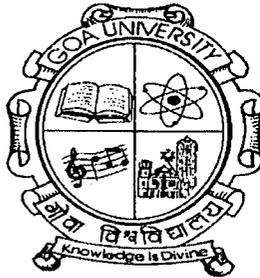


**LEGAL CONTROL OF
BIO-MEDICAL WASTE MANAGEMENT:
THE GOAN EXPERIENCE**



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DAS/Leg

A Thesis

Submitted to Goa University
for the Award of the Degree of

DOCTOR OF PHILOSOPHY

IN
LAW

By

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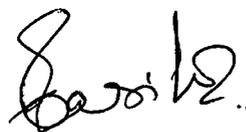
DECLARATION

I hereby declare that this thesis titled, "**LEGAL CONTROL OF BIO-MEDICAL WASTE MANAGEMENT: THE GOAN EXPERIENCE**", submitted for the award of the **Degree of Doctor of Philosophy in Law**, to Goa University, Panaji-Goa, is an original research work done by me.

I also hereby declare that this thesis or any part of it has not been submitted to any other University for the award of any Degree or Diploma or Fellowship.

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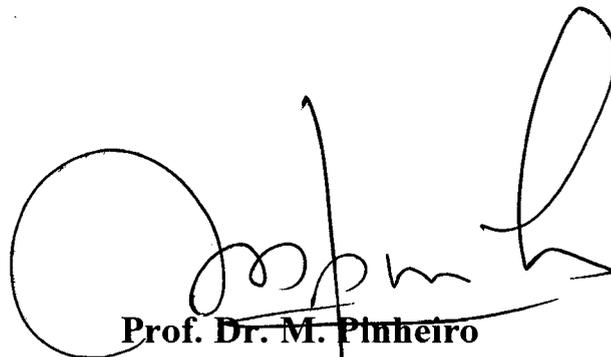
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ABBREVIATIONS

AC	Appeal cases
AIDS	Acquired Immuno Deficiency Virus
AIR	All India Reporter
ALT	Andhra Law Times
AP	High Court of Andhra Pradesh
AWC	Allahabad Weekly Cases
BomCR	Bombay Cases Reporter
BWM	Bio-Medical Waste Management
CCUs	Cardiac Care Units
CLT	Civil Law Times
Co.	Company
CPCB	Central Pollution Control Board
CrLJ	Criminal Law Journal
Dept.	Department
DLT	Delhi Law Times
EA	Environment Agency
EC	European Council
EÚ	European Union
Ed.	Edition
EPA	Environment Protection Agency
EPP	Environmental Protection Policy

EWC	European Waste Catalogue
Fig.	Figure
GLR	Gujarat Law Reporter
Gms	Grams
GSPCB	Goa State Pollution Control Board
Guj.	High Court of Gujarat
HBV	Hepatitis B or C Virus
HCW	Healthcare Waste
HIV	Human Immunodeficiency Virus
HP	High Court of Himachal Pradesh
HR	House of Representatives (In American Law)
http	Hyper Text Transfer Protocol
i.v.	Intravenous
ICUs	Intensive Care Units
Kant	High Court of Karnataka
Ker	High Court of Kerala
kg.	Kilogram
LDCs	Least Developed Countries
MACT	Maximum Achievable Control Technology
MJAFI	Medical Journal of Armed Forces of India
MoEF	Ministry of Environment and Forests
MP	High Court of Madhya Pradesh
MWTA	Medical Waste Tracking Act

NCT	National Capital Territory
NEPMs	National Environmental Protection Measures
OECD	Organisation of economic cooperation and development
OPDs	Out Patient Department
OTs	Operation Theatre
Path.	Pathology
POPs	Persistent Organic Pollutants
PVC	polyvinyl chloride
QQ	Quantity and Quality
Raj	High Court of Rajasthan
SC	Supreme Court
SCC	Supreme Court cases
Sec.	Section
UK	United Kingdom
UN	United Nations
UP	High Court of Uttar Pradesh
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
UOI	Union of India
USA	United States of America
Vet.	Veterinary
Vol.	Volume

WAC	Waste Acceptance Criteria
WCED	World Commission on Environment and Development
WHO	World Health Organisation
WLR	Weekly Law Reports (UK)
www	World Wide Web

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Chapter 1

THE PROBLEM AND ITS SETTING

1.1 Introduction

There is a telling adage which says: "We have not inherited this world from our parents; we have merely borrowed it from our children." It is a fact that the Earth is not inherited; rather it is merely to be held in trust for generations to come! Just like natural resources have to be used prudently whenever required, keeping in mind the needs of the future, the environment too has to be preserved in the best possible manner, taking all necessary precautions that science has provided. Balancing the interests of the present with those of the future has indeed become a difficult task in itself due to the selfish and unmindful tendencies of human nature. This being so, there is a constant conflict of interests with matters relating to environmental protection.

Healthcare is undoubtedly an inevitable facet of human existence. The very functioning of a healthcare establishment generates waste which in turn needs to be effectively managed. The legal control of the management of such waste in India is the focus of this study with special reference to the State of Goa during the first decade of the 21st century.

Humankind has been grappling with innumerable problems right from the day he was forced to tread on this Earth. The undaunted pursuit for survival has, no doubt, prodded him, but his vulnerability at the same time has increased manifold. The greatest challenge that man has ever faced which has enervated his might in the modern context is the environmental degradation in the form of global warming, ozone layer depletion, acid rain, famine, droughts, floods, pollution of air, water, land, etc.¹

In the pursuit of preserving the health of mankind, the human brain invented medicine and curative processes including surgery. As medical science progressed, diseases also increased manifold. Even when it was claimed that one disease was eradicated, a new and incurable disease emerged as a side or direct effect of the treatment. AIDS² is one such disease that man is yet to conquer. As health is wealth, health of nature is wealth of the universe and this holds for generations to come. It is the responsibility of everybody to preserve nature for the future.

¹ Rafiqi F.A., *Polluter Pay's Principle and Taxing Policy in India: Where do they Meet?* Kashmir University Law Review, Vol. VIII, p. 34.

² Acquired Immune Deficiency Syndrome or acquired immunodeficiency syndrome (AIDS) is a disease of the human immune system caused by the Human Immunodeficiency Virus (HIV). This condition progressively reduces the effectiveness of the immune system and leaves individuals susceptible to opportunistic infections and tumours. HIV is transmitted in many ways – by the use of syringes or getting hurt by sharp objects containing the virus and through direct contact of a mucous membrane or the bloodstream with a bodily fluid containing the virus.

The health status of an individual, a community or a nation is determined by the interplay and integration of two ecological factors i.e. the internal environment of the human being himself and the external environment which surrounds him. Disease spreads due to the disturbance in the delicate balance between humankind and the environment. The science of safeguarding health is known to people as 'sanitation' and it covers the whole field of controlling the environment with a view to prevent disease and promote health.³

The problem of environmental pollution which started with the advent of the human being on Earth has now become extremely acute, both in developed and developing places. Due to loss of self-cleaning capacity of the air, developed countries have laid down stringent safety standards and measures to maintain the power of the balance of nature in the area of waste management, particularly in the area of Bio-Medical Waste Management. But the developing countries have delayed such pollution problems, which are very harmful, detrimental or injurious to public health, safety and welfare as Paul Harrison⁴ in his book 'The Third World Tomorrow', has warned that there would be no tomorrow for the third world countries if such pollution problems continue to remain in the society for non-adoption of anti-pollution strategies.⁵ Therefore, it can be emphasized that eco-development is one of the sensible preconditions of sustainable development, and for that matter

³ Patnaik Raghunath, *Bio-Medical Waste Management in the process of environmental governance*. <http://www.nlsenlaw.org/wastemanagement/articles/biomedical-waste-management> visited on 7.3.2006.

⁴ An environmental writer, editor and photographer and Founder-President of the World Pantheist Movement.

⁵ Harrison Paul, *The Third World Tomorrow*; Penguin Books Ltd., (1980) at pp. 38-40.

immediate measures are required to be taken to stem the terrible implication of nature resulting from non-scientific disposal of Bio-Medical Waste.⁶

Scientists and religious heads believe that nature was created first and then living beings were introduced to live on nature, which includes the five major components called *Pancha Bhuta*⁷ - water, air, earth, fire and sky. Every living being contains these five elements within its body. Like the need to maintain these elements within body, there is a greater need to protect them in nature too and in the process such maintenance should not become the reason for destruction or pollution.⁸

Economic processes of a society need continuous flow of materials. Humankind takes from the environment a wide variety of vegetables, minerals and animal materials; transforms them into a wider variety of economic goods, consumes these goods, a process during which these goods undergo physical or chemical transformation and become, in effect, garbage; and then discards these unwanted products of consumption into the environment. Unwanted materials - solid, liquid, or gaseous are also generated during these processes and they too are discarded into the environment.⁹

⁶ Sustainable development is a pattern of resource use that aims to meet human needs while preserving the environment so that these needs can be met not only in the present, but also for future generations. The term was used by the *Brundtland Commission* which coined what has become the most often-quoted definition of sustainable development as development that "meets the needs of the present without compromising the ability of future generations to meet their own needs".

⁷ It is a term in the Sanskrit language to mean five natural elements.

⁸ Madabushi Sridhar, *India: Hospital Waste Management and Principles of Liability: Efficient Law Minus Enforcement* at www.mondaq.in/article.asp?articleid=19672 visited on 1.12.2005.

⁹ Dales J.H., *Pollution, Property and Prices*, UK: Edward Elgar Publishing Ltd, 2002, p. 1.

With the onset of industrialization, generation of such unwanted materials or waste production increased proportionately with the production of goods. Rapid and unprecedented industrial development has thus brought many environmental and health problems. Although the industrial and technological advancements have helped to improve food products, raise living standards, solve time and space problems, they have adversely affected the natural environment and thereby disturbed 'the balance of nature'. Our capability of self-maintenance and self-regulation has been disrupted by the continuous discharge of pollutants by the industries. Moreover, improper treatment and discharge of waste and its unhygienic disposal created a serious problem for biotic¹⁰ and abiotic¹¹ components of the environment.¹²

Handling and disposal of wastes has become a big task due to growing urban population. Improper disposal has become one of the challenging problems of urbanization. Waste is generally defined as "something which is not put into proper usage at a given time".¹³ The original definition of waste *res derelicta*¹⁴ corresponds to the concept of 'throw away' culture.¹⁵ Waste generally, is of three kinds, viz. solid wastes, liquid wastes and gaseous

¹⁰ In biology, 'biotic' components are the living things that shape an ecosystem. They are any living component that affects another organism. Such things include animals which consume the organism in question, and the living food that the organism consumes.

¹¹ In Biology 'abiotic' components are non-living chemicals and physical factors in the environment. These phenomena underline all of biology. These factors, generally while downplayed, can have enormous impact on evolution.

¹² Shastri S.C., *The Polluter Pays Principle and the Supreme Court of India*, Journal of the Indian Law Institute, vol. 42, 2000, p.108

¹³ Concise Oxford Dictionary, 10th ed., Oxford University Press, p. 1616.

¹⁴ Meaning the abandoned object in Latin.

¹⁵ Kiss Alexander, *The International Control of Transboundary Movement of Hazardous Wastes* Texas International Law Journal Vol. 26(1991) p. 521.

wastes. Waste can also be categorized according to its origin as domestic waste, industrial waste and hospital waste.

The word 'waste' refers to useless, unused, unwanted or discarded material. Waste can be classified by multitude of schemes: by physical state (solid, liquid, gaseous), and then within solid waste by original use (packaging waste, food waste, etc), by material (glass, paper, etc), by physical properties (combustible, compostable, recyclable) by origin (domestic, commercial, agricultural, industrial, etc.) or by safety level (hazardous, non-hazardous).¹⁶ In India, for regulatory purposes, waste is generally classified into municipal solid waste and hazardous waste.

1.2 Meaning and Ambit of Bio-Medical Waste

Over the years there have been tremendous advancements in the healthcare system. However it is ironic that the healthcare settings, which restore and maintain community health, are also threatening their well-being. Poor waste management practices pose a huge risk to the health of the public, patients, professionals and contribute to environmental degradation.¹⁷

Bio-Medical Waste is defined as any waste fabricated during the diagnosis, testing, treatment, research or production of biological materials by either animals or mankind. Such waste has the potential to be hazardous to human health if it is left unregulated. It originates from Bio-Medical Waste

¹⁶ Forbes R. McDougall, Peter R. White, Marina Franke and Peter Hindle, *Integrated Solid Waste Management: a Life Cycle Inventory*, 2nd ed., Oxford: Blackwell Science Ltd, Osney Mead, p.4.

¹⁷ Joseph, J. and Krishnan, A., (2004). *Hospital waste management in the union territory of Pondicherry – An exploration*. www.pon.nic.in/citizen/science/ppcc-new/joe.pdf visited on 7.12.2005

facilities, such as hospitals, clinics, nursing homes, laboratories, funeral homes, dentist offices, veterinarian or physician complexes, medical transporters (e.g., ambulances) and storage and treatment facilities for biological entities since they all produce Bio-Medical Waste. It contains human body parts, tissues and organs as well as animal body parts, carcasses, excreted bodily wastes, parts containing blood and wastes generated at veterinary hospitals. Besides, microbiology and biotechnology cultivate Bio-Medical Waste in the form of laboratory cultures, live or non-live vaccines, and human and animal cell cultures used during research.

Items that come into contact with biological-waste functions are also considered Bio-Medical Waste originators. Needles, syringes, blades, scalpels, blood stained material or cotton balls and dirtied plasters are a few such examples. Discarded medicines, used tubing and catheters, chemicals used for disinfection purposes and any waste that is a consequence of laboratory upkeep are all instigators of Bio-Medical Waste as well.¹⁸

In the area of pollution, the management of wastes is a perennial agenda and of these wastes, the Bio-Medical Waste is a special kind of waste. The infectious nature of the Bio-Medical Waste itself reveals the danger of its mismanagement. Bio-Medical Waste (also popularly called healthcare waste or hospital waste) is a by-product of healthcare and includes sharps, non-sharps, blood, body parts, chemicals, pharmaceuticals, medical devices and radioactive materials. Generation of Bio-Medical Waste in

¹⁸ http://www.ehow.com/facts_5503042_origin-biomedical-waste.html visited on 12.12.2005

sizeable quantities, depending upon the number of patients and the nature of activity, is an unavoidable side effect of healthcare delivery systems which primarily and predominantly takes within its fold processes like diagnosis, treatment, surgical intervention, post-operative care, rehabilitative care, clinical research, clinical trials, etc.

Inadequate and poor handling or management of this waste exposes healthcare workers, waste handlers, patients and the community in general to infections, toxic effects and serious fatal consequences as well. This is recognized as 'pollution' according to definitions used in the United Kingdom¹⁹ which explained it as "The introduction by man into the environment of substances or energy liable to cause hazards to human health, harm to living resources and ecological systems, damage to structure or amenities or interference with legitimate uses of the environment."

World Health Organization (WHO), in its classification of waste, classifies Bio-Medical Waste into the following categories: General waste, Infectious waste, Pathological waste, Radiological waste, Chemical waste, Pharmaceutical waste, Sharps and Pressurized waste. This categorization is on the basis of weight, density and constituents of the waste. As per the available documentation, in a given context of a modern hospital, the average waste ranges between 1.5 and 2.5 Kg. per day per bed. It constitutes plastics, paper, glass, linen, metal, human flesh and organic tissues. The percentage of wastes may vary from hospital to hospital, depending upon its practices.²⁰

¹⁹ For eg. Section 1(3) of the Environmental Protection Act, 1990 (UK)

²⁰ http://www.who.int/water_sanitation_health/medicalwaste/002to019.pdf visited on 12.12.2005

In India, however, the average rate of generation of Bio-Medical Wastes is comparatively less and varies from 1 kg to 1.5 kg per bed per day. It is estimated that an average hospital generates about 16 per cent materials that could be considered as potentially infectious agents. Studies reveal that about 7% of typical hospital wastes are pathological waste including body parts etc, which need to be incinerated.²¹ By implementing good segregation programs, it is possible to reduce this Waste stream to a lesser extent. The estimated amount of unregulated infectious waste per day per bed varies between 800 gms and 1100 gms, which if regulated, would vary between 50 gms and 500 gms.²² Releasing such hazardous waste from hospitals without treatment will pose a serious threat to health of human beings and environment.

A lot of hospital waste is hazardous material. Common hazardous waste found in hospitals include the chemotherapy and anti-neoplastic chemicals (cancer chemotherapy and cytotoxic drugs), formaldehyde, photographic chemicals, radio nuclides, solvents, mercury waste, anaesthetic gases and cleaning and maintenance chemicals and supplies (chlorine, paint, insecticides, phenyl). The hospital wastes include pathological and radioactive wastes. Pathological waste means tissues, organs of body parts, human foetuses, animal carcasses and most blood and body fluids. The

²¹ <http://medind.nic.in/haa/t01/i1/haat01i1p75o.pdf> visited on 12.12.2005. Also see Fig 1(ii) at p. 12.

²² Agarwal Anek, (Mumbai: Mithibai College 2002-03) *Bio-Medical Waste Management in Indian Hospitals – Why and How?* A study conducted on hospitals in Mumbai as a project in Management course. The author suggests that the approach of such reduction it requires disinfecting at regular intervals for storing the infectious wastes.

radioactive waste (solid, liquid, and gaseous wastes contaminated with radio-nuclides) is generated from *in vitro* or *in vivo* testing.²³

Besides, there will be chemical wastes with discarded solid, liquid and gaseous chemicals from diagnostic chemicals, experimental procedures and disinfecting procedures. Infectious waste include cultures and stocks of infectious agents from laboratories, waste from surgeries, and autopsies on patients who have died due to infectious diseases, waste from infected patients in isolation wards, and dialysis waste from infected patients. Needles, syringes, scalpels, blades, broken glass, nails and items that could cause a cut or puncture which may become a source of entry of infecting agents are categorized as 'sharps'. Unused drugs and chemicals, returned from wards constitute pharmaceutical wastes.

Although medicines and surgical operations help in curing diseases, improper methods of disposing wastes generated in the process will be the cause of diseases as a result of the 'treatment'. As a result, the very purpose of the medical inventions and scientific research will be defeated. There is therefore a duty to see that the Bio-Medical Waste generated will not develop into a monster taking away the fruits of centuries of research and pushing society into disaster.

The different location or points of hospital waste generation are the Operation Theatres (OTs); various wards; Labour rooms; Out-Patient departments (OPDs); dressing rooms; injection rooms; Intensive Care Units

²³ See *supra* note 20 at p. 8. *In vitro* means outside the body, eg. laboratory work and *in vivo* means inside the body, eg. in clinical trials.

(ICUs), Coronary Care Units (CCUs), dialysis rooms; laboratories; corridors and compounds of hospitals or nursing homes. It is estimated that a large percentage of Bio-Medical Waste is non-hazardous. Only small fractions of such waste are infectious like sharps and liquids and an even smaller fraction have hazards like chemical wastes.

A detailed classification of hospital wastes shown in Fig. 1(i) indicates the several types of wastes that can exist in a hospital setup.

CLASSIFICATION OF HOSPITAL WASTES²⁴

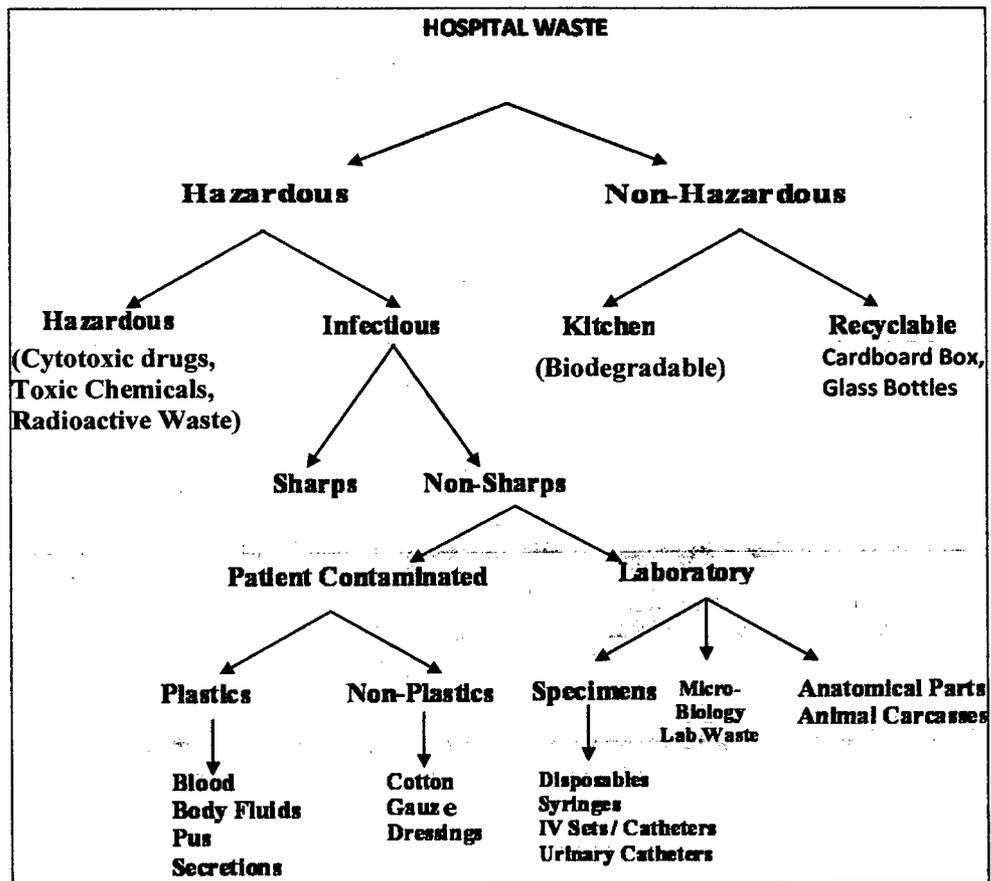


Fig. 1(i)

²⁴ (Source: WHO). *Supra* note 20 at p. 8.

For the purpose of giving an overview of the same, a broad classification of such wastes in India has been pictorially depicted in Fig.1(ii). All figures mentioned therein are in percentages.

PERCENTAGE LAYOUT OF BIO-MEDICAL WASTES²⁵

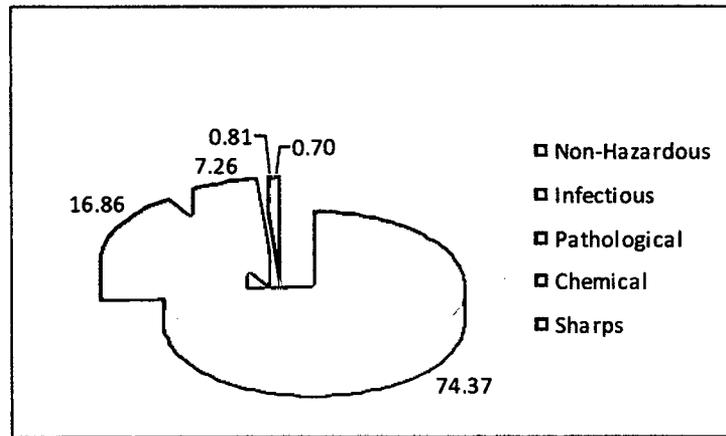


Fig. 1 (ii)

In India, Bio-Medical Waste Management and handling has become tremendously significant in the emerging discipline of healthcare law and ethics. This development is basically because of two factors:

(i) Ever expanding and entrenching public and private healthcare delivery centres generating sizeable quantum of Bio-Medical Waste. Healthcare establishments (both private and government) in India have

²⁵ (Source: Indian Society of Hospital Management). <http://www.medwasteind.org> visited on 5.4.2006. It is based in Pune and is a registered body of professionals to address the issues and concerns of hospital waste at the national level, and to facilitate/advocate/undertake research activities on issues of hospital waste management and eco-friendly disposal.

registered a 15 to 20 per cent growth in the last decade.²⁶ Same trend is likely to continue for another decade.

(ii) Awareness about the Bio-Medical Waste, its perilous effects and fatal consequences. This is due to rising levels of literacy amongst the people and a degree of precaution being exercised by the common man and the patients, both admitted and out-door.²⁷

The State of Goa has a rapidly growing healthcare delivery system, both in terms of Government involvement and in respect of private players, who have been responsible for the mushrooming of new hospitals with super-specialties and state-of-the-art facilities.²⁸ This is mainly due to the fact that Goa is a domestic and global tourist destination that has converted it into a hot spot for medical tourism.²⁹ Needless to say, such healthcare establishments are expected to generate a large quantum of hospital waste, especially where 'foreign patients' expect the 'dispose after use' rule for practically every durable used in the establishments. Healthcare is an inseparable part of human resource and therefore, such a situation, coupled with the ever-rising migrant labour class presence, due to the year-round Real Estate industry, have increased the demand for additional healthcare facilities like pathology laboratories, dental clinics and dispensaries on a regular basis.³⁰ All of these will, but naturally, contribute to the rising quantum of

²⁶ *Ibid.*

²⁷ Joga Rao S. V., *Bio-Medical Waste and the Law – A referral Guide*; 1st Edition, Legalaxy, 2004.

²⁸ See para 4.2 at p.128.

²⁹ *Ibid.* All these private establishments have web-sites to cater to touring patients who pay in foreign currency for different kinds of medical facilities. Rates of different 'packages' are reflected in these sites.

³⁰ As informed by NGOs in interviews conducted. See para 4.4.4 at p.152 and para 4.9 at p. 178.

Bio-Medical Waste generated in the state. In view of these facts, the State of Goa will witness the amount of Bio-Medical Waste generating for the next decade increasing to several metric tons/day.³¹

It is in this context that the study examines in great detail the legal control of Bio-Medical Waste Management in the existing healthcare scenario in the State of Goa and in particular, the following aspects of it, viz. the growth of the establishments in the healthcare sector, the quantum of Bio-Medical Waste the state is generating, the problems this waste is posing to the environment and health, the status of the actual ways and means adopted to meet these problems of Bio-Medical Waste and the extent to which healthcare institutions abide by legal regulations in this regard. This study seeks to make certain suggestions and recommendations for effective management of Bio-Medical Waste in view of the available findings through this research and propose a specific legislation for the State of Goa in this regard.

1.3 The Hazards of Bio-Medical Waste

Lack of infrastructure in most of the clinics results in mixing of infectious, non-infectious and hazardous wastes which are then disposed into the community bins. Even though extremely hazardous and infectious waste constitute a small percentage of the total waste, when such waste is mixed

³¹ See estimation of waste generated in the state of Goa at para 4.5 at p. 153.

with non-hazardous waste, the entire waste becomes hazardous/infectious, which drastically increases the chances of affecting the health of waste workers and rag-pickers. This also affects the normal management practices of municipal solid waste like composting and waste recovery/ recycling. The impact of Bio-Medical Waste is also connected with the fact that several of these categories are not recyclable. Table 1.1 shows the several categories of Bio-Medical Waste stream, their impact and information in terms of whether or not they are recyclable.

IMPACT OF BIO-MEDICAL WASTES³²

Bio-Medical Waste Category	Impact	Recycling Category
Infectious Waste		
Anatomical wastes (tissues, organs and body parts)	Infects waste handlers and dependants through direct contacts, vectors	Non-recyclable
Human blood, body fluids, bandages and cotton wastes and other medical wastes	Infect through direct contacts or by vectors and spreads diseases like typhoid, tuberculosis, hepatitis, AIDS etc.	Non-recyclable
Microbial cultures and stocks (lab cultures, stocks or specimens of micro-organisms live or vaccines)	Causes health disorders like headache, cough, skin burn, eye burn, etc., when in contact. If not autoclaved causes serious infections	Non-recyclable
Sharps Waste		
Needles & syringes	Spreading of infectious diseases like Tetanus, Hepatitis, AIDS and Septicemia	Illegally recycled

³² (Source: Indian Society of Hospital Waste Management). See *supra* note 25 at p. 12.

Bio-Medical Waste (category)	Impact	Recycling (category)
Scalpels, blades & broken glass	Causes cuts on skin and body portion	Recyclable
IV fluid, blood & urine-bags	Releases Dioxin and Furan, Suspended Particulate Matter, gases on incineration, oxides of sulphur, nitrogen and carbon	Illegally recycled
Catheters & plastic tubing, PVC surgical gloves	Dissolution of DHEP chemical from PVC material may serve as human carcinogens and may disturb hormonal function	Illegally recycled
Non-infectious Waste		
Cytotoxic chemical wastes (anticancer drugs, radioactive materials, phenyl, strong acids and alkalies)	Causes cytotoxicity and injury to cells in the form of cancer, ulcers, anemia, skin diseases, poisoning, Foetal abnormalities	Acids & Alkalies may be reusable after pre-treatment
Chemical wastes (used in the production of biological & disinfections process)	Causes health disorders like headache, cough etc. Some disinfection chemicals like pesticides and insecticides disturb the normal function of hormones and act as carcinogens	Reusable after pre-treatment
Solid Wastes		
Food & canteen wastes, plastics, paper boxes and other wastes	No serious impacts	Recyclable after composting / pre-treatment
Incineration ash	Partially incinerated ash may spread diseases	Non-recyclable

Table 1.1

Amongst all categories of Bio-Medical Waste, the sharps (which include syringe, needle, canula,³³ broken glass, ampules, etc.) have the highest disease transmission potential through the direct prick/stab type injuries. Unorganised sectors like illegal slaughter houses, small commercial

³³ A tube that can be inserted into the body, often for the removal or delivery of fluids.

establishments, roadside vendors, tiny industries, small clinics and private practitioners are major contributors to illegal disposal of waste.

Health Hazards of the following nature are by and large inferred and experienced from the Bio-Medical Waste.

1. Injuries from 'sharps' to all categories of hospital personnel and waste handlers.
2. Nosocomial infections³⁴ due to poor infection control and poor waste-management.
3. Risks of infections outside hospitals for waste handlers, scavengers and eventually, the general public.
4. Risks associated with hazardous chemicals, drugs when they are being handled by persons handling wastes at all levels.
5. Disposables like syringes etc., being repacked and sold without being even washed.
6. Drugs disposed off being repacked and sold to unsuspecting buyers.

Similarly, the following environmental hazards have been noticed and experienced because of improper handling and management of Bio-Medical Waste.

1. Toxic emissions like dioxins, furan gases and carbon, sulphur particles from defective/inefficient incineration.

³⁴ Hospital-borne infections.

2. Indiscriminate disposal of incinerator ash residues.
3. Leachate³⁵ from improper waste treatment residues, leading to contamination of ground water.
4. Incinerators, which do not achieve high enough prescribed temperatures, actually end up producing toxic gases from plastics, because the temperature, at which they burn, is technically incorrect.

1.4 Mismanagement of Bio-Medical Waste

Bio-Medical Waste Management has become a major concern in today's world. Human activities all over the world generate large amount of wastes. Rapid urbanization, industrial and technological innovations, which are responsible for generating large quantities of waste, have made waste management a difficult issue. But such waste has to be handled effectively to prevent its effects upon environment and human health.

The perils of medical waste first garnered attention in the late 1980s, when items such as used syringes washed up on several East Coast beaches in USA lead to the law regulating medical waste.³⁶ However in India the seriousness about the management came into lime light only after 1990s.³⁷

The Government of India had enacted some legislations and rules to protect the environment and health of people.³⁸ Yet, they were not effectively changing the environmental scenario with environment being polluted and

³⁵ The liquid that drains off from leaches, in a landfill.

³⁶ See para 2.2 at p. 37.

³⁷ See para 3.10 at p. 117.

³⁸ For eg. The Water (Prevention & Control of Pollution) Act, 1974; The Air (Prevention & Control of Pollution) Act 1981; and The Environment (Protection) Act, 1986.

health of persons being at stake. Wastes were not being handled and disposed of safely. Even though there were good environmental laws, it was felt that the laws were not effective in protecting the environment and health of the people since policies prevented their effective implementation.³⁹ The solution to this problem therefore was to provide specific rules for specific purposes by notifying such rules.⁴⁰

The Government of India, while invoking and exercising power under Secs. 6, 8 and 25⁴¹ of the Environment Protection Act, 1986, has enacted the Bio-Medical Waste (Management and Handling) Rules, 1998⁴² since Bio-Medical Waste management and handling has been given top priority amongst public health hazards and also since as always, any kind of regulation requires a legal control. These rules were amended twice in the year 2000 and once again in the year 2003.

As per these rules, the definition provided for 'Bio-Medical Waste' is that it means any waste, which is generated during the diagnosis, treatment or immunisation of human beings or animals or in research activities pertaining thereto or in the production or testing of biologicals,⁴³ and including categories mentioned in Schedule I of the said rules.⁴⁴

³⁹ Patel Almitra; *Municipal and Bio-Medical Waste Management in India: Enforcement and Implementation*. <http://gyanyog.com/library/libartdis.asp?r=152 &libid=617> visited on 5.6.2006.

⁴⁰ Bio-Medical Waste Management at <http://www.cprecc.org/04-pamphlets/23-biomedicalwaste> visited on 2.1.2007.

⁴¹ Sec. 6 deals with rules to regulate environmental pollution; Sec. 8 deals with persons handling hazardous substances to comply with procedural safeguards while Sec. 25 deals with power to make rules.

⁴² Hereinafter also known as the BWM Rules.

⁴³ A term used to describe vaccines, cultures and other preparations made from living organisms and their products, intended for use in diagnosing, immunizing, or treating humans or animals, or in related research.

⁴⁴ See Rule 3(5); BWM Rules, 1998.

Medical wastes may be generated throughout healthcare facilities wherever medical procedures are conducted.⁴⁵ The ill effects of poor management and handling of Bio-Medical Waste have aroused concern all over the world especially due to its far-reaching effects on human health and environment. Since new hospitals are mushrooming to meet the health hazards the generation of wastes will always be on an upward trend. The main cause for increase in quantity of medical waste is the shift from reusable items to disposable goods. The problem of medical waste has acquired gargantuan proportions and complex dimensions. On an average a hospital bed generates 1.25 kg of waste per day, out of which 10-15 per cent is infectious and rest is general waste. These quantities become unmanageable and the hospital prefers to throw them in municipal bins. General waste, which is rich in organic material, is a very strong media for the micro-organisms in infectious waste component of hospital waste. Thus one would give the micro-organisms good environs to multiply if the wastes are mixed. Exposure to health-care waste can result in injury or disease.

The Supreme Court of India has rightly observed in *Rural Litigation Entitlement Kendra v. State of U.P.* that, "The preservation of the environment and keeping the ecological balance unaffected is a task which not only the government but every citizen must also undertake. It is a social

⁴⁵<http://www.ul.com/eph/insights/ephiv4n4/med.html> visited on 23.5.2006.

obligation and let every citizen be reminded that it is his 'fundamental duty' as enshrined in Article 51A of the Constitution".⁴⁶

Bio-Medical Wastes need safe disposal, since they pose hazard due to two principal reasons: the first is their intensity and the other, their toxicity. It is more dangerous than a chemical, since Bio-Medical Waste can cause serious infections and incurable diseases.⁴⁷ The medical waste is not being regulated satisfactorily in India. It is estimated that India generates around three million tonnes of Bio-Medical Waste every year and the amount is expected to grow at eight percent annually.

Barring a few large hospitals in metropolitan cities, most of the other smaller hospitals and nursing homes have no effective system to safely dispose of their wastes. With no care or caution, these health establishments have been dumping waste in local municipal bins or even worse, out in the open. Surveys carried out by various agencies show that healthcare establishments in India are not giving due attention to dispose the waste properly.⁴⁸ Thus Bio-Medical Waste Management is an area which needs proper attention because of its ill-effects upon the environment and human beings.

Rag-pickers and *safaikarmacharis*⁴⁹ who rummage through this waste in search of disposables are also at great risk. They get exposed to the waste through any open wounds; inhalation of air borne pathogens and pricks by

⁴⁶ AIR 1985 SC 652. Article 51A has been included as Chapter IVA in the Constitution of India vide The Constitution (Forty-second Amendment) Act, 1972.

⁴⁷ M.Sridhar Aacharyulu, *Hospital Waste Management Principles of Liability: Efficient Law Minus Enforcement*, *Indian Socio-Legal Journal*, vol.27, Issue 1&2, January/December 2001.

⁴⁸ *Ibid.*

⁴⁹ A term in Hindi, meaning subordinate staffs who are sweepers.

sharps, and all this makes them prone to infections. This improper handling, treatment and disposal of the Bio-Medical Waste leads to spreading of diseases such as HIV and Hepatitis, ocular, genital and skin infections. There may be anthrax,⁵⁰ meningitis,⁵¹ hemorrhagic fevers,⁵² septicemia,⁵³ bacterial and fungal infections, etc.⁵⁴

The present study aims to critically make a complete and comprehensive study of the problem of efficacy of the rules governing Bio-Medical Waste Management in the State of Goa, in order to find out lacunae in them and to suggest remedial measures and consequently to evolve an effective system of this waste management through a legislation specifically for the State of Goa.

1.5 Objectives of the Research

The objectives of the study are:

- (i) To analyse the concept of Bio-Medical Waste, different kinds of such waste and to have a comprehensive understanding of its nature and

⁵⁰ This is an acute disease caused by the bacteria *Bacillus anthracis*. Most forms of the disease are lethal, and it affects both humans and other animals.

⁵¹ This is inflammation of the protective membranes covering the brain and spinal cord, known collectively as the meninges.

⁵² All types of VHF are characterized by fever and bleeding disorders and all can progress to high fever, shock and death in extreme cases.

⁵³ Septicemia is a serious, life-threatening infection that gets worse very quickly. It can arise from infections throughout the body, including infections in the lungs, abdomen, and urinary tract.

⁵⁴ "There is strong epidemiological evidence from Canada, Japan and the USA, that the main concern of infectious hospital waste is the transmission of HIV/AIDS virus and, more often of Hepatitis B or C virus (HBV) through injuries caused by syringes contaminated by human blood." Agarwal, Ravi. *Medical Waste Issues, Practices and Policy: An Indian and International Perspective*, New Delhi: Seminar on Health and the Environment, Centre for Science and Environment July 6-9th, 1998.

scope and the methods available to handle and dispose them in the State of Goa.

(ii) To analyse the problem of Bio-Medical Waste Management in the State of Goa and investigate the adequacy of law and efficacy of administrative agencies in effective handling and proper disposal of Bio-Medical Wastes.

(iii) To trace the international efforts for the management and handling of Bio-Medical Waste in view of the legal systems prevalent in the United States of America, the United Kingdom, Australia, Europe, Africa, Asia and south Asian countries with a view to have a broad perspective about the legal control of such waste management at the international level.

(iv) To trace the concerns of the legal system in India from ancient times in terms of waste management generally and to analyse the modern laws and rules promulgated in India relating to management and handling of Bio-Medical Wastes.

(v) To study the methods of treatment and disposal of Bio-Medical Waste in the various healthcare establishments in the State of Goa and to investigate and evaluate the deficiencies present in them.

(vi) To analyse the existing rules and regulations pertaining to the management and handling of Bio-Medical Wastes for their efficacy, especially in the context of enforcement and feasibility.

(vii) To examine the role of the higher judiciary in contributing to the development of environmental jurisprudence and the legal control of Bio-

Medical Waste Management, generally as also with particular reference to the State of Goa.

(viii) To make suggestions and recommendations for better Bio-Medical Waste Management in terms of specific legislation for the State of Goa and consequently to protect the environment and health of the public.

1.6 Hypotheses Postulated

(i) Healthcare institutions function in gross violation of the existing Bio-Medical Waste (Management and Handling) Rules, 1998 thereby posing dangers to in-patients, visitors and the public at large.

(ii) The Bio-Medical Waste (Management and Handling) Rules, 1998 suffer from certain basic shortcomings. As a result they have become ineffective in protecting the environment generally and health of the people in particular.

1.7 Methodology used in Research

Besides review of literature and studies which are related to Bio-Medical Waste Management,⁵⁵ this study involves an exhaustive empirical research primarily through survey method, by collecting data through several techniques of providing survey forms, completing questionnaires and conducting informal interviews of different respondents ranging from healthcare institutions, doctors, nursing staff, auxiliary staff,

⁵⁵ See Bibliography at p. 234.

randomly selected patients and visitors, officials of the Goa State Pollution Control Board and representatives of Non-Governmental Organizations.⁵⁶ Site visits were also undertaken to examine several aspects of Bio-Medical Waste Management.

Original sources on the subject, like national legislations, rules and regulations have been identified by visit to several libraries in the State of Goa and in other States in India and these have been tested and verified in accordance with the objectives of this research. Secondary sources that are of concern to the present research have been looked into by personally attending seminars, interaction with other researchers personally and corresponding with authors of various articles from other States in India. Such sources have also been tested and verified to the extent applicable to the present research.

1.8 Importance of the Study

Production of Bio-Medical Waste in large quantities is an inevitable side effect of modern scientific and medical advancements and nothing much can be done to alter that. The treatment and disposal of such type of waste, however, is an extremely relevant and sensitive issue, because it involves questions related to environment pollution and public health hazards. In this context there was a pressing need to formulate rules for the management and handling of such wastes in order to scientifically standardize all practices in this regard.

⁵⁶ All data and findings incorporated in Chapter 4 at p.126.

The importance of the study lies in the fact that it analyses the problems associated with Bio-Medical Wastes and suggests remedial measures to tackle the problem of Bio-Medical Waste Management. The research and consequent suggestions and recommendations including a proposal for a specific legislation for the State of Goa are believed to be useful to legislators. Administrators of healthcare establishments, academicians, lawyers and non-government organizations will also benefit from this study. The importance of the study lies in its purpose of making an original contribution to the discipline of law.

1.9 Limitations of the Study

The following are the limitations of the study:

Firstly, since the area relating to Bio-Medical Waste Management is very large, only the problems created by such wastes generated in the area of human healthcare management are investigated with reference to relevant legal norms. Other forms of Bio-Medical Wastes generated through ways and means unconnected with human healthcare management like originating from research activities and veterinary care, although important in their own way, have not been dealt with in the present study, primarily since their contribution to the problem of Bio-Medical Waste Management is to a miniscule extent.

Secondly, all aspects of Bio-Medical Waste Management in respect of healthcare establishments of the armed forces under the Ministry of Defence have been kept outside the purview of this study, although the Bio-Medical Waste Management Rules equally apply to them. The task of obtaining empirical data and on-the-spot studies in such places would entail a lot of practical difficulties, as entry into such places is restricted or controlled.

1.10 Scheme of the Study

The writing and documentation of this research has been done in accordance with the standard guidelines for graduate students, scholars and research writers, wherein the content notes are composed as foot notes. The study is arranged into a scheme which underlines the relevance of the problem and its setting in the context of the environment as explained in this chapter.

This Chapter has underlined the meaning of waste generally and the special place of Bio-Medical Wastes amongst other wastes. The problems of mismanagement of Bio-Medical Wastes have been elaborated and the objectives, limitations and need for the study of the legal control of Bio-Medical Waste Management are the contents of this Chapter.

The Second Chapter examines the international legal machinery, which includes the legal systems of Bio-Medical Waste Management in the United States of America, United Kingdom, Western Australia, Europe, South

Africa, Asia and the south Asian countries, most of which are neighbours to the Indian sub-continent.

The specific rules for management and handling of Bio-Medical Waste in India from ancient times till the present, along with the amendments including the specific judicial response in this regard are the contents of the Third Chapter.

The implementation of the rules and procedures for proper handling of Bio-Medical Wastes and the Goan experience with regard to the problems of Bio-Medical Waste mismanagement across a spectrum of healthcare institutions, which involves voluminous information gathered through various means and subject to statistical techniques using Microsoft Excel,⁵⁷ has been thoroughly discussed in the Fourth Chapter.

Finally, the importance, use and purpose of this study have been kept in mind and an evaluation of the data and findings gathered from the different aspects of research methodology at hand has been concluded. This has been done by keeping in mind the objectives of this research and it has involved assessment of the salient aspects of information generated through research tools as recorded in the Fourth Chapter. This study has critically analysed the deficiencies in infrastructure of the healthcare establishments based upon the findings arrived at from the respondents in the study. The suitability of the provisions of law in the context of Bio-Medical Waste Management and their implementation is examined in this research, based on which suggestions and

⁵⁷ It is an office suite of interrelated desktop applications, servers and services for the Microsoft Windows operating system.

recommendations are made for effective management of Bio-Medical Wastes. Accordingly, the concluding remarks have formed the closing component of this research study in the Fifth and final Chapter.

Chapter 2

INTERNATIONAL LEGAL MECHANISMS

2.1 Introduction

There are different sources of International law, principally international conventions or treaties, international customary law and the general principles of law recognized by States. In recent years, all of these sources have contributed to international environmental law. The inherent reservation notwithstanding, treaties and conventions have made a major contribution to developing international environmental law over the last few years. In order to achieve sustainable development, it is imperative to address on priority basis the principal social economic and environmental changes contained in Agenda 21.⁵⁸ Most international agreements are sector specific in nature, concluded at different times with uneven international knowledge and concern.

⁵⁸ The number 21 refers to an agenda for the 21st century. It also refers to the number on the UN's agenda at this particular summit.

The earth's atmosphere is a common heritage. The environmental issues take into account the human being and not the State as a unit. It is therefore a global issue. Even though the United Nations has convened an International Conference on the Human Environment at Stockholm 1972,⁵⁹ where a dialogue on protection of environment had begun and despite the fact that later the United Nations Environment Programme (UNEP)⁶⁰ was established and subsequently the concepts of sustainable development and development without destruction evolved, Bio-Medical Waste Management concerns did not come on the agenda and did not take centre stage. However, the Stockholm declaration recognized that Man is a part of nature and his life depends on it. The Secretary General, United Nations⁶¹ in Stockholm Conference appealed for a joint and concerted effort by all on this planet. At the said Stockholm Conference the world reiterated that it is the duty of every person to protect the environment and prevent its pollution and since then, domestic laws and international treaties impose this duty on individuals and even states.

Very few countries of the world have specific legislation to deal with the management and handling of Bio-Medical Wastes. The study has

⁵⁹ Also known as the Stockholm Conference was an international conference convened under United Nations auspices held in Stockholm, Sweden from June 5-16, 1972. It was the UN's first major conference on international environmental issues, and marked a turning point in the development of international environmental politics.

⁶⁰ The United Nations Environment Programme coordinates United Nations environmental activities, assisting developing countries in implementing environmentally sound policies and practices. It was founded as a result of the United Nations Conference on the Human Environment in June 1972 and has its headquarters in Nairobi, Kenya. UNEP also has six regional offices and various country offices.

⁶¹ U. Thant said "Like it or not we are travelling together on a common planet and we have no national alternative in which we and our children can live a full and peaceful life."

revealed information about the legal mechanisms prevalent in the United States of America, United Kingdom, Australia, South Africa, Europe, Asian and South Asian countries, all of which have legislative enactments of different types to deal with Bio-Medical Waste Management.

The International Community recognised this responsibility and drafted several instruments reminding Man to be kind to the natural world. After the loss of millions of human beings the UN Charter expressed a deep concern for the people yet to be born.⁶² Likewise, the Right to a healthy world was also reiterated at the Stockholm conference in 1972⁶³ that explained the imperative goal for mankind so as to defend and improve the human environment for present and future generations. Besides war, peace and development, the International Law made a beginning in regulating the environmental issues. It was felt that mankind has both a right to a healthy world around and a solemn responsibility to protect and improve the environs for the next generation.

International treaties, Conventions, Conferences and Protocols resulted in regulatory legislation to protect the environment in several countries for framing policies to protect and improve environment, preventing pollution, punishing environmental crimes, and for compensating the persons affected by breach of protective provisions. Even before emergence of environmental laws, polluters were liable under the general principles of tortious liability like nuisance.

⁶² Preamble to the Charter of the United Nations Organisation, 1945.

⁶³ *Supra* note 60 at p. 31.

There are, however, some international agreements and regulatory principles, which form the basis for healthcare waste management rules at the national level:

1. The **Basel Convention**⁶⁴ is a global agreement, ratified by 175 member countries⁶⁵ to address the problems and challenges posed by trans-boundary movements of hazardous wastes. The Secretariat, based in Geneva (Switzerland) is administered by UNEP. It facilitates the implementation of the Convention and related agreements. It also provides assistance and guidelines on legal and technical issues and conducts training on the proper management of hazardous waste.⁶⁶

The key objectives of the Basel Convention are to minimize the generation of hazardous wastes in terms of quantity and hazardousness, to dispose of them as close to the source of generation as possible and to reduce the movement of hazardous wastes.⁶⁷

A central goal of this Convention is 'environmentally sound management', which means addressing the issue through an integrated life-cycle approach, and involves strong controls from the generation of a hazardous waste to its storage, transport, treatment, reuse, recycling, recovery and final disposal. The aim of such environmentally sound management is to protect human health and the environment by minimizing hazardous waste production whenever possible.

⁶⁴ Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes, 1989.

⁶⁵ <http://www.basel.int/ratif/convention.htm> visited on 24.4.2011.

⁶⁶ <http://www.basel.int/pub/simp-guide.pdf> visited on 24.4.2011.

⁶⁷ *Ibid.*

2. The **Polluter Pays Principle** is an environmental policy principle which requires that the costs of pollution be borne by those who cause it. In its original emergence the Polluter Pays Principle aims at determining how the costs of pollution prevention and control must be allocated - the polluter must pay.⁶⁸ Four versions of this principle have been identified: economically, it promotes efficiency; legally, it promotes justice; it promotes harmonization of international environmental policies; it defines how to allocate costs within a State.⁶⁹

Historically, the first mention of the Principle at the international level is to be found in the 1972 Recommendation by the OECD Council on Guiding Principles concerning International Economic Aspects of Environmental Policies,⁷⁰ where it stated that the principle to be used for allocating costs of pollution prevention and control measures to encourage rational use of scarce environmental resources and to avoid distortions in international trade and investment. This principle means that the polluter should bear the expenses of carrying out the above-mentioned measures decided by public authorities to ensure that the environment is in an acceptable state.

⁶⁸ http://www.eoearth.org/article/Polluter_pays_principle visited on 23.4.2011.

⁶⁹ Bugge H. C., 1996. "The principles of polluter pays in economics and law", in Eide E. and Van Der Bergh R. (eds) "Law and Economics of the Environment", Oslo: Juridisk Forlag, 1996.

⁷⁰ OECD, 1972. Recommendation of the council on guiding principles concerning international economic aspects of environmental policies. May. Council Document no. C(72)128. Paris: Organization of Economic Cooperation and Development.

The principle has also been reaffirmed in the Rio Declaration by stating that National authorities should endeavor to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.⁷¹

3. The **Precautionary Principle** is a key principle governing health and safety protection. This principle states that if an action or policy has a suspected risk of causing harm to the public or to the environment, in the absence of scientific consensus that the action or policy is harmful, the burden of proof that it is not harmful, falls on those taking the action. This principle allows policy makers to make discretionary decisions in situations where there is the possibility of harm from taking a particular course or making a certain decision when extensive scientific knowledge on the matter is lacking. The principle implies that there is a social responsibility to protect the public from exposure to harm, when scientific investigation has found a plausible risk. These protections can be relaxed only if further scientific findings emerge that provide sound evidence that no harm will result.⁷²

The World Charter for Nature, which was adopted by the UN General Assembly in 1982, was the first international endorsement of the precautionary principle. It was subsequently incorporated into international conventions; the most widely cited being the Rio Declaration wherein it is

⁷¹ Principle 16 of Rio Declaration on Environment and Development, 1992.

⁷² http://www.sourcewatch.org/index.php?title=Precautionary_principle visited on 23.4.11

stated that in order to protect the environment, the precautionary approach shall be widely applied by States according to their capability and that where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.⁷³

4. The **Duty of Care Principle** stipulates that any person handling or managing hazardous substances or related equipment is ethically responsible for using the utmost care in the task. In English tort law, an individual may be owed a duty of care by another, to ensure that they do not suffer any unreasonable harm or loss. If such a duty is found to be breached, a legal liability is imposed upon the duty-ower, to compensate the victim for any losses they incur.

The idea of individuals owing strangers a duty of care, where beforehand such duties were only found from contractual arrangements, developed at common law, throughout the 20th century. Its origins can be found in the case of *Donoghue v Stevenson*,⁷⁴ where a woman succeeded in establishing a manufacturer of ginger beer owed her a duty of care, where it had been negligently produced. Following this, the duty concept has expanded into a coherent judicial test, which must be satisfied in order to claim in negligence. In this case, Lord Atkin established a unique neighbour principle or a general duty that individuals must take reasonable care in their actions or omissions, so as not to cause harm to others proximate to them.

⁷³ Principle 15 of Rio Declaration on Environment and Development, 1992.

⁷⁴ [1932] AC 562.

This principle therefore stipulates that any organisation that generates waste has a duty to dispose of the waste safely and that it has ultimate responsibility for how waste is containerized, handled on-site and off-site and finally disposed of.⁷⁵

5. The **Proximity Principle** recommends that treatment and disposal of hazardous waste takes place at the closest possible location to its source, in order to minimize the risks involved in the transport. Therefore any organization, should as far as possible, recycle or dispose of the waste it produces, inside its own territorial limits, thus aiming to achieve responsible self-sufficiency at a regional/or sub regional level.⁷⁶

2.2 Legal Framework in United States of America

Viewing the USA law historically, it is seen that beginning on August 13, 1987 a “30-mile garbage slick” composed primarily of medical and household wastes prompted expansive closures of numerous New Jersey and New York beaches. Investigations ongoing throughout the year indicated that the waste likely originated from New York City’s marine transfer stations and the Southwest Brooklyn Incinerator and Transfer Station in particular. Then the assistant commissioner of the New Jersey Department of Environmental Protection stated his belief that the cause of pollution was intentional rather than accidental since sealed plastic garbage bags were cut at the top, so their contents could disperse through the ocean. Such deliberate action is due to the

⁷⁵ http://www.healthcarewaste.org/en/130_hcw_intagreemts.htm visited on 23.4.2011.

⁷⁶ *Ibid.*

high cost (~\$1500/ton) associated with the legal disposal of the waste, whereby private waste contractors were tempted to dump wastes illegally in order to avoid high fees.

2.2.1 Medical Waste Tracking Act, 1988⁷⁷

It is reported that for the first time the Bio-Medical Waste Management issue was discussed at a meeting convened by the World Health Organisation (WHO) Regional Office for Europe at Bergen, Norway in the year 1983.⁷⁸ The seriousness of the issue was brought to limelight during the 'beach wash-ups' of summer 1988. Subsequent investigations carried out by the Environment Protection Agency (EPA) of USA in this regard culminated in the passing of the Medical Waste Tracking Act, 1988 (MWTA). With the passage of time the problem has evolved as a global humanitarian issue⁷⁹ and there came into existence various types of regulatory laws in different parts of the world to manage and handle Bio-Medical Wastes in their own way. Therefore, any discussions on legal provisions of Bio-Medical Waste Management need to begin with the legal framework for this purpose in the USA since they can be seen as pioneers in the field of legal control of Bio-Medical Waste Management by virtue of passage a legislation for this purpose.

⁷⁷ H.R. 3515, 100th Congress of the United States of America; 2nd session, 25th January 1988.

⁷⁸ <http://medind.nic.in/jab/t01/i4/jabt01i4p276.pdf> visited on 3.7.2006.

⁷⁹ Sreejith A., *Hygiene and Bio-Medical Waste Management plan for healthcare environmental setting: A study with special focus on Kerala, India*. www.scribd.com visited on 5.7.2006.

The federal legislation has a “Medical Waste Tracking programme,⁸⁰ to which various states belong, unless indicted by the Governor of such a state by notifying the administrator. It also provides a list of Bio-Medical Wastes belonging to the programme, ranging from cultures and stocks of infectious agents and associated biological, pathological wastes, waste human blood and its products, sharps used on patients, contaminated parts of animals, wastes from surgery or autopsy that were in contact with infectious agents, laboratory waste, including commercial and industrial laboratories, dialysis wastes, discarded medical equipment and parts that were in contact with infectious agents, biological waste and discarded materials that are contaminated with secretions from those suffering from communicable diseases. It also includes a clause for other waste material resulting from medical care offered to a patient and as declared by the administrator. Hence the list is exhaustive.

Environment protection is ensured by providing for compliance orders that can be issued by the administrator, failing to comply with which, can bring upon the violator a fine of up to \$ 25,000. There are also criminal penalties of fine per day up to \$ 50,000 and/or imprisonment of two years. However, for criminal penalty to apply, the person needs to have an intention to violate the tracking regulations, and hence, this being a difficult element to prove, it is rather superfluous. There is also a civil penalty, under which the

⁸⁰ *Federal Environmental Law*, Minnesota, West Publishing Co., 1991, pp. 856-862.

violators are liable to pay upto \$ 25,000 for each violation, from failures to segregate to dispose in a specific manner.⁸¹

Designed primarily to monitor the treatment of medical wastes through their creation, transportation and destruction, i.e. from cradle-to-grave, the MWTA was approved to amend the Solid Waste Disposal Act to require the Administrator of the Environmental Protection Agency to promulgate regulations on the management of infectious waste.⁸² The MWTA was enacted as a pilot study to better determine how the life cycle of medical wastes played out under federal regulations.

Specifically, Medical Waste Tracking Act, 1998 which amended the existing Solid Waste Disposal Act, 1976,⁸³ did the following:

(i) It defined medical waste and established which medical wastes would be subject to program regulations.

(ii) It established a cradle-to-grave tracking system utilizing a generator initiated tracking form.

(iii) It required management standards for segregation, packaging, labelling and marking, and storage of the medical waste.

(iv) It established record keeping requirements and penalties that could be imposed for mismanagement.

⁸¹ See 'Enforcement', Sec. 11005 in Sec. 2(a) of the MWTA, 1988.

⁸² See Long title and Sec. 2(a) of the Medical Waste Tracking Act, 1988.

⁸³ (SWDA) This Act provides for comprehensive cradle-to-grave regulation of hazardous waste and authorizes environmental agencies to order the cleanup of contaminated sites. Since 1984, it has also called for the extensive regulation of underground storage tanks and the cleanup of contamination caused by leaking tanks.

EPA promulgated the MWTA regulations on March 24, 1989. The regulations for this two year program went into effect on June 24, 1989 and expired on June 21, 1991 and were in effect in four states and Puerto Rico.⁸⁴ During this time, EPA also gathered information and performed several studies related to medical waste management. The MWTA and EPA's associated program served to focus attention on the medical waste issue and provided a model for some states and other federal agencies in developing their own medical waste programs. After the repeal of the MWTA, States were given the responsibility to regulate and pass laws concerning the disposal of medical waste. Consequently all fifty states of the USA vary in their regulations for the disposal of Bio-Medical Wastes.⁸⁵

The MWTA also required EPA to examine various treatment technologies available at the time for their ability to reduce the disease causing potential of medical waste. The technologies that EPA examined in 1990 included:

- (i) incinerators and autoclaves (both onsite and offsite)
- (ii) microwave units
- (iii) various chemical and mechanical systems

The legislation provides a listing of definitions on what materials will be classified as 'medical wastes'. The list includes within its definitions: 'cultures and stocks of infectious agents', 'pathological wastes' such as body

⁸⁴ New York, New Jersey, Connecticut and Rhode island.

⁸⁵ California, Florida, Georgia, Maine, Michigan, Missouri, Montana, Rhode Island, Vermont, Washington, West Virginia and Wisconsin are amongst the States that have prominent legislative regulations. The other States have either guidelines or policies only.

tissues, blood wastes and blood by-products, sharps, contaminated carcasses and beddings of animals, surgery or autopsy wastes that were once in contact with infectious agents, 'laboratory wastes' and 'dialysis wastes that were in contact with the blood of patients undergoing hemodialysis'.⁸⁶ Defining what objects were to be classified as medical wastes was crucial to ensure that all municipalities under the MWTA would be monitoring similar materials.

In order to outline how the program should manage the transportation of waste materials, four requirements were primarily identified: firstly, to provide a means of monitoring 'the transportation of waste from the generator to the disposal facility' unless the said waste had previously been incinerated; secondly to be able to ensure the 'generator of the waste' that the waste had been 'received by the disposal facility'; thirdly, to develop a uniform system, for the tracking of materials across states and lastly, to develop a means to label and contain the wastes for the safety of the handlers.⁸⁷

There are provisions allowing for agents of the EPA to 'enter ... any establishment ... where medical wastes are or have been generated' so as to conduct 'monitoring', 'testing', or to 'obtain samples from any person'. This process would allow for the EPA to legally enter generating facilities for the purpose of determining if infectious agents and materials were being handled as prescribed by the administrator of the EPA.⁸⁸

⁸⁶ See 'Listing of Medical Wastes', Sec. 11002 in Sec. 2(a) of the MWTA, 1988.

⁸⁷ See 'Tracking of Medical Waste', Sec. 11003 in Sec. 2(a) of the MWTA, 1988.

⁸⁸ See 'Inspections', Sec. 11004 in Sec. 2(a) of the MWTA, 1988.

A major point of importance within the MWTA is its inclusion of specific enforcement provisions within the legislation.⁸⁹ This becomes notable as it allows for one of the first instances in which an agency of the federal government may prosecute those charged with violation of regulations dealing with medical wastes. During the enactment of the MWTA the administrator of the EPA may be allowed to commence civil action in the United States district court in the district in which the violation occurred, against those being charged with the violation.

These regulations are also integrated with the state laws and hence even the state may conduct inspections, especially with regard to waste that may be imported into a state, and the program does not pre-empt any state or local laws except as to the form of tracking system.⁹⁰ Hence, checks are laid at every stage to ensure compliance. Especially important is the 'health impacts report' that is drawn up every two years by the administrator of the agency for toxic substances and disease registry, which reports on the health effects of medical waste on the aspects like:

- (i) the potential for infection or injury from the segregation, handling, storage, treatment or disposal of medical wastes;
- (ii) an estimate of the number of people affected annually by sharps and the nature of the injuries;
- (iii) an estimate of the public affected annually due to causes mentioned in (i) and (ii) and finally,

⁸⁹ See 'Enforcement', Sec. 11005 in Sec. 2(a) of the MWTA, 1988.

⁹⁰ See 'Relationship to State Law', Sec. 11007 in Sec. 2(a) of the MWTA, 1988.

(iv) the diseases possibly spread by medical waste, like AIDS and an estimate of the number of cases traceable to medical waste.

In the USA, the cost of waste disposal has increased due to stiff environmental regulations, both at the state and federal level and the environmental standards are being further strengthened. Hence incinerators are to be used efficiently and according to set norms. Important in this regard is the Federal Clean Air Act, 1990 which sets out standards. In addition, there is a Code of Federal Regulations on Occupational Safety and Health Act, 1910, which deals in detail with the duty of employers to their employees in the hospital, dealing with their waste. This includes proper labelling, segregation in relation to waste generation out of treatment given to persons with different types of diseases and hence segregation and regulation is at that very basic level. This includes even the description of the type of containers in which the waste is to be stored, the manner of cleaning them before reuse and also a description of dealing with the laundry.

2.3 Legal Framework in United Kingdom

The purpose of UK Waste Legislation is to control the keeping, transport and treatment, deposit and disposal of waste. It controls all sections of the waste management industry, including storage, registration, licensing, monitoring, record keeping and controls on specific Waste streams such as hazardous waste and clinical wastes.⁹¹

⁹¹ <http://www.ciwn.co.uk/pma/1581> visited on 3.2.2006.

2.3.1 General Waste Management Legislative Framework

There are several laws in the UK generally applicable to waste regulation and they are:

The Birth Police (Scotland) Act, 1892 and 1903;

The Destructive Insects and Pests Act 1914;

The Persons Act, 1919;

The Public Health Act, 1936;

The Drugs and Cosmetics Act, 1940;

The Industries (Development and Regulation) Act, 1951;

The Prevention of Food Adulteration Act, 1954;

The Solid Waste Disposal Act, 1955;

The Litter Act, 1958;

The Dangerous Litter Act, 1971;

The Deposit of Poisonous Waste Act, 1972;

The Water Act, 1973;

The Health and Safety at Work Act, 1974;

The Control of Pollution Act, 1974;

The Resource Conservation and Recovery Act, 1976;

The Insecticides Act, 1968 and

The Refuse Disposal (Amenity) Act, 1978.

The whole system of waste management in hospitals is being done through segregation of the waste, keeping hazardous ones in red containers,

less hazardous ones in yellow containers and the rest in black containers. However, studies revealed that a number of hospitals incinerated wastes at low temperatures leading to emissions rich in dioxin content.⁹²

However, the waste legislation controlling the handling, collection and disposal of clinical waste is very extensive. The lack of understanding in the process of clinical disposal often results in unintentional breaking of laws. Clinical waste regulations apply to any person or organisation that produces clinical waste. The 'producer' is responsible for care of their clinical waste while they hold it and for packing it appropriately to prevent its escape. The producer is also responsible for ensuring that all the regulations around clinical waste disposal are met. Moreover the description of the waste needs to be accurate and contain all the information necessary for safe handling, treatment and disposal.

2.3.2 Controlled Waste Regulations, 1992

In these rules, 'clinical waste' means (a) any waste which consists wholly or partly human or animal tissue, blood or other body fluids, excretions, drugs or other pharmaceutical products, swabs or dressings, or syringes, needles or other sharp instruments, being waste which unless rendered safe may prove hazardous to any person coming into contact with it; and (b) any other waste arising from medical, nursing, dental, veterinary, pharmaceutical or similar practice, investigation, treatment, care, teaching or

⁹² *Ibid.*

research, or the collection of blood for transfusion, being waste which may cause infection to any person coming into contact with it.⁹³

2.3.3 The Environmental Protection Act, 1990

In this legislation, Section 34(1) of the Environmental Protection Act 1990 imposes a duty of care on any person who imports, produces, carries, keeps, treats or disposes of controlled waste or, as a broker, has control of such waste. The duty requires such persons to ensure that there is no unauthorised or harmful deposit, treatment or disposal of the waste, to prevent the escape of the waste from their control or that of any other person, and on the transfer of the waste to ensure that the transfer is only to an authorised person or to a person for authorised transport purposes and that a written description of the waste is also transferred.

The Duty of Care Regulations, 1991⁹⁴ introduced under section 34(5) of the Environmental Protection Act, 1990 cast a duty on any person who is bound by the duty of care, to make and to retain documents and furnish copies of them to the concerned authorities. Breach of the duty of care or of these Regulations regarding documentation is a criminal offence. The duty of care and these Regulations do not apply to an Occupier of domestic property with respect to household waste produced on the property.

One of the aims of the Duty of Care is to stop waste producers from simply handing over waste, without considering where it will be going. On a

⁹³ <http://www.statutelaw.gov.uk> visited on 15.5.2006.

⁹⁴ The Environmental (Duty of Care) Regulations, 1991.

construction site, the waste producer is the person carrying out the work which gives rise to the waste, not the person who issues instructions or establishes contracts that give rise to waste. Where a haulier is brought by the main contractor to remove a sub-contractors waste, the main contractor is acting as a broker and all three parties are therefore subject to the duty.

Wherever waste is being stored, it must not be allowed to escape. This means that all containers/skips must be safe and secure, and they should also be labeled accurately. Waste should also be segregated to prevent mixing. It is the employer's responsibility to make sure that all employees are aware of the location of the containers, and what can go in each.⁹⁵

2.3.4 The Carriage of Dangerous Goods Regulations, 2007

According to these regulations, carrying goods by road or rail involves the risk of traffic accidents. If the goods carried are dangerous, there is also the risk of an incident, such as spillage of the goods, leading to hazards such as fire, explosion, chemical burn or environmental damage. Most goods are not considered sufficiently dangerous to require special precautions during carriage. Some goods, however, have properties which mean they are potentially dangerous if carried.

Dangerous goods are liquid or solid substances and articles containing them, that have been tested and assessed against internationally agreed criteria by a process called classification and found to be potentially dangerous

⁹⁵ <http://www.crwplatform.co.uk> visited on 3.3.2006.

(hazardous) when carried. Dangerous goods are assigned to different Classes depending on their predominant hazard.

There are regulations to deal with the carriage of dangerous goods, the purpose of which is to protect everyone either directly involved (such as consignors or carriers), or who might become involved (such as members of the emergency services and public). Regulations place duties upon everyone involved in the carriage of dangerous goods, to ensure that they know what they have to do to minimise the risk of incidents and guarantee an effective response.

Carriage of dangerous goods by road or rail is regulated internationally by agreements and European Directives, with biennial updates of the Directives, taking account of technological advances. New safety requirements are implemented by Member States via domestic regulations which, for Great Britain, directly referring to the technical agreements.

2.3.5 The Hazardous Waste (England and Wales) Regulations, 2005

These regulations have certain key requirements as follows:

- (a) The list of Hazardous Wastes is defined by the European Waste Catalogue under the List of Wastes Regulations, 2005.
- (b) Each hazardous waste producing site, unless exempt, must be required to be pre-registered with the Environment Agency (EA) before waste can be collected.

(c) Consignees (hazardous waste receivers) must keep records of all consignments received and submit quarterly returns to the EA together with a fee per consignment.

(d) Sites that are registered will be subject to EA inspection and monitoring.

(e) The mixing of hazardous waste with other hazardous waste types and non hazardous waste is prohibited.

(f) All hazardous waste entering hazardous waste landfill sites and cells must also comply with the Waste Acceptance Criteria (WAC).

(g) Hazardous wastes will need to be sampled and tested in order to produce analysis results that can be used to determine whether a waste complies with WAC and can therefore continue to be landfilled.

The Regulations replaced the Special Waste Regulations and cover all wastes previously classed as 'Special'. The full list is now defined by those wastes marked with an asterisk in the European Waste Catalogue (EWC) which adds in over 200 different waste types.

The Regulations require that all hazardous waste producers are registered prior to any collections and it will be an offence for hazardous waste to be collected from a site that is not registered or exempt. The EA is encouraging registration through the internet by applying higher charges for paper based or telephonic registration and have developed a national database system that will provide a unique number for each site on registration. This

number, along with specific consignment identification, must be on every consignment sent out from that site.

2.4 West Australian Waste Management Legal Framework

Western Australia occupies nearly one third of the Australian continent. Due to the size and the isolation of the state,⁹⁶ considerable emphasis has been made of these features and no other regional administrative jurisdiction in the world occupies such a high percentage of a continental land mass. Hence this study has findings of the legal control of wastes in this part of Australia.

2.4.1 Hospitals and Health Services Act, 1927

Certain terms are defined in statutes, for example, a public hospital means any hospital that is conducted or managed by a board constituted under this Act; or the Minister under this Act or declared to be a public hospital under Section 3 of the Act.⁹⁷ Hospitals (Administration of Public Hospitals) Regulations, 1940 made under this Act provide model bye laws for the guidance of boards of management of public hospitals in respect of the matters regarding which such boards may make bye laws.

2.4.2 Environmental Protection Act, 1986

It is important to note that an Environmental Protection Policy

⁹⁶ The rest of Australia does not have laws for Bio-Medical Waste Management, although policies and guidelines are followed.

⁹⁷ See Sec. 2; Hospitals and Health Services Act, 1927.

(EPP) made under this Act carries the greatest weight because EPPs have statutory force and regulations can be made to enforce them. Indeed the nomenclature of EPPs can lead to a misunderstanding of the legal effect of policies generally.

Administrative guidelines may be published by an agency of government to describe how one or more of the functions of that agency will be administered. An example of Administrative Guidelines are those published by the Environmental Protection Authority for the process of environmental impact assessment under the Environmental Protection Act, 1986; or the Administrative Guidelines published under the Environmental Protection and Biodiversity Conservation Act, 1999 to aid the assessment procedure for referrals under that Act.

As far as Environmental regulation is concerned, it can reasonably be said that hospitals produce large quantities of waste. In metropolitan and country, sewerage and drainage areas, the Water Corporation, the Water and Rivers Commission and the relevant local government authority administer drainage and sewerage services.⁹⁸

The Environmental Protection Act, 1986 and the regulations made pursuant to it contain the means to: prevent the generation of waste; recover the resources from waste; dispose of waste properly; and manage the

⁹⁸ The Metropolitan Water, Sewerage and Drainage Areas are constituted by Sec 6; The Metropolitan Water Supply, Sewerage and Drainage Act, 1909. In areas outside the boundaries of the Metropolitan Water, Sewerage and Drainage Area, sewerage areas may be constituted, modified or dissolved.

consequences of waste disposal.⁹⁹

Under the Environmental Protection Act, 1986, (EP Act) there is a tiered licensing system with three types of licences for emissions to air, land and water, which are regulated, monitored and best practice licences.¹⁰⁰ Fees vary depending on the level of emission monitoring firms choose to follow. Firms or businesses who do not accurately monitor discharges hold regulated licences; those who monitor discharges may hold monitored licences; and those who hold best practice licences have an approved environmental management system, an approved continuous improvement plan and conduct audits.¹⁰¹

In this legislation, a person is said to commit an offence if he, she or it, intentionally or with criminal negligence (a) causes waste to be placed; or (b) allows waste to be placed, in any position from which the waste could reasonably be expected to gain access to any portion of the environment; and would in so gaining access be likely to result in pollution.¹⁰²

The Occupier of any premises is said to commit an offence if it does not comply with any prescribed standard for the discharge of waste or the emission of noise, odour or electromagnetic radiation and takes all reasonable and practicable measures to prevent or minimize the discharge of waste and the emission of noise, odour or electromagnetic

⁹⁹ Bates G M and Lipman Zada, *Pollution Law in Australia* 2002 Butterworths, at p. 236.

¹⁰⁰ *Ibid.*

¹⁰¹ *Ibid.*

¹⁰² See Sec. 50(1); The Environmental Protection Act, 1986 (Western Australia).

radiation, from those premises.¹⁰³

In case of a discharge of waste, occurs as a result of an emergency, accident or malfunction occurs otherwise than in accordance with a works approval or licence or with a requirement contained in a pollution abatement notice; or is of a prescribed kind or a kind notified in writing to the Occupier concerned, and has caused or is likely to cause pollution, the Occupier of the premises on or from which that discharge took place who does not, as soon as practicable after that discharge, notify the Chief Executive Officer of the prescribed details of that discharge, commits an offence.¹⁰⁴

If any waste has been or is being discharged from any premises otherwise than in accordance with a works approval or licence or a requirement contained in a pollution abatement notice, or a condition of pollution is likely to arise or has arisen, an inspector or authorized person may, with the approval of the Chief Executive Officer, give such directions in writing as the inspector or authorized person considers necessary to such person as he considers appropriate to remove, disperse, destroy, dispose of or otherwise deal with the waste which has been or is being discharged; or to prevent the condition of pollution from arising or control or abate that condition if it arises, as the case requires; or with such assistance as he considers appropriate to remove, disperse, destroy, dispose of or otherwise deal with the waste which has been or is being discharged;

¹⁰³ See Sec. 51; The Environmental Protection Act, 1986 (Western Australia).

¹⁰⁴ See Sec. 72; The Environmental Protection Act, 1986 (Western Australia).

or prevent the condition of pollution from arising or control or abate that condition if it arises, as the case requires.¹⁰⁵

As far as the liability of Occupiers, the Occupier of premises must comply with any prescribed standard and must take all reasonable and practicable measures to prevent or minimise the discharge of waste from premises.¹⁰⁶ The board of a hospital may be an Occupier which is liable for unlawful discharges of waste. Hospital waste may include general, industrial, hazardous and clinical waste¹⁰⁷.

Perth public hospitals are not, prescribed premises under the Environmental Protection Act, 1986 and accordingly do require licensing under Part V of the EP Act, a licence must be obtained from the Department of Environmental Protection to discharge waste from prescribed premises;¹⁰⁸ offensive trades described specifically under Schedule 2 of the Health Act, 1911; or noxious industries under the model scheme provisions to be found in Appendix B of the Town Planning Regulations, 1967 made pursuant to the Town Planning and Development Act, 1928 Accordingly, the works approvals or licences required under those Acts are not required for public hospitals.¹⁰⁹

There are a number of waste classifications and licence

¹⁰⁵ See Sec. 73; The Environmental Protection Act, 1986 (Western Australia).

¹⁰⁶ See Regulation 5, and Schedule 1 of the Environmental Protection Regulations, 1987.

¹⁰⁷ Hazardous waste is waste that is ignitable, corrosive, reactive, toxic or infectious. The DEP has not developed a Code of Practice for managing clinical waste but for the time being has adopted the national Code of Practice for the Management of Clinical and Related Wastes.

¹⁰⁸ See Part V of the Environmental Protection Act, 1986.

¹⁰⁹ However, various other activities undertaken at hospitals for example laundries, grease traps and oil traps will need licences from the Department of Environmental Protection.

requirements.¹¹⁰ Statutory requirements for licences or other environmental authorisations for the discharge, disposal and transport of waste; provisions for environmental management; and offences and penalties, generally depend on how waste is classified.¹¹¹ Industrial waste is generally distinguished from other waste by definitions in the regulatory framework that governs their disposal.

Prior to its commencement a hospital that seeks to discharge its industrial waste into the sewerage system must obtain approval from the Water Corporation.¹¹² In making the application the hospital must give details of all the types of effluents and pre-treatment works, and may be required to install special monitoring equipment. The approval will be in the form of an industrial waste permit.¹¹³ In addition hospitals attract quality and quantity (QQ)¹¹⁴ charges, to reflect the load which they add to the system and to determine the cost of the service provided by the Water Corporation.

Under the Metropolitan Water Supply, Sewerage and Drainage By-laws, 1981, whether or not a particular hospital is complying with its obligations is unlikely to be discovered unless a major polluting event discovered at the treatment plant can be tracked back to the offending hospital. The Water Corporation is the sole judge of the quality, quantity and

¹¹⁰ See Halsbury's Laws of Australia.

¹¹¹ *Ibid.*

¹¹² For example at the Sir Charles Gardiner hospital area there are several such permits each relating to each entity that resides in the hospital vicinity.

¹¹³ See Water Corporation Industrial Waste Information Brochure Hospital published 17 December 2001, on the Water Corporation website, www.watercorporation.com.au visited on 3.2.2007.

¹¹⁴ *Ibid.*

rate of industrial waste discharge and whether a discharge complies with a permit issued by it.¹¹⁵ Accordingly, as long as a public hospital pays the annual licence fee and complies with any conditions attached to the permit it will be left alone.¹¹⁶

If the Water Corporation suspects a breach of an industrial waste permit, it may issue a notice to the Occupier to make good the damage; it may terminate the permit or recover costs from the Occupier for remediation works carried out by the Corporation.¹¹⁷

2.4.3 Health Act, 1911

It is an offence under this Act for a person to allow or cause chemical refuse, waste or any liquid over a temperature of 43 degrees into a sewer of, or any drain communicating with a sewer of a local government where that matter causes a nuisance, is injurious to health or interferes with the disposal of sewage.¹¹⁸

2.4.4 Metropolitan Water Authority Act, 1982

It is an offence under this Act to cause or permit sediment or other pollutant to enter a main drain in the Metropolitan Water, Sewerage and

¹¹⁵ See the Metropolitan Water Supply, Sewerage and Drainage Bye-laws 1981 as amended.

¹¹⁶ Where there is a release of certain contaminants pre-treatment fixtures may be required to be or ought to be put into place such as grease arresters, petrol/oil arresters, sand arresters, neutralisers and dilution pits.

¹¹⁷ *Ibid.*

¹¹⁸ See Sec. 94; The Health Act, 1911 and see *Farlodge v Rough* (unreported decision of the Supreme Court of Western Australia) Murray J No 1131 of 1992, 12 January 1993, for the vicarious liability of an employer for breach of section 94 by its employees.

Drainage Area.¹¹⁹ The Water Corporation may give a notice to any person or corporation who commits an offence to repair any damage and remove any cause of pollution. Failure to comply with the notice is an offence.¹²⁰

2.5 European Legal Framework

Depending on whether on not they are EU countries, the approach varies. EU countries have a specific legislative frame work. The European Waste Catalogue (EWC) applies and there are Incineration Directives, Landfill Directives and National Waste Regulations for such countries.

2.5.1 Directives for EU Countries

Wastes are defined by their European Waste Catalogue (EWC) Codes. EWC Codes are 6 digits long, with the first two digits defining the overarching category of waste, the next two defining the sub-category and the last two defining the precise Waste stream. Clinical waste comes under the "18" codes, for example: "18 01 01" corresponds to healthcare waste (18), from humans (01), that is sharp and not infectious (01).¹²¹

The Landfill Directive, more formally Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste, is a European Union Directive issued by the European Union to be implemented by its member states. The Directive's overall aim is to prevent or reduce as far as possible negative

¹¹⁹ See Secs. 101(1)(b) & 101 (1)(c); The Metropolitan Water Authority Act, 1982.

¹²⁰ See bye-law 4.9; The Metropolitan Water Supply, Sewerage and Drainage Bye-laws, 1981.

¹²¹ <http://en.wikipedia.org/wiki/Medical-waste> visited on 5.2.2006.

effects on the environment, in particular the pollution of surface water, groundwater, soil and air, and on the global environment, including the greenhouse effect, as well as any resulting risk to human health, from the land-filling of waste, during the whole life-cycle of the landfill. This legislation also has important implications for waste handling and waste disposal.

2.5.2 Policy of Non-EU Countries

Non EU countries have either no legislative framework or it is not implemented. However, WHO waste management policies and Persistent Organic Pollutants (POPs) treaty¹²² are applicable. The guiding principles of WHO activities include preventing the health risks associated with exposure to health-care waste for both health workers and the public by promoting environmentally sound management policies for health-care waste; supporting global efforts to reduce the amount of noxious emissions released into the atmosphere to reduce disease and defer the onset of global change; and reducing the exposure to toxic pollutants associated with the combustion process through the promotion of appropriate practices for high temperature incineration.

The strategy is to better understand the problem of healthcare waste management for which WHO recommends that countries conduct assessments prior to making any decision as to which healthcare waste

¹²² The Stockholm Convention on Persistent Organic Pollutants, 2001.

management methods are to be chosen. Tools are available to assist with the assessment and decision-making process so that appropriate policies lead to the choice of adapted technologies.

Short-term strategies include production of all syringe components made of the same plastic to facilitate recycling; selection of PVC-free medical devices; identification and development of recycling options wherever possible (e.g. for plastic, glass, etc.); and research and promotion on new technologies or alternatives to small-scale incineration.¹²³

Until countries in transition and developing countries have access to healthcare waste management options that are safer to the environment and health, incineration may be an acceptable response when used appropriately. Key elements of appropriate operation of incinerators include effective waste reduction and Waste segregation; placing incinerators away from populated areas; satisfactory engineered design; construction following appropriate dimensional plans; proper operation; periodic maintenance; and staff training and management.¹²⁴

¹²³ http://www.allcountries.org/health/health_care_waste_management.html visited on 23.4.2011.

¹²⁴ http://www.who.int/immunization_safety/waste_management/update/en/ visited on 23.4.2011.

Medium-term strategies include further efforts to reduce the number of unnecessary injections thereby reducing the amount of hazardous health-care waste that needs to be treated; research into the health effect of chronic exposure to low levels of dioxins and furans; and risk assessment to compare the health risks associated with: (1) incineration; and (2) exposure to health-care waste.¹²⁵

Long-term strategies include effective, scaled-up promotion of non-incineration technologies for the final disposal of healthcare waste to prevent the disease arising from: (a) unsafe healthcare waste management; and (b) exposure to dioxins and furans; support to countries in developing a national guidance manual for sound management of healthcare waste; support to countries in the development and implementation of a national plan, policies and legislation on healthcare waste; promotion of the principles of environmentally sound management of healthcare waste as set out in the Basel Convention; and support to allocate human and financial resources to safely manage healthcare waste in countries.¹²⁶

2.5.3 Medical Waste Management in Croatia

Special mention needs to be made of Croatia,¹²⁷ which is a non EU member but has a well regulated waste management legal regime. Medical waste management here is regulated by the Waste Act, 2004 and Ordinance

¹²⁵ *Ibid.*

¹²⁶ *Ibid.*

¹²⁷ Officially, the Republic of Croatia is classified as an emerging and developing economy by the International Monetary Fund and a high income economy by the World Bank.

on Waste Types and Directive on manipulation of waste generated in Healthcare. The implementation of these laws and waste management in general are also supported by the legislation dealing with Transport of Hazardous materials and that of Toxic Substances. Modern trends in waste management promote an integrated approach also called 'waste chain'. This integrated approach to medical waste management is based on hierarchical structuring of waste management structure from the point where it is produced to its final disposal. Priority is always accorded to reducing the amount and the harmfulness of waste by replacing harmful materials with those that are not, but where it is not possible, waste management includes sorting and separating, pre-treatment on site, safe transportation, final treatment and sanitary disposal. Methods of choice for final treatment should not be harmful for human health and environment. Even though Croatian regulations define and cover all steps in the waste management chain, their implementation is one of the country's greatest issues. Improper practices are seen, right from waste production in healthcare institutions to the final disposal and include handling, sorting, and use of containers or treatment in incinerators. In addition, Croatia lacks locations for sanitary landfills.¹²⁸

2.6 Legal Framework for Waste Management in South Africa

In South Africa, effective regulations have been identified in Guateng - the smallest province in the Republic with only 1.4% of the land area, but

¹²⁸ http://www.researchgate.net/publication/6677053_Medical_waste visited on 7.2.2006.

highly urbanised, which comprised of the cities of Johannesburg and Pretoria.¹²⁹

2.6.1 Healthcare Waste Management Regulations, 2003

The province of Guateng has these regulations, which apply to all persons who generate, collect, receive, store, transport, treat, dispose of, or handle healthcare risk waste in any form in the Province of Gauteng. It defines 'healthcare waste generator' means any person, whose acts or processes produce healthcare waste and includes, but is not limited to:

- (a) Home based care givers and organisations;
- (b) Medical and Dental Practitioners, clinics, hospitals, surgery centres, laboratories, research laboratories, and General Practitioners;
- (c) Veterinary Practitioners, Clinics, and Hospitals;
- (d) Traditional Healers; and
- (e) Tattoo Artists; Body Pierces, Undertakers, and Embalmers.

It lays down a general prohibition and duty of care, focuses on segregation, waste minimization, packaging, internal transport, treatment and disposal of healthcare waste. Other issues of concern in these regulations are authorization to generators of healthcare waste, reporting, record keeping and audit reports.¹³⁰

For the purpose of enforcement, healthcare risk waste inspectors are appointed who have powers of inspection and to cause the production of

¹²⁹ <http://www.elaw.org/node/2852> visited on 4.5.2006.

¹³⁰ Some of these provisions are similar to the Indian legal provisions discussed at para 3.8 at p.95.

documents.¹³¹ Besides, there are provisions devoted to the offences and penalties which include punishments and fines provided along with award of damages and a special provision to cease activities.¹³² The regulations also include Schedules providing for Standards of packaging, Standards for disinfection for reusable containers, minimum performance requirements for controlled combustion treatment facilities and for non-combustion (alternative) treatment facilities.¹³³

2.7 Waste Management Legal Framework in Asia

The hospital waste management practices in a few Asian countries have been chosen, viz. Japan, People's Republic of China and several of the South Asian countries, since they are neighbours to the Indian sub-continent. As for the south Asian countries, a comparative analysis has been drawn and the Indian legal scene has been included in the comparison.

2.7.1 Waste Disposal Law of 1970 in Japan¹³⁴

In Japan, the waste management practice is carried out in accordance with this 'law'. The first rule of infectious waste management was regulated in 1992 and infectious wastes are defined as the waste materials generated in medical institutions as a result of medical care or research which contain pathogens that have the potential to transmit infectious diseases. Revised

¹³¹ See Secs. 29 & 32; Guateng Healthcare Waste Management Regulations, 2003.

¹³² See Secs. 33, 35 & 39; Guateng Healthcare Waste Management Regulations, 2003.

¹³³ See Schedules I – IV; Guateng Healthcare Waste Management Regulations, 2003.

¹³⁴ Japanese legal system does not use the term 'Act' for a legislation, but terms it as 'Law'.

criteria for infectious waste management were promulgated by the Ministry of Environment in the year 2004. Infectious waste materials are divided into three categories: the form of waste; the place of animal generation; the kind of infectious diseases.¹³⁵

This Japanese waste management law which was enacted in 1970 and last amended in the year 2000, provides for the definition and classification of wastes; standards for waste treatment; establishing national policy and regional/municipal programme on waste management; treatment of municipal wastes by municipalities; authorization for waste transporters, treatment facilities and landfills; manifest system for industrial waste and about official inspections and penalties.¹³⁶

2.7.2 Environmental Protection Law of People's Republic of China, 1989¹³⁷

In The Peoples Republic of China, sustainable management of healthcare wastes (HCW) takes into account the requirements deriving from the Stockholm Convention on Persistent Organic Pollutants (POPs)¹³⁸ and the WHO recommendations. Although there were two laws on the subject, this is the principal law on Environmental Protection in China. The other law is a special law for prevention, control and elimination of infectious disease and protection of human health, viz. Law of the People's Republic of China on

¹³⁵ Miyazaki M. and Une H.; *Infectious waste management in Japan: A revised regulation and a management process in medical institutions*. http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B visited on 8.2.2006.

¹³⁶ http://www2.kankyo.metro.tokyo.jp/anmc21_WM/legislation.htm visited on 8.2.2006.

¹³⁷ Adopted on December 26, 1989. See <http://www.china.org.cn/english/environment/34356.htm>

¹³⁸ *Supra* note 122 at p. 59.

Prevention and Treatment of Infectious Diseases, 1989¹³⁹; and although there have been various standards laid down in the year 2001,¹⁴⁰ it was only after a few years that special administrative regulation for Chinese healthcare waste management was introduced called the Healthcare Waste Management Regulation, 2003. One important basis of this management process, stimulated five categories of Healthcare Waste as infectious waste, pathological waste, sharp objects, chemical waste and pharmaceutical waste and this was recognized through another regulation called Medical Waste Category 2003 which was soon thereafter followed by stipulated administrative punishment for violations of Healthcare Waste management provision called the Administrative Punishment Rules for Medical Waste management in the year 2004.¹⁴¹

By the end of 2005, there were 149 low-standard Healthcare Waste disposal facilities in operation in China, distributed throughout different areas. According to the National Hazardous Waste and Healthcare Waste Disposal Facility Construction Plan, 331, modern, high-standard, centralized facilities will be built up in China in municipal level cities. Although incineration is still the main technical option for HCW disposal in China, it is expected that, especially for medium and small size facilities, non-

¹³⁹ Adopted on February 21, 1989.

See http://www.falvm.com.cn/falvm/app/db/f_enlawshow.jsp?TID=20090616104658307207362

¹⁴⁰ Incineration Pollution Control standard, Storage Pollution Control standard and Landfill Pollution Control Standard.

¹⁴¹ <http://www.sciencedirect.com/science> visited on 23.4.2011.

incineration technologies will develop quickly and will soon become the main technical option.¹⁴²

The basic management needs, both from the point of view of pollution control and final disposal, have been defined, and a system of technical and environmental standards has been formulated and implemented. However, there are still some shortages. This is particularly true when considering the best available techniques and best environmental practices developed under the Stockholm Convention, with which the present technological and managing situations are not completely compliant. In this framework, the lifecycle (from generation to final disposal of wastes) of HCW and holistic approaches (technology verification, facilities operation, environmental supervision, environmental monitoring, training system, financial mechanism, etc.) towards HCW management are the most important criteria for the sustainable and reliable management of HCW in China.¹⁴³

2.8 Bio-Medical Waste Management Legal Framework in South Asian Countries

As far as the South Asian countries are concerned, the legal control or legislative measures in respect of management of Bio-Medical Wastes in select countries, viz. in Bangladesh, Bhutan, Maldives, Nepal, Pakistan and Sri Lanka were examined in this study.

¹⁴² *Ibid.*

¹⁴³ *Ibid.*

It is seen that apart from India, which has a specific set of Rules from the year 1998 and Pakistan, which has Rules for hospital waste management from the year 2005, other South Asian countries do not have any specific legal control over the management and handling of Bio-Medical Wastes, even though there are legislative measures for the protection of the environment.

Table 2.1 provides a comparative analysis of the state of healthcare waste legislations and policies in the mentioned countries of the South Asian region vis-à-vis India.

BIO-MEDICAL WASTE MANAGEMENT IN SOUTH ASIAN COUNTRIES

Country	Legal Control
Bangladesh	No specific rules covered in the Environmental Protection Act, 1995 of the country.
Bhutan	Guidelines for Infection Control (Ministry of Health) Addressed Environmental Code of Practice for Hazardous Waste Management, 2001 Policy.
India	Bio-Medical Waste (Management and Handling) Rules, 1998. (Amended: March, 2000 and June, 2003)
Maldives	No separate rules in Environmental Protection and Preservation Act, 1993 of the country.
Nepal	No polices and legislation dealing with hazardous wastes.
Pakistan	Hospital Waste Management Rules, August 2005.
Sri Lanka	No proper legal framework in National Environmental Act, 2001. (Draft of National policy)

Table 2.1

2.9 Conclusion

The international legal mechanisms for the control of general wastes are of different character in different parts of the world. This study has revealed that Bio-Medical Waste Management was earlier controlled through laws governing general waste management in almost all countries, till such time specific law was enacted for this purpose. The legal framework in the USA is the starting point in the enactment of specific law for this purpose, following which several countries of the world took initiatives in this direction.

Even before the environmental law took shape, the regulatory principles which formed the basis of healthcare management existed. Apart from this, the International treaties, Conventions and protocols also resulted in regulatory legislation to protect the environment in some countries, which included preventing pollution and enacting legislation for the control of waste management. Therefore, every country has some law to protect the environment and control waste management and this study has highlighted the legal framework in the United Kingdom, Western Australia, Europe, South Africa, Asian and South Asian countries. Apart from the USA, a few amongst these countries have specific laws to manage Bio-Medical Wastes, notable amongst them being the Guateng Province in South Africa and India being the first amongst the South Asian countries to have a law that is specific for the managing and handling of Bio-Medical Waste.

Chapter 3

NATIONAL LEGAL REGIME

3.1 Introduction

Having examined the evolution of international legal regimes pertaining to the management and handling of Bio-Medical Wastes and detailed the relevant laws prevalent in different parts of the world, this Chapter focuses on the scenario pertaining to Indian legal regime governing Bio-Medical Waste Management tracing the same historically from the ancient period to the present-day law governing the subject.

Environment has always been a matter of concern and the legal regimes of the times sought to protect the environment wherever necessary. However there was no specific legal regime to control Bio-Medical Wastes since technological progress had not brought us to the level of 'dispose after use' culture that we are in today. Most of the problems associated with Bio-Medical Waste Management have arisen since solutions sought to be

provided to a problem have themselves become another problem, leading to a vicious circle.

The problem of environmental pollution is as old as the evolution of *homo sapiens*¹⁴⁴ on this planet. The ambition of mankind for limitless enjoyment and comfort has led towards the exploitation of nature's wealth so indiscriminately that it has reduced nature's capacity to provide for the future. The voracious appetite of humankind for resources and the desire to conquer nature has ended on a collision course with the environment. The demand for an explosive technological society imposes intense stress on the state of the equilibrium with the environment.

The relationship between human beings and the environment has varied from time to time and it has also been varying from place to place at a given point of time. This statement is quite legitimate as far as India and its environment protection policy is concerned. It was a statement of one of the great personalities in the field of law, Prof. Upendra Baxi, who once said that in India, Environment protection and management started only after 1972 i.e. after the Stockholm Conference and that the Constitution of India was environmentally blind prior to 1976. However, many other personalities later disagreed.¹⁴⁵

The concept of environmental jurisprudence in India is not new. The age-old environmental jurisprudence in Indian civilization - to live in harmony with nature is almost forgotten. Worshipping nature as deity and

¹⁴⁴ Humans commonly refers to the species *homo sapiens* (Latin: "wise man" or "knowing man")

¹⁴⁵ Budholai Bharat; *Environment Protection laws in the British Era*.
<http://www.legalserviceindia.com/articles/brenv.htm> visited on 5.8.2006.

recognizing Earth as Mother shows a kind of conservation ethics that comes through history, culture, religion and Vedic Philosophy. In order to understand the concept of environmental jurisprudence in Indian society, the discussion needs to address the aspects in different periods like the Ancient Period and Pre-Historic Period, Historic Period, British Period and Post-Independence era. Therefore, from Ancient Times and through Medieval Times and British concerns we today have the latest relevant legislations and specific rules to assist and control the management and handling of Bio-Medical Wastes.

3.2 Environment Protection in Ancient and Pre-Historic Period

Protection of environment was prevalent in our Ancient Indian Society and the concept of environment was best explained by the word *Paryavarana*.¹⁴⁶ In the earliest stages of human history in India, human beings considered the environment as very dominant and that was why, they worshipped trees, forests, animals, mountains, rivers etc. All of these held a special place of reverence in Hindu mythology. The *Vedas*, *Puranas*, *Upanishads*, and other scriptures of the Hindu religion gave a detailed description of trees, plants and wildlife and their importance to the people. The *Rig Veda* highlighted the potentialities of nature in controlling the climate, increasing fertility and improvement of human life emphasizing on intimate kinship with nature. *Atharva Veda* considered trees as abode of

¹⁴⁶ Which in Sanskrit means something that envelopes us.

various gods and goddesses. *Yajur Veda* emphasized that the relationship with nature and the animals should not be that of dominion and subjugation but of mutual respect and kindness. Many animals and plants were associated with gods and goddesses so that they were preserved for the future generations. As they were associated with supernatural powers, no one dared to misuse the resources and therefore there was a check on the excess utilization of resources.

Sages, Saints and great thinkers and teachers of India lived in forests. As a result, people dared not destroy the forest. Protection of nature was considered to be the duty of everyone. *Rig Veda*, *Manu Smriti* and *Charak Samhita* have emphasized the purity, healing and medicinal value of water. Because of this, a system of or a code of conduct developed in Indian society to keep the water clean and wholesome.

Hindu society, in Vedic era was conscious of adverse pollution effects of indiscriminate destruction of plants and forests. They gave respect and consideration for the natural world including animals and birds. *Yajurva Veda* emphasizes the relationship with nature and animals; it should not be that of dominion and subjugation but of mutual respect and kindness.

All the religious texts preach the importance of the natural world. In Islam there is close harmony between man and nature. The Holy *Quran* declares that Allah created heaven and earth. From clouds he released water. On earth he made rivers and raised mountains. According to Islam every thing is created from water. Thus there is significance of purity of water.

Mankind is the trustee of nature, whereas the other living creatures are considered to be the beneficiaries. Destruction of nature is the destruction of life. Christians are baptized in water as a sign of purification. It also gave importance for the protection and preservation of the natural environment. In Sikh religion also the concern for environment is evident from the fact that it considers every creature to be the incarnation of God and hence conservation and preservation are essential principles.

Ancient jurisprudence in relation to the environment had close proximity with Pre-Historic Era. Gautam Buddha the greatest rationalist, humanist and environmentalist of the era derived enlightenment while meditating under the Bodhi tree. The basic tenets of Buddhism are simplicity and *ahimsa* or non-violence. The principles of simplicity teach us that man should not overexploit the natural resources. Buddhism preaches the norms of respect of ecology. It believes in non separable relationship of man with trees and forests. In Buddhism the tree is a potential source of food and shelter for human beings and animals. Buddha preached compassion towards every living creature.

Jainism condemns sacrifice of animals to the sacred fire. It disapproved captivity, whipping, overloading or depriving animals of adequate food and drink. Jainism is also based on the principle, which is in close harmony with nature and helps in protecting and preserving the nature. *Mahavira* proclaimed a profound ecological truth saying that one who neglects or disregards the existence of earth, air, fire, water and vegetation,

disregards one's own existence. He thus explained that man has no existence exclusive of nature.

3.3 Environment Protection in Historic Period

During historical period before Maurya's regime there was no precise idea of environmental conservation. Maurya period was perhaps the most glorious chapter in the Indian history for environmental protection. The concern for environmental protection in India in the medieval times can be traced back to the period between 321 and 300 B.C. since devices and rules for protecting environment are clearly discernible from then. The rules for the city administration pronounced by *Chanakya*¹⁴⁷ testify that the rulers were keen on maintaining hygiene and cleanliness. The civic responsibility and municipal regulations were verses relating to hygiene and damage to property. He dealt in detail and meticulously explicated the various rules for the protection and upgradation of environment. Rules made by *Kautilya* made it mandatory for the rulers to protect forest and animals. They also prohibited killing or injuring animals and birds. Severe penalty was prescribed for the offenders. The *Arthashastra*¹⁴⁸ provided for punishments against the citizens for violating norms of hygiene as under:¹⁴⁹

¹⁴⁷ He was an adviser and prime minister to the first Mauryan Emperor Chandragupta (c. 340-293 BC), and was the chief architect of his rise to power. *Kautilya* and *Vishnugupta*, the names by which the ancient Indian political treatise called the *Arthashastra* identifies its author, are traditionally identified with *Chanakya*.

¹⁴⁸ This is an ancient Indian Hindu treatise on statecraft, economic policy and military strategy which identifies its author by the names *Kautilya* and *Vishnugupta*, who are traditionally identified with *Chanakya* as in *ibid*.

¹⁴⁹ R. P. Kangle; *The 'Kautilya Arthashastra'*, 2nd Edition, Part-I, p. 94.

(a) For throwing dirt on the road, the fine shall be one-eighth of a pana¹⁵⁰ and for blocking the same with mud or water the fine shall be one-quarter of a pana. {2.36.26}

(b) For the same cause, on the royal highway, such fine shall be double. {2.36.27}

(c) For using a holy place as an urinal, the fine shall be one-half of a pana, as a latrine, one pana; for using a water reservoir as an urinal, the fine shall be one pana, as a latrine, two panas; for using a temple as an urinal, the fine shall be one and one half of a pana, as a latrine, three pana and for using a royal building as an urinal, the fine shall be two pana, as a latrine four panas. {2.36.28}

(d) For throwing dead bodies of animals like cat, dog or serpent inside the city, the fine shall be three panas, and for other animals like donkey, camel, mule, horse or a cattle, the fine imposed shall be six panas and for human dead bodies the fine shall be 50 panas. {2.36.30}

In Historic Period most of the temples or shrines were situated in remote places in forests and mountains. This originated from the belief that God has nearness with nature. Therefore, people have not dared to interfere with the surroundings of temple or shrines. This promoted the conservation of forests and wildlife in many places. Environmental protection existed during Mauryan Period and continued till the end of Gupta Empire in 673 A.D.

¹⁵⁰ Mauryan Dynasty introduced silver punch marked coins, amongst which was a 'pana'.

Other Hindu Kings also prohibited killing of animals and destruction of forest.

King Ashoka of the Mauryan Empire did as much as he could to protect environment. He made several laws for the preservation of the ecology of India. King Ashoka expressed his view about the welfare of creatures in his State. He gave orders for planting of trees by the roadside for the benefit of travellers. He also issued *Adhvapatra*¹⁵¹ to preserve forests and natural water resources. He prescribed various pecuniary punishments for killing animals that include even ants, squirrels, parrots, pigeon, lizards and rats.

3.4 Medieval Period Environment Protection

The same trend continued even during the Moghul period (1526-1858) where environmental conservation emphasized more on aesthetic parameters. They were great lovers of nature spending their time in the lap of natural environment. They also made significant contribution by establishing magnificent gardens, fruit orchards and parks and foliage at different places. To some extent, the religion of complete tolerance practiced by Akbar¹⁵² practices concern for protection of birds and beasts. Different regimes had different rules, but they have shown their common concern for the preservation and enrichment of the environment. In the course of time, however, human beings did not distil the obvious logic in various

¹⁵¹ In Sanskrit meaning command of the king.

¹⁵² Also known as Shahanshah Akbar-E-Azam or Akbar the Great (23 November 1542 – 27 October 1605) was the third Mughal Emperor of India/Hindustan.

mythological commands and this resulted into a gradually drifting loss of concern for nature and the environment.

3.5 Lack of British Environmental Concerns

It has been seen through literature review that the British did not have any specific concerns for India on healthcare and hospital hygiene. Although they did legislate on some issues of environmental importance, they chanced upon some subjects which are close to the area of civic cleanliness, but the regulations did not reach anywhere close to handling hospital based hazards.

The British and their rule in India showed some destruction of natural resources too. The early British rulers in India were totally indifferent to the needs of forest conservation. The British set foot on the Indian sub-continent around the year 1600, with the mission of trading goods from India in the form of East India Company. The early days of British rule in India were days of plunder of natural resources. They started exploiting the rich resources present in India by employing the policy of imperialism.

It was observed that there was fierce onslaught on Indian forest. This onslaught was due to increasing demands for business and military purposes. Royal Navy, ship building, supply of teak and sandalwood for exports and trade purpose and some programs such as development of railway networks were given precedence at the cost of the environment.

However on a positive note, apart from forest enactments, the British government also made attempts to regulate various kinds of pollution in India, namely water, air and wild life. Some of the Acts were The Shore Nuisance (Bombay & Kolaba) Act, 1853,¹⁵³ which was one of the earliest laws concerning water pollution. The Oriental Gas Company Act, 1857,¹⁵⁴ was enacted to regulate pollution produced by Oriental Gas Company by imposing fines.

The next and most important enactment was The Indian Penal Code, 1860,¹⁵⁵ and it was enacted to be a complete Criminal Code. A polluter of the environment could be punished if he does any act which causes any common injury, danger or annoyance to the public or to the people in general then the act may be treated as public nuisance as defined under Sec. 268 IPC¹⁵⁶ and the offender may be punished under Secs. 290 or 291 of the code.¹⁵⁷ Similarly a person who unlawfully or negligently does any work which is or which he knows or has reason to believe to be likely to spread infection of any disease dangerous to life, may be punished under Sec. 269 IPC. There are also penal provisions under a situation which either causes or destroys or

¹⁵³ Secs. 1,2 & 5; The Shore Nuisance (Bombay & Kolaba) Act, 1853 (Central Act No. 11 of 1853).

¹⁵⁴ Secs. 15,16,17 & 24; The Oriental Gas Company Act, 1857 (Central Act No. 5 of 1857).

¹⁵⁵ It stands as a tribute to the genius of Lord Macaulay who was the President of the First Indian Law Commission constituted in 1834.

¹⁵⁶ Section 268 of Indian Penal Code, 1860 (Central Act No.45 of 1860) , which has provisions relating to offences affecting the public health, safety, convenience, decency and morals under Chapter XIV, defined public nuisance imposed penal liability. It says that "a person is guilty of public nuisance who does any act or is guilty of an illegal omission which causes any common injury, danger or annoyance to the people in general who dwell or occupy property in the vicinity or must necessarily cause injury, obstruction, danger or annoyance to persons who may have occasion to use any public right. A common nuisance is not excused on the ground that it causes some convenience or advantage".

¹⁵⁷ These sections took into account those types of nuisance that are not defined in the Code and in respect of their continuance after injunction to discontinue, respectively.

diminishes the value or utility or any property injurious as provided under Secs. 426, 430, 431 and 432 IPC.¹⁵⁸ This means that any person who generates, collects, receives, stores, transports, treats, disposes or handles Bio-Medical Waste in any form shall be treated as the contravener of the above penal provisions.¹⁵⁹ However, this Penal Code prescribes punishments in various kinds of pollution which do not have a deterrent effect in the present society.¹⁶⁰ In addition, The Police Act, 1861¹⁶¹ prevents and controls the slaughtering of animals, cleaning of carcass, throwing dirt into streets and also prescribes punishments for the offenders in the nature of fines.

The Indian Easements Act, 1882¹⁶² protected the riparian owner against unreasonable pollution by upstream user. The Indian Fisheries Act, 1897¹⁶³ penalized the killing of fish by poisoning water by using explosives. The earliest enactments during British rule to control air pollution were the Bengal Smoke Nuisance Act, 1905¹⁶⁴ and Bombay Smoke Nuisance Act, 1912.¹⁶⁵

In the field of wildlife protection the early legislation was limited to wildlife statute for the protection of wild elephants. The Elephants' Preservation Act, 1879¹⁶⁶; The Northern India Canal and Drainage Act,

¹⁵⁸ All these are aggravated forms of the offence of 'mischief' defined under Sec 425 IPC.

¹⁵⁹ Patnaik Raghunath; *Bio-Medical Waste Management and the Process of Environmental Governance* 322 Central India Law Quarterly 24 (2001).

¹⁶⁰ Highest form of punishment is imprisonment of either description or fine of both.

¹⁶¹ Sec. 34 First; The Police Act, 1861 (Central Act No. 5 of 1861).

¹⁶² Secs. 15, 23(c) & 28(d); The Indian Easements Act, 1882 (Central Act No. 5 of 1882).

¹⁶³ Sec. 5; The Indian Fisheries Act, 1897 (Central Act No. 4 of 1897).

¹⁶⁴ Secs. 6, 7, 8, 8A and 9; Bengal Smoke Nuisance Act (Bengal Act No. 3 of 1905).

¹⁶⁵ Sec. 9; Bombay Smoke Nuisance Act (Bombay Act No. 7 of 1912).

¹⁶⁶ Secs. 3 & 8; The Elephants' Preservation Act, 1879 (Central Act No. 6 of 1879).

1873¹⁶⁷; The Obstruction in Fairways Act, 1881¹⁶⁸; The Indian Forest Act, 1878¹⁶⁹ and Wild Birds and Animals Protection Act, 1912¹⁷⁰ were legislations that introduced regulatory measures on hunting. The first comprehensive law for the protection of wildlife and its habitat was for the Hailey National Park, which was established in Uttar Pradesh.¹⁷¹

3.6 India's Independence and Environment Scenario

Once India became independent from the British rule, during the early years of Indian independence there was no precise environmental policy. The Constitution of India came into force in the year 1950 and the judiciary contributed to expansion of the concept of Fundamental Rights that had a bearing on environmental protection¹⁷². Simultaneously, Government was making enactments from time to time to protect environment as per the needs in the society.

3.6.1 Legislative Enactments and Environmental Protection

Two early post-independence laws touched water pollution and other legislations were introduced later. The Factories Act, 1948¹⁷³ mentions the effective arrangements for waste disposal and empowered State Government to frame rules to implement these directives. With the River Boards Act,

¹⁶⁷ Secs. 34 & 70; The Northern India Canal and Drainage Act, 1873 (Central Act No. 8 of 1873).

¹⁶⁸ Secs. 8 & 10; The Obstruction in Fairways Act, 1881 (Central Act No. 16 of 1881).

¹⁶⁹ Central Act No. 7 of 1878; first drafted in 1865, revised and later consolidated in 1927.

¹⁷⁰ Sec.3; Wild Birds and Animals Protection Act, 1912 (Central Act No. 8 of 1912).

¹⁷¹ Now Corbett National Park.

¹⁷² See para 3.6.2 at p. 83.

¹⁷³ Secs. 11 & 12; The Factories Act, 1948 (Central Act No. 63 of 1948).

1956¹⁷⁴ for the regulation and development of Inter-State Rivers and river valleys, the Government was empowered to prevent water pollution.

There were also other important enactments regarding environmental protection. Prevention of Cruelty to Animals Act, 1960¹⁷⁵ deals with protection of animals, The Atomic Energy Act, 1962¹⁷⁶ was passed to regulate nuclear energy and radioactive elements in India, The Insecticides Act, 1968¹⁷⁷ provides regulation regarding manufacture and distribution of insecticides. In most of these other statutes that have some bearing on environmental pollution, the environmental concern is incidental to the principal objective of the law. All the statutes are scattered and piecemeal.

During the period of 1970 the Central Government changed its direction from environmental indifference to environmental concern and made different environmental legislations. This period saw the beginning of environmental policy in India. Developments during this decade gave a new dimension and direction to the policy concern in the field of environmental protection.

Parliament enacted other comprehensive laws in the area of environmental protection. They are The Wildlife Protection Act, 1972¹⁷⁸ and Water (Prevention and Control of Pollution) Act, 1974¹⁷⁹ in the field of wildlife protection and water pollution respectively. There was also the enactment of the Water (Prevention and Control of Pollution) Cess Act,

¹⁷⁴ Sec. 13(A)(a)(vii); River Boards Act, 1956 (Act No. 49 of 1956).

¹⁷⁵ Secs. 5(g), 9(a), 11-13; Prevention of Cruelty to Animals Act, 1960 (Central Act No. 59 of 1960).

¹⁷⁶ Secs. 3(bb)(ii), 3(e)(i),(ii),(iii), 11(d), 16, 17 & 30; The Atomic Energy Act, 1962 (Central Act No. 33 of 1962).

¹⁷⁷ Secs. 4(2)(b), 17 & 19; The Insecticides Act, 1968 (Central Act No. 46 of 1968).

¹⁷⁸ Secs. 11, 12, 50-58; The Wildlife Protection Act, 1972 (Central Act No. 53 of 1972).

¹⁷⁹ Secs. 16-33, 41-50; The Water (Prevention and Control of Pollution) Act, 1974 (Central Act No. 6 of 1974).

1977¹⁸⁰ in the area of water pollution. In the early 1980s forest conservation and air pollution laws were passed. They were the Forest Conservation Act, 1980¹⁸¹ and the Air (Prevention and Control of Pollution) Act, 1981¹⁸² for the conservation of forest and control of air pollution respectively.

3.6.2 Environmental Protection through Constitutional Law

With independent India having the Constitution coming into force, several fundamental rights were bestowed through Part III amongst which Art. 21 confers on all persons the right to life. The scope and access of environmental justice finds place in the right to life and an activist judiciary was wholly instrumental for expanding the horizon of the spirit of Art. 21.¹⁸³ After independence, there is also constitutional sympathy for environmental preservation; with the year 1972 actually marking a distinct turning point in the history of environmental management in India.¹⁸⁴

To implement the decision taken at the United Nations Conference on the Human Environment the Indian Parliament made tremendous changes in the field of environmental management. It was in this decade that environmental protection was accorded a Constitutional status by the Constitution (Forty-second Amendment) Act, 1976 which incorporated

¹⁸⁰ Sec. 3; The Water (Prevention and Control of Pollution) Cess Act, 1977 (Central Act No. 36 of 1977).

¹⁸¹ Secs. 2 & 3A; Forest Conservation Act, 1980 (Central Act No. 69 of 1980).

¹⁸² Secs. 19-31A, 37-46; The Air (Prevention and Control of Pollution) Act, 1981 (Central Act No. 14 of 1981).

¹⁸³ "No person shall be deprived of his life and personal liberty except according to procedure established by law".

¹⁸⁴ Jain, M. P., *Indian Constitutional Law*. 5th ed. (Nagpur : Wadhwa and Company, 2007).

Article 48A¹⁸⁵ and Chapter 1VA which included Article 51(A) (g).¹⁸⁶ After this amendment, it has become obligatory on the part of the State and every citizen to protect and improve the environment. Article 47 of the Directive Principles of State Policy lays down that the improvement of the public health is one of the primary duties of the State. Similarly Article 48A envisages that the State shall endeavour to protect and improve the environment and Article 51A (g) made it a fundamental duty on every citizen of India to protect and improve the natural environment.

In India, the Judiciary has played a very substantive role in giving impetus to the environment protection activities. Initially, it was mainly through litigation between individuals over some kind of environmental nuisance. Over a period of time, the environmental litigation has transformed from individuals seeking legal remedies to a state where resolution of disputes centred on large scale impact of environmental policy perspectives and also the time tested conflict between Fundamental Rights.

By and large, the Indian Judiciary was approached to decide on environmental issues in the light of derived Fundamental Rights enshrined in the Indian Constitution. The environmental jurisprudence thus created was in the context of Art. 21, which includes the right to wholesome environment and right to livelihood. Judicial decisions relating to these aspects have been discussed.

¹⁸⁵ Protection and improvement of environment and safeguards of forests and wild life.

¹⁸⁶ It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wild life and to have compassion for living creatures.

In *Subhash Kumar v. State of Bihar*,¹⁸⁷ a writ by way of Public Interest Litigation (PIL) was filed in the Supreme Court seeking direction to the Director of Collieries to stop the discharge of slurry from its washeries into the Bokaro River. It was alleged that, the slurry which gets deposited on the agricultural land affects its fertility. Moreover, the effluent in the form of slurry pollutes the river, making it unfit for drinking and irrigation. One of the main issues of the case was, whether the right to life included the right to wholesome environment. Justice Singh, in his judgment held that Right to life is a Fundamental Right under Art. 21 of the Constitution and it includes the right of enjoyment of pollution free water and air for full enjoyment of life.

In *Kinkri Devi v. State*,¹⁸⁸ a writ was filed under Art. 226, 51A (g) and 48A in the Himachal Pradesh High Court, in order to protect and preserve the Shivalik Hills. For this purpose, a lease for the excavation of limestone required to be cancelled. The Court also recognised the importance of issues relating to environment and ecological balance.

Also, under Articles 51A(g) and 48A, a Constitutional pointer exists towards the State and a Constitutional duty of the citizens, not only to protect but also to improve the environment and to preserve and safeguard the forests, flora and fauna. Since this case was decided by the H.P. High Court, before the Supreme Court's decision in *Subhash Kumar's case*¹⁸⁹, a right under Art. 21 remained without being recognized, even though rights under Art. 51A(g) and 48A were upheld.

¹⁸⁷ AIR 1991 SC 420.

¹⁸⁸ AIR 1988 HP 4.

¹⁸⁹ *Supra* note 187.

In *T. Damodar Rao v. S.O., Municipal Corporation, Hyderabad*¹⁹⁰ the case broadly deals with whether the LIC of India and the Income Tax Department, Hyderabad, can legally use the land owned by them in a recreational zone for residential purposes, thereby contradicting the development plan. A writ of *mandamus* was issued by the Court forbidding these departments from constructing anything for residential purposes. One of the reasons for the writ being issued was the environmental imbalance that could be caused by such type of constructions. The court held that such constructions would be contrary to law and to Art. 21, as the enjoyment of life and its attainment and fulfilment embraces the protection and preservation of nature's gifts, without which life cannot be enjoyed.

In *Hamid Khan v. State*,¹⁹¹ a PIL was filed by a public-spirited advocate pointing towards the State Government in not taking proper measures before supplying drinking water from hand pumps, which resulted in colossal damage to the health of the population of Mandla District. Samples were sent to various labs in the State. All results showed high fluoride content. The Court held that Art. 21 conferred the right upon the people to have pollution free air and pure water. Therefore, the State was responsible for not taking precautionary steps to provide proper drinking water and was required to compensate the suffering ailing people.

¹⁹⁰ AIR 1987 AP 171.

¹⁹¹ AIR 1997 MP 191.

In *Banwasi Seva Ashram v. State of U.P.*,¹⁹² a writ was filed by *adivasis*, under Article 32, with regard to their rights over certain forestlands. This was their habitat. After a part of the jungle became a 'reserved forest' under the Forest Act, forest officer began interfering with the *adivasis* operations in those areas, thereby obstructing their free movement. In the meanwhile some part of the same forest was allotted to NTPC (National Thermal Power Corporations Limited) for setting up of a power plant and this allotment also was challenged. The Court upheld the allotment of forest land to NTPC on the reasoning that there is a great demand in this country for energy such as electricity and specific parts of our country have suffered tremendous set-backs in industrial activity for want of energy. The Court, however, granted certain rights and facilities to the *adivasis* in the reserved forest.

In *B.T. Ingle v. State of Maharashtra*,¹⁹³ land was to be acquired by the State Government to construct a dam. A Writ petition was filed under Art. 32 for the vacation of an interim stay order. In the process of doing so, the Court insisted that the interests of backward/tribal people be looked into. The Court also held various specific measures to be taken by the State Government before construction such as providing an alternate employment for a person whose occupation is being affected by the construction of the dam.

¹⁹² AIR 1987 SC 374.

¹⁹³ AIR 1987 SC 532.

The case of *Abhilash Textiles v. Rajkot Municipal Corporation*,¹⁹⁴ basically deals with carrying on a business or trade in an unregulated manner and causing harm to the society and to what extent it is violative of the Constitution. Abhilash Textiles contended that they were carrying on the business for the last 25 years and employing 20,000 to 25,000 people. The effluents of the petitioners were causing serious health disorders to the local people. The Court taking a pro-environment stand did not accept any of the petitioner's contentions and thereby discharged the petition.

In *K.C. Malhotra v. State*,¹⁹⁵ a PIL was filed by a doctor with relation to the spread of epidemic cholera (which resulted in death of 12 children) due to open drain, filthy water, heaps of dirt, contaminated water and rubbish. This state of affairs was clearly due to the negligence of various State bodies/authorities. The Court held that Right to life also included the bare necessities of life such as right to adequate nutrition, clothing, shelter, facilities of reading and writing. Right to life meant something more than just physical survival. The people of that area have a right under Art. 21 to ensure that the Government takes steps for the improvement of public health as the same are among its primary duties. The Court ultimately issued directions to keep up the health of the inhabitants of the locality.

In *Law Society of India v. Fertilizers and Chemicals Travancore Limited*,¹⁹⁶ a PIL was filed alleging that high potency danger is involved to human life in the vicinity, in allowing continuing the operation of an

¹⁹⁴ AIR 1988 Guj 57.

¹⁹⁵ AIR 1994 MP 548.

¹⁹⁶ AIR 1994 Ker 309.

ammonia storage tank. The Court held that the guarantee to life is more than immunity from annihilation of life. Right to environment is a part of Right to Life. The Court after going through the material on record, directed to decommission the ammonia tank in order to protect Wellington island and Cochin.

In *Sushila Saw Mill v. State of Orissa*,¹⁹⁷ a notice under the Orissa Saw Mills and Saw Pit Control Act, 1991 was issued to the petitioner to close down his operations. The petitioner, having felt that his Fundamental Right under Art. 19 was violated, filed a petition at the Orissa High Court. To protect forest wealth and environment the Act imposes a total ban on sawing operations in prohibited areas. The Court held that preservation of forests was a great matter of public interest and therefore the Act was not violative of Fundamental Rights, as the restriction would fall under the reasonable exceptions.

Incidentally, the growth of environmental jurisprudence in India was slow but steady. The pioneer amongst the cases, which is still the *Magnacarta* of the environmental jurisprudence for recognition of public right to decent living was treated in *Municipal Council, Ratlam v. Vardhichand*¹⁹⁸ where Justice V. R. Krishna Iyer in his inimitable style, affirmed the trial Court's order directing under Sec 133¹⁹⁹ CrPC, 1973 to abate the nuisance of a foul drain flowing in between the city with the filth and stink and discharge from an alcohol plant. The recognition and growth of

¹⁹⁷ AIR 1995 SC 2484.

¹⁹⁸ AIR 1980 SC 1622.

¹⁹⁹ Conditional order for removal of nuisance.

Public Interest Litigation (PIL) has become a catalyst for environmental justice. While in *Rural Litigation and Entitlement Kendra v. State of Uttar Pradesh*,²⁰⁰ the Supreme Court recognized the imbalance of the ecology and hazard to healthy environment due to working of lime-stone quarries, in *Sachinand Pandey v. State of West Bengal*,²⁰¹ the court recognized society's interaction with nature and the environmental issue affecting humanity. Likewise there are a host of decisions whereby the judiciary has expanded the ambit of Art. 21.²⁰² However, more recently the Supreme Court invoked the 'public trust doctrine' evolving methods for arriving at 'net present value' to be paid by the State for diversion of forest land to non-forest use,²⁰³ rationalized the meat export promotion policy and regulation of abattoirs²⁰⁴ and intervened in town planning, providing for conversion of large open lands of cotton mills in Mumbai.²⁰⁵ All these decisions show that Art. 21 has grown in leaps and bounds.

The High Courts and the Supreme Court of India imposed a duty on individuals and the State to protect the environment holding that the right to life under Article 21 includes right to live in an unpolluted environment also.²⁰⁶ 'Strict Liability' for hazardous activity as laid down in the celebrated case of *Rylands v. Fletcher*,²⁰⁷ imposed a strict liability on the persons for the

²⁰⁰ *Supra* note 46 at p. 21.

²⁰¹ AIR 1987 SC 1109.

²⁰² *M. C. Mehta v. Union of India* AIR 1987 SC 965 also called the oleum gas leak case; *Vellore Citizens Welfare Forum v. Union of India* AIR 1996 SC 2715, called the Tanneries case where the principle of 'sustainable development' was stressed.

²⁰³ *T. N. Godavarman Thirumulpad v. Union of India* AIR 2005 SC 4256.

²⁰⁴ *Akhil Bharat Goseva Sangh v. State of A.P.* 2006 (4) SCC 162.

²⁰⁵ *Bombay Dyeing Mfg. Co. Ltd. (3) v. Bombay Environmental Action Group* (2006) 3 SCC 434.

²⁰⁶ See *supra* note 190 at p. 86.

²⁰⁷ (1868), L.R. 3 H.L.

and acceptance. 'Generator is responsible' is the universal principle holding the healthcare establishments legally accountable for damage caused by waste management processes. The enterprise should not be able to an excuse that it had taken all reasonable care and that the harm occurred without any negligence on its part and it is reasonable and justified to impose strict liability to pay the social cost of the tragedy.

3.6.3 Criminal Procedure Code and Environment Protection

Different types of pollution can be controlled or removed by the District and Sub Divisional Magistrates or by Magistrates specially empowered for the purpose, by exercising powers under Section 133 which provides for issuance of a conditional injunction order against a particular person, under Section 143 which provides for issuance of an absolute order against general public nor to repeat or continue a public nuisance and under Section 144 which provides for issuance of an order in urgent cases of nuisance or apprehended danger of the Criminal Procedure Code, 1973.

3.7 Specific Legislations

Amongst the different comprehensive enactments made by the Parliament to protect environment by dealing with all aspects of environmental pollution, is the Environment (Protection) Act, 1986²¹².

²¹² See Secs. 7-17; The Environment (Protection) Act, 1986 (Central Act No. 29 of 1986).

3.7.1 The Environment (Protection) Act, 1986

In order to protect and improve the environment and for matters connected therewith the Environment (Protection) Act, 1986 was enacted. India made an international commitment at the United Nations Conference on the Human Environment held at Stockholm in June 1972, to protect and improve the human environment in order to prevent hazards to human life and other living creatures, plants and property and hence India had to take steps in that direction and made this legislation applicable to the whole of India.²¹³

Sec. 8 of Environment (Protection) Act, 1986 imposes a liability to comply with procedural safeguards in disposal of hazardous substances, as prescribed. The Supreme Court of India held that it had power to award compensation; that it has implicit power to issue whatever direction, order or *writ* to enforce the fundamental right and that the power of the Court is not only injunctive in ambit, which is, preventing infringement of a fundamental right but it also provides remedial relief against breach of the fundamental right already committed.²¹⁴ However, Sec. 15 provides for imposing a penalty of Rs. one lakh and an imprisonment up to five years or both for any violation of the provisions. It also provides for higher penalty in case of continuous

²¹³ Art. 51(c) says that the State shall endeavour to foster respect for international law and treaty obligations in the dealings of organised peoples with one another. See also the enabling provision, Art. 253 of the Constitution of India.

²¹⁴ *Bandhua Mukthi Morcha v. Union of India* AIR 1984 SC 802.

violation. But the Environment (Protection) Act, 1986, does not provide any measure or liability to pay compensation to the victims of the violations of the provisions.

3.7.2 Public Liability Insurance Act, 1991²¹⁵

With the objective of catering to public liability insurance for the purpose of providing immediate relief to the persons affected by accidents occurring while handling any hazardous substance and for matters connected therewith or incidental thereto. This Act made it mandatory for Occupiers of hazardous activity to do public liability insurance to provide minimum relief to the victims. Sec. 3 of the Act imposes a duty and liability for providing relief specified in schedule for such death, injury or damage. However, it is also the duty of the state to provide for effective remedies against the environmental hazards. The Public Liability Insurance Act, 1991 is a step towards fulfilling such an obligation to some extent.

An immediate relief up to a maximum of Rs 37,500 can be determined by the District Collector under this legislation. For larger compensation, the affected person has to seek remedies under other laws or common law developed by the courts. However this law does not specifically cater to the management and handling of hospital wastes

²¹⁵ Secs. 3 & 4; Public Liability Act, 1991 (Central Act No. 6 of 1991).

3.7.3 National Environment Tribunal Act, 1995²¹⁶

This legislation provides for strict liability for damages arising out of any accident occurring while handling any hazardous substance and for the establishment of a National Environment Tribunal for effective and expeditious disposal of cases arising from such accident, with a view to giving relief and compensation for damages to persons, property and the environment and for matters connected therewith or incidental thereto. It also creates tribunals to enforce the absolute liability principle.

3.8 Specific Rules for Bio-Medical Waste Management

Many rules and notifications are made possible by The Environment (Protection) Act, 1986.²¹⁷ In the year 1989, the Government of India, in exercise of powers conferred under sections 6, 8 and 25 of the Environmental (Protection) Act, 1986 formulated the Hazardous Waste (Management & Handling) Rules, 1989 which were amended in 2000. But these rules did not cover hospital wastes, despite of the fact that India was a party to Basel Convention trans-boundary movement on hazardous Waste Management and therefore the same were bound to be notified. In consonance with the same a draft notification on Bio-Medical Wastes (Management and Handling) Rules, 1995 was issued on 24th April, 1995 vide S.O. 378(E) II 3(ii) Gazette of India

²¹⁶ Secs. 3,8 and 9; National Environment Tribunal Act, (Central Act No. 27 of 1995).

²¹⁷ Recycled Plastics Manufacture and Usage Rules, 1999; Fly Ash Notification in 1999, 2003, 2008 and 2009; Municipal Solid Waste (Management and Handling) Rules, 2000 and Battery (Management and Handling) Rules in 2000.

Extra., Sl. No. 19 and objections were invited from public. After duly considering necessary amendment in the Draft Rules, the Bio-Medical Waste (Management & Handling) Rules 1998 finally came into operation with effect from 20th July, 1998 vide S.O. 630 (E) II 3(ii), Gazette of India, Extra, Sl. No. 460. These Rules are applicable to all persons who generate, collect, receive, store, transplant, dispose or handle Bio-Medical Waste in any form.²¹⁸

The draft rules underwent amendment after a period of three years and the Bio-Medical (Management and Handling) Rules, 1998 enumerated the institutions generating Bio-Medical Wastes including hospital, nursing homes, clinics, dispensaries, veterinary institutions, animal houses, pathological laboratories and blood banks. These also specifically mention the duty of Occupier, categories of Bio-Medical Wastes and various standards for treatment and disposal of Bio-Medical Wastes.

This notification which is popularly called Bio-Medical Waste Management rules has certain highlights. These rules apply to all persons who generate, collect, receive, store, transport, treat, dispose, or handle Bio-Medical Waste in any form. Akin to all typical enactments, these rules at the outset define several entities that need to be understood in the context of management and handling of Bio-Medical Waste. These terms would be interpreted in the manner they are described, unless the context means otherwise and for this purpose, the important terms are defined.

²¹⁸ See Rule 2; BWM Rules, 1998.

It is specified in these Rules that it shall be the duty of every Occupier of an institution generating Bio-Medical Waste which includes a hospital, nursing home, clinic, dispensary, veterinary institution, animal house, pathological laboratory, blood bank by whatever name called to take all steps to ensure that such waste is handled without any adverse effect to human health and the environment.²¹⁹

As far as treatment and disposal of Bio-Medical Waste are concerned, it shall be treated and disposed of in accordance with Schedule I, and in compliance with the standards prescribed in Schedule V. Besides, every Occupier, where required, shall set up in accordance with the time-schedule in Schedule VI, requisite Bio-Medical Waste treatment facilities like incinerator, autoclave, microwave system for the treatment of waste, or, ensure requisite treatment of waste at a common waste treatment facility or any other waste treatment facility.²²⁰

These rules provide specific directions with regard to the segregation of Bio-Medical Wastes at the point of generation into containers or bags in accordance with Schedule II, prior to its storage, transportation, treatment and disposal. These containers shall be labelled according to Schedule III.²²¹ It has been laid down that Bio-Medical Waste shall not be mixed with other wastes. If a container is transported from the premises where Bio-Medical Waste is generated to any waste treatment facility outside the premises, the

²¹⁹ Sec 3; BWM Rules, 1998.

²²⁰ See Schedules I, V & VI; BWM Rules, 1988.

²²¹ See Schedules II & III; BWM Rules, 1988.

container shall, apart from the label prescribed in Schedule III, also carry information prescribed in Schedule IV.²²²

Notwithstanding anything contained in the Motor Vehicles Act, 1988, or rules thereunder, untreated Bio-Medical Waste shall be transported only in such vehicle as may be authorised for the purpose by the competent authority as specified by the Government. With regard to storage, untreated Bio-Medical Waste shall not be kept stored beyond a period of 48 hours, unless, if for any reason it becomes necessary to store the waste beyond such period, the authorised person must take permission of the prescribed authority and take measures to ensure that the waste does not adversely affect human health and the environment.²²³

The role of municipal bodies of the relevant areas insofar as they shall continue to pick up and transport segregated non Bio-Medical Waste generated in hospitals and nursing homes, as well as duly treated Bio-Medical Wastes for disposal at municipal dump site is provided in the Rules. Therefore they would be failing in their duty if they fail to carry out such transportation as specified.

Except otherwise provided, the prescribed authority for enforcement of the provisions of these rules shall be the State Pollution Control Boards in respect of States and the Pollution Control Committees in respect of the Union Territories and all pending cases with a prescribed authority appointed

²²² See Rule 6; BWM Rules 1998.

²²³ *Ibid.*

earlier shall stand transferred to the concerned State Pollution Control Board, or as the case may be, the Pollution Control Committees.²²⁴

It has been laid down in the rules that the prescribed authority for enforcement of the provisions of these rules in respect of all healthcare establishments including hospitals, nursing homes, clinics, dispensaries, veterinary institutions, animal houses, pathological laboratories and blood banks of the Armed Forces under the Ministry of Defence shall be the Director General, Armed Forces Medical Services shall be appointed by the State or Union territory government, within one month from the coming into force of these rules.²²⁵ The prescribed authority shall on receipt of Form I make such enquiry as it deems fit and if it is satisfied that the applicant possesses the necessary capacity to handle Bio-Medical Waste in accordance with these rules, grant or renew an authorization, as the case may be.²²⁶

An authorisation shall be granted for a period of three years, including an initial trial period of one year from the date of issue. Thereafter, an application shall be made by the Occupier/Operator for renewal. All such subsequent authorisation shall be for a period of three years. A provisional authorisation will be granted for the trial period, to enable the Occupier/Operator to demonstrate the capacity of the facility.²²⁷ The prescribed authority may after giving reasonable opportunity of being heard to the applicant and for reasons thereof to be recorded in writing, refuse to

²²⁴ See Rule 7(1); BWM Rules, 1998.

²²⁵ See Rule 7(1A); BWM Rules, 1998.

²²⁶ See Rule 7(4); BWM Rules, 1998.

²²⁷ See Rule 7(5); BWM Rules, 1998.

grant or renew authorisation.²²⁸ Every application for authorisation shall be disposed of by the prescribed authority within ninety days from the date of receipt of the application.²²⁹ The prescribed authority may cancel or suspend an authorisation, if for reasons, to be recorded in writing, the Occupier/Operator has failed to comply with any provision of the Act or these rules. However, no such authorisation shall be cancelled or suspended without giving a reasonable opportunity to the Occupier/Operator of being heard.²³⁰

Occupiers of institutions generating, collecting, receiving, storing, transporting, treating, disposing and/or handling Bio-Medical Waste in any other manner, except such Occupier of clinics, dispensaries, pathological laboratories, blood banks providing treatment/service to less than 1000 (one thousand) patients per month,²³¹ shall make an application in Form I²³² to the prescribed authority for grant of authorisation. Every Operator of a Bio-Medical Waste facility shall make an application in Form I to the prescribed authority for grant of authorisation.²³³ Every application in Form I for grant of authorisation shall be accompanied by a fee as may be prescribed by the Government of the State or Union Territory.²³⁴ The authorisation to operate a

²²⁸ See Rule 7(6); BWM Rules, 1998.

²²⁹ See Rule 7(7); BWM Rules, 1998.

²³⁰ See Rule 7(8); BWM Rules, 1998.

²³¹ See Rule 8(1); BWM Rules, 1998.

²³² See Annexure-2 at p.282.

²³³ See Rule 8(2); BWM Rules, 1998.

²³⁴ This provision, Sub-rule 3 of Rule 8, BWM Rules 1998, has been struck down by the Karnataka High Court in the case of *Fr. Mueller's v. The Member Secretary and others* AIR 2004 Kant 342 and held as *ultra vires* the parent Act in view of Art. 265, which mandates about no levy of tax without authority of law. There is no express provision in the Act enabling the framing of Rules to levying of a fee and levy of a fee is part of a taxing power that can be exercised only by legislature. Also see

facility shall be issued in Form IV,²³⁵ subject to conditions laid therein and such other condition, as the prescribed authority, may consider it necessary.

The Government of every State/Union Territory shall constitute an Advisory Committee. The Committee will include experts in the field of medical and health, animal husbandry and veterinary sciences, environmental management, municipal administration, and any other related department or organisation including non-governmental organisations. As and when required, the committee shall advise the Government of the State/Union Territory and the prescribed authority on matters related to the implementation of these rules.²³⁶

The Ministry of Defence shall constitute an Advisory Committee²³⁷ in respect of all healthcare establishments including hospitals, nursing homes, clinics, dispensaries, veterinary institutions, animal houses, pathological laboratories and blood banks of the Armed Forces under the Ministry of Defence, to advise the Director General, Armed Forces Medical Services and the Ministry of Defence in matters relating to implementation of these rules.

The Central Pollution Control Board shall monitor the implementation of these Rules in respect of all the Armed Forces healthcare establishments under the Ministry of Defence.²³⁸ After giving prior notice to the Director General Armed Forces Medical Services, the Central Pollution Control Board along with one or more representatives of the Advisory Committee

St. Philomena's hospital vs. The Member Secretary, Prescribed Authority for Bio-medical waste and others decided by the Karnataka High Court in January 2000.

²³⁵ See Annexure-2 at p. 286.

²³⁶ See Rule 9(1); BWM Rules, 1998.

²³⁷ See Rule 9(2); BWM Rules, 1998.

²³⁸ See Rule 9A(1); BWM Rules, 1998.

constituted under sub-rule (2) of rule 9 may, if it considers it necessary, inspect any Armed Forces healthcare establishments.²³⁹

Every Occupier/Operator shall submit an annual report to the prescribed authority in Form II by 31 January every year, to include information about the categories and quantities of Bio-Medical Wastes handled during the preceding year. The prescribed authority shall send this information in a compiled form to the Central Pollution Control Board by 31 March every year.²⁴⁰

Every authorised person shall maintain records related to the generation, collection, reception, storage, transportation, treatment, disposal and/or any form of handling of Bio-Medical Waste in accordance with these rules and any guidelines issued.²⁴¹ All records shall be subject to inspection and verification by the prescribed authority at any time.²⁴²

When any accident occurs at any institution or facility or any other site where Bio-Medical Waste is handled or during transportation of such waste, the authorised person shall report the accident in Form III to the prescribed authority forthwith.²⁴³

Except as otherwise provided in sub-rule (2), any person aggrieved by an order made by the prescribed authority under these rules may, within thirty days from the date on which the order is communicated to him, prefer an appeal in Form V, to such authority as the Government of State/Union

²³⁹ See Rule 9A(2); BWM Rules, 1998.

²⁴⁰ See Rule 10; BWM Rules, 1998.

²⁴¹ See Rule 11(1); BWM Rules, 1998.

²⁴² See Rule 11(2); BWM Rules, 1998.

²⁴³ See Rule 12; BWM Rules, 1998. Also see Annexure-2. at p. 285.

Territory may think fit to constitute. Provided that the authority may entertain the appeal after the expiry of the said period of thirty days if it is satisfied that the appellant was prevented by sufficient cause from filing the appeal in time.²⁴⁴ Any person aggrieved by an order of the Director General, Armed Forces Medical Services under these rules may, within thirty days from the date on which the order is communicated to him prefer an appeal to the Central Government in the Ministry of Environment and Forests.²⁴⁵

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 Bio-Medical Wastes generated in the area under their jurisdiction and in 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, so as to comply with the provisions of these rules.²⁴⁶

There are 10 categories of Bio-Medical Waste types in all and each of them has a specified mode of treatment and disposal option for effectively rendering the said waste free from risk.²⁴⁷ Further the colour coding and container types with options as per Schedule I of the BWM Rules, 1998 is also included in these rules.²⁴⁸ The BWM Rules prescribe the labels to be

²⁴⁴ Rule 13(1); BWM Rules, 1998.

²⁴⁵ See Rule 13(2); BWM Rules, 1998.

²⁴⁶ See Rule 14; BWM Rules, 1988.

²⁴⁷ See Rule 5 and read with Schedule I of BWM Rules, 1998.

²⁴⁸ See Rule 6 and read with Schedule II of BWM Rules, 1998.

used for Bio-Medical Waste containers/bags²⁴⁹ and the information to be provided on the container, in addition to the biohazard symbols.²⁵⁰

The BWM Rules also lay down the standards for treatment and disposal of Bio-Medical Wastes which include standards for incinerators, standards for waste autoclaving, standards for liquid wastes, standards for microwaving and standards for deep burials in Schedule V.²⁵¹

There are deadlines for installing facilities like incinerators, autoclave and microwave systems ranging from 30th June 2000 to 31st December 2002 as the maximum permissible period, depending on the population size of the town and the number of beds in the hospital.²⁵²

The BWM Rules are very exhaustive insomuch as the various forms required for the purpose of communicating with the concerned authorities are also provided, viz. Form I is to be used by an applicant when applying for authorization or renewal of authorization, which form is to be filled in and submitted in duplicate.²⁵³ Form II is to be filled in by every Occupier/Operator every year as it is an annual report to be submitted to the prescribed authority before 31 January every year.²⁵⁴ Accident reporting is to be done by filling Form III which contains all the necessary particulars.²⁵⁵ Form IV is with respect to grant of authorisation for operating a facility for collection, reception, treatment, storage, transport and disposal of Bio-

²⁴⁹ See Rule 6 and read with Schedule III of BWM Rules, 1998.

²⁵⁰ See Rule 6 and read with Schedule IV of BWM Rules, 1998

²⁵¹ See Rule 4 and read with Schedule I of BWM Rules, 1998.

²⁵² See Rule 5 and read with Schedule VI of BWM Rules, 1998.

²⁵³ See Rule 8; BWM Rules, 1998.

²⁵⁴ See Rule 10; BWM Rules, 1998.

²⁵⁵ See Rule 12; BWM Rules, 1998.

Medical Wastes, to be used by the authority.²⁵⁶ When an appeal is to be filed against the order of the appropriate authority at the district or regional level or of the Goa State Pollution Control Board acting as the appropriate authority or the State/Union Territory level authority, the same has to be done with the use of Form V.²⁵⁷

The responsibility the Municipal Corporations, Municipal Boards or Urban Local Bodies shall be to provide suitable common disposal/incineration sites for the Bio-Medical Waste generated in their area. If the area is outside the jurisdiction of Municipal Corporation/Boards, etc., it becomes the duty of the Occupier generating Bio-Medical Waste /Operator to arrange for suitable sites individual or in association, so as to comply with the provisions of these Rules. Every authorised person (Occupier, etc.) is under a duty to maintain records related to generation, collection, reception, storage, transportation, treatment, disposal or handling of Bio-Medical Waste in any form in accordance with the rules or guidelines issued.²⁵⁸

This Notification of Bio-Medical Waste Rules is a benevolent piece of legislation and shows the growing concern of the government to contain and control the growing problem of Bio-Medical Waste. Since the management and handling of Bio-Medical Waste is a problem of great importance and may anytime assume threatening dimension, it is essential that these rules are implemented with a heavy hand and all seriousness. The problem of Bio-

²⁵⁶ See Rule 8(4); BWM Rules, 1998.

²⁵⁷ See Rule 13; BWM Rules, 1998.

²⁵⁸ See Rule 14; BWM Rules, 1998.

Medical Waste Management is worsening in metropolitan cities of India; therefore, it requires proper and effective implementation of these rules.

The obligation to manage and handle Bio-Medical Waste according to the Rules is clearly on 'Occupier' of an institution generating Bio-Medical Waste which includes a hospital, nursing home, clinic, dispensary, veterinary institution, animal house, pathological laboratory, blood bank by whatever name called to take all steps to ensure that such waste is handled without any adverse effect to human health and the environment.²⁵⁹ Since the term 'Occupier' in relation to an institution generating Bio-Medical Waste means a person who has the control over that institution and/or its premises,²⁶⁰ it such person who is made duty bound to observe the stipulated standards and procedures. However, the Rules also explicitly state that they apply to all persons who generate, collect, receive, store, transport, treat, dispose or handle Bio-Medical Waste in any form.²⁶¹ Therefore, every person shall be responsible for acts and omissions that fall under their respective activities.

The general obligation under the Rules is to take all steps that are necessary to ensure that the Bio-Medical Waste is handled without any adverse effect to human health and the environment. Specific obligations however, falls mainly under two categories. Firstly, the necessary authorization from the prescribed authority shall be obtained by every Occupier of an institution generating, collecting, receiving, storing, transporting, treating, disposing and/or handling Bio-Medical Waste in any

²⁵⁹ See Rule 4; BWM Rules, 1998.

²⁶⁰ See Rule 3(8); BWM Rules, 1998.

²⁶¹ See Rule 2; BWM Rules, 1998.

manner²⁶² and also by every Operator of a Bio-Medical Waste treatment facility for dealing with Bio-Medical Wastes. Secondly, every Occupier, where required, shall set up in accordance with the time-schedule²⁶³, requisite Bio-Medical Waste treatment facilities like incinerator, autoclave, microwave system for the treatment of waste, or ensure requisite treatment of waste at a common waste treatment facility or any other waste treatment facility.

As stated above, every Occupier of an institution, generating, collecting, receiving, storing, transporting, treating, disposing and/or handling Bio-Medical Waste in any manner, and providing treatment or service to at least one thousand patients per month and every Operator of a Bio-Medical Waste facility shall apply to the prescribed authority for grant of authorization.

It is needless to mention here that for obtaining authorization from the prescribed authority, the Occupier of the institution shall have to set up all the necessary facilities and meet all the prescribed standards of waste handling and treatment. Facilities are to be established for treating and disposing the Bio-Medical Waste in accordance with Schedule I and for complying with the standards prescribed in Schedule V.

²⁶² Except such Occupier of clinics, dispensaries, pathological laboratories, blood banks providing treatment/service to less than 1000 patients per month, as provided in Rule 8 (1); BWM Rules, 1998.

²⁶³ It may be noted that the prescribed time limits of all types of institutions have expired as on 31 December 2002 as per Rule 5(2) r/w Schedule 6; BWM Rules, 1998, making these facilities mandatory for all.

Authorisation can be obtained from the prescribed authority by setting up necessary facilities and applying in accordance with Rule 8 of BWM Rules in Form I.²⁶⁴ The Governments of all States and Union territories were required to establish, within one month of the coming into force of the Rules, a prescribed authority for granting authorization and implementation of the Rules. The respective Governments were also required to constitute an Advisory Committee consisting of experts in the field of medicine and health, animal husbandry and veterinary sciences, environmental management, municipal administration, and any other related department or organization, including non-governmental organizations. As and when required, the Committee is required to advise the Government and the prescribed authority on matters related to the implementation of these Rules. Similarly, the Ministry of Defence is required to constitute in the Ministry, an Advisory Committee in respect of all healthcare establishments of the Armed Forces under the Ministry of Defence, to advise the Director General, Armed Forces Medical Services and the Ministry of Defence in matters relating to implementation of these Rules.

The prescribed authority shall on receipt of Form I make such enquiry as it deems fit and if it is satisfied that the applicant possesses the necessary capacity to handle Bio-Medical Waste in accordance with these Rules, grant or renew an authorization as the case may be. An authorization shall be granted for a period of three years, including an initial trial period of one year

²⁶⁴ See Annexure-2 at p. 282.

from the date of issue. Thereafter, an application shall be made by the Occupier/Operator for renewal. All such subsequent authorization shall be for a period of three years. A provisional authorization will be granted for the trial period, to enable the Occupier/Operator to demonstrate the capacity of the facility.

The prescribed authority may after giving reasonable opportunity of being heard to the applicant and for reasons thereof to be recorded in writing, refuse to grant or renew authorization. Every application for authorisation shall be disposed of by the prescribed authority within ninety days from the date of receipt of the application. The authorization to operate a facility shall be issued in Form IV, subject to conditions laid therein and such other condition, as the prescribed authority, may consider necessary. The prescribed authority has the power to cancel or suspend the authorisation if, for reasons to be recorded in writing, the Occupier/Operator has failed to comply any provisions of the Environment (Protection) Act, 1986 or this Rules, provided that no authorisation shall be cancelled or suspended without giving a reasonable opportunity to the Occupier/Operator of being heard.

Any person aggrieved by an order of the Director General, Armed Forces Medical Services, under these Rules, may within thirty days from the date on which the order is communicated to him, make an appeal to the Central Government in the Ministry of Environment and Forests. In all other cases, any person aggrieved by an order made by the prescribed authority under these Rules may, within thirty days from the date on which the order is

communicated to him or her, make an appeal in Form V to such authority as the Government of State or Union territories may think fit to constitute.

There are several duties of Occupiers. The fundamental duty of an Occupier, with regard to handling and management of Bio-Medical Waste is to take all steps necessary to ensure that such waste is handled without any adverse effect to human health and the environment. Every Occupier, as required, shall set up, necessary Bio-Medical Waste treatment facilities like incinerator, autoclave, microwave system for the treatment of waste, or ensure requisite treatment of waste at a common waste treatment facility, or any other water treatment facility.

Every Occupier or Operator shall submit an annual report to the prescribed authority in Form II by 31st January every year, to include information about the categories and quantities of Bio-Medical Wastes handled during the preceding year. The prescribed authority shall send this information in a compiled form to the Central Pollution Control Board by 31st March every year. Form II is produced here for the purpose of facilitating readers' ready reference.

When any accident occurs at any institution or any site where Bio-Medical Waste is handled, or if any accident happens during transportation of such waste, the authorized person shall report the accident in Form III to the prescribed authority forthwith. Suffice here to say that it is the duty of the Occupier of an institution dealing with Bio-Medical Waste, if he or she is treating/serving at least 1000 patients in a month and every Operator of a Bio-

Medical Waste Treatment facility, to obtain necessary authorisation from the prescribed authority.

Every authorized person shall maintain records related to the generation, collection, reception, storage, transportation, treatment, disposal, and/or any form of handling of Bio-Medical Waste in accordance with these rules and any guidelines issued. All such records shall be subject to inspection and verification by the prescribed authority at any time.²⁶⁵

There are certain standards for the handling and treatment of Bio-Medical Waste in terms of treatment and disposal and standards of incinerators, viz. their operating standards and the emission standards. So also the standards for water autoclaving including optimum temperatures are laid down. It is further specified that there should be a recording of operational parameters by having graphic or computer recording devices, which will automatically, and continuously monitor and record dates, time of day, load identification number, and operating parameters throughout the entire length of the autoclave cycle.²⁶⁶

The validation test of spore testing and the routine test using chemical indicator strip/tape and the standards for liquid waste generated as an effluent having to conform to certain bio-physical and bio-chemical parameters and the permissible limits are laid down as part of the BWM Rules. These limits are applicable to those hospitals that are either connected with sewers without terminal sewage treatment plant or not connected to public sewers. For

²⁶⁵ See Annexure-2 for detailed specifications.

²⁶⁶ *Ibid.*

discharge into public sewers with terminal facilities, the general standards as notified under the Environment (Protection) Act, 1986 shall be applicable.²⁶⁷

The standards for microwaving or microwave treatment is that it shall not be used for cytotoxic, hazardous, or radioactive wastes, contaminated animal carcasses, body parts, and large metal items. The microwave system shall comply with the efficacy test or routine tests and the supplier, before operation of the limit, may provide a performance guarantee. The microwave should completely and consistently kill the bacterial and other pathogenic organism that are ensured by approved biological indicator at the maximum design capacity of each microwave unit. Biological indicators for microwave shall be *Bacillus Subtilis* spores using vials or spore strips with at least 1x10 spores per millilitre.²⁶⁸

The standard for deep burial of the specified wastes is that a pit or trench should be dug about 2 meters deep. It should be half filled with waste, and covered with lime within 50 cm of the surface, before filling the rest of the pit with soil. It must be ensured that animals do not have any access to burial sites. On each occasion, when wastes are added to the pit, a layer of 10 cm of soil shall be added to cover the wastes. Burial must be performed under close and dedicated supervision. The deep burial site should be relatively impermeable and no shallow well should be close to the site. The pits should be distant from habitation, and sited so as to ensure that no contamination occurs of any surface water or ground water. The area should not be prone to

²⁶⁷ *Ibid.*

²⁶⁸ *Ibid.*

flooding or erosion. The location of the deep burial site will be authorized by the prescribed authority. The institution shall maintain a record of all pits for deep burial.²⁶⁹

The Municipal Corporations, Municipal Boards or Urban Local Bodies, as the case may be (without prejudice to the rule relating to the treatment and disposal of Bio-Medical Waste) shall be responsible for providing suitable common disposal or incineration sites for the Bio-Medical Wastes generated in the area under their jurisdiction. In areas outside the jurisdiction of any municipal body, it shall be the responsibility of the Occupier generating Bio-Medical Waste, or the Operator of a Bio-Medical Waste treatment facility to arrange for suitable sites individually or in association, so as to comply with the provisions of these Rules.

There are certain standards for the handling and treatment of Bio-Medical Waste. The basic premise is that Bio-Medical Waste shall not be mixed with other type of waste. Any non bio-medical solid waste, generated in hospitals and nursing homes, as well as duly treated Bio-Medical Wastes, shall be picked up by the Municipal body of the area, for disposal at municipal dump site. Untreated Bio-Medical Waste should never be kept stored for more than 48 hours. However, if it becomes necessary to store the waste beyond this time limit, the authorized person must take permission of the prescribed authority, and adopt measures to ensure that the waste does not adversely affect human health and the environment.

²⁶⁹ *Ibid.*

Before disposal, Bio-Medical Waste should be segregated according to the categories prescribed because the modes of disposal for various categories are different. These details are as provided in Schedule I. The segregated Waste should be arranged in coloured containers or bags, at the point of generation, in accordance with the standards prescribed by Schedule II. The containers or bags containing the various categories of Bio-Medical Waste have to be labelled as per the instructions given in Schedule III. If a container has to be transported from the area where the Bio-Medical Waste was produced, to any treatment facility outside the area, the container should, apart from the label prescribed in Schedule III, also carry the information prescribed in Schedule IV.

For the sake of its importance, even at the cost of repetition, it is once again reiterated that the object of a person who is in charge of any Bio-Medical Waste should be to ensure that they are properly handled so that no adverse effects are caused to human health and the environment. In no case, Bio-Medical Waste should be allowed to be mixed with other types of wastes. In storing as well as transporting, all prescribed precautions are to be compulsorily ensured.

Finally, no untreated Bio-Medical Waste should be stored beyond a period of 48 hours. If at all this cannot be avoided, then the person in charge must obtain permission from the prescribed authority and take measures to ensure that the waste does not cause any adverse effect to human health and the environment.

3.9 National Guidelines for Bio-Medical Waste Management

In March 2002, the Ministry of Health and Family Welfare, Govt. of India laid down the National Guidelines on Hospital Waste Management, which apart from covering the aspects included in the Bio-Medical Rules, also laid down recommendations for safety measures, training, management and administrative functions. However, it is seen that these guidelines came into focus in an indirect manner.²⁷⁰

The policy statement aims to provide for a system for management of all potentially infectious and hazardous waste in accordance with the Bio Medical Waste (Management & Handling) Rules, 1998. Bio-Medical Waste means any waste, which is generated during the diagnosis treatment or immunization of human beings or animal or in research activities pertaining thereto or in the production or testing of biologicals, including categories mentioned in the Schedule I of the Bio-Medical Waste (Management & Handling) Rules, 1998.

The various categories of wastes, hazardous, toxic and Bio-Medical Waste should be segregated into ten specified categories for the purpose of its safe transportation to a site for appropriate treatment. Certain categories of toxic and hazardous waste required specific treatment (disinfection/decontamination) before transportation for treatment, which can also be done

²⁷⁰ These guidelines were specified in the Infection Management and environment plan for reproductive and child health programme (Phase II) Dept. of Family Welfare, Ministry of Health & Family Welfare, Government of India, 2004. Also, Environment and waste management plan for Revised National Tuberculosis Control Programme, Central TB Division, Directorate General of Health Services, Ministry of Health & Family Welfare, Govt. of India 2005.

under the categorization as mentioned.²⁷¹ It is also specified that the points of segregation are the points of generation. A unique feature is the type of container to be used for collection is specified along with the colour codes.²⁷²

As regards the location of the containers, labelling, instructions regarding bags and storage, following are the guidelines. All containers having different coloured plastic bags should be located at the point of generation of waste i.e. near OT Tables, injection rooms, diagnostic services areas. The colour of container/plastic bags used for collection of segregated Bio-Medical Waste should be identifiable. All the bags/containers must be labelled according to the rules (Schedule III) of Bio Medical Waste Rules, 1998. It should be ensured that waste bags are filled up to only three fourth capacity, tied securely and removed from the site of the generation regularly and timely. Storage refers to the holding of Bio-Medical Waste for a certain period of time, after which it is sent for treatment and disposal. In other words it means the duration of time wastes are kept at the site of generation and transit till the point of treatment and final disposal. No untreated Bio Medical Waste shall be kept, stored beyond a period of 48 hours. The authorised person must take the permission of the prescribed authority, if for any reason; it becomes necessary to store the waste beyond 48 hours. The authorised person should take measures to ensure that the waste does not adversely affect human health and the environment, in case; it is kept beyond the prescribed limit.

²⁷¹ See Annexure-3 at p. 289.

²⁷² *Ibid*

Besides these, the national guidelines have been clearly laid down as to transportation, treatment of different types of wastes, safety measures and training of medical and paramedical personnel. The constitution of the waste management committee with the head of the hospital as its chairman has been strongly advocated. Besides, co-ordination between the hospital agencies has been recommended. Finally the educative and co-operative angle of these guidelines is seen when the NGOs involvement in dissemination of information is solicited while laying down that healthcare units with treatment facilities should extend the same to others in the vicinity.²⁷³

3.10 Specific Judicial Response

Undoubtedly, the decisions of the higher judiciary, especially those given by the Supreme Court of India are with the concept of 'legal regime' as that is the law of the land.²⁷⁴ The decisions with respect to Bio-Medical Waste Management commenced in the mid-1990s although the judiciary earlier had many decisions in the area of environmental protection

The issue of 'Improper Hospital Waste Management' in India was first highlighted in a writ application in *B.L. Wadhera v. Union of India*,²⁷⁵ long before the hospital wastes were regulated by the 1998 Rules. The apex court while keeping in view the appalling conditions arising due to Bio-Medical Waste disposal provided certain guide lines:

²⁷³ *Ibid*

²⁷⁴ Art. 141; Constitution of India, 1950.

²⁷⁵ AIR 1996 SC 2969.

(a) All hospitals with 50 beds and above should install incinerators or any other effective alternate method under their own administrative control.

(b) The incinerator or alternative methods should be fitted with necessary pollution control mechanism, approved and conforming to the standards laid down by the Central Pollution Control Board.

(c) The Central Pollution Control Board and the State Pollution Control Boards should regularly send its inspection teams in different areas to ascertain that the collection transportation and disposal of garbage/ wastes is carried out satisfactorily.

After the notification of the Bio-Medical Waste (Management and Handling) Rules, 1998, there has been no specific judicial response on the subject from the Supreme Court of India. However there have been directions and orders of different High Courts in the country, mainly on the aspect of compliance.

The Karnataka High Court on 14.3.2000 in the matter of *State of Karnataka and Others v. B. Krishna Bhat and Others*²⁷⁶ directed the Government of Karnataka to take action in regard to disposal of hospital wastes and to totally ban throwing of hospital wastes in any public or common area and to introduce incinerators in big hospitals; and to transport waste from small hospitals to Corporation incinerators. The 56 interim orders made by the learned Judge, broadly covered improvement of roads, public

²⁷⁶ 2001(2) KarLJ 1.

health and infrastructural facilities in Bangalore. These orders covered laying roads and sidewalks, improving street lighting, co-ordination among agencies regarding digging footpaths and road cutting, prevention of dumping of debris and hospital waste, etc.

The Delhi High Court in *Courts On Its Own Motion v. In The Matter of Statement made by Shri Raman Duggal, Adv.*²⁷⁷ on 16.1.2001 gave directions to the M.C.D. and other related authorities that the All India Institute of Medical Sciences, New Delhi through its Director to install sufficient number of incinerators, or an equally effective alternate, to dispose of the hospital waste. The Director shall file an affidavit within two months to indicate the progress made in this respect. It further gave directions that the MCD and NDMC to issue notices to all the private hospitals/nursing homes in Delhi to make their own arrangements for the disposal of their garbage and hospital waste and that they be asked to construct their own incinerators. In case these hospitals are permitted to use facilities (for collection, transportation and disposal of garbage) provided by the MCD and NDMC then they may be asked to pay suitable charges for the service rendered in accordance with law.

The Andhra Pradesh High Court decided on 29.08.2001 in *M. Vijaya v. Chairman and Managing Director, Singareni Collieries Co., Ltd., Hyderabad and others*²⁷⁸ regarding a woman who had contracted the dreaded disease, AIDS due to negligence of the hospital. It was held that all the

²⁷⁷ 2001 CrLJ 1064.

²⁷⁸ AIR 2001 AP 502.

hospitals and nursing homes should be directed to dispose of their Bio-Medical Waste in terms of Bio-Medical Waste (Management and Handling) Rules, 1998 and they shall strictly comply with the norms specified therein. Such hospitals shall be directed to obtain the necessary authorisation for disposal of the waste from the Pollution Control Board.

The Allahabad High Court, in *Rajesh Kumar Srivastava v. A.P. Verma and Ors.*²⁷⁹ on 28.1.2004 was commenting on the evasion of legal restrictions by physicians and noted that they shall observe the laws of the country in regulating the practice of medicine and shall also not assist others to evade such laws. They should be co-operative in observance and enforcement of sanitary laws and regulations in the interest of public health like Bio-Medical Waste (Management and Handling) Rules, 1998 and such other Acts.

The Rajasthan High Court (Jaipur Bench) decided on 20.10.2000 in *Suo Motu v. State of Rajasthan and Ors.*²⁸⁰ and held that the city of Jaipur has an important place in the history of the State of Rajasthan. It being the capital of the State deserves to showcase the history, heritage and culture of the people of the city. But the city has since been suffering from slew of maladies. And this has also adversely affected the quality of life of the residents. Decay of the city must be prevented and it needs to be restored to its pristine glory, beauty, grace and charm. And all types of hygiene must be maintained and rules of waste management must be followed including

²⁷⁹ 2004(2) AWC 967.

²⁸⁰ AIR 2005 Raj 82.

hospital waste management. Necessary directions were given to the municipal corporation, the Jaipur development Authority and the Rajasthan Housing Board in this regard.

The Allahabad High Court on 1.11.2004 held in the matter of *Satish Chaturvedi S/o S. Chaturvedi v. State of U.P. through the Chief Secretary and Ors.*²⁸¹ and gave directions important in the field of management and handling of Bio-Medical Wastes at the Swaroop Rani Hospital, Allahabad. This was since the hospital had made a garbage dump inside the hospital near the post-mortem operation theatre. This was held to be most objectionable as it will make even the healthy people who visit the hospital sick.

In *Oil Country Tubular Ltd. v. A.P. Pollution Control Board and Anr.*²⁸² the Andhra Pradesh High Court on 29.03.2005 directed the Yellareddy Gram Panchayat, Nalgonda District in Andhra Pradesh to ensure their 'No Objection Certificate' should contain conditions about waste management including Bio-Medical Waste in connection with an industry proposed to be set up.

On 15.02.2006 in *Suo Motu v. Ahmedabad Municipal Corpn. and 46 Ors.*²⁸³, the Gujarat High Court directed the hospitals run by the management administered by the Government, semi-Government or local civic bodies, having 30 or more beds to make their own arrangement to construct and install incinerator or to have equally efficient arrangement for the disposal of

²⁸¹ Not reported but available as MANU/UP/1662/2004 on www.manupatra.com visited on 3.2.2006.

²⁸² 2005(3) ALT 175.

²⁸³ (2006)2 GLR 1129.

the garbage and the hospital waste. It was held that such notification is to be issued and adequate publicity be given to it as expeditiously as possible and in any case not later than 30th April, 2006. In case the private hospitals are permitted to use facilities, namely, collection, transportation and disposal of garbage and hospital waste provided by the Government/civic body hospitals, the management of the private hospitals to be asked to pay suitable charges for the service rendered in accordance with law.

The Bombay High Court in *Bombay Environment Action Group and Sameer Mehta v. State of Maharashtra (through Secretary, Urban Development Dept. and Secretary, Revenue and Forest Dept.) and Ors.*²⁸⁴ held on 19.10.2006 that Municipal bodies of the twin hill stations of Mahabaleshwar and Panchgani must appreciate that they are going to suffer if environment is not protected by them and it was in interest of all that steps suggested to protect environment ought to be implemented and civic amenities including hospital waste management handled in accordance with law.

The Orissa High Court on 15.11.2006 in *Maitree Sansad v. State of Orissa and Ors.*²⁸⁵ expressed serious concern in respect of three Medical Colleges and Hospitals of the State as well as some nursing homes which are operating in the city of Cuttack as also the Capital Hospital in Bhubaneswar which the petitioner contended gross violation of the rules relating to

²⁸⁴2007(1) BomCR 721. Clubbed with *Hotel Pratap Heritage and Anr. v. Bombay Environmental Action Group and Ors.* and *Panorama Resort Pvt. Ltd. and Ors. v. State of Maharashtra and Ors.*

²⁸⁵ 103 (2007) CLT 191.

management and handling of Bio-Medical Wastes and directed the Chairman, State Pollution control Board to cause inquiry in this regard.

In *Delhi Medical Association and Ors. v. Union of India (UOI) and Ors.*²⁸⁶ the Delhi High Court on 24.04.2009 held that the running of a nursing home involves the use of and therefore disposal of highly toxic chemicals and substances. The waste generated by a hospital or nursing home is certainly of a hazardous nature. The Environment (Protection) Act, 1986 sets out the applicable statutory provisions concerning the disposal of such hazardous waste by a nursing home or a hospital. Merely because an Act and the Rules there under do not specifically advert to the disposal of hazardous waste by such nursing home, it would not mean that such nursing home does not have to conform to the standards set down under the EPA and the Rules made there under.

The Madras High Court on 15.05.2009 in *D. Saravanan v. The Union of India (UOI) rep. by Secretary to Government, Ministry of Environment and Forest and Ors.*²⁸⁷, held that any hazardous waste including Bio-Medical Waste should be disposed of as per applicable Rules & norms with necessary approvals of the Govt. of Pondicherry (Department of Science, Technology & Environment).

In *All India Plastic Industries Association through its Secretary Shri Ajay Gupta S/o Shri R.N. Gupta, Mr. Bhupesh Ralli S/o Shri J.P. Ralli, Gupta Plastic Industries and Mr. Radhey Shyam Gupta S/o late Shri O.P. Gupta,*

²⁸⁶ AIR 2009 Delhi 163.

²⁸⁷ Reported as MANU/TN/1105/2009 on www.manuptra.com visited on 20.5.2009.

*Gupta Plastic Industries v. Government of NCT of Delhi Department of Forests and Wildlife*²⁸⁸ the Delhi High Court held on 14.07.2009 that the use, sale and storage of all kinds of plastic bags shall be forbidden in respect of different places in the National Capital Territory of Delhi, like Five Star and Four Star Hotels restaurants and eating places, fruit and vegetable outlets of Mother Dairy but exempt Hospitals as far as the use of plastic bags as prescribed under Bio Medical Waste (Management and Handling) Rules, 1998, since hospital waste management is of concern.

It has been observed that the judicial concern on the part of the various High Courts is noteworthy. However, the Supreme Court has not been approached in any way for directions by aggrieved citizens, NGOs or any others nor has the apex Court chanced to take stock of the situation *suo motu*, after the coming into force of the Bio-Medical Waste (Management and Handling) Rules, 1998.

Incidentally, judicial activism by the Bombay High Court, Panaji Bench at Goa has come as a welcome step in respect of the management of Bio-Medical Waste in the State of Goa. The fourth Chapter of this thesis which is a statistical profile of the Goan experience, examines these decisions in detail.

²⁸⁸ Reported as MANU/DE/0954/2009. See also *Praveen Mittal v. Department of Environment, Govt. of NCT of Delhi* 162(2009)DLT365 decided by the Delhi High Court on 28.8.2009.

3.11 Conclusion

This Chapter has traced the growth of the different legal provisions from various enactments pertaining to environmental protection, including certain penal laws. There is need to mention here, that although in this Chapter, such legal provisions are mentioned, the National Legal Regime for the management and handling of Bio-Medical Waste is through Rules, namely The Bio-Medical Waste (Management and Handling) Rules, 1998 is a subordinate legislation issued under the provisions contained in the parent Act, i.e. The Environment (Protection) Act, 1986.

The enforcement provisions contained in the parent Act is therefore, applicable to the Rules as well. There is power vested in the authority to enter at all reasonable times with such assistance as he considers necessary, any place for he enforcement of the Act and provision for stringent punishment for contravention of provisions.

Apart from the Rules, National Guidelines have been prepared by the MoEF, Govt. of India to enable each hospital to implement the said Rules by developing comprehensive plans. Further, various High Courts in the country have been proactive in matters related to such waste management.

Chapter 4

THE GOAN EXPERIENCE – A STATISTICAL PROFILE

4.1 The State of Goa: an Introduction

Goa is India's smallest state by area²⁸⁹, a tiny emerald land and the fourth smallest by population²⁹⁰. Located on the west coast of India in the region known as the *Konkan*, it is bounded by the state of Maharashtra to the north and by Karnataka to the east and south, while the Arabian Sea forms its western coast. Goa is India's richest state with a GDP per capita two and a half times that of the country as a whole. It was ranked the best placed state by the Eleventh Finance Commission for its infrastructure and ranked on top for the best quality of life in India by the National Commission on Population based on the twelve Indicators.²⁹¹

²⁸⁹ 3702 square kilometers.

²⁹⁰ As per 2001 census population is 13,42,998.

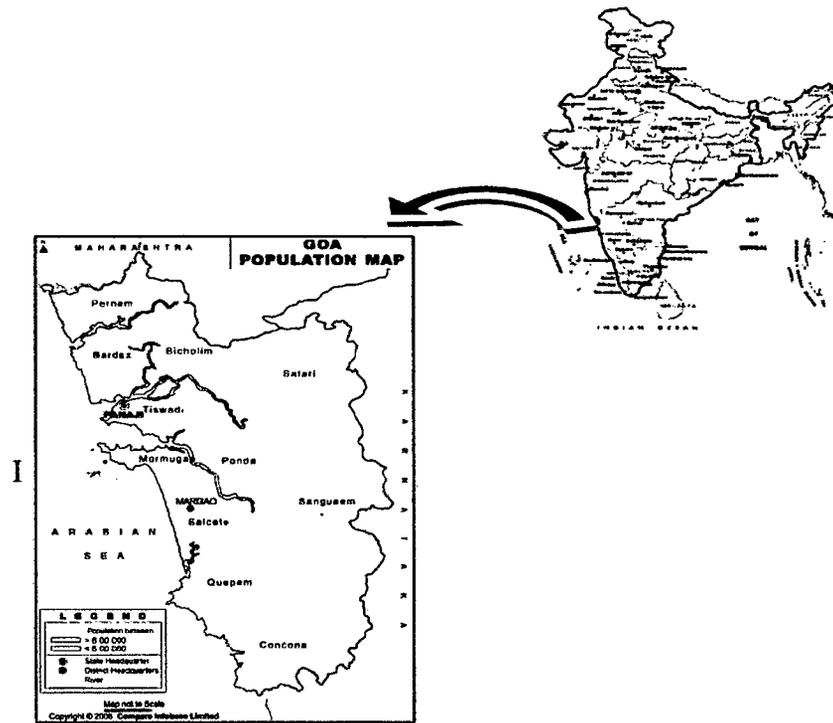
²⁹¹ <http://www.goagovt.nic.in> visited on 12.12.2005.

Panaji is the state's capital, while Vasco da Gama is the largest city. The historic city of Margao is the commercial capital of the State and still exhibits the cultural influence of the Portuguese, who first landed in the early 16th century as merchants, and conquered it soon thereafter. This Portuguese overseas territory existed for about 450 years, until it was annexed by India in 1961.

Renowned for its beaches, places of worship and world heritage architecture, Goa is visited by large numbers of international and domestic tourists each year. It also has rich flora and fauna, owing to its location on the Western *Ghats* range, which is classified as a biodiversity hotspot.

The 25th State in the Union of States of India, which was part of Union territory of Goa, Daman & Diu from 1961 till 30 May 1987 when it was carved out to form a separate State, it comprises two districts for the purpose of revenue administration viz North Goa and South Goa. The entire State comprises 11 Talukas.²⁹² North Goa district comprises six Talukas with a total area of 1736 square kilometres while South Goa district comprises five Talukas with an area of 1966 square kilometres. For the purpose of implementation of development programmes, the State is divided into 12 community development blocks.

²⁹² Mentioned in para 4.2.2 at p. 133.



In all there are 189 Village Panchayats which are local authorities for a total of 383 villages of which 233 are in North Goa district and 150 in South Goa district. As per the 2001 census, there are a total of 44 towns of which 13 are Municipalities. Panaji has a corporation and the remaining are census towns.

4.2 Healthcare Scenario in the State of Goa

In order to ascertain and examine the healthcare scenario in the state, the study commences by obtaining information from the Directorate of Health

Services (DHS), Government of Goa and the various Municipal Councils²⁹³ since all these authorities exercise jurisdictional control over different types of Occupiers in terms of their registration. To get a more comprehensive view the study has also perused the official website of the Government of Goa.²⁹⁴

4.2.1 Major Hospitals in the State of Goa

Amongst the several healthcare institutions functioning in the State, a few hospitals are noteworthy due to the super-specialities existing and the volume of patients which avail of services at these institutions. This study has treated them as major hospitals and deliberately included them amongst the healthcare institutions visited for the purpose of obtaining information for the testing of the hypotheses.

4.2.1.1 Goa Medical College and Hospital, Panaji

Earlier known as the *Escola Médico-Cirúrgica de Goa*,²⁹⁵ it was established in 1842 during the Portuguese rule and renamed Goa Medical College in 1963. It is the oldest medical college in Asia. The college is under Goa University since 1986 before which it was under Bombay University and offers the MBBS course, several MS and MD courses, and some super-specializations. It now has its headquarters in Bambolim-Goa and has a long

²⁹³ In all, the State of Goa has one Corporation of the City of Panaji and thirteen Municipal Councils, viz. Mormugao, Ponda, Margao, Mapusa, Cuncolim, Quepem, Sanguem, Sanquelim, Canacona, Bicholim, Valpoi, Pernem and Curcholem-Cacora.

²⁹⁴ <http://www.goagovt.nic.in> visited on 12.12.2005.

²⁹⁵ In the Portuguese language meaning Medical-Surgical School of Goa.

tradition of providing quality services to all sections of the society through its 1200-bed capacity and several OPDs. The Institute of Psychiatry and Human Behaviour (at Bambolim), the TB and Chest Disease Hospital (at St. Inez), The Rural Health and Training Centre (at Mandur) and the Urban Health Centre (St. Cruz) form part of the establishment.

4.2.1.2 Hospicio Hospital, Margao

This is a 400-bed Government-owned district hospital of South Goa under the Directorate of Health Services (DHS), which has been providing healthcare to patients for over a hundred years. It was established by a Christian organisation with congregational support during Portuguese times and was taken over by the government of Goa in 1978 to provide patients with the benefit of all major specialties, including that of a blood bank of Zonal blood testing centre (ZBTC) level.

4.2.1.3 Asilo Hospital, Mapusa

This has about 280 beds and is the major district hospital of North Goa, also under the Directorate of Health Services (DHS), which has been providing healthcare to patients for over fifty years. It was established by the Government of Goa to provide patients with the benefit of all major specialties, especially in the north of Goa.

4.2.1.4 Apollo Victor Hospital, Margao

The 150-bed Apollo Victor Hospital, spread over an area of 1,25,000 square feet, is a super-speciality hospital in Margao catering to the upper strata of society and to domestic and foreign tourists. For the present hospital, the Victor Group inked a joint venture with the Apollo chain of hospitals and is considerably new as compared to other major hospitals in the State. Its patient strength is the highest in the State amongst the private hospitals. The high number of foreign tourists indicates their preference for medical and surgical remedies under insurance packages and medical tourism for medical and dental care.

4.2.1.5 Vrundavan Hospital, Porvorim

Located at Mapusa, off NH-17, Vrundavan Hospital and Research Centre is the first multi-specialty healthcare institution in Goa to be awarded an ISO 9001:2000 certification. Owing the biggest private dialysis unit in Goa, it is the first of its kind in Goa to provide temporary and permanent dialysis facilities. In ophthalmology, advanced vitreoretinal surgery is conducted at Vrundavan Hospital and the hospital also has the only Excimer Laser facility in the state to correct refractive error. The haemodialysis unit has nine dialysis machine stations.

4.2.1.6 NUSI Hospital and Research Centre, Cuncolim

Previously known as Apollo NUSI Hospital, the hospital disassociated from Apollo Group in April 2005. It started in November 2001 with bed strength of 35, it is now expanding to include a total of 110 beds, three Operation Theatres, and one more Intensive Care Unit. Services in super-specialties like gastroenterology, nephrology, cardiology, diagnostic imaging and radiology, orthopaedics, neurosurgery, ENT, ophthalmology are offered here.

4.2.1.7 Manipal Hospital, Dona Paula

What started as a cancer centre today stands as an integrated secondary care hospital. Manipal Goa Hospital (MGH) at Dona Paula, seven kilometres from Panaji, was inaugurated on January 24, 1994 after a MoU was inked between the Goa Cancer Society and the Medical Relief Society, Manipal on February 12, 1992. In addition to oncology, MGH is a multi-specialty hospital providing emergency, recovery and rehabilitative care in addition to diagnosis and consultation. The hospital is linked with telemedicine supported by the Manipal Network of Hospitals and often consultants from Manipal Hospital, Bangalore, come for super-speciality consultation. This is the first and only one to have nuclear medicine facility in Goa.

4.2.1.8 Salgaocar Medical Research Centre (SMRC), Chicalim

Salgaocar Medical Research Centre (SMRC) at Chicalim, Vasco da Gama was started in 1981 as an 80-bed tertiary care hospital. With a built-up area of about 4,500 square metres, the hospital sprawls over 4.5 hectares of land, and is currently on an expansion mode. The specialities offered now are general medicine, general surgery, cardiology, onco-surgery, chest medicine, laparoscopic surgery, paediatric medicine, paediatric surgery, gynaecology and obstetrics, urology, ophthalmology, ENT and orthopaedics and trauma. As of now, SMRC has two full-time consultants and 22 visiting consultants.

4.2.2 Growth of Healthcare Institutions

Having obtained data from the year 2002, this study has tabulated the increase in the number of various healthcare units through the subsequent years, Taluka-wise, till the year 2007. This has been done so as to enable the ascertainment of the trends of such growth in each of the Talukas.

4.2.2.1 Ponda Taluka

The data obtained by the questionnaire method in respect of the various healthcare units from this Taluka is reflected in Table 4.1

PONDA TALUKA

Occupiers in Ponda Taluka						
Units	2002	2003	2004	2005	2006	2007
Hospitals	2	6	7	9	11	14
Dental Clinics	3	8	12	26	27	31
Path. Labs	0	1	1	2	3	4
Dispensaries	4	7	11	19	22	26
Blood banks	0	0	0	0	0	0
Vet. hospitals	0	0	0	0	0	0

Table 4.1
(Source: Ponda Municipal Council)

This tabulated data obtained was further subjected to analysis and represented graphically in a line chart in Fig. 4 (i), for better appreciation of the trend.

TRENDS OF OCCUPIERS IN PONDA TALUKA

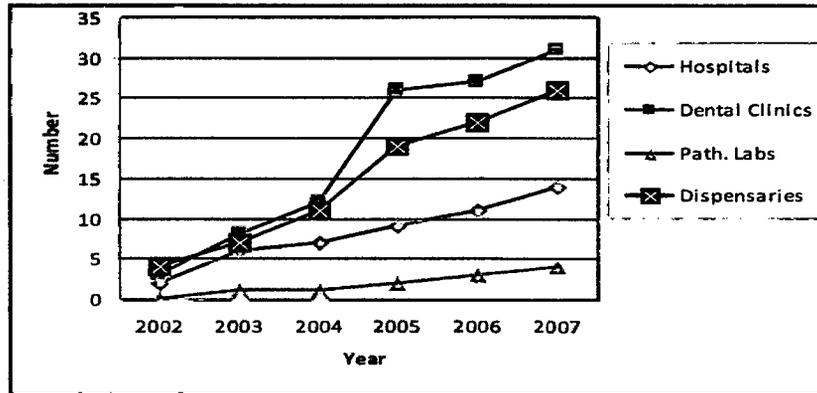


Fig. 4(i)

The graph shows the trends from the year 2002 to the year 2007. There is a marked rise in the number of dental clinics, followed by that of dispensaries and a marginal rise of hospitals and pathology laboratories over a span of six years of the available data. As seen, there are no blood banks in this Taluka.

4.2.2.2 Tiswadi Taluka

The data obtained by the questionnaire method in respect of the various healthcare units from this Taluka is reflected in Table 4.2

TISWADI TALUKA

Occupiers in Tiswadi Taluka						
Units	2002	2003	2004	2005	2006	2007
Hospitals	11	13	16	18	21	23
Dental Clinics	14	18	20	24	26	30
Path. Labs	6	7	8	10	12	15
Dispensaries	72	91	107	128	144	150
Blood Banks	2	2	3	3	3	3
Vet. Hospitals	2	2	2	2	2	2

Table 4.2

(Source: Corporation of City of Panaji)

This tabulated data obtained was further subjected to analysis and represented graphically in a line chart in Fig. 4(ii) for better appreciation of the trend.

TRENDS OF OCCUPIERS IN TISWADI TALUKA

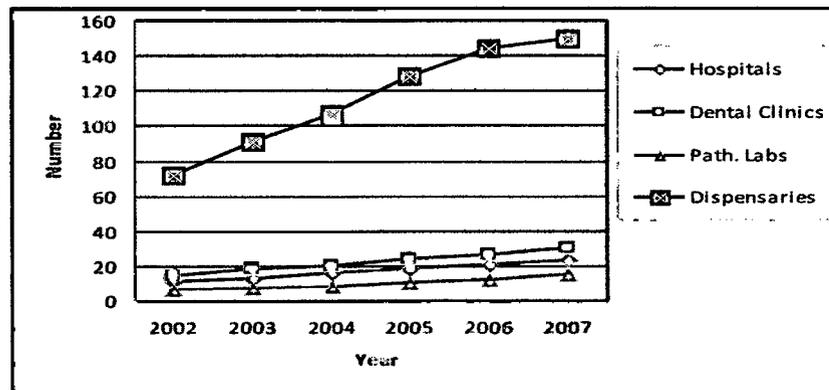


Fig. 4 (ii)

The graph shows the trends from the year 2002 to the year 2007. There is a marked rise in the number of hospitals, followed by a minimal rise of dental clinics, dispensaries and pathology laboratories over a span of the six years of available data. The numbers of blood banks have remained virtually the same.

4.2.2.3 Satari Taluka

The data obtained by the questionnaire method in respect of the various healthcare units from this Taluka is reflected in Table 4.3.

SATARI TALUKA

Occupiers in Satari Taluka						
Units	2002	2003	2004	2005	2006	2007
Hospitals	4	5	6	7	8	9
Dental Clinics	0	0	0	0	1	1
Dispensaries	3	4	5	9	11	12
Path. Labs	0	0	0	0	0	0
Blood Banks	0	0	0	0	0	0
Vet. Hospitals	0	0	0	0	0	0

Table 4.3
(Source: Valpoi Municipal Council)

This tabulated data obtained was further subjected to analysis and represented graphically in a line chart in Fig. 4(iii), for better appreciation of the trend.

TRENDS OF OCCUPIERS IN SATARI TALUKA

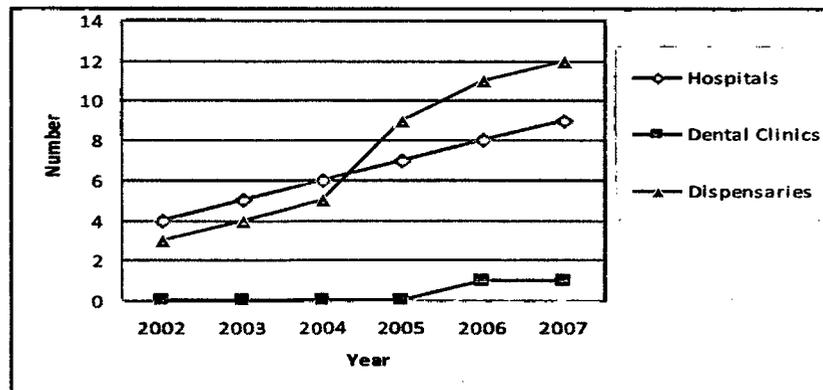


Fig. 4(iii)

The graph shows the trends from the year 2002 to the year 2007. There is a marked rise in the number of dispensaries, followed by a similar rise of hospitals; dental clinics have shown a marginal rise over a span of the

six years of available data. There are no pathology laboratories or blood banks in this Taluka.

4.2.2.4 Salcette Taluka

The data obtained by the questionnaire method in respect of the various healthcare units from this Taluka is reflected in Table 4.4

SALCETTE TALUKA

Occupiers in Salcette Taluka						
Units	2002	2003	2004	2005	2006	2007
Hospitals	23	24	26	28	30	32
Dental Clinics	58	71	87	99	119	129
Path. Labs	13	16	18	20	22	25
Dispensaries	107	129	146	158	169	180
Blood Banks	1	1	1	1	1	1
Vet. Hospitals	3	3	3	3	3	3

Table 4.4

(Source: Margao and Cuncolim Municipal Councils)

This tabulated data obtained was further subjected to analysis and represented graphically in a line chart in Fig. 4 (iv), for better appreciation of the trend.

TRENDS OF OCCUPIERS IN SALCETTE TALUKA

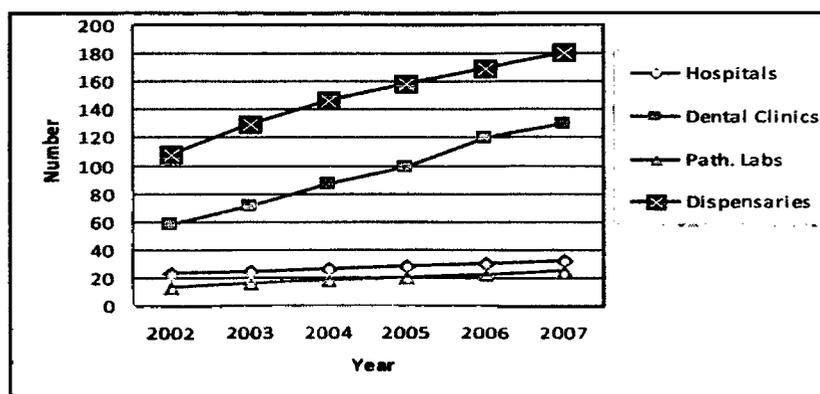


Fig. 4 (iv)

The graph shows the trends from the year 2002 to the year 2007. There is a marked rise in the number of hospitals, followed by a similar rise of dental clinics. The number of dispensaries and pathology laboratories over a span of the six years of available data is virtually constant and there has been only one blood bank over these years.

4.2.2.5 Mormugao Taluka

The data obtained by the questionnaire method in respect of the various healthcare units from this Taluka is reflected in Table 4.5

MORMUGAO TALUKA						
Occupiers in Mormugao Taluka						
Units	2002	2003	2004	2005	2006	2007
Hospitals	4	6	8	9	10	11
Dental Clinics	7	10	12	15	18	20
Path. Labs	2	2	3	3	3	4
Dispensaries	11	13	16	24	28	30
Blood Banks	1	1	1	1	1	1
Vet. Hospitals	0	0	0	0	0	0

Table 4.5

(Source: Mormugao Municipal Council)

This tabulated data obtained was further subjected to analysis and represented graphically in a line chart in Fig. 4(v), for better appreciation of the trend.

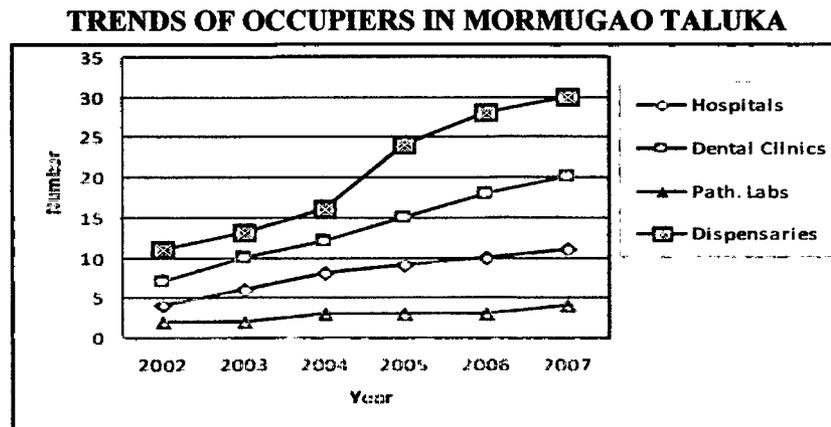


Fig. 4(v)

The graph shows the trends from the year 2002 to the year 2007. There is a marked rise in the number of dispensaries, followed by a similar rise of dental clinics. The number of hospitals and pathology laboratories over a span of the six years of available data has shown a gradual increase and there has been only one blood bank over these years.

4.2.2.6 Bicholim Taluka

The data obtained by the questionnaire method in respect of the various healthcare units from this Taluka is reflected in Table 4.6

BICHOLIM TALUKA

Occupiers in Bicholim Taluka						
Units	2002	2003	2004	2005	2006	2007
Hospitals	2	3	4	5	6	6
Dental Clinics	0	1	1	2	2	2
Dispensaries	3	4	5	6	7	8
Path. Labs	0	0	0	0	0	0
Blood Banks	0	0	0	0	0	0
Vet. Hospitals	0	0	0	0	0	0

Table 4.6

(Source: Bicholim and Sanquelim Municipal Councils)

This tabulated data obtained was further subjected to analysis and represented graphically in a line chart in Fig. 4 (vi), for better appreciation of the trend.

TRENDS OF OCCUPIERS IN BICHOLIM TALUKA

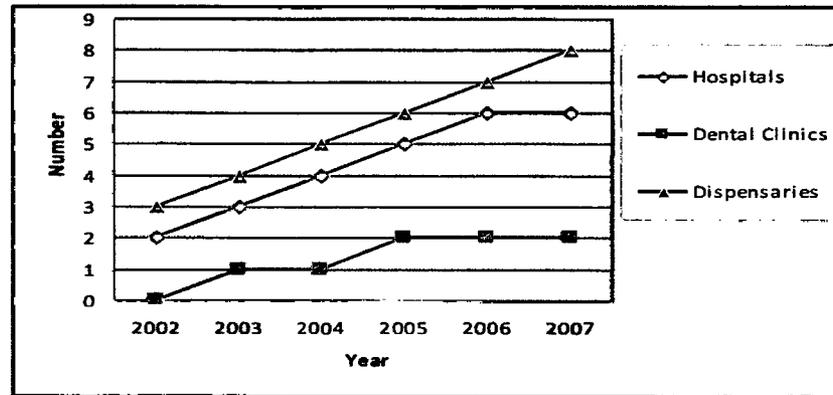


Fig. 4 (vi)

The graph shows the trends from the year 2002 to the year 2007. There is a steep rise in the number of dispensaries, followed by a marked rise of hospitals. The number of dental clinics over a span of the six years of available data has marginally increased and there are no pathology laboratories or blood banks in this Taluka.

4.2.2.7 Bardez Taluka

The data obtained by the questionnaire method in respect of the various healthcare units from this Taluka is reflected Table 4.7.

BARDEZ TALUKA

Occupiers in Bardez Taluka						
Units	2002	2003	2004	2005	2006	2007
Hospitals	15	16	18	20	22	24
Dental Clinics	20	23	25	29	32	35
Path. Labs	3	4	5	6	8	10
Dispensaries	68	79	90	101	110	120
Blood Banks	2	2	2	2	2	2
Vet. Hospitals	1	1	1	1	1	1

Table 4.7

(Source: Mapusa Municipal Council)

This tabulated data obtained was further subjected to analysis and presented graphically in a line chart in Fig. 4(vii) for better appreciation of the trend.

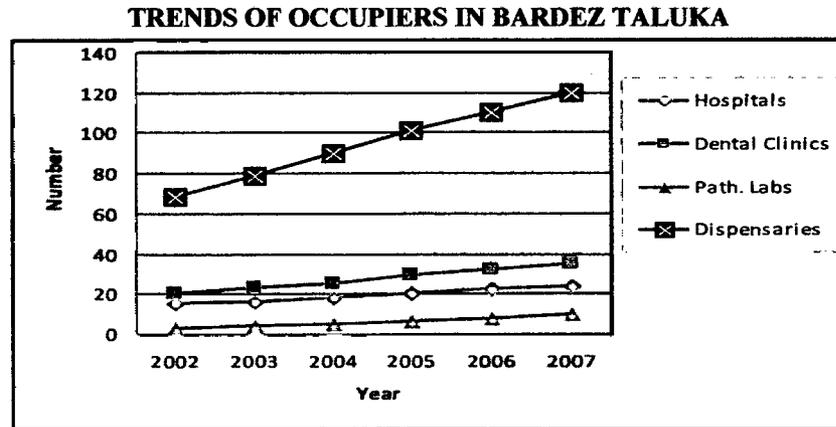


Fig. 4 (vii)

The graph shows the trends from the year 2002 to the year 2007. There is a gradual and steady rise in the number of dispensaries. The number of dental clinics, pathology laboratories and hospitals is comparatively lesser but they too have steadily increased over a span of the six years of available data. The number of blood banks is virtually constant.

4.2.2.8 Quepem Taluka

The data obtained by the questionnaire method in respect of the various healthcare units from this Taluka is reflected in Table 4.8.

QUEPEM TALUKA

Occupiers in Quepem Taluka						
Units	2002	2003	2004	2005	2006	2007
Hospitals	1	1	2	2	2	2
Dental Clinics	0	1	1	1	1	1
Dispensaries	7	8	9	10	11	12
Path. Labs	0	0	0	0	0	0
Blood Banks	0	0	0	0	0	0
Vet. Hospitals	0	0	0	0	0	0

Table 4.8

(Source: Quepem and Curchorem-Cacora Municipal Councils)

This tabulated data obtained was further subjected to analysis and represented graphically in a line chart in Fig. 4(viii), for better appreciation of the trend.

TRENDS OF OCCUPIERS IN QUEPEM TALUKA

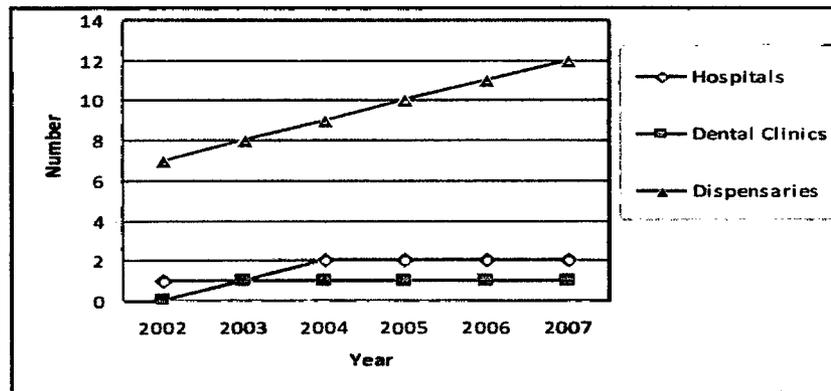


Fig. 4 (viii)

The graph shows the trends from the year 2002 to the year 2007. The number of dispensaries is high and on the increase. Hospitals and dental clinics are very few and fairly constant in number. There are no pathology laboratories or blood banks in this Taluka.

4.2.2.9 Sanguem Taluka

The data obtained by the questionnaire method in respect of the various healthcare units from this Taluka is reflected in Table 4.9.

SANGUEM TALUKA

Occupiers in Sanguem Taluka						
Units	2002	2003	2004	2005	2006	2007
Hospitals	3	4	5	6	7	8
Dental Clinics	1	1	1	1	1	1
Path. Labs	1	2	2	3	4	4
Dispensaries	5	6	7	8	9	10
Blood Banks	0	0	0	0	0	0
Vet. Hospitals	0	0	0	0	0	0

Table 4.9
(Source: Sanguem Municipal Council)

This tabulated data obtained was further subjected to analysis and represented graphically in a line chart in Fig. 4(ix), for better appreciation of the trend.

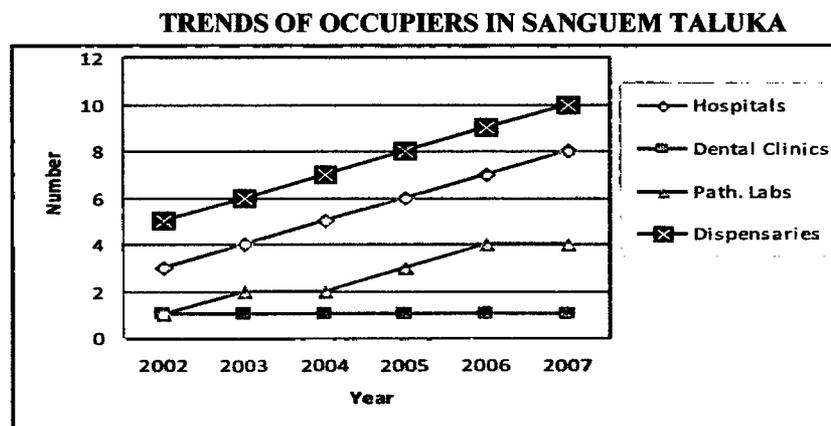


Fig. 4 (ix)

The graph shows the trends from the year 2002 to the year 2007. All healthcare establishments seems to be on the increase with the exception of

dental clinics that are few in number and have remained constant over a span of six years of available data. There are no blood banks in this Taluka.

4.2.2.10 Canacona Taluka

The data obtained by the questionnaire method in respect of the various healthcare units from this Taluka is reflected in Table 4.10.

CANACONA TALUKA

Occupiers in Canacona Taluka						
Units	2002	2003	2004	2005	2006	2007
Hospitals	1	1	2	2	2	3
Dental Clinics	2	2	3	4	4	5
Path. Labs	1	2	3	3	3	3
Dispensaries	5	6	7	8	9	10
Blood Banks	0	0	0	0	0	0
Vet. Hospitals	0	0	0	0	0	0

Table 4.10

(Source: Canacona Municipal Council)

This tabulated data obtained was further subjected to analysis and represented graphically in a line chart in Fig. 4 (x), for better appreciation of the trend.

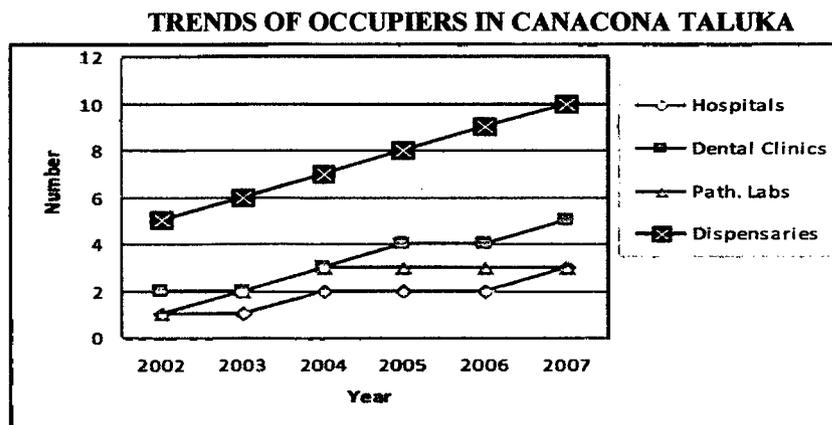


Fig. 4 (x)

The graph shows the trends from the year 2002 to the year 2007. The number of dispensaries is high and on the increase. Hospitals, pathology laboratories and dental clinics are fewer in number and gradually increasing. There are no blood banks in this Taluka.

4.2.2.11 Pernem Taluka

The data obtained by the questionnaire method in respect of the various healthcare units from this Taluka is reflected in Table 4.11

PERNEM TALUKA

Occupiers in Pernem Taluka						
Units	2002	2003	2004	2005	2006	2007
Hospitals	0	0	0	1	1	1
Dental Clinics	0	1	1	1	1	1
Path. Labs	0	0	1	1	1	1
Dispensaries	1	2	3	3	3	4
Blood Banks	0	0	0	0	0	0
Vet. Hospitals	0	0	0	0	0	0

Table 4.11

(Source: Pernem Municipal Council)

This tabulated data obtained was further subjected to analysis and represented graphically in a line chart in Fig. 4(xi) for better appreciation of the trend.

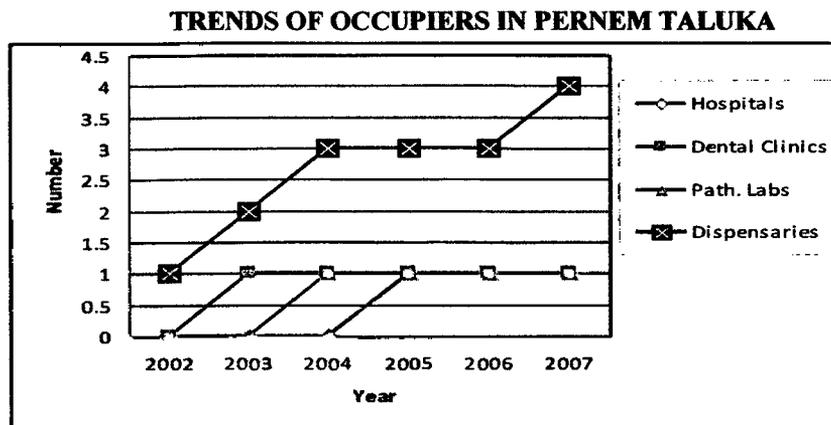


Fig. 4 (xi)

The graph shows the trends from the year 2002 to the year 2007. There are hardly any healthcare establishments in this Taluka and a marginal increase of dispensaries. There has been commencement of some healthcare units in recent years. There are no blood banks in this Taluka.

4.2.3 An Overview of Healthcare Institutions

The data obtained from these sources has been tabulated in the various categories as seen in Table 4.12. As there are eleven Talukas and several types of Occupiers envisaged under the rules, this study has classified the Occupiers Taluka-wise and the latest information is tabulated.

DISTRIBUTION OF HEALTHCARE INSTITUTIONS²⁹⁶

Talukas	Occupiers of Occupiers					
	Hospitals/ nursing homes	Dental Clinics	Path Labs	Dispensaries/ clinics	Blood Banks	Veterinary hospitals/ clinics
Ponda	14	31	4	26	0	0
Tiswadi	23	30	15	150	3	2
Sattari	9	1	0	12	0	0
Salcette	32	129	25	180	1	3
Mormugao	11	20	4	30	0	0
Bicholim	6	2	0	8	0	0
Bardez	24	35	10	120	2	1
Quepem	2	1	0	12	0	0
Sanguem	8	1	4	10	0	0
Canacona	3	5	3	10	0	0
Pernem	1	1	1	4	0	0

Table 4.12

²⁹⁶ (Source: DHS, Govt. of Goa and Municipal Councils). Information as on 31st December, 2007.

To further appreciate the data pictorially, the tabulated information was submitted to analysis and the resultant histogram is seen in Fig. 4(xii).

OVERVIEW OF OCCUPIERS

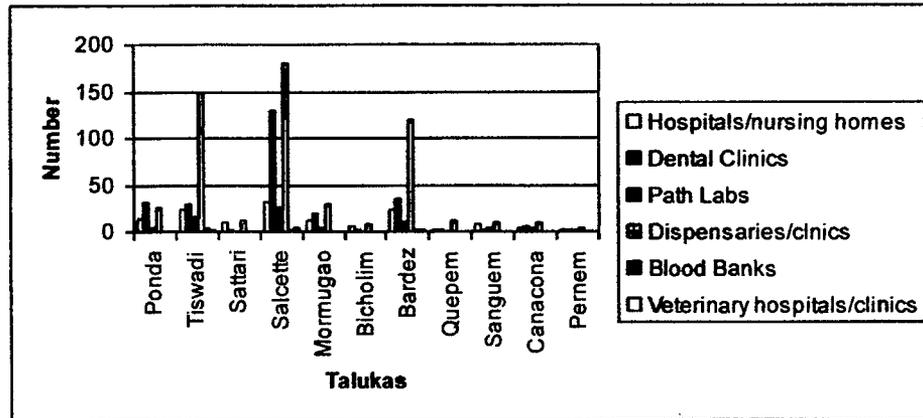


Fig 4 (xii)

The histogram in Fig. 4 (xii) reveals that the Talukas of Tiswadi, Salcette and Bardez have a largest number of Occupiers, amongst which dispensaries/clinics are in exceptionally high figures. Following closely behind, in the Taluka of Salcette are a huge number of dental clinics. However, what is relevant is the bed-strength in hospitals as the quantum of waste generated is directly proportional to this.

4.3 Healthcare Institutions Visited

Since the veterinary hospitals have been excluded from the ambit of this study, the total number of Occupiers under purview of this research in each Taluka was tabulated in Table 4.13 to reveal a sum total of 1024

Occupiers for the purpose of this study. This constitutes the 'Universe' of the healthcare institutions.

GRAND TOTAL OF HEATHCARE INSTITUTIONS IN THE STATE

Universe of Occupiers						
Talukas	Hospitals/ nursing homes	Dental Clinics	Path. Labs	Dispensaries/ clinics	Blood banks	Total
Ponda	14	31	4	26	0	75
Tiswadi	23	30	15	150	3	221
Sattari	9	1	0	12	0	22
Salcette	32	129	25	180	1	367
Mormugao	11	20	4	30	1	66
Bicholim	6	2	0	8	0	16
Bardez	24	35	10	120	2	191
Quepem	2	1	0	12	0	15
Sanguem	8	1	4	10	0	23
Canacona	3	5	3	10	0	21
Pernem	1	1	1	4	0	7
Total	133	256	66	562	7	1024

Table 4.13

Sampling of the healthcare institutions was resorted to next. There being very few blood banks in the State, contained in only four Talukas, data has been obtained from all of them, thereby retaining the entire universe as the sample. So also, as far as the hospitals are concerned, the major ones, enumerated in para 4.2.1 (at p. 129) were deliberately retained in the sample, irrespective of the Taluka they are contained in. This is since by their very nature and size, they contribute to the volume of Bio-Medical Waste generated in the State of Goa to a great extent. The remainders of hospitals were randomly sampled to obtain an even distribution.

All other types of Occupiers like dental clinics, path labs and dispensaries/clinics were randomly sampled evenly across all eleven Talukas, such that the sample is representative of the bulk of the universe. In doing so, data obtained from a total of 133 Occupiers. These constituted the sample of healthcare institutions. This distribution of sampling done is reflected in the Table 4.14. The sample of Occupiers is seen to be 12.98% of the universe.²⁹⁷ Therefore, this amounted to a combination of purposive and random sampling.

NUMBER OF HEALTHCARE INSTITUTIONS SAMPLED

Sample of Occupiers						
Talukas	Hospitals/ nursing homes	Dental Clinics	Path Labs	Dispensaries/ clinics	Blood banks	Total
Ponda	2	6	1	5	0	14
Tiswadi	2	3	2	13	3	23
Sattari	2	1	0	6	0	9
Salcette	5	10	3	13	1	32
Mormugao	2	3	1	4	1	11
Bicholim	1	2	0	3	0	6
Bardez	3	5	2	12	2	24
Quepem	1	0	0	1	0	2
Sanguem	1	1	2	4	0	8
Canacona	1	1	0	1	0	3
Pernem	1	0	0	0	0	1
Total	21	32	11	62	7	133

Table 4.14

4.4 Respondents

In a system of waste management several stakeholders are involved and hence different categories of respondents were identified.

²⁹⁷ This is since 133 Occupiers were samples from a grand total of 1024 Occupiers.

4.4.1 Personnel in Occupiers

At the level of the Occupier, this study has identified certain categories and numbers of personnel associated with different healthcare settings, i.e. ten Medical Superintendents, twenty-five Doctors, thirty Nursing Staff and thirty-five Auxiliary staff (supporting staff), totalling in all 100. Having obtained the sample of healthcare settings, a questionnaire²⁹⁸ was designed to suit these categories referred to above which was developed after literature survey and review. The said questionnaire was distributed to the identified personnel from amongst the sample of Occupiers, after a pilot survey.

4.4.2 Enforcement Authorities

The prescribed authority under the rules is the Goa State Pollution Control Board and it is entrusted with a very big role in the effective monitoring of the rules. This study involved interviewing the Chairman²⁹⁹ of the Goa State Pollution Control Board and has included parts of the interview in the foregoing paragraphs. Besides, this study identified seventeen officials³⁰⁰ of the Goa State Pollution Control Board of different ranks, involved in the implementation of the BWM Rules. A questionnaire³⁰¹ designed to suit these officials, developed on the basis of the problem of

²⁹⁸ See Appendix-1 at p. 224.

²⁹⁹ Dr. L. U. Joshi, (in June 2008) whose tenure came to an end on 7th June, 2009, after which the new incumbent, Dr. Simon D'Souza (in June 2009) has been interviewed.

³⁰⁰ These officials, including Natalia Dias, Legal officer (interviewed in October 2008) comprised the team constituted for inspections of healthcare facilities in accordance with the directions of the Hon'ble High Court of Bombay at Goa passed in *suo motu* writ petition No. 02/07 on 05/01/2009.

³⁰¹ See Appendix-2 at p. 229.

mismanagement of Bio-Medical Waste was distributed. In addition, informal interviews were conducted with a few of these officials in order to deviate from the 'structured' context of the questionnaire distributed to them.

4.4.3 Municipal Authorities

The municipal authorities are bestowed with the duty to pick up duly treated Bio-Medical Wastes for disposal at municipal dump site in addition to transporting segregated non bio-medical solid waste generated in hospitals and nursing homes.³⁰² Hence this study has identified the Chief Officers of four of the fourteen Municipal Councils³⁰³ and obtained the necessary information from them through interviews conducted in June, 2008.

It was revealed by the Chief Officers of municipal bodies identified in this study, that they collect wastes from all the healthcare institutions in their jurisdiction and carry the same to a disposal site for dumping, where all wastes were collectively disposed. They were not aware if the wastes being transported were treated wastes and that there are rules laid down for treatment. They were also not aware of the rules regarding transportation of Bio-Medical Wastes.

³⁰² See Rule 6(6); BMW Rules, 1998 as inserted by Inserted by Rule 3 of the Bio-Medical Waste (M & H) (Second Amendment) Rules, 2000 vide notification S.O.545(E), dated 2.6.2000.

³⁰³ Municipal Councils of Margao, Mapusa and Mormugao and the Corporation of the city of Panaji, as these are the four major areas in the State.

4.4.4 Non-Governmental Organizations (NGOs)

These play a very important role in the effective management of socio-legal issues. In the management of Bio-Medical Wastes, which is a socio-legal problem that has reached alarming proportions, these organizations have a significant contribution to this study. They conduct workshops, seminars, create awareness and training programmes on different topics related to Bio-Medical Waste.³⁰⁴ Some members from NGOs are appointed at the core and advisory committee of the MoEF. Such activists have been identified and necessary information has been obtained through the interview method.³⁰⁵

4.4.5 Patients and Visitors

A few informal interviews with randomly selected patients and visitors, as respondents in this study, were conducted. This is since patients, feel the pulse of the hospital and 'reside' along with the mismanagement, possibly becoming the first victims through hospital borne infections and visitors are in all likelihood to expose themselves to risks in premises where practices related to management and handling of wastes are unscientific.

³⁰⁴ In July 2002, Shrishti, an NGO in New Delhi had helped the police crack down sites, where Bio-Medical Waste was dumped by the hospitals. This was also supported by the media and appeared in the Aaj Tak news channel, where NGO activists opened bags containing human organs, used syringes that were dumped without being treated.

Also, one NGO in Mumbai city, HOPES (Help Organisation For People, Environment and Society) has been playing a very important role not only in getting the latest details about news events but also helping the hospitals and the government in every possible way to solve the problem. Their target audience has been students, healthcare professionals, organizations, corporates and the general public.

³⁰⁵ Padmashree Adv. Norma Alvares, Social Activist and Counsel, Bombay High Court of Goa Foundation; Dr. Joe D'Souza, Microbiologist, Columnist and social activist; Mr. Roland Martins, Convener of GOACAN; eminent environmentalist Mr. Clinton Vaz; activist Vinayak Mordekar and Environmentalist activist Patricia Pinto. Interviews were conducted in the month of June 2008.

4.5 Profile of Generation of Bio-Medical Waste in the State

In order to estimate the quantum of waste generated from the various types of healthcare establishments in the State, the researcher subjected the information on the healthcare scenario and the bed strength, as obtained from occupiers through questionnaires, to a calculation based on unit generation of waste and accordingly arrived at the figures tabulated in table 4.15.

Estimation of Bio-Medical Waste Generation in the State of Goa				
Types of Occupiers	Number of Occupiers	Bed strength	Unit waste generation	Total waste generation (kg/day)
Government and private hospitals	133	4865	1.2 (kg/day)	5838
Healthcare establishments				
Dental clinics	256	-	0.4 (kg/day)	102.4
Path labs	66	-	0.4 (kg/day)	26.4
Dispensaries/ clinics	562	-	0.3 (kg/day)	168.6
Blood banks	6	-	2.0 (kg/day)	12
Total Bio-Medical Waste generation (kg/day)				6147.4
Annual Bio-Medical Waste generation (MT/annum)				2243.8

Table 4.15

(Source: Estimated and information by personnel from sampled occupiers)

For a small State like Goa 2,243.8 metric tonnes of Bio-Medical Waste generated annually is a colossal amount as compared to other very large states.³⁰⁶ Moreover, as the trends show increase in the healthcare establishments, it is obvious that the quantum of Bio-Medical Waste generated will also be on the increase.³⁰⁷

³⁰⁶ The neighbouring State of Karnataka (area 1,91,700 sq. kms. being 50 times larger) generates approximately 32,000 metric tonnes of such waste annually (as on 31.12.2005) which includes wastes from veterinary hospitals/clinics.

³⁰⁷ Even though Bio-Medical Waste includes waste generated from the treatment, diagnosis and treatment of animals, the same has been excluded from this study. See limitations of the study in para 1.9 at p. 26.

4.6 Analysis of Bio-Medical Waste Management Studies

Management of Bio-Medical Waste is a wide concept to involve several inter-linked aspects viz. sensitization to the waste management policy of the Government, adhering to the waste management practices, employee education and training and attitude assessment.

4.6.1 Bio-Medical Waste Management Policy

The underlying policy in the management of Bio-Medical Waste is four-fold as far as the healthcare setting is concerned:

- (i) The management and the employees must be aware of the applicable legislation or rules;
- (ii) The management must have a waste management plan;
- (iii) The management must assign waste management responsibilities and
- (iv) The employees must be generally aware that a designated authority gives an authorization for the purpose.

More than half of the respondents, namely, personnel in the Occupiers, 59 from 100 (59%) were not aware of the legislation or rules applicable to Bio-Medical Waste Management. Only five of the respondents were able to list the legislative Act and/or rules when asked. Less than half, 38 from 100 (38%) of the respondents reported that their healthcare settings followed a

waste management plan. Waste management responsibilities were included in the job description of their employees by 63 out of 100 (63%) of the respondents. Vast majority, 78 out of 100 (78%) of them were not aware of authorization.

4.6.2 Bio-Medical Waste Management Practices

These practices test the preparedness and efficacy of the respondent healthcare institutions with respect to different parameters, which reflect the adherence and implementation of the BWM Rules.

4.6.2.1 Use of Deep Burial Pits

Human anatomical waste, viz. human tissues, organs and body parts, categorized as category No. 1 must be subject to deep burial or incineration according to Schedule I of the BWM Rules.³⁰⁸ (Deep burial shall be option available in towns with population below 5 lakhs. No towns in the state of Goa have a population exceeding 5 lakhs and therefore the deep burial option is the available one). The information about deficiencies in this regard obtained through questionnaires from the personnel in Occupiers (see para 4.4.1) are tabulated.

³⁰⁸ See Rule 5; BWM Rules, 1998.

Burial Pit Deficiencies			
Talukas	Occupiers	No burial pit	Percentage deficient
Ponda	14	8	57.14
Tiswadi	23	15	65.22
Sattari	9	5	55.56
Salcette	32	5	15.63
Mormugao	11	5	45.45
Bicholim	6	2	33.33
Bardez	24	4	16.67
Quepem	2	2	100.00
Sanguem	8	2	25.00
Canacona	3	1	33.33
Pernem	1	1	100.00

Table 4.16

(Source: Personnel from sampled occupiers)

Representing the same pictorially, the Taluka-wise extent of deficiency in terms of not using deep burial pits is shown in Fig. 4(xiii)

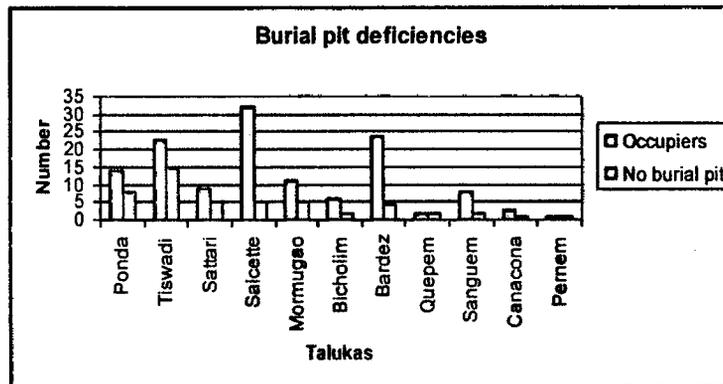


Fig. 4 (xiii)

The large quanta of percentages show the lack of deep burial pits. The overall percentage of all Talukas in this respect of this deficiency is 49.75%. At this stage it is pertinent to note that this study does not involve studying the specifications of the pits in those healthcare units which claim to have one

as it is simply not possible to verify such details. However this is a matter within the domain of the Goa State Pollution Control Board.

4.6.2.2 Use of Autoclave/Microwave

Microbiology and biotechnology wastes, like those from laboratories, waste sharps, discarded medicines and cytotoxic drugs, soiled wastes like contaminated fabrics and solid wastes like catheters and disposables (other than sharps), categorized from categories Nos. 2 – 7 in Schedule I of the BWM Rules,³⁰⁹ all require the use of autoclaves or microwaves. The information about deficiencies in this regard obtained through questionnaires from the personnel in Occupiers (see para 4.4.1) are tabulated.

Autoclave/Microwave deficiencies			
Taluka	Occupiers	No Autoclave/Microwave	Percentage deficient
Ponda	14	6	42.86
Tiswadi	23	17	73.91
Sattari	9	3	33.33
Salcette	32	18	56.25
Mormugao	11	4	36.36
Bicholim	6	6	100.00
Bardez	24	7	29.17
Quepem	2	2	100.00
Sanguem	8	4	50.00
Canacona	3	1	33.33
Pernem	1	1	100.00

Table 4.17
(Source: Personnel from sampled occupiers)

Representing the same pictorially, the Taluka-wise extent of deficiency in terms of not resorting to autoclaving or microwaving to disinfect is shown in Fig. 4 (xiv).

³⁰⁹ *Ibid* as contained in the same Rule.

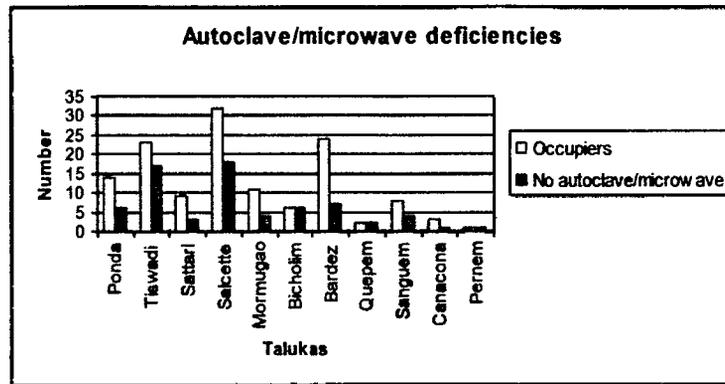


Fig. 4 (xiv)

The even larger quanta of percentages in the last column show the lack of infrastructure in terms of autoclaving/microwaving. The overall percentage of deficiencies relating to the use of autoclave and microwave for disinfecting is 59.56%, which is the position with majority of the healthcare establishments. At this stage it is submitted that this study has not gone into the working of the autoclaves and microwaves in those healthcare units which have provided information about the existence of a autoclave/microwave. However this is a matter within the domain of the Goa State Pollution Control Board.

4.6.2.3 Use of Shredder

Schedule I of the BWM Rules, 1998 read with Rule 5 provide that waste sharps like needles, syringes, scalpels, blades, glass etc. that may cause puncture and cuts, which includes both used and unused sharps need to be treated by shredder. Likewise, Solid Waste also includes wastes generated from disposable items other than the waste sharps such as tubings, catheters,

intravenous sets etc. The information about deficiencies in this regard obtained through questionnaires from the personnel in Occupiers (see para 4.4.1) are tabulated.

Deficiencies Regarding Shredders			
Talukas	Hospitals	No shredder	Percentage deficient
Ponda	14	1	7.14
Tiswadi	23	2	8.70
Sattari	9	3	33.33
Salcette	32	6	18.75
Mormugao	11	2	18.18
Bicholim	6	1	16.67
Bardez	24	1	4.17
Quepem	2	2	100.00
Sanguem	8	2	25.00
Canacona	3	1	33.33
Pernem	1	1	100.00

Table 4.18
(Source: Personnel from sampled occupiers)

Representing the same pictorially, the Taluka-wise extent of deficiency in terms of non-use of shredders for the treatment of Bio-Medical Waste is seen in Fig. 4 (xv)

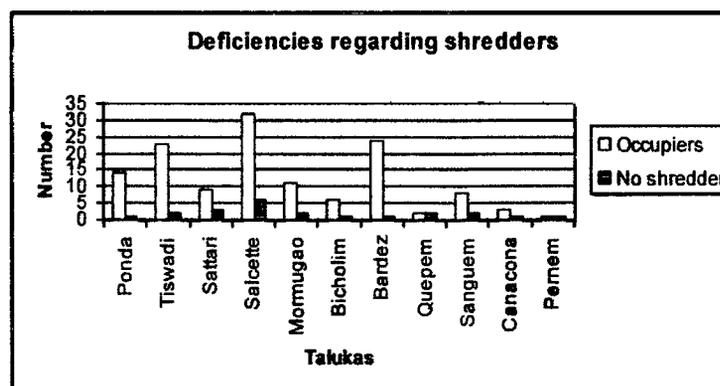


Fig. 4 (xv)

The overall percentage of deficiencies in all Talukas of the State as not equipped with shredders is 33.21% of the totalled sampled healthcare establishments.

4.6.2.4 Use of Appropriate Disinfectants

The use of disinfectants is predominant in the preliminary treatment of wastes like waste sharps that include needles, syringes, scalpels, blades and glass, solid wastes like those generated from disposables other than waste sharps and liquid wastes that include laboratory, washing, cleaning and house keeping materials categorized as categories Nos. 4, 7 and 8. The information about deficiencies in this regard obtained through questionnaires from the personnel in Occupiers (see para 4.4.1) are tabulated.

Improper Disinfectants			
Ponda	14	4	28.57
Tiswadi	23	2	8.70
Sattari	9	1	11.11
Salcette	32	3	9.38
Mormugao	11	2	18.18
Bicholim	6	2	33.33
Bardez	24	1	4.17
Quepem	2	2	100.00
Sanguem	8	2	25.00
Canacona	3	1	33.33
Pernem	1	1	100.00

Table 4.19

(Source: Personnel from sampled occupiers)

Representing the same pictorially, the Taluka-wise extent of deficiency in terms of not using appropriate disinfectants is seen in Fig. 4 (xvi).

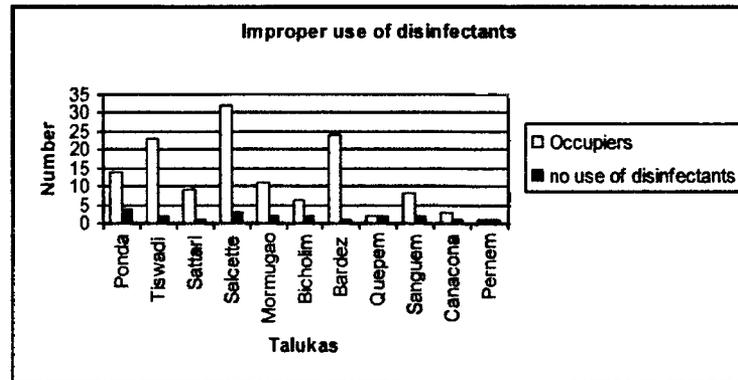


Fig. 4 (xvi)

The considerably lower quanta of percentages in majority of the Talukas lead to an overall average of 33.79%. However, this percentage is in no way a consolation since the use of disinfectant liquids is the minimum a healthcare establishment can be expected to possess and use and about one-third of the healthcare establishments are lacking in such a basic aspect.

4.6.2.5 Segregation of Wastes

The key to waste management lies in segregation of wastes. It is laid down in the BWM Rules that different categories of wastes are to be sorted and placed in different containers or bags as per Schedule II of the BWM Rules.³¹⁰ Segregation at source is important as it allows special attention to be given to small quantities of waste and hence it should be done early. The

³¹⁰ See Rule 6; BWM Rules, 1998.

information about deficiencies in this regard obtained through questionnaires from the personnel in Occupiers (see para 4.4.1) are tabulated.

Segregation deficiencies			
Talukas	Hospitals	No segregation	Percentage deficient
Ponda	14	13	92.86
Tiswadi	23	18	78.26
Sattari	9	7	77.78
Salcette	32	25	78.13
Mormugoa	11	8	72.73
Bicholim	6	4	66.67
Bardez	24	21	87.50
Quepem	2	2	100.00
Sanguem	8	7	87.50
Canacona	3	3	100.00
Pernem	1	1	100.00

Table 4.20
(Source: Personnel from sampled occupiers)

Representing the same pictorially, the Taluka-wise extent of deficiency in terms of not resorting to segregation of wastes is seen in Fig. 4 (xvii)

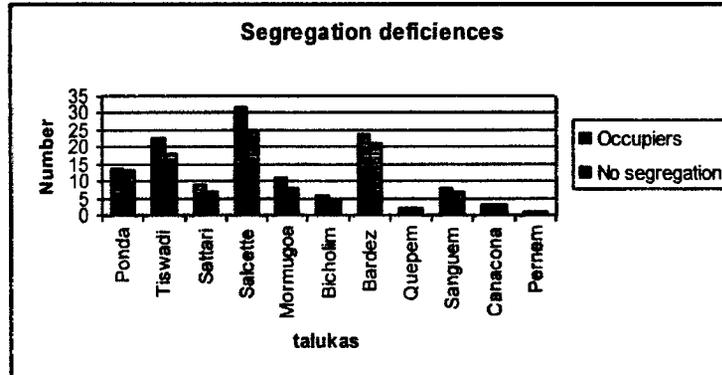


Fig. 4 (xvii)

This reveals unusually high quanta of percentages, the overall average being 85.58% of healthcare institutions not segregating wastes as per the rules.

4.6.2.6 Labelling of Waste Containers

Labelling must be done for Bio-Medical Waste containers or bags in accordance with Schedule III of the BWM Rules.³¹¹ The symbols for depicting biohazard and cytotoxic wastes are provided in the BWM Rules. This label is to be prominently visible and non-washable. The information about deficiencies in this regard obtained through questionnaires from the personnel in Occupiers (see para 4.4.1) are tabulated.

Labelling deficiencies			
Talukas	Occupiers	No labelling observed	Percentage deficient
Ponda	14	13	92.86
Tiswadi	23	18	78.26
Sattari	9	7	77.78
Salcette	32	25	78.13
Mormugao	11	8	72.73
Bicholim	6	4	66.67
Bardez	24	21	87.50
Quepem	2	2	100.00
Sanguem	8	7	87.50
Canacona	3	3	100.00
Pernem	1	1	100.00

Table 4.21
(Source: Personnel from sampled occupiers)

Representing the same pictorially, the Taluka-wise extent of deficiency in terms of non-labelling of waste containers is seen in Fig. 4 (xviii).

³¹¹ *Ibid.*

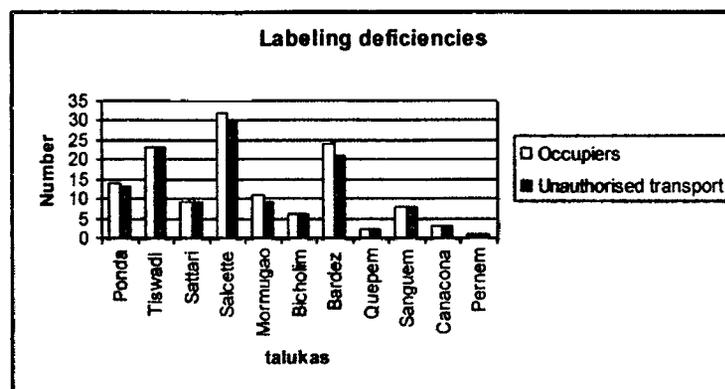


Fig. 4 (xviii)

As seen in cases on segregation, the average percentage of all Talukas wherein no labelling is observed as per the BWM Rules is again a huge 85.58%.

4.6.2.7 Non-Use of Colour Codes

Apart from the system of having to segregate the Bio-Medical Wastes in accordance with the types, whereby a specified type of container is required to be used, Schedule II of the BWM Rules also indicates a particular colour code for the container carrying a particular type of waste. These colour codes are universal in nature, with a connotation to a particular level of risk involved. The information about deficiencies in this regard obtained through questionnaires from the personnel in Occupiers (see para 4.4.1) are tabulated.

Colour Coding deficiencies			
Talukas	Hospitals	No colour coding	Percentage deficient
Ponda	14	12	85.71
Tiswadi	23	16	69.57
Sattari	9	7	77.78
Salcette	32	24	75.00
Mormugao	11	8	72.73
Bicholim	6	4	66.67
Bardez	24	19	79.17
Quepem	2	2	100.00
Sanguem	8	6	75.00
Canacona	3	3	100.00
Pernem	1	1	100.00

Table 4.22
(Source: Personnel from sampled occupiers)

Representing the same pictorially, the Taluka-wise extent of deficiency in terms of not resorting to colour coding of containers used for collection of different types of wastes is seen in Fig. 4 (xix).

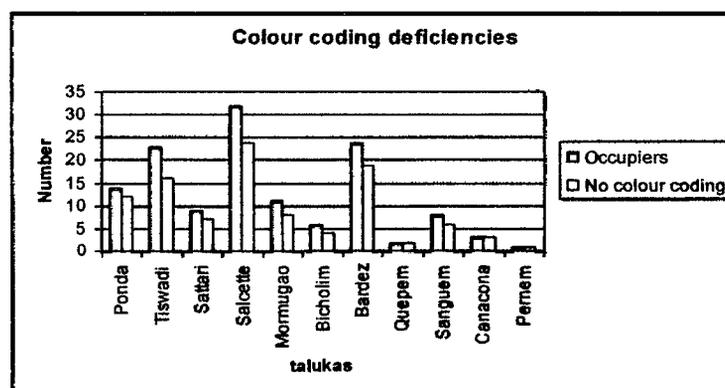


Fig. 4 (xix)

It is observed that 81.97% of the healthcare units in the various Talukas under study do not observe the colour coding prescribed under the BWM Rules.

4.6.2.8 Transportation of Untreated Wastes

Transportation of untreated Bio-Medical Wastes is always a matter of concern. Hence it is regulated by the BWM Rules, which state that apart from the colour codes in accordance with Schedule III mentioned of earlier, information labels regarding the type of waste need to be also used on these containers in accordance with Schedule IV of the Rules.³¹² Municipal authorities are obliged under the Rules to pick up and transport duly treated wastes as it does with segregated non bio-medical solid wastes. This is meant for transportation to a dump site. As for waste treatment at a common waste treatment facility, there is no such facility in the State. However, several respondent Occupiers claimed that some out-sourcing for treatment is being done to agencies that treat wastes.³¹³ In such cases of transportation, this rule would also apply since the logic of the rule is in respect of waste that is being transported. For all types of transportation, the appropriate authority has to authorize the transport being used for this purpose, in addition to all other rules. The information about deficiencies related to transportation, obtained through questionnaires from the personnel in Occupiers (see para 4.4.1) are tabulated.

³¹² See Rule 6; BWM Rules, 1998.

³¹³ M/s P.K. Agencies, which do not have authorisation from Goa State Pollution Control Board.

Deficiencies Related to Transportation			
Talukas	Hospitals	Unauthorised transport	Percentage deficient
Ponda	14	13	85.71
Tiswadi	23	23	78.26
Sattari	9	9	88.89
Salcette	32	30	81.25
Mormugao	11	9	81.82
Bicholim	6	6	100.00
Bardez	24	21	83.33
Quepem	2	2	100.00
Sanguem	8	8	100.00
Canacona	3	3	100.00
Pernem	1	1	100.00

Table 4.23

(Source: Personnel from sampled occupiers)

Representing the same pictorially, the Taluka-wise extent of deficiency in terms of transportation of bio-medical of wastes is seen in Fig. 4 (xx).

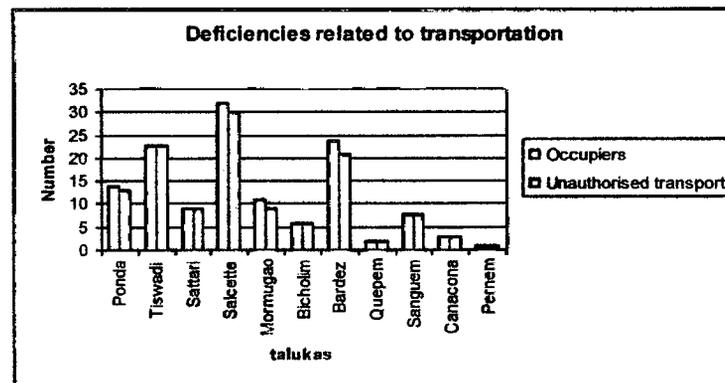


Fig. 4 (xx)

It is observed that an overwhelming 95.99% of the healthcare units in all the Talukas under study do not observe the various prescribed under the BWM Rules with regard to transportation of untreated Bio-Medical Wastes in the state of Goa.

4.6.2.9 Over-Storage of Untreated Bio-Medical Wastes

Besides having to ensure that the storage places are durable and are kept clean, being impermeable to liquid wastes and protected from vectors, it is to be ensured that untreated Bio-Medical Wastes are not stored beyond a period of 48 hours. The information about deficiencies in this regard obtained through questionnaires from the personnel in Occupiers (see para 4.4.1) are tabulated.

Deficiencies Related to Storage			
Talukas	Hospitals	Over-storage	Percentage deficient
Ponda	14	1	7.14
Tiswadi	23	3	13.04
Sattari	9	2	22.22
Salcette	32	2	6.25
Mormugao	11	2	18.18
Bicholim	6	1	16.67
Bardez	24	3	12.50
Quepem	2	0	0.00
Sanguem	8	0	0.00
Canacona	3	0	0.00
Pernem	1	0	0.00

Table 4.24

(Source: Personnel from sampled occupiers)

Representing the same pictorially, the Taluka-wise extent of deficiency in terms of over-storage of Bio-Medical Waste is seen in Fig. 4 (xxi).

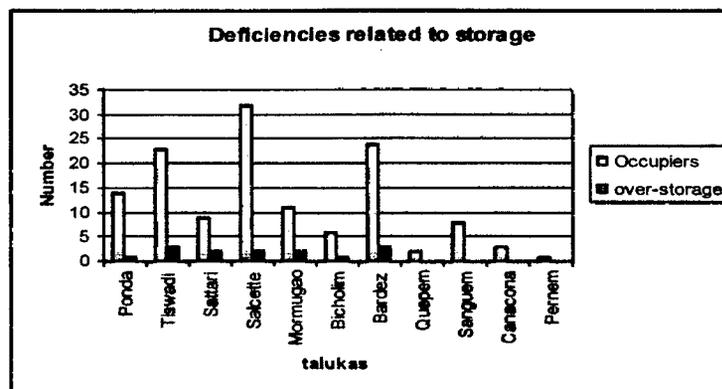


Fig. 4 (xxi)

It is revealed that a relative miniscule percentage of 8.73% healthcare units in the various Talukas of the state store their untreated Bio-Medical Waste beyond a period of 48 hours. In other words a large 91.27% observe this Rule. Therefore, the possibility of hospital borne infections arising out of mismanaging wastes that can affect in-house patients are kept to a small possibility. However, the deficient percentage numerically amounts to quite a number of such healthcare units and hence they need to follow the Rule strictly in order to eliminate such infections.

4.6.2.10 Authorisation Deficiencies

The BWM Rules have included a Form I which is an application for authorization by every Occupier³¹⁴ of an institution generating, collecting, receiving, storing, transporting, treating, disposing and/or handling Bio-Medical Waste in any other manner, and the prescribed authority shall grant such authorization. The information about deficiencies related to authorization is obtained through an interview/questionnaire of the Legal Officer of the Pollution Control Board (see para 4.4.2) and are tabulated.

Authorisation Deficiencies			
Talukas	Occupiers	No. authorization	Percentage deficient
Ponda	14	10	71.43
Tiswadi	23	18	78.26
Sattari	9	7	77.78
Salcette	32	28	87.50
Mormugao	11	7	63.64
Bicholim	6	3	50.00
Bardez	24	18	75.00
Quepem	2	2	100.00
Sanguem	8	5	62.50
Canacona	3	1	33.33
Pernem	1	1	100.00

Table 4.25

(Source: Legal Officer, Goa State Pollution Control Board)

³¹⁴ Except such Occupier of clinics, dispensaries, pathological laboratories, blood banks providing treatment/service to less than 1000 (one thousand) patients per month.

Representing the same pictorially, the Taluka-wise extent of deficiency in terms of no authorisation of bio-medical of wastes is seen in Fig. 4 (xxii).

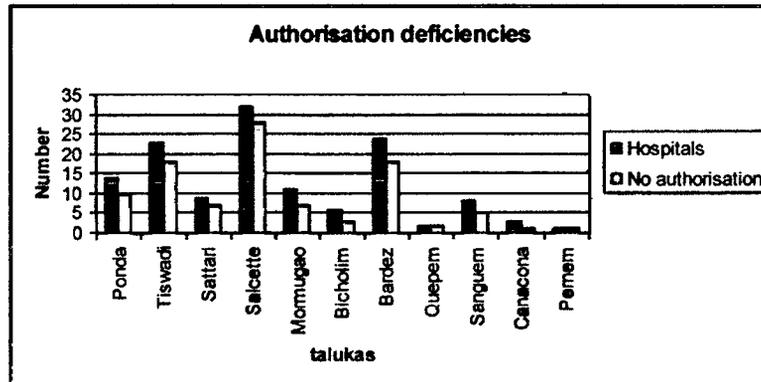


Fig. 4 (xxii)

It is observed that an average of 72.68% of Occupiers of all the Talukas in Goa are operating without any authorization or not having renewed the authorization, which has since been invalidated.

4.6.2.11 Record Keeping by Occupiers

Efficient hospital waste management requires accurate record keeping of all aspects of the programme to document compliance, assess expenditures and evaluate minimization of efforts. Every authorised person shall maintain records related to the generation, collection, reception, storage, transportation, treatment, disposal and/or any form of handling of Bio-Medical Waste in accordance with these rules and any guidelines issued. All records shall be subject to inspection and verification by the prescribed authority at any

time.³¹⁵ The deficiencies related to keeping of records are obtained questionnaires from personnel in Occupiers (see para 4.4.1) and are tabulated.

Deficiencies Related to Record Keeping			
Talukas	Hospitals	No records kept	Percentage deficient
Ponda	14	12	85.71
Tiswadi	23	18	78.26
Sattari	9	8	88.89
Salcette	32	26	81.25
Mormugao	11	9	81.82
Bicholim	6	6	100.00
Bardez	24	20	83.33
Quepem	2	2	100.00
Sanguem	8	8	100.00
Canacona	3	3	100.00
Pernem	1	1	100.00

Table 4.26
(Source: Personnel from sampled occupiers)

Representing the same pictorially, the Taluka-wise extent of deficiency in terms of records of generation and handling of bio-medical of wastes is seen in Fig. 4 (xxiii).

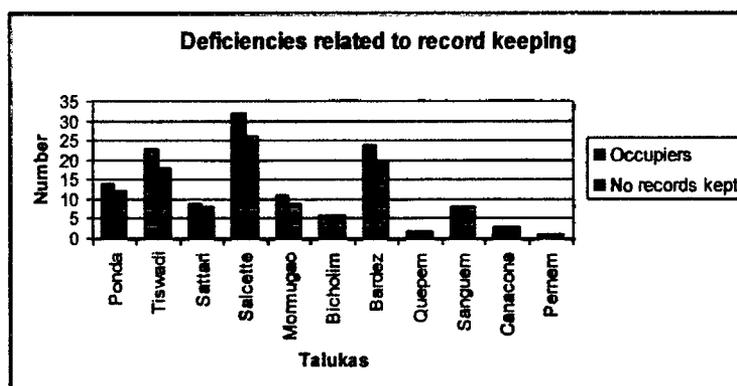


Fig. 4 (xxiii)

The findings of this aspect revealed that at an average, a phenomenal 90.84% of healthcare establishments in all the Talukas in the State did not maintain records as required under the BWM Rules.

³¹⁵ See Rule 11; BWM Rules, 1998.

4.6.2.12 Accident Reporting

When any accident occurs at any institution or facility or any other site where Bio-Medical Waste is handled or during transportation of such waste, the authorised person shall report the accident in Form III to the prescribed authority forthwith.³¹⁶ There has not been a single accident case reported to date, as informed through questionnaire by the Goa State Pollution Control Board, the prescribed authority under the rules, during the period wherein the data has been obtained.

4.6.2.13 Annual Reporting

Every Occupier/Operator shall submit an annual report to the prescribed authority in Form II by 31 January annually, to include information about the categories and quantities of Bio-Medical Wastes handled during the preceding year. The prescribed authority in turn shall send this information in a compiled form to the Central Pollution Control Board by 31 March annually.³¹⁷ The information in table 4.26 showing the number of Occupiers that have submitted such reports in the year ending 31st January 2008 is obtained through interview conducted with the Chairman, Goa State Pollution Control Board (see para 4.4.2).

³¹⁶ See Rule 12; BWM Rules, 1998.

³¹⁷ See Rule 10; BWM Rules, 1998.

Incidents of Annual Reporting		
Talukas	Occupiers	Reports submitted
Ponda	14	1
Tiswadi	23	3
Sattari	9	0
Salcette	32	5
Mormugao	11	1
Bicholim	6	0
Bardez	24	2
Quepem	2	0
Sanguem	8	0
Canacona	3	0
Pernem	1	0

Table 4.27

(Source: Chairman, Goa State Pollution Control Board)

As seen from the table, only 12 out of the 133 Occupiers considered as respondents, have submitted the annual reports to the prescribed authority. Hence the percentage of respondent Occupiers who have abided by the Rule is 9.02% and 90.98% of the respondent Occupiers are defaulters.³¹⁸ It is therefore seen that the Goa State Pollution Control Board has a small fraction of records about the categories and quantum of Bio-Medical Waste generated in most of the Talukas in the State of Goa.

4.6.3 Employee Education and Suitability

The data collected on employee education is on three aspects, viz. whether the respondent has undergone any training programme on hospital waste management; whether the hospital provides annual education on waste

³¹⁸ Percentages are not indicated in Table 4.27 since only few incidents of annual reporting exist. Data is also not represented pictorially for the same reason.

management for an employee and whether the concerned respondent would like to attend a programme on hospital waste management.

The findings reveal that 88 out of 100 (88%) have not undergone any training on waste management. 80 out of 100 (80%) reported that their health care setting does not have any annual education programme on waste management. Majority, i.e. 85 out of 100 (85%) of them were interested in attending a programme on Bio-Medical Waste Management.

4.6.4 Employee Attitude Assessment

Safe management of healthcare waste was agreed to be an issue by the majority, 80 out of 100 (80%) of the respondents. 57 out of 100 (57%) of the respondents were of the view that it is the responsibility of the government. However, there was almost total agreement, 92 out of the 100 respondents (92%) that it is an issue involving team work. 47 out of 100 (47%) of the respondents believe that safe management efforts will increase the financial burden and 36 out of 100 (36%) of them felt that it is an extra burden on work.

4.7 Analysis of Information from Enforcement Authorities

Information was obtained from the officials of the Goa State Pollution Control Board³¹⁹, both by using the questionnaire method and the interview

³¹⁹ See para 4.4.2 at p. 150.

method. As per information received, various ranks like Scientific Assistant, Junior Environmental Engineer, Scientific Assistant, Junior and Senior Laboratory Assistants form part of the inspection teams that report on compliance of BMW Rules. It was further informed that routine monitoring of all Occupiers is not possible since the Board is over-stressed with work and hence they resort to surprise inspections as and when possible.

With regard to major healthcare establishments, certain specific observations were communicated in this study. These are:

(I) The premier medical institution in the State is the Goa Medical College and Hospital (GMC) and it has installed an incinerator having a capacity of 60 kgs/hr which operates for 6 hrs/day. However, the plasma pyrolysis³²⁰ plant is not in operation and is utilized for disposal of plastic waste. The facilities are presently being utilized by the following healthcare institutions/corporations for disposal of Bio-Medical Waste, namely:

1. Goa Medical College Hospital, Bambolim.
2. Goa Dental College Hospital, Bambolim.
3. Institute of Psychiatry and Human Behaviour, Bambolim.
4. Hospicio Hospital, Margao (South Goa).
5. Asilo Hospital, Mapusa (North Goa).
6. Corporation of the City of Panaji, collecting healthcare waste from units in the city of Panaji-Goa.

³²⁰ Plasma can reach temperatures up to 10,000°C and thus provides high temperature combined with ultra-violet radiation to destroy pathogens in waste.

(II) The following major defects are present in the said incinerator, plasma pyrolysis plant and other facilities:

1. The secondary chamber of the incinerator is non-functional.
2. The chimney has to be repaired and its height should be 30 mts.
3. The plasma pyrolysis plant is presently not in operation.
4. Solid waste (Category 7) is being directly sent to deep burial. This is against the Rules of treatment prescribed as it has to be disinfected, autoclaved or microwaved and shredded.
5. Unsegregated waste is brought to the incinerator facility.
6. Incinerator ash is being disposed on land within premises. This is not in compliance to the provisions/rules as the same has to be stored and finally disposed in a secured landfill.
7. Arrangements for autoclaving or microwaving are not available with the Goa Medical College for the treatment of Bio-Medical Wastes.
8. Goa Medical College Hospital has not installed a shredder.
9. Deep burial is not in accordance with the recommendations of the BWM Rules.

(III) Mormugao Municipal Council has appointed an agency, M/s Sara Cleaning Services for collection of Bio-Medical Wastes. However the said agency has not obtained authorization from the Board.

(IV) M/s P. K. Waste Management Services has been appointed by the Directorate of Health Services for collection and transportation of untreated

Bio-Medical Wastes from Hospicio Hospital, Margao and Asilo Hospital, Mapusa for treatment and disposal at the Goa Medical College facility. This agency has also not obtained authorization of the Board under the rules.

As regards a Common Waste Treatment Facility this study revealed that the State of Goa does not have a common facility for disposal or incineration of Bio-Medical Wastes and no initiatives have been taken in this regard, neither by the municipal bodies within their jurisdiction nor by the Occupiers generating such wastes, outside municipal jurisdictions. The Government has in fact moved a proposal to acquire 40,000 square metres of land in Dharbandora in Ponda Taluka for this purpose. However, this proposal is moving slowly due to the several departments through which it has to go.

4.8 Analysis of Information from Municipal Authorities

It was informed by the Chief Officers of the sampled municipal authorities³²¹ that the wastes generated by the healthcare establishments within their jurisdiction are collected and transported to disposal sites, where they are dumped. They were not aware of specific containers required for such transportation nor whether the waste being transported is treated or not by the Occupiers.

They were unanimous in their information provided that there is no common waste treatment facility but were aware that the Government has

³²¹ See para 4.4.3 at p. 151.

considered acquiring land at a proposed site admeasuring 50,000 square metres at Dharbandora in Ponda Taluka.

The Chairperson of Margao Municipal Council³²² however divulged that medical establishments have to mandatorily apply for trade and occupation licences, failing which the establishment will be considered to be functioning unauthorisedly. Due to the issuance of notices in this regard, several medical establishments in Margao and neighbouring suburbs, operating without these mandatory licences have rushed to the civic body seeking proper clearances.

It was also informed by the respondents that although some of the healthcare establishments, including some hospitals, claim that they dispose their Bio-Medical Wastes, the municipal council workers who are employed to lift solid municipal wastes often complain of gloves and syringes being dumped into their garbage bins.

4.9 Analysis of Information from NGOs

Information has been obtained from representatives of NGOs identified in respect of management of Bio-Medical Wastes.³²³ All of them were unanimous in their views that the Primary Health Centres (PHCs) dump their wastes on the premises itself. Most of the private hospitals and nursing homes do the same or dispose of their wastes with the other garbage that goes to the municipal dumps and not one of Goa's towns has the wherewithal to

³²² Mr. Savio Coutinho .

³²³ See para 4.4.4 at p. 152.

segregate Bio-Medical Wastes from other wastes. This is extremely dangerous for Goa's environment and for its people. They further informed that garbage from the towns of Panaji and Mapusa was being dumped in a land-fill site in the vicinity at a place called Curca, without being treated. These wastes have seeped into the ground affecting the water table, destroying wells and affecting fields. Residents from there now drink only tanker water.

4.10 Analysis of Information from Patients and Visitors

Data has been obtained from patients and visitors as respondents who were randomly selected from different healthcare institutions across the different Talukas, majority of whom informed that segregation of by-products from healthcare is not being carried out at point of generation and all wastes are being dumped in a common receptacle. It was also informed that wastes from the healthcare establishments are being dumped in municipal bins in close proximity to the hospital premises.

4.11 Judicial Intervention

While the study was being wrapped up the empirical data collected from the different respondents using various tools adopted in the field of research methodology, the Panaji bench of the Bombay High Court took *suo motu* cognizance³²⁴ of the status of the garbage, biomedical and hazardous

³²⁴ As reported on 05/01/2009, O Heraldo newspaper, the matter was before a bench comprising Justice N. A. Britto and Justice P.B. Majmudar.

waste disposal in the state of Goa following a spate of media reports censuring the government. The Court directed the Goa State Pollution Control Board to submit the status report within a period of three weeks. Following this High Court directive, the Goa State Pollution Control Board shortly served notices and began inspecting hospitals, veterinary hospitals, dispensaries, pathological laboratories, nursing homes and blood banks to determine whether Bio-Medical Waste generated is scientifically disposed of in accordance with the Rules or not.³²⁵

Interestingly, the Goa State Pollution Control Board stepped up the efforts along with the State government to acquire a common site for disposal of hazardous waste and Bio-Medical Waste.³²⁶ Shortly thereafter the State government asked the hospital managements to immediately decide on short-term measures to tackle Bio-Medical Wastes.³²⁷ The month of February 2009 saw the Counsel for the Goa State Pollution Control Board³²⁸ submit before the Court that seven civic bodies had inadequate composting facilities and that some of them did not segregate waste into biodegradable and non-biodegradable waste.³²⁹

³²⁵ The notices threatened to shut down hospitals or clinics that did not co-operate.

³²⁶ As reported on 11/01/2009 in the O Heraldo newspaper, a site at Darbhadora in Ponda Taluka admeasuring about 40,000 square metres was short listed by the government but no further steps in that direction were carried out. The Goa State Pollution Control Board felt the pressure since the High Court was reprimanding it for its inaction on all erring units.

³²⁷ As reported on 19/01/2009 in the Times of India newspaper, representatives of the Indian Medical Association, Private Nursing Homes and Pathology Laboratories attended the meeting chaired by the Chief Secretary, Government of Goa, J. P. Singh on 18/01/2009. The methodology contemplated was that all authorities, whether Government or private-run could come together in whatever way they can to jointly put up a short term plan for the purpose.

³²⁸ Sr. Adv. A. N. S. Nadkarni.

³²⁹ As reported on 18/02/2009 in the Times of India (Goa Edition), the municipal councils were those of Cuncolim, Curchorem, Pernem, Sanquelim, Valpoi, Sanguem and Quepem.

The Hon'ble High Court of Bombay, Panaji Bench continued to track the matter of Bio-Medical Waste Management and in the month of April 2009 it was informed by the Goa Pollution Control Board that it had inspected 145 health centres out of the 185 in the State of Goa.³³⁰ Shortly thereafter, the print media once again brought to the forefront the indiscriminate dumping of Bio-Medical Waste all over the State without any regard to the norms which are a decade old. It was further reported that Bio-Medical Waste produced from Goa's healthcare centres top the list of environmental concerns and that only the Goa Medical College and Hospital has the wherewithal to dispose of Bio-Medical Waste properly right now (along with which it treats waste coming from the two district hospitals, viz. Asilo Hospital in Mapusa and Hospicio Hospital in Margao) and this does not take into account the tonnes of Bio-Medical Waste generated by the 20-odd government primary health centres and 130-odd private nursing homes and hospitals.³³¹

Due to the constant watch by the judiciary, the month of May 2009 saw a new claim of a level of preparedness by the Hospicio Hospital in Margao being ready to adhere to Bio-Medical Waste Rules.³³² The hospital claimed to have constructed a deep burial pit and possess facilities like autoclaving and microwaving and that mutilation and shredding as also disinfection will be carried on in accordance with rules. At this juncture it is

³³⁰ As reported on 09/04/2009 in The Navhind Times newspaper.

³³¹ As reported on 08/05/2009 in The Times of India (Goa Edition) newspaper.

³³² As reported on 22/05/2009 in The Times of India (Goa Edition) newspaper.

pertinent to note that it will be just the second Occupier in the State³³³ even though the total number of healthcare units in the State is many times more. Shortly thereafter, the Goa Medical College and Hospital, Bambolim expressed its intention to outsource the management of solid and medical waste generated in its premises to a private player.³³⁴

³³³ The first being the Goa Medical College and Hospital, Bambolim to have some semblance of preparedness in disposing Bio-Medical Waste as per rules.

³³⁴ As reported on 28/06/2009 in The Times of India (Goa Edition) newspaper. The Medical Superintendent, Dr. Rajan Kunkolienkar was quoted in this context, while confirming that the hospital generates about 2000 kgs of waste per day and another 100 kgs per day from each of the district hospitals is being sent for treatment.

Chapter 5

CONCLUSIONS AND SUGGESTIONS

5.1 Introduction

A developing country like India has seen healthcare sector slowly unfold into an industry and an unavoidable side effect of such a situation is the generation of huge quantities of Bio-Medical Wastes. There has been an increase in the volume of services rendered in healthcare sector and consequently increased volumes of such waste,³³⁵ which is a part of the subject of this study. A large section of the healthcare sector has not given importance to the proper management and handling of Bio-Medical Wastes.

The State of Goa, being an international tourist destination and a hotspot for medical tourism, has got an exceptional number of patient turnovers and has therefore faced the brunt of the ill-effects of improper Bio-

³³⁵ See quantum of waste generated at para 4.5 at p. 153.

Medical Waste Management to a large extent.³³⁶ Hence, this study was undertaken with several objectives, ranging from analysing the problem of Bio-Medical Waste mismanagement in the State of Goa to, examining the nature of legal control for its overall efficacy in the context of the existing situation. As a result, voluminous data has been collected and at relevant findings arrived at, the problem evaluated and suggestions and recommendations offered, including a proposal for a specific legislation for the State of Goa, which are the contents of this Chapter.

Two hypotheses have been put forth; viz. firstly, that the Healthcare institutions function in gross violation of the existing rules, thereby posing danger to in-patients, visitors and the public at large and secondly, that these rules themselves suffer from certain basic shortcomings and as a result, the existing rules have become ineffective in protecting the environment generally and health of the people in particular. After having traced the growth of the legal mechanisms, both international and domestic, as seen in the Second and Third Chapters respectively, the latest rules governing the subject of Bio-Medical Waste Management have been perused, namely, the Bio-Medical Waste (Management and Handling) Rules, 1998, which have been notified by the Government of India in the exercise of power conferred by Sections 6, 8 and 25 of the Environment (Protection) Act, 1986. The study has also examined the National Guidelines on Bio-Medical Waste Management put forth by the Ministry of Health and Family welfare, which

³³⁶ <http://www.nomad4ever.com/2009/02/22/medical-tourism-5-reasons-to-consider-go/> visited on 25.2.2009.

have been laid down in March 2002 for safety measures, training, management and administrative functions.

Having done so, the researcher proceeded to test the hypotheses, subject to the some limitations of keeping outside the purview of this study, findings on wastes generated from research activities and veterinary care and those related to healthcare establishments of the Defence Forces, all for justifiable reasons.³³⁷ The voluminous empirical data generated and findings arrived at, through the various tools of research methodology, which were subsequently subject to statistical analysis, make up the body of the statistical profile of this study incorporated in the fourth Chapter.

5.2 Bio-Medical Waste Management Scenario

Since this study has approached on a two-fold premise and has two levels of hypotheses tested, it is imperative to first evaluate the healthcare scenario in the context of the shortcomings and deficiencies existing with the Occupiers generally, before proceeding to examine the various rules and provisions that are in themselves insufficient or in need of clarity, which as a result, hamper the achievement of the primary objectives of managing and handling Bio-Medical Wastes.

³³⁷ Bio-Medical Wastes otherwise include these areas as per the definition in Rule 2(4), BWM Rules, 1998.

5.2.1 An Overview

On a perusal of the findings in the Fourth Chapter, at the outset itself, it is pertinent to note that the numbers of Occupiers in all the Talukas are seeing an upward trend in the numbers of various healthcare units, specially the apparently 'smaller' units, viz. pathology laboratories, dispensaries and dental clinics, over a period of six years of data available. The importance of this study comes to the fore, since Occupiers will acquire gigantic proportions in years to come, if this trend continues. As per the data, the position of Occupiers as on 31st December 2007 in this tiny State of Goa shows about 150 hospitals, 300 dental clinics and an unimaginable 600 dispensaries or small clinics!³³⁸

Having obtained data from the respondents of this study, viz. the sampled respondents engaged in providing services in the different healthcare establishments; officials of the Goa State Pollution Control Board; the municipal authorities; the Non-Governmental Organisations (NGOs) and a few patients and visitors all being the stakeholders, it is possible to have a broad overview of the issues and concerns of Bio-Medical Waste Management. This is even more pertinent since the total amount of Bio-Medical Wastes generated in the State of Goa was estimated and this is approximately 2,243.8 metric tonnes annually.³³⁹ This figure is colossal and should demand even greater attention of the law enforcement authorities.

³³⁸ See Table 4.13 at p. 148.

³³⁹ See para 4.5 at p. 153.

Bio-Medical Waste Management involves several inter-connected aspects like sensitizing to the waste management policies of the Government, adhering to the waste management practices, employee suitability and assessment of attitudes. It is very important that in the management of Bio-Medical Waste, those involved are aware of the applicable legislation or rules; that they have a waste management plan; that they assign waste management responsibilities and that they are aware that a designated authority gives an authorization for the purpose. Employee Education and Suitability³⁴⁰ is the level of education of the concerned employees vis-à-vis waste management which involves the imparting of on-the-job training by the healthcare establishment or through an outside agency. Employee Attitude Assessment³⁴¹ is an important criterion since it reveals the level of seriousness attributed to the issue of management and handling of wastes by the concerned personnel who are first-hand involved in the scheme of handling Bio-Medical Wastes.

5.2.2 Bio-Medical Waste Management Policies

In a majority of the areas of this study, the scene is dismal and calls for serious and immediate amelioration. Since more than half (59%) of the respondents³⁴² were not aware of the legislation or rules applicable to Bio-Medical Waste Management and only five of the respondents were able to list the legislative Act and/or rules when asked, it means that the Government has

³⁴⁰ See para 4.6.3 at p. 173.

³⁴¹ See para 4.6.4 at p. 174.

³⁴² See para 4.7 at p. 174.

not done enough to sensitize the personnel who are employed in healthcare establishments that generate Bio-Medical Wastes. Less than half (38%) of the respondents³⁴³ reported that their healthcare settings followed a waste management plan, which is too small a percentage in an area of risk-proned environment. Merely including waste management responsibilities in the job description of employees appears to be only for the record and even this has been reported as being done by 63% of the respondents,³⁴⁴ which again is not a satisfying figure. Vast majority (78%) of the respondents³⁴⁵ were not even aware that authorization by the Goa State Pollution Control Board reflects the starting point of the 'disconnect' in the system between the prescribed authority under the rules and the Occupiers.

5.2.3 Bio-Medical Waste Management Practices

The study evaluated the waste management practices of the respondent Occupiers in respect of the various administrative requirements that are laid down under the Rules, the strategies in connection with segregation and transportation and the treatment and disposal of Bio-Medical Wastes.

5.2.3.1 Administrative Requirements

Every Occupier of an institution generating, collecting, receiving, storing, transporting, treating, disposing and/or handling Bio-Medical Waste

³⁴³ *Ibid.*

³⁴⁴ *Ibid.*

³⁴⁵ *Ibid.*

in any other manner, shall make an application in Form I for authorization.³⁴⁶ Annual reporting by every Occupier/Operator, maintenance of records by authorized persons and accident reporting by authorized persons whenever necessary are also laid down. However, it is observed that vast majorities (72.68%) of Occupiers are unauthorised to function in terms of Bio-Medical Waste Management³⁴⁷ and even greater majorities (90.84%) do not maintain any records³⁴⁸ and hence there is very little information related to the generation, collection, reception, storage, transportation, treatment, disposal and/or any form of handling of Bio-Medical Waste . Further, no accidents have been reported till date in prescribed format to the prescribed authority³⁴⁹. In respect of mandatory annual reporting, meant to be furnished to the prescribed authority by 31st January annually, only 12 of the 133 Occupiers under study (9.02%) had submitted such reports.³⁵⁰ The Goa State Pollution Control Board has not undertaken any measures due to non-receipt of such reports,³⁵¹ even though the Central Pollution Control Board has to be compulsorily be intimated by 31st March annually.³⁵²

³⁴⁶ Except such Occupier of clinics, dispensaries, pathological laboratories, blood banks providing treatment/service to less than 1000 (one thousand) patients per month. However, almost all respondent Occupiers stated having provided service to above 1000 patients per month.

³⁴⁷ See para 4.6.2.10 at p. 169.

³⁴⁸ See para 4.6.2.11 at p. 170.

³⁴⁹ See para 4.6.2.12 at p. 172.

³⁵⁰ Refer Table 4.26 at p. 171.

³⁵¹ See para 4.6.2.13. at p. 172.

³⁵² *Supra* note 317 at p. 172.

5.2.3.2 Segregation and Transportation

Segregation, packaging, transportation and storage are equally important in the management and handling of Bio-Medical Waste. Segregation is the first step and it is clearly prescribed that Bio-Medical Waste should not be mixed with other wastes. In the rules laid down for segregation, Schedule II prescribes a certain type of container with a particular colour coding to be adopted and Schedule III prescribes the symbols to be used on such containers.³⁵³ However, alarming amounts (85.58%) of Occupiers do not segregate wastes in accordance with the rules of segregation³⁵⁴ and equally high amounts (81.79%) do not observe the colour coding scheme³⁵⁵.

The rules also laid down that in case of transportation, containers shall also carry information prescribed in Schedule IV and such vehicle used in transportation has to be authorized.³⁵⁶ Further, untreated Bio-Medical Waste should not be stored for more than a period of 48 hours at the premises, unless it is unavoidable and with permission being sought by the authorized person from the prescribed authority.³⁵⁷ Almost all the Occupiers responded as failing to comply with the rules regarding transportation of untreated wastes (95.99%) which includes the label for transportation and authorized vehicles³⁵⁸ and relatively small numbers (8.73%) responded to having kept

³⁵³ See Rule 6; BWM Rules, 1998.

³⁵⁴ See para 4.6.2.5 at p. 161.

³⁵⁵ See para 4.6.2.7 at p. 164.

³⁵⁶ See Rule 6(4); BWM Rules, 1998.

³⁵⁷ See Rule 6(5); BWM Rules, 1998.

³⁵⁸ See para 4.6.2.8 at p. 166.

untreated Bio-Medical Waste on the premises beyond the stipulated period of 48 hours.³⁵⁹

Lastly, the role of the municipality in picking up duly treated Bio-Medical Waste is provided for in Rule 6(6) of the BWM Rules. However, the information provided by the Chief Officers of municipal bodies identified, that the municipal bodies collect wastes from all the healthcare institutions in their jurisdiction and carry the same to a disposal site for dumping, where all wastes were collectively disposed and that they were not aware if the same were treated wastes, shows the failure of this particular Rule.³⁶⁰

5.2.3.3 Treatment and Disposal of Bio-Medical Wastes

The methods of treatment and disposal of Bio-Medical Wastes are the main aspects of these Rules. Schedule I has laid down the categories of wastes and their methods of treatment while the scientific standards for operating technical instruments like incinerators, autoclaves and microwaves are prescribed in Schedule V. For the purpose of abiding by Schedule I, which prescribes the various ways by which treatment of Bio-Medical Wastes must be undertaken, the Occupier must possess certain specified facilities like autoclaves or microwaves³⁶¹. However, majority of the Occupiers

³⁵⁹ See para 4.6.2.9 at p. 168.

³⁶⁰ See para 4.4.3 at p. 151.

³⁶¹ Incineration has never been a compulsory option due to high cost factor involved.

(59.56%)³⁶² did not even possess autoclaves or microwaves amongst all Talukas in the State.³⁶³

As for the other mandatory facilities required to treat Bio-Medical Wastes as per the Rules, about half the number (49.75%) of Occupiers³⁶⁴ did not have deep burial pits³⁶⁵ and about one-third (33.21%) of the Occupiers³⁶⁶ did not have shredders, which are required to mutilate and prevent unauthorized re-use and surprisingly about one-third (33.79%) of the Occupiers³⁶⁷ did not even use the prescribed standard of disinfectants,³⁶⁸ which to a great extent exposes primarily, the first-hand personnel to great risks of infection.

According to Schedule VI of the BWM Rules, a time-frame was envisaged for the use of Bio-Medical Waste treatment facilities of incineration, microwaving and autoclaving system. The notified date therein at the latest for any type of healthcare establishments was the 31st December 2002. The researcher commenced his study in the year 2005, almost three years after the said date and the information gathered therefore in respect of lack of preparedness to deal with Bio-Medical Wastes is even more disturbing.

³⁶² See para 4.6.2.2 at p. 157.

³⁶³ It is a different matter whether the existing autoclaves and microwaves comply with standards prescribed in Schedule V of BWM Rules, 1998.

³⁶⁴ See para 4.6.2.1 at p. 155.

³⁶⁵ This option is available to all Occupiers in the State of Goa since none of the town have a population exceeding 5 lakhs.

³⁶⁶ See para 4.6.2.3 at p. 158.

³⁶⁷ See para 4.6.2.4 at p. 160.

³⁶⁸ 1% Sodium hypochlorite solution or an equivalent, to ensure disinfection.

5.2.4 Employee Education and Suitability

As far as the findings drawn on Employee Education and Suitability are concerned, of the three aspects, viz. whether the respondent³⁶⁹ has undergone any training programme on hospital waste management; whether the hospital provides annual education on waste management for an employee and whether the concerned respondent would like to attend a programme on hospital waste management, the first two aspects again show a poor level of employee education since a very large segment (88%) of respondents have not undergone any training on waste management³⁷⁰ and an equally large (80%) number reported that their healthcare setting does not have any annual education programme on waste management.³⁷¹ There is however some consolation in observing that a majority (85%) of them were interested in attending a programme on Bio-Medical Waste Management³⁷² and it shows their willingness to contribute to a hygienic environment in their healthcare establishments.

5.2.5 Employee Attitude Assessment

Findings as to assessment of the attitude of the respondents yielded very significant results. Safe management of healthcare waste was agreed to be an issue by a majority (80%) of the respondents,³⁷³ which goes to show its importance within the work structure. Since 57% of the respondents were of

³⁶⁹ See para 4.6.3 at p. 173.

³⁷⁰ *Ibid.*

³⁷¹ *Ibid.*

³⁷² *Ibid.*

³⁷³ See para 4.6.4 at p. 174.

the view that it is the responsibility of the government,³⁷⁴ the study concludes that the respondents recognize that it is for the State of Goa to take necessary measures to tackle issues and concerns related to the study. It is well established that the State has been entrusted with the function of protection of various rights, including being a guardian of the environment. The almost total agreement (92%) that this is an issue involving team work³⁷⁵ also strengthens the argument that an agenda like Bio-Medical Waste Management needs a holistic approach with each individual in the link having its own functional role. About half (47%) of the respondents believing that safe management efforts will increase the financial burden³⁷⁶ is an unfortunate finding since the healthcare settings, specially privately owned have used their establishments for maximizing profits and need to allocate appropriately towards this agenda. The Government not allocating enough funds in the budgetary heads should not be an issue in private healthcare settings. As far as public sector undertakings are concerned, the tax payers are entitled to be free from the ills of the mismanagement of Bio-Medical Waste. As for the 36% of them that felt that it is an extra burden on work,³⁷⁷ this is typical work culture in the service sector, which should be tackled by the concerned managements of establishments, with punitive measures befitting the violators of sound and healthy waste management practices.

³⁷⁴ *Ibid.*

³⁷⁵ *Ibid.*

³⁷⁶ *Ibid.*

³⁷⁷ *Ibid.*

5.3 Bio-Medical Waste Management Rules

Having completed a detailed evaluation of Bio-Medical Waste Management in the State of Goa in the light of the BWM Rules, the findings of which are contained in the Third Chapter, a critical evaluation of the BWM rules themselves is also absolutely necessary in the context of the hypothesis postulated in this study. For this purpose, the content of the relevant rules have been examined and the need for having such rules in their existing form, has been ascertained, giving reasons for the same.

India has been a pioneer in the South Asian Region to have a legal control of Bio-Medical Waste Management, known as the Bio-Medical Waste (Management and Handling) Rules, 1998 as they are the first of its kind of national law in the whole of South-East Asian region. However, since national legislation is the only basis for improving healthcare waste management practices in any country, there should be a clear foresight of the enforcement of the provisions, even before the law is enacted. Unfortunately, the Indian law failed to have such a foresight and it even failed to come up to the standard prescribed by the WHO, for example, having alternatives to incineration.³⁷⁸

Activities in connection with treatment or immunization of animals as also research activities and testing of biologicals are included in the definition of Bio-Medical Waste.³⁷⁹ Therefore the definition seeks to include wastes

³⁷⁸ <http://www.who.int/mediacentre/factsheets/fs281/en/index.html> visited on 4.4.2008. Alternatives to incineration are required mainly due to possibility of combustion below 800 °C, which causes release dioxins and furans, harmful to human health.

³⁷⁹ See Sec. 3(5); BWM Rules, 1998.

from veterinary institutions, animal houses and research centres. However, in common parlance, Bio-Medical Wastes are most often referred to as hospital waste or healthcare waste and consequently, would not include wastes from research activities and veterinary care. Therefore these wastes being outside the strict mainstream of Bio-Medical Waste as commonly understood, the definition of Bio-Medical Waste ought to have excluded these aspects. A separate categorization of these wastes should have been done since such wastes are scientifically bio-medical in nature and their ill-effects can be harmful.

The Rule that is made applicable to the 'Occupier of an institution' that generates Bio-Medical Waste³⁸⁰ gives a direction to it that all steps are to be taken to handle such waste without any adverse effect to 'human health and the environment'.³⁸¹ This provision is very generally worded and does not specifically provide 'Dos' and 'Donts' so as to avoid the adverse effects above referred.

As far as the treatment and disposal of various categories of Bio-Medical Wastes are concerned, Schedule I of the Rules provide for several modes of treatment and disposal options. Amongst these Rules, there is mention about setting up of incinerator or any other alternative mechanism in a hospital.³⁸² The Pollution Control Board is not equipped with enough infrastructures to check each and every incinerator of a hospital in relation to

³⁸⁰ See Rule 4; BWM Rules, 1998.

³⁸¹ *Ibid.*

³⁸² None of the Occupiers in the State of Goa are compelled to incinerate, since deep burial is an option when the population in the town is less than five lakhs, which it is, in all towns.

its operation and emission standards as provided in Schedule V.³⁸³ Strangely, the rules even imposed deadlines regarding setting up of incinerators amongst any other methods,³⁸⁴ even after they had been discarded by western countries.³⁸⁵ Besides, in the use of incineration, there is reportedly emission of dioxins and furans, which are carcinogenic³⁸⁶.

In a hospital environment, technologies like incineration fail because untrained janitor staffs run them. The incinerator should be used at its optimum level otherwise the waste may not be treated properly. In most of the surveys carried out, incinerators run at temperatures lower than those specified in the rules and due to this poor operation and maintenance, these incinerators do not destroy the waste, need a lot of fuel to run, and are often out of order. When every hospital uses an incinerator, it is underutilized since the amount of infectious waste of a single hospital is not sufficient for the optimum use of the machine, thereby leading improper treatment of Bio-Medical Waste. Therefore on the whole, it is not feasible for every hospital to use an incinerator and it is preferable to have centralized incinerators instead.

The Rules provide that treated Bio-Medical Wastes are to be picked up and transported by municipal bodies as also segregated non bio-medical solid

³⁸³ Rule 5; Bio-Medical Waste (Management and Handling) Rules, 1998. See also *Med waste Update* vol. 6 No. 3, October 2002; In Delhi 21 hospitals have incinerators. Most of the hospitals did not have pollution control devices nor could provide information regarding frequency of emission testing. *Srishiti*, an NGO conducted the survey of 16 medical incinerators in Delhi hospitals during July to September, 2002.

³⁸⁴ See Schedule VI; BWM Rules, 1998.

³⁸⁵ The New York law relating to medical waste provides an option to businessman who generates medical waste can treat the medical waste or some one else can do it for them. This means that the Act does not impose setting up of any treatment system.

³⁸⁶ A descriptive term, for things capable of causing cancer. Carcinogens are cancer-causing substances or agents.

waste.³⁸⁷ There are no means to distinguish with an absolute precision between the two types of wastes. A small carelessness of throwing a syringe or a needle contaminated by infectious waste will pose great danger as the waste which is assumed to be non bio-medical solid waste could in fact be infectious waste as a result. Therefore this Rule is not at all feasible as utmost care is required while segregating and findings reveal that the required standard of care is not present. Hence this Rule requires reconsideration to ensure the objectives of segregation since, as of now, segregation of the Bio-Medical Waste into specific categories of Bio-Medical Waste and storage in different colour coded containers is not being implemented to an appreciable extent, as observed.³⁸⁸

There is a specific direction in the Rules that the maximum permissible period of storage of untreated Bio-Medical Waste is 48 hours.³⁸⁹ The question here is as to how the authorities ensure compliance with this rule when there is no technology to test this period of 48 hours in respect of such wastes. The authorities also do not have any designated officials to undertake surprise inspections in this regard. Apparently, the only way left for the authorities is to rely on the statement of the hospital staff, which speaks of the weakness of this Rule.

At present the Rules are concentrating only upon the hospitals in the objective of treatment and disposal of Bio-Medical Wastes. This is evident upon perusal of the Rule that directs all Occupiers of institutions handling

³⁸⁷ See Rule 6(6); BWM Rules, 1998.

³⁸⁸ See Rule 6(2); BWM Rules, 1998.

³⁸⁹ See Rule 6(5); BWM Rules, 1998.

Bio-Medical Wastes in different ways to apply for grant of authorisation, but excludes specifically Occupier of clinics, dispensaries, pathological laboratories, blood banks providing treatment/service to less than 1000 (one thousand) patients per month. Firstly, the prescribed authority has no means to verify the number of patients provided with services in these apparently 'smaller' Occupiers. Secondly, while it is true that medical practitioners and dental clinics generate small quantities of Bio-Medical Waste when compared to the hospitals, the numbers of such medical practitioners and dental clinics is getting enormously huge and all these result in huge quantities of Bio-Medical Waste being generated³⁹⁰. There is an inherent policy contradiction in these Rules, since on the one hand, the Rules require all medical practitioners to safely handle Bio-Medical Wastes,³⁹¹ on the other hand the Rules keep outside their purview smaller Occupiers, even though they collectively contribute significantly to the quantum of Bio-Medical Wastes generated. Therefore, the law is at present concentrating on medium and large polluters and leaving aside the marginal polluters, which are great in number and which in effect outweigh other polluters.³⁹² As the rules exist, it is not within the Rules for the State of Goa to bring each and every medical practitioner under its purview.

³⁹⁰ Such smaller Occupiers will evade seeking authorization claiming that they provide service to less than 1000 patients a month. Also, several surgeons carry out minor surgical interventions and follow up post-operative care in their clinics involving sizeable volumes of several categories of Bio-Medical Waste.

³⁹¹ See Rule 4; BWM Rules, 1998.

³⁹² See para 4.2.3 at p. 146.

The Rules mention that the Central or the relevant State or Union territory Pollution Control Boards as the prescribed authority.³⁹³ However these Boards are already over-stressed because of lack of infrastructure, manpower and technical power to implement the existing legislative requirements.³⁹⁴ New responsibilities of this kind have certainly put added pressure on Boards and in turn have resulted in poor implementation.³⁹⁵ An analysis of the Rules vis-à-vis their implementation portrays the total lack of preparedness on the part of the State of Goa, in terms of both infrastructure and skill.

The Rules should have devoted attention towards establishment of common treatment sites which includes incinerator or autoclave, shredder and an engineered pit despite the fact that the Occupier/Operator has the potential and the means to handle the same. Instead, these Rules are generally notified for every Operator to be equipped with the requisite facilities.

The law relating to Bio-Medical Waste Management should play an important role in curbing the menace of mismanagement and the bio-medical Rules have to face to such challenges in order to strengthen regulation.³⁹⁶ The fear of punishment for contravention of the Rules seems illusory and meaningless as much enforcement of penal provisions under the Environment

³⁹³ See Rule 7; BWM Rules, 1998.

³⁹⁴ <http://www.oHeraldo.in/news/Local%20News/Govt-to-set-up-trade-zones-for-recyclable-waste-soon/36401.html> visited on 3.3.2008

³⁹⁵ See para 4.4.2 at p. 150.

³⁹⁶ Kenneth J. Warren, *Hospitals, EPA Join Forces To Deal With Pollutants*, The Legal Intelligencer, Philadelphia, Aug 16 (2001).

(Protection) Act, 1986 has not been done.³⁹⁷ In view of this, regulation of bio- medical waste presents significant challenges.

The scenario of Bio-Medical Waste demands better management. The present rules appear ineffective to manage the volumes of Bio-Medical Waste. Law has stumbled in performing its duty; much of attribute from the lack of proper implementation mechanism. Although the law relating to Bio-Medical Waste Management is in infant stage, the time has come to act seriously and implement the rules effectively. Greater commitment is required on the part of the Government looking into the magnitude of the problem. The regulatory body should be strengthened. There is certainly a need to re-look at the rules.

5.4 Towards a Goa-Specific Law for Bio-Medical Waste Management

Primarily, the prevalent rules on the subject of Bio-Medical Waste Management owe their existence to The Environment (Protection) Act, 1986 - the parent Act. Therefore these rules are in the nature of 'Delegated Legislation' and do not amount to 'Supreme Legislation'. Consequently, the force of legislation is not present in these rules independent of the force of the parent Act. Therefore, in the event of amendment of areas of the parent legislation, the rules will be also faced with the same treatment. In the given circumstances, the researcher feels that considering the healthcare scenario of

³⁹⁷ *Supra* note 394 at p. 200.

the State of Goa and the Bio-Medical Waste Management practices, there is a need for the Legislature of the State of Goa to enact legislation for the purpose of independently managing and handling such wastes in an effective manner. The researcher has therefore examined the legal basis by which such a law can be enacted in the light of the Constitution of India and suggested a comprehensive law for the purpose of Bio-Medical Waste Management in the State of Goa.

5.4.1 Directive Principles of State Policy

Part IV of the Constitution contains provisions from Article 36 to Article 51, which are Directive Principles of State Policy which the framers of the Constitution included as goals or aspirations to embody the concept of a welfare State.³⁹⁸ These principles are fundamental in the governance of the country and it shall be duty of the State to apply these principles in making laws.³⁹⁹ Even though it has been laid down that the provisions contained in Part IV shall not be enforceable by any Court,⁴⁰⁰ these principles have been held to supplement fundamental rights in achieving a Welfare State. Parliament can amend the fundamental rights for implementing these directives, so long as the amendment does not touch the basic features.⁴⁰¹ Article 47 states that it is the duty of the State to improve public health as

³⁹⁸ *Keshavananda Bharati v. State of Kerala* AIR 1973 SC 1461.

³⁹⁹ Art. 37, Constitution of India.

⁴⁰⁰ *Ibid.*

⁴⁰¹ *Chandra Bhavan v. State of Mysore* AIR 1970 SC 2042.

amongst its primary duties.⁴⁰² The inclusion of Article 48A by amendment⁴⁰³ provides for the protection and improvement of the environment and safeguarding forests and wild life by the State. It is established law laid down by the Supreme Court of India⁴⁰⁴ that this Directive Principle is to be read along with Article 21⁴⁰⁵ and Article 51 A (g).⁴⁰⁶ It is therefore submitted that the Constitutional mandate is very clear for the State to protect the environment.

5.4.2 Constitutional Imperatives

The legislative relations or distribution of legislative powers between the Centre and the States is provided for in Part XI of the Constitution of India and it provides for the Legislature of the State to make law for the whole or any part of the State.⁴⁰⁷ It provides further, in Article 246(3) that the Legislature of the State has exclusive power to make laws for such a State or any part thereof with respect to any of the matters enumerated in List II in the Seventh Schedule of the Constitution of India.⁴⁰⁸ The researcher further submits that since Entry No. 6 of List II is on the subject of Public health and sanitation; hospitals and dispensaries, the Legislature of the State of Goa has legislative competence in enacting Legislation for the management of Bio-Medical Waste generated from any establishment within its territorial limits.

⁴⁰² Amongst other duties of raising the level of nutrition and the standard of living.

⁴⁰³ The Constitution (Forty-second Amendment) Act, 1976

⁴⁰⁴ In *Subhash Kumar v. State of Bihar* AIR 1991 SC 420.

⁴⁰⁵ This is a fundamental right under Part III which protects life and personal liberty.

⁴⁰⁶ This is a fundamental duty contained in Part IVA of the Constitution of India, inserted by The Constitution (Forty-second Amendment) Act, 1976.

⁴⁰⁷ Article 245 of Constitution of India, 1950.

⁴⁰⁸ It is referred to as the State List and contains a total of 66 entries.

5.4.3 Thrust Areas of the Proposed Legislation

This study proposes a specific Legislation for an effective management of Bio-Medical Wastes in the State of Goa. The requisites of the said proposed Legislation are keeping in mind the Goan experience in the field evaluated by the researcher. After having enumerated the imperative Constitutional aspects in this regard, this study has culminated by an attempt being made to draft a Bill for this purpose, which contains the legal requisites of a model Legislation in this regard.⁴⁰⁹ The Schedules relating to ways and means of treatment of different kinds of Bio-Medical Waste and other related aspects like types of containers and standards of treatment are the scientific aspects and need to be drafted in consultation with experts in the field. Likewise, the requisite Forms are to be made available in accordance with the requirements.

5.4.3.1 Need for Clarity in Definitions

Before any improvement can be made in Bio-Medical Waste Management, consistent and scientifically based definitions must be established as to what is meant by Bio-Medical Waste and its components, and all other aspects of the Legislation that are required for the effective management of Bio-Medical Waste. Since the primary goal of 'managing' Bio-Medical Wastes from healthcare facilities is to prevent the accidental spread of disease, then it must first be acknowledged that there is only a small

⁴⁰⁹ See draft of proposed The Goa Bio-Medical Waste Management Bill, 2010 in Annexure-4 at p. 300

percentage of the Bio-Medical Waste stream that is contaminated in a manner that renders it capable of transmitting disease. Therefore, the definitions in the legislation have to be precise and focused on that small vulnerable percentage in particular.⁴¹⁰

5.4.3.2 Focus Primarily on Segregation of Bio-Medical Waste

The current Bio-Medical Waste Management practices observed at many healthcare establishments in the State of Goa is that all wastes, potentially infectious, general and hazardous chemical materials are all mixed together as they are generated, collected, transported and finally disposed of.⁴¹¹ As a result of this failure to establish and follow segregation protocols and infrastructure, the waste leaving healthcare institutions, as a whole is both potentially infectious and hazardous and at greatest risk are the workers who handle the wastes (hospital subordinate staff, municipal workers and rag-pickers).

The risk to the general public is secondary and occurs in three ways:

- (i) accidental exposure from contact with wastes at municipal disposal bins;
- (ii) exposure to chemical or biological contaminants in water;
- (iii) Exposure to chemical pollutants (e.g., mercury, dioxins) from incineration of the wastes.

⁴¹⁰ Bio-Medical Waste could be 'risk' waste, which is infectious and 'general' which is non-infectious. Contaminated sharps like syringes are the most vulnerable in this regard.

⁴¹¹ See para 4.6.2.5 at p. 161.

Hospitals are currently burning wastes or dumping wastes in municipal bins which are transported to unsecured dumps.⁴¹² No matter what final strategy for treatment and disposal of wastes is selected, it is critical that wastes are segregated at the point of generation prior to treatment and disposal. This most important step must be taken to safeguard the occupational health of healthcare workers.

If proper segregation is achieved through training, clear standards, and tough enforcement, then resources can be turned to the management of the small portion of the waste stream needing special treatment. This is not to minimize the need for resources to be allocated for assisting with segregation. Training, proper containers, signs, and protective gear for workers are all necessary components of this process to ensure that segregation takes place and is maintained. Undoubtedly, the beginning of the problem is where the waste itself arises and the focus is on the doctor, the nurse and the concerned subordinate staff. Therefore the Law has to address the issue of segregation at source, including standards to be maintained and their enforcement.

5.4.3.3 Need for Instituting a 'Sharps' Management System

Of the Bio-Medical Waste stream that is potentially infectious or hazardous, the most immediate threat to human health (patients, workers and public) is the indiscriminate disposal of sharps (needles, syringes, lancets, and other invasive tools), even though it constitutes the smallest fraction of these

⁴¹² See para 4.4.3 at p. 151.

wastes.⁴¹³ Almost 85% of sharp injuries are caused between their usage and subsequent disposal and more than 20% of those that handle them encounter 'stick' injuries.⁴¹⁴ Proper segregation of these materials in rigid, puncture proof containers which are then monitored for safe treatment and disposal is the highest priority for any healthcare institution. Risk of disease transmission from Bio-Medical Waste will be solved to a large extent when proper 'sharps' management is instituted in all healthcare facilities.

A secure accounting and collection system for transporting the contaminated 'sharps' for treatment and disposal of Bio-Medical Waste and proper training of all hospital personnel on management and handling of 'sharps' and personal protection needs to be emphasised in the Legislation in accordance with the guidelines formulated by the specialized Committee constituted by the Ministry of Environment & Forests (MoEF) for implementation of the BWM Rules.⁴¹⁵

5.4.3.4 Ensure Secure Collection and Transportation

The benefits of segregation are realised when there is secure internal and external collection and transportation systems for Bio-Medical Waste. Bio-Medical Wastes are to be segregated at the point of generation and should not be mixed together by labourers as they collect it, else the value of segregation will be lost. The real concern of hospital administrators is to

⁴¹³ Sharps constitute only 0.7% of total Bio-Medical Wastes. See Fig. 1.(ii) at p. 12.

⁴¹⁴ Yadav Mukesh; *Hospital Waste – A Major Problem*; J K Practitioner; 2001; 8(4); 276.

⁴¹⁵ Kaushal Anoop K; *Safe Management of Bio-Medical Sharps Waste in India*; Lawyers Update; July 2009.

prevent the reuse of medical devices, containers and equipment after disposal and this should be taken into account in a legislative scheme. In addition, the practice of cleaning and reselling, syringes, needles, medicine vials and bottles, is not well documented but appears to have enough evidence to indicate that it is a serious concern.⁴¹⁶ Items that could potentially be reused illegitimately must be either rendered unusable after their use, like cutting needles, puncturing i.v. sets, etc. Legislative measures to that effect need to be considered.

5.4.3.5 Setting up a Bio-Medical Waste Management Team

The aim of proper Bio-Medical Waste disposal is to stop spread of infection among the hospital staff, relatives attending the hospital, rag-pickers and public at large. Therefore, the most important step in the scheme will be setting up of the Waste Management Team or an Infection Control Committee and the formulation of rules to prevent the spread of infection. This team needs to be constituted in order to be responsible for the implementation of the Waste Management Programme (WMP) in the healthcare establishments. The members of this team should include the Waste Manager,⁴¹⁷ Infection Control Nurse, Housekeeping In-Charge, one Senior Doctor and a Microbiologist.

⁴¹⁶ There is need to understand the risk that unsecured waste disposal systems have. It has been observed that street vendors selling used latex gloves, or using cidex (a disinfectant used in hospitals in the State of Goa but regulated as a pesticide in the US) containers to hold water for making tea.

⁴¹⁷ It is suggested to have a full-time appointee who will be responsible for all activities relating the management and handling of Bio-Medical Wastes, including handling communications from Governmental authorities, monitoring problems related to such wastes and maintaining all required permits and documentation.

Legislation should indicate the typical functions of this Team or Committee including preparing facility-specific environmental/waste management policies, conducting (or hiring a consultant to perform) a waste assessment or audit, reviewing and analyzing the assessment, applicable regulations, assessment and reduction tools and available waste management technologies, communicating the plan to the staff, public monitoring, communicating the progress of the project and evaluating the success of the waste reduction project results.

5.4.3.6 Record Keeping

Effective Bio-Medical Waste Management requires accurate record keeping of all aspects of the programme to document and ensure compliance, assess expenditures and evaluate minimization efforts. The written waste management policy should identify those staff responsible for record keeping. The important information that should be recorded and for which provision needs to be included in the proposed Legislation includes:

(i) Amount and types of waste generated by each department and by the entire hospital;

(ii) Direct costs for supplies and materials used for collection, transport, storage, treatment, disposal, decontamination, cleaning and training;

(iii) All labour costs associated with waste management including training costs;

(iv) Cost for prevention and treatment of waste-related injuries and illnesses and associated costs of the technology. Provision

5.4.3.7 Educate, Train and Ensure Worker Safety

Workers who handle hospital wastes are at greatest risk from exposure to the potentially infectious wastes and chemical hazardous wastes. This process starts with the clinical workers at which stage generation of Bio-Medical Wastes commences. It is seen that many such workers handle wastes without proper knowledge of the exposure risks.⁴¹⁸ This includes the workers who collect and transport the wastes through the hospital or who take the waste to municipal bins, the municipal workers who collect wastes at the municipal bins and transport it to city dumping sites, and the rag-pickers, who represent the informal waste management sector, but play an important role in reducing the amount of waste destined for ultimate disposal. Whether rag-pickers are considered as part of the formal system or not, they are integrally involved in waste management and their unique role and personal safety and health needs to be considered.

Proper education and training must be offered to all workers beginning with Doctors till the subordinate staff to ensure an understanding of the risks that wastes pose, how to protect themselves, and how to manage wastes

⁴¹⁸ See para 4.6.3 at p. 173.

(especially how to properly segregate). Education and training programs must be developed which speak to each segment of the system in a way specific to each category and there is need for legislative provisions in this regard.

5.4.3.8 Bio-Medical Waste Audit

This is the final step in the waste management programme. No waste management programme can succeed or proceed without a waste audit. A medical waste audit is a periodic assessment of the waste management programme that must be undertaken by the waste manager in order to determine the extent to which the waste management action programme has been initiated and the related goals achieved. This waste audit can be conducted at anytime, every six months. This audit acts as a control function and helps to identify the possible areas, where mistakes are taking place and serves as a basis for taking corrective action. Legislation needs to have a provision for such an audit for the effective management of Bio-Medical Wastes.

5.4.3.9 Appointment of Bio-Medical Waste Management Inspector

In order to ensure effective management of Bio-Medical Wastes, the main concern will always be the enforcement of the legislative provisions. Therefore, there is need for the State Government to appoint an Inspector in this regard, whose powers and duties, like entry into healthcare establishments without notice to ensure compliance of the legislative

provisions are also specifically laid down in the enactment. The enactment also needs to provide for the duties of the healthcare waste establishment managements in respect of cooperating with the Inspector in order that he may carry out his functions in an effective manner.

5.4.3.10 Bio-Medical Waste Management Authority

An authority is proposed to be constituted under the legislation which oversees the implementation of the provisions of this Law. Such an authority should consist of a Chairperson, who is qualified and competent to head such an authority. The members can be from other related areas and from other stakeholders in the system. There can be one representative from the discipline of law, one representative of the Association of Nursing Homes, one Senior Scientist, either a Microbiologist or Bio-Chemist from a research organization and one representative of an NGO in the field of environment. This body should have the power to examine the applications for the purpose of granting authorisation to healthcare establishments generating, treating and/or transporting Bio-Medical Wastes. An appellate authority needs to be appointed by the State Government to enable the aggrieved establishments to have redressal in respect of non-grant of such authorisation.

5.4.3.11 Offences and Penalties

The Legislation needs to recognise the failure or contravention to comply with the provisions of the Legislation by treating the same as an

Offence and impose punishments in the nature of stringent fines. In case of continued failure or contravention within a period of one year of conviction, imprisonment terms need to be imposed.

5.5 Effective Bio-Medical Waste Management: Action Plan

In addition to drafting the requisites of model legislation for Bio-Medical Waste Management, the researcher has conceptualized an action plan for such management. This calls for the implementation of the waste management programme, which involves the managerial process of planning, organizing, implementing and control. The purpose of solving any problem requires a thorough understanding of the working scenario of the healthcare establishment. It is suggested by this study that the contents of legislative provisions⁴¹⁹, necessary Schedules in the legislation⁴²⁰ along with this action plan can be compiled into a Manual which can be called the 'Green Book',⁴²¹ which could be made mandatory for every healthcare establishment to possess as a referral guide and to comply with the provisions of Law.

This study also revealed the need to indicate guidelines to the healthcare establishments to ensure that Bio-Medical Waste Management is carried out in the most efficient manner. These guidelines are as follows:

⁴¹⁹ Suggested by this study as seen in para 5.4 at p. 201.

⁴²⁰ Like those pertaining to scientific standards for treating wastes by identified processes; forms for applications etc.

⁴²¹ As seen in the case of the 'Red Book' pertaining to the Import and Export (Control) Act, 1947.

5.5.1 Top Management to take Initiatives

The waste management process should begin with the top management. The Chairman, Board of Directors, General Managers should be committed towards the implementation of the programme, because without their support it is difficult to acquire the resources, manpower and time to implement this change. These authorities must take notice of the current happenings within the institution and develop a waste management program that best suits the need of the hospital.

The next step that the top management needs to do is to decide whether to call expertise from outside to provide the necessary consultancy and training to the employees or make use of the in-house expertise. Generally, it is preferred to call external qualified expertise because employees in the organization are not competent enough to manage on their own, since the activity of waste management is a specialised activity in comparison with what the employees are regularly practicing.

The cost of construction, operation and maintenance of systems for managing Bio-Medical Waste represents a significant part of the overall budget of the hospital if the BWM Rules, 1998 are to be implemented in their true spirit. There are two types of costs – internal, which involves cost of segregation, mutilation, disinfection, internal storage and hidden cost of protective equipment and external, which involves off-site transport of waste, treatment and final disposal.⁴²²

⁴²² Rao S. K. M. et. al; *Bio-Medical Waste Management : An Infrastructural Survey of Hospitals* ; MJAFI, Vol. 60, No. 4, 2004.

5.5.2 Decide Purchase Policy

Incorporating waste reduction criteria in purchasing practices will immediately reduce the amount of waste entering the facility. The purchasing department should lay down criteria such as reusable packaging and products with recyclable content, such as paper instead of plastics, as a prerequisite in the purchasing decisions. The hospitals must encourage vendors to minimize the amount of packaging used to protect their products or seek suppliers that offer products with minimal packaging. This is because majority of the waste produced in the hospitals is associated with packaging.

As regards the purchase of 'sharps', it should be borne in mind that after use, they constitute the most hazardous form of waste in the ultimate Bio-Medical Waste stream. To control their flow in this waste stream, it is necessary to exercise a strict purchase policy on 'sharps' such as needles, and injections only in the required quantities and from reputed suppliers, irrespective of high costs. This will curtail waste arising from defective supplies, which are in addition to the 'sharps' waste arising out of actual use.

So also, establishing clear guidelines for product purchase that emphasizes on waste reduction will keep problems related to waste to a minimum. New emphasis needs to be put on waste reduction of hazardous materials. For example, Bio-Medical Waste Management would benefit from a policy of a phase out of mercury-based products and technologies. Digital and electronic technology is available to replace mercury-based diagnostic

tools. This is called 'substitution' and is a purchasing and investment decision. Since there is no capacity in most countries to safely manage mercury wastes, this reduction policy will make a serious contribution to cleaning up the hospital Waste stream. This is one example wherein reduction strategies which could be identified and implemented in the State of Goa.

5.5.3 Choose the Treatment Technology

Healthcare institutions in the State of Goa, including hospitals, clinics, doctors and dentists generate a tremendous amount of waste in the course of treating patients.⁴²³ They generate 'regulated medical waste' or infectious waste, hazardous chemical waste, recyclable, reusable and solid waste. In order to fulfil the medical ethics of 'to do no harm', it is the responsibility of the healthcare industry to create and implement waste disposal policy for all of these Waste streams that include worker safety, public health, environment considerations as well as regulatory compliance.⁴²⁴ Fulfilling this ethic also calls for a cultural shift to consider disposal technologies and services as part of a total waste management system. This system should include 'upstream waste management'⁴²⁵ and the proper, accountable operation of all disposal equipment and post-treatment technology management. Healthcare establishments should strive towards non-burn technologies as an alternative.

⁴²³ See Fig. 4 (xii) at p. 147 and para 4.5 at p. 153.

⁴²⁴ Such compliance can only be achieved by legislative measures. There has been an attempt to draft a Bill for model legislation in this regard in Annexure-4 at p. 300.

⁴²⁵ A term used for elimination of some and minimization of some wastes, reuse and recycling of others.

These are basically into three categories: chemical, high heat (plasma torch, pyrolysis) and Low heat (autoclaving, microwaving, hryooclaving).⁴²⁶

5.5.4 Invest in Equipments for Reprocessing of Supplies

The science of the reprocessing of equipment and materials for reuse in medical facilities is well established in India and should be supported in the State of Goa too. Professional healthcare associations should be urged to firmly support judicious reuse of materials, and should begin to set standards for reprocessing. Maintenance of this effort within hospitals will provide quality products and thwart efforts to increase reliance on disposables. Disposables are costly, increase waste generation, and do not necessarily provide for decrease in infection rates in hospitals. A reprocessing industry must however be supported with investment in proper equipment and training so that it is carried on in a safe and efficient manner.

5.5.5 Invest in Environmentally Sound Waste Treatment and Disposal Technologies

The rush to incinerate medical waste in countries around the world as an ultimate solution to a problem without definition is doing great injustice to the community, the public health of its people, and the environment. Of the several recommendations made, it is no accident in giving attention to treatment technologies.

⁴²⁶ McRae Glenn; *Medical Waste Treatment Strategies and Technologies: A Basic Overview for Developing Countries*; SPREG Waigani Convention Handbook.

Choices of treatment technologies should be made in line with a clear knowledge of the Waste stream to be managed and the goal to be achieved through treatment. If the technology is to be environmentally sound, the Waste stream should be able to be treated (disinfected) without creating other hazardous by-products.

If the overall goal of waste management is to prevent disease transmission from waste products, then the emphasis should be placed on the 'management' aspect of the process and not on the 'technological fix'. Technology should fit the situation and work in the management system to achieve the final goal as part of the overall system, not as a replacement for the system. Technology choices will be made to meet local needs and conditions and cannot be uniformly applied throughout a state or country.

5.5.6 Develop Plans and Policies

To ensure continuity and clarity in these management practices, healthcare establishments should develop clear plans and policies for the proper management and disposal of wastes.⁴²⁷ They need to be integrated into routine employee training, continuing education, and hospital management evaluation processes for systems and personnel. In certain countries a set of standards on the "Environment of Care" which includes plans and policies for the proper management of hazardous materials and

⁴²⁷ Healthcare establishments can be accorded accreditation on a periodic basis which should be linked to their renewal license.

workers' safety, is developed, without which a hospital cannot be accredited.⁴²⁸

Every healthcare establishment should have a clear plan to tackle emergencies related to waste management. Hospital managements should be prepared for unexpected hazardous waste situations such as accident spills, equipment failures, delays or interruptions in waste collection, transport, treatment services or any other incident that requires rapid action and decision making.⁴²⁹ As much as possible, such emergencies should be addressed in the hospital management plan, which should include a notification system, disinfectants to be used and documentation of action to be taken. Such aspects should be part of the waste management policy as well as the employee's training.

5.6 Conclusions

The solution of environmental pollution on Bio-Medical Waste Management solicits concerted multi-disciplinary endeavours. Therefore proper environmental health requires the co-operation and service of public health and medical professionalism apart from educating people about the menace. As far as policy and legal framework, the relevant provisions should provide for the respective standards, formalities and procedures to be

⁴²⁸ In the U.S. the Joint Commission for the Accreditation of Health Care Organizations has been developing this strategy. The US EPA rule requires that hospitals develop waste management plans, a requirement that many states have had on the books for several years. Municipal governments or state governments could require waste management plans from all hospitals as a condition for operating.

⁴²⁹ Kewalramani Neera; *Bio-Medical Waste Management* in Smartdoc Desktop Reference Manual; Association of Medical Consultants, 1st Edition, Sep 2005.

complied by all people concerned. However, it is crucial to understand that despite enunciation of law dealing with pertinent standards, formalities and procedures as detailed above, unless appropriate efforts are made to translate the same into action, law will remain more on paper; an act of futility, when it comes to achieving the contemplated objective in practice. This is the precise reason why, appropriately structured and customized strategies need to be identified for the purpose of meaningful implementation of the Law.

One such strategy is the effective dissemination of provisions of law among those who are either directly or indirectly obligated under the Act for its proper implementation. Inclusion of Bio-Medical Waste Management component in the curriculum of medical, dental and nursing courses will contribute towards improvement. The environmental issue is slowly gaining ground in the Indian society. This is because environmental problems affect each and every individual thus resulting in substantial awareness at all levels. The younger generation must be entrusted with this task since they are the future of the country. The Bio-Medical Waste Management is certainly an environmental issue and therefore, proper training must be given to the people, who will be directly responsible for its management. Therefore, it is important to include Bio-Medical Waste Management in the curriculum of courses above referred. This is because doctors, dental surgeons and nurses are directly responsible for the supervision and handling of the Bio-Medical Waste and they are directly handling such waste in their routine jobs.

Educating the general public about the potential hazards about Bio-Medical Waste is also very important. The cooperation of the people is a must to ensure proper treatment of Bio-Medical Waste. The education of the public should begin in the hospitals, where nurses, who regularly come in contact with the patients, can educate them about Bio-Medical Waste especially diabetic patients, who regularly use insulin injections and then simply throw the infected injections in the dustbin. However, the most important category that must receive education is the private clinics, medical testing centres and small hospitals, which individually generate wastes in smaller quantities but cumulatively, the waste generation is substantial and significant.

It is time that hospitals and other medical institutions realized the importance of managing and treating Bio-Medical Waste in a safe and non-hazardous manner that can prevent the spread of pathogens and microbial infections into our environment and society.

The State of Goa needs to wake up to this problem as quickly as possible and confront it with courage and determination. This requires greater investment in the healthcare technology to improve the quality of its management systems. However, what it first needs is awareness about the magnitude of this problem. Awareness can be brought about by NGOs who are aware and have the capability to educate others. The Government of Goa in this regard can offer financial help to these NGOs to carry out the necessary awareness and training operations required by the hospitals. The

corporate sector too can contribute a great deal by developing innovative technologies and manufacturing environment friendly products.

It is the ethical and social responsibility of healthcare professionals to control the process of disposal of dangerous wastes of hospital. It is the duty of the State, Legislators, Healthcare establishments and the general public to make sure that environmentally acceptable Bio-Medical Waste disposal is introduced and implemented effectively. Though it is the moral duty of medical professionals to see that hazardous wastes are systematically processed and disposed, it is the duty of the State of Goa to introduce effective legal machinery for the purpose.

It can therefore be stated that social regulation can be achieved through the establishment of norms of conduct and the creation of required legal machinery along with accompanying empowerment on the authority. Law serves as one of the key instruments of such social regulation. Therefore it is essential for developing a legal frame work on the management of Bio-Medical Waste and implementation of the same thought an effective medium for sustainable development. This needs an integrative character highlighting consensus planning, policy and procedure which are not considered inimical to the social norms. Therefore a judicious balance between environment protection and Bio-Medical Waste Management is the need of the hour.

Apart from this research being helpful to Legislators, academicians and other stakeholders, citizens living in the State of Goa too have benefited and can contribute towards management of Bio-Medical Wastes. These

citizens can spread awareness among other people and put pressure on the healthcare establishments to adopt safe waste management practices. Citizens must write to the healthcare units, wherever and whenever they visit them and remind the concerned managements about safe management of Bio-Medical Wastes. Besides, observations regarding improper management of Bio-Medical Wastes can also be reported to the State Government in writing to the concerned authorities.

If the desired results are still not forthcoming, the press and the media can always be approached for they have a great role to play in the protection of rights, which is why they are referred to as the 'fourth estate'. Hopefully this will result in the Judiciary taking cognisance of the plight of Bio-Medical Waste Management in the State and play the activist role, as always. These are some of the few measures expected from every reader of this research work, who has the onus of passing on to future generations an environment friendly and healthy space on this planet.⁴³⁰ It takes only a little effort of every educated Indian to help one's country, one's society, one's environment and finally and most importantly, oneself!

⁴³⁰ Inter-generational equity is where each generation has the right to inherit the same level of environmental bliss enjoyed by previous generations and to an equitable access to the use and benefits of these resources. At the same time, the present generation is a custodian of the planet for future generations, obliged to conserve this legacy so that future generations may also enjoy these same rights, called the Public Trust doctrine.

Appendix - 1

Questionnaire for Occupiers

1. Healthcare setting:

- | | |
|-------------------------------------|--------------------------|
| 1) Medical College-Hospital. | <input type="checkbox"/> |
| 2) Private Hospital / Nursing Home. | <input type="checkbox"/> |
| 3) Community Health Centre. | <input type="checkbox"/> |
| 4) Primary Health Centre. | <input type="checkbox"/> |
| 5) Laboratories / Blood Bank. | <input type="checkbox"/> |
| 6) Dental Clinic. | <input type="checkbox"/> |
| 7) Dispensary. | <input type="checkbox"/> |
| 8) Others. _____ | |

2. a) Person interviewed:

- | | |
|------------------------|--------------------------|
| A. Medical authorities | <input type="checkbox"/> |
| B. Doctor | <input type="checkbox"/> |
| C. Nurse | <input type="checkbox"/> |
| D. Auxiliary Staff | <input type="checkbox"/> |

b) Education

- | | |
|--------------------|--------------------------|
| A. Post Graduation | <input type="checkbox"/> |
| B. Graduation | <input type="checkbox"/> |
| C. Secondary | <input type="checkbox"/> |
| D. Primary | <input type="checkbox"/> |
| E. Illiterate | <input type="checkbox"/> |

3. a) Age. _____

b) Sex (M /F)

4. What is the quantity of waste generated every day in your healthcare setting?

Waste Management Policy:

5. Are you aware of any legislation/rules applicable to the hospital waste management?

Yes No

If yes, please list the legislative act/rules

6. Does your healthcare setting have a waste management plan?

Yes No

7. Are there waste management responsibilities in the-job descriptions of hospital supervisory staff (Head of hospital, Department Heads, Nursing Superintendent, Pharmacist, Lab Supervisor etc)

Yes No

8. Are you aware of authorisation?

Yes No

If yes, when it is it required?

Waste Management Practices:

9. Tick the facilities available for Waste Management –

Segregation	Containment	Deep Burial	Burning	Autoclave	Incineration

10. Should waste be segregated into different categories?

Yes No

If yes, who does the segregation?

1. Doctor
2. Nursing Assistant
3. Auxiliary staff
4. Do not Know

11. Do you color code the waste for disposal?

Yes No

If yes, match the following

Yellow	Puncture proof Plastic Bag Container	Incinerator / Deep Burial
Red	Plastic Bag	Disposal Landfill
Blue / White	Plastic Bag	Autoclave / Microwave
Black	Disinfected container Plastic-Bag	Autoclave / Microwave

12. Is the infection waste labeled with the Bio-Hazard Symbol?

Yes No

13. Where do you dispose Bio-Medical Waste?

1. Dumping in corporation bin
2. House to Rouse Waste Collection
3. Any authorised hospital waste collection
4. Any other specify _____

14. Do you maintain a register for waste disposal?

Yes No

15. Has your healthcare setting done a waste audit in last three years?

Yes No

Employee education:

16. Have you undergone any training programme on hospital waste management?

Yes No

17. Does your hospital provide annual education on waste management for employee?

Yes No

18. Would you like to attend a programme on Hospital Waste- Management?

Yes No

Attitude Assessment

	Agree	Disagree	No comment
19. a) Safe management of healthcare waste is not an issue at all.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) State management of healthcare waste is the responsibility of government.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Waste management is team work / no single class of people is responsible for safe management.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Safe Management Efforts by Hospitals Increased financial burden on Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Self Management of Healthcare Waste is An extra burden on work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Thank you for your cooperation

Appendix - 2

Questionnaire for Enforcement Authorities**Part I - Preliminary statistical data relating to State of Goa:****Number of Occupiers:**

a. Hospitals	...	...
b. Nursing homes	...	...
c. Clinics/dispensaries	...	...
d. Path labs	...	...
e. Dental units	...	...
f. Blood banks	...	...
g. Veterinary institutions	...	...
h. Animal houses	...	...
i. Production units of biologicals	...	...
j. Research units of biologicals	...	...
k. Others	...	...

2. How many of above Occupiers have requisite treatment**facilities:**

- | | |
|--|-----|
| a. specify names, if few | ... |
| b. Number of common facilities, if any | ... |

- c. Position at GMC ...
- d. Other major hospitals ...
- e. Military hospital (Campal) ...

3. Number of Operators:

- a. Prior to 2007:
- b. Recent (in 2007):

Part – II Information about BMW Rules and role of Pollution Control

board:

- 1. Constitution of the board:
- 2. Number of officials overseeing enforcement:
(Designations/qualifications/expertise)
- 3. What is a pollution control committee? (Rule 7(1))
- 4. How does the board assess: (surprise check or routine monitoring?)
 - a. Treatment and disposal as per Sch I
 - b. Segregation as per Sch II(colour code)
 - c. Storage beyond 48 hrs as per Rule 6(5)
 - d. Any application under proviso for further delays? ...

- e. Feasibility when granting authorisations
 - f. Untreated waste being transported?
 - g. Standards under Sch V
5. Any cases of cancellations?
 6. What is the fee for application in Form I?
 7. Why the "less than 1000 patient per month clause" for Occupiers in Rule 8(1)?
 8. How is the number assessed?
 9. How is Bio-Medical Waste Management controlled in respect of others?
 10. Who is appellate body when authorization is refused?
 11. Is annual reporting rigorously followed?
 12. How many cases of accident reporting?
 13. Number of violators (approximate) in last 4-5 years:
 14. What penalties can the board impose?
 15. Can the board order closure of Occupier's unit?
 15. Has Rule 14 (common disposal) been enforced?

Part – III Information about civic bodies and role of pollution control board

1. Total number of Municipal bodies in the State:
2. Is their role mandatory under BMW rules - (In view of Rule 6(6))?
3. What about Village Panchayats? Their number:
4. Can action be taken by the board against civic bodies for lapses?

Part – IV Role of Non-governmental organizations (NGOs)/others:

1. What is their role? Have they contributed to ameliorating the scenario?
2. Any specific names?
3. Any other stakeholders? Their role?

Part – V Education in Bio-Medical Waste Management:

1. Training of medical and para-medical staff to handle wastes

2. Is there awareness/sensitisation of the rules through seminars, conferences etc?
3. Are there advertisements about hazards issued via press/media?
4. What about web based information? Who updates and how often?

Any other relevant information?

Thank you for your cooperation

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Annexure - 1**THE ENVIRONMENT (PROTECTION) ACT, 1986****No. 29 OF 1986**

[23rd May, 1986.]

An Act to provide for the protection and improvement of environment and for matters connected therewith:

WHEREAS the decisions were taken at the United Nations Conference on the Human Environment held at Stockholm in June, 1972, in which India participated, to take appropriate steps for the protection and improvement of human environment;

AND WHEREAS it is considered necessary further to implement the decisions aforesaid in so far as they relate to the protection and improvement of environment and the prevention of hazards to human beings, other living creatures, plants and property;

BE it enacted by Parliament in the Thirty-seventh Year of the Republic of India as follows:-

CHAPTER I**PRELIMINARY****1. SHORT TITLE, EXTENT AND COMMENCEMENT**

- (1) This Act may be called the Environment (Protection) Act, 1986.
- (2) It extends to the whole of India.
- (3) It shall come into force on such date as the Central Government may, by notification in the Official Gazette, appoint and different dates may be appointed for different provisions of this Act and for different areas.

2. DEFINITIONS

In this Act, unless the context otherwise requires,--

- (a) "environment" includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property;
- (b) "environmental pollutant" means any solid, liquid or gaseous substance present in such concentration as may be, or tend to be, injurious to environment;

- (c) "environmental pollution" means the presence in the environment of any environmental pollutant;
- (d) "handling", in relation to any substance, means the manufacture, processing, treatment, package, storage, transportation, use, collection, destruction, conversion, offering for sale, transfer or the like of such substance;
- (e) "hazardous substance" means any substance or preparation which, by reason of its chemical or physico-chemical properties or handling, is liable to cause harm to human beings, other living creatures, plant, micro-organism, property or the environment;
- (f) "occupier", in relation to any factory or premises, means a person who has, control over the affairs of the factory or the premises and includes in relation to any substance, the person in possession of the substance;
- (g) "prescribed" means prescribed by rules made under this Act.

CHAPTER II

GENERAL POWERS OF THE CENTRAL GOVERNMENT

3. POWER OF CENTRAL GOVERNMENT TO TAKE MEASURES TO PROTECT AND IMPROVE ENVIRONMENT

- (1) Subject to the provisions of this Act, the Central Government shall have the power to take all such measures as it deems necessary or expedient for the purpose of protecting and improving the quality of the environment and preventing controlling and abating environmental pollution.
- (2) In particular, and without prejudice to the generality of the provisions of subsection (1), such measures may include measures with respect to all or any of the following matters, namely:--
 - (i) co-ordination of actions by the State Governments, officers and other authorities-
 - (a) under this Act, or the rules made thereunder, or
 - (b) under any other law for the time being in force which is relatable to the objects of this Act;
 - (ii) planning and execution of a nation-wide programme for the prevention, control and abatement of environmental pollution;
 - (iii) laying down standards for the quality of environment in its various aspects;

(iv) laying down standards for emission or discharge of environmental pollutants from various sources whatsoever:

Provided that different standards for emission or discharge may be laid down under this clause from different sources having regard to the quality or composition of the emission or discharge of environmental pollutants from such sources;

(v) restriction of areas in which any industries, operations or processes or class of industries, operations or processes shall not be carried out or shall be carried out subject to certain safeguards;

(vi) laying down procedures and safeguards for the prevention of accidents which may cause environmental pollution and remedial measures for such accidents;

(vii) laying down procedures and safeguards for the handling of hazardous substances;

(viii) examination of such manufacturing processes, materials and substances as are likely to cause environmental pollution;

(ix) carrying out and sponsoring investigations and research relating to problems of environmental pollution;

(x) inspection of any premises, plant, equipment, machinery, manufacturing or other processes, materials or substances and giving, by order, of such directions to such authorities, officers or persons as it may consider necessary to take steps for the prevention, control and abatement of environmental pollution;

(xi) establishment or recognition of environmental laboratories and institutes to carry out the functions entrusted to such environmental laboratories and institutes under this Act;

(xii) collection and dissemination of information in respect of matters relating to environmental pollution;

(xiii) preparation of manuals, codes or guides relating to the prevention, control and abatement of environmental pollution;

(xiv) such other matters as the Central Government deems necessary or expedient for the purpose of securing the effective implementation of the provisions of this Act.

(3) The Central Government may, if it considers it necessary or expedient so to do for the purpose of this Act, by order, published in the Official Gazette, constitute an authority or authorities by such name or names as may be specified in the order for the purpose of exercising and performing such of the powers and functions

(including the power to issue directions under section 5) of the Central Government under this Act and for taking measures with respect to such of the matters referred to in sub-section (2) as may be mentioned in the order and subject to the supervision and control of the Central Government and the provisions of such order, such authority or authorities may exercise and powers or perform the functions or take the measures so mentioned in the order as if such authority or authorities had been empowered by this Act to exercise those powers or perform those functions or take such measures.

4. APPOINTMENT OF OFFICERS AND THEIR POWERS AND FUNCTIONS

(1) Without prejudice to the provisions of sub-section (3) of section 3, the Central Government may appoint officers with such designation as it thinks fit for the purposes of this Act and may entrust to them such of the powers and functions under this Act as it may deem fit.

(2) The officers appointed under sub-section (1) shall be subject to the general control and direction of the Central Government or, if so directed by that Government, also of the authority or authorities, if any, constituted under sub-section (3) of section 3 or of any other authority or officer.

5. POWER TO GIVE DIRECTIONS

Notwithstanding anything contained in any other law but subject to the provisions of this Act, the Central Government may, in the exercise of its powers and performance of its functions under this Act, issue directions in writing to any person, officer or any authority and such person, officer or authority shall be bound to comply with such directions.

*Explanation--*For the avoidance of doubts, it is hereby declared that the power to issue directions under this section includes the power to direct--

- (a) the closure, prohibition or regulation of any industry, operation or process; or
- (b) stoppage or regulation of the supply of electricity or water or any other service.

6. RULES TO REGULATE ENVIRONMENTAL POLLUTION

(1) The Central Government may, by notification in the Official Gazette, make rules in respect of all or any of the matters referred to in section 3.

(2) In particular, and without prejudice to the generality of the foregoing power, such rules may provide for all or any of the following matters, namely:--

- (a) the standards of quality of air, water or soil for various areas and purposes;
- (b) the maximum allowable limits of concentration of various environmental pollutants (including noise) for different areas;
- (c) the procedures and safeguards for the handling of hazardous substances;
- (d) the prohibition and restrictions on the handling of hazardous substances in different areas;
- (e) the prohibition and restriction on the location of industries and the carrying on process and operations in different areas;
- (f) the procedures and safeguards for the prevention of accidents which may cause environmental pollution and for providing for remedial measures for such accidents.

CHAPTER III

PREVENTION, CONTROL, AND ABATEMENT OF ENVIRONMENTAL POLLUTION

7. PERSONS CARRYING ON INDUSTRY OPERATION, ETC., NOT TO ALLOW EMISSION OR DISCHARGE OF ENVIRONMENTAL POLLUTANTS IN EXCESS OF THE STANDARDS

No person carrying on any industry, operation or process shall discharge or emit or permit to be discharged or emitted any environmental pollutants in excess of such standards as may be prescribed.

8. PERSONS HANDLING HAZARDOUS SUBSTANCES TO COMPLY WITH PROCEDURAL SAFEGUARDS

No person shall handle or cause to be handled any hazardous substance except in accordance with such procedure and after complying with such safeguards as may be prescribed.

9. FURNISHING OF INFORMATION TO AUTHORITIES AND AGENCIES IN CERTAIN CASES

(1) Where the discharge of any environmental pollutant in excess of the prescribed standards occurs or is apprehended to occur due to any accident or other unforeseen act or event, the person responsible for such discharge and the person in charge of the place at which such discharge occurs or is apprehended to occur shall be bound to prevent or mitigate the environmental pollution caused as a result of such discharge and shall also forthwith--

(a) intimate the fact of such occurrence or apprehension of such occurrence;

and

(b) be bound, if called upon, to render all assistance,

to such authorities or agencies as may be prescribed.

(2) On receipt of information with respect to the fact or apprehension on any occurrence of the nature referred to in sub-section (1), whether through intimation under that sub-section or otherwise, the authorities or agencies referred to in sub-section (1) shall, as early as practicable, cause such remedial measures to be taken as necessary to prevent or mitigate the environmental pollution.

(3) The expenses, if any, incurred by any authority or agency with respect to the remedial measures referred to in sub-section (2), together with interest (at such reasonable rate as the Government may, by order, fix) from the date when a demand for the expenses is made until it is paid, may be recovered by such authority or agency from the person concerned as arrears of land revenue or of public demand.

10. POWERS OF ENTRY AND INSPECTION

(1) Subject to the provisions of this section, any person empowered by the Central Government in this behalf shall have a right to enter, at all reasonable times with such assistance as he considers necessary, any place--

(a) for the purpose of performing any of the functions of the Central Government entrusted to him;

(b) for the purpose of determining whether and if so in what manner, any such functions are to be performed or whether any provisions of this Act or the rules made thereunder or any notice, order, direction or authorisation served, made, given or granted under this Act is being or has been complied with;

(c) for the purpose of examining and testing any equipment, industrial plant, record, register, document or any other material object or for conducting a search of any building in which he has reason to believe that an offence under this Act or the rules made thereunder has been or is being or is about to be committed and for seizing any such equipment, industrial plant, record, register, document or other material object if he has reason to believe that it may furnish evidence of the commission of an offence punishable under this Act or the rules made thereunder or that such seizure is necessary to prevent or mitigate environmental pollution.

(2) Every person carrying on any industry, operation or process of handling any hazardous substance shall be bound to render all assistance to the person empowered by the Central Government under sub-section (1) for carrying out the functions under that sub-section and if he fails to do so without any reasonable cause or excuse, he shall be guilty of an offence under this Act.

(3) If any person wilfully delays or obstructs any persons empowered by the Central Government under sub-section (1) in the performance of his functions, he shall be guilty of an offence under this Act.

(4) The provisions of the Code of Criminal Procedure, 1973, or, in relation to the State of Jammu and Kashmir, or an area in which that Code is not in force, the provisions of any corresponding law in force in that State or area shall, so far as may be, apply to any search or seizures under this section as they apply to any search or seizure made under the authority of a warrant issued under section 94 of the said Code or as the case may be, under the corresponding provision of the said law.

11. POWER TO TAKE SAMPLE AND PROCEDURE TO BE FOLLOWED IN CONNECTION THEREWITH

(1) The Central Government or any officer empowered by it in this behalf, shall have power to take, for the purpose of analysis, samples of air, water, soil or other substance from any factory, premises or other place in such manner as may be prescribed.

(2) The result of any analysis of a sample taken under sub-section (1) shall not be admissible in evidence in any legal proceeding unless the provisions of sub-sections

(3) and (4) are complied with.

(3) Subject to the provisions of sub-section (4), the person taking the sample under sub-section (1) shall--

- (a) serve on the occupier or his agent or person in charge of the place, a notice, then and there, in such form as may be prescribed, of his intention to have it so analysed;
- (b) in the presence of the occupier or his agent or person, collect a sample for analysis;
- (c) cause the sample to be placed in a container or containers which shall be marked and sealed and shall also be signed both by the person taking the sample and the occupier or his agent or person;
- (d) send without delay, the container or the containers to the laboratory established or recognised by the Central Government under section 12.

(4) When a sample is taken for analysis under sub-section (1) and the person taking the sample serves on the occupier or his agent or person, a notice under clause (a) of sub-section (3), then,--

- (a) in a case where the occupier, his agent or person wilfully absents himself, the person taking the sample shall collect the sample for analysis to be placed in a container or containers which shall be marked and sealed and shall also be signed by the person taking the sample, and
- (b) in a case where the occupier or his agent or person present at the time of taking the sample refuses to sign the marked and sealed container or containers of the sample as required under clause (c) of sub-section (3), the marked and sealed container or containers shall be signed by the person taking the samples, and the container or containers shall be sent without delay by the person taking the sample for analysis to the laboratory established or recognised under section 12 and such person shall inform the Government Analyst appointed or recognised under section 12 in writing, about the wilfull absence of the occupier or his agent or person, or, as the case may be, his refusal to sign the container or containers.

12. ENVIRONMENTAL LABORATORIES

(1) The Central Government may, by notification in the Official Gazette,--

- (a) establish one or more environmental laboratories;

(2) If the failure or contravention referred to in sub-section (1) continues beyond a period of one year after the date of conviction, the offender shall be punishable with imprisonment for a term which may extend to seven years.

16. OFFENCES BY COMPANIES

1) Where any offence under this Act has been committed by a company, every person who, at the time the offence was committed, was directly in charge of, and was responsible to, the company for the conduct of the business of the company, as well as the company, shall be deemed to be guilty of the offence and shall be liable to be proceeded against and punished accordingly:

Provided that nothing contained in this sub-section shall render any such person liable to any punishment provided in this Act, if he proves that the offence was committed without his knowledge or that he exercised all due diligence to prevent the commission of such offence.

(2) Notwithstanding anything contained in sub-section (1), where an offence under this Act has been committed by a company and it is proved that the offence has been committed with the consent or connivance of, or is attributable to any neglect on the part of, any director, manager, secretary or other officer of the company, such director, manager, secretary or other officer shall also be deemed to be guilty of that offence and shall be liable to be proceeded against and punished accordingly.

Explanation--For the purpose of this section,--

(a) "company" means any body corporate and includes a firm or other association of individuals;

(b) "director", in relation to a firm, means a partner in the firm.

17. OFFENCES BY GOVERNMENT DEPARTMENTS

(1) Where an offence under this Act has been committed by any Department of Government, the Head of the Department shall be deemed to be guilty of the offence and shall be liable to be proceeded against and punished accordingly.

Provided that nothing contained in this section shall render such Head of the Department liable to any punishment if he proves that the offence was committed without his knowledge or that he exercise all due diligence to prevent the commission of such offence.

(2) Notwithstanding anything contained in sub-section (1), where an offence under this Act has been committed by a Department of Government and it is proved that the offence has been committed with the consent or connivance of, or is attributable to any neglect on the part of, any officer, other than the Head of the Department, such officer shall also be deemed to be guilty of that offence and shall be liable to be proceeded against and punished accordingly.

CHAPTER IV MISCELLANEOUS

18. PROTECTION OF ACTION TAKEN IN GOOD FAITH

No suit, prosecution or other legal proceeding shall lie against the Government or any officer or other employee of the Government or any authority constituted under this Act or any member, officer or other employee of such authority in respect of anything which is done or intended to be done in good faith in pursuance of this Act or the rules made or orders or directions issued thereunder.

19. COGNIZANCE OF OFFENCES

No court shall take cognizance of any offence under this Act except on a complaint made by--

- (a) the Central Government or any authority or officer authorised in this behalf by that Government, or
- (b) any person who has given notice of not less than sixty days, in the manner prescribed, of the alleged offence and of his intention to make a complaint, to the Central Government or the authority or officer authorised as aforesaid.

20. INFORMATION, REPORTS OR RETURNS

The Central Government may, in relation to its function under this Act, from time to time, require any person, officer, State Government or other authority to furnish to it or any prescribed authority or officer any reports, returns, statistics, accounts and other information and such person, officer, State Government or other authority shall be bound to do so.

**21. MEMBERS, OFFICERS AND EMPLOYEES OF THE AUTHORITY
CONSTITUTED UNDER SECTION 3 TO BE PUBLIC SERVANTS**

All the members of the authority, constituted, if any, under section 3 and all officers and other employees of such authority when acting or purporting to act in pursuance of any provisions of this Act or the rules made or orders or directions issued thereunder shall be deemed to be public servants within the meaning of section 21 of the Indian Penal Code (45 of 1860).

22. BAR OF JURISDICTION

No civil court shall have jurisdiction to entertain any suit or proceeding in respect of anything done, action taken or order or direction issued by the Central Government or any other authority or officer in pursuance of any power conferred by or in relation to its or his functions under this Act.

23. POWERS TO DELEGATE

Without prejudice to the provisions of sub-section (3) of section 3, the Central Government may, by notification in the Official Gazette, delegate, subject to such conditions and limitations as may be specified in the notifications, such of its powers and functions under this Act [except the powers to constitute an authority under sub-section (3) of section 3 and to make rules under section 25] as it may deem necessary or expedient, to any officer, State Government or other authority.

24. EFFECT OF OTHER LAWS

(1) Subject to the provisions of sub-section (2), the provisions of this Act and the rules or orders made therein shall have effect notwithstanding anything inconsistent therewith contained in any enactment other than this Act.

(2) Where any act or omission constitutes an offence punishable under this Act and also under any other Act then the offender found guilty of such offence shall be liable to be punished under the other Act and not under this Act.

25. POWER TO MAKE RULES

(1) The Central Government may, by notification in the Official Gazette, make rules for carrying out the purposes of this Act.

(2) In particular, and without prejudice to the generality of the foregoing power, such rules may provide for all or any of the following matters, namely--

- (a) the standards in excess of which environmental pollutants shall not be discharged or emitted under section 7;
- (b) the procedure in accordance with and the safeguards in compliance with which hazardous substances shall be handled or caused to be handled under section 8;
- (c) the authorities or agencies to which intimation of the fact of occurrence or apprehension of occurrence of the discharge of any environmental pollutant in excess of the prescribed standards shall be given and to whom all assistance shall be bound to be rendered under sub-section (1) of section 9;
- (d) the manner in which samples of air, water, soil or other substance for the purpose of analysis shall be taken under sub-section (1) of section 11;
- (e) the form in which notice of intention to have a sample analysed shall be served under clause (a) of sub section.(3) of section 11;
- (f) the functions of the environmental laboratories, the procedure for the submission to such laboratories of samples of air, water, soil and other substances for analysis or test; the form of laboratory report; the fees payable for such report and other matters to enable such laboratories to carry out their functions under sub-section (2) of section 12;
- (g) the qualifications of Government Analyst appointed or recognised for the purpose of analysis of samples of air, water, soil or other substances under section 13;
- (h) the manner in which notice of the offence and of the intention to make a complaint to the Central Government shall be given under clause (b) of section 19;
- (i) the authority of officer to whom any reports, returns, statistics, accounts and other information shall be furnished under section 20;
- (j) any other matter which is required to be, or may be, prescribed.

26. RULES MADE UNDER THIS ACT TO BE LAID BEFORE PARLIAMENT

Every rule made under this Act shall be laid, as soon as may be after it is made, before each House of Parliament, while it is in session, for a total period of thirty days which may be comprised in one session or in two or more successive sessions, and if, before the expiry of the session immediately following the session or the successive sessions aforesaid, both Houses agree in making any modification in the rule or both Houses agree that the rule should not be made, the rule shall thereafter have effect only in such modified form or be of no effect, as the case may be; so, however, that any such modification or annulment shall be without prejudice to the validity of anything previously done under that rule.

Annexure - 2
THE BIO-MEDICAL WASTE (MANAGEMENT AND HANDLING)
RULES, 1998

MINISTRY OF ENVIRONMENT & FORESTS

NOTIFICATION

New Delhi, 20th July, 1998

¹**S.O.630(E)**. - Whereas a notification in exercise of the powers conferred by Sections 6, 8 and 25 of the Environment (Protection) Act, 1986 (29 of 1986) was published in the Gazette vide S.O. 746(E), dated 16 October, 1997 inviting objections from the public within 60 days from the date of the publication of the said notification on the Bio-Medical Waste (Management and Handling) Rules, 1998 and whereas all objections received were duly considered;

Now, therefore, in exercise of the powers conferred by Section 6, 8 and 25 of the Environment (Protection) Act, 1986 the Central Government hereby notifies the rules for the management and handling of Bio-Medical Waste .

1. SHORT TITLE AND COMMENCEMENT

- (1) These rules may be called the Bio-Medical Waste (Management and Handling) Rules, 1998.
- (2) They shall come into force on the date of their publication in the official Gazette.

2. APPLICATION

These rules apply to all persons who generate, collect, receive, store, transport, treat, dispose, or handle Bio-Medical Waste in any form.

3. DEFINITIONS

In these rules unless the context otherwise requires:

1. "**Act**" means the Environment (Protection) Act, 1986 (29 of 1986);

¹ As published in Gazette of India, Extraordinary Part II Section 3- Sub section (ii), vide notification S.O.630(E), dated 20.7.1998.

2. "**Animal House**" means a place where animals are reared/kept for experiments or testing purposes;
 3. "**Authorisation**" means permission granted by the prescribed authority for the generation, collection, reception, storage, transportation, treatment, disposal and/or any other form of handling of Bio-Medical Waste in accordance with these rules and any guidelines issued by the Central Government.
 4. "**Authorised person**" means an Occupier or Operator authorised by the prescribed authority to generate, collect, receive, store, transport, treat, dispose and / or handle Bio-Medical Waste in accordance with these rules and any guidelines issued by the Central Government.
 5. "**Bio-Medical Waste**" means any waste, which is generated during the diagnosis, treatment or immunisation of human beings or animals or in research activities pertaining thereto or in the production or testing of biologicals, and including categories mentioned in Schedule I;
 6. "**Biologicals**" means any preparation made from organisms or micro-organisms or product of metabolism and biochemical reactions intended for use in the diagnosis, immunisation or the treatment of human beings or animals or in research activities pertaining thereto.
 7. "**Bio-Medical Waste treatment facility**" means any facility wherein treatment disposal of Bio-Medical Waste or processes incidental to such treatment or disposal is carried out ²[and includes common treatment facilities.]
- ³[(7a) '**Form**' means Form appended to these rules;]
8. "**Occupier**" in relation to any institution generating Bio-Medical Waste , which includes a hospital, nursing home, clinic dispensary, veterinary institution, animal house, pathological laboratory, blood bank by whatever name called, means a person who has control over that institution and/or its premises;

² Added by rule 2(i) of the Bio-Medical Waste (M & H)(Second Amendment) Rules, 2000 notified vide notification No. S.O.545(E), dated 2.6.2000 and came into force w.e.f.2.6.2000.

³ Inserted by Rule 2(ii) of the Bio-Medical Waste (M&H) (Second Amendment) rules, 2000 notified vide Notification No.S.O.545(E), dated 2.6.2000 and came into force w.e.f. 2.6.2000.

9. **"Operator of a Bio-Medical Waste facility"** means a person who owns or controls or operates a facility for the collection, reception, storage, transport, treatment, disposal or any other form of handling of Bio-Medical Waste ;
10. **"Schedule"** means schedule appended to these rules;

4. DUTY OF OCCUPIER

It shall be the duty of every Occupier of an institution generating Bio-Medical Waste which includes a hospital, nursing home, clinic, dispensary, veterinary institution, animal house, pathological laboratory, blood bank by whatever name called to take all steps to ensure that such waste is handled without any adverse effect to human health and the environment.

5. TREATMENT AND DISPOSAL

(1) Bio-Medical Waste shall be treated and disposed of in accordance with Schedule I, and in compliance with the standards prescribed in Schedule V.

(2) Every Occupier, where required, shall set up in accordance with the time-schedule in Schedule VI, requisite Bio-Medical Waste treatment facilities like incinerator, autoclave, microwave system for the treatment of waste, or, ensure requisite treatment of waste at a common waste treatment facility or any other waste treatment facility.

6. SEGREGATION, PACKAGING, TRANSPORTATION AND STORAGE

(1) Bio-Medical Waste shall not be mixed with other wastes.

(2) Bio-Medical Waste shall be segregated into containers/bags at the point of generation in accordance with Schedule II prior to its storage, transportation, treatment and disposal. The containers shall be labelled according to Schedule III.

(3) If a container is transported from the premises where Bio-Medical Waste is generated to any waste treatment facility outside the premises, the container shall, apart from the label prescribed in Schedule III, also carry information prescribed in Schedule IV.

(4) Notwithstanding anything contained in the Motor Vehicles Act, 1988, or rules thereunder, untreated Bio-Medical Waste shall be transported only in

such vehicle as may be authorised for the purpose by the competent authority as specified by the Government.

(5) No untreated Bio-Medical Waste shall be kept stored beyond a period of 48 hours :

provided that if for any reason it becomes necessary to store the waste beyond such period, the authorised person must take permission of the prescribed authority and take measures to ensure that the waste does not adversely affect human health and the environment.

⁴[(6) The Municipal body of the area shall continue to pick up and transport segregated non bio-medical solid waste generated in hospitals and nursing homes, as well as duly treated Bio-Medical Wastes for disposal at municipal dump site].

7. PRESCRIBED AUTHORITY

⁵[(1) ⁶[Save as otherwise provide, the prescribed authority for enforcement] of the provisions of these rules shall be the State Pollution Control Boards in respect of States and the Pollution Control Committees in respect of the Union Territories and all pending cases with a prescribed authority appointed earlier shall stand transferred to the concerned State Pollution Control Board, or as the case may be, the Pollution Control Committees].

⁷[(1A) The prescribed authority for enforcement of the provisions of these rules in respect of all healthcare establishments including hospitals, nursing homes, clinics, dispensaries, veterinary institutions, Animal houses, pathological laboratories and blood banks of the Armed Forces under the Ministry of Defence shall be the Director General, Armed Forces Medical Services].

(2) The prescribed authority for the State or Union Territory shall be appointed within one month of the coming into force of these rules.

(3) The prescribed authority shall function under the supervision and control of the respective Government of the State or Union Territory.

⁴ Inserted by Rule 3 of the Bio-Medical Waste (M & H) (Second Amendment) Rules, 2000 vide notification S.O.545(E), dated 2.6.2000.

⁵ Substituted by Rule 4 of the Bio-Medical Waste (M & H) (Second Amendment) Rules, 2000 vide notification S.O.545(E), dated 2.6.2000.

⁶ Substituted by Rule 2 (a) of the Bio-Medical Waste (M&H) (Amendment) Rules, 2003 vide notification S.O.1069 (E), dated 17.9.2003.

⁷ Inserted sub-rule (1A) by Rule 2(b), *ibid.*

(4) The prescribed authority shall on receipt of Form I make such enquiry as it deems fit and if it is satisfied that the applicant possesses the necessary capacity to handle Bio-Medical Waste in accordance with these rules, grant or renew an authorisation as the case may be.

(5) An authorisation shall be granted for a period of three years, including an initial trial period of one year from the date of issue. Thereafter, an application shall be made by the Occupier/Operator for renewal. All such subsequent authorisation shall be for a period of three years. A provisional authorisation will be granted for the trial period, to enable the Occupier/Operator to demonstrate the capacity of the facility.

(6) The prescribed authority may after giving reasonable opportunity of being heard to the applicant and for reasons thereof to be recorded in writing, refuse to grant or renew authorisation.

(7) Every application for authorisation shall be disposed of by the prescribed authority within ninety days from the date of receipt of the application.

(8) The prescribed authority may cancel or suspend an authorisation, if for reasons, to be recorded in writing, the Occupier/Operator has failed to comply with any provision of the Act or these rules:

Provided that no authorisation shall be cancelled or suspended without giving a reasonable opportunity to the Occupier/Operator of being heard.

8. AUTHORISATION

(1) Every Occupier of an institution generating, collecting, receiving, storing, transporting, treating, disposing and/or handling Bio-Medical Waste in any other manner, except such Occupier of clinics, dispensaries, pathological laboratories, blood banks providing treatment/service to less than 1000 (one thousand) patients per month, shall make an application in Form I to the prescribed authority for grant of authorisation.

(2) Every Operator of a Bio-Medical Waste facility shall make an application in Form I to the prescribed authority for grant of authorisation.

(3) Every application in Form I for grant of authorisation shall be accompanied by a fee as may be prescribed by the Government of the State or Union Territory.

⁸[(4) The authorisation to operate a facility shall be issued in Form IV, subject to conditions laid therein and such other condition, as the prescribed authority, may consider it necessary.]

9. ADVISORY COMMITTEE

⁹[(1)] The Government of every State/Union Territory shall constitute an advisory committee. The Committee will include experts in the field of medical and health, animal husbandry and veterinary sciences, environmental management, municipal administration, and any other related department or organisation including non-governmental organisations ¹⁰[***] . As and when required, the committee shall advise the Government of the State/Union Territory and the prescribed authority about matters related to the implementation of these rules.

¹¹[(2) Notwithstanding anything contained in sub-rule (1), the Ministry of Defence shall constitute in that Ministry, an Advisory Committee consisting of the following in respect of all healthcare establishments including hospitals, nursing homes, clinics, dispensaries, veterinary institutions, animal houses, pathological laboratories and blood banks of the Armed Forces under the Ministry of Defence, to advise the Director General, Armed Forces Medical Services and the Ministry of Defence in matters relating to implementation of these rules, namely:-

- (1) Additional Director General of
Armed Forces Medical Services Chairman
- (2) A representative of the Ministry of
Defence not below the rank of Deputy
Secretary, to be nominated by that Ministry Member
- (3) A representative of the Ministry of Environment
and Forests not below the rank of Deputy Secretary
to be nominated by that Ministry. Member
- (4) A representative of the Indian Society of

⁸ Inserted by Rule 5 of the Bio-Medical Waste (M&H) (Second Amendment) Rules, 2000 vide notification S.O.545(E), dated 2.6.2000.

⁹ Re-numbered as Sub Rule (1) by Rule 3 of the Bio Medical Waste (M&H) (Amendment) Rules, 2003 notified vide Notification No.S.O.1069(E), dated 17.9.2003.

¹⁰ Omitted by Rule 6 of the Bio-Medical Waste (151)(Second Amendment) Rules, 2000 vide notification S.O.545(E), dated 2.6.2000.

¹¹ Inserted sub Rule (2) by Rule 3 of the Bio Medical Waste (M&H) (Amendment) Rules, 2003 notified vide Notification No.S.O.1069(E), dated 17.9.2003.

Hospitals Waste Management, PuneMember]

¹²[9A. MONITORING OF IMPLEMENTATION OF THE RULES IN ARMED FORCES HEALTHCARE ESTABLISHMENTS

(1) The Central Pollution Control Board shall monitor the implementation of these rules in respect of all the Armed Forces healthcare establishments under the Ministry of Defence.

2) After giving prior notice to the Director General Armed Forces Medical Services, the Central Pollution Control Board along with one or more representatives of the Advisory Committee constituted under sub-rule (2) of rule 9 may, if it considers it necessary, inspect any Armed Forces healthcare establishments.]

10. ANNUAL REPORT

Every Occupier/Operator shall submit an annual report to the prescribed authority in Form II by 31 January every year, to include information about the categories and quantities of Bio-Medical Wastes handled during the preceding year. The prescribed authority shall send this information in a compiled form to the Central Pollution Control Board by 31 March every year.

11. MAINTENANCE OF RECORDS

(1) Every authorised person shall maintain records related to the generation, collection, reception, storage, transportation, treatment, disposal and/or any form of handling of Bio-Medical Waste in accordance with these rules and any guidelines issued.

(2) All records shall be subject to inspection and verification by the prescribed authority at any time.

12. ACCIDENT REPORTING

When any accident occurs at any institution or facility or any other site where Bio-Medical Waste is handled or during transportation of such waste, the

¹² Inserted Rule 9A by Rule 4 of the Bio Medical Waste (M&H) (Amendment) Rules, 2003 notified vide Notification No.S.O.1069(E), dated 17.9.2003.

authorised person shall report the accident in Form III to the prescribed authority forthwith.

13. APPEAL

¹³[(1)] ¹⁴[Save as otherwise provided in sub-rule (2), any person] aggrieved by an order made by the prescribed authority under these rules may, within thirty days from the date on which the order is communicated to him, prefer an appeal ¹⁵[in form V] to such authority as the Government of State/Union Territory may think fit to constitute:

provided that the authority may entertain the appeal after the expiry of the said period of thirty days if it is satisfied that the appellant was prevented by sufficient cause from filing the appeal in time.

¹⁶[(2) Any person aggrieved by an order of the Director General, Armed Forces Medical Services under these rules may, within thirty days from the date on which the order is communicated to him prefer an appeal to the Central Government in the Ministry of Environment and Forests.]

¹⁷[14. 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 Bio-Medical Wastes generated in the area under their jurisdiction and in 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, so as to comply with the provisions of these rules].

¹³ Re-numbered as sub-rule (1) by Rule 5 (a) of the Bio Medical Wastes (M&H) (Amendment) Rules, 2003 notified vide Notification No.S.O. 1069(E), dated 17.9.2003.

¹⁴ Substituted by Rule 5(a), *ibid*.

¹⁵ Inserted by Rule 7 of the Bio-Medical Waste(M & H) (Second Amendment) Rules, 2000 vide notification S.O.545 (E), dated 2.6.2000.

¹⁶ Inserted sub-rule (2) by Rule 5(b) of the Bio Medical Waste (M&H) (Amendment) Rules, 2003 notified vide Notification No.S.O.1069(E), dated 17.9.2003.

¹⁷ Inserted by Rule 8 of the Bio-Medical Waste (M&H) (Second Amendment) Rules, 2000 notified vide S.O.545(E), dated 2.6.2000.

SCHEDULE I

(See Rule 5)

CATEGORIES OF BIO-MEDICAL WASTE

¹⁸ [Waste Category No.]	Waste Category ¹⁹ [Type]	Treatment and Disposal ²⁰ [Option +]
Category No.1	Human Anatomical Waste (human tissues, organs, body parts)	Incineration [@] /deep burial*
Category No.2	Animal Waste (animal tissues, organs, body parts carcasses, bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals, colleges, discharge from hospitals, animal houses)	Incineration [@] /deep burial*
Category No.3	Microbiology & Biotechnology Wastes (Wastes from laboratory cultures, stocks or specimens of micro-organisms live or attenuated vaccines, human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes from production of biologicals, toxins, dishes and devices used for transfer of cultures)	Local autoclaving/micro-waving/incineration [@]
Category No.4	Waste sharps (needles, scalpels, syringes, blades, glass, etc. that may cause puncture and cuts. This includes both used and unused sharps)	Disinfection (chemical treatment) ^{@@} / Autoclaving/ microwaving and mutilation /shredding ^{##}

¹⁸ Substituted by Rule 9 (i) of the Bio-Medical Waste (M & H) (Second Amendment) Rules, 2000 notified vide S.O.545(E), dated 2.6.2000.

¹⁹ Added by Rule 9(ii), ibid.

²⁰ Substituted by Rule 9 (iii), ibid.

Category No.5	Discarded Medicines and Cytotoxic drugs (wastes comprising of outdated, contaminated and discarded medicines)	incineration [@] / destruction and drugs disposal in secured landfills
Category No.6	²¹ [Soiled] Waste (Items contaminated with blood, and body fluids including cotton, dressings, soiled plaster casts, lines beddings, other material contaminated with blood)	incineration @ autoclaving/ microwaving
Category No.7	Solid Waste (wastes generated from disposable items other than the waste ²² [sharps] such as tubings, catheters, intravenous sets etc.)	disinfection by chemical treatment@@ autoclaving/ microwaving and mutilation/shredding##
Category No.8	Liquid Waste (waste generated from laboratory and washing, cleaning, house-keeping and disinfecting activities)	disinfection by chemical treatment @@ and discharge into drains.
Category No.9	Incineration Ash (ash from incineration of any Bio-Medical Waste)	disposal in municipal landfill
Category No.10	Chemical Waste (chemicals used in production of biologicals, chemicals used in disinfection, as insecticides etc.)	Chemical treatment @@ and discharge into drains for liquids and secured landfill for solids

@@ Chemicals treatment using at least 1% hypochlorite solution or any other equivalent chemical reagent. It must be ensured that chemical treatment ensures disinfection.

²¹ Substituted by rule 9(iv), *ibid.*

²² Substituted by Rule 9 (v) of the Bio-Medical Waste (M & H) (Second Amendment) Rules, 2000 notified vide S.O.545(E), dated 2.6.2000.

- ## Mutilation/shredding must be such so as to prevent unauthorized reuse.
 - @ There will be no chemical pre-treatment before incineration. Chlorinated plastics shall not be incinerated.
 - * Deep burial shall be an option available only in towns with population less than five lakhs and in rural areas.
- ²³[+ Options given above are based on available technologies. Occupier/Operator wishing to use other State-of-the-art technologies shall approach the Central Pollution Control Board to get the standards laid down to enable the prescribed authority to consider grant of authorisation].

²³ Substituted by Rule 9 (iii) of the Bio-Medical Waste (M& H) (Second Amendment) Rules, 2000 notified vide S.O.545 (E), dated 2.6.2000.

SCHEDULE II

(see Rule 6)

COLOUR CODING AND TYPE OF CONTAINER FOR DISPOSAL OF BIO-MEDICAL WASTES

Colour Coding	Type of Container	Waste Category	Treatment options as per Schedule I
Yellow	Plastic bag	Cat.1, Cat. 2, Cat.3, Cat. 6	Incineration/deep burial
Red	Disinfected container/plastic bag	Cat. 3, Cat.6, Cat.7	Autoclaving/Microwaving/ Chemical Treatment
Blue/White translucent	Plastic bag/puncture proof container	Cat.4, Cat.7	Autoclaving/Microwaving/ Chemical Treatment and destruction/shredding
Black	Plastic bag	Cat.5 and Cat.9 and Cat.10 (Solid)	Disposal in secured landfill

Notes :

1. Colour coding of waste categories with multiple treatment options as defined in Schedule I, shall be selected depending on treatment option chosen, which shall be as specified in Schedule I.
2. Waste collection bags for waste types needing incineration shall not be made of chlorinated plastics.
3. Categories 8 and 10 (liquid) do not require containers/bags.
4. Category 3 if disinfected locally need not be put in containers/bags.

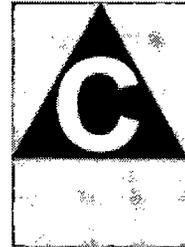
SCHEDULE III

(see Rule 6)

LABEL FOR BIO-MEDICAL WASTE CONTAINERS/BAGS

BIOHAZARD SYMBOL

CYTOTOXIC HAZARD



BIOHAZARD

CYTOTOXIC

HANDLE WITH CARE

Note: Label shall be non-washable and prominently visible.

SCHEDULE IV

(see Rule 6)

**LABEL FOR TRANSPORT OF BIO-MEDICAL WASTE
CONTAINERS/BAGS**

Day..... Month.....

Year

Date of generation.....

Waste category No.....

Waste Class

Waste description

Sender's Name & Address

Receiver's Name & Address

Phone No.....

Phone No.....

Telex No.....

Telex No.....

Fax No.....

Fax No.....

Contact Person.....

Contact Person.....

In case of emergency please contact:**Name & Address**

Phone No.

Note : Label shall be non-washable and prominently visible.

SCHEDULE V

(see Rule 5 and Schedule I)

**STANDARDS FOR TREATMENT AND DISPOSAL OF BIO-MEDICAL
WASTES****STANDARDS FOR INCINERATORS:**

All incinerators shall meet the following operating and emission standards:

A. Operating Standards

1. Combustion efficiency (CE) shall be at least 99.00%.
2. The Combustion efficiency is computed as follows:

$$\text{C.E.} = \frac{\% \text{CO}_2}{\% \text{CO}_2 + \% \text{CO}} \times 100$$

3. The temperature of the primary chamber shall be $800 \pm 50^\circ\text{C}$.
4. The secondary chamber gas residence time shall be at least 1 (one) second at $1050 \pm 50^\circ\text{C}$, with minimum 3% Oxygen in the stack gas.

B. Emission StandardsParameters Concentration mg/Nm³ at (12% CO₂ correction)

- | | |
|---|-----|
| (1) Particulate matter | 150 |
| (2) Nitrogen Oxides | 450 |
| (3) HCl | 50 |
| (4) Minimum stack height shall be 30 metres above ground. | |
| (5) Volatile organic compounds in ash shall not be more than 0.01%. | |

Note :

- Suitably designed pollution control devices should be installed/retrofitted with the incinerator to achieve the above emission limits, if necessary.
- Wastes to be incinerated shall not be chemically treated with any chlorinated disinfectants.
- Chlorinated plastics shall not be incinerated.
- Toxic metals in incineration ash shall be limited within the regulatory quantities as defined under the Hazardous Waste (Management and Handling) Rules, 1989.
- Only low sulphur fuel like L.D.O./L.S.H.S./Diesel shall be used as fuel in the incinerator.

STANDARDS FOR WASTE AUTOCLAVING:

The autoclave should be dedicated for the purposes of disinfecting and treating Bio-Medical Waste,

(I) When operating a gravity flow autoclave, medical Waste shall be subjected to:

- (i) a temperature of not less than 121°C and pressure of 15 pounds per square inch (psi) for an autoclave residence time of not less than 60 minutes; or
- (ii) a temperature of not less than 135°C and a pressure of 31 psi for an autoclave residence time of not less than 45 minutes; or
- (iii) a temperature of not less than 149°C and a pressure of 52 psi for an autoclave residence time of not less than 30 minutes.

(II) When operating a vacuum autoclave, medical Waste shall be subjected to a minimum of one pre-vacuum pulse to purge the autoclave of all air. The Waste shall be subjected to the following:

- (i) a temperature of not less than 121°C and pressure of 15 psi per an autoclave residence time of not less than 45 minutes ; or
- (ii) a temperature of not less than 135°C and a pressure of 31 psi for an autoclave residence time of not less than 30 minutes;

(III) Medical Waste shall not be considered properly treated unless the time, temperature and pressure indicators indicate that the required time, temperature and pressure were reached during the autoclave process. If for any reasons, time temperature or pressure indicator indicates that the required temperature, pressure or residence time was not reached , the entire load of medical waste must be

autoclaved again until the proper temperature, pressure and residence time were achieved.

(IV) Recording of operational parameters

Each autoclave shall have graphic or computer recording devices which will automatically and continuously monitor and record dates, time of day, load identification number and operating parameters throughout the entire length of the autoclave cycle.

(V) Validation test Spore testing:

The autoclave should completely and consistently kill approved biological indicator at the maximum design capacity of each autoclave unit. Biological indicator for autoclave shall be *Bacillus stearothermophilus* spores using vials or spore strips, with at least 1×10^4 spores per millilitre. Under no circumstances will an autoclave have minimum operating parameters less than a residence time of 30 minutes, regardless of temperature and pressure, a temperature less than 121°C or a pressure less than 15 psi.

(VI) Routine Test

A chemical indicator strip/tape that changes colour when a certain temperature is reached can be used to verify that a specific temperature has been achieved. It may be necessary to use more than one strip one strip over the waste package at different location to ensure that the inner content of the package has been adequately autoclaved.

STANDARDS FOR LIQUID WASTE :

The effluent generated from the hospital should conform to the following limits :

PARAMETERS	PERMISSIBLE LIMITS
pH	6.5-9.0
Suspended solids	100 mg/l
Oil and grease	10 mg/l
BOD	30 mg/l
COD	250 mg/l
Bio-assay test	90% survival of fish after 96 hours in 100% effluent

These limits are applicable to those hospitals which are either connected with sewers without terminal sewage treatment plant or not connected to public sewers.

For discharge into public sewers with terminal facilities, the general standards as notified under the Environment (Protection) Act, 1986 shall be applicable.

STANDARDS OF MICROWAVING:

1. Microwave treatment shall not be used for cytotoxic, hazardous or radioactive wastes, contaminated animal carcasses, body parts and large metal items.
2. The microwave system shall comply with the efficacy test/routine tests and a performance guarantee may be provided by the supplier before operation of the unit.
3. The microwave should completely and consistently kill the bacteria and other pathogenic organisms that is ensured by approved bio-logical indicator at the maximum design capacity of each microwave unit. Biological indicators for microwave shall be *Bacillus Subtilis* spores using vials or spore strips with at least 1×10^4 spores per milliliter.

STANDARDS FOR DEEP BURIAL

1. A pit or trench should be dug about 2 metres deep. It should be half filled with waste, then covered with lime within 50 cm of the surface, before filling the rest of the pit with soil.
2. It must be ensured that animals do not have any access to burial sites. Covers of galvanized iron/wire meshes may be used.
3. On each occasion, when wastes are added to the pit, a layer of 10 cm of soil shall be added to cover the wastes.
4. Burial must be performed under close and dedicated supervision.
5. The deep burial site should be relatively impermeable and no shallow well should be close to the site.
6. The pits should be distant from habitation, and sited so as to ensure that no contamination occurs of any surface water or groundwater. The area should not be prone to flooding or erosion.
7. The location of the deep burial site will be authorized by the prescribed authority.
8. The institution shall maintain a record of all pits for deep burial.

²⁴[SCHEDULE VI]

(see rule 5)

**SCHEDULE FOR WASTE MANAGEMENT FACILITIES LIKE
INCINERATOR/AUTOCLAVE / MICROWAVE SYSTEM**

A. Hospitals and nursing homes in towns with population of 30 lakhs and above	By 30 th June, 2000 or earlier
B. Hospitals and nursing homes in towns with population of below 30 lakhs - (a) with 500 beds and above (b) with 200 beds and above but less than 500 beds. (c) With 50 beds and above but less than 200 beds (d) With less than 50 beds	By 30 th June, 2000 or earlier By 31 st December, 2000 or earlier By 31 st December, 2001 or earlier By 31 st December, 2002 or earlier
C. All other institutions generating Bio-Medical Waste not included in A and B above.	By 31 st December, 2002 or earlier

²⁴ Substituted 'Schedule VI' by Rule 2 of the Bio-Medical Waste (M&H) (Amendment) Rules, 2000 notified vide notification S.O.201(E), dated 6.3.2000 and came into force w.e.f. 6.3.2000.

FORM I

(See rule 8)

**²⁵[APPLICATION FOR AUTHORISATION/RENEWAL OF
AUTHORISATION]**

(To be submitted in duplicate)

To,

The Prescribed Authority

(Name of the State Govt. /UT Administration)

Address.

1. Particulars of Applicant

(i) Name of the Applicant
(in block letters & in full)

(ii) Name of the Institution:

Address :

Tele No., Fax. No., Telex No.,

2. Activity for which authorisation is sought:

(i) Generation

(ii) Collection

(iii) Reception

(iv) Storage

(v) Transportation

(vi) Treatment

(vii) Disposal

(viii) Any other form of handling

3. Please state whether applying for fresh authorisation or for renewal:

(in case of renewal previous authorisation number and date)

²⁵ Substituted by Rule 10 of the Bio-Medical Waste (M &H) (Second Amendment) Rules, 2000 notified vide S.O.545(E), dated 2.6.2000.

4. (i) Address of the institution handling Bio-Medical Wastes:
(ii) Address of the place of the treatment facility:
(iii) Address of the place of disposal of the waste:
5. (i) Mode of transportation (in any) of Bio-Medical Waste :
(ii) Mode(s) of treatment:
6. Brief description of method of treatment and disposal (attach details):
7. (i) Category (see Schedule I) of waste to be handled
(ii) Quantity of waste (category-wise) to be handled per month
8. Declaration

I do hereby declare that the statements made and information given above are true to the best of my knowledge and belief and that I have not concealed any information.

I do also hereby undertake to provide any further information sought by the prescribed authority in relation to these rules and to fulfil any conditions stipulated by the prescribed authority.

Date :

Signature of the applicant

Place :

Designation of the applicant

FORM II
(see rule 10)
ANNUAL REPORT

(To be submitted to the prescribed authority by 31 January every year).

1. Particulars of the applicant:
 - (i) Name of the authorised person (Occupier/Operator):
 - (ii) Name of the institution:
Address
Tel.No.
Telex No.
Fax No.

2. Categories of waste generated and quantity on a monthly average basis:

3. Brief details of the treatment facility:
In case of off-site facility:
 - (i) Name of the Operator
 - (ii) Name and address of the facility :
Tel. No., Telex No., Fax No.

4. Category-wise quantity of waste treated :

5. Mode of treatment with details :

6. Any other information :

7. Certified that the above report is for the period from

.....

Date : Signature

Place : Designation.....

FORM III
(see Rule 12)

ACCIDENT REPORTING

1. Date and time of accident :
2. Sequence of events leading to accident :
3. The waste involved in accident :
4. Assessment of the effects of the accidents on human health and the environment:
5. Emergency measures taken :
6. Steps taken to alleviate the effects of accidents :
7. Steps taken to prevent the recurrence of such an accident :

Date :

Signature

Place:

Designation

²⁶[FORM IV]

[see Rule 8(4)]

(Authorisation for operating a facility for collection, reception, treatment, storage, transport and disposal of Bio-Medical Wastes.)

1. File number of authorisation and date of issue.....

2.of is hereby granted an authorisation to operate a facility for collection, reception, storage, transport and disposal of Bio-Medical Waste on the premises situated at
.....

3. This authorisation shall be in force for a period of Years from the date of issue.

4. This authorisation is subject to the conditions stated below and to such other conditions as may be specified in the rules for the time being in force under the Environment (Protection) Act, 1986.

Date

Signature.....

.....

Designation

Terms and conditions of authorisation *

1. The authorisation shall comply with the provisions of the Environment (Protection) Act, 1986 and the rules made thereunder.
2. The authorization or its renewal shall be produced for inspection at the request of an officer authorised by the prescribed authority.

²⁶ Added by Rule 11 of the Bio-Medical Waste (M &H) (Second Amendment) Rules, 2000 notified vide S.O.545(E), dated 2.6.2000.

3. The person authorized shall not rent, lend, sell, transfer or otherwise transport the Bio-Medical Wastes without obtaining prior permission of the prescribed authority.
4. Any unauthorised change in personnel, equipment or working conditions as mentioned in the application by the person authorised shall constitute a breach of his authorisation.
5. It is the duty of the authorised person to take prior permission of the prescribed authority to close down the facility.

* Additional terms and conditions may be stipulated by the prescribed authority.

²⁷[FORM V]

(see rule 13)

Application for filing appeal against order passed by the prescribed authority at district level or regional office of the Pollution Control Board acting as prescribed authority or the State/Union Territory level authority.

1. Name and address of the person applying for appeal :
2. Number, date of order and address of the authority which passed the order, against which appeal is being made (certified copy of order to be attached)
3. Ground on which the appeal is being made.
4. List of enclosures other than the order referred in para 2 against which appeal is being filed.

Signature

Date :

Name & Address.....

F.No.23(2)/96-HSMD
V.RAJAGOPALAN, Jt. Secretary

Note : The Principal rules were published in the Gazette of India vide number S.O.630(E), dated 20.7.98 and subsequently amended vide (1) S.O.201(E), dated 6.3.2000; (2) S.O.545(E), dated 2.6.2000; and (iii) S.O.1069(E), dated 17.9.2003.

²⁷ Added by Rule 11 of the Bio-Medical Waste (M &H) (Second Amendment) Rules, 2000 notified vide S.O. 545(E), dated 2.6.2000.

Annexure - 3**NATIONAL GUIDELINES ON HOSPITAL WASTE MANAGEMENT
BASED UPON THE BIO-MEDICAL WASTE
(MANAGEMENT & HANDLING) RULES, 1998**

The Bio-Medical Waste (Management & Handling) Rules, 1998 were notified under the Environment Protection Act, 1986 (29 of 1986) by the Ministry of Environment and Forest, Govt of India on 20th July, 1998. The guidelines have been prepared to enable each hospital for implementation of the said Rules by developing comprehensive plan for hospital waste management smoothly in terms of segregation, collection, treatment, transportation and disposal of hospital waste.

1. POLICY ON HOSPITAL WASTE MANAGEMENT

The policy statement aims "to provide for a system for management of all potentially infectious and hazardous waste in accordance with the Bio Medical Waste (Management & Handling) Rules, 1998 (BMW, 1998).

2. DEFINITION OF BIO MEDICAL WASTE

Bio Medical waste means any waste, which is generated during the diagnosis treatment or immunization of human beings or animal or in research activities pertaining thereto or in the production or testing of biologicals, including categories mentioned in the Schedule I of the Bio-Medical waste (Management & Handling) Rules, 1998.

3. CATEGORIES OF BIO-MEDICAL WASTE

Hazardous, toxic and Bio-medical waste should be segregated into following categories for the purpose of it's safe transportation to a specific site for specific treatment. Certain specific categories of toxic and hazardous waste required specific treatment (dis-inspection/ decontamination) before transportation for treatment, which can also be done under the categorization as mentioned below:

Category No.1. HUMAN ANATOMICAL WASTE

This includes human tissues, organs and body parts.

Category No. 2. ANIMAL WASTE

This includes animal tissue, organs, body parts carcasses, bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals, colleges, discharge from hospitals, animal houses.

Category No. 3. MICROBIOLOGY & BIOTECHNOLOGY WASTE

This includes waste from laboratory cultures, stocks or specimens of microorganisms live or attenuated vaccines, human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes from production of biologicals, toxins, dishes and devices used for transfer of cultures.

Category No. 4. WASTE SHARPS

This comprises needles, syringes, scalpels, blades, glass etc, which may cause puncture and cuts. This includes both used and unused sharps.

Category No. 5. DISCARDED MEDICINES AND CYTOTOXIC DRUGS

This contains waste comprising of outdated, contaminated and discarded medicines.

Category No. 6. SOILED WASTE

This contains items contaminated with blood, and body fluids including cotton, dressings, soiled plaster casts, linens, beddings, other material contaminated with blood.

Category No. 7. SOLID WASTE

This contains wastes generated from disposable items other than the waste sharps such as tubing, catheters, intravenous sets etc.

Category No. 8. LIQUID WASTE

This contains wastes generated from laboratory and washing, cleaning housekeeping and disinfecting activities.

Category No. 9. INCINERATION ASH

This contains ash from incineration of any bio-medical waste.

Category No. 10. CHEMICAL WASTE

This contains chemical used in production of biologicals, chemicals used disinfection as insecticides etc. .

4. SEGREGATION OF WASTE

4.1 It should be done at the source of generation of bio medical waste e.g. all patient care activity areas, Diagnostic Services areas, Operation theatres, Labour Rooms, treatment rooms etc.

4.2 The responsibility of segregation should be with generator of bio medical waste i.e. Doctors, Nurses and Technicians etc.

4.3 The Bio Medical waste should be segregated as per categories applicable.

5. COLLECTION OF BIO MEDICAL WASTE

Collection of Bio medical waste should be done as per Bio Medical Waste (Management & Handling) Rules, 1998 (Rule 6—schedule II)

5.1 Type of container and colour for collection of Biomedical waste:

S. No.	Category	Type of Container	Colour Coding
1.	Human anatomical waste	Plastic Bag	Yellow
2.	Animal waste	-do-	-do-
3.	Microbiology & Bio-Technology waste	-do-	yellow/ red
4.	Waste sharp	Plastic bag puncture proof container translucent	Blue/White
5.	Discarded Medicines & Cytotoxic waste	Plastic bag	Black
6.	Solid waste (Soiled)	-do-	Yellow/ red
7.	*Solid waste (Plastic)	Plastic bag puncture proof container translucent	Blue/White
8.	Liquid waste	-	-
9.	Incineration ash	Plastic bag	Black
10.	Chemical waste (solid)	-do-	Black

5.2 All the items sent to incinerator/deep burial (Cat 1,2,3,6) should be placed in Yellow coloured bags.

5.3 All the Bio-medical waste to be sent for Microwave/autoclave/Chemical treatment should be placed in Red coloured bags.

5.4 Any waste which is sent to shredder after autoclaving/microwaving/chemical treatment is to be packed in Blue/white translucent bag.

5.5 **Location of containers:**— All containers having different coloured plastic bags should be located at the point of generation of waste i.e. near OT Tables, injection

rooms, diagnostic services areas. The colour of container/plastic bags used for collection of segregated Biomedical waste should be identifiable.

5.6 Labelling:—All the bags/containers must be labelled according to the rules (Schedule III of Bio Medical Waste Rules, 1998).

5.7 Bags:—It should be ensured that waste bags are filled up to only three fourth capacity, tie securely and remove from the site of the generation regularly and timely.

5.8 Certain categories of waste which may need pre-treatment (decontamination/disinfection) and the site of generation such as plastic and sharp materials, etc should be removed from the site of generation only after treatment.

5.9 The process of collection should be documented in a register, the colour plastic bags should be replaced and the garbage bin should be cleaned with disinfectant regularly.

6. STORAGE OF WASTE

Storage refers to the holding of Bio-medical waste for a certain period of time, after which it is sent for treatment and disposal. In other words it means the duration of time wastes are kept at the site of generation and transit till the point of treatment and final disposal.

6.1 No untreated Bio Medical Waste shall be kept, stored beyond a period of 48 hours

6.2 The authorised person must take the permission of the prescribed authority, if for any reason; it becomes necessary to store the waste beyond 48 hours.

6.3 The authorised person should take measures to ensure that the waste does not adversely affect human health and the environment, in case; it is kept beyond the prescribed limit.

7. TRANSPORTATION

7.1.1 Transportation within the Hospital.

7.1.2 Within hospital, waste routes must be designated to avoid the passage of waste through patient care areas as far as possible.

7.1.3 Separate time should be earmarked for transportation of Bio Medical Waste to reduce chances of its mixing with general waste as far as possible.

7.1.4 Dedicated wheeled containers, trolleys or carts should be used to transport the waste bins/ plastic bags to the site of storage/ treatment.

7.1.5 Trolleys or carts should be thoroughly cleaned and disinfected in the event of any spillage.

7.1.6 The wheeled containers should be designed that the waste can be easily loaded, remains secured during transportation, does not have any sharp edges and easy to clean and disinfected.

7.2 Transportation of clinical waste to treatment/disposal outside the hospital.

7.2.1 Untreated Bio Medical Waste shall be transported only in such vehicles as may be authorised for the purpose by the competent authority as specified by the Govt. under the Motor Vehicle Act, 1988.

7.2.2 The containers for transportation must be labeled as given in Schedule III and IV of BMW Rules 1998.

8. TREATMENT OF HOSPITAL WASTE

8.1 General waste (non-hazardous, non toxic, non infectious):

The safe disposal of this waste should be ensured by the through Local Municipal Authority.

8.2 Bio Medical Waste

8.2.1 Incineration: The incinerator should be installed and made operational as per specifications under the BMW Rules, 1998 and a certificate may be taken from CPCB/State Pollution control Board. Specific requirement regarding the incinerator and norms of combustion efficiency and emission levels, etc have been defined in the Bio Medical Waste (management & Handling) Rules 1998. In case of small hospitals, joint facilities for incineration can be developed depending upon the local policies of the Hospital and feasibility. The plastic bags made of chlorinated plastic should not be incinerated.

8.2.2 Deep burial: Standard for deep burial are also mentioned in the Bio Medical Waste (management & Handling) Rules 1998. The waste under category 1 and 2 can be accorded deep burial and only in cities having less than 5 lakh populations.

8.2.3 Autoclave and Microwave treatment: Standards for the autoclaving and Microwaving are also mentioned in the Bio Medical Waste (Management & Handling) Rules 1998. All equipment installed/ shared should meet these techniques. The waste under category 3,4,6 and 7 can be treated by these techniques.

8.2.4 Shredding: The plastic (IV bottle, IV Sets, syringes, catheters etc) sharps (needles, blades, glass etc) should be shredded but only after chemical treatment/ microwaving/autoclaving ensuring disinfection.

8.2.5 Needles destroyers can be used for disposal of needles directly without chemical treatment.

8.2.6 Secured landfill: The incinerator ash, discarded medicines, cytotoxic substances and solid chemical waste should be treated by this option.

8.2.7 It may be noted there are multiple options available for disposal of certain category of waste. The individual hospital can choose the best option depending treatment facilities available.

8.2.8 Radioactive Waste: The management of the radioactive waste should be undertaken as per the guidelines of BARC.

8.2.9 Liquid and Chemical Waste.

- i. Chemical Waste & Liquid Waste from Laboratory: Suitable treatment, dilution or 1% hypochlorite solution as required shall be given before disposal.
- ii. The effluents generated from the hospital should conform to limits as laid down in the Bio-Medical Waste (management & Handling) Rules, 1998 (Schedule V)
- iii. The liquid and chemical waste should not be used for any other purpose
- iv. For discharge into public sewers with terminal facilities, the prescribed standard limits should be ensured.

9. SAFETY MEASURES

9.1 Personal Protection

Hospitals and health care facilities have to ensure that the following personal protective equipment are provided.

(i) Gloves

- (a) Disposable vinyl gloves
- (b) Latex surgical gloves for invasive procedures
- (c) Heavy-duty rubber gloves up till elbow for cleaners.

(ii) Masks: Simple and cheap deflector mask to prevent health care workers against aerosols and splashes. Incinerator staff should wear dust masks.

(iii) Protective glasses.

(iv) Plastic aprons.

(v) Special footwear e.g. gum boots for Hospital waste handlers.

9.2 Immunization: Hepatitis B and Tetanus.

9.3 Reporting Accident & Spillages.

There should be a procedure for reporting accident or incidents and records should be kept. The report should include the nature of accident when and where it occurred and which staff were directly involved.

9.4 All the generators of Bio Medical Waste should adopt universal precautions and appropriate safety measures while doing therapeutic and diagnostic activities and also while handling the biomedical waste.

9.5 All the sanitation workers engaged in the handling and transporting should be made aware of the risks involved in handling the Bio Medical Waste.

10. TRAINING

10.1 The entire medical professional must be made aware of Bio Medical Waste (Management & Handling) Rules, 1998.

10.2 Each and every hospital must have well planned awareness and training programmes for all categories of personnel including administrators.

10.3 To make aware about safe hospital waste management practices.

10.4 Training should be conducted category wise and more emphasis should be given in training modules as per category of personnel.

10.5 Training should be conducted in appropriate language/medium and in an acceptable manner.

10.6 Wherever possible audiovisual material and experience trainers should be used.

10.7 Training should be interactive and should be include awareness sessions, demonstration sessions. Behavioural science approach should be adopted with

emphasis on establishing proper practices. It is a continuous process and will need constant reinforcement.

11. MANAGEMENT & ADMINISTRATION

11.1 The Head of the Hospital shall form a Waste Management Committee under his Chairmanship. The waste management committee shall meet regularly to review the performance of the waste disposal. This committee should be responsible for making hospital specific action plan for hospital waste management and its supervision, monitoring and implementation.

11.2 The Heads of each hospital will have to take authorization for generation of waste from appropriate authorities as notified by the concerned State/U.T. Government well in time and get it renewed as per time schedule laid in the rules. The application is to be made as per format given in form I of BMW rules.

11.3 The annual reports, accident reporting as required under BMW Rules should be submitted to the concerned authorities as per BMW Rules format (form II and form III respectively).

12. COORDINATION BETWEEN HOSPITAL & OUTSIDE AGENCIES

12.1 **Municipal authorities:** As quite a large percentage of waste (in India upto 90%) generated in Indian hospital belong to general category (non-toxic and non-hazardous), hospital should have constant interaction with municipal authorities so that this category of waste is regularly taken out of the hospital premises for further disposal.

12.2 Coordinated efforts should be made by health authorities and municipal authorities to involve private sector / NGOs for creation of common facilities for treatment.

12.3 Health authorities in coordination with municipal authorities should facilitate optimal utilization of waste treatment facility in the area.

12.4 Coordination with NGOs and Environmental Groups: For public awareness and education.

12.5 Sharing of facility: Hospital which are not on possession of their own facility for treatment may get their waste treated in a shared facility. The hospitals having excess for treatment should extend the capacity to nearby smaller hospital or health care units.

12.6 There should be coordinated agencies to take care of exigencies/disruption of waste treatment equipment in a unit.

(b) Cultures and stocks of infectious agents from research and industrial laboratories;

(c) Wastes from the production of bacteria, viruses, or the use of spores, discarded, live and attenuated vaccines, and culture dishes and devices used to transfer, inoculate, and mix cultures; or

(d) Waste containing any microbiological specimens sent to a laboratory for analysis;

(ii) Human surgery specimens or tissue removed at surgery or autopsy;

(iii) Animal parts, tissues or fluids suspected or known to be infected.

(iv) Waste, which at the point of transport from the generator's site, or at any point thereafter, contains recognizable fluid blood, fluid blood products and containers or equipment containing blood that is fluid or blood from animals known to be infected with any disease;

(v) Waste containing discarded materials contaminated with excretion, exudates, or secretions from humans or animals who or which are required to be isolated by the infection control staff, the attending physician or surgeon, the attending veterinarian, or the local health officer, in order to protect others from highly communicable diseases or from isolated animals known to be infected.

(vi) All waste generated in isolation wards;

(vii) Infectious liquids;

(viii) Sharps waste;

(ix) Chemical waste which consists of discarded solid, liquid, and gaseous chemicals, including pharmaceutical waste and other hazardous waste from diagnostic and experimental work and from cleaning, housekeeping, and disinfecting procedures;

(x) Waste containing any radio-active material or waste produced from patient treatment containing radio active material;

(xi) Any waste, specimen, tissue, fluid, liquid, or sharp which resembles Bio- medical waste as contemplated in Sec. 2 (e) (i) to (x) and categorised in Schedule 2.

(f) '**bio-medical waste generator**' means any person, whose acts or processes produce bio-medical waste and includes a hospital, nursing home, clinic dispensary,

veterinary institution, animal house, pathological laboratory, surgery centres, dental practitioners or blood bank by whatever name called .

(g) **'transport'** means the movement of bio-medical waste from the point of generation to any intermediate point and finally to the point of treatment or disposal. Transport does not include the movement of bio-medical waste from a bio-medical waste generator to another bio-medical waste generator for the purposes of testing and research, or internal transport;

(h) **'transport operator'** means a person or enterprise engaged in the transportation of bio-medical waste.

(i) **'bio-medical waste manager'** means the nominated professional by a bio-medical waste generator, who is responsible for the day-to-day monitoring, management and problem-solving in relation to the management of bio-medical waste.

(j) **'common bio-medical waste treatment facility'** means a premises wherein there exists a facility for treatment of bio-medical wastes collected from different bio-medical waste generators by transport operators.

(k) **'sharps waste'** means any device having acute rigid corners, edges, or protuberances capable of cutting or piercing, and includes:

(i) Hypodermic needles, syringes, blades, and needles with or without attached tubing; and

(ii) Broken glass items, such as Pasteur pipettes and blood vials contaminated with bio-medical waste.

CHAPTER 2

GENERAL REQUIREMENTS APPLICABLE TO BIO-MEDICAL WASTE

3. General prohibition and duty of care

(a) No person may containerise, collect, transport, sort, recover, treat, store, dispose of or otherwise manage bio-medical waste other than in accordance with Schedule 1 of the Act.

(b) No person may containerise, collect, transport, sort, recover, treat, store, dispose of or otherwise manage bio-medical waste in a manner that results in or creates a risk of harm to human health or the environment.

(c) Every generator of bio-medical waste must take all reasonable measures to prevent any other person from contravening sub-sections (a) and (b) in relation to that bio-medical waste. Such reasonable measures include ensuring that all persons involved with the collection, transport, treatment and disposal of bio-medical waste generated by that facility, are aware of and are in compliance with this Act.

4. Waste minimization, Segregation and Packaging

(a) A bio-medical waste generator must manage the impacts of bio-medical waste in its operations by minimising the generation of bio-medical waste at source.

(b) All bio-medical waste generators must, at the point of generation and at all times thereafter, segregate bio-medical waste in accordance with Schedule 1 of the Act. No person shall dispose of bio-medical waste together with other wastes or in any manner other than in the manner prescribed under this Act.

(c) All bio-medical waste packaging must be in accordance with the Minimum Requirements for packaging of bio-medical waste, as set out in Schedule 7 of this Act.

(d) All bio-medical waste generators must mark bio-medical waste containers in accordance with Schedule 3 of this Act containing the international Biohazard symbol.

(e) All containers containing bio-medical waste generated must clearly indicate the name or registration number of that generator and must clearly indicate that the contents that they contain.

(f) All bio-medical waste generators must secure leak proof containers and puncture resistant containers when full to prevent leakage or expulsion of contents during handling, storage or transport.

(g) All persons must place bio-medical waste in one or more leak proof containers for the purpose of internal transport. All persons must place leak proof containers containing bio-medical waste in one or more rigid puncture resistant containers prior to storage or transport from the facility. Rigid puncture resistant containers shall be leak proof, have tight fitting covers, and be kept clean and in good repair.

(h) All persons must place liquid bio-medical waste in capped or tightly secured leak proof and spill proof containers.

(i) All bio-medical waste generators must, at the point of generation and at all times thereafter, place and keep sharps waste in a sharps container. When full, sharps

containers must be tightly sealed to prevent the release of any sharps waste from the container.

(j) All bio-medical waste generators, transporters and treatment facilities must minimise the manual handling and lifting of bio-medical waste containers by employees by providing alternative means of carrying out these functions.

5. Internal transport

(a) No bio-medical waste may be transported internally at a bio-medical waste generator except in accordance with the Minimum Requirements set out in Schedule 8 to the Act.

(b) Bio-medical waste generators must ensure that:

(i) the internal transport of bio-medical waste occurs in such a manner so as not to cause a of harm to any person;

(ii) the manual lifting and carrying of bio-medical waste for the purpose of internal transport is avoided, or where it cannot be avoided all together, minimized; and

(c) Every bio-medical waste generator must provide the necessary equipment and implement a manoeuvrable, wheeled system for the internal transport of bio-medical waste.

6. Storage

(a) All bio-medical waste generators must ensure that the time period between bio-medical waste being collected by a transporter from the generator's premises and that waste being treated, does not exceed forty eight hours.

(b) Any and all areas used for the storage of bio-medical waste containers shall be secured so as to deny access to these areas to unauthorized persons. Storage areas must be clearly marked with warning signs on, or adjacent to, the exterior of entry doors, gates, or lids. Storage areas may be secured by use of locks on entry doors, gates, or receptacle lids. Storage areas must be maintained so as to prevent the entry of animals and natural elements and to prevent them from becoming breeding sites or food sources for insect vectors or rodents.

(c) Storage of bio-medical waste must be carried out in accordance with the Minimum Requirements set out in Schedule 9 to the Act.

7. Treatment

Bio-medical waste shall be treated and disposed off in accordance with Schedule 2, and in compliance with the standards prescribed in Schedule 5.

8. Health and safety

(a) All bio-medical waste generators must ensure that once bio-medical waste is placed in a container, that bio-medical waste is not removed from that container for the purposes of decanting to another container, or for any other purpose, until such waste is received by the treatment facility.

(b) In order to avoid any injuries to or infection of people, bio-medical waste generators must:

(i) take all necessary measures to ensure that re-usable containers are effectively disinfected before re-use, according to the standards specified in Schedule 10 of this Act

(ii) provide adequate secure storage areas for bio-medical waste;

(c) make provision for minimal manual handling of bio-medical waste; and

(d) provide appropriate personal protective equipment to employees handling bio-medical waste.

9. Authorisation

(a) Every institution generating, collecting, receiving, storing, transporting, treating, disposing and/or handling bio-medical waste in any other manner shall make an application to the Bio-medical Waste Management Authority for grant of authorization.

(b) The authorisation to operate a facility shall be issued, subject to conditions laid therein and such other condition, as the Bio-medical Waste Management authority, may consider it necessary.

10. Record keeping

(a) Every bio-medical waste generator shall maintain records related to the generation, collection, reception, storage, transportation, treatment, disposal and/or any form of handling of bio-medical waste in accordance with these rules and any guidelines issued.

(b) All records shall be subject to inspection and verification by the bio-medical waste inspector at any time.

11. Accident reporting

When any accident occurs at any institution or facility or any other site where bio-medical waste is handled or during transportation of such waste, the authorised person shall report the accident to the prescribed authority forthwith.

12. Bio-medical waste Management teams

(a) It shall be the duty of the every bio-medical waste generator to appoint a full-time bio-medical waste manager, who will be responsible for all activities relating the management and handling of bio-medical wastes, including handling communications from Governmental authorities, monitoring problems related to such wastes and maintaining all required permits and documentation

(b) Every bio-medical waste management generator shall also constitute a Bio-medical waste management team, headed by the manager appointed under sub-section (1) and consist of not less than four members, comprising of at least one infection control nurse, housekeeping personnel, one senior doctor and a microbiologist/bio-chemist, excluding the manager appointed under sub-section(a).

(c) The bio-medical waste management team constituted under sub-section (b) shall prepare waste management policies, conduct a waste assessment or audit, review and analyse the assessment, under waste reduction projects; evaluate success of these results and oversee employee training related to bio-medical waste management.

(d) It shall be the duty of every bio-medical waste generator to ensure that its employees undergo training in bio-medical waste management at least once in a period of three years.

CHAPTER 4
REQUIREMENTS APPLICABLE TO BIO-MEDICAL WASTE
TRANSPORTERS

10. Registration

Every bio-medical waste transporter must register with the Bio-Medical Waste Management Authority in accordance with the time-frame set out in Schedule 6 to the Act.

11. General transportation requirements

(a) Bio-medical waste transporters must provide and require all persons manually handling containers of untreated bio-medical waste to wear clean, protective gloves and coveralls, changeable lab coats, or other protective clothing. The competent authority may require other protective devices appropriate to the type of untreated bio-medical waste being handled.

(b) Bio-medical waste transporters must transport untreated bio-medical waste in leak proof and puncture resistant containers in separate vehicle compartments.

(c) Bio-medical waste transporters must not transport untreated bio-medical waste in the same vehicle with other waste unless the untreated bio-medical waste is contained separately and kept separate from other waste by barriers.

(d) Bio-medical waste transporters must transport untreated bio-medical waste in strict compliance with the Minimum Requirements as set out in Schedule 9 to the Act.

(e) Bio-medical waste may only be transported to a common bio-medical waste treatment facility permitted in terms of the Act.

12. Tracking documents

(a) A bio-medical waste transporter must maintain completed tracking documents for all bio-medical waste it transports. At the time the bio-medical waste transporter receives bio-medical waste from any person, the transporter shall provide that person with a copy of the tracking document for that person's bio-medical waste records. At the time the bio-medical waste transporter releases the bio-medical waste to a bio-medical waste transfer station or treatment facility, the transporter shall provide that person with a copy of the tracking document for that person's bio-

medical waste records; and return a copy of the tracking document duly signed by the bio-medical waste transfer station or treatment facility to the person from whom the bio-medical waste was received.

(b) The transporter must maintain a copy of such tracking documents for a minimum of 2 (two) years. The transporter must submit to the competent authority, upon request, copies of any tracking documents the transporter is required to maintain.

(c) The tracking document shall include, but shall not be limited to the information contained in the form as set out in Schedule 8 of the Act.

(d) Any bio-medical waste transporter transporting bio-medical waste in a vehicle must have a tracking document in his possession while transporting the waste. The tracking document shall be shown upon demand to the bio-medical waste management inspector or any other official authorized in this regard.

CHAPTER 5 AUTHORITIES AND ENFORCEMENT

13. Appointment, Powers and duties of Bio-Medical Waste Inspectors

(a) The State Government shall in writing appoint any suitably qualified person as a bio-medical waste inspector for each taluka to perform the functions contemplated in the Act.

(b) A bio-medical waste inspector may, at any reasonable time and without prior notice, enter into or upon any property with the necessary persons, vehicles, equipment and material in order to carry out a routine audit or inspection of any bio-medical waste generator or bio-medical waste transporter.

(c) A bio-medical waste inspector may, at any reasonable time and without prior notice, on the authority of a warrant, enter into or upon any property with the necessary persons, vehicles, equipment and material, and perform any action necessary to -

(i) Investigate whether the Act, or any condition attached to any authority, or any rule or standard adopted in accordance with the Act, or any notice or directive issued under the Act is being contravened; or

(ii) Investigate whether any information supplied in connection with the Act is accurate.

14. Duty to assist bio-medical waste inspector

When a bio-medical waste inspector enters any property or site referred to in Sec. 13 above, the operator, owner or manager and each employee performing any work there must assist the bio-medical waste inspector, furnish answers to questions and provide any facility that the inspector reasonably requires.

15. Duty to produce documents

Any person who holds or should hold an authorisation or any other document, issued or required in accordance with the Act, must produce it at the request of the bio-medical waste inspector and must -

- (a) allow the inspector, for the purpose of the inspection, to remove any articles or objects pointed out by the inspector;
- (c) allow the inspection of documents specified by the inspector including the making of copies thereof; and
- (d) furnish the inspector, at the inspector's reasonable request, with any information under that person's control.

16. Powers of bio-medical waste inspector to deal with unsafe conditions

(a) If a bio-medical waste inspector reasonably believes that a condition or activity is a threat or may present a reasonable to human health or the environment, the inspector may issue a written directive to any person responsible for that condition or activity that -

(i) the activity be restricted or suspended, and the inspector may place conditions on that activity; or

(ii) action be undertaken within a reasonable time by the person concerned to remove the threat.

(b) Any person issued with a directive under sub-section (a) must take the steps set out in the directive, within the specified period, to rectify the activity or condition referred to in the directive.

17. Constitution of the Bio-Medical Waste Management Authority

The State Government shall appoint a Bio-Medical Waste Management Authority headed by a Chairman and four other members.

18. Constitution of an appellate authority

The State Government shall constitute an appellate authority to hear appeals from the orders passed by the Bio-Medical Waste Management Authority.

CHAPTER 7

OFFENCES AND PENALTIES

19. Offences and Penalties

(a) Whoever fails to comply with or contravenes any of the provisions of this Act, or the rules made or orders or directions issued thereunder, shall, in respect of each such failure or contravention, be punishable with imprisonment for a term which may extend to five years with fine which may extend to one lakh rupees, or with both, and in case the failure or contravention continues, with additional fine which may extend to five thousand rupees for every day during which such failure or contravention continues after the conviction for the first such failure or contravention.

(b) If the failure or contravention referred to in sub-section (a) continues beyond a period of one year after the date of conviction, the offender shall be punishable with imprisonment for a term which may extend to seven years.

SCHEDULE 1

(See Sec. 4 (b))

**COLOUR CODING AND TYPE OF CONTAINER FOR DISPOSAL OF
BIO-MEDICAL WASTES**

SCHEDULE 2

(See Sec. 7)

CATEGORIES OF BIO-MEDICAL WASTE AND THEIR TREATMENT

SCHEDULE 3

(See Sec. 4(d))

LABEL FOR BIO-MEDICAL WASTE CONTAINERS/BAGS