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The format of the article as follows:

1. Font should be Times New Roman and font size to be 12 in 1.5 spacing with maximum of 4-5 typed pages.
2. Figures and typed table should be in separate pages and provided with title and serial numbers.
3. The exact position for the placement of the figures and tables should be marked in the manuscript.
4. The article should be below 10% plagiarized.

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EDITORIAL




World Ozone Day is celebrated on 16th September at both national and international levels. Various types of activities, competitions such as poster making, sketching, quiz, related to ozone layer depletion, debate and speeches are held in schools and colleges in order to make the students aware about the depletion of ozone layer and how to protect it using eco-friendly and ozone protective products.

Current year DESKU EIACP celebrated ozone day on 15th September, 2023 through seminar and drawing competitions among the school children's in different categories and poster competitions among the college and university students.

In the National seminar, the technical session was conducted by Dr. Punarbasu Chudhury, Calcutta University. He described the ozone layer depleting substances, global warming and coldest, windiest, driest, loneliest continent. Then the technical session was continued by Prof. Anilava Kaviraj, retired professor of Zoology, University of Kalyani. He described the positional advantage of earth in solar system for life to sustain, emergence of man and overexploitation of resource, climate change and its consequences, effect of ozone layer and its effect on plants, animals, human being, environment and climate change also.

This newsletter contains two articles; the first article discusses about the effect of climate change on biodiversity and the second article discusses about the impacts of climate change on fisheries and aquaculture. The principal aim of this newsletter is to discuss about the sources of climate change and its impact on environment.



Prof. Kausik Mondal

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EIACP PC- RP on Environmental Biotechnology, University of Kalyani

Climate change and biodiversity - what is in store for us?

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Abstract

Earth originated about 4.6 billion years ago, while life on earth originated 3.2 billion years ago in a reduced environment. Blue green algae evolved about 2.2 billion years ago and started producing oxygen into the earth's atmosphere through photosynthesis. Complex life evolved about 600 million years ago, when there was sufficient oxygen and a shield of protection to life in the form of ozone layer. Earth became habitable to life because average temperature was 15 °C with minimum diurnal fluctuation, a suitable atmosphere with 78.09% nitrogen and 20.95% oxygen and trace amount of carbon dioxide and inert gases. A thin layer of ozone (approx. 3mm) in the stratosphere absorbs harmful UV rays coming from sun and provides vital protection to man and other biota on earth. Due to increased production of ozone depleting substances (ODs) like nitrous oxide and chlorofluorocarbon (CFC) the ozone layer has been broken down in many places. United Nations through an international agreement, the Montreal Protocol, have been largely successful in controlling production and uses of ODs. But with the advancement of science and technology man has encroached the habitats of wild lives and destroyed biodiversity directly through deforestation, hunting, or indirectly through pollution and climate change. As per IUCN 338 vertebrates became extinct during the last 500 years. We must conserve wild lives and control production and emission of ozone depleting substances and greenhouse gasses for a sustainable environment to prevail on earth.

Keywords: Environment, Ozone, Pollution, Chlorofluorocarbon (CFC), Climate change

The primitive earth

It is estimated that Earth originated about 460 crores years ago. At the beginning, it was a ball of hot molten mass, called magma containing mixture of minerals and dissolved gases. For about 1 billion year the earth was remarkably hot with an estimated temperature of about 2000 °C (Scott and Lindsey, 2023). Gradually the surface of magma cooled down and degassed water vapour and some greenhouse gases mostly carbon dioxide, which formed a

secondary atmosphere on earth and facilitated to form the water ocean 3.5 billion years ago. Average temperature of earth during this period was 80°C (Joseph, 2010). As earth cooled from its molten state, minerals started to crystallize and settle resulting in a separation of minerals based on density and the creation of the earth-crust, mantle, and core. Magma still exists today below the earth crust and above the mantle and often comes out through volcanoes as lava.

Origin of life and its protection

During the first few million years, the Earth frequently faced collisions with asteroids and meteorites. Some researchers proposed that one such big collision with a large planetary body, often called as Theia, created the moon, a significant phase in the history of earth and its atmosphere. Once created, the moon produced profound effects on earth. By its gravitational pull the moon helped the earth's axis to tilt to a fixed angle and stabilized the orbit of earth around Sun. These impacts of moon on earth in turn stabilized the seasonal changes, determined the length of day and night and tidal action on ocean, thereby producing an environment on earth suitable for life to originate on earth.

It is estimated that life originated approximately 3.2 billion years ago. But the atmosphere was then devoid of oxygen and life was dominated by anaerobic microbial communities. Blue green algae evolved almost a billion year later and started photosynthesis for the first time to convert molecules of water (H₂O) and carbon dioxide (CO₂) to produce organic compounds and molecular oxygen (O₂) using energy from the sun (Dismukes, et al., 2001). Some of this molecular oxygen began to accumulate in the atmosphere, while some of them went high up in the atmosphere and absorbed UV rays from sun to split into single oxygen atom. This oxygen combined with molecular oxygen to form ozone. It was an important development in the history of earth before the evolution of complex life roughly 600 million years ago, when there was plenty of oxygen in the air (Stüeken, et al., 2020) and a shield of ozone layer that protected the life on earth.

Why earth is habitable to life?

Earth is habitable to life for some of its unique properties, which are not found in any other

planet in this solar system. The average temperature on earth is 15 °C with minimum diurnal fluctuation, while that in Mercury and Venus it is 165 °C and 464 °C respectively and in other planets it ranges from -65°C to -200°C. Diurnal fluctuation of temperature on earth is minimum (approx.10 °C), because a major part of the solar radiation reflected from earth surface is prevented from escaping into space by a blanket of greenhouse gases like water vapour, methane, carbon dioxide, nitrous oxide, chlorofluorocarbon etc. (Fig. 1).

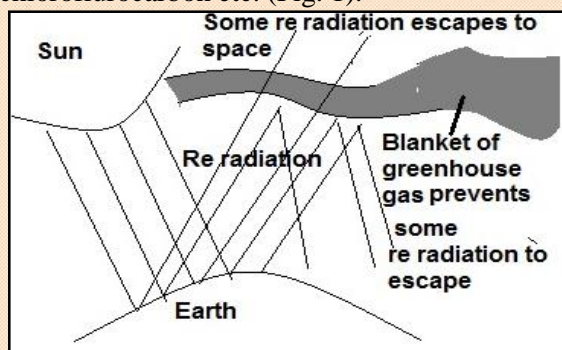


Fig. 1. Greenhouse effects in earth atmosphere

The Mercury has no greenhouse gas. As a result, the day temperature rises to 430°C, while the night temperature drops to -290°C. Venus, on the other hand has a very high concentration of CO₂ (approx. 30000 ppm), which prevents escape of heat from the surface of the Venus and keeps the planet extremely warm. The Earth has evolved to develop an atmosphere comprising of 78.09% nitrogen and 20.95% oxygen and rest with CO₂, water vapour and inert gases.

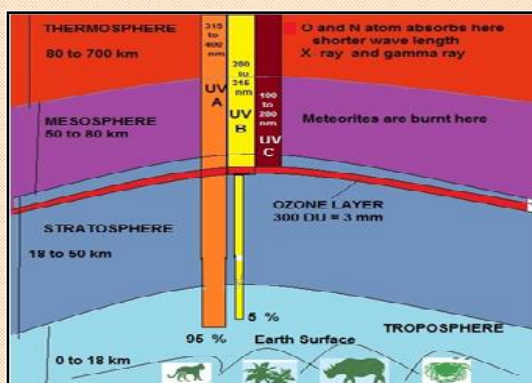


Fig. 2. Different layers of atmosphere that protects life on earth.

Such an atmosphere is suitable for life to exist on earth. Had there been more oxygen, the atmosphere would frequently catch fire with the entry of meteorites. Moreover, the first layer of the atmosphere (troposphere), which span from 0-18 km from the earth surface and is the area

where we experience air circulation, storm, lightning etc., are protected by three more layers (Fig. 2). Immediately above troposphere lie the stratosphere, which contains a thin layer of ozone to prevent entry of harmful UV rays, mesosphere above the stratosphere, which burns the meteorites and thermosphere above it, which absorbs the harmful short wave length radiation like X-ray and gamma ray of sun.

Ozone layer and its impact

UV radiation is extended from 100 to 400 nanometer (nm) in the solar radiation spectrum. The UV radiation is sub-divided into three distinct spectrum viz. UV-A (315-400 nm), UV-B (280-315 nm) and UV-C (100-280nm). Ozone layer can't prevent UV-A radiation, but prevents UV-B radiation by 95% and UV-C radiation by 100 %. Shorter the wave length more is its harmful impact on health of animals. Thus UV-C radiation is most harmful and the ozone layer keeps it away from the biosphere (part of the atmosphere where life exists). Only a 3 mm thin layer of pure ozone (300 DU), can prevent 100% of UV-C from entering into troposphere. The thickness of ozone layer is often termed in Dobson unit (DU). One Dobson unit (DU) is equivalent to 100 nm.

In 1970 it was discovered that nitrous oxide and chlorofluorocarbon (CFC) breaks ozone and the three scientists who discovered it were awarded the Nobel prize in Chemistry in 1995. Since these two substances are significant exhausts from several industrial activities, they substantially destroyed the ozone layer over the years and produced ozone holes in stratosphere. Such ozone holes become distinct over Antarctica and to some extent in Arctic stratosphere during September to mid December because of unique climatic conditions in these parts of the earth during the transition from 6 months dark period to 6 months light period. Creation of ozone hole has serious consequence on human health resulting in increased incidence of skin cancer, cataract and impaired immune system. United Nations (UN) felt it urgent to phase out production and consumption of ozone depleting substances (ODs) and initiated a global agreement in 1987, called the Montreal Protocol to effect the phasing out of ODs. The agreement was signed on 16th September, 1987 and the agreement came into force by the signatory countries in 1989. It is one of the most successful global agreement and the UN in 1994 proclaimed 16th

September as the International Day for the Preservation of Ozone Layer.

Mass extinction and climatic fluctuation

As mentioned above, complex life evolved approximately 600 million years ago and gradually diversified into various forms of life. As new plants and animals evolved through passage of time, they faced fluctuation of climate and 50-95% of lives became extinct which is fifth times during this 600 million years history of earth. These are called mass extinction. Dinosaurs evolved approximately 250 million years ago and became extinct 100 million years ago during one such mass extinction. The last mass extinction occurred 65 million years ago. The exact reason behind the mass extinction is not known. But it has been established that earth experienced periodic glaciations in a cycle of 1 lakh year with intermediate peaks every 40-42 thousand years. Serbian scientist Milutin Milankovitch proposed that this periodic glaciations is a result of three properties of earth viz. eccentricity, obliquity and axial precession. Obliquity refers to orbit of the earth being periodically round to elliptical in a cycle of 1 lakh year. Currently earth's orbit is almost round and is close to Sun. Similarly earth is currently tilted at 23.4 degree. But the tilting ranges from 22.1 to 24.5 degree in a cycle of 41000 years, which is called obliquity. The last maximum tilt was 10000 years ago. As Earth rotates, it wobbles slightly upon its rotational axis due to tidal forces. This is called axial precession, which spans over 25000 years. These three cycles together called Milankovitch cycle and periodic glaciation occurs as a result of these cycles (Fig. 3). We are now in between two glacial periods and facing a warm interglacial period.

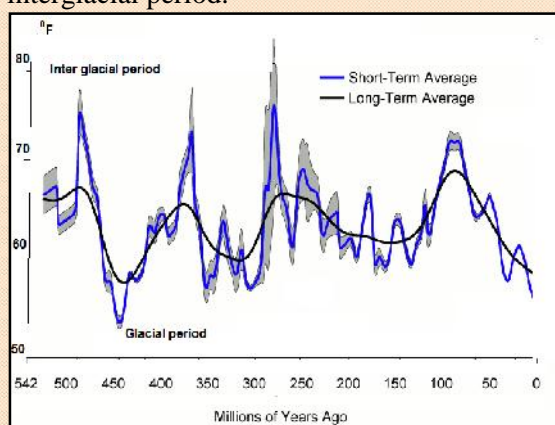


Fig. 3. Cyclic fluctuation of temperature of earth during the last 600 millions years

Emergence of man and destruction of biodiversity

Modern man (*Homo sapiens*) evolved approximately 300000 years ago in Africa with certain traits that allowed them to take much advantages of environment over other organisms. Man learned agriculture only 10000-15000 years ago, but made dramatic achievements during the last 200 years including industrial revolution, green revolution, developments in genetic engineering, computer science, internet, journey to space and in many others areas. But most of these achievements were at the cost of wild lives and their habitats. While demand of food, luxury and comfort of man increased with the increase of human population, areas of natural habitats and population of wild lives started decreasing. Approximately, 420 million ha of forest was lost during the period 1990 to 2020 due to conversion for agricultural purposes, urbanization, climate change or forest fires (FAO. 2022). Most of these deforestations were in the tropics. A recent report by WWF (Pacheco, et al., 2021) indicates that during the period 2004 to 2017, more than 43 million ha of forest land has been cleared across the tropics and sub-tropics mostly for agricultural purposes. Deforestation resulted in extinction of 600 plant species during the last 250 years (Humphreys, et al., 2019). Strong international movements started across the globe to stop deforestation and encourage reforestation. But in a mature forest there exists strong interconnections between plants through their roots and associated mycorrhizae, known as wood wide web (Simard, et al., 1997). New forests may be developed by fresh plantations, but the wood wide web developed through thousands of years of evolution of plants can't be restored.

The wild lives have been steadily declined during the last 150 years, with the advent of human civilization. The loss is not only due to loss of their habitats, but also due to direct hunting by man and indirect effects of man on environment like pollution, climate change etc.. Thousands of Galapagos fur seals (*Arctocephalus galapagoensis*), were killed in the 19th century before a protection was enforced in 1959 by the Ecuador government. Almost 3 million whales have been slaughtered in the last century. Whales, seals and walrus have a thick layer of fat, called blubber, below the dermis of their skin. The blubber is a

delicacy in many western countries and are thus indiscriminately slaughtered for human greed. Since whales have a huge body they accumulate huge carbon from the atmosphere and when they die and sink in the ocean a huge amount of carbon is transferred from environment to ocean bottom. Whales are abundant in Antarctic sea. It is estimated that, before the start of commercial whaling whales sequestered about 400000 tonnes of carbon per year, which dropped to only 60000 tonnes of carbon per year by 1972 (Reinert, 2023). As per IUCN 338 vertebrates species became extinct in the last 500 years (Fig. 4).

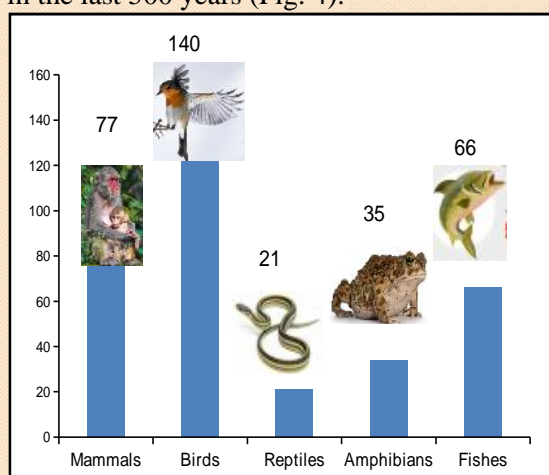


Fig. 4. Vertebrates extinct (last 500yrs)

Large, long lived, specialized and endemic animals and plants are most susceptible to extinction. Due to increased rate of extinction during this period, scientists apprehend that we are progressing towards sixth mass extinction. Although land use pattern appeared as the crucial driver, climate change also produced profound effects on biodiversity loss (Sala, 2000). Corals are the worst victim of global warming followed by the amphibians. Corals are most sensitive to temperature. They remain in symbiotic association with the tiny algae, dinoflagellates. When the water heats up, corals become stressed and they expel the algae. After they expel the algae, the corals turn fluorescent pinks, blues and yellows as they produce chemicals to protect themselves from the Sun's harmful rays. Amphibians require a moist environment for their skin. With the rise of temperature many amphibians have been vanished. The extinction of the golden toad in 1990 being the recent incidence. We must check greenhouse gas emission to check rise of global temperature and search for alternative fuel for a clean and sustainable environment for the coming future.

Conclusion

Analyzing the climatic changes during the last 600 million years history of earth, it is revealed that we are now living in warm phases of earth in between two ice ages. But human activities have further aggravated the climate through deforestation, industrial agriculture and industrial activities resulting in global warming. Moreover, deforestation and indiscriminate killing of wild lives have drastically reduced biodiversity across the globe. If it continues, it will soon lead to sixth mass extinction. Fortunately, many government and non-government organizations have initiated conservation of wild lives and control of ozone depleting substances and greenhouse gasses, so that a sustainable environment prevails on earth.

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Effect of Climate Change on Fishery and Aquaculture

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Abstract

Climate change is a most-significant global phenomenon of environmental issue caused due to human activities. Abrupt changes in temperature, erratic rainfall, and extreme climate events are the major consequences of climate change. Impacts of climate change tend to be greater in tropical regions of Africa and Asia, where temperatures are higher, contributing to the reduction of fishery productivity. Climate change affects on physiological behaviour, growth performance, reproductive capacity, mortality and distribution of aquatic species. Our lifestyles at the individual and societal level are the key to contributing towards climate change solutions.

Key words: Climate change, Environmental, Temperature, Fishery

Introduction

Climate change refers to a long-term shift in temperatures and weather patterns due to human activities and in present time it is the most-significant global phenomenon environmental issue (Dutta et al., 2020). Human activities like burning of fossil fuels, oil and gas are the largest contributor to global climate change as well as deforestation and forest degradation that emit greenhouse gases (GHGs) into the atmosphere. Burning of fossil fuels generates greenhouse gas emissions that include carbon dioxide and methane. These cause the atmosphere to trap more heat than it used to, these include warming temperatures and changes in precipitation. By increasing the global anthropogenic greenhouse gas (GHG) emissions over the decades are major contributors to the global warming and poses threats and challenges to mankind. Climate change has been recognized as the foremost environmental problem of the twenty first century and may affect the different ecosystems with corresponding impacts on key sectors, such as water resources, agriculture, natural ecosystems including forestry, health and

industrial sectors (Santra et al, 2014; Samal, 2012) (Fig. 1.).

Climate change is an important environmental influence on ecosystems and it has already produced significant and measurable impacts on almost all ecosystem, taxa and ecological processes, including changes in species distribution, timing of biological behaviours, assemblage composition, ecological interactions and community dynamics (Grimm, et al, 2013; Shivannam, 2022).

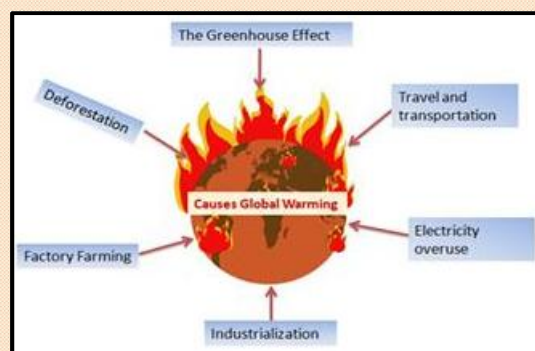


Fig. 1 Causes of Global Warming

Climate change has both direct and indirect impacts on fishery sector. The impacts of climate change highly effective in reduction of fishery productivity in tropical regions of Asia and Africa (FAO, 2020). Direct effects act on physiology and behavior and alter growth, reproductive capacity, mortality and distribution but indirect effects alter the productivity, structure and composition of the marine ecosystems on which fish depend for food (Fig. 2). Water and climate change are inextricably linked. Global changes in average temperature of the world lead to melting of arctic ice caps and high altitude ice which result in rise in sea level and altering oceanic current. It has been presumed that rise in sea level may affect distribution and migration pattern of fish (Bakshi and Panigrahi, 2015).

Fishery and aquaculture have always provided food for billions of people around the world. Fish provides about 20% of animal protein intake, so it is an important part of the human diet in almost all countries of the world. Fish is a cheapest source of animal proteins, highly nutritious which dominate poor people's diets (Thorpe et al., 2006).

But marine and aquatic ecosystems are under stress due to anthropogenic stressors such as global climate change, which imply temperature rise, salinity change, and ocean acidification; ecosystem disturbance; and selective pressure from capture have shown a

rapid effect on the growth rate of several fish species (Dijoux and Boukal 2021; Hendry, et al., 2017; Laufkötter, et al., 2020; Silvy, et al., 2020; Bowles, et al., 2020; Denechaud, et al., 2020; Oke, et al., 2020; Pinsky, et al., 2021; Andersen, et al., 2016). Healthy fish stocks are a key component of biodiversity and ecosystems and can also produce more food and incomes for fishers (Fig. 3).

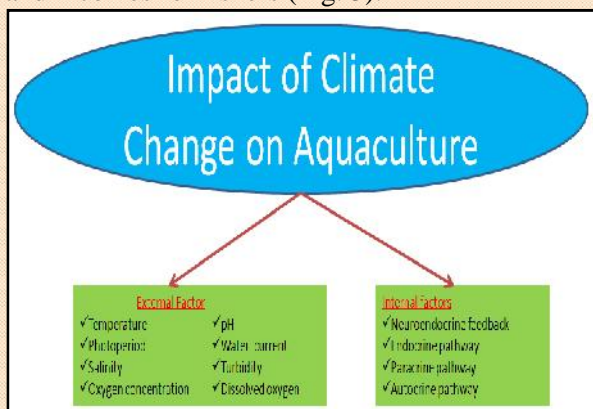


Fig.2 Impact of climate change on aquaculture

The oceans are estimated to store about 50 times more CO₂ than the atmosphere. The projected increase in CO₂ uptake by oceans at 1.5°C or more global warming will have adverse effects on the growth, development, calcification, survival, and abundance of several aquatic species (IPCC, 2018). Temperature variation and ocean acidification and ocean deoxygenation can lead to the loss of marine habitats and species, while freshwater ecosystems are being impacted by changes in water temperature, water flow, and fish habitat loss

Impacts of Climate Change on fishery

The climate change has great impact on global fish production including marine and freshwater aquaculture. Climate change also have significant negative effect on marine ecosystem including plants, fish, corals and mammals, causing coral bleaching and altering species composition and diversity which impact on overall socioeconomic growth (Munday et al., 2008; Pratchett et al., 2008; Daw et al., 2009; Ateweberhan et al., 2013; Klinger et al., 2017; Belhabib et al.; 2018; FAO, 2020). Due to unusual seasonality climate change is ravaging food production systems by sloping its productivity in harsh environmental conditions and disease outbreaks (Ray et al., 2019; Siddique et al., 2022). The climate change has both negative and positive impact on the environment.



Fig. 3. Aquaculture fishery

Positive impacts of climate change

- ✓Enhanced primary productivity and benefit production of filter feeders
- ✓Increased metabolic rate, feed conversion and growth rate
- ✓Extended growth season
- ✓Low winter mortality
- ✓Faster growth rate in cooler regions/higher latitudes

Negative impacts of climate change

- ✓Thermal stress
- ✓Algal bloom formation produces harmful toxins
- ✓Reduced dissolved oxygen levels
- ✓Changes in spawning patterns
- ✓Stock loss (fish kill/mortality)
- ✓Reduced water quality
- ✓Prevalence of pest, diseases and predators
- ✓Consumer safety issues
- ✓Reduced water availability
- ✓Loss of farming sites
- ✓Salinization of underground water
- ✓Reduced culture period

Impact on net primary productivity

The productivity of any water body is determined by net primary production of the system. A good valuation of net primary productivity (NPP) in respect to the consequences of climate change may alter the future trend of marine as well as fresh water production (Gang et al., 2017).

Decline in phytoplanktons

Global warming has significant effect on the decline in phytoplankton population, which results the reduction of available nutrient, oxygen and sunlight in aquatic system. The fish population directly depends on the primary producer phytoplanktons. Some plankton, such as diatoms, grows better at cooler temperatures. As a result the fishing industries and aquatic ecosystem greatly hampered through the decrease in plankton population.

Effect on ecosystem and fish production

Rising temperatures affect vegetation, food sources, and access to water and in the marine aquatic ecosystems are being affected by rising ocean temperatures, ocean acidification and ocean deoxygenation. The freshwater ecosystems are also being impacted by climate change effect through increasing average water temperature and water circulation which cause loss of fish habitat and production. Through ongoing climate change scenario a number of terrestrial, freshwater and marine species have changed their geographic location, seasonal activities, migration patterns, abundances and the ways in which they interact with other species (IPCC, 2018). The ecosystems may become uninhabitable for certain plants, animals, forcing the wildlife to migrate for searching of food and livable conditions, while some other flora and fauna unable to survive.

Species extinction

The combination of challenges could cause many animals to go extinct. About a quarter of the world's freshwater fish species are at risk of extinction by climate change reported by International Union for Conservation of Nature (IUCN) Red List assessment. The IUCN data indicated that out of the 14,898 species about 3,086 are at risk of extinction. At least 17% of the threatened freshwater fish species are affected due to influenced by climate change (Down to Earth, 13th Dec 2023).

Impact on fish breeding behavior

The ongoing climate scenario changes in temperature, salinity, acidification and hypoxia, which impact on reproductive behavior of fishes. The fishes are facing problem in their normal breeding process and survivability. The sex differentiation is affected by temperature and thermo cycles.

Diseases outbreak

The Climate changes effect frequently cause losses in productivity of aquaculture systems and increase the vulnerability of cultured fish to diseases. The global temperature rising is likely to accelerate the replication rate, virulence, life cycle longevity, and transmission of pathogens among several finfish and shellfish species (Marcogliese, 2008). Increasing temperature may promote the emergence of epizootic diseases in aquaculture and cause serious economic challenges and worsening of other environmental parameters affects the development of parasites and pathogenic bacteria.

Conclusion and Prospects

In recent the climate change effect has impact on many sectors including global food production. The climate change risks on the fishery and aquaculture sectors are expected to differ across geographical or climatic zones. The only solution for reducing climate change effect is the change in human behavior. The recent campaign initiated by India on 'Lifestyle for Environment(LiFE)' mission can solve the deterioration of environment for a sustainable future. India's traditional lifestyles are inherently sustainable, and we are well positioned to showcase to the world that change at the individual and societal level are key to contributing towards climate change solutions.

Use of environmentally-friendly modes of transportation; choose a fuel-efficient vehicle like a hybrid or electric car. Instead of driving a car, try to walk, or use public transport more often can decrease the pollution caused by fossil fuels. Save energy at home and at work place by turning off lights and electronic devices when not using them and opting to buy energy-efficient appliances.

The Mission LiFE programmes have seven theme objectives like 1. Save Energy 2) Save Water 3) Say No to Single Use Plastic 4) Reduce E-waste 5) Adopt Sustainable Food Systems 6) Reduce Waste 7) Adopt Healthy Lifestyles (Fig. 4). The Govt. of India take initiative to promote Mission LiFE programmes in every sectors for future sustainable environment. The Ministry of Environment, Forest and Climate Change (MoEFCC), and Environmental Information, Awareness, Capacity Building and Livelihood Programme (EIACP), Govt of India actively promoted the Mission LiFE programmes through different activities and awareness programme. Different Govt. sectors, NGOs, institutions and common people are come forward to control the climate change and other environmental problems through changing the human lifestyle. From now our lifestyle should be environmental friendly.



Fig. 4 Mission LiFE programmes

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Drawing competition on Ozone Day

World Ozone Day is celebrated on 16th September at both national and international levels. Various types of activities, competitions such as poster making, sketching, quiz, related to ozone layer depletion, debate and speeches are held in schools and colleges in order to make the students aware about the depletion of ozone layer and how to protect it using eco-friendly and ozone protective products. As per the instruction of MoEF & CC the DESKU EIACP RP regularly celebrate Special days i.e. Environmental day, Aranya Saptaha, Wetland day, Yoga day, Ozone day, Swachh Bharat etc. to create awareness among the people on different current environmental issues. Current year DESKU EIACP RP celebrated ozone day through a seminar, drawing competitions among the school children's in different categories and poster competitions among the college and university students. The drawing competition was organized on 4th September, 2023 on the theme 'Ozone layer depletion through our daily lifestyle'. A good number of participants were participated in this programme.



Ozone Day drawing competition



Participants taking the pledge for protection of the environment



Ozone Day drawing competition



Ozone Day drawing competition



Some selected drawings of the drawing competition

FORTHCOMING EVENTS		
Event	Date	Place & Correspondence
The 10 th International Conference On Renewable Energy Technologies (ICRET 2024)	5-7 th January 2024	Chongqing, China http://icret.org/
IEEE--2024 12 th International Conference on Nano and Materials Science (ICNMS 2024)	12-15 th January 2024	Bangkok, Thailand http://www.icnms.org
The 8 th International Conference on Climate Change 2024 - ICC 2024	8-9 th February 2024	Colombo, Sri Lanka, western province, Sri Lanka https://climatechangeconferences.com/
6 th International Conference on BioMedical Technology (ICBMT 2024)	23-25 th February 2024	Ho Chi Minh, Vietnam http://www.icbmt.org/
5 th World Congress on Biotechnology Research	25-26 th March 2024	Dubai, United Arab Emirates https://worldbiotechcongress.info/

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<p>FROM: DESKU EIACP RP DEPARTMENT OF ENVIRONMENTAL SCIENCE, UNIVERSITY OF KALYANI KALYANI-741235, NADIA WEST BENGAL</p>	<p style="text-align: right;">BOOK POST</p> <p>TO</p> <hr/> <hr/> <hr/>
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