



One tree can make a difference: where will you plant yours this Earth Day?

Your leaf, 13 April 2018

Trees are valued for the many benefits they provide to our global landscapes. They offer us shade on hot days, provide important habitat and food for our native wildlife, combat climate change by sequestering carbon, increase property value and improve mental health – just to name a few! In honour of Earth Day, I want to share one particular benefit of our trees – their ability to decrease stormwater runoff and filter pollutants!

In urban environments, trees are especially important because they help to absorb rainwater. However, as climate change progresses and green landscapes, including trees, are replaced by man-made structures such as roads or buildings, that rainfall becomes stormwater runoff. This runoff flows over roads, parking lots and other impermeable surfaces collecting harmful pollutants such as pesticides, salts, heavy metals and bacteria which end up in our storm drains and sewers creating problems for both wildlife and humans.

Trees are able to mitigate the effects of stormwater runoff through their amazing absorption abilities. Tree canopies intercept and slow down rainfall, reducing the amount and speed of water running off on the ground. Because the rainfall is moving slower, more of it infiltrates the ground and tree roots are then able to better absorb it. This both reduces the amount of runoff and filters out pollutants that would otherwise make their way into our water system.

The Town of Newmarket is partnering with LEAF, and The Regional Municipality of York to offer a rebate to Newmarket residents who plant a tree through LEAF's Full Service or Do-It-Yourself tree planting programs! The Town will cover an additional \$100 towards the purchase prices of one tree per property.

An online guide to planting trees

The Hindu, 18 April 2018

Sudha Raman, Deputy Director, Vandalur Zoo, said the department had a lot of information on the various species of trees which they had wished to make available for farmers who were looking at agro-forestry, as well as individuals such as home gardeners and institutions in urban pockets to encourage them to increase the green cover. The app has information about around 150 species of trees, which is also available on a website.

"Farmers in particular, we realised, had been turning to the same handful of species for agro-forestry.

The app provides information about trees which are best suited to their districts and also has a 'plantation calculator' which can help with the number of trees that can be planted in a given area," she explained.

Tree directory

Users of the app will get to choose the trees categorised under species, type or location from a 'Tree Directory' and as well as look through the models and inter-cropping, which can be implemented by farmers in their agricultural lands.

"The information on the app and the website is available in both Tamil and English. We've also encouraged officials to conduct workshops with farmers if they need to be oriented on any queries," Ms. Sudha added.

Through feedback received from the users, the department further plans to build a database to aid in their forestry initiatives across the State.

The app and the website has video tutorials on topics such as transplantation, cultivation techniques of trees such as sandal, silver oak and neem.



Air Pollution May Pose Serious Risks to Young Children

The New York Times, 13 April 2018

Air pollution, even of short duration, increases the number of lower respiratory infections, a new study reports, and the effects may be particularly serious in young children.

Acute respiratory infection of the lungs and airways, usually caused by viruses, are a leading cause of illness and death in young children.

The study, in the American Journal of Respiratory and Critical Care Medicine, tracked 146,397 people, 77 percent of them children younger than 2, who had infections treated in hospitals and clinics in Utah.

Researchers gathered data on levels of small particulate matter, or PM_{2.5}, from sensors at three monitoring stations in the state's Wasatch Front region. The area has substantial variations in PM_{2.5}.

Beginning in the second week after an increase in pollution levels, the researchers found a corresponding increase in respiratory infections, peaking in the third week after the PM_{2.5} increase.

The scientists calculate that each short-term increase of 10 micrograms per cubic meter in PM_{2.5} is associated with a 15 to 23 percent increase in serious respiratory infections.

"There's no reason to panic here," said the lead author, Benjamin D. Home, of Intermountain Medical Center Heart Institute.

"When air pollution is high, avoid idling cars, stay distant from highways, stay indoors or go out in the early morning when pollution is usually lower.

We don't have to feel like we're victims."

More than 95% of world's population breathe dangerous air, major study finds

The Guardian, 17 April 2018

More than 95% of the world's population breathe unsafe air and the burden is falling hardest on the poorest communities, with the gap between the most polluted and least polluted countries rising rapidly, a comprehensive study of global air pollution has found.

Cities are home to an increasing majority of the world's people, exposing billions to unsafe air, particularly in developing countries, but in rural areas the risk of indoor air pollution is often caused by burning solid fuels. One in three people worldwide faces the double whammy of unsafe air both indoors and out.

The report by the Health Effects Institute used new findings such as satellite data and better monitoring to estimate the numbers of people exposed to air polluted above the levels deemed safe by the World Health Organisation. This exposure has made air pollution the fourth highest cause of death globally, after high blood pressure, diet and smoking, and the greatest environmental health risk.

Experts estimate that exposure to air pollution contributed to more than 6m deaths worldwide last year, playing a role in increasing the risk of stroke, heart attack, lung cancer and chronic lung disease. China and India accounted for more than half of the death toll.

Burning solid fuel such as coal or biomass in their homes for cooking or heating exposed 2.6 billion people to indoor air pollution in 2016, the report found. Indoor air pollution can also affect air quality in the surrounding area, with this effect contributing to one in four pollution deaths in India and nearly one in five in China.

Bob O'Keefe, vice-president of the institute, said the gap between the most polluted air on the planet and the least polluted was striking.



Using the right plants can reduce indoor pollution and save energy

Science Daily, 19 April 2018

In a Review published April 19 in Trends in Plant Science, Frederico Brilli, a plant physiologist at the National Research Council of Italy -- Institute for Sustainable Plant Protection, and colleagues conclude that a better knowledge of plant physiology, along with integration of smart-sensor-controlled air cleaning technologies, could improve indoor air quality in a cost-effective and sustainable way.

Plants improve air quality through several mechanisms: they absorb carbon dioxide and release oxygen through photosynthesis, they increase humidity by transpiring water vapor through microscopic leaf pores, and they can passively absorb pollutants on the external surfaces of leaves and on the plant root-soil system. But plants are usually selected for indoor use not for their air-purifying abilities but for their appearance and ability to survive while requiring little maintenance. "For most of us plants are just a decorative element, something aesthetic, but they are also something else" says Brilli.

Surprisingly little research has been done to quantify the effects of different plant species on indoor air quality. NASA performed pioneering work in the 1980s, but they relied on a simple experimental approach; studies with more sophisticated, modern research methods and modeling have not yet been conducted. Further research is needed identify the characteristics of the highest-performing plant species in indoor environments, including their morphology (i.e. leaf shape and size), anatomy, and physiology (i.e., CO₂ assimilation rate). According to Brilli, such studies could show how to "optimize the use of plants indoors, in terms of how many plants per square meter we need to reduce air pollution to a certain level."

Research is also needed to understand plant microbiomes: the populations of microorganisms (bacteria and fungi) that live with plants both in the soil and on leaf surfaces.

Science behind smog and its ominous implications

Down to Earth, 03 April 2018

The 'Great Smog of London' or 'The Big Smoke' in December 1952 was the most severe air pollution crisis in European history, causing around 8,000-12,000 deaths.

The London Smog was preceded by the life-threatening 1948 Donora Smog in the US. Smog clouds, consisting metal dust, sulfur dioxide and carbon monoxide, developed on October 26, 1948. As a result, around 7,000 residents suffered from various breathing problems and were hospitalised. At least 20 residents died within 5-6 days. Similarly, Beijing suffered major air pollution in 2013 due to burning of coal, which caused 366,000 premature deaths.

These environmental disasters did not happen in a day. There were many alarming signs, like the ones we are witnessing in Delhi nowadays.

Sources of Smog

For cities located in river basins and surrounded by mountains, smog is a persistent problem because trapped smog in the valley cannot be carried by the wind. Primary pollutants are the ones that contribute to smog formation and are emitted directly from the source.

Secondary pollutants form in the atmosphere by chemical interactions of primary pollutants with normal environmental conditions. The key pollutants that lead to air pollution are oxides of nitrogen, especially nitrogen oxides and nitric oxides, which are released in the atmosphere by combustion of fossil fuel coming from coal power plants, factory emissions and car exhausts.

Nitrogen dioxide is a serious air pollutant, which, on inhalation, causes pulmonary edema (an accumulation of excessive fluid in the lungs). Moreover, it contributes to photochemical smog, thus, causing serious damage to the environment.



How the Environment Has Changed Since the First Earth Day

National Geographic, 21 April 2018

When Earth Day was first created in 1970, it rode the coattails of a decade filled with social activism. Voting rights were strengthened, civil rights were outlined, and women were demanding equal treatment.

But there was no Environmental Protection Agency, no Clean Air Act, or Clean Water Act.

Fast forward 48 years and what started as a grassroots movement has exploded into an international day of attention and activism dedicated to preserving the environment. Officially, the United Nations recognizes this upcoming April 22 as International Mother Earth Day.

Across the globe, millions of people take part in Earth Day. According to the Earth Day Network, one of the largest activist bodies organizing Earth Day events, people celebrate by holding marches, planting trees, meeting with local representatives, and cleaning up their local environments.

In the Beginning

A series of critical environmental issues helped birth the modern environmental movement. Rachel Carson's book *Silent Spring* published in 1962. It brought to light the dangerous use of a pesticide called DDT that was polluting rivers and destroying the eggs of birds of prey like bald eagles.

When the modern environmental movement was at its genesis, pollution was in plain sight. White birds turned black from soot. Smog was thick. Recycling was nascent.

Then, in 1969, a large oil spill struck the coast of Santa Barbara, California. It moved then-Senator Gaylord Nelson from Wisconsin to put Earth Day on the national stage. More than 20 million people turned out.

It spurred a movement that pushed then-President Nixon to create the Environmental Protection Agency.

7 things we've learned about Earth since the last Earth Day

Vox.com, 23 April 2018

Earth Day turned 48 on Sunday, April 22, and Google celebrated it with a Google Doodle of conservationist Dr. Jane Goodall, who nudged us in a video to "do our part for this beautiful planet."

When Sen. Gaylord Nelson (D-WI) founded Earth Day in 1970, his hope was to make the environment a political issue in an era when US rivers caught on fire and thick smog choked cities.

In many ways, it worked. Since then, major environmental laws have helped clean up much of the vivid toxic detritus in the soil, air, and water in the US. But our challenges today are no less daunting. The accumulation of greenhouse gases in the atmosphere, the loss of wilderness and species, and the acidification and pollution of the oceans have all become more acute — and more destabilizing.

The plastic problem is even worse than we thought

One of the bleakest stories of the year so far was the report of a 6-ton sperm whale washing up on the shores of southern Spain with 64 pounds of plastic in its stomach, a grotesque sign of the alarming rate at which we're dumping plastics into the ocean.

The plastic crisis is a truly global one, and the numbers are staggering: A 2015 study found that between 4.8 and 12.7 million metric tons of plastic makes it into the ocean from land each year. By 2050, there will be more plastic than fish in the ocean by weight.

Since plastic is synthetic, there are few natural processes that break it down, allowing bags, straws, and packaging to linger for decades if not centuries. And we're not very good at containing it to landfills. About 32 percent of plastics make it out into nature, where it often ends up in the bellies of fish, birds, and whales — and, as it turns out, potentially in our stomachs too.