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## 12. Common Disposal/Incineration Sites

Without prejudice to rule 5 of these rules, the Municipal Corporations, Municipal Boards or Urban Local Bodies, as the case may be, shall be responsible for providing suitable common disposal/incineration sites for the biomedical wastes generated in the area under their jurisdiction and areas outside the jurisdiction of any municipal body, it shall be the responsibility of the occupier generating bio-medical waste/operator of a bio-medical waste treatment facility to arrange for suitable sites individually or in association, to comply with the provisions of these rules.

### 7.4.2 The Bio-medical Waste Management Rules, 2016

As per the Bio-medical Waste (Handling and Management) Rules, 1998, bio-medical waste was divided into eight categories. However, multiple categories of waste were clubbed to be disposed of into the four colour-coded bags. Multiple categories of waste have been observed to be confusing by the housekeeping staff. Further, the occupiers had their treatment facilities (such as an incinerator, burial pits, etc.) for the final disposal of bio-medical waste. Also, it was found that up to 82% of the healthcare facilities either had no credible bio-medical waste management or require improvement (Bhalla et al. 2019).

To address these issues, in the exercise of the powers conferred by Section 6, 8 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), and in supersession of the Bio-Medical Waste (Management and Handling) Rules, 1998 and further amendments made thereof, the Central Government notified the Bio-medical Waste Management Rules, 2016. These rules apply to all persons who generate, collect, receive, store, transport, treat, dispose, or handle bio-medical waste in any form including hospitals, nursing homes, clinics, dispensaries, veterinary institutions, animal houses, pathological laboratories, blood banks, AYUSH hospitals, clinical establishments, research or educational institutions, health camps, medical or surgical camps, vaccination camps, blood donation camps, first aid rooms of schools, forensic laboratories and research labs.

The prescribed authority for enforcement of the provisions of these rules in respect of all the health care facilities located in any State/Union Territory is the respective State Pollution Control Board (SPCB)/ Pollution Control Committee (PCC) and in the case of health care establishments of the Armed Forces under the Ministry of Defence shall be the Director General, Armed Forces Medical Services (DGAFMS). These rules stipulate the duties of the Occupier or Operator of a Common Bio-medical Waste Treatment Facility as well as the identified authorities. According to these rules, every occupier or

operator handling bio-medical waste, irrespective of the quantity is required to obtain authorisation from the respective prescribed authority i.e., State Pollution Control Board and Pollution Control Committee, as the case may be. These rules consist of four schedules and five forms (<https://cpcb.nic.in/bio-medical-waste-rules/>).

The key differences between the Bio-Medical Waste (Management and Handling) Rules, 1998 and the Bio-medical Waste Management Rules, 2016 are as follows: (1) the removal of multiple categories and to continue with only four colour codes, and (2) that no occupier was permitted to establish an on-site treatment and disposal facility if service of a common biomedical waste treatment facility (CBMWTF) is available within a distance of 75 km (Bhalla et al. 2019).

The Bio-Medical Waste Management Rules, 2016 have also been amended in 2018 to improve compliance and strengthen the implementation of environmentally sound management of biomedical waste in India.

#### **Salient features of Bio-Medical Waste Management (Amendment) Rules, 2018:**

(Source: <https://pib.gov.in/Pressreleaseshare.aspx?PRID=1526326>)

1. “Bio-medical waste generators including hospitals, nursing homes, clinics, dispensaries, veterinary institutions, animal houses, pathological laboratories, blood banks, health care facilities, and clinical establishments will have to phase out chlorinated plastic bags (excluding blood bags) and gloves by March 27, 2019.
2. All healthcare facilities shall make available the annual report on their website within two years from the date of publication of the Bio-Medical Waste Management (Amendment) Rules, 2018.
3. Operators of common bio-medical waste treatment and disposal facilities shall establish barcoding and global positioning system for handling bio-medical waste in accordance with guidelines issued by the Central Pollution Control Board by March 27, 2019.
5. The State Pollution Control Boards/Pollution Control Committees have to compile, review and analyze the information received and send this information to the Central Pollution Control Board in a new Form (Form IV A), which seeks detailed information regarding district-wise bio-medical waste generation, information on Health Care Facilities having captive treatment facilities, information on common bio-medical waste treatment and disposal facilities.
6. Every occupier, i.e. a person having administrative control over the institution and the premises generating biomedical waste shall pre-treat the laboratory waste, microbiological waste, blood samples, and blood bags through disinfection or sterilization on-site in the manner as

prescribed by the World Health Organization (WHO) or guidelines on the safe management of wastes from health care activities and WHO Blue Book 2014 and then sent to the Common bio-medical waste treatment facility for final disposal".

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## **7.5 SOLID WASTE MANAGEMENT RULES**

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### **7.5.1 Municipal Solid Wastes (Management and Handling) Rules, 2000**

Municipal Solid Waste (MSW) consists of household waste, construction and demolition debris, sanitation residue, and waste from streets. With rising urbanization and change in lifestyle and food habits, the amount of municipal solid waste has been increasing rapidly and its composition also continuously changing. It was reported that 70% of the Indian cities lack adequate capacity to transport MSW and there are no sanitary landfills to dispose of the waste. The existing landfills are neither well equipped nor are not lined properly to protect against contamination of soil and groundwater. Over the last few years, the consumer market has grown rapidly leading to products being packed in cans, aluminium foils, plastics, and other non-biodegradable items that cause incalculable harm to the environment.

In exercise of the powers conferred by sections 3, 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government notified the Municipal Solid Wastes (Management and Handling) Rules, 2000 to regulate the management and handling of the municipal solid wastes. These rules shall apply to every municipal authority responsible for the collection, segregation, storage, transportation, processing and disposal of municipal solid wastes.

Municipal Solid Wastes (Management and Handling) Rules, 2000 are being implemented by the municipal authorities as these authorities are responsible for the management of municipal solid waste. The Rules are in force since September 2000. Local bodies are required to ensure that solid waste generated in the city/town is managed in accordance with the provisions of the Rule relating to the collection, segregation, storage, transportation, processing and disposal. Central Pollution Control Board (CPCB) during the reporting year interacted with State Pollution Control Boards (SPCBs) and Pollution Control Committees (PCCs) in union territories and provided feedback on various aspects of the Rule. SPCBs/PCCs persuaded local bodies to seek authorization and formulate an action plan for the management of solid waste.

The municipal authority shall comply with these rules as per the implementation schedule. Municipal Solid Wastes (Management and Handling) Rules, 2000 contain four schedules and these are required to be complied with by the local bodies.

### **Schedule I**

1. Setting up of waste processing and disposal facilities
2. Monitoring the performance of waste processing and disposal facilities
3. Improvement of existing landfill sites as per provisions of these rules
4. Identification of landfill sites for future uses and making sites ready for operation.

### **Schedule II**

#### **1. Collection of municipal solid wastes**

- a) Organizing house-to-house collection of municipal solid wastes through any of the methods, like community bin collection (central bin), house-to-house collection, collection on regular pre-informed timings and scheduling by using bell ringing of musical vehicle (without exceeding permissible noise levels);
- b) Devising collection of waste from slums and squatter areas or localities including hotels, restaurants, office complexes and commercial areas;
- c) Wastes from slaughterhouses, meat and fish markets, and fruits and vegetable markets, which are biodegradable, shall be managed to make use of such wastes;
- d) Bio-medical wastes and industrial wastes shall not be mixed with municipal solid wastes and such wastes shall follow the rules separately specified for the purpose;
- e) Collected waste from residential and other areas shall be transferred to the community bin by hand-driven containerized carts or other small vehicles;
- f) Horticultural and construction or demolition wastes or debris shall be separately collected and disposed off following proper norms. Similarly, wastes generated at dairies shall be regulated in accordance with the State laws;
- g) Waste (garbage, dry leaves) shall not be burnt;
- h) Stray animals shall not be allowed to move around waste storage facilities or at any other place in the city or town and shall be managed in accordance with the State laws.

#### **2. Segregation of Municipal Solid Wastes**

The municipal authority shall organize awareness programmes for the segregation of wastes and shall promote recycling or reuse of segregated materials. The municipal authority shall undertake a phased programme to ensure community participation in waste segregation.

### 3. Storage of Municipal Solid Wastes

Municipal authorities shall establish and maintain storage facilities in such a manner as they do not create unhygienic conditions around them.

### 4. Transportation of Municipal Solid Wastes

Vehicles used for transportation of wastes shall be covered. Waste should not be visible to the public, nor exposed to an open environment preventing their scattering.

### 5. Processing of Municipal Solid Wastes

Municipal authorities shall adopt suitable technology or a combination of such technologies to make use of wastes to minimize the burden on landfill. Land filling shall be restricted to non-biodegradable, inert waste and other waste that are not suitable either for recycling or for biological processing. Land filling shall also be carried out for residues of waste processing facilities as well as pre-processing rejects from waste processing facilities. Landfilling of mixed waste shall be avoided unless the same is found unsuitable for waste processing.

#### Schedule III

Schedule III lays specifications for the selection of landfill sites and the operation of landfilling.

- a) It shall be the responsibility of the concerned municipal authority to identify the landfill sites, operation and maintenance.
- b) The selection of landfill sites shall be based on an examination of environmental issues.
- c) The landfill site shall be planned and designed with proper documentation of a phased construction plan as well as a closure plan.
- d) The landfill site shall be fenced or hedged and provided with a proper gate to monitor incoming vehicles or other modes of transportation.
- e) The landfill site shall be well protected to prevent the entry of unauthorized persons and stray animals.
- f) Wastes subjected to landfilling shall be compacted in thin layers using landfill compactors to achieve a high density of the wastes.
- g) To prevent pollution problems from landfill operations, the following provisions shall be made, namely:
  - i) diversion of storm water drains to minimize leachate generation and prevent pollution of surface water and also for avoiding flooding and the creation of marshy conditions.
  - ii) Provisions for management of leachate collection and treatment

shall be made.

- iii) Prevention of run-off from landfill areas entering any stream, river, lake or pond
- iv) Construction of a non-permeable lining system at the base and walls of the waste disposal area.
- v) A vegetative cover shall be provided over the completed site by the selection of locally adopted non-edible perennial plants that are resistant to drought and extreme temperatures. The selected plants shall have the ability to thrive on low-nutrient soil with minimum nutrient addition. The plantation is to be made in sufficient density to minimize soil erosion.

#### **Schedule IV**

Schedule IV relates to the “Standards for Composting, Treated Leachates and Incineration”.

1. The waste processing or disposal facilities shall include composting, incineration, palletization, energy recovery or any other facility based on state-of-the-art technology duly approved by the Central Pollution Control Board.
2. In case of engagement of a private agency by the municipal authority, a specific agreement between the municipal authority and the private agency shall be made particularly, for the supply of solid waste and other relevant terms and conditions.
3. To prevent pollution problems from compost plants and other processing facilities, the following shall be complied with, namely:
  - a. The incoming wastes at the site shall be maintained before further processing. To the extent possible, the waste storage area should be covered. If such storage is done in an open area, it shall be provided with an impermeable base with a facility for collection of leachate and surface water run-off into lined drains leading to a leachate treatment and disposal facility;
  - b. Necessary precautions shall be taken to minimize the nuisance of odour, flies, rodents, bird menace and fire hazard;
  - c. In case of breakdown or maintenance of plant, waste intake shall be stopped and arrangements are worked out for diversion of wastes to the landfill site;
  - d. Pre-process and post-process rejects shall be removed from the processing facility on regular basis and shall not be allowed to pile at the site. Recyclables shall be routed through appropriate vendors. The non-recyclables shall be sent to well-designed landfill site(s).

- e. In the case of a compost plant, the windrow area shall be provided with an impermeable base. Such a base shall be made of concrete or compacted clay, 50 cm thick, having a permeability coefficient less than 10<sup>-7</sup> cm/sec. The base shall be provided with a 1 to 2 per cent slope and circled by lined drains for collection of leachate or surface run-off;
- f. Ambient air quality monitoring shall be regularly carried out particularly for checking odour nuisance in the down-wind direction on the boundary of a processing plant.

### 7.5.2 The Solid Waste Management Rules, 2016

The Government has notified the new Solid Waste Management Rules, 2016 which will supersede the Municipal Solid Wastes (Management and Handling) Rules 2000. The salient features of the SWM Rules, 2016 are as follows ([https://cpcb.nic.in/uploads/MSW/Salient\\_features\\_SWM\\_Rules.pdf](https://cpcb.nic.in/uploads/MSW/Salient_features_SWM_Rules.pdf); [https://cpcb.nic.in/uploads/MSW/SWM\\_2016.pdf](https://cpcb.nic.in/uploads/MSW/SWM_2016.pdf)):

1. The jurisdiction of the rules has been extended beyond the municipal area. These rules apply to (i) Every urban local body (Megacity to Panchayat level), (ii) outgrowth in urban agglomerations, (iii) census towns as declared by the Registrar General and Census Commissioner of India, (iv) notified areas, (v) notified industrial townships, (vi) areas under the control of Indian Railways, (vii) airports/ airbases, (viii) Ports and harbours, (ix) defence establishments, (x) special economic zones, (xi) State and Central government organizations, (xii) places of pilgrims, (xiii) religious and historical importance as may be notified by the respective State government from time to time and (xiv) every domestic, institutional, commercial and any other non-residential solid waste generator situated in the areas.
2. The Waste Generators include every household, event organizers, street vendors, RWAs & Market Associations, Gated communities having more than area 5000 square metres, hotels & restaurants, etc. 3. Duties of Waste generators and Authorities:
  - i) Every Waste Generator shall segregate waste and store it separately and hand it over to Municipal workers or authorized waste pickers.
  - ii) Ministry of Environment, Forest & Climate Change shall constitute a "Central Monitoring Committee" to monitor and review every year.
  - iii) Ministry of Urban Development (MoUD) shall frame National Policy on Solid Waste Management (SWM) and coordinate with States/UTs, provide technical guidelines, financial support, training to local bodies, etc.
  - iv) Departments of Fertilizers and Chemicals shall assist in market

development for city compost and make it available to companies (3/4 bags compost: 6/7 bags Fertilizers).

- v) Ministry of Agriculture shall make flexible Fertilizer Control Order, promote utilization of compost, testing facility for compost and issue guidelines.
  - vi) Ministry of Power shall fix the tariff of power generation from the Waste-to-Energy project and ensure distribution through companies.
  - vii) Ministry of New and Renewable Energy (MNRE) shall facilitate infrastructure for waste-to-Energy plants and provide a subsidy.
  - viii) Secretary In-charge, Urban Development (state/Union Territories) shall prepare State Policy/Strategy, adopt waste reduction, reuse, recycling, recovery strategy, coordinate for state planning, identification of common/regional landfills, notify guidelines of buffer zones.
  - ix) District Collector/Magistrate shall facilitate identification of landfill site, and quarterly review the performance of local bodies.
  - x) Secretary, Panchayats performs the same functions as Secretary, Urban Development at the Panchayat level.
  - xi) CPCB shall coordinate with SPCBs/PCCs for monitoring and Annual Reports, formulation of standards, review of new technologies, prepare guidelines for buffer zones restricting residential, commercial and construction activities areas; and inter-state movement of waste.
  - xii) Local Authority/Panchayats shall prepare SWM plan with a timeline and its implementation, segregate, adopt waste reduction, reuse, recycling strategy, material recovery, processing/ disposal of Waste, user fee and levy spot fine.
  - xiii) SPCBs/PCCs shall monitor, issue authorization and regulate.
  - xiv) Manufacturers/Brand owners shall facilitate collecting back wastes of their products and provide a pouch for packaging sanitary wastes, etc.
  - xv) Industry (cement, power plant, etc.) shall use "Refused Derived Fuel" (RDF) within 100 km.
  - xvi) Operator of facilities shall follow guidelines/standards
4. The criteria and actions to be taken for solid waste management in hilly areas include avoiding landfill on the hills, making waste transfer stations, strict action for littering and constructing landfill in plain areas.
5. Criteria for waste to energy process:

- i) Non-recyclable waste having a calorific value of 1500 Kcal/kg or more shall not be disposed of in landfills and shall only be utilized for generating energy either through refuse-derived fuel or by giving away as feed stock for preparing refuse-derived fuel.
- ii) High calorific wastes shall be used for co-processing in cement or thermal power plants.

6. Time Frame for Implementation of SWM Rules:

- a) Landfill Identification: 1 year
- b) Procurement of waste processing facilities: 2 years
- c) Ensure segregation of waste: 2 years
- d) Cities up to 1 million population: 2 Years
- e) Million plus cities: 3 years
- f) Setting up sanitary landfills: 3 years
- g) Bioremediation/capping of old landfills: 5 years

7. Review of implementation of rules at various levels:

- a) MoEF&CC, Central Monitoring Committee: Every year
- b) District Collector review performance of Local authorities: Quarterly
- c) SPCBs/PCCs review implementation of Rules with DMA: half yearly
- d) Secretary In-charge, Urban Development- State level Advisory Committee: half yearly

**Check Your Progress 1**

**Note:** i) Use the space given below for your answers.

ii) Check your answers with those given at the end of the unit.

1. Explain the provisions of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.

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2. Explain the provisions of the Bio-medical Waste Management Rules, 2016.

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- .....
- .....
- .....
3. Explain the features of the Solid Waste Management Rules, 2016.

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## 7.6 LET US SUM UP

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Scientific disposal of hazardous waste through the collection, storage, packaging, transportation and treatment in an environmentally sound manner minimizes the adverse impact on public health and the environment. The hazardous waste can be disposed of through captive treatment facilities installed by the individual waste generators or Common Hazardous Waste Treatment, Storage and Disposal Facilities. Hazardous waste such as lead acid battery scraps, used oil, waste oil, spent catalyst etc. and other waste such as waste tyres, paper waste, metal scrap etc. are used as raw material by the industries involved in recycling such waste and as a supplementary resource for material and energy recovery. Accordingly, it is always preferable to utilize such waste through recycling, or for a resource recovery to avoid disposal through landfill or incineration. Unscientific disposal of hazardous and other waste through burning or incineration leads to the emission of toxic fumes comprising Dioxins and Furans, Mercury, and heavy metals, causing air pollution and associated health-related problems. Unscientific dumping of hazardous waste on land may lead to the contamination of the surface/groundwater quality, which may have severe impacts on public health and cause diseases like cancer. Hazardous Waste Management Rules are notified to ensure safe handling, generation, processing, treatment, package, storage, transportation, use reprocessing, collection, conversion, and offering for sale, destruction and disposal of hazardous waste.

Biomedical waste is medical waste, it is defined as solid waste generated during the diagnosis, testing, treatment, research or production of biological products for humans or animals. Biomedical waste includes syringes, live vaccines, laboratory samples, body parts, bodily fluids and waste, sharp needles, cultures and lancets. The main sources of biomedical waste are hospitals, medical clinics and laboratories. As per the act passed by the Ministry of Environment and Forests in 1986 & notified the Bio-Medical Waste (Management and Handling) Rules in July 1998, it is the duty of every

institution or its premises, to take all steps to ensure that waste generated is handled without any adverse effect to human health and environment. The Bio-medical Waste (Handling and Management) Rules, 1998 aim to streamline the process of waste segregation, collection, treatment and disposal.

Management of municipal solid waste involves the collection, segregation and secondary storage, transportation, treatment and final disposal of waste. Reactive, toxic, flammable, explosive or corrosive waste is called hazardous waste. Their disposal is a difficult task because they cause danger or are likely to cause danger to health and/or the environment. Municipal Solid Wastes (Management and Handling) Rules, 2000 to regulate the management and handling of municipal solid wastes. These rules shall apply to every municipal authority responsible for the collection, segregation, storage, transportation, processing and disposal of municipal solid wastes. The Solid Waste Management Rules were notified in 2016. The jurisdiction of the rules has been extended beyond the Municipal area. The Solid Waste Management Rules were notified in 2016. The jurisdiction of the rules has been extended beyond the Municipal area.

In this unit, we have discussed the key provisions of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, the Bio-Medical Waste (Management and Handling) Rules, 1998 and the Bio-medical Waste Management Rules, 2016 and the Solid Waste Management Rules, 2016.

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## 7.7 KEY WORDS

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### **Environmentally Sound Management of Hazardous Wastes:**

Environmentally sound management of hazardous wastes means taking all steps required to ensure that the hazardous wastes are managed in a manner which will protect health and the environment against the adverse effects which may result from such wastes.

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## 7.8 SUGGESTED FURTHER READING/REFERENCES

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### **Web Links**

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<https://cpcb.nic.in/bio-medical-waste-rules/>

<https://www.iwma.in/HWM%20Rules.pdf>

<https://cpcb.nic.in/rules/#:~:text=Hazardous%20Waste%20Management%20Rules%20are,and%20disposal%20of%20Hazardous%20Waste.>

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[https://cpcb.nic.in/uploads/MSW/Salient\\_features\\_SWM\\_Rules.pdf](https://cpcb.nic.in/uploads/MSW/Salient_features_SWM_Rules.pdf);

[https://cpcb.nic.in/uploads/MSW/SWM\\_2016.pdf](https://cpcb.nic.in/uploads/MSW/SWM_2016.pdf)

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## **7.9 ANSWERS TO CHECK YOUR PROGRESS**

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### **Check Your Progress 1**

1. Please refer to section 7.3
2. Please refer to section 7.4
3. Please refer to section 7.5

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## UNIT 8 GENERAL LAWS AND PROGRAMMES FOR ENVIRONMENTAL PROTECTION

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### Structure

- 8.1 Introduction
- 8.2 Objectives
- 8.3 Environmental Laws
- 8.4 General Laws for Environmental Protection
  - 8.4.1 Prevention of Food Adulteration Act, 1954
  - 8.4.2 Essential Commodities Act, 1955
  - 8.4.3 Insecticide Act, 1968
  - 8.4.4 Fertilizer Control Order, 1985
  - 8.4.5 Food Safety and Standards Act, 2006
- 8.5 Programmes for Environmental Protection
  - 8.5.1 National Health Policy, 2002
  - 8.5.2 National Rural Health Mission
  - 8.5.3 National Vector-borne Disease Control Programme
  - 8.5.4 National Tobacco Control Programme
  - 8.5.5 National Programme for Prevention and Control of Fluorosis
  - 8.5.6 National Iodine Deficiency Disorder Control Programme
- 8.6 Plant Quarantine and Animal Quarantine
- 8.7 Environmental Labels
  - 8.7.1 Ecomark
- 8.8 Let Us Sum Up
- 8.9 Key Words
- 8.10 Suggested Further Reading/References
- 8.11 Answers to Check Your Progress

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### 8.1 INTRODUCTION

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Worldwide, environmental protection is at the centre stage of planning. India is no exception. Since independence, several environmental laws were framed which are directly targeted to protect human health and the environment. The laws are the system of rules which a particular country or community recognizes as regulating the actions of its citizens/members and which it may enforce by the imposition of penalties. In this unit, we would be discussing the different laws and programmes for environmental protection. Further, we would be discussing plant and animal quarantine and environmental labels.

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## 8.2 OBJECTIVES

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After studying this unit, you should be able to:

- discuss the laws and programmes for environmental protection;
- explain plant quarantine and animal quarantine;
- explain the environmental labels and Ecomark.

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## 8.3 ENVIRONMENTAL LAWS

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The major focus of “Environmental Laws” is to protect and preserve the environment for our sustainability. Law as such is a system of rules created and enforced through governmental or social institutions to regulate the behaviour of human beings. In India, the first written evidence regarding the conceptualization of environmental laws dated back to the pre-Vedic age, when the *Manusmriti* was created. In India, along the historical timeline, several proclamations and dictums related to the environment were passed by kings and rulers. During the pre-independence British era, the environmental laws for the protection of targeted habitat, domain or specific environment emerged and evolved.

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## 8.4 GENERAL LAWS FOR ENVIRONMENTAL PROTECTION

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### 8.4.1 Prevention of Food Adulteration Act, 1954

Food is the basic need of living organisms and its quality directly influences the health, growth and development of individuals along with society. To protect human health, the Prevention of Food Adulteration (PFA) Act was enacted in 1954. The major objectives of the PFA act are to make provision for the prevention of adulteration of food; prevent the import, manufacturing, sale and distribution of adulterated and misbranded food and ultimately prevent all types of food adulteration. Under this Act, any articles used as food or drink for human consumption (excluding drugs and water) are regarded as food. PFA act has described in detail the ambits of adulterated food. Adulterated food is those which cannot fulfil the nature, quality or substance demanded by the purchaser, contains any constituents or substances (including poisonous ingredients) which are harmful or badly affect the quality of food; addition or abstraction of any substances during processing or bad storage which badly affects the quality of food; food which is unfit for human consumption due to any filthy, putrid, rotten, decomposed or diseased animal or vegetable substance or is insect-infested or is otherwise; food articles obtained from diseased animals; food items with a higher level of colouring matter or preservatives than the prescribed limits; food with sub-standard quality or purity either causing harm to health or not etc. Under PFA Act, 1954, a “Food (Health) Authority” is constituted both at the centre and state to exercise the powers and perform responsibilities within local areas as specified and assigned by notification from time to time in the

Official Gazette. PFA Act also covers misbranded food items and it covers mainly imitated or a substitute resembling authentic food which is not plainly and conspicuously labelled to indicate its true character; false information about country or place of production or manufacturing; deviation in name with respect to food item; any modification like polishing etc. to conceal the actual or real value of food; food labels with false claims or otherwise regarding content, composition and even about the manufacturer, etc. Under PFA Act, to enforce the clause, an institutional structural and functional foundation was envisaged by setting up a central committee for food standards and a central food laboratory. PFA Act also generally prohibit the import of adulterated and misbranded food. The act also clearly mentioned the prohibition of manufacturing, sale, storage etc. of adulterated, misbranded, not in accordance to the condition of the license, prohibited food declared by Food and Health authority in the interest of public health, any article of food in contravention of any other provision of this Act or any rule made thereunder, etc. The act mentioned the power of public analysts and food inspectors. It also elaborated on the procedure to be followed by food inspectors and specified the format and content of the report by public analysts. PFA Act also entrusts manufacturers, distributors and dealers to give warranty; vendors to disclose the name etc. of the person from whom the article of food was purchased. PFA Act has provision for penalties to the person or companies, who offends the rules and simultaneously elucidates the power of the court to try cases summarily. Under PFA Act, the power of the central government for giving direction and both central and state government regarding the framing of rules are clearly described.

#### **8.4.2 Essential Commodities Act, 1955**

India after its independence and with the adoption of the Indian constitution focussed on a people's welfare-centric government. Under the control and pre-liberalised period, government wish to regulate the essential commodities, due to inadequate supply and lack of competition. A severe shortage of food during the 1950s led to an amendment in the constitution by the addition of entry No.33 to list 3 of the 7th Schedule to the Constitution in 1954. Subsequently Essential Commodities Act, 1955 was passed and came into force on 1<sup>st</sup> April 1955.

The Essential Commodities Act (ECA) is an act of the Parliament of India which was enacted to ensure the easy availability of essential commodities or products to the consumers, whose supply if obstructed owing to hoarding or black marketing by unscrupulous traders would affect the normal life of the people. The Act provides for the regulation and control of production, distribution and pricing of commodities which are declared as essential for maintaining or increasing supplies or for securing their equitable distribution and availability at fair prices. This includes foodstuff, drugs, fuel (petroleum products) etc. The list of items under the Act includes drugs, fertilisers, pulses and edible oils, petroleum and petroleum products etc. The Centre can include new commodities as and when the need arises, and take them off the

list once the situation improves. The government by a notified order can declare any commodity as 'essential' for ECA, 1955. Section 3 of the Act empowers the government to control the production, supply, distribution, trade and commerce of such commodities. The Act since its enactment in 1955 has been used by the government to regulate the production, supply and distribution of a whole host of commodities it declares "essential" to make them available to consumers at fair prices. The enforcement/implementation of the provisions of the ECA lies with the state government and Union Territory Administration.

The regulatory mechanism under ECA was through licence and permit for production, storage, transport, distribution, disposable acquisition, use and consumption of an essential commodity; moderating food grains cultivation; controlling prices; prohibiting or withholding sale of any essential commodity; fixing a certain proportion of products to be sold by the stakeholder of any essential commodity to the government; regulating and prohibiting any commercial and financial transaction in food which may be detrimental to the public interest etc. Due to several reasons, many of the ECA provisions have become irrelevant and consequently, the number of essential commodities which stood at 70 in the year 1989 has been significantly reduced to only 7. ECA also states about the penalties to be imposed in case of violation of order or under circumstances of giving false statements or furnishing false records. The offender under ECA violation shall be tried only by the special court as per the Essential Commodities (Special Provisions) Act, 1981. These Special provisions have been extended by an ordinance but have now lapsed.

Under the world trade organisation (WTO) regime and in conformity with economic liberalisation, the Department of Consumer Affairs is committed to developing a single Indian common market across the country for both manufacturing and agricultural commodity. Due to the relatively more comfortable food production situation, the government reduced restrictions like licensing of dealers, limits on stock and control on movement from time to time. The government also found that restrictions only hampered the growth of the agricultural sector and the promotion of food processing industries in rapidly changing economic scenarios and liberalisation. Now, the main focus of the ECA is to regulate mainly those commodities which are essential to protect the interest of the farmers and the large section of people living below the poverty line.

### **8.4.3 Insecticide Act, 1968**

Insecticides are one of the important agrochemicals input for cultivation and farming for controlling and managing the insects and pests to minimise damage to the crops. Insecticide Act (IA), 1968 was enacted based on the recommendation of the Kerala and Madras Food Poisoning Case Enquiry Commission about deaths due to poisoning through the consumption of imported wheat contaminated by pesticides accidentally. The expert

Committee of ICAR headed by Prof. M.S. Thacker also thoroughly studied the whole question of pesticide use and proposed legislation during 1964-67.

The government of India passed IA to regulate the import, manufacturing, sale, transport, distribution and use of insecticides to prevent risk to human beings or animals and for matters connected therewith. Initially, the Ministry of Health and Family Planning was enforcing the ministry for IA, which was later transferred to the Ministry of Agriculture. The Act was brought into force in 1971. As per IA, insecticide includes any substance or such other substance or preparations intended for preventing, destroying, repelling or mitigating any insects, rodents, fungi, weeds and other forms of plant and animal life not useful to human beings. The Act has enlisted in detail the powers of the Central and State government.

The IA established a statutory board i.e., Central Insecticides Board under section 4. Central Insecticides Board's primary role is to advise the Central and State Governments on technical, and administrative matters within the Act and to carry out the other functions assigned to the Board by or under this Act. Also, the IA act provisioned to constitute a Registration Committee (1 chairman and maximum 5 members) for registration of insecticides after its scrutiny of their formulae and verifying claims as regards their efficacy and safety to human beings and animals made by the importer or the manufacturer, as the case may be. IA elaborates on the rules and procedures of insecticide registration. As envisaged in IA, any person desiring to import or manufacture insecticide has to apply to the Registration Committee for the registration of such insecticide and there shall be a separate application for each such insecticide. The Act has also allowed an aggrieved applicant to appeal against non-registration or cancellation. Besides that, the power of revision is also given to the central government in a case related to the registration of pesticides. A refusal to register any insecticide or cancellation of a certificate of registration of any insecticide shall be notified in the official Gazette and such other manner as may be prescribed.

Under this Act, the State government has the power to appoint "Licensing Officers" by notifying in the official gazette. The licensing officer has the responsibility of giving a license to any person for manufacturing or selling, stocking or exhibiting for sale or distribution of any insecticide. At any time, the licensing officer has the power of revocation, suspension and amendment to the licenses. Similar to the registration, an appeal against the decision of a licensing officer is provisioned under IA.

Central Insecticide Laboratory (CIL) was also established under Section 16 of the IA. The major function of the CIL is to analyze such samples of insecticides sent to it under the Act by any officer or authority and submission of certificates of analysis to the concerned authority; carry out such investigations as may be necessary for ensuring the conditions of Registration of Insecticides; determine the efficacy and toxicity of insecticides. Also, execute the responsibilities which may be entrusted to it

by the Central Government or by a State Government with the permission of the Central Government and after consultation with the Central Insecticides Board. Along with CIL, the Central and State government can appoint a person with the necessary suitable technical qualification as Insecticide Analysts for catering to a particular area or specific class of insecticides.

“Insecticide Inspectors” are ground-level investigators and enforcers of IA. They have the power to inquire, enter, search, seize etc. the offenders of the Act or rules made under the IA. If necessary, “Insecticide Inspectors” can stop the distribution, sale or use of an insecticide, if found in contravention of the provisions of IA or the rules made there under, for a specified period not exceeding twenty days. The procedure of execution of duty and responsibilities of “Insecticide Inspector” is described in IA. The rule under the IA act has made it compulsory for the person, if enquired, to divulge about the place where insecticides are manufactured or kept. In case of conviction, the insecticide stocks will be confiscated, as per provisions and guidelines under IA.

IA also prohibits the import, manufacture and sale of certain insecticides which are primarily misbranded, prohibited under Section 27 and not in accordance with IA act provisions. The IA has enlisted the types of offences, both by an individual or company and recommended punishments for the offenders. As per IA, no court inferior to that of a Metropolitan Magistrate or a Judicial Magistrate (first class) shall try any offence under this Act.

Use of any insecticide by any person for his household purposes or garden or in respect of any land under his cultivation is exempted from IA. Also, Central Government may, by notification in the official Gazette exempt any educational, scientific or research organization engaged in carrying out experiments with insecticides.

#### **8.4.4 Fertilizer Control Order, 1985**

Fertiliser is one of the important inputs for agriculture, which provides nutrients to the crops and plants for their survival, growth and development. The quality of fertiliser is directly linked to agricultural progress and it concerns millions of farmers in India. Apart from that, shortcomings in the fertilisers can also lead to a shortage of food grain production and therefore may affect all of us. The ultimate objective of the Fertiliser Control Order (FCO) is to support farmers and sustain agricultural production.

With the above foreground, Fertilizer (Control) Order (FCO), 1985 was promulgated under section 3 of the Essential Commodities Act to regulate trade, price, quality control and distribution of fertilizers. FCO is administered by the Department of Agriculture Cooperation, Government of India. FCO lays down what substances qualify for use as fertilizers in the soil, product-wise specifications, methods for sampling and analysis of fertilizers, the procedure for obtaining license/registration as manufacturer/dealer in fertilizers and conditions to be fulfilled for trading

thereof etc. Like any other Act or order, FCO has defined several terminologies related to fertilisers like fertilisers, compound or complex fertilisers, a mixture of fertilisers etc.; its forms and quality of fertilisers like granulated mixtures, grade-nutrient element contents (%) in the fertilizer, etc. It also established the "Certificate of Source" which reveals the source from which fertilizer for purpose of the sale is obtained.

Under FCO, the central government regulate the equitable distribution of fertilisers at a fair price by notifying in the official Gazette, fixing the maximum prices or rates at which any fertilizer may be sold by a manufacturer, importer, dealer, or a pool handling agency. Also, based on the situation in an area or state, the government can regulate the period of storage, differential allocation and prices of fertilisers for different classes of consumers. It prohibits the selling of fertilisers above the maximum price or rate fixed. Both Central and State governments by notification can constitute an advisory committee i.e., "Central Fertilizer Committee" and "State Fertilizer Committee" to seek advice from time to time in matters related to FCO.

FCO enforce registration of dealers of fertilisers (including a manufacturer, an importer, a pool handling agency, a wholesale dealer, a retail dealer and an industrial dealer) mandatory under and in accordance with the terms and conditions of a certificate of registration granted under clause 9. The registration procedure, its validity, revocation or refusal and renewal are also mentioned in FCO.

Similar to the registration of dealership, FCO outlines the process for registration of manufacturers of a mixture of fertilisers, condition for the grant, period of validity, refusal, renewal procedure etc. of registration certificate of the manufacturer. A registering authority or controller may suspend or cancel such certificate on specified grounds.

Ensuring the quality of fertilisers to the users is an important target of FCO. For the same, as per clause 19 of FCO, it restricts manufacture/import for sale, sell, offer for sale, stock or exhibit for sale or distribute any fertilizer or mixtures of fertilizers or which is not of prescribed standard. It prohibits the sale, offers for sale, stock or exhibit for sale or distribution of adulterated fertilisers. The non-adherence of packaging and marking of fertilisers in the manner laid down in FCO will restrict the marketing of fertilisers. FCO also specify about the specifications in respect of imported fertilizers. Manufacturers/importers and pool handling agencies have to compulsorily comply with certain requirements regarding packing and marking etc. It also envisaged requirements for laboratory facilities by manufacturers of fertilisers. FCO also regulate fertiliser quantity sale by notifying about the restriction on sale/use of fertilizers and bulk sale of fertilizers.

Like any other order or Act, FCO establishes enforcing agencies or offices or officers to implement, execute and enforce the statutory guidelines. Appointment of registering authority and inspectors along with their

qualification, powers etc. are given in FCO. Fertilizer samples are drawn periodically by fertilizer inspectors of State Governments to check their quality as per the parameters prescribed in the FCO. In the case of imported fertilizers, the fertilizer inspectors of the Central Government draw samples from ships/containers. Fertiliser samples drawn by Inspector shall analyse in accordance with the instruction contained in Schedule II (Part B) in the "Central Quality Control and Training institute, Faradized or Regional Fertilizer Control Laboratories at Bombay, Madras or Kalyani (Kolkata) or in any other laboratory notified for this purpose by the State Government by qualified fertilisers analysts. There is a clear-cut time limit for analysis and communication of results. State Governments are empowered under the FCO to take appropriate administrative and legal action against those not complying with the provisions prescribed in the Order.

In 2017, the FCO, 1955 has been amended and henceforth after its notification called as Fertiliser (Control) Amendment Order, 2017. The most important change in terms of including the words "inorganic, organic and mixed" after fertilisers in the FCO order. Also, the quality specification for Neem Coated Urea (NCU) and Neem oil utilised for the production of NCU has been amended.

#### **8.4.5 Food Safety and Standards Act, 2006**

Food is a basic requirement for the survival of any living organism, including human beings. With a growing population worldwide, especially in the developing world (including India), demand and sources of food are growing very fast. To ensure the health of the human population, there is an important need to ensure food safety, not only in terms of quantity but also good quality. Also, under liberalised economy, food safety and standards are important for the global food trade. With this background, Food Safety and Standard Act (FSSA), 2016 was framed and enacted.

The objectives of FSSA are to consolidate the laws relating to food and to establish the Food Safety and Standards Authority of India (FSSAI) for laying down science-based standards for articles of food and to regulate their manufacture, storage, distribution, sale and import, to ensure availability of safe and wholesome food for human consumption and matters connected therewith or incidental thereto. FSSA, 2016 is an umbrella Act which subsumed 8 older acts related to food safety like the Prevention of Food Adulteration Act (1954), Fruit Products Order (1955), Meat Food Products Order (1973), Vegetable Oil Products (Control) Order (1947), Edible Oils Packaging (Regulation) Order (1988), Solvent Extracted Oil, De- Oiled Meal and Edible Flour (Control) Order (1967) and Milk and Milk Products Order (1992). Under this Act, "Food" includes any substance, whether processed, partially processed or unprocessed, which is intended for human consumption and includes primary food to the extent defined in the clause, genetically modified (GM) or engineered food or food containing such ingredients, infant food, packaged drinking water, alcoholic drink, chewing gum, and any

substance, including water used into the food during its manufacture, preparation or treatment. The FSSA excludes from the food category any animal feed, live animals if they are not prepared or processed for placing on the market for human consumption, plants, before harvesting, drugs and medicinal products, cosmetics, narcotic or psychotropic substances, etc.

FSSA has mentioned and defined relevant terminology, which is related to food safety and its standards. The terms related to food are adulterant, contaminants, extraneous matter, food additive, infant food, infant milk substitute, ingredient, misbranded food, primary food, substance, sub-standard and unsafe food etc. Under the Act, several functionaries are also stated: Food Authority i.e., Food Safety and Standards Authority of India established under section 4, Chairperson of Food Authority, Commissioner of Food Safety (appointed under section 30), Designated Officer (appointed under section 36), Food Analyst (appointed under section 45), food business operator, Food Safety Officer (appointed under section 37), manufacturer, Food Safety Appellate Tribunal (established under section 70) etc. The major responsibilities of different functionaries are elaborated in the Act like 'food safety audit'- means a systematic and functionally independent examination of food safety measures adopted by manufacturing units to determine whether such measures and related results meet with objectives of food safety and the claims made in that behalf; risk analysis-assessment-communication and management. FSSA defined risk as the probability of deleterious impact on the health of consumers of such food and the severity of that effect, consequential to a food hazard.

Within FSSA, an autonomous body called Food Safety and Standards Authority of India (FSSAI) is established under the Ministry of Health and Family Welfare, Government of India. The most important role of FSSAI is to protect and promote public health through the regulation and supervision of food safety. The Chairperson and Chief Executive Officer (CEO) are the most important executive position of FSSAI along with 22 members. The CEO is the legal representative of the Food Authority. In India, FSSAI is only responsible for setting and prescribing standards for food. The statutory powers bestowed under FSSA to the FSSAI are framing 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, and contributing to the development of international technical standards in food, collecting and collating data regarding food consumption, contamination, emerging risks etc. and disseminating information and promoting awareness about food safety and nutrition in India. FSSA has also stated the terms and conditions of qualification, composition, selection, terms of office, removal etc. of FSSAI officers and other employees. The Food Authority can also establish Central Advisory Committee, Scientific Committee etc. along with their detailed procedure. FSSA documents the duties, functions, and proceedings of the Food Authority. Central Government has the power to issue directions to

Food Authority and obtain reports and returns.

FSSA highlights general principles to be followed in the Administration of Act. The Central Government, the State Governments, the Food Authority and other agencies shall be guided by principles given under the Act. The most fundamental principle is to endeavour to achieve an appropriate level of protection of human life and health and the protection of consumer interests, including fair practices in all kinds of food trade regarding food safety standards and practices. The mechanism to adhere to the principle is through risk assessment and its science-based management to prevent, reduce or eliminate that risk.

FSSA has also enumerated general provisions for food articles like food additives and processing aid; Contaminants, naturally occurring toxic substances, heavy metals, etc. and GM foods, organic foods, functional foods, proprietary foods etc. According to FSSA, no article of food shall contain any contaminant, naturally occurring toxic substances or toxins or hormones or heavy metals in excess of such quantities as may be specified by regulations. Also, the Act reflects on packaging and labelling of foods and restrictions of advertisement along with prohibition to unfair trade practices.

FSSA also regulates all imports of articles of food and enforces that no person shall import into India any unsafe or misbranded or sub-standard food or food containing extraneous matter. To ensure food safety, the Act also fixes the responsibilities of the food business operator; liability of the manufacturers, packers, wholesalers, distributors and sellers and food recall procedures. The Act also specify the guidelines regarding licensing and registration of food business.

The Food Authority and the State Food Safety Authorities are the enforcing agency of this Act. State Government appoints the Commissioner of Food Safety for the State for efficient implementation of provisions, rules and regulations of FSSA. Commissioner of Food Safety appoints "Designated and Food Safety Officers". Designated Officers can issue 'improvement notice' to food business operators and may suspend any licence forthwith in the interest of public health. Food Safety Officers operate within specified jurisdiction area of the State and have the power to search, investigate, take samples, and seize any articles of food which appears to be in contravention of this Act or the regulations made thereunder. In case of violation of the FSSA provisions and guidelines, the prosecution can be initiated based on the findings of Food Safety Officers, Designated Officers, Food Analysts and Commissioner of Food Safety.

FSSAI lays down procedures and guidelines for notification of the accredited laboratories as per ISO17025 and it can be classified as FSSAI notified NABL accredited labs, State Labs and Referral Labs. Food Analysts working in these laboratories undertake analysis of samples as mentioned under this Act. The Food Analysts are appointed by the Commissioner of Food Safety and different Food Analysts may be appointed for different articles of food.

Food Authority also provides recognition to organisations or agencies for food safety audits and checks compliance with food safety management systems. Food Safety Management System includes Good Manufacturing Practices (GMPs), Good Hygienic Practices (GHP's), Hazard Analysis and Critical Control Point (HACCP) and such other practices as may be specified by regulation, for the food business.

The FSSA elaborates on the different types of offences like for sale or stores or selling or distributing or imports food, not of the nature or substance or quality demanded, sub-standard food, misbranded food, food containing extraneous matter, unsafe food etc. and recommends for penalties and punishments. It also provisioned penalties for misleading advertisement, failure to comply with the directions of the Food Safety Officer, and possessing adulterants. Punishment is recommended in cases like interfering with seized items, for false information, obstructing or impersonating a Food Safety Officer, carrying out a business without a licence etc.

The legal framework under FSSA is through notification of Adjudicating Officer by the State government not below the rank of Additional District Magistrate of the district. Adjudicating Officer shall have the powers of a civil court. Central Government or State Government may establish one or more tribunals i.e., Food Safety Appellate Tribunal to hear appeals from the decisions of the Adjudicating Officer under section 68. Special courts can be notified under specified circumstances and Public Prosecutor can be appointed. The aggrieved has the right to appeal before High Court and it shall be disposed of by a bench of not less than two judges.

FSSA in its chapter XI described the finance, account, audit and report of FSSAI or Food Authority. FSSA has also specified in detail the power of Central and State governments to make rules, the power of Central Government to give directions to State Governments etc. FSSA has an overriding effect over all other food-related laws.

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## **8.5 PROGRAMMES FOR ENVIRONMENTAL PROTECTION**

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### **8.5.1 National Health Policy, 2002**

Health is one of the most important factors which influences the quality of life, and life expectancy and is therefore related to the human development index (HDI) of a country. A healthy population of a nation are like an asset and an essential prerequisite for socio-economic sustainable growth and development. In India, National Health Policy was promulgated in 1983, which helped in improving discernible changes in important determinant factors relating to health like demographic (life expectancy, crude birth and death rate, IMR), epidemiological (eradication of Guinea worm) and health infrastructural parameters (number of primary health centres, hospitals, doctors per thousand persons etc.). But, the target of "Health for All by the

year 2000 AD” under National Health Policy, 1983 was assessed to be too ambitious due to several factors (mainly financial constraints). With this background, National Health Policy-2002 was promulgated to provide a boost and impetus to health sectors in India.

The main focus of the National Health Policy, 2002 is to ensure equitable access to health services across the social and geographical expanse of the country. The policy emphasized increasing the aggregate public health investment through a substantially increased contribution by the Central Government. The priority would be on preventive and curative initiatives at the primary health level through an increased sectoral share of allocation. Health being under the "State List", the contribution of the central government to the overall public health funding has been limited to about 15 per cent before the implementation of NHP-2002. NHP-2002 policy targets to increase health sector expenditure to 6 per cent of GDP in long term and at least 2 per cent of GDP contribution towards public health investment by the year 2010. By 2010, the policy also planned to increase the share of the Central Government's contribution to 25 per cent. The NHP-2002 policy affirmed to strengthen the decentralized public health services in the country and hence there is a need for infusion of substantial resources into the health sector from the Central Government Budget.

NHP-2002 envisaged an increase in the sectoral outlay in the primary health sector to reduce inequities and imbalances of health facilities and infrastructure among different regions, rural versus urban and between economic classes in the most effective method. Therefore, an increased allocation of 55, 35 and 10 % of the total public health investment were planned for the primary, secondary and tertiary health sectors respectively. NHP focus on the primary health sector will facilitate affordability and accessibility of health facilities to a vast number of individuals in a cost-effective manner.

NHP-2002 envisaged the gradual convergence of all health programmes under a single field administration. Also, it underlines the key role of the Central Government in designing national health programmes with the active participation of the State Governments. The Policy envisages that autonomous bodies at State and district levels should be engaged in the implementation of the programme. The role of the State government was proposed to be limited to monitoring and technical issues of the programme. To infuse dynamism into the health sector, the multi-tasking health staff was envisaged and it was proposed that all rural health staff should be available for the entire gamut of public health activities at the decentralized level. For the same, training and re-orientation of health staff were also proposed.

NHP-2002 also described and discussed the public health infrastructure. The document reported that in large parts of India, decentralized public health service outlets have become practically dysfunctional. Due to resource constraints, the supply of drugs by the State Governments is grossly

inadequate and it was found that the unavailability of drugs also discourages patients to utilize diagnostic services and seeking the advice of the medical professionals in the public health system. Against this backdrop, the NHP envisages kick-starting the revival of the Primary Health System by providing some essential drugs under Central Government funding through the decentralized health system. To cope with the scientific advancement of health science, the policy recognized the need for more frequent in-service training for public health medical personnel like medical officers, paramedics, etc. Based on global experience about the positive relationship between the quantum of investment in the primary health sector and improved public health indices, the policy places great reliance on the strengthening of the primary health structure for the attaining of improved public health outcomes on an equitable basis by committing additional aggregate financial resources.

The NHP envisaged the means of extending public health services. For that, the need for expanding the pool of medical practitioners was proposed. It suggests for inclusion of practitioners of Indian Systems of Medicine and Homoeopathy. The policy emphasized simplification of recruitment, services/procedures, and rules of contract employment to practitioners, even outside their disciplines, as part of the basic primary health services in under-served areas. It also issued a guideline to State for making mandatory two-year rural posting before the award of a degree.

NHP-2002 laid great emphasis upon the implementation of public health programmes through local self-government institutions and also agreed to increase financial allocation for disease control programs by the Central government. The policy also introduced minimum statutory norms for health care personnel. The Policy also envisaged setting up Medical Grant Commission to set up new medical colleges and upgrade the existing infrastructure. It also emphasized the purpose of improvement of quality of medical practitioners in terms of their theoretical and practical exposure. For that, the Policy identifies need-based modification in the existing curriculum, more toward skill-oriented syllabus and practical training.

The policy focused more on increasing specialists in public health and family medicine. In the interest of patient care, the policy emphasizes the need for an improvement in the ratio of nurses vis-à-vis doctors/beds. The policy emphasized the requirement of promoting the use of generic drugs and vaccines over propriety drugs. NHP-2002 also provides support for National Programme for Universal Immunization against Preventable Diseases, by proposing not less than 50% of the requirement of vaccines/sera be sourced from public sector institutions.

NHP-2002 envisages the setting up of a two-tiered organized urban primary health care structure. The policy envisages joint funding for the urban primary health system by the local self-government institutions and State and Central Governments. NHP – 2002 envisages a network of urban-centric

trauma care networks and decentralized mental health services. NHP-2002 also delved into information, education and communication (IEC) policy. It also targets to increase in Government-funded health research programs. In principle, NHP-2002 encourage the participation of the private sector in all areas of health activities – primary, secondary or tertiary. Simultaneously, it also envisages suitable legislation for regulating minimum infrastructure and quality standards in clinical establishments/medical institutions by the private sector. NHP-2002 recognizes the significant contribution made by NGOs and other institutions of the civil society in making available health services to the community. NHP-2002 also promulgate about setting up of a national disease surveillance network. The policy also envisaged environmental and occupational health, health statistics, identification of specific programmes targeted at women's health, a contemporary code of ethics, enforcement of quality standards for food and drugs, regulation of standards for para-medical disciplines etc.

In 2017, National Health Policy (NHP-2017) was promulgated and the Policy seeks to reach everyone in a comprehensive integrated way to move towards wellness. It aims at achieving universal health coverage and delivering quality health care services to all at an affordable cost. The NHP, 2017 advocates a positive and proactive engagement with the private sector for critical gap filling towards achieving national goals. The policy aspires to provide at the district level most of the secondary care which is currently provided at a medical college hospital. The policy emphasizes reorienting and strengthening the Public Health Institutions across the country, to provide universal access to free drugs, diagnostics and other essential healthcare.

### **8.5.2 National Rural Health Mission**

India is getting more and more urbanised with the progress of time. But the rural area is lagging in terms of infrastructure, amenities and development parameters than the urban cities. This is equally true in terms of health. With this background, to support the basic need of the rural population, National Rural Health Mission was launched in the year 2005. The NRHM is now under National Health Mission. NRHM focus on programmes to address the health needs of under-served rural areas. Based on health indicators, 18 states were initially identified under this mission. Under the NRHM, the Empowered Action Group (EAG) States as well as the North Eastern States, Jammu and Kashmir and Himachal Pradesh have been given special priority. NRHM now operates in all the States of India.

The main goals and objectives of NRHM are reduction in Infant Mortality Rate (IMR), Maternal Mortality Ratio (MMR), support for universal access to public health services like women & child health, water, sanitation, nutrition and immunisation, prevention of communicable and non-communicable diseases, promotion of healthy lifestyle, strengthen AYUSH, population stabilisation, gender and demographic balance, etc.

The main thrust of NHRM is on establishing a fully functional, community-owned, decentralized health delivery system with inter-sectoral convergence at all levels, to ensure simultaneous action on a wide range of determinants of health such as water, sanitation, education, nutrition, social and gender equality. Institutional integration within the fragmented health sector was expected to provide focus on outcomes, measured against Indian Public Health Standards for all health facilities.

The apex institutional framework of the mission in the centre is through Union Minister for Health & Family Welfare and an Empowered Programme Committee (EPC) headed by the Union Secretary for Health & Family Welfare and State Health Mission headed by the Chief Minister. The functions of the Mission would be executed through the State Health & Family Welfare Society. The intermediate district-level institutional body framed under the mission is District Health Mission (DHM) headed by the Chairperson, Zila Parishad and to support it every district will have an integrated District Health Society (DHS). It will have the District Collector as the Co-Chair and Chief Medical Officer as the Mission Director.

The NRHM envisaged bottom grassroot level workers as Accredited Social Health Activists (ASHAs) as community volunteers, which will establish a link between the community and the health system. ASHA is acting as a basic structural and functional unit of mission and fulfils the health-related demands of underprivileged sections of the population, especially women and children, who find it difficult to access health services in rural areas. The Auxiliary Nurse Midwives (ANMs) at health sub-centres, working under primary health centres guide ASHAs on aspects of health care and are regarded as the first contact person between the community and the health services. Also, the mission targets to train and enhance the capacity of Panchayat Raj Institutions (PRIs) to own, control and manage public health services. It also targets integrating vertical Health and Family Welfare programmes, developing capacities for preventive health care, promoting the non-profit sector, particularly in under-served areas etc. The core strategies of the mission are to strengthen sub-centre and facilitate their local planning and action and more importantly develop a cadre of Multi-Purpose Workers (MPWs). The mission also supports strengthening existing Primary Health Centres (PHCs) and Community Health Centres (CHCs). The mission establishes Rogi Kalyan Samiti (Patient Welfare Committee)/Hospital Management Society for community management of public hospitals. Through Village Health Sanitation and Nutrition Committees (VHSNC), the mission targets to increase their involvement with the local communities to address the needs of poor households and children.

Under NRHM, to decrease neonatal and maternal deaths, Janani Suraksha Yojana (JSY) focus on promoting the institutional delivery of babies. Reproductive and Child Health (RCH) Programme under Nation Rural Health Mission and its major component are maternal health, child health, immunization, family planning, Adolescent Health (AH) and PC-PNDT. The

RCH, launched in 2005, establishes partnerships with the state governments and is consistent with the government's National Population Policy-2000 and the National Health Policy-2001. Now, NRHM is operating under National Health Mission.

### **8.5.3 National Vector-borne Disease Control Programme**

National Vector-borne Disease Control Programme (NVBDCP) is one of 13 national health programmes operating under the Ministry of Health and Family Welfare, Government of India. At present, the NVBDCP is an umbrella programme for the prevention and control of Vector-borne diseases mainly Malaria, Dengue, Chikungunya, Japanese Encephalitis, Kala-Azar and Filaria (Lymphatic Filariasis). The Directorate of the National Vector-borne Diseases Control Programme is responsible for framing technical guidelines, assistance, policies and assistance to the States in form of cash and commodity for the implementation of the Programme. The Directorate is also responsible for budgeting and planning the logistics pertaining to the central sector. The States are responsible for the implementation of the programme and health being a state subject, the vector-borne diseases control component works under the Directorate of Health Services with stipulated technical components. At the district level, District level offices like District Malaria Offices have been established and it operates under District Chief Medical and Health Offices by the states. At present 565 District Malaria Units are functioning in India.

The major agenda of the NVBDCP is to early diagnose with complete treatment promptly, propagate an integrated vector management system, capacity building at each level of the health care system and promote research related to vector-borne diseases and monitoring and evaluation of the programme. The strategies for prevention and control of vector-borne diseases under NVBDCP include “Integrated Vector Management”, “Disease Management” and “Supportive Intervention”. National Dengue Day is celebrated on the 16<sup>th</sup> May of each year to increase community awareness about the prevention of dengue before the onset of monsoon in India.

### **8.5.4 National Tobacco Control Programme**

Tobacco is the product prepared from the leaves of tobacco plants (*Nicotiana* species) and it contains nicotine-a stimulant alkaloid. The use of tobacco mainly for smoking and chewing causes harm to human health and aggravate diseases related to the heart, lungs, liver etc. The alarm about the ill effects of tobacco consumption was highlighted by the World Health Organization (WHO) naming tobacco as the world's single greatest preventable cause of death in the year 2008. Globally, about 6 million people die due to tobacco use. India is the second largest producer and consumer of tobacco. In India, apart from about 0.9 million death each year due to diseases related to tobacco use, 50 % of male and 25 % of female cancer are associated with tobacco. The ramification of tobacco use is not only limited to adverse effects

on health, it also badly affects the socio-economic, and educational conditions of many families. India, being party to WHO Framework Convention on Tobacco Control (FCTC), initiated several steps to control and manage the menace of tobacco. The National Tobacco Control Programme (NTCP) was launched in 2007 - 08 under the 11<sup>th</sup> Five Year Plan under the Ministry of Health and Family Welfare (MoHFW) in 42 districts of 21 States/UT of India.

The main objectives of NTCP are awareness creation about the harmful effects of tobacco use and to facilitate effective implementation of the Tobacco Control Laws. The NTCP also targets a reduction in the production and supply of tobacco products. This is a centrally sponsored scheme for all the states. The major activities undertaken under the NTCP are organising public awareness campaigns; monitoring, evaluation and research; adviser and inter-sectoral linkages; training and capacity building of multiple stakeholders; ensuring effective implementation of the provisions made under "The Cigarettes and Other Tobacco Products (Prohibition of Advertisement and Regulation of Trade and Commerce, Production, Supply and Distribution) Act, 2003" (COTPA); setting up and expansion of tobacco cessation centres to help people quit tobacco etc. Section-5 of the COTPA prohibits all forms of advertisement (direct/indirect/surrogate), promotion and sponsorship of tobacco products.

NTCP through State Tobacco Control Cells, District Tobacco Control programme, tobacco product testing labs, Adult Tobacco Survey (ATS) etc. work towards effective implementation of the programme. The National Tobacco Control Cell (NTCC) is responsible for overall policy formulation, planning, implementation, monitoring and evaluation of the different activities envisaged under the National Tobacco Control Programme (NTCP). Joint Secretary/Director rank in charge of MoHFW, GOI guides and supervise the NTCC activities. NTCC has developed and implemented a quarterly reporting format and therefore increases monitoring and both qualitative and quantitative enforcement of NTCP.

### **8.5.5 National Programme for Prevention and Control of Fluorosis**

Fluorosis is a health problem caused due to excessive intake of fluoride through drinking water/food products/industrial pollutants over a long period. It results in major health disorders like dental fluorosis, skeletal fluorosis and non-skeletal fluorosis or fluoride toxicity due to its depositions in soft or hard tissues of the body. Fluorosis problem is observed worldwide and endemic to at least 25 countries, including India. In India, about 230 districts are affected due to high levels of fluoride, mostly in groundwater. Based on the extent and alarming problem of fluorosis, the National Programme for Prevention and Control of Fluorosis (NPPCF) was initiated during the 11th Five Year Plan (2008-09), to prevent and control fluorosis in the country. About 195 districts are covered under NPPCF and during the 12<sup>th</sup> Five Year Plan period

it is working under the non-communicable disease Flexi-pool of the National Health Mission (NHM).

The major objectives of NPPCF are to evaluate and utilize the baseline survey data regarding fluorosis generated by the Ministry of Drinking Water and Sanitation; integrated and comprehensive management of fluorosis in the selected areas; capacity building for prevention, and diagnosis and management of fluorosis cases.

The strategies followed under the programme **are** surveillance of fluorosis in the community; human resource capacity building; establishment of diagnostic facilities in the district; health education for prevention and control of fluorosis cases; management of fluorosis cases including supplementation, surgery and rehabilitation; health education for prevention and control of fluorosis cases.

The following activities are regularly conducted within NPPCF program like

- Community Diagnosis of Fluorosis village/block/cluster wise.
- Facility mapping from prevention, health promotion, diagnostic facilities, reconstructive surgery and medical rehabilitation point of view – village/block/district wise.
- Gap analysis in facilities and organization of physical and financial support for bridging the gaps, as per strategies listed above.
- Diagnosis of individual cases and providing its management.
- Public health intervention based on community diagnosis- behaviour change by IEC and training.

### **8.5.6 National Iodine Deficiency Disorder Control Programme**

Worldwide, iodine deficiency disorders constitute the single largest cause of preventable brain damage. The consequences of deficiency disorders are invisible and irreversible but can be prevented. Deficiency of iodine can cause physical and mental retardation, cretinism, abortions, stillbirth, deaf mutism, squint and various types of goitres. In India, about 337 districts are affected with Iodine Deficiency Disorders (IDDs) with a prevalence rate of more than 5 %.

In light of the above facts, National Iodine Deficiency Disorder Control Program was launched in 1992, as a successor to National Goiter Control Program (1962). The specific goal of the National Iodine Deficiency Disorder Control Programme (NIDDCP) is to bring the prevalence of IDD to below 5% and ensure 100% consumption of adequately iodized salt (15ppm) at the household level. Central Nutrition and Iodine Deficiency Disorder Cell at the Directorate General of Health Services under the Ministry of Health & Family Welfare is the nodal agency for the implementation of NIDDCP. The Centre provides financial support for manpower involved in the programme at the State IDD cell and monitoring laboratory; health education and

publicity activities including global IDD day activities (each year on 21<sup>st</sup> October); for conducting district IDD survey/resurvey to assess the magnitude of IDD; procurement of salt testing kits etc.

The major objectives of the NIDDCP are to survey assessing the magnitude of IDD at the district level; supply iodized salt in place of common salt; resurveys to assess iodine deficiency disorders and the impact of iodized salt after every 5 years in the districts; laboratory monitoring of iodized salt and urinary iodine excretion; health education and publicity about iodine deficiencies and disorders and related issues.

The other relevant action taken by the government to prevent iodine deficiency and disorders is making all salts iodized since 1986 and banning the sale of non-iodized salt under the Food Adulteration Act (1954) since 2006.

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## **8.6 PLANT QUARANTINE AND ANIMAL QUARANTINE**

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The dictionary meaning of quarantine is "a state, period, or place of isolation in which people or animals or plants that have arrived from elsewhere or been exposed to the infectious or contagious disease are placed. Quarantine is a state of enforced isolation. In India, Plant Quarantine regulatory measures are operative through the Destructive insects & pests Act, 1914 (Act 2 of 1914). The importance of Plant Quarantine has increased because of Globalization and liberalization in the international trade of plants and plant materials and the signing of the Sanitary and Phytosanitary (SPS) Agreement under WTO by India. International Plant Protection Convention (IPPC), 1951 agreement and guidelines are necessary to be followed for exportable agricultural commodities, while getting the phytosanitary certification. Also, International Standards for Phytosanitary Measures (ISPM) prepared under IPPC as a guiding document of the United Nations Food and Agriculture Organization's (UN-FAO) global programme of policy and technical assistance in plant quarantine should be followed for plant quarantine-related issues.

The main objective of plant quarantine is the inspection of imported agricultural commodities for preventing the introduction of exotic pests and diseases inimical to Indian fauna and flora through the implementation of the DIP Act, 1914 and the Plant Quarantine (Regulation of Import into India) Order, 2003 issued under DIP Act; inspection of plants and plant material meant for export as per the requirements under International Plant Protection Convention (IPPC) 1951 of FAO to facilitate pest free trade and detection of exotic pests and diseases for their containment by adopting domestic quarantine regulations, if introduced. Plant quarantine is enforced through the Directorate of Plant Protection, Quarantine and Storage within the Department of Agriculture, Co-operation and Farmer Welfare, Ministry of Agriculture and Farmer Welfare, Government of India. The major role and activities undertaken by the officials toward the implementation of plant

quarantine are as follows,

- i) To issue import permits with additional declarations and special conditions to facilitate safe imports of agricultural products.
- ii) To undertake quarantine inspection and laboratory testing of plants and plant material to ensure freedom from exotic pests.
- iii) To undertake phytosanitary certification (for issuance of Phytosanitary Certificates).
- iv) To undertake fumigation/disinfestations/disinfections of commodities to control infestation/infection.
- v) To undertake certification of post-entry quarantine facilities and inspection of imported growing plants and plant material.
- vi) To support Export market access for India's agriculture products from the phytosanitary point of view.
- vii) To facilitate safe global trade in agriculture by assisting the producers and exporters by providing a technically competent and reliable phytosanitary certificate system to meet the requirements of trading partners.
- viii) To provide Grants-in-aid to Designated Inspection Authorities to meet the travel expenses and also to State PSC issuing authorities for equipping them with minimal equipment required for export inspection/certification.
- ix) Approving/accreditation of treatment providers in line with the requirement of International Standards for Phytosanitary Measures (ISPM) number 15.
- x) To undertake Pest Risk Analysis (PRAs) of different agricultural commodities with respect to their import or export in relation to the countries concerned.

The Plant Quarantine Order describes various aspects and conditions of import of agricultural articles (plants and plant products) into India, like in Schedule I -points of entry for imports of plants/plant materials and other articles, Schedule IV - list of plants/planting materials and countries from where import is prohibited, Schedule VIII - list of quarantine weed species are described. In India, plant quarantine specifies standard operating procedures (SOP) like SOP for post-entry quarantine inspection etc. and National Standard for Phytosanitary Measures like Quarantine Treatments and Application Procedures. For the plant quarantine, 35 quarantine stations at different International Airports, Seaports and Land frontiers are operating in India. Plant Quarantine Information System (PQIS) disseminates information regarding quarantine-related matters.

In India, like plant quarantine, animal quarantine through Animal Quarantine and Certification Services (AQCS) is also focused on preventing the ingress of dangerous exotic diseases into the country through imported livestock and livestock products. The oldest act related to animal quarantine in India dates back to the Livestock Importation Act, 1898, which was amended in the year 2011 and enacted as Livestock Importation (Amendment) Act, 2011. The remarkable difference in the amendment act was made through the insertion of the "Livestock Product" word and it broaden the enforcement areas of animal quarantine to meat and meat products, egg and egg powders, milk and milk products, bovine, ovine, caprine, embryo, ova, semen, pet food products of animal origin etc.

The major motto of animal quarantine is to prevent the ingress of any exotic livestock diseases into India through the importation of livestock and livestock products as per the provisions of the Livestock Importation Act (Act No. IX. of 1898) as amended by the Livestock Importation (Amendment) Act, 2001 (5.7.2001) and the regulations orders and agreement on the application of Sanitary and Phytosanitary Measures (SPS) standards; to provide an internationally accepted certification service for augmenting export and to play an important role to increase international trade of livestock and livestock products; to inspect and register the plants/mills exporting the animal by-products.

For AQCS, 6 quarantine stations have been established in New Delhi, Kolkata, Mumbai, Chennai, Bangalore and Hyderabad. The animal-based laboratories like High-Security Animal Disease Laboratory (HSADL), Bhopal, National Research Centre on Equines (NRCE), Hissar, Central Disease Diagnosis Laboratory at IVRI, Bareilly, Regional Disease Diagnosis Laboratory, NABL accredited laboratories along with Veterinary colleges helps in executing AQCS.

Animal quarantine under AQCS classified and categorized livestock or livestock products as 'restricted items'- which need an import license from the Directorate General of Foreign Trade (DGFT), 'free items'- requiring a Sanitary Import Permit (SIP) from the Department of Animal Husbandry, Dairying and Fisheries and 'prohibited" in view of disease status. The export and import (EXIM) procedure under the AQCS is documented and enforced during animal quarantine. Department of Animal Husbandry, Dairying and Fisheries, Government of India has laid down standard operating procedures for animal quarantine and certification services in which protocol for entry of vehicles in quarantine area with or without animal, code of conduct for animal attender or cleaner, packaging and dispatching of samples, burials, disinfection, incineration, post-mortem, entry and exit of animals etc. are documented.

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## 8.7 ENVIRONMENTAL LABELS

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The environment has emerged as one of the most important factors influencing human beings. Worldwide, the concern for the environment is increasing day by day and people are not only aware of the environment, but also are willing to propagate the agenda of sustainability. Environmental labelling is an umbrella term that describes the various means by which companies disclose information on their environmental activities. Environmental labels are an emerging philosophy and it helps in improving environmental management to ensure long-term protection, stewardship and availability of natural resources for a nation's sustainable growth. Environment labels or Eco-labels are a voluntary method of environmental performance and certification, which identifies overall proven environmental preferences of a product or service within a specific category. The Environmental Labels help to identify the overall environmental preference of a product or service. The Eco-labelled products manifest the quality control procedures like ISO 14000 and 9000. Through Eco-labelling, environmentally friendly production processes and services are promoted which saves water, phases out toxic and hazardous chemicals and optimizes material utilization and recycling. Environmental labelling also helps in improving the quality of the product and therefore increases the export market potential of the eco-labelled products.

The manufacturers generally need to follow the principles of Eco-labeling as per ISO 14020. It encompasses

- i) accurate, verifiable, relevant and non-deceptive declarations;
- ii) scientific methodology-based declarations;
- iii) life cycle-based declaration;
- iv) promote innovation for improved environmental performance;
- v) consensus with interested parties on environmental declarations; and
- vi) availability of information concerning the procedure, methodology, and any criterion used to support environmental declarations to all interested parties.

By meeting the above criteria, the companies can position their products as 'green' products. Consumers, government agencies, certification agencies, non-governmental organizations and manufacturers are having an important role in different entities in eco-labelling implementation in India.

### 8.7.1 Ecomark

Ministry of Environment and Forest, Government of India, through a resolution launched the eco-labelling scheme known as 'Ecomark' in 1991. The scheme will promote the labelling of environment-friendly products and will operate on a national basis to provide accreditation and labelling for household and other consumer products, which meet certain environmental

criteria along with quality requirements of the Indian Standards. The main aim of the Ecomark scheme is to create awareness among consumers towards identifying environmental-friendly products. An environment-friendly product is a product which is made, used or disposed of in a way that significantly reduces the harm it would otherwise cause the environment. The criteria follow a cradle-to-grave approach, i.e., from raw material extraction to manufacturing, and disposal. The 'Ecomark' label is awarded to consumer goods which meet the specified environmental criteria and the quality requirements of Indian Standards. Any product with Ecomark will be the right environmental choice.

The major targeted objectives of the scheme are:

- i) To provide an incentive for manufacturers and importers to reduce the adverse environmental impact of products.
- ii) To reward genuine initiatives by companies to reduce the adverse environmental impact of their products.
- iii) To assist consumers to become environmentally responsible in their daily lives by providing information to take account of environmental factors in their purchase decisions.
- iv) To encourage citizens to purchase products which have less harmful environmental impacts.

The ultimate objective is to improve the quality of the environment and to encourage the sustainable management of resources.

The Ecomark to a product is granted after facing the three important stages i.e.,

- 1) A steering committee under MoEF determine the product categories for coverage under the scheme and also formulates strategies for promotion, implementation, future development and improvements in the working of the scheme.
- 2) Technical committee by Central Pollution Control Board (CPCB) - to identify the specific product to be selected and the individual criteria to be adopted, including, wherever possible, inter se priority between the criteria if there be more than one.
- 3) Bureau of Indian Standards - to assess and certify the products and draw up a contract with the manufacturers, allowing the use of the label.

Any product which qualifies to get "Ecomark labels" must fulfil the following criteria like substantially less polluting potential, recyclable, saving non-renewable resources and reduction of the adverse primary criteria with minimum harmful environmental impact in comparison with other comparable products in production, usage and disposal.

The logo of Ecomark is an “earthen pot” which symbolizes the use of a renewable resource like earth, which does not produce hazardous waste and consumes little energy in making. It puts across its environmental message and the image can reach people to promote a greater awareness of the need to be kind to the environment.

**Check Your Progress 1**

**Note:** i) Use the space given below for your answers.

ii) Check your answers with those given at the end of the unit.

1. Write a short note on the Prevention of Food Adulteration Act, 1954.

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2. Write a short note on Essential Commodities Act, 1955.

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3. Write a short note on National Rural Health Mission.

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4. Write a short note on plant quarantine.

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5. Write a short note on environmental labels.

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## 8.8 LET US SUM UP

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The present unit has primarily discussed the important laws and programmes linked to the environmental protection of India. In this unit, we have discussed different laws and programmes for environmental protection; plant and animal quarantine and environmental labels.

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## 8.9 KEY WORDS

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**Insecticide:** Insecticide includes any substance or such other substance or preparations intended for preventing, destroying, repelling or mitigating any insects, rodents, fungi, weeds and other forms of plant and animal life not useful to human beings.

**Health:** Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.

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## 8.10 SUGGESTED FURTHER READING/REFERENCES

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Divan, S., & Rosenkranz, A. (2001). *Environmental Law and Policy in India*. New Delhi: Oxford University Press.

Ghosh, S. (2019). *Indian Environmental Law*. The Orient Black Swan.

Maheshwara Swamy, N. (2022). *Text Book on Environmental Law*. 2<sup>nd</sup> Edition. Asia Law House publication.

Sahasranaman, P.B. (2012). *Handbook of Environmental Law* (Second Edition). Oxford University Press.

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## 8.11 ANSWERS TO CHECK YOUR PROGRESS

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### Check Your Progress 1

1. Please refer to section 8.4.1
2. Please refer to section 8.4.2
3. Please refer to section 8.5.2
4. Please refer to section 8.6
5. Please refer to section 8.7



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