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,\(^{273}\) which is 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

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\(^{273}\) See quantum of waste generated at para 4.5 at p. 176.
turnovers and has therefore faced the brunt of the ill-effects of improper Bio-Medical Waste Management to a large extent.\textsuperscript{274} 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, the researcher has collected voluminous data and arrived at relevant findings, evaluated the problem and offered suggestions and recommendations, including a proposal for a specific legislation for the State of Goa, which are the contents of this Chapter.

The researcher has put forth two hypotheses; 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 researcher perused the latest rules governing the subject of Bio-Medical Waste Management, 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 researcher also examined the National Guidelines on Bio-Medical Waste Management put forth by the Ministry of Health and Family welfare, which 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, both for justifiable reasons. 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 the researcher has approached this study 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

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275 Bio-Medical Wastes otherwise include these areas as per the definition in Rule 2(4), BWM Rules, 1998.
clarity, which as a result, hamper the achievement of the primary objectives of managing and handling Bio-Medical Wastes.

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 with the researcher. The importance of this study comes to the fore, since Occupiers will acquire gigantic proportions in years to come, presuming 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!276

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

276 See para Table 4.13 at p. 171.
Management. This is even more pertinent since the researcher estimated the total amount of Bio-Medical Wastes generated in the State of Goa and this is approximately 2,243.8 metric tonnes annually. This figure is colossal and should demand even greater attention of the law enforcement authorities.

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 Suitability 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 though an outside agency. Employee Attitude Assessment 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.

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277 Supra note 273 at p. 209.
278 See para 4.6.3 at p. 199.
279 See para 4.6.4 at p. 199.
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 respondents\(^{280}\) 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 not done enough to sensitize the personnel who are employed in healthcare establishments that generate Bio-Medical Wastes. Less than half (38%) of the respondents\(^{281}\) reported that their healthcare settings followed a waste management plan of too small a percentage in an area of risk-prone 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\(^{282}\) which again is not a satisfying figure. Vast majority (78%) of the respondents\(^{283}\) 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.

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\(^{280}\) See para 4.7 at p. 200.

\(^{281}\) Ibid.

\(^{282}\) Ibid.

\(^{283}\) Ibid.
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 in any other manner, shall make an application in Form I for authorization. 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 Management and even greater majorities (90.84%) do not maintain any records and hence there is very little information related to the generation, collection, reception, storage, transportation, treatment, disposal

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284 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.
285 See para 4.6.2.10 at p. 194.
286 See para 4. 6.2.11 at p. 195.
and/or any form of handling of Bio-Medical Waste. Further, no accidents have been reported till date in prescribed format to the prescribed authority. 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. The Goa State Pollution Control Board has not undertaken any measures due to non-receipt of such reports, even though the Central Pollution Control Board has to be compulsorily be intimated by 31st March annually.

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. However, alarming amounts (85.58%) of Occupiers do not segregate wastes in accordance with the rules.

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287 See para 4.6.2.12 at p. 197.
288 Refer Table 4.26 at p. 198.
289 See para 4.6.2.13. at p. 197.
290 Supra note 255 at p. 198.
of segregation\textsuperscript{292} and equally high amounts (81.79\%) do not observe the colour coding scheme\textsuperscript{293}.

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.\textsuperscript{294} 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.\textsuperscript{295} 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 vehicles\textsuperscript{296} and relatively small numbers (8.73\%) responded to having kept untreated Bio-Medical Waste on the premises beyond the stipulated period of 48 hours.\textsuperscript{297}

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 by the researcher, 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

\textsuperscript{292} See para 4, 6.2.5 at p.186.
\textsuperscript{293} See para 4.2.6.7 at p. 189.
\textsuperscript{294} See Rule 6(4), BWM Rules, 1998.
\textsuperscript{296} See para 4.6.2.8 at p.190.
\textsuperscript{297} See para 4.6.2.9 at p. 192.
aware if the same were treated wastes, shows the failure of this particular Rule.\textsuperscript{298}

### 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 microwaves\textsuperscript{299}. However, majority of the Occupiers (59.56\%)\textsuperscript{300} did not even possess autoclaves or microwaves amongst all Talukas in the State.\textsuperscript{301}

As for the other mandatory facilities required to treat Bio-Medical Wastes as per the rules, about half the number (49.75\%) of Occupiers\textsuperscript{302} did not have deep burial pits\textsuperscript{303} and about a third (33.21\%) of the Occupiers\textsuperscript{304} did

\textsuperscript{298} See para 4.4.3 at p. 174.
\textsuperscript{299} Incineration has never been a compulsory option due to high cost factor involved.
\textsuperscript{300} See para 4.6.2.2 at p. 180.
\textsuperscript{301} It is a different matter whether the existing autoclaves and microwaves comply with standards prescribed in Schedule V of BWM Rules, 1998.
\textsuperscript{302} See para 4.4.6.2.1 at p. 179.
\textsuperscript{303} This option is available to all Occupiers in the State of Goa since none of the town have a population exceeding 5 lakhs.
\textsuperscript{304} See para 4.6.2.3 at p. 182.
not have shredders, which are required to mutilate and prevent unauthorized
re-use and surprisingly and about a third (33.79%) of the Occupiers\textsuperscript{305} did not
even use the prescribed standard of disinfectants,\textsuperscript{306} 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 31\textsuperscript{st} 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.

\subsection*{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 respondent\textsuperscript{307} 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

\begin{footnotes}
\item[305] See para 4. 6.2.4 at p.184.
\item[306] 1\% Sodium hypochlorite solution or an equivalent, to ensure disinfection.
\item[307] See para 4.6.3 at p. 199.
\end{footnotes}
employee education since a very large segment (88%) of respondents have not undergone any training on waste management\(^{308}\) and an equally large (80%) number reported that their healthcare setting does not have any annual education programme on waste management.\(^{309}\) There is however some consolation in observing that a majority (85%) of them were interested in attending a programme on Bio-Medical Waste Management\(^{310}\) 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,\(^{311}\) which goes to show its importance within the work structure. Since 57% of the respondents were of the view that it is the responsibility of the government,\(^{312}\) the researcher 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.

\(^{308}\) Ibid.  
\(^{309}\) Ibid.  
\(^{310}\) Ibid.  
\(^{311}\) See para 4.6.4 at p. 199.  
\(^{312}\) Ibid.
The almost total agreement (92%) that this is an issue involving team work 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. Almost half (47%) of the respondents believing that safe management efforts will increase the financial burden 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, 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.

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

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313 Ibid.
314 Ibid.
315 Ibid.
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, namely for alternatives to incineration.316

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.317 Therefore the definition seeks to include wastes 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

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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 could have been done since such wastes are scientifically bio-medical in nature and their ill-effects can be harmful.

The Rules are very wide and includes the ‘Occupier of an institution’ who generates Bio-Medical Waste.\textsuperscript{318} However there is a direction mentioning that all steps are to be taken to handle such waste without any adverse effect to health and the environment.\textsuperscript{319} 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.\textsuperscript{320} The Pollution Control Board is not equipped with enough infrastructures to check each and every incinerator of a hospital in relation to

\textsuperscript{318} See Rule 4, BWM Rules, 1998.
\textsuperscript{319} Ibid.
\textsuperscript{320} 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.\textsuperscript{321} Strangely, the rules even imposed deadlines regarding setting up of incinerators amongst any other methods,\textsuperscript{322} even after they had been discarded by western countries.\textsuperscript{323} Besides, in the use of incineration, there is reportedly emission of dioxins and furans, which are carcinogenic\textsuperscript{324}.

In a hospital environment, technologies like incineration fail because untrained janitor staff runs 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.

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\textsuperscript{321} Rule 5 of 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. Srishti, an NGO conducted the survey of 16 medical incinerators in Delhi hospitals during July to September, 2002.
\textsuperscript{322} See Schedule VI, BWM Rules, 1998.
\textsuperscript{323} 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.
\textsuperscript{324} A descriptive term, for things capable of causing cancer. Carcinogens are cancer-causing substances or agents.
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 waste.\textsuperscript{325} 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.\textsuperscript{326}

There is a specific direction in the Rules that the maximum permissible period of storage of untreated Bio-Medical Waste is 48 hours.\textsuperscript{327} 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.

\textsuperscript{325} See Rule 6(6), BWM Rules, 1998.
\textsuperscript{326} See Rule 6(2), BWM Rules, 1998.
\textsuperscript{327} See Rule 6(5), BWM Rules, 1998.
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 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 generated\(^{328}\). 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;\(^ {329}\) 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

\(^{328}\) 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.

\(^{329}\) See Rule 4, BWM Rules, 1998.
and which in effect outweigh other polluters.\textsuperscript{330} 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.

The Rules mention that the Central or the relevant State or Union territory Pollution Control Boards as the prescribed authority.\textsuperscript{331} However these Boards are already over-stressed because of lack of infrastructure, manpower and technical power to implement the existing legislative requirements.\textsuperscript{332} New responsibilities of this kind have certainly put added pressure on Boards and in turn have resulted in poor implementation.\textsuperscript{333} 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.

\textsuperscript{330} See para 4.2.3 at p. 169.
\textsuperscript{331} See Rule 7, BWM Rules, 1998.
\textsuperscript{332}http://www.oHeraldo.in/news/Local%20News/Govt-to-set-up-trade-zones-for-recyclable-waste-soon/36401.html visited on 3.3.2008
\textsuperscript{333} See para 4.4.2 at p. 173.
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.\textsuperscript{334} The fear of punishment for contravention of the Rules seems illusory and meaningless as much enforcement of penal provisions under the Environment (Protection) Act, 1986 has not been done.\textsuperscript{335} 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.

\textsuperscript{334} Kenneth J. Warren, \textit{Hospitals, EPA Join Forces To Deal With Pollutants}, The Legal Intelligencer, Philadelphia, Aug 16 (2001)
\textsuperscript{335} \textit{Supra} note 332 at p. 227.
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. Consequently, 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 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.³³⁶ 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.³³⁷ Even though it has been laid down that the provisions contained in Part IV shall not be enforceable by any Court,³³⁸ 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.³³⁹ Article 47 states that it is the duty of the State to improve public health as amongst its primary duties.³⁴⁰ The inclusion of Article 48A by amendment³⁴¹ 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 India³⁴² that this Directive Principle is to be read along with Article 21³⁴³ and Article 51 A (g).³⁴⁴ Thus the researcher submits that the Constitutional mandate is very clear for the State to protect the environment.

³³⁷ Art. 37, Constitution of India.
³³⁸ *Ibid*.
³³⁹ *Chandra Bhavan v. State of Mysore* AIR 1970 SC 2042
³⁴⁰ Amongst other duties of raising the level of nutrition and the standard of living.
³⁴¹ The Constitution (Forty-second Amendment) Act, 1976
³⁴³ This is a fundamental right under Part III which protects life and personal liberty.
³⁴⁴ This is a fundamental duty contained in Part IVA of the Constitution of India, inserted by The Constitution (Forty-second Amendment) Act, 1976.
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 making law for the whole or any part of the State.\(^{345}\) 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.\(^{346}\) 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.

5.4.3 Focus 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 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

\(^{345}\) Article 245 of Constitution of India, 1950.

\(^{346}\) It is referred to as the State List and contains a total of 66 entries.
Legislation in this regard. The Schedules relating to ways of 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 completed 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 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.

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348 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.
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.\textsuperscript{349} 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.

Hospitals are currently burning wastes or dumping wastes in municipal bins which are transported to unsecured dumps.\textsuperscript{350} 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

\textsuperscript{349} See para 4.6.2.5 at p. 186.  
\textsuperscript{350} See para 4.4.3 at p. 174.
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 wastes. Almost 85% of sharp injuries are caused between their usage and subsequent disposal and more than 20% of those that handle them encounter

351 Sharps constitute only 0.7% of total Bio-Medical Wastes. See Fig. 1.(ii) at p. 13.
‘stick’ injuries.\textsuperscript{352} 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.\textsuperscript{353}

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 prevent the reuse of medical devices, containers and equipment after disposal.

\textsuperscript{352} Yadav Mukesh; \textit{Hospital Waste – A Major Probem}; J K Practitioner; 2001; 8(4); 276
\textsuperscript{353} Kaushal Anoop K; \textit{Safe Management of Bio-Medical Sharps Waste in India}; Lawyers Update; July 2009
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.\textsuperscript{354} 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.

\textbf{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,\textsuperscript{355} Infection Control Nurse, Housekeeping In-Charge, one Senior Doctor and a Microbiologist.

\textsuperscript{354} The researcher has observed 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, to understand the risk that unsecured waste disposal systems have.

\textsuperscript{355} 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. 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.

356 See para 4.6.3 at p. 199.
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 (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

The enforcement of the legislative provisions will always remain the main concern in order to ensure effective management of Bio-Medical Wastes. 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 duties of the healthcare waste establishment managements in respect of enabling the Inspector to carry out his functions in an effective manner, also needs to be part of the enactment.

5.4.3. 10 Bio-Medical Waste Management Authority

It is proposed that an authority be constituted under the legislation which will 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 based organization and one representative of an NGO in the field of environment. Authorisation to healthcare establishments generating, treating
and/or transporting Bio-Medical Wastes will be granted by this Authority. An appellate authority needs to be appointed by the State Government to enable establishments to approach in cases wherein authorization has been denied.

**5.4.3. 11 Offences and Penalties**

The Legislation needs to recognize 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
provisions\textsuperscript{357}, necessary Schedules in the legislation\textsuperscript{358} along with this action plan can be compiled into a Manual which can be called the ‘Green Book’\textsuperscript{359}, 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:

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

\textsuperscript{357} Suggested by this study as seen in para 5.4 at p. 229.
\textsuperscript{358} Like those pertaining to scientific standards for treating wastes by identified processes; forms for applications etc.
\textsuperscript{359} As seen in the case of the ‘Red Book’ pertaining to the Import and Export (Control) Act, 1947.
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.

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.

Likewise, establishing clear guidelines for product purchasing that emphasized waste reduction will keep waste management problems in focus. 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.\footnote{See Fig. 4 (xii) at p. 170 and para 4.5 at p. 176.} 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.\footnote{Such compliance can only be achieved by legislative measures. The researcher has attempted to draft a Bill for a model legislation in this regard at Annexure-4.} 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’\footnote{A term used for elimination of some and minimization of some wastes, reuse and recycling of others.} 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. These are basically into three categories, namely, chemical, high heat (Plasma Torch, Pyrolysis) and Low Heat (Autoclaving, microwaving, Hrydoclaving).\footnote{McRae Glenn; \textit{Medical Waste Treatment Strategies and Technologies: A Basic Overview for Developing Countries}; SPREG Waigani Convention Handbook}
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.
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.\(^{365}\) 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

\(^{365}\) Healthcare establishments can be accorded accreditation on a periodic basis which should be linked to their renewal license.
plans and policies for the proper management of hazardous materials and workers’ safety, is developed, without which a hospital cannot be accredited.\textsuperscript{366}

Emergency planning should also be catered to by the healthcare establishment. 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.\textsuperscript{367} 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.

\textbf{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

\textsuperscript{366} 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.

menace. As far as policy and legal framework, the relevant provisions should provide for the respective standards, formalities and procedures to be 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. 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!

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.