Electronic Waste (E-Waste) and Its Impacts in Bangladesh: An Evaluation of Existing Laws and Implementation Process

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Abstract

A safe environment and humans' survival are interconnected but this linkage is continuously challenged by the potential threats of environmental pollution. This existing threat of environmental pollution for a country like Bangladesh increased to a further decree considering the unplanned disposal management of electronic waste as the rapid technological development adds to the high probabilities of the use, dumping, and recycling of E-waste. Directly and indirectly, the nature and lives of our country are undergoing the risk of climate change, health disease, and loss of life in certain circumstances. The hazardous chemicals and contaminated fumes released from the disposal process of E-waste for its detrimental effects on the environment and human health required systematic, planned E-waste management through the scope of proper legislative arrangement, legal obligation along with well-designed practical implementation mechanism of laws, and administrative policies following the international mandate. This research is an attempt to review the existing legal framework of E-waste management in Bangladesh.

Keywords: E-waste, Environment Pollution, Health Hazard, Legislation, Implementation.

1. Introduction

Bangladesh has entered into a new era of hi-tech growth and development with digitalization and up-gradation in technology and communication. This random technological development has increased the demand as well as the use of electronic devices in day-to-day lives. This increased demand and use of electronic devices increase the amount of old, unused, and dumped electronic products which are terrifying the world with a threat of environmental pollution by producing toxic chemicals and heavy metals. The problem of E-waste will continue as more and more highly sophisticated electronic goods are being invented and manufactured with the help of advanced technology to make human life easy. E-Waste Recycling and Reuse Services Worldwide" found that the market for recycling and reuse services jumped from 6.2 to 6.8

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¹ "Study on E-waste: Bangladesh Situation 2010", Environment and Social Development Organization-ESDO, Dhaka, Bangladesh, accessed August 25, 2023, https://www.env.go.jp/recycle/circul/venous_industry/pdf/env/h27/02_4.pdf

²"What is E-waste? Definition and Why It's Important", *Great Lakes Electronic Corporation*, accessed August 25, 2023, https://www.ewastel.com/what-is-e-waste.

billion from 2009 to 2010 and is expected to grow to more than triple by 2020 which provides an obvious indication of the growing rate of E-waste that may be the cause of huge problem like environmental pollution, ecological imbalance and human health hazards.³

The projected E-waste generation is approximately 59.4 million metric tons by 2022 and 61.3 million metric tons by 2023 worldly. In Bangladesh, this risk is higher due to adequate information gap, shortage of accurate and comprehensive data relating to E-waste, limited scope of refurbishment and recycling, lack of proper management knowledge, poor public awareness, and most importantly insufficient legal rules, and regulations, and practical implementation. This paper shows the endeavor to evaluate the existing laws particularly connected to E-waste management with a view to justifying the stability of available legal mandates and mechanisms based on the present status and impact of E-waste disposal. Possible secondary sources are critically scrutinized using analytical methods to find a way out of the existing challenges. This paper suggests that strong implementation of laws and the creation of public awareness can improve the devastating scenario of E-waste management where the expectation behind the enactment of the Hazardous Waste (E-waste) Management Rules, 2021 is still suffering the deficiency of a well-decorated implementation process.

2. Methodology

This research is analytical in nature. The article is mainly based on secondary data that are systematically gathered and analyzed from different sources including journals, books, and other recent publications to present a reliable conclusion. Moreover, all the related laws as well as recent rules of Bangladesh have been analyzed concisely to draw a clear picture of existing legal and administrative arrangements to address the issue of the current state E-waste management system and its impact on the environment and human life.

3.1 Meaning of Electronic Waste

The term "E-waste" elaborately means "electronic and electrical waste". In general, electronic waste (E-waste) means all dumping of secondary electronic goods whether it may be technical devices, home appliances, or any other electronic utilities but now it has lost its significance and is being discarded by their original owners. ⁶ E-waste includes all discarded, broken, and unwanted electrical or electronic equipment that has lost its utility in service life. ⁷

Specifically, a research study defined E-waste as "a broad and growing range of electronic devices ranging from large household devices such as refrigerators, air conditions, cell phones, personal stereos, and consumer electronics to computers which have been discarded by their

³Bohley Martin, Katharine and Harris "An Analysis of E-waste: When Do Electronics Die?" *Journal of the Indiana Academy of the Social Sciences* 17, no. 1(2014), https://digitalcommons.butler.edu/jiass/vol17/iss1/3.

⁴ Ian Tiseo, "Outlook on global e-waste generation 2019-2030" accessed October 25, 2023, https://www.statista.com/statistics/1067081/generation-electronic-waste-globally-forecast/.

⁵ "Study on E-waste: Bangladesh Situation 2010"

⁶ "Study on E-waste: Bangladesh Situation 2010"

^{7&}quot;What is E-waste?"

users". ⁸According to a researcher "E-Waste can be classified as any electrical powered appliance that has reached its end-of-life". ⁹ In a clear world, all used electronic equipment can be included in the growing list of E-waste at the end of its fruitful life in a form of secondary electronic products, unused product, broken or discarded items and garbage.

As per the United Nations Environmental Programme (UNEP) "E-waste is a term encompassing various forms of electrical and electronic equipment that are old, end-of-life electronic appliances that have ceased to be of any value to their owners" 10

In broadly elaboration of all regular electronic items and products E-waste can be classified under four main categories such as Home Appliance and Entertainment Devices, Communications and information related Devices, Electronic Utilities and Office and Medical Equipment.¹¹

	Home Appliances	Microwaves; Electric cookers; Heaters; Fans; DVDs; Stereos; Televisions; Video Game Systems; Fax machines; Copiers; Printers
E-Waste	Communications and Information Technology Devices	Cell phones; Smartphone; Desktop Computers; Computer Monitors; Laptops; Circuit boards; Hard Drives
	Electronic Utilities	Remote Controls; Television Remotes; Electrical Cords; Lamps, Smart Lights, Night Lights Treadmills; Smart Watches; Heart Monitors; Diabetic Testing Equipment
	Office and Medical Equipment	Printers; IT Servers; Cords and Cables; Wi-Fi Dongles; Dialysis Machines; Imaging Equipment; Phone & PBX systems Audio & Video Equipment; Network Hardware UPS Systems; Power Distribution Systems (PDU's); Autoclave; Defibrillator

Table 1: Electronic Waste with Related Equipment

3.2 Disposal Process of E-Waste with its Impact on Environment and Human Health in Bangladesh

Electronic instruments contain different types of toxic chemicals and metal elements as they make components in a safe way for mankind but this safe way can be a threat when they are thrown away after use in an open environment because toxic chemicals are released into the air,

⁸ J. Puckett, L. Byster, S. Westervelt et al., "Exporting Harm: The High-Tech Trashing of Asia", *The Basel Action Network (BAN) and Silicon Valley Toxics Coalition (SVTC)*, (2002),accessed 20 August 2023, http://www.ban.org/E-waste/technotrashfinalcomp.pdf.

⁹ Santhanam Needhidasan and other, "Electronic waste – an emerging threat to the environment of urban India" *National Library of Medicine*, accessed September 2, 2023, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3908467/.

¹⁰Shahriar Hossain, "Guidelines for E-waste Management in Bangladesh", *Environment and Social Development Organization* (ESDO), accessed October 25, 2023, https://www.academia.edu/40627111/Guidelines_for_e_waste_management_in_Bangladesh_ESDO.

^{11 &}quot;What is E-waste?"

water, land and cause serious health risk. ¹² In spite of the possible scope of disposal and recycling of E-waste, in most cases, the improper disposal of electronic products damages the environment through hazardous substances like lead, mercury, arsenic, cadmium, selenium, and hexavalent chromium and flame which directly create the high risk of cancer and developmental and neurological disorders. ¹³All the precarious toxins that are produced in E-waste management, duping, and recycling processes through the contamination of air, water, soil and other basic elements of human survival can carriage serious health risks to individuals living around in E-waste dumping sites directly and also all humankind indirectly. These risks include respiratory problems, skin disorders, neurological issues, developmental problems in children, and even cancer. So, the environment is directly affected by the mismanagement, inappropriate manner, and disposal of hazardous wastes and makes a bridge to the risk of health, risk of life as well as an unhealthy earth for the future generation.

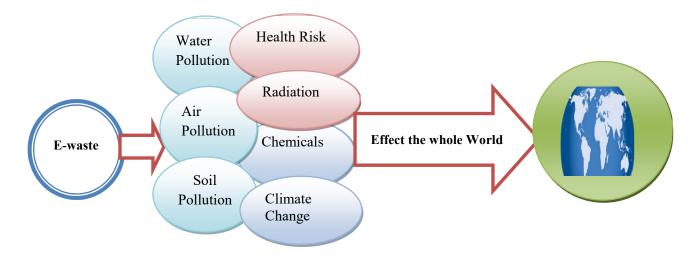


Figure 1: Linkage between E-waste and the Environment along with Human Health

The way of disposal of E-waste can be classified into the process of land filling, incineration, recycling, or exportation and each process has a negative impact on the environment.¹⁴

¹² "Effects of Electronic Waste Pollution", Great Lakes Electronic Corporation, accessed August 28, 2023, https://www.ewaste1.com/effects-of-electronic-waste.

¹³ Santhanam Needhidasan, Melvin Samuel, Ramalingam Chidambaram, "Electronic waste – an emerging threat to the environment of urban India", *Journal of Environmental Health Science & Engineering*, (2014 Jan 20), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3908467/

^{14 &}quot;Guidelines for E-waste Management in Bangladesh"

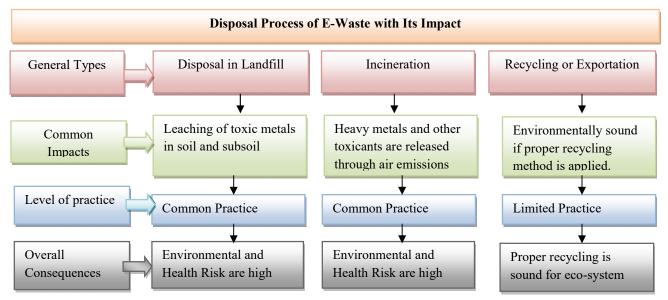


Figure 2: Disposal Process of E-waste with its Impact

4. Present Status of E-waste Management in Bangladesh

E-waste management in Bangladesh with its rapidly growing population and unplanned technological advancement suffers a series of significant challenges like inadequate infrastructure for proper disposal and recycling, lack of public awareness, and non implementation of national and international mandates. From different sources including the ship breaking industry, Bangladesh produces about 3 million MT of electronic waste in each year. It may increase in the upcoming days because there is a close relationship between the government mission of digital Bangladesh and increasing rate of electronic products. At present, the country's E-waste production rate is about 30 percent, which is an alarming one, considering its adverse effects on the environment, among those mobile phones alone contribute 10.5 tons of electronic waste, TV set produced 1.7 tons of electronic waste and ship breaking industries produce about 25 lac tons of electronic waste each year 15. The following table shows an estimated report of E-waste generation of a certain period of time in the global sphere.

Year	E-Waste generation in MMT	Year	E-Waste generation in MMT
2030	74.7	2024	63.3
2029	72.9	2023	61.3
2028	71.1	2022	59.4
2027	69.2	2021	57.4
2026	67.2	2020	55.5
2025	65.3	2019	53.6

Source: Tiseo (2021)¹⁶

¹⁶ "Global e-waste Generation Outlook 2030"

[&]quot;Global e-waste Generation Outlook 2030", accessed October 2, 2023, https://www.statista.com/statistics/1067081/generation-electronic-waste-globally-forecast/.

5. Laws in Bangladesh Relating to E-waste Managements

Considering the issues of environment conservation, Bangladesh has adopted a series of acts, rules regulations but there is no comprehensive policy, act, rules, and regulations especially focusing on electronic waste management. None of the existing environmental laws make any detailed and clear guidelines to tackle E-waste management.

5.1 E-Waste Management under the Factory Act, 1965

Basically, deals with health safety and a hygienic atmosphere of the workplace, keeping with this mandate every factory is instructed to arrange effective arrangements for the disposal of waste as per section 13. Concerned regulatory bodies are assigned to check cleanliness, wastewater release, wastewater treatment, smoke, hazardous gas release, etc. Necessary measures are prescribed for the prevention of inflammable dust, gas, and fume under sec. 42.But this Act is quite silent to provide any effective measures to control industrial pollution. The issue of hazardous gas release is technically addressed but no clear application of this act with respect to E-waste management though the contribution of the industrial sector in the production of E-waste is growing recklessly.

5.2 E-Waste Management under the Environment Pollution Control (EPC) Ordinance, 1977

The main object is to control, prevent, and abate pollution of the environment of Bangladesh. This ordinance enumerates the formation and activities of the Environment Pollution Control Board under section 3, and Implementation Cell under section 6 but all these provisions have in general application to all types of pollution that affect the environment and no special attention to combat against the growing threat of E-waste. The issue of E-waste management is not covered under any provisions specifically.

5.3E-Waste Management under the Factory Rules, 1979

These rules draw a clear sketch of the responsibilities of the concerned authorities for the disposal of wastewater and supply of drinking water. No direct attempt is made to deal with the E-waste or hazardous elements disposal or conservation.

5.4E-Waste Management under the National Environment Policy, 1992

The National Environmental Policy was designed to highlight the goals of protection, improvement, and ecological balance of the environment with the sustainable use of natural resources with a view to reducing natural disasters have been suggested. A general interpretation of the sustainable use of natural resources and ecological balance is effective in reducing the impact of E-waste but no direct provisions are incorporated.

5.5 E-Waste Management under Bangladesh Environment Conservation Act, 1995

The Environment Conservation Act, 1995 is intended to uphold conservation under sec. 5, improvement and mitigation of pollution by authorizing the Director General to undertake any activity necessary to conserve and enhance the quality of the environment and to control,

prevent, and mitigate any pollution. But this Act practically failed to address the direct application of preventive measures and other related international principles to protect the environment.

5.6 E-Waste Management under Environment Conservation Rule, 1997

Restrictions imposed against all illegal dumping of industrial, commercial, and household wastes. The requirement of an environmental impact analysis and no-objection certificate has been incorporated as a pre-requirement of starting any related proceeding. Specific and clear mention of E-waste management is totally absent but leniently the restrictions mentioned for illegal dumping may applied to all sectors generally.

5.7 E-Waste Management under Urban Management Policy Statement 1998

Basically, designed for solid waste disposal, public sanitation, drain cleaning, and road maintenance. Not addressed the concern of E-waste management though E-waste management is closely connected to urban management.

5.8 E-Waste Management under Biomedical Waste Management Rules, 2008

Particularly deals with the safe management of medical waste. Specifically, the source of hazardous waste is identified as a threat to the environment. E-waste was first identified as a potential source of harmful chemicals.

5.9 E-Waste Management under the Environment Court Act, 2010

To move forward from the failure of the Bangladesh Environment Court Act, 2000 a fresh Environment Court Act (Bangladesh Environment Court Act, 2010) has been passed by repealing the previous one. The act aimed to establish one or more environmental courts in 64 districts encompassing the jurisdiction under environmental law basically means the Bangladesh Environment Conservation Act, 1995, and such other laws as may be subsequently specified by the Government as per sec. 2 (c) of the respective act. Having jurisdiction to try offenses as well as claims for compensation in connection to E-waste following the analysis.

5.10 E-Waste Management under the Hazardous Waste (E-waste) Management Rules, 2021

After the expectation of a huge phase of time a codified Hazardous Waste (e-waste) Management Rules, 2021 comes into light with massive probability. Specific, codified, rules on E-waste Management following the mandate Bangladesh Environment Conservation Act, 1995. To facilitate the implantation of the Bangladesh Environment Conservation Act, 1995 government enacted this rule, and it contained a series of provisions to control the E-waste management of the country. Considering the alarming threat of E-waste in the upcoming days, the government imposed a bundle of duties upon the different concerned stockholders such as producers, dismantlers, recyclers, transporters, and refurbishes under this instrument. For instance, section 3 of the rules 17 describes a series of duties of the manufacturer as well as assembler to collect the

¹⁷Sec. 3, The Hazardous Waste(e-waste) Management Rules,2021

E-waste for recycling, to use the uniform code of the company, to transfer the E-waste to the dismantler, to arrange sufficient storage for keeping e-waste and to create awareness among the consumer through the leaflet, SMS etc.

Hoarders, businessmen or shop owners are also responsible for keeping the E-waste properly as well as disposing of those to the recycler with sufficient caution of environmental threat. 18 It also prescribed the responsibility of the refurbisher and consumer¹⁹. Under this rule, the dismantler is responsible for making registration under these rules as well as collecting the environmental certificate before dismantling any E-waste. They are also required to ensure that all the dismantling process shall be done in compliance with the guidelines of the Department of Environment considering the adverse effects on the environment²⁰. The Recycler is bound to carry out their recycling process in such a manner that it does not hamper the environment as well as public health; they must ensure the international standard and follow the government directions as the government prescribes from time to time²¹. This rule has also contained provisions regarding the registration process of e-waste management, receiving environmental non-objection certificates, manner of hoarding e-waste as well as prescribed the standard of using dangerous materials in manufacturing electrical and electronic products.²²Under this rule, restrictions are imposed upon the importation of any used or old electronic or electrical products except for the purpose of use in the educational institution or in the work of research subject to the prior approval of the department.²³ Every manufacturer, assembler, big importer, hoarder, businessman of electronic and electrical products, recycler, dismantler, and furbishers responsible for preserving the information regarding the collection and disposal of E-waste and submitting it to the department within 60 days from the expiry of every fiscal year. The department is responsible for submitting the consolidated report before the government within 30th November of every fiscal year. ²⁴All the local government authorities are responsible for monitoring the E-waste management with the cooperation of the department. Section 15 of the Rules prescribed that if any person violates any provisions of this rule shall be punished under section 15 (1), table-6 of the Bangladesh Environment Conservation Act, 1995.

5.11 The Penal Code, 1860 and Law of Tort

The improper management, disposal, or recycling process can be covered under the purview of public nuisance as prescribed under section 268 of the Penal Code, 1860 if the disposal process creates any kind of disturbance or detriment to the public. At the same time, legal proceedings for compensation caused for E-waste for every negligent behavior that spreads infectious disease or trouble as an element of private and public nuisance may start under tort.

¹⁸Ibid

¹⁹Ibid

²⁰Ibid

²¹*Ibid*

²²Ibid

²³Ibid ²⁴Ibid

4. Major Challenges in E-waste Management with Special Consideration of Existing Legal Framework

4.1 Invisible and Indirect Impact

Though the dangerous impact of E-waste management and recycling is continuously affecting all the vital elements of nature directly; the effect is noticeable only in the long run. As the impact affects the whole society at a time, individuals are also sleeping without taking any special consideration on this issue. Ultimately the issue of high national and international concern is treated less notably because of its nature.

4.2 Lack of Awareness

The common people are quite ignorant about the environmental destruction due to pollution and health hazards associated with improper E-waste disposal. This lack of awareness leads to taking these inappropriate disposal practices without further legal action as well as practical implementation of due practice of E-waste management.

4.3 Inadequate Legal Arrangement

Among the huge list of rules, regulations, and policies of Bangladesh, only a few instruments address the issue of hazardous waste. However, the inclusion of E-waste management, enforcement, and monitoring are often inadequate. The Hazardous Waste (E-waste) Management Rules, 2021 is the only instrument specially makes sufficient arrangement but still it lacks implementation mechanisms.

4.4 Difficulty to Start Legal Proceedings

Sec. 17 of the Bangladesh Environment Conservation Act, 1995 empowers the affected person or group of persons, the public, or the Director General on behalf of them to file a suit for compensation before the Environment Court. But the matter of concern this right has been restricted by imposing the condition of the written report of an Inspector of the Department of Environment (DoE) as a pre-condition for starting any legal proceedings for compensation under Sec. 6(3) and 7(4) of the Environment Court Act, 2010. There is an attempt to justify this type of restriction with the inclusion of the exceptional provision wherewith the satisfaction of the Environment Court/ Special Magistrate Court on the point that a person presented a written request to the said Inspector to accept a claim for compensation/ a complaint and no action was taken within 60 (sixty) days after such request, and that such claim/ complain deserves to be taken into cognizance for the purpose of trail, then the Court may, after giving the Inspector or the Director General a reasonable opportunity of being heard, directly receive the claim for compensation/ complain without such written report, or may, if it considers appropriate, direct the said Inspector to investigate the claim/offense. All these arrangements make a complicated way of justice for the general person and at the same time the control of e-waste management definitely hampers.

4.5 Lack of Effective Coordination

As proper E-waste management requires a series of steps, effective coordination between all related departments is a mandatory condition. The coordination of Environment Courts and DoE is a must because filing suit for compensation for the violation of any laws under the Bangladesh Environment Conservation Act, 1995 requires the written report of an Inspector of the Department of Environment (DoE). So, the institution of suits on respective environmental issues is the joint effort of the environmental court and DoE. But the reality is DoE has offices only in 21 districts with only one inspector in each office where the control, disposal, and proper management of E-waste is mandatory and necessitates having the opportunities of access to justice in any area of Bangladesh.²⁵

4.6 Informal Recycling

A significant portion of E-waste in Bangladesh is processed through informal recycling operations, often in hazardous conditions. This exposes workers to toxic substances without proper safety measures.

4.7 Limited Infrastructure

The country lacks the necessary infrastructure for safe E-waste collection, transportation, and recycling. There are few dedicated e-waste recycling facilities in Bangladesh with limited resources and manpower.

4.8 Import of E-waste in any Form

It is not wrong to say that a developing country like Bangladesh is the dumping zone of e-waste that is produced in developed countries as most of the e-waste is exported to developing countries to underdeveloped countries. There have been concerns about the import of e-waste from other countries into Bangladesh, further exacerbating the e-waste problem. In this regard, Bangladesh is lagging behind in imposing proper restrictions, obligations, and control of excessive import of e-waste.

4.9 Lack of Extended Producer Responsibility (EPR)

Many electronics manufacturers do not have effective take-back or recycling programs in place, which means consumers often, have limited options for the proper disposal of their old devices.

4.10 Lack of Strong Regulations and Policy

While there are regulations in place to control hazardous waste, including e-waste, enforcement can be challenging. The absence of stringent regulations and monitoring mechanisms can contribute to improper disposal practices.

²⁵ Imtiaz Ahmed Sajal, "Common People's Access to the Environment Courts of Bangladesh: An Appraisal" *Bangladesh Law Digest* (July 16, 2015), https://bdlawdigest.org/environment-court-act-2010.html.

5. The Way to Forward

The long-term consumption nature with other related complex issues makes E-waste management more difficult and requires coordinated efforts from the government; industries, non-governmental organizations, and the public to minimize its adverse impacts on both the environment and human health. The responsible factors of E-waste pollution in Bangladesh require immediate time-bound solutions with the active participation of all stakeholders and national international coordination.

To overcome the problems, the researcher wishes to provide the following suggestions:

- i. Well-structured enforcement mechanisms need to be established to control the import, handling, and disposal of E-waste.
- ii. Developing dedicated E-waste recycling facilities and proper collection systems is essential for the safe disposal of electronic waste.
- iii. Continuously educating the public about the risks of improper E-waste disposal and the importance of responsible recycling is crucial. So, the public can make them aware to reduce the use as well as practice appropriate manner of disposal of E-waste.
- iv. Electronics manufacturers can play a role by designing products for easier recycling and taking responsibility for the end-of-life management of their products. So, the E-waste disposal method will be prescribed and systematic.
- v. Collaboration with international organizations and countries experienced in E-waste management can provide valuable insights and assistance. So, the gathered experience helps to find out an environmentally friendly recycling method for E-waste in Bangladesh.

6. Conclusion

People of Bangladesh are dreaming of a pollution-free world where electronic waste is a great concern for the future survival of the healthy universe. Bangladesh is standing in a vulnerable position with the immense impact of climate change as well as life threats and the devastating electronic disposal management makes this situation more complex. With the enactment of Hazardous Waste (E-waste) Rules, 2021 the new era of environmental protection is addressed but the effective implementation measures of these laws as well as other related strategies are still per away from the desired destination. To overcome this situation, besides enacting rules and regulations, coordination from the different stakeholders including the consumer as well as the manufacturer is most important, otherwise, the country failed to achieve its goal.