



MODULE 3

ENVIRONMENTAL POLLUTION

NOISE POLLUTION

- Prof. Rohan Dasgupta

WHAT IS NOISE?

- Sounds, particularly loud ones, that disturb people or make it difficult to hear wanted sounds, are noise.
- It means any unwanted sound that disrupts one's quality of life by disturbing the normal activities like working, sleeping, conversing etc.
- The word noise originates from the Latin word "Nauseas" meaning discomfort or disgusting.
- For example, neighbours playing loud music, sound of drill machines, road traffic sounds etc.



WHAT IS NOISE POLLUTION?

- **Noise pollution** is the excessive noise that may harm the activity or balance of human or animal life.
- Noise pollution is classified into two types:
 - i. Outdoor noise pollution
 - ii. Indoor noise pollution



WHAT IS NOISE POLLUTION?

- **Outdoor noise pollution** is summarized by the word environmental noise. The source of most outdoor noise worldwide is mainly caused by machines and transportation systems, motor vehicles, aircraft and trains. Poor urban planning may give rise to noise pollution, since side-by-side industrial and residential buildings can result in noise pollution in the residential areas.
- **Indoor noise pollution** can be caused by machines, building activities and music performances, especially in some workplaces.



SOURCES OF NOISE POLLUTION

- Transportation systems are the main source of noise pollution in urban areas. For eg. noise created by motor vehicles, aircrafts, rails etc.
- Construction of buildings and roads cause a lot of noise pollution due to the use of compressors, bulldozers, loaders, dump trucks, pavement breakers etc.
- Industrial noise from factory machineries, boilers, generators, motors etc. add to the already unfavourable state of noise pollution.
- Audio entertainment systems are a source of both outdoor and indoor noise pollution.
- Household appliances like washing machine, juicer mixer and grinder are sources of indoor noise pollution.
- Noise from the highway vehicles is becoming a serious problem for the rural areas through which the highway is passing.

EFFECTS OF NOISE POLLUTION

Dec '12, '13, Jun '13

Noise pollution effects both health as well as behavior.

- **Hearing:**

- ✓ Constant exposure to noise leads to hearing loss.
- ✓ The elevated sound levels cause trauma to the cochlear structure in the inner ear, which gives rise to irreversible hearing loss.

- **Cardiovascular Health:**

- ✓ High noise levels can contribute to cardiovascular effects and exposure to moderately high noise which causes a statistical rise in the blood pressure of 5-10 mm Hg; a clear and measurable increase in stress and vasoconstriction leading to the increased blood pressure as well as to increased incidence of coronary artery disease.

EFFECTS OF NOISE POLLUTION

Dec '12, '13, Jun '13

- **Annoyance:**

- ✓ Noise pollution constitutes a significant factor of annoyance and distraction in modern artificial environments.
- ✓ It may interfere with office activity, sleeping or resting etc.

- **Environment:**

- ✓ Noise pollution can also be harmful to animals.
- ✓ High noise levels may disturb the natural cycles of animals like feeding behavior, breeding practices and migration paths.
- ✓ Most sensational damage caused by noise pollution is the death of certain species of whales, brought on by extremely loud (upto 200 decibels) sound of military SONAR.

EFFECTS OF NOISE POLLUTION ON WILDLIFE

- Noise can have a detrimental effect on wild animals, increasing the risk of death by changing the delicate balance in predator or prey detection and avoidance, and interfering the use of the sounds in communication, especially in relation to reproduction and in navigation.
- Acoustic overexposure can lead to temporary or permanent loss of hearing.
- An impact of noise on wild animal life is the reduction of usable habitat that noisy areas may cause, which in the case of endangered species may be part of the path to extinction.
- Noise pollution may have caused the death of certain species of whales that beached themselves after being exposed to the loud sound of military sonar



CONTROL MEASURES OF NOISE POLLUTION

- ✓ Public awareness regarding the need to control noise pollution.
- ✓ Reduction in exposure to noise by application of engineering control techniques such as alteration and modification of design to reduce noise, by construction of sound barriers or the use of sound absorbers.
- ✓ Reduction in exposure to noise by making exposed personnel use protective ear plugs and decreasing the exposure time.
- ✓ By creating vegetation buffer zones through large scale tree plantation which absorbs noise.
- ✓ Government should strictly control on noise by imposing ban and penalties.



MODULE 3

ENVIRONMENTAL POLLUTION

E-POLLUTION

- Prof. Rohan Dasgupta

What is E-Waste/E-Pollution?

- **Electronic waste** or **e-waste** describes discarded electrical or electronic devices.
- Used electronics which are destined for reuse, resale, salvage, recycling or disposal are also considered as e-waste.
- Informal processing of electronic waste in developing countries may cause serious health and pollution problems; which is popularly termed as e-pollution.
- Electronic scrap components, such as CRTs may contain lead, cadmium, beryllium or brominated flame retardants.
- Even in developed countries recycling and disposal of e-waste may involve significant risk to workers and communities and great care must be taken to avoid unsafe exposure in recycling operations and leaking of materials such as heavy metals from landfills and incinerator ashes.



What is E-Waste/E-Pollution?

- "Electronic waste" may be defined as discarded computers, office electronic equipment, entertainment devices, mobile phones, television sets, refrigerators etc.
- This includes used electronics which are destined for reuse, resale, salvage, recycling, or disposal. Others are re-usables (working and repairable electronics) and secondary scrap (copper, steel, plastic etc.) to be "commodities", and reserve the term "waste" for residue or material which is dumped by the buyer rather than recycled, including residue from reuse and recycling operations.



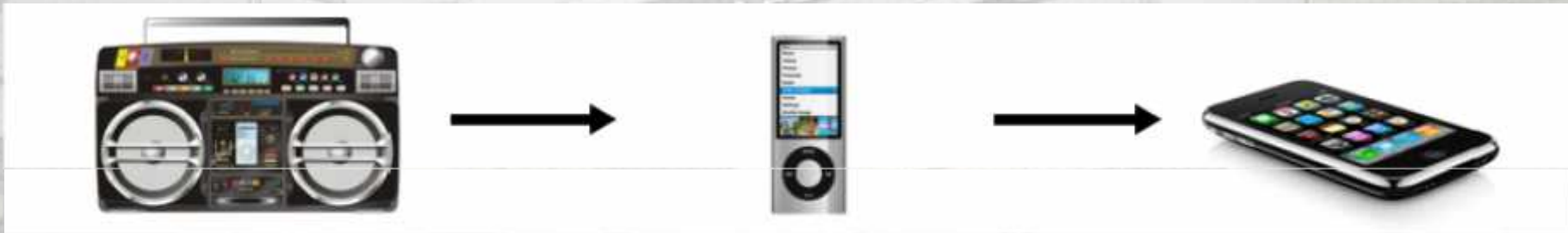
What is E-Waste/E-Pollution?

- Because loads of surplus electronics are frequently commingled (good, recyclable, and non-recyclable), several public policy advocates apply the term "e-waste" broadly to all surplus electronics.
- Cathode ray tubes (CRTs) are considered one of the hardest types to recycle.
- CRTs have relatively high concentration of lead and phosphors (not to be confused with phosphorus), both of which are necessary for the display.
- The United States Environmental Protection Agency (EPA) includes discarded CRT monitors in its category of "hazardous household waste" but considers CRTs that have been set aside for testing to be commodities if they are not discarded, speculatively accumulated, or left unprotected from weather and other damage.

Sources of E-Waste/E-Pollution:

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- Rapid changes in technology, changes in media (tapes, software, MP3), falling prices and *planned obsolescence* have resulted in a fast-growing surplus of electronic waste around the globe.



- Technical solutions are available, but in most cases a legal framework, a collection, logistics and other services need to be implemented before a technical solution can be applied.
- Display units (CRT, LCD, LED monitors), processors (CPU, GPU, or APU chips), memory (DRAM or SRAM), and audio components have different useful lives.

Sources of E-Waste/E-Pollution:

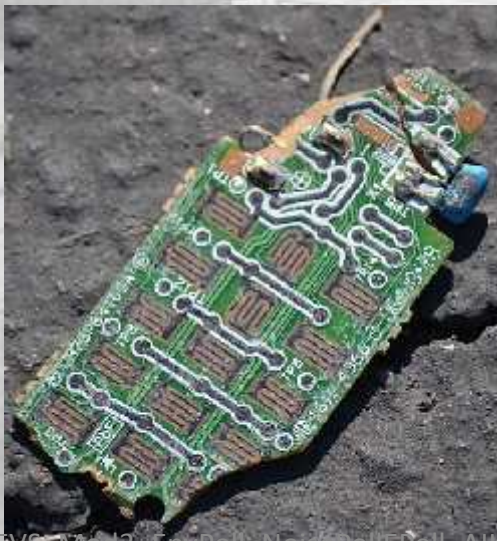
Dec '12, '13, Jun '13

- An estimated 50 million tons of E-waste are produced each year.
- The USA discards 30 million computers each year.
- 100 million phones are disposed of in Europe each year.
- Only 15-20% of e-waste is recycled, the rest of these electronics go directly into landfills and incinerators.
- The amount of e-waste being produced - including mobile phones and computers - could rise by as much as 500 % over the next decade in some countries, such as India.
- The United States is the world leader in producing electronic waste, tossing away about 3 million tons each year.
- China already produces about 2.3 million tons (2010 estimate) domestically, second only to the United States. And, despite having banned e-waste imports, China remains a major e-waste dumping ground for developed countries.

Sources of E-Waste/E-Pollution:

Dec '12, '13, Jun '13

- Electrical waste contains hazardous but also valuable and scarce materials.
- Up to 60 elements can be found in complex electronics.
- While there is agreement that the number of discarded electronic devices is increasing, there is considerable disagreement about the relative risk (compared to automobile scrap, for example), and strong disagreement whether curtailing trade in used electronics will improve conditions, or make them worse



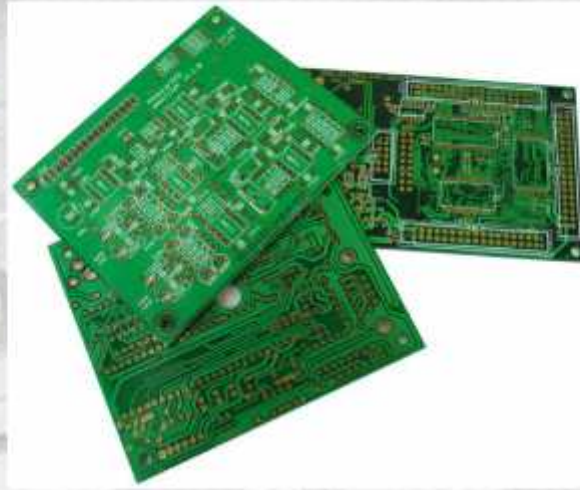
Effects of E-Waste/E-Pollution:

Dec '12, '13, Jun '13

- The processes of dismantling and disposing of electronic waste in the third world lead to a number of environmental impacts.
- Liquid and atmospheric releases end up in bodies of water, groundwater, soil and air and therefore in land and sea animals – both domesticated and wild, in crops eaten by both animals and human and in drinking water.
- Airborne dioxines are found in levels 100 times more than previous due to e-pollution.
- High levels of carcinogens in duck ponds and rice paddies have been blamed on e-waste.
- Contamination of cadmium, copper, nickel and lead in rice paddies were is also a harmful effect of e-pollution.
- Heavy metals such as copper is found in road dust due to e-pollution.



Cathode Ray Tubes



Printed Circuit Boards



Plastic from Keyboards and Printers



Chips and other gold plated components



Computer Wires

Effects of E-Waste/E-Pollution:

Dec '12, '13, Jun '13

- **Environmental impact of the processing of different electronic waste components:**

E-Waste Component	Process Used	Potential Environmental Hazard
Cathode ray tubes (used in TVs, computer monitors, ATM, video cameras, and more)	Breaking and removal of yoke, then dumping	Lead, barium and other heavy metals leaching into the ground water and release of toxic phosphor
Printed circuit board (image behind table - a thin plate on which chips and other electronic components are placed)	De-soldering and removal of computer chips; open burning and acid baths to remove final metals after chips are removed.	Air emissions as well as discharge into rivers of glass dust, tin, lead, brominated dioxin, beryllium, cadmium and mercury
Plastics from printers, keyboards, monitors, etc.	Shredding and low temp melting to be reused	Emissions of brominated dioxins, heavy metals and hydrocarbons

Effects of E-Waste/E-Pollution:

Dec '12, '13, Jun '13

- **Environmental impact of the processing of different electronic waste components (continued...):**

E-Waste Component	Process Used	Potential Environmental Hazard
Chips and other gold plated components	Chemical stripping using nitric and hydrochloric acid and burning of chips	Hydrocarbons, heavy metals, brominated substances discharged directly into rivers acidifying fish and flora. Tin and lead contamination of surface and groundwater. Air emissions of brominated dioxins, heavy metals and hydrocarbons
Computer wires	Open burning and stripping to remove copper	Hydrocarbon ashes released into air, water and soil.

A woman with long brown hair is in the foreground, covering her ears with her hands. She has a distressed expression. In the background, a large white commercial airplane is on a runway. The scene is overlaid with a semi-transparent grid and several vertical green lines. The text "Thank you!" is written in a large, black, cursive font across the center of the image.

Thank you!