



# ENVOICE

A Newsletter from the Department of Environmental Science, Vivekananda College, Thakurpukur, Kolkata

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Earth Day Issue

April, 2020

## FROM THE DESK OF PRINCIPAL

In our lifetime, we are passing through the most tumultuous and catastrophic period due to the unprecedented attack by Novel Corona COVID-19 virus all over the World. This is the first time in human history that the entire world population has stopped movement from one part of the globe to other. As a consequence, in our city too, all members of Vivekananda College family are really isolated. But, there will be life after COVID-19 scenario. We have to start afresh with new ideas and vision. Now, it is time to combat this disastrous situation collectively. Under such unusual condition, it is really commendable to publish the e-version of the tenth edition of ENVOICE, the signature of the Environmental Science Department of our college. This e-publication will certainly carry immense attention to all and also encourage people around us.

I sincerely welcome this initiative from the core of my heart.

Thanks to all and pray for good health and Corona-free world ahead.

Dr. Tapan Kumar Poddar,  
Principal  
Vivekananda College, Thakurpukur

## In This Issue

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- Bhutan – a Carbon neutral country
- And More.....

## Renovation or Reincarnation

Rajarshi Mitra

Head, Dept. of Environmental Science, Vivekananda College

The Earthday has completed its 50 years of journey last year, since the first celebration in 1970. And this year the Earth is at rest from its day to day hassle and bustle. The civilization, perhaps for the first time, is paying back in its own coins for the renovation of the living planet.

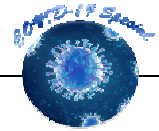
Renovation or reincarnation, the search for the appropriate word is continuing and will be like that until the humankind awake up from their ever dreaded nightmare called Novel Corona virus or more specifically SARS-CoV-2 – a tiny organism, or not even an organism by definition that has locked up half of the globe for more than a month.

We conquered the Earth and its all species, to become the most dominant race on the planet, but are helpless today before an enemy which cannot even be seen until a soldier is bleeding. The civilization is retreating and getting locked up by its own, to be safe. This retrogression was long due, human exploited the nature beyond any limit. Somewhere they had to stop, at least for a while, and that is what is being done.

At the ambit of such a unique Earth day, the 10<sup>th</sup> issue of the ENVOICE is published with the special gamut of write ups on COVID-19.

While the dreaded disease is taking a high toll of lives and livelihoods, the mother Nature is getting time to unload some of the wastes, and to get the balance back. Inevitably, this pandemic will bring out some positivity with altered flow of resource and lessons learned amid such a global disaster, and it would be the biggest challenge to follow the lead towards the reincarnation of civilization in the cradle of Sustainable Development.

We will be happy to hear from you.....  
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## Amazon Fire and Pollution , After That COVID-19 and Earth's Restoration

Protisha Ghosh

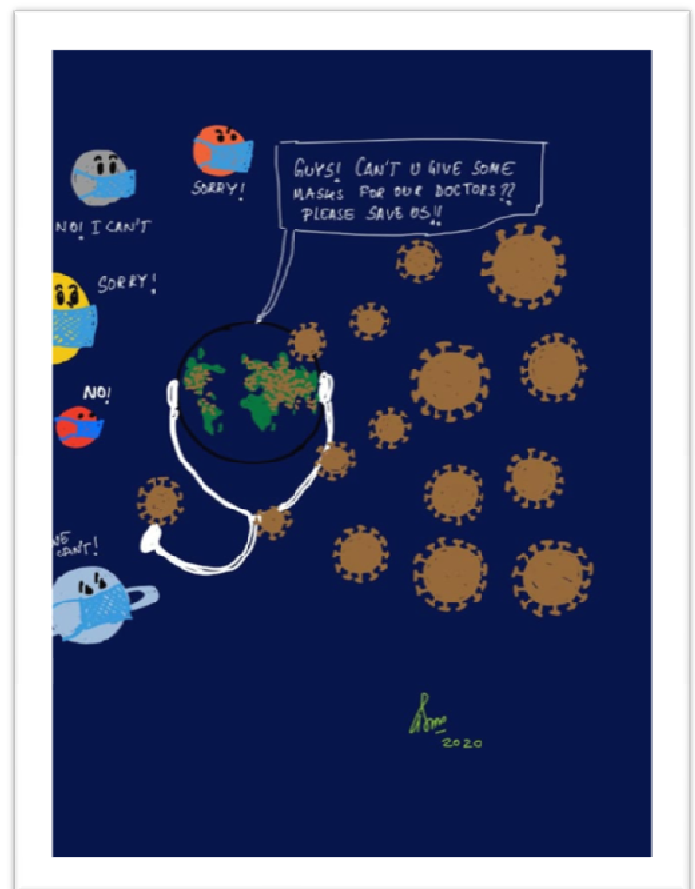
*B.Sc 3<sup>rd</sup> Year, Department of Environmental Science*

The Amazon is the largest rainforest in the world that covers 550 million hectare of land and is the home to a quarter of the Earth's land-bound species. Everyone on the planet benefits from the health of Amazon. As its tree take in carbon dioxide and releases oxygen, the Amazon plays a vital role in pulling planet – warming greenhouse gases out of the atmosphere. But as the world's largest rainforest is taken away by logging, mining and so many anthropogenic activities, it may not be able to provide the same buffer.

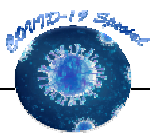
Year 2019 showed a trailer of Amazon fire due to pollution caused by anthropogenic activities which we can say manmade disaster. In which 906,000 hectares of land was burned, because of slash and burn approach to deforest land for agriculture, effects of climate change and global warming and due to unusually longer dry season with above average temperatures around worldwide throughout 2019. Although there are several direct reasons available, but pollution has been the main reason behind all these disasters, natural catastrophes that causes great damage or loss of life, even extinction of several species.

At the end of 2019, the world got a pathetic gift in the form of corona virus (SARS-CoV-2). It is both boon and bane for us. In one side it took so many lives all over the world but on the other side it has given a chance to the Earth to replenish itself. The disease was first identified in December 2019 in Wuhan, the capital of China's Hubei province and has since spread globally, resulting in the ongoing 2019 – 20 corona virus pandemic. This pandemic was so dangerous that the WHO declared a Public Health Emergency of International concern. But this COVID-19 helped to ignite a global, green economic transformation and restoration of the green planet, as it forced entire countries into lockdown mode.

The anthropogenic activities are very low now, factories are closed due to which rivers are now getting less polluted, transportation is locked due to which air and noise pollution is less, seemingly, global warming is coming under control etc. In India the water quality of Ganga and Yamuna rivers are improving, wildlife animals, those were under endangered category are safe, animals who were lost somewhere due to human crowd are coming out on road from their hidden places. Our Earth is flourishing, recovering all the damages that we have given to it. It is obvious that we can't ignore the death rate of humans, thousands of people are dying every day, whole world is suffering from a huge economic crisis , but behind all these our Earth is rejuvenating, refreshing itself which is actually a boon for us.



*By: Sumana Mukherjee, Faculty,  
Department of Environmental Science*

**INVITED ARTICLE****The COVID19 Lockdown  
– Nature’s self-healing**

Dr. Arindam Dutta

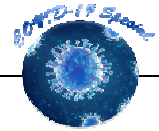
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Earth Sciences & Climate Change Division  
The Energy & Resources Institute, New Delhi*

Billion tons of greenhouse gases (GHG) were added to the atmosphere since the industrial revolution, million tons of plastics were dumped in different water bodies and oceans of the world annually in last 50-60 years, thousand tons of atmospheric pollutants like particulate matters, oxides of nitrogen (NO<sub>x</sub>), carbon mono oxide, sulfur dioxide (SO<sub>2</sub>) etc. are being added to the atmosphere every day through different anthropogenic activities. The GHGs have evidently increased the average temperature of the earth, which has significant effect on regional climate. Plastic debris in water bodies, fuel leakages from the water crafts or vessels have significantly affected the aquatic life. Above all, the human being themselves is directly affected from different acute and chronic diseases related to atmospheric pollutants particularly the particulate matters. Global agencies/organizations like IPCC, WHO, UNEP have developed several guidelines to reduce the anthropogenic damage to natural resources; but the wealth hungry human never followed those.

However, the nature has its own ways of reminding humankind that natural resources are limited and not for indiscriminate use. After the industrial revolution in 18<sup>th</sup> Century, the world suffered from Cholera pandemic between 1816 and 1850 more than 300,000 deceased all over the world. The World War I ends with the death toll of estimated 17 to 100 million related to the Spanish Flu pandemic between 1918 and 1920. Recent coronavirus pandemic (COVID19) which has already claimed 168 thousands live, triggered panic globally in last few months. These pandemics have forced a majority of

global population to stay indoors while minimizing all natural resource depleting polluting or contaminating anthropogenic activities. The positive effects of these pandemics on atmospheric carbon di-oxide (CO<sub>2</sub>) cycle are well evident from the GHG analysis of the ice cores from the Antarctica and different glaciers of the world. Even about sixty years ago, the world spewed only 9.2 billion tons per year, but 45 billion tons were emitted to the atmosphere during 2017 alone. China is the largest emitter of atmospheric CO<sub>2</sub> (approx. 10 billion ton annually) followed by the USA (approx. 5 billion ton annually). A study of the Center for International Climate Research in Oslo, has estimated that the situation may worsen owing to 3% annual rise in coal use for energy generation in China related to decrease in hydro power generation due to less rainfall. The carbon emissions in China, were down by an estimated 18% between early February and March 2020 due to falls in coal consumption and industrial output, as reported by Carbon Brief. It was estimated the slowdown of industrial activities due to wide spread of COVID-19, the biggest emitter of CO<sub>2</sub> could avoid about 250 million tons of annual CO<sub>2</sub> emissions which is half of total CO<sub>2</sub> emission from the Great Britain. On the other side, about 400 million tons of CO<sub>2</sub> emissions was avoided in the European Union due to decrease in power demand and depressed manufacturing activities, this is approximately 9% of estimated annual emission of the EU during 2020. In the US massive decrease in CO<sub>2</sub> emission is estimated as the movement of passenger car and long haul truck came to a standstill after nationwide massive loss of human lives to the COVID 19.

However, there is nothing to cheer about these declines in national level emission of CO<sub>2</sub>. This is just tip of the iceberg that we need to achieve to restrict the global ambient temperature rise between 2° C to 3°C towards the end of 2100. It



is difficult to predict how the world's biggest economies will rebound. It depends on individual nations' effectiveness on COVID-19 responses. Some researched have estimated low carbon emission globally due to dragged stunted economic growth after COVID 19; while others have also estimated the emission could roaring back if nations lean heavily on dirty fuels to boost the economy immediately. Nevertheless, the pandemic may have already left its significant footprint on 2020's global carbon bill.

There are several blue lines of happiness in the background of sorrow of unprecedented impact of COVID 19 on humankind. Nature is breathing a sigh of relief when the anthropogenic activities are slow down due to the impact. The flora and fauna began to breath and relishing their share of freedom in the nature. Birds, aquatic species which were not daring to venture in the human territory, are now started to appear in the open. Lakes in Bangaluru has got aquatic life, the Nainital lake has got clear water, the Yamuna water has got so clean that the river floor is visible, the DO in the Ganga has reached 6.0 mg/L at Varanasi.

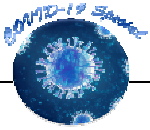


The Olive Ridley turtle have got day-time nesting in Rasikulya, Odisha after seven years, without the disturbance from tourists and fishing nets. Old world sparrows are back in metropolitan cities like Delhi. However, reports have also suggested that the street pigeons are at risk of starvation in cities due to lesser movement of people.

The restriction measures have been mainly oriented on flattening the epidemic curve of the COVID 19, but at the same time confinement of the population, reduction of public transport, and most of the industrial and economic activities let to a considerable decrease in road traffic, and consequently, in levels of ambient air pollution in different cities across the globe. Significant decrease in the ambient level of NO<sub>2</sub> was observed over Wuhan, China; Milan, Italy; Barcelona, Spain; Paris, France; Barlin, Germany and East Cost of the USA during the period when the restriction measures like lockdown were imposed during February to April 2020. Significant decrease in ambient PM-10, PM 2.5 , NO<sub>x</sub> and O<sub>3</sub> was also reported in Delhi, Mumbai and Kolkata during the lockdown period compared to respective concentrations during previous year.

However, two bubbles of 'social sustainability' and 'economic sustainability' cannot be neglected while achieving environmental sustainability. COVID 19 pandemic has unprecedentedly slowdown the social and economic developmental activities all over the world, while providing momentary environmental benefits. Humanity will eventually halt the spread of the corona virus, but its effect is going be felt for generations. The past few weeks have demonstrated humans can radically alter habits, lifestyles, and patterns of behavior when needed. This lesson learnt from the nature's self-healing process can benefit the future generations to tackle adverse anthropogenic impact on the environment.





## The World Is Not In a Lockdown

Utsav Biswas

*B.Sc 4<sup>th</sup> Semester, Department of Environmental Science*

Yes, that's right. It is true that millions of people are at home, factories have shut down, most of the institutions are either closed or are operating at a bare minimum. Only the essential ones such as the healthcare system or the police are functioning. Roads are empty, skies are silent.

Is that the world? It is just the modern human urban civilization that is in a lockdown. Nature is not in lockdown. The animals, birds and many other organisms can finally experience some freedom and peace after so many years. The human race's race has suddenly stopped. In pre-COVID-19 days, the whole world was busy. And surely was driven by a common theme – economic growth. We were quite comfortably destroying the planet. Even persons in positions of great power and authority denied the facts of climate change. Not only did they deny but even claimed the opposite. Such individuals confuse the people. The people in general were caught in a web of manipulated dreams. Most of us are unaware. We were so high on dreams that we missed out the simple and subtle things, such as silence and the sounds of the natural world. It is difficult to imagine things that are dissimilar to the ways of 'normal' life, like imagining how would it sound if all the aero planes, trains, vehicles stopped for a day? Or if most people could forget all their busy schedule and sit together at home for a day?

Fortunately, now no more, there is a need to imagine. This lockdown has created so many such situations which are otherwise impossible to create. And most of us suddenly have the rare privilege of experiencing something like this from our homes. Now, we can see the differences with our own eyes. The differences between, a World of rampant destruction, and a World, where the Nature is given a chance to take back. This experience will hopefully provide the long coveted nudge to a lot of us to start thinking differently and maybe lead us to reshuffle our priorities in life. Who knows, maybe the rest will be history.

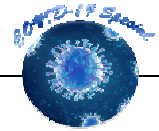
## COVID-19 Pandemic: A protection to Nature

Srijan Singh

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The scenario across the globe today is very fascinating. Even though it seems to be unprecedented but actually it was quite predictable if we would have pay heed to the facts of unaccounted use of the natural resources and the rate of rapid decrease in the wild species population satisfying the ever increasing need of civilization. Actually, we had never taken the issue as a matter of serious concern. We took the future predictions and the present day reports to be a casual reference and a thought it will take decades for the disaster to occur. Every step of today decides the result of tomorrow, our mother nature had always aware us by many sorts of signs known as natural calamities. It's our responsibility to take the appropriate steps as environment and its' resources are not essentially only for the human civilization, we should be aware of the fact that if the natural food web gets disturbed or the essential needs of every living organisms lead towards its extinction then a question for survival on the planet Earth may arise. The entire thing may seem to be a hoax or a made up story and even for that, we believe, we are prepared with present technologies and inventions which will never let such future predictions to come true.

It can be a silver line, in the context of this COVID 19 pandemic, that our thought process will be changed. This virus with a huge toll of lives and economy has shattered the pride of human civilization within a very short period of time. Many powerful countries and their facilities were said to be capable to protect the country by any means of disaster and its' consequences, but they all had been proved to be worthless. And it's a message to all of us that protection of natural resources is more important than its consumption, we need to work on the sustainable resource management, which will maintain an equilibrium and can be more effective way of using natural resources.



## Environment under COVID – 19

Sarodarchita Goswami  
 Student of the Department of Environmental Science  
 from the Batch of 2019 (Ibis)

The world today is under consternation of the COVID – 19 pandemic with more than 200 countries under its grip worldwide. Day after day the virus is spreading all over the world and considering its highly contagious nature, lockdown has been implemented by in the affected countries continuously or periodically to save their citizens from falling ill. People in affected countries today are tired of home imprisonment in lockdown period for maintaining social distances. The distress is rapidly increasing within the society but at the same time, there is some good news from the nature.

To start with the list there has been a drastic reduction in greenhouse gases concentration in the atmosphere. The analysis conducted by Carbon Brief suggest that there is a 15% – 40% reduction in the output produced by key industrial sectors which has led to 25% depletion in the emission of Carbon dioxide (CO<sub>2</sub>) gas during lock down period. NASA also released two images of China, the first image reveals pollution over the cities and the other shows that NO<sub>2</sub> the average levels were seen to be 36% less than earlier. Owing to the online work from home keeping social distancing, travelling has also gone down significantly and according to the researchers of Columbia university traffic levels in New York were estimated to be down by 35% and as a result CO<sub>2</sub> concentration has been dropped along with Methane over the city.

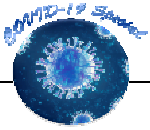
Notable positive effects are also seen in our country. The Central Pollution Control Board data showed that water quality of the Ganga River has seen significant improvement since enforcement of the nationwide lockdown, that has led to reduction in dumping of industrial waste into it. The Ganga river water was found to be suitable for bathing at most monitoring points. According to the real time water monitoring data of the CPCB, out of the 36 monitoring units placed at various points of the Ganga river, the water quality around 27 points were

suitable for bathing and propagation of wildlife and fisheries. Environmentalist Vikrant Tongad said to the *Economic Times*, the improvement has been specially seen in the industrial clusters which used to see huge pollution level due to dumping by industries. Due to the lockdown, industrial activities are at the lower level. There would definitely be less effluent generation and discharge but the improvement is a temporary respite. What is required, is more stringent regulations, opines Himanshu Thakkar, coordinator of South Asia Network of Dams, Rivers & People (SANDRP) in an interview to the NDTV.

The air pollution in atmosphere too has come down to such an extent that visibility of the atmosphere has enhanced several times. Anumita Roy Chowdhury, an air pollution expert at New Delhi based Centre for Science and Environment, described this improved air quality as like a very big unintended experiment unfolding in front of us. The lockdown demonstrates the scale at which change is needed, but also shows people what it means to breathe clean air. Taking a cue from Roy Chowdhury, it is to be said that, neither the lockdown nor the COVID-19 is welcome, but the lessons learnt can be used in further formulation of strategies and plan of action to curb down the pollution scenario in India and the world as well.



By Riyanka Biswas  
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## Epidemic Outbreak: an outcome of Evolution or Environmental changes!

Rudrarup Basak

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In a globalizing world, infectious diseases have become a rising challenge to mankind. In the past the Black Death, also known as Pestilence and Plague originated in Asia and arrived Europe via the land and sea trade routes. This was perhaps the most discussed spread of epidemics till date. Epidemics are useful illustrations of large-scale mass mortality caused by infectious diseases. Indeed, popular science brings the reference of Black Death in the context of recent outbreaks of avian flu, Ebola, Zika and the current case of COVID-19.

One upcoming challenge originates from the effect of increasing temperature associated with climate change, which facilitates the transmission of infectious diseases and distribution of certain vector-borne diseases. This linkage between climate change and transmissions of diseases has been proposed in many studies. The effects of climate change on infectious disease materialize through a set of complex pathways that involve various parts of nature. The connections between climate change and infectious diseases are difficult to trace. Historical evidences suggest that latitudinal, altitudinal, seasonal, and inter-annual associations between climate and disease are superimposed on each other and affect the patterns of infectious disease spread in a nonlinear manner. It is also demonstrated that cold and dry climate conditions sometimes indirectly increase the prevalence of epidemics through involvement of locusts attack, draught and famines. It is further noticed that positive associations of epidemics with droughts, floods, locusts, and famines mainly coincided with higher frequency temperature variations. Evidence of climatic forcing on contemporary plague abundance in rodents and humans has also been unearthed in a few research findings. For example, in Central Asia, high-resolution palaeo-climatic indices correlate with plague prevalence and population density in a major plague host species, the great gerbil (*Rhombomys opimus*), over 1949-1995.

Epidemics spread across large regions are becoming pandemics by flowing along transportation and social networking. It has been shown that, cities with higher values of both centrality and transitivity were more severely affected by the epidemics.

*Contd. to page 8....*

## The Silent Wars That's Still

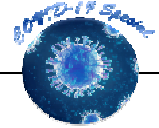
Trisa Bhattacharjee

B.Sc 3<sup>rd</sup> Year, Department of Environmental Science

How still this all feels. No buses, no trains, no college, no pollution that will further increase our pain. Nature, the biggest creation we live in, yet has the biggest mysteries to bring. Who knew that the swans in Venice would return, the air traffic would be gone. A virus was all she needed to make us feel that we are her guests not family. The silence today is eerie. Stranded streets, empty restaurants, frozen workplaces, and we all even after this need to keep still, we are indeed still, silently meshed up inside our homes. What once bustled with gossiping, constant chatter and laughter, cries of love, remains locked. Our words have found a new place to stay, house party, quarantine, zoom, lockdown, google duo, thermal screening and what not.

A probable gigantic World War III (?) suppressed by the actions of a 120 nanometre virus. Yeah we are still, just like Pablo Neruda once wrote,

*Now we will count to twelve  
And we will all keep still  
For once on the face of the earth  
Let's not speak in any language  
Let's stop for one second  
And not move our arms so much.  
It would be an exotic moment  
Without rush, without engines  
We would all be together  
In a sudden strangeness.  
Fishermen in the cold sea  
Would not harm whales  
And the man gathering salt  
Would look at his her hands.  
Those who prepare green wars.  
Wars with gas, wars with fire.  
Victories with no survivors.  
Would put on clean clothes  
And walk about with their brothers  
In the shade, doing nothing*



Yeah, for now this is what Earth needs, this is what we need. A study found, adversity of this virus increases with pollution in air. Another study, as published in 'Nature' magazine says this virus may be resistant enough to spread through water. Countries unable to control mass gathering of its citizens are now unable to control mass death of the same. Death toll is increasing every passing day. And people who are not affected, what about them? Depression the coolest thing of yesterday becomes the biggest scare of today. But, is this all to some point worth it? Most people will deny, because to them human life is supreme. But what about the life of the Supreme itself, who holds us? Forest fire eats up most of Amazon and Australia, the major source of oxygen, better call it life is burnt. Pollution was increasing, industries not following the rules. May be earth has found her way to cure herself, found her way to help us live in a better place. And just like we humans Earth seems a bit partial this time, partiality not based on race rather based on fitness. Darwins theory of 'survival of the fittest' is something all of us read and now we experience that. But unlike any other humans even Earth gives us a bit of concession. She forgives the one who stay still. So to fight for our existence there is only one war to be done out there, a war that restricts humans right to move around, a war that worships science and believes in her, a war united yet divided against SARS COVID-19 virus.

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### **Epidemiology.....after page 7**

Some schools of researchers working with large databases of epidemics outbreaks in Europe and its neighbouring regions highlighted the connection between navigable rivers and the spread and recurrence of epidemics in the past. It was also found that these epidemics were mostly urban in nature. Yet, despite these important findings, little is still known about the inland transmission and the severity of infectious diseases in history and some of their basic characteristics are still debated. However, amid this crisis of COVID-19 the whole World seems still unprepared to combat the spread of a pandemic even in this era of scientific excellence.

## **Bhutan – A Carbon Neutral Country**

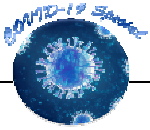
Utsav Biswas

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What you just read is not quite true. But before I tell you why, I must tell you a few other things. We know what carbon is, right? It is an element. But carbon neutral doesn't mean that carbon has no charge. In fact the meaning is far from it. Carbon neutrality refers to achieving net zero Carbon dioxide (CO<sub>2</sub>) emissions by balancing CO<sub>2</sub> emissions with CO<sub>2</sub> removal or simply eliminating CO<sub>2</sub> emissions altogether. In a world driven by economic growth and powered by fossil fuels, carbon is more than just an element. It has become the basis of modern civilization and it is primarily carbon that is causing irreversible change to our environment.

Bhutan is a small developing country in the Himalayas, sandwiched between two economic giants - China and India. Like all countries Bhutan aspires for economic growth. But, unlike other countries economic growth is not the topmost priority of the Bhutanese government. Way back in the 1970s, the 4<sup>th</sup> king of Bhutan, Jigme Singye Wangchuck proclaimed that for Bhutan "Gross National Happiness (GNH) is more important than Gross National Product (GNP)". Ever since, all development in Bhutan is driven by GNH, to increase and sustain the wellbeing of her people. GNH is Bhutan's approach of a more holistic development than we normally hear about. But it is a very small country. It's GDP (Gross Domestic Product) is less than \$2.45 billion (2018). In comparison India's GDP is \$2.716 trillion (2018). That is more than a thousand times more. And yet, Bhutan is able to do something our country can only dream about. In Bhutan both education and healthcare are free. It is all provided by the state. Now, you might be wondering how that is even possible for such a small country with limited natural resources. The clue to the answer lies in the question itself. The moment we realize that something precious to us is limited, we start using





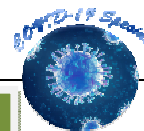
our brains. Bhutan uses her resources very carefully, ever committed to their mission of ‘development with values’. We know that economic growth is necessary. But is it so important that we sacrifice our culture and our environment for it? Unlike most other nations, Bhutan thinks and acts differently. The constitution of Bhutan mentions that “to conserve the country’s natural resources and to prevent degradation of the ecosystem, a minimum of 60% of Bhutan’s total land shall be under forest cover for all time.” In reality the percentage of land under forest cover is 72%, most of which is pristine. (In comparison India’s forest cover is 21.54%). As a result, it is one of the few remaining global biodiversity rich areas in the world.

Our lives are powered using energy derived from burning fossil fuels. And in that process we are releasing carbon dioxide that was locked up inside the Earth for millions of years. This is raising the global atmospheric temperature which in turn is leading to climate change and more frequent natural disasters. The current atmospheric CO<sub>2</sub> concentration is 405ppm (2017 value). If fossil fuel burning continues at a business as usual rate, such that humanity exhausts the reserves over the next few centuries, CO<sub>2</sub> will continue to rise to levels of the order of 1500 ppm. The atmosphere would then not return to pre-industrial levels even tens of thousands of years into the future. As of today, out of the 195 countries of the world, Bhutan is special. It is not only carbon neutral, but carbon negative! Bhutan’s annual CO<sub>2</sub> emission is estimated to be 1.454 million metric tons (in comparison India’s annual CO<sub>2</sub> emissions is 2454.774 million metric tons), while the amount of CO<sub>2</sub> sequestered by the forests of Bhutan is about 6.3 million metric tons. That means Bhutan is a net carbon sink.

Bhutan harnesses the energy of her fast flowing rivers and generates enough electricity from its hydropower units to export it (to India) and in the process, offset millions of tons of CO<sub>2</sub>. It even provides free electricity to its rural farmers. But, today it is facing the impacts of climate change. Glaciers are vanishing at an alarming rate, causing

floods, GLOFs (Glacial Lake Outburst Floods), landslides, breaching dams and causing widespread destruction to the Bhutanese people. But they have done absolutely nothing to contribute to global warming and climate change.

The United Nations Framework Convention on Climate Change (UNFCCC) says that if the intended promises made at the Paris Agreement in 2016 are kept, we would be able to keep the increase in global average temperature well below 2°C above pre-industrial levels; and to limit the increase to 1.5°C. But, current trends show that what we are doing is nowhere near to what is necessary even to meet our targets. The 1.5°C and 2°C targets are debatable. That is because rich nations are well equipped to face that change. But, is it enough for the small and poor countries which are disproportionately facing the impacts of climate change? What wrong have the people in those countries done, who have lived sustainably for generations and have a far better understanding of their environment and love for nature than us? Tribal communities, island nations, economically and geographically disadvantaged people are already impacted by climate change, to which they have zero contribution. This raises the two very serious issues of climate politics and climate justice. Basically, these people are at the mercy of the developed and developing nations. It is up to them to decide which countries or people are worth saving. Similar is the fate of millions of living organisms that we share our planet with. It is up to us now. We have all the information and scientific expertise necessary to manage climate change but simply lack a collective and committed effort. We must understand that we are in it together. Every country has natural resources and every country is in the process of facing the inevitable climate crisis. Bhutan has set the example of success which we all must follow. Else, we must forget nature and reality as we know it today and prepare ourselves for a question we are going to face one day. The question our children and grandchildren will ask us –“How, in spite of knowing everything about the climate crisis and having the possibility of preventing it, were you not moved enough to act?”



## NEWS FROM THE DEPARTMENT

### Summary of Students Research projects during 2018 -20

#### Viability Assessment of Cow Urine as Organic Manure for Horticultural Practices

*Prangya Pradipta Nayak, Sayan Debnath & Trisa Bhattacharjee*

Cow urine is being used along with cowdung as organic fertilizer for its nitrogen content and low cost in several areas in India and abroad. The main objective of the experiment was to have an idea on the usefulness of cow urine as organic fertilizer. It was applied to chilly plants in different concentrations for three months and the growths of the plants were observed. Four pots with chilly plants were exposed to the treatment, one of which did not get the urine supplement along with other fertilizers and was treated as control. The other three pots were given supplement of 5 ml, 10 ml and 20 ml cow urine per week for a span of 10 weeks.

It was found that the untreated plant attended maximum vertical growth with minimum lateral growth and failed to bear fruit. On the other hand the plant with maximum supplement had highest number of fruits with not so conspicuous vertical growth. Although within this very limited scope no conclusive comment can be drawn, but at least in this experiment, use of cow urine as organic fertilizer showed some positive impacts on the horticultural variety.

#### Comparative study of domestic energy use in residential areas of different Socioeconomic setup

*Dayadra Mondal, Aheli Sengupta, Diana Dutta*

One of the major concerns of today's World with the goal of sustainability assessment is the energy use and the related carbon footprints. The pattern of energy consumption sometimes is considered to be a key parameter in measuring sustainability of a society. With advent of more eco-friendly energy technology and more energy efficient equipments, the people are leaning towards a more energy intensive lifestyle too. Consequently the goal is being defeated.

This research is a comparative study of energy consumption tendency in areas with different socioeconomic set up in and around Kolkata covering 48 to 52 households at each of the four regions, using a predetermined questionnaire.

As expected, the urban area, particularly with higher household income was found to be inclined towards more and more energy intensive lifestyle which in turn leads to non-sustainability. Although, the education level, was found to be correlated with income, but that was not found to be effective in curving the lifestyle leading to a better tomorrow.

#### An inventory for causes of Heat island formations at Kolkata

*Utsav Biswas and Milan Sahadevan Kuleri*

Urban Heat Island (UHI) refers to the atmospheric warmth of a city compared to its countryside. UHI are formed in almost all urban areas whether large or small and in both warm and cold climates. The reasons behind the formation of heat islands are numerous and specific to urban areas. USEPA explains, as urban areas develop, changes in infrastructure replace open land and vegetations, impermeable dry surfaces replace the most permeable land surfaces. Consequently, these changes cause urban regions to be warmer than their rural surroundings.

This project aims to identify the possible causes of heat island formation in the city of Kolkata during the day time of summer season. Purposefully temperature, relative humidity, dew point and wind speeds were recorded at different locations of the city during the period of peak temperature i.e. 12 noon to 3 pm in the month of May, 2019. The data were generated at two to four different points in near vicinity either separated by a road or a patch of vegetations, to identify any cause of UHI formation. Overall findings indicate that the city landscape is showing heat island effects, but there is very little scope to identify any particular cause within an area. Even there had been no significant change in temperature within some small urban green patches compared to the adjacent roads. This is invariably an indication of UHI. However, areas with higher canopy cover, like Maidan, Rabindra sarabar etc. showed slightly lower temperature profile compared to other regions, which may be indicative of the role of vegetation in urban management.

#### Envoyage Meet, 2019

4<sup>th</sup> Reunion of the department was held on 2<sup>nd</sup> October, 2019 in the college premises. It was a grand success with several alumni joined the occasion from different corners of the country.