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# E-WASTE MANAGEMENT AND ENVIRONMENTAL SUSTAINABILITY IN BANGLADESH

## Existing policies and policy gaps

# *E-waste Management and Environmental Sustainability in Bangladesh*

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*March 2021*

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# EXECUTIVE SUMMARY

*The uses of digital technologies have touched almost every aspect of modern life reaching around half of the developing world's population in only two decades[1]. While the technologies have been developing for many years, however, have shown unprecedented growth with its enhance application in a wide range of social and economic activities like delivering trade and public services, harnessing financial inclusion and e-commerce, supporting marginalized groups and communities with free flow of information etc. The wide-ranging use of digital technologies has essentially been triggered with the innovation of digital devices like mobile, laptops, tablets, computers etc., most of which used in the developing countries are not quality products. The quality standard is often compromised to keep the price low for mass use. In most cases, the unregulated bi-lateral trade with the technologically advanced countries makes domestic market of the poor countries over saturated with the supply of cheap devices with a relatively shorter life-span that promote 'one-time-use' culture leaving basically no option of re-reusing the devices and foreclosing the potentials of circular economy.*

*Though the digital technologies have created scope of an inclusive digital economy as well as achieving the flagship ambition of the SDGs, yet there are many challenges. The major challenge is the management of e-waste that is piling-up day by day. They contain toxic materials such as lead, mercury, copper, cadmium, beryllium, barium etc, that cause severe risk related to health and damage to environment. They also contribute to the climate change through releasing carbon dioxide ($CO_2$) during combustion and recycling of e-waste.*

*This has become a particular problem in Bangladesh. The government of Bangladesh literally opened-up imports of cheap digital devices to complement its political vision of 'Digital Bangladesh' to be achieved by 2021. The vision was set to make Bangladesh technologically advanced through the effective use of digital devices in its key development sectors like education, health, communication etc. Inspired by that Vision, the private and public agencies have promoted mass utilization of digital devices, which also has increased the volume of e-waste roughly from 2.81 million tons in 2009 to around 12 million tons e-waste in 2019[2].*

*Most of the e-wastes are collected informally from the sources, some reusable metals are taken out and the rest are dumped in to open landfills, farming land and in the open water bodies. And unstructured, unskilled and informal practices of e-waste recycling leave more than 30 millions of children, women and non-formal workers exposed to the hazardous substances. Unfortunately, the environmental consequence as well as the emission factors of millions of tons of e-waste is largely unknown.*

*Bangladesh currently has no specific environmental policy or act or guidelines to directly manage the e-waste problem. Though a draft regulation on 'E-waste management rules' was developed and amended in 2011 and 2017 respectively under the Environment Conservation Act, 1995, no progress in rules acceptance and implementation has been visible till today. Moreover, there is no legal authorization in the rules of Bangladesh to trade off e-waste and its disposal and management. Bangladesh is a signatory to the Basel Convention on Trans-boundary Movements of Hazardous Waste; however currently there is no specific regulation dealing with e-waste management except National 3R strategy for waste management.*

[1] *UN nd, https://bit.ly/2YlLgzS*

[2] *(The Daily Star 2019, https://bit.ly/2YlLgzS)*

# CONTEXT

*E-waste comprises of wastes generated from used electronic devices and house hold appliances which are not fit for their original intended use and are destined for recovery, recycling or disposal. Such wastes encompasses wide range of electrical and electronic devices such as computers, hand held cellular phones, personal stereos, including large household appliances such as refrigerators, air conditioners etc.*

*In recent years due to technological development and rapid growth of economy in Bangladesh, a market has grown for mobile, computers, consumer electronic products and home appliances. This growing market results in an increase in the amount of local consumer products in the market and a significant amount of electronic products needs to be disposed off after several years of use which ultimately cause a new environmental challenge.*

*Bangladesh consumes 3.2 million tons of electronic waste yearly and of this amount 20 to 30 percent in recycled and rest is dumped in open places. Among them 10,504 metric tons of toxics e-waste are generated from cell phones alone in the last 21 years. Every year around 296,302 TV sets are scrapped and generate approximately 0.17 million metric tons of e-waste. The major challenge is the management of e-waste that is piling-up day by day. They contain toxic materials such as lead, mercury, copper, cadmium, beryllium, barium etc, that cause severe risk related to health and damage to environment. Highly toxic chemicals initiate in the e-waste components can contaminate soil, groundwater and air, as well as affect the workers of the unit and the community living around it. They also contribute to the climate change through releasing carbon dioxide ($CO_2$) during combustion and recycling of e-waste.*

*The amount of e-waste in Bangladesh is recycled is solely done in informal sector with private initiatives. And in informal sector women and children labourers are mostly involved. Every year almost 15% child worker dies and more than 83% are exposed to toxic material and become sick and forced to live with long term illness. Moreover, labour of this sector face highly toxic work environment where health and environment is compromised and particularly dangerous for children and pregnant women.*

*At present, in Bangladesh, there is a lack of awareness about the hazards of electronic waste in Bangladesh. The electronic waste is reused, broken down for parts or disposed of completely. The present informal practice of recycling is not carried out safely and it becomes a danger to human health and the surrounding environment.*

# STATE OF E-WASTE IN BANGLADESH

*According to Bangladesh Electronic Machinery Marketing Association (BEMMA), Bangladesh consumes around 3.2 million tones of electronic products each year. Of this amount, only 20 to 30 percent is recycled and rest is dumped as obsolete or disposed of in open places, which is hazardous to health and environment. Presently, there is no specific law and ordinance for e-waste management and recycling, and no formal plant for recycling of e-waste in a hazard freemanner. Most of these electronic products are recycled by the informal sector located mainly in Dhaka and Chittagong.*

***According to a survey by ESDO, Every year about 2.8 million metric tons of e-wastes are generated in Bangladesh.***

*Among them 10,504 metric tons of toxics e-waste are generated from cell phones alone in the last 21 years. Every year around 296,302 TV sets are scrapped and generate approximately 0.17 million metric tons of e-waste. E-waste generated from ship breaking yards alone accounts for more than 2.5 million metric tons of toxics e-waste each year.*

*In Bangladesh every year more than 15% of child workers die as a result of e-waste recycling and more than 83% are exposed by toxic substances and become sick and are forced to live with long term illness. Approximately fifty thousand children are involved in the informal e-waste collection and recycling process, amongst them about 40% are involved in ship breaking yards.*

*Electronic Wastes (e-wastes) can cause widespread environmental damage due to the use of toxic materials in manufacturing of electronic goods (Mehra, 2004). Hazardous materials such as lead, mercury and hexavalent chromium in one form or the other are present in such wastes primarily consisting of printed circuit boards, batteries and cathode ray tubes (CRTs).*

*The cadmium from one mobile phone battery is enough to pollute 600 m3 of water (Trick, 2002). The quantity of cadmium in landfill sites is significant, and considerable toxic contamination is caused by the inevitable medium and long-term effects of cadmium leaking into the surrounding soil (Envocare, 2001). Plastics are highly flammable, the printed wiring board and housings of electronic products contain brominates flame retardants, a number of which are clearly damaging to human health and the environment.*

***Highly toxic chemicals found in the e-waste components can contaminate soil, groundwater and air, as well as affect the workers of the unit and the community living around it.***

*Moreover, the workers in the e-waste recycling operations face dangerous working conditions where health and environmental conditions are compromised.*

*According to an estimate, more than 500 thousand computers were in use in 2004*

*and this number has been growing at 11.4% annually (Hossain, 2004). Even if the figure of 500 thousand were taken as the baseline, that many PCs would contain approximately 15,323 tonnes of waste (@ 27.2 kg/PC for 5 years of obsolescence) in 2010 containing deadly plastics, lead, mercury etc.*

*Two methods were suggested for estimating the quantity of e-waste (PC and Cell phone) (Sinha et al. 2007). The first method, Market supply Method A, (MA) assumes that the average lifetime of an electronic product is approximately five years and after that these are discarded and come to the waste stream. The second method, Market supply Method B, (MB) assumes that all the products are not disposed at the same time; rather they are in varying quantities over successive years. Here weighted average method is used to show the product disposal trend. For, PCs the growth rate is considered to be 11.4% (Hossain, 2004) and for cell phones a 100% growth rate is considered annually (Pervez et al. 2007).*

# EXISTING POLICY AND POLICY GAPS

*Bangladesh currently has no specific environmental policy or act or guidelines to directly manage the e-waste problem. Though a draft regulation on 'E-waste management rules' was developed and amended in 2011 and 2017 respectively under the Environment Conservation Act, 1995, no progress in rules acceptance and implementation has been visible till today.*

***Law Overview***

*The use of information and communication technology is increasing day by day for providing better services. On the other hand, discarded and obsolete ICT equipment also produces e-waste. Lack of e-waste management is leading problem to environmental pollution in many parts of the country. This has a devastating effect on the environment and human health. However, Bangladesh has developed environmental policies, practices and laws that deal with strict environment but don't have any strict law for e waste management. Bangladesh's environmental sector policy framework contains policies, guidelines, and applications. In addition to these Bangladesh has many laws and regulations related to environmental issues. A brief summary of the content and application of the policies, rules, laws and regulations relating to environment and e-waste management are provided below. This analysis includes existing policies, practices, and applicable e-waste laws.*

- *The National Environment Policy, 1992: Bangladesh adopted this law focusing all activities that pollute and destroy the environment.*
- *Environment Conservation Act 1995 (Revision up to 2012)*
- *Environmental Conservation Rules 1997*
- *The Environment Court Act, 2000*
- *Ozone Depleting Substance (Control) Rules 2004 (Amendment 2014)*
- *Clean Development Mechanism (CDM)*
- *Lead Acid Battery Recycling and Management Rules, 2006*
- *National 3R Strategy for Waste Management, 2009: The solid waste management rules based on the 3R principle as well as hazardous waste management rule.*

*3R means reducing waste, reusing and recycling resources and products. The strategy clarifies the concepts of reducing, reusing and recycling. Reducing refers to choosing to use items with care to reduce the amount of waste generated. Reusing involves the repeated use of items or parts of items which still have usable aspects. Recycling means the use of waste itself as resources.*

***Gaps of Current legislation and Policy***

*There is no legal authorization in the rules of Bangladesh to trade off e-waste and its disposal and management. Bangladesh is a signatory to the Basel Convention on Trans-boundary Movements of Hazardous Waste. Currently there is no specific regulation dealing with e-waste management. However Ministry of Environment and Forests (MoEF) is in the process of formulating the rules on handling of e-waste. In the National 3R*

*strategy for waste management (Reduce, Reuse and Recycle), the e-waste management issue is emphasized.*

*Comprehensive and sustainable laws are needed to ensure hazard free recycling of e-waste, which will be based on 'polluter pay principle' (PPP). Government should enact rules for e-waste Management and handling. The legislation should ensure environmental justice and involve the participation of all the stakeholders. Bangladesh's Department of Environment (DoE) has published draft rules that restrict the use of 15 substances or groups of substances in certain electrical products.*

*The Hazardous Waste (E-Waste) Management Rules, 2019, apply to "every e-waste producer, manufacturer, large importer, dismantler, recycler, trader or shopkeeper, hoarder, transporter, repairer, collection centre, auctioneer, exporter and large users of electrical and electronic products and other relevant persons."*

*The products covered are:*

- *Household appliances;*
- *monitoring and control equipment;*
- *medical equipment;*
- *automatic machines; and*
- *IT and telecommunication equipment.*

# RECYCLYING OF E-WASTE: SCRENARIO & CHALLENGES

***E-waste recycling in Dhaka City***

*With the rapid update of technological product, large amount of electronic goods are becoming obsolete and are disposed of in a short period of time. The equipments that are disposed of after various official use and personal use go to people involved in different tiers to recycle things. In Dhaka, very commonly they are known as the vangari shops (waste dealer shops) those who are involved in the waste product selling business.*

***Ignorance regarding hazards of e-waste:***

*Workers and the owners don't think that recycling electronic products are hazardous. The lack of visibility of toxic material contained in e-waste by naked eyes makes them belief that these do not contain any harmful elements. There is huge knowledge gap or awareness among the shop owners and workers about the hazard of e-waste.*

***E-waste recycling in Chittagong Port City***

*Chittagong generates the highest quantity of e-waste due to the existence of ship breaking industry. Most of the second hand electronic products are purchased by recycle shop owners from auction held in the Vatiary area of the city.*

***Gender component:***

*Women working in e-waste sector are more vulnerable. As electronic wastes are not biodegradable, they are very dangerous to health, especially for pregnant women. For adults, there are long-term effects. People can have cancer, kidney problems and other deadly diseases from exposure to e-waste. Pregnant women are one of the major vulnerable groups. Complications that might affect pregnant women are: miscarriage, prematurity, low birth weight, congenital malformations, abnormal thyroid function, thyroid development, neurobehavioral disturbances and gene-toxicity.*

***Child Labor:***

*In Bangladesh more than 15% child worker died during and after effect of e-waste recycling and more than 83% are exposed by toxics substances and become sick and live with long term illness. According to ESDO, recent study and available information, approximately (50,000) fifty thousand children's are involved in the non-formal e-waste collection and recycling process, amongst them about 40% are involved in ship breaking yards.*

***Challenges for e-waste Management:***

- *Awareness Build-up*
- *Collection of e-Waste*
- *Separation of different materials*
- *Recycling Management*
- *Legal Enforcement*
- *Health Hazards*
- *Child Labor*
- *Risk management*
- *Pollution*

# RECOMMENDATIONS

*The E-waste is gradually increasing. All the stakeholders: producers, sellers, users, recycle agencies and the policy makers need more collaboration. The following recommendations are put forward for effective management of e-waste.*

***Awareness Program:*** *A large-scale awareness program should be initiated for all the stakeholders: producers, sellers, users, recycle shop owners and workers to enhance their understanding regarding the danger of e-waste and also to ensure their participation in the recycling process.*

***Establish Recycling Plants:*** *There is an urgent need to establish e-waste treatment plant. This may be founded on public-private partnership (PPP/ Non-profit basis). Producers should be registered with the recycling agencies and treatment plants for paying the recycling cost. Treatment cost might be shared by producers and consumers. It can also be based on profit. But some control should be established as profit making opportunity might lead towards early recycling and inefficient utilization of resources*

***Extended Producers Responsibility:*** *Producer's responsibility should be extended so that they will ensure that hazard free disposal of e-waste is ensured. They should be responsible for the products after their useful life and pay the cost to the recycling agency. This will encourage redesign of products aiming at improved recyclability, reduce the use of toxic materials by developing alternative materials, encourage producing products with longer life span and promote research and development of environment friendly technology.*

***Separation of Garbage:*** *In Bangladesh, household wastes are not separated before disposal. Initiatives should be taken to separate garbage's into burnable, non-burnable and e-waste. This will help the households to segregate waste easily and e-waste which will in turn increase recovery by reducing wastage.*

***Need for Research:*** *There is no enough research about this issue. So Research should be conducted more for solving this issue. Besides, seminar, workshops should be arranged as awareness program.*

***Policy Formulation:*** *As there has no specific policy for e-waste management so it's an urgent need to formulate policy for e-Waste management as soon as possible.*

***Conclusion:*** *While the problem of e-waste and the current management practices were widely discussed, there was an urgent need to conduct in-depth studies in Bangladesh. This is to help policy makers with appropriate policy instrument as well as to dispel common myths that e-waste is yet to be threat in Bangladesh. This study attempted to take a modest attempt to investigate the current management practices in Bangladesh by conducting literature surveys, interviews and observations. Results of the study indicate that contrary to the common belief, in Bangladesh the quantity and process of managing of e-waste is very rudimentary and is emerging as a huge threat. It is high time for the stakeholders to act now.*

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