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Toxicity e-waste ejects could have long term effect on habitat and Homo sapiens. It accounts for approximately 40% of lead and 70% of heavy metals found in landfills. This leads to ground water contamination, air pollution and soil acidification

## Harmful effects of E-waste on living beings and environment



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**E**-Waste is the sticky end of ever growing world of electronic gadgets. Last two decades and a half have witnessed a revolution in electronic products which has no doubt enormously enhanced our economy, created jobs and brought about a great transformation in our day-to-day life.

In 90s electronic gadgets and computers were as expensive as being luxury items and were only

within the reach of upper middle class and above. Over the years, the technology has improved and electronic items have long been easily accessible to common men. Their prices keep on declining and electronic gadgets are becoming more and more affordable as well as useful even for all and sundry. As per various surveys, people prefer ever having a mobile in their possession to having a toilet in

their dwelling houses, whether they are from urban or rural areas. With the economy ever growing, we find people universally taking pride in consumerism. Normally durability of these products is not more than four to five years. Due to advancement in technology, day by day consumers do opt for the latest energy- efficient products. With each passing day new features are coming up leaving behind the



India is the fifth biggest producer of e-waste in the world, discarding 1.7 million tonnes (Mt) of electronic and electrical equipment as per UN report. There is a complete ignorance in public about the repercussion of throwing electronic products and accessories unattended

This article is an attempt by the authors to create an awareness about the toxic effects on living beings and environment of chemicals/pollutants emitted during the unsafe e-waste recycling. Ironically while every individual is generating e-waste most of us are totally ignorant about its harmfulness and hazardous nature which can affect not only the present but even future generations if not addressed now. The Three R principles: Reduce e-waste through smart procurement and good maintenance; Reuse electronic equipment by donating or selling; and Recycle those products that cannot be repaired can delay the accelerated generation of e-waste



previous day's acquisition of a handset out of date. Our curious mind begins to feel unhappy if left behind in the era of gadget freak world and gets easily lured to purchase latest gadget even on loan which is readily available. It is ironical that there are fewer schemes to provide loan for toilet construction which is a basic necessity for health and hygiene of modern India than purchasing the electronic goods.

Every individual is generating e-waste and masses are ignorant about multiplying and hazardous effects of it. Majority of people are not aware that so much unaccounted magnitude of e-waste will have adverse and irreversible impact on the future generations. The equipments used in most of the industries which include the energy, and oil and natural gas sectors also, have lot of electronic items which also add to the

quantum of e-waste. High and prolonged exposure to chemicals/pollutants emitted during unsafe e-waste recycling is also hazardous to health. Lethal contents include lead, cadmium, mercury, polyvinyl chloride, chlorofluorocarbons, arsenic, nickel and barium that are causes of many known and unknown diseases like cancer, asthma, bone diseases, brain diseases and others.

These harmful unbridled pollutants will gradually enter in our body through food chain by contaminating first the soil and later its produce for consumption. Once an agrarian village Guiyu and its neighbouring villages in

Guangdong Province of China, have now been converted into graveyard of the world's largest electronic waste dump sites, there by destroying inherent character and beauty of soil, river water and their flora and fauna. Studies by the Shantou University Medical College revealed that very high levels of lead were found in young children of these villages that could adversely

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impact IQ and the development of the central nervous system. Likewise the village of Sangrampur, a small hamlet located 30 miles south of Kolkata has also been identified as big e-waste centre though no specific studies have been conducted as yet to ascertain its repercussion.

The main concern regarding e-waste is that it might contribute only a few percent of total waste but the toxicity it ejects could have long term effect on habitat and Homo sapiens. E-waste accounts for approximately 40% of lead and 70% of heavy metals found in landfills. This leads to ground water contamination, air pollution and soil acidification. A recent study by University of Michigan has found that illegal battery recycling business in Delhi has enhanced the airborne lead levels by two to eight times, well above the recommended health parameters.

About 2 percent of India's total electronic waste gets recycled due to absence of proper infrastructure, legislation, framework and concrete guidelines. The country produces approximately 1.3 million metric tonnes of e-waste per annum. Delhi National Capital Region (NCR) is likely to generate about 1,07,000 metric tonnes (MT) of e-waste per annum by 2017 from the current level of 68,000 metric tonnes per annum growing at a

compound annual growth rate (CAGR) of about 25 per cent, as revealed by the latest study by the Associated Chambers of Commerce and Industry of India (ASSOCHAM). United States is ranked top (42%) acquiring the highest share of e-waste import in India followed by China (30%) and European Union (18%). It is far cheaper for these countries to ship these items than recycling them there. Though import of e-waste for recycling is banned in India, as per Manufacturers' Association for Information Technology (MAIT) and GTZ, the German Technical Collaboration Agency survey during 2007 has revealed that about 50,000 tonnes of electronic scrap is imported annually stealthily making India one of the biggest yards of e-waste. There is need for strong enforcement of law to prevent the country from turning into a dump yard for global waste. Loopholes in law facilitate illegal import. Second-hand electronic equipments having residual life of five years are being imported. The Ministry of Environment, Forest and Climate Change has notified e-waste management rules, 2016 in which producers are for the first time held responsible for Extended Producers' Responsibility (EPR).

EPR has become common in Europe, but it is a huge success and buy in Japan. The law places the burden and responsibility of recycling on everyone: consumers, retailers and manufacturers varying with the type of appliance and brand. However, EPR

implementation in Norway mandates the domestic producers and importers to finance the e-waste collection and treatment systems and the financing could happen individually or collectively.

Computer equipment accounts for almost 68 percent of e-waste followed by telecommunication equipment (12%), electrical equipment (8%) and medical equipment (7%). Other equipments, including household e-scrap, account for the remaining 5 percent. India is the fifth biggest producer of e-waste in the world, discarding 1.7 million tonnes of electronic and electrical equipment in 2014, as per UN report. There is a complete ignorance in public about the repercussion of throwing these products unattended. 95% of e-waste is handled by informal sector recyclers who are not serious about the guidelines issued by Central Pollution Control Board (CPCB) and rest 5% by formal ones.

The Three R principles: Reduce e-waste through smart procurement and good maintenance; Reuse electronic equipment by donating or selling; and Recycle those products that cannot be repaired will delay the accelerated generation of e-waste. Proper recycling of electronic items will not adversely impact our environment and human healths rather increase the use of reusable and refurbished equipment and reduce energy use while conserving limited resources. There could be one or more 'Collection Centres' in each town as per population variation for collecting the e-waste. The consumers will hand over their unused electronic items to either scrap dealer 'Kabariwala' at some

cost or directly to the Collection Centre in the town. The scrap dealer in turn will hand over them to the Collection Centres that would send all e-waste to the 'Disposal Centres' which will be established near the bigger cities for the bulk collection and processing. To get rid of unattended e-waste from each household and spread awareness among people, some days may be earmarked in a year or month through the involvement of youth and college students to collect e-waste at some landmark places as initiated in some cities. The scrap dealer or any other unauthorized person should not be permitted to either dismantle the e-waste

products or process them to extract any useful item. Rather they would have to necessarily deposit the e-waste at the Collection Centres. It will deter e-waste going directly into landfills or in the hands of informal sectors. The processing of e-waste should be done through public private partnership at the Disposal Centres. Engagement of various stakeholders and relevant scientific consultation within this chain of events will be a step forward to solve the e-waste problem. Effective implementation of e-waste management policies throughout the industry will streamline informal recyclers and safe disposal of e-waste. [dewjournal.com](http://dewjournal.com)

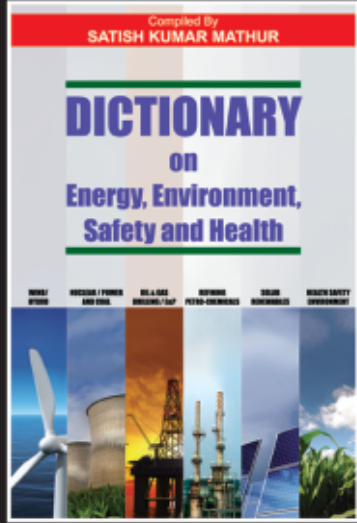
The views expressed here are exclusively of authors and do not represent the views of either the Government of India or the NITI Aayog.

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Dr. Ashok Kumar Jain belongs to 1983 batch of Indian Forest Service, Telangana cadre. He is presently working as Adviser (Rural Development, Drinking Water & Sanitation and Housing & Urban Poverty Alleviation) in NITI Aayog, Government of India. He did his MSc & MPhil in Botany and PhD in Development Studies. He has held several important assignments in Andhra Pradesh such as District Forest Officer; Conservator of Forests; Project Director, Drought Prone Area Programme; Special Commissioner, DPAP & Wage Employment; Vice Chairman & Managing Director, Andhra Pradesh State Irrigation Development Corporation; Director, Ground Water Department; Special Secretary, Irrigation & Command Area Development Department and Vice Chairman, Andhra Pradesh Housing Board & Commissioner, Housing. He is also a Member in several committees of Government of India. Dr. Jain has supported the Sub-group of Chief Ministers on Swachh Bharat Abhiyaan in preparing their report which was submitted to the Prime Minister in October, 2015. He is also the Convener of the Task Force on Elimination of Poverty in India headed by Vice Chairman, NITI Aayog.

Dr. Kumari Dibya is working as Young Professional in NITI Aayog, Government of India. She has contributed substantially in the report writing of the Sub Group of Chief Ministers on Swachh Bharat Abhiyaan which was submitted to the Prime Minister in October, 2015. She holds PhD in Economics in the field of International Trade. She has more than six years of experience and worked in research field of developmental sectors in Hong Kong University of Science and Technology, Hong Kong and IIM Ranchi. Her research field lies in Drinking Water and Sanitation, Waste Management, Environment and Rural Development.

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