



ENVIS - NBRI

Plants and Pollution



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Pollution Awareness and Mitigation in school

NATIONAL BOTANICAL RESEARCH INSTITUTE, LUCKNOW

Hedging against Bangkok's PM2.5 pollution crisis

Bangkok Post, 03 February 2019

The sounds of tools hammering against the ground, combined with the constant clanking of metal can often be heard, sometimes into the late hours of the night. Dry dust has been blown over by the wind, irritating many people in the area, except Ms Manee. As people outside wear masks, 70-year-old Ms Manee is not reluctant to take a deep breath as the air in the shop seems fresh.

"If you grow lots of these plants, dust won't have a chance to come near you. Customers come in here and say it's very cool and quiet. Some say it's very peaceful and the air they breathe is really refreshing, just like in real nature," Ms Manee told the Bangkok Post.

"I've known about the ability of plants to trap dust for a long time, but I don't think many people acknowledge the benefit of these plants in terms of fighting the polluting dust."

She said the plants have a dust-scrubbing structure.

"It really all comes down to the surface of the leaves. Leaves with a rough surface and many hairs will be better at trapping dust, while leaves with smooth surfaces won't have as much ability to trap dust." Ms Manee also made recommendations of plants suitable for trapping the PM2.5 dust particles. She recommends ton moek (water jasmine or wrightia religiosa benth), lin mangkorn (mother-in law's tongue or sansevieria trifasciata) and soi intanin (Bengal trumpet vine or thunbergiagrandidiflora).

These plants, she said, are the best choices because they can easily be found in almost every shop at a low price.

"But to be honest, every species of plant can trap dust, it's not just a handful of species that can do it. It's just this one can do it much more than the other plants can."

Apart from their ability to trap dust, plants can also filter air. She recommended ton kosol (croton or thunbergia grandiflora), mother-in-law's tongue, aloe vera, Boston fern (nephrolepis exaltata), daylee (peace lily or spathiphyllum) and sao noy pa paeng (dumbcane exotica) are well known for their ability to freshen up the air and are often put inside bedrooms or living rooms.

FGCU, Lehigh schools team up to teach kids about water quality

ABC-7, 25 February 2019

In light of our algae issues, professors and students from Florida Gulf Coast University have teamed up with teachers in Lehigh Acres to teach kids about water quality. Today, the lesson led them outside, right to the shores of our local waterways.

From the classroom to their school retention pond, students at Lehigh Senior High School and Varsity Lakes Middle School are getting their hands dirty so they can keep our water clean.

"These are going to be the citizens that grow up in Southwest Florida and maybe will live here in Southwest Florida and will be making decisions about policies that are going to impact us in the future," said Molly Nation, a professor of environmental education at FGCU.

First, it's a classroom lesson all about algae, everything from contributing factors to mitigation methods.

"Things like fertilizer, things like pet waste, trash or things like trash or pollution. Also, reducing the amount of fertilizers they use, cleaning up after their pet waste, really thinking about the green infrastructure that helps to alleviate some of those pollutants that come into our local water," said Nation. Meanwhile, a group of middle school students is digging up dirt, learning firsthand how to protect their detention pond with plants.

"They plant plants in here like the duck potato because when runoff does occur, or if there's fertilizer that ends up running into the water, these plants actually use a lot of it so that there isn't a lot of runoff in the water," said Tyler Panariello, an environmental studies student at FGCU. Teachers said this kind of hands-on learning lasts longer than a traditional lecture.

"Rather than it being a message of doom and gloom, we are trying to build ownership within our community to better understand how our own personal choices impact our water quality," said Marsha Ellis, a 6th-grade earth and space science teacher at Varsity Lakes Middle School. These lessons also teach these kids they're never too young to make a difference.

"We can try to grow more plants to filter the water to make it even more cleaner so the world can be a better place," said Bradley Laureore, a 6th-grade student at Varsity Lakes Middle School. As part of the program, students also get the opportunity to take water samples from the retention pond and learn how to test them for algae.



The Green New Deal could help farmers help the planet

Popular Science, 14 February 2019

This month, a group of Democratic lawmakers called for an ambitious plan for the United States to reach net-zero carbon pollution in 10 years. While experts debate whether the proposal is technologically or politically feasible, the so-called Green New Deal is about more than shifting to cleaner, more advanced forms of energy sources. It's also about shifting to more traditional forms of agriculture.

While farming generally takes a back seat to energy in discussions of climate, it accounts for up to a third of carbon pollution, by one account. Tractors and trucks that harvest and transport our food burn gasoline and diesel, generating pollution. Synthetic fertilizers derived from fossil fuels spur the release of heat-trapping gas from the soil, and cows and sheep emit large volumes of planet-warming pollution. Then there is the matter of agricultural giants burning forests to clear land for farming and grazing, thereby releasing carbon stored in trees into the atmosphere and reducing the capacity of the land to store CO₂.

And yet, while agriculture is a big part of the problem, it can also be part of the solution. Smart growing practices can help soak up pollution and store it in the ground—what's known as carbon farming.

Plants scrub carbon dioxide from the atmosphere and store it in their leaves and branches. When those plants shed their leaves and die, that carbon enriches the soil, where it's gobbled up by insects, fungi, and microbes, and then exhaled back into the atmosphere. If more carbon goes into the soil than comes out, the process helps to eliminate atmospheric carbon dioxide, cooling the planet. Carbon farming also helps guard against climate change, as soil that is rich with microbes and fungi holds more water, which protects it from drought and mitigates the impact of floods.

There are steps farmers can take to make sure the soil retains as much carbon as possible, namely disturb the soil as little as possible and till the earth only where necessary. Keep the soil covered in a diverse array of deep-rooted crops. Rotate between cash crops, like wheat, and cover crops, like ryegrass, which nurture the soil and can be fed to livestock.

Trees can mop up farming's ammonia emissions

The Scottish Farmer, 10 February 2019

Agriculture is the main source of ammonia emissions in the UK, with the majority coming from animal manure and fertilisers. Ammonia can lead to excess reactive nitrogen levels in sensitive habitats, causing a decline in the biodiversity of lichens, mosses and other flora.

It can also lead to acidification of soils, and combines with other pollutants to produce particulate matter pollution, which is harmful to human health.

Scientists from the NERC Centre for Ecology and Hydrology worked with Forest Research to develop the free online calculator and guidance as part of research funded by the Scottish Environment Protection Agency. By following the advice in the guidance, farmers, regulators and planning authorities can optimise tree planting to recapture ammonia around animal housing, which is a key source of ammonia emissions, and estimate the percentage of ammonia that will be recaptured by different planting options, over a set time period – up to 50 years.

The guidance also advises which tree species will thrive in different parts of the UK, what distance to plant trees from animal housing, and in what configuration. There is also information to help with the incorporation and use of existing woodlands.

CEH ecologist Dr Bill Bealey said: "Trees are particularly effective scavengers of air pollutants like ammonia. They recapture the pollutant in the tree canopy and on to the leaves, and they also help disperse the ammonia plume which reduces impacts of nitrogen pollution on nearby sensitive habitats.

"Farmers who use trees to mitigate ammonia can look to a long-term range of benefits. New canopies can improve animal welfare by providing animals with shade and protection from aerial predators. They can also provide screening around animal housing units, to soften the look of buildings and minimise visibility impacts on the landscape."

Dr Elena Vangelova, a soil sustainability expert from Forest Research, said:

"Tree shelters are an agroforestry technique that have benefits for farmers and society as a whole. The capture of carbon and nitrogen by additional planting will play a role in helping the UK achieve its greenhouse gas emission reduction targets."



On the Importance of Biodiversity Conservation for Human Existence

Kashmir Reader, 25 February 2019

Unregulated urbanization, industrialization and increased human activities have led to rapid deterioration of the environment. This has severely affected the life supporting systems. The past decade or so has seen a serious concern from people of all walks of life towards various environmental issues concerning humans directly or indirectly which include global warming, biodiversity loss, depletion of ozone layer, acid rain, dumping of hazardous wastes and so on.

The world is a beautiful place to live in because of a wide variety of living organisms including plants, animals and micro-organisms with whom we share this planet. The remarkable diversity of living organisms form an inseparable and significant parts of our planet however, the ever increasing human population is posing serious threats to bio-diversity. Plants and animals of a region constitute biodiversity or sum total of all the variety of living organisms on earth constitute biodiversity.

Biodiversity is a natural wealth essential for human survival. At the global level, an estimated 1.7 million species of living organisms have been described to date and many more are yet to be discovered. It has been currently estimated that the total number of species may vary from 5 – 50 millions. Both flora and fauna, all over the world are under an assault from a variety of indiscriminate human activities.

Loss of species is a serious cause of concern for human survival. It has been observed that 79 species of mammals, 44 of birds, 15 of reptiles and 3 of amphibians are threatened. The threat to survival or loss may be caused in three ways: Direct ways (which include deforestation, hunting, poaching, commercial exploitation), indirect ways (which include loss or modification of the natural habitats, introduction of exotic species, pollution, etc.) and Natural causes (which include Climate change.)

Among these causes, habitat destruction and over-exploitation are the main ones. Habitat (natural home) destruction: may result from clearing and burning forests, draining and filling of wetlands, converting natural areas for agricultural or industrial uses, human settlements, mines, building of roads and other developmental projects.

Worrying dip in global biodiversity

Down to Earth, 22 February 2019

Global biodiversity — the variety of life at the genetic, species and ecosystem levels — is under severe threat, says The State of the World's Biodiversity for Food and Agriculture report 2019. The report has been published by the Food and Agriculture Organization (FAO).

The report is country-specific, where 91 nations have submitted findings on the state of their biodiversity for food and agriculture.

Maintaining biodiversity is essential as it contributes to agriculture and food production. It includes domesticated plants and animals, livestock, forest and aquaculture systems, harvested forests and aquatic species, wild relatives of domesticated species and the vast range of organisms that live in and around food and agricultural production systems, the report says.

Though important contributors to food security, many key components of biodiversity are declining. The FAO report says that the proportion of livestock breeds at risk of extinction is increasing, and plant diversity in farmers' fields is decreasing. Countries report that many species of pollinators, natural enemies of pests, soil organisms and wild food species are vanishing due to the destruction and degradation of habitats, overexploitation and pollution. In many parts of the world, biodiverse agricultural landscapes are being replaced by monoculture, the report warns.

A prime example in this case is the monoculture cultivation of arhar (pigeon pea) for cash in a few Baiga villages like Bouna in Dindori district of Madhya Pradesh, which has uprooted the local millet sikiya relished for generations. "It is clear that food and agricultural production is currently a major driver of biodiversity loss. Expansion of production on the current model is going to lead to even more severe impacts on biodiversity," report coordinator Julie Belanger told DTE.

Forest loss represents a major global threat to biodiversity. Though rates of loss have decreased (and gone into moderate reverse in some regions), global forest area continues to decline, with the early part of this century seeing net losses in sub-Saharan Africa, Latin America and Southeast Asia, the report points out. The main cause of deforestation is conversion to agriculture. With decline in forests, wild foods, an important source of food for many rural households, are vanishing.

**Need a breath of fresh air? AIRGROW to the rescue****The Times of India, 24 February 2019**

Today the air is all synthetic. Living environments should improve our wellbeing, not damage it. AIRGROW believes in connecting with nature which should be part of everyday life.

"Right now, pure indoor air is a privilege only a few enjoy. We want to bring this gift to everyone and reconnect humanity with nature, hence we came up with the idea of AIRGROW, said Harshit Bahl (30).

AIRGROW amplifies the natural properties of the plants by directing toxic agents through the roots of the plant. It works using the concept of bio-filtration, phytoremediation and aeroponics.

AIRGROW's technology elevates the air purification efficiency of plants to a whole new level and creates fresh pure indoor air, making your home, office a healthier place for you to live and work. It is the only air purifier which produces Oxygen and reduces carbon dioxide naturally, he claims.

AIRGROW combines technology and design.

"We've worked hard on the design for more than two years. The design is important, not only for the aesthetics of the product but also to improve the air purifying performance.

AIRGROW combines the best of green walls, air purifiers and humidifier and more into one," says Bahl, an alma mater of UIET Panjab University.

Conceived and developed by Harshit, he believes that there are three things which one needs for survival – food, water and air. One can survive without food for two weeks, without water for four days, but without air, one lives only for a few minutes. If one sees that the water in a glass is dirty, they choose not to drink it. But pollution in the air cannot be seen.

My inspiration was more needbased. Strict parents not giving pocket money in college made me start my venture. Denial of funds by our college director to print our college magazine made me look for other avenues to fund it.

I ended up launching my own youth-oriented magazine in university named "Youth 360" where companies used to pay to advertise their products in University. Students used to work for me free of cost to gain experience and to improve their resumes for their MBA applications and job opportunities.

For our children and grandchildren we must reduce carbon pollution**Seacoastonline, 06 February 2019**

Carbon dioxide pollution of our atmosphere is the major cause of Global Climate Change.

The costs of the destruction caused by recent super-storms, hurricanes, tornadoes, floods and fires are exceeding our ability to repair the damages.

People have lost their jobs and homes and valuable infrastructure and natural resources have been destroyed.

Less carbon dioxide pollution would mean less destruction due to Climate Change.

A reduction of carbon pollution will benefit children and adults as well by improving public health and reducing health care costs.

Our children and grandchildren will pay even greater economic and human costs if we don't act soon to limit carbon emissions.

A recent report indicated that carbon discharges rose by 3.4 percent in 2018, the largest increases in eight years. The rise occurred even as a record number of coal-fired generating plants in the US were shut down.

The increase is even more alarming as President Trump repeals regulations that limit carbon pollution.

We need a major national program to reduce carbon pollution. The Carbon Dividend Act of 2018 puts a tax on fossil fuels, the major cause of carbon pollution.

Taxing coal and oil can reduce carbon pollution by about 40% and stimulate and speed up the growth of new green and clean technologies and jobs.

The Carbon Dividend Act is revenue neutral.

Tax collections will be refunded directly to tax payers. Both Republicans and Democrats have cosponsored the bill and most Americans support reducing carbon emissions.