invariably the first responders in all emergencies. Capacity building has to include awareness, training, sensitisation, orientation, education right from the school levels, developing skills of communities and the community leaders. Therefore, it is of utmost importance that the capacities at the grassroots level are enhanced and strengthened.

CHAPTER 3

FOOD BIO-TERRORISM

CHARACTERISTICS, CONSEQUENCES AND LEGAL ISSUES

3.1 Characteristics of food bioterrorism

Food terrorism has been defined by the World Health Organisation (WHO) as an act or threat of deliberate contamination of food for human consumption with chemical, biological and radio-nuclear agents for the purpose of causing deaths to

civilian populations and/or disrupting social, economic or political stability. Obviously, the government is responsible to make strategies and plans to protect the citizens and the economy from such attacks, but, it also makes it incumbent on the individual organisations to implement and routinely test their own management and product recall systems.

The potential effects of food bio terrorism can be severe on the economy and the psyche of a nation. It can cause severe disease outbreaks which can have devastating effect on the health of the citizens and can paralyse the public health services. There is a gap in the preparedness which can lead to mis-diagnosis and inappropriate response by the authorities. The effects may be short term and long term.

Economic activities can be severely disrupted. Extortion threats targeted at particular organisations, loss of loyalty, impact on tourism, loss of reputation and export losses are some common acts which may result due to such actions. It may also be intended with the objective of political destabilisation of a government due to widespread disruptions and anxiety in the food chain and water supply systems.

The characteristics of the use of biological weapons can briefly be gives as follows-

1. Area affected can potentially be very large
2. It is extremely difficult to detect them
3. Same element may have multiple manifestations hence isolation of the individual strains is cumbersome
4. It may take more than 3-4 days to detect and thus impact the mitigation action. However, timely action can limit their impact.

Some biological agents and their implications have been summarised in the table below.

Table-2

What are the Biological Agents of Concern for Intentional Food-borne Contamination?[20]

Biological Agents	**Description**	**Associated foods in Natural Occurrences**	**Onset**	**Symptoms**
Bacillus	Spore-forming	Dairy, Seafood,	1 to 7 days	Bloody

anthracis	bacterium that causes gastrointenstinal anthrax	Some raw meats and Water		diarrhoea, Fever, Loss of appetite and Nausea; followed by bad stomach pain
Clostridium botulinium Toxin	Spore-forming bacterium that produces highly toxic neurotoxins; food borne botulism results from ingestion of the toxins	Canned foods, Honey, Improperly processed foods and Pasteurised foods	6 hours to 2 weeks; most commonly 12 to 36 hours	Difficulty in speaking and swallowing; Double vision, Malaise, Muscle weakness and Vertigo; Paralysis of breathing muscles can cause death
Escherichia coli O157: H7	Strain of the vegetative bacterium ***E.Coli*** that produces potent toxins that cause severe damage to the intestinal lining	Cheese curd, Dry-cures salami, Game meat, Lettuce, Raw milk, Unpasteurised fruit juices and various raw or uncooked meat	1 to 8 days	Abdominal pain, Diarrhoea that is initially watery but becomes grossly bloody, and severe cramping
Shigella dysenteriae Type 1	Vegetative bacterium that causes the infectious disease Shigellosis; Can be caused by three other ***Shigella spp; boydii, flexnari*** and ***sonnei***	Poultry, raw fruits and vegetables, salads (for example, tuna or potato) and shellfish	12 to 50 hours	Abdominal pain, fever, malaise and watery or bloody diarrhoea
Salmonella spp.	Group of vegetative bacteria of the genus ***Salmonella*** that cause Salmonellosis, a gastrointestinal	Eggs, dairy products, milk, poultry and raw meats	12 to 3 days	Abdominal cramps, Diarrhoea and Fever

	disease in humans; ***S. Enteritidis*** and ***S. Typhimurium*** are the most common causative agents in the United States			
Salmonella typhi	Vegetative bacterium that is the causative agent of typhoid fever	Contaminated milk, Shellfish and Raw fruits and Vegetables	3 days to 3 weeks	Chills, Constipation, Fever, Headache, Malaise and Myalgia; Confusion, Delirium, Intestinal perforation and death may occur in severe cases
Vibrio cholerae	Vegetative bacterium that is the causative agent of cholera	Cabbage, lettuce and raw shellfish	6 hours to 5 days	Circulatory collapse, Profuse watery diarrhoea, Vomiting and shock

Source- *Bioterrorism: Threat to the U.S. Food System -Biological Agents of Concern*- Brochure issued by the Department of Homeland Security, USA

3.2 Consequences of use of biological weapons

The consequences of use of biological weapons can be either short term or long term. The psychological impact can be more severe than that of the use of conventional weapons. The possible long term consequences include- delayed & environmentally mediated health effects, chronic illness, new and unidentified infectious diseases becoming endemic and serious ecological changes. The under developed and the developing countries are severely vulnerable even during normal times as far as the public health services are concerned, so at the times of emergency the consequences may be extremely severe. The coping mechanism of the system and bodily resistance capabilities of the individuals is also extremely important in

such cases. So, one can very well imagine the impact on these populations when a calamity of large magnitude strikes, for which they are not only unprepared but completely unaware. The symptoms often become difficult to detect because biological organisms mutate and become resistant to drugs in an enabling environment. They can transmit from one person to another rather easily. They can even be drawn from dead bodies, cultured/ grown and reproduced.

Thus, ignorance of the symptoms, treatment and after-effects need to be mitigated by education and preparedness, otherwise it can lead to devastating consequences.

3.3 Response perspectives

Historically, from the times of Manu to the Saracen Code of Warfare based on the Quran, the Lieber Code of 1863 in the Unites States and the 1925 Geneva Convention Protocol, this seems widespread.[21] Poisoning is not new to humankind. We have read it in many stories and epics in India that the kings and their kin have used poison to take revenge or to eliminate their opponents. Internationally, the great plague of 14th century was allegedly spread by the Tartars besieging the fortress of Caffa in the Crimea. Sporadic use of biological agents was also reported in the World War I. International terrorist organizations have continued to operate in Asia, Africa and the Europe with impunity beginning since the 2001 attacks in the US, choosing their targets at will. It becomes imperative that any means of, and opportunity at making any symbolic statement against the powerful nations would definitely be employed by these groups in future too.

The various preventive measures and the response measures taken can be put in a tabulated form as below-[22]

Table -3

Preventive Measures	Response Measures
Intelligence measures (identify potential threats; understand motivations; predict behaviour)	Early detection of exotic/foreign pathogenic agents
Monitoring programs (detect/track	Early prediction of disease dispersion

specific pathogens/diseases)	patterns
Establishment of laboratories to research the most-virulent diseases	Early containment procedures
International counter-proliferation treaties, protocols, and agreements	Epidemiology and treatment
Creation of agent-specific resistance in livestock	Depopulation and carcass disposal
Specific vaccination against the most-threatening animal disease agents	Diplomatic/legal/economic/ political responses
Modification (where possible) of vulnerable food/agriculture practices	Compensation and Indemnity
Bio-security and surveillance	Vaccination and pharmaceutical stockpiling
Education and training (Federal, state and local)	Education and training; Public awareness and outreach programs

Source: Most of the above items are from Henry Parker, *Agricultural Bioterrorism: A Federal Strategy to Meet the Threat*, McNair Paper 65, Washington, D.C.: Institute for National Strategic Studies, National Defense University, March 2000, pp. 40-41.

An old joke goes, “Waiter, there’s a fly in my soup”. The waiter replies, “Not so loudly Sir, everyone would want one in their’s too”. What we actually see and what we consume are poles apart. It is mainly due to lack of accountability, responsibility and clarity of action on the part of the enforcement agencies. Apart from the inadequate resources to monitor security and safe practices by the government agencies, the security attitude and consciousness of the average citizens all over the world is still very low. To compound the problem, public attitude about food safety and food defence mechanisms is also abysmally poor. This is primarily due to the lack of awareness, general poverty situation in the country, lack of trust and confidence on government agencies and parastatals (government organisations) which are largely seen as inefficient, corrupt and often conniving with unscrupulous foreign and local businessmen. Though many nations have established their

Regulatory bodies, the fact still remains that they are ill-equipped and need huge resources, equipment, technological know-how and competent personnel to handle their tasks effectively. At present it is inadequate, thus, allowing possibilities which could be taken advantage of by any terrorist group to achieve their objective/targets. The effectiveness of the response mechanisms thus, depends upon the preparedness and execution of the plans properly.

According to Huxsoll (2000); Royal Society, 2002, the response mechanisms should include-[23]

1. Preventive measures such as Hazard Analysis and Critical Control Points (HACCP) management plans
2. Developing strategies to control outbreaks of animal diseases
3. Prompt identification of agents
4. Increasing awareness of health authorities
5. Ready availability of Medicines, etc
6. Development of Bio-security measures including decontamination and disinfection.
7. Appropriate communication channels
8. Disposal of carcases and possible human bodies
9. Securing the food and water supply chain to prevent further losses

So, broadly, the principles of protection can be summed up as -

1. *Risk reduction measures*

a) Administrative and physical controls

b) Technological controls

2. *Physical protection measures*

a) Collective measures- Specially designed shelters

b) Individual protection measures- Use of Air purifiers, etc.

3.4 Guidelines for action

Guidelines and steps to be taken by the law enforcement agencies, at scene of crime/attack can be broadly categorised as follows-

- Analysis of the available information
- Searching for the contaminant
- Isolating the contaminant and taking samples for future use and analysis
- Cordoning off of the area
- Risk reduction and neutralisation of the immediate threat
- Long term steps for preventing the spread of the biological agent used
- Evacuation and Infection/contamination spread control

3.5 Legislation

3.51 Safeguards under the Constitution of India

There are various constitutional provisions guiding human life and dignity of the citizens of India. The Supreme Court of India has given a wider interpretation to the scope of Article 21 to include the Right to have a clean and healthy environment.[24] The scope of the Right to life has been further widened by the Supreme Court of India to include the Right to Sustainable Development.[25] In the Tehri Dam case involving construction of a dam across a river in the mountain ranges in the Himalayas, the Supreme Court of India has held that disaster management is part of the Right to Sustainable Development. [26] Even otherwise, a State is responsible under the doctrine of ***parens patriae***.[27] Doctrine of *parens patriae* imposes an obligation on the State or sovereign authority to protect persons under disability. This doctrine which was originally applicable to the king has been applied by Courts in a number of cases to make the State responsible for providing relief to victims of disaster. In ***B.J. Diwan vs. State of Gujarat (2001)*** the Gujarat High Court rejected the government‘s argument that the court doesn’t have jurisdiction to adjudicate upon a case, which claims the enforcement of relief and rehabilitation. The court went on to hold that the right to relief and rehabilitation is a guaranteed right under Article 21 of the Constitution and the state is duty bound to ensure the same.

The various provisions of the Indian Constitution have been summarised below-

Article 21*: Right to life and personal liberty*-"No person except according to procedure established by law shall be deprived of his life or personal liberty". It is a Fundamental right of the object's personal liberty which can be taken away only according to procedure established by law and the state is duty bound to prevent encroachment on and loss of life. Anyone can seek protection under this article.

Article 14*:* *Right to Equality* which states that "The State shall not deny to any person equality before the law or the equal protection of the laws within the territory of India Prohibition of discrimination on grounds of religion, race, caste, sex or place of birth."

Article 19*:* This gives the citizens (which include both women, men and third gender) the *Right to Freedom*, which among other things guarantees freedom of speech and expression, freedom of movement, freedom of practising trade and profession etc.

Article 32*:* This Article gives right to us to *seek constitutional remedies* through the Supreme Court of India for violation of Fundamental Rights mainly.

Article 226: Powers of the High Courts to entertain writs and issue orders under their jurisdictions

Besides these mandatory principles, the **Directive Principles of the Constitution** also provide for the following-

Article 47*:* Commit the State to raise the level of nutrition and the standard of living and to improve public health, particularly by prohibiting intoxicating drinks and drugs injurious to health except for medicinal purposes.

Article 48: State should also organise agriculture and animal husbandry on modern and scientific lines by improving breeds and prohibiting slaughter of cows, calves, other milch and draught cattle.

Article 51*:*Obligation of the state to honour international commitments.

Article 51A: It lays down the fundamental duties for every citizen for compassion towards animals.

3.52 Food protection laws in India

The Indian food processing industry is regulated by several laws which govern the aspects of sanitation, licensing and other necessary permits that are required to start up and run a food business. The legislation that dealt with food safety in India was the Prevention of Food Adulteration Act (PF Act), 1954. This Act had been in place for over five decades and there was a need for change due to varied reasons and changing requirements of our food industry.

P.F. Act, 1954 was replaced by the **Food Safety and Standards Act, 2006** (**FSSA**) which now overrides all other food related laws. It was designed to improve the overall food safety of the population and food trade within and outside India. It specifically repealed eight laws which were in operation prior to the enforcement of FSSA:

1. The Prevention of Food Adulteration Act, 1954
2. The Fruit Products Order, 1955
3. The Meat Food Products Order, 1973
4. The Vegetable Oil Products (Control) Order, 1947
5. The Edible Oils Packaging (Regulation) Order, 1998
6. The Solvent Extracted Oil, De oiled Meal, and Edible Flour (Control) Order, 1967
7. The Milk and Milk Products Order, 1992
8. Essential Commodities Act, 1955 (in relation to food)

Food Safety and Standards Authority of India (FSSAI) established under the Food Safety and Standards Act, 2006 is an autonomous body established under the Ministry of Health & Family Welfare, Government of India. FSSAI is responsible for protecting and promoting public health through the regulation and supervision of food safety, which it does through laying down of standards and monitoring. [28]

The following are the statutory powers that the FSS Act, 2006 gives to the Food Safety and Standards Authority of India (FSSAI).[29]

- Framing of regulations to lay down food safety standards
- Laying down guidelines for accreditation of laboratories for food testing
- Providing scientific advice and technical support to the Central Government
- Contributing to the development of international technical standards in food
- Collecting and collating data regarding food consumption, contamination, emerging risks etc.
- Disseminating information and promoting awareness about food safety and nutrition in India

The punishments which can he meted out in cases of adulteration etc. are-

- Penalty of 7 years in jail to life imprisonment and Rs. 10 lakhs penalty for causing death
- 6 years in jail and Rs. 5 lakh fine for grievous harm caused by unsafe food intake
- 1 year jail and Rs. 3 lakh fine for non-grievous harm
- 6 months jail and Rs. 1 lakh fine for mislabelling

However, despite such a huge gamut of laws, there are very few cases in which punishment is actually meted out. It is mainly due to lack of awareness among the law enforcement and legal fraternity. There are some more ambiguities within the food safety framework which need to be rectified. E.g. in case of powdered milk, producers need to maintain standards of Bureau of Indian Standards (BIS) as well as of FSS Act. For fruits and vegetables the standards of Food Safety and Security Act and Agricultural Marketing Standards (AGMARK) apply. Therefore, it becomes difficult for the producers and the consumers to actually discern the standards which need to be followed for different products. On top of this, some states in India have fixed their own standards in certain product categories, thereby compounding the problem further.

3.53 Other laws related to contamination and mischief of food and edible items

3.53.1. The Prevention of Cruelty Animals Act,1960

a) ***Section 11(1) (c)***- Wilfully and unreasonably administering any injurious drug or injurious substance (Non-Cognisable offence)

b) ***Section 11(1)(l)***- Mutilates any animal or kills any animal (including stray dogs) by using the method of strychnine injections in the heart or in any other unnecessarily cruel manner (Cognisable offence)

c) ***Section 12***- Use of Oxytocin injection on milching animal in order to induce milk is illegal and amounts to cruelty on animal. It is a cognizable offence and the person shall be punishable with a fine, which may extend up to one thousand rupees, or with the imprisonment for a term which may extend up to two years, or with both and the animal on which the operation was performed shall be forfeited to the Government. The proprietor of the shop selling these drugs to a dairy shall be liable to lose his license as a pharmacist and shopkeeper in addition to criminal charges with punishment of up to 5 years in prison. The Government of India has acknowledged the negative effects of oxytocin and has declared it as a scheduled substance. It is illegal under the Food and Drug Adulteration Act to buy, sell or administer these injections without a physician's permit. No person/milkman can purchase the drug without having the requisite prescription from a Registered Medical Practitioner or Registered Veterinarian.

3.53.2. Indian Penal Code, 1860

a) ***Section 268 IPC***- A person is guilty of a public nuisance who does any act or is guilty of an illegal omission which causes any common injury, danger or annoyance to the public or to the people in general who dwell or occupy property in the vicinity or which must necessarily cause injury, obstruction, danger or annoyance to persons who may have persons who may have occasion to use any public right. A common nuisance is not excused on the ground that it causes some convenience or advantage.

b) ***Section 269/270 IPC***- It can be a negligent act or a malignant act which can spread infection or disease dangerous to life. These sections enable a person to file a charge sheet to prohibit the killing of an animal or the sale of the meat obtained from sacrificed animals, in any public place, other than those which are registered for this

purpose. Also, the killing of an animal in public place amounts to public nuisance, and annoyance to the public.

c) ***Section272 IPC***- Adulteration of food or drink intended for sale

d) ***Section 273 IPC***- Sale of noxious food or drink

e) ***Section 274 IPC***- Adulteration of drugs

f) ***Section 275 IPC***- Sale of adulterated drugs

g) ***Section 276 IPC***- Sale of drug as a different drug or preparation

h) ***Section 277 IPC***- Fouling water of public spring or reservoir

i) ***Section 278 IPC***- Making atmospheres noxious to health

j) ***Section 428 IPC*** deals with the punishment for committing mischief by killing, poisoning, maiming or rendering useless any animal or animals of the value of ten rupees or upwards. The punishment for such offences is simple or rigorous imprisonment for a term, which may extend to two years, or with a fine, or with both.

k) ***Section 429 IPC*** deals with the punishment for the same nature of crime but for the animals of the value of fifty rupees or upwards. It must be immediately lodged as an First Information Report (F.I.R) with the area police station. The punishment in this case will be imprisonment of either description for a term, which may extend to five years or with a fine, or with both.

3.53.3 Consumer Protection Act, 1986

The provisions of this Act are intended to provide effective and efficient safeguards to the consumers against various types of exploitation and unfair dealings. Unlike other laws which are basically punitive or preventive in nature, the provisions of the Act are compensatory. The Act envisages three-tier quasi-judicial machinery at the national, state and district levels. At the national level, there is National Consumer Disputes Redressal Commission (known as National Commission), at the State level there is Consumer Disputes Redressal Commission (known as State Commission), and at the district level there is Consumer Disputes Redressal Forum (known as District Forum).

The major focus of the Act is on the following areas-

1. Prohibition of anti competitive agreements
2. Prohibition against abuse of dominant position
3. Regulation of combinations
4. Advocacy of Competition policy

3.53.4 The Water (Prevention and Control of Pollution) Act, 1974- The Act was enacted to prevent and control water pollution, maintain or restore the wholesomeness of water and to establish boards for the prevention and control of water pollution. This Act strictly prohibits discharge of any poisonous, noxious or polluting matter i.e., discharge of any domestic or industrial wastes into the water beyond the permissible limits as laid down by the Act. The penalties for contraventions may result in imprisonment and fine.

3.53.5 The **Citizen Charter of the Ministry of Food Processing Industries, GOI** states as one of its objectives that it will facilitate food safety and quality assurance based on internationally accepted best practices and standards. It has also set up a Grievance Redressal mechanism and a helpline for filing of complaints related to any issues related to the food processing sector.[30] It has also endeavoured to set up a chain of laboratories to ensure that good quality food enters the markets. In the interest of consumer safety and public health, there is a need for testing food products in order to ensure that it complies with domestic standards as well as international standards for exports. There is a need for testing the imported food products to ensure that they are of the requisite standards and those food products which are not permitted for manufacture domestically are not allowed to come into India from the foreign markets. Apart from this, the level of contaminants, additives and pesticide residues in food items needs to be monitored regularly. Therefore, a network of food testing and analysis laboratories is required to support the surveillance system of food regulator, timely analysis of samples and ensure compliance of international and domestic standards on food in case of exports as well as imports.[31]

HACCP, ISO Standards are necessary condition for improving the overall quality of food safety & hygiene in the country and also to increase India's share in global food trade. The main objective of the scheme is to motivate the food processing industry for adoption of food safety and quality assurance mechanisms such as TQM including ISO 9000, ISO 22000, HACCP, GMP, GHP. This will enable the food processors to adhere to stringent quality and hygiene norms thereby protecting the health of consumers, enhance product acceptance by buyers, both domestic & overseas and keep Indian industry technologically abreast of international best practices.[32]

The need for preparing a comprehensive Disaster management plan was felt due to the impact of the Bhopal Gas tragedy in 1984. The Indian Parliament enacted the Environment (Protection) Act (EPA), 1986 for the purpose of safeguarding and protecting the environment from unregulated industrial or other activities. The Act was enacted to provide for the protection and improvement of, environment human environment, prevention of hazards to human beings, other living creatures, plants and property.

In the year 1991, with a view to protect the fragile ecosystem of the coastal areas in India from unregulated developmental activities, the Government of India issued Coastal Regulation Zone (CRZ) Notification under the EPA to control the developmental activities within 500 meters of high tide line.

The **Disaster Management Act, 2005** and the **National Policy, 2009** marks the institutionalisation of the paradigm shift in disaster management in India. The relief centric approach being followed till then was changed to one of pro-active detection, prevention, mitigation and overall preparedness in terms of tackling such impending disasters. The concept has since then shifted from being reactive to being pro-active. It has been clearly spelt out in the policy that disaster is a natural and man-made phenomenon which cannot be wished away fully. Disasters will occur, but, their impact can be reduced by taking appropriate mitigating steps beforehand.

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