The National Policy suggests a multi-pronged approach for disaster risk reduction and mitigation consisting of the following-[33]

- Integrating risk reduction measures into all development projects
- Initiating mitigation projects in identified high priority areas through joint efforts of the Central and State governments
- Encouraging and assisting State level mitigation projects
- Paying attention to indigenous knowledge on disaster and coping mechanisms
- Giving due weightage to the protection of heritage structures

In a recently held conference the Hon'ble Prime Minister Shri Narendra Modi stated that his government is working on tougher Consumer Protection Laws. He mentioned that a new Act is on the anvil to crack down on misleading advertising, simplifying grievance Redressal mechanism and in overall consumer empowerment. This law will be in line with the UN guidelines on consumer protection. Strict action will ensue if there is any element of cheating or fraudulent sale of adulterated items keeping consumer interest utmost.

CHAPTER 4
CASE STUDIES

4.1 Introduction

In an article published in the newspaper *The Hindu*, on 20th December, 2017, titled "*CAG pulls up Food regulator*" the CAG has commented on the Food Safety and Standards Authority of India (FSSAI) for lack of action on its part for issuing licences to business operators without complete documents. It said that 65 of the 72 state food laboratories, to which the FSSAI had sent samples did not possess the National Accreditation Board for Testing and Calibration Laboratories accreditation.

The Auditor also stated that the FSSAI had failed in ensuring that the Customs authorities followed up the "Non-Conformance Reports" issued by the regulator and take appropriate action to ensure that unsafe foods did not enter the country. It noted that there were "systemic inefficiencies, delays and deficiencies in the framing of various regulations and standards, amendments to regulations in violation of the Act and the specific direction of the Supreme Court".

A performance audit of food safety was conducted in 10 selected states. A test check of 3 Central and 5 State licensing authorities has found that in 3119 out of 5915 cases, licensing had been issued to the Food Business Operators on the basis of incomplete documents. The reasons cited were shortages of trained manpower and testing facilities.[34]

The World Health Organization (WHO) has warned that terrorist groups could try to contaminate food supplies and has urged countries to strengthen their surveillance. In a special report, the leading UN health agency, said an attack using chemical or biological agents in food could lead to people dying or contracting serious illnesses like cancer. The agency said it had not received any specific warnings of such an attack. But it added that it viewed deliberate food contamination as "a real and current threat".

The 45-page booklet entitled Terrorist Threats to Food warns of the potential insertion of pesticides, viruses and parasites in food as "a way of deliberately harming civilian populations".[35]

Prince Charles has been a royal pain in the butt for Europe's agriculture biotechnology community according to reports published in the British journals. Julian Kinderlerer, assistant director of Britain's Sheffield Institute of Biotechnology,

said the Prince of Wales was the catalyst that sparked the outcry against genetically modified (GM) organisms in the United Kingdom with an article he published on his website in 1998. In that article he said: "Mixing genetic material from species that cannot breed naturally takes us into areas that should be left to God. We should not be meddling with the building blocks of life in this way." He followed that up with a 1999 article published in the Daily Mail, one of the country's largest tabloid newspapers, in which he said the United Kingdom doesn't need GM food at all.

The prince also said that people who wish to be sure that they are eating or growing "real food" will be denied that choice if conventional or organic crops become contaminated by GM crops grown nearby. His words sparked media frenzy, said Kinderlerer, in a speech he delivered at the Agricultural Biotechnology International Conference 2002, held in Saskatoon last week.[36]

4.2 International cases

CASE I

July to September 2016 *Salmonella itchii* affair in cereals in Israel

In July 2016, rumours about *salmonella* contamination in Unilever cereals spread among Israeli consumers.[37] Initially, Unilever did not provide public information about the subject and queries on the matter were initially rebuffed by the company as a non-story and nonsense. On the night of 26th July 2016, Unilever had stopped transferring cornflakes to retailer chains.[38] On 28th July, Yediot Ahronot reported tens of thousands of boxes of breakfast cereal had been destroyed.[39] By 28th July, despite the company's assurances that nothing contaminated was released for consumption, many customers stopped buying Unilever products and started to throw away all cornflakes made by Unilever.[40] The company withheld the information about what were the affected production dates.

On 2nd August 2016, *Globes* reported that the company has published more information about Telma cereals handled on the packaging line in which the contamination was discovered and that a Telma announcement had been made: "We again stress that all Telma products in the stores and in your homes are safe to eat.

According to our company's strict procedures, every production batch is checked and put on hold. These products are not marketed until test results for this production series are returned, confirming that all is well. If any flaw is discovered, the batch is not marketed to stores, as was the case."[41] In the following days the Health Minister, Yakov Litzman, threatened to pull Unilever's licence in Israel. He accused Unilever of lying to his ministry regarding salmonella-infected breakfast cereals.[42]

On 7th August, *Globes* reported that contamination may be sourced in pigeon faeces, the Health ministry said that there might be other sources for the contamination and pigeon faeces are not the only possible source. Globes also said that the production line is automatic (without human hands) and the possibility that the source is human is a very slim chance. On 8th August 2016, the Israeli Health minister suspended a manufacturing licence until Unilever carry out a number of corrections; the action came after an inspection of the Arad plant, stating "This was a series of negligent mistakes, and not an incident with malicious intent by the firm's management and quality control procedures."[43] An investigation led by Prof. Itamr Grutto and Eli Gordon concluded that the event was caused by negligence. On 23rd September it was reported that the cereals produced between the 18th and 20th July at the Arad plant had traces of *salmonella*. [44]

CASE 2

US incidents[45]

In 1984, members of an Oregon cult headed by Bhagwan Shree Rajneesh used cultivated *Salmonella* bacteria to contaminate restaurant salad bars with the hope of affecting the outcome of a local election. Fortunately there were no fatalities in the incident but there were approximately 751 cases of individuals becoming ill and 45 individuals needed to be hospitalized. This incident was detected by local public health officials but they in turn could not pinpoint the source of the outbreak. It took FBI officials one year to link the outbreak to the cult. Prior to the anthrax cases in September of 2001, this was the only recorded case of a bioweapon being used against citizens of the US.

More recently in January of 2003, a Michigan supermarket employee was indicted for intentionally contaminating 200 pounds of ground beef with nicotine. The Centers for Disease Control and Prevention released the information that 92 individuals became ill after purchasing and consuming the ground beef. This case helps document the idea that it is quite simple for one person to intentionally contaminate the food supply and have a major impact.

In October 1996, a former laboratory employee, plead guilty to contaminating a tray of doughnuts and muffins with the food borne pathogen *Shigella dysenteriae* Type 2. The former St. Paul Medical Center (located in Dallas, Texas) employee used an unoccupied supervisor's office computer to send out an email inviting 45 other laboratory workers that pastries were available in the employee break room. 12 of the 45 employees ate some amount of a pastry and eventually contracted severe gastrointestinal disease. Four of those employees required hospitalization but there were no fatalities. The origin of the pathogen was the laboratory itself, which was found to have great conditions to house the pathogen and lax security which made it possible for this intentional contamination to occur.

CASE 3

Aflatoxins in Kenya

During 1981, 2004 and 2005 in Kenya, Maize had been found contaminated with aflatoxins which has been implicated in deadly epidemics in that country, but the fungi contaminating the maize with aflatoxins have not been characterized. The S strain of *Aspergillus flavus* with lethal aflatoxicosis took more than 125 lives in 2004. The 2004 outbreak of acute aflatoxicosis in Kenya was one of the most severe episodes of human aflatoxin poisoning in history. A total of 317 cases were reported by 20th July 2004, with a case fatality rate of 39%. This epidemic resulted from ingestion of contaminated maize. However, identities of the fungi causing the contamination remain unclear.[46]

CASE 4

Report of anthrax antibodies found on defected North Korean soldier raises bio-warfare concerns[47]

Antibodies against anthrax found in the body of a defected North Korean soldier have raised doubts that North Korea is developing bio-warfare capabilities. The concerns emerged after South Korea based Channel A reported the finding about antibodies. According to the report, the defected soldier may have developed the antibodies against anthrax by either getting exposed to the virus or by receiving a vaccination.

The fact that the defected soldier was only a mid-level officer indicates that the country may have developed some form of vaccination against the virus and is supplying it on a large scale to its troops. It can also be construed that the Pyongyang regime may be producing the virus in large quantities.

The deadly anthrax virus is capable of killing around 80 percent of those exposed to it unless they are provided proper treatment within 24 hours. There have been concerns around North Korea developing arsenal aimed at biological warfare as it flexes its nuclear muscle. The new development puts South Korea, which has not yet developed vaccines against anthrax, in a tight spot.

Earlier, a Japanese newspaper Asahi Shimbun had reported that North Korea was looking to mount the anthrax virus on its inter-continental ballistic missiles. It had claimed that the country was experimenting with equipment that will enable the survival of virus even when exposed to intense temperatures. Similarly, the White House too had released a report earlier this month claiming North Korea was developing chemical and biological weapons that can be delivered via missiles. Pyongyang, however, has continued to deny these allegations and accused the US of spreading lies.

CASE 5

Adulteration of Paprika in Hungary[48]

The Hungarian Government is desperately trying to restore consumer confidence in one of the country's most famous products - ground paprika - after

large quantities of the popular spice were found to be contaminated with lead oxide. The scandal stunned all Hungarians and was quickly followed by the arrest of individuals believed to have Mafia links. Government officials believe that, with the help of food analysis, they have the problem fully under control. Prof. Erno Pungor of The Institute for General and Analytical Chemistry in Budapest, says "There has been much embarrassment over the issue."

"The Hungarian Ministry of Agriculture found that 5.8 per cent of a batch of 3,432 random samples had been adulterated with *Pb3O4*. Not only did it enhance the colour of the paprika but it also added to the weight, increasing the profit to unscrupulous dealers." Unfortunately, the discovery came too late for some. Several people have died through consuming the contaminated paprika and dozens have been taken ill. Paprika has always been a much sought after spice - it is used generously in Hungarian goulash but there is an unpleasant history of adulteration with red lead.

CASE 6

A vegetable seller in western Germany realised that the lettuce he had been selling throughout the day contained rat poison [49]

The Rhine Main-based vendor noticed the small blue kernels in a carton of romaine lettuce but it was too late - already five cartons of romaine have been sold, according to *Focus*. A delivery of 110 cartons of the salad from Italy resulted in 105 of them being destroyed; a spokesman from the regulatory agency in Frankfurt told the magazine's online service on Friday. One carton was sold to a market in Offenbach, a suburb of Frankfurt. Four others were sent to a vegetable distributor and most likely sold to consumers.

As of Friday there were no reports of poisoning or injuries from the rat poisoning, the regulatory agency said. The Federal Office for Consumer Protection and Food Security warned against consuming the salad. The poison appears as small blue kernels. The salad was sold to the flying traders *Fliegende Handler* in the Rhine Main area and to the Istanbul Market in Offenbach.

CASE 7

***E.Coli* in South Korea**[50]

Beginning in early May 2011, an outbreak caused by Shiga toxin–producing *Escherichia coli* O104:H4 was reported in Germany and other countries in Europe. In this outbreak, the number of haemolytic uremic syndrome (HUS) cases has been unusually high. As of June 9, 2011, a total of 722 cases of HUS, 19 deaths, and 2,745 cases of Entero-hemorrhagic *E. coli* infection were reported.

A case of HUS caused by *E. coli* O104:H4 was first reported in South Korea in 2004. Because infections caused by *E. coli* O104:H4 have been reported rarely, interest has arisen in the *E. coli* O104:H4 strain from South Korea. The studies were conducted on the *E. coli* O104:H4 strain isolated in South Korea (EC0417119) in 2004 and compared it with the *E. coli* O104:H4 strain associated with the current EHEC outbreak in Europe.

CASE 8

The Canadian Food Inspection Agency (CFIA) detected *chloramphenicol* in honey labelled as product of Canada. *Chloramphenicol* is banned for use in food-producing animals, including honey bees, in Canada as well as in a number of other countries. On April 14, 2004, the Canadian Food Inspection Agency (CFIA) informed Health Canada that five lots of honey labelled as "Product of Canada" were distributed in British Columbia and were found to contain residues of the banned drug *chloramphenicol*. The CFIA is monitoring a voluntary food recall for the detection of *chloramphenicol* in buckwheat honey based on a health risk assessment conducted by Health Canada. [51]

CASE 9

Bleaching substance found in remains of Ergo Cha milk tea poisoning victims[52]

The Philippines National Police (PNP) said the remains of the two people killed after drinking milk tea from the Ergo Cha milk tea shop in Manila have tested positive for a bleaching substance.

In a statement released Monday, the PNP said the remains of both William Abrigo, owner of Ergo Cha milk tea shop in Sampaloc, Manila, and customer Suzaine Dagohoy tested positive for oxalic acid, a "colorless substance [that] will not easily be determined when dissolved in water or beverages."

The PNP Crime Laboratory conducted forensic examinations after a post-mortem examination by the Manila Police District (MPD), which found that Dagohoy had died due to "shock probably secondary to ingestion of toxic substance."

The PNP Crime Laboratory findings also confirmed results from the MPD examination, which found oxalic acid in the blood and stomach contents of Abrigo. According to PNP Crime Laboratory director Chief Supt. Theresa Ann Cid, "About 10 µg/mL (micrograms per milliliter) of oxalic acid is considered dangerous amount. The average human body contains approximately four (4) liters of blood, therefore, it will only take about 40mg of oxalic acid to poison a human body which can potentially led to a person's death."

Murder and frustrated murder charges have been filed against Abrigo's son, Lloyd, whom a shop assistant implicated in the incident, saying he brought a foul-smelling liquid into the store before the incident.

CASE 10

Spanish Cooking Oil Scandal[53]

Twenty years ago, the Spanish "cooking oil" disaster began as a mystery illness. Years later, the toll was put at more than 1,000 deaths and more than 25,000 seriously injured, many of whom were permanently disabled. It was the most devastating food poisoning in modern European history. The disaster is historically important not just because of its scale and the number of victims. It was a prototype contemporary scientific fraud as it marked the first time that the multinational interests successfully contrived a major cover-up in international science. One thing that is certain about the Spanish "cooking oil" disaster is that it had nothing to do with cooking oil. The epidemic is officially deemed to have started on May 1 1981, when an 8-year-old boy, Jaime Vaquero Garcia, suddenly fell ill and died in his mother's arms on the way to La Paz children's hospital in Madrid. Learning that his

five brothers and sisters were also ill doctors had them all brought in and put one of the girls into intensive care. The other four children were transferred to the Hospital del Rey, Madrid's prestigious clinic for infectious diseases, where doctors began treating them for "atypical pneumonia".

The Vaquero family proved merely the first of many. It seemed to be mainly women and children who were affected. The initial symptoms were flu-like: fever and breathing difficulties, vomiting and nausea, although patients soon developed a pulmonary oedema (the build-up of fluid in the lungs), skin rashes and muscle pain. The epidemic was national news.

After a few days, Muro told the media that he believed it was due to food poisoning, adding that the foodstuff was marketed "via an alternative route". He was certain of this because the casualties were all coming from the apartment blocks of the communities and towns surrounding the capital; almost no one from Madrid itself appeared to be affected. At the end of the two-year trial in 1989, the judges themselves stressed that the toxin in the oil was "still unknown".

An internal German government memo was recently leaked to news magazine Der Spiegel. According to this, the monitoring of imported produce had revealed that there continued to be unsafe pesticide residues on fruit and vegetables from Spain. Some peppers were "highly contaminated" and the residues had "reached levels we can no longer tolerate". It was the last line of the memo that was most telling: "Under no circumstances should the general public be informed."

4.3 Indian cases

CASE 1

The aflatoxic hepatitis in India in 1974

The key issues and challenges in the food supply chain during Disaster situations is the likelihood of food borne disease outbreak in the community. Several disease outbreaks in humans due to contaminated food had been described in the past in India.

In 1974, the people of India came across to recognise hepatitis as a result of the consumption of maize contaminated with *Aspergillus flavus*. The outbreak of disease lasted for 2 months and it was confined to the Western Indian tribal population belonging to Banswada district of Rajasthan and Panchmahals district of Gujarat. The people suddenly began to show the symptoms of ascites and oedema of lower limbs and portal hypertensions. Hepatitis was reported in 200 villages confirming 106 deaths. The analysis of contaminated maize samples showed that the diet of affected people contained the fungus *A. flavus* in the range of 6.25–15.6 parts per million (ppm). This result means affected people might had consumed 2000–6000 μg/kg or parts per billion (ppb) of aflatoxins, daily over a period of 1 month (Krishnamachari et al. 1975).[54] Tandon, Krishnamurthy and co-workers presumed that an epidemic of jaundice in north-Western India (1974) was also due to toxic hepatitis which affected both humans and dogs (Tandon et al. 1977)[55]

CASE 2

Deoxynivalenol mycotoxicoses attack

In India during 1987 due to consumption of rain damaged, mould affected wheat Deoxynivalenol was implicated in an outbreak of emetic syndrome in Kashmir State. An outbreak of acute food borne disease caused by fumonisin was reported in South India during 1995 affecting 1,424 people due to contaminated sorghum and maize. *Rhizopus toxicosis* was reported from Maharashtra State and caused the death of three people. These outbreaks continue to be a significant health problem of people in India, because their poor purchasing power compels them to consume contaminated food.[56]

CASE 3

Outbreaks at Kalpakkam in Tamil Nadu in 1981

Phycotoxins are toxic metabolites of the algae found in marine and fresh water environments. Algal blooms take place in certain areas during certain periods especially following ecological disturbances and concentration of polluted matter. Typical outbreaks such as paralytic shell fish poisoning had been reported in the past

mostly from temperate waters. During the present decade, at least two outbreaks have been reported from India. In one of the outbreaks at Kalpakkam in Tamil Nadu in 1981, children were reported to have died due to consumption of shell fish containing the toxins. The symptoms included gastrointestinal disturbances, tingling sensation in lips, tongue and fingertips, blurred vision and sensation of floating in the air. Another outbreak was reported from the Fisheries College, Mangalore in Kumble estuary in the West Coast following the consumption of clams. During December 1987, a food borne disease presumably due to consumption of fish was also reported from four slums in the suburbs of Bombay. People of different age groups and both sexes, who consumed the fish caught in a particular pond were affected. The symptoms included pain in the abdomen, vomiting and diarrhoea, weakness and alternating sensation of heat and cold. The extracts from the fish *Mystus singhala* from the pond were found to be toxic to mice and phycotoxins were identified as the aetiological factor. The pond from which the fish were caught was in an ecologically disturbed state due to its reclamation and flow of industrial effluents and had thick algal blooms, especially of *Oscillatoria sp*.[57]

CASE 4

Outbreaks of epidemic dropsy

Several outbreaks of epidemic dropsy due to consumption of mustard oil contaminated with oil obtained from the seeds of the plant *Argemone mexiciana* have been described in India during the last one century. The most recent outbreak of epidemic dropsy occurred in the districts of Shivpuri and Sheopur in Madhya Pradesh during June 2003. About 500 persons were affected. A field investigation carried out jointly by the National Institute of Nutrition (NIN) and the National Institute of Communicable Disease (NICD) and Dr. Ram Manohar Lohia (RML) Hospital, New Delhi revealed that the disease is due to consumption of a mixture of edible oils contaminated with argemone oil. Ten out of fourteen oil samples examined showed argemone oil contamination ranging from 0.11 to 17.6%. *Sanguinarine* was detected in 4 out 18 serum samples in the range of 12-30 µg/100 ml.[58]

Fumonisin mycotoxicoses also affected many persons due to mouldy sorghum and Veno Occlusive disease during mid 1970's in Afghanisthan and India due to weed seed contamination in staple food grains.

CASE 5

Eating expired biscuits in government run school

Over 60 children fell sick after eating expired biscuits in government run school Aashram paddhati vidyalaya in Bhadohi district of Uttar Pradesh recently. Reports say that the students suffered abdominal pain and vomiting after eating expired biscuits given to them. "Collected samples of biscuits, found out they were expired. Action will be taken against defaulters," said a district administration official.

District Magistrate Vishak G said that the school was run by the social welfare department and that an inquiry has been ordered into the incident. All the children are in the age group of 10 to 14 years, Chief medical officer (CMO) Satish Singh said.[59]

CASE 6

Contamination of water in Delhi

More than 80% of Delhi's tap water is contaminated by plastic-microfibres, new research has shown. This is the third highest contamination rate in the world after the US (New York and Washington DC) and Beirut, Lebanon. These findings are part of a study conducted after testing 150 samples of tap water collected by news website Orb Media from five continents. Though many in Delhi's well-off circles do not use tap water for drinking, large swathes of the capital's population have no access to safe drinking water. Research found the US had the highest contamination at 94%. Plastic fibres were found in samples taken from various sites, including the Congress buildings and Trump Tower in New York, US. Beirut, Lebanon was marginally behind at 93% followed by India at 82%. European nations, including UK, Germany and France, had the lowest contamination rate of 72%. These microscopic fragments enter the water system in several ways, from synthetic fibre clothing, tyre dust and microbeads. Most of these are believed to originate from

clothes, upholstery and carpets. Washing machines and dryers add to the problem. According to a Guardian report, a UK study found that each cycle of a washing machine could release more than 700,000 microscopic plastic particles.[60]

The latest study shows that both the developed and the developing countries are suffering from the same malaise.

In another story published in the Times of India, New Delhi edition on October 16th, 2017, "*High ammonia in water halts supply*", the water contamination issue has been highlighted. The concerns have become widespread and are being noted and discussed openly.

CASE 7

Rat poison mixed in wheat at Madarsa run by ex- Vice President's wife[61]

In an incident which former Vice President Hamid Ansari's wife Salma Ansari called "shocking and scary", some unidentified men allegedly mixed rat poison in the water supply of Madarsa Chacha Nehru in Aligarh that houses 4000 children. The Institute located in the heart of the city is run by Al Noor Charitable Society. Police immediately filed a FIR against unidentified persons in the case under Sections 328 & 506 IPC. Following the incident the Institute installed CCTV cameras. According the SSP Aligarh, a student spotted the miscreants and alerted the warden. The samples of the food were collected and sent for forensic analysis and the students were warned not to drink water from taps till further orders and alternate arrangements were made for them. CMO Aligarh Dr. Ahmad said that "Rat poison cannot prove fatal to human beings until it is mixed with an anticoagulant (chemical substance that prevents or reduces coagulation of blood), it could have made the students sick. A lot would depend on the quantity of rat poison mixed in the water".

Copy of the First Information Report registered in the Police Station is attached as Appendix 'H'

CASE 8

Monosodium Glutamate (MSG) in Maggi noodles

"Adulteration in our daily food items has been proved time and again. But this is not just another case. This is heavy metal, completely the next level", so opined Amit Khurana, programme manager for food safety and toxins at the Centre for Science and Environment. Narpinder Singh, President of the Association of Food Scientists and Technologists, India, however adulteration by the MNC's selling processed and packaged food is just the tip of the iceberg.[62] Although the Swiss giant Nestle has challenged the validity of the tests, 20 million packs worth Rs. 1000 crores had to be recalled. Officials at the FSSAI stated that if the ingredients are packed separately, they ought to be tested separately. It also mentioned that India does not allow addition of Monosodium Glutamate (MSG). This is accentuated by the fact that there is no standard testing protocol in the food safety act.

Nestle India Limited was fined Rs. 45 lakhs by the district administration of Shahjahanpur, UP in 2015. The Nestle distributors were also fined Rs. 17 lakhs. The district administration said that after hearing representations from Nestle officials and distributors this step had been taken.

In an earlier case, Nestle had approached the Bombay High Court and has raised the issue of interpretation of the food safety act and sought a judicial review of the order passed by the Maharashtra FDA and the FSSAI. It had subsequently re-launched Maggi noodles in the market in 2015, after fulfilling conditions set by the Bombay High Court which lifted the ban imposed by FSSAI.