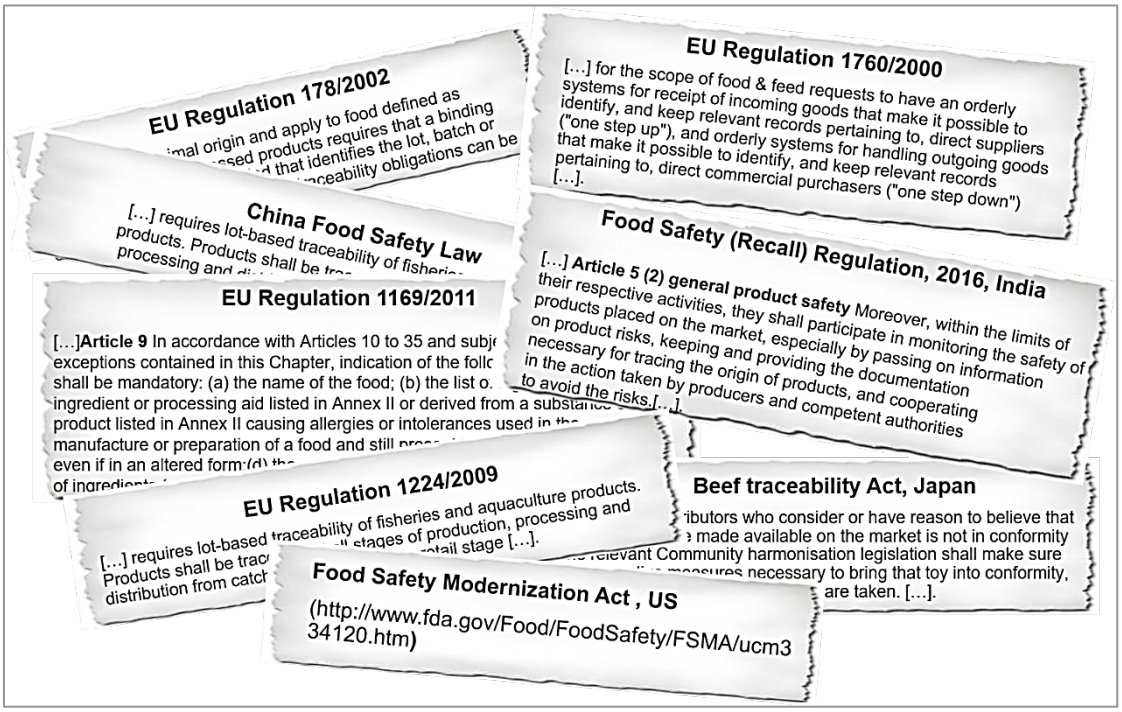
- Determine the origin of a product, ingredient or component
- Simplify problem-solving in event of defective or contaminated product, ingredient or component
- Identify issues quickly, contain them, and resolve them
- Limit losses and lower costs
- Protect public health and safety
- Build trust and confidence in products and businesses
- Verify that the produce is locally grown
- Improve operating efficiencies of growers, packers, and shippers

Considering the ability of an efficient traceability system to reduce risks, various regulatory and industry requirements across the globe have mandated its implementation to enable food safety.

Regulatory requirements

Many developed and fast developing countries have implemented legal requirements for traceability to ensure food safety, and exporting countries are under pressure to comply with these regulations.

Some of the regulations that require food businesses to have a traceability system are listed below:



European Union

a) EU 1169/2011

This Regulation makes it mandatory for all manufacturers and retailers of packaged food – especially those selling online, to display complete product information, so that consumers can make an informed purchase decision at the point-of-sale by giving them information about quality, nutritional value, ingredients and, sometimes, country of origin. This product information must be visible online as well as in-stores.

This Regulation replaces both the nutrition labelling directive (90/496/EEC) and the food labelling directive (2000/13/EC).

All food companies exporting to EU must comply with this Regulation by not only supplying the products but also authentic information related to them, in digital format.

A standards-based traceability system provides all this information in a structured and consistent manner.

b) EU 178/2002

This Regulation requires brand owners to establish a traceability system for food, feed, food-producing animals, and any other substance incorporated into food or feed. This Regulation also laid down general principles and requirements of food law, established by the European Food Safety Authority, and procedures in matters of food safety.

It requires food business operators to: (1) be able to identify from whom and to whom a product has been supplied; (2) have systems and procedures in place that make this information available to the competent authorities on request.

The requirement relies on the 'one-step back' and 'one-step forward' approach to confirm from which supplier a product is received and to which customer a product is sent.

As a part of a system of **beef traceability**, EU also established mandatory beef labelling regulation **(EC) 1760/2000** in 2000.

FSMA, United States

Section 201 of the Food Safety Modernization Act (FSMA), published by the US Food and Drug Administration (FDA), contains several components that address food safety problems through traceability. This act aims to ensure the food supply chain is safe by shifting the focus from responding to contamination, to preventing it.

It calls for enhanced food traceability; and also enhances FDA's infrastructure and reporting systems to incorporate it.

The act also directs the Secretary of Health and Human Services, in consultation with the Secretary of Agriculture, to establish a product tracing system within FDA to receive information that improves the capacity of the agency to effectively and rapidly track & trace food that is in the United States or offered for import into the United States.

This means, post this Regulation, Indian exporters supplying food to the US face increased scrutiny under FSMA. The Regulation provides the US FDA with important new tools for inspection and compliance, such as a mandate to inspect at least 600 foreign facilities; access to records, including industry food safety plans; and firms will be required to maintain documents on the implementation of their plans and get certification from accredited laboratories.

To comply with FSMA, exporters need to have a safety plan – outlining hazards, such as contamination, in every stage of the supply chain and listing mitigation measures. This means exporters have to invest and upgrade their safety systems to ensure compliance.

Having a standards-based traceability system will not only help them meet the FSMA requirements but also various other regulatory requirements across the globe, besides preparing FBOs to act swiftly in case of any adverse incident.

Other Regulations across the globe

Other European countries, such as **Norway and Switzerland**, have also adopted rules that are similar to EU regulations and have established their own system for tracking and tracing food products.

China Food Safety Law, 2015, imposes stricter controls and supervision on food production and management, besides granting more enforcement powers to regulators (CFDA and local FDA) in addressing food safety issues.

It places more emphasis on the supervision and control in every step of food production, distribution, sale, and recall. Special provisions are set out for food trading activities, including food sold on a third-party trading platform and food imported through e-commerce channels.

Australia and New Zealand regulate food contact substances through a single bi-national agency – Food Standards Australia New Zealand (FSANZ) – under the joint Australia New Zealand Food Standards Code.

The code was revised in 2016 with an objective to lower the incidence of foodborne illness by strengthening food safety and traceability throughout the food supply chain, from paddock to plate.

It specifies food handling controls related to the receipt, storage, processing, display, packaging, transportation, disposal, and recall of food. It covers the 'one-step back' and 'one-step forward' elements of traceability.

Primary production and processing standards in Chapter 4 of the Food Standards Code also include traceability measures. There are specific traceability requirements for:

- seafood businesses (Standard 4.2.1)
- poultry processors (Standard 4.2.2)
- dairy primary production, transport, and processing businesses (Standard 4.2.4)
- egg producers and egg processors (Standard 4.2.5)
- seed sprout processors (Standard 4.2.6).

The **Japanese** Handbook for **Introduction of Food Traceability Systems** (Japan Ministry of Agriculture, Fishery and Forestry, 2008) provides comprehensive guidance to food standards in accordance with Japanese Agricultural Standards (JAS) and traceability requirements.

The Japanese Ministry of Agriculture, Fishery and Forestry (JMAFF 2008) has mandated under its **Beef Traceability program** to assign a unique number to domestic beef, which is carried from the birth of the animal, to the carcass at the abattoir, and the label on (or the invoice of) the final packaged product. The assigned identification number allows consumers to review the history of beef products online before buying.

In addition, Japan has also implemented a rice traceability regulation on July 1, 2011 (USDA/ERS 2014). The **Rice Traceability Act** states that domestic producers and importers of foreign rice and rice products must retain records on receipt and shipment, including information about the source of the product (Japan External Trade Organization 2011).

Food safety Regulation in India

Until the recent Food Safety and Standards (Food Recall Procedure) Regulations, 2017, food safety in India was governed by Section 28 of the Food Safety and Standards Act, 2006.[8]

Under the FSS Act 2006, the responsibility of the food safety majorly lies on brand owners. However, the recent Regulation has exceedingly widened the scope of recall by covering all food business operators and making each trading partner responsible for food safety.

The only exceptions are restaurants, caterers, and takeaway joints, unless they have multi-outlet food business chains with integrated manufacturing and distribution network.

The objective of the Regulation is to ensure removal of food under recall from all stages of the food chain, ensure dissemination of information to concerned consumers, and ensure retrieval, destruction or reprocessing of food under recall.[9]

This Regulation is applicable to food or food products that are determined or prima facie considered unsafe and/or as may be specified by FSSAI from time to time.

E-commerce guidelines in India

Since online retailing of food items is gaining prominence in India and increasing its customer base exponentially, FSSAI has brought the online business operators under the purview of food safety law.

For this, FSSAI has issued separate guidelines for e-commerce companies. According to these guidelines, food companies having their e-commerce portals need to obtain licence for their

entire supply chain besides ensuring that delivery of products is done by 'trained personnel' in order to ensure safety.

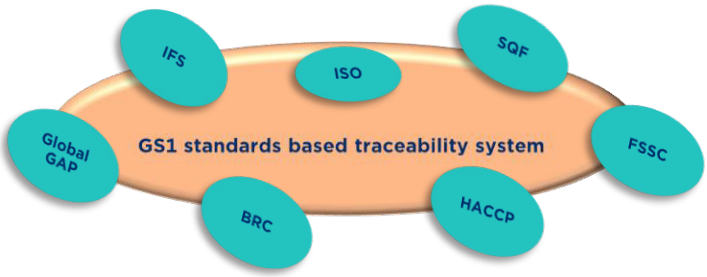
E-commerce entities that only provide listing/directory services to the sellers/brand owners, restaurants, vendors, importers, or manufacturers of the food product are exempt from this regulatory requirement. However, they should ensure that no misleading information/false claims pertaining to the sellers/brand owners, vendors, importers, or manufacturers or misleading images of food products are made available or shown on their platform.

On supply chain compliance, e-commerce FBOs are required to sign an agreement with the sellers/brand owners/manufacturers "averring that the said sellers/brand owners/manufacturers are compliant with the FSS Act and its rules & regulations."

On handling of consumer complaints, such e-commerce FBOs would have to immediately notify the issue to the sellers/brand owners/importers/manufactures who would be liable for expeditious resolution. In case of recall, e-commerce FBOs/entities will have to immediately delist any food products listed on their platform, which are not in compliance with the Act.

With these regulatory requirements, it's clear that whether a FBO is selling products in the domestic market or exporting to various international markets, adoption of a global traceability system helps in gaining consumer trust and complying with various regulatory requirements.

Industry requirements



Food retailers across the world are also increasingly demanding certifications of suppliers according to Global Food Safety Initiative (GFSI) schemes – an industry-driven initiative that provides guidance on food safety management systems necessary for safety along the supply chain.

The main reason for establishing GFSI was to ensure confidence in safe food deliveries while continuing to improve food safety along the supply chain network. The GFSI standard scheme includes Safety Quality Food (SQF), British Retail Consortium (BRC), International Featured Standard (IFS), Food Safety System Certification (FSSC), GLOBAL GAP, Best Aquaculture Practices (BAP), and Canada GAP. It covers all parts of the supply chain network from food itself, packaging process, packaging materials, storage, and distribution for primary producers, manufacturers, and distributors.

In order to remain competitive in today's global market, companies are increasingly adopting food standards and are subjected to food safety audits on a regular basis to maintain these certification(s). Some of the prevalent requirements on food safety are detailed as below:

BRC (British Retail Consortium)

The BRC Global Standard for Food Safety is developed by food industry experts from retailers, manufacturers, and food service organisations, to ensure it is rigorous and detailed, yet easy to understand.

First published in 1998, the Standard is now in its 7th issue and is well-established globally. It provides a framework to manage product safety, integrity, legality, and quality, and the operational controls for these criteria in the food and food ingredient manufacturing, processing, and packing industry.

As per this, company shall have a system to trace and follow all raw materials (including primary packaging materials) from source through all stages of processing and distribution of the finished products to the customer.

SQF (Safe Quality Food)

SQF is a Food Safety Management Certification Scheme, created and managed by SQF Institute. Its requirements provide a rigorous system to manage food safety risks and safe products for use by companies in the food industry.

It is a GFSI (Global Food Safety Initiative) recognized food safety certification. The certification allows customers to have confidence in food safety programs of the company.

As per this, raw materials and finished products shall be clearly identified and be traceable through the process to the finished product. The same shall be documented with records of product dispatch and destination.

IFS (International Featured Standard)

The IFS Food Standard is a GFSI recognized standard for auditing food manufacturers. It focuses on food safety and the quality of processes and products. It concerns food processing companies and companies that pack loose food products.

As per this standard, a traceability system shall be in place, which enables identification of product lots and their relation to batches of raw materials, packaging in direct contact with food, and packaging intended or expected to be in direct contact with food. The traceability system shall incorporate all relevant processing and distribution records.

HACCP

Hazard Analysis and Critical Control Points (HACCP) is a systematic preventive approach to food safety from biological, chemical, and physical hazards in production processes that can cause the finished product to be unsafe, and designs measurements to reduce these risks to a safe level.

In this manner, HACCP attempts to avoid hazards rather than attempting to inspect finished products for the effects of those hazards. The HACCP system can be used at all stages of a food chain, from food production and preparation processes to packaging, distribution, etc.

It requires organisations to establish and apply a traceability system that enables identification of product lots and their relation to batches of raw materials, processing, and delivery records. The traceability system shall be able to identify incoming material from immediate suppliers and the initial distribution route of the end product.

ISO 22005:2007

ISO 22005:2007 gives the principles and specifies the basic requirements for the design and implementation of a feed and food traceability system. It can be applied by an organisation operating at any step in the feed and food chain.

It is intended to be flexible enough to allow feed and food organizations to achieve identified objectives.

This standard allows organisations operating at any step of the food chain to:

- trace the flow of materials (feed, food, their ingredients, and packaging),
- identify necessary documentation to track each stage of production,
- ensure adequate coordination between different actors involved,
- require that each party be informed of, at least, his direct suppliers and clients, and more.

Moreover, a traceability system can improve the appropriate use of information and productivity of the organisation.

In China, ISO 22005:2007 was adopted in 2009 into a national standard — GB/T 22005–2009: 'Traceability in the feed and food chain: General principles and basic requirements for system design and implementation.' In 2010, a technical document was published on the same.

Food recall

Food recall is a set of actions required to be taken to remove unsafe food from distribution, sale, and consumption. All food businesses must be able to quickly remove food from the marketplace to protect public health and safety.

Food is recalled because of a report or complaint from wholesalers, retailers, government, or consumers. It might also result from a food business' own testing and auditing.

Food recalls are most importantly a public health issue, but they are also significant economic issues. According to a study by the US Food Marketing Institute and the US Grocery Manufacturers Association, the average cost of a recall to a food company is $10 million in direct costs, which typically includes notification (to regulatory bodies, supply chain, consumers), product retrieval (reverse logistics), storage, destruction, unsaleable product, and of course the additional labour costs associated with these activities as well as the investigation of the root cause. This is in addition to brand damage and lost sales.[14]

The impact of food recall is inversely proportional to the preparedness of FBOs involved in the supply chain. In other words, a strong, structured, and a standards-based traceability system not only limits the impact of recall but also enables brand owners to foresee problems and act before it takes the shape of a Regulatory recall and/or consumer complaint.

Further, 24×7 media coverage and social networking have power to spread the news far beyond the affected region, impacting the brand negatively. Hence, it's in the benefit of the companies/FBOs to minimise the impact of recalls by acting on it swiftly through an efficient recall management system based on a global traceability system.

The Survey

With a view to gauge the state of the Indian food industry on food safety awareness and preparedness, CII FACE and GS1 India undertook a survey across small and large companies covering select food categories.

Objective

The study was conducted to understand current business processes and identify gaps, which impede implementation of effective food traceability systems.

Other areas covered by the study include:

a) Level of awareness and compliance with regulatory requirements
b) Current technologies used and impediments in adoption of global best practices
c) Roadmap for implementation of traceability and recall systems using global standards and technologies

A comprehensive survey questionnaire was designed to solicit inputs from various departments of FBOs related to food quality & safety, marketing, production, logistics, and distribution.

The survey entailed interviews with senior managers across departments of 48 food companies through field surveys across the country. Initial responses were analysed for consistency, completeness, and discrepancies, if any. Based on the same, select companies were approached again to cross check accuracy of information provided by them.

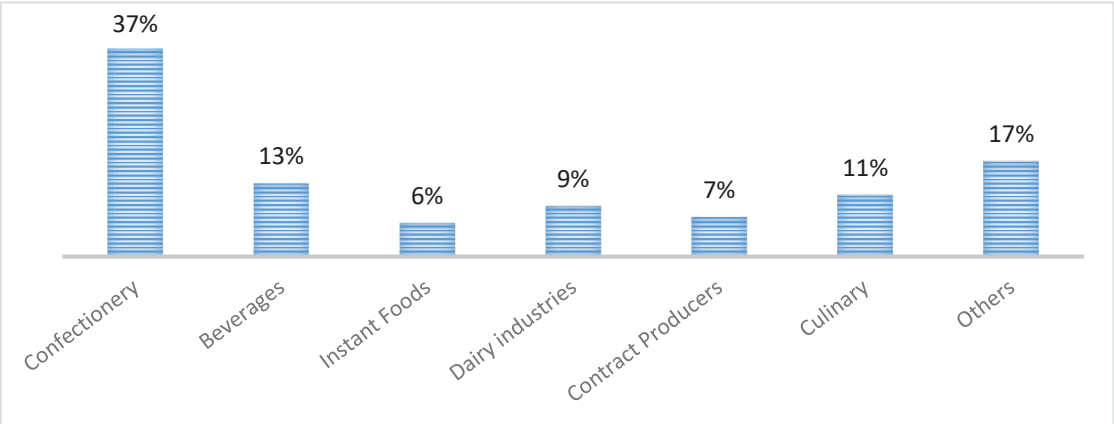
Final responses were analysed to identify industry trends on food safety & traceability and these were considered while arriving at the survey findings, conclusion, and study report recommendations.

Research of secondary data was also undertaken to gather information on prevalent and emerging global best practices in traceability and recall.

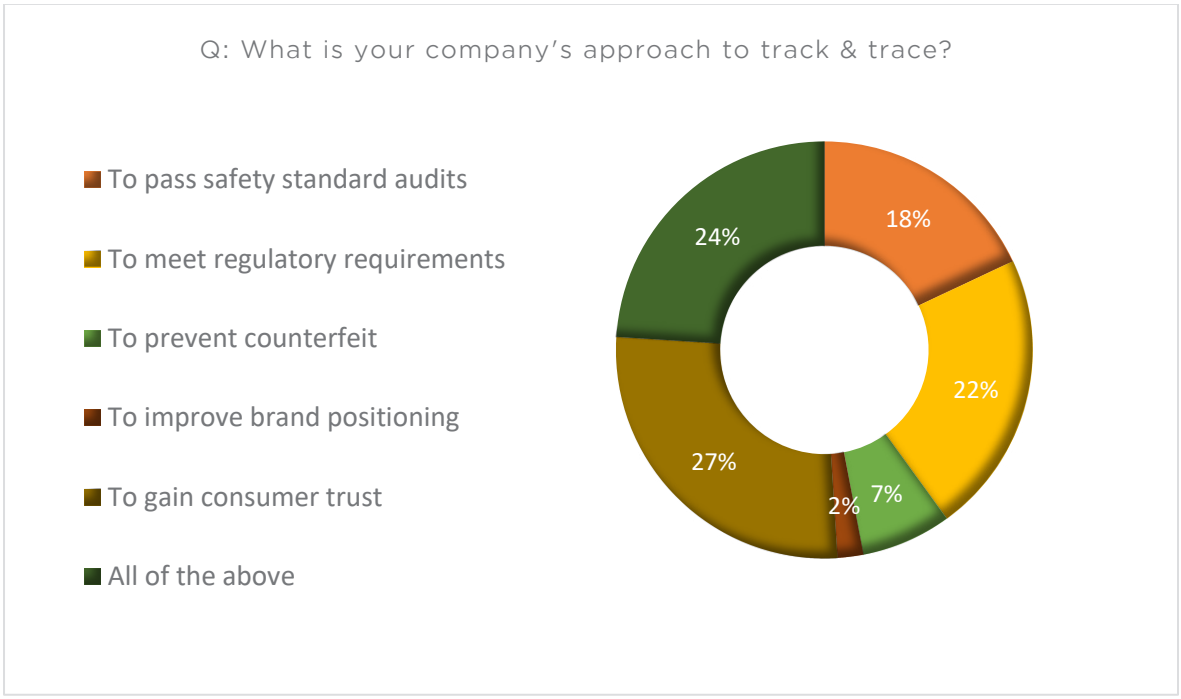
Findings

The survey questionnaire was designed to collect information related to (a) nature of the company (domestic/exports), sales turnover, manufacturing units and products (b) awareness & need for food traceability (c) knowledge of prevalent industry & regulatory requirements (d) preparedness for traceability & recall and (e) current supply chain processes, including for logistics and distribution trade.

1. **Food categories selected for survey**



2. Awareness & need for food traceability



Consumer trust emerged as the single biggest reason for companies to implement track & trace systems in their supply chains.

The second biggest reason was to comply with regulatory requirements, including international requirements in case of exports.

Detection of counterfeits was another major reason for implementing traceability to secure brand image & equity, limit company exposure to liabilities, and inspire greater consumer confidence.

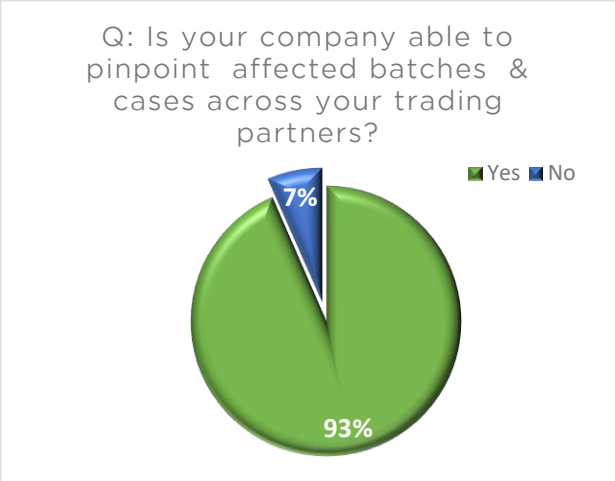
3. Awareness of Regulatory requirements

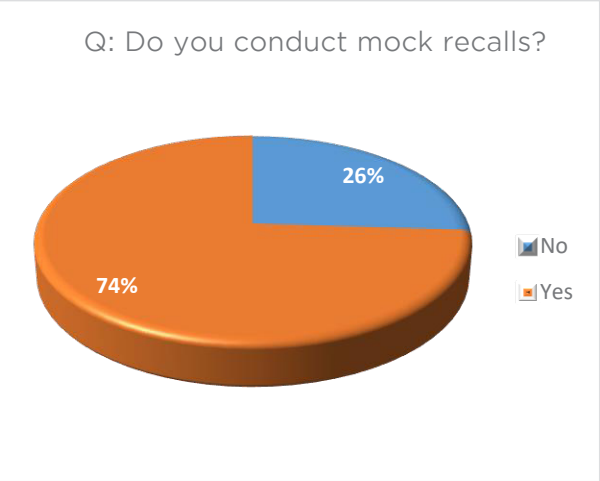
Companies, in general, were aware of both national and international regulatory requirements for traceability & recall, including FSSAI's recall guidelines. They, however, did not appear to know on how best to comply with these requirements.

4. Preparedness on food recall

In event of recall requirement, companies were queried on their ability to locate offending batches in their distribution trade across trading partners with speed and accuracy, and whether they conducted any mock recalls from time to time to test the efficacy of their recall system.

74% of the companies surveyed informed that they conduct mock recalls but limited to one level down the supply chain, i.e., till their distributor level only. This was so since beyond their distributors, there were no effective IT systems and applications in place to allow trading partners to capture information related to movement/storage of products with their batch numbers, case numbers, quantity, expiry dates, dates of supplies receipts, onward dispatch, etc.

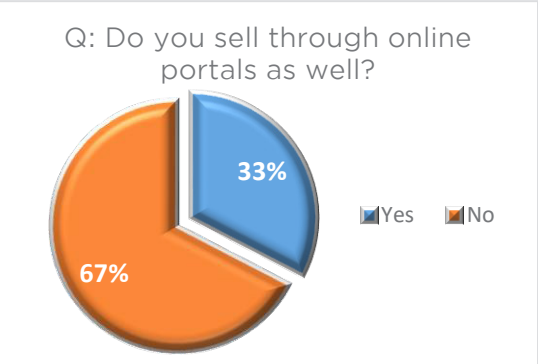




It was also discovered that almost all companies had no systems for tracking raw materials/ingredients/additives, etc., in their upstream supply chain, limiting the effectiveness of track & trace and recall across the whole supply chain.

5. **Omni channel selling**

67% of companies surveyed informed that their food products were also sold through online shopping portals. This adds complexity from consumer and regulatory stand points since food products were not accessible physically at the time of purchase and product label information, such as expiry date, batch, etc., is not available.



6. **Awareness/knowledge on technologies for traceability**

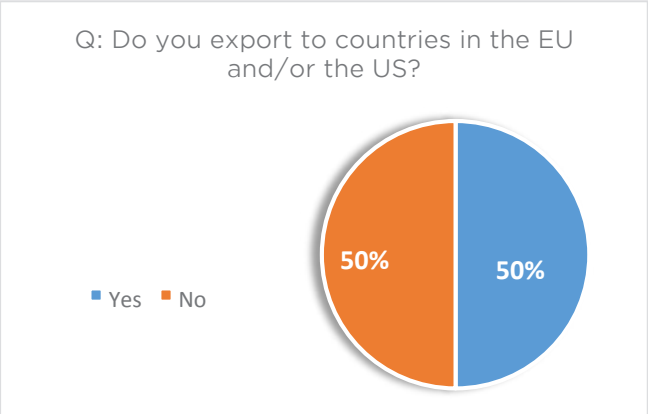
78% of the companies surveyed currently use an ERP system (mostly SAP) to capture batch-related information and movement of supplies till their warehouses. Others still use manual ledgers to record this information.

Most of the companies were familiar with barcoding for capturing product information for traceability requirements but lacked in-depth knowledge on how to deploy this technology effectively across their supply chains.

7. **Awareness & compliance amongst exporters**

50% of the companies surveyed informed that they were also into exports. They confirmed that for the products exported by them, they were complying with various regulatory requirements such as of the US FDA, EU 178/2002, 1169/2012, other European guidelines, etc. In addition, where required by their buyers, they complied with food safety requirements, which included GFSI guidelines, BRC, SQF standards, and HACCP.

Compliance was, however, limited to exported products only and did not apply for domestic sale products. The reasons for this included added costs for building infrastructure, investing in automation when cheap labour was available in plenty.



8. **Challenges to effective recall**

Companies surveyed highlighted the following challenges in implementing effective recall systems in their supply chains:

- Lack of skilled manpower
- Lack of automation in their supply chains across trading partners
  Added infrastructure costs

Conclusion

Companies surveyed included manufacturers of finished food products and raw material suppliers.

While most finished food product manufacturers had implemented traceability and recall till one level down their supply chain, i.e., till their warehouse/distributor level, raw material suppliers were not a part of the traceability system in the samples surveyed. Hence a greater thrust on strengthening awareness across suppliers would go a long way in implementing track & trace and recall systems.

Traceability in Food Supply Chain

Traceability is the ability to track any food through all stages of production, processing and distribution (including import and at retail). It is the ability to trace the history, application or location of an object [ISO 9001:2015]. When considering a product, traceability can relate to:

- origin of materials and parts;
- processing history;
- distribution and location of the product after delivery.

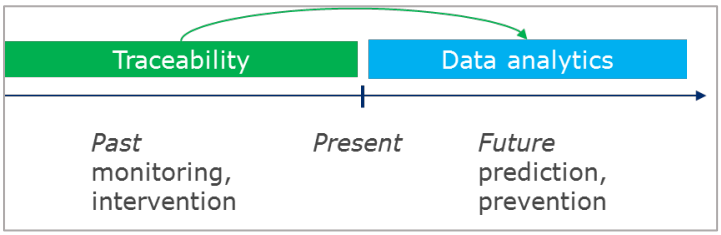
To enable food processing businesses to substantiate food safety claims, it is not only important to track products up to consumers but also the traceability system should extend to facilitate identification of all food inputs, such as:

- raw materials
- additives
- other ingredients
- packaging

Traceability enables corrective actions (such as a product recall) to be implemented quickly and effectively when something goes wrong. When a potential food safety problem is identified, whether by a food business or a Government agency, an effective traceability system can help isolate and prevent contaminated products from reaching to consumers.

Traceability data can also be leveraged for much more than crisis-resolution. Data and related methods such as data analytics have become one of the most important ways for organisations to control and proactively monitor their supply chains.

Traceability enables access to relevant data for analysis and decision making. Data accessibility is a key to drive speed of response and precision of analysis. It involves gathering, storing, and reporting detailed information about every important event throughout production and distribution stages. That information can then be used in many different ways to improve operations or to resolve seemingly unrelated challenges.



Note: Traceability data will not be the only source for effective data analytics. Various other sources, such as weather information, geographic data, demographic data, will also be required.

Technologies supporting traceability

To implement traceable food supply chains, technological innovations are needed for product identification, data capture, and information sharing. Since a traceability system spans across the entire supply chain, it is essential that it accommodates every trading partner in the most efficient manner to be effective.

Some of the technologies used for product identification and data capture are:

A. Alphanumeric codes: These are the sequences of numbers and letters displayed in various sizes on package or product labels.[10] Writing and reading codes is done manually which requires significant human resources and cost. Manual management of data leads to duplication errors and poor performance. There is no particular standard for Alphanumerical codes and are usually generated by company or organization itself.[5] Due to this, there is a high risk of data integrity corruption in alphanumeric codes.[15]

B. Barcodes: Initially patented in 1952 in Philadelphia (first used in around 1970), barcodes can be described as a series of parallel bars and spaces of varying widths printed on an item or product. This automatic, high reading speed, precise technology provides simpler, more economical, and accurate traceability systems.[11,12,13]

C. RFID: Radio frequency identification (RFID) is a technology that uses radio waves to identify, classify, and locate 'articles' (objects, people or animals). Being in use since Second World War, this technology is yet new in food sector. The main characteristic of RFID is that there is no requirement of physical contact or line of sight orientation between reader and tags. Electronic Product Code (EPC), a unique serialized code, is one of the common types of data stored in a tag.

D. Product Markers: Markers placed on food products can be chemical, physical, or biological. Physical markers include unique molecules or atoms that can be detected easily by UV rays, X-rays, fluorescence, etc.. Chemical markers include those that create a distinct flavour, aroma or absorbance. For example, vitamin placed in alcoholic beverage.[15]

Among the above mentioned technologies, the most cost effective technology is barcodes. It needs to be used with global standards to enable all trading partners in the supply chain to communicate seamlessly with each other.

Global standards in traceability

To track products effectively at any point in the supply chain, information in a structured and standardised manner on the following is required to be captured:

- name and address (and other contact details) of suppliers and description of products or inputs supplied
- name and addresses (and other contact details) of trading partners and a description of the product supplied to them
- date of transaction or delivery
- batch or lot identification (or other markings)
- volume or quantity of product supplied or received
- any other relevant production records

Also, it is important for each trading partner to be able to read and understand all the above information to leverage the full potential of a traceability system and ensure visibility within the complete supply chain.

For this, a traceability system must be neutral and based on global standards. Some of characteristics of a Standards-based traceability system are:

- ### Interoperable and scalable

  An organisation's traceability system will need to support a multitude of applications and use cases, from risk management to supply chain efficiency, Regulations, sustainability, and consumer trust, or brand integrity. It should be adaptable because needs will evolve over time. It should leverage investments based on proven technologies and make use of what is already in place (e.g., logistic labels, barcode scanners) within each company and/or its trading partners as much as possible. It should also enable easy integration with new system components.

  A system that is implemented to meet internal traceability requirements may not be able to interoperate with systems of other parties in the supply chain. In order to ensure an appropriate level of interoperability, organisations will need to ensure that their systems are all built on a common set of standards. This does not mean that all actors in the supply chain need to use exactly the same system, but their systems will need to be able to support standardised data.

- ## Technology agnostic

  Various information technologies and tools are available in the market to support traceability implementation. Commonly, multiple system components need to work together to deliver an overall system. These may include a system for managing product identification and master data, one or more solutions for automatic identification and data capture (AIDC), and other systems to capture transactional or event data about a product's path through the supply chain.

  Parties in a supply chain may also have different levels of technical maturity. They may have chosen different technologies or may have implemented the same technology in different ways (using different software or platforms).

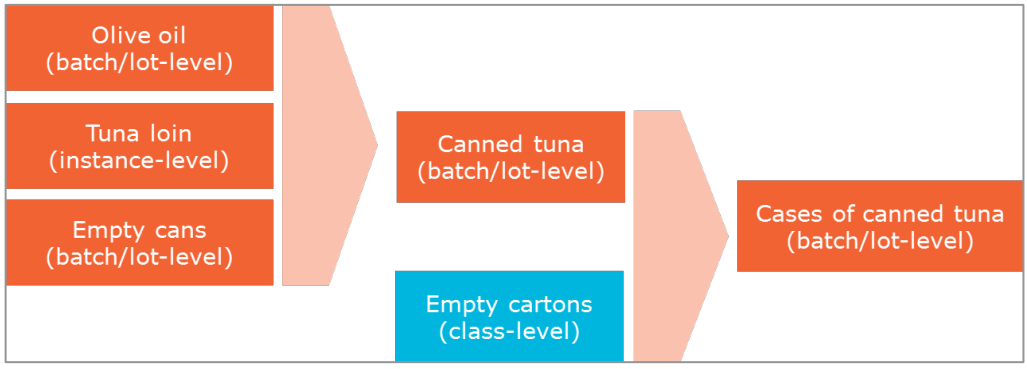
  Standards-based systems and components are, to a certain level, naturally interoperable with other systems and components that conform to the same standards.

- ## Unique identification

  At the heart of any traceability system is the identification of objects that need to be traced. A traceable object is a physical or digital object for which there is a need to retrieve information about its history, application, or location. Examples of traceable objects include products (consumer goods, medicines, electronic devices, etc.), logistic units (palletised goods, parcels, etc.), and assets (trucks, vessels, trains, fork lifts, etc.).

  For the physical identification of traceable objects, generally three main levels of identification can be distinguished:

  1. **Class-level identification**, where the object is identifiable by its product/part ID, enabling it to be distinguished from different kinds of products or parts.
  2. **Batch/lot-level identification**, where the product/part ID is extended with a batch/lot number, limiting the number of traceable objects with the same ID to a smaller group of instances (for example, items produced at the same time).
  3. **Instance-level identification**, where the traceable object is identified with a serialised ID, limiting the number of traceable objects with the same ID to one individual instance.



  Companies will often apply a combination of these identification levels. This is, for example, a common practice in transformation events arising in manufacturing, where the input in a manufacturing process includes primary and secondary ingredients/materials. Taking the example of making canned tuna, primary ingredients/materials would comprise tuna loin, olive oil and cans, whereas empty cartons (in which the cans are packed into) would belong to secondary materials.

- Sector and product neutral

  Standards based traceability system can be leveraged for supply chains across many sectors, including food and beverage, apparel, pharmaceuticals, medical devices, humanitarian logistics, technical equipment and components.

- Cross-functional

  Because the sharing and use of traceability data can impact so many aspects of business operations, it should be no surprise that traceability tools and solutions are relevant across many functions and departments in an organisation, including but not limited to:

  a) Quality & safety teams (risk management, recall readiness, audits, management of errors and incidents, expiry date management, stock rotation).
  b) Compliance teams that are concerned with regulation and organisational requirements.
  c) Consumer facing teams that need to share relevant information.
  d) Internal teams that are tasked with fighting counterfeit, enabling supply chain security or brand protection.
  e) Social responsibility teams focused on ethical and environmental topics.
  f) Product life cycle management teams.
  g) Teams responsible for transport and logistics.
  h) Systems development and management teams.

  People responsible for such a variety of functions will often have different perspectives on the needs of traceability systems and tools. All of these different perspectives are important.

Implementation requirements

Barcodes are one of the most cost effective technologies but to use this across all parties, requires a system of standards.

The GS1 System of Standards provides a comprehensive set of standards to identify, capture, and share information about objects throughout their lifecycle, providing the core foundation for interoperability:

- Supply chain partners identify business objects and locations using standardised identifiers.
- Supply chain partners capture an object's identity and any additional attributes (e.g. expiry date) that have been encoded in a standardised manner in a data carrier (barcodes). This ensures the object can be read automatically and consistently throughout the supply chain. Thereby, also the time (when), location (where), and other data (who and why) are recorded.
- Once supply chain partners are using a common language for identification and data capture, the gathered data is refined and enhanced with business context, to transform it into data that can be shared using standardised semantics, in a standardised format, and using standard exchange protocols.

GS1 traceability standards have been implemented for traceability from upstream suppliers to consumers. It allows an end-to-end traceability system, linking the flow of information to physical products. In an event of food outbreak, sharing of traceability information between trading partners in the supply chain is critical to ensure a targeted and effective recall.

Getting started

This section provides an overview of a step-by-step methodology for designing a traceability system. The methodology is intended for use by individual companies as well as by organisations or working groups that wish to establish sectorial and/or regional guidelines.

Recommended Traceability Methodology

Designing the traceability system

- Step 1: Set traceability objectives
- Step 2: Gather traceability information requirements
- Step 3: Analyse business processes
- Step 4: Define identification requirements
- Step 5: Define traceability data requirements
- Step 6: Design traceability data repository functions
- Step 7: Design traceability data usage functions

Building the traceability system

- Step 8: Perform gap analysis ('as is' versus 'to be')
- Step 9: Establish components of the traceability system
- Step 10: Testing and piloting

Deploying and using the traceability system

- Step 11: Roll-out
- Step 12: Documentation and training
- Step 13: Monitoring and maintenance

Designing the traceability system

Step 1: Set traceability objectives

Traceability is a shared responsibility of all actors in a value network. This means that in order to establish traceability goals, each actor will need to consider its own strategy as well as the strategy of other actors in the network. Often there are forces in play that help to define the direction, such as legal or commercial requirements of dominant players. The request for greater transparency by end consumers is also an increasingly important driver.[19]

It is important to place an emphasis on the overall goals of deploying a traceability system. "What problem are we trying to solve"?

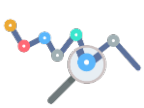
Step 2: Gather traceability information requirements

Traceability objectives are transformed into concrete information requests that need to be fulfilled by the traceability system.

Step 3: Analyse business processes

Analyse business processes in detail that is sufficient to understand the traceability aspects related to the goals and information requirements. It should include:

- Traceability roles and responsibilities per stakeholder
- Process flows that depict state changes and movements of traceable objects.



Step 4: Define identification requirements

Based on the analysis of the business process flows, it will become clear which entities will require identifiers. The next step is to determine the right level of identification for each of those entities. [19]

Determination of the level of trade item identification is a crucial decision with far-reaching consequences. Also for other entities, such as locations and documents, it is important to consider the method and level of identification.

Step 5: Define traceability data requirements

Traceability data requirements are decided by the required level of precision. A good way to proceed is to consider the Who, What, When, Where, and Why dimensions of each relation, transaction, and event.

Step 6: Design traceability data repository functions

Three main functions need to be fulfilled[19]:

- Data capture
- Data storage, including archiving procedures that define how traceability data is recorded, stored and/or administered, taking into account the minimum retention period required from legal and commercial perspectives.
- Data sharing

Step 7: Design traceability data usage functions

Specific functions will be needed to detect exceptions and prevent incidents. Such functions may range from simple queries to advanced data analytics.

Examples:

- Expired certificate
- Temperature exception during transport
- Counterfeit detection

Furthermore, functions will be needed to manage interventions. Interventions procedures may be simple (limited to internal) or complex (involving a large number of external parties).

Examples:

- Recall notification, execution and closeout
- Quarantine
- Counterfeit remediation

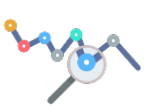
Building the traceability system

Step 8: Perform gap analysis ('as is' versus 'to be')

Based on the design phase, gaps can be found between the 'as is' and 'to be' situations. [19]

Step 9: Establish components of the traceability system

The next step is to evaluate whether it is possible to use existing hardware and software, or if it will be necessary to buy new components.



Step 10: Testing and piloting

Find trading partner(s) to pilot/test the traceability system.

Deploying & using the traceability system

Step 11: Roll-out

Establish an implementation plan by product/facility. Prioritise based on identified quick wins, in order to build stakeholder confidence. [19]

Step 12: Documentation & training

Besides designing the traceability system, responsible parties will also need to address the implementation and maintenance of their traceability systems, such as[19]:

- Making specific people accountable
- Having written procedures
- List of internal and external traceability parties that need to be contacted.
- List of key personnel for crisis management with defined responsibilities, e.g., separation of roles for initiation and approval in events such as recalls
- Communication plan for internal and external trace requests

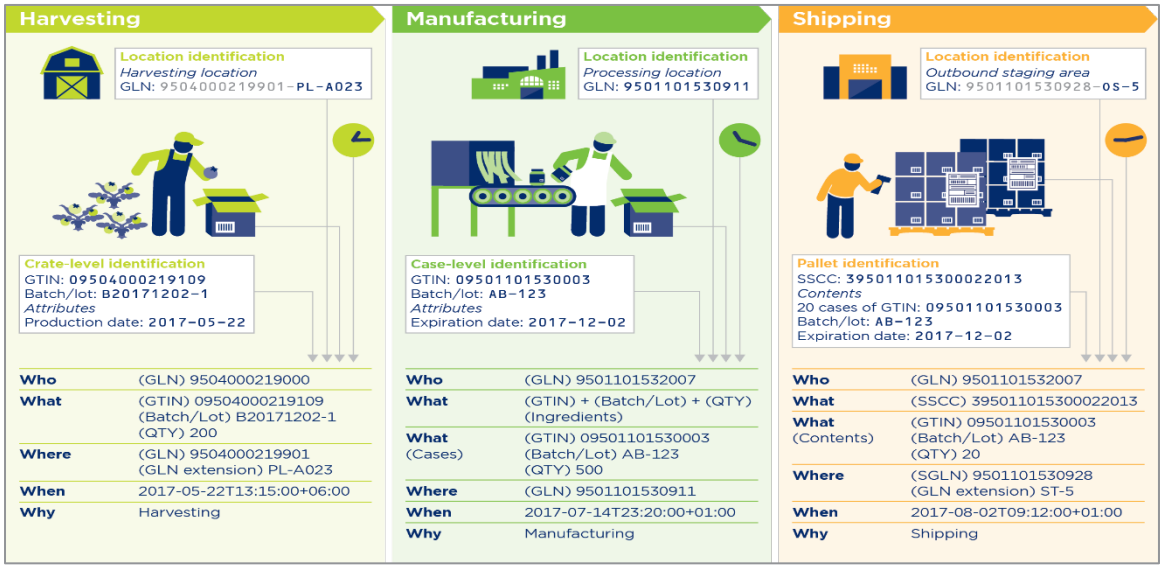
Step 13: Monitoring & maintenance

It will be essential to include a monitoring and maintenance procedure, defining how the current operation will be verified and how the traceability system will be kept in line with the actual production and distribution process. The procedure could include:

- Regular audits to check if the system is still meeting the traceability goals
- Checks to assure and maintain the availability and quality of the traceability data

Using global standards – An example

Supply chain business process steps are illustrated below. Each step will lead to one or more critical tracking event for which key data elements need to be recorded[19].

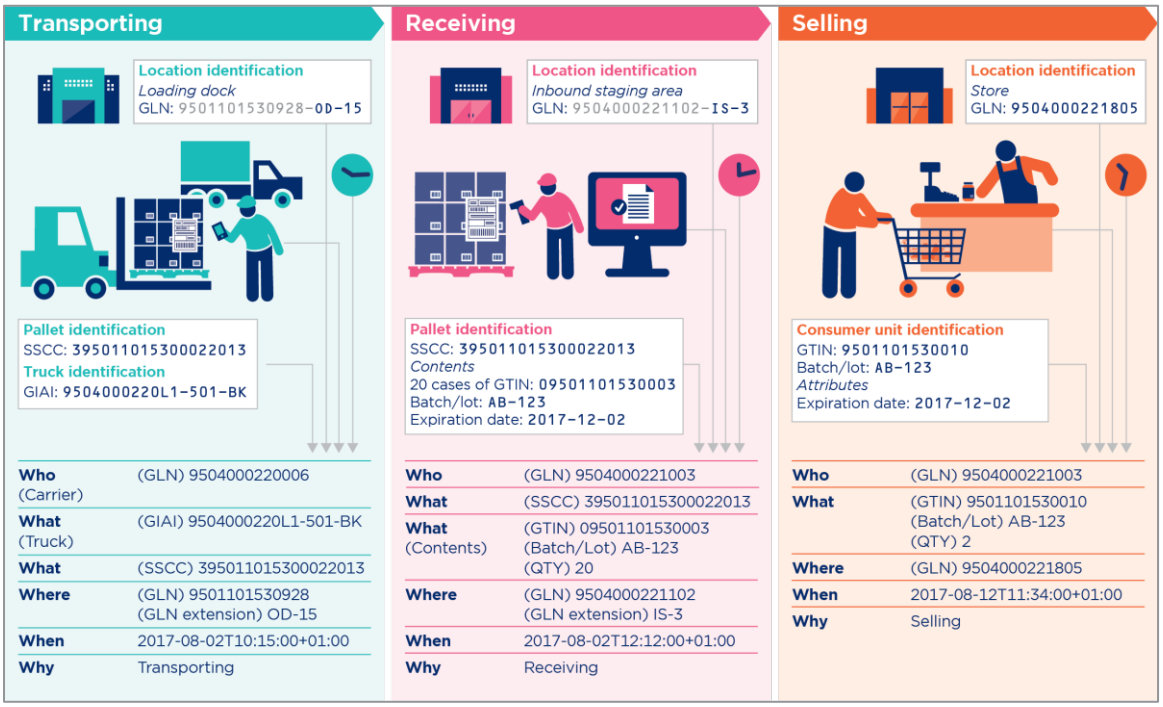


Harvesting: The producer harvests the crop and packs the products into cases.

Manufacturing: The manufacturer transforms ingredients into final products. After that, the manufacturer packs the products into cases. To maintain traceability, the inputs and outputs of the process are recorded on batch/lot level.

Shipping: The warehouse department picks the goods and packs them onto pallets.

To maintain traceability, warehouse records the links between product and pallet IDs. Subsequently, the pallets are moved to the outbound staging area to be collected by the carrier.



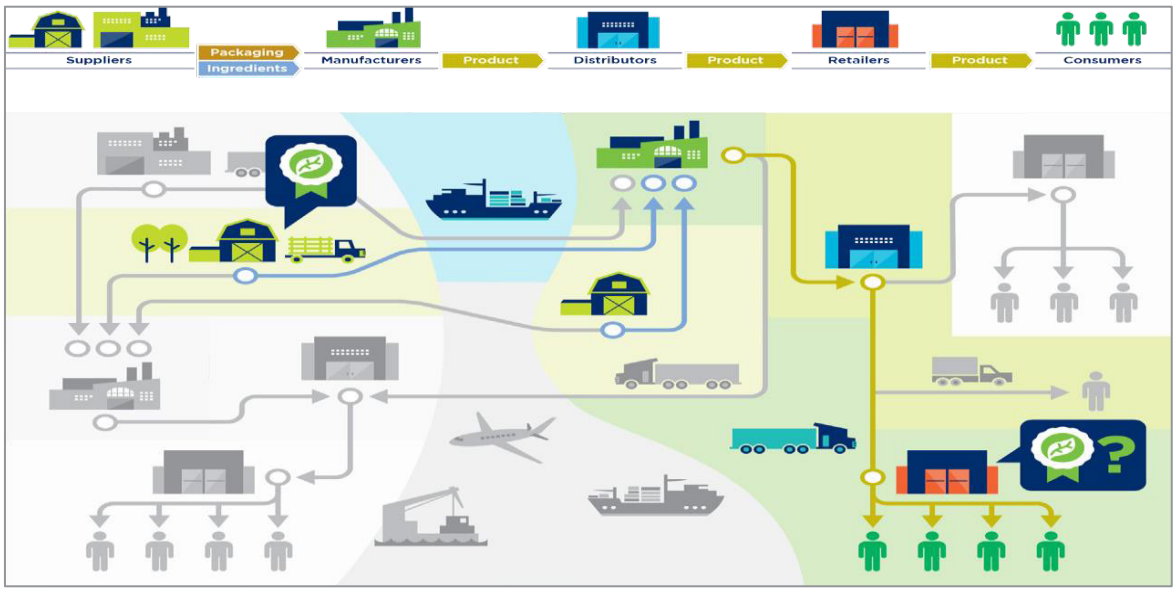
Transporting: The carrier arrives and loads the pallets onto the truck. The driver uses his mobile device to identify each of the pallets. The link between the pallets and the truck is recorded. Now, by tracking the truck, pallets and goods can also be tracked.

Receiving: Pallets arrive in the retail distribution centre. The incoming goods department inspects the received goods by scanning the barcodes on pallet label and comparing the data against pre-registered information in the system. When all checks are ok, the goods will be marked as available in the inventory management system.

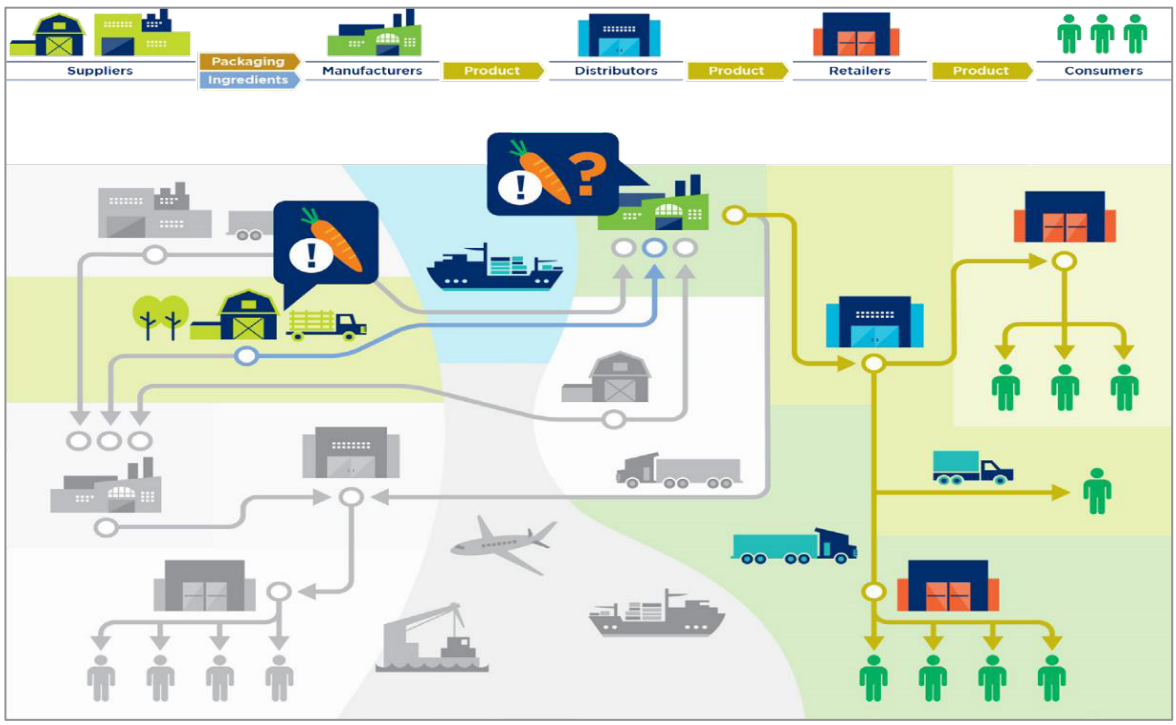
Selling: The products have arrived at the store and have been placed on the shelves. At the checkout, barcodes are scanned at the PoS and sales are recorded.

How traceability data can be applied?

Data usage: Upstream query



Data usage: Downstream query



Global case studies

1. Global recognition for Croatian company

Koestlin is one of the leading Croatian food manufacturing companies, with 100-year history in confectionary production. It needed to address problems of lack of a regulated system for tracing raw materials, semi-finished products, and products in storage, production, and distribution chain. Also, staff needed to be educated in terms of traceability and the lack of an integrated IT system.

In 2008, Koestlin took part in a pilot project and uniquely identified all packaging levels of their products, (trade units, transport boxes, pallets) using global GS1 standards.

The company is benefited hugely by becoming a food producer whose product quality is recognised in many markets across the world. In fact, since it first started implementing global standards, Koestlin has seen a growth in its sales of over 300%.

2. Mushroom grower in the US

Mother Earth Organic Mushrooms was founded on a dairy farm in West Grove, Pennsylvania, nearly a century ago with only two mushroom houses. Currently C.P. Yeatman & Sons, Inc., the owner of Mother Earth, LLC, employs 200 people and operates a total of 61 houses. Annually they grow, pack, ship, and transport over 20 million pounds of fresh, quick-frozen and dried mushroom varieties to distributors, retailers, and the foodservice industry.

The company was eager to meet the demands of its customers for produce traceability while remaining committed to delivering a safe and tasty product. For this, Mother Earth LLC implemented case-level traceability using global GS1 standards for end-to-end visibility from the mushroom house to the customer (Distributor, Grocer or Restaurant).

Some of the benefits accrued are

- Real-time inventory management enabled quicker and accurate order fulfilment.

- Improved recall process. It reduced the time taken in recalling products from hours to minutes.
- Enhanced operation reduced labour-intensive tasks for greater productivity.

A typical 1,000-pound lot of bulk mushrooms arriving in the production facility is scanned into production using the pallet tag. If the lot is to be divided into 10-pound cases, the system keeps track of the production while packers simultaneously inspect for and remove "stumps" as well as pass each completed box through a metal detector.

3. Packaging company in Peru gains competitive advantage

Vartini Packing is a young packaging company established in Peru in 2004. Targeting international consumer goods manufacturers, such as Unilever or Henkel, required Vartini to meet their demands from upstream suppliers in terms of flexibility and operational risk.

Vartini Packing decided to differentiate itself by developing a packaging traceability service for its clients, providing real-time visibility into their packaging operations, something that no other packaging company in Peru was doing.

With GS1 standards-based traceability system, clients of Vartini Packing benefited from real-time visibility, allowing for improved product quality and effective response to market demand. Key clients, such as Unilever, 3M, Henkel and their third-party logistics providers are using the new traceability tool.

For Vartini Packing, this meant reduced cycle times in responding to traceability requests from clients, from several hours to minutes, and hence reduced administrative costs such as information searching. With increased confidence of their clients, Vartini saw 20% increase in sales with their major clients.

4. Visibility from Catch to Customer

METRO GROUP is a leading global retailing company with approximately 2,50,000 employees working in over 2,200 outlets in 31 countries throughout Europe and Asia. With sales totalling nearly €66 billion in 2012-13, METRO GROUP's portfolio of strong brands offers a wide range of services for commercial customers and consumers alike.

As fish products travel through the supply chain from fishermen to processors to distribution centres and on to METRO Cash & Carry locations, the identification data is scanned at various points along the way.

"Professional customers shopping at our METRO Cash & Carry locations can now scan fish barcodes to understand where the fish was caught, how it was caught, the best-before date, and other important data – all information provided directly by our fish suppliers," advises Gallus. "Consumers can also scan barcodes to access this information."


THE WAY FORWARD

The survey undertaken of food companies across the country brought out important aspects on Industry awareness and approach towards food safety in general and traceability in particular. Most of the companies expressed their willingness to implement an effective and efficient traceability system across trading partners in their supply chains with an objective of inspiring greater consumer confidence in their food products.

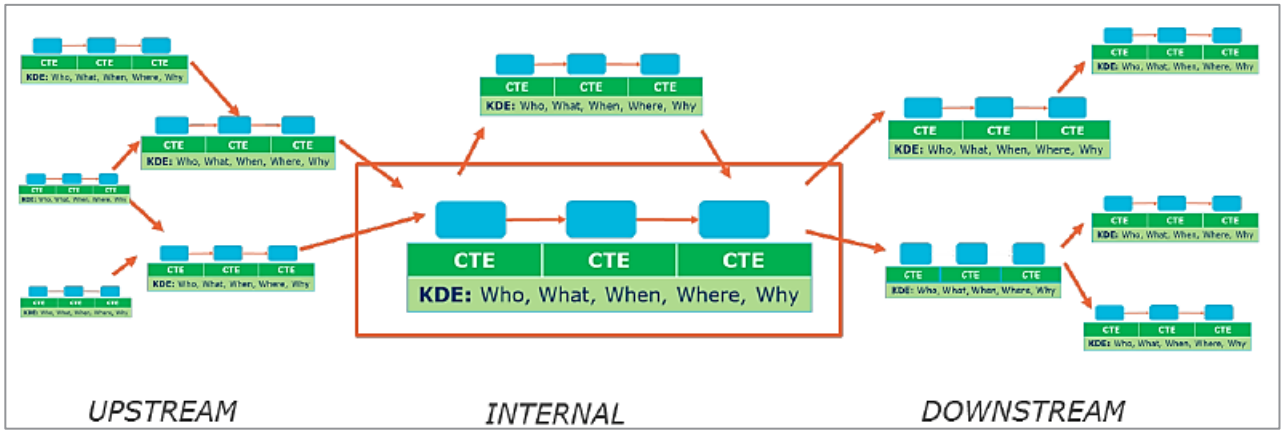
For traceability system to work seamlessly across trading partners till the point of sale, interoperability between their existing internal traceability systems is essential. This requires data exchange between them on event specific data, in terms of time (when), location (where) and other data (who and why) of the product.

AIDC technologies, like barcoding or RFID, are required to be used for capturing data on product movement and communicating the same across trading partners in a structured and standardised manner.

Barcodes based on GS1 standards provide a foundation for an effective and efficient traceability system. They help supply chain partners uniquely identify products, locations, and any additional attributes of products, such as expiry date, batch number, etc., in a standard manner.

GS1 standards based traceability system is cost effective and makes all supply chain partners responsible for sharing data and ensuring visibility.

Traceability data across supply chain



Because of the complexities inherent to most supply chains, each party needs to ensure movement of traceability data in two directions (upstream and downstream) and systems should support parties querying for data. Time taken to respond to these queries define the efficiency of the recall system. Quick response time is important for food businesses to ensure food safety.

An efficient recall is capable of limiting ruination of the corporate image and liability for corporate negligence, which can otherwise cause significant costs/loss.

Besides recall, an efficient traceability system also helps food businesses meet market pressures, growing consumer demands for more product information, and compliance with regulatory requirements. Since supply chains span across multiple jurisdictions for each country and region, it's important that traceability systems adopted by food companies are in sync with global traceability requirements.

GS1 traceability standards and system enable an end-to-end traceability, linking the flow of information to physical products in an affordable, interoperable manner, which can be implemented by small & large food companies and the distribution trade.

References

1. A joint study report by the Associated Chambers of Commerce and Industry of India (ASSOCHAM) and TechSci Research, published in March 2017
2. https://www.checkit.net/managing-your-food-supply-chain-in-a-global-industry/
3. https://foodsafetytech.com/column/5-problems-facing-global-food-supply-chain/
4. http://www.iifiir.org/userfiles/file/publications/notes/NoteFood_04_EN.pdf
5. http://globalfoodsafetyresource.com/food-safety-regulations/
6. https://retail.economictimes.indiatimes.com/re-tales/indian-online-grocery-retailing-will-grow-despite-challenges/1959
7. Kirova, V., Kirby, N., Kothari, D., and Childress, G., (2008). Effective requirements traceability: Models, tools, and practices.
8. http://knnindia.co.in/news/newsdetails/sectors/fssai-notifies-food-safety-and-standards-food-recall-procedure-regulations-2017
9. https://www.foodsafetymagazine.com/signature-series/recall-the-food-industrys-biggest-threat-to-profitability/
10. https://www.foodsafetymagazine.com/enewsletter/the-importance-of-food-traceability/
11. http://www.thermofisher.com/us/en/home/products-and-services/promotions/industrial/investigating-authenticity-tracing-origin-isotope-fingerprints.html?ce=E.17CMD.IO116.06090.01&cid=E.17CMD.IO116.06090.01&http://www.thermofisher.com/us/en/home.html
12. Manos, B., & Mnikas, I. (2010). Traceability in the Greek fresh produce sector: drivers and constraints. British Food Journal, 112(6), 640e652.
13. Mattoli, V., Mazzolai, B., Mondini, A., Zampolli, S., & Dario, P. (2010). Flexible Tag Datalogger for food logistics. Sensors and Actuators A: Physical, 162(2), 316e323.
14. McKean, J. D. (2001). The importance of traceability for public health and consumer protection. Scientific and Technical Review, 20(2), 363e371.
15. Moe, T. (1998). Perspectives on traceability in food manufacture. Trends in Food Science & Technology, 9(5), 211e214.
16. Morris, C., & Young, C. (2000). “Seed to shelf”, “teat to table”, “barley to beer” and “womb to tomb”: discourses of food quality and quality assurance schemes in the UK. Journal of Rural Studies, 16(1), 103e115.
17. PWC. (2016). Fighting $40bn food fraud to protect food supply [Press Release]. Retrieved from http://press.pwc.com/News-releases/fighting–40bn-food-fraud-to-protect-food-supply/s/44fd6210-10f7-46c7-8431-e55983286e22
18. https://foodsafetytech.com/column/5-problems-facing-global-food-supply-chain/
19. GS1 Global Traceability Standard version 2.0 https://www.gs1.org/sites/default/files/docs/traceability/GS1_Global_Traceability_Standard_i2.pdf

Appendix

Survey questionnaire

General section

1. Basic Information

- Company name
- Date of inception of company
- Date of starting of traceability practices
- Name of Chairperson/Managing Director
- Designation
- Department
- City
- Email
- Phone number
- Turnover (in Rs Crore)
- Product category

2. What are the major product type(s) of your company? [Please rank the first three major product types – by 1, 2, 3]

- Rice & Wheat Products & Food Grains
- Canned and Instant Food
- Frozen Food
- Juices
- Confectionery
- Biscuits
- Namkeen & Snacks
- Spices
- Milk and Dairy products
- Organic Food & Health Food
- Others, please specify

(Also provide a list of your brands and number of SKUs and give a percentage of SKUs compliant with traceability requirements)

3. Do you sell through online portals as well?

- Yes
- No

4. Do you export to countries in the EU and/or US, etc.?

- Yes (which product and how much)
- No

5. What kind of food safety, quality management system and change management initiative/process(CMI) do you follow? For example, ISO certification, HACCP, GFSI guidelines, BRC, SQF, etc.

6. How many manufacturing units do you have in India?

7. What is your company's approach to track & trace products?

- To pass safety standard audits
- To meet regulatory requirement
- To prevent counterfeits
- To improve brand positioning & reputation
- To gain consumer trust (Assurance of safety of consumer)

8. What are your thoughts on trends and the evolution of traceability/product recall systems in the future?

- Do you use barcode.
- Or you use RFID
- Other (please specify)

9. Are you aware of standards & technologies that enable traceability across supply chain trading partners? Please specify (hint: barcoding etc.)

Quality

1. Do you have a recall management team in place within your organisation?

- Yes
- No

2. Do you have a documented (written) process in place on the steps that should be followed in the event of a recall?

- Yes
- No

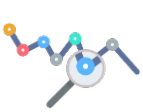
3. In the event of a product recall, is your company able to pinpoint the affected batches and cases across your trading partners?

- Yes, we are able to identify the exact location of any specific recalled products within the supply chain, which enables us to retrieve the affected batch(s) of products effectively
- No, we are unable to identify, locate and retrieve the affected products and therefore have to recall all affected products
- Unknown, please specify

(Please provide details on under what circumstances product recall is conducted, up to what extent, who is authorised person to initiate a recall procedure, and how it is communicated.)

4. Have you ever tested or assessed the performance of your recall process?

- Yes
- No



5. Do you conduct mock recalls?
   - Yes (yearly, half yearly, quarterly, or monthly)
   - No

   (If yes, till which point in your supply chain and in how much time.)

6.What challenges do you face in executing a recall? (Process, time, and percent recovery, others)

7. In the last 1-2 years, what cost did you incur towards product withdraws/recalls due to food safety issues, quality or product failure incidences

8. Are you satisfied with the way information for recall notifications is managed between trading partners?

   - Yes
   - No

9. Do all products of your company carry an identification number (e.g. barcode/EAN/UPC)?

   - Yes
   - No

10. What is your FSSAI license number?

11. Are you aware of the Food Safety and Standards (Food Recall Procedure) Regulations, 2017?

   - Yes
   - No

12. How do you intend to comply with this regulation? Do you have any plan to implement a recall system to meet FSSAI food recall guidelines? If yes, what timeline are you considering?

13. Specify the technology or technology refinement you intend to use for implementing your recall/traceability system in order to comply with FSSAI's Food Safety and Standards (Food Recall Procedure) Regulations, 2017?

14. Are you required to comply with any other local/international recall/traceability requirement? If yes, please specify.

15. What are the major barriers in implementing a recall system?

   - Skilled Manpower
   - Too complicated to implement/lack of expertise
   - Don't have the required skillset within the organisation to help with
   - Lack of infrastructure
   - No government incentives to drive implementation
   - Cost is prohibitive
   - Lack of Information/knowledge
   - Do not know where to start
   - Don't know the solution that can trace whole supply chain

16. Do you have a formal mechanism to track the freshness of your product in the marketplace?

17. What challenges do you face in managing product freshness in the supply chain?

18. What is the extent of product returns and losses on account of product expiration?

19. How do you trace and track the allergen products (type I, type II, type III)?

Distribution

1. Which trading partners make up your distribution system? Select all that apply.

    - C&F agents (how many do you work with)
    - Distributors (how many do you work with)
    - Wholesalers (how many do you work with)
    - Stockists (how many do you work with)
    - Modern trade retailers (those you supply with directly. How many do you work with?)
    - Supply directly to institutions (such as hospital canteens, schools, army canteen etc.) (how many do you work with)

2. Do you track the movement of manufactured products after they leave your facility?

    - Yes
    - No

3. Do you have a formal or informal system to track the movement of goods? What is it?

4. If yes, up to which point in your distribution chain do you track?

    - Track products only until it reaches the distributor's warehouse
    - Track the products as it travels from our manufacturing facility, to distributor's warehouse, until it reaches the retailer's warehouse
    - Track the product from our facility all the way up to point-of-sale (retail outlet)

5. Are you aware if your trading partners are recording this information as well (or sub-set of this information) at the other distribution points?

    - Yes
    - No
    - I don't know

6. If yes, at which distribution points is this information recorded?

    - Wholesaler
    - Retailer
    - All
    - Other
    - I don't know

7. What information is recorded at the distribution points?

8. Do you have access to the information recorded at the other distribution points?

   - No (How do they ensure that the distributor or retailer is not selling an expired or close to expiry product? What is your mechanism to ensure unsafe product is not being invoiced in the supply chain without your consent?
   - If yes (How do you access this information?)

9. Do you face any difficulty in accessing, sharing, managing data across trading partners?

   - Yes
   - No

10. If yes, what are your challenges?

Planning & Logistics

1. What information do you record about a product (SKU) at the manufacturing location from a track and trace, expiration, freshness, and recall perspective? Select all that apply.

   - Brand name
   - Unique product number (EAN/UPC)
   - Expiration date
   - Carton dimensions
   - Carton weight
   - Food type
   - Batch/lot number/code
   - Date of expiry

   Please provide a representative sample of the document if possible or copy of invoice

2. How do you capture and record this information?

   - Manually in a ledger
   - Data is inputted in a computer/ERP system
   - By scanning product barcode
   - By scanning product and carton barcode
   - Other

3. What is the level of inaccuracy you currently face & time spent because of manual data capture?

4. Which departments in your organisation have access to the recorded information?

5. For how long is the information stored for?

   - Until the Product's expiry date
   - Beyond product's expiry date (please specify reason)
   - Other

CII's Food and Agriculture Centre of Excellence

CII FACE is set up by the Confederation of Indian Industry (CII) to contribute to the ongoing policy dialogue related to agriculture and food-security concerns. The Centre through its integrated approach of action oriented programs and capacity building addresses the issues from the farm gate to the consumer end.

The vision of CII FACE is "to act as a catalyst in the integrated development of India's agriculture and food sector" and its mission is "to improve the competitiveness of India's agriculture sector, by catalysing innovation, building capacity and enhancing productivity across the agriculture and food value chain, ensuring food security and inclusive growth".

GS1 India

GS1 India is a Standards body set up by the Ministry of Commerce and Industry, Government of India, along with apex Chambers of Commerce and organisations. It allocates and administers the use GS1 global standards in India.

GS1 India is an affiliate of GS1 Global, Brussels, which oversees a network of more than 112 GS1 organisations worldwide.

GS1 standards help businesses improve the efficiency, safety and visibility of their supply chains across physical and digital channels. Most commonly, GS1 standards are used in barcoding of consumer items and they enable important applications such as accurate billing, real time stocks management at retail outlets and through the distribution trade, track & trace, product recalls etc.

GS1 India services and solutions enable businesses to implement global standards correctly and apply them to different business processes for meeting requirements of their trading partners and regulators.