Plants and Pollution
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Afforestation : Pollution

CSIR-NATIONAL BOTANICAL RESEARCH INSTITUTE, LUCKNOW

The wrong kind of trees: Ireland's afforestation meets resistance

The Guardian, 07 July 2019

Ireland is ramping up its response to the climate crisis by planting forests – lots of forests. East, west, north, south, the plan is to plant forests, the more the better. With enough trees, goes the hope, Ireland can compensate for many of the cows, vehicles and fossil-burning power plants that make it one of Europe's worst climate offenders.

From having just 1% forest cover in 1900, Ireland now has 11%, covering 770,000 hectares. It has just committed to planting 8,000 more hectares each year to reach 18% coverage. Research published last week said planting billions of trees across the world was the biggest and cheapest way to tackle the climate crisis. But some in Ireland have a problem with the great green vision. They say Ireland is planting the wrong sort of forests – dark, dank abominations that kill wildlife, block sunlight and isolate communities.

"It's like a wall around you, dead, darkness. It's suffocating. We're losing the landscape," said Edwina Guckian, a member of Save Leitrim, a group that is resisting plantations.

"You couldn't live in the middle of this thing unless you were Grizzly Adams," said Jim McCaffrey, another member, crouching in a gloomy, tangled copse. "It's absolute misfortune when you see the plantations coming." The group, named after county Leitrim in Ireland's north-west, has delayed some plantations with a blitz of planning objections and hopes to galvanise resistance in other counties. Last month a protester……

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In India, can private forests be the answer to deforestation, wildlife loss and pollution?

scroll.in, 23 July 2019

When Taimur Ali Khan, the son of Bollywood celebrities and Indian paparazzi's favourite muse, was gifted a mini forest on his first birthday, it made headlines. Ordering a full-fledged forest is a more expensive, Instagram-friendly rehash of the ancient Indian tradition of planting a tree to mark an occasion. Taimur's 1,000 square feet forest of around 100 trees was projected as a haven for birds, bees and butterflies, underscoring the need to have such green isles in the urban sea of concrete, glass and metal. There's nothing exclusive about Taimur's forest, however. Several families, corporates and non-profit organisations now have such oases in today's increasingly hot and dusty world both for their own relief and to support nature.

Can these private forests – groves spanning hundreds of hectares and startup-driven mini greens – be our answer to deforestation, wildlife loss and environmental pollution? What kind of social complexities and sustainability aspects do these spaces bring along? India has lost over 1.6 million hectares of tree cover between 2001 and 2018, according to an analysis by non-profit World Resources Institute using datasets collated by the University of Maryland, Google, US Geological Survey and NASA, besides satellite images…...

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Plants and Pollution
ENVIS RP-NBRI
ENVIS RP-NBRI
NEWS BULLETIN
Vol. 07, July 2019

Tree and Climate

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Tree planting 'has mind-blowing potential' to tackle climate crisis

The Guardian, 04 July 2019

Planting billions of trees across the world is by far the biggest and cheapest way to tackle the climate crisis, according to scientists, who have made the first calculation of how many more trees could be planted without encroaching on crop land or urban areas.

As trees grow, they absorb and store the carbon dioxide emissions that are driving global heating. New research estimates that a worldwide planting programme could remove two-thirds of all the emissions that have been pumped into the atmosphere by human activities, a figure the scientists describe as “mind-blowing”.

The analysis found there are 1.7bn hectares of treeless land on which 1.2tn native tree saplings would naturally grow. That area is about 11% of all land and equivalent to the size of the US and China combined. Tropical areas could have 100% tree cover, while others would be more sparsely covered, meaning that on average about half the area would be under tree canopy. The scientists specifically excluded all fields used to grow crops and urban areas from their analysis. But they did include grazing land, on which the researchers say a few trees can also benefit sheep and cattle.

“This new quantitative evaluation shows [forest] restoration isn’t just one of our climate change solutions, it is overwhelmingly the top one,” said Prof Tom Crowther at the Swiss university ETH Zürich, who led the research. “What blows my mind is the scale. I thought restoration would be in the top 10,…….

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How trees could save the climate

Science Daily, 04 July 2019

The Crowther Lab at ETH Zurich investigates nature-based solutions to climate change. In their latest study the researchers showed for the first time where in the world new trees could grow and how much carbon they would store. Study lead author and postdoc at the Crowther Lab Jean-François Bastin explains: "One aspect was of particular importance to us as we did the calculations: we ex-cluded cities or agricultural areas from the total restoration potential as these areas are needed for hu-man life."

The researchers calculated that under the current climate conditions, Earth's land could support 4.4 billion hectares of continuous tree cover. That is 1.6 billion more than the currently existing 2.8 billion hectares. Of these 1.6 billion hectares, 0.9 billion hectares fulfill the criterion of not being used by hu-mans. This means that there is currently an area of the size of the US available for tree restoration. Once mature, these new forests could store 205 billion tonnes of carbon: about two thirds of the 300 billion tonnes of carbon that has been released into the atmosphere as a result of human activity since the Industrial Revolution.

According to Prof. Thomas Crowther, co-author of the study and founder of the Crowther Lab at ETH Zurich: "We all knew that restoring forests could play a part in tackling climate change,……

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Plants and Pollution
ENVIS RP-NBRI
NEWS BULLETIN
ENVIS RP-NBRI
Vol. 07, July 2019

Research to Fight Climate Change

CSIR-NATIONAL BOTANICAL RESEARCH INSTITUTE, LUCKNOW

Improved model could help scientists better predict crop yield, climate change effects

Science Daily, 09 July 2019

"This is an exciting new computer model that could help us make much more accurate predictions across a wide range of conditions," said Johannes Kromdijk, who led the work as part of an international research project called Realizing Increased Photosynthetic Efficiency (RIPE).

RIPE, which is led by the University of Illinois, is engineering crops to be more productive without using more water by improving photosynthesis, the natural process all plants utilize to convert sunlight into energy to fuel growth and crop yields. RIPE is supported by the Bill & Melinda Gates Foundation, the U.S. Foundation for Food and Agriculture Research (FFAR), and the U.K. Government's Department for International Development (DFID).

The current work focused on simulating the behavior of what are known as stomata -- microscopic pores in leaves that, in response to light, open to allow water, carbon dioxide, and oxygen to enter and exit the plant. In 2018, the RIPE team published a paper in Nature Communications that showed increasing one specific protein could prompt plants to close their stomata partially -- to a point where photosynthesis was unaffected, but water loss decreased significantly. This study's experimental data was used to create the newly improved stomata model introduced today. "We've known for decades that photosynthesis and stomatal opening…….… **Read More...**

Gene identified that will help develop plants to fight climate change

Science Daily, 11 July 2019

In addition, the findings, published in Cell on July 11, 2019, will also allow researchers to develop plants that can help combat climate change as part of Salk's Harnessing Plants Initiative. The initiative aims to grow plants with more robust and deeper roots that can store increased amounts of carbon underground for longer to reduce CO_2 in the atmosphere. The Salk initiative will receive more than $35 million from over 10 individuals and organizations through The Audacious Project to further this effort.

"We are incredibly excited about this first discovery on the road to realizing the goals of the Harnessing Plants Initiative," says Associate Professor Wolfgang Busch, senior author on the paper and a member of Salk's Plant Molecular and Cellular Biology Laboratory as well as its Integrative Biology Laboratory. "Reducing atmospheric CO_2 levels is one of the great challenges of our time, and it is personally very meaningful to me to be working toward a solution."

In the new work, the researchers used the model plant thale cress (Arabidopsis thaliana) to identify genes and their variants that regulate the way auxin, a hormone that is a key factor in controlling the root system architecture, works. Though auxin was known to influence almost all aspects of plant growth,…… **Read More...**

Plants and Pollution
ENVIS RP-NBRI
ENVIS RP-NBRI
NEWS BULLETIN
Vol. 07, July 2019
Better Crop Against Climate
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'Planting green' cover-crop strategy may help farmers deal with wet springs

Science Daily, 01 July 2019

The approach -- known as planting green -- could help no-till farmers counter a range of problems they must deal with during wet springs like the ones that have occurred this year and last year. These problems include soil erosion, nutrient losses, soils holding too much moisture and causing a delay in the planting of main crops, and main-crop damage from slugs.

"With climate change bringing the Northeast more extreme precipitation events and an increase in total precipitation, no-till farmers especially need a way of dealing with wet springs," said Heather Karsten, associate professor of crop production ecology, whose research group in the College of Agricultural Sciences conducted a three-year study of planting green. "We wanted to see if farmers could get more out of their cover crops by letting them grow longer in the spring."

As cover crops continue to grow, they draw moisture from the soil, creating desired drier conditions in wet springs for planting corn and soybeans. With planting green, after those main crops are planted into the cover crops, the cover crops are typically terminated by farmers with an herbicide. The decomposing cover crop residues then preserve soil moisture for the corn and soybean crops through the growing season.

The study took place at five sites over three years -- on three cooperating Pennsylvania farms that plant no-till in Centre, Clinton and Lancaster counties; at Penn State's Russell E. Larson…… **Read More...**

Scientists make fundamental discovery to creating better crops

Science Daily, 22 July 2019

The discovery could lead to the development of bioenergy and food crops that can withstand harsh growing conditions, resist pathogens and pests, require less chemical fertilizer and produce larger and more plentiful plants per acre.

Scientists in recent years have developed a deeper understanding of the complex relationship plants have with mycorrhizal fungi. When they are united, the fungi form a sheath around plant roots with remarkable benefits. The fungal structure extends far from the plant host, increasing nutrient uptake and even communicating with other plants to "warn" of spreading pathogens and pests. In return, plants feed carbon to the fungus, which encourages its growth.

These mycorrhizal symbioses are believed to have supported the ancient colonization of land by plants, enabling successful ecosystems such as vast forests and prairies. An estimated 80% of plant species have mycorrhizal fungi associated with their roots.

"If we can understand the molecular mechanism that controls the relationship between plants and beneficial fungi, then we can start using this symbiosis to acquire specific conditions in plants such as resistance to drought, pathogens, improving nitrogen and nutrition uptake and more," said ORNL molecular geneticist Jessy Labbe. "The resulting plants would grow larger and..…… **Read More…**