

THE GREEN ARCHIVE



HIGHLIGHTS

<i>An Insight into the Farmer's Bill</i>	3
<i>The Bloodcurdling California Wildfires</i>	4
<i>Agriculture's Role in Uplifting Indian Economy</i>	6
<i>World Ozone Day: The Shield for Life</i>	6

The Side of Plants You Never Knew

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It is fairly evident to us that plants, especially forest trees, are quite intelligent beings in themselves. Their physiological processes function in a life supporting way, and without them, life on earth would cease to exist. But hold on, there is more to it. New research has suggested that plants too can communicate within themselves and with other organisms. Now, their communication is obviously not verbal like us humans, but research says that it works in the most effective way.

According to several studies, it was discovered that trees communicate via visual, olfactory and electrical signals which travel in a form of nerve cells at root tips. The roots of trees extend a long way below the ground, sometimes twice the spread of the crown. In a natural forest, the roots of trees eventually intersect. This is how the trees interact with each other. Moreover, forest soils are enriched with thin fungal filaments called "hyphae", which penetrate the ground and act as a medium of

exchange of information between trees. These hyphae create an internet-like connection within the forest vegetation, and this helps the trees to share information about insects, drought and other dangers. For example, when *Acacia* spp. are being attacked by insects, they release pheromones and ethylene gas, which signals the other *Acacia* trees to release toxins in leaves to combat the predators. This saves tremendous damage and loss among forest trees. Dr. Suzanne Simard, the forester who first discovered this, gave the forest network a term called "Wood Wide Web".

Now the catch here is, if a plant is not in the forest network, i.e. if it is isolated from the bunch, it renders an incapacity to receive or give any necessary information regarding its defense. Therefore, as a result, they are much more likely to get damaged first. This is exactly why most monoculture or artificial plantations are more susceptible to insect and pest attacks than natural ones. Since the plants are growing in monoculture, they fall short of biodiversity, and it is the reason why farmers need heavy amounts of insecticides, pesticides and

fungicides for the crops. This action proves to be detrimental not only to the environment, but also to the economic circumstances of the farmers.

As the after effects of the COVID-19 pandemic continue to butcher the Indian economy, critical steps must be taken to cut down unnecessary expenses, which are present in ample amounts especially in the fields of agriculture and forestry. History stands as witness to the fact that whenever humanity has tried to alter the ways of nature, nature has always backlashed. It should be an essential prerequisite for farmers to introduce associate species of planted crops beside them and improve the overall biodiversity of the plantation.

The global population rises and the demand of agriculture and forest produce is sky-rocketing, and a step of utmost importance is to enhance the biodiversity of plantations, and let the crops grow in a more natural environment, so that they can "talk" their problems out. For unlike humanity, nature has always been capable to solve its own problems.

Editor's Desk



The year 2020 is not ceasing to surprise us, and none of us could've expected to be where we are right now. It's been more than six months since the students have tread on the DBS campus and had that mesmerizing breath of fresh air while sitting on the bench under the Ficus trees in the college garden. It is like what they say, you only miss something when it is not around anymore. But the staff members are doing their best to not let us get deprived of the college feeling, even when we're at home.

Realizing the gravity of the situation, online classes were started soon after the first lockdown in March, and this distant learning initiative leverages technological encroachments to ensure that physical boundaries do not thwart our academic progress. The DBS faculty knows how to keep their students engaged with numerous assignments and projects, ensuring this pandemic does not take a psychological toll on us. Not just academics, but even the co-curricular activities keep on going as if the college dynamic never went immobile.

Sure, this pandemic has altered most of our perspectives about life and has created a different world with a whole new set of obstacles, but the brighter side of it all is that it has encouraged us to push our limits and discover unique learning

opportunities. For instance, the idea of this newsletter could not have stemmed if the unrelenting boredom had not pushed the boundaries of creativity. This is the first publication solely for the Departments of Agriculture and Forestry, and it will keep on blossoming in the years to come, as our strength grows. The active participation and support received from the faculty and students for this newsletter has indeed been heartwarming. This is just one of the many undervalued experiences this pandemic has given us. Glass half full, eh?

More than anything, the COVID-19 pandemic is an assessment of our resolve in the midst of a global crisis. It is about finding the proverbial silver lining in a gigantic dark cloud encompassing the sky, and finding our purpose in the new reality presented to us. What the world needs right now is our individual cooperation during such testing times, and it becomes our responsibility as educated citizens to not stride out without wearing a mask and repeated sanitization. Let us not disappoint this planet anymore, shall we?

Manas Shukla
Editor-In-Chief

An Insight into the Farmer's Bill 2020



Source: Pexel

Sonakshee Jha

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Imagine there's an owner of a small carpet manufacturing unit who has manufactured a good number of carpets and is all set to sell it, suppose a big luxury home decor brand approaches him for some high margin carpets, he has a great opportunity, to earn, to flourish, but alas! He can't just sell it to anyone he wishes to, rather he's forced by the government to sell his carpets only to the government licensed traders in the nearby carpet Mandi where only a specific kind of government approved carpets are accepted.

There the agents and traders form a cartel and manipulate things in their favour and keep a huge commission for themselves and eventually he only gets the MSP (Minimum Support Price) decided by the government. This way, he misses out on many economic opportunities. The low profit margin, inability to pay interests or even for the raw materials, traps him in a vicious inescapable cycle. Same is the case with the millions of farmers and people associated only with the agriculture sector, while all other sectors in India have free market access.

The Farmers Produce Trade and Commerce Bill gives farmer

access to the free market i.e there won't be any inter-state barrier or any compulsion to sell only a specific type of produce or only at the mandis.

Concerns

1. Role of commission agent eliminated.
2. State government won't get the mandi fee.

Oats are grown by farmers in many states of India and are used as fodder for their cattles, and in those same states people in the urban areas pay a good amount to buy packed oats from fancy National/ International brands.

This is only because farmers can't afford to cultivate crops which are not being purchased at their nearby mandi.

The Farmers Agreement of Price Assurance and Farm Services Bill ensures that the farmers can enter pre-defined contracts with some parties, agreeing on price, quantity and product even before the farming begins, assuring them of a certain price to sell the produce (forward contract), giving farmer more power, as now instead of producing what is being purchased at the nearby mandi, they can produce what the national market desires and can sell to any entity.

Concerns

1. Farmers may not be able to

negotiate with big entities

2. Why would any big sponsor deal with the small and marginal farmers?

Now suppose there's a wholesaler who buys a certain product from the mandi but is unable to find the right buyers and wishes to store the product in his warehouse, but then there's this **Essential Commodities Act** (introduced in 1955, when India faced frequent famines) which allows one to store only a limited amount of product. This forces him to sell the product quickly, thus agreeing to the low prices by the buyer, so from the next time, he ensures that he buys only a small amount of the product, thus restricting the size and scale of business, both the wholesaler and the producer suffers, and a less economic value is created from the entire value chain.

The Amendment will now exclude many agri-products from this essential commodity list, and they'll only be included back again when India faces an extreme scarcity of any of these products, thus, letting the wholesalers, food-processors etc. to scale up their operations.

Concerns:

Big players may dictate the market prices of the products.

The Bloodcurdling Californian Wildfires



Source: Pexel

Wanishree Jha

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A series of forest wildfires broke out on the 5th of September, 2020, devastating millions of acres in the US state of California. "It is worst in the last 18 years, and they are going to be more extreme," reported by the California Department of Forestry and Fire on the record breaking series of blazes that are burning across the state of California. Starting from the mid of August and devastating millions of miles they are continuously extending to the rest of state with a comparable intensity. With retrospective reports and analysis of such breakouts, an early outlook already displays the cause of this wildfire- a combination of high temperature, low humidity, high winds, delayed and low rainfall; but all these factors could be summed up and donned as the Climate Change, and it's the key driver of this trend.

Statistical reports counts a total number of 7,982 fire incidents, devastating about 1.8 million hectares of land; death toll rises to 30 and tens of thousands of

families have been evacuated. More than 17,000 fire fighters are on the front lines to combat this nature's apocalypse. The economic cost is more than 1.45 billion USD.

Major wildfires and their causes

Lightning strikes and thunderstorms, sparked many known fires in the mid of August, while in early September an enormous heat wave and Diablo with Santa Ana winds caused the active fires to grow explosively. While many of them are fuelled by humans though accidentally, one such is the El Dorado fire which razed about 10,000 acres, sparked by a smoke generating device during the gender reveal party of a couple's new-born.

The August Complex is the worst active fire till date burning in the Coastal Range of California, it originated as 38 separate fires sparked by lightning strikes ruining an area of 352,157 ha. According to the National Interagency Fire Centre, 2.7 M ha have been burned this year so far and blanketing communities in thick smoke whose

consequences are poor air quality index and acute lungs diseases.

The extreme climatic conditions, dry and drought prone areas around, all are a sign of global warming caused by the excessive emission of carbon dioxide and methane gasses. This rises the Earth's atmospheric temperature, and such variability causes an increase in potential forest fuels moreover, US is ranked second in the total carbon emission around the globe which efficiently triggers wildfires every year, these factors are collectively regarded as climate change. To establish resilience, the least we could do is :

- Discouraging developments, near forests
- Removing fuels, dead trees from forests
- Minimize habitat damage
- Recovery plans and management

Climate Change and its aftermaths:

"The past is no longer a guide to the future, for the future, for flooding and for fire and lots of other ways in which climate change is played out." a research official concluded on rising issues of forest fires.

The Overlooked Impact of Climate Change

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Global climate change has already had discernible impacts on the environment. Glaciers have dwindled, ice on rivers and lakes is disbanding earlier, plant and animal ranges have shifted and trees are flowering sooner.

Effects that scientists had anticipated in the past would result from global climate change is now occurring: loss of sea ice, expedited sea-level rise and longer, more intense heat waves. Some of the long-term effects of global climate change is discharged to continue to diversify over this century and beyond. The mass of climate change beyond the next few decades depends predominantly on the abundance of heat-trapping gases emitted globally, and how diplomatic the Earth's climate is to those emissions. Since human-induced warming is superposed on an intrinsically varying climate, the temperature rise has not been, and

will not be, uniform or smooth across the country or over time. The length of the frost-free season (and the interrelated growing season) has been intensifying nationally since the 1980s, with the largest increases occurring in the



Source: Unsplash

western part of the world, encompassing ecosystems and agriculture.

Droughts in the Southwest and heat waves (periods of abnormally hot weather lasting days to weeks) everywhere are projected to become more intense, and cold waves less intense everywhere. The intensity, frequency and duration of North Atlantic hurricanes, as well

as the frequency of the strongest (Category 4 and 5) hurricanes, have all increased since the early 1980s. Global sea level has risen by about 8 inches since ethical record-keeping began in 1880. It is projected to rise another 1 to 8 feet by 2100. This is the resuscitation levelled water from sea-level melting ice and the proliferation of seawater as it warms. Sea-level several decades, storm surges and high tides could combine with sea-level and land subsidence to further increase flooding in many regions. Sea level rise will continue past 2100 because the oceans take a very long time to respond to warmer problems at the Earth's surface.

Ocean waters will therefore continue to warm and sea level will continue to rise feet many centuries at rates equal to or higher than a choice-free current century. The Arctic Ocean is expected to become essentially ice-free summer before mid-century.

The Prime Minister Kisan Yojna

Abantika Das

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The Chief Minister of Madhya Pradesh Shivraj Singh Chauhan has announced that he will provide financial assistance to the farmers to save them from the present crisis. Chauhan said that under the CM Kisan Samman Nidhi Yojana the state government will give Rs. 4,000 annually to the farmers. That is, every 6 months, the government will do a direct transfer to the farmers' account in 2 installments. In this way, the farmers will get a total amount of Rs. 10,000 yearly by including the

Rs. 6,000 already received by the PM Kisan Yojana and the previously mentioned Rs. 4,000 from the State Government.

The Pradhan Mantri Kisan Samman Nidhi Yojana also known as the PM-Kisan Yojana is a government scheme through which, all small and marginal farmers will get up to Rs. 6,000 per year as minimum income support in three installments of Rs. 2000 which is directly transferred to their bank accounts. The first installment is disbursed between 1 December to 31 March. The second installment is transferred directly to the farmers' account between April 1 to

July 31 and the third installment is given from August 1 to November 30.

Now you see that this particular announcement along with other schemes like Relief under Revenue Circular Book, PM Kisan Samman Nidhi, Loan on Zero Percent Interest, Prime Minister Crop Insurance Scheme as a package was made by Chauhan just before the by-election. He went on to say that the implementation of these schemes will increase the income of the farmers in a better way. So, was this meant to be a publicity stunt, or is it just another campaign promise?

Role of Agriculture in India's Economy

Neeraj

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Since the drastic downfall of India's economy in the past few months, the Indian agriculture sector has been leading the revival of the economy. A majority of the rural population is dependent on farming in India and amidst the COVID-19 pandemic, the agriculture sector remained unaffected as farmers were permitted to harvest during Rabi season. Resultantly, India reported record-breaking wheat harvest during the lockdown.

Further, preliminary data from the Agricultural Ministry confirmed that paddy has been sown in 12 million hectares across India. The cultivation area of paddy increased by more than 1.00% on year on year basis. Also, India received 14% higher rainfall than the past year benefiting the sector as most farmlands in the country depend on the monsoon because of the lack of irrigation.

Agriculture contributes to about 17% of the total GDP of India. Schemes like the PM Kisan and PM Garib Kalyan Yojna helped farmers



Source: Unsplash

during cultivation and harvest. Further, an 11% increase in wages owing to Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGA) added to farmer's income. These factors significantly contributed to the increased output of farmers backing the economy's revival. Despite the nationwide pandemic, the agriculture sector had a growth of 5.9% compared to the whole Indian economy growing only by 3.9%.

Pradeep Kashyap, the founder of MART, said that understanding the role of agriculture is very important, especially when the manufacturing and service sectors have taken a hit. For the past few years, farmers have been suffering from lousy storage facilities leading to crop wastage.

Even though productivity and rainfall look good for now, it is essential to tackle that side of the problem as well.



Source: Unsplash

Ozone: Shield for Life

Sneha Singh

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This year we celebrate 35 years of the Vienna Convention and 35 years of global ozone layer protection. The existence of Life on this Earth would not be possible without sunlight but do this enormous amount of emanating energy coming directly from the sun is all good for life? Here comes the ozone into play. The earth's atmosphere is made up of six layers of which the second layer is stratosphere and this very layer holds the Ozone layer in it. Ozone

is a colorless gas which forms a protective layer that absorbs the harmful ultraviolet light from the sun. It acts as the earth's sunscreen and preserves life on the blue planet.

In late 1970s, the scientists discovered that humanity is creating a hole in the ozone shield, they raised the alarm and the world came to know about the Ozone depletion. Ozone hole doesn't refer to the actual hole in the layer but it is more like a thin patch with the thinnest areas near the poles. The hole caused by Ozone-depleting

gases (ODSs) used in aerosols and cooling, such as refrigerators and air-conditioners - was threatening to increase cases of skin cancer and cataracts, and damage plants, crops and ecosystems.

Vienna Convention for the Protection of the Ozone Layer:

The confirmation of the ozone layer depletion prompted the international community to take action to protect the ozone layer. This was formalized in the Vienna Convention for the Protection of the Ozone Layer which was adopted and signed by 28 countries on 22nd march 1985. In September 1987,

this led to the drafting of The Montreal Protocol on Substances that Deplete the Ozone Layer

Under the Convention’s Montreal Protocol, governments, scientists and industries worked together to cut out 99 per cent of all ozone-depleting substances and put the ozone layer on a path to recovery.

Hope for the future:

Nonetheless, the global outcry surrounding the hole in the ozone layer and subsequent action taken against it does show that meaningful change can happen, especially when alternatives, such as renewable energy exist. Therefore, it’s vital to keep making noise about the climate

crisis if we’re to stand any chances of halting rising temperatures. Strikes, petitions, lifestyle changes and shared awareness are crucial for keeping momentum around the climate conversation going. Who knows, maybe one day we’ll be reading articles titled ‘How the battle to tackle climate change was won?’

Every year on 16 september the international day for the preservation of the ozone layer is celebrated. World Ozone Day shows that collective decisions and actions, guided by science and humanity are the only way to solve major global crisis.

A Grain Discovery App planned for US in 2021

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Adopting grain discovery’s app was a no-brainer for Jeff Curry. “I actually signed up on the spot when I first tried it because I immediately saw how this would change my business,” says Curry, Sharedon, Farms, Owen Sound, Ontario. “As a sole operator, the time savings are invaluable and will allow me to build a better connection with my farmers.”

The app, which was recently released by the Ontario-based start-up, streamlines the current process of buying and selling grain.

“By allowing live pricing , and an industry-first instant contract confirmation, we’re eliminating missed opportunities and tedious jobs like juggling calls and manual paperwork,” says Rory O’Sullivan, Grain Discovery CEO.”

“With this app, my farmers have all their information at their fingertips, so they can make informed decisions,” says Tiffany Spearing, general manager of Lockie Farms Grain Elevator, Zephyr. “It’s very easy to use. We have farmers in their 20s using it , and we have farmers in their 80s using it. And for me, I have



GRAIN
DISCOVERY

Key Features:

- **Personalization:** Grain buyers receive their own branded app with grain origination and portfolio management software.
- **Live Marketplace:** Buyers post their live bids to farmers who can confirm deals instantly, or post their own target offers.
- **Portfolio:** Users can view tickets, deliveries, contracts, and settlements anytime, anywhere.
- **Communication:** Messaging and alert functions enhance the connection between buyers and farmers.

additional communication options to reach customers, plus the ability

to buy directly via target offers simplifies my buying process.”

Currently available across Ontario, the company plans to expand into North America and Australia in 2021. The app is free for farmers and available to download from the Apple app store. Farmers should check with their local grain buyers for availability. Buyers can sign up for the app through Grain Discovery.

While comparing for similar technology in India, it has eNAM. National Agriculture Market or eNAM is an online trading platform for agriculture commodities in India. The market facilitate farmers, traders, and buyers with online trading in commodities.

Small Farmers Agribusiness Consortium(SFAC) is the lead agency for implementing eNAM under the aegis of Ministry of Agriculture and Farmer’s Welfare, Government of India.

Modi government has targeted to double farmer’s income by 2022. This seems a mammoth task as the farmer’s real income needs to grow at a CAGR of 10.4% to meet the government’s target. eNAM is an important initiative in this direction.

Stings That Can Kill: Murder Hornets

Suprabha

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Killer Hornets to Murderous Fleas, Insects can be weapons of mass destruction. After the global pandemic attack of Covid 19, hornet has clearly struck a nerve to the citizens of US has grabbed an international attention towards the Agricultural Scientists. Very infamous species of *Vespa mandarinia*, with the ability to wipe out the entire colony of honeybees. Washington State Department of Agriculture (WSDA) had trapped the first ever Asian male giant hornet, last month of December, when it was really not a matter of concern. Found along Eastern Russia, down to South East Asia, India, as well as in Japan. Nearly 30,000 hive of honeybees are destroyed and counting. Due to Asian hornet 50 people die within a year because of venom causing kidney damage, Sting can pierce the normal bee-keeper suits and hurts

seven times of a bee.

Appearance of Asian Hornets seeks yellow - orange giant head with ball-like round eyes which can grow upto inches of 2 or 6.4 cm in



Source: Unsplash

length, are more destructive during early fall and late summer. Attack bees chewing their heads off and pretending their hives to be own, while young bees are carried away as a source of protein for the young

hornets. Low altitude forest and mountains favours them to survive and in-built of underground nests.

Basically, it's a threat to humans in the field of Agriculture and Apiculture as various kind of crops, berries and fruits are pollinated by the bees, also a major reason for lowering the economy. Even such insects with great potential can be used as a deadly weapon by the opponents in the future is a matter of concern. Scientists and Researchers of US are setting traps like Controlled smoke, Baited traps, technologies like Jerry-rigged welding gun, radio frequency track to eradicate entirely.

So, what is to be done is if you find insect seeking the appearance of Murder hornet, try contacting Agriculture Extension Agency then stay the heck away because intervening in something you are not aware of can unknowingly kill ecologically important bees and wasps as an error.

Climate Change May Cause 26% Habitat Loss for Snow Trout in the Himalayan Rivers: A Study by WII

Yashika

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A new climate change study by the government's Wildlife Institute of India has found that- Snow trout, the iconic cold-water fish species found in Himalayan rivers, would lose their habitat by 16 per cent in the next 30 years and by over 26 per cent by 2070.

The snow trout (*Schizothorax richardsonii*) belonging to family

Cyprinidae, is an endemic fish of the Himalayan region. The species is tagged as vulnerable species in the IUCN red list of threatened species. The fish thrives well in snowmelt water of several streams and rivers in the region but are occasionally exposed to more than 20 degree during the summer season.

An ensemble of 72 statistical models across the Himalayas, the study –authored by the scientists of

Wildlife Institute of India (WII) namely, Aashna Sharma, Vineet Kumar Dubey, Jeyaraj Antony Johnson, Yogesh Kumar Rawal and Kuppasamy Sivakumar – reveals the vulnerable snow trout would be squeezed into the high-altitude rivers in the Himalayas. “Our empirical findings strongly suggest that snow trout, a prime cold-water fish of Himalayan rivers, would suffer a habitat loss in the future and the high-altitude areas would



Source: www.thethirdpole.net

act as only saviours, provided suitable habitat connectivity is offered," senior scientist Kuppusamy Sivakumar told PTI.

The study clearly says that the on-going climate changes have a lot of impact on the mountains all across the globe, the Himalayas being the most sensitive to the change. It is therefore bringing

about a higher rate of glacier meltdown.

"The Himalayan cold-water species are concerningly most vulnerable to these changes because of their limited thermal range," it says. The study was funded by the Department of Science & Technology (DST). It is a part of the government's National Mission for

Sustaining the Himalayan Ecosystem (NMSHE).

According to the study, if the countries all across the globe continue their greenhouse emissions as usual, "the species (snow trout) would lose a net habitat of 16.29 per cent till the year 2050 which would further increase to 26.56 per cent in the year 2070."

These fish species have great commercial value hence it becomes extremely important to conserve the Himalayan rivers. Being exposed to a lot of anthropogenic factors earlier as well, the population of the snow trout is likely to decrease at a very alarming rate.

The study recommends some solutions such as persuasive "conservation efforts beyond political boundaries by combined decisions of the policymakers of Himalayan countries" also "unsustainable harnessing of rivers for hydropower development projects and energy efficiency by improving green energy potential".

Forest Wildlife and Ecosystem: Threats, Issues and Destruction

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Wildlife is something which man cannot construct. Once it is gone, it is gone forever. A pyramid can be rebuilt, but not an ecology. The environment and the economy go side by side, humanity cannot sustain without either of them. If we can't protect the environment, we can't protect ourselves.

The single biggest threat to our planet is the destruction of habitat and along the way loss of precious wildlife. We need to reach a balance where People, Habitat and Wildlife co-exist. If we don't, everyone loses. Human beings are on the track of development, but they are also

blameworthy for Economical Imbalances. "Each species plays a different role in the ecosystem, if we just replace one with another this can have a huge impact that we can't predict. The Global Biodiversity found that despite progress in some countries, natural habitat continue to disappear and vast number of species remain threatened by extinction from human activities. Humans 'threaten 1 million species with extinction.'

Key Points:

- Wildlife populations have fallen by more than two-thirds in less than 50 years.
- Deforestation from logging and palm oil plantation is causing

endangered orangutans to lose their native habitat in Indonesia, African grey parrot are also endangered due to habitat loss and wildlife trade.

- Climate change and reduced fresh water supply have put Sundarban Tiger Reserve in West Bengal (India) on the endangered ecosystem list.

- Rainforest that once grew over 14% now cover only 6%, Rainforest have already been lost due to human demand for wood and habitat encroachment.

- The amount of carbon absorbed by the world's intact tropical forests has fallen. We need to curb fossil fuel emissions before the global carbon cycle starts working against us.



- More than 350 elephants died in Botswana, the cause of their deaths are cyanobacterial neurotoxins produced by a unique type of algae. These algae will become an even bigger problem as a result of climate change, global warming, drought and human population growth. These toxins have been linked to human health issues including liver cancer, brain disorders.

- Coronavirus pandemic is also linked to destruction of wildlife and world's ecosystem. The number of emerging infectious disease

outbreaks has more than tripled every decade since the 1980s. More than two-thirds of these diseases originate in animals, and about 70% of those come from wild animals. Many of the infectious diseases we are familiar with - Ebola, HIV, Swine and Avian Flu - are zoonotic.

Covid 19 is a stark reminder of how nature and humans are intertwined. The next pandemic is already coming, unless humans change how we interact with

wildlife.

It is disheartening to note that the world has not met its target to stem the destruction of wildlife and ecosystem in last decade. Forests are shields, protecting humans from infectious diseases. Saving and restoring them reduces the risk of future pandemics, while delivering jobs, improving livelihoods & fighting climate change.

It is our collective and individual responsibility to preserve and tend to the ecosystem in which we all live.

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