ADVERSE EFFECTS OF E WASTE ON ENVIRONMENT: AN OVERVIEW

Smt. PUSHPA K S
Asst. Prof. of Law
Vidyodaya Law College,Tumakuru
Gmail: pushpaksllm@gmail.com

Introduction

E-waste poses significant threats to the environment through soil, water, and air contamination, as well as resource depletion and biodiversity loss. Improper disposal and inadequate recycling practices release toxic substances like lead, mercury, and cadmium into the environment, impacting ecosystems and human health. Effective e-waste management strategies, including sustainable policies and public awareness, are crucial to mitigate these risks and promote a circular economy. This present article signifies the negative effects of electronic waste on environment and some conventions related to electronic waste.

Key words – E waste, Environment, Effects, conventions, management, strategies.

Introduction

E-waste, or electronic waste, encompasses discarded electronic devices like computers, phones, and appliances. Its improper disposal poses a growing environmental and health hazard worldwide. The rapid technological advancements and short product lifecycles contribute to a massive accumulation of e-waste, which contains hazardous materials and valuable resources.

Negative Effects on Environment

The consequences of improper e-waste disposal in landfills or other non-dumping sites pose serious threats to current public health and can pollute ecosystems for generations to come. When electronics are improperly disposed and end up in landfills, toxic chemicals are released, impacting the earth's air, soil, water and ultimately, human health[1].

Negative Effects on Air

Contamination in the air occurs when e-waste is informally disposed by dismantling, shredding or melting the materials, releasing dust particles or toxins, such as dioxins, into the environment that cause air pollution and damage respiratory health. E-waste of little value is often burned, but burning also serves a way to get valuable metal from electronics, like copper. Chronic diseases and cancers are at a higher risk to occur when burning e-waste because it also releases fine particles, which can travel thousands of miles, creating numerous negative health

---

[1] E-Waste management in India: An emerging environmental and Health issue. Indian J Occup Environ Med. By Pandve HT

risks to humans and animals. Higher value materials, such as gold and silver, are often removed from highly integrated electronics by using acids, desoldering, and other chemicals, which also release fumes in areas where recycling is not regulated properly. The negative effects on air from informal e-waste recycling are most dangerous for those who handle this waste, but the pollution can extend thousands of miles away from recycling sites

The air pollution caused by e-waste impacts some animal species more than others, which may be endangering these species and the biodiversity of certain regions that are chronically polluted. Over time, air pollution can hurt water quality, soil and plant species, creating irreversible damage in ecosystems. For instance, an informal recycling hub in Guiyu, China that was formed by parties interesting in extracting valuable metals from e-waste, and subsequently has caused the region to have extremely high lead levels in the air, which are inhaled and then ingested when returned to water and soil. This can cause disproportionate neurological damage to larger animals, wildlife and humans in the area.

Negative Effects on soil

When improper disposal of e-waste in regular landfills or in places where it is dumped illegally, both heavy metals and flame retardants can seep directly from the e-waste into the soil, causing contamination of underlying groundwater or contamination of crops that may be planted nearby or in the area in the future. When the soil is contaminated by heavy metals, the crops become vulnerable to absorbing these toxins, which can cause many illnesses and does not allow the farmland to be as productive as possible.

When large particles are released from burning, shredding, or dismantling e-waste, they quickly re-deposit to the ground and contaminate the soil as well, due to their size and weight. The amount of soil contaminated depends on a range of factors including temperature, soil type, pH levels and soil composition. These pollutants can remain in the soil for a long period of time and can be harmful to microorganisms in the soil and plants. Ultimately, animals and wildlife relying on nature for survival will end up consuming affected plants, causing internal health problems.

Negative Effects on Water

After soil contamination, heavy metals from e-waste, such as mercury, lithium, lead and barium, then leak through the earth even further to reach groundwater. When these heavy metals reach groundwater, they eventually make their way into ponds, streams, rivers and lakes. Through these pathways, acidification and toxification are created in the water, which is unsafe for animals, plants and communities even if they are miles away from a recycling site. Clean drinking water becomes problematic to find.

Acidification can kill marine and freshwater organisms, disturb biodiversity and harm ecosystems. If acidification is present in water supplies, it can damage ecosystems to the point where recovery is questionable, if not impossible.

Negative Effects on Humans

As mentioned, electronic waste contains toxic components that are dangerous to <u>human health,</u> such as mercury, lead, cadmium, polybrominated flame retardants, barium and lithium. The negative health effects of these toxins on humans include brain, heart, liver, kidney and skeletal system damage. It can also considerably affect the nervous and reproductive systems of the human body, leading to disease and birth defects. Improper disposal of e-waste is unbelievably dangerous to the global environment, which is why it is so important to spread awareness on this growing problem and the threatening aftermath. To avoid these toxic effects of e-waste, it is crucial to properly e-cycle, so that items can be recycled, refurbished, resold, or reused. The growing stream of e-waste will only worsen if not educated on the correct measures of disposal.

E- waste helps the environment that, Recycling the e-waste saves space in landfills and prevents the environmental pollution caused by the toxins. Recycling also reduces the need for landfills in the first place. Goods made from recycled materials use less water, create less pollution, and uses less energy.

International Conventions to E waste

Basel Convention

The overarching objective of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal is to protect human health and the environment against the adverse effects of hazardous wastes. E-waste is categorized as hazardous waste due to the presence of toxic materials such as mercury, lead and brominated flame retardants are considered as hazardous waste according to the Basel Convention. In addition, transboundary movements of hazardous and other wastes, including e-waste ending up in dumps, are deemed to be illegal traffic under the Basel Convention, Article 9.

As part of the Convention, the Partnership for Action on Computing Equipment (PACE) was launched at the ninth meeting of the Conference of the Parties to the Basel Convention, on 23-27 June 2008. PACE is a multi-stakeholder partnership for governments, industry leaders, non-governmental organizations and academia to tackle the environmentally sound management, refurbishment, recycling and disposal of used and end-of-life computing equipment, taking into account social responsibility and the concept of sustainable development, and promoting the sharing of information on life cycle thinking.

E-Waste Coalition

In addition, on 21 March 2018 at the World Summit on the Information Society (WSIS) Forum, seven United Nations entities signed a Letter of Intent paving the way for greater collaboration in the area of e-waste management in developing a UN E-Waste Coalition. Its aims include a commitment by the signatories to increase collaboration, building partnership and supporting Member States to address the global WEEE challenge. Further to this, at the 2019 WSIS Forum, three new UN entities signed the Letter of Intent.

The coalition brings together the following organizations, the majority based in Geneva:

- ILO
- ITC
- ITU
- UNEP
- UNU

- United Nations Human Settlement (UN Habitat)
- United Nations Industrial Development Organization (UNIDO)
- United Nations Institute for Training and Research (UNITAR)
- World Health Organization (WHO)
- Secretariat of the Basel, Rotterdam and Stockholm Conventions

The coalition is supported by the World Business Council for Sustainable Development (WBCSD) and the World Economic Forum, and was coordinated, until 31 October 2020, by the Secretariat of the UN Environment Management Group (UNEMG). UNEP is now hosting the temporary secretariat of the coalition.

International Electro technical Commission (IEC)

Founded in 1906, the International Electrotechnical Commission (IEC) is the world's leading organization for the preparation and publication of International Standards for all electrical, electronic and related technologies, known collectively as "electrotechnology."

IEC provides a platform to companies, industries and governments for meeting, discussing and developing the International Standards they require. All IEC International Standards are fully consensus-based and represent the needs of key stakeholders of every nation participating in IEC work.

International Labour Organization (ILO)

The only tripartite U.N. agency, since 1919 the International Labour Organization (ILO) brings together governments, employers and workers of 187 member States, to set labour standards, develop policies and devise programmes promoting decent work for all women and men. More than 1.2 billion jobs depend on a stable environment and ecosystems. ILO's Green Initiative aims to scale up the its knowledge, policy response and capacity to manage a just transition toward greener economies and a sustainable future.

In addition, the Green Jobs Programme signals ILO's commitment to act on climate change and to promote resource efficient and low-carbon societies. Decent work is a cornerstone for effective policies to green economies for achieving sustainable development.

This implies that efforts to reduce adverse environmental impact must lead to socially just outcomes with employment opportunities for all.

International Telecommunication Union (ITU)

Founded in 1865 to facilitate international connectivity in communications networks, the International Telecommunication Union (ITU) is the United Nations specialized agency for information and communication technologies – ICTs. ITU's Development Bureau (ITU-D) has been given a mandate to "assist developing countries in undertaking proper assessment of the size of e-waste and in initiating pilot projects to achieve environmentally sound management of e-waste through e-waste collection, dismantling, refurbishing and recycling." (WTDC Resolution 66). To this end ITU-D is developing e-waste guidelines to help countries identify best policies. It is also carrying out an electronic waste management project, and recently launched a new partnership to help improve global e-waste statistics.

ITU, in cooperation with the United Nations University (UNU), have joined forces to form the Global E-waste Statistics Partnership (GESP). Its main objectives are to improve and collect worldwide statistics on waste electrical and electronic equipment (WEEE). The GESP also raises visibility on the importance of compiling WEEE statistics and delivers capacity building workshops using an internationally recognized, harmonized measurement framework. The initiative informs policy makers, industries, academia, media and the general public by enhancing the understanding and interpretation of global WEEE data and its relation to the SDGs.

The publication of the Global and Regional E-Waste Monitors are key achievements of the GESP which highlight global growth in the generation of WEEE. These reports also introduce the wider public to the global WEEE challenge and include national analysis on WEEE.

International Trade Centre (ITC)

The transition to a digital world is offering unprecedented opportunities for innovation, entrepreneurship and growth, and how the global consumption of electrical and electronic equipment is generating extraordinary amounts of e-waste. Large dumps sites around the world have been created due to the e-waste generated.

One of the key challenges for the more environmentally sound management of e-waste in developing countries is linking the informal and formal e-waste processors and providing coaching opportunities to small and medium-sized enterprises (SMEs).

SMEs and industry associations can play a key role in unlocking collaboration within values chains to ensure more circular and sustainable approaches. The International Trade Centre (ITC), in collaboration with other signatories of the E-Waste Coalition will use their expertise to help solve these pressing issues.

The ITC has a growing focus on environmental sustainability and social inclusion as important elements for SME competitiveness and for fostering Good Trade. ITC will contribute with these experiences to the important work of the e-waste coalition.

United Nations Environment Programme (UNEP)

UNEP has provided several reports and guidance manuals on dealing with e-waste. The Chemicals and Health Branch is leading UNEP's activities on chemicals and waste and is the main catalytic force in the UN system for concerted global action on the environmentally sound management of chemicals and waste.

World Health Organization (WHO)

A WHO report on e-waste and child health Children and Digital Dumpsites, released in June 2021, calls for urgent effective and binding action to protect the millions of children, adolescents and expectant mothers worldwide whose health is jeopardized by the informal processing of discarded electrical or electronic devices.

As many as 12.9 million women are working in the informal waste sector, which potentially exposes them to toxic e-waste and puts them and their unborn children at risk.

Meanwhile more than 18 million children and adolescents, some as young as 5 years of age, are actively engaged in the informal industrial sector, of which waste processing is a sub-sector. Children are often engaged by parents or caregivers in e-waste recycling because their small hands are more dexterous than those of adults. Other children live, go to school and play near e-waste recycling centres where high levels of toxic chemicals, mostly lead and mercury, can damage their intellectual abilities.

Children exposed to e-waste are particularly vulnerable to the toxic chemicals they contain due to their smaller size, less developed organs and rapid rate of growth and development. They absorb more pollutants relative to their size and are less able to metabolize or eradicate toxic substances from their bodies[2].

Proposed solutions to problem of E-Waste

• Domestic legal framework to address these gaps in import of E Waste

• Need to address safe disposal of domestic waste.

• Tie recycling in with take-back product

• The Framework should address the issue of E waste imports for reuse and recycling.

• Attract investment in this sector

• Link up activities of informal sector with formal sector

• Provide for appropriate framework for processes

• Promote adequate ESM technologies for recycling

• Incorporate precautionary principles and polluter pays

• Insist on domestic processing

• Then make sure the company you select has capacity to handle either type of E-Scrap.

• Promote recycling units to ease process and to encourage generators to have proper e-waste disposal

• Impart training to generators on e-waste handling

• Awareness program on recycling

• Fix duties and responsibilities to recyclers

• Tax incentives for scrap dealers

• Reward and reprimand schemes for performance and non-compliance of e-waste management.

Government Initiatives

- Swachh Bharat Mission.
- GOBAR-dhan (Galvanizing Organic Bio-Agro Resources) Scheme.
- Jal Shakti Abhiyaan.
- Waste to Energy.

---

[2] Environmental exposure to lead and children's intelligence at the age of seven years: By Bathurst PA, McMicheal AJ, Wigg NR, Vimpani GV, Robertson EF, Roberts RJ, et al.

Conclusion:

E-waste is a problem that is being faced by almost all countries globally but more so by developing countries as the e-waste is imported to these countries in bulk. It is critical to educate people and encourage them to practise Recycle, Reuse, and Reduce instead of producing waste. Waste disposal should be a priority for municipalities and governments. It has to be collected separately, treated effectively, and disposed of e-waste. It is also a diversion from conventional landfills and open burning. It is essential to integrate an informal sector with the formal sector. The competent authorities in developing countries like India need to establish mechanisms for handling and treating e-waste safely and sustainable manner. Hence each of us must be committed to cutting down the waste and use, reuse and recycle all e-waste.

REFERENCES:

1. Dahl R. Who pays for e-junk? Environ Health Perspect. 2002;110:A196–9. [PMC free article] [PubMed] [Google Scholar]
2. CPCB. Guidelines for environmentally sound management of e-waste (As approved vide MoEF letter No. 23-23/2007-HSMD) Delhi: Ministry of Environment and Forests, Central Pollution Control Board, March 2008. Available from: http://www.cpcb.nic.in [last accessed on 2008 Mar 12]
3. Pandve HT. E-waste management in India: An emerging environmental and health issue. Indian J Occup Environ Med. 2007;11:116. [PMC free article] [PubMed] [Google Scholar]
4. Mor R.S., Singh S., Bhardwaj A., Osama M. Exploring the awareness level of biomedical waste management: case of Indian healthcare Management Science Letters, 7 (10) (2017), pp. 467-478
5. .Jatindra P., Sudhir K. E-waste management: a case study of Bangalore, India
6. Research Journal Environmental and Earth Sciences, 1 (2009), pp. 111-115
7. Google Scholar
8. Agarwal R. (1998) India: The World's Final Dumpyard!, January, Basel Action News, Vol.1 atwww.ban.org accessed on 14th September 2006.
9. CII (2006). "E-waste management", Green Business Opportunities, Vol.12, Issue 1,
10. Confederation of Indian Industry, Delhi.
11. Devi B.S, Shobha S. V, Kamble R. K. (2004). E-Waste: The Hidden harm ofTechnological
12. Revolution, Journal IAEM, Vol.31, pp.196-205.
13. DIT (2003). Environmental management for Information Technology industry in India,
14. Department of Information Technology, Government of India, pp.122-124.
15. Kurian Joseph (2007) "Electronic Waste Management In India-Issues And Strategies Eleventh International Waste Management and Landfill Symposium.