Mother Earth

Quarterly e-Magazine
Environment and Disaster Management Department
Ramakrishna Mission Vivekananda Educational and Research Institute, Narendrapur Campus
Volume-1, Number-1, April-June 2023

This earth is higher than all the heavens; this is the greatest school in the universe.

Swami Vivekananda

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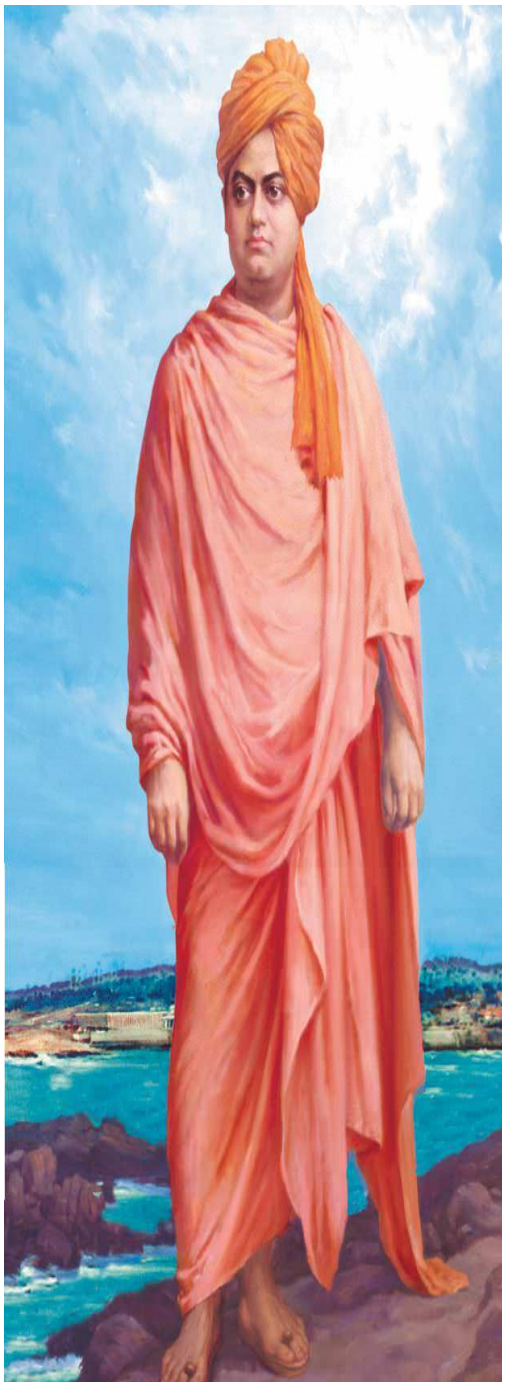

Among the 'thrust areas' chosen for study and research in our University bearing Swami Vivekananda's hallowed name is 'Environment and Disaster Management (EDM)' and the Centre chosen for the implementation of postgraduate and research programmes in this important area is Ramakrishna Mission Ashrama, Narendrapur which has several decades of experience in running programmes on education, outreach and extension programmes in agriculture, rural development and related fields with an ideal ambience, elevating and peaceful. After more than a decade of initial struggle, this Centre can now proudly boast of being one of the finest Centres in the State of West Bengal in the field of agriculture and rural development for education and research in these areas.

Environment and Disaster Management is a relatively new area in the educational enterprise of Ramakrishna Mission Vivekananda Educational and Research Institute, a Deemed to be University under University Grants Commission, Government of India, Ramakrishna Mission itself has been into the field of Disaster Management, also known as 'Relief and Rehabilitation' since its very inception 125 years ago. In the field of education and research, however, to our knowledge, the M.Sc. and Ph.D. programmes run by School of Environment and Disaster Management and Department thereunder, are the first of its kind in India.

Being highly and truly inter-disciplinary in character, this field needs to be promoted in a big way and the new generation students need to be made keenly aware of the subtle nuances in research in this area like environmental ethics, ecological balancing, conservation and preservation of the earth's resources, global warming, climate change, environmental modelling, United Nations Organization's SDGs, etc.

This e-magazine, whose first issue will see the light of day on the auspicious occasion of the Earth Day on 22 April 2023, will keep telling its readers the story of the EDM Department—its struggles over more than a decade of its formation, its vision in transmitting the knowledge of our environment and the importance of post- and pre-disaster management to generations of students, and a lot more in this area of ever growing importance. This e-magazine will continually update the readers on the story of in the EDM Departments' journey in aspiring for and reaching further heights of excellence.

On this occasion, we seek the good wishes, cooperation and support of all the stakeholders for the success of this new venture. May it enlighten, enliven and encourage all those connected with the University's Faculty Centre at Narendrapur for years to come.

Belur Math
Main campus of the University
20 April 2023

Swami Atmapriyananda
Pro-Chancellor

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April 21, 2023

MESSAGE

"Away, away, from men and towns,
To the wild wood and the downs, —
To the silent wilderness,
Where the soul need not repress its music."
—Percy Bysshe Shelley

These words of Shelley remind us of the importance of nature and the relevance of global eco-system in our daily life. Yet, we are neither safeguarding nor protecting the biodiversity of the other organisms we share the planet with. As a species, we depend on plants and agriculture for our very existence and they need to receive greater attention and focus.

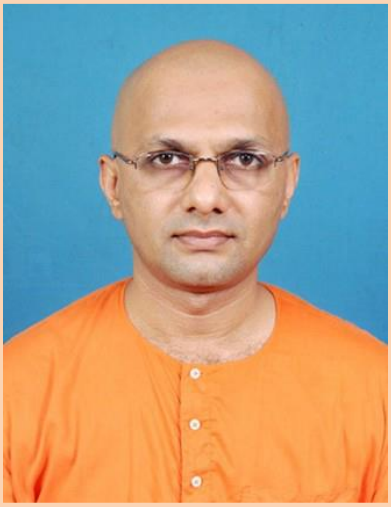
The future of the Earth and its inhabitants has never been more uncertain because of urbanisation and deforestation, but there is still time for us to prevent further catastrophe. Scientists have a crucial role to play in the preservation of plant biodiversity and crop genetic diversity, both vital goals that will have a major impact on the success or failure of humanity's attempts to prevent ecological disaster.

It is very encouraging to learn that the department of 'Environment and Disaster Management' and its students are bringing out an e-Magazine named 'Mother Earth' which is to be launched on our website on 22 April, 2023. Earth Day is an annual celebration that honors the volunteers of the environmental movement. It also raises awareness of the need to protect Earth's natural resources for future generations. In this age of urbanisation this magazine will surely create awareness among us on the environmental issues and make us aware of the importance of environment.

On this occasion, I sincerely pray to Bhagavan Sri Ramakrishna, Holy Mother Sri Sarada Devi and Swamiji Maharaj to shower their choicest blessing upon all the stakeholders for the success of this new venture.

Swami Shastrajnananda
Secretary, Ramakrishna Mission Ashrama Narendrapur
Administrative Head
IRDM Faculty Centre, Narendrapur

MESSAGE



It is very heartening to know that our students, alumni and faculty of the department of 'Environment and Disaster Management' are bringing out an e-Magazine called 'Mother Earth' and the inaugural issue of which is going to be launched on our website on 22 April, 2023.

The first Earth Day was celebrated in 1970 when a United States senator from Wisconsin organized a national demonstration to raise the awareness about environmental issues which soon became an international event. Earth is referred to as 'Mother' in most of the countries in their own languages as a supporter of all the life.

In many of the Indian scriptures also earth is praised in various ways. We can see one such example in Bhumi Suktam from Atharva Veda which says –

> *" Salutations to mother earth! In her is woven together ocean and river waters; in her is contained food which she manifests when ploughed, in her indeed is alive all lives; may she bestow us with that life".*

It is very appropriate that this e-Magazine is coming up to raise the awareness on the environmental issues and keep the young minds focused on the much needed importance of environment (mother earth) which has already been threatened!

I wish a grand success of this venture by our students, alumni and the faculty.

Swami Shivapurnananda
Assistant Administrative Head

Celebrating the Mother Earth Day

Dr. P G Dhar Chakrabarti
Swami Vivekananda Chair Professor on Environment and Disaster Management

The General Assembly of the United Nations in a resolution adopted on 22 April 2009 decided to designate 22 April as International Mother Earth Day. Earlier the day was being observed as Earth Day, initially in the United States since 1970, and subsequently around the world since 1990.

Earth Day in USA

The immediate impetus for celebration of the Earth Day in the United States was the massive oil spill in Santa Barbara, California in January 1969 that killed over 3,500 sea birds and numerous marine animals such as dolphins, elephant seals, and sea lions. The public outrage against the spill took the shape of massive protests, lending support to the burgeoning environment movement in the country, started with the publication of Rachel Carson's bestseller *Silent Spring* in 1962. Students across university campuses, already in the forefront of anti-Vietnam movement, joined in thousands. 22 April 1970, a weekday falling between spring break and final exams, was chosen as the day of nationwide protests to maximize student participation. 20 million Americans — at the time, 10% of the total population of the United States — took to the streets, parks and auditoriums to demonstrate against 150 years of industrial development that had left imprints on polluted soil, air and water, with serious consequences on human, plant and animal health. This protest movement spearheaded a spate of environmental legislations in the USA and around the world.

Earth Day around the world

Earth Day went global in 1990, with EARTHDAY.ORG, the mother body created in the USA, networking and mobilizing over 200 million people in 141 countries and lifting environmental issues onto the world stage. This paved the way for the 1992 United Nations Earth Summit in Rio de Janeiro. Thereafter there has not been any looking back. Every year Earth Day is celebrated on a chosen global environmental issue, engaging more than 1 billion people every year, and has become a major rallying point for engaging people around the world for protection of the planet.

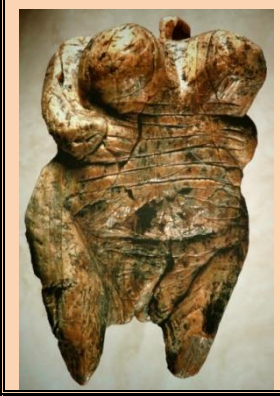
From Earth Day to Mother Earth Day

Renaming the Earth Day as the International Mother Day by the United Nations was a recognition of the global character of the movement to protect planet earth, as also an acknowledgement of the veneration of the planet earth as 'Mother' by the communities and cultures across time and space. Mother Earth nurtures, protects and sustains life on earth - in plants, animals, humans and other living species – through its free gifts of clean air, water, energy and food - all that are necessary for lives to survive.

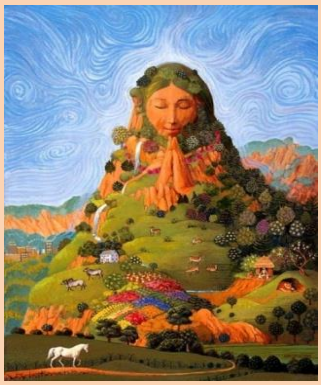
Mother Earth Magazine

It is heartening that faculty, alumni and students of Environment and Disaster Management Department of RKMVERI have decided to launch an e-magazine on the occasion of the celebration of International Mother Earth Day this year and name it MOTHER EARTH. This connects the initiative of this Department with the civilizational ethos of countries around the world in as much as it does with the contemporary global movements. This further casts upon us an obligation to protect the Mother Earth from the growing pollution, depleting sources, changing climate, and threatening calamities, May the Goddesses of the Mother Earth bless us in our initiatives.

MOTHER EARTH GODDESSES AROUND THE WORLD



Venus of Hohle Fels, dating between 40,000 and 35,000 years ago, point to the worship of a prehistoric Mother Goddess who represented fertility and reproduction.



Pachamama: the fertility goddess of the indigenous people of the Andes who sustains all life on earth, presides over harvests, embodies the mountains, and has the ability to cause earthquakes.

Prithvi, the goddess of the earth, is described as *Mātáram Bhűmim* in Rig Veda. She is also known as Vasudha, Dhariti, Vasundhara - all incarnation of the Mother Earth.

Hòutǔ is the Chinese Queen of the Earth, and the deity of deep earth and soil. In one of her myths, she saved many lives by correcting the flow of water during the Great Flood China.

In Greek mythology, **Gaia**, meaning 'land' or 'earth' is the ancestral mother – parthenogenic of all life. She is the consort of Uranus (the sky), from whose sexual union she bore the Titans (parents of many of the Olympian gods), the Cyclopes, and the Giants; as well as of Pontus (the sea).

In Roman mythology **Tellus Mater** or **Terra Mater** ("Mother Earth") is the personification of the Earth. She is associated with rituals pertaining to soil, earth, agriculture and fertility.

Geb is the Egyptian goddess of the Earth. She is also a goddess of fertility and farming, and is associated with birth, death and the life cycle in Egyptian mythology.

In Māori mythology, **Papatūānuku** was the earth mother who created the world with the sky father anginui.

Earth Day – Some Random Thoughts

Dr. Sudipta Tripathi
Assistant Professor Environment and Disaster Management

There is no planet B to cater the demand of human civilization. Earth is the only planet where all components for the existence of life are present. Natural resources like air, water, soil ecosystem etc. are maintaining a harmonic relationship in this planet earth. But due to rapid urbanization, industrialization, and so-called development somehow that harmony in the planet earth has been disturbed. Indiscriminate use of natural resources and unplanned development sometime causes disaster in our planet, which we are experiencing every day either physically or through electronic media. Frequency of occurrence of disaster like earthquake, cyclone, flood, drought etc. had enhanced several folds during recent past. Pollution in air, water and soils are increasing day by day due to huge population growth and development. As a result, nature is behaving abnormal causing climate change, global warming, sea level rise, acid rain, ozone layer depletions etc., which have a big impact on our environment and society in recent time. In this context we have to remember that "the nature is kind enough to meet our need not our greed".

So, at present we are standing in a crossroad of environment and development where we have to maintain balance/harmony between the two. "Earth Day" celebration, which was stared in the year 1970 on 22nd April, is one such initiative to maintain this harmony.

Like other years, in this year also we are also going to celebrate the 53rd earth day with a theme "**Invest in our Planate**". Now, we have to understand what are those investments? To protect our planet earth and to make it more congenial for our future generation we have to invest some things on the occasion of earth day.

Those investments may be summarized as activities or oaths to be taken by us on the occasion of Earth Day which are

1. Plant a tree
2. Use wild flower and native plants
3. Provide support to your pollinator
4. Provide climate literacy
5. Clean up plastic in neighborhood or local park
6. Stop pesticides and chemical in garden
7. Conserve water
8. Swap out your kitchen and household product
9. Think about your diet
10. Involve kids in environmental activities

To perform those activities throughout the year either in our individual capacity or through institutional initiative definitely provide as a better future and happy planet.

Let us pray to the Almighty to give us enough strength to feel and perform those activities and make this Earth Day 2023 a grand success.

EDM UPDATES

(January- April 2023)

- **IUINDRR:** Environment and Disaster Management Department was admitted to the Indian Universities and Institutions Network on Disaster Risk Reduction (IUINDRR)
- **Environmental, GIS and Disaster Simulation Laboratories**
  Two modern laboratories – an Environmental Chemistry and Microbiology Laboratory and a GIS and Disaster Simulation Laboratory – have been established in the Department. These will obviate the needs of the students to strengthen the practical lessons and research activities of the Department.
- **Reconstitution of Board of Studies:** The Board of Studies of EDM was reconstituted with eminent experts on the subject
- **Revised Syllabuses:** Revised syllabus of MSc and PhD programme of Environment and Disaster Management and Certificate Course on Humanitarian Studies have been approved.
- **Participatory Disaster Risk Assessment:** MSc First Semester students of Environment and Disaster Management made a field visit to village Pakhiraloy in Gosaba Block of South 24 Paragana District for preparation of Participatory Disaster Risk Assessment (PDRA) and Village Disaster Management Plan (VDMP)from 6-9 February,2023.
- **Internship cum dissertation work:** MSc fourth semester students of Environment and Disaster Management are pursuing their internship cum dissertation work at different Central and State Government Institutes and NGOs of International repute. These include ICAR, NIRD&PR, IIRS, IMD, AIDMI, WBPCB, GOWB,
- **Dr. P G Dhar Chakrabarti** delivered the Keynote Address at the National Conference on Disaster Research and Knowledge Management organized by the Central University Chennai in collaboration with National Institute on Disaster Management in Chennai on 21 February 2023.
- **Dr. P G Dhar Chakrabarti** delivered a colloquium lecture on “Measuring Disaster Risks and Resilience in India” at RKMVERI, Narendrapur on 10.03.2023.
- The report of the research project on “Strengthening Humanitarian System of India” sponsored by the WFP was released during the third session on National Platform on Disaster Risk Reduction in New Delhi, March, 2023. **Dr. P G Dhar Chakrabarti** was the Principal Researcher of the project
- **Dr. SudiptaTripathi** published an article on “Revisiting the oldest manure of India, Kunapajala: Assessment of its animal waste recycling potential as a source of plant biostimulant” with others in Frontiers in Sustainable Food Systems (2023). 6:1073010.
- **Dr.SudiptaTripathi** published an article on “Isolation and characterization of beneficial bacterium from the rhizosphere of *Suaedanudiflora* in Sundarbans, India” (2023) in Journal of the Indian Society of Coastal Agricultural Research
- **Dr. SudiptaTripathi** delivered an invited television talk on “use of microorganisms and plant in reducing environmental pollution” in Krishidarshan programme on 29.03.2023 at 5.30 PM over DD Bangla at Doordasrshan Kendra, Kolkata.
- **Debasmita Roy**, ex-student of our department, has qualified SET for eligibility for Assistant Professor in Environmental Science conducted by West Bengal College Service Commission held on 08.01.2023.

Global Environment and Disaster Updates

(January-March 2023)

As per the global disaster database of EM-DAT, the first quarter of 2023 witnessed as many as 131 disasters globally, each killing either 10 persons or injuring 100 persons. A total of 56,788 persons were killed in these disasters, 127,941 were injured, 19,583,572 were affected and economic losses to the tune of 43.922 billion US dollars were suffered by countries and communities around the world.

Out of these 131 disasters, 80 were natural and 51 technological disasters. The most prominent natural disaster was flood (33), followed by cyclones and tornadoes (18), earthquake (16), landslide (5), epidemic (5), cold wave (2) and drought (1). The most important technological disasters were transport related accidents on road, river, sea, and air (33), followed by industrial accidents (5), fire (5), collapse of buildings (3), and miscellaneous accidents (5).

Earthquake in Syria and Turkey

The most severe among all these disasters was the Turkey-Syria earthquake. A devastating 7.8 magnitude earthquake struck Syria's northern and western regions, as well as the southern and central sections of Turkey, on February 6. Only nine hours later, a 7.7 magnitude earthquake with numerous aftershocks rocked the area, escalating the devastation. One of the deadliest earthquakes in recent Turkish history the earthquake killed 50096 persons in Turkey and 4500 in Syria.

Australia's flash floods

Flash floods were caused by torrential rain on February 8 and 9 in New South Wales. There were over 600 calls for assistance, necessitating the evacuation of thousands of individuals. The majority of the areas were unaffected because the storms that brought the floods were confined to the coast. However, there had been no reports of fatalities.

Earthquake in New Zealand

A powerful earthquake that shook the area around Wellington, New Zealand's main city, occurred on February 13. The catastrophe occurred while the nation was still dealing with the fallout from tropical cyclone Gabrielle, which took seven lives. On Tuesday (February 14), the 6.1-magnitude earthquake prompted Prime Minister Chris Hipkins to proclaim a national state of emergency, citing the ongoing rain and flooding as aggravating factors. About 9,000 individuals had been left homeless as of February 16; 3,000 of them had sought refuge in emergency shelters. Alarmingly, 1,442 people have been listed by the authorities as formally missing.

Avalanche in Tajik

Eastern Tajik province of Gorno-Badakhshan faced as many as 69 avalanches on February 16, killing more than 20 people. The government warned locals not to journey through the area until further notice and suspended international traffic. Many roads and communication networks were damaged, making rescue efforts even more difficult.

Brazil Floods

The region experienced heavy rainfall on February 18–19, 2023, as an area of low pressure off the coast of Brazil delivered moist onshore flow. Brazil's richest state, São Paulo, which has already received more than 600mm (23.6 inches) of rain—the greatest cumulative total ever recorded in the nation—has experienced landslides and flooding in coastal communities due to intense downpours. As the official death toll increased to 67, search and rescue teams rushed to find the dozens of people still unaccounted for after heavy rains devastated coastal areas of Brazil's south eastern São Paulo state.

Updates on issues of environment and climate change

Some of the important updates on the fields of environment and climate change globally were the following:

IPCC Synthesis Report:

The most important event of the first quarter of 2023 was the much awaited release of the Synthesis Report of IPCC Sixth Assessment on 20 March 2023. The report reiterates that humans are responsible for all global heating over the past 200 years leading to a current temperature rise of 1.1°C above pre-industrial levels, which has led to more frequent and hazardous weather events that have caused increasing destruction to people and the planet. The report reminds us that every increment of warming will come with more extreme weather events.

The report outlines that the 1.5°C limit is still achievable and outlines the critical action required across sectors and by everyone at all levels. The report focuses on the critical need for action that considers climate justice and focuses on climate resilient development. It outlines that by sharing best practices, technology, effective policy measures, and mobilising sufficient finance, any community can decrease or prevent the usage of carbon-intensive consumption methods. The biggest gains in well-being can be achieved by prioritizing climate risk reduction for low-income and marginalized communities.

UNGA Resolution on Obligation of Countries to Address Climate Change:

A resolution adopted on 29 March 2023 at the United Nations General Assembly in New York is being hailed as a victory for climate justice. The resolution was spearheaded by the Pacific nation of Vanuatu, a country bearing the brunt of the climate crisis. Co-sponsored by more than 130 countries, the resolution states that the UN General Assembly will seek the opinion of International Court of Justice on the legal consequences for states that, "by their acts and omissions", damage the climate in such a way that it affects others, particularly small island nations who are among the most vulnerable to the effects of climate change.

International Day of Zero Waste:

In response to the worsening impacts of waste on human health, the economy and the environment, the world marked the inaugural International Day of Zero Waste on 30 March 2023. UN Secretary-General António Guterres said on the Day. "Humanity is treating our planet like a garbage dump. We are trashing our only home.…It's time to fight back, and launch a war on waste."

Established through a UN General Assembly resolution that followed other resolutions on waste, including the 2 March 2022 UN Environment Assembly's commitment to advance a global agreement to end plastic pollution, the International Day of Zero Waste is jointly facilitated by the UN Environment Programme (UNEP) and the UN Human Settlements Programme (UN-Habitat). The Day calls upon all stakeholders – including civil society, businesses, academia, local communities, women and youth – to engage in activities that raise awareness of zero-waste initiatives.

Climate Change and Community Resilience

Diksha Kar

Climate change is the defining environmental challenge of the twenty-first century posing a global threat to the sustainability of environmental, social, and economic systems. The IPCC emphasizes that both incremental and transformational adaptation strategies would be required to effectively address future climate-related impacts.

Community-based initiatives are emerging as promising approaches to lessen the impacts of climate change while empowering people and bolstering community resilience. These approaches have been applied to a wide range of climate adaptation programs in climate vulnerable communities— from disaster risk reduction (DRR), emergency preparedness, and flood/drought protection to sustainable agriculture, water resource management, food security, and resilient livelihood solutions .

Local innovation and agency are critical complements of these programs in fostering sustained community resilience. Community-based approaches with engagement of the vulnerable population that are adequately supported by international agencies, national and local government, academics, experts, and nonprofit organizations have the potential to develop locally relevant, culturally appropriate, and sustainable solutions.

Sustainable Development Goals (SDGs) and the principles of resilience offer additional tools to situate current climate adaptation initiatives and explore opportunities for enhancing existing adaptation models. There is documented evidence of successful outcomes of community-based initiatives in improving both the adaptive capacity and resilience. There is a need to learn from these initiatives to develop a more integrative and standardized framework that can be widely replicated. Based on the experiences gained in successful implementation of community based climate adaptation programmes, particularly in the context of South Asia, a framework can be developed for Climate Resilient Community Based Adaptation. This framework can have six components:

1. Livelihood diversification

Rising temperature and uncertain rainfall with associated changes disrupts the established livelihood system; hence there is need to develop alternative livelihood opportunities based on local resources, technology, market demands, and new skill sets.

2. Infrastructure development

Infrastructure of irrigation, agricultural research and extension, communication, marketing, cold storage, food processing for value addition of agricultural and horticultural products needs to be strengthened through public-private participation.

3. Microfinance and insurance

Self Help Groups of women, farmers, artisans etc can pool their small savings to develop micro-finance and micro-insurance systems supported by a policy eco-system such as refinancing facilities of banks and insurance companies.

4. Resource management

Many community-based organizations are working on restoring degraded ecosystems, protection of lakes, rivers, and forests in order to ensure that these natural resources provide natural insurance against climate risks. In coastal areas conservation of mangroves provides protection against cyclones and coastal flooding.

5. Ecosystem integrity

There are many instances of communities working together to restore integrity of nature, such as reforestation of degraded forest land, restoring tidal flooding of coastal rivers, protection of river banks, and building natural erosion control bunds, which help to deal with extreme weather conditions like floods, storms etc.

6. Capacity Building

While communities have the inherent capacity for resilience, these should be further enhanced through sensitisation, awareness generation, training and skill development.

Climate Action for Mitigating Heat Wave

Dr. Mahadev Bera

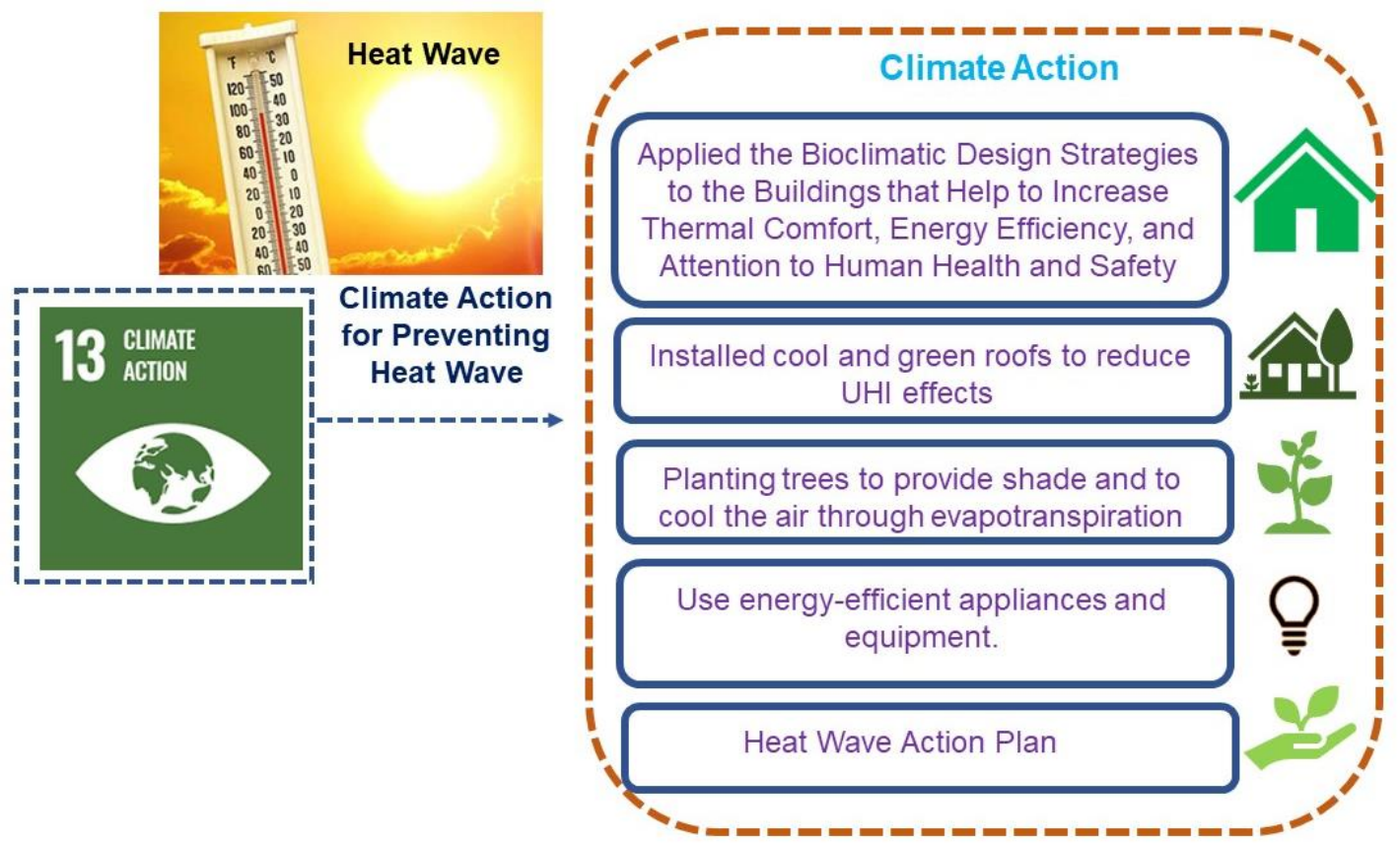
Globally, hot days are becoming hotter and more frequent, whereas cold days are becoming less frequent. A heat wave is a period of unusually high temperatures that is higher than the normal maximum temperature that typically happens in the summer in the North-Western regions of India. Typically, heat waves happen between March and June, but they can very rarely last all the way through July.

According to IMD the criteria for heat wave are:

- Heat Waves should not be anticipated until a station's maximum temperature reaches at least 40°C for plains and at least 30°C for hilly regions.
- Heat waves should be declared when the actual highest temperature is 45°C or higher, regardless of the typical maximum temperature.

Climate action for preventing heat waves:

The climate action for mitigating and preventing heatwaves are (a) adopting the bioclimatic design strategies to make the building eco-friendliness, human friendliness, and energy friendliness; (b) installing cool and green roofs; (c) planting the tree; (d) energy-efficient appliances use; (e) prepare the heat wave action plan for mitigating the effects of, prepare for, respond to, and recover from heatwaves.



Circular Economy and Lead Recovery

Asmita Basu

The manufacture of lead acid batteries primarily involves lead, an extremely hazardous metal. The detrimental effect on the environment of virgin lead is extremely significant, and its importation is higher in cost as well. As a result, secondary sources like battery scraps and other lead-bearing wastes provide over seventy percent of the necessary lead required by the industry[1]. The Circular Economy (CE) plays a significant role in the lead recovery and recycling industries (Figure 1). By altering a material's design and manufacturing procedure, CE aims to increase a material's lifespan and ensure subsequent re-utilization[2]. Through the implementation of the CE model (Figure 2), resources could be used sustainably and the amount of imported battery scrap could be reduced.

Figure 1: Circular Economy Benefits

As most manufacturers strive for innovative and ecologically responsible ways to improve current processes associated with creating and producing new products, CE has grown in popularity over time. This would not only reduce dependency on volatile raw material prices and the high expenses of limited resources, but would also enable corporations to make long-term financial savings. The prime strategies to be followed for operationalization of CE are presented in Figure 3.

Figure 2: Key Elements of Circular Economy Model

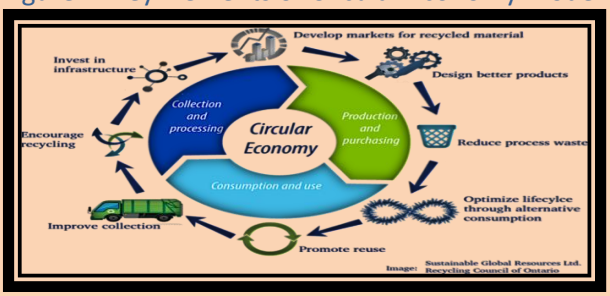
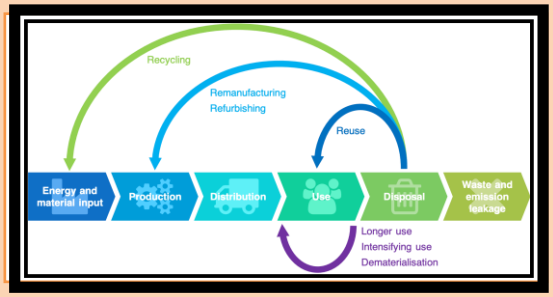


Figure 3: *Strategies for Implementation of Circular Economy*



The primary objective of the secondary lead smelting sector is to facilitate the production of lead ingots that are subsequently sent to various battery manufacturing facilities for further utilization. In a conventional lead smelting facility, Lead dross, Lead ash, and Slag are the three major types of hazardous wastes (HWs) that are being generated. Units primarily report quantity of lead dross and slag combined in the form of Lead baring residues ('9.1 category' waste) whereas Lead ash generation is reported separately ('9.2 category' waste). Lead ash and lead dross, two of the three generated HWs, are recyclable, which means they are returned to the production loop to be utilized again until all of the lead remainders have been consumed.

However, the generation of slag that can be dumped in landfills continues to raise environmental concerns[3]. An investigation conducted by the author indicates that most units usually underestimate the amount of slag they generate leading to higher environmental risk due to unscientific disposal of HWs that may have adverse impacts on the environment and human health.[3]

[1] Niti Aayog (2021); Government Driving Transition from Linear to Circular Economy, Posted On: 18 MAR 2021 3:23PM by PIB Delhi

[2] Prengaman, R.D. and Mirza, A.H. (2017). 20 - Recycling concepts for lead–acid batteries in Lead-Acid Batteries for Future Automobiles, Editor(s): Jürgen Garche, Eckhard Karden, Patrick T. Moseley, David A.J. Rand; Elsevier, 575-598 (https://doi.org/10.1016/B978-0-444-63700-0.00020-9)

[3] Basu Asmita, Dhar Aditya, Chakrabartty Satyendra Nath, Mitra Sarbani and Agrawal Krishna M Agrawal (2022); Operationalizing Circular Economy- Lead Recovery and Recycling Units, Proce. 12th International Conference on Sustainable Waste Management & Circular Economy and IPLA Global Forum 2022 Organised by International Society of Waste Management, Air and Water (ISWMAW)

Women, Climate Change and SDGs

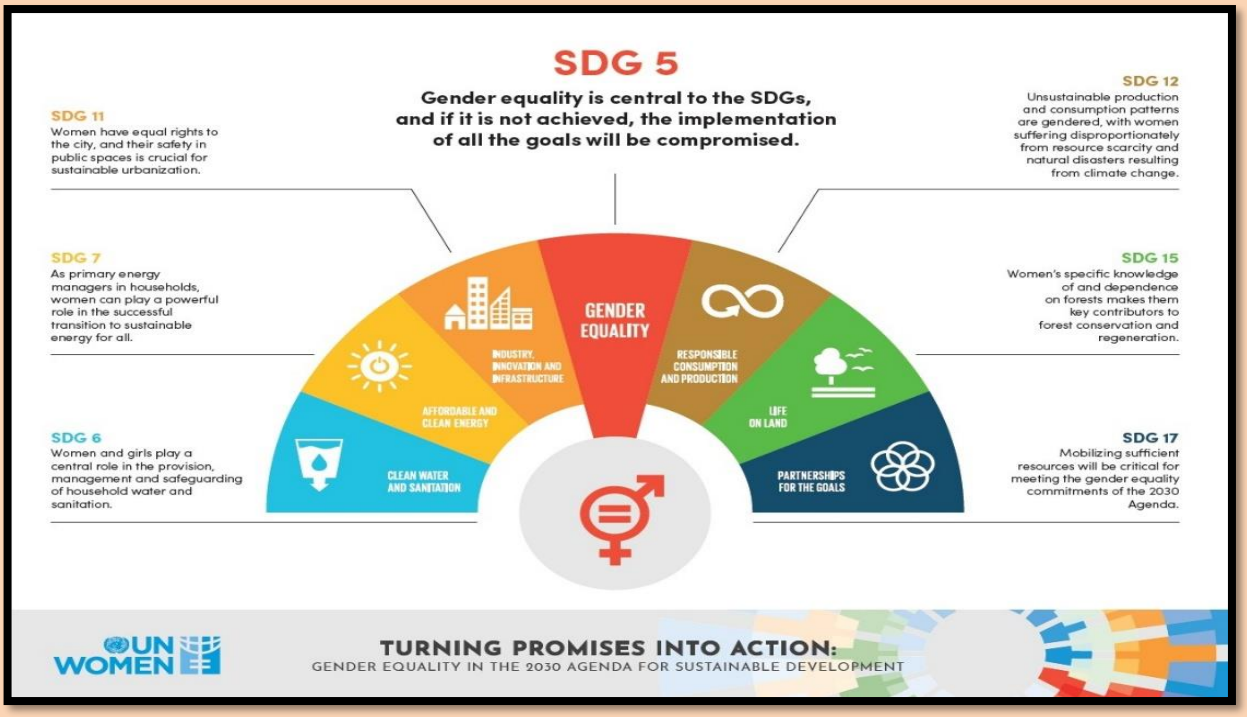
V Rohit Kumar

Women around the world are bearing disproportionate burden of the impacts of climate change. Women comprise a significant proportion of the agricultural labour globally. While male folk attend to the more physical challenging tasks of ploughing, harvesting and transporting that are usually limited to the beginning and closing of cropping cycles, women attend to the field round the year for sowing, transplantation, weeding, manuring, husking and storing, in addition to performing household chores including child and elderly care.

When extreme climatic events like heat wave, drought, flood, cyclonic storms, cloudbursts etc affect agriculture and livelihood, adult male from rural areas migrate to urban areas in search of livelihood as construction workers and other activities, leaving the fields as well as the homes for the women to manage under very difficult circumstances. This increases the burden of work on women, who are already overburdened with agricultural activities along with the domestic work and child care. In many communities, women have to walk long distances for procuring fuel wood and water.

Often disasters cause loss of lives and shelters and many households lose their earning male members forcing women and girls to look for alternate avenues of income. Girl child drops out of the schools to support household works. Often they become victims of human trafficking, sexual exploitation and abuse.

UN Sustainable Development Goals have placed very high priorities on achieving 'gender equality and empowerment of all women and girls' which is expressly stated in SDG-5 and run through several other goals. Unequal burden of climate change on women is no doubt posing very serious challenges to the achievement of these goal of gender equality and empowerment.



Correlation between the gender equality in the achievement of the SDGs.

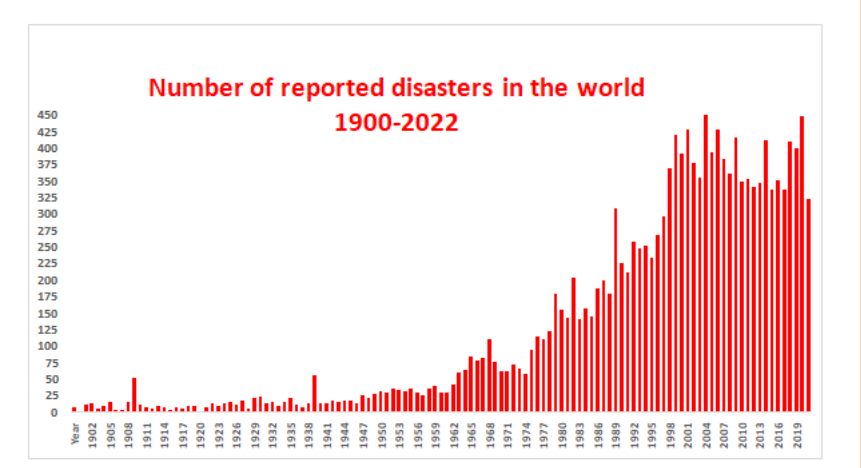
A paradigm shift in the unfortunate state of affairs can be brought about by building up the capacity and resilience of women, empowering them with modern as well as sustainable techniques of agriculture and making them aware about livelihood diversification, and involving them in decision making on everything that concern them. They are inherently capable to deal with various adversities, if we provide them equal opportunity and support we will pave a path towards a climate resilient society for the upcoming future generations.

Climate Change and Natural Hazards

Sonia Paul

Celebrated British-American scholar-activist Ben Wisner had written a paper in 1976 titled 'Taking the Naturalness out of Natural Disaster'. This is known to have changed the discourse of disaster research, as the focus shifted from natural hazards to unnatural vulnerabilities that were found to be contributing much more to disasters causing losses of lives, livelihoods and assets of countries and communities around the world.

Now warming climate and spiralling hydro-meteorological disasters seem to be changing the character of natural hazards. What was hitherto known to be a natural process embedded into the earth system of temperature-winds-precipitation is now seen to be changing its natural course due to anthropogenic interventions.



Human activities since the beginning of industrial revolution, more particularly after the middle of nineteenth century – emitting dangerous green house gases in the atmosphere by indiscriminate burning of coal, oil and gasses, deforesting large areas for mining, infrastructure and urban development, and damaging potential carbon sinks have driven us to a tipping point when the very survivability of living species on the planet earth is in danger.
Large scale deposits of carbon dioxide, nitrous oxide, methane and other gases in the air deposited over two hundred years act like a blanket grappled around the world, which traps the sun heat and rises the earth temperature. Earth scientists are near unanimous in their observations that the average surface temperature of the earth has increased by more than 1 degree centigrade during last 100 years, and in next 100 years temperature would increase between 2.4 to 4.8 degrees, unless drastic measures are taken to reduce the GHG emissions in the atmosphere.

Rising temperature is causing glacial deposits in mountains and Polar Regions, ice sheets and permafrost to melt, raising sea levels, threatening low lying coastal areas and islands. Increasing temperature is also causing more evaporation from ocean resulting in more intense atmospheric depressions, tropical cyclones and storms. This is further disturbing the natural cycle of atmospheric precipitation, causing longer dry spell and shorter but more intense rainfall, creating conditions of drought and flood over large areas hitherto unknown.

As a result natural disasters are increasing in terms of frequency, complexity and intensely. According to EM-DAT during the last 32 years globally meteorological disasters (cyclone, heat wave), hydrological disasters (flood, landslide wet) and climatological disaster (drought, GLOF, wild fire) have increased much more compared to geophysical disasters like earthquakes, tsunamis and landslide dry.

During the last 20 years globally, the number of climate related disasters like flood, storms wildfire, drought, extreme temperature have almost doubled. Around 1.65 billion people were affected by flood, 1.43 billion people by drought and 727 million by storm. Cyclonic storms alone killed 199,718 people during the period, followed by 165,923 deaths due to extreme temperature and 104,614 deaths by flood. The financial losses caused by storms were estimated to a staggering $1.39 trillion.

No doubt these disasters are caused due to increasing exposure of vulnerable people, assets and economy to the natural hazards, but the character of natural hazards are also changing due to anthropogenic climate change. This raises the question whether we call the natural hazards as natural.

Plastics at Sea: The Menace of Marine Plastic Pollution

Arundhati Aich

The vast expanse of our oceans, covering more than 70% of the Earth's surface, is home to a staggering array of marine life. From majestic whales to colourful corals, the oceans are teeming with biodiversity. Marine biodiversity, the variety of life in the ocean and seas, is a critical aspect of all three pillars of sustainable development—economic, social and environmental—supporting the healthy functioning of the planet and providing services that underpin the health, well-being and prosperity of humanity. However, beneath the surface lurks a silent menace - marine plastic pollution.

Over the past few decades, our oceans have become a dumping ground for plastic waste, posing a grave threat to marine ecosystems and the delicate balance of our planet's blue heart.

Marine plastic pollution has reached epidemic proportions, with an estimated 8 million metric tons of plastic waste entering the oceans every year. Based on available data and reports the top 10 countries that have been identified as major contributors to plastic pollution in the ocean are Philippines, India, Malaysia, China, Indonesia, Myanmar, Brazil, Vietnam, Bangladesh and Thailand. Plastics of all shapes and sizes, from micro-plastics smaller than a grain of rice to large plastic debris such as fishing gear and plastic bottles, are pervasive in our oceans. These plastics persist for hundreds of years, slowly breaking down into smaller particles and infiltrating every corner of the marine environment.

Causes

The causes of marine plastic pollution are complex and multifaceted. The primary sources of marine plastic pollution include inadequate waste management and littering, with plastic waste from land-based sources, such as rivers and coastal areas, being a major contributor. Inadequate waste collection, recycling, and disposal systems in many coastal communities and developing countries lead to large amounts of plastic waste entering the oceans. Additionally, plastic waste

generated by industries, fishing and aquaculture activities, and shipping also contribute to marine plastic pollution.

Impacts on marine life and human health

The impact of marine plastic pollution on marine life is devastating. Marine animals, such as sea turtles, seabirds, whales, and seals, often mistake plastic debris for food or become entangled in discarded fishing gear, leading to injury, suffocation, and death. Coral reefs, often referred to as the "rainforests of the sea", are also threatened by plastic pollution, as plastic debris can damage delicate corals and hinder their ability to grow and thrive.

The impacts of marine plastic pollution are not limited to marine life alone. Plastics in the oceans can also have serious consequences for human health. Fish and other marine species can ingest micro-plastics, which have been found in seafood consumed by humans. These micro-plastics can contain toxic chemicals, such as persistent organic pollutants (POPs) and heavy metals, which can bio-accumulate in the food chain and pose a risk to human health. Furthermore, plastic debris can wash up on beaches, posing a threat to tourism, and disrupting local economies that depend on healthy oceans.

Solutions and future outlooks

Addressing marine plastic pollution requires a multi-pronged approach that involves reducing plastic waste at its source, improving waste management and recycling systems, and promoting awareness and behaviour changes among individuals, communities, and industries.

Governments, businesses, NGOs, and individuals all have a role to play in tackling this global crisis. Efforts such as beach cleanups, plastic reduction campaigns, and plastic waste management infrastructure investments are steps in the right direction. Additionally, innovations in plastic alternatives, recycling technologies, and policy interventions can contribute to a more sustainable future for our oceans.

Environment, Disasters and Mental Health

Chetana Tunga

"The impacts of climate change are increasingly part of our daily lives, and there is very little dedicated mental health support available for people and communities dealing with climate-related hazards and long-term risk," Dr Maria Neira, Director of the Department of Environment, Climate Change and Health at WHO. (Source- World Health Organization)

Heat wave and effect on mental health

It is well established that human mental health issues arise from a complex interplay between genetic, psychological, lifestyle, and other distinct factors. According to Indian journal of Occupational & Environmental Medicine, climate change and environmental exposures have impacts on human mental health and there are well established links between aggressive behaviours and temperatures. One study from Australia shows that heat waves are associated with increased rate of mental disorder such as mood disorders, anxiety disorders, dementia and anxiety related disorders. Workers are more affected with psychological distress.

Psychological consequence aftermath of disaster

Anyone who suffered disasters like earthquake, flood, cyclone etc has potential risk for developing post-traumatic stress disorder (PTSD). Development of PTSD is linked with downfall in quality of life and increase in significant distress. Various studies project that over the time period a major portion of population would be impacted by psychological consequence with increasing impact of climate change.

Drought and farmer suicide

A causal relationship has also been found between occurrence of drought and farmer suicides and this trend seems not only in India but also in developed country like Australia. Failure of crop due to drought can cause economic hardship and prolonged drought may force people to migrate to other region and this may further lead to stress, anxieties leading to attempts to commit suicide by the farmers.

Economic stress due to climate change and effects on mental health

It has been projected that rising temperature shall have very adverse impacts on agriculture in the tropical climatic zones of Asia, Africa and Latin America where agriculture is the main source of livelihood for overwhelming majority of population. Reduced productivity due to impacts of climate change and loos of crop due extreme climatic conditions such as drought, flood, heat wave, cyclone etc shall cause serious economic hardships, which can result in increasing rate mental health problem, particularly among vulnerable poor. Long term agricultural stresses have been associated with deterioration of social capital, leading to significant dent on mutual support system in communities that can have very disastrous consequences on mental health.

Effects of pollution on mental health

Pollution has been linked to several mental health issues, including anxiety, depression, and suicide. The exposure to pollutants, both indoors and outdoors, can contribute to negative moods, irritability, and reduced cognitive function. The most common pollutants that affect mental health are fine particulate matter (PM2.5), nitrogen dioxide (NO2), and ozone (O3). These pollutants have been shown to affect the central nervous system, leading to changes in behavior and cognitive function.

World Health Organization in their new policy guidelines of 2022 has urged countries to include mental health support in their response to the climate crisis. New researches in environmental psychology are marking how changes in environment affect human behavior and experience. To be happy and to lead a stress less life it is necessary to protect environment and improve environmental health.

Revival of Kolkata Tramways can Mitigate Climate Change and Protect Environment

Soumik Roy Chowdhury

Kolkata, the City of Joy, is the only city in India which has eco-friendly and pollution free tramway system which is the oldest running tramways in Asia. Trams have been running in Kolkata since 1880. From horse drawn tram to single coach AC electric tram, Kolkata Tramways has come a long way. By Nov 1902 electrification of all the eight routes of Kolkata Tramways was completed. On 19th July 1967, the Calcutta Tramways Company Act was passed and government took over the management of the company. After Nationalization the condition of tramway system started to deteriorate.

From its peak of 8 depots, 17 terminus and 60+ routes, now Kolkata has only 2 depots, 3 terminus and 3 routes which are operational as of April 2023. Gradual closure of tram routes, tracks, depots, terminus, retrenchment of staff, sale of old tram coaches as scraps and purchase of new coaches have resulted in virtual death of the historic tramways in Kolkata. Three routes survive as a souvenir for the visiting tourists. When the whole world is recognising the merits of tramways as an eco-friendly mode of urban transport in the era of climate change, the authorities in West Bengal seem to be least concerned to revive the tramways as a viable strategy for mitigating the impacts of climate change, and neutralising the growing air pollution in the city.

Climate change has become a very serious issue in today's world. Kolkata faces increasing heat waves, flood hazard and water logging as a result of climate change. Kolkata has an overall average elevation of about 8 m above MSL. Kolkata is the second most polluted city in the world. Kolkata also ranks second in per capita CO_2 emission with 3.29-ton CO_2 per capita. A study done by WBPCB describe that pollution from automobile industry is increasing day by day. Automobile exhausts are a major source of air pollution contributing about 50% of total air pollution. These include sulphur dioxide, nitrogen dioxide, carbon monoxide, carbon dioxide, hydro-carbons and PM 2.5 and PM 10. These are combining to create Urban Heat Island Effect making the city of Kolkata significantly hotter than its hinterland. This is having adverse impacts on health and mental health, with rising numbers of acute respiratory, pulmonary and nervous disorders.

The road space in Kolkata is only 6% against national average of 15%, but the number of new vehicles is increasing at a rate of 7% per annum resulting in traffic congestion. Cars in Kolkata carry 5% of the total number of people that travel every day, but take up 29% of road space. There are efforts to increase road space by building flyovers and by passes to provide faster lanes for travel, but this encourages more cars and more pollution."Adding highway lanes to deal with traffic congestion is like loosening your belt to cure obesity". wrote Lewis Mumford, Real solution to city's transport woes lies in decreasing the number of private cars and building a strong mass rapid transit system run by electric or renewable energy. A strong network of Kolkata Metro with a revived Kolkata Tramways, wherever feasible, can provide environment friendly, pollution free inclusive mode of transport system in Kolkata.

There is no need to built a whole new system, as the system exists, and it needs upgradation, which will be far less capital intensive than constructing new fly over and adding new fleet of buses. There are identified routes where tramways can be revived with minimum investment, but cost-benefit ratio in terms of reducing pollution and improving environment of the city will be far more. The accident rate of tramways is also very low, while it carries larger number of people with lesser road space, running in reasonable good speed if line is free from intrusion. Tramway is also comfortable for all age groups - for children, elderly, women and disabled in particular - helping to reduce social discrimination in the City of Joy that provides room for everyone to live. Revival of tramways is therefore a sine qua non of reviving the culture of this historic and inclusive metropolis.

পাখিরালয় গ্রামের অভিজ্ঞতা

Rasmoni Karak

কাকিমা আর একটি মেয়ে মাটির উনানএ রান্না করছে, কড়ায় রয়েছে কিছু পুঁটিমাছ, মেয়েটি খুন্তি নাড়ছে আর ধান গাছের অবশিষ্টাংশ যেটিকে "ন্যাড়া" বলা হয়, ওটা দিয়ে উনান এর আগুন জ্বালিয়ে রাখার অনবরত চেষ্টা চালিয়ে যাচ্ছে, এমন সময় আমি আর এক বন্ধু মিলে একটি বাড়িতে ঢুকলাম, কাকিমা আমাদের পরিচয় জানতে চাইলেন, আমরা পরিচয় দিলাম, ওনার সাথে খড়ের স্তূপে বসে আমরাও উনানএ ন্যাড়া দিতে দিতে কথপোকথন এর মাধ্যমে ওনার বাড়ির অর্থনৈতিক অবস্থা জানলাম!

ওনার দুই ছেলে বাইরে কাজে গিয়েছে, বাড়িতে শুধু কাকিমা আর কাকু থাকেন, যে মেয়েটি খুন্তি নাড়ছে ওটি ওনার জা-এর মেয়ে, ছেলেরা যা পাঠায় সেটা থেকেই সংসার চলে, এখন ব্যাঙ্গালোর আছে তবে মাঝে মাঝে দুবাই, কাতার যায়, ওখানে রাজমিস্ত্রি বা বাসন মাজার কাজ (হোটেল-এ), ঘর গোছানোর কাজ করে থাকে! পুকুরটিতে অজস্র শ্যাওলা বেড়ে উঠেছে এবং বিভিন্ন পোকামাকড় চোড়ে বেড়াচ্ছে ওই জলে ওনারা স্নান করেন জেনে হতবাক হয়ে আমরা দুজনের দিকে তাকিয়ে থাকলাম কিছুক্ষণ, জিজ্ঞাসা করলাম কোন শারীরিক সমস্যা রয়েছে কিনা, জানালেন "যোনিতে কিছু সমস্যা রয়েছে অনেক অর্থ জোগাড় করে শহরের ডাক্তারের কাছে গিয়েছিলাম জানিয়েছে কোন প্রতিকার নেই।" পরামর্শ দিলাম পুকুরের জলে স্নান না করে কলের জল ব্যবহার করতে, অদ্ভুত এক ভঙ্গি নিয়ে জানালেন "আমরা খাবার জল পায় কিনা তাই ঠিক নেই! সেই জলে আবার স্নান।" জানতে পারি পাইপ লাইনের মাধ্যমে পানীয় জল সরবরাহ করা হয় তাও নির্দিষ্ট কিছু সময়ের জন্য বহুদূরে গিয়ে জল আনতে হয়, মাঝে মধ্যে আবার জল পাওয়াও যায় না।

শেষ গ্রাম, এরপর থেকেই শুরু হচ্ছে ম্যানগ্রোভ, দ্বীপ ভরা অজস্র জঙ্গল আর হেতালের বন, গর্জন গাছের সারি আরো কত বন্য প্রাণীর বাস, নদীতে মাংষাশী কুমির, সেই সকল নদীর বা খাঁড়ির মাঝেই একটি দ্বীপের ওপর রয়েছে এই পাখিরালয় গ্রামটি, মনের মধ্যে হাজার প্রশ্ন জোট পাকাচ্ছিল, জিজ্ঞাসা করলাম মাঝে মধ্যে কি গ্রামের মধ্যে বাঘ ঢুকে পড়ে? জানালো এখন ওনাদের এই সমস্যা তীব্র নয়। আমরা জিজ্ঞাসা করলাম আপনাদের এখানে বন্যা না ঘূর্ণিঝড়ে বেশি কষ্ট ভোগ করতে হয়? জবাবটা কিছুটা এমনছিল, "প্রতি ভাদ্র মাস নাগাদ গ্রামে জল ঢুকে ভাসিয়ে রাখে কিন্তু ঘূর্ণিঝড় 4/5 বছরে একবার দুবার হয় তখন সবাই সাহায্য করে অনেকের সুবিধা হয়। কিন্তু বন্যার সময় না কেউ সাহায্য করে না কেউ খবর রাখে।"

আমি যে বাড়িটায় ঢুকলাম বাড়িটি কোন রকমের টিন দিয়ে বানানো এনাদের কোন চাষের জমি নেই, আইলা ঝড়ের সব বাড়ি ধ্বংসস্তূপে পরিণত হয়েছিল, তারপর কিছু সরকারি ভাবে সহায়তা পেয়েছিল, আইলা ঝড়ের দিনটি উনি যে ভাবে প্রতিস্থাপিত করেছিলেন- "আমরা দেখছি, কি উঁচু হয়ে জল আসছে আমরা দৌড়ে দৌড়ে আসছি আমাদের জিনিস পত্র নিতে, চোখের নিমেষে আমার বাড়ি, হাঁড়ি, কড়া, খুন্তি, খাট,বিছানা, সব জলের তলায় চলে গেল, আমরা সাঁতার কাটছি, কোন রকমে বিভিন্ন গাছ পালা ধরে ঘূর্ণিঝড় আশ্রয় কেন্দ্র পৌছালাম। আজও প্রাণের সুরক্ষার নিশ্চয়তা নেই! জীবন আমাদের জোয়ার ভাটার খেলা, আজ আছি কাল নেই।

পরের বাড়িটিতে লোকটি জঙ্গল করেন, অনেক আগ্রহের সাথে শুনলাম- লোকটি ১০-১২ দিনের খাবার দাবার গুছিয়ে নিয়ে চলে যায় নৌকা করে, তার পরে রাতের পর রাত সেখানে থাকে, কোন বসতি নেই,শুধু চারিদিকে বন্যপ্রাণী আর বনজঙ্গল, হিংস্র পশুর হুংকার এবং ঝিঁঝিঁ পোকার ডাক আর পূর্ণিমার আলো কখনো বা আমাবস্যার অন্ধকার। যেখানে বাঘ পর্যবেক্ষনের জন্য রেডিও কলার টেকনলজি ব্যবহার করা হয়, এখনো সেখানে মানুষ গিয়ে জঙ্গলে রাতের পর রাত পাহারা দেয়! এই অবিশ্বাস্য কর ঘটনা শুনে গা রীতিমতো কাঁটা দিয়ে উঠেছিল। পরিস্থিতির ভয়াবহতা আমার মনে প্রখর দাগ কেটেছিল যখন আমরা পরদিন জলপথের মাধ্যমে সংরক্ষিত জঙ্গল পরিদর্শনে গিয়েছিলাম, বাড়িতে বসে যখন মানুষটির কথা শুনেছিলাম, ভয়াবহতা তখনো সেই তীব্র আকার ধারণ করেনি, যতক্ষণ না পর্যন্ত এই বনগুলোকে আমি নিজের চোখে দেখেছি, আমি নিজে সাক্ষী হয়ে তবে বিশ্বাস করতে পেরেছি তখনকার সেইদিন সেইরাতের অন্ধকারময় পরিস্থিতি কেমন হতে পাড়ে। ভেবে দেখেছো একটা বোনের গভীরতা, সেই বনে বাঘ রয়েছে সেখানের একটা খাঁড়িতে তুমি রয়েছো! রাতের অন্ধকার, যেখানে কোন জনমানব নেই, নদীতে জলটা পর্যন্ত শুকিয়ে যায় (ভাটায়)। বাঘ একটা দ্বীপ থেকে অন্য দ্বীপে যাওয়ার চেষ্টা করে! অন্য স্থানে বাঁধ তৈরি করার জন্য কিছু গ্রামবাসীকে টাকা দিয়ে অর্থনৈতিক ভাবে সাহায্য করে অন্যত্র সরিয়ে দেওয়া হয়েছে কিন্তু আজও পর্যন্ত গ্রামে একটাও কংক্রিটের বাঁধ তৈরি হয়নি, ঘরে ঘরে পানীয় জলের হাহাকার, বন্যার কারণে বার বার নদীর লবনাক্ত জল মাটির উর্বরতা হ্রাস করে মাটিকে অনুর্বর করে চলেছে, পুকুরের নোংরা জলে স্নান করে অধিকাংশ মহিলাদের শারীরিক সমস্যা তীব্র প্রকট হয়েছে, গ্রামে হাসপাতালের অভাব রয়েছে!

অধিকাংশ মানুষের প্রধান জীবিকা চাষাবাদ, প্রধানত ধানচাষী এছাড়াও খারিফের আগে যেমন চৈত্র আষাঢ় মাস করে কচুরমুখী, ঢেঁড়স, পুঁইশাক, মুগডাল, লঙ্কা, বরবটি, ওল, চিচিংঞ্চে, ঝিঙে ইত্যাদি চাষ হয়ে থাকে এছাড়াও খারিফ সময় শ্রাবণ-কার্তিক মাসকরে ধান, করলা, বেগুন, কাঁচালঙ্কা চাষ হয়, রবি মরশুমে অগ্রহায়ণ-ফাল্গুন মাস আলু, ওলকপি, ফুলকপি, টমেটোর, বিট, কপি, গাজর, বেগুন, লালআলু, কাঁচালঙ্কা, পিঁয়াজ, পালংশাক, লালশাক, মুলোশাক, ধনি শাক ইত্যাদি চাষ হয়। এখানে জল ও মাটিতে লবনের পরিমাণ অধিক থাকায় চাষীর। প্রতিনিয়ত সমস্যার সম্মুখীন হয়ে থাকে।

তাছাড়া এখানেও আষাঢ়-শ্রাবণ মাস করে ঝুলোন উৎসব, ভাদ্র-আশ্বিনে বড় ঠাকুরের পুজো, শান্তি পুজো, পৌষ-মাঘ মাসে টুসু পূজা, ভাদু পূজা, বনদেবীর পূজা, ফাল্গুন-চৈত্র মাসে হরি ঠাকুরের পূজা ইত্যাদির প্রচলন রয়েছে।

আমরা কিছু পুকুরের জল এবং মাটির স্যাম্পেল সংগ্রহ করলাম, এছাড়াও গ্রামে PM-2.5, PM-10, Bright sunshine প্রভৃতি পরীক্ষা করেছি, এরপর আমরা পঞ্চায়েত থেকে জানতে পারলাম গ্রামের জনসংখ্যা, মহিলা/পুরুষের জনসংখ্যার হার, মোট বাড়ির পরিমাণ। এইভাবেই আমরা পুরোদিনটা তথ্য সংগ্রহ করলাম আমরা সাধ্যমত চেষ্টা করেছি এবং পরদিন সকাল থেকে সন্ধ্যা পর্যন্ত আমরা বনদপ্তর সংরক্ষিত অঞ্চল এবং জনমানবশূন্য পরিবেশে ছিলাম যেখানে প্রতিটা মুহূর্ত বাঘ দেখার তৃষ্ণা নিয়ে চোখ বিতৃষ্ণ ছিল।

মন বারবার বলে চলেছিল এই সেই আদিম সময় যেখানে মানুষ প্রকৃতির সাথে লড়াই করে আজকের সভ্য সমাজের আবিষ্কার গড়েছে, civilization গড়ে তুলেছে! কিন্তু আজ ও আদিম সভ্যতা আমাদের পরিবেশ থেকে বিলুপ্ত হয়ে যায়নি, যেটি সকলের নজরে সামনে থেকেও মানুষের জ্ঞান চক্ষুর মূল্যবোধের সম্মুখে এসে দাঁড়ায়নি। যতক্ষণ না মানুষ এটিকে নিজের চোখে, অন্তর হইতে অনুভব করতে পারে, দূর থেকে এই পরিস্থিতির অনুভব করা সত্যই অসম্ভব, গ্রামবাসীদের ইতিহাস ও ভবিষ্যতের পাতায় দারিদ্রতা নিত্য সঙ্গী লেখা থাকলেও, মানুষ গুলো সেই পরিস্থিতির মধ্যে দিয়েই প্রকৃতির সাথে লড়াই করে আজও বেঁচে আছে, পানীয় জলের অভাবে পিপাষু হয়ে রয়েছে! প্রতিটি দিন একটু একটু করে শেষের দিকে অগ্রসর হচ্ছে।

From the pen and pencil of Jubaraj Roy

Save Mother Earth from Smokes In and Out

-0 -

বিষক্রিয়া

আমাদের পৃথিবী আজ ভীষণ অসুস্থ।
জন জীবন তার বুকে বিষ ঢালছে অবিরত।
মাঠ দিচ্ছে বিষাক্ত জল, কারখানা ছাড়ছে ধোঁয়া।
তরু সারি আজ ভীষণ অসহায়, ধরিত্রী আবৃত বিষাক্ত ছায়া।
কলেরা, ডাইরিয়া, টাইফয়েড আজ নিত্য পথ যাত্রী, সুস্থতা আজ প্রশ্নের মুখে।
চোখ, নাকে জ্বালা তো ছিলই, সঙ্গে করোনারি সিনড্রোম হচ্ছে বুকে।
মানুষ আজ চোখ মেলেছে, বুঝেছে এর পরিণাম।
হয়েছে আজ ভীষণ দেরি, চোকাতে হচ্ছে এর বড় দাম।
তবুও আমাদের থামলে চলবে না, চেষ্টা চালাতে হবে যথা সাধ্য ।
আর্টিকেল 51(A)g পালনের জন্য, প্রতিটি নাগরিক কেই করতে হবে বাধ্য।
ধরিত্রী আমাদের মা, আমরা তারই সন্তান।
মা এর ঋণ তো অপরিশোধনীয়, অন্তত কিছুটা কর তার সন্মান।

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INARTICULATE NATURE'S REVENGE

Piles of e-waste piles of plastic thrown away!
tons of energy wasting day by day,
Someday it will wash away!
burning of fossil fuel in few second!
Millions of years take to form minerals.
Industries vehicles are emitting toxic chemicals,
Nature adjusting its emotion by changing climate!
Afforestation is the slow process, atmosphere getting rapid temper,
Season change, devastated cyclone, flood become frequent,
Landslide, drinking water, air, noise pollution are daily member!
Developing technology creating new risk of disaster
Deficit in infrastructure vulnerability fixed.
Innovation scientist fail to build harmony!
Sustainable utilising procedure making peoples duty,
Ancestors discovered cosmos long ago using process of environment friendly.

Rasmoni Karak

Oh, Mother Earth

1

Days in and out
For years, centuries, and millennia
Oh, Mother Earth!
You created
Billions and trillions of lives in numerous forms
And nurtured, sustained and protected them
With air, water, energy and food
Intertwined with each
In a complex web of relationships
In harmony and conflict
That makes our planet
So unique in the Universe

2

Amazing your
Planning and design - your quads of spheres
Oh Mother Earth!
Atmo, litho, hydro and bio spheres
With layers and layers of atoms, particles, matters
Drawing energy from the Sun
Absorbing, transmitting, radiating and
Synthesising with moisture, gases and minerals
To support and sustain life in
Plants, animals, birds, insects and micro-organisms
In complex chains of foods
In lives, deaths and decays
In a seamless manner

3

You have a bounty and plenty
To fulfil the needs of all
Oh, Mother Earth!
With precision and exactitude of a scientist
Wisdom and vision of a philosopher
Compassion and care of a saint
Joy and ecstasy of a poet
With love for all and malice towards none
You provide comfort and happiness
Peace and solitude
Always charging and recharging lives
To move ahead

4

You created us
The Homo sapiens
With intellect and power to create
Oh, Mother Earth!
And we used our brain and brawn
To understand and exploit your resources
To create the anthroposphere
The civilizations based on
Agriculture, industry, trade, knowledge
Inventions, innovations
Dazzling metropolises and monuments
Wealth, leisure, recreation

5

We also created
Wars, conflicts, persecutions
Poverty, squalor, inequality, exploitation
Oh Mother Earth!
Denuding your forests and mangroves
Polluting rivers, lakes, oceans
Filling the air with toxic smokes and gases
Soil with chemicals and pesticides
Burning your reserves of coal, oil and gases
Replacing your protective layer of ozone
With a thick blanket of GHG
Upping temperature, melting glaciers, raising sea level
Bringing earth on the brink of collapse

6

We admit our follies
We repent our arrogance
Oh Mother Earth!
Give us a chance to correct ourselves
To redeem your lost glory
By education, awareness, campaigns
Forcing Governments to enact laws to
Protect nature, conserve forests, clean air, water
Binding countries through
Conventions. Protocols, Agreements
Give us a chance
To save us and save you the Mother Earth.

P G Dhar Chakrabarti

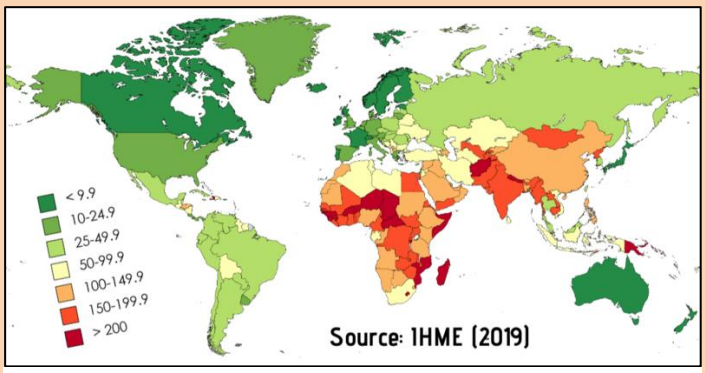
The Deadly Duo:
Climate Change and Air Pollution

Diya Roy

Climate change and air pollution are two main significant environmental challenges of our time. Climate change refers to the long-term changes in the Earth's climatecaused by human activity such as burning of fossil fuels, deforestation and industrial processes. These changes have significant impacts on natural ecosystems and human societies, including rising temperatures, sea levels, and changes in precipitation patterns.

Air pollution on the other hand, refers to the presence of harmful substances in the air such as particulate matter (PM10, PM2.5), Oxides of Nitrogen (NO_X), Sulfur dioxide (SO_2), Ozone(O_3) etc. These pollutants have adverse effects on human health and the environment including respiratory problems, cardiovascular disease, damage to crops and ecosystems. The main sources of these pollutants are – Oxides of Nitrogen (NO_X) which is largely produced by emissions from cars, trucks, and buses are associated with the incidence of pediatric asthma, and Sulfur dioxide (SO_2) is primarily produced by the burning of fossil fuels particularly coal and oil, power plants and industrial processes. It can also be emitted from volcanic eruptions and wildfires. Ozone (O_3) is formed through a complex chemical reaction between nitrogen oxides (NOx) and volatile organic compounds (VOCs) in the presence of sunlight. These pollutants are emitted from various sources, including motor vehicles, industrial processes, and power plants. PM10 or particulate matter with a diameter of 10 micrometers or less, can be emitted from both natural and human-made sources. Natural sources include dust storms, wildfires. Human-made sources include vehicle exhaust, industrial processes, and burning fossil fuels for heating and energy production.

The relationship between air pollution and climate change is complex and diverse. For example, air pollution contributes to climate change by releasing Green House Gases(GHGs) into the atmosphere. The burning of fossil fuels such as coal and oil produces carbon dioxide (CO_2) which is the most significant GHG. Other air pollutants, such as methane (CH_4) and black carbon also contribute to climate change. At the same time, climate change can worsen air pollution by altering weather patterns, increasing the frequency and severity of natural disasters and intensifying heat waves and droughts. This can lead to the production of more pollutants and the spread of airborne diseases.



Air Pollution Death Rates (number of deaths per 100,000 population

The impacts of the deadly duo of climate change and air pollution on human health are significant. Air pollution is responsible for millions of premature deaths every year and exposure to high levels of pollutants can lead to respiratory and cardiovascular diseases, cancer, and other health problems. Climate change also poses significant health risks including heat-related illnesses, the spread of vector-borne diseases and malnutrition due to crop failures. The most vulnerable populations such as children, the aged people and pregnant women are at the high risk.

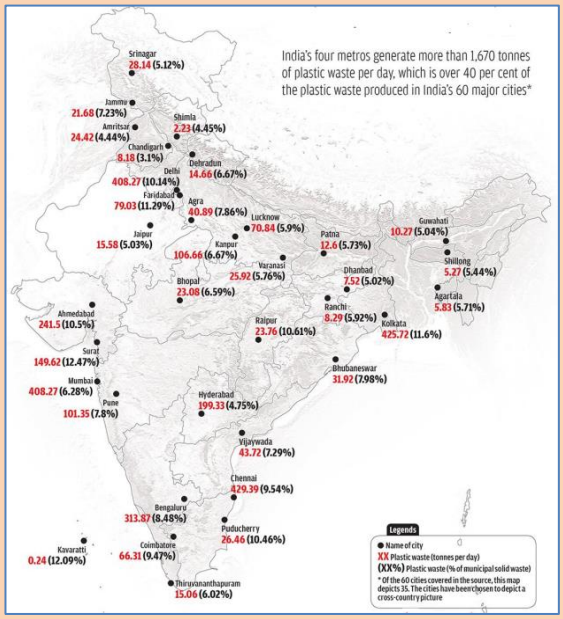
To address the climate change and air pollution, governments should initiative regulations as well as mass awareness, incentives to reduce GHG emissions and promote clean energy. Adoption of renewable energy like solar and wind power and promoting electric vehicles and public transportation can reduce air pollution and GHG emissions. Individuals can also help by using public transportation, reducing energy consumption and supporting local farmers. Reducing GHG emissions is essential to mitigate the risks posed by climate change and air pollution and promote sustainable practices for a healthier future.

Plastic Waste - a Burning Problem in India

Sayani Ghosh

Waste has a tremendous impact on both the environment and human health. The rate of generation of various types of waste has increased with the rise in population in urbanised cities and has become a major cause of concern in today's time. The Solid Waste Management (SWM) system in India is facing critical challenges as Urban Local Bodies (ULBs) have struggled to efficiently manage solid waste. Across India, existing systems for the collection, transportation and disposal of solid waste are mired in chaos.

Plastic Waste is one of the most rapidly growing waste streams in Municipal Solid Waste (MSW) all over the world. Though other types of plastic waste like plastic bottles, plastic wrappers, and plastic furniture can be recycled, whereas Single Use Plastic (SUP) cannot be reused or recycled. Either it dumps on the landfill or creates a blockage problem in the drainage system in the urban area. But the complete ban on SUP products may have negative social and economic impacts if the government do not consider sensitivity to local realities, including the interests of MSMEs, marginalized communities, and the informal recycling sectors (IRS).



Every year, India generates 15 Mt of Plastic Waste, of which, only one-quarter is recycled. The majority of Plastic Waste in India is dumped in unmanaged landfills, which is a major source of groundwater contamination. As of 2014, collection efficiency was estimated at 80.28%, out of which, only 28.4% was being treated. The Figure in below shows Plastic Waste generation in India from 2012 to 2019 based on data reported by various states. It was found that until 2019, most states had not reported Plastic Waste generation in their respective state. Among the states, with a few exceptions, Punjab, Andhra Pradesh, and Gujarat regularly reported Plastic Waste generation-related data to the Central Pollution Control Board of India.

As of 2016, the total generation of Plastic Waste in India was 17481 kilotonnes (kt), while 167 kt and 3 kt were imported and exported, respectively, that year. The Figure below shows the population distribution and Plastic Waste generation in India, based on data available from the Centre for Science and Environment for the financial year 2018–2019. Uttar Pradesh has the highest no. of population. Gujrat, Maharashtra, and Tamil Nadu are the three major states where Plastic Waste generation is high. The national average was recorded as 3.36 Mt of waste for the year. In Goa, per capita per day Plastic Waste generation is close to 60 g, which is much greater than thenational average of 8 g.

The primary concern in India when it comes to plastic waste management and recycling is the implementation of Extended Producer Responsibility (EPR). EPR requires manufacturers and importers to directly interact with the supply chain, making recycling-oriented product design a priority for these stakeholders. Additionally, the flow of plastic waste from overseas can overburden the system, necessitating controlled monitoring to identify the quantity and quality of waste entering the country. Local councils and states along coastlines need to play an active role in minimizing the environmental impact and leakage of plastic waste into land and marine ecosystems.

From a legal perspective, there should be a clearer outlook on the role and responsibilities of the plastic waste supply chain. Informal recyclers should be integrated into formal collection and recycling channels, and unique recycling technologies should be implemented for multi-layered plastic polymers. Baseline assessments of mismanaged single-use plastic are crucial, and regulatory, economic, awareness and voluntary interventions should be considered.

Olive Ridley Turtle:
A vulnerable species of Indian Subcontinent

Kasturi Datta

*O*live Ridley Turtle (Lepidochelysolivacea Eschscholz) is a rare species found in the eastern cost of India. It is the smallest and most abundant turtle found in the warm water ocean of the world. It is included in Schedule I of the IUCN Red data book and is prohibited for trade by signatory countries.

Geographical Locations

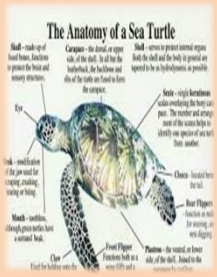
Olive Ridley Turtles are found in a wide range of tropical regions but are more concentrated in three zones in India: Orissa, India; Coasta Rica, and Mexico. In India, they come through Kerala, Tamil Nadu, and Andhra Pradesh, but prefer the coastal areas of Gahirmata marine sanctuary in Kendrapara District.

Description

Olive Ridley Turtle are olive coloured carapace and its shape quite resemble with heart shaped rounded structure. The fully grown adult turtle reaches to a maximum weight of 50 kg and grow up to a length of 61 cm. It is to be mentioned that both male and female carapace are same in size.

Interesting facts

Olive Ridley Turtle survive on jelly fish, snails, crabs and molluscs. They can swim upto a distance of 1000 km and reach a nearby beach for their breeding activities. After 45-60 days, they hatch their eggs and crawl back to the ocean. A single female turtle can lay 80-120 eggs in a conical nest about one and half feet deep.



Threats

Olive ridley turtles are vulnerable to predators such as jackals, hyenas, fiddler, crabs and ferrol dogs. Due to egg harvesting, unlawful killing of females who are nesting, and the commercial sale of the flesh, humans are a significant contributor to their reduction..The unintentional entanglement in fisherman nets, coastal development initiatives, natural disasters, climate change, and beach erosion are additional risks. The open drain that flows into the beach has recently been responsible for the discovery of large numbers of dead turtles, endangering marine life.

Initiative taken for conservation

Orissa Government has taken steps to protect turtles, such as adopting Turtle Excluder Devices and installing a 600-meter net barricade along the Casiruanna forest cover. Wildlife staff are on vigil to keep predators at bay, and the Indian Coast Guard Operation Olivia helps protect turtles during breeding and nestling.

Suggestion

Olive Ridley Turtle is a unique species that swim 1000 km pathways to reach the Indian sub-continent and again return to the sea. It must be saved from plastic pollution. To do this, it is important to minimise the use of single-use plastic and implement an alternative version of reusable product. Local communities, tourists, NGOs, and private sectors must participate in a beach clean-up project, and all people must be educated on the potential problems caused by plastic use through training, seminars, awareness programmes, and social media.

Let More Flamingos Fly

Kaberi Saha

The word 'Flamingo' hass originated either from the Portuguese word 'Flamengo', which means 'Flame'. Flamingo are gregarious birds sporting brilliant shades of pink, slender legs, long graceful necks, large wings and short tails of 3 to 5 feet.

Flamingo in India

There are six different types of Flamingos found in the world, of which two species are found in India. The tallest are Greater Flamingo (*Phoenicopterus roseus)* and the smallest are Lesser Flamingo (*Phoeniconaias minor***)**. Rann of Kutch in Gujarat is known as 'Flamingo city' of India. The largest population of lesser flamingos are found in the salt deserts of the western state of Gujarat. The Greater Flamingo usually migrate to India between November and May to find food and for laying eggs. Beside Gujarat the Flamingos can be seen in Sewri mudflats and Navi Mumbai wetland of Mumbai and Chilka Lake of Odisha.

Threat to Flamingos

The biggest threat to Flamingos population is habitat loss due to anthropogenic activities, mainly hunting for sports, and also for food and medicines over the years. Climate change, water pollution, mining and conversion of agriculture land also threaten the population of Flamingo.

Current status

Currently, none of the Flamingos species are considered as endangered species, but Lesser Flamingos are enlisted in the IUCN's near threatened red list. Recently the Government of Maharashtra declared 16.9 square kilometer of Thane Creek as first Flamingo sanctuary of India under Wildlife Protection Act (1972). So, conservation of mangroves and wetlands are necessary for the survival for this beautiful magnificent bird as a symbol of beauty of Mother Nature.

Environmental paw prints of pets

Nidrothita Modak

"You can't share your life with a dog or cat and not know perfectly well that animals have personalities and mind and feelings"-

Jane Goodall

There is nothing like the unconditional love of a pet whether it is dog or cat or anything else. But in recent study it was reported that our beloved dogs and cats emits the equivalent of almost 64 million tons of greenhouse gas per year andit is equivalent to 13.6 million cars for a year.

But in recent times, it's become a big issue about our dogs or cats' diets as they are big meat eaters. We know livestock farming (16.5% of GHG is caused by animal agriculture) is a significant contributor to carbon emissions. This releases harmful substances like antibiotics, bacteria, pesticides, and heavy metals into the surrounding environment. As the manure decomposes, it releases emissions including methane, ammonia, and carbon dioxide, which further contribute to climate change. When we feed our pets a meat-based diet, the carbon footprint gradually increases, and it's related to climate change factors.

Another source of pollution is pet waste, which contributes significantly to environmental pollution and has a negative impact on human health. Pet waste does not simply decompose; it starts as a small source of pollutants and ends up becoming a big problem for water quality and even human health. Besides the cat litter, this contains toxic substances called *Toxoplasma gondii* that can transfer to soil and plants and harm biodiversity.The *toxoplasma* parasite from the cat's litter faeces harms mostly pregnant or immunocompromised humans. We have to be very careful about our pet's waste; it should not be thrown in the water also because it causes excessive growth of algae and weeds, which may cause eutrophication.

Although this pet'spawprintis not that much highlighted in recent times but it isgoing to be big issues in future years, as global warming and pollution is a big issue in our daily life. We can try to control this problem by few ways like:

- We can feed our pets a plant-based diet that contains proteins, vitamins, and other essential ingredients after discussing it with our veterinarian.
- We must use eco-friendly and easily biodegradable cat litter to avoid pollution.
- And finally, we can assure that every recreational area, such as parks, has a disposal box for pet waste and that every municipal corporation has pet waste pick-up services in every locality.

As the environment and our pets are both equally important to our mother earth, we must be more careful with our pets without harming our environment. The environment plays a vital role in our healthy living, and on the other hand, our pets improve our mental health. So we have to protect both without harming each other.

Ozone Layer Depletion

Bhagyasree Chatterjee

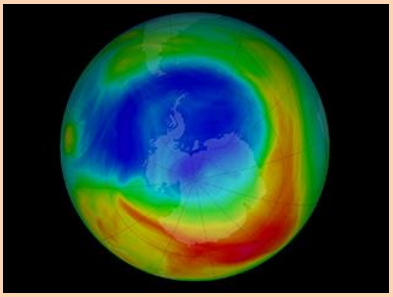
"The earth without ozone means a house without any roof and base "

The ozone is an inorganic molecule with pungent small and pale blue colour, defined with chemical formula of O_3, and found mainly in the lower stratosphere, approximately 15 to 35 km above the Earth. Its thickness varies seasonally and geographically, but its overall concentration is small in relation to other gases in the stratosphere, less than 10 parts per million of ozone, while the average ozone concentration in Earth's atmosphere as a whole is about 0.3 parts per million. However this layer performs a very important function – it shields the earth from the ultraviolet radiation of the sun.

The ozone layer absorbs 97 to 99 percent of the Sun's medium-frequency ultraviolet light (from about 200 nm to 315 nm wavelength), which otherwise would potentially damage exposed life forms near the surface. During the mid-seventies, atmospheric research revealed that the ozone layer was being depleted by chemicals released by industry, mainly chlorofluorocarbons (CFCs), threatening life on Earth, including increased skin cancer in humans and other ecological problems.

How ozone layer depletes

CFCs are heavier-than-air particles that persist in the troposphere due to their chemical inertness and insoluble nature in water. They entered the stratosphere primarily through convection, random drift, and the turbulent mixing of air in the troposphere. They cause the CFC molecules to disintegrate - ozone (O_3) is broken down into oxygen and oxygen dioxide in a sequence of chemical reactions as a result of the release of the highly reactive fluorine (F) and chlorine (Cl) atoms. As a result, ozone in some parts of the stratosphere is lost faster than it can be replaced.



Ozone Hole, now a yearly occurrence over Antarctica in the spring, is the term used to describe the weakening of the ozone layer caused by a decrease in ozone concentration. We receive daily photos of ozone holes across the Antarctic region from satellite instruments.

Problem of Ozone Layer Depletion

Depletion of Ozone Layer (OLD) increases quantum of UVB in earth's surface, with harmful consequences:

a) It raises the chance of developing many skin cancers, such as malignant melanoma and others, is particularly hazardous to our eyes, and damages our immune systems.
b) It alters the internal structure of the plant and lengthening the formative stages.
c) It is particularly harmful for phytoplankton that survives in the upper layer of the water column where there is sufficient daylight to support net profitability.
d) It has huge negative impact upon the biogeochemical cycle too.

Solution

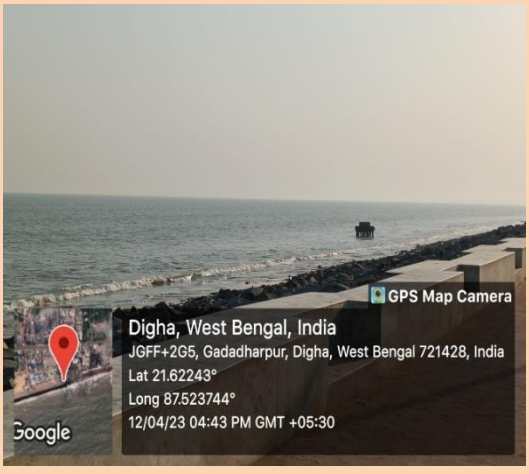
Solution to the problem of OLD lies in stopping consumption of gases that are damaging to the ozone layer. These include nitrous oxide, methyl bromide, halogenated hydrocarbons, and CFCs (chlorofluorocarbons). This definitive prescriptions for addressing to the global problem of OLD led to the adoption of the Montreal Protocol in 1987, which bans the production of CFCs, halons, and other ozone-depleting chemicals. The ban came into effect in 1989, the Ozone levels stabilized by the mid-1990s and began to recover in the 2000s, as the shifting of the jet stream in the southern hemisphere towards the south pole has stopped and might even be reversing. Recovery is projected to continue over the next century, and the ozone hole is expected to reach pre-1980 levels by around 2075.The Montreal Protocol is considered the most successful international environmental agreement to date. Success of the Montreal Protocol has raised the hopes that with the collective efforts of the developed and developing countries the complex problem of rising Green House Gas emission in the atmosphere will be resolved sooner than the later.

Climate Change and Tourism in Digha

Abhisek Kar

Digha is a popular seaside resort of Purba Medinipur district of West Bengal, located 200 km away from Kolkata. Described as the 'Brighton of the East', the resort town and its surroundings beaches have witnessed massive growth in recent areas, most of which have taken place in an unplanned manner without any scientific assessment of the hazards, vulnerabilities and risks, or carrying capacity of the areas, or assessment of environmental impacts of these developments. The climate change with rising temperature, increasing frequencies and intensities of cyclonic storms, floods, ingress of sea water on the surface and sub-surface are compounding the risks of the tourist town. Here are some of the impacts of climate change on tourism in Digha:

Erosion of beaches and shorelines: Rising sea levels and increased storm activity are causing erosion of the beaches and shorelines. This can lead to loss of beach front property and infrastructure, as well as loss of mangroves that are natural habitats for marine and coastal wildlife.



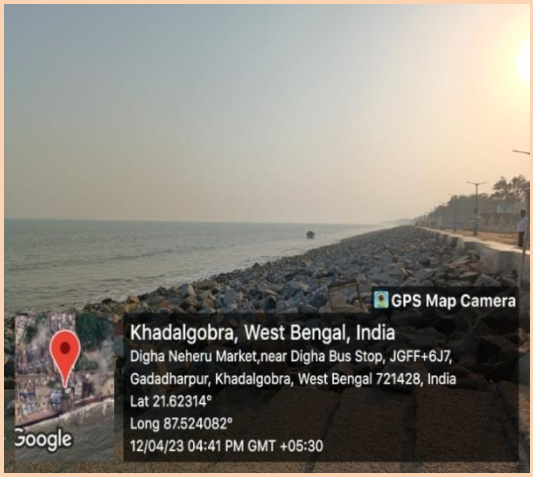


Fig: - 1 & 2 Erosion of Digha's sea shoreline

Flooding and damage to infrastructure:

Climate change is causing more frequent and intense storms, which can lead to flooding and damage to infrastructure such as hotels, restaurants, and roads. In 2021, Cyclone Yaas caused widespread damage to buildings, roads, and other infrastructure in Digha. This can lead to temporary closures of tourist facilities, which can have a significant impact on the local economy.

Figure-3: Cyclone Amphan lashing on the coasts of Digha

Encroachments on Saline Embankments:

Sea embankments were constructed by the Britishers to protect the town from sea erosion and to provide a safe and enjoyable experience for tourists visiting the beach as well as prevent the seawater to enter the agricultural lands and protect the nearby villages. Some embarkments are built in the low-lying areas in Digha Mohana, Mondarmoni, Jalda, etc. to keep the extra water from the high tides and prevent the entering of the saline water into the villages, agricultural land, and tourist places. During the 1960s these low-lying areas are given on lease to some fishing communities to do aquaculture in that area. During the 1980s many hotels and resorts were built in the area attracting further unplanned settlements in the low lying areas. The bunds were encroached and breached at many places opening saline water to enter into the agricultural fields because. In recent years, the government of West Bengal has taken several measures to keep the sea embankment of Digha intact and prevent it from further erosion. Some of these measures are Beach Nourishment, Groynes, Coastal Regulation Zone (CRZ) Rules, etc.

Conclusion:

In conclusion, climate change is having a significant impact on tourism in Digha, a major economic driver for the town. It is important for the tourism industry and local government to take action to adapt to the changing climate and mitigate its impacts on the industry. By investing in resilient infrastructure, conserving water resources, and promoting sustainable tourism practices, Digha can continue to attract tourists and support the local economy for years to come.

Sustainable Agriculture and Organic Farming

Anindya Haty

Sustainable agriculture and organic farming practices are gaining popularity as people are becoming aware of the benefits in terms of the environment and human health.

Sustainable agriculture is a practice which agriculture activities are followed in economically viable, socially acceptable way with little or no distortion on the environment. On the other hand, organic farming practices could be one of the important avenues to achieve sustainable agriculture. Organic farming, usually organic or natural inputs are used for crop cultivation, is an environment friendly approach of crop cultivation. It can help to reduce the use of synthetic chemicals in agriculture which can affect negatively on the environment.

Organic farming promotes biodiversity. By avoiding the use of genetically modified organisms (GMOs) and synthetic chemicals, organic farming creates a more diverse ecosystem that can support a wider range of plant and animal species. This can help to promote pollinators, protect water resources, improve soil health, reduce the risk of pest and disease infestation, and reduce soil erosion.

This practise can help to combat climate change by promoting carbon sequestration in the soil through practises like crop rotation, organic input addition to the soil, cover cropping, etc. This practise helps reduce the amount of carbon in the atmosphere. Additionally, these practises can reduce greenhouse gas emissions by reducing the need for synthetic fertilisers and chemical pesticides.

Organic farming can improve the nutritional quality of food. Studies have shown that organic produce can contain higher levels of antioxidants and vitamins than conventionally cultivated crops. Additionally, organic farming practises can improve soil health, which can lead to healthier crops and a healthier society.

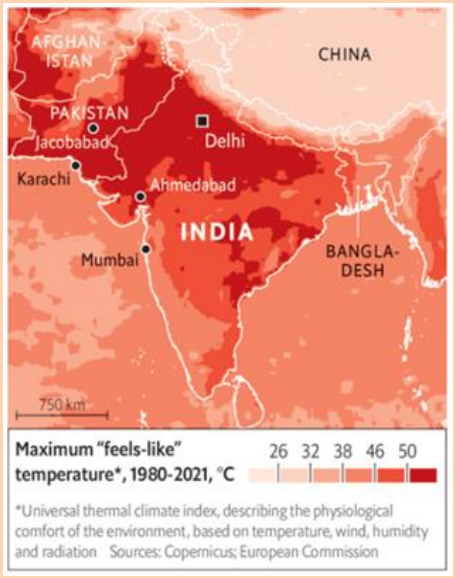
Organic farming practises can be more profitable in the long run. By reducing the need for expensive inputs like synthetic fertilisers and pesticides, organic farming practises can lower the production costs. Additionally, consumers are often willing to pay a premium price for organic products, which can help farmers to earn higher profits.

In conclusion, organic farming practises are important for promoting environmental sustainability, improving human health, and building more resilience to climate change. By adopting organic practises, farmers can help to reduce the use of synthetic chemicals, promote biodiversity and produce healthier,

Rising Heat Discomfort in the Gangetic Plains

Pinanki Das

The Gangetic plains of India is a vast region in north and east India that is home to over 500 million people, mostly engaged in outdoor activities on the field in subsistence agriculture and urban informal sectors of construction and street vending. The combined effects of rising temperature and humidity due to impacts of climate change are creating what the scientists describe as 'wet bulb temperature' in this region, in which presence of high humidity in atmosphere prevents dissipation of body sweats making it difficult for the body to cool itself. This may have instant impacts on physical and cognitive functions of the body and create life-threatening conditions.



The threshold limits of human survivability in the combined heat-humidity index is 35^0 C and the region has crossed 31^0, which is worse than the African and Gulf countries. This is an emerging issue of grave concern which needs to be addressed at all levels.

With soaring temperatures and rising mercury, most of northern plain and southern plateau and even some of the hilly areas are passing through a phase of intense heat wave continuously for past several years. The number of heat wave days has increased by 138% in the last 20 years, as per a study conducted by the Centre for Science and Environment. The year 2022 recorded 280 heat wave days between March and May — considered the highest in last two decades. This year heat waves are much more intense and may even beat all past records.

Heat Wave Action Plan

According to India Meteorological Department heat wave conditions are created when actual maximum temperature is $\geq 45^0$C for three consecutive days, recording a departure of 4.5^0C to 6.4^0C from normal temperature. This needs revision, as the humidity is not factored in the determination of heat wave conditions. From a purely meteorological definition, we need to have a multi-disciplinary consideration of heat wave analysis, taking into account the possible impacts of heat wave on human body and natural production system.

Based on IMD classification of heat wave, several States and cities have prepared Heat Wave Action Plans. Ahmadabad was the first city of India to have prepared Heat Wave Action Plan and 130 cities in 11 States in India have replicated similar plans. NDMA has also issued guidelines for preparation of heat wave action plans. Simple measures such as early warning system, changing timing of schools and offices, provision of drinking water in street corners and work places have brought down heat wave related mortalities in some places.

Considering the findings of new research on 'Wet Bulb Temperature' and proposed revised norms of IMD for declaration of heat wave, NDMA should revise their guidelines on heat wave risk management which should beyond responding to heat wave conditions to addressing the structural and non-structural measures for mitigating the risks of heat wave, such as changes in working conditions in factories, fields, and other work places, developing techno-legal regimes for heat insulating old and new buildings, cold-chains for protection of agricultural and horticultural produce from heat wave conditions etc.

Glorious journey of Project Tiger

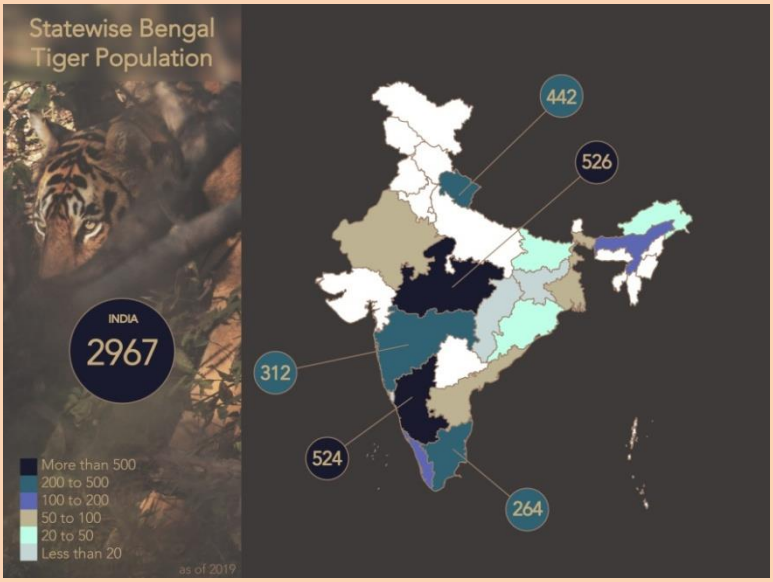
Pritthish Rauth

Project Tiger is a tiger conservation programme lunched on 1 April 1973 by the Government of India when Indira Gandhi was the Prime Minister. The programme started its journey from Jim Corbett National Park, Uttarakhand. The main objective of the project was to promote the conservation of tiger (*Panthera tigris)*. This was the largest wild life conservation initiative around the world.

Tigers play an important role in maintaining the harmony of the ecosystem. As top predators, tigers are preying on herbivores and help to keep the balance between the prey animals and the forest vegetation.

But due to habitat loss, climate change, hunting the tiger population declined during the recent past. To maintain the balance in the ecosystem, conservation of tiger is essential, which was the main objective of Project Tiger.

This project completed its glorious fifty years recently. The great achievement of the project is the enhancement of number of tigers in our country. The number of tigers has crossed 3000 in this year, which is a milestone achievement of the project. India now boasts of having the largest number of tigers in its jungles. While China addressed the problem of declining tiger population through captive breeding programme, India demonstrated to the entire world that it is possible to revive wile life population in their natural habitat despite growing pressures on forests of the country.



One of the key reasons behind the success of ‘Project Tiger’ was the involvement of local communities in the conservation efforts. The local communities were trained in wildlife management techniques and were given a share in the revenue generated through ecotourism activities.

Another important aspect of the programme was to develop the infrastructure facilities for tourists in the Tiger Reserves. This led to an increase in ecotourism activities, which not only generated revenue but also created awareness about the need for conservation among the general public.

Madhya Pradesh, known as ‘Tiger state of India’ has the highest percent (19%) tiger population of India, followed by Karnataka, Uttarakhand, Tamil Nadu and Maharashtra.

West Bengal is the home of famous Royal Bengal Tiger in its natural habitat in the Sunderbans. The State has a total tiger population of 88. The state is currently looking to augment the tiger population in Buxa Tiger Reserve. The state is also radio-collaring and monitoring the tiger population in Sundarban Tiger Reserve.

Upgrading Smart Phones Every Two Years- Bad For Planet?

Arkadip Mondal

We live in an era where not even a single day passes when we can live without smart phones; they have become so indispensable that more than 84 percent of the world's human population owns smart phones, and the number is constantly increasing.(Source- world bank and pew research data).Amidst this,there are rising concerns about the negative impacts these substances could inflict on mother nature. Research has been conducted at several levels and indicates that these smart phones do in fact, add to climate change issues. Yet, neither consumers nor manufacturers have fully acknowledged or addressed the issue. How funny that we frequently overlook the environmental damage caused by the smart phone itself while using our smart phones to promote recycling, sustainability, and environmental advocacy on social media.

Smartphone's alone produced a whopping 580 million tonnes of co2 emissions in 2020, from the extraction of raw materials through manufacturing, distribution, transit, usage, and terminal life cycle.

Crux of the issue

Smartphone industries, without a doubt, are there to generate maximum profit and the environmental aspects barely get any due recognition.
A Smartphone contributes to climate change and global warming over its entire life cycle—from Production to Disposal. The energy-intensive mining required to obtain the heavy metals used in smart phones, such as lithium, cobalt, and gold, usually results in acute environmental damage. Naturally, mass manufacture of smart phones in mega factories has a detrimental effect on the environment. The primary manufacturing process accounts for 85% to 95% of a Smartphone's overall carbon footprint. The batteries, integrated circuits, speakers, and display units that go into manufacturing a Smartphone are all mass-produced, which seriously impacts the environment in terms of carbon footprint, heat emissions, and other factors. Not just hardware, the networking and data centers required for the software development of the operating system, including IOS and Android, can also be energy intensive, emitting a lot of heat and carbon dioxide. For instance, the data centres use about 200 terawatt-hours (TWh) of power annually, or close to 1% of the world's total electricity demand, and produce 0.3% of all co2 emissions worldwide (source-IEA database)
When new versions of our smart phones are launched, we habitually upgrade them quickly, which generates a lot of physical e- waste. That amount, which comprised more than 50 million tonnes of projected weight in 2019 and almost 10% of the world's electronic garbage, was estimated.

Are Smartphone manufacturers to be blamed?

The launch of brand-new Smartphone models every two to three years is used as a profit-making marketing scheme that relies on brand loyal consumer market constantly looking for new designs, features, quality, and overall brand image. This strategy encourages the faster disposal of smart phones, which is made worse by the fact that the majority of industry players are not transparent about the recycling potential of discarded smart phones.
Another strategy these industries apply to boost profits is to create expensive or difficult-to-replace components, including batteries or display units. So if consumer breaks these parts, they will be more inclined to buy brand new phones than invest in repairing them.

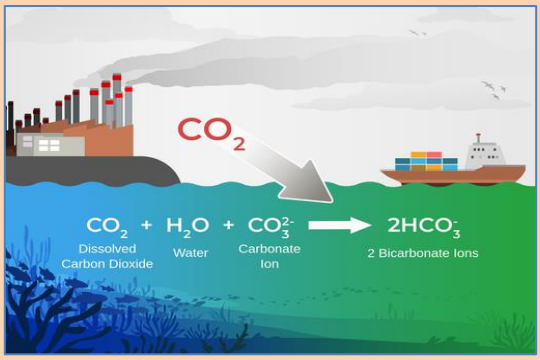
As we migrate to a more digitalized world, careful consideration will be needed to determine what trade-offs we will find acceptable and exactly how we may manage the costs and rewards of such a change.

Ocean Acidification

Banashree Chakraborty

Ocean covers 70% of the earth surface. Here more life is present than anywhere else in our earth. In our environment ocean plays a vital role in absorbing the carbon dioxide from nature. It absorbs around 29% of global carbon dioxide.

Day by day the emissions of carbon dioxide are increasing. As a result, the absorbing rate of carbon dioxide by the sea is also increasing and due to this the ocean surface water has become more acidic.This is known as the ocean acidification.



Why ocean acidification has become one of the major environmental issues?

Carbon dioxide gas is one of the greenhouse gases that have its negative effect on our environment. Here in ocean we notice that the more absorbance of it creates some problems likes its effect the marine eco system (like loss of the corals, shellfish and some organism) which is beneficial for us.

Most effected ocean due to ocean acidification

Although ocean acidification has the negative effect on the ocean all over the world but there are two oceans that faced maximum impact of it. Those two oceans are **Polar Ocean** in the **Arctic** and the **Antarctic.**

What should we do to reduce ocean acidification?

As ocean acidification is related with carbon dioxide gas emissions and pollution so we have to look over more on the climate change act and also try to reduce the use the fossil fuels. In our environment we have some halophytes plants (kelp, eelgrass and vegetations) that have the ability to absorb carbon dioxide from the water and reduce the acidity. Creating conditions for unhindered growth of this type of plants in the ocean may be helpful for reducing the ocean acidification.

Global initiative on ocean acidification

In 2015, the United Nations adopted the 2030 Agenda with a set of 17 Sustainable Development Goals (SDG), including a goal 14 which calls to "conserve and sustainably use the oceans, seas and marine resources for sustainable development". Ocean acidification is directly addressed by the target SDG 14.3, which reads: "Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels". This target has one indicator: Indicator 14.3.1 which calls for the "Average marine acidity (pH) measured at agreed suite of representative sampling stations". The Intergovernmental Oceanographic Commission (IOC) of UNESCO was identified as the custodian agency for the SDG 14.3.1 Indicator. In this role, IOC-UNESCO is tasked with developing the SDG 14.3.1 Indicator Methodology, the annual collection of data towards the SDG 14.3.1 Indicator and the reporting of progress to the United Nations. It is expected these initiatives will provide a scientific basis for monitoring the conditions of the oceans and take appropriate remedial measures, which will no doubt be complex and time consuming.

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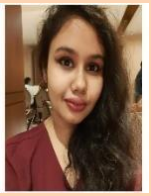

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