



Newsletter

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(Organization for Clean, Green & Sustainable Environment)

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Climate Emergency and Lagging Conviction



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A brief account of Voice of Environment (VoE)

A group of university students have started activities like public awareness camps, joint general discussions for pilgrimages and other familiar people to spread consciousness regarding environmental conservation. This initiative was primarily for the holy river **Ganga** during the “**Maha Khumb Mela**” at **Haridwar, Uttarakhand**, India, in 2010. Later on, this group has started working to spread mass awareness to citizens of India and the entire globe by using social media and other media sources. Gradually this mission extended to global environmental conservation and protection mission. Thus, the name came into the mind of group members of the organization as “**Voice of Environment**”, the organization for Clean Green and Sustainable Environment. The Voice of Environment was established officially on 22nd September 2014 and finally registered under the society registration Act. XXI of 1860 on-30-10-2014.

Editorial Message

Dear Esteemed Readers and Nature Lovers,

The first edition of Volume 04 of the Voice of Environment Newsletter is now available! First and foremost, this issue aims to address climate change and ensure a pollution-free, long-term future. This issue aims to disseminate the awareness message across the globe. However, we intend to do all possible to ensure that our newsletter contains fascinating, provocative articles that will appeal to a broad spectrum of researchers, environmentalists, and practitioners. Finally, we'd like to express our gratitude to various individuals whose assistance and support have made our first issue possible. All of our well-wishers and supporters deserve our appreciation. We also appreciate any feedback that will assist us in formulating our future problem more comprehensively and scientifically.

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Tackling Climate Change

As the world has begun to recover from the Coronavirus pandemic, the Glasgow Conference of the countries of the world (31 October to 12 November 2021) was a historic opportunity to take concrete measures for tackling climate change and to build a better and greener earth. The COP26 President did point out that the green recoveries across the globe could bring in good jobs, trillions in investment and ground-breaking new technology. The main aim is to keep the global temperature rise under control, limiting average annual increase to at least 1.5 degrees, if not less. It requires production of less carbon than we take out of the atmosphere by the second half of the century (2050 and beyond) such that we can achieve 'net zero' carbon production by 2050.

Climate change is the greatest danger facing the earth today. Around the world, storms, floods and wildfires have intensified becoming totally unpredictable. Lessening and controlling the impacts of climate change will lead to clean air and restoration of nature. Protecting the forests has become very critical if we want to control climate change. Irony is forests are still being destroyed at the rate of a football pitch every few seconds. If this is the state of affairs, then how can we achieve 'zero carbon growth' by 2050?

COP26 tried to formulate an action plan for reducing or eliminating emission of the five most important greenhouse gases, namely, Carbon Dioxide (CO₂), Methane (CH₄), Nitrous oxide (N₂O), Hydrofluorocarbons (HFCs), Sulphur hexafluoride (SF₆) with only a little success. The future of the earth depends entirely on how we succeed in controlling these gases, more particularly, the first two. COP26 tried its best to persuade the countries to adapt measures for protecting communities and natural habitats, which are most vulnerable to the devastating effects of climate change. Let's hope that some positive changes will emerge soon from the deliberations and decisions of COP26.

K. G. P. Bhattacharyya

19 Dec 2021

Special Message

I've read through a few of Voice of Environment's previous newsletters, and it's worth noting that most of the contributors have experience dealing with short, medium, and long-term environmental challenges. I'd like to express my gratitude to the entire organization's team for developing, editing, and publishing the newsletter. I'm patiently awaiting the publication of the upcoming newsletter, which is almost ready to appear in front of us. I extend my heartfelt congratulations and best wishes to the entire team for their unwavering commitment to raising relevant applied knowledge about current environmental challenges.

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CHANGING CLIMATE AND LOOMING ISSUES

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Knowing the reality, we deny the reality. Though it is the worst of the times, it is the best because we still have a chance. The questionable part is whether we are using the opportunity or losing the opportunity. The world is on the verge of a climate crisis. It is evident from numerous reports coming up frequently. Several agencies, namely the Food and Agriculture Organization, International Panel on Climate Change, Conference of Parties (CoPs), World and Metrological Organization, International Union for Conservation of Nature and Natural Resources, and others worldwide, are working towards climate change. These reports by these agencies have highlighted the problem in detail. In 2019 when the Parliament of Canada declared the climate crisis, it became evident that the world is facing a climate emergency.

Climate change is very much visible. Climate change has led to the destruction of wildlife, as evident from Bush fires occurring in Australia. Australia has been witnessing the fires as in 2020, 2021. As per sources, these fires are an outcome of climate change. Fires that took place in the rainforests of the Amazon are another example. Arctic and Alaska also witnessed many wildfires. Many extreme weather events took place in India. These extreme events included unusual thunderstorms, floods, cyclones, unpredictable landslides, distinctive patterns of precipitation etc. Cyclones like *Fani Hikka*, *Kyaar Maha*, and *Bulbul* occurred in the Indian Ocean.

Another area of concern is the degrading health of mountains. Glaciers are retreating, thereby creating sufferings for the people high upslope. The depleting glaciers bring problems in the mountainous areas due to rising temperature and depletion of water resources. Fast receding glaciers and their fast-melting create too many issues like frequent floods, erosion of soil, change in vegetation, the shift in the timberline. Many important medicinal and aromatic plants get wiped out completely. Many animals go extinct due to the absence of favourable climatic conditions for their survival.

Single-use plastics are adding to the problem. They are chemical formulations. The most disturbing thing is that they are not re-used. They are used and thrown away. The new Plastic Waste Management Amendment Rules, 2021, which will bring the complete ban on single-use

plastics, can bring some relief. These amendment rules will phase out the twenty single-use plastics by 2022. The outcome is yet to come.

A solution accompanies every problem. But as far as climate change is concerned, the solution part needs to be identified and implemented before it is too late. We have to synchronize with nature. We have to find environmentally sound technologies with minor carbon emissions. The strategies need to be developed which are at frequency with environment. The projects planned and carried for the development purpose should undergo rigorous environmental impact assessment. Switching over to alternate energy sources like solar energy, wind energy is the need of the time. Shutting the coal-based power plants have to be enforced. People working there can be transferred to the new departments of energy generation after proper training.

Another significant thing that needs to be taken care of is the annual conference of parties. These platforms should be the game changers and not mere meeting and parting grounds with no outcome. We should not only go for such meetings for the meeting sake. We should have a firm conviction and commitment towards ourselves and nature. Before entering the meeting halls, all the nations should clarify that mere conferences and discussions will not bring anything unless we do the things on the ground. In case of mountains, it has been found that mountain people, particularly mountain women, play a significant role in adapting to the changing climate. Certain studies like Gautam et al., 2007 and Mitchell et al., 2007 have suggested that women have played a substantial part in bringing out the adaptive measures. For example, due to water shortages, the women of Sikkim switched over to dry land cultivation. Their efforts succeeded in converting the barren lands to cultivable ones after the Koshi floods in 2008, as has been well pointed out in a study by Goodrich et al., 2017. Singh (2014), while working on the Khul Gad Micro watershed of Kumoun Himalaya, also highlighted the role of women in the management and functioning of household and agricultural activities. Nepal's women farmers started conserving spring water in ecologically sensitive zones through community forestry programmes (Karki & Gurung, 2012). In contrast, Lama & Devkota, 2009 worked on how the people of Nepal devised adaptive strategies in the changing scenario.

To conclude, we need to figure out how to be sustainable genuinely. We need to differentiate between growth and development. In the name of development human race is exploiting itself. There is a dire need to rethink the buzzwords like the green economy, green chemistry, and the idea of replacing big trees of hundred years with few ornamental plants so that we can construct significant buildings and establish projects. The changing conditions of the world are well

represented in the form of destruction of wildlife, forest fires, escalation of wastelands, eroding soil, excessive flooding, prolonged episodes of drought, an ongoing pandemic of COVID-19 and its variants, namely Delta and Omicron are the clear indications of climate change. It is a warning to humankind to revisit the idea of development.

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CLIMATE EMERGENCY AND LAGGING CONVICTION

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As we all know, our earth was formed millions of years ago, and it was not the same as we see it today. It has undergone many changes over time. Over millions of years, the difference in the climatic conditions has led us to such a beautiful planet filled with mountains, rivers, grasslands, oceans, and many more eye-captivating landscapes. Not only scenic beauty but our mother nature provides us with many resources that are very useful for human beings. The earth has gone through several climatic changes due to natural cycles and fluctuations in the remote past. The unnecessary and adversely affecting changes occurring today are a result of human activities and the reckless use of natural resources that we get for free from nature. Due to which the diverse flora and fauna of this planet face many problems. And one of the significant issues that we are facing today is the climate emergency that is global warming. We all have studied about it earlier or read news and reports regarding its effects, causes and solutions, but the steps are taken for the same is hardly seen. In the past, we have shown a lot of negligence regarding this significant issue. The challenges are increasing day by day, and many parts of the world are confronting natural calamities and several hardships associated with them.

What is global warming and its cause?

The increase in the earth's temperature is called global warming. The annual global temperature has increased gradually since the industrial revolution, and robust measures must be taken. The term climate crisis or emergency is used. A study has shown that the term does make a more emotional solid impact and invokes responses, as it conveys a sense of hardship. And in this stressful situation, there's much need for more substantial steps to be taken and implemented. Hence to understand the intensity of the problem, the term climate emergency has been used to urge impactful actions and attention of the political will, which has hardly been drawn previously.



Fig-1 Forest fire



Fig-2 Drought



Fig-3 Melting ice

The increasing atmospheric temperature is causing increment in the global temperature. The main thing that causes this climate emergency is the emission of greenhouse gases. Various human activities release gases like carbon dioxide, methane, nitrous oxide, water vapour, and chlorofluorocarbons (CFCs) in the atmosphere, which absorb the sunlight and solar radiations that must have bounced back into space but get trapped by these gases. The significant side effects of this climate crisis are ozone layer depletion, extreme weather conditions like hot heat waves, more frequent droughts, rising ocean levels, etc.

Effects of climate emergency

The global impact of this crisis is being faced everywhere. The global annual temperature has increased in total by a little more than 1°C or about 2°F since the industrial revolution. Most human activities rely upon these natural resources. Cars, flights and industries work by burning fossil fuels, and the burning of fossil fuels emits the maximum amount of greenhouse gases. Thus increasing the global temperature results are in hotter summers and heat waves. These are directly causing increment in heat-related illness? Due to an increase in the temperature, the water reservoir dries up fast, leading to droughts and the expansion of desserts. Many parts of the world are going through this hardship where they don't regularly get water to meet their needs. Drying up of these water reservoirs result in poor crop production and a decline in grasslands which further lead to increasing poverty, hunger, mortality of humans and animal. In forest areas, wildfire starts and expands quickly due to raised temperature, leading to loss of species in their habitat. In warm climatic conditions, storms absorb more heat energy from the air and become faster, turning into violent hurricanes.



Fig-4 Emission of greenhouse gases



Fig-5 Flooded City

As 2020 has been recorded as the hottest year, its consequences have been seen in different parts of the world. Russia and California suffered from uncontrollable forest fires during this year.

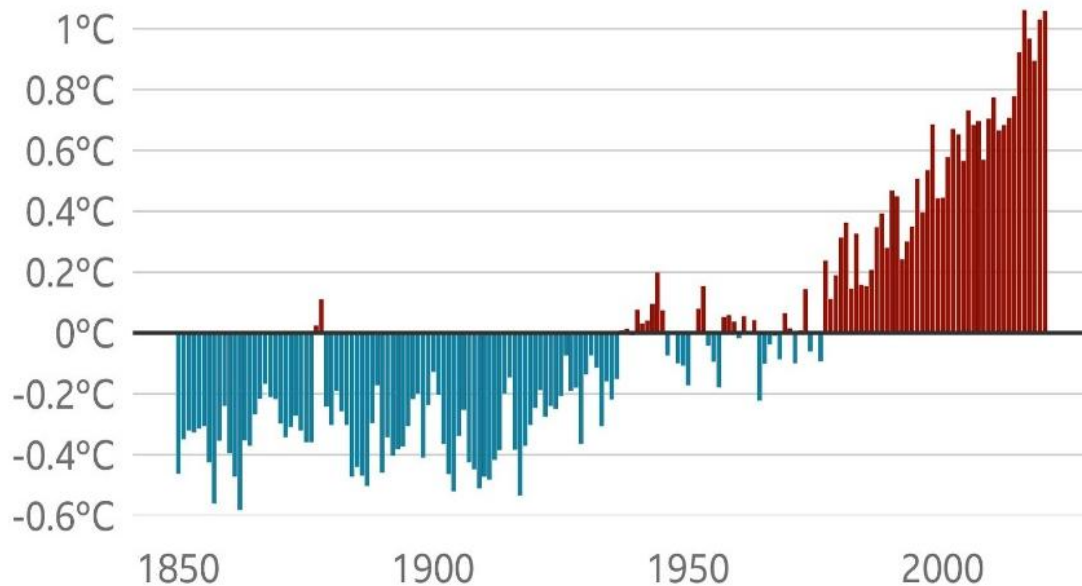


Fig-6 Average land and ocean temperature

Also, the Atlantic hurricane season included the record-breaking 30 tropicals, 6 major hurricanes, and 13 hurricanes altogether. The heating up of the earth is also causing a rise in the ocean level, because of which coastal communities are in danger. Since 1995, the Great Barrier Reef in Australia has already lost half of its corals. The ocean also absorbs carbon dioxide, making it acidic, endangering marine life. These climate change-associated disasters took place

worldwide; Droughts let the highest number of death in Africa. South America suffered 50% of the deaths due to floods whereas Europe suffered from heat waves from 2003 to 2010.

Steps to be taken:

This major issue needs stronger steps to be taken and implemented. Significant changes are required to come from the governments and the businesses. We also have to take measures as individuals, and everyone needs to reduce their carbon footprint. The contributions of every individual are essential to bringing about a change in today's condition. They are reducing the use of vehicles that consumes fossil fuels. Mainly there is a need to replace fossil fuels with renewable resources. Industries should use hydroelectric power or windmills to run their factories. The manufacturing of electric vehicles should be increased, and their use should be promoted. Governments should promote using solar panels and water harvesting systems to reduce the carbon footprint of individuals. In December 2015, the Paris climate agreement took place. It is a step to re-imagine a fossil-free future for our planet. The Paris Agreement's long-term temperature goal is to keep the rise in mean global temperature to well below 2 °C (3.6 °F) above pre-industrial levels, and preferably limit the increase to 1.5°C (2.7 °F), recognizing that this would substantially reduce the effects of climate change. In 2021, the UK Government organized a World summit, COP26 to minimize carbon emission till 2030.

Although agreements and summits are being organized, ground-level work is still missing. Many countries have taken pledges to become carbon neutral, but it's easier said than done. Like many countries like India and China, whose economy depends heavily on oil and coal, it's challenging to cut down their carbon emissions. Moreover, Prime Minister Narendra Modi has set net-zero greenhouse gas emissions by 2070, a significantly later deadline than many other countries. Prime Minister also says, India will reduce the emissions intensity of its economy by 45% by 2030. These pledges and summits are of no use until groundwork is done correctly. The government needs to provide a solid working plan to reach its target, switching to hydroelectric power, solar power, windmills, etc. The establishment of recycling plants is much needed. Without these significant steps, it's unimaginable to reach the target.

Acknowledgement: https://images.google.com/?gws_rd=ssl

INTOXICATED KEEPERS

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Dreaming of deliciously sweet dandelions

But filling up senses is the ash from the
rainforest fire.

The melody merges with the cries,

Of souls being burnt alive

The fire rises

And the music to drown the deaths is on the
climb.

Speakers, stadiums, cinemas are alive

Thrive

Blinding, beloved as the cure

The river passed away an hour ago

Soon the trees follow

And now the birds, beasts, bewitched

Hollowed, howled

But were drowned by the clouded cheers

“Love me” if anybody around me appears to
hear me

Whispered the rainforest to me

CLIMATE EMERGENCY AND LAGGING CONVICTION: INDIAN CONTEXT

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“The earth, the air, the land and the water are not an inheritance from our forefathers but on loan from our children. So, we have to hand it over to them at least as it was handed over to us”
– Mahatma Gandhi.

Global surface temperature, one of the critical indicators of global warming and cooling, shows a 1.09 °C increase in the last decade (2011-2020) compared to 1850-1900, with more growth over the land surface than that of the ocean (IPCC, 2021). More than 11000 scientists worldwide unanimously declared a climate emergency in 2020, analyzing variation in 29 vital signs from 1979 to 2020, i.e., for 40 years conveying effects of human activities on Green House Gas (GHG) emissions, thus revealing the consequent impact of human activities on climate change. Methane (CH₄) is the second most crucial GHG after carbon-di-oxide (CO₂) and more than 25% contributor to the current global warming crisis released due to various anthropogenic activities involving natural gas that contains CH₄ as the vital component. This contaminant possesses approximately 80 times higher atmosphere warming capacity than CO₂ over the first 20 years of its release into the air (UNEP, 2021).

The tremendous variation in vital signs has proven that the climate crisis is accelerating faster than was anticipated by many scientists. The climate emergency and biodiversity crisis is connected so that it is impossible to disentangle one from the other. To halt a further decline in climate, humanity needs to address both in tandem. In November 2021, the Glasgow Pact, an agreement reached by the parties of the 26th Conference of Parties (COP26) in Glasgow, UK, emphasizes the need for further efforts in reducing GHG emission and the importance of country-specific efforts by formulating more apt national and regional planning by the parties to the pact. India is one of the parties to COP26. Presently, there is a considerable gap in the efforts and urgency in the matter.

Despite attempts to align with the climate commitments through several initiatives, India's work extensively appears to be far from the drastic measures demanded to counter the climate exigency. There's higher rainfall in a reasonably short period. At the same time, there has been

an increase in famines, followed by floods. There have also been more forest fires, as well as locust attacks. Winters have shortened slowly, and summers have become longer. All this has wrought destruction on farmers. This is how the climate exigency has manifested itself in India.

In Glasgow COP26, Indian Prime Minister Narendra Damodardas Modi represented the 3rd giant polluter globally, with coal accounting for 70% of its power-generating source. Modi's attendance was seen as very important as leader of one of the most significant GHG emitting nations. Indian PM's purpose was to probably portray the nation as a solution to the climate necessity and not the problem. India is yet to submit its current strategies with a substantial revision in its previously declared goals of 2015 to combat climate change.

India is the only prominent signatory of the Paris climate agreement that is expected soon to achieve the contract's target as per the Emission Gap Report by the UN Environment Program. As per the official statement of the Union Minister of Environment, Forest and Climate Change in November 2020 nation has achieved its voluntary target of emission intensity of around 21% by 2020 over 2005 levels. For the fact, India is targeting around 35% emission intensity by 2030 than that of 2005. The emissions intensity mainly measures GHG emissions (by volume) per unit of economic growth (in GDP).

India is approaching fast towards one of the earlier goals set out in 2015 of achieving approximately 40% share capacity to generate electricity from non-fossil energy-based resources. The Indian Government expects to realize this target by 2023, 7 years earlier than anticipated. India's stand on net-zero GHG emission lacks clarity. Initially reluctant to commit to the net-zero target by 2050, unlike other giant emitter states, it later set out an independent target of net-zero emissions by 2070, while neighboring China, another major emitter, has penciled in for a decade early commitment.

India possesses extraordinary rich species diversity among 15 nations worldwide (William et al., 2019). As mentioned earlier, India needs to be serious about protecting its biodiversity to mitigate climate risks. India has 23.39% of the total geographical area of the country protected under the Indian Forest Act, 1927, Wild Life Protection Act, 1972 and State Forest Acts. The most pressing climate risks in India up to 2050 includes flooding, heat waves, droughts, water scarcity, extreme precipitation, and complex indirect linking of many physical risks resulting from climate crisis such as the increased risk of vector-borne diseases due to rise in temperature, lack of food and nutrition security and loss of livelihood (Debnath et al., 2021).

Being a member or participant in all important Climate, Biodiversity and Conservation efforts, India is expected to show exemplary commitment to preserving its biodiversity and, consequently, positively impacting climate change. Recent events, however, indicate otherwise.

A petition filed recently with the Honourable Supreme Court demands directions to the environment ministry to declare a climate emergency in India. This petition also requires achieving zero greenhouse gas emissions across all the sectors of the economy by the year 2025.

Is it time to redesign criminal law to handle climate exigency defaulters? The present generation in the Anthropocene is capable of inflicting damage to and causing deterioration in climate in ways that could make humanity defunct. Postericide is the ethical retaliation against humanity's changed state of affairs in the Anthropocene. The ambit of international criminal law points to addressing the existential hazards caused by climatic changes all around. International criminal law focuses on covering the population worldwide irrespective of international borders, at present and in the future. It conveys the values that bind the entire human race together across time. It avers the condemnation of inconceivable atrocities that have affected humanity's core—as stipulated in the Rome Statute of 17 July 1998 of the International Criminal Court (ICC), which defines, among other things, the transnational crimes under ICC's governance.

Anthropogenic activities over the last two and a half centuries have accrued GHG in the atmosphere, leading to the climate extremity at present. This extremity is an unintended result of anthropogenic action across history, leading to the destruction of carbon sinks, concentrated carbon stocks, and inflating carbon overflows. These conducts, scattered across time and space, are beyond the reach of the international criminal law, not least because the relevant majority is dead.

Denial to climate change exigency has affected the mitigation efforts, which could have prevented the present climate change emergency, amplifying the threat that locks into the human race in a disastrous global climate situation. The falsehoods of people in power in states and industrial groups who have put us and our future generations in peril should be held answerable. Damages which climate change deniers have done are heinous, and they have still no limitations for their excuses. The time has come to demand answers and take strict legal action against these climate offenders.

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CLIMATE EMERGENCY AND LAGGING CONVICTION

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An incident a few days back: sitting in a chair with one of my friends and having a deep conversation about the current climate change-related issues, I had an epiphany about what I can do to combat the problems posed by climate change. In one of those discussions, she pointed like a layman, "Why are you working on climate change and what exactly are you doing? Is it worthwhile and rational for you, your firm, and the government to work on climate change issues?" I replied, "Isn't climate change affecting you?" She said, "Of course not! Why should I be concerned about my future when I have a comfortable present?" I was taken aback by her response, which made me wonder why she isn't concerned about her future and the next generation. The way we think about climate change needs to change starting from today itself to prevent our future generations from being stuck! Spreading awareness is the answer to the realization that I mentioned in prior conversations about what we can do to address climate change issues. The first and the most crucial step in combating climate change are raising awareness. Addressing climate change as an emergency issue during the awareness programs will lead to successful campaigns and boost the efforts that we put forth to combat climate change.

The threats posed by climate change must be a warning and must create an alarming situation amongst people generalizing and declaring it a climate emergency. The climate emergency is the urgency to minimize and stop climate change from causing severe damage to the environment and human life. To avoid suffering due to climatic crises, efforts to maintain the ecosystem and environment should scale up dramatically. In March 2019, the Ministry of Environment, Forests, and Climate Change (MoEFCC) introduced the India Cooling Action Plan (ICAP) to promote access to sustainable cooling (India Cooling Action Plan (ICAP), 2021). By 2022-23, this strategy intends to minimize cooling demand, refrigerant demand, and cooling energy requirement, recognize "cooling and related sectors" under the National Science and Technology Program, and provide training and certification under the Skill India Mission. Public conversations must be an element to address climate change, with people's perspectives and contributions playing a vital role in addressing climate change issues.

Alternatives to direct electricity, coal power, and fossil fuels, such as installing and using solar rooftop systems, must be known to the public to combat climate emergencies. This condition will encourage the adoption of renewable energy sources, resulting in decreased carbon emissions and lower bill expenses for individuals going about in their daily lives. For building a better nation, if we design a good road infrastructure, we can develop a safe way for people to cycle all over the city instead of operating private vehicles. Special arrangements must be made in public transportation and the facility for the elder's to travel comfortably. Adults and children should refrain from driving their cars and vehicles and enhancing the use of mass buses while increasing the usage of bicycles to get more exercise and minimize air pollution and congestion in their everyday life. Another element is behavioral change in terms of climate change perspectives. Behavioral modification and indolent regular habits are essential variables in attaining international climate change targets. Creating a spark for a sustainable environment can be done by modifying our daily food habits by reducing the kill of animals for food. This situation may help reduce the unnecessary death of animals by posing a threat to them. There must be a reduction in the average meat intake where an innocent is slaughtered, exposing the species to human slaughter for profit. People should make commitments that will move countries closer to net-zero carbon emissions, accelerate the use of renewable natural resources, and reduce fossil fuels (UNEP, 2021). Declaring a climate change emergency will assist people in ensuring their future security and safety. Using the support of government firms and serving society with a good and evident non-selfish goal would aid in the propagation of this critical climate emergency requirement. According to the Intergovernmental Panel on Climate Change (IPCC) study, the global monsoon cycle would be disrupted in the twenty-first century. The monsoon winds will tend to weaken with the increase in the intensity of monsoon precipitation, the reason being an increase in atmospheric moisture (Stocker & Qin, 2013). Also, as a result of global warming, the volume of water in the ocean expands, resulting in a rise in sea level, which causes severe flooding in low-lying places (Stocker & Qin, 2013). Amount and quality of coastal waters is also affected by groundwater depletion and changes in the water inside the reservoirs. The word "climate emergency" is typically used to describe a long-term problem that requires immediate attention. It can be stated at different stages, with each firm disclosing it according to its in-depth understanding and ideal research. After the declaration, it stresses the firm to act upon the targets they had committed to achieving.

Climate change awareness is growing, but attempts to counteract it are still inadequate and insufficient to rescue our future promptly. This is where the world is lagging! Some steps that we can implement, from a local to a global level, for combating climate change are:

1. Recognize the significance of climate change on a personal level.
2. Determining and gathering the scope for individual and societal awareness and informing people about the climate emergency.
3. Identify a source or organization that can assist in disseminating the information gathered from individuals during public dialogues and awareness campaigns.
4. Developing ways to address various climate change challenges.
5. A seasoned expert review for the techniques.
6. Consultation with the general public.
7. Funding and investment are required to carry out the plan and strategies.
8. Putting the strategy and plans to tackle climate change into action.
9. Identifying additional research and development needs and opportunities in climate science.
10. Significant changes as a result of the tasks mentioned above' experience.

Compared to the disasters brought about by climate change, which directly harms the environment and humans, the steps to alert people about the climate emergency are still insufficient. Writing tiny blogs and articles with statistical proof that people can rely on can help raise awareness about climate change and climate emergencies. During speaking engagements, public speeches, and discussions, we can show some graphs demonstrating global warming and past studies and trends in climate change over some time. Make a statistical connection between the issue and the climate emergency to persuade people to understand the need for climate change to be labelled a climate emergency! So, before time flies and things go out of our hands, we must become aware of climate change and take action in the face of a climatic emergency.

Begin, Rethink and Act upon climate change because it is an emergency and we're lagging!

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CLIMATE EMERGENCY IN INDIA WITH SPECIAL PROMINENCE ON SEA-LEVEL RISE

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Introduction

Sea-level rise (SLR) has been a primary global concern in recent times. Millions of inhabitants of developing countries are on the verge of being displaced by the SLR and accompanying severe economic and ecological loss (Dasgupta et al., 2007). With inhabitants of 1380 million, India is experiencing severe climate change impacts like heat waves, irregular rainfall, flood, drought, and SLR. Enhanced global SLR is an enduring climate change consequence that affects entire coastline areas (Ramachandran et al., 2017). SLR deliberated substantially as a significant threat to low-land coastal populations (Nicholls et al., 2011). According to estimates, even 1 meter SLR in developing countries' coastal areas would drown 194,000 Km² of landmass and displace at least 56 million people (Dasgupta & Meisner, 2009). The rise in mean sea level (MSL) will pose a significant risk to those living in the vulnerable zones in India. IPCC (2021) reports 28.6 million citizens of Indian cities, namely- Visakhapatnam, Chennai, Kochi, Surat, Mumbai, and Kolkata, will experience coastal floods with an SLR of 50 cm. Coastal administrators and policy-makers need to consider SLR a severe threat and take necessary mitigation and adaptation measures for the Indian coast. According to Khan et al. (2013), adaptation to SLR is the most appropriate to cope with this comprehensive challenge.

Observation of Past Sea-Level Changes in India

A study by Unnikrishnan et al. (2006) reveals SLR of 1-2 millimeter/year over the last century for India. National Oceanic and Atmospheric Administration (NOAA) analyzed the monthly

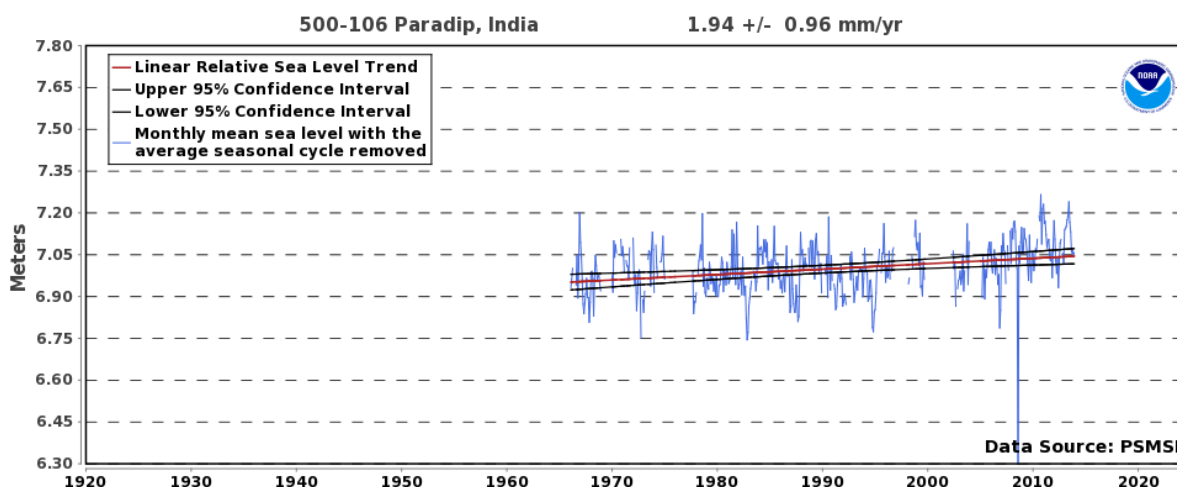


Figure 1 Mean sea level trend of Paradip tide gauge station (Source: PSMSL)

MSL historical data is from 1966 to 2015 to see the changes along the coast of Odisha, India. This 50 year-long monthly data of Paradip tide gauge station shows that the sea level is increasing steadily. The observed sea level trend is 1.94 millimeter/year, comparable to a change of 0.64 feet in 100 years.

Nandy and Bandopadhyay (2011) used the Permanent Service for Mean Sea Level (PSMSL) data to examine the annual MSL trends for the Hugli estuary. For the selected tide gauge stations, the rates of sea-level change were -3.82, +0.89, +2.43, and +4.85 millimeter/year, respectively. Using the SimCLIM climate model, Ramachandran et al., (2017) projected SLR for the coastal districts of Tamil Nadu and Puducherry. NOAA estimated the monthly MSL trend for the tide gauge station (Chennai) as 0.32 millimeter/year, comparable to a variation of 0.10 ft. in a hundred years.

Projected Sea Level rise over India

The projected SLR possibilities for the 21st century vary from 0.3-2.0 m, all linked to the collapsing polar caps. The adaptation research and planning of climate change identify the places at risk of being affected by SLR.

Few studies in high-risk locations have attempted to associate SLR scenarios with increasing rates of population and estimates. Several earlier studies, in the example, have used current population statistics to predict people at risk for future SLR flooding.

Unnikrishnan et al. (2006) used the results of a climate model (HadRM2) simulation for the northern Indian Ocean to develop future scenarios for tropical cyclones (Bay of Bengal) for the years 2041–60. Past tide gauge data analysis estimates SLR alongside the coast of India. Kochi, Mumbai and Visakhapatnam indicated SLR of just under 1 millimetre/year among the tide gauge stations studied; however, the data for Chennai reveals a rate of fall. Khan (2013) demonstrated local SLR projection using to SimCLIM climate model, which is based on IPCC AR4 is estimated for Total trend (climate) and Vertical Land Movement (non-climate change) at Tamil Nadu's Vellar-Coleroon estuarine zone. For total trend component the estimated of SLR up to the year 2100 was noted as 22.4 cm (low percentile), 24.1 cm (medium projection) and 25.16 cm (high percentile) for B1 scenario (Best-case scenario); 32.79 cm (low percentile), 36.18 cm (median projection) and 38.30 cm (high percentile) for A1B scenario (Balanced Scenario); 44.93 cm (low percentile), 50.33 cm (median projection), and 53.7 cm (high percentile) for A1F1 scenario (High-estimate scenario) (Figure 2).

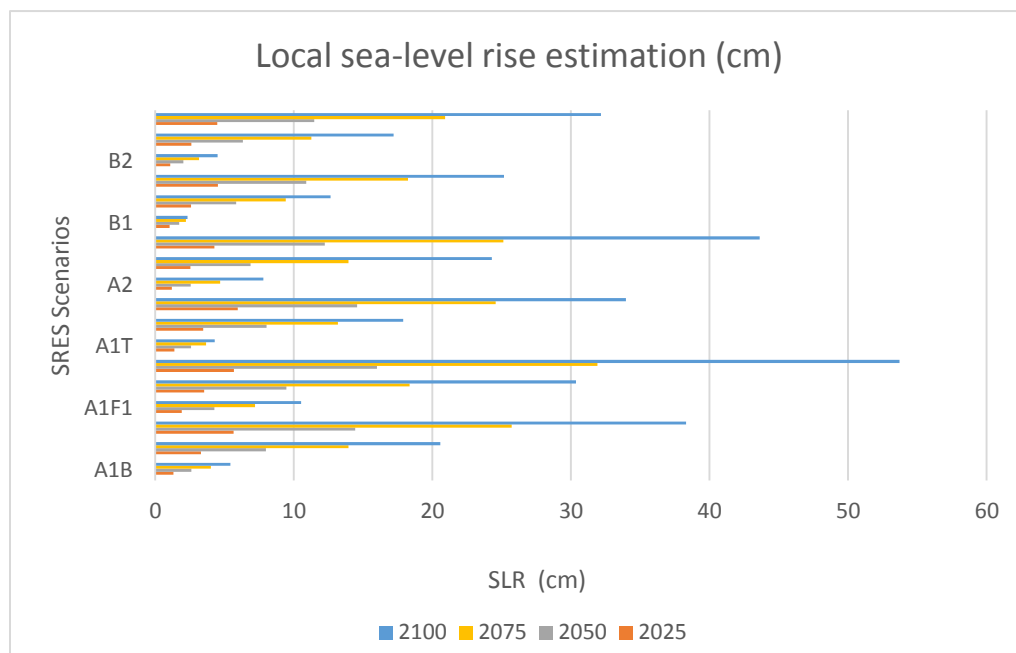


Figure 2 Sim CLIM based vertical land movement component of Local SLR estimates at different SRES scenarios (Source: Ramachandran et al., 2017)

Ramachandran et al., (2017) studied SLR projections for the coasts of Tamil Nadu and Puducherry. From 2025 to 2100, the average projected SLR range is expected to vary from the lowest 7.12 cm (RCP2.6) to the highest 78.15 (RCP8.5).

Conclusion

Climate change may impact habitats like mangroves, coral reefs, fisheries, and tourism (IPCC, 2007). The Indian coastline, rich in natural ecosystems, lagoons, olive ridley rookeries, and beaches, draws more tourists to the region and provides better employment options, allowing people to survive. According to Carrasco et al. (2015), these coastal formations are not resistant to the effects of SLR. Cyclones, floods, and droughts are highly hazardous in India, wreaking havoc on the fishing industry. Many SLR studies in India have found that sea-level rise and other calamities such as coastal erosion, hurricanes, tsunamis, and storm surges are significant concerns along India's coast. SLR will put India's coastal lands at risk, which provide various ecological and socioeconomic benefits to its residents. According to a study by Ramachandran et al. (2017), even if initiatives to moderate climatic forcing by 2050 are implemented, SLR is anticipated to speed up in the 21st century. As a result, an integrated strategic adaptation plan for India's coastal area is urgently needed to reduce SLR risk. The vulnerable coastal areas, natural resources, and dependent societies highlighted in previous studies are in jeopardy, and prompt action is required to improve their resilience.

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PHYTOREMEDIATION: USE FOR POLLUTION CONTROL

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Introduction

Toxic substances which are added to the environment are referred to as pollution. These harmful chemicals are known as pollutants. Natural disasters and human activities such as garbage and industrial wastes create environmental pollution. Pollutants of air, water, soil, thermal and radioactive wreak havoc on the ecosystem.

Conventional restoration procedures are expensive, whereas phytoremediation is a low-cost, ecologically friendly alternative. Phytoremediation is just using plants to remove environmental pollutants from air, water and soil. Heavy metals such as lead, cadmium, and arsenic are removed by it. Plants are used to lower heavy metal bioavailability in the ground. The techniques of bioremediation are as under:

- (i) **Phytoextraction:** Heavy metals are removed from the soil using plants.
- (ii) **Phytovolatilization:** Plants absorb heavy metals from the soil and release them into the atmosphere.
- (iii) **Phytofiltration:** Heavy metal ions are removed utilizing hydroponically grown plants.
- (iv) **Phytotransformation:** Use of plants to degrade complex substances into simpler forms.
- (v) **Rhizofiltration:** It is the process of absorbing contaminants (primarily metals) from water and aqueous solutions via the roots of plants.
- (vi) **Phytostabilization:** Use of plants to reduce the bioavailability of contaminants in the environment.

Different plants species react to pollution in different ways. While some plants can tolerate pollution (suspended particulate matter, dust and gases), others are incredibly vulnerable. Plants reactions to air quality are affected by the amount and severity of hazardous substances present in them and the length of time they have been exposed. Some anti pollutant plants that aid in the bioremediation of pollution include:

Air Pollution: The release of toxic elements like toxic gases, particles, organic macromolecules etc., into the atmosphere is known as air pollution.

1. Common Name: Senseviera

Scientific Name: *Dracaena trifasciata*

Family: Asparagaceae

Role in Pollution Control: It is an ornamental plant with yellow striped leaves and tiny pale green flowers. It is high in hexadecanoic acid, which aids in absorbing toluene while also lowering CO₂ emissions (Sriprapat et al., 2013).

2. Common Name: Rice

Scientific Name: *Oryza sativa*

Family: Poaceae

Role in Pollution Control: It is a monocot, annual plant that grows in tropical areas. Scientists examined the rice crop in West Bengal's 24 Parganas district, which was the most affected by arsenic. Arsenic solutions in plants are inhibited by the gene "arsenite-S-adenosyl methyl transferase" of the soil-borne bacteria *Rhodomonas palustris*. It reduces the accumulation of heavy metals like Cd and Zn in polluted soil (Saengwilai et al., 2017).

3. Common Name: Florist's daisy

Scientific Name: *Chrysanthemum morifolium*

Family: Asteraceae

Role in Pollution Control: The plant is a perennial, herbaceous, indoor plant. It remediates benzene and toluene in a better way. As Studied by NASA, it removes Trichloroethylene, benzene, formaldehyde, and NH₃ (Yang & Liu, 2011).

II. Soil Pollution

Soil contamination is generally termed soil pollution. It is the deterioration of land due to hazardous or artificial compounds in the soil.

1. Common Name: Mustard

Scientific Name: *Brassica juncea*

Family: Brassicaceae

Role in Pollution Control: It is a major oilseed crop. Large amounts of Cr, Pb, Cu, and Ni are removed from the soil (Ebbs et al., 1997).

2. Common Name: Vetiver grass

Scientific Name: *Vetiveria zizanioides*

Family: Poaceae

Role in Pollution Control: It is a perennial grass that grows to a height of two meters and a depth of three meters in the earth. Due to deep roots, this is resistant to extreme external disturbances like drought, flood, fire, frost, and heat waves. It can also withstand a wide variety of soil acidity, alkalinity, salinity, and higher Al, Mn, and toxic metals like As, Cr, Ni, Pb, Zn, Hg, Se and Cu (Roongtanakiat & Chairaj, 2010).

III. Water Pollution:

Water pollution occurs when dangerous chemicals and particulate materials are deposited in water bodies like rivers and oceans. Pollutants commonly emitted by humans, such as sewage disposal failure, chemical spills, etc. pollute water bodies.

1. Common Name: Grey mangrove

Scientific Name: *Avicennia marina*

Family: Poaceae

Role in Pollution Control: It is a salt-excretive mangrove. Within root & foliar tissues, it acquires various metals in varied amounts. Pb accumulated less in the roots than the other metals, although Zn was identified in significant quantity in the leaf tissue (Cheng S., 2012).

2. Common Name: Water thyme

Scientific Name: *Hydrilla verticillata*

Family: Hydrocharitaceae

Role in Pollution Control: It is submerged, rooted aquatic plant grow 20ft depth of water. It absorbs Hg, Cr, Pb, Cd metals. It has a high Cr, Cd storage capacity (Hassan et al., 2016).

3. Common Name: Patera

Scientific Name: *Typha domingensis*

Family: Typhaceae

Role in Pollution Control: It is herbaceous, perennial found in water. It is very effective in reducing bacterial contamination of water. It is tolerant of a toxic environment. It remediates Zn, Al, Fe, Pb (Mojiri et al., 2013).

IV. Radioactive Pollution:

The pollution created by the discharge of radioactive compounds into the atmosphere during operations such as nuclear explosions, mining of radioactive ores and so on is known as radioactive pollution.

1. Common Name: Sunflower

Scientific Name: *Helianthus annuus*

Family: Asteraceae

Role in Pollution Control: Sunflowers have a unique ability to remove radioactive elements like Cesium-137 and Strontium- 90 at Chernobyl (Adesodun et al., 2010).

2. Common Name: Amaranthus

Scientific Name: *Amaranthus retroflexus*

Family: Amaranthaceae

Role in Pollution Control: A cosmopolitan genus of an annual or short-lived perennial plant. Cesium-137, the most prevalent radionuclide in the Chernobyl exclusion zone, maybe concentrated by them (Furhman, 2002).

Conclusion

Plant atmosphere restoration has numerous advantages, including environmental friendliness, green environmental protection, low cost and low technical requirements; thus, environmental protection experts progressively favour it. Phytoremediation, on the other hand, has a slew of issues. It takes a long time and has a restricted number of options; for example, it takes a long time and is limited by biomass, growth cycle, geographical environment, weather and other factors. The absorbed pollutants may be re-released into the environment to cause secondary pollution or pollution through the biological amplification of the food chain. With the deepening of research and the emergence of advanced technologies, the use of plants in air pollution

management has received a lot of attention. With the progress of phytoremediation technologies, we have to believe this will have greater and broader application possibilities in the prevention and management of all kinds of pollution.

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IMPACT OF CLIMATE CHANGE ON WILDLIFE

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What is driving the climate change?

The instinct to survive drove the evolution of early humans from ape-like ancestors to present-day form. Gradual changes in the human body, human abilities, human society and novel technologies have ensured the sustenance of the human race. Until recent times, the human evolutionary trajectory had limited impact on the global ecosystem. This situation changed as humans developed complex societies and technologies, which made it possible for humans to exploit much more natural resources than any other species disproportionately. Globalization and the fad of consumerism have caused an everlasting impact on our ecosystem in a brief period. Global warming due to the burning of fossil fuels is a direct result of industrialization and ongoing economic activities. For the past century, the Earth has been warming up gradually due to the greenhouse effect causing the rising level of carbon dioxide in the atmosphere. In 2020, the global average temperature was already up by 1.16 °C, and CO₂ levels are up by 110 ppm compared to the 20th century. Today, carbon dioxide levels are higher than at any point in at least the past 800,000 years (Blunden & Boyer, 2020). Intergovernmental Panel on Climate Change (IPCC) predicts that the average global temperature could rise to 4 degrees Celsius by 2100 if the present rate of greenhouse gas emission is not regulated (IPCC, 2021). Such a rise in global temperature and CO₂ in the atmosphere will have massive implications on the global climate. Besides adversely affecting every aspect of human life, climate change will further aggravate the dire situation for wildlife that has already been kneeling under the pressure of deforestation, hunting, the spread of invasive species and diseases.

How will the effects of climate change unfold?

The rise in CO₂ levels in the atmosphere is causing a gradual rise in global temperature, and it was predicted to set a chain reaction resulting in extreme environmental changes. An increase in mean atmospheric temperature will cause a higher evaporation rate, leading to more rainfall. Increased rainfall may sound good, but the rainfall pattern will be unpredictable and not evenly distributed. Some regions will get a flood, and others will see drought.

As the climate warms, glaciers, permafrost and ice sheets will melt and drain excess water into the ocean. Also, ocean water expands as it warms, thus increasing its volume and causing a rise in sea level. By the year 2100, climate models predict a 20–50 cm rise in sea level, inundating low-lying coastal areas. Oceans absorb some of the excess heat and CO₂ from the atmosphere. CO₂ reacts with ocean water to form weak carbonic acid. A rise in temperature and carbon dioxide emissions will acidify oceans by 0.14 to 0.35 pH by 2100 (IPCC, 2021). Tropical storms derive their energy from the warm ocean surface. Warmer oceans have expected to cause the intensification of such storms. The temperature rise will also increase the frequency of wildfires during summers and cause extensive damage to the forest cover, especially in the drier regions.

How will climate change affect wildlife?

Climate change will exert both direct and indirect effects on wildlife. Climate change will affect nature by altering a species' food supply, its reproductive timing, indirectly affecting its fitness and Shift in distribution range. Shift in breeding season: Wildlife breeds in response to environmental cues such as increasing temperature and duration of sunlight. As the climate gets warmer, animals and birds are expected to breed earlier, and a breeding window will shrink. Rising temperatures will also make the vegetation bloom and insects hatch early. These shifts, however, will not be synchronous. As a result, several avian species will face reproductive failure causing a further imbalance in the ecosystem (Halupka & Halupka, 2017).

Shift in distribution range: Wildlife has evolved to survive in their respective habitat through millions of years of gradual evolution and adaptations. Since climate change is occurring rapidly, wildlife does not have a chance to adapt. Due to a shift in the rainfall and temperature profile of the habitat, nature will have to move to newer regions to find suitable habitats. However, habitat destruction and fragmentation will impede wildlife movement, and most habitat specialist species will perish. In the mountainous areas, the species living in lower elevations will shift higher up, while species living higher up in colder climates will perish due to global warming (Parmesan & Yohe, 2003).

Destruction of coastline: Since 1901, the global sea level has risen approximately eight inches. Further rise in sea levels will reduce nesting areas for coastal nesting species such as turtles and feeding grounds for waders. More frequent and stronger storms will contribute to the over wash of beaches and salt marsh flooding.

Rising sea level also increases the salinity of groundwater and pushes saltwater further upstream. This will lead to a catastrophic decline in populations of coastal wildlife (USGCRP, 2014).

Empirical data suggests climate change will cause a shift in their distribution ranges, phenology and abundance. Destruction of marine life: Estimated 70 per cent of the Earth's surface area is oceans and comprises 75 per cent of all known species. Rising CO₂ levels in the atmosphere acidify the ocean, making it difficult for crustaceans and other marine life to form their shells, leading to their population collapse. Zooplanktons (microscopic marine creatures) form the base of the food chain in the marine ecosystem. It will negatively impact all species which are dependent on these zooplanktons. Coral reefs provide habitat to thousands of marine creatures and help nutrient recycling in the marine ecosystem. Due to increased sea surface temperature, coral reefs worldwide have already begun dying, such as Australia's Great Barrier Reef (Poloczanska et al., 2016). Due to the rise in sea level, and inundation of low-lying areas, there will be an influx of environmental migrants (or climate refugees; the people who are displaced from their home region due to ecological calamities). · Loss of habitat and increased anthropogenic pressure: At present, more and more land is being used to grow food, build cities and provide accommodation for the ever-rising human population. Forest areas and unclaimed territories will be brought under agriculture to meet the demands of a growing population. This will significantly reduce the availability of suitable habitats for wildlife.

Change in the nutritional content of food: High CO₂ levels ramp up the process of photosynthesis. Plants will grow faster due to a rise in atmospheric CO₂ levels. However, it will cause them to produce more simple carbohydrates such as glucose instead of complex sugars such as starch and reduce the protein and mineral content in grains (Mariem et al., 2021). The reduced nutritional quality of important food crops could mark the beginning of a looming health crisis for both humans and wildlife. Wildlife will have to spend more time foraging to meet their daily nutritional intake, and it will compromise their survival fitness by making them more prone to predation. Effect on migratory birds and animals: Several species of birds, fishes, insects and mammals make annual long-distance migrations between their wintering and breeding grounds. Migratory birds (e.g., Siberian cranes and Amur falcons) fly across continents to reach their wintering ground in Asia and Africa. They spend 8-10 months before flying back to their breeding grounds in Russia. An altered weather regime is causing a gradual shift in the timing of the migration.

This has already led to asynchrony with food availability, as noted in certain species (Seebacher & Post, 2015). Also, climate change-driven loss of habitat will affect their traditional wintering grounds. Migratory species need to fuel up before starting migration by consuming more food to

build fat reserves in their bodies. They require stopover sites en-route migration to avoid exhaustion. Climate change will alter the food availability and habitat quality at the stopover sites. Thus, migratory species will be one of the worst affected due to climate change.

Reduced biodiversity: Up to 50% of species are forecast to lose most of their suitable climatic conditions by 2100 if the global average temperature rises by $\sim 3.2^{\circ}\text{C}$. Such species will ultimately go extinct, and this will cause a cascading effect on the ecosystem via alterations in the food web (interconnected network of prey and predators). Biodiversity renders several ecosystem services which make our ecosystem productive and resilient to climatic perturbances. When many species go extinct (mass extinction), the entire ecosystem will collapse (Pacifi et al., 2015).

How to mitigate the impact of climate change?

There are many preventive measures that world leaders and citizens can take to reduce the impact of climate change. The first step must be a reduction in the emission of greenhouse gases.

One of the most significant contributors to greenhouse gas emissions is a fossil fuel used in transportation. We must shift to more environmentally friendly options such as natural gases, hydrogen fuel and biofuels for our transportation needs. This also requires designing more efficient engines which can run on alternative fuels. Coal combustion for power generation is the second most significant source of greenhouse gas emissions. Thermal power plants generate about 65 per cent of the electricity consumed in India. As a result, we must shift to renewable energy sources such as solar, wind, and nuclear power. Suppose world leaders adhere to the Paris Agreement and take measures to keep global temperature far below 2°C over pre-industrial levels. In that case, the threat of climate change on biodiversity will be significantly reduced. It accomplishes this by drastically reducing the number of threatened species and giving animals and ecosystems more time to adjust to the changing climate — whether through new habitats, behavioural adaptation, or human-led conservation initiatives.

The nations must also make efforts to increase the forest cover, develop corridors between protected areas to ensure connectivity between currently fragmented habitats, and reduce the growth rate of the human population through education and availability of contraceptive measures.

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SUSTAINABLE LIFESTYLES: A NEED OF THE HOUR

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We must recognize that we have inherited our world from our predecessors and borrowed it from future generations and hence have a responsibility for its conservation. The most effective and straightforward approach to do so is through a sustainable lifestyle, which can be embraced by anybody with slight modifications to daily routines and can improve our lives and the entire planet.

Thus, it is not a "choice" for those, whose consciences have been pricked, but a requirement, a responsibility of every individual who lives on this planet, lest we lose our Mother Earth, our home, very soon. Sustainable development is critical at the moment because it entails developing in the present without exploiting future assets or jeopardizing our future. Everyone out there must actively contribute to creating an inclusive, resilient, and sustainable future for the inhabitants of our planet. To achieve sustainable development, the first and most critical step is to genuinely balance the three fundamental parts: economic growth, environmental preservation, and social inclusion. All of these factors are interconnected at several levels and are, in fact, critical to the future generation's well-being and reliability. Without a doubt, another real and yet unachieved milestone towards global sustainability must be eradicating poverty. Economic growth that is sustainable, inclusive, and equal must not be restricted to one requirement of the living class. Both sides of the economy must have access to comparable options, opportunities, social growth, and fundamental living standards.

A few statistics and facts:

1. Because of the inefficient delivery and reaping procedures, nearly one-third of the food, which is 1.3 billion tonnes worth around \$1 trillion, is found putrefied in the trash or spoils of customers and merchants every year (FAO-UN, 2011).
2. If everyone starts using bulbs that consume less power, the whole of the globe would be able to save US \$120 billion annually (UN Org, 2020).
3. If the world's population reaches 9.6 billion by 2050, one earth would not be sufficient. It has been estimated that three planets of nearly the size of the earth would be needed to maintain the current lifestyle (UN Org, 2020).

Production and consumption that are sustainable require efficiency gains. The COVID-19 pandemic allows countries to revert to ongoing styles and shift their consumption and production habits toward more environmentally sound ways, which will lead to a sustainable present and future. The plan also includes a focus on resource conservation and promoting sustainable

lifestyles. Such methods of production and consumption prove contributory in reducing poverty and the acceleration of low-carbon and green economies. G-20 countries account for around 75% of global material consumption and 80% of global CO₂ emissions. In this way, the G-20 governments promote resource efficiency and material circularity. Most G-20 countries' resource efficiency benefits are small (OECD Org, 2021). Material consumption increases, causing significant environmental pressures on the environment such as land degradation, greenhouse gas emissions, and dangerous chemical dispersion. Domestic policy must combine resource efficiency and circular economy concepts while considering national realities. It is also necessary to coordinate national and local efforts to enhance material management.

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VARIOUS INITIATIVES BY VOICE OF ENVIRONMENT (VoE) TEAM



Plantation Drive at Cotton University Premise on the occasion of Republic Day 2021

Media Report Link-<https://www.sentinelassam.com/guwahati-city/voice-of-environment-initiative-on-republic-day-2021-plantation-drive-held-at-cotton-university-522283>



Plantation drive on World Forest Day 2021 by the VoE at
Arya Vidyapeeth College, Guwahati, Assam

Media Report Link- <https://www.southasia24x7.com/archives/19579>



Plantation Drive on occasion of World Environment Day 2021 at B. Borooah College Guwahati, Assam

The Assam Tribune

Date 7 Jun 2021

Plantation drives organised across Guwahati

CITY CORRESPONDENT

GUWAHATI, June 6: To mark World Environment Day, the Voice of Environment (VoE) and Xomadhan (a self-help group) organised a plantation drive at B Borooah College today.

For environmental sustainability, nation-building activities, green and food secured State, an ongoing mission was started by the team VoE earlier.

The team planted some fruit tree saplings such as *Silikha* (Indian hog plum), *Aamlokhi* (Indian gooseberry), *Jalfai* (Olive), *Madhuri Aam* (Guava) and *Kordoi* (Star Fruit).

The team consisted of Bhaskar Hazarika, Dhanjit Gogoi and environmentalist Moharana Choudhury. Dr Digantha Choudhury, associate professor, Department of Chemistry, B Borooah College, the students and staff were present during the plantation drive.

World Environment Day was also celebrated at Fishfed, Rupnagar by main-

taining all Covid protocol on Saturday.

The day was celebrated with plantation of trees, holding of a seminar on the importance of the aquatic ecosystem, distribution of tree seedlings for plantation on the bank of fishery and within the fish farm, etc.

The whole programme was co-ordinated by Dr Dhruba Jyoti Sharma, managing director, Fishfed. The programme was attended by Pradyut Choudhury, chairman of the State Environment Impact Assessment Authority as chief guest, and a few others.

Meanwhile, Surya Cement, a leading cement brand, organised a plantation drive at Sonapur on the occasion of World Environment Day, stated a press release. On the occasion, a 'Plant Trees-Save Earth Contest' was launched to encourage and motivate the employees, business partners and their families to plant trees and send the

pictures through WhatsApp to the company, added the release.

Along with the rest of the country, State Bank of India Guwahati, Metro also celebrated World Environment Day on June 5 observing all Covid protocol, a press release stated.

As part of the programme, a tree plantation drive was undertaken at Deepor Beel and Medicinal and Aromatic Plants Garden, Guwahati where Suranjana Dutta and L Thangboi, general managers, Network I and Network II respectively, Madan LS, DGM, Bikash Basumatary, assistant general manager and a few other officials took active part and planted nearly 100 saplings in the area. On the occasion, the State Bank of India also felicitated the Beat Officer and the forest guards for their yeoman service in the area of forest conservation and distributed sweets and snacks among them.

Our Staff Reporter adds: The In-

stitute of Advanced Study in Science and Technology (IASST) celebrated World Environment Day on Saturday. The online celebrations commenced with a welcome address by Dr Arundhati Devi, associate professor, along with an introduction to the present status of the Deepor Beel ecosystem.

Prof Ashis Kumar Mukherjee, director, IASST, delivered the inaugural address by highlighting the ongoing research activities at the institute in the areas of ecology and environment.

Prof Mukherjee also emphasised the conversion of waste-to-value added product with appropriate processing. Eminent academicians as well as scientists from different renowned institutions of India participated and presented valuable talks pertaining to the occasion.

Prof Krishna Gopal Bhattacharyya of Assam Don Bosco University delivered a speech on this year's theme 'Ecosystem Restoration'.

Media Report Link- <https://www.southasia24x7.com/archives/20018>



Plantation and Environmental Awareness drive on the occasion of Independence Day 2021 at Guwahati Railway Station

Media Report Link <https://www.guwahatipus.com/guwahati/independence-day-plantation-drive-held-at-guwahati-railway-station>

TEAM VoE IN RESEARCH INITIATIVE

Research Paper Link- <https://link.springer.com/article/10.1007/s42108-021-00117-5>

Students conduct research on groundwater, soil quality near waste disposal site

CHRONICLE NEWS SERVICE

SILCHAR: Students of Karimganj College, passionate about environmental conservation, in 2014, took an initiative to visit the municipal dumping site of Silchar town and understand the urban waste management scenario. They visited the dumping site of Silchar and tried to understand the urban waste management scenario, which is a key problem in India. The team comprising late Rahul Das and Gaurav Roy, who is now associated with the Voice of Environment (VoE), a youth-based non-governmental organisation based in Guwahati, led the pilot study which involved sampling of groundwater and soil samples. The preliminary study was done under the scholarly guidance of Moharana Choudhury, an environmentalist from Assam, Dr. Dibakar Deb, the head of



Student-researchers at the spot

the Department of Chemistry, Karimganj College, and Dr. Sumita Paul Purkayastha, an assistant professor of the same department, Karimganj College. The study was followed by detailed data analysis and stakeholder engagement programmes, including community sensitisation and mobilisation. The team was further enriched by the scholarly expertise and peerless supervision of eminent scientist Prof K G Bhattacharjee, Department of Chemistry, Gauhati University, Assam. Other members include Dr. Darpa Saurav Jyethi, assis-

tant professor, Indian Statistical Institute, North-East Centre, Tezpur, Dr. Joystu Dutta, assistant professor and head of the Department of Environmental Sciences, Sant Gahira Guru Vishwavidyalaya, Sarguja, Chhattisgarh, and Tirthankar Sen, an M. Tech student of Department of Biosciences and Bioengineering, Indian Institute of Technology Guwahati. It may be mentioned here that one of the authors of the study, Rahul Das lost his life at a road accident in Guwahati in 2016. The research team was actively helped during sampling by lo-

cal social worker Prabal Dutta and members of the organisation Voice of Environment, which is based in Assam. The research findings were finally published in the International Journal of Energy and Water Resources, Springer, on March 4, 2021. The study shows the impact of the municipal waste disposal site on trace element contamination levels in soil and groundwater. The researchers found the soil to be 'extremely contaminated' with respect to the geo-accumulation index. The observations show the impact of the nearby dumpsite on environmental parameters, such as groundwater and soil quality. The researchers feel there is a need for more monitoring studies so that the data can be used to suggest the best sustainable environmental management practices for addressing waste management in emerging towns and cities in this part of the country.

Researchers study economic valuation of Chandubi Lake



SIVASISH THAKUR

GUWAHATI, Oct 20: A holistic economic valuation of the Chandubi Lake by a team of researchers has highlighted serious ecosystem marginalisation in the biodiversity-rich wetland where ecosystem services have not been priced and reflected in decision making, corroborating a complete policy and market failure.

The two researchers studied the economic valuation of the Chandubi wetland from January 2019 to February 2021 to arrive at a host of conclusions which have been published in the book *Wetland Conservation: Current Challenges and Future Strategies* by American publishers John Wiley & Sons.

One of the authors, Deepak Kumar who is working on environmental policy and plan-

ning and ecosystem-based disaster risk reduction in the United Nations Development Programme in India, said that agriculture yield from transformed/converted/encroached lakes does not reflect values lost due to flood protection, fisheries, biodiversity, etc., – something reflected in the economic marginalisation of the Chandubi Lake.

“People who degrade are not the same whose livelihoods are affected, leading to continued deterioration of the wetland. Wetland governance has been ineffective to address sectoral policies providing incentives leading to wetland depletion,” Kumar added.

Co-author Moharana Choudhury, a city-based environmentalist associated with NGO Voice of Environment, said that after doing extensive research on the ecosystem

valuation of the Chandubi wetland, they had estimated the monetary value of the wetland – despite inadequate and insufficient data – at ranging from a minimum of \$49 /hectare/year to \$24,390/hectare/year.

In Indian currency, the value ranges from a minimum of Rs 3479/hectare to Rs 17,31,690/hectare/year at the dollar prices during the period of research.

Kumar said, “Now academicians, researchers and policymakers will come to know about the wide range of ecosystem services and benefits the Chandubi wetland adores. It can be developed into a global centre of tourism and research.”

According to Choudhury, Chandubi has an immense potential to be designated as a Ramsar Site wetland of international importance. “We tried to produce a broader picture of

the monetary evaluation of this wetland within our limited resources so that people could understand the used and non-used values of wetlands and their potential role in driving sustainable development goals.”

Highlighting the Chandubi wetland’s rich natural resource with livelihood generation potential, he added that it is essential to know that wetlands have social, economic and ecological significance.

“They offer a diversity of ecosystem services and benefits. Wetlands are proving to be a watershed; the intensity of urban flash flood risk has magnified multiple times now because of dying wetlands. People’s ignorance and knowledge deficit have put such a vital ecosystem of disaster risk reduction at stake,” Choudhury said.

The research paper urged the government to develop a far-sighted vision to formulate sustained policies to protect and conserve such significant ecosystems and their biodiversity.

The Chandubi Lake is a naturally perennial landscape formed as a post-catastrophic consequence of tectonic submergence of forests during the massive earthquake of 1897 in Assam. Located in Kamrup district, it reflects a cultural ecotone of two bordering states of Assam and Meghalaya.

NHR

Media Report Link- <https://timesofindia.indiatimes.com/city/guwahati/ramsar-site-tag-sought-for-chandubi-lake/articleshow/86769282.cms>

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Panel Discussion on International Mountain Day 2021 “Mountains for Sustainable Tourism”

Medi Report Link-

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- 2) <https://www.southasia24x7.com/archives/23257>

Acknowledgement:

From the Editorial team, we would like to express our thanks and gratitude to the Voice of Environment (VoE) members, contributors, and well-wishers. It would not be possible to prepare the newsletter without their support and cooperation. Though we are passing through some tough times, we have tried our best to represent the newsletter to the community. We hope you will enjoy it!

Conflict of interest statement:

The editorial team maintained the ethical guidelines of publication. All submitted articles have been screened for plagiarism and accepted based on quality. It is understood that the authors of their articles have mentioned the sources or acknowledged the original documents if they have used any previously published data/picture/or any other matters. The editorial team declares no conflict of interest among themselves.

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Best wishes
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Thank You All