



NEWS BULLETIN

Plants and Pollution

ENVIS RP-NBRI
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Vol. 04, April 2020

Plantation to Save Environment

CSIR-NATIONAL BOTANICAL RESEARCH INSTITUTE, LUCKNOW

Colombia wants to plant 180 million trees: Is it a realistic goal?

Mongabay, 02 April 2020

At the end of January this year, Colombian President Iván Duque announced at the World Economic Forum held in Davos, Switzerland, that the country's goal is to plant 180 million trees by 2022. This is based on the restoration of more than 300,000 hectares (741,316 acres) of degraded land.

Days later, the Ministry of the Environment said that a campaign called Great National Day: *#PorqueSembrarNosUne* (*#BecausePlantingUnitesUs*), commonly known as *Sembratón*, would be held on March 21 and 22. During those days, more than five million trees would be planted throughout the national territory.

Due to the COVID-19 pandemic, the campaign was postponed; however, once the health crisis is over, the national government has all the intention to go forward with it. Experts clarify that the plantation of seedlings is only the first step of the ecological restoration process which will have to be monitored for years.

The following are some of the questions experts have regarding the country's ambitious challenge.

Richard Romero, supervisor of the *Sembratón* campaign, says that the trees will be obtained from nurseries of the Colombian Agriculture and Livestock Institute (ICA), the National Natural Parks System of Colombia, the Regional Autonomous Corporations (CAR) and private companies like hydroelectric companies—entities that are obliged to make environmental compensations by planting trees.

“We should also talk to ranchers to get them involved. Extensive livestock farming causes big problems because it damages protected forests. You have to consider all of that,” Romero said.

He claims that there is enough.....

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On Arbor Day 2020, we are planting hope

The World Economic Forum , 24 April 2020

Arbor Day 2020 - a holiday dedicated to planting and appreciating trees - arrives as America is living through a public health crisis unparalleled in the last century. The combined loss of life, employment and even simple free movement are felt deeply across our nation. In the face of such a profound national crisis, it might seem logical to skip our annual day of celebration for America's trees and forests.

But America has a proud history of rally, not retreat, in the face of our greatest challenges. That is why I believe we need to use this Arbor Day to embrace trees as a symbol of our national resolve and hope for the future.

After all, there are few actions in life more hopeful and forward looking than planting a tree. It is an act of faith to imagine a small tree seedling can withstand storms, invasive insects and other threats to grow up and provide us with so many natural gifts.

The COVID-19 pandemic has shown we need these gifts more than ever. This includes the gift of being able to breathe deeply, which trees help us do by absorbing air pollution. There is also the gift of a peaceful mind, which we can discover by interacting with nature—even a tree we see out of the window while sequestered in our homes. And the gift of products that come from trees, like medical supplies and home paper products.

Right on time, a new movement is building in the US and around the world to conserve, restore and grow 1 trillion trees by 2030. The trillion trees goal is based on rigorous scientific analysis of the potential space worldwide for planting trees and how to maximize their benefits for people and wildlife - which includes their.....

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Lockdown: Improvement of Air Quality

CSIR-NATIONAL BOTANICAL RESEARCH INSTITUTE, LUCKNOW

The deadly link between COVID-19 and air pollution

The World Economic Forum, 15 April 2020

As the coronavirus pandemic impacts millions across the world and brings economies to a grinding halt, there is a lot of talk about how emissions from fossil fuel combustion have dropped radically in many countries. Yet this is no solution to air pollution and climate change. For while eerily empty cities may be bathed in blue skies, millions are suddenly out of work and wondering how they are going to care for their families.

The poor and most vulnerable will suffer most from both the health impacts and the economic crisis. Cleaner air for a few months may be a tiny silver lining to COVID-19's dark clouds, but will do little in the long run to solve the problem of outdoor air pollution that kills more than four million people every year. For that we need to kick our habit of burning coal, oil and gas.

What's more, people living in high-pollution cities are more likely to have compromised respiratory, cardiac and other systems – and are therefore more vulnerable to COVID-19's impacts.

One of the refrains all of us are hearing as the coronavirus spreads is to quit smoking. But what about the 90% of people worldwide who are exposed to high levels of air pollution? They can't choose to quit breathing the air where they live. On every continent, people suffer the negative health impacts of air pollution. Living in Delhi is comparable to smoking six cigarettes a day. The respiratory systems of people in California and Australia have been compromised by air pollution from climate-fuelled forest fires. The people of Wuhan have suffered poor air quality for years, and just last summer took part in air pollution protests.

During the SARS outbreak in China, a study by researchers at UCLA's School of Public Health showed that patients with SARS were more..... [Read More...](#)

Here's how lockdowns have improved air quality around the world

The World Economic Forum, 20 April 2020

The COVID-19 pandemic has caused industrial activity to shut down and cancelled flights and other journeys, slashing greenhouse gas emissions and air pollution around the world. If there is something positive to take from this terrible crisis, it could be that it's offered a taste of the air we might breathe in a low-carbon future.

The World Health Organisation (WHO) estimates that about 3 million people die each year from ailments caused by air pollution, and that more than 80% of people living in urban areas are exposed to air quality levels that exceed safe limits. The situation is worse in low-income countries, where 98% of cities fail to meet WHO air quality standards.

Measurements from the European Space Agency's Sentinel-5P satellite show that during late January and early February 2020, levels of nitrogen dioxide (NO₂) over cities and industrial areas in Asia and Europe were lower than in the same period in 2019, by as much as 40%.

Two weeks after the nationwide lockdown was announced on March 23 in the UK, NO₂ pollution in some cities fell by as much as 60% compared to the same period in 2019. NASA revealed that NO₂ pollution over New York and other major metropolitan areas in north-eastern USA was 30% lower in March 2020, compared to the monthly average from 2015 to 2019.

Most NO₂ comes from road transport and power plants, and it can exacerbate respiratory illnesses such as asthma. It also makes symptoms worse for those suffering from lung or heart conditions. NO₂ emissions have been a [Read More...](#)



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Positive Role of Microbes to Plants Growth

CSIR-NATIONAL BOTANICAL RESEARCH INSTITUTE, LUCKNOW

Cable bacteria can drastically reduce greenhouse gas emissions from rice cultivation

Science Daily, 20 April 2020

Half of world's population is nourished by rice crops, but rice cultivation is harsh to the climate. The rice fields account for five percent of global emissions of the greenhouse gas methane, which is 25 times stronger than CO₂.

This is because the rice plants grow in water. When the fields are flooded, the soil becomes poor in oxygen, creating the right conditions for microorganisms to produce methane. Now researchers from Aarhus University and the University of Duisburg-Essen have found that cable bacteria could be an important part of the solution. In the laboratory, they have grown rice in soil with and without cable bacteria and measured what happened.

"And the difference was far beyond my expectations. The pots with cable bacteria emitted 93% less methane than the pots without cable bacteria," says Vincent Valentin Scholz, who conducted the experiments as a PhD student at the Center for Electromicrobiology (CEM) at Aarhus University.

"Cable bacteria transport electrons over centimeter distances along their filaments, changing the geochemical conditions of the water-saturated soil. The cable bacteria recycle the soil's sulfur compounds, thus maintaining a large amount of sulfate in the soil. This has the consequence that the methane-producing microbes cannot maintain their activity," explains Vincent Valentin Scholz.

It is already known that the rice growers can temporarily slow down the emission of methane by spreading sulfate on the rice fields. Apparently, the cable bacteria can do this for them -- and not just temporarily.

This finding adds a new angle to the role of cable bacteria as ecosystem engineers. While the authors emphasize that they have only the very first laboratory observation, it is tempting to speculate that [Read More...](#)

Scientists use bacteria to help plants grow in salty soil

Phys.Org, 27 April 2020

A new study has shown that salt-tolerant bacteria can be used to enhance salt tolerance in various types of plants. The new approach could increase crop yield in areas dealing with increasing soil salinity.

Each year, about 2 million to 3 million hectares of irrigated farmland go out of production worldwide due to salinity problems, according to the U.S. Agency for International Development. Increased soil salinity not only reduces water uptake for crops but can often create a nutrient imbalance that decreases plant growth and yield.

Although salt levels in soil can increase naturally over time, especially in arid areas, farming practices also contribute. Irrigation water, especially recycled wastewater, contains salts that concentrate in the soil. Fertilizers also add salts to the soil.

"Agricultural soil loss continues to rise, posing a very real threat to many important crops," said research team leader Brent Nielsen, Ph.D., professor at Brigham Young University.

"Our method for enhancing the salt tolerance of plants could be scaled up to allow farmers to use more of their land and improve yield. This would create a more stable income for farmers and a more reliable food supply for consumers."

Ashley Miller, a graduate student working in Nielsen's lab, was scheduled to present this research at the American Society for Biochemistry and Molecular Biology annual meeting in San Diego this month. Though the meeting, to be held in conjunction with the 2020 Experimental Biology conference, was canceled in response to the COVID-19 outbreak, the research team's abstract was published in this month's issue of The FASEB Journal..... [Read More...](#)



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Carbon Sequestration by Plants

CSIR-NATIONAL BOTANICAL RESEARCH INSTITUTE, LUCKNOW

Almond orchard recycling a climate-smart strategy

Science Daily, 01 April 2020

Whole orchard recycling is when old orchard trees are ground, chipped and turned back into the soil before new almond trees are planted.

The study, published in the journal PLOS ONE, suggests that whole orchard recycling can help almond orchards be more sustainable and resilient to drought while also increasing carbon storage in the soil.

"To me what was really impressive was the water piece," said corresponding author Amélie Gaudin, an associate professor of agroecology in the UC Davis Department of Plant Sciences. "Water is central to how we think about agriculture in California. This is a clear example of capitalizing on soil health. Here we see some real benefits for water conservation and for growers."

Drought and high almond prices have encouraged higher rates of orchard turnover in recent years. The previous practice of burning trees that are no longer productive is now restricted under air quality regulations, so whole orchard recycling presents an alternative. But how sustainable and effective is it for the environment and for farmers?

For the study, scientists measured soil health and tree productivity of an almond orchard that turned previous Prunus woody biomass back into the soil through whole orchard recycling and compared it with an orchard that burned its old trees nine years prior.

They also experimentally reduced an orchard's irrigation by 20 percent to quantify its water resilience.

Their results found that, compared with burn treatments, whole orchard recycling can:

- Sequester 5 tons of carbon per hectare
- Increase water-use efficiency by 20 percent
- Increase crop yields by 19 percent [Read More...](#)

Harnessing plants and microbes to tackle environmental pollution

Science Daily, 09 April 2020

"People have been arguing about whether these long-lived pioneers contribute much to carbon storage over the long term," said Caroline Farrior, an assistant professor of integrative biology at The University of Texas at Austin and a primary investigator on the study. "We were surprised to find that they do."

It is unclear the extent to which tropical rainforests can help soak up excess carbon dioxide in the atmosphere produced by burning fossil fuels. Nonetheless, the new study provides insights about the role of different species of trees in carbon storage.

Using more than 30 years' worth of data collected from a tropical rainforest in Panama, the team has uncovered some key traits of trees that, when integrated into computer models related to climate change, will improve the models' accuracy. With the team's improved model, the scientists plan to begin answering questions about what drives forest composition over time and what factors affect carbon storage.

Most existing Earth system models used to forecast global climate decades from now, including those used by the Intergovernmental Panel on Climate Change, represent the trees in a forest as all basically the same.

"This analysis shows that that is not good enough for tropical forests and provides a way forward," Farrior said. "We show that the variation in tropical forest species's growth, survival and reproduction is important for predicting forest carbon storage."

The project was led by Nadja Rüger, research fellow at the German Centre for Integrative Biodiversity Research (iDiv), Halle-Jena-Leipzig.

In addition to the finding about..... [Read More...](#)