Plants and Pollution

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Waste to solution

NATIONAL BOTANICAL RESEARCH INSTITUTE, LUCKNOW

Floating parks made from plastic waste could unite communities to tackle pollution

Phys.org, 03 January 2019

The equivalent of one truck of plastic waste is dumped into the ocean every minute, but what if it could be caught and removed before it drifted out to sea? One such solution, called the Recycled Park Project, is being floated in Rotterdam. Developed over the last five years, the idea is turning plastic waste into islands.

The Recycled Island Foundation and the WHIM Architecture firm launched the Recycled Park Project in 2014 with the aim of catching plastic waste in Rotterdam's New Meuse river before it enters the North Sea. Three floating litter traps with nets attached collect litter in the water while volunteers sweep the riverbank.

The retrieved plastic is converted into hexagonal building blocks which have been used to build a floating island park in the river itself. The park is open to the community and filled with plants and benches, giving people a new green habitat to enjoy in the heart of the city.

A 140 square metre prototype was opened to the public in July 2018. It's hoped that five more plastic litter traps can be added to the river, creating an island of at least 190 square metres. If successful, similar islands could be built worldwide, with research ongoing in Indonesia.

The River Meuse carries a huge amount of plastic waste which is exposed after high tide on the river banks. By removing plastic from the river, the more costly and difficult job of removing it from the North Sea is avoided.

Despite the obvious benefits, however, retrieving plastic waste from the river is technically illegal. Waste in the New Meuse River still legally belongs to whoever discarded it, as EU law states that waste may not be abandoned and littering is a form of abandonment. So, the taking and using of this waste in theory amounts to stealing from its most recent owner.

In a first, Punjab govt to establish waste to energy projects

Pakistan Today, 22 January 2019

LAHORE: Punjab government aims to complete waste to energy projects in six major cities of the Province within a year.

While presiding over a meeting on Monday, senior Minister Abdul Aleem Khan directed the concerned officials to start waste to energy projects in Lahore, Rawalpindi, Multan, Faisalabad, Gujranwala, and Sialkot immediately.

He further announced that Islamabad will also be included in the scheme. The government will also gift the same project to Khyber Pakhtunkhwa (KP) government for Peshawar, he added.

Punjab Local Government and Community Department Department (LGCDD) have been directed to establish the plants. LGCDD Secretary Captain (retd) Saif Anjum gave a detailed presentation to meeting participants about the project and shared past experiences.

Long term planning has been devised for waste to energy projects, which will be part of the Clean and Green Punjab Campaign, he said. The project will be initiated with the cooperation of Chinese and other foreign companies.

The minister said that "the initiative will replace dumping sites where garbage will produce electricity, gas and other usable products."

Initial estimates suggest that the project will help in reducing 2,000 tons of Lahore city's municipal solid waste per day to generate electricity.

The senior minister claimed that in order to ensure a healthy environment for citizens and avoiding damage to the soil in the six cities, other urban areas will also be included in the scheme, adding that the project will be carried out in each district of the Punjab province in the later stages.

Abdul Aleem Khan criticized the previous government for not paying proper attention towards waste management and a lack of long term planning.

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Climate Change: Plant

NATIONAL BOTANICAL RESEARCH INSTITUTE, LUCKNOW

Growing pains: how the climate crisis is changing British gardens

The Guardian, 14 January 2019

"It's basically chaotic," says Tony of the new climatic normal. "It's non-stop flowers from now on. Winters are milder on average and there's every opportunity to have a riot of lovely flowers from December right through till spring."Deadly floods in Bangladesh, devastating wildfires in California, melting glaciers in Greenland, coral bleaching in the oceans – this is climate change in action. Highlighting far more benign changes in Britain, long blessed with a moderate climate, may appear trivial or downright insensitive. Our gentle extremes – the beast from the east, or summer 2018 being England's hottest ever – are far from drastic. But they still pose challenges, and there is more change coming.

Britain's 27 million gardeners could be the canaries in our coalmine. How are gardeners experiencing climate change in Britain and how is it transforming our gardens? And can adapting our gardening styles mitigate the negative impacts of climate change?Marie and Tony couldn't see their garden when they first viewed the house in 1982 because it was covered by a snowdrift. In the years since, as their south-facing quarter-acre evolved from a children's play-space to a "four-seasons garden" with an all-year-round rainbow of flowers, shrubs and trees, they have witnessed the Midlands climate become steadily milder. Autumn frosts are much later, if they strike at all, and September is a summer month now. Their begonias continue until October. "That would never have happened in the past; we'd barely get through September without air frosts," says Tony. "Although it's warming up, you've got to plan for the extremes. We're still going to get very severe winters and it will wipe out many gardeners' new species."

They know about this only too well. Their garden features a jungle area of bamboo, palm trees, a banana tree and the stumps of several Tasmanian tree ferns.

How much can forests fight climate change?

Nature, 15 January 2019

When it comes to fighting global warming, trees have emerged as one of the most popular weapons. With nations making little progress controlling their carbon emissions, many governments and advocates have advanced plans to plant vast numbers of trees to absorb carbon dioxide from the atmosphere in an attempt to slow climate change. But emerging research suggests that trees might not always help as much as some hope.Forest schemes got a big boost from the 2015 Paris climate accord, which for the first time counted all countries' efforts to offset their carbon emissions from fossil-fuel use and other sources by planting or protecting forests. China aims to plant trees over an area up to four times the size of the United Kingdom. California is allowing forest owners to sell credits to CO2-emitting companies, and other US states are considering similar programmes, which could motivate projects that establish new forests and protect existing ones. The European Union is moving towards allowing countries to include forest planting in their plans to fight climate change; some nations in the bloc have also pledged billions of dollars to tropical forest programmes.Many scientists applaud the push for expanding forests, but some urge caution. They argue that forests have many more-complex and uncertain climate impacts than policymakers, environmentalists and even some scientists acknowledge. Although trees cool the globe by taking up carbon through photosynthesis, they also emit a complex potpourri of chemicals, some of which warm the planet. The dark leaves of trees can also raise temperatures by absorbing sunlight. Several analyses in the past few years suggest that these warming effects from forests could partially or fully offset their cooling ability.Such concerns have prompted vigorous debate among scientists about how forests in different regions have warming or cooling effects. Nobody denies that trees are good for the environment; after all, forests provide a host of benefits, and harbour much of the world's terrestrial biodiversity.

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New approach to curb climate change
NATIONAL BOTANICAL RESEARCH INSTITUTE, LUCKNOW

To curb climate change, we have to suck carbon from the sky. But how?

National Geographic, 17 January 2019

At McCarty Family Farms, headquartered in sun-blasted northwest Kansas, fields rarely sit empty any more. In a drive to be more sustainable, the family dairy still grows corn, sorghum, and alfalfa, but now often sows the bare ground between harvests with wheat and daikon. The wheat gets fed to livestock. The radishes, with their penetrating roots, break up the hard-packed surface and then, instead of being harvested, are allowed to die and enrich the soil.

Like all plants, cereal grains and root vegetables feed on carbon dioxide. In 2017, according to a third-party audit, planting cover crops on land that once sat empty helped the McCarty farms in Kansas and Nebraska pull 6,922 tons of carbon dioxide from the atmosphere and store it in the soil across some 12,300 acres—as much as could have been stored by 7,300 acres of forest. Put another way: The farm soil had sucked up the emissions of more than 1,300 cars."We always knew we were having a sizable impact, but to have empirical numbers of that size is inspiring to say the least," says Ken McCarty, who runs the farms with his three brothers.

Moves like this are among a host of often overlooked steps that scientists now say are crucial to limiting the worst impacts of climate change.

From planting more trees and restoring grasslands to using sophisticated machines with fans and filters to capture CO2 from ambient air, these far-ranging steps are all aimed at one thing: Sucking greenhouse gases from the sky.The machines to do that are still cumbersome and expensive. But managing forests and grasslands and farms with an eye toward atmospheric carbon removal is often a matter of doing what we already know how to do, only better."We know how to deal with forests; we know how to store carbon in soil," says Richard Birdsey at Woods Hole Research Center.

Climate change: How could artificial photosynthesis contribute to limiting global warming?

Science Daily, 16 January 2019

The Intergovernmental Panel on Climate Change (IPCC) has numerically simulated various scenarios. Only in the most optimistic scenario can the climate target still be achieved by means of immediate and drastic measures in all sectors (transport, agriculture, construction, energy, etc.). In the less optimistic scenarios, the global community will have to take additional measures beginning in 2030 or by 2050 at the latest: we will have to implement "negative emissions" by removing large quantities of CO2 from the atmosphere and store them permanently in order to balance the carbon budget. One example of negative emissions is large-scale forestation -- forests bind CO2 in wood as long as it is not later used as fuel. But CO2 could also be removed from the atmosphere and bound using artificial photosynthesis.

Physicists have now calculated how this might work. Dr. Matthias May of the HZB Institute for Solar Fuels is an expert in artificial photosynthesis. Dr. Kira Rehfeld is an environmental physicist at the University of Heidelberg studying climate and environmental variability.In a median scenario, at least 10 gigatonnes of CO2 per year would have to be removed from the atmosphere beginning around 2050 to balance the climate carbon budget. Forestation and cultivation of biomass for reducing CO2 compete for the same areas as are needed for agriculture, however. With just more biomass alone, it is therefore difficult to reach this scale, for natural photosynthesis is not a particularly efficient process. Leaves are able to use a maximum of two per cent of the light for converting CO2 and water into new chemical compounds. The two physicists argue that in order to bind 10 gigatonnes of CO2 per year in the forest, about 10 million square kilometres of the fertile areas on Earth would have to be planted with new forest. This corresponds to the area of continental Europe (up to the Urals!).Materials systems currently being researched for artificial photosynthesis might bind CO2 with considerably greater efficiency.

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Water pollution

NATIONAL BOTANICAL RESEARCH INSTITUTE, LUCKNOW

Council nod for phytoremediation technique to cleanse Conolly Canal water of metals

The Hindu, 23 January 2019

The Kozhikode Corporation council has given approval to the phytoremediation measures undertaken by Mini Pharma in Conolly Canal. Phytoremediation is a scientific technique in which plants with special properties are used to absorb metal content from water to purify it. The first phase of the project will be completed in 45 days.

The plant used is Ludwigia peruviana or Peruvian primrose, a small aquatic plant with yellow flowers found in marshy parts of Wayanad. The plant, according to a study conducted by the Centre for Water Resources Development and Management (CWRDM) in 2006, can absorb metals such as iron, lead, cadmium, chromium, nickel, copper and zinc from water. The technique was introduced to purify water in Conolly Canal from January 1 on an experimental basis, under the aegis of Mini Pharma, a city based agro-medical pharmacy. Water in the canal, where a major cleaning drive was carried out a month ago under the Operation Conolly Canal project, was found to have presence of heavy metals as per a study conducted by CWRDM recently.

"If the Corporation succeeds in blocking the drains through which polluted water enters the canal, the plant can be used extensively to convert the canal into a crystal clear waterbody," said Abdul Letheef of Mini Pharma, former Principal of Government Homoeopathic Medical College in Kozhikode. However, concerns over the cost of the project remain. "One unit of the plant will cost around ₹ 400, including all the expenses incurred to procure it and prepare it for aquatic life.To cleanse the 11.2 kilometres of Conolly Canal, the cost will be around ₹10 lakh," Dr. Letheef said.Meanwhile, P.S. Harikumar, Senior Principal Scientist at CWRDM, who played a major role in carrying out the study on Peruvian primrose, said that he was not sure if the project would be successful in flowing water.water. "We conducted the study in a confined environment.

How Oysters Can Clean Up Water Pollution

Care2, 23 January 2019

Oysters are a delicacy all over the world, but did you know that they have another vital function related to their filter-feeding lifestyle? It turns out that oysters are absolutely fantastic for filtering polluted waters by storing contamination in their shells and tissue.

Organizations like the Billion Oyster Project are explicitly harnessing that ability in environmental cleanup efforts, drawing on the power of nature to clean water and help ecosystems recover from pollution like oil spills, sewage, chemicals, nutrient runoff and more.

Harnessing oysters for this kind of work starts with vast quantities of oyster shells, which young oysters — known as "spat" — love to grow on. Groups reach out to restaurants and seafood processors for discarded shells and create artificial reefs to encourage oysters to start taking root.It can take up to three years for an oyster to fully mature — and the survivability rate is variable, thanks to the poor conditions in the water. But once a population is established, these organisms can begin filtering. Researchers can snag mature specimens for study to monitor water quality.

That filtration, of course, can mean that the oysters are inedible. In New York, for instance, the presence of sewage in the water makes eating oysters a nonstarter. Even so, their population hasn't climbed back up anywhere close to where it was when Europeans first arrived. At that time, the area was absolutely teeming with mollusks, growing in thick reefs so dense that they actually impeded navigation. Oyster numbers are starting to rise, though.

The same can be seen in the Chesapeake Bay, once a hotspot for oysters and now the site of a commercial campaign that's farming them to clean up the environment and generate revenue.Numerous communities in the Gulf are also using oysters for environmental cleanup, especially in the aftermath of the infamous Deepwater Horizon spill. In these communities, the goal includes both the desire for cleaner water and economic recovery for fisheries that were devastated by the spill.