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## GENOMIC EPIDEMIOLOGY OF COVID-19: A 21<sup>st</sup> CENTURY PANDEMIC

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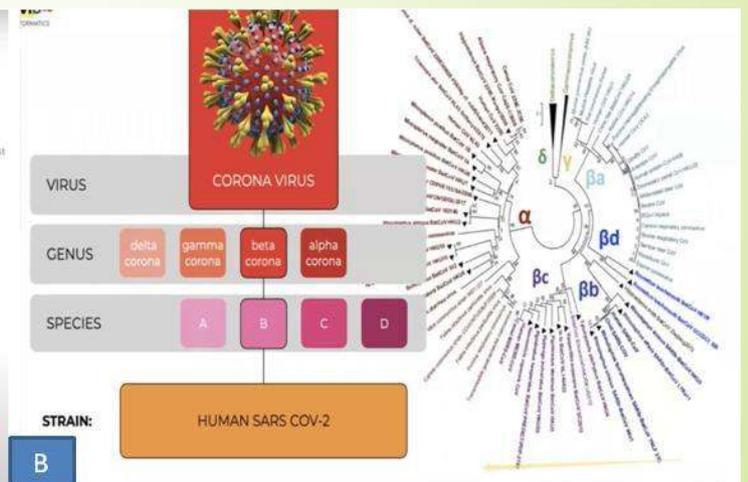
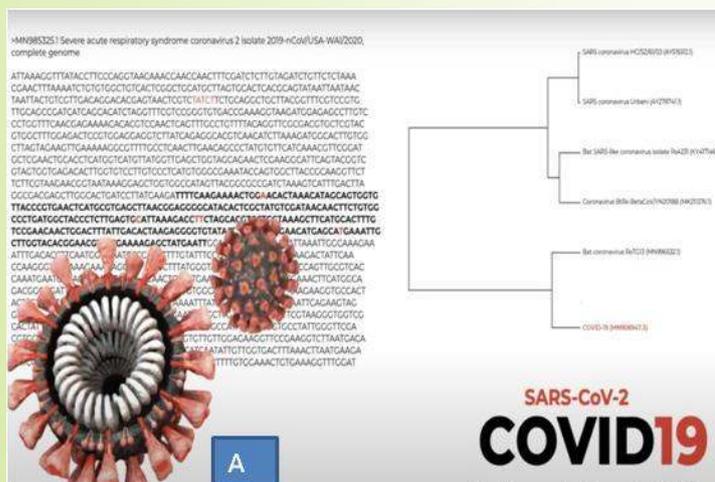
Coronaviruses are members of the subfamily coronavirinae in the family coronaviridae and the order nidovirales. The recent emergence of a novel coronavirus with an outbreak of unusual pneumonia in wuhan, china, and then pandemic outbreak in 2019-nCoV or COVID-19. Based on its phylogenetic relationships and genomic structures the COVID-19 belongs to genera betacoronavirus which has a close similarity of sequences of COVID-19 to that of severe acute syndrome-related coronavirus (SARS-CoV) and the virus uses ACE2 as the entry receptor like SARS-CoV. These similarities of the SARS-CoV-2 to the one that caused the SARS outbreak (SARS-CoVs) the coronavirus study group of international committee on taxonomy of viruses termed the virus as the SARS-CoV-2.

The coronavirinae family is divided into four major genera:

- Alphacoronavirus

- Betacoronavirus
- Gammacoronavirus
- Deltacoronavirus

Given the high prevalence and wide distribution of coronaviruses in animals, the genetic diversity and frequent recombination of their genomes, and increasing human-animal interface and frequent cross species infections, novel coronaviruses are likely to emerge periodically in humans. As we know RNA is the genetic material of the coronavirus and within the genetic material lies the message. The message can be studied by each nucleotide, nucleotide sequence can be translated into amino acid sequence and then broke into protein. For that now the virus needs to use the host machinery. But we can look from different viruses that come from different hosts to access information. In order to use machinery they need to make adaptations, change in sequence and that process is known as mutation study of mutation is possible by multiple sequence alignment. by that we can see how the sequences are related to each other, their similarities, their differences etc. The size of the SARS-CoV2 genome is approximately 30 kb, and its genomic structure has followed the characteristics of known genes of coronavirus; the polyprotein ORF1ab also known as the polyprotein replicase covers more than two thirds of the total genome size, structural proteins, including spike protein, membrane protein, envelope protein, and nucleocapsid protein.



**Spike Glycoprotein-** This is the spike glycoprotein from this coronavirus which has a structure of amino acids if we have polar charged amino acids then these amino acids have to support the function of this protein, now if we talk about their chemical property. Polar charged amino acids are hydrophilic and they have a charge and this protein connects to the receptor and this connection has to happen by using the properties of these amino acids and then It helps the virus to get

entry inside the cells. On the flip side some of the uncharged amino acids that are facing towards the inside of the protein. There are some more amino acids (the non polar amino acids) and these are actually used as the building blocks.

**Polybasic furin cleavage site and O-linked glycans-** The second notable feature of SARS CoV-2 is a polybasic cleavage site (RRAR) at the junction of S1 and S2, the two subunits of the spike protein. This allows effective cleavage by furin and other proteases have a

role in determining viral infectivity and host range. In addition a leading proline is also a low pathogenicity avian influenza virus into high pathogenic forms. The acquisition of polybasic cleavage sites by HA has also been observed after repeated passage in cell culture or through animals. The function of the predicted O-linked glycan is unclear, but they could create a 'mucin like domain' that shields epitopes or key residues on the SARS CoV-2 spike protein. Several viruses utilize mucin like domains as glycan shields involved immunoevasion. Although prediction of O-linked glycosylation is robust, experimental studies are needed to determine if these sites are used in SARS-CoV-2.

#### **Compare the novel Coronavirus genome with other Coronavirus genome**

This shows that there were only six different genomic sequences taken including Human SARS-CoV-2, a couple of sequences from bats (One of them is bat-RaTG13, which is a very recent sample and also one of the closest one's to the novel coronavirus), another from pangolin (which is thought to be the intermediate host) and another human SARS-CoV (which has a higher mortality rate but was not as infectious). After taking the specific sequences there were some changes found, there were two types of changes found

- The one that includes single nucleotide changes
- And some of the changes the whole section was inserted

So that points to some biological mechanisms that can explain that how this virus got from original host which is hypothesised i.e. bat or pangolin into the human host. while the analyses above suggests that's SARS CoV-2 may bind human ACE2 with high affinity, computational analyses predict that the interactions are not ideal and that RBD (receptor binding domain) sequence is different from those shown in SARS CoV be optimal for receptor binding. As we already know that there are multiple strains of the betacoronavirus they can called SARS, MERS, and nCoV. The coronavirus genome is approximately 30,000 nucleotides long and it will have specific regions that are important to understand

how this virus works. So when we talk about comparing those sequences we can compare whole genome between each other but that is a lot of data to compare. Instead we can start looking at the specific positions that will be more relevant to know how it is different.

#### **Mutations found in Corona virus**

The researchers found that there were over 700 mutations, of which almost two-thirds resulted in a change in the amino acid sequence of the protein. The rest were in the intergenic regions. There were 39 non-synonymous mutations with prevalence more than 0.06%, or at least 20 of the analysed genomes. These mutations were found in 6 genes, namely, replicase polyprotein (ORF1ab), spike protein, membrane glycoprotein, nucleocapsid phosphoprotein, ORF3, and ORF8. The most significant number of non-synonymous mutations was in the ORF1ab gene, which encodes 16 non-structural proteins. Among these, NSP3, NSP12, and NSP2 have a high number of mutations, numbering 117, 61, and 61, respectively. The gene itself displays over half of the frequent mutations, with 22 mutations in the RNA-dependent RNA polymerase, helicase, proteinase, endo-RNAase, exonuclease, and transmembrane domains. The highest number of mutations was in the USA, with 316 mutations. This included US-specific singleton mutations (occurring only once in a population), seen in a quarter of all the mutations, while Chinese mutations accounted for half this number. Almost every American genome had one or more of seven mutations.

At present, there is no specific treatment for COVID-19. Given the high rate of transmission of this virus between humans and its pandemics Due to the high similarity of the virus to its families, efforts have been made to provide medicines and vaccines for COVID-19. Differences in the length of the spike as it is longer in COVID-19 are likely to play an important role in the pathogenesis and treatment of this virus. However, identifying the specific molecular details of the virus is helpful in achieving treatment goals.

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## **ENDANGERED GANGETIC DOLPHINS SPOTTED ON RIVER HOOGHLY**

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I was traveling on a steamer as a part of a Heritage River Cruise across the River Hooghly on December 25, 2020. The River Hooghly traverses beside the City of Joy, Kolkata before finally merging with the Bay of Bengal further down south. Since it was a heritage tour, I was taking pictures all through the cruise. There are two major bridge systems on the Hooghly River; namely the old and iconic Howrah Bridge (Ravindra Setu) and the more recent Second Hooghly Bridge (Vidyasagar Setu). Both these bridges are an essential means of transport and communication across the River Hooghly between the two highly populous districts of Howrah and Kolkata. Government records suggest that over 80,000 vehicles and over 1,50,000 commuters use the Howrah Bridge every day. Furthermore, both districts are also connected by an extensive network of boats, steamers, and ferries to cater to the large number of commuters moving in and out of the Howrah Railway Station. It is interesting to note that this Howrah junction is one of the largest as well as oldest railway stations of India as well as the continent of Asia.

Furthermore, both the districts of Howrah and Kolkata located on the banks of River Hooghly are manufacturing hubs of the state of West Bengal. As a consequence, there are numerous offices, factories, workshops, water purification centers, cremation centers, storage facilities, godowns, hotels, restaurants, recreational parks, museums along both sides of the river. In short, this river is the socio-cultural-economic lifeline of the capital city of Kolkata and the state of West Bengal. But this also means that the river is heavily polluted, overcrowded and over exploited. Unrestricted movement of vehicles across the river and heavy pressure of commuters travelling between the districts of Howrah and Kolkata every day causes heavy stress on the river and its resources, the local ecosystem and the environment. The aquatic ecosystem of this pristine river is heavily damaged due to release of toxic domestic sewage and industrial chemicals, synthetic fertilizers, various kind of plastic products, dead and decomposing human and animal bodies to mention only a few. This intensive anthropogenic pressure on the riverine system has undoubtedly damaged the local aquatic food chains and food webs; and disrupted the life cycle of various aquatic species once thriving in Hooghly River.

The Gangetic dolphin (*Platanista gangetica gangetica*) and the Indus dolphin (*Platanista gangetica minor*) are two sub species of endangered dolphins reported from the Indian subcontinent and often referred to as South Asian river dolphins. These two sub



species were previously considered as two distinct species. However now they are reported as to sub species of a single species of river dolphin (*Plantasia gangetica*). The Gangetic dolphin is distributed across the rivers and tributaries of the River Ganges and Brahmaputra in India, Nepal and Bangladesh. The Indus dolphin is restricted to the Indus River in Pakistan. The Indus dolphin has also been reported from the River Beas in Punjab. The Gangetic dolphin has been designated as the national aquatic animal of India; while the Indus dolphin is recognized as the national mammal of Pakistan. According to IUCN less than 3,500 Gangetic dolphins and less than 1,500 Indus dolphins are currently surviving in the wild. All these facts and figures suggest how important these animals are to South Asia. The river dolphin can be easily considered as a flagship species of both freshwater and marine aquatic systems. Their numbers are an important indicators of the ecological health of their respective ecosystems in which they survive. They are known to be extremely intelligent, industrious and highly adaptable to their immediate

environment. Unfortunately, the severe anthropogenic pressures on the South Asian river systems are pushing them towards extinction.

I was extremely thrilled to observe at least two adult, full sized and extremely agile and healthy Gangetic dolphins jumping out of the water as our steamer was passing underneath the Howrah Bridge during the heritage cruise. I have been extremely surprised to note the dolphins so close to human activities almost nearest the shoreline. Several years back I have noted them on the River Hooghly but in the Midway channels much further from the shorelines. It is quite surprising that this majestic aquatic mammals have adapted so well and moved close to the shores for the purpose of foraging. It is unimaginable that such a majestic species living in the open wild waters would move so close to human habitation. One of the possibilities that I think may have been the reason to see them so close to the shore could possibly be due to the disturbances generated in the water as a result of

passing heavy aquatic vehicles on the River Hooghly. This could be pushing the fishes scared from the sound and the high frequency waves generated in water towards the shores. The dolphins could just be following them along the shores and foraging on them as an easy supply of their favourite meal. Furthermore, I also feel that they have learnt to coexist with humans in their natural ecosystems. Unfortunately I was unable to take pictures of the dolphins jumping out of water since it happened within a flash of a second! I am so sorry to frustrate the readers.

I have seen several reports on Indian newspapers in the past about the dolphins getting stranded within inland wetlands that are

connected to the major river systems via cricks and channels. Unfortunately most reports indicate that these animals could not be saved by the forest department staff due to lack of adequate training, available gears and equipments, lack of veterinary support and lack of suitable transportation to release them back into the river. Nonetheless, it's a joy to see such majestic and endangered species thriving close to human habitation on a river system that is heavily stressed due to critical anthropogenic pressures. More conservation efforts are therefore necessary to protect this majestic aquatic mammal and help them survive in the natural ecosystems to the best of our abilities.

Photo credit: S. K. Basu

## झांसी, उत्तर प्रदेशके आदिवासी किसानों द्वारा सूचना संचार प्रौद्योगिकी का उपयोग अपने सामाजिक-आर्थिक उत्थान के लिए एक असली बाधा

मुकेश सहगल<sup>1</sup> आदेश कुमार<sup>2</sup> निशि रॉय<sup>2</sup> एवं मीनाक्षी मलिक<sup>1</sup>

<sup>1</sup>भा.कृ.अनु.प.- राष्ट्रीय समेकित नाशीजीव प्रबंधन अनुसन्धान केंद्र, पूसा परिसर, नई दिल्ली-११००१२

<sup>2</sup>कृषि विज्ञान केंद्र बरारी, झांसी उत्तर प्रदेश यू.पी.-२८४००१

1935 में उत्तर प्रदेश का नाम संयुक्त प्रांत में छोटा कर दिया गया, हालाँकि जनवरी 1950 में इसका नाम बदलकर उत्तर प्रदेश कर दिया गया था। यह राज्य उत्तर में उत्तराखंड और हिमाचल प्रदेश, पश्चिम में हरियाणा, दक्षिण में मध्य प्रदेश और पूर्व में बिहार से घिरा है। उत्तर प्रदेश को दो अलग-अलग क्षेत्रों-दक्षिणी पहाड़ियों और गंगा के मैदान में विभाजित किया जा सकता है। 2011 की जनगणना में उत्तर प्रदेश की अनुसूचित जनजाति (ज) जनसंख्या, कुल जनसंख्या का 0.1 प्रतिशत (199,812,341) का हिस्सा है। अनुसूचित जनजाति जनसंख्या का दशकीय विकास लगभग 42 प्रतिशत रहा है, जो 1991-2001 के दौरान कुल जनसंख्या (25.8 प्रतिशत) की वृद्धि से 16.2 प्रतिशत अधिक है। राज्य में कुल पांच अनुसूचित जनजातियाँ हैं और इन सभी की गणना 2011 की जनगणना में की गई है। 2011 की जनगणना में ग्रामीण क्षेत्रों में रहने वाली कुल झांसी जिले की आबादी 1,165,119 है और राज्य की जनजातीय आबादी मुख्य रूप से 88.8 प्रतिशत गांवों में निवास करती है।

जैसा कि सभी जानते हैं कि भारत विभिन्न जाति पंथों और संस्कृतियों का एक पंथ है। भारत में अनेकों राज्य हैं जो भारत की विविधता में एकता का प्रतिनिधित्व करते हैं। आर्थिक सुधार की प्रक्रिया को आगे बढ़ाया जाना चाहिए, जैसे कि सूचना संचार प्रौद्योगिकी (फ्ब) की युग आ चुका है झझांसी- उत्तर प्रदेश ने एक कदम आगे की ओर अग्रसर किया है, जो नीति निर्माताओं के लिए विवाद का स्रोत हो सकता है और नए उन्नत भारत के वास्तुकार। बुंदेलखंड, लक्ष्य क्षेत्र में से एक होने के नाते आदिवासी आबादी के उत्थान के लिए विशेष ध्यान देने की मांग करता है।

कृषि में आई.सी.टी को ई-कृषि के रूप में भी जाना जाता है, जो कि एक उभरता हुआ क्षेत्र है और देश में कृषि और ग्रामीण विकास पर खास ध्यान केंद्रित करता है। आई.सी.टी एक महत्वपूर्ण उपकरण है जो किसानों को उनकी आवश्यकता के आधार पर दैनिक जानकारी प्रदान करता है। इस डिजिटल जानकारी का उपयोग किसान अपनी आवश्यकताओं के आधार पर विभिन्न उद्देश्यों के लिए कर सकते हैं।

विशेष रूप से, ई-कृषि में ग्रामीण क्षेत्र में सूचना और संचार प्रौद्योगिकी (आई.सी.टी) का उपयोग करने के लिए नवीन तरीकों के अवधारणा, डिजाइन,

विकास, मूल्यांकन और अनुप्रयोग शामिल हैं, जिसमें कृषि पर प्राथमिक ध्यान दिया गया है ए आई.सी.टी में डिवाइस, नेटवर्क, मोबाइल, सेवाएं और एप्लिकेशन शामिल हैं एडिनोवेटिव इंटरनेट-युग की तकनीकों और सेंसर से लेकर अन्य पहले से मौजूद एड्स जैसे कि फिक्स्ड टेलीफोन, टेलीविजन, रेडियो और उपग्रह हैं। मानकों, मानदंडों, कार्यप्रणाली, और उपकरण के साथ-साथ व्यक्तिगत और संस्थागत क्षमताओं का विकास और नीति समर्थन ई-कृषि के सभी प्रमुख घटक हैं।

कृषि या ई-कृषि हस्तक्षेपों में कई आई.सी.टी का विकास और परीक्षण भारत में चारों ओर किया जा रहा है ताकि कृषकों को कृषि उत्पादकता और आय में वृद्धि के माध्यम से या जोखिम को कम करके अपनी आजीविका में सुधार करने में मदद मिल सके। कृषि में मोबाइल तकनीकों का उपयोग भी बहुत तेजी से बढ़ रहा है। यह उपकरण सबसे लोकप्रिय माना जा रहा है और स्मार्टफोन की कृषि में उपयोगतासकारात्मक प्रभाव को बढ़ाती है और इस क्षेत्र में पूर्ण क्षमता का उपयोग करने में मुख्य चुनौती के रूप में पहुंच की पहचान करती है ए

यह आम अनुभव है कि आदिवासी किसान ज्यादातर कंप्यूटर के ज्ञान से वंचित है ए आई.सी.टी इन्फ्रास्ट्रक्चर से जीवन की गुणवत्ता में काफी सुधार करने की क्षमता है और इस तरह यह आदिवासी ग्रामीण विकास में एक जरूरी अंग बन गया है। आई.सी.टी किसी भी क्षेत्र में समाधान की एक विस्तृत श्रृंखला प्रदान करता है ए इस तकनीक के प्रभावी उपयोग की माध्यम से किसानों द्वारा सामना की गई बाधाओं का पता लगाने और पौधों की सुरक्षा की जानकारी के लिए समय-समय पर सुझाव देने का प्रयास किया गया है।

2019 में झांसी यूपी के ब्लॉक के तीन गांवों में अध्ययन किया गया था, जिसमें कुल 90 किसानों को संरचित साक्षात्कार अनुसूची के माध्यम से एकत्र किया गया था, जिसमें यह पता चला कि आई.सी.टी के बारे में ज्ञान की कमी है ए झांसी में आई.सी.टी शामिल करने के लिए महत्वपूर्ण विशिष्ट बाधाएं जो कि अध्ययन के समय सामने आईं जैसे कि प्रसारण उपकरणों की उच्च लागत, रेडियो ए टेलीविजन प्रस्तुतियों के लिए उच्च शुल्क, एक्सेस ए इंटरनेट कनेक्टिविटी और बिजली बिजली की समस्याओं की उच्च लागत।

फैक्टर एनालिसिस के उपयोग ने मुख्य तीन कारकों में पहचान की बाधाओं को रोशन करने का समर्थन किया - खराब वातावरण, पहुंच की कमी और असंबंधित सूचना के प्रसारण देश के बुनियादी ढांचे के आधार को विकसित करने के लिए कई राष्ट्रीय सरकारी विभागों को बाधाओं के बावजूद उपयोग करने के लिए सम्मानित किया गया है। इन बाधाओं में सुधार करने के लिए आई.सी.टी सेवा के बारे में जागरूकता लाना जरूरी है ए इस उपकरण, उपकरणों की खराब स्थिति, प्रासंगिक जानकारी समय पर नहीं मिलना तथा शैक्षिक और कृषि प्रयोजन के लिए आई.सी.

टी के उपयोग कुछ मुख्य बाधाएं हैं जिनमें किसानों द्वारा सुझावों को लागू करने से इन सभी बाधाओं को दूर किया जा सकता है यह उचित और बेहतर अवसंरचनात्मक सुविधाएँ गाँव स्तर पर प्रदान करना ही कृषि शिक्षा का उद्देश्य है एक समय में प्रासंगिक जानकारी प्रदान करना और प्रशिक्षण के साथ कौशल विकास का निर्माण आई.सी.टी की मदद से ही किया जा सकता है

प्रस्तावना भारत एक विकासशील देश है जहाँ आदिवासी किसानों का मुख्य व्यवसाय कृषि है। हाल के वर्ष में इन गाँवों में कृषि के लिए किए गए प्रयासों को बदलने पर उत्साहजनक संकेत मिला है उत्पादन सिद्धि के साथ कृषि तकनीक पर बातचीत के माध्यम से पारंपरिक एक से आधुनिक। नए विचारों का हस्तांतरण भी कृषि क्षेत्र का एक महत्वपूर्ण

पहलू है। अब एक दिन, यह कई संचार चैनलों और माध्यमों के नवाचार के कारण इतना आसान बनाता है। जमीनी स्तर पर ऑनलाइन संचार सेवाओं में कई सूचना सर्वर उपलब्ध हैं उनमें से कुछ ऑनलाइन संचार सेवाओं में कृषि प्रौद्योगिकी के हस्तांतरण में प्रभावी हैं। कृषि प्रौद्योगिकियों के हस्तांतरण के लिए टेलीफोन, कंप्यूटर और इंटरनेट और अन्य आई.सी.टी सेवाएं अधिक प्रभावी हैं। ग्रामीण क्षेत्रों में सतत आर्थिक विकास के लिए आई.सी.टी एक महत्वपूर्ण आवश्यकता है। व्यापक रूप में, आई.सी.टी एक छत्र शब्द है जो सूचनाओं को हेरफेर करने और संचार करने में सभी उन्नत तकनीकों को शामिल करता है। आई.सी.टी अवसंरचना में जीवन की गुणवत्ता में काफी सुधार करने की क्षमता है और इस प्रकार यह ग्रामीण विकास का एक अनिवार्य अनिवार्य आयाम बन गया है

## RETURN OF THE CITY BIRDS

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The COVID-19 pandemic has been harsh and painful to all corners and sections of the human society across all the continents irrespective of developed, developing and under developed nations. Globally our socio-cultural and socio-political life has been severely disrupted and our economies badly shattered. The rising levels of unemployment, lack of food and essential commodities as well as economic insecurity, political desirability as well as the break down of the health care infrastructures across several countries have been a sad and hopeless legacy from the fall out of this historic pandemic of which we are all part of. Long and over extending lockdowns have been a painful experience for all.

However, there has been a silver lining to this limitless pain and hardships that many of us have experienced is the impact on our local ecosystem and environment has been surprisingly positive. The lockdowns made sure that all industries in agricultural activities remain completely closed together with strict travel restrictions in all forms. As a consequence the pollution level across the country went down significantly. I happened to be in

India during this period and experienced the brightest, bluest, cleanest and most beautiful sky across the cityscape. Observing the sky both in the daytime and at nights during this lockdown period demonstrated the most spectacularly clean city skyscape, I have ever observed since my childhood. There were reports on the television as well as on the internet regarding spectacular display of wildlife across the planet in almost all the continents. This has been phenomenal as due to severe anthropogenic pressures, city based wildlife has been pushed out of their habitat.

My observations during the pandemic around the city of Kolkata, which is a densely populated metropolis has been the phenomenal return of various bird species. These include not only the most commonly seen common crows, common mynas, feral pigeons, spotted dove and red vented bulbuls only. But several other species like jungle crows, black kites, tailor birds, purple rumped sunbirds, house and field sparrows, crow pheasants, rufous tree pies, black hooded orioles, swallows, drongos, barn owl, barbets, kingfishers, woodpeckers, oriental magpie robin, green bee eaters, Indian pond heron, small, intermediate and large egrets, Indian cormorants, storks, little bitterns, Indian pond herons, rock pigeons, doves, jungle myna, bank myna, Indian roller, rose ringed parakeets to mention only a handful and those that I can identify.



Also noticed 3-4 small and large bat species during my night observations. I was unable to identify the few nocturnal birds I saw or recorded their calls. Many friends and colleagues also reported about spotting various civet and small wildcat species in and around the city or in the rural belts in addition to various species of lizards (mostly monitor lizards, aquatic and terrestrial snakes) and amphibians (toads and frogs). I myself spotted Gangetic dolphins in the Hooghly River very close to the shores.

Hence it can be said that although the pandemic did enormous harm to our society and social lives; but, it rewinded our past mistakes and brought nature closely back to us either way we never anticipated. It is important for us to remember that as

humans we have taken too much from our ecosystem in environment and damage them irreparably. However, in spite of all the sadness and negativity associated with the global pandemic in one way or the other he taught us a lesson that we should all remember for generations. In spite of the hardships, the site of the wildlife and the chirping of the birds made my day abs inspired me to hand on. It is their food important for all of us to work together again on a common platform to save the environment for our future generations to enjoy the spectacular beauty of nature and its unique serenity.

Photo credit: **S. K. Basu**

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## THE EMERGENCE OF “NEW” ENVIRONMENTALISM

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### Introduction

Environmentalism refers to the advocacy to preserve, protect and restore the natural environment from damage. It is philosophy and social movement for the protection of nature. In simple terms, it relates with the environmental movements taken up by the people in order to protect the environment.

However, the thoughts about the nature and its conservation had different viewpoints in the initial years. Early thinkers, such as Thoreau, Emerson, Muir and Leopold wrote of nature or wilderness rather than the environment. The term Environmentalist was not used at the time even when the American Environmental Movement began. By the late 1800s, the environmental movements split into “conservationists” versus “preservationists.” The Conservationists led by Gifford Pinchot, an American Forester believed in the conservation of resources for future use by humans. On the other hand, the “Preservationists” led by John Muir, an environmental philosopher, were more concerned about the existence of nature on equal footing as the humans and had a moral obligation for the conservation.

The creation of the Empire Forest in 1855 in British India was a step towards conservation of forests and usage of its resources for the common people. The forests were conserved for not just environmental value but also earned revenue and helped in job creation. Empire forestry influenced environmental thinking in the late nineteenth and the early twentieth century.

Later, the environmentalism attained the face of social justice movement and sought to address the inequitable distribution of environmental hazards among the poor and minorities. The safety of mine workers and peasants' condition were the discussion points at various platforms. It was put forward that the workplace, the forests and rivers were all part of the environment, and people should protect them.

The Term Environmentalist came into use in 1960s when the upper class attempted to save land for recreation and reduce pollution and other systemic stresses. The expanding post-World War II economy raised consciousness about the environmental costs of economic progress, but it also led increasingly affluent Americans to insist upon a better quality of life. The spread of ecological consciousness from the scientific world to the general

public was reflected in popular metaphors of the planet as Spaceship Earth or Mother Earth.

### Environmentalism of 1960s.

The publication of the Rachel Carson Book “Silent Spring” in 1962 helped to create a widespread ecological consciousness and alarmed the world about the ill effects of pesticide use. Similarly the passing of the Wilderness Act in 1964 in U.S. helped to protect more than 100 million acres of public land for hiking, camping, and solitude. This was the time when several countries of the world were struggling with the rise of diseases. Japan was suffering from an unknown but horrifying neurological disorder called the Minamata Disease and it was impossible to breathe in Tokyo, London or Los Angeles. The powerful environmental movement which began in the 1960s gained momentum during the 1970s.

### Environmentalism of 1970s

The 1970s saw the emergence of the major environmental statutes and Acts. The movements during this time increasingly addressed environmental threats created by the disposal of toxic waste and other pollutants. The primary responsibility for clean air and water shifted to the federal government. The Environmental Protection Agency was created in 1970 and the use of DDT was banned in 1972. The celebration of the first ever Earth Day on 22<sup>nd</sup> April 1970 and the UN's first environmental conference also happened in the 70s. In India, the environmental movements and agitations were raised by the poor and those who were directly dependent on environment for meeting their various needs. The Chipko Movement along with similar movements like Appiko was initiated at this time.

### Environmentalism of 1980s.

By this time, the environment had become an electoral issue and the governments were forced to respond. Stiff laws were framed and were enforced with great vigour and, thus ensured substantial industrial investment in pollution control. The late 1980s saw the growth of the environmental justice movement. In India, media attention grew and the people started writing about the environmental issues after the Bhopal Gas Tragedy incident which brought these issues at the forefront. Media attention grew; people started writing on various issues of environment in various languages. Environmental debates entered into the national political agenda. The Department of Environment was set up in 1980 which was later converted into Ministry of Environment was set up at Central level in 1985 with State Ministry in various states.

### Environmentalism of the 1990s

Public awareness about the importance of bringing about a balance between environment and development grew.

Development projects that were unfavorable to social and environmental concerns were opposed during this period. Examples showing the way forward towards participatory, community-based natural resource management systems were recognized. It was realized that international support and global efforts are required to mitigate the effects of environmental problems. International treaties such as Montreal Protocol to curb the Ozone Depleting Substances (ODS) and the Kyoto Protocol to reduce carbon emissions came into existence. It was at this time that the scientists and social scientists systematically started analyzing the root cause of the environmental problems and their impacts.

### Environmentalism of 20s

By this time, the environmental concerns had entered in all spheres and sectors. Environmental history and ecological economics became subjects of study and there were number of cross cutting interdisciplinary areas were explored. Anti-environmental backlash began. Greens found themselves being cast as negative, backward looking and as the obstacles to India's development. The fast economic growth led to increasing temperature, dirty rivers, polluted skies and intense and unpredictable weather conditions.

### The 21<sup>st</sup> Century Environmentalism

The Modern Environmentalism is based upon Green Business, Green Products, Clean Energy, Responsible Production and Consumption, Recycling, Organic Farming, Green Consumerism and Intervention of technology. The emergence of Pragmatic Environmentalism is a new concept. It is a strategy in environmental thought which argues that theoretical debates are hindering the ability of the environmental movement to forge agreement on basic policy imperatives. It seeks to balance environmental impacts and public policy and stresses on the necessity to look at several aspects of any environmental issues.

### Who is an Environmentalist?

The term "environmentalist," said to have been used in the 1960s to denote "person who is concerned about the physical environment, the pollution of our air and water." In other words, "person who accepts the theory that environment is of overriding importance in determining individual characteristics" or "person working to solve environmental problems, such as air and water pollution, the exhaustion of natural resources, and uncontrolled population growth" is an environmentalist.

Today's environmentalists are Social Activists, Green Warriors, Teachers and Academics, Scientists and Researchers and Policy Makers and Planners. These are generally found to be the type of people who are also more concerned about an egalitarian distribution and who are thus more willing to make personal sacrifices for the greater good. They also believe that markets and capitalism are able to solve the environmental problems.

While both environmentalists and the general public have a strong preference towards clean air and a good environment, they differ in their level of activity due to their cultural differences in the way they organize their social and political way of life.

Gender and Environmentalism have a strong correlation. Socialization and Structural theories recognize role of women as

caregivers and more compassionate and protective than men. There are specific areas like Economic Growth Orientation where men are more involved in market force. Men have more knowledge regarding technical environmental issues which is less linked with environmental damage. Safety and health concerns of women are more pronounced. Women have less trust in science and technology than men which is positively related to environmental concern.

### Environmentalism of the Poor vs. the Environmentalism of the Rich

The Environmentalism of the Rich in the West has always been because of the desire to have clean and green pastures and to preserve the magnificent animals for aesthetic pleasures. Growing Environmental protests are not by the middle class (unlike in the West) but by the poor people. The poor protest development as they believe that development will only make them poorer. For the Environmentalism of the poor, Environmentalism is not a luxury; it is a matter of survival. There are growing pollution threats across the World where there are protests against pollution, deforestation, the takeover of grazing lands, of fishing areas, of beaches. The need to protect the immediate environment is strongly put forward by these poor. They are also the true environmentalists as they have less money so they buy less, drive less and have much smaller ecological footprint as against the rich who have extremely resource intensive lifestyle.

### Conclusion

Environmentalism has come a long way from conservationism to modern day environmental management. Environmentalism has a significant role in promoting equity and justice as communities of color and people living in poverty face greater environmental challenges and bear higher negative cost from environmental problems (The Lancet, 2018). There is a strong need to reinvent the growth that is affordable and sustainable. The environmentalism has to be powered by people and innovation.

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**From the Editor's**

Dear Readers,

I wish my warm wishes!!

January is the first month of the beginning of the New Year. Various festivals, events of national and international importance fall in the month. National Youth Day is celebrated to mark the birth anniversary of Swami Vivekananda also called Swami Vivekananda Jayanti every year on 12 January. He was born on 12 January, 1863. The government had decided to observe it as National Youth Day because the philosophy of Swamiji and the ideals for which he lived and worked could be a great source of inspiration for the Indian Youth. Every year on 25 January **National Tourism Day** is celebrated in India to raise awareness and educate people about the importance of tourism and the role it plays in the Indian economy. On 26 November, 1949 the Indian Constituent Assembly adopted the Constitution the supreme law of the land, and replaced the Government of India Act 1935. It came into effect on 26 January 1950 with a democratic government system. This day is marked as **Republic Day** of India. **World Leprosy Eradication Day** is observed on the last Sunday (30 January) of January to focus on the target of zero cases of leprosy-related disabilities in children.

In January issue, we recount the various projects and popular articles. I express sincere and huge thank to all the persons who shared articles, without which there wouldn't have been this newsletter issue. Please continue sharing such articles and share with your friends also.

I would like to thank President and General Secretary, NESA, New Delhi, and the Editorial team including Print, Designer and Publication committee for their nonstop support and efforts throughout this edition.

Hope this edition makes an interesting read. Please feel free to offer any suggestions for improvement.

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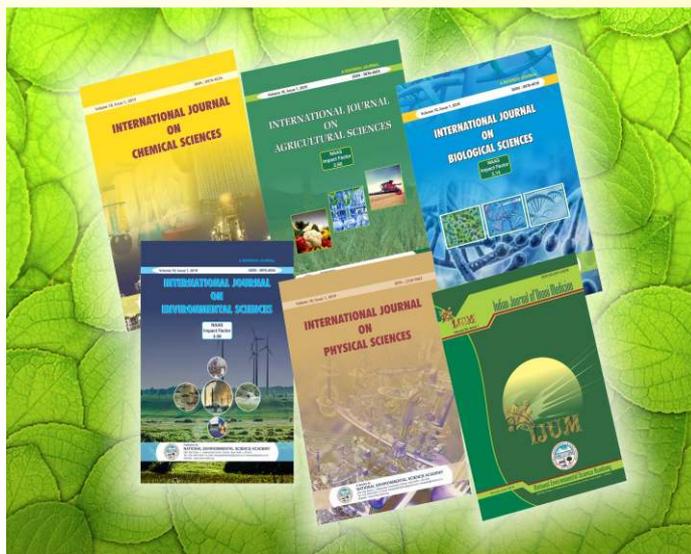
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