Acid Rain

Another reason to worry about the release of Sulphur oxides and Nitrogen oxides into our atmosphere is acid rain.

As seen earlier, our activities release SO_2 and NO_2 into the atmosphere.

These gases combine with water vapour that exists in clouds and in the air to form sulphuric and nitric acids, which become part of rain and snow.

Sulphur dioxide not only reacts with water vapour, it dissolves easily in water to form sulphurous acid which reacts with oxygen in the air, (usually in the presence of a catalyst such as NO_2), and gets further oxidised to sulphuric acid.

What are the effects of acid rain?

- Acid rain ends up in our lakes, rivers and oceans. Over time our lakes and rivers might become too acidic for plants, fish, animals and human who live off them.
- Acid rain also affects crops and trees in more ways than one.

o First, the roots get damaged as a result of which the plant doesn't grow to its full potential or even dies.

o The acidity destroys nutrients present in the soil.

o Useful micro organisms which convert decaying organic matter to soil through natural composting also die leaving behind the decaying smelly mess instead of nutrients for plants.

o The waxy coat on leaves is damaged which makes the plant vulnerable to disease. Some of the sulphur dioxide is capable of clogging up the stomata in the leaves and killing them. This reduces the tree's ability to make food.

o Also, toxic metals that are freed from the soil due to the acid in the rain are absorbed by trees, damaging them even further.

o With trees destroyed, the animals or birds that live in the trees suffer due to loss of their natural habitat.

- Acid rain affects buildings or other man-made structures like bridges, reacting with the material we've used for the structures and making it weak at the foundation by causing corrosion, fracturing or discolouration. The Taj Mahal is affected by acid rain as are our temples, ancient inscriptions and murals that have previously survived for centuries.
- Acid rain also frees the toxic metals which are present in the ground and washes them into water sources. Perhaps you've seen warning signs posted near some water bodies that the fish may have been poisoned by mercury. This is a direct result of acid rain causing elements like mercury and aluminium to be freed from the soil and rocks and washed away into the waters. Fish and others who use the water are affected. Studies have shown that mercury that accumulates in the organs and tissues of animals, either directly or through the food chain, has been linked to brain damage in children, nerve

disorders, heart problems and even death. People are not only unable to eat the fish, even people whose livelihood depends on fishing suffer. As for aluminium, it causes Alzheimer's disease.

- The acidic water eventually gets to our drinking water supply and contaminates it. When the water is acidic enough, it may even corrode the water pipes, adding in dissolved copper and lead to the water supply.
- Toxic metals which are absorbed from water by fruits, vegetables, and in the tissues of animals indirectly affect humans.
- We do neutralise the effects of the acid by water treatment, wherever possible, especially our city drinking water stored in reservoirs. Very often, this doesn't include removal of Aluminium and so, Alzheimer's is a serious problem in our cities. We are unable to treat rivers or larger lakes or water that is constantly being fed by new waters and which becomes acidic again. Rural people depending on wells and lakes and rivers for their drinking water are affected. Their health suffers. Many abandon their villages and move to the cities causing another dimension of overpopulation to the problem. The better solution has to be prevention of acid rain through

o environmental regulations to limit the quantity of emissions from our factories by adding scrubbers to reduce the amount of sulphur dioxide released in the air.

o To have the gas emitted from the exhaust pipes of vehicles converted to something harmless.

o To use coal that has less sulphur and nitrogen compounds for our industries.