Legal Framework on E-Waste Management: A Critical Analysis

SUMMARY OF THESIS

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SUMMARY

1. INTRODUCTION

The industrial revolution brought by science and technology in nineteenth century marked a new era in human civilization. The revolution brought by information and communication in twentieth century brought enormous changes in the way we organize our lives, our economies, industries and institutions. These changes have brought enormous development in modern time and enhanced the quality of our lives. At the same time, these have led to manifold problems including the problem of massive amount of hazardous waste and other wastes generated from electric products. These hazardous and electronic wastes pose a great threat to the human health and environment. The issue of proper management of electronic wastes, therefore, is critical to the protection of livelihood, health and environment. It constitutes a serious challenge to the modern societies and requires coordinated efforts to address it for achieving sustainable development.[1]

A Report on E-waste presented by the United Nations University-Institute for the Advanced Study of Sustainability on July 01, 2020, global generation of E-waste was estimated to be 53.6 million tons per year. Asia was found to be the largest producer of E-waste with a generation rate of 24.9 million tons per year which amounts to a per capita generation rate of 5.6 kg/person-year.[2] About 80% of the E-wastes are transported unlawfully from developed to developing countries. It has been estimated that 60–70% of the E-waste collected from Europe is shifted to Asian and African countries for dismantling and recycling. The high amount of E-waste generated throughout the globe are due to the products least life span, cheap/low prices, lifestyles of consumers, change of consumption patterns or increased consumption, illegal transboundary movement, low durability, which are non-cost effective, and unregulated. This rapid increase in E-waste generation is linked with the time to time up-gradation advances in technologies, and further continuous

[1]Nivedita Chaudhary,"Electronic Waste in India: A Study of Penal Issues" 2 *ILI Law Review* (2018).
[2]Vanessa Forti, Cornelis P.Balde, et.al., The Global E-waste Monitor 2020 Quantities, flows, and the circular economy potential 24 (United Nations University, 2020).

fluctuation or fall in prices. Most of the developing countries lack proper disposal, safety measure, and proper management of the E-waste pollution.[3]

The current Indian scenario of E-waste management is different from the worldwide. The practice of E-waste is a serious issue because of the informal recycling activities. Therefore, quantification of E-waste in India is very difficult and, there is no mechanism and policy to check the flow of E-waste in the system. India is the third biggest producer of E-waste in the world; As per the United Nations University report, 3.2 million tonnes of E-waste was generated in the country in 2019, a UN report have warned that the volume of global E-waste is likely to rise by 21 percent in next three years[4]. In India E-waste collection, transportation, segregation, dismantling, recycling and disposal is done manually by untrained labours in informal sector. Due to low awareness and sensitization E-waste is thrown along with garbage which is collected and segregated by rag pickers. E-waste contains reusable and precious material. Rag pickers sell this E-waste to scrap dealers and run their livelihood. The scrap dealers supply the E-waste to recycling industries. The recyclers use old and hazardous technologies and equipment, to recycle/treat the E-waste[5].

2. REVIEW OF LITERATURE

For the purpose of writing research work, the researcher has review the followingbooks and articles-

- **Claus Hieronymi, Ramzy Kahhat and Eric Williams, *E-Waste Management, From Waste to Resource* (Taylar and Francis Group New York, 2013).**

The author examined that a review thelandscape of electronic waste, E-waste, management is changing dramatically. Besides a rapidly increasing world population, globalization is driving the demand for products, resulting in rising prices for many materials. Absolute scarcity looms for some special resources such as indium. Used electronic products and recyclable materials are increasingly crisscrossing the globe.

[3]. Guidelines for Environmentally Sound Management of E-waste, (2008).
[4] Vanessa Forti, Cornelis P. Balde, et.al., T*he Global E-waste Monitor 2020 Quantities, flows, and the circular economy potential* 104-114 (United Nations University, 2020).
[5]KurianJoseph,'Electronic*Waste Management in India–Issues and Strategies', Proceedings of the Eleventh International Waste Management and Landfill Symposium*, 36 (LEAD October 2007).

This is creating both opportunities and challenges for E-waste management. The book will focus on the current and future trends, technologies, and regulations for reusable and recyclable E-waste worldwide. It will also compare international E-waste management perspectives and regulations under a view that includes the environmental, social, and economic aspects of the different systems. The mission of this book is to educate consultants, legislators, recyclers, waste managers, manufacturers, and the general public about the future of E-waste. It has been divided in twelve chapters that cover three major themes: (1) a holistic view of the global E-waste situation; (2) the current reserve supply chain and management of used electronics, including flows, solutions, policies, and regulations; and (3) future perspectives and solutions for a sustainable E-waste management. Accordingly, the first Chapter describes the current E-wastescenario around the world and its major environmental, social and economic implications, such as E-waste and landfills, formal and informal recycling, reuse, and their social and economic impacts.

Thus, Chapter 6 introduces the reader to several E-waste management systems in Europe and North America and describes a framework that can be used to compare and evaluate their performance that can be applied in the future to gain insight into their effects on system performance and future improvements. One of the main issues related to the global E-waste situation are the transboundary flows of E-waste, from developed to developing countries, or even between developing countries

Global policies related to transboundary flows of used electronics and their major future challenges and recommendations are discussed in Chapter 8 the future of E-waste management is analysed in the following chapters. The future legal development of electronic products and its management is discussed in Chapter 9 Chapter 10 gives an overview of some of the most important sustainability issues facing the electronics sector including energy, climate change, materials and E-waste, and examines how these environmental and social concerns are converging with core business matters.

- **Rakesh Johri, *E-Waste: Implications, Regulations, and Management in India and Current Global Best Practices* (Energy and Resources Institute Ltd., 2013).**

The author examined that a review E- waste regulation India and International status E-waste legislation in the European Union and the Basel Convention Regulating E-waste, and also a review of the international and national legal framework on E-waste extended producer responsibility, and international rules and regulations on E-waste recycling technology for E-waste optimal planning for computer waste recycling of e- scrap in a global environment, opportunities and challenges technologies for recovery of resources from E-waste CPCB draft guideline for environmentally sound management of E-waste.

- **Bruce Fowler, *Electronic Waste*: *Toxicology and Public Health Issues*" (Academic Press London, 2017).**

This book discusses the major public health concerns due to the presence of toxic chemicals that are generated from improper recycling and disposal practices of electronic waste. This book highlights hazardous inorganic chemicals found in E-waste, including arsenic, cadmium, lead, mercury, gallium, iridium, and nano materials, also focusing on health issues related to the presence of BPA, styrene, and other plastic components and combustion products, while also identifying populations at special risk.

To provide readers with potential solutions to this global problem, the author presents risk assessment approaches using chemicals, mixtures, biomarkers, susceptibility factors, and computational toxicology. He discusses how to translate the information gathered through risk assessment into safe and effective international policies.

The final chapter is devoted to future research directions. This is a timely and useful resource for all those concerned with the health issues surrounding E-waste management and proper disposal, including toxicologists, public health and policy officials, environmental scientists, and risk assessors.

This book highlights Emphasizes the transference of electronic wasteto developing countries where populations of concern include children working in recycling activities and impoverished groups with poor nutritional status and limited access to medical resources.

- **Rajya Sabha Secretareat "E-Waste in India"** ***Research Unit,*** **New Delhi (2012)**

This Article highlights a brief insight into this relatively new concept of E-waste, its generation in India and the environmental and health concerns attached to it. It highlights the E-waste recycling economy in the thriving informal and the nascent formal sector and the urgent need for a more clear-cut legislation and forward looking vision.It highlights also the revolutionary changes experienced in societies across the world due to the application of electronics are far more deep and widespread than the impact of industrial revolution. The electronics age made unprecedented impact on human society and spectacularly enhanced our connectivity across the globe. The widespread use of electronic items has made communication easier, boosted business activities and created employment opportunities. However, along with the benefits, it has brought into focus many challenges, like the rising problem of E-waste, that have to be boldly dealt with by society. In the current scenario, it is always possible that human health and environment would be drastically endangered if concerted legislations and actions were not taken for efficient management and disposal of E-waste. The Article also looks into the global trade in E-waste and the international experience in this regard.

- **Santhanam Needhidasan, "Electronic Waste an Emerging Threat to the Environment of Urban India"** ***JESHE*** **(2014).**

This article focuses on the problem of E-waste along with its policy level implications, and that there is an urgent need to address the issues related to E-waste in India in order to avoid its detrimental future consequences.

The use of Information and Communication Technology cannot be ignored and dispensed with in the contemporary era and the same requires a sound and effective strategy as well. The benefits of ICT are also accompanied with certain drawbacks and

nuisances that, if ignored, may be a big threat to India's environment. The ICT strategy of India must consider these aspects on a priority basis and the same must be an in dispensablepart and parcel of the Indian e-governance plan.

- **Monika and Jugal Kishore, "E-Waste Management: As a Challenge to Public Health in India" *IJCM* (2010).**

This article focuses on the problem of E-waste and environmental epidemiological studies are required to assess the present status of E-waste management system in India, to assess the E-waste quantities and exact amplitude of the problem in Indian cities, and to establish relationships with the informal recycling sectors. The valuable data will be generated by these studies that would help in drafting an action plan for E-waste management. India should start a surveillance system for diseases and health consequences of E-waste. The sustainability of E-waste management systems has to be ensured by improving the collection and recycling systems. It would be desirable to establish public-private partnerships in setting up buy-back or drop-off centers. Levying advance recycling fees is another approach to ensure waste management sustainability.

3. STATEMENT OF PROBLEM

Developing countries are facing enormous challenges related to the generation and management of E-waste which are either internally generated or imported illegally; India is no exception to it. However, the existing management practices related to E-waste in India are reasonably poor and have the potential to risk both human health and the environment. Keeping in view the above E-waste problem the government of India in exercise of powers conferred under Sections 3, 6 and 25 of the EPAct, 1986 had codified Hazardous Waste (Management and Handling) Rules, 1989 and Hazardous Waste (Storage Export and Import) Rules, 1989 to regulate the dangerous dimensions of hazardous waste in India. For the first time the MoEF has started to draft the Waste Electronic and Electrical Equipment Rules began in 2006 as a corollary to the Hazardous Waste Management and Handling Rules, 1989. Subsequently, Guidelines for Environmentally Sound Management of E-waste, 2008 and E-Waste (Management and Handling) Rules, 2011were issued to deal the

problems of E-Waste. More recently, Government of India notified a rule on E-Waste in the form of "E-waste (Management and Handling) Rules, 2016". Electric and electronic equipment especially computer content toxic and heavy metals with information technological development generates E- waste in a huge amount. This waste contents material such as lead, mercury, cadmium and plastic that cause toxic pollution if it inadequately disposed of. There are several methods to disposed E-waste either by landfill or incinerator or recycle or exporting. However, all this method will give negative impact to human health and environment, other than that problem related to facilities and location of E-waste disposal is occurring. For instances, in a landfill method of the E-waste, it will contaminate groundwater and if we incinerate E-waste, it will produce hazardous smelt and left hazardous residue.

The management practices of E-waste are poorly designed in India and caused a serious human health and environmental issues. Further, the Involvement of urban poor and illegally imported E-waste from developed countries exaggerate the problem of E-waste. Moreover, the lack of public awareness regarding the disposal of electronic goods and inadequacy of policies to handle the issues related to E-waste enhance the problem in India. Therefore, the proper implementation of the "E-waste Rules, 2016" is necessary to address the ever growing pile of E-waste in the country. In India, we need to enact a strong and comprehensive legislation on E-waste management in order to ensure that it would not harm to environment in general and man in particular. It is also the responsibility of everyone including individuals and corporate bodies, to help the Government reduce waste through recycling.

4. OBJECTIVES OF RESEARCH

The purpose of this research is to examine the law and policy on E-waste management in India, in order to develop a framework for sustainable E- waste management regime in future. In this context the following objectives of research are as under:

1. To explore the various sources of E-waste.
2. To analyse the International Legal Framework relating to E-waste management.
3. To analyse the adverse effects of E-waste on human health and environment.
4. To analyse the implementation of laws towards E-waste management.

5. To assess the role of Judiciary, Pollution Control Boards and National Green Tribunal in the regulation of E-waste management in India.
6. To suggest the effective measures for the E-waste management.

5. HYPOTHESIS

1. The available international and national level legal regime is not sufficient for the proper E-waste management.
2. The implementation of available regulations relating to management of E-waste is not effective.
3. There is a lack of accurate figure of E-waste volumes generated domestically and by imports.
4. There is lack of awareness among people about the adverse effect of E-waste on human health and environment.

6. RESEARCH METHODOLOGY

The methodology of the research shall be primarily doctrinal by using and secondary sources. The various conventions, resolution, authoritative text books, International Law Journals, report, gazette,judicial pronouncement and various articles of national and international authors will be referred by the researcher to critically analysed to the substantiate logic and rational behind the different provisions relating to the legal framework on E-waste management.

7. FRAMEWORK OF THE STUDY

For the systematic, smooth and purposeful study the entire research work has been broadly divided into seven chapters.

CHAPTER-I – INTRODUCTION

The first is an introduction to various concepts relating to the research work. It includes statement of problem, objectives of the study, hypothesis and research methodology of the research work.

CHAPTER II - E-WASTE: MEANING AND CONCEPT

E-waste is a general term that encompasses a huge variety of products that have electric and electronic components in them. Electronic waste, or E-waste, consists of obsolete electrical and electronic equipment. Obsolete EEE includes computers, televisions, mobile phones, printers and white electronic goods, such as refrigerators. It is very difficult to give a precise definition due to the complexity in the vast number of products that could be included therefore it is possible to define them broadly.

Electronic waste, also known as electronic waste or WEEE, or in short called E-waste, is used to describe obsolete or end of life electrical and electronic equipment. There is no generally accepted definition of E-waste around the world.

According to the European Directive 2002/96/EC, "Waste electrical and electronic equipment, including all components, subassemblies and consumables which are part of the product at the time of discarding."

The Directive 75/442/EEC, Article 1(a), defines as "E-waste encompasses a broad and growing range of electronic devices ranging from large household devices such as refrigerators, air conditioners, cell phones, personal stereos, and consumer electronics to computers which have been discarded by their users.

According to Basel action network the e-waste is defined as "E-waste includes a wide and developing range of electronic appliances ranging from large household appliances, such as refrigerators, air-conditioners, cell phones, stereo systems and consumable electronic items to computers discarded by their users"

United Nations University's initiative on solving the E-waste Problem defines E-waste as, "E-Waste is a term used to cover items of all types of electrical and electronic equipment and its parts that have been discarded by the owner as waste without the intention of re-use."

Organization for Economic Co-operation and Development (OECD), E-waste has been defined as "any appliance using an electric power supply that has reached its end-of-life.

According to E-waste (Management and Handling) Rules, 2016 section 3(p) defines as "Electrical and Electronic Equipment" means equipment which is dependent on electric current or electro-magnetic field in order to become function." And section 3(r) defines E-waste as "electrical and electronic equipment, whole or in part discarded as waste by the consumer or bulk consumer as well as rejects from manufacturing, refurbishment and repair processes.

CHAPTER-III- INNATIONAL LEGAL FRAMEWORK ON E-WASTE MANAGEMENT

At the International level there are several international legal instruments developed for international co-operation in the field of hazardous sustains for environmentally sound management across the border. In order to deal with the hazardous substances and its sound management the global community adopted the Basel Convention in 1989. This Convention talks on the control of transboundary Movements of Hazardous Wastes and their Disposal is the most comprehensive and pioneering global environmental treaty on hazardous wastes and other wastes. It was negotiated under the auspices of the United Nations Environment Programme in the late 1980s. India is a signatory to the Basel Convention, which requires countries to ensure that hazardous wastes and hazardous recyclable materials are managed in an environmentally sound manner. It deals with the question of the transboundary movements of hazardous and other wastes.

The preamble of the Convention convinced that member States should take necessary measures to ensure that the management of hazardous wastes and other wastes including their transboundary movement and disposal is consistent with the protection of human health and environment It also recognised that the increasing desire for the prohibition of transboundary movements of hazardous wastes and their disposal in other States, especially developing countries. The Convention laid down the general obligations of the member States which includes minimum reduction of the generation of hazardous and other wastes and substantial reduction of their transboundary movements. The Convention declares that illegal traffic in hazardous wastes or other wastes is criminal. Furthermore, a signatory State cannot ship hazardous waste to any country that has not signed the treaty. A State party to the

Convention shall prohibit all persons under its national jurisdiction from transporting and disposing of hazardous wastes or other wastes unless such persons are authorized or allowed to perform such types of operations. The obligations under this Convention of States in which hazardous waste and other wastes are generated to require that those wastes are managed in an environmentally sound manner may not under any circumstances be transferred to the States of import or transit.

Article, 1 of the convention talks about the scope of the convention. It provides that the following wastes that subject to transboundary movement and shall be "Hazardous wastes" for the purposes of this Convention:

1. (a) Wastes that belong to any category contained in Annex I, unless they do not possess any of the characteristics contained in Annex III.

1. (b) Wastes that are not covered under paragraph (a) but are defined as, or are considered to be, hazardous Wastes by the domestic legislation of the Party of export, import or transit.

2. Wastes that belong to any category contained in Annex II that are subject to transboundary movement shall be other wastes for the purposes of this Convention.

3. Wastes which, as a result of being radioactive, are subject to other International control systems, including international instruments, applying specifically to radioactive materials are excluded from the scope of this Convention.

The Basel Convention requires the prior informed consent of other states before environmentally harmful activities may be undertaken. The essence of the control system established by the Basel Convention is the need for prior, informed, written consent from transit states and the state of import .Information must be supplied which is sufficient tenable the nature and effects on health and the environment of the proposed movement to be assessed.

There are two ways in which the requirement of prior informed consent is enforced. The first is by making the state of export accept the return of illegal waste where practicable or, where the importer is at fault, imposing on the state of import a duty to ensure safe disposal of the waste.

The second method employed by the Basel Convention is to ensure that states punish illegal traffic as a criminal offence. The requirement of prior consent, as we have seen, is simply an expression of the sovereignty of a state over the use of its territory and resources.

The primary obligation imposed by the Basel Convention is to manage the trans-boundary movement of waste in an environmentally sound manner. This obligation applies to exporting, transit, and importing states alike, and also to trade with non-parties, which may only be conducted under an agreement providing for management no less environmentally sound than is required by the convention. The crucial point is that states must not permit export or import of waste if they believe that it will not be handled in an environmentally sound manner. Developing states do not escape this responsibility for sound management of imported waste; if they cannot meet it, they must either seek assistance, relying on the conventions provisions for international co-operation or prohibit the import.

The principal aims of the convention are reiterated, including waste prevention and minimization, least transboundary movement, recycling self-sufficiency and proximity of disposal. Criteria to be used in assessing the soundness of waste management standards include the following:

Whether waste sites are authorized and of adequate standard to deal with the waste in question, whether operators of waste sites are adequately trained, whether sites are monitored, and whether waste generation is minimized through best practice and clean production methods.

Further development of the convention regime is the responsibility of the conference of the parties established for this purpose. It has power to adopt decisions, amendments, and protocols, and to undertake any additional action required to further the objectives of the convention. The obligatory provisions of information from parties regarding trans- boundary movements, their effects on health and the environment and any accidents during transport or disposal, given the conference a basis on which to review the effectiveness of the convention and the polices of states. In most respect the Basel Convention’s provision for international supervision thus follows the typical pattern adopted in many environmental treaties.

Apart from that the Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa, 1991, was adopted by the member-states of the defunct Organisation of Africa Unity (OAU), now African Union (AU), as a protest against the persisting dumping of hazardous and nuclear wastes in the territorial borders of African countries which the Basel Convention was perceived not to have effectively addressed.

Another notable regional treaty related to hazardous wastes 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 Wastes within the South Pacific Region, 1995. This treaty opened for signature in Waigani, Papua New Guinea, in 1995, and entered into force in 2001.

CHAPTER-IV- NATIONAL LEGAL FRAMEWORK ON E-WASTE MANAGEMENT

The national legal framework governing environmental issues focus on specific type of pollution and regulation of hazardous substances. To combat the ever growing E-waste problem, India needs to have strong rules and regulations. Over the years, the government has instituted a number of regulations for better management of hazardous waste in the country. Of late, only in 2006 in exercise of powers conferred under Sections 3, 6 and 25 of the Environment (Protection) Act, 1986 the MoEF has started to draft .The Hazardous Wastes (Management and Handling) Amendment Rules, 2003 under schedule 3; E-waste is to be defined as "Waste Electrical and Electronic Equipment including all components, sub-assemblies and their fractions except batteries falling under these rules". The definition provided here is similar to that of Basal Convention. E-waste is only briefly included in the rules with no detail description. The Guidelines for Environmentally Sound Management of E-Waste, 2008 was a Government of India initiative and was approved by Ministry of Environment and Forest and Central Pollution Control Board. It classified the E-waste according to its various components and compositions and mainly emphasises on the Environment and Forest and Central Pollution Control Board. It classified the

E-waste according to its various components and compositions and mainly emphasises on the management and treatment practices of E-waste.

The following rules will come under the Environment (Protection) Act 1986 (EPA). The E-Waste (Management and Handling) Rules, 2011, putting the onus of re-cycling of electronic wastes on the producers, the Ministry of Environment and Forest has for the first time notified E-waste management rules. The E-waste (management and handling) Rules, 2011 would recognize the producers' liability for recycling and reducing E-waste in the country. The rules will come into effect from May_1, 2012. according to this regulation, 'electrical and electronic equipment' means equipment which is dependent on electric currents or electro-magnetic fields to be fully functional and 'E-waste' means waste electrical and electronic equipment, whole or in part or rejects from their manufacturing and repair process, which are intended to be discarded. these rules are meant to be applied to every producer, consumer or bulk consumer involved in manufacturing, sale purchase and processing of electrical and electronic equipment, collection centres, dismantlers and recyclers of E-waste. Responsibilities of producers, collection centres, consumers, dismantlers, recyclers etc. are defined and incorporated in these rules.

1. **E-Waste (Management) Rules, 2016**

E- Waste (Management) Rules, 2016 In October 2016, the E-Waste (Management) Rules, 2016 replaced the E-Waste (Management and Handling) Rules, 2011. These rules are called the E-Waste (Management) Rules, 2016, which came into force on the 1st day of October, 2016. This new rules have many new and effective provisions. It contains six Chapters and 24 Sections in total and four Schedules respectively. Wherein, Chapter 1 consists of 3 sections in which Section 1 talks about the short title and commencement of the rules. Section 2 talks about the application of the rules which says that these rules shall apply to every manufacturer, producer, consumer, bulk consumer, collection centres, dealers, e-retailer, refurbisher, dismantler and recycler involved in manufacture, sale, transfer, purchase, collection, storage and processing of e-waste. Section 3 is a definition clause where various terms like 'bulk consumer', 'Central Pollution Control Board', 'consumables', 'channelisation', 'dismantler', electrical and electronic equipment', 'E-waste', 'orphaned products',

'refurbisher' etc are defined. Section 4 describes the responsibilities of the manufacturer which is to collect e-waste generated during the manufacture of any electrical and electronic equipment and channelise it for recycling or disposal. Section 5 describes the responsibilities of the producer which says that the producer of electrical and electronic equipment shall be responsible for implementing the Extended Producers Responsibility.

However, according to the rules, bulk consumers such as enterprises and government will be responsible for recycling of the E-wastes generated by them. The bulk users have to ensure that the E-waste generated by them is channelized to authorized collection centres or is taken back by the producers. They also have to maintain records of E-wastes generated by them and make such records available with State Pollution Control Boards or the Pollution Control Committees. The Environment Ministry must work closely with the States to implement the tighter rules.

2. Amendment to the E-Waste (Management) Rules, 2018

This amendment relaxes certain aspects of the strict E- Waste (Management Rules of 2016). Specifically, the amendment focus on the E-waste collection targets by 10% during 2017-2018, 20% during 2018-2019, 30% during 2019-2020, and so on. This amendment also gives the Central Pollution Control Board power to randomly select electronic equipment on the market to test for compliance of rules. The financial cost associated with this testing shall be the responsibility of the government, whereas previously, this responsibility was of the producer.

CHAPTER-V- E-WASTE: IMPACT ON HUMAN HEALTH AND ENVIRONMENT

E-waste is a growing and emerging global problem because plethora toxic chemicals are released to the environment during dismantling, burning, and recycling processes. Therefore, for this purpose, the current chapter aims to investigate with special emphasis on e-waste associated impacts on the environmental and human health.These enormous quantities in combination with the fact that E-waste contains a wide range of hazardous compounds have turned E-waste into a global environmental

issue. When the E-waste is not taken care of appropriately, either in general wastes processes or in recycling processes, these hazardous compounds may be released and thereby become a threat to humans and the environment.

E-waste is known to contain a wide variety of toxic or otherwise hazardous components that may constitute a serious risk for human health and the environment if they are released during processing, recycling or disposal. For example, E-waste contains a wide range of heavy metals, such as lead, cadmium and mercury, and also persistent organic compounds, such as brominated flame retardants and phthalates. However, it should be noted that many of these pollutants are not present as pure compounds in the E-waste, but are constituents of complex materials, e.g. flame retardants in plastics, or are hidden inside electrical components, such as mercury in switches, and are therefore difficult to isolate and separate from the other components. These facts make the recycling of E-waste very complicated and costly, although it is obvious that it is necessary from an environmental point of view. To avoid serious environmental pollution and human exposure, adequate treatment of E-waste is crucial, particularly considering the huge amounts of E-waste that is being produced globally.

Recycling, involving the removal of hazardous compounds and recovery of valuable components, represents an opportunity both from environmental and resource conservation perspectives. However, since recycling processes seldom are perfect and completely removes all hazardous compounds from the waste, these processes are also associated with potential hazards and risks, and not least during the uncontrolled recycling activities carried out in many developing countries.

E-waste assumes significance due to its complex and toxic nature, also due to low public awareness the actual impact is being constantly ignored by the general public and the policy makers. Apart from the awareness another concerning factor is the loss of scarce metals present in E-waste, the demand for minerals used in the manufacture of electronics has to be compensated for by intensified mining activities, which in turn has given rise to conflicts for these resources worldwide

CHAPTER VI- E-WASTE MANAGEMENT: ROLE OF JUDICIARY AND POLLUTION CONTROL BOARDS

The judiciary has played a very vital role in protecting the environment and checking its degradation and pollution. It is the judiciary, which introduced the concept of environmental jurisprudence and made continuous serious efforts to make the people aware about the dire consequences of environmental pollution. In India E-waste management law has seen considerable development in the last two decades. In Toxic link v. Union of India & Others (2016), the National Green Tribunal held that the, All stakeholders, particularly, the local authorities upon whom burden lies to ensure proper collection, segregation, transportation and disposal of solid waste should act in complete coordination and coherence to ensure that the country tackles this menace of E-waste management, objectively, effectively and ensures that there is no pollution of the environment and consequent adverse impacts on public health.

CHAPTER-VII- CONCLUSION AND SUGGESTIONS

Electronic waste has become a huge problem for the world as we continue to grow the technology and become their slaves. If an instant action is not taken right away, it will continue to grow and will become a much bigger problem for the planet. Also, it has a massive bearing on environment and human life if not handled in an environmentally sound manner. There has to be sufficient rights for citizens to take legal recourse for damages caused to their health, environment and property.

Therefore, it has become the necessity of the time to manage the electronic waste in an organized and safe manner with sustainable recycling technologies. There is a need for stringent universal legal provisions and robust monitoring mechanisms to deal and match up with electronic waste of present times. It is imperative to have strict penalties like other countries analyzed here have because according to deterrence theory, people are most likely to be dispirited from committing a crime if the punishment is instantaneous, evident and severe. Also, there is a need to adopt effective strategy to encourage re-use, refurbishing or recycling of e-waste in specialized facilities to prevent environmental contamination and human health risks.

SUGGESATIONS

On the basis of above conclusion, the researcher has laid down some suggestions:-

1. Ban hazardous E-waste exports
2. Make the extended producer responsibility
3. Need for stringent health safeguards and environmental protection laws in India
4. Developing innovative methods and technologies for processing new forms of E-waste
5. Monitoring of compliance of E-waste rules
6. Awareness programme
7. Require producers to take it back
8. Get the poisons out
9. Design for longevity, upgradability, repair and re-use
10. Establishment of eco-friendly recycling

RECOMMENDATIONS TO GOVERNMENT

1. The regulations with regard to the management of E-waste has to be simplified so that manufacturers, dismantlers, authorized recyclers and other related parties can perform better for effective and timely disposal.
2. Government should set up regulatory agencies in each district, which are vested with the responsibility of coordinating and consolidating the functions of the various government authorities regarding hazardous substances.
3. Authorised E-waste recycler must upgrade their processes and make sure they adhere to best quality standards. They must be transparent and accountable for their functioning and have to upgrade their systems
4. Government should bring informal sector in to formal system and give them adequate infrastructure and safety measures for recycling and also increase the accountability of this sector.
5. A certain percentage from the price of all such electronic equipment can be directed towards the recycling budget of the government. The government

can direct a small part of budget for training E- waste handlers, for public awareness and other related activities. Government must take responsibility to train and monitor the workers. It is necessary to provide them secured livelihood along with life and health insurance.

6. Governments should be responsible for providing an adequate system of laws, controls and administrative procedures for hazardous waste management. Existing laws concerning E-waste disposal be reviewed and revamped. A comprehensive law that provides E-waste regulation and management and proper disposal of hazardous wastes is required. Such a law should empower the agency to control, supervise and regulate the relevant activities of government departments.
7. Governments should enforce strict regulations against dumping E-Waste in the country by outsiders. Where the laws are flouted, stringent penalties must be imposed. In particular, custodial sentences should be preferred to paltry fines, which these outsiders / foreign nationals can pay.
8. Governments must encourage research into the development and standard of hazardous waste management, environmental monitoring and the regulation of hazardous waste-disposal.
9. The Indian government must take the initiative to enact a unique and exclusive law related to the E -waste management.
10. Governments should enforce strict regulations and heavy fines levied on industries, which do not practice waste prevention and recovery in the production facilities.
11. Governments should encourage and support NGOs and other organizations to involve actively in solving the nation's E-Waste problems.
12. E-waste is still not a known concept for many. Efforts are to be made to create awareness programs on E-waste and its management. Campaign aimed to protecting human health and limiting environmental effects where electronics are being produced, used and discarded.
13. Government should have consultations with the industry and all stakeholders to recognise a range of EOL (end of life) for all Electronic and electrical products. This classification is essential as consumers in India so that

consumers do not need to dispose of products before their actual EOL just because of the rules.

14. Polluter pays principle and extended producer responsibility should be adopted.