

**A LEGAL ANALYSIS OF ELECTRONIC WASTE MANAGEMENT  
AND HANDLING IN INDIA.**



Dissertation submitted to National Law University and Judicial Academy, Assam  
In partial fulfilment for one year LL.M Degree programme

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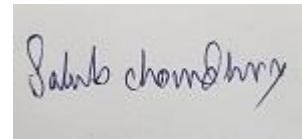
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NATIONAL LAW UNIVERSITY AND JUDICIAL ACADEMY, ASSAM

2019-2020

## **SUPERVISOR CERTIFICATE**

It is to certify that Saurav Baishya is pursuing Master of Laws (LLM.) from National Law University and Judicial Academy, Assam and has completed his dissertation titled “**A LEGAL ANALYSIS OF ELECTRONIC WASTE MANAGEMENT AND HANDLING IN INDIA**” under my supervision. The research work is found to be original and suitable for submission.



**Date: August 17, 2020**

**Mr. Saheb Chowdhury**

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## DECLARATION

I, **Saurav Baishya**, pursuing Master of Laws (LL.M.) from National Law University and Judicial Academy, Assam, do hereby declare that the present dissertation titled “**A LEGAL ANALYSIS OF ELECTRONIC WASTE MANAGEMENT AND HANDLING IN INDIA**” is an original research work and has not been submitted, either in part or full anywhere else for any purpose, academic or otherwise, to the best of my knowledge.

*Saurav Baishya.*

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## **PREFACE**

Human beings have progressed over the time and along with it the process of utilizing the resources have also altered. After every use some residues are generated that are of no value meant for to be discarded. Such residues are known as wastes. Initially, in the primitive stages human beings managed their wastes at the individual level, but as time passed the problem of waste management started gaining global concerns. Similarly, at present the issue of electronic wastes or e-wastes are gaining serious considerations especially because the rate of generation is such wastes are increasing at an alarming level due to the outcome of technological inventions.

The study relating to the ecological significance of e-wastes is important because most of these e-wastes are regarded as hazardous wastes that possess the potential to degrade human health as well as the health of the ecosystem. It has now become important to know to what extent these e-wastes can contribute for environmental degradation and what can be done to reduce such impacts. Further, it is also very important to analyze the validity of the regulatory framework that governs these e-wastes management system.

This paper will thus study the various impacts of wastes in general and e-wastes in particular upon the natural ecosystem. Further, this paper will also try to understand the legal mechanism that is governing the management of these e-wastes both at the international level and at the national level along with the shortcomings if any that exists in this legal mechanism. At last this paper will also attempt to provide certain possible suggestions to the challenges, if any against the e-waste management regulations.

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**2019-2020**

## TABLE OF CASES

*Calcutta Youth Front and Another v. State of West Bengal and Another*

*M.C Mehta v. Kamal Nath*

*MV Naidu v. Union of India*

*Divya Pharmacy v. Union of India*

*Palin Granit Oy v. Vehmassaion kansanterveystyon kuntayhtyman hallitus*

*OSS Group Ltd v. Environment Agency*

*R (Rackham) v. Swaffham Magistrates Court and the Environment Agency*

## **TABLE OF STATUTES**

### **International**

- 1992: Basel Convention
- 1995: Wagaini Convention
- 1998: Bamako Convention

### **National**

- 1950: Constitution of India
- 1974: Water (Prevention and Control of Pollution) Act
- 1981: Air (Prevention and Control of Pollution) Act
- 1986: Environment Protection Act

### **Rules and Regulations**

- 2001: Batteries (Managing and Handling) Rules
- 2008: Hazardous Wastes (Management, Handling and Transboundary Movement) Rules
- 2011: E-wastes (Management and Handling) Rules
- 2018: E-waste (Management) Amendment Rules

## TABLE OF ABBREVIATIONS

1.	CPCB	Central Pollution Control Board
2.	Ca	Calcium
3.	Cd	Cadmium
4.	Cu	Copper
5.	EPR	Extended Producer Responsibility
6.	Kg	Kilogram
7.	MT	Metric Tone
8.	Ni	Nickel
9.	MOEF&CC	Ministry of Environment Forest and Climate Change
10.	RBI	Reserve Bank of India
11.	RoHS	Reduction of Hazardous Wastes
12.	SPCB	State Pollution Control Board
13.	WEEE	Waste Electronic and Electrical Equipment
14.	Zn	Zinc



## CONTENTS

<i>TOPIC</i>	<i>PAGE NO</i>
<b>CHAPTER I- INTRODUCTION</b>	
Statement of Problem	1
Aims and Objectives	3
Scope and Limitation	4
Research Questions	5
Hypotheses	6
Research Methodology	7
Literature Review	8
Chapterization	15
<b>CHAPTER II- EVOLUTION OF WASTE MANAGEMENT SYSTEM</b>	
What is “waste”?	17
Types of Wastes	18
Development of Waste Management system	20
Development of E-Waste Management in India	21
International Problem Related to E-Waste	25
E-Waste Problem in India	26
<b>CHAPTER III- ECOLOGICAL IMPACT OF E-WASTE</b>	
Meaning of Ecology	27

The Nature and Scale of the Problem	29
Impact of E-Waste on Environment and Health	34
Environmental and Health Impacts of E-waste in India	40

## **CHAPTER IV- INTERNATIONAL AND LEGAL FRAMEWORK ON WASTE MANAGEMENT**

International law and Waste Management	43
The Defects of the Transfrontier Shipment Legislation	45
European Waste Management law and Policy	48
The Waste Hierarchy	48
The European list of wastes	49
Waste Treatment Directives	49
The Waste Incineration Directive	49
The Landfill Directive	50
Basel Convention	51
Basel Ban Amendment	54
Regulation of E-waste Trade	55
Bamako Convention	55
Waigani Convention	56
North America	57
International Environmental Technology Center, IETC	58
The Partnership for Action on Computing Equipments, PACE	58
Global Partnership for Waste Management, GPWM	59
International E-waste Monitoring Network, IEMN	59

**CHAPTER V- LEGISLATIVE FRAMEWORK OF INDIA ON E-WASTE: A LEGAL ANALYSIS**

“E” Waste and Legislations	61
Constitution of India	64
Water Act	65
Air Act	65
Environment Protection Act, 1986	65
Hazardous Waste Rules, 2008	66
Batteries (Managing and Handling) Rules, 2001	68
E-Waste (Management and Handling) Rules, 2011	70
E-waste Rules of 2016	71
E-waste Amended Rules of 2018	72
OSS Group Ltd v. Environment Agency [2008] Env LR 8	73
C-1/03 Van de Walle and ors [2005] Env LR 24	73
R (Rackham) v. Swaffham Magistrates Court and the Environment Agency [2004] EWHC17	74
C-9/00 Palin Granit Oy v. Vehmassaion kansanterveystyon kuntayhtyman hallitus (2002) Env LR 35	75

**CHAPTER VI- CHALLENGES AND LIMITATIONS RELATED TO E-WASTE MANAGEMENT** 76-77

**CHAPTER VII-CONCLUSION AND SUGGESTIONS** 80

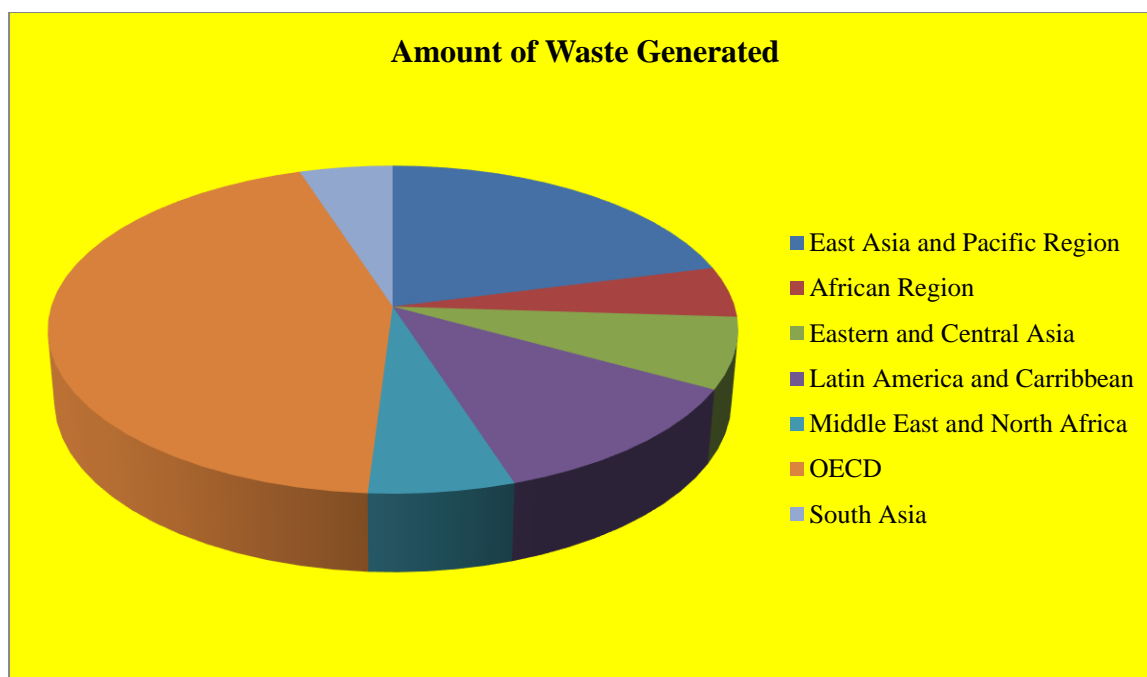
**Bibliography** XIII-XV

## CHAPTER I

### INTRODUCTION

The myth that technological development contributes to industrial and economic development of a nation might be true. But at the same time, every one forgets that it also causes irrevocable damage to the environment and human life.<sup>1</sup>

Everything in this world has its utility but after its use it more often becomes unusable or incapable of being utilized any more. In such a situation such useless things becomes wastes. But these valueless wastes are not without any significance. If thought in an innovative way these wastes might become valuable resources which can even boost up greatest of the great economies and at the same time if not handled in a proper manner the same wastes can become a curse on the entire humanity.<sup>2</sup> Likewise, these wastes also have a huge ecological impact. Wastes can degrade the natural ecosystem thereby causing great harm to the health of all living creatures including human beings. Waste may lead to all sorts of pollution like air pollution, water pollution, etc. It is therefore necessary to handle waste in an efficient and eco friendly manner.<sup>3</sup>



<sup>1</sup> L Lakshmi, Waste Management – Environmental impact (The Icfai University Press) 45-46(1<sup>st</sup> ed. 2008).

<sup>2</sup> Basel Action uploaded on (2013) Exporting Harm: The High-Tech Trashing of Asia, (Jun18, 2020, 10:12AM) <http://www.youtube.com/watch?v=yDSWGV3jGek>.

<sup>3</sup> *Ibid.*

**Table 1**

Regions	Amount of Waste Generated
East Asia and Pacific Region	21%
African Region	5%
Eastern and Central Asia	7%
Latin America and Caribbean	12%
Middle East and North Africa	6%
OECD	44%
South Asia	5%

Table 1.1. Region Wise Waste Generations<sup>4</sup>

Similarly, due to the advent of technological revolution several electronic gadgets has flooded the earth ecosystem where these electronic gadgets after being used or after losing their utility turns into e-waste or electronic wastes. These electronic wastes also have a huge ecological impact and since the technological innovations are crossing every limits of civilizations, at the same time it is also introducing a whole variety of new wastes which if not handled in a proper manner may lead to serious consequences.

Indicator	Africa	America	Asia	Europe	Oceania
Number of Countries	53	35	49	40	13
Population in millions	1,174	977	4,364	738	39
E-Waste generated kg/inch	1.9	11.6	4.2	16.6	17.3
Indication Waste generated (Mt)	2.2	11.3	18.2	12.3	0.7
Collection and Recycling as	0.004	1.9	2.7	4.3	0.04

<sup>4</sup>Waste Generation, World Bank Report (May 19, 2020, 12:13 AM)  
<https://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/336387-134852610766/Chap3.pdf>.

Documented (Mt)					
Rate of Collection	0%	17%	15%	35%	6%

Table 1.2. Generation and Collection of E-waste per continent 2017<sup>5</sup>

The apex court in *MV Naidu vs. Union of India* has categorically emphasized on the need of balance between sustainable economic development and environment and environmental safety. Safe living and economic development should go hand-in-hand. The need for striking a balance between different industrial developments and protection of environment in the wake of innovations of technologies has been reiterated by the Apex Court of India while delivering the judgement in numerous cases. The industrial revolution brought an awakening among the men inhabiting this Earth that the Nature, with all its resources was not unlimited and forever renewable. The uncontrolled industrial development generating tons of industrial waste disturbed the ecological balance by polluting the air and water which in turn, had a devastating effect on the wildlife and, therefore, the early efforts to protect the environment related to the protection of ecology as whole. The Calcutta High Court in *Calcutta Youth Front and Another vs. State of West Bengal and Another*, 1986 (2) CLJ 26. expressed its concern over the ecological degradation because of various reasons and states that ‘an ecological problem in contrast is a special type of social problem.’<sup>6</sup> To speak of phenomenon as a social problem is not to suggest merely or perhaps at all that we do not understand how it comes about: It is labelled a problem not because, like a scientific problem, it presents an obstacle to our understanding of the world and we believe that our society would be better off without it. Thus, protection of society and ecology is the prime concern and there should be a balancing effect of industrialization economic development and the environmental protection. The advancement in the information technology is no exception to this principle.<sup>7</sup>

The information technology, along with advantages, has brought many woes to the people and the society. One of the important problems posed by it is the pollution of the environment resulting in health and occupational hazards.<sup>8</sup> The printed circuits, monitors, mouse, key

<sup>5</sup>The Global E-waste Monitor 2017, United Nations University (May 19, 2020, 01:13 AM) <https://www.itu.int/en/ITU-D/Climate-Change/Documents/GEM%202017/GlobalEwaste%20Monitor%202017%20.pdf>.

<sup>6</sup> Kishore K. Wankhade, ‘Britain’s Environment Agency Confirms huge e-waste outflow to India’ (May 15, 2020) [www.toxiclinks.org](http://www.toxiclinks.org).

<sup>7</sup> AV Narsima Rao, “E” Waste: Are the Environmentalists and Regulators Ready to Face the Challenge? [Conserveland.org](http://Conserveland.org). 776,777-78 (2013).

<sup>8</sup> *Ibid.*

boards, semiconductors, chips, storage disks, are some of the parts associated with computers. Most of the materials, being toxic in nature, are identified as hazardous waste and are required to be managed and handled in accordance with the Rules.<sup>9</sup>

The electronic waste (e-waste) is a potential and vulnerable source of environmental pollution. The fast changing technologies, change in the life style, dependency upon the fast track communications and computing systems are further adding to the degradation of environment with the increased computers, computer peripherals, mobile phones and television sets. 'The fastnesses' and urge for 'sophisticated facilities' for comfortable life are the reasons for faster changes in the information technologies and electronic industries rendering the electronic products and devices obsolete within no time. The research and innovations on continual bases are furthering the replacement of existing computers, computer components, models, devices in a short period by the latest versions, resulting in the accumulation of 'Electronic' Waste.<sup>10</sup>

The innovation in the field of information technology has brought faster changes in the usage of computers and their components. The 'Personal computer' is not a status symbol today but it is a necessary part of life, irrespective of economic conditions and social backgrounds. The use of computers in the field of education, employments, business, commerce, industries, communications, transportation (land, marine, and rail and air transportations), space and satellite researches and electronic media has increased. It goes without saying that there is no sector or organization which is left without using computers. The computer has become inseparable from man and his personal belongings.<sup>11</sup> The increase in demand for computers has prompted the manufacture of computers of various models in big numbers. Continuous research is on to update the computer technologies and components. The updations of a computer are not a task of a day. It is never ending process and results in discarding the outdated computers and its components which cannot meet the speed and need of the day. The old computers and components become obsolete. They form and constitute the 'Electronic Waste'.<sup>12</sup> This issue is not only to India but to every developed and developing country. Most countries do not have enough systems or capabilities to deal with the issue.

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<sup>9</sup> Jennifer-Ann Hoeveler, International Approaches to Dealing with Electronic Waste, 13 N.Z. J. Env'tl. L. 117 (2009).

<sup>10</sup> Hoeveler, J. (2009). International approaches to dealing with electronic waste. New Zealand Journal of Environmental Law, 13(1), 117-160.

<sup>11</sup> Wong, C., Luksemburg, W., & Wong, Export of toxic chemicals - A review of uncontrolled electronic-waste recycling. Environmental Pollution, (Jun12,2020,10:13AM) <https://doi.org/10.1016/j.envpol.2007.01.044>

<sup>12</sup> *Supra note 32.*

The complexities of computer waste are increasing day-by-day with the increase in the usage of computers and fast technological changes. They are penetrating into the lives of the people, irrespective of their locations whether rural or urban.<sup>13</sup> As such millions of the PCs (Personal Computers) will be in operation. According to the study conducted by Toxics Links, an NGO working on 'Electronic' Waste in different metros of India, 2 million PCs are obsolete currently and are shelved in the store rooms and reckoned as wastes.<sup>14</sup> The number of obsolete PCs in developed countries will be further alarming. More than 24 million computers were recognized as obsolete in USA during the year 1996 and the number may further grow up to 300 million by the end of 2008. The developed countries like USA and Great Brittan, after understanding the impact of ever increasing nuisances of the computer waste, have started to send them to developing countries like India, China and Pakistan with the pretext of donation to the poor social organisations or for the purpose sale in the secondary market for either repair or reuse. In fact a major portion of the waste which is imported on one or the other pretext is only the computer junk which has no economic value or reusability.<sup>15</sup>

Though the Basel Convention bans the export or import of hazardous waste, the players in the market adopted various indirect methods such as sale of second hand goods, sent in the process of donation or gift to charities or other trusts and also by giving mis-descriptions and mislabelling .Thus, the computer scrap imports from the developed countries are adding fuel to the local problem of increased computer waste. The internal and external technological events and environments are exerting pressure on the units engaged in the disposal of 'Electronic' Waste, a strategic plan and policy must be formulated to mitigate environmental depletion and increase the awareness on the adverse impact of the 'Electronic' Waste on environment.<sup>16</sup>

The quantum of 'Electronic' Wastes is increasing year by year and is a threat to the environmentalists and the regulators. Whistles are blown and cautions are given to equip to face the challenge thrown by the 'Electronic' Waste generation. The application of the principle R3(Reduce , Reuse and Recycle ) to 'Electronic' waste may not be so effective as

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<sup>13</sup>Boon, J.E., Isaacs, J.A. & Gupta, S.M. (2001) Economics of PC recycling. In: Proc. SPIE, 2001. <http://www.coe.neu.edu/~smgupta/4193-07-SPIE.PDF>.

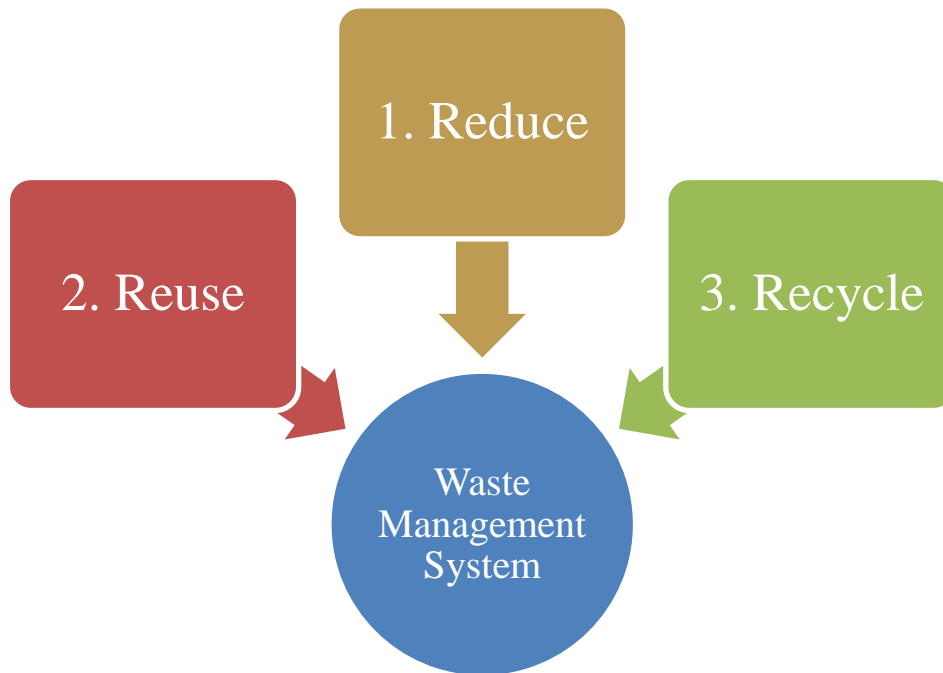
<sup>14</sup>Finlay, A. (2005) E-waste Challenges in Developing Countries: South Africa Case Study, Association for Progressive Communications.(Jun 23,2020,08:00AM)www.apc.org.

<sup>15</sup> *Supra note 48.*

<sup>16</sup> Lenin Mark," Approaches to Dealing with Electronic Waste" (2009) 13:1 New Zeal& J of Environmental L 117.



the increase of usage of computer devices and electronic products are increasing day by day on one side and the products puts to use are becoming obsolete within short period due to frequent updations in the technological front on other side . It causes increased ‘Electronic’ Waste, and mounting pressure on environment.<sup>17</sup> The waste management system broadly includes three Rs via, Reduce, Reuse and Recycle.



Every computer contains nearly about 90 units made up of 1000 materials of hazardous nature.<sup>18</sup>

Thus, the important toxins present in the components can be summarized as below –<sup>19</sup>

- ❖ Computer circuit boards: Lead and Cadmium
- ❖ Computer batteries: Cadmium
- ❖ Picture tubes : cathode-ray tubes :Lead oxide and Barium
- ❖ Printed circuit boards, cables and plastic casing : Brominated flame- retardants
- ❖ Copper cables and plastic computer casing and other fitting: toxic dioxins and furans

When burnt to recover valuable metals

- ❖ Switches : Mercury

<sup>17</sup>Varun Dalal, E-waste hell ,(Jun16,2020,09:01PM) [http://www.youtube.com/watch?v=dd\\_ZttK3Pu M](http://www.youtube.com/watch?v=dd_ZttK3Pu M).

<sup>18</sup>Gasó, D.J. (2005) Recycling of Electronics: a Lose- Proposition. Competitive Enterprise Institute,(May 16,2020,04:31PM)www.cei.org

<sup>19</sup>Supra note 41.

- ❖ Flat screen: Mercury
- ❖ Capacitors and transformers (old) : Poly Chlorinated Biphenyl

Table 1.3 contains the lists of various materials used in the different components of personal computer (PCs) in accordance with their weight and location. This table help us to understand the composition of hazardous wastes which are being dealt by recyclers when handle a single personal computer. It reflects the gravity of the current situation to understand the environment and health risks.

NAME	CONTENT (% OF TOTAL WEIGHT )	WEIGHT OF MATERIAL IN COMPUTER (lbs.)	USE / LOCATION
Aluminium	14.1723	8.5	Structural, conductivity/housing,CRT,PWB,Connectors
Arsenic	0.0013	<0.1	Doping agents in transistors/PWB
Barium	0.0315	<0.1	In Vacuum tube/CRT
Bismuth	0.0063	<0.1	Wetting agent in thick film / PWB
Cadmium	0.0094	<0.1	Battery , glu-green phosphor emitter/housing ,PWB,CRT
Chromium	0.0063	<0.1	Decorative , hardener /(steel)housing
Cobalt	0.0157	<0.1	Structural , magnetivity /(steel)housing ,CRT,PWB
Copper	6.9287	4.2	Conductivity /CRT,PWB
Europium	0.0002	<0.1	Phosphor activator/PWB
Gallium	0.0013	<0.1	Semiconductor /PWB
Germanium	0.0016	<0.1	Semiconductor /PWB
Gold	0.0016	<0.1	Connectivity , Conductivity /PWB, connector
Iron	20.4712	8.5	Structural , magnetivity /steel
Indium	0.0016	<0.1	Transistors, rectifiers /PWB
Lead	6.2988	3.8	Soldering ,metal joining
Manganese	0.0315	<0.1	Structural , magnetivity /steel

Mercury	0.0022	<0.1	Batteries , switches / housing ,PWB
Nickel	0.8503	0.51	Structural , magnetivity /steel
Niobium	0.0002	<0.1	Welding allow /housing
Plastic	22.9907	13.8	Includes organic ,oxides other than silica
Platinum	0		Thick film conductor /PWB
Palladium	0.0003	<0.1	Connectivity ,conductivity /PWB, connectors
Rhodium	0		Thick film conductor/PWB
Ruthenium	0.0016	<0.1	Resistive circuit /PWB
Selenium	0.0016	0.00096	Rectifiers /PWB
Silica	24.8803	<0.1	Glass, solid state devices /CRT,PWB
Silver	0.0189	<0.1	Conductivity /PWB, connectors
Tantalum	0.0157	<0.1	Capacitors/PWB, power supply
Terbium	0	0	Green phosphor activator, dopant/CRT,PWB
Tin	1.0078	0.6	Metal joining /PWB,CRT
Titanium	0.0157	<0.1	Pigment, alloying agent /(aluminium) housing
Yttrium	0.0002	<0.1	Red phosphor emitter/CRT
Zinc	2.2046	1.32	Battery, phosphor emitter/P[WB,CRT

Table 1.3 Composition of personal computers<sup>20</sup>

### Statement of Problem

The problem of this research lies at evaluating the damage caused by the “Electronic” Waste in India which is a potential and vulnerable source of environmental pollution including health hazards as well as degradation of the natural ecosystem besides having a well established regulatory mechanism for waste management, yet India is facing this serious threat of environmental degradation.

<sup>20</sup>Keekeesocean,E,Waste in India  
Short,documentary,(Jun20,2020,11:11AM)[http://www.youtube.com/watch?v=sFfaYc\\_pIx8](http://www.youtube.com/watch?v=sFfaYc_pIx8).

## **Aims and Objectives**

**Aim** –The main objectives of this Research is to establish certain solutions to the loopholes confronted by the Indian legal framework on “Electronic” Waste management to reduce the harmful influences of wastes on the ecology.

### **Objectives –**

1. To evaluate the ecological significance of waste specially the “Electronic” Waste;
2. To study the International and the national instruments on the waste management system;
3. To highlight the loopholes of the present waste management system of India so to find out the limitations of those laws or rules or the issues related to their implementation mechanism ; and
4. To highlight some probable suggestions for mitigating such limitations and issues after analyzing the views of different scholars on this behalf.

## **Scope and Limitations**

The Scope of this Research will include the following –

1. The study will draw the evolution of the waste management phenomena in general;
2. The study will deal with the literatures that is available between 2017-2019 and will provide gap between those literatures ;
3. It will also include a study of those International Legal Conventions and laws that are related to the waste management system specially that regulates the Electronic –waste and their relationship with the natural environment ;
4. The study will focus on the Indian legal framework governing the waste management process;
5. The waste management system under the study will include only the Electronic – waste management and handling specifically; and
6. The study will draw attention to the term ecology which includes the relationship between the living organisms and the natural environment.

## **Limitations**

The Research however will suffer from the following limitations –

1. Laws, Rules and Guidelines are dynamic in nature. With the emerging new demands in the society these laws rules will be subjected to changes by virtue of amendments for which this research will be valid until the period these laws remain unchanged;
2. It also limits the term ecology that include only the interrelationship between the living organisms and the environment , while the term ecology is a broad term which includes several social factors related to a particular individual;
3. The study will also focus on the national legislations of India and in order to have a clear understanding a detailed review of the laws of other countries also need a comparative analysis.

### **Research Questions**

This Research will make an attempt to find solutions of the following research questions-

1. Whether the legal framework relating to waste management is sufficient to deal with the problem between Electronic Waste management and environment protection;
2. Whether the waste management laws are sufficient enough to deal with the problems which emerge between e-waste management and environment protection?
3. Whether the laws relating to waste management in India are in conformity with the international and legal standards especially with respect to Electronic Waste management; and
4. Whether the laws relating to waste management in India are facing any challenges and if yes then how to mitigate those challenges?

### **Hypothesis**

The Research will be based on the following hypothesis-

**Hypothesis 1-** To study the damage caused by e-waste and to finds an alternative to manage and handle the e-waste scientifically and legally in order to mitigate its effect on the environment.

**Hypothesis 2-** Better implementation of laws related to waste management in India specially those which are related to electronic waste will ensure lesser ecological crisis.

## **Research Methodology**

The methodology to be followed for this Research will be legal doctrinal Method, where data will be secondary data. Historical approach of research will be applied for the purpose of studying the harms and opportunities of Electronic waste management as it is a very fast emerging threat to natural environment and implementation of laws related to waste management in India. An analytical approach will also be applied study the data that will be collected for conducting the research. Regarding data collection the following will be major sources of data-

1. Seminar Papers/ Articles
2. Books and Journals
3. Internet
4. Case law Reports.

Mode of citation will be Bluebook 20<sup>th</sup> Edition.

## **Literature Review**

**The Research is based upon the following literatures that have been reviewed in order to have a proper understanding about the problem and to understand the relationship that exists between the various subject-matters of the topic-**

1. **Waste Management – Environmental impact by L Lakshmi**<sup>21</sup> This book analysis the genesis of the laws relating to waste management at the international level and defines the meaning of wastes, its categories, the sources of wastes, how wastes impact us finally how it can be managed. This book is also important in this study as it provides with the concept of waste and its management in a manner that provides a general understanding about the concept.

It also provides an insight into the importance of these laws in the global arena. It gives us a very brief and clear explanation about wastes and most importantly about e- wastes and gives us a brief idea about the effects of e-wastes and the facts relating to e-waste in India which are very much important in order to derive at the conclusion of this research .

2. **Waste Management**<sup>22</sup>by **Vimlendu Jha**- This book is on waste management that provides an insight to the various aspects of wastes. It defines the meaning of wastes, its

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<sup>21</sup> L Lakshmi, Waste Management – Environmental impact (The Icfain University Press)(2008).

<sup>22</sup> Vimlendu Jha, Waste Management, Mobile Seva, e-book,Swissaid,India),(2017).

categories, the sources of wastes, how wastes impact us and finally how it can be managed. This book deals with the concept of waste and its management in a manner that provides a general understanding about the concepts related thereto.

This book is important for this research primarily because it provides very brief and clear explanation about wastes and most importantly about e-wastes. It gives us a brief idea about the effects of e-waste and the facts relating to e-waste in India which are very important in order to derive at the conclusion of this research.

- 3. The Development of Waste Management Law by Adam Johnson<sup>23</sup>**- This Article analysis the genesis of the laws relating to waste management at the international laevel. It provides us with an idea as to how the various laws relating to waste management were brought into existence. The reasons behind taking such initiatives and the negotiations involved in the world community for bringing forth those laws.

This article is important in this study as it provides an insight into the importance of these laws in the international arena. It also analysis the extent of international cooperation between several nations and the demanding values for bringing these laws into existence.

- 4 The Global E-waste Monitor, 2017<sup>24</sup>**- This is an effort provided by the United Nation University, International Telecommunication Union and International Solid Waste Association on the amount of e-wastes generated annually by different nations at the global level. It further provides an estimated assumption about the extent of e-wastes that is expected to be generated till 2025. It provides in addition to that the status of implementation of the e-waste laws in different countries as well as the implementation status of the Basel Convention.

This particular document is important for this study mainly because it provides us with the facts and data about the global e-waste generation as well about the working of the various e-waste legislations. It further provides necessary information relating to transboundary movement of e-wastes across the world. All these information are very essential for this study as they are directly related to the research problem.

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<sup>23</sup>Adam Johnson, The Development of Waste Management Law, (Jun16, 2020, 11:11AM) [https://n.oxforddictionary.cpm/dictionary/waste..EMRC, pdf](https://n.oxforddictionary.cpm/dictionary/waste..EMRC.pdf).

<sup>24</sup>Global E-waste Monitor, 2017, DNA 2017(Jun 19, 2020, 10:11PM)<https://www.dnaindia.com/analysis/column-the-business-of-e-waste>.

- 5 Solid Waste Management in Metro Cities in India by C S Shylajan and Souvik Bhattacharjya**<sup>25</sup> This Article states that the role played by the Ministry of Environment and Forest (MEF), Government of India (GOI) in defining the Municipal Solid Waste (MSW). Too much of MSW entering the environment puts additional stress on the assimilative capacity of the environment leading to risks to society and the environment. Municipal solid waste generated from cities in developing countries is a serious threat to urban environment as it causes hardships to public health and raises external costs. However, it has received lesser attention from policymakers and researchers than the other environmental problems. This article studies the mechanism of solid waste management in three urban cities, namely Kolkata, Delhi and Chennai. The study shows that Kolkata generates a huge amount of waste per day. Municipal Corporation, which is responsible for waste management, spends a substantial amount of its annual budget on waste collection and transportation.
- 6 *Can India manage its toxic e-waste?* By Banjot Kaur**—This article is about the situation of e-waste management in India and the various lacunas associated with it. This article provides a brief analysis about the various legal provisions relating to e-waste in India. Further, it also provides the views of some of the scholars who are expert in this matter about the status of the implementation of these rules in India. This article is important for the study at hand since it not only helps in understanding the actual implementation of the laws in India relating to e-waste management but also helps in justifying the validity of these rules in dealing with the situation. This article furthermore provides with an insight to the aspects as to how the different authorities responsible to manage the waste management system performing their duly assigned responsibilities.
- 7 Construction and Demolition Waste Management: from Japan to Hong Kong by Anton Ming-Zhi, Gao**<sup>26</sup> This Article begins by analyzing the problems faces in managing the construction and demolition waste ('C and D' works) and the corresponding legal and policy measures. He discusses that if one can save raw materials from getting damaged, by utilizing fewer raw materials then less waste is produced. Saving the existing construction materials is a more time-consuming method; which could be one of the reasons why the workers still use traditional slow and quiet ways to

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<sup>25</sup> C S Shylajan and Souvik Bhattacharjya, Solid Waste Management in Metro Cities in India, (Jan 2011).

<sup>26</sup> Anton Ming-Zhi, Gao, Construction and Demolition Waste Management: from Japan to Hong Kong, (Jun. 1, 2020, 10:01 PM) 2018.



dispose the demolition material. The management of Construction and Demolition waste (C and D Waste) has direct relationship with geographical situations and construction methods and affect the attitude and method of C and D waste management.

- 8 E-waste Management in India :Challenges and Opportunities (2019) by Ms Akanksha Manish and Dr Paromita Chakravorti<sup>27</sup>** – This is an Article which gives the brief idea about the legal provision in respect to e-waste in India and also focuses on the contemporary situation of e-waste management in India. Moreover, it also provide with the necessary information regarding to the growing problems of e-waste calls for greater emphasis on recycling of e-waste and better e-waste management and some views of scholars who are expert in this area. This article also important because it provides the fact and data about the e-waste generation at global level as well about the working of the various e-waste legislation. In addition to that it also provides information relating to the transboundary movement of e-waste.

### **Tentative Chapterization**

This paper will include the following tentative chapters-

1. Introduction
2. Evolution of Waste Management system
3. Ecological impact of E-Waste
4. International and legal framework on waste management
5. Legislative Framework of India on E-Waste : A Legal Analysis
6. Challenges and limitations related to E-Waste management
7. Conclusion and Suggestions

**Chapter 1** will provide a general introduction of the topic under study. It will further include the objectives, statements of the problem, hypothesis, the research questions, methodology and the literatures reviewed for the purpose of this study.

**Chapter 2** will make an analysis of the evolution of the waste management system in the world then in India as well. In addition to that it will also provide a brief explanation about the evolution of the E-Waste management system in order to understand that how the concept of waste management has changed across time.

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<sup>27</sup> Ms Akanksha Manish and Dr Paromita Chakravorti, E-waste Management in India :Challenges and Opportunities( May 22,2019,11:44 AM) [http://www. Wastemanagement/e-waste.pdf](http://www.Wastemanagement/e-waste.pdf).

**Chapter 3** this chapter will analysis the close relationship of waste management with the ecology and what are their impacts on the ecology relating to waste management.

**Chapter 4** in this chapter the focus will be on the International legal framework governing the waste management phenomena with special emphasis on E- Waste.

**Chapter 5** this chapter will include the Indian laws which are related to waste management which also includes Electronic-Waste management and the contemporary scenario relating to waste management in India.

**Chapter 6** this chapter will interpret the data with an attempt of preparing a report for solving the research questions as well highlight the challenges and limitations of the different waste management laws in the country including E- Waste management laws.

**Chapter 7** this chapter will finally provide the conclusion of the research and also testify the hypotheses and will make an attempt to provide with some important and vital suggestions by analysing all the facts which are related to this study so to solve the problems of this research.

## CHAPTER II

### EVOLUTION OF WASTE MANAGEMENT SYSTEM

#### What is “waste”?

Waste means matter or material of any type which is unwanted or something that is left after removal of useful substances or parts from those materials.<sup>28</sup>

As an adjective, waste indicates any material, substances or bi-product that has been estimated or discarded as of having no longer utility or is not required after the completion of a process.<sup>29</sup>

Wastes are objects or substances that are to be disposed of or are intended to be disposed of.<sup>30</sup>

Wastes are not the prime products which have no further use for the generator after his/her purpose of production, transformation or consumption and which the generator wants to dispose of.<sup>31</sup>

Waste is any object that the holder discards or intends to discard or is required to be discarded.<sup>32</sup>

From the above definitions we can derive that waste is something that is of no use and is meant to be disposed of. Waste may be of various types depending upon its nature of difference.

#### Types of Wastes

Wastes can be classified into various classes; however some of the broadly defined categories of wastes can be listed as follows-

##### 1. Municipal Wastes

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<sup>28</sup>Meaning of Waste in English, Cambridge Dictionary (May 17, 2020, 01:12 AM)  
<https://dictionary.cambridge.org/dictionary/english/waste>.

<sup>29</sup>Definition of Waste in English, Oxford Living Dictionary (May 17, 2020, 01:17 AM)  
<https://n.oxforddictionary.com/dictionary/waste>.

<sup>30</sup> Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, 1989, Art. 2(1)- “Wastes’ are substances or objects, which are disposed of or are intended to be disposed of are required to be disposed of by the provisions of national law”.

<sup>31</sup>In: Pongracz., Waste Minimization and Resource Use, (Jun 10, 2020, 08:00PM) Oulu, Finland, pp. 83–92.  
<http://www.oulu.fi/resopt/wasmin/ylamella.pdf>.

<sup>32</sup>*Ibid.*

It contains of those wastes which are generated from day to day affairs. They include clothes, wires, glasses, remains of foods, etc. they comes from schools, factories but mostly from households.<sup>33</sup>

## 2. Hazardous Wastes-

Hazardous wastes are those categories of wastes that possess potential threat to public health and environment.<sup>34</sup>Hazardous wastes can be of different categories depending on all the three physical aspects of wastes including gaseous, solid and liquid. Hazardous, such wastes requires different ways of treatment since they by nature cannot be disposed of though common means.

## 3. Biomedical Wastes-

Biomedical wastes are those wastes which includes infectious materials. They are mainly generated by physicians, dentists, medical research facilities or any other forms of health care units.<sup>35</sup> Medical wastes are any wastes generated during testing diagnosis, medical research, or treatment of either animals or human beings.<sup>36</sup>

## 4. Solid Wastes-

It includes any garbage, sludge, refuse, etc. from water supply treatment plant, wastewater treatment plant, air pollution treatment plant, etc. and other materials which are discarded including contained gaseous material, liquid, solid resulting from industrial, housing, agriculture, mining, commercial and other community activities but excludes solid or dissolved materials in domestic sewage or in industrial discharges or irrigation return flows subject to permit under 33 USC 1342, or special nuclear or by-product material as defined by Atomic Energy Act of 1954 or any other materials as defined by any agreements between contracted parties.<sup>37</sup>

## 5. Wet Wastes-

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<sup>33</sup> Waste, TOPPR (Mar 17, 2019, 02:12 AM) <https://www.toppr.com/guides/biology/our-environment/waste>.

<sup>34</sup>Resource Conservation and Recovery Act, EPA (May 17, 2020, 02:30 AM) <https://www.epa.gov/agriculture#Social%20Wastes>.

<sup>35</sup>What is Medical Wastes, Definition, Types, Examples and More, MP (May 17, 2020, 02:45 AM)

<https://www.medprodisposal.com/what-is-medical-waste-medical-waste-defination-types-examples-and-mors>.

<sup>36</sup>*Ibid.*

<sup>37</sup> What is Solid Waste, DEC (May 17, 2020, 02:45 AM) <https://www.gec.ny.gov/chemical/8732.html>.

They are generally biodegradable wastes which includes cooked ass well as uncooked fruits, vegetables, other food items, vegetable peels, flower wastes and all other decomposable wastes.<sup>38</sup>

#### 6. Gaseous Wastes-

These wastes results from dropping and dissolution activities. These are affluent released in the Earth's atmosphere in the gaseous form. They mostly include oxides of carbon, nitrogen, sculpture, etc.

#### 7. Electronic Wastes-

Electronic wastes are generally those wastes that are discarded after the utilization of an electronic gadget or product.<sup>39</sup>They are harmful because most of the e-waste like CPUs contains many harmful materials like cadmium, lead, brominated flame, etc. They are even considered as hazardous wastes in most cases like the United Nations Environment Programs Agency considers Cathode Ray Tubes, CRT monitors as hazardous.<sup>40</sup>

The above are few categories of wastes that are broadly defined, however wastes are also categorized as industrial wastes, agricultural wastes, domestic wastes, biodegradable-non biodegradable wastes and likewise. But the above mentioned categories give us a brief insight about those categories which are commonly used to define the nature of various types of wastes.

### **Development of Waste Management System**

Waste management includes those measures that are taken to manage wastes right from their inception to their final disposal.<sup>41</sup>An efficient waste management deals with all kinds of wastes including industrial, households and so on. Waste management system includes collection, transportation as well as disposal of savage, garbage and other forms of wastes; it includes all processes and resources for efficient handling of wastes in compliance with the health codes and environmental regulations.<sup>42</sup>

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<sup>38</sup>Wet Wastes, BBMP (Mar 17, 2020, 03:03 AM)

[bbmp.gov.in/BBMPSWM/Forms/Publicwastetreatment.aspx?Page=wet](http://bbmp.gov.in/BBMPSWM/Forms/Publicwastetreatment.aspx?Page=wet).

<sup>39</sup>Lava's initiatives for e-waste management, LAVA (Mar 18, 2020, 01:19 AM)  
[www.lavamobile.com/blog/ewaste-management/](http://www.lavamobile.com/blog/ewaste-management/).

<sup>40</sup>Russell Morgan, Tips and Tricks for Recycling Old Computer Wastes (Mar 18, 2020, 01:30 AM)  
[www.smartbiz.com/article/articleprint/1325/-1758](http://www.smartbiz.com/article/articleprint/1325/-1758).

<sup>41</sup>*Ibid.*

<sup>42</sup>Waste Management, Business Dictionary (Jul 18, 2020, 02:13 AM)  
[www.businessdictionary.com/defination/waste-management.html](http://www.businessdictionary.com/defination/waste-management.html).

Waste management now not only includes merely dumping down the unwanted wastes but also includes a systematic ways of handling the wastes with a proper system approach.<sup>43</sup>

Generation of wastes by human can be found throughout the history of human civilization. It was more in areas with high population density while it was low in areas with low population rates; however, waste management as a system was rarely popular in the ancient history. Mostly wastes were dumped or burned or thrown in open water for their disposal. Few communities practiced some unique ways of waste disposal like the Maya followed a fixed monthly ritual where the people of the village gathered together all their garbage burned them and dumped the remaining in large dumps.<sup>44</sup>

However, due to the industrial revolutions and increasing urban populations the streets of the urban areas in England started getting flooded with wastes as there were lack of waste clearance regulations during those times.<sup>45</sup> The first ever demand for establishing a municipal authority empowered with the powers of removing wastes was made in 1751 by Corbyn Morris. He advocated for clearance of wastes by a uniform public body for preserving the health of the people within the polluted cities.<sup>46</sup> But the first organized solid waste management system appeared in London in the latter half of the 18<sup>th</sup> century. Around the dust-yards a waste collection and recourse recovery system was established. The main waste in those days was the coal dust which had a value for soil improving and bricks manufacturing. However this system soon lost its importance as the dust lost its value in 1850<sup>47</sup>.

Soon due to huge health crisis and outbreak of massive cholera in the mid 19<sup>th</sup> century, there emerged a serious public health debate and due to a famous report via, The Sanitary Condition of The Labouring Population 1842, the first ever legislation on this issue originated. In London, the Nuisance Removal and Disease Prevention Act of 1846 marked

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<sup>43</sup> Waste Management: Meaning, Types/Methods, Importance, Benefits and Solutions (May 18, 2020, 01:34 AM) <https://www.indiacelebrating.com/environmental-issue/waste-management-meaning-types-methods-importance-benefits-and-solutions/amp/>.

<sup>44</sup>*Ibid.*

<sup>45</sup> Paul Halsall, Modern History Sourcebook: Florence Nightingale: Rural Hygiene, FU (Mar 19, 2020, 12:24 AM) <https://sourcebook.fordham.edu/mod/nightingale-rural.asp>.

<sup>46</sup> Lewis Herbert, Centenary History of Waste and Waste Managers in London and South east England, CIWM (Mar 19, 2020, 12:27 AM) <https://web.archive.org/web/20130813042213if../http://www.ciwm.co.uk/FILES/About..CIWM/100yrs..London..and..SE..center.pdf>.

<sup>47</sup> Costas A. Velis & Christopher R. Cheeseman, 19<sup>th</sup> century London dust-yards: A case study in closed looped resource efficiency, SD (Mar 19, 2020, 12:43 AM) <https://doi.org/10.1016/j-warsman.2008.10.018>.

the beginning of a legal regulatory mechanism for waste management in London.<sup>48</sup> The Municipal Board of Works became the first authority for centralizing sanitation regulation in cities that were rapidly expanding while the Public Health Act 1875 made household to deposit their wastes in moveable receptacles compulsory. Thus it introduced the concept of dust-bin.<sup>49</sup>

Due to the huge rate of increase of wastes that required disposal at a large scale brought into existence the incinerators which were then called as ‘destructors’. The first ever incinerator was built in Nottingham by Manlove Alliott & Co. Ltd in 1874. However, they met with huge oppositions since they produced a huge amount of ash that was again left out in the neighbouring areas. Similarly, at the turn of the 20<sup>th</sup> century other cities of Europe and North America came up with Municipal Bodies for waste management and in 1895 in United States, New York City became the first city to have a garbage management system.<sup>50</sup>

Early waste disposal tricks were simple dumping mechanism where the wastes were pulled by the horses to the dumping sites. However the first motorized trucks with a dumping lever mechanism came into origin in Britain in the year 1920. The Garwood Load Packer became the first truck to incorporate a hydraulic compactor in 1938.<sup>51</sup>

But soon the problem of garbage disposal became a global problem as transboundary movement of waste started taking place therefore thereafter several international conventions and regulatory framework for waste management came into existence which will be discussed in the fore coming chapters.

Thus waste management system means and includes a system that is for handling the wastes right from its inception to its final disposal in conformity to the health codes and the environmental regulations. Such management system differs from country to country based on their economic, political and other social aspects.

Most human activities generate waste which is evident throughout the history of human civilization. Despite that, the production of wastes remains a major source of concern as it has always been since pre historic period. In recent times, the rate and quantity of waste

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<sup>48</sup>Edwin Chadwick, The Victorian Web (Jul 19, 2020, 12:55 AM)  
[www.victorianweb.org/history/chadwick?.html](http://www.victorianweb.org/history/chadwick?.html).

<sup>49</sup>History of Solid Waste Management, EED (Jul 19, 2020, 01:11 AM)  
<http://environmentalisteveryday.org/publications-solid-waste-industry-research/information/history-of-solid-waste-management/early-america-industrial-revolution.php>.

<sup>50</sup>*Ibid.*

<sup>51</sup>*Supra note 33.*

generation have been on the increase; however, the system of waste management was rarely popular in the ancient times also. In pre historic period where wastes were merely a source of nuisance that needed to be disposed of. Proper management was not a vital issue as the population of that time was small and big amount of land was available to the population at that time. In those days, the environment easily disposed the volume of waste produced without any form of degradation.<sup>52</sup>

In recent times most of the developed countries passed through a period when they were developing environmentally. However, today most of these countries have effectively addressed much of the health and environmental pollution issues associated with waste generation. In contrast, the increasing rate of urbanisation and developments in emerging countries is now leading to repeat of the same historical problems that developed countries have had to address in the past.<sup>53</sup>

### **Development of E-Waste Management in India**

In India wastes were mostly managed by sweepers where the women use to carry the wastes in trays and dumped it in the nearby storage sites. The male sweepers used broomsticks to sweep the streets and bullock carts to carry the wastes to the disposal sites. It was estimated that the urban locations in India generated more than 1, 00,000 MT of wastes per day. The Ministry of Urban Development in 2011 estimated that urban cities generated approximately more than 0.1 million MT of wastes per day. It was even alleged that most of the local bodies including Municipalities and Nagar Panchayats in India did not provide an effective and efficient waste management system to the citizens. The Public Infrastructure Report of 2006 by Page no. 162 reported that in India no public system for collection of waste and sanitary waste management was provided since then. The old and traditional waste management system was based on the caste system where the untouchables were mainly responsible for manually collecting wastes. The techniques used for waste collection and their disposal were mostly out dated. It led to several health related consequences, like for instance the breaking down of huge epidemics in Surat.<sup>54</sup>

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<sup>52</sup> *Supra note 78.*

<sup>53</sup>Nduwe, E. Government and Business: Telecom Infrastructure In tandem. January 2006. Paper Presentations/Publications (May17, 2020, 10:00PM). [www.ncc.gov.ng](http://www.ncc.gov.ng).

<sup>54</sup>Evolution of Solid Waste Management System in India, Ch 3, Shodhganga (May 18, 2020, 01:23 AM) <http://shodhganga.infillbret.ac.in/bitstram/10603/19421/08...chapter%203.pdf>.



The concern for disposal and recycling of e-waste gained prominence after the expansion and growth of the technological revolution where due to the existence of potential threat to the human health because of the presence of hazardous substances in such e-waste, several rules and regulations were passed internationally.

E-waste was first dumped in landfills or was incinerated but soon due to the realization of the detriment that was caused to the environment by these e-wastes, the first legislation for organizing the e-waste management system, The Resource Conservation and Recovery Act -, RCRA was passed in 1976 in the United States. But this Act led to the dumping of wastes in the least developed countries which led to the suffering by rest of the world as a consequences of such dumping of e-waste in their land. Two landmark incidents in 1980s worked as eye-openers for the entire world over this issue. The first incident was the Khain Sea Waste Disposal incident, where a ship named Khain Sea registered in Liberia was carrying approximately 14,300 tons of toxic ashes from incinerated e-waste in Philadelphia. The original destination for disposal of that waste which was New Jersey refused to accept such a quantity of waste, as a result of which the ship was searching for a new destination in the Atlantic Ocean for its disposal. The ship within the time span of two years dumped around 4,000 tons of wastes in many least developed countries while more than about 10,000 tons of waste were dumped in the Indian and the Atlantic Ocean. Similarly, an incident where around 3,500 tons of wastes were dumped in a small town called Koko in Nigeria that were carried from Italy in 1988. These two incidents primarily led to the emergence of the Basel Convention in 1989 with a prime objective to regulate the transboundary movement of waste between nations in general and to prevent movement of hazardous wastes from the developed countries to the LDCs in particular. Since then several recycling unit for extracting useful resources from e-wastes and then for the disposal of the remaining in the safe manner started opening up across the globe.<sup>55</sup>

The concept of Electronic waste or e-waste came into existence when electronic and other electrical equipment become unfit for their originally intended purpose or that have crossed the expiry date. Devices like Computers, servers, mainframes, monitors, compact discs (CDs), printers, scanners, copiers, calculators, fax machines, battery cells, cellular phones, transceivers, TVs, iPods, medical apparatus, washing machines, refrigerators, and air conditioners are examples of e-waste (when unfit for use). These electronic equipment

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<sup>55</sup>Karan Thakkar, History of E-waste, LIN (May 20, 2020, 12:17 AM)<https://www.linkedin.com/pulse/history-e-waste-karan-thakkar>.

replaced with latest models because of the rapid technological advancements and production of latest electronic devices. As a result of which it led to an exponential increase in e-waste generation. People tend to switch over to the newer models and the life of products has also decreased.<sup>56</sup>

Basically the composition of e-wastes includes plastics, cathode ray tubes (CRTs), printed circuit boards, cables, and many others. Significant metals could be recovered from e-waste, if or when they are scientifically and mechanically processed which includes such as copper, silver, gold, and platinum and many more.<sup>57</sup> The amount of toxic substances such as liquid crystal, lithium, mercury, nickel, polychlorinated biphenyls (PCBs), selenium, arsenic, barium, brominated flame retardants, cadmium, chrome, cobalt, copper, and lead, makes it extremely unsafe, if e-waste is dismantled and prepared in a simple manner with simple or unplanned techniques. E-waste brings a hazard or risk to humans, animals, and to the environment as well. The designs of heavy metals and highly toxic substances like mercury, lead, beryllium, and cadmium creates a serious threat to our natural environment.<sup>58</sup>

Consumers are the key to better management of e-waste through the process of reuse, recycle and reduce. Initiatives such as Extended Producer Responsibility; Design for Environment; Reduce, Reuse, Recycle (3Rs), technology platform for linking the market facilitating a circular economy aim to encourage consumers to correctly dispose their e-waste, with increased reuse and recycling rates, and adopt sustainable consumer habits. In developed countries, e-waste management is given high priority, while in developing countries it is exacerbated by completely adopting or replicating the e-waste management of developed countries and several related problems including, lack of investment and technically skilled human resources.<sup>59</sup> In addition, there is lack of infrastructure and absence of appropriate legislations specifically dealing with e-waste. Also, there is inadequate description of the roles and responsibilities of stakeholders and institutions involved in e-waste management, etc. In 2016, the Ministry of Environment, Forest and Climate Change (MoEFCC) released

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<sup>56</sup>Milojkovic, J. & Litovski, V. (2005) Concepts of computer take-back for sustainable end-of-life. FACTA UNIVERSITATIS. Working and Living Environmental Protection, 2, 363–372.

<sup>57</sup>Toxic Substances Control, Managing waste cathode tubes, Computer and Electronic Recycling Index,(Jul 20,2020,10:00PM)<http://www.recycle.net/price/computer.html>.

<sup>58</sup>Manufacturing of Electronic Equipment for Reuse and Recycling, (Jun30, 2020, 06:00PM) <http://www.deer2.com>.

<sup>59</sup> *Ibid.*

the updated E-waste (Management) Rules, which came in supersession of the E-waste in India (GOI, 2016).<sup>60</sup>

### **International Problem Related to E-Waste**

It is continued to take place illegal shipment and dumping of e-waste even with the convention also.<sup>61</sup> So, Basel Convention aims at reducing and regulating the movement of hazardous waste as international treaties between the nations. It is estimated that about 50 million tonnes of e-waste was estimated globally during the year 2018. About 70% of the world's population are covered by e-waste legislation out of which personal devices as computers, screens, smart-phones, tablets, TVs and the remainder being larger household application with heating and cooking equipments.<sup>62</sup> But 20% of global e-waste is recycled in every year which covered about 30-40 million tonnes of is either burned for resources recovery or illegally traded and treated in a sub-standard way. More than 100 million computers are thrown away in the US with less that 20% being recycled properly.<sup>63</sup> China alone discards 160 million electronic devices in a year. But, China has been regarded as the largest e-waste dumping site in the world and hundreds of thousands people have expertise in dismantling electronic junk. Now the rate of e-waste volume is increasing globally which is 10 to 15% yearly.<sup>64</sup> One third of electrical and electronic e- waste in the EU is reported as separately collected and appropriately treated. The introduction of EPR scheme during year 2003 was the important step in South Korea where 70% respectively and the remaining was sent to landfill sites or incineration plants. The EU WEEE directive imposes collection, recovery and recycling targets on its member countries clearly in the EU.<sup>65</sup> It stipulates a minimum collection target of 4kg/ capita per year for all the member states. Thus the collection and weight based recycling targets seek to reduce the amount of hazardous substances disposed into landfills and to increase the availability of recyclable materials that indirectly encourages less virgin materials consumption in new products. Switzerland is the first country in the world to have established and implemented a formal e-waste management

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<sup>60</sup>Xiao C, Laurence A., United Recycling, (May 21, 2020, 10:14AM)  
<http://www.unitedrecycling.com/takeback/main.html>.

<sup>61</sup>Silicon Valley Toxics Coalition. Poison PCs and toxic TVs, (May 16, 2020.07:00PM) <http://www.svtc.org>.

<sup>62</sup> *Supra note 10*.

<sup>63</sup>Hewlett-Packard (HP) Hardware Recycling,(May 16,2020.07:00PM) <http://www.hp.com>.

<sup>64</sup> *Supra note 7*.

<sup>65</sup> Materials for the Future , CRT smelting. The electronics recycling issues(May 21,2020,10:14AM)MBA Polymers, Inc.; [www.mbapolymers.com](http://www.mbapolymers.com).

system that has recycled 11kg/capita of e-waste against the target of 4kg/capita set under Waste Electrical and Electronic Equipment (WEEE) by the European Union (E.U).<sup>66</sup>

In developing countries compared to EU and Japan, the zero enforcement of existing regulatory framework or law existing regulatory framework or low level of awareness, sensitization and adequate occupational safety for those involved in these process exacerbate e-waste management which have well-developed initiatives at all levels aimed at changing consumer behaviour. So, there is need for developing countries to adopt effective strategies to encourage reuse, refurbishment or recycling e-waste in specialized facilities to prevent environmental contamination and human health risks.<sup>67</sup>

The Basel Action Network (BAN) aims to ensure that e-waste is dealt with in an environment-friendly manner. It safeguards the planet from toxic waste trade. The BAN, Silicon Valley Toxic Coalition (SVTC) and Electronics Take-Back Coalition (ETBC) constitute an associated network of environmental advocacy NGO's in the US. The three organisations common objective is to promote national level solutions for hazardous waste management. A recent initiative has been e-stewards, a system for certifying recyclers and takes back programmes so that conscientious consumers know which ones meet high standards. It is also know that the China, Peru, Ghana, Nigeria, India and Pakistan are the biggest recipients of e-waste from industrialized countries of the world.<sup>68</sup>

### **E-Waste Problem in India**

In India e-waste management system is of recent development. It is mainly because India was not technology developed to that extent to produce huge pile of e-waste. However due to the changing time the country has also witnessed the impacts of the technological revolution for which e-waste management has now emerged as a serious topic for discussion primarily in the legal sector. In 2011, E-waste Handling and Management Rules became the first set of rules governing specifically the e-waste generation and its disposal. Subsequently E-waste management Rules were passed in 2016 which were again amended in 2018.

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<sup>66</sup>Alvesalo, Anne, Steve Tombs, 2006. Re-imagining crime prevention: Controlling corporate crime? *Crime, Law, and Social Change*, 45: 1-25.

<sup>67</sup> *Ibid.*

<sup>68</sup>Barry, Dan. 2010. A quiet evening, waiting for the next angry man. *Washington Post*. (May 09, 2020, 11:34AM)from nytimes.com/2010/03/15/us/ 1 51and.html?hpw.

India stands 5th position in the world for top most e-waste producing countries after the USA, China, Japan and Germany and recycles less than 2% of the total e-waste it produces annually and formally.<sup>69</sup>

And also India is at 177 positions amongst 180 Countries as per the Environment Performance Index 2018 and as per a report released at the world Economic Forum 2018. It was linked to poor performance in the environment health policy and deaths due to air pollution categories. India generates more than 2 million tonnes of e-waste annually since 2018 and also imports huge amount of e-waste from other dumping in the open dump-sight which gives rise to issues as ground water contamination, poor health.<sup>70</sup> Electronic Waste Management identified that computer equipment account for almost 70% of e-waste, followed telecommunications equipment phones, Electrical equipment, and medical equipment with remaining from household e-waste in India as per study of the Associated Chambers of Commerce and Industry of India.<sup>71</sup> The e-waste Collection, transportation, processing and recycling is dominated by the informal sectors. Sectors are well networked and unregulated. All the materials and value that could be potentially recovered are not recovered. In addition, there are serious issues regarding leakages of toxins into the environment and workers fatty and health.<sup>72</sup> Delhi is the largest e-waste dismantling centre of India. Adults and children spend 8 to 10 hours daily extracting reusable components and precious metals like copper, gold and various functional parts from the devices. E-waste recyclers use processes such as open incineration and acid leeching. This situation could be improved by creating awareness and improving the infrastructure of recycling units along with the prevalent policies. The majority of the e- waste collected in India is managed by an unorganized sector. And also informal channels of recycling and reuse of electronics such as repair shops, use product dealers, e-commerce portal vendors collect a significant proportion of the discarded electronics for reuse and can utilization of parts and components.<sup>73</sup>

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<sup>69</sup>Neil. 2010. The Austin tragedy of the IRS out of control. *Findlaw.com*. (Jul 22, 2020, 04:42PM) [writ.news.findlaw.com/buchanan/20100225.html](http://writ.news.findlaw.com/buchanan/20100225.html).

<sup>70</sup> *Supra note 19*.

<sup>71</sup> *Ibid*.

<sup>72</sup> *Supra note 18*.

<sup>73</sup> Robert Tonetti, EPA Office of Solid Waste, presentation materials "EPA's Regulatory Program for E-Waste," (May 26, 2020, 10:30AM) <http://www.epa.gov/waste/conserva/materials/ecycling/docs/e-wasteregs.pdf>.

## CHAPTER III

### ECOLOGICAL IMPACT OF E-WASTE

#### Meaning of Ecology

Ecology is defined by various scholars and organizations in various ways. It is broad as well as dynamic term for which a single definition of this term to indicate a single approach is near about impossible. However, some of the commonly used definitions of this term can be mentioned as below-

Ecology refers to that scientific study which studies the processes which influences the distribution and abundance of organisms, their interactions as well as the interactions between them and the transformation and flux of energy and matter.<sup>74</sup>

Ecology is the study that studies the relationship between plants, animals, human and the environment including the balances between these relationships.<sup>75</sup>

It is a branch of biology that deals with the relationship and interactions between the organisms and their environment including other organisms.<sup>76</sup>

From the above definitions of ecology it becomes clear that ecology is broadly a discipline that studies the relationships and interactions between the living organisms and their environment. For this paper the term ecology will be limited to the aspect of studying how the waste management system influences the interrelationships between the human beings, the other organisms and the environment. In short, the study will focus on how the waste management system influences the natural eco system.

The subject of ecology is known in India since long back. The Vedas, Epics and Puranic writings have dealt with ecological thoughts. Charaka, an ancient physician described the importance of Vayu (air), jala (water), Vruksha (tree), Desha (topography) and Kala (time) in regulation of life. Similarly, the concept of ecology appeared in the writings of the Greek philosophers like Hippocrates, Aristotle, Theophrastus, and Reaumur, who mentioned the topics of organisms in their writings, namely, natural history, the habits of animals and the

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<sup>74</sup>Definition of Ecology, Carry Institute of Ecosystem Studies (Jun 18, 2020, 02:13 AM)  
<https://www.carryinstitute.org/discover-ecology/definition-ecology>.

<sup>75</sup>Definition of Ecology, Collins (May 18, 2020, 02:23 AM)  
<https://www.collinsdictionary.com/dictionary/english/ecology>.

<sup>76</sup>Freeman M. H. 1989. Standard Handbook of Hazardous Waste Treatment and Disposal, McGraw-Hill Company, USA.

plants growing in different areas. Theophrastus, who first described inter-relations between organisms and their environment, has been called the 'First Ecologist'.<sup>77</sup>

Antony Van Leeuwenhock (1632-1723) explained the food chains and population. Linnaeus (1707-1778) and Buffon, in his book Natural History in 1756 made notable contributions to the subject of ecology. English botanist Bradley mentioned biological productivity in the early 18th century. Before the term 'Ecology' was coined, Charles Darwin's book On the Origin of Species, which was published in 1859, contained many seeds that could grow to dominate modern ecology.<sup>78</sup> There is some controversy about the person who coined the term ecology and first used it in literature. Kormondy states that Henry David Thoreau, the American naturalist and philosopher, for the first time in 1857, used the term 'Ecology' among other fields of biology and natural history. But he did not provide a definition of the term 'Ecology'. There are references in literature in favour of German biologist, H.Reiter, who is said to have used the term 'Ecology' for the first time in 1868 ( see Reiter, 1885 ;Macmillan, 1897).<sup>79</sup>

The term 'Ecology' has been defined by different ecologists as given below:

**Ernst Haeckel (1866):-** "Ecology is the body of knowledge concerning the economy of nature i.e. the investigation of the total relations of the animal to its inorganic environment".<sup>80</sup>

**Warming (a Danish botanist) (1895):-** Ecology (Oekologie) is "the study of organisms in relation to the environment".<sup>81</sup>

**Frederick Clements (an American ecologist) (1916):-** "Ecology "is the science of community".<sup>82</sup>

**Charles Elton (a British ecologist) (1927):-** "Ecology is the scientific natural history concerned with the sociology and economics of animals".<sup>83</sup>

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<sup>77</sup> *Ibid.*

<sup>78</sup>Third World Network. 1991. Toxic Terror: Dumping of Hazardous Wastes in (the Third World, Third World Network, Malaysia.

<sup>79</sup>*Ibid.*

<sup>80</sup>*Ibid.*

<sup>81</sup>*Supra note 14.*

<sup>82</sup>Basel Action uploaded on (2013) Exporting Harm: The High-Tech Trashing of Asia (Jun 23,2020,11:13AM)

<http://www.youtube.com/watch?v=yDSWGV3jGek>.

<sup>83</sup>*Supra note 16.*

## The Nature and Scale of the Problem

Initially waste management was dealt within the individual level where the discarded materials were disposed off in the nature. But as human civilization progressed, the amount of wastes and the extent of them being hazardous increased to a level that now the nature cannot bear the burden of such an amount of untreated wastes, as a consequence of which, present day civilization is facing a lot of health crisis as well as ecosystem degradation.

Similarly, since the last few decades a new category of waste known as the Waste Electrical or Electronic Equipment (WEEE) or electronic waste has created huge concerns in both developed and the developing countries which is at present one of the fastest growing streams of waste.<sup>84</sup> E-waste has already constituted a huge environmental problem since currently shares 5% of the world's municipal waste which is at a fast growth in the developed countries.<sup>85</sup> United States leads the table for producing the largest volume of legally accounted wastes while in EU it is increasing at the rate of three times in every five years. An UNEP study report provided that EU alone produces around 5-7 million of e-wastes every year which amounts to 14-15 kg/capita annually and this amount is about to increase by 3-4% till 2017. While in 2011, China produced around 11.1 million MT of e-wastes compared to 10 million MT produced by US.<sup>86</sup> It shows that the developing countries have also joined this race of e-waste production. Besides the domestic wastes, the e-wastes from US, EU and other developed countries are being discarded in China due to weak regulations.<sup>87</sup> It is assumed that out of 29-50 million MT of e-wastes 75-80% is shipped to the developing countries specifically Asia and Africa for recycling and disposal.<sup>88</sup> Out of these developing countries a large amount of e-waste is bang exported to China and India; however some of the other destinations are Pakistan, Bangladesh, Ghana, Nigeria and Kenya.<sup>89</sup> It is believed that these exports to these countries for the disposal of e-wastes amounts to the growth of the informal economic sectors as well as contributes to the GNP. But the technologies of these developing

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<sup>84</sup>Dateline uploaded on (2011), E-waste hell ( Jun 20, 2020, 01:11 AM)

[http://www.youtube.com/watch?v=dd\\_ZttK3PuM](http://www.youtube.com/watch?v=dd_ZttK3PuM).

<sup>85</sup>E-waste, the hidden side of IT Equipment's manufacturing and use, early warning on emerging environmental threats, Ch 5, UNEP DEWAGRID Europe (2025).

<sup>86</sup>Kevin Brigden,(2008). Chemical contamination at e-waste recycling, Ghana, Greenpeace Toxic Tech 10, August 2008.

<sup>87</sup>Tian B. Lij, Status quo of e-waste export in mainland China, 14, IJGEH, 1-10 (Jun 20, 2020, 01:11 AM)

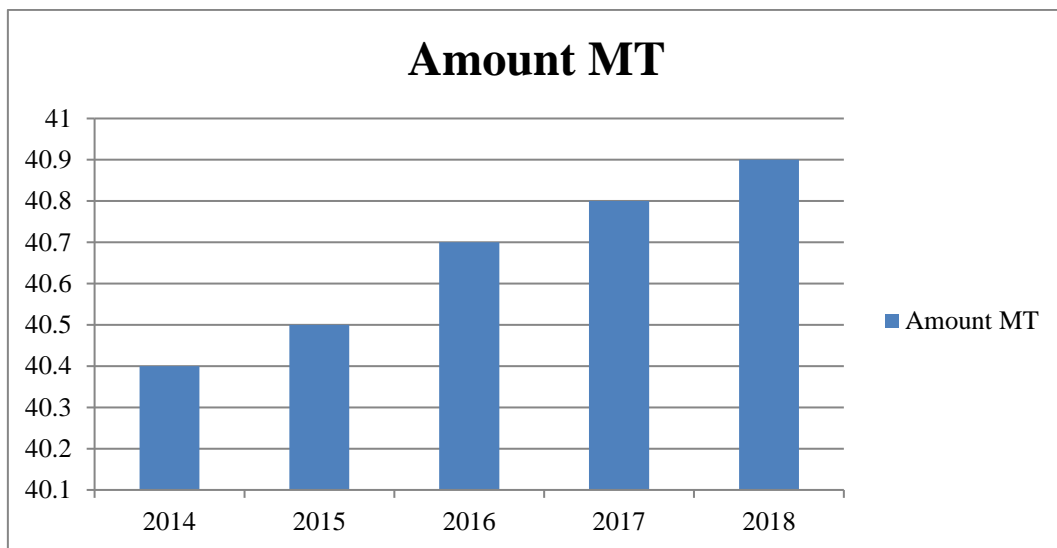
<http://urpan1.un.org/intradoc/groups/public/documents/apoity/unpan050303.pdf>.

<sup>88</sup>Michelle Heacock, et. Al, E-waste and Harm to Vulnerable Population: A Growing Global Problem, EHP (Jun 20, 2020, 01:11 AM) <https://www.nobi.nlm.gov/pmc/articles/PMC485409/>.

<sup>89</sup>Robinson, E-waste, an assessment of global production and environmental impacts, STE (Mar 21, 2019, 11:12PM) <https://www.ncbi.nlm.nih.gov/pubmed/19846207/>.



nations are highly primitive or out-dated as a result of which the disposal mechanism possess a huge potential of threat to the safety of the workers and also to the environment.<sup>90</sup> These transboundary movements of waste are illegal under the Basal Convention of 1992 and also under the respective national environmental legislations.<sup>91</sup> These e-wastes contain several hazardous as well as toxic substances which are non-biodegradable in nature. A pro-long accumulation of these wastes may result in decoration in both human as well as ecosystem health. Based on the scientific reports on this issue, the EU banned e-waste from the landfills in 1990.<sup>92</sup> Scientific studies have proved that due to the chemical exposure from the e-wastes results into health hazards like fetal loss, low birth weight, prematurity, abnormal thyroid formations and developments, Geno toxicity and neurological disturbances.<sup>93</sup>



**Figure 3.1. Global E-waste generated<sup>94</sup>**

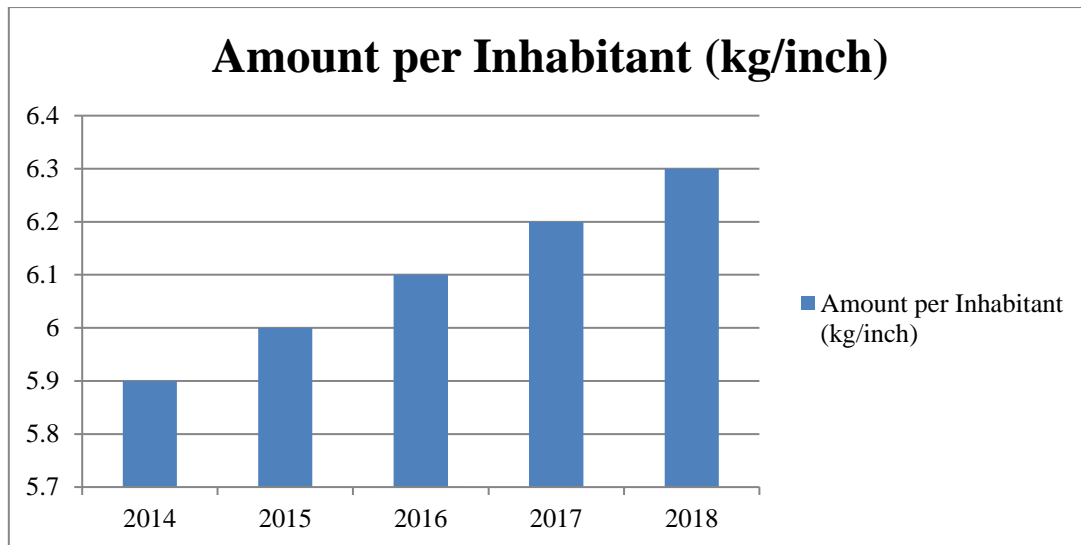
<sup>90</sup> F Schneider, *The Shadow Economy*, an international survey, Cambridge University Press, UK.

<sup>91</sup> Basel Convention on Control of Transboundary Movements of Hazardous Wastes and their Disposal, 1992.

<sup>92</sup>M. Khurum. S, *Electronic Waste: A Growing Concern on Today's Environment*, 2011, ERI (Jul 22, 2020, 11:10 PM) <http://dx.doi.org/10.1155/2011/474230>.

<sup>93</sup>*Ibid.*

<sup>94</sup>CP. Balde, et al, *The Global E-waste Monitor*, 2017, UNU (May 20, 2020, 01:13 AM) <https://www.itu.int/en/ITU-/Climate-Change/Documents/GEM%202017/Global-E-waste%20Monitor%202017%20.pdf>.



**Figure 3.2. Global E-waste generated per Inhabitant**

The above two figures depicts a clear image that how e-waste production has significantly increased year after year and which is even expected to increase furthermore.

To save our present day civilization, we are to take preventive measures on the amount of untreated wastes from which regularly increasing burden day by day for which we are the people cannot save our progress of human civilization as well as present day civilization is facing a lot of health crisis and ecosystem degradation. So, the Waste Management should be dealt with at the individual level where the discarded materials can be disposed off in nature and also take care on the system of air pollution.<sup>95</sup>

Similarly, a new category of waste is known as Waste Electrical and Electronic Equipment (WEEE) or Electronic Waste has been created huge concerns in both developed and the developing countries since last few decades which is one of the fastest growing streams of waste at-present. It has constituted huge environmental problems and it stands at a fast growth in the developed countries. The United States leads a table for producing the largest volume of legally accounted waste, it is increasing at the rate of three times more in every 5 (five) years.<sup>96</sup> A study report provides that EU produces around 5 to 7 million of E-wastes every year along which amount to 14-15 kegs/capita annually and this amount is about to increase by 3-4% till 2017 while in 2011- china produced around 11.1 million MT of e-waste

<sup>95</sup>J. Puckett, L. Byster, Exporting Harm: The High-Tech Trashing of Asia, The Basel Action Network (BAN) and Silicon Valley Toxics Coalition,(Jun12,2020,20:00AM) <http://www.ban.org/E-waste/technotrashfinalcomp.pdf>.

<sup>96</sup>R. Wanjiku, "HP Africa e-waste problem," Computerworld Kenya, (Jun 29, 2020, 07:00AM) <http://www.computerworld.co.ke/articles/2009/02/20/hp-and-partners-tackle-africa-e-waste-problem>.

compared to 10 million MT Produced by US . And it shows that the developing countries have also joined this race of e-waste production. Besides domestic waste, it is assumed that out of 30-50 percent million MT of e-waste at-least 70 to 80 percent is shipped to the developing countries in Asia and Africa for recycling and disposal.<sup>97</sup>

A large amount of e-waste is being exported to china and India out of developing countries. However other destinations are Bangladesh, Pakistan, Kenya, Ghana and Nigeria. These exports to these countries for the disposal of e-waste amount to the growth of the informal economic sectors as well as contribute to the GNP. The technologies of these countries are highly primitive or out-dated as a result, the disposal mechanism poses a huge potential of threat to the safety of the workers and also to the environment. The e-waste contains several hazardous as well as toxic substances i.e. non-biodegradable in nature. As per scientific reports on these issues, the EU banned e-waste from the landfills in 1990. It has proved that due to chemical exposure from the e-waste result into health hazards like fatal loss, low birth weight, pre-maturity , abnormal thyroid formations, development of neon toxicity, neurological disturbances and losses of immunity in human body which cannot protect themselves from the nature creates virus like ‘ Corona’ from the polluted environment.<sup>98</sup>

The consumption of electronic appliances is massive and increases steadily. As a consequence, e-waste may be considered as one of the fastest-growing waste streams in the world today. This trend is likely to continue because of technological innovation and the relatively short lifespan of electronic devices. The special consistency of e-waste also results in high recycling costs, which lead to another set of problem. As labour costs are low and environmental regulations more lenient in many developing countries, it is more convenient for developed countries to dispose of e-waste there instead of dealing with the problem within their own borders. Being aware of the increasing threat, limited measures have been taken by governments to counteract the difficulties.<sup>99</sup>

At present, large proportions of waste from these latter categories are recycled or reuse. For example, inert demolition rubble is often reused in new construction projects or road building. Perhaps more critically, much of the waste from these categories falls outside present legal controls, because it is either not ‘waste’ for the purpose of waste legislation or it

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<sup>97</sup>NRDC (2012), Natural resources defense council, E-Waste: Our Electronic Junk (Jul 14, 2020, 07:00PM)<http://www.nrdc.org/living/stuff/e-wastesaving-developing-communities-electronicjunk.asp>.

<sup>98</sup>Ramachandra T.V., (2004), e-waste management. *Envis Journal of Human Settlements* (Jul 14, 2020, 07:00PM) from <http://www.ces.iisc.ernet.in/energy/paper/ewaste/ewaste.htm>.

<sup>99</sup>*Ibid.*

is classified as exempt from many of the controls. Accordingly, most legal controls have been directed at dealing with municipal, industrial, and commercial wastes. The amount of municipal waste produced is slowly dropping, but there are still significant challenges in order to reduce waste production.<sup>100</sup>

Historically, most of the waste disposed of in the UK was land filled. Almost 80 percent of municipal waste was disposed of in landfill sites, with historical low levels of recovery and recycling. Over time, the amount of waste going to landfill has decreased and the figure now stands at 50 percent. By comparison, on average, other EU Member States have had much lower rates of landfill (40 percent) and higher levels of recycling (26 percent). There were a variety of reasons for the comparative poor performance of the UK in comparison to other countries. Much of the reliance on landfill as the preferred option for waste disposal reflected the availability of suitable landfill sites with relatively stable geological conditions.<sup>101</sup> The reliance on landfill, in turn, led to the lack of development of other recycling and recovery options. This abundance of cheap landfill sites has also contributed to inertia in terms of new laws and policies that would have encouraged alternative waste recycling and recovery Options or waste minimization. This position is in sharp contrast to other European countries, which made greater use of legal and economic instruments, such as bans on the land filling of certain wastes, extended producer responsibility for waste recycling and recovery, high taxes on landfill, and direct charging for the disposal of household waste. A combination of these measures provides incentives to minimize waste production and develop alternative facilities to sort, recover, and recycle waste.<sup>102</sup>

The position in the UK is in the process of changing, with many new initiatives and policies Partly, this is because many existing landfill sites are reaching their full capacity and because the supply of suitable new locations for landfill sites is very limited indeed. In some areas, the problem is acute, leading to the need to transport waste long distances. Another driver is the need to implement European legislation that sets waste reduction, recycling, and recovery targets. The main consequence is that, although waste production is set to rise, the amount of waste going to landfill is falling and will continue to fall over the next fifteen years. On the assumption that this reduction is not met through waste minimization initiatives, there will have to be a huge increase in alternative disposal, recovery, and recycling routes. Principally,

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<sup>100</sup>Daniel j.DeNoon, Study Links Cancer to Aspartame,(May 30,2020,10:00 PM),<http://www.cbsnews.com/stories/2005/07/28/health/webmd/main712605.shtml>.

<sup>101</sup>News Release,OPA,US Secretary of Labor Elaine L. Chao Outlines Accomplishments of High-Level Us Department of Labour Delegation to China (Jun 24,2020,11:00PM), <http://www.dol.gov/opa/media/press/opa/OPA20041146.htm>.

<sup>102</sup>*Ibid.*

this will be met through an increase in waste incineration capacity, with the recovery of the energy produced. Other waste management methods, such as composting and recycling, will also have to be increased.<sup>103</sup>

### **Impact of E-Waste on Environment and Health**

The presence of various chemicals, heavy metals and other hazardous substances endangers the health of the people and also the environment.<sup>104</sup> The following are some of the effects of various metals used in the computer upon human health and environment.

**Table 2: Hazardous Substance Present in PCs and Their Impact on Health<sup>105</sup>**

<b>Hazardous substance</b>	<b>Type</b>	<b>Health Problems</b>	<b>Environmental Problems</b>
<b>Cadmium</b>	<b>Toxic</b>	<b>Respiratory Problems, Kidney Problems Poisonous in nature</b>	<b>Acute environmental degradation with cadmium emission during recycling</b>
<b>Lead</b>	<b>Toxic</b>	<b>Central and Peripheral nervous systems, endocrine and blood system, and, and kidneys in humans.</b>	<b>Toxic effects on plants, animals and microorganisms and their blood and nervous systems</b>
<b>Mercury</b>	<b>Toxic</b>	<b>Damage to brain , skin problems</b>	<b>Settles down in the water, effects the plants, animals and microorganisms</b>
<b>Chromium</b>	<b>Toxic</b>	<b>Skin Allergies, Asthmatic problems, allergies and DNA damage</b>	<b>Burning of chromium emits toxic gases which is dangers to living beings and settles as sludge in the ground water.</b>

<sup>103</sup>Rachel Clark, Dealing with Uncertainty, RACHEL'S Env'T & Health Weekly, (Jun 24,2020,09:09 AM) <http://dieoff.org/page32.htm>.

<sup>104</sup>Ahsan Shamim, et. Al, E-waste Trading Impact on Public Health, IJWR (May 24, 2020, 11:10 PM) <https://www.omicsonline.org/pdfdownload.plp?public-health-and-ecosystem-services-indeveloping-countries-2252-5211-1000188.pdf&aid=65103>.

<sup>105</sup> *Ibid.*

<b>Plastic</b>	<b>Toxic</b>	<b>Respiratory and Digestive problems, allergies</b>	<b>Burning of plastic and PVC products generates dioxins and furans</b>
<b>Brominated Flame Retardants</b>	<b>Toxic</b>	<b>Endocrine problems, respiratory problems, effects the brain functioning</b>	<b>Affects the food chain , fish and birds low development of fetus brain, contaminates the water and air</b>

In addition to the above stated health problems and environmental issues, still newer dimensions of ‘e’ waste hazards have been noticed. The computer waste has increased chances of cancer.<sup>106</sup> Experiment conducted further found that the blood of the people handling the computer waste manually has more metallic contents particularly chlorinated and brominated substance. The dioxins and toxins are released into the atmosphere when the circuit boards and plastics are burnt in the open atmosphere or incinerators. The ashes also contain hazardous chemical substances when they are sent for landfill contaminates the surroundings. The steam used to clean the computer components and the residual sludge resulting from the cleaning process contains trace of heavy metals which when mixed and flown along with the municipal sewage waste pollutes the water reservoirs and also ground water by way of seepage. Thus, the e-waste poses a great threat before the environmentalists and regulators to mitigate its impact upon the environment.<sup>107</sup>

The environmental issues associated with computer waste are on par with that of industrial hazardous waste. The heavy metals, particularly cadmium, chlorides, bromides, lead, mercury, affect the natural environment while treated and transported. If they are used for landfills, the soil, water and air will be contaminated because of their reactions with moisture contents of the earth and the atmosphere.<sup>108</sup>

During the incineration, emissions contain hazardous vapours of chemicals. It is very difficult at this stage to assess the overall impact up the computer waste upon the individual and the

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<sup>106</sup>Wingspread Conference on the Precautionary Principles, The Wingspread Consensus Statement on the Precautionary Principle, (Jun 12, 2020, 08:00AM), <http://www.sehn.orgwing.html>.

<sup>107</sup>Coby SC, Wong, et. Al, Evidence of excessive release of metals from primitive e-waste process in Guiyu, China, 148, EP.

<sup>108</sup>*Ibid.*

environment. The severity can be experienced and the processes are established the activities are being undertaken fully.<sup>109</sup>

Due to economic constraints and lack of proper scientific infrastructures for disposal of huge amount of e-wastes after globalisation has made suffer in many developing and developed countries. It is yet to be ascertained that the emission of harmful elements from the e-waste which impacts on human health. It has proved the presence of harmful toxic elements that biological samples derived from human bodies are due to exposure of humanity to the chemical present in the e-waste. So that, such exposure to the e-waste produces toxic or genotoxic effects in the health of the workers who are working in such e- waste management centres and also influences the health of the local residents and their future generations.<sup>110</sup>

It is found that the computers, monitors, television and other e-products items contains about 50% of lead and 70% of heavy hazardous metals that are found in the landfills that are used as e-waste disposed . The harmful metal poses toxins which can reach into the soil and also into the groundwater from the landfills.<sup>111</sup> The air pollution chemicals are chromium, cadmium, lead, arsenic etc. Which have been identified as present in the atmosphere in and around the e-waste disposal. After studies, it has also identified the presence of silicosis, mercury, exposure to dioxins, carcinogens and other Metals as occupational safety hazards that is due to inhaling of fumes which are generated during the process of disposal of such e-waste and due to drinking of having contaminated water and foods. And on the other hand, some health hazards like thyroid malfunctions, lung disorders, abnormal hormone expressions, irregular birth weight and childbirth etc. are also mainly caused by these e-wastes.<sup>112</sup> So, these compounds and toxic metals are believed to be the major threats on public health. It also includes the direct exposure ingestion of contaminated fumes and dust, skin contacts with several harmful substances. As the people work in the recycling zones without protection and suffer from such direct occupational hazards. The recycling operations involves burning of plastic metals to extract metals for scrapping and then also openly burning the circuit boards for removing solder and washing them in acid that they can get remove the gold or other metals etc. This acid is then mostly dumped into the water surfaces

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<sup>109</sup> E-waste, the hidden side of IT Equipment's manufacturing and use, early warning on emerging environmental threats, Ch 5, UNEP DEWAGRID Europe (2025).

<sup>110</sup>Tian B. Lij, Status quo of e-waste China, 14, IJGEH, 1-10 (May 20, 2020, 01:11 AM) <http://urpan1.un.org/intradoc/groups/public/documents/apoity/unpan050303.pdf>.

<sup>111</sup>Michelle Heacock, E-waste and Vulnerable Population: A Growing Global Problem, EHP (May 20, 2020, 01:11 AM) <https://www.ncbi.nlm.gov/pmc/articles/PMC485409/>.

<sup>112</sup>Robinson, E-waste, an assessment of global production, STE (May 21, 2020, 11:12PM) <https://www.ncbi.nlm.nih.gov/m/pubmed/19846207/>.

available nearby which leads to contaminate the ecosystem. So, these processes are officially banned and also declared as illegal of acid leaching of the e-waste.<sup>113</sup>

The direct and indirect child workers in e-waste recycling zone and their health impacts had been established by some researches. Researchers have provided evidences about child workers whose health have been impact during e-waste recycling process as if it difficult to estimate the actual number of child workers in those sites due to lack of data segregation and analysis. Blood samples were examined of children working in the e-waste recycling sites and the reports of which found and proved presence of lead, cadmium etc. in their blood after a case study in Managua, Nicaragua from Australia, China and USA.<sup>114</sup>

The harmful hazardous substances generated due to more accumulation of e-waste which contaminates water resources and causing of environmental degradation. The above mentioned facts indicate that e-waste impact on human health and the natural ecosystem. It gives us an idea that there is an urgent need of taking serious action on the issue where more such evidences are available.<sup>115</sup>

The e-waste after globalization has made many developing and least developed countries suffer mainly due to economic constrains as well as due to lack of proper scientific infrastructures for proper disposal of such huge amount of e-wastes. The health impacts on human beings due to the exposure to the harmful elements in the e-wastes are yet to be properly ascertained but biological samples derived from human bodies have proved the presence of harmful toxic elements that are due to the exposure of humanity to the chemicals present in the e-wastes. But there is no doubt that such exposure to the e-waste produces toxic or genotoxic effects in the health of the workers working in such e-waste management centers and also influences the health of the local residents and their future generations where such e-waste management centers are located. Another serious issue is that most of these people are unaware about the harm that the use of these electronic devices and their disposal in the landfills causes due to the extent of harmful chemicals present in those e-wastes. It is found that computers, monitors, televisions and other display items contains around 49% of lead and almost 70% of all heavy hazardous metals that are found in the landfills that are used as e-waste disposal sites. These harmful metals possess toxins that can leach into the soil and

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<sup>113</sup>M. Khurum. S, Electronic Waste: A Growing problem on Today's Environment, 2011, ERI (May 22, 2020, 11:10 PM) <http://dx.doi.org/10.1155/2011/474230>.

<sup>114</sup> *Ibid.*

<sup>115</sup>CP. Balde, the Global E-waste Monitor, 2017, UNU (May 20, 2020, 01:13 AM) <https://www.itu.int/en/ITU-/Climate-Change/Documents/GEM%202017/Global-EMonitor%202017%20.pdf>.



also in to the groundwater from the landfills. They can also evaporate and enter into the air through incineration. It has therefore alleged by many researchers that environmental degradation takes place due to the improper handling of these e-wastes, that can further enter the human body through various pathways amongst which inhaling of contaminated air and dust is one of the most significant pathways. Some common chemicals that cause pollution are- chromium, cadmium, lead, arsenic, etc. and these have been identified to be present in the atmospheres in and around the e-waste disposal sites in China. BAN studies have identified silicosis, mercury, exposure to dioxins, carcinogens as well as other metals as occupational safety hazards that is due to inhaling of fumes which are generated during the process of disposal of such e-wastes and also due to drinking and having contaminated water and foods in the disposal sites.<sup>116</sup>

Some of the health hazards that have been identified to be caused by these wastes are thyroid malfunctions, lung disorders, abnormal hormone expressions, irregular birth weight and childbirths, etc. Belonged compounds and heavy metals are believed to be the major threats on public health. Direct exposure includes ingestion of contaminated fumes and dusts, skin contacts with several harmful substances, etc. Basically, people working in the recycling zones with very poor protection suffer from such direct occupational exposure hazards. The most commonly used recycling operations involves burning of the plastic metals to extract the metals for scrapping, then openly burning the circuit boards for removing solder or washing them in acid so that the gold or other metals gets removed. This acid is then mostly dumped into the open water surfaces available nearby which contaminates the water ecosystem. Although, the process of acid leaching of the e-waste is officially banned and is declared as illegal, yet in countries like China, it is still openly used. Researchers have shown that Pearl River is one of the largest light industrial bases in China where dissolved metal concentrations were found.<sup>117</sup>

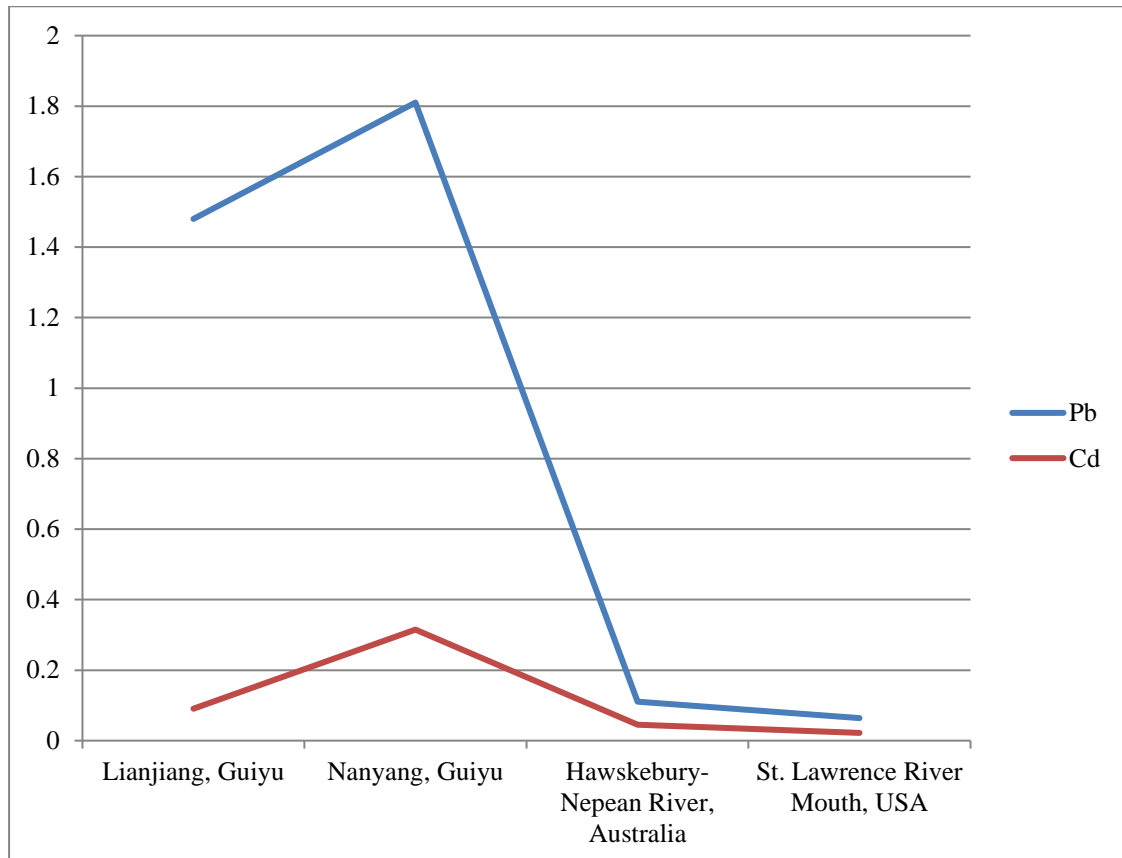
A link between direct and indirect children health workers in e-waste recycling zones and their health impacts had been established by several researches. It is however difficult to estimate the actual number of child workers in those sites mostly due to lack of data segregation and analysis but researches have provided evidences about such children workers whose health have been impacted by e-waste recycling process. A case study in Managua,

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<sup>116</sup>World Health Organisation (1992) (cited in Kevin *et al.*, 2008) Cadmium. *Environmental Health Criteria* 135. ISBN 941571357.

<sup>117</sup>*Ibid.*

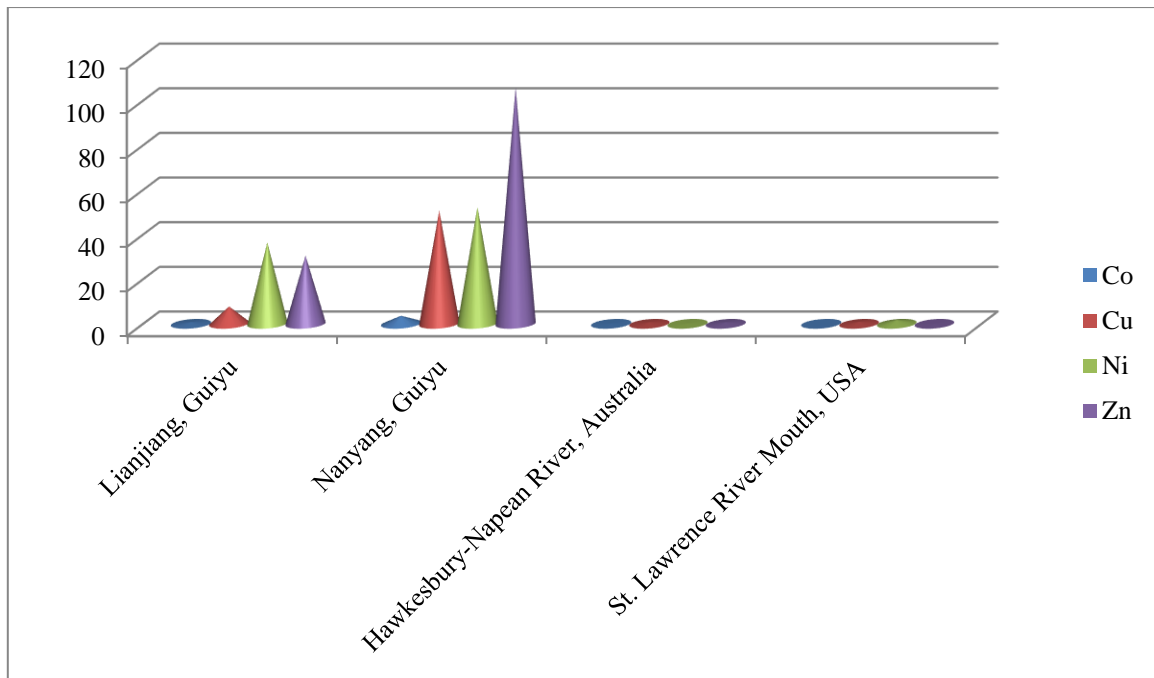
Nicaragua, blood samples of children working as scavengers in the e-waste recycling sites were examined, the reports of which proved presence of lead in their blood. Amongst them, those who worked at the waste disposal site 29% of lead that was more than the community action level of 100ug/L as recommended by CDC (Center for Disease Control and Prevention). While elevated body loadings of heavy metals were reported in two other studies. In Guiyu, China 80% of the children are estimated as suffering from respiratory diseases. Evidences of leukemia were also reported.<sup>118</sup>



**Figure 3.3. Amount of Pb and Cd in few rivers from China, Australia and USA<sup>119</sup>**

<sup>118</sup>Van Birgelen, A.P.M. (1998) (cited in Kevin et al., 2008) Hexachlorobenzene as a possible major contributor to the dioxin activity. *Environ. Health Persp.* 106(11): 683-688.

<sup>119</sup>*Ibid.*



**Figure 3.4. Amount of Co, Cu, Ni and Zn in the above mentioned rivers**

The two figures shows us that harmful hazardous substances generated due to huge accumulation of e-wastes contaminates the water resources, thereby causing environmental degradation.

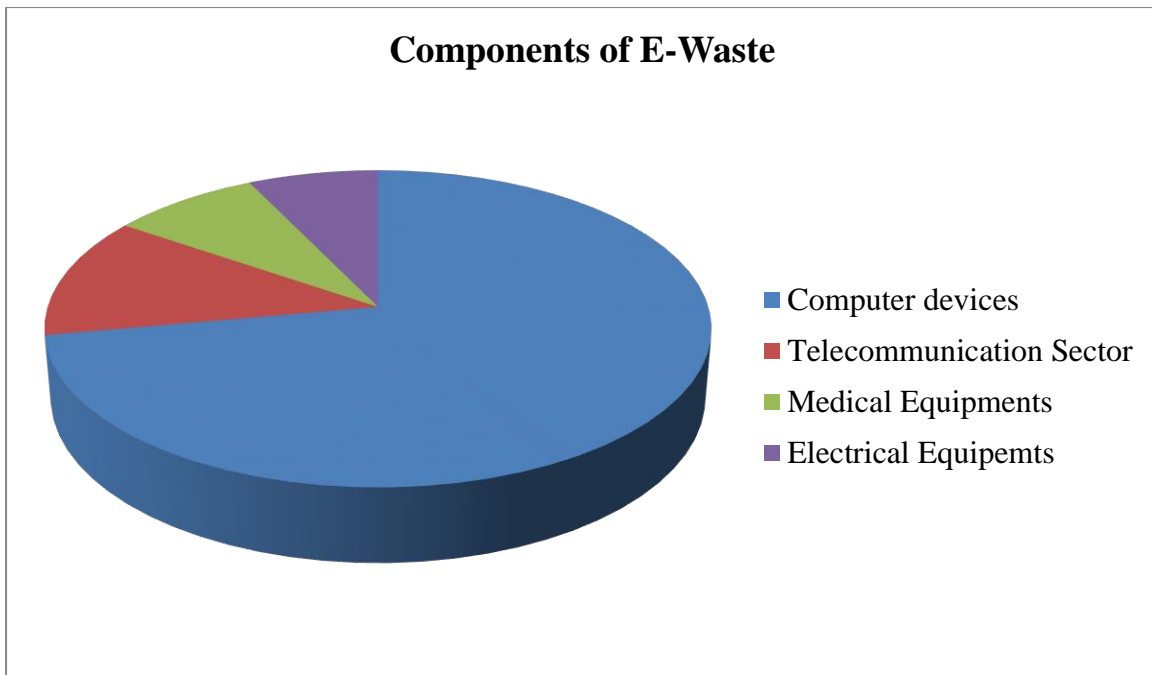
The above mentioned facts are just an indicative that how e-waste impacts on the natural ecosystem and human health. There are many such evidences but these give us an idea that there is an urgent need of taking serious concerns about the issue.

### **Environmental and Health Impacts of E-waste in India**

India produces a huge amount of e-waste and takes 5th position in the world as largest producer where about 2 million tons of e-waste is generated annually within the countries out of which an undocumented amount of e-waste is imported from other countries.<sup>120</sup> The following are some of the chief components of e-wastes in India which contribute to e-waste.<sup>121</sup>

<sup>120</sup>India fifth largest producer of e-waste, TH (May, 21, 2020, 11:13 PM) <https://www.thehindu.com/sci-tech/energy-and-environment/india-fifth-largest-producer-of-e-waste-study/article-14340415.ece#>.

<sup>121</sup>Miles Park, Electronic Waste is Recycled condition in India, THE CONVERSE, (May 22, 2020, 12:11 PM) <https://theconversation.com/electronic-waste-is-recycled-in-appalling-conditions-in-india-110363>.



**Figure 3.5. - Different Components of E-Waste in India.**

Devices	Amount of Waste Generated
Computer devices	70%
Telecommunication Sector	12%
Medical Equipments	8%
Electrical Equipments	7%

India also suffers from the problem of e-waste and air pollution. India is at 9<sup>th</sup> position out of 10 related to the most polluted cities in the world. E-waste recycling system like de-soldering processes the ability of contributing to such air pollution. The air pollution again leads to water and soil pollution from the chemicals released in the air during the process of e-waste recycling.<sup>122</sup> It comes again back on the earth after raining which ultimately contaminates the water and soil. The surface water is now estimated to be polluted about 80% in India.<sup>123</sup> This huge amount of soil contamination due to PCB is found to be mainly in Chennai followed by Bangalore, Mumbai and Delhi. The pregnant women, children and old age persons falls under the category of vulnerable population who are more susceptible to the health impacts that are

<sup>122</sup> *Ibid.*

<sup>123</sup> *Supra note 75.*

the results of exposure to the e-waste. Around 5 lakhs of children are estimated to be working in e-waste recycling sites. The children are sensitive to lead poisoning while pregnant women may suffer from abortions, premature births etc. Due to the exposure to the hazardous chemicals of e-waste that seem from the various researches.

The public and private sector companies generate the highest quantities of e-waste that is 75% while household sector generates 16% in India; producing largest amount of e-waste is the top listed cities Mumbai, New Delhi, Bangalore and Chennai. In the landfills and ground water 40% of lead and 70% of other heavy metals from the e-waste amount.<sup>124</sup> India has generated around 5 million tons of e-waste out of which 4 kgs of e-waste per capita approximately during this year 2020.

The most important problem is that the workers working in the recycling sites of these wastes are unaware about the extent of risk involve in such improper handling. It is found that about 25,000 of workers inclusive of children are engaged in e-waste recycling sites in New Delhi. Out of which about 3 units dismantles which stands 10,000 to 20,000 tons of such waste bare handed and those materials are lift unrecycled are either discarded in the landfills or are buried down. So these methods may leads to contamination of air water and soil.<sup>125</sup>

From the above discussion, we may found that how seriously e-waste impacts us especially on our ecosystem and the health of the poor citizens as well as the resident of India.<sup>126</sup>

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<sup>124</sup>Monika, Jugal Kishore, E-waste Management as a Challenge, IJCM (May 22, 2020, 12:13AM) [www.ijcm.org.in/article.asp?issn=09700218,year=2010,volume=35,issue=4,spage=392,subset=monika](http://www.ijcm.org.in/article.asp?issn=09700218,year=2010,volume=35,issue=4,spage=392,subset=monika).

<sup>125</sup>Maria Abib-Habib & Hari Kumar, Air Pollution Environmentalists Are Wary, NYT (Mar 22, 2020, 12:10 AM) <https://www.nytimes.com/2019/01/11/world/asia/india-air-pollution.html>.

<sup>126</sup>Sushmi Dey, 80% of Indian water may be polluted, TOI (May 22, 2020, 12:15AM) <https://m.timesofindia.com/home/environment/pollution/india-surface-water-may-be-polluted-report-by-international-body-says/articleshow/47848532.cms>.

## CHAPTER IV

### INTERNATIONAL AND LEGAL FRAMEWORK ON WASTE MANAGEMENT

#### International law and Waste management

International law and Waste management generally, waste regulation has been concerned with controlling the management of waste within the domestic context. There are three main areas in which international environmental law has played a significant part. First, the organisation for Economic Co-operation and development (OECD) has played an important role in harmonizing international definitions of waste, which, in turn is reflected in the European List of Wastes.<sup>127</sup>

Secondly, international law has had a major impact on preventing the dumping of waste at sea. The United Nations Convention on the Law of the Sea (UNCLOS) provides a general obligation to prevent marine pollution, which covers dumping (Arts, 19-4). More particularly, the 1972 London Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter provides a global framework for the control of the deliberate disposal at sea of wastes or other matter, with various regional agreements- such as the 1992 Oslo- Paris (OSPAR) Convention for the Protection of the Marine Environment of the North East Atlantic – applying to specific geographical areas.

Thirdly, as waste regulation became tighter in some countries, the costs of disposal rose and it became common practice to export hazardous wastes to developing countries in which it could be disposed of at a lower cost -mainly as a result of lower environmental standards. The control of transboundary movement of hazardous waste is governed at the international level by the Basel Convention on the Control of Transboundary Movement of Hazardous Waste and their Disposal. The Convention entered into force in May, 1992 and was ratified by the UK on 7 February 1994.<sup>128</sup> The Convention establishes a system whereby the exporter of waste must obtain the consent of the regulatory authorities in the importing country prior to shipping that waste. That consent must include a written confirmation that the importer of the waste will deal with the waste in an environmentally sound manner. In cases in which the consignment of waste cannot take place-for example, in circumstances under which it would

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<sup>127</sup>2 Frederick Pollock, *The History Of English Law* 308-23(2d ed. 1912).

<sup>128</sup> *Ibid.*

not be handled in an ‘environmentally sound manner’ -the exporter of the waste is bound to take back the waste within ninety days.<sup>129</sup>

While the Basel Convention has attempted to regularize the position in relation to the export of hazardous waste to developing countries, it has been argued that the Convention legitimates the trade in hazardous waste, which is open to abuse through the use of vague subjective standards, such as managing the transfer in an ‘environmentally sound manner’, and the lack of effective monitoring and control. The result is that there is a risk that waste is still imported into developing countries either illegally or without proper regard to the risks associated with its recovery.

The EU Regulation on the Supervision and control of shipments of Waste within, into and out of the community gives effect to the Basel Convention throughout the EU. The regulation subjects the transfer of all waste (not only that which is hazardous) between countries to system of ‘prior informed consent’ of the regulatory agencies in two respective countries. The Regulation has direct effect, but the UK subsequently ratified the Basel Convention in 1994 and its requirements are now implemented under the Transfrontier Shipment of Waste Regulations 2007 and the UK plan for Shipments of Waste.<sup>130</sup>

This plan sets out the policy behind the Regulations. It is advisory and non-binding (although it gains its force through the Regulations.)

The type of notification that must be given differs depending upon the nature of the waste that is shipped, whether the waste is destined for recovery or disposal and whether the waste is transferred between two Member State or out of the EU. Waste that is being transported for disposal is relatively straightforward and must comply with the requirements of the Basel Convention. In the UK, the Plan for shipments of waste bans all exports of waste for disposal and bans most imports for disposal, other than in exceptional cases in which wider environmental considerations apply. Waste transported for recovery is controlled under a more complicated system. The EU Regulation adopts two processes.<sup>131</sup>

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<sup>129</sup>Evolution of Solid Waste Management System in India, Ch 3, Shodhganga (May 21, 2020, 01:23 AM) <http://shodhganga.inflibret.ac.in/bitstream/10603/19421/08...chapter%203.pdf>.

<sup>130</sup> *Supra note 20*.

<sup>131</sup>Karan Thakkar, History of E-waste, LIN (Mar 20, 2019, 12:17 AM) <https://www.linkedin.com/pulse/history-e-waste-karan-thakkar>.

- A prior written notification and consent process, which is used for hazardous and semi-hazardous waste intended for recovery.
- An information-based procedure in which shipments are accompanied by certain information, which is used for non-hazardous waste intended for recovery.

The procedure is linked to two lists of Wastes:<sup>132</sup>

- ‘Green list’ waste listed in Annex III of the Regulation is covered by the information-based procedure. Shipments of ‘green list’ waste need to be accompanied by a contract between the parties involved in the transport, basic information, such as a description of the waste, quantity shipped, the name and address of the person to whom the waste is consigned, and a description of the recovery operation involved. In addition, such shipments are allowed if the waste is dealt with in an environmentally sound manner throughout its movement and it is treated using techniques that are broadly equivalent to those used within the EU—that is, under the Waste Framework Directive. Finally, the person shipping the waste and the consignee must keep a copy of the completed documentation for three years.
- ‘Amber list’ waste can be found in Annex IV to the Regulation. Shipments of ‘amber’ waste must be subject to the notification procedures found in the Basel Convention. Under the notification procedure, the notifier (shipper of the waste) must submit the notification to the ‘home’ regulatory authority, which then sends it on to the regulatory authorities at the destination and in any transit countries. The regulatory authorities have thirty days in which to give their consent (with or without conditions) or to object. If a shipment cannot be completed, the notifier must take the waste back.

### **The Defects of the Transfrontier shipment legislation**

The importance of effective Transfrontier legislation increases as domestic waste disposal costs rise; the availability of cheaper disposal routes abroad becomes attractive—particularly if credit for recycling and recovery can be gained within domestic regimes. In 2005 and 2006, over 50 percent of shipments were identified to be non-compliant with the requirements of the Transfrontier Shipment of Waste Regulations. Most of the breaches related to mixtures of wastes collected from municipal waste streams. The inspections demonstrated that they were being exported as ‘green list’ or ‘non-notifiable’ wastes, whereas the true legal position was

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<sup>132</sup> *Ibid.*



that they should have been notified to the Environment Agency.<sup>133</sup> Other illegal shipments were being exported to countries that did not wish to accept. Thus one of the key changes in the amended Regulation is to impose stricter controls over the movement of ‘green list’ wastes. This applies for the first time to movements of Waste outside the EU. In addition, there is now an obligation to ensure the ‘environmentally sound’ management of all waste throughout the shipment, and during its recovery and disposal.

Other defects related to the import of hazardous wastes as demonstrated by the saga of the import of the so-called US Ghost Ships. The US Maritime administration (MARAD) owned 130 old warships that needed dismantling. The ships were hazardous, because of small quantities of hazardous wastes, such as PCBs and asbestos, within the structures. MARAD approached a UK company to carry out the work on thirteen of the ships in a dock at Hartlepool. MARAD applied for Transfrontier Shipment (TFS) consent in June 2003. Under the Regulation, the Environment Agency was only allowed thirty days within which consent had to be given or consent was deemed to be granted. Once granted, the TFS approval could not be revoked. The Environment Agency issued its consent in July 2003.<sup>134</sup> Subsequently, it became clear that there were a number of problems with the proposed recovery processes that were to be carried out on the ships. The planning permission for the site was invalid and existing waste management licence needed to be modified to cover the proposed recovery operations. As a consequence, the US ships could not be dismantled, because the necessary authorizations were not in place. The ships had, however, already set sail for the UK. The Agency’s attempt to modify the waste management licence breached on a nearby nature conservation site. Friends of the Earth overturned the modification in the High Court.<sup>135</sup>

The saga of the Ghost Ships demonstrated that, as in other areas of environmental regulation the many overlapping powers and responsibilities need to be clearly coordinated. The importation of hazardous waste requires a number of related consents or authorization in addition to the requirement for TFS approval. The thirty-day period for consent is too short to

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<sup>133</sup>E-waste Inventory Assessment Manual, UNEP, 1-13(May 13, 2020, 01:12 AM) <https://www.linkedin.com/history-e-waste-karan-thakkar>.

<sup>134</sup>Electronics Takeback Coalition (2010) “Facts and Figures on E-waste and Recycling”[www.electronicstakeback.com](http://www.electronicstakeback.com); Updated June 4.

<sup>135</sup>UNEP, (2007a) E-Waste: Volume I Inventory Assessment Manual. United Nations EnvironmentProtection” 123 pp.

allow for proper consideration of the overall consequences of importation and there is no formal process of consultation with statutory bodies or the public.<sup>136</sup>

### **European Waste Management law and Policy**

European policy on waste management is based largely upon broad objectives centred around a ‘waste hierarchy’. One of the weaknesses of the EU’s previous Environment Action Programmes (EAPs) however, has, been the vagueness of the specific methods of promoting the waste hierarchy. The Sixth EAP, Environment 2010: Our Future, Our Choice, identified waste and resources as one of the four priority areas for action. The programme generally follows the waste hierarchy in the setting of objectives in terms of Prevention, recycling, and reuse. Various waste streams are identified for specific action and the idea of integrated product policy in reducing waste is emphasized.<sup>137</sup> The general objectives found in the Sixth EPA are supplemented by a more specific thematic strategy on waste prevention and recycling, which sets out plans to identify priority wastes, measures to ensure their recycling and collection, and instruments to encourage the creation of markets for recycled materials. With the most recent Framework Directive (2008/98/EC), the waste hierarchy now enjoys a stronger statutory base.<sup>138</sup>

#### **The waste hierarchy:<sup>139</sup>**

The cornerstone of all waste law is the aim of meeting, as far as possible, a hierarchy of waste with policies and laws designed to promote measures as high up the hierarchy as possible. The hierarchy is as follows.

##### **1. Prevention**

The primary aim is to prevent the creation of waste at source the proper design of products and processes. This is linked with such initiatives as the development of integrated product policy, clean technology, eco-labelling, and product life cycle analysis.

##### **2. Recycling and reuse**

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<sup>136</sup>Schmidt, C. W, (2006) “Unfair Trade e-Waste in Africa”, *Environmental Health Perspective*, Vol 114, No 4, April, pp 232-235.

<sup>137</sup>Townsend, T. G. (2011) “Environmental Issues and Management Strategies for Waste Electronic and Electrical Equipment. *Journal of Air & Waste Manage. Assoc.* Vol 61pp 587–610

<sup>138</sup>Weil, N, (2005) *E-waste Dumping Victimized Developing Nations*, *Study Says*, IDG/PC World News, October 31.

<sup>139</sup> *Ibid.*

A second aim is to recycle or to reuse waste that is produced, with particular emphasis to place on the use of waste as a source of energy, for example, through combined heat and powers schemes linked to waste incinerators. An obvious example of the EU's role in this area is its development of the producer responsibility obligation, covering such waste streams as packaging waste, end -of life vehicles, batteries, and electrical and electronic waste.

### 3. Proper management and disposal

A third aim is that waste should be disposed of safely, preferably by incineration, with landfill only used as a last resort.

European law on waste management is based around Directives that lay down general principles, such as the setting up of licensing and inspection system to ensure that the management of waste does not harm human health and the environment. These general principles can be found in the broad framework Directive on waste (2008/98/EC). These general principles are complicated by more detailed legislation. These cover two main areas.<sup>140</sup>

First, there are a number of important Directives that address methods of waste treatment, including Directives on landfill (99/31/EC) and Industrial Emissions (Integrated Pollution Prevention) (2010/75/EU). These Directive lay down standards for waste treatment- such as emissions of dioxins from incinerators and the type of line for landfill - and ban the disposal of certain products in landfills -for example , liquid waste and tyre.

Secondly, there is a group of Waste Directive that are more concerned with the management of particular types of waste. Some of these Directives address particularly hazardous waste, where as others seek to reduce the amount of wastes arising in certain in waste streams.<sup>141</sup>

#### **The European list of wastes<sup>142</sup>**

While the framework Directive sets out objectives and control over waste generally, there are more specific obligations in relation to categorizing waste. Article 7 of the Framework directive requires the drawing up of a list of wastes. Initially, this was found in the European Waste Catalogue, which classified waste into one of twenty main groups. The Waste Catalogue was subsequently amended by the European list of Wastes.

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<sup>140</sup>Bamako Convention on the Ban and the Control of Transboundary Movement and Management of Hazardous wastes into Africa, 1998.

<sup>141</sup> *Supra note 33.*

<sup>142</sup> UNEP, (2007b) E-Waste: Volume II E-Waste Management United Nations Environment Protection, 124 pp.

## **Waste Treatment Directives<sup>143</sup>**

In addition to the general principles laid down, the Framework Directive, the second group of European Directives addresses methods of waste treatment. For example, the industrial Emissions (Integrated Pollution Prevention and Control) Directive regulates waste treatment and encourages waste minimization as a part of many significant industrial installations, including landfill sites and incinerators. There is an overlap between this Directive and two other important waste treatments Directive on landfill and waste incineration (the waste incineration Directive will be repealed from January 2014). These latter Directives introduce specific standards for waste treatment (for example, emission and performance standards), whereas the former Directive applies a general framework of standards and objectives to the waste installation as a whole. The extent of these overlaps has been ameliorated by the incorporation of the main substantive provisions into the Environmental Permitting (England and Wales) Regulations 2010.

## **The Waste Incineration Directive<sup>144</sup>**

The Waste Incineration Directive 2000/76/EC (repealed by the Industrial Emissions Directive from January 2014) replaced and extended two previous Directives on the incineration of municipal and hazardous waste. The directive has a general application to both normal incinerators and those plants in which the incineration of waste is used primarily as fuel to produce energy or other products (Art.1). This would include waste to energy plants and such things as cement kilns. All incinerators are required to be subject to authorization and the authorizations, or permits, must have conditions listing the type and quantities of hazardous and non-hazardous waste that may be treated, the plant's incineration or co-incineration capacity, and the sampling and measurement procedures that are to be used (Art.4).<sup>145</sup> The Directive lays down minimum time and temperature for waste combustion in order to guarantee complete waste combustion (Art. 5) and there are emission limit values (ELVs) set down for atmospheric emissions of certain substances, such as heavy metals, dioxins and furans, and greenhouse gases( Annexes II and V).

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<sup>143</sup>MoEF, (2008) Guidelines for Environmentally Sound Management of E-waste, Ministry of Environment and Forests, Delhi, India; March 12, 84 pp.

<sup>144</sup> Pinto, V. N. & Patil D.Y, (2008) "E-waste Hazard: The Impending Challenge" *Indian Journal of Occupational and Environmental Medicine*; vol 12 Issue 2.

<sup>145</sup>IETC has evolved over the 25 years history, IETC (May 25, 2020, 11:43 PM)  
<https://www.unenvironment.org/ietc/who-we-are>.

## The Landfill Directive<sup>146</sup>

The Landfill Directive has the main objectives of harmonizing waste disposal standards across Member States, with particular emphasis on standards of design, operation, and aftercare for landfill sites. It is also intended to act as the first major stimulant to the recovery and recycling of waste. The main part of the Directive sets out targets for the reduction of the amount of biodegradable municipal waste put into landfills and thereby reduce the amount of methane produced. Thus, Art.5 of the Directive requires the amount of biodegradable municipal waste that is disposed off in landfills to be reduced in three stages: by 25 percent, 50 percent, and 65 percent of the 1995 levels by 2006, 2009, and 2016, respectively. Even these deadlines can be extended in cases in which, as in that of the UK, more than 80 percent of biodegradable municipal waste was disposed off in landfills in 1995 (making the deadlines 2010, 2013, and 2020, respectively). In addition to these waste reduction targets the Directive:<sup>147</sup>

- Defines different categories of waste (municipal waste , hazardous waste, and landfills for inert waste) (Arts. 2 and 4);
- Bans the co-disposal of hazardous, non-hazardous, and inert wastes in the same landfill, and completely bans the landfill of certain hazardous wastes, liquid wastes, and tyre (Art. 5 and 6);
- Introduces waste acceptance criteria at all sites in order to reduce risk and requires that all waste must be pre-treated before disposal , which includes sorting and compaction of waste (Art.6);
- Requires that an operator makes adequate financial provision for maintenance and aftercare (Art. 10);
- Lays down general standards for all landfills, including such things as leachate collection and control, and over gas and leachate produced at landfill sites (Annex D). In particular, all landfill gases must be either used to produce energy or flared off; only a minority of current sites do this.

The significance of the Landfill Directive can be assessed against the background of disagreement between Member States that postpone the adoption of the Directive for approximately nine years. The Directive has already had a major impact upon current policies

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<sup>146</sup> *Supra note 31.*

<sup>147</sup> Osuagwu, O. E. & Ikerionwu C, ( 2010) “E-cycling E-waste The Way Forward for Nigeria IT and Electromechanical Industry” *International Journal of Academic Research.*

and practice, and the introduction of landfill quotas, bans on co-disposal, and waste acceptance criteria should see a move away from the historical reliance upon landfill in the UK.

### **Basel Convention<sup>148</sup>**

Basel Convention was opened for signature on 22nd March 1989, and entered into force on 5th May 1992. This convention comprises of 186 states and the European Union are the member parties to the Basel Convention. Haiti and the United States are the two countries that have signed and entered into convention but not ratified it. The Basel Convention is also known as the Basel Convention on the Control of Transboundary Movement of Hazardous Waste and their Disposal which is an international treaty specially designed to reduce and control the movements of hazardous waste from developed to less developed countries (LDCs).<sup>149</sup> However, the Basel Convention does not address radioactive waste. The prime aim of Basel Convention is to minimize the generation of toxic waste, and to ensure their environmentally sound management as possible to the source of generation, and also to assist the LDCs in environmentally sound management of the hazardous and other wastes they generate.

This Convention is a United Nation Treaty signed in 1989, at Basel, Switzerland and entered into force in 1992. The Convention primarily aims for reducing transboundary movement of hazardous wastes and to restrict the movement of such wastes especially from the developed countries to the Least Developed Countries, LDCs. One of its objectives is also to reduce the amount toxicity of the hazardous waste in order to remove the risks of ecological degradation. Further, it provides a protection to the LDCs from irregular movement of hazardous wastes into their lands as well as attempts to empower them technologically to make them capable of handling wastes in an environmentally sound manner. However, this particular convention does not deal with radioactive wastes.

The Convention defines the parameters and characteristics of hazardous wastes by virtue of Annex I and Annex ii. If any waste falls under the list in Annex I or possess any characteristics of those which are provided in Annex iii then such wastes will come under the scope of this convention. In short, a waste to become hazardous must be both listed as well as

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<sup>148</sup> Chen, A. Dietrich, K. N. Huo, X. & Ho S, (2011) "Developmental Neurotoxicants in E-Waste" *An Emerging Health Concern. Environmental Health Perspectives*, vol 119, no 4, April, pp 431-438.

<sup>149</sup>The Partnership for Action on Computing Equipments, UNEP, BC (Jun 25, 2020, 11:13 PM) <http://www.basel.int/Portals/4/Basel%20Convention/docs/pub/leaflets/leaf/PAC.pdf>.

must have certain characteristics like that of being toxic, flammable, explosive or corrosive. Moreover, if any law of the exporting or importing countries or the countries in transit defines any waste as hazardous then that waste may fall within the purview of this convention. The term disposal is also defined under this convention and Annex which provides the methods that are held as disposal or recycling under this convention.

The Convention besides laying down conditions upon import and export of cross border movement of wastes also provides for notices, consent and tracking for cross border movement of wastes. It provides for a general prohibition on cross border movement of wastes with the exception that if any party or non party is under any other treaty has the capacity to transfer wastes.

Article 4 prohibits import of wastes from any party of the convention. It encourages the member nations to reduce waste generations by keeping it close to the source of its generation so that internal pressure may force to recycle such wastes to reduce pollution. It however, speaks about illegal trafficking of hazardous wastes as illegal but it lacks any enforcement action.

Article 12 makes the parties liable to adopt protocols for defining the liabilities for damage caused due to movement of hazardous wastes.

The Convention discourage exports of hazardous and other wastes, which should only be allowed if the exporting state does not have the capacity, facilities or suitable sites to dispose them off in an environmentally sound manner, or if the wastes are required as a raw material for recycling or recovery in the importing state, or in accordance with other criteria decided by the parties. Moreover, parties may not transfer to importing or transit states their obligation under the convention to carry out environmentally sound management, and can impose additional requirements consistent with the convention to better protect human health and the environment. The transport and disposal of hazardous and other wastes may only be carried out by authorised persons, and transboundary movements must conform to generally accepted and recognised international rules and standards of packaging, labelling and transport, and take account of relevant internationally recognised practices, and be accompanied by a movement document until disposal.

The Convention sets forth details for the international regulation of transboundary movement of hazardous and other waste between parties based upon a system of 'prior informed

consent'. The exporting state, generator or exporter must notify the states concerned of any proposed transboundary movement, including the information specified in Annex v (A). The importing state responds by giving its consent with or without conditions, denying permission, or requiring additional information and no transboundary movement may commence until the exporting state must not allow transboundary movement to commence until it has the written consent of the transit state. The Convention allows for general notification and consent to cover a twelve-month period where wastes having the same characteristics are shipped regularly to the same disposer via the same exit office of the exporting state, entry office of the importing state and custom office of the transit state. Importing state and transit States, that are parties, may require the wastes to be covered by insurance or other guarantee. When a Transboundary Movement cannot be completed in accordance with the terms of the contract, the exporting state must take back the wastes if alternative arrangements cannot be made for their disposal in an environmentally sound manner.<sup>150</sup>

Parties can enter into bilateral, multilateral or regional agreements or arrangements regarding transboundary movement of wastes provided that they do not derogate from the requirements of the convention and provided they stipulate provisions that are no less environmentally sound than the convention. The Convention does not affect transboundary movement taking place entirely among the parties to such agreements, which must be notified to the secretariat, provided that they are compatible with the requirements of the convention. The parties are subject to detailed reporting requirements, and the Convention provided for consultations on liability to be held as soon as possible. The Convention is kept under review by a Conference of the Parties and a secretariat. At the fifth Conference of the Parties, held in December 1999, the Parties adopted a Protocol on Liability and Compensation. Compared to many other environmental agreements, the Convention sets out relatively detailed tasks for the secretariat, including gathering and sharing information, and examination of notifications and other aspects of transboundary movement. Until the first Conference of the Parties, which was held in November 1992, UNEP carried out the secretariat functions on an interim basis. The second Conference of the Parties, held in March 1994, approved an immediate ban on the export from OECD countries to non-OECD countries of hazardous waste intended for final disposal and also agreed to ban the export of wastes intended for recovery and recycling

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<sup>150</sup>Global e-waste Monitor 2017, CCW, (Mar 25, 2020, 11:13 PM) [www.itu.int/en/ITU/Climate-Change/Pages/Global-e-waste-monitor-2017.aspx](http://www.itu.int/en/ITU/Climate-Change/Pages/Global-e-waste-monitor-2017.aspx).



by 31 December 1997.<sup>151</sup> The ‘Basel Ban’, as it became known, was not formally incorporated into the Convention by the second Conference of the Parties, and disputes arose as to whether it was legally binding on the Parties. To resolve this dispute, it was proposed at the third Conference of the Parties, September 1995, that the Basel Ban be formally incorporated into the Basel Convention as an amendment. The Basel Ban Amendment adopted by the third Conference of the Parties does not refer to OECD and non-OECD countries, but rather bans hazardous waste exports for final disposal and recycling from Annex VII parties (member of the EU, OECD and Liechtenstein) to non-Annex VII parties.<sup>152</sup> The ambiguous wording of Article 17.5 of the Basel Convention led to three opposing views on the number of ratifications required in order for the Ban Amendment to come into force. The depositary took the view that Article 17.5 requires two-thirds of current members (169 in 2006) to ratify the Amendment; some non-governmental organisations espoused the view that the Amendment requires two-thirds of the total number of states parties at the time of the Amendment’s adoption in 1995; other argued that the Amendment requires two-thirds of those states parties present and voting in 1995. Consensus could not be reached at the ninth conference of the Parties on the adoption of a reinterpretation of Article 17.5 adopting the ‘fixed time’ approach allowing for the Amendment to come into force. In 2007, the UN Depositary settled for the ‘current time’ approach, requiring three-quarters of the totality of states parties. The Basel Ban has not yet entered into force as only sixty-eight parties have so far ratified the Amendment.<sup>153</sup>

### **Basel Ban Amendment**

After the Basel convention was passed several LDCs argued it failed in restricting movement of hazardous wastes to their territory, rather many developed countries justified such movements in the name of recycling. It introduced merely the concept of Prior Informed Consent but it rarely had any impact. As a result of which several regional treaties like the Bamako Convention came into being. Thus, some of the LDCs came together and initiated this amendment. This Ban Convention is not yet in force due to stiff opposition from many developed countries and industries particularly the OECD nations since this treaty provided

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<sup>151</sup> Ban, B. Gang J., Lim J., Wang S., An K. & Kim D, (2005) “Studies on the reuse of Waste Printed Circuit Board as an Additive for cement Mortar”, *Journal of Environmental Science and Health. Taylor and Francis* Vol 40 pp 645-656.

<sup>152</sup>Wikipedia,(2011b)*Basel Convention*.( Jun 25,2020,11:30 PM)

[http://en.wikipedia.org/wiki/Basel\\_Convention](http://en.wikipedia.org/wiki/Basel_Convention).

<sup>153</sup> *Ibid*.

for an absolute ban on cross border movements of hazardous wastes for some of the developed nations.

### **Regulation of E-waste Trade**

The Convention also restricts movement of hazardous e-wastes that contains elements such as lead, mercury, arsenic, hexavalent chromium, and such other toxic substances with the motive of protecting and safeguarding the environment. If any e-waste contains any of the above mentioned elements then automatically it will come under the scope of the Basel Convention.

### **Bamako Convention<sup>154</sup>**

The Koko Case as well as the failure of the Basel Convention marked the beginning of this particular convention. It was found that besides the Basel Convention being in force the developed nations were able to export hazardous wastes into the LDCs. This convention was initiated as an improvement to the Basel Convention and even included radioactive wastes that were excluded from the Basel Convention.

This convention is also based on the same format with that of the Basel Convention but it is an improvement to the extent that it provides for strict provisions to restrict transboundary movement of wastes and also it included radioactive wastes within its scope.

The Convention on the Ban of Imports into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa (1991 Bamako Convention) was adopted by African governments following negotiations under the auspices of the organisation of African Unity. It establishes a regional regime to prohibit trade in waste, giving effect to the positions many African governments had adopted in the negotiations on the 1989 Basel Convention. To a large extent, the 1991 Bamako Convention follows the approach taken in the 1989 Basel Convention, but departs from it in a number of important respects. First, and most notably, like the former 1989 Lome Convention (which is no longer in force, but had subjected the EU to a blanket prohibition on all direct or indirect export of hazardous waste and radioactive waste from the EU to the ACP states (African, Caribbean and Pacific Group of states), and required ACP states to prohibit the direct or indirect import of such waste from the EU or from any other country), the Bamako Convention prohibits

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<sup>154</sup>DHHS (2005) (cited in Kevin *et al.*, 2008) 11<sup>th</sup> Report on Carcinogens. U.S. Department of Health and Human Services, US Public Health Service, National Toxicology Program.

trade in hazardous waste. Parties must prohibit the import of all hazardous wastes into Africa from non-contracting parties and deem such imports illegal and criminal. A second difference is that parties must ensure that hazardous wastes to be exported are managed in an environmentally sound manner in the state of import and transit, and only authorized persons may store such wastes. Third, the definition of hazardous waste adopted by the Bamako Convention is broader than that in the Basel Convention. The Bamako Convention includes several other subtle but significant differences.<sup>155</sup> Wastes to be used as raw materials for recycling and recovery may not be exported, and parties must appoint a national body to act as a 'Dump watch' to co-ordinate governmental and non-governmental bodies. Moreover, parties may not decide not to require prior written consent; parties must not allow use of general notification; the rule requiring notification of the transit state applies to transboundary movements from a party through a state or states which is or are not parties, and illegal traffic may be returned only to the exporter. The Bamako Convention is administered by its own Conference of the Parties and secretariat, the functions of which were carried out on an interim basis by the OAU (now the AU) and the UN Economic Commission for Africa. Significantly, the Secretariat of the Bamako Convention is granted greater powers than the Secretariat of the Basel Convention since it may verify the substance of allegations of breach of the Convention and submit a report to all parties. Moreover, it provides for the apparently compulsory jurisdiction of ad hoc dispute settlement organ, or the ICJ.<sup>156</sup>

### **Waigani Convention**

The Convention to Ban the Importation into Forum Island Countries of Hazardous and Radioactive wastes and to Control the Transboundary Movement and Management of Hazardous Waste within the South Pacific Region (1995 Waigani Convention) was adopted by government in the South Pacific region following negotiations under the auspices of the South Pacific Forum. The Waigani Convention was modelled after the Bamako Convention, and, like the latter treaty, it bans the import of hazardous and Radioactive wastes into its area of coverage and regulates the transboundary movement of such wastes amongst parties thereto. In addition, 'other parties', namely, Australia and New Zealand, are required to ban the export of hazardous wastes to all Forum Island Countries and territories within the Convention area. Other similarities to the Bamako Convention includes the Waigani

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<sup>156</sup> *Supra* note 39.

Convention's prohibition on the dumping of hazardous wastes at sea, and its requirements that any transboundary movement of Hazardous Wastes shall be covered by insurance, bond or other guarantees as may be required or agreed to by the importing or transit party.<sup>157</sup> The Waigani Convention also replicates the provisions of the Bamako Convention regarding the national definition of hazardous wastes, and the duty to re-import, although in the event of an authorised transboundary movement of Hazardous Waste that cannot be completed the exporting party need not re-import those waste if alternative arrangements are made for the disposal of the wastes in an environmentally sound manner. The Waigani Convention also permits the use of a general notification procedure where 'hazardous wastes having the same physical and chemical characteristics are shipped regularly to the same disposer via the same customs office of exit of the exporting Party, via the same office of entry of the importing Party, and, in the case of transit, via the same customs office of entry and exit of the Party or Parties of transit.'<sup>158</sup>

Alongside its prohibition on waste trade, other objectives of the Convention are: to reduce the transboundary movement of Hazardous Waste to a minimum consistent with their environmentally sound management; to treat and dispose of hazardous wastes as close as possible to their source of generation in an environmentally sound manner way; and to minimise the generation of Hazardous waste. As under the Bamako Convention, wastes covered by the Waigani Convention includes certain radioactive wastes, but exclude waste arising from the normal operation of a vessel, the discharge of which is covered by another international instrument. The Convention is administered by a Conference of Parties with assistance from a Secretariat, which is to co-operate with the Basel Convention secretariat. An innovative provision of the Convention requires the Conference of the Parties to establish a 'Revolving Fund 'for interim use in emergency situations to minimise damage from disasters or accident involving transboundary movement or disposal of hazardous wastes within the Convention area.'<sup>159</sup>

## **North America<sup>160</sup>**

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<sup>157</sup>Nigeria Customs Service, (2011) *Challenges Facing Effective Management and Regulation of E-waste*. A paper presented by Nigeria Customs Service of Regulation and Management of Ewaste in Nigeria.

<sup>158</sup>*Ibid*.

<sup>159</sup>Elinder, C.G. & Jarup, L. (1996) (cited in Kevin et al., 2008) Cadmium exposure and health risks: recent findings. *Ambio* 25, 5: 370-373.

<sup>160</sup>Umesi, N.O. & Onyia S, (2008) "Disposal of e-wastes in North America: An Appraisal of Regulations and Current Practices", *International Journal of Sustainable Development and World Ecology*; pp 565-573.

The 1989 Mexico -United States Hazardous Waste Agreement requires the exporting country to notify the importing country of Individual shipments or a series of shipments over a twelve month period, which the importing country must respond to within forty-five days indicating its consent, with or without conditions or its objections. The exporting country must re-admit any shipment that may be returned for any reason by the country of import. The Agreement between the United the United States and Canada Concerning the Transboundary Movement of Hazardous Waste requires the exporting country to notify the importing country of proposed transboundary shipments of hazardous waste, and states that, if no response is received within thirty days, the country of import will be deemed to have granted its consent. The United States also has bilateral agreements on the export of hazardous wastes from Costa Rica, Malaysia and the Philippines.

### **Some International Organisations and Initiatives to Monitor E-waste Management: -**

More than the treaties and regulations it is needed to take affirmative action for addressing a particular issue. For this reason for dealing with the increasing burden of e-waste several international organizations and initiatives are been taken. Some of such initiatives and organizations will be discussed under this head. These organizations and the initiatives will help us in knowing that how attempts are being made in the international level to reduce the growing burden of e-waste hazards on the humanity.

#### **1. International Environmental Technology Center, IETC-**

The ITEC was established with the objective of transferring technology to the developing countries and the countries whose economies are in transition. Recently, in 2005 the Bali Strategic Plan for Technology Support and Capacity Building along with the United Nations Environment Assembly Resolution on chemicals and waste worked as reinforcement for this center. It focuses on holistic waste management for sustainably deal with the ecological challenges for the developing countries. it works with the national and the local government of different countries for reducing and recycling their wastes, improving their waste management capacities, increasing their capabilities in mitigating climate change, providing better job opportunities in their projects, etc. it works basically in chief directions, via-providing knowledge on the products needed for environmentally sound management as well as good practices, providing technical and advisory support to the countries so that they can implement ecofriendly technologies and approaches and promoting as well as disseminating

about the environmentally sound management methods and practices.<sup>161</sup> The IETC plays an important role in the management of e-waste also. Since e-waste is a product of technology therefore much can be done through regulating the process of technological innovations taking place across the world so that the rate of e-waste generation can be controlled even before they are actually produced. It has worked with the United Nations Environment Assembly in order deal with the ever increasing e-waste. It can also promote such useful and economic technologies that can help in reducing the e-wastes as well as managing them or recycling them in an ecologically sound manner.

## **2. The Partnership for Action on Computing Equipments, PACE-**

It is established as a multi-stakeholder partnership in order to manage in environmentally sound manner the used and end-of-life computing equipment. The working group of PACE consists of PC manufacturers, governments, environmentalists and experts from other necessary sectors who determines their scope of affairs and activities.

This organization was launched in the Bali COP of Basel Convention in 2008. PACE aims in promoting sustainable development by recycling end-of-life computer equipments in a ecologically sound manner. This organization provides a platform for the computer manufacturers, governments of developing and LDCs, various experts and others to discuss on the topics as how to manage the e-wastes in a manner that it serves the triple goal of social, environment and economic progress and welfare. This organization also aims in capacity building in the poor countries for enabling them to efficiently deal with such wastes.<sup>162</sup>

## **3. Global Partnership for Waste Management, GPWM-**

It was launched in 2010 and works as partnership platform for governments, international organizations, local authorities, academia, NGOs, etc. it mainly works with the objectives of building political capacity, sharing ideas and information, creating awareness, bridging information gaps, and such other activities for the purpose of promoting resource conservation as well as resource efficiency. These objectives are intended to be achieved by way of managing waste to avoid environmental and health hazards due to improper management of such wastes. They advocates for international cooperation and advanced

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<sup>161</sup>IETC has evolved over the 25 years history, IETC (Jun 25, 2020, 11:43 PM)  
<https://www.unenvironment.org/ietc/who-we-are>.

<sup>162</sup>The Partnership for Action on Computing Equipments, UNEP, BC (Jun 25, 2020, 11:13 PM)  
<http://www.basel.int/Portals/4/Basel%20Convention/docs/pub/leaflets/leaf/PAC.pdf>.

capacity building to boost up the waste management system and at the same time to reduce the production of wastes at the source itself. It covers e-waste also thereby it prominently becomes a matter for consideration in dealing with the e-waste management initiatives.

#### **4. International E-waste Monitoring Network, IEMN-**

The United Nation the increasing volumes of e-waste are leading to serious environmental as well as health hazards due to the presence of several hazardous substances in those e-wastes. It is even reported that during 2016 only 20% of the globally produced e-wastes were recycled. Therefore, the United States Environmental Protection Agency and the Taiwan Environmental Protection Administration in collaboration with the International Environmental Agency were engaged in building up a global platform for building capacity to deal with Waste Electrical and Electronic Equipment (WEEE) that is now popularly known as e-waste. Thus, in order to achieve this goal, the IEMN was established by US, EPA and Taiwan,EPA.<sup>163</sup>

#### **5. Global E-waste Monitor, 2017-**

The Global E-waste Monitor is a comprehensive effort jointly carried out by International Telecommunication Union (ITU), United Nation University (UNU) and International Solid Waste Association (ISWA). It gives information about the volume of e-wastes generated across regions, the results of the various recycling methods and the implementation status of various e-waste legislations. It strive its efforts in achieving the Sustainable Development Goals (SDGs) by managing the e-waste information standards. It also highlights the importance of proper data analysis about the e-waste management.<sup>164</sup>

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<sup>163</sup>International Cooperation, EPA (Jul 25, 2020, 12:17 AM) <https://www.epa.gov/international-cooperation/international-ewaste-management-network-iemn>.

<sup>164</sup>Global e-waste Monitor 2017, CCW, (Jul 25, 2020, 11:13 PM) [www.itu.int/en/ITU/Climate-Change/Pages/Global-e-waste-monitor-2017.aspx](http://www.itu.int/en/ITU/Climate-Change/Pages/Global-e-waste-monitor-2017.aspx).

## CHAPTER V

### LEGISLATIVE FRAMEWORK OF INDIA ON E-WASTE: A LEGAL ANALYSIS

#### “E” Waste and Legislations

The object of the environmental legislations is to prevent, regulate and control the environmental pollution. The objective being welfare in nature, the Constitution of India has imposed the responsibility on the Governments, central and the state, to initiate actions on line with the objectives in the process of complying the directions set by the Constitution, the parliament has enacted Environment (Protection) Act 1986 to prevent and control the environmental pollution caused by certain pollutants.<sup>165</sup>

The Acts have further empowered the Ministry of Environment and forests, to make rules, regulations and issue notifications in the process of prevent and mitigating the environmental pollution. The Government under the provisions of the law have established the Pollution Control Boards and the central and state level.<sup>166</sup> The law and Rules made there under have defined the role play of the Pollution Control Boards. They are given with the responsibility to regulate the ‘handling and management of Hazardous waste’ generated in the society either at industrial place , or during the recycling of plastics, or during the delivery of healthcare services , or handling of lead acid batteries, hazardous chemicals and microorganisms. As the procedure is well defined and established under the Rules and judicial directions, and with the cooperation of environmentalist the regulatory authorities are able to perform their responsibilities to some extent. There is no specific legislation to govern the disposal of ‘e’ waste in India.<sup>167</sup>

The ‘Environment (Protection) Act 1986 (EP Act) is the umbrella enactment which governs the issue relating to the protection of environment. The EP Act is not comprehensive in its nature. In exercise of power conferred by section 6, 8 and 25 of the EP Act , the Central Government, the Ministry of Environment and Forests had formulated ‘the Hazardous Waste

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<sup>165</sup> Toxics Link. E-Waste in Chennai Time is running out. (May 23, 2020, 10:12 AM) [www.toxicslink.org](http://www.toxicslink.org) [2011].

<sup>166</sup> E-waste rule puts onus on producer. (May 23, 2020, 10:13 AM) <http://articles.timesofindia.indiatimes.com>.

<sup>167</sup> *Supra note 38*.



(Management and Handling ) Rules , 1989’ (HW Rules) which are applicable for the ‘Management and handling’ of Hazardous wastes which includes ‘e’ waste .<sup>168</sup>

Schedule- 1 of the HW Rules contains the list of the processes generating the Hazardous Waste. Schedule- 2 contains the lists of waste substances with consternation limits. If the waste contains more concentration than the limits stated in the schedule they are considered as hazardous and are to be treated as per the HW Rules. Schedule -3 contains the list of waste to be applicable only for imports. Rules 12, 13 and 14 of the HW rules impose a mandatory duty upon the persons upon the persons importing or exporting hazardous goods for the purpose of reuse or recycle to obtain a licence from the prescribed authorities, i.e. the State Pollution Control Boards with the permission from the Ministry of Environment and Forest by payment of prescribed fee and providing requisite information and permissions granted under different environmental Acts such as Air Act and Water Act.<sup>169</sup> These enterprises are required to obtain licence from the Customs Department and Reserve Bank of India for exporting or importing the waste. The transboundary waste disposal is governed by the norms specified by the Basel Convention.<sup>170</sup>

The components of computer and other electronic devices contains various chemical such as cadmium, lead, chlorides , bromides , mercury and plastics etc in high concentration than stated in the Schedules of the HW Rules . As such, they are dealt as per the guidelines of the HW Rules. The HW rules insist that no person can generate the Hazardous without obtaining the permission from the competent authority, the State Pollution Control Boards and should exercise enough precautions such as safety measures and equipment, training to the employees or the workers involved in the waste disposal and using the standards prescribed for packaging, collecting and transporting the waste. Similar rules are applicable to the generators and operators of ‘e’ waste. They have to use precautionary methods while they remove soldier -material (lead) from the picture tubes or other parts of the electronic devices. The provisions lay down in the ‘the Recycled Plastics Manufacture and Usage Rules, 1999’ pertain to handling and recycling of plastic components of the electronic wastes including the cables and wires.<sup>171</sup> The metals and chemicals, while are a part of the electronic wastes, are

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<sup>168</sup> *Ibid.*

<sup>169</sup>Recycling – from e-waste to resources, final report, Mathias Schlupe. (May 23, 2020, 10:13 AM)  
<http://www.unep.org/>.

<sup>170</sup>Bridgen, K., Labunska, I., Santillo, D. & Allsopp, M. Recycling of electronic waste in China and India: Workplace and Environmental contamination. (May 23, 2020, 10:13 AM)  
[http://pcglobal.org/files/Recycling\\_of\\_electronic\\_wastes.pdf](http://pcglobal.org/files/Recycling_of_electronic_wastes.pdf).

<sup>171</sup> *Ibid.*

treated for decontamination before they are melted or made use for other purposes. The dumpsites for the hazardous waste should fulfil condition laid down in the Rule 8 of HW Rules.

The 'Hazardous Waste (Management and Handling) Amended Rules, 2003' provides for granting licences to the recyclers of the Hazardous Waste. The proposed recycler has to register himself with the Ministry of Environment and Forests (MoEF) by filing an application along with the prescribed fee, information and documents such as consent from the PCB under the Air Act, Water Act, HW Rules, registration from District Industrial Centres. The Rules state that the applicant should have enough technologies and equipment to handle the recycling process and submit proof of the same to the MoEF. Once satisfied about the credentials of the applicant, the Ministry grants permission for a period of two years which can be renewed before it is expired. The renewal application has to be filed at least six months before the expiry of the authorization.<sup>172</sup> The Recycler should purchase the computer waste from the generators either in auction or bulk sale. The recyclers should submit reports having the details of purchase and sale of the waste regularly to the PCBs.

The Rule 16 of the HW Rules imposes a duty upon the occupiers, and transporters for the damages caused to the environment resulting from improper handling and disposal of hazardous waste including the electronic waste.<sup>173</sup>

The real situation of handling and managing the electronic waste is different. It is understood that no permission has been granted to recycle or reuse the electronic wastes so far. On the other hand, the trade in the electronic waste is creating a 'fortune' as it is yielding huge benefits to the people handling or disposing them. The value of the waste is almost zero and being dealt as scrap and purchased at nominal rates. There is a secondary marketing which is providing enough electronic waste for disposed and recycling. The traders from India, China and Pakistan are also importing 'e' -waste from developing countries like USA and UK.<sup>174</sup> The developed countries are interested in saving their own environment by dumping 'e' garbage in the dump yards of developing countries like India. It is treacherous and unimaginable. The British Environmental Agency (BEA) has indicated that several companies of UK are exporting their 'e' waste to India and other Asian countries. It is

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<sup>172</sup>Monika, Kishore J, E-waste management: As a challenge to public health in India. Indian J Community Med. (May 27, 2020, 09:13 AM).

<sup>173</sup>India together: UN report spotlights India's e-waste pile up (May 27, 2020, 10:13 AM)<http://www.indiatogether.org/2010/mar/env-NEWASTE.html>.

<sup>174</sup> *Supra note 15*.

estimated that around 23,000 tonnes of waste is being sent to these countries from Europe. In addition they are planning to dump lakhs of television sets and tonnes of other electronic waste material in the Asian countries.<sup>175</sup> The USA is also a potential threat to India as it is involved in the Asian countries. The USA is also a potential threat to India as it is involved in exporting 'e' waste in disguise of 'donation' or 'for secondary sale'.<sup>176</sup>

India is a densely populated country which is also economically a developing country, where a major section of the population are poverty stricken as well as uneducated and are devoid of a proper living standard. In such a situation, waste management in the country becomes a very serious issue mainly because due to lack of proper and efficient technologies and resources, most of the waste recycling sites are not hygienic in one side while due to the ignorance of the people working in such sites about the health and ecological hazards as well as due to their unemployment and poverty stricken situation they are forced to work in such sites. But these issues mark the development of the country in a negative way. For this reason waste management regulations were passed from time to time. However, legislations in the field of e-waste management in India are of very recent development that is in the year 2016.

The following points will thereby give a brief analyze some of the important waste management regulations with respect to India on the e-waste management.

### **Constitution of India<sup>177</sup>**

Every law to be valid in India must be in conformity with the standards provided by the Constitution of India. So therefore, all legislations and rules in the field of waste management will also have to be in conformity with the Constitution, meaning it must not be derogatory to the standards maintained by it. Further, the Constitution by virtue of Article 21 provides for a right to life with personal liberty to the citizens of India that has been interpreted by the Indian Judiciary to be inclusive of the right to a clean and healthy environment. For which now it is a right of every citizen to approach to the Indian Judiciary in case of any violation of this right due to improper waste management including waste management by virtue of Article 32 and 226. Furthermore, Article 253 allows the Parliament to make laws for the whole or any part of the country for giving effect to the International Treaties and

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<sup>175</sup>Top E-Waste Management Companies in India. (May 27, 2020, 10:13 AM) <http://entrance-.net/top-e-waste-managementcompanies- in-india>.

<sup>176</sup>Plug-in to eCycling. (May 27, 2020, 10:13 AM) <http://www.epa.gov/epawaste/partnerships/plugin/indx.html>.

<sup>177</sup> *Ibid.*

Obligations. By virtue of which several waste management international treaties including the Basel Convention have been given effect by Indian laws.

### **Water Act<sup>178</sup>**

This Act is important from the point of view of waste management because it established the Pollution Control Boards in India for the first time at the central level, via CPCB as well as at the State level, via SPCB AND ALSO Joint Pollution Control Boards where necessary. These Boards were made responsible to check water pollution by this Act and to take adequate measures to reduce or to control such pollution. As far e-wastes are concerned these Boards have the authority to monitor the extent of contamination that has been caused due to improper e-waste management to the water and to take necessary actions on this behalf. This Act also provides for penalties for disobeying the provisions under this Act. Section 24 prohibits disposal of harmful effluents in rivers and other water sources that will also include disposal of harmful e-wastes.<sup>179</sup>

### **Air Act<sup>180</sup>**

The Act has provided the National Ambient Air Quality Standards and has also allowed the CPCB and the SPCBs to determine standards of air quality and to check air pollution. This Act has empowered the PCBs to take all necessary actions for improving the air quality in the Air Pollution Control Areas. Since it has already mentioned in Chapter 3 that how e-waste as well as other wastes contributes to air pollution thereby the PCBs are also empowered to monitor the disposal and handling of such wastes. Air pollution as defined under this Act is a very extensive and broad definition since it includes every solid, liquid as well as gaseous substance that may be or is a threat to human health as well as to other living creatures and the environment.<sup>181</sup>

### **Environment Protection Act, 1986<sup>182</sup>**

This Act is the most important piece of legislation since it is regarded as umbrella legislation in matters relating to the protection of environment. The reason behind recognizing it as

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<sup>178</sup>Water (Prevention and Control of Pollution) Act of 1974, No.41, Acts of Parliament, 1974, (India).

<sup>179</sup>*Ibid.*

<sup>180</sup>Air (Prevention and Control of Pollution) Act of 1981, No.40, Acts of Parliament, 1981, (India).

<sup>181</sup>*Ibid.*

<sup>182</sup>Environment Protection Act, 1986, No.39, Acts of Parliament, 1986, (India).

umbrella legislation is because of Section 3 by virtue of which the Central Government has the power to make rules and to take all necessary actions for the purpose of protecting the environment. As such, it becomes clear that all the waste management rules that have been framed by the Central Government after the enactment of this Act derives their origin from this particular Section. Further Section 3(2)(vii) explicitly gives the Central Government the powers for handling hazardous substances.

In addition to the above, Section 6 provides the Central Government with the power to make rules for controlling environmental pollution. The rules as provided by Section 3 can be made for the standard of quality of air, water and soil for various areas and purposes, the limits of various environmental pollutants, prohibition and restrictions on handling of hazardous substances in definite areas, and such other rules that are also important for waste management. Moreover, Section 9 makes it mandatory for every person engaged in handling hazardous wastes to comply with all the rules relating to that.

The Act makes it an obligation for those disposing hazardous wastes to inform about the same to the PCBs and to take necessary measures for avoiding any mishaps due to such disposal. Further, the PCBs have been entrusted with the powers to inspect any location or industry for checking of release of polluting substances by virtue of Section 10 and 11. Again, for violation of any of the provisions under this Act will make that person liable for penalties under Section 15.

Thus, this Act due to its various provisions can be regarded as a major step in the legal sector for the protection of environment in general and for the management of wastes including e-waste in particular. This law can be held responsible for the emergence of several rules after the implementation of this Act for regulating the waste management sector within the country at various levels from time to time.<sup>183</sup>

### **Hazardous Waste Rules, 2008<sup>184</sup>**

These rules were introduced to implement the International Obligations entrusted upon India by the Basel Convention. One of the most important features of these rules is that it provides for the regulation of transboundary movement of hazardous wastes that is export and import of wastes from and to India. It defines the powers, duties and functions of thee authorities that

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<sup>183</sup>*Ibid.*

<sup>184</sup>*Supra note 194.*

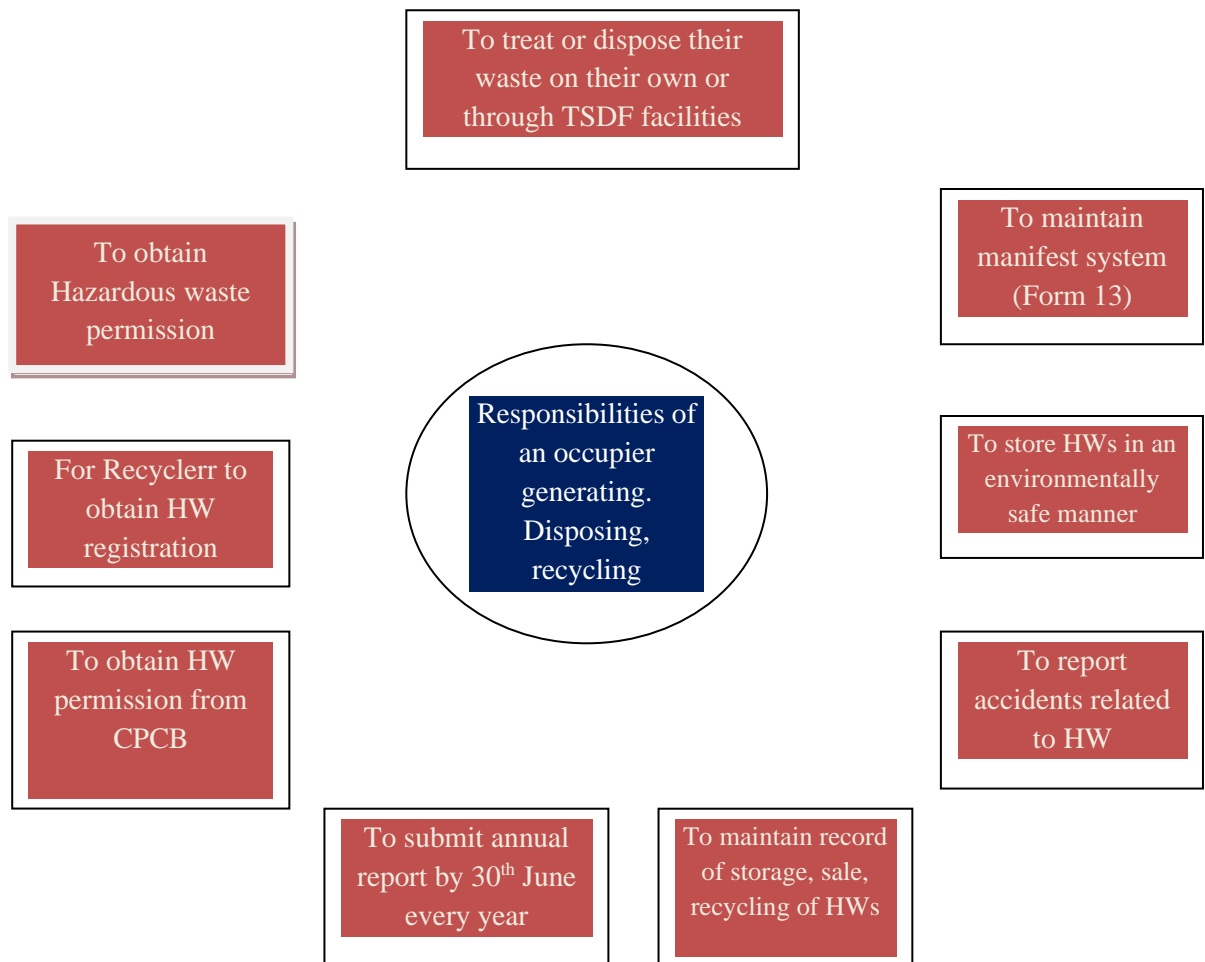
are engaged in this process of waste management. The Rules therefore applies to- waste generators, recyclers, disposers, the government and the PCBs.

Rule 3(1) provides a very wide definition of hazardous wastes as it includes any waste that due to its physical, toxic, flammable, chemical, explosive and corrosive characteristics can create danger to the environment or is likely to cause either alone or when comes in contact with any other substances. Part A, B and C of the schedule attached to these rules mentions about the nature of hazardous that if possessed by any substance will amount it as hazardous wastes.

The Rules provides for the duties of the occupier who is the person incharge of an establishment of any kind producing hazardous wastes that includes taking reasonable care in handling such hazardous wastes, their recycling and disposal, informing the SPCBs about the necessary information of such handling and also to take all necessary steps required to avoid any accident during the process of handling such hazardous wastes.

The occupier is required to take permission from the SPCB for the purpose of handling hazardous wastes, recycling or for their disposal by virtue of forms provided along with the rules. The SPCB on the other hand after examining the application may or may not grant permission but rejection of the application can be made only after hearing to the applicant. The SPCB further can issue conditions while granting permission to any such application which the occupier is bound to follow, on failure will lead to the cancellation of the application, but such cancellation is possible only after hearing. Furthermore, the occupier is also responsible for maintaining records of the hazardous wastes dealt by the occupier, its disposal, recycling, etc processes in detail that will have to be provided for inspection on demand by the SPCB.

For the purpose of regulating transboundary movement of hazardous wastes the MOEF&CC has been made the nodal officer under Section 12. import of waste in India has been permitted only by Rule 13(1) while Rule 13(2) allows such import only for recycling and reuse. But import and export of wastes mentioned in Schedule which is strictly prohibited. The Rules allows for export of hazardous wastes only to the actual generator or disposer however only after getting prior informed consent. After which the exporter will have to obtain NOC from the CPCB. Further, these Rules provides for maintaining records of every such imports and exports of hazardous wastes which will be left open for inspection by the PCBs on demand.



There are many such provisions that are been provided by these Rules that deals with the management of hazardous wastes in India, even through not explicitly dealing with e-wastes but still these Rules are wide enough to include even the hazardous e-wastes.<sup>185</sup>

### **Batteries (Managing and Handling) Rules, 2001<sup>186</sup>**

These Rules apply to all the importers, manufacturers, reconditioners, assemblers, and consumers as well as bulk consumers who are involved in the process of manufacturing, sale, processing or any other activities with batteries are parts of it. Under this Rules a battery will mean a lead acid battery that acts as a source of electricity and contains elements of lead metal.

<sup>185</sup>Hazardous Wastes (Management, Handling And Transboundary Movement) Rules, 2008.

<sup>186</sup>Batteries (Managing and Handling) Rules, 2001, No.55, Acts of Parliament, 2001, (India).

The responsibilities of the manufacturer, or the assembler, or the importer, or the reconditioner includes ensuring the used batteries are taken back in place of the new batteries from the customers or the bulk customers and then to file a half yearly return about the sale of the new batteries and the buy back of the old batteries to the SPCBs before 30 June and 30 December respectively. They are also responsible to set up collection centers to collect the used batteries from the customers or dealers either individually or jointly with other such manufacturers, assemblers, etc. and to send them to registered recyclers only. They are further responsible to ensure environmental safety during such transportation, to buy recycled lead only from registered recyclers, to inform about violations of these Rules by any dealers to the SPCB and also to organize public awareness campaigns.

The importers of batteries must obtain permission from the CPCB by Form 1 for a period of five years, renewal of which will be based upon the condition of compliance to these Rules. Customer Clearance of the imports will be contingent with the valid registration from RBI and also one time registration with MOEF or any other authority designated by it.

The Rules also provide for the responsibilities of the dealers that are to collect back the used batteries from the customers and give them appropriate discount for giving back the used batteries, to register themselves with the SPCB for five years and the other responsibilities includes ensuring safe transportation of the batteries and their handling back to the original sources without causing any environmental harm.

The recyclers on the other hand are responsible to register themselves with the SPCB and to comply with all the conditions, the lead recycled are to be marked as recycled and they are also responsible for creating public awareness.

The customers are responsible not to dispose the batteries in any manner other than handling it back to the recyclers, manufacturers, dealers, assemblers, etc. The bulk customers are to file annual returns to the SPCB by Form vii and to inform about every matter related to the use of the batteries.

Finally the rules also provide for the duties of the authorities appointed under these rules that include filling compliance report to the SPCB and such other duties as specified.

Thus in this way these Rules governs the regulation of one of the most important component of the e-wastes, is Batteries.



## **E-Waste (Management and Handling) Rules, 2011<sup>187</sup>**

These Rules is important in the sense that it provides all the necessary conditions for the purpose of disposing e-waste in an environmentally sound manner. It includes responsibilities of the producer of e-waste as mentioned in Rule 4 and to create collection centres and creates public awareness through publications, advertisements, posters or by any other means of communication. The producers are also responsible for filing annual reports prescribed in Form 3 either to the SPCB or PCB before June 30 Of every year.<sup>188</sup>

Rule 5 deals with the duties of collection centres which includes authorisation from the SPCB or PCB to maintain records of the wastes collected. They also have the duty to ensure that the e-waste collected by them is stored and safe transfer to registered dismantlers or recyclers without any damage to environment during the transportation of e-waste.

Rule 6 provide the duties of consumer or bulk consumers, ‘consumer or bulk consumers’ means public sector undertakings , banks, government departments , companies registered under Companies Act and multinational companies shall maintain records of e-waste generated by them as prescribed in Form 2.<sup>189</sup>

The dismantlers shall have to obtain authorisation and registration from the SPCB under the Rule 9 and 11 for ensuring that no damaged is caused to the environment during storage and transportation of e-waste. Every recycler have to obtain authorisation from the PCB or SCPB to ensure that recycling processes are in accordance with the procedure given by the CPCB from time to time and they are responsible to file an annual reports to SPCB OR PCB on or before 30<sup>th</sup> June of every year.<sup>190</sup>

Rule 9 provide for the procedure for grant of authorisation, the collection centre, dismantlers and recyclers of electronic waste need to obtain an authorisation from the SPCB or PCB for a period of five years.

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<sup>187</sup>E-Waste (Management and Handling) Rules, 2011, No.57, Acts of Parliament, 2011, (India).

<sup>188</sup>*Supra note 134.*

<sup>189</sup>India gets first e-waste management rules Piyali Mandal / New Delhi (Jun 09, 2020, 11:11AM)

<http://www.businessstandard.com>.

<sup>190</sup>*Supra note 111.*

Rule 12 deals with the procedure for storage of e-waste, the collection centres, recyclers need to store the e-waste for one hundred and eighty days with the proper maintenance of a record for collection, sale, and transfer of such waste.<sup>191</sup>

### **E-waste Rules of 2016**

The MOEF&CC introduced a new set of e-waste Rules in 2016 after superseding the old Rules. These Rules mad the following changes-

1. Manufacturers, Producer Responsibility Organization and the refurbisher are now introduced as additional stalkholders.
2. Schedule 1 has been extended to include components that are consumable, spares and EEE parts.
3. Mercury containing lamps including Compact Florescent Lamps (CFL) are now put under the preview of these Rules.
4. In order to include the collection centers and take back systems as for collection of e-wastes under Extended Producer Responsibility, a collection mechanism based approach has been adopted.
5. For e-waste repair, collection, etc. an option has been provided to give scope for EPR.
6. Now the state wise authorization of EPR has been replaced by Pan India EPR authorization by CPCB.
7. The authorization shall be in line with the targets specified for collection that is 30% of e-waste generated in first two years followed by 40% in next two years then by 50% for the succeeding two years then 70% afterwards.
8. A new economic measure in the form of Deposit Refund Scheme has been initiated through these Rules where the customers will pay initially to the producers who after returning back the end-of-life products will pay back to the customers with interests.
9. E-waste exchange system has also been provided by these Rules for exchange of e-wastes between authorized agencies.
10. The Role of the State Governments has also been extended by these Rules in order to ensure safety, health and other welfare conditions of the workers engaged in the process of dismantling of e-wastes.
11. A zone must be earmarked or allocated to any new industry or estate for dismantling or recycling of e-wastes produced by those industries or estates by a Department of

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<sup>191</sup>*Supra note 115.*

Industry in the State or any other Government departments authorized to do so by the governments.

12. The Labor Department in the State has been entrusted with the responsibilities of registering the workers working in these dismantling sites and to work for their skill development. It has also assigned responsibilities on the urban local bodies for channelizing orphan products to proper recycling centers.

Thus, these Rules were addressed as an improvement to the old Rules of 2011.

### **E-waste Amended Rules of 2018<sup>192</sup>**

These Rules were amended for channelizing the e-wastes to proper recycling zones and to formalize the e-waste recycling sector. The targets under EPR has been revised and set for the new producers who have entered recently in this game. Some of the salient features of these Rules are as follows-

1. The new target specifies 10% as for 2017-18 which will increase at a rate of 10% annually till 2023 and after which the EPR targets will become 70%.
2. New sets of target have been provided for the new producers whose term is less than the average life time of the products.
3. The PROs are now made responsible to apply to the CPCB for conducting any activities under these Rules.
4. The cost of RoHS shall be borne by the government and if any product does not comply with the RoHS test then it must be paid by the producers.

The amended Rules of 2018 are thus an extension of the previous Rules with more improvement in the process of e-waste regulation.

The above discussion highlights the various laws and rules that governs the management of wastes including e-wastes. These laws had been subjected to several amendments owing to the increasing demands of time. The production and generation of e-wastes are increasing day by day and along with it the risks and hazards related to such e-wastes are also increasing. Thus, by these laws and rules an effort has been made to regulate the waste management system in an ecologically sound manner.

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<sup>192</sup> E-waste (Management) Amendment Rules, 2018. No.57, Acts of Parliament, 2018, (India).

## Case Study

### 1. C-9/00 Palin Granit Oy v. Vehmassaion kansanterveystyon kuntayhtymän hallitus (2002) Env LR 35<sup>193</sup>

#### (A broad definition of waste)

This is a good example of the broad supply approach to the definition of waste. Palin Granit stored leftover stone at a granite quarry in Finland. The Finnish waste authorities considered the left-over stone to be waste for the purpose of Finnish law and that its storage site was a backfill. PG argued that the leftover stone was stored for short periods for subsequent use without the need for any recovery measures and did not pose any danger to human health or the environment. The Finnish waste authority argued that the left-over stone should have been considered as waste as long as evidence of reuse of the stone had not been provided. The Finnish Court referred to the court of justice the question of whether the leftover stone produced from stone quarrying was competent of being regarded as ‘waste’.

### 2. OSS Group Ltd v. Environment Agency [2008] Env LR 8<sup>194</sup>

#### (When does waste ceased to be waste)

OSS collected and treated waste oil, and resold it as a fuel. The Central issue was whether the treated oil discontinued to be waste following treatment and prior to sale. The Environment Agency argued that the oil discontinued to be waste after it was burned as a fuel. The Court of Appeal acknowledged the difficulties in making a judgement on the vague definition of waste found in what is now Art. 3 (1) of the Directive, but held that the oil was not being ‘discarded’ in any ordinary sense of the term. It was necessary to make a balanced, intended judgement on the facts of the case to see whether the oil was still waste when burned. The key factors were that waste oil was converted by OSS into a distinct, marketable product,

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<sup>193</sup>House Committee on Foreign Affairs, Subcommittee on Asia, the Pacific and the Global Environment, “Exporting Toxic Trash: Are We Dumping Our Electronic Waste on Poorer Countries?” (May 21, 2020, 10:13 PM) [http://www.internationalrelations.house.gov/hearing\\_notice.asp?id=1031](http://www.internationalrelations.house.gov/hearing_notice.asp?id=1031).

<sup>194</sup>Yan Guoa, et al., *Journal of Environmental Quality*, “Heavy Metals in the Environment: Heavy Metal Contamination from Electronic Waste Recycling at Guiyu, Southeastern China,” July-August, 2009, Vol. 38:1617-1626.

which could be used exactly in the same way as an ordinary fuel and with no harmful Environmental effects.

### **3. C-1/03 Van de Walle and ors [2005] Env LR 24<sup>195</sup>**

#### **(Extending the concept of ‘discarding’)**

The Court of justice was asked to consider the question of whether petrol leaking from underground storage tanks at a Texaco filling station was waste or not. As with the previous case law, the key question was whether it could be said that the petrol had been discarded. The Court held that accidental leaks and spillages of petrol were substances that the holder did not deliberate to produce and which were ‘discarded’, albeit involuntarily, at the time of production or distribution. The Court also ruled that soils contaminated by the hydrocarbons were waste even where they had not been dugged, because the soil could not be recovered or disposed of without some decontamination works. Finally, the Court considered that Texaco, as the petrol supplier, was the producer (and therefore holder) of the waste for the purpose of the Framework Directive in instances in which the leak occurred even if only in part - by a ‘disregard of contractual obligations ‘ to serve and maintain the tanks on the part of Texaco. In the UK, accidental spillages or leakages of substances have not necessarily been regarded to be waste. The central problem created by the Van de walle decision is that the Court of Justice has expanded the concept of waste and the application of the Framework Directive into new areas. While that may be compulsory to respond to a set of facts in Belgium, the decision cuts across long- established statutory controls in other Member States. For example, there are controls to avert such leaks and to remedy the consequences under various pieces of legislation dealing with, for example, Water pollution and historic pollution. It should be noted though, that the case been decided today the consequence might have been different in light of the exclusion from the definition of waste of certain soils and land in Art.2. It also begs the question about the role and motive of other EU legislation, such as the Water Framework Directive and Environmental Liability Directive, which purportedly address such problems.

### **4. R (Rackham) v. Swaffham Magistrates Court and the Environment Agency [2004] EWHC17<sup>196</sup>**

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<sup>195</sup>Xia Huo, et al., *Environmental Health Perspectives*, “Elevated Blood Lead Levels of Children in Guiyu, an Electronic Waste Recycling Town in China,” Vol. 115, Number 7, July 2007, 1113-1117.

### **(The uncertainty of defining ‘waste’)**

The owner of a farm (R) mixed municipal waste with compost and other green waste to make a product. He took the view that the mixed material was not waste. The Environment Agency did not agree and prosecuted. R sought to challenge the prosecution. One of the grounds of challenges was that the meaning of waste (as derived from the ARCO Chemie decision) could not be defined with sufficient certainty to enable R to know what to do to act in accordance with the law. As such, the prosecution was a breach of the right to not be punished without law under Art.7 ECHR. The High Court dismissed the application, holding that, although the decision in ARCO required the exercise of judgement it was not so uncertain as to amount to a breach of Art. 7.

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<sup>196</sup>EPA published the final results of its study on “Electronics Waste Management in the United States” (May 21, 2020, 10:13 PM)<http://www.epa.gov/waste/conserve/materials/ecycling/manage.htm>.

## CHAPTER VI

### CHALLENGES AND LIMITATIONS RELATED TO E-WASTE MANAGEMENT

India is emerging as one of the biggest producers of e-waste in the world. As already mentioned in Chapter 3, India produces around 2 million tonnes wastes annually and this figure is about to increase. Knowing this issue several Rules have been made, the first being the E-waste Rules of 2011 that has been replaced by the Rules of 2016 and again amended in the year 2018.<sup>197</sup> And also there is a Batteries Management Rule in force in India. Still the scenario is not safe for the ecosystem as well as for the health of the general public within the country. Some of the challenges faced by the legal framework in India in the field of e-waste management can be briefly pointed out in this chapter in the following manner-

1. Under the Rules the PCBs are responsible to manage a proper data about the generation of e-wastes. Madhav Dev, former Union Environment Minister on March 25, 2017 announced that the CPCB had projected India to generate 0.8 million tons till 2010, but since then nothing has been done by the SPCBs. Although, EPR targets have been provided by the Rules which the producers are claiming to have satisfied, yet no mechanism has been specified for verifying such claims.<sup>198</sup> The CPCB has the duty to conduct tests for granting authorization to the recyclers of the e-wastes. The law not only speaks for the producers responsibility to collect the wastes, but it also provides for ensuring that the wastes have been transferred to the recycling centres safely. But due to the absence of any proper monitoring system it cannot be guaranteed that such transportation of wastes is done safely and even the annual reports filed by most of the producers are silent in this respect.<sup>199</sup> The CPCB reported that there are 214 registered e-wastes recycling centre that recycled or dismantled only 0.0056 million tons of e-wastes generated out of 2 million e-wastes. This shows that more than 95% of e-wastes are being recycled in the informal sectors in a very crude manner that possess a potential threat to the environment as well as to the health of those workers working in those recycling centres.<sup>200</sup>

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<sup>197</sup> EPA's "Landfills" (June 12, 2020, 10:10AM) <http://www.epa.gov/osw/nonhaz/municipal/landfill.htm>.

<sup>198</sup> Robert Tonetti, EPA Office of Solid Waste, "EPA's Regulatory Program for E-Waste," (June 12, 2020, 10:10AM) <http://www.epa.gov/waste/materials/eyclcing/docs/e-wasteregs.pdf>.

<sup>199</sup> *Supra note 124*.

<sup>200</sup> Banjot Kaur, Can India manage its toxic e-waste?, DTE (May 26, 2020, 10:17 PM) <https://www.downtoearth.org.in/waste/can-india-manage-its-toxic-e-waste>.

2. As far as the imports of e-wastes in India is concerned it has been alleged that no proper documentation of e-wastes imports to India has been made by the monitoring authorities responsible for this matter.<sup>201</sup> While the UNEP by a Report in 2016-17 admitted that China, India, Pakistan and Malaysia are the largest e-waste destination in Asia.<sup>202</sup> The Rules provides that no import of e-wastes is permissible in India except for the purpose of refurbishing and second use for which even if permission is given, they would have to be re-exported to the exporting countries within 1 to 3 years of time.<sup>203</sup> But then, the Central Board of Excise and Customs that is the nodal agency lacks proper human agency to determine whether such imports are for second hand use.<sup>204</sup> Further, according to MOER&CC, there is no definite mechanism to verify whether such e-wastes have been re-exported.<sup>205</sup> Priti Mahesh, the Chief Program Coordinator of Toxic Link, Delhi opined that the law is best on papers but due to absence of proper monitoring mechanism and proper implementation, it has completely failed to attain its objectives<sup>206</sup>.

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<sup>201</sup> Government Accountability Office report to the Chairman, Committee on Foreign Affairs, House of Representatives, "Electronic Waste: EPA Needs to Better Control Harmful U.S. Exports through Stronger Enforcement and More Comprehensive Regulation," report GAO 08-1044, (June 12, 2020.10:10AM) <http://www.gao.gov/new.items/d081044.pdf>.

<sup>202</sup> For information about the Basel Action Network's "E-Stewards Certification Program," (June 12, 2020.10:10AM) [http://www.estewards.Org/esteward\\_certification.html](http://www.estewards.Org/esteward_certification.html).

<sup>203</sup> EPA's "Responsible Recycling (R2) Practices" (June 12, 2020.10:10AM) <http://www.epa.gov/waste/conserves/materials/ecycling/r2practices.htm>.

<sup>204</sup> EPA's Office of Solid Waste, "Electronic Waste Management in the United States: Approach 1," EPA530-R-08-009, (July 12, 2020.10:10AM) <http://www.epa.gov/epawaste/conserves/materials/ecycling/manage.htm>.

<sup>205</sup> Activities listed here are specified in "Closing the Loop: Electronics Design to Enhance Reuse/Recycling Value," (June 12, 2020.10:10AM) [http://www.greenelectronicscouncil.org/documents/0007/Design\\_for\\_End\\_of\\_Life\\_Final\\_Report\\_090208.pdf](http://www.greenelectronicscouncil.org/documents/0007/Design_for_End_of_Life_Final_Report_090208.pdf).

<sup>206</sup> *Ibid.*



## CHAPTER VII

### CONCLUSION AND SUGGESTIONS

From the study so far we can easily come to the conclusion that e-wastes are increasing with the passage of time due to the increase in the technological innovations. The people enjoying the benefits of technological advancements, particularly benefits derived from the information technology, are not aware of the other side of the benefits. The revolutions in the electronics and computer technologies have brought a number of facilities and advantages to the society, and equally they also brought inconveniences and problems of Environment degradation. Safe environment is a fundamental requirement for healthy living and anything which endangers the environmental safety should be looked with a great concern. E-waste is recognised as a potential pollutant and hazards to the environment. The need of the day is to manage the same carefully to avert the dangers it poses to the environment and the society. Under the present scenario, the alternative available is to protect the environment and manage the waste scientifically to mitigate its effect.

The first task of managing the e-waste is to bring awareness among the people about its adverse effects and caution them to use preventive steps and safety measures. The electronic mass media and print media may be used for the purpose. The other important dimension of management of waste is to fix the 'extended product responsibility' upon the manufacturers so that they may sell the products with a condition to take back or buy back once the goods they sold once they become obsolete or the purpose is accomplished. It helps in reduction of waste at source and disposal of waste scientifically as the manufacturers handle them professionally. The manufactures should be instructed to use eco-friendly material and processes while they design and manufacture the products. The manufactures should be asked to update their technologies to handle the e-waste. The consumers should purchase the computers and other products forecasting their future requirement. It helps to avoid frequent purchase of devices as and when the technology changes take place there will be less conversion into waste. The responsibility should also be imposed upon the users (generators of the e waste) to sell the waste to the traders having the licence for recycling.

The risk of e-wastes upon human health and the ecosystem is also increasing along with it. The management of these e-wastes has become a serious issue for the present human civilization to deal with. It has also been made clear by several facts that the presence of harmful hazardous substances in the e-wastes like lead, cadmium, and mercury as well as

other such chemicals that leads to the contamination of the air, water and soil due to their accumulation in the ecosystem for a long time without proper treatment. Informal sectors of recycling has also contributed to the health hazards of the workers working there, and several health related disorders have also been found to be the consequences of improper handling of e-wastes.

Owing to these reasons several regulations had been provided both at the international level primarily the Basel Convention and at the national level like the E-waste Rules. But unfortunately, UNEP reports demonstrate that still at present several transboundary illegal movements of e-wastes are taking place. Further, the Basel Convention lacks any proper enforcement mechanism for checking such illegal movements. In India too, it has been found that besides having well drafted laws, yet in the absence of a proper monitoring system and also due to lack of efficient implementation, these laws are failing to achieve their primary goals.

In the wake of the challenges to the waste management system in India the following suggestions can be made-

1. A proper monitoring mechanism of the e-waste management system must be made specified in the Rules;
2. The annual records filed to the PCBs and other authorities during the process of management of these e-wastes by the actors involved in this process must be made more transparent for public verification and all information about such records must be made publicly available at free of cost so that the authorities responsible for maintaining such records becomes accountable;
3. Further, the CPCB is responsible for granting authorization to the recyclers but the applications filed by the applicants as well as the process of their verification must be made transparent enough for making public scrutiny possible;
4. Sufficient number of experts shall be appointed in the nodal agency for the purpose of verifying that whether any wastes that has been imported to India are for refurbishing and second hand use or for any other purposes;
5. Platforms shall be provided by law itself to the NGOs on contractual basis for the purpose of implementing the various provisions of these Rules and proper monitoring system must be introduced to check their accountability;

6. Arrangements for better living conditions to those workers working in the informal sectors of recycling shall be made available so that they are discouraged from joining those sectors since they do certain jobs due to necessity and compulsion;
7. Public awareness must be enhanced at all levels because the issue becomes even more dangerous due to the ignorance of the general public and
8. Stricter penalties must be provided not only for the individual violators of the Rules but also for the authorities engaged in public duty for ensuring proper implementation of these Rules because one of the biggest challenges to e-waste management in India is that most of the public authorities are not performing their functions in the right manner.

Thus, we can finally say that although in India there exists a legal mechanism for regulating the waste management, a lot has to be done for ensuring a better waste management system that is ecologically sound. Hence, the hypothesis that more efficiency of the waste management laws in India along with their proper implementation especially those related to e-wastes will ensure lesser ecological crisis.

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