DECEMBER 2021

Monthly Bulletin

VOLUME L, NO. 10

CLIMATE HAS NO BORDERS

THE ASIATIC SOCIETY
1 PARK STREET ● KOLKATA-700016

Contents

From the Desk of the General Secretary

If now it be asked, what are the intended objects of our inquiries within these spacious limits, we answer, MAN and NATURE; whatever is performed by the one, or produced by the other.

Sir William Jones

Dear Members and Well-wishers,

You are aware that the Asiatic Society's Monthly Bulletins are normally not issued in the months of October-November. Therefore, after our updated Monthly Bulletins covering (July, August, September, 2021), the December issue is now ready for release. The months of October, November, December, even after making a synoptic view, appears to be replete with many important occasions, in terms of historical as well as contemporary relevance, both at the national as well as global level. For example, the initiation of constituent assembly on 9th December, 1946 (which marks the departure preparatory to India's independence). Simultaneously, the natural disaster and loss of life to the tune of 70000 due to cyclone in Bengal on October 11, 1737 also registers a special mark in our life. This time-frame includes the birthdays of a number of eminent scientists in our country such as Dr. Meghnad Saha (October 6, 1893), Homi J. Bhabha (October 30, 1909), C.V. Raman (November 7, 1888), Acharya Jagadish Chandra Bose (November 30, 1858) and others. The birth of Birsa Munda on November 15, 1875 signifies a different dimension when compared with the publication of Charles Darwin's *On the Origin of Species* (November 24, 1859). The unique event of world history was the implementation of Gregorian Calendar (October 15, 1582) on the one hand along with the formation of the Azad Hind Government by Netaji Subhas Chandra Bose (October 21, 1943) on the other. The Human Rights Day (December 10) may be juxtaposed with the World Environment Conference in Kyoto, Japan (December 11, 1997). The havoc of Tsunami (December 26, 2004) may still be remembered with the Chasnala Mining Disaster (27th December, 1975).

Friends, the period under coverage of the present Bulletin has also witnessed a lot of academic activities of the Society (mainly online). A number of endowment lectures were delivered by eminent scholars during this period. For example, K.K. Handique Memorial Lecture 2020, on 2nd September, 2021, Pandit Iswar Chandra Vidyasagar Lecture 2020, on 9th September, 2021, Indira Gandhi Memorial Lecture 2019, on 13th September, 2021, Professor Suniti Kumar Chatterji Memorial Lecture 2019, on 21st September, 2021, Professor Maya Deb Memorial Lecture 2020 on 22nd October, 2021 etc. Apart from this, a documentary on the History of the Asiatic Society done by Shri Goutam Ghose, an eminent film Director, on the occasion of observance of 225 years of its existence, was launched through YouTube on 28th September, 2021. A programme in Hindi on the

occasion of Hindi Diwas was organised on 14th September, 2021 with an impromptu speech in Hindi by the employees on Digital India and a pledge taking programme was observed on 1st November, 2021 as a part of the Vigilance Week. One of the most important programmes was the display of an exhibition in collaboration with the Embassy of Hungary to India on "Pligrim Scholar : Alexander Csoma de Koros Commemorative Exhibition" during 28th October to 3rd November, 2021. This was inaugurated by H. E. the Ambassador of Hungary to India, Mr. Andras Laszlo Kiraly. On this occasion Hon'ble Union Minister of State for Education, Government of India, Dr. Subhas Sarkar, was present as Guest of Honour. Another exhibition cum lecture demonstration was organised on "Manuscripts on Ayurveda" in observance of the National Ayurveda Day on 2nd November, 2021.

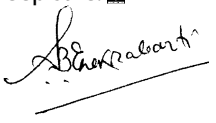
A number of other important lecture-programmes have already been scheduled in this month such as, a special lecture on "India in Egypt" by Dr. Tilak Ranjan Bera, formerly Fullbright Fellow and Senior Research Fellow, Ministry of Culture, Government of India, on 2nd December, 2021 and another by Dr. Jaya Mitra, an eminent Environmentalist on "Viswa-Sansar" on 15th December, 2021. A complete list of narrative details of all these programmes will appear in appropriate place.

A Review Meeting with the Secretary, Shri Govind Mohan, IAS and Additional Secretary, Shri Partha Sarathi Sen Sharma, IAS of the Ministry of Culture, Government of India, was held on 25th November, 2021 at the Science City Auditorium in Kolkata with all the institutions/organisations under Ministry of Culture based in Kolkata. Some important academic programmes have also been lined up keeping in view of the **Azadi Ka Amrit Mahotsav**; Bicentenary of Dr. Raja Rajendralala Mitra, the first Indian President of the Asiatic Society in 1885; 250 years of Raja Rammohun Roy, the acclaimed Social Reformer and an extraordinary scholar and Centenary Celebration of late Professor Shyamadas Chatterjee, an eminent Physicist of the country. Very soon the Society is going to organise an international seminar in collaboration with the Embassy of Poland to India on the studies on ancient cities in both Poland and India.

We are on the threshold of observing the 239th Foundation Day of the Asiatic Society on 15th January, 2022. Professor Rudrangshu Mukherjee, an eminent historian will deliver the Foundation Day Oration.

Let me conclude my note with the heartfelt wishes for a Happy Christmas, 2021, and a Happy New Year, 2022, in the context of a formidable impact of the two major struggles of the time, both global and national, emanated from two great events, having wider implications. These are the recently concluded COP26 organised at Glasgow, Scotland, UK, on the one hand and the long sustained rally and peasant protests continuing for a year with substantial victory which was demonstrated near the capital of our country. Our long term future will depend on the successful culmination of the both.

Please keep well and keep safe.



(S. B. Chakrabarti)
General Secretary

... in order to ensure our success and permanence, we must keep a middle course between a languid remissness, and an over zealous activity, and that the tree, which you have auspiciously planted, will produce fairer blossoms and more exquisite fruit, if it be not at first exposed to too great a glare of sunshine ...

Sir William Jones

AN ORDINARY MONTHLY GENERAL MEETING OF THE ASIATIC SOCIETY WILL BE HELD ON MONDAY, 6TH DECEMBER 2021 AT 5 P.M. AT THE VIDYASAGAR HALL OF THE SOCIETY

MEMBERS ARE REQUESTED TO KINDLY ATTEND THE MEETING

AGENDA

1. Confirmation of the Minutes of the last Ordinary Monthly General Meeting held on 6th September, 2021.
2. Notice of Intended Motion, if any, under Regulation 49(d).
3. Matters of current business and routine matters for disposal under Regulation 49(f).
4. Consideration of reports and communications from the Council as per Regulation 49(g).
5. The General Secretary is to report that in terms of the provision of Clause 6 of bye-laws IV of the Asiatic Society the name of Justice Chittatosh Mookerjee has been duly nominated by the Council in its meeting held on 29th September, 2021 for election as Honorary Fellow of the Society.
6. The following paper will be read by Dr. Syamal Chakrabarti :

   Glasgow Climate Pact : An Account in Nutshell

Dated : 18th November, 2021

(S B Chakrabarti)
General Secretary

NOTICE FOR EXTRAORDINARY GENERAL MEETING

Ref No: 74 Dated: 23.11.2021

As per Regulation 51, an Extra Ordinary General Meeting of the Asiatic Society, Kolkata will be held on Monday, 6th December, 2021 at 04:30 p.m. in the Vidyasagar Hall of the Society to adopt the Audited Accounts and Auditors' Report of the Asiatic Society, Kolkata for the year 2020-21. All members are requested to kindly attend the said meeting.

(Professor Swapan Kumar Pramanick)
President

COVID-19 Safety Protocol will be strictly adhered to

Election Notification of Office-Bearers and other Members of the Council for the year 2022-24

The Asiatic Society

Founded in 1784
(An Institution of National Importance declared by an Act of Parliament)
and
(An Autonomous Organization under Ministry of Culture, Government of India)
Patron : Hon'ble Governor of West Bengal

Ref. No. : TASK/Elec-2022/2021-22/072 Date : 15/11/2021

NOTIFICATION

In pursuance of amended Regulation 37 of the Asiatic Society, Kolkata, an Election Committee comprising the following members is constituted for conducting the election of Office-Bearers and other Members of the Council to be held in the year 2022:

1. Additional Secretary (In-charge of the Asiatic Society), Ministry of Culture, Government of India and the official member of the Council of the Asiatic Society representing the Government of India.
2. Director of Public Instruction, Department of Higher Education, Government of West Bengal and the official member of the Council of the Asiatic Society representing the Government of West Bengal.
3. The Registrar of Societies, Government of West Bengal or the representative not below the rank of Joint Registrar.

Ordinarily the representative of the Government of India shall be the Chairman of the Committee.

(S. B. Chakrabarti)
General Secretary

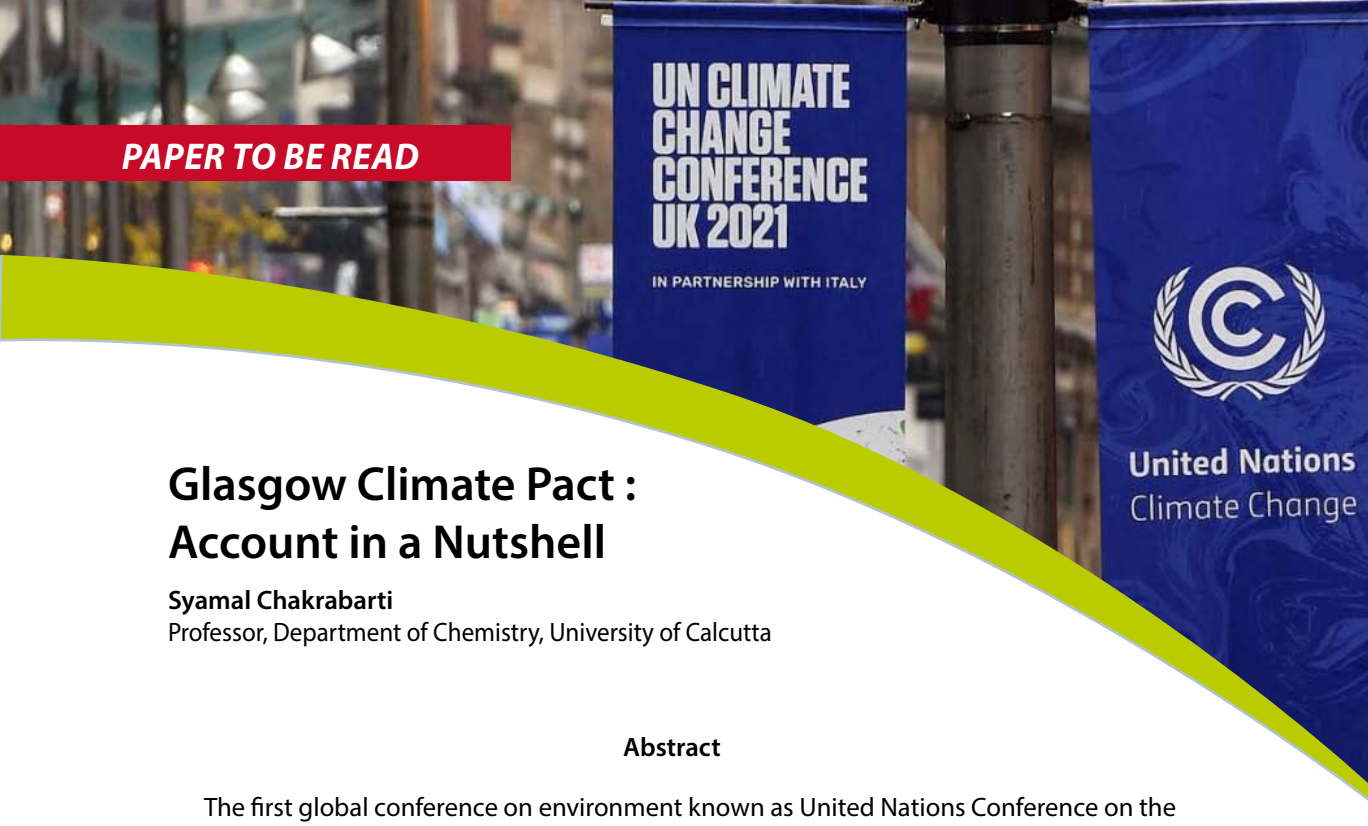
Copy to all concerned

1 Park Street | Kolkata-700016 | Phone : 2229-0779, 2249-7250, 2229-7251 | (D) 2229-3993 Fax : 91-033-2217-2355
website : www.asiaticsocietykolkata.org | e-mail : gs.asiatic@gmail.com / theasiaticsociety@gmail.com

Election Matters

ATTENTION : ALL MEMBERS

Following the Regulations in respect of the election procedure of the Council of the Asiatic Society, Election of Office Bearers and other members of the Council will be held in the year 2022. Ordinary members, who will pay their subscription up to 31st December, 2021 shall be entitled to participate in the Election process and cast their votes. Ordinary members are requested to pay due subscription immediately on any working day (12 noon to 4 p.m.) not later than 31st December, 2021.



PAPER TO BE READ

Glasgow Climate Pact : Account in a Nutshell

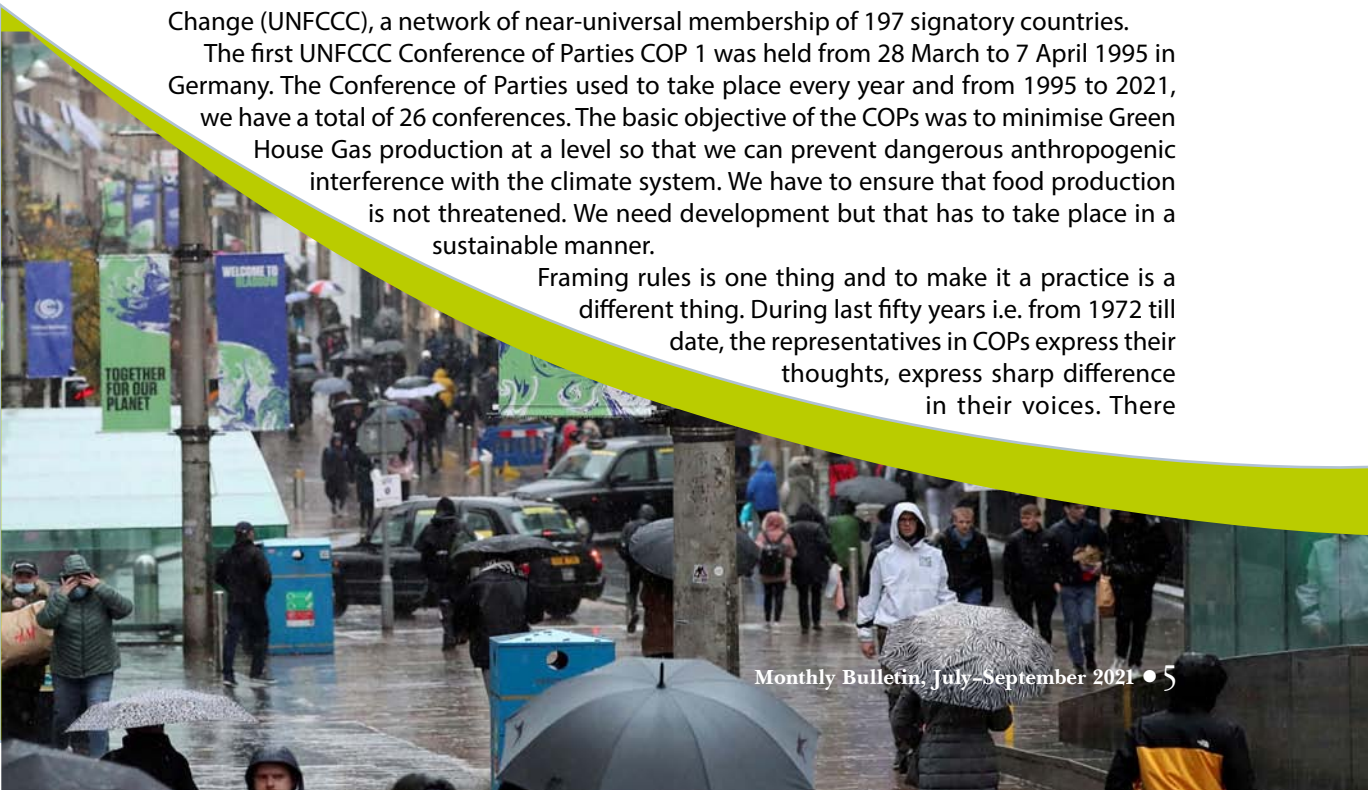
Syamal Chakrabarti
Professor, Department of Chemistry, University of Calcutta

Abstract

The first global conference on environment known as United Nations Conference on the Human Environment was held in Stockholm, Sweden in 1972. At the end of twelve days conference (5-16 June 1972), Stockholm Declaration and Plan of Action was adopted. In the year 1988, Intergovernmental Panel on Climate Change (IPCC), an Intergovernmental body of the United Nations was formed to assess anthropogenic climate change and to provide possible solutions of the environmental problems. This international platform used to publish 'Assessment Reports' after definite intervals. Their reports have played a key role for policy makers and also in different conferences of United Nations Framework Convention of Climate Change (UNFCCC), a network of near-universal membership of 197 signatory countries.

The first UNFCCC Conference of Parties COP 1 was held from 28 March to 7 April 1995 in Germany. The Conference of Parties used to take place every year and from 1995 to 2021, we have a total of 26 conferences. The basic objective of the COPs was to minimise Green House Gas production at a level so that we can prevent dangerous anthropogenic interference with the climate system. We have to ensure that food production is not threatened. We need development but that has to take place in a sustainable manner.

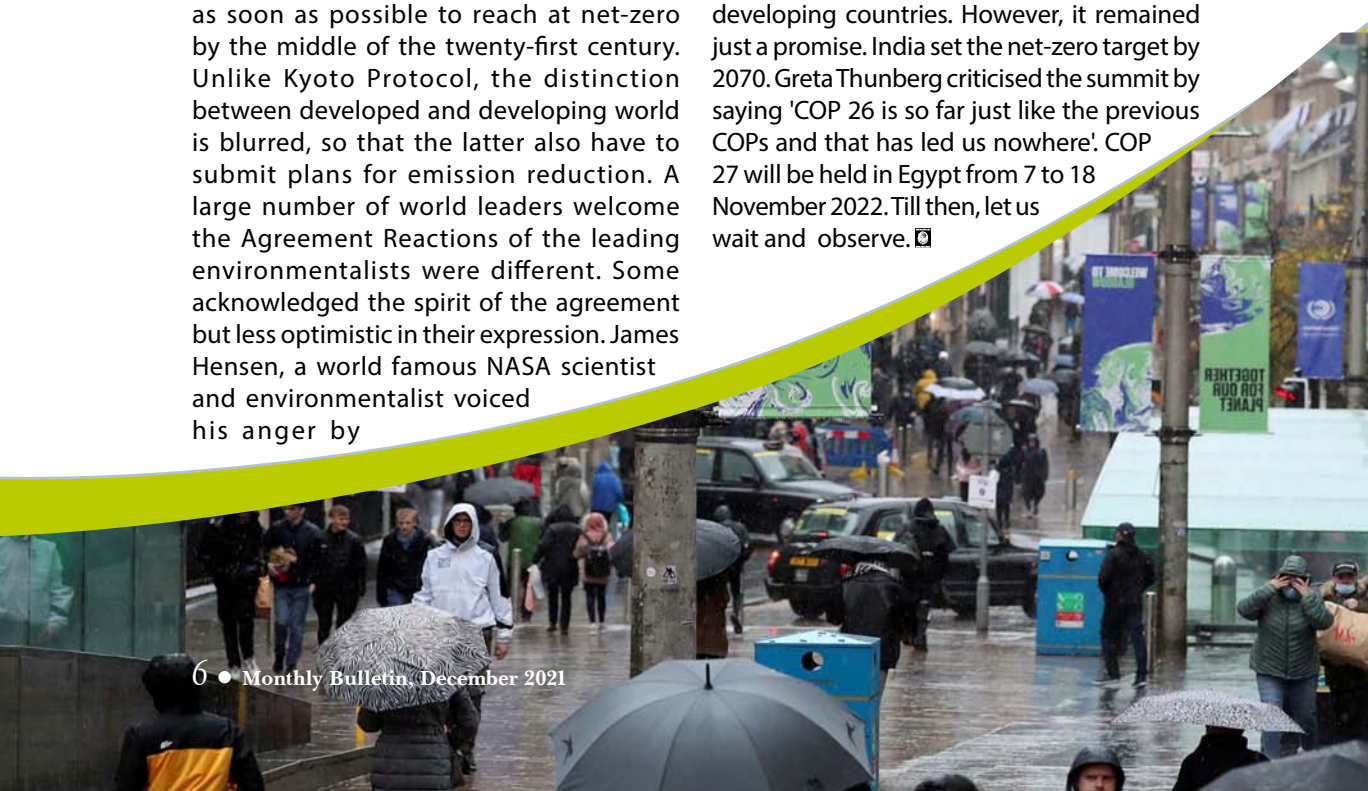
Framing rules is one thing and to make it a practice is a different thing. During last fifty years i.e. from 1972 till date, the representatives in COPs express their thoughts, express sharp difference in their voices. There



are also rare moments when almost all the countries try their best to have an all acceptable decisions.

The 2021 United Nations Climate Change Conference, known as COP 26 was held at the SEC Centre in Glasgow, Scotland, United Kingdom from 31 October to 13 November 2021. The president of the conference was a cabinet minister, Alok Sharma. It was supposed to take place one year before but due to COVID-19 pandemic, it has happened later. Even if we have lot of controversies, there are a few promising milestones in the history of environmental conferences. They are 'Montreal Protocol' (1987), 'Kyoto Protocol' (1997) and 'Paris Agreement' (2015). Paris Agreement is an international treaty on climate change which covers climate change mitigation, adaptation and finance. As of November 2021, 193 members have ratified the agreement. Only four countries are left among which only Iran is a potential emitter. USA withdrew in 2020 but rejoined in 2021. The agreement promises to keep the rise in mean global temperature to well below 2ºC (3.6ºF) above pre-industrial levels. Emissions should be reduced and as soon as possible to reach at net-zero by the middle of the twenty-first century. Unlike Kyoto Protocol, the distinction between developed and developing world is blurred, so that the latter also have to submit plans for emission reduction. A large number of world leaders welcome the Agreement Reactions of the leading environmentalists were different. Some acknowledged the spirit of the agreement but less optimistic in their expression. James Hensen, a world famous NASA scientist and environmentalist voiced his anger by saying that most of the agreements are full of promises but no action afterwards.

At this context, COP 26 took place. For the first time after COP 21, parties were expected to commit to enhance ambition towards mitigating climate change as outlined in 'Paris Agreement'. 'Glasgow Climate Pact' was adopted, the first ever climate deal with the aim of reducing coal, the worst fossil fuel for greenhouse gases. There was a demand of 'phasing out' coal but ultimately changed to 'phasing down' because of the intervention of two large coal-reliant countries India and China. Unlike previous summits, it was not sponsered by fossil fuel companies. Under the Paris Agreement, countries are supposed to mention their nationally determined contributions (NDC) to decrease their GHG emissions. It was expected to submit every five years i.e., first in 2020. But lot of countries have not submitted their NDC. China committed to become Carbon Neutral by 2060. More than 100 countries agreed to deforestation by 2030. Climate finance for adaption and mitigation was one of the principal topics of negotiation. The Paris Agreement included 100 billion USD annually in finance by 2020 for developing countries. However, it remained just a promise. India set the net-zero target by 2070. Greta Thunberg criticised the summit by saying 'COP 26 is so far just like the previous COPs and that has led us nowhere'. COP 27 will be held in Egypt from 7 to 18 November 2022. Till then, let us wait and observe.



President's Column

The 26th Conference of the parties to the UN Framework Convention on Climate Change – known as COP 26, held in Glasgow, UK, has just been concluded. After the Paris Agreement in 2015, this happens to be the most important international conference on climate talk. Since the first climate talk of the international level conference held in Rio-de-Janeiro, Brazil in 1992, where there was a ratification of the UN Framework Convention on climate change, the world has witnessed several such international level talks, but the climate catastrophe continues to haunt the world – with no immediate visible solutions being available worldwide. We have all witnessed massive demonstrations being held outside the conference venue in Glasgow and in many other capitals of the world where angry protests were made by organizations which are concerned with the worsening climate situation all the world over and its catastrophic effects on human civilization and even human existence. The Resolutions adopted at the Glasgow convention COP 26 show that issues relating to climate change are most complex and no unilateral or short term solution is visible. In a highly inequitable world where there is a sharp difference between developed, underdeveloped and undeveloped countries, fixing a fixed target for everybody irrespective of their technological level of development, would be unjust. This has been termed as 'climate injustice'.

What are the key issues? It can be seen that three major pollution issues are there causing a threat to the earth today. These are global warming, ozone depletion and acid rain. These are affecting the climate and all nations are being affected by it. Global warming and ozone depletion are the outcomes of such pollutions. Since this is an emerging and escalating threat to all nations, common action and strategy need to be adopted to combat this threat.

As far as global warming is concerned, the key intergovernmental body which had been set up for the first time to combat the problem, was the Intergovernmental Panel on Climate Change (IPCC), which published its report in 1990. This Report formed largely the agenda for the United Nations Conference on Environment and Development (UNCED) in Rio-de-Janeiro in 1992. The Rio conference has justifiably been termed as the Earth Summit where 25000 people attended the main session. The Conference adopted a Framework Convention on Climate Change signed by 160 nations. Three working groups formed at the IPCC were on Science, Impacts and Response strategies. In 2001 the IPCC published its third assement report which was more comprehensive. The issue of global warning and the strategies were discussed in World Economic Forum Meet in Davos in 2004. There was another international meet at Paris in 2015 which also set the goal of carbon emission at 1.5^{o}C as a long term goal. But the key issue regarding how to reach the goal in a world vertically divided, was not resolved.

It is against this background that the COP 26 meet at Glasgow has now just been completed. Containment of global warming and the strategies to be adopted towards that goal in an uneven world appeared to be the central issue. And there are many roadblocks. As it has been said, "COP 26 aspires to rejuvenate faith in global carbon markets; support sustainable developments in poorer countries and device ways to deliver fully on a promised climate finance fund and

help developing countries to kickstart their so called green transition goal."

At its present state, the world is nowhere near the goal of limiting temperature increase to even 2°C. And at the present situation we cannot even think of reaching the declared target of 1.5°C in foreseeable future. On the other hand, if countries continue to pursue their current environmental policies, the world will likely to experience 3°C of warming by 2100, in which case the whole civilisation will be at stake. The key issues are Adaptation and Mitigation. Rapid climate change is indicated by temperature rise, sea level rise, precipitation change, droughts and floods. It has its impact on human and natural systems affecting food and water resources, eco system and biodiversity, human settlement and human health. This has also its adverse impact on socio-economic development paths. Hence the urgent need for Mitigation which means containing emissions of green house gasses and aerosols. All these can be done through containments of temperature. In general adaptation is aimed at reducing the effects and Mitigation is aimed at reducing the causes of climate change, in particular, the emissions of gasses that give rise to it.

The COP 26 summit is aimed at reaching the target of containment of temperature. For India to reach the climate target involves increasing the use of renewable energy, reducing carbon emissions and, most notably, reach net-zero emissions by 2070 - a fifty years target. Increase of non fossil fuel energy capacity and increasing the share of renewable capacity means India's dependence on coal as source of energy and for that the power sector will have to be drastically reduced and redesigned. The CO_2 emission by industry will have to be drastically curtailed. The whole farming sector will have to be overhauled.

Regarding the overall goal, George Eustice, the UK Environmental Secretary pointed out, "to keep 1.5°C alive, we need action from every part of society, including an urgent transformation in the way we manage economic system and grow, produce and consume food on a global scale. We need to put people, nature and climate at the core of our food system."

In such a situation, as reducing climate change involves huge investments and thorough overhauling of the agriculture, industry and power sectors, the Indian delegate at the COP 26 summit spoke about conditional targets. As he said "the global action on climate change is contingent on delivery of timely and adequate finance… it is imperative that developed countries act decisively to deliver on their commitment to provide financial support."

In this context the BASIC nations (Brazil, South Africa, India and China) opposed the EU proposal of 'carbon border tax' and asked affluent nations to bridge the trust deficit by fulfilling their obligations on climate finance through mobilisation of huge funds. A group, emerging at the conference, known as LMDC (Like Minded Developing Countries) which includes India, China, Indonesia etc. protested against the move for 'carbon colonisation' by the developed countries. The Bolivian representative at the conference stated, "developed countries are pushing the narrative of 1.5°C very hard. We know that this narrative will lead them to control the whole world once again. And those countries that are not able to achieve the net-zero target by 2060, they will be ethically and financially condemned. That is against climate justice". The approach must not be Mitigation centric. The developed countries are trying very hard to limit global warming to 1.5°C above pre-industrial level (1850-1900) as opposed to the target under Paris Agreement which put 2°C as upper limit while keeping 1.5°C as an aspirational goal. This collective articulation by the developing countries is being looked with suspicion by the developed countries. They are calling it as radical third world discourse like 'carbon colonisation' and 'carbon imperialism'. The

developing countries are trying to solve the impasse within a framework of equity and climate justice.

This 'trust deficit' between the developing world and the affluent North is not nearly a psychological or behavioural phenomena. It has deep historical and economic roots. If we look at the historical emission pattern of green house gasses, wherein carbon dioxide (CO_2) is the largest contributor, we will find that more than 60% of these emissions have come from the developed countries. The US alone with 4% of the world population emits about a quarter of the emissions so far. Alfred Crossby, in his famous work, *Ecological Imperialism : the Biological Expansion of Europe, 900 to 1900* has shown, how these countries have migrated all over the world, have recklessly exploited and destroyed natural resources and altered ecological balance in those countries. This ecological imperialism has subsequently turned to economic and political imperialism. Now these countries, having enjoyed the fruits of this reckless exploitation of nature and having so long delayed any decisive action for an equitable solution to climate change problem are now demanding that all countries declare their commitment towards climate change. Mitigation as this is an urgent need to ensure a safe planet.

Take the text of 'phasing out' (a terminology used in the Paris Agreement), which some of the developed countries have committed themselves to. India can, ill afford, to commit itself to this goal within a foreseeable future. The developed countries have taken decades to develop alternative infrastructure to protect its population. But what is the immediate alternative of coal or even natural gas in India? Or take the example of overhauling of the present system of agriculture which also contributes CO_2 in the environment? Any attempt to rush an alternative biosafety measure would have an adverse effect on the poorer section of the population who are vulnerable on many counts.

As far as the agriculture is concerned it is vital to curb global warning stoked by farming, deforestation and other landing changes that account for about a quarter of humanity's planet heating emissions. During the pendency of the Conference, 45 governments including India pointed out that this agricultural overhauling needs a huge amount of investment. It would include "leveraging over four billion dollars of new public sector investment into agricultural innovation, including the development of climate resilient crops and regenerative solutions to improve soil health".

In the power sector, dependence on coal and other fossil fuel have to be drastically reduced with the emergence of alternative renewable sources of energy. This is easier said than done. Developed countries have been able to build infrastructure – ironically through the large scale use of fossil fuel resources and achieve a certain level of independence in the matter. For the underdeveloped countries, development of alternative renewable sources of energy within a targeted period is an uphill task. What the developed countries have done so far, it is hardly possible for the developing countries at this stage to do. For example, nuclear energy as one cost effective alternative has largely remained an elusive phenomenon. It forms only 2% of the share of energy in electricity production in India as compared to 4% in China, 18% in Russia, 19% in the US and 72% in France. So the net position is that rich countries grew rich on fossil fuels and now they are more comfortably placed to transition to renewable sources of energy. As opposed to this, IEA forecasts the largest increase in energy demand in India among all other countries over the next 20 years. Where coal is plentiful, and its mining sector employs over 2 million people, any attempt to switch over to alternative source of energy in place of coal or any other fossil fuel is very costly and socially disrupting. We have also to remember that the cost of capital for energy transition is very high. Keeping this factor in mind, the Paris Agreement stipulated that the transition cost for switching over to

renewable source of energy has to be met by the developed countries.

So, the key questions which were dealt with at the COP 26 conference vis-à-vis the Paris Agreement of 2015 were the following:

1) Fossil fuel as the key driver of warming occupies a crucial position which are got to be discontinued if global warming process has to be arrested. In the Paris Agreement the terminology used for this was 'phase out' which means to totally discontinue the use of fossil fuel. But in the COP 26, after the final negotiation, the word 'phase down' has been inserted. Phase down means progressively reducing the use of coal while phase out means altogether eliminating its use over a period of time.
2) Though the overall goal of capping the warming at 1.5°C has not been abandoned, that is not an immediate goal. Instead, there will be review of the situation every five years. India has committed itself to achieve this goal in around 2070 – long 50 years of gestation period.
3) While developed countries have avoided any definite policy for climate finance, the issue of such financing has received recognition from the COP 26 convention. We all remember that the then American President, Donald Trump, faced with this challenge of climate financing, dissociated himself from the world climate conference held at Paris in 2015 altogether. It is satisfactory to note that President Byden has accepted the burden of climate finance, though the budgetary provision which is there in the US for this appears to be extremely inadequate. We have to remember that the US is responsible for more carbon emission than any other country of the world. And even now it continues to dither on making commitment by finance.
4) The question arises, was the COP 26 climate conference successful? The answer is both yes and no. Climate activists all over the world will feel disappointed that a definite time bound policy for containing the global warming phenomenon has not been possible to achieve so that containing the temperature increase to even 2°C may not be possible in near future. But, on the other hand, there is a provision in the COP 26 climate conference to periodically review the progress of the countries in discontinuing the use of fossil fuels every five years. So the pressure is on and the world community has not totally abdicated the goal of containing the global warming phenomenon.

(Swapan Kumar Pramanick)
President

Award

Dr. S.B. Chakrabarti, General Secretary along with Professor Ranjana Ray, Anthropological Secretary handing over the Abha Maity Memorial Lectureship Award to Professor Nirmala Banerjee.

Pilgrim Scholar : Alexander Csoma de Koros Commemorative Exhibition

The Asiatic Society, Kolkata in collaboration with the Embassy of Hungary in India organised a Photo Documentary Exhibition on the eminent Hungarian Philologist and Orientalist Alexander Csoma de Koros on and from 28th October, 2021 to 3rd November, 2021 at its premises at 1 Park Street, Kolkata -700016.

Hon'ble Ambassador of Hungary to India, Mr. Andras Laszlo Kiraly inaugurated the exhibition entitled 'Pilgrim Scholar : Alexander Csoma de Koros Commemorative Exhibition' on 28th October at 3 p.m. at the aesthetically decorated Vidyasagar Hall of the Society. Dr Subhas Sarkar, Hon'ble Union Minister of State for Education, Govt of India graced the occasion as Guest of Honour of the programme.

The programme began with the invocation rendered by Sumnapal Bhikkhu.

Dr. Satyabrata Chakrabarti, General Secretary of the Asiatic Society delivered the welcome address.

In his inaugural speech, Hon'ble Ambassador of Hungary to India, Mr. Andras Laszlo Kiraly laid special emphasis on the exchange of cultural views between India and Hungary.

Dr Subhas Sarkar, Hon'ble Union Minister of State for Education, Govt of India delivered the Guest of Honour's Speech. In his speech, the Hon'ble Minister highlighted the glorious cultural heritage of India.

Professor Swapan Kumar Pramanick, President of the Society presided over the programme and offered his Presidential remarks.

The formal vote of thanks was given by Dr. Sujit Kumar Das, Treasurer of the Society.

A large number of members, scholars and academicians were present in this programme.

Compiled by : **Arupratan Bagchi,** Administrative Officer

Review Meeting with Secretary, Ministry of Culture in Kolkata

Review meeting with the Secretary, Ministry of Culture at the Science City Conference Room in Kolkata on 25th November 2021

Shri Govind Mohan, IAS, Secretary, Ministry of Culture and Shri Partha Sarathi Sen Sharma, IAS, Additional Secretary, Ministry of Culture at the review meeting. Dr. S.B.Chakrabarti, General Secretary, Dr. Sujit Kumar Das, Treasurer and Shri Dhiman Chakraborty, Controller of Finance representing the Asiatic Society, Kolkata.

Dr. S.B. Chakrabarti, General Secretary of the Asiatic Society presenting memento and the Society's publications to Shri Govind Mohan, IAS, Secretary, Ministry of Culture.

Academic Events of The Asiatic Society since September 2021

September 2021

7th September 2021

K.K. Handiqui Memorial Lecture 2020

Topic: Poetics of History in the Sanskrit Secondary Epics
Speaker : Professor Tapodhir Bhattacharjee

9th September 2021

Pandit Iswar Chandra Vidyasagar Lecture 2020

Topic: Sutra Vidyasagar
Speaker : Professor Amiya Dev

13th September 2021

Indira Gandhi Memorial Lecture 2019

Topic: The Journey to Partition : Some Poorly remembered happenings.
Speaker : Professor Rajmohan Gandhi

14th September 2021

Program on Hindi Diwas. Ashu Bhason on Azadi ka 75 tamo barso par 'Digital India'.

17th &18th September 2021

Live Webinar on " Why do we need to talk about caste ?"

Co-ordinator: Professor Raj Sekhar Bose

21st September 2021

Professor Suniti Kumar Chatterji Lecture 2019

Topic: Interpolations and Interpolations-within –Interpolations : Ramayana Ayodhyakanda cantos 100-102 (critical edition): A case study.
Speaker : Professor Ramkrishna Bhattacharya.

28th September 2021

"RIVERS OF KNOWLEDGE", a film on the Asiatic Society by Gautam Ghosh Youtube release on the occasion of Birth Anniversary of Sir William Jones.

October 2021

22nd October 2021

Professor Maya Dev Memorial Lecture 2020
Topic: Cardiac Health of Indian Women : Biopsychosocial Interventions.
Speaker: Professor Meena Hariharan.

28th October 2021-3rd November 2021

The Asiatic Society, Kolkata in association with Embassy of Hungary to India organised an Exhibition entitled "Pilgrim Scholar: Alexander Csoma de Kőrös Commemorative Exhibition".

November 2021

1st November 2021

Pledge taking in observance of Vigilance week.

2nd November 2021

Exhibition & Lecture Demonstration on Manuscripts on Ayurveda in observance of National Ayurveda Day.

28th November 2021

23rd Asin Dasgupta Memorial Lecture 2021 in collaboration with the Asiatic Society, Kolkata and Paschimbanga Itihas Samsad.
Speaker: Professor Rajat Kanta Roy .
Topic: বর্ণাশ্রম ধর্ম থেকে জাতধর্ম : ভারতবর্ষীয় সমাজের দীর্ঘকালীন রূপান্তর।

December 2021

2nd December 2021

Special Lecture on 'India in Egypt'.
Speaker: Dr Tilak Ranjan Bera, formerly Fulbright Fellow, Senior Research Fellow, Ministry of Culture, Govt. of India.

বিশেষ বক্তৃতা

বিষয় ঃ বিশ্ব-সংসার
বক্তা ঃ জয়া মিত্র, সাহিত্যিক ও পরিবেশ কর্মী
স্থান ঃ বিদ্যাসাগর হল, দি এশিয়াটিক সোসাইটি
সময় ঃ ১৫ ডিসেম্বর ২০২১, বেলা ৩ টে

বিশ্ব-সংসার

জয়া মিত্র

আমার বিশ্ব তো এই পৃথিবী, প্রকৃতির অগণ্য জটিল আর সূক্ষ্ম শৃঙ্খলায় যা চলে। সেই চলনেরই এক পর্যায়ে এসে তাতে অন্যান্য উদ্ভিদ ও প্রাণীর পর মানুষ আবির্ভূত হয়েছে। অর্থাৎ বিশ্বপ্রকৃতির যে অসংখ্য নিয়মের সূক্ষ্ম জটিলতা তাই মানুষ ও প্রাণীজগতের বেঁচে থাকাকে সম্ভব করেছে। এর ব্যত্যয় ঘটলে প্রাণ বিপন্ন হবে। এই সকলের জানা কথাটি নতুন করে বারে বারে মনে করাচ্ছেন পৃথিবীর বহু বিজ্ঞানী, সমাজবিজ্ঞানী, সাধারণ মানুষেরাও। মনে করাতে হচ্ছে কারণ নানাভাবে পৃথিবীর অধিকাংশ প্রাকৃতিক সম্পদের মালিকানা দখল করেছেন যে মুষ্টিমেয় মানুষ, তাঁরা বিশ্বের স্থায়িত্ব-বিষয়ক বুনিয়াদী জ্ঞানটিকে অগ্রাহ্য করে প্রাকৃতিক শৃঙ্খলাকে তছনছ করছেন।

জল ও মাটির জঙ্গমতার যে নিজস্ব নিয়ম সেগুলি ধ্বংস হতে হতে কতোখানি বিপজ্জনক অবস্থায় এসেছে, তার ফলে কোন প্রলয় আসন্ন হয়ে উঠছে, মাত্র দু মাস আগেকার ভয়াবহ বন্যা তার এক স্পষ্ট প্রমাণ। গত এক দশকে জলবায়ুর যে লক্ষণীয় পরিবর্তন হচ্ছে, তা নিয়ে এখন পৃথিবীর সাধারণ মানুষও উদ্বিগ্ন।

বৃহৎ এই পরিবর্তন আজকে প্রত্যক্ষ প্রভাব ফেলছে মানুষের গৃহস্থালীতে, জীবিকায়, তার ব্যক্তিগত জীবনধারণের ক্ষেত্রে। আর্থনীতিক, সামাজিক এই পরিবর্তনের গভীর ও বিপজ্জনক ভিত তৈরি হয়েছে আমাদের সমাজের চিন্তায়, দীর্ঘকাল ধরে। নিজেদের 'ইচ্ছা'য় ধ্বংসের দিকে এগিয়ে যাচ্ছে মানুষ। আমাদের রক্ষা পাবার জন্য সবচেয়ে কঠিন লড়াই তাই সংস্কৃতিতে -- অলীক ভোগবাদের সঙ্গে বিচার ও ভবিষ্যত চিন্তার সংস্কৃতির। এছাড়া আমাদের সামনে কোনো তৃতীয় পথ খোলা নেই।

Prime Minister's Office

National Statement by Prime Minister Shri Narendra Modi at COP26 Summit in Glasgow

Posted On: 01 NOV 2021 11:30PM by PIB Delhi

Friends,

Today I am representing amid you, the land which gave this mantra thousands of years ago-

सम्-गच्छ-ध्वम्,
सम्-व-दद्वम्,
सम् वो मानसि जानताम्।

Today in the 21st century, this mantra has become more important, has become more relevant.

सम्-गच्छ-ध्वम्. That is, let's move together सम्-व-दद्वम् - That is, let's all interact together and सम् वो मनानसि जानताम् - That is, everyone's minds should also be one.

Friends,

When I first came to Paris for the Climate Summit, it was not my intention to add one promise to the many promises being made in the world. I came with a concern, for the whole of humanity. I came as a representative of a culture that gave the message of 'Sarve Bhavantu Sukhinah' means that everyone should be happy.

And so, for me the event in Paris was not a summit, it was a sentiment, a commitment. And India was not making those promises to the world, but those promises, 125 crore Indians, were making to themselves.

And I am happy that a developing country like India, which is working to lift crores

of people out of poverty, which is working day and night on the Ease of Living for crores of people, despite having 17 percent of the world's population today, whose responsibility in emissions has been only 5 percent, still India has left no stone unturned to show that it has fulfilled its obligation.

Today the whole world believes that India is the only big economy, which has delivered in letter and spirit on the Paris Commitment. We are making every effort with determination, working hard, and showing results.

Friends,

Today, when I have come among you, I have also brought India's track record. My words are not just words, they are cheers of bright future for the future generations. Today India is at number four in the world in installed renewable energy capacity. India's non-fossil fuel energy has increased by more than 25% in the last 7 years. And now it has reached 40 percent of our energy mix.

Friends,

Passengers numbering more than the entire population of the world, travel by Indian Railways every year. This huge railway system has set itself a target of making itself 'Net Zero' by 2030.This initiative alone will lead to a reduction of 60 million tonnes of emissions annually. Similarly, our massive LED bulb campaign is reducing emissions by 40 million tonnes annually. Today, India is working fast on many such initiatives with a strong will.

Along with this, India has also given institutional solutions to cooperate with the world at the international level. As a revolutionary step in solar power, we initiated the International Solar Alliance. We have created a coalition for disaster resilient infrastructure for climate adaptation. This is a sensitive and vital initiative to save crores of lives.

Friends,

I would like to draw your attention to one more important topic. Today the world is recognizing that lifestyle has a big role in climate change. I propose to you today a One-Word Movement.

This One-Word , in the context of climate, can become the basic foundation of One World. This is a word- LIFE...L, I, F, E, i.e. Lifestyle For Environment Today there is a need for all of us to come together, together with collective participation, to take Lifestyle For Environment (LIFE) forward as a campaign.

This can become a mass movement of Environmental Conscious Life Style. What is needed today is MindFul and Deliberate Utilization, instead of Mindless and Destructive Consumption. These movements together can set goals that can revolutionize many sectors such and diverse areas such as fishing, agriculture,

wellness, Dietary Choices, Packaging, Housing, Hospatility, Tourism, Clothing, Fashion, Water management and Energy.

These are topics where each of us has to make Conscious choices everyday. These daily choices of billions of people around the world will take the fight against climate change, billions of steps forward every day.

And I consider it as a movement on every ground whether on economic grounds, on scientific grounds, on the basis of the experiences of the past century, it meets every criterion. This is the path of selfrealization. This is the only way to benefit.

Friends,

In the midst of this global brainstorming on climate change, on behalf of India, I would like to present five nectar elements, Panchamrit, to deal with this challenge.

First- India will reach its non-fossil energy capacity to 500 GW by 2030.

Second- India will meet 50 percent of its energy requirements from renewable energy by 2030.

Third- India will reduce the total projected carbon emissions by one billion tonnes from now onwards till 2030.

Fourth- By 2030, India will reduce the carbon intensity of its economy by less than 45 percent.

And fifth- by the year 2070, India will achieve the target of Net Zero. These panchamrits will be an unprecedented contribution of India to climate action.

Friends,

We all know this truth that the promises made till date regarding climate finance have proved to be hollow. While we all are raising our ambitions on climate action, the world ambitions on climate finance cannot remain the same as they were at the time of the Paris Agreement.

Today, when India has resolved to move forward with a new commitment and a new energy, So in such times, the transfer of climate finance and low cost climate technologies becomes more important. India expects developed countries to provide climate finance of $1 trillion at the earliest. Today it is necessary that as we track the progress made in climate mitigation, we should also track climate finance.

The proper justice would be that the countries which do not live up to their promises made on climate finance, must be pressured too.

Friends,

Today India is moving forward on the subject of climate with great courage and great ambition. India also understands the suffering of all other developing countries, shares them, and will continue to express their expectations.

For many developing countries, climate change is looming large over their existence. We have to take big steps today to save the world. This is the need of the hour and this will also prove the relevance of this forum. I am confident that the decisions taken in Glasgow will save the future of our future generations, giving them the gift of a secure and prosperous life.

Speaker Sir, I took more time, I apologize to you, but I consider it as my duty to raise the voice of developing countries. That's why I have emphasized on that too. I once again thank you very much.

DISCLAIMER: This is the approximate translation of Prime Minister's remarks. Original remarks were delivered in Hindi.

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Achieve Net-Zero Save Great Hero

Asok Kanti Sanyal
Biological Science Secretary, The Asiatic Society

COP26 – the 26th Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC) was formally opened on 31st October, 2021 after a year delay due to the COVID-19 pandemic. It was surely a crucial summit, after the landmark Paris Agreement was signed in 2015. The conference was attended by 3000+ participants including world leaders, scientists, decision makers, activists and youngs from more than 200 countries. The conference was ended almost a day late from the declared schedule. Interestingly, after at least five years of planning, deliberations and concept making processes on the Paris Agreement, the Glasgow Conference was ended with the great hope of "Net Zero" neglecting the "Great Hero" – the biodiversity.

After 13 days of lengthy deliberations and discussions, cycles of recrimination and last-minute compromises the COP26 was ended with lots of work to be done on fulfilling the main agreement with a goal to arrest the planet's warming. But the Presidency of the conference is now questioned by the critics about the justice paid to the Paris Agreement particularly of Article 6 and Article 13. Was the conference meant for change of "phase out" to "phase down"? How long the global commons even of the developed countries will listen big talks and be used as trump cards in the intricate play of power games of big brothers? It is glimmer of hope that they have begun to protest with fisted hands.

Jayanta Basu, a Kolkata based journalist and critic of the COP26 in a personal discussion made a quote of Alok Sharma, COP26 President, "1.5° C is alive but its pulse is weak and it will only survive if we keep our promises and translate commitments into rapid action". Many other environmentalists also pointed out that the COP26 was simply of little progress beyond earlier in the question of coal which is the single largest source of electricity generation globally. It provides nearly 37% of the world's energy and its use is still growing.

The "Paris Agreement" of 2015 emphasized to bring all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects, with enhanced support to assist developing countries to do so. The Paris Agreement's central aim was to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2° C above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 ° C.

It is well known that burning fossil fuels has a great impact on our climate. But did you know that biodiversity loss also increases greenhouse gas emissions? When we will be talking about climate and biodiversity loss, we should have to consider the agriculture. Industrial agriculture drives biodiversity loss. Industrial agriculture destroys biodiversity and that biodiversity loss contributes to the climate crisis. All around the world rising temperatures are changing ecosystems and

the species live there as their native home are getting extinct or critically endangered. They enjoy only two options, do or die, either adapt yourself in degraded ecosystem or enlist yourself as extinct or threatened species. Besides greatly miserable and unmanageable threats of various natural disasters climate change directly affect biodiversity loss and ecosystem degradation.

It is established that Global warming effects plants, animals and microorganisms both by changing their habitat and by direct effect of temperature. Climate change effects many physiological processes such as photosynthesis in plants. Many species are becoming extinct because of habitat loss which would lead to increase diseases.

The successful and more effective management of biodiversity which underpins cultural, economic and social well-being of not only humankind but of all living forms on the Earth, regulates climate and in turn controls the ecosystem services maintaining global climate. The Kyoto Protocol which was adopted in December 1997 with an aim to reduce the emission of gases that contribute to global warming established an international treaty to combat "dangerous human interference with the climate system", in part by stabilizing greenhouse gas concentrations in the atmosphere. Unfortunately, knowingly defying the central aim of the protocol, the human impacts through their irrational acts resulting increase of global rate of species extinction which is already at least tens to hundreds of times higher than the average rate over the past ten million years and is accelerating. The last report of the World-Wide Fund for Nature (WWF) recorded 68% decline of vertebrate species over the last five decades.

As the effects of climate change accelerates, climate-change refugia are wisely provided short term and long-term measures planned wisely, they can serve as stepping-stones for multiple species as climates continue to change. The first challenge is identifying and mapping potential refugia – some of which could be small "microrefugia". The interesting and most important phenomena in consideration of relation between climate change, biodiversity loss and disfunction of ecosystems conjointly undermines nature's ability to regulate greenhouse gas (GHG) emission, which accelerates climate change and increase vulnerability. Here I would like to mention the inextricable link between climate change and biodiversity. Biodiversity soaks carbon – locking it away in trees, cycling it through food chains, and sequestering it deep in the Earth's seas and soils. If it is looked otherwise, you would find that sequestered carbon in ecosystems is polluting the components. It is, therefore, to be tackled together and addressed simultaneously so that biodiversity is saved and rightly manage the climate change and ecosystem degradation. Presently, the prime agenda of UN, next to climate change, is halting and reversing biodiversity loss and ecosystem services. To attend this objective and to initiate activities with serious attention to take better care of nature which in turn minimizes global climate crisis– with the declared action-plan towards the biodiversity strategy for 2030.

India being the partner of EU's, announced a range of ambitious targets for 2030. It had promised to quadruple its clean energy capacity to 500GW. The most interesting to note that India wanted to generate 60% of its electricity from renewable. Also desired to be the nation of reduce the emission intensity, nearly 45% compared to the 2005 base-line. Another historical declaration of 2070 goal of going net-zero. If India stands to its commitments towards mitigation of vulnerability to climate change that would be the century's glorious moment for the country. But reality shows 25 Indian cities contributed nearly 360.3 million metric tons– the equivalent of 17.7% of the country's total emissions in 2015. In the same year 6 Indian cities – namely, New Delhi, Kolkata, Mumbai,

Hyderabad, Chennai and Bengaluru also were responsible for nearly 10% Indian's carbon footprint. Another perpetual problem is migration of rural population to urbans and it was estimated that around 416 million people will be added to the urban population from 2018 to 2050. This will require more energy and living spaces for man and animal at the cost of agricultural land and forests causing frequent natural disasters, loss of biodiversity and ecosystem degradation forever. Rainforests, once regarded as the lungs of the Earth, they now act as a net contributor of CO_2 – slashed and burned to make room for plantations and mines. We are currently releasing nearly 70 million tons of CO_2 per day into the atmosphere. CO_2 level which was under 300 ppm for the past 6000,000 years are approaching 385 ppm and are expected to reach 550 ppm by the year 2100, if current rate of emission continues.

Climate change refers to any change in the environment due to human activities or as a result of natural processes. Climate change have had enormous impact on biodiversity patterns in the past and will remain one of the major of biodiversity patterns in the future. In the past, climate had varied considerably within short time scale – evidence from fossils and palaeobiological studies have indicated that those periods of rapid climate change have been associated with mass extinction event. Now it is questioned frequently, should the fossils of the man and other life forms of the present day i.e., of Anthropocene epoch witness like the animal fossils of Permian epoch, that climate change and a mass extinction of species coupled with the destruction of large number of ecosystems were the causes of our extinction?

It is now the essential task to examine the links between climate change and biodiversity loss, how these affect us and how definite strategies are to be formulated to tackle them together to track progress of European Union efforts to meet the goals of the Paris Agreement. It would be the need of the time both for development of negative emission technology and solutions that help to achieve emission target and their link to biodiversity and healthy ecosystem.

Recent report of Intergovernmental Panel on Climate Change (IPCC) and Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services(IPBES) refer that climate change and biodiversity loss are inextricably connected. The processes have the same causes linked to our patterns of production and consumption. We therefore need to respond to both threats at the same time in minimizing our interference in the natural system. It would therefore be unwise to neglect one problem in favour of the other. It is surprising fact that in any discussion of mitigating global warming and related consequences, none of the"Climate Change Summits" is referring the importance of biodiversity. These two must be addressed together, not separately, otherwise the global 2030 commitment of ecosystem restoration will not see the face of success.

Six Voices from and after Glasgow Summit

1

The Climate of COP26: Code Red for Humanity or Capitalism?

Elisabeth Abergel
Université du Québec à Montréal (UQAM), Canada

COP26 was presented as "humanity's last hope" to get the global temperature 1.5°C below pre-industrial levels in the wake of the IPCC's (Intergovernmental Panel on Climate Change) latest report. The Framework Convention on Climate Change (UNFCCC) was originally set up as a negotiating instrument tasked with establishing national commitments and timetables for targets and emission reductions as well as financial mechanisms, technology transfer and 'common but differentiated' responsibilities of developed and developing countries. Annual meetings or Conference of the Parties (COP) to the Framework Convention were set up for negotiating the multilateral responses to climate change. COP1 took place in Berlin in 1995 and laid the groundwork for the Kyoto Protocol, which detailed commitment targets for 6 main greenhouse gases, carbon dioxide (CO_2) and methane being on top of the list as the most damaging in terms of global warming. So, it's been 25 years since COP1. For over a quarter of a century, scientists have warned against global warming and potential tipping points, a series of reports from the IPCC have laid out the situation for several decades. Their message has essentially been the same, to keep the earth's atmosphere liveable reduce fossil fuel production and consumption. The latest report published in August 2021 set the tone for COP26, in clear language with alarming language and alarmist intent. The title could not be clearer: "Code red for Humanity". Surfing on the ambitious 2015 Paris Accord, to keep temperature targets of "+1.5°C alive" above pre-industrial levels until the end of this century, we now know that the commitments made during COP26 to reduce CO_2 emissions by 45% by 2030 will lead to a rise of at least +2.4°C during that same period. This is assuming that such promises were kept. So, what happened in Glasgow? Did the promises and "ambitions" of the world's leaders really match the urgency of the situation as laid out by the IPCC scientists? Were the demands from developing countries surrounding adaptation, mitigation and losses and damages funding schemes and material assistance fulfilled? What did 198 countries actually agree to achieve?

As economic activity resumed and pandemic lockdowns eased, CO_2 emissions quickly reached pre-pandemic levels. Considering all this, COP26, delayed by a year due to the global pandemic, was going to happen after all. The Glasgow conference since the Paris Accord and the last IPCC report was meant to mark a new beginning in climate governance with mechanisms to redress systemic inequities and tackle issues such as the ecological debt, resulting from historical dispossession and displacement of natural resources from poor countries to rich countries. Hence, the recognition of a debt accumulated by rich countries over ecological damage, ecosystem plundering, and resource extraction of vulnerable

countries is not only crucial to attain some level of environmental justice but it appeared like a good starting point to craft real world commitments by signatories to the climate crisis.

Clearly, Glasgow came at a time in our history after the so-called "summer from hell", the hottest summer on record in the Western hemisphere with temperature extremes which led to spectacular wildfires and unprecedented storms causing massive flooding in Europe. The ecological improvements seen during the pandemic lockdowns were short-lived and the extent of COVID-19 damage could be counted not only in terms of millions of human lives lost but also in terms of the unmanageable amounts of biomedical plastic wastes generated worldwide. Yes, animals emerged from their hiding places encouraged by the absence of humans during repeated confinements, dolphins swam in Venice and the air quality temporarily improved due to lack of airplanes and heavy vehicle traffic. Satellite data measuring nitrogen dioxide emissions during a two-month lockdown coinciding with a slowdown in industrial activity in China showed that 77,000 lives might have been saved due to reductions in toxic air (McMahon, 2020). Informed thinkers made the links between pandemics and climate change, showing the material manifestations of COVID-19 as the result of economic pressures, capital markets flows and industrial expansion into wild spaces. The mixing and mingling of wild and domesticated human and non-human life originating in these transitional spaces, coupled with the precarity of the people living on their periphery were acting as reservoirs for future global pandemics. However, the link between climate change and global health crises were not explicitly discussed in Glasgow. Despite the plights of several delegates alerting against the consequences of current climate disasters, the human toll of repeated droughts in some African regions and health issues linked to extreme heat, loss of life and subsistence due to wildfires and toxic pollution in other parts of the global south, rising sea water threatening the very existence of Pacific islanders, negotiations about funds for adaptation and loss and damages financial mechanisms remained highly technical, ignoring practical measures that could be taken at this time. During one of the workshops I attended, I was struck by the impenetrable diplomatic jargon which was completely disconnected from the urgency of the realities and tragedies of climate destruction happening now. Discussions about technological solutions over long timelines, projections of not yet existing technological developments were applauded by attendees in several panels dealing with innovation. In the end, the measures and financial assistance in favour of vulnerable countries and populations were grossly lacking. Their voices and pleas were not heard. The climate crisis is not about some abstract calculations of Carbon or other atmospheric elements and optimistic technological projections.

Rather than discuss the inadequacy of the "Glasgow Pact" and the fact that the 1.5°C target will not be met, my experience of the first week of COP26 was that of spectacle, I think it is most fitting to simply say that this whole exercise was not about saving humanity or the planet but rather it was about saving capitalism from its own destructive tendencies. Can we save the climate from capitalism? World leaders sought to come up with a last minute watered down "pact" proving the thesis that capitalism survives by internalizing its own contradictions. The timid language of "phasing down" rather than "phasing out" fossil energies or the inability to commit to adaptation funding or financial mechanisms to redress injustices or deal

with ecological debt made it obvious. COP26 was not about stopping climate change, it was about buying time for our failed economic system. If, as Boris Johnson stated that "it's one minute to midnight on the doomsday clock" then we wasted precious time for urgent action.

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2

Still Mired in Growth: From COP to a Culture of Quitting

Arne Harms
Max Planck Institute for Social Anthropology, Halle, Germany

Now that Glasgow COP 26 is over, disappointment reigns supreme. A number of observers voice their frustration with the outcome. Some postpone hopes for solutions or for the operationalization of the Paris Accord to the next upcoming COP. Others herald in the end of this type of meeting, and to the approach to climate governance it embodies. To them, it's high time civil society takes over. They call for correcting national or regional policies from below, by way of climate movements, science-citizen assemblies or think tanks, since working policies from above obviously doesn't work. Still others voice their frustration that fundamental ideas and approaches were – once again – left untouched.

Mounting evidence suggests that humankind can't solve the problems of climate change, biodiversity collapse of pollution by more of the same. Technical fixes can take us only so far. Take the energy transition, for example. Studies demonstrate that the shift to renewables won't be just or beneficial as long as it continues the same principles of extraction, commodification and exploitation. That is, as long as it is operating in a capitalist mode of growth.

Once again, or so it seems, de-growth is the elephant in room. There are limits to growth, and that verdict has echoed through prominent places since the 1972 Club of Rome report (Meadows et al. 1972), at the latest. Yet, COP 26 has been more of a machine to growth than a site to at least starting to align economies on other terms. This doesn't come as a surprise. The fossil fuel industry mobilized an army of lobbyists, tasked, so much is safe to say, with quelling decisions that would harm the industry's outlooks. The finance industry, on their end, has long discovered sustainability business as a new frontier they are keen to mine. And a nexus of start-ups and conventional industries is advertising their products as climate change solutions, from solar over e-mobility all the way to fair food. Between greenwashing and aspirations for a Green New Deal, growth is alive and kicking. It continues to serve a panacea to all kinds of problems, a rallying cry and, often enough, an implicit norm.

Questioning growth is, of course, calling for trouble. Written into the DNA of mainstream economics, and into economic theory, everyday aspirations or notions of well-being, it's notoriously hard to

problematize, not to speak of transcending it. None of this to say that growth is generally bad. Nature never is fully inert; it abounds by extending roots and foliage or by nurturing next generations. Procreation is the sign of life as we know it. Similarly, there is nothing to object against making knowledge expand and grow, thereby enabling a maturing of selves and societies. Runaway growth, on the other hand, heralds in climate change, biodiversity collapse and poisoning. As I write this, the images of a Yamuna cloaked in foam during the 2021 Chhath Puja are fresh in my mind. At the surface, this may be a story of deregulation and neglect; but at the bottom of it's a story of, what Julie Livingston calls, 'self-devouring growth' (Livingston 2019). Beyond a specific point economic growth fails to translate into an increase in prosperity or well-being, but only buttresses the concentration of wealth in the hands of few (Hickel 2020). It is key, therefore, to distinguish between desired and undesired forms of growth. Between creation and cancer, if you will. Degrowth is not a return to the stone age. Its proponents would endorse the steady widening of, say, the web of health provisioning; yet they would question Big Pharma's machinations.

According to Thomas Hylland Eriksen, our world is overheating (Eriksen 2016). Human mobility, communication channels or the shipping of goods are all accelerating unprecedentedly across the last few decades. Some of the consequences include, unsurprisingly, pollution and global warming. Now, the problem is, Eriksson argues, that we lack a thermostat. No mechanisms are in place to cool these processes down or even to agree at which point to make a cut. Devising such a thermostat requires questioning the ideas and aesthetics that underpin overheating. Endless growth being one of them.

This debate, and, perhaps, to even call for it, gets you into rough waters. What comes after growth? How is well-being for all possible if not through growth? Such questions appear particularly explosive in so-called developing nations. I have seen seminar rooms at Indian universities virtually explode when I dared to question growth. It is not just that the idea of postcolonial nations needing to catch up holds sway. That is, the idea that developing nations are, well, developing and that they need to make full use of growth in order to catch up. Growth here becomes a means of achieving justice or, at the very least, an attempt at counterbalancing historical injustices and secure a piece of the cake. Questioning growth, all too easily, runs the risk of getting disqualified as yet another attempt to exclude the former colonies from what is rightfully theirs; an act of patronising and keeping into waithood for all the promises industrial modernity has got to offer. That it was me – a white male from Europe – who dared growth made things worse. Questioning growth takes us right into the middle of postcolonial politics. This may be insightful from a scholarly perspective; and irritating as a citizen or activist.

Ours are leaden times. Disagreement over the facticity of global warming, biodiversity collapse or pollution is over. Future outlooks are getting bleaker by the day. Climate anxiety sneaks into hearts and minds. Yet, inactivity reigns supreme. Well, that's not true. Mega infrastructure projects and industrial complexes rise with breath-taking speed. And pollution reaches new levels. So there is a spurt of activity, leading further down the rabbit hole, fuelled by an obvious incapability and unwillingness to revise the course of action. Social psychologist Harald Welzer argues that contemporary societies lack a culture of quitting (Welzer 2021). How to quit believing in the promises of infrastructure developments? How to stop aspiring for growth as a means of attaining well-being or justice? How to turn an ocean steamer? Questioning growth is a good way to start. Postcolonial India is an ideal place doing so, as good as any.

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3

The Electric Car Won't Save Us

Rob Gioielli
University of Cincinnati

One of the many disappointments coming out of COP26 was that the United States did not sign on to the commitment to make a one-hundred percent switch to "zero-emission" vehicles by 2040. Other notable absentees for this particular pledge were China, Germany and Japan, as well as major automakers Toyota and Volkswagen (Hernandez 2021). America's two biggest auto makers, General Motors and Ford Motors, did make the commitment, however.

The irony of this choice from the American perspective is that zero-emission vehicles, especially electric cars and trucks, are a key part of the current government's official climate agenda, and switching away from internal combustion engines has been a major focus of the country's climate policy for almost two decades. From a consumer standpoint, this focus appears to finally be taking off, as yearly sales of plug-in electric vehicles are taking off. The country appears to finally be achieving the network affects needed to facilitate this transition, as the growth of charging stations, product diversity and a younger generation of consumers comfortable with the new technology normalizes the purchase of "plug-in" electric vehicles.

Despite the apparent success of this technological transition, which should have a major impact on carbon loads, the United States has done very little to actually shift to less energy intensive systems of mobility. The country's public transit, bicycling and pedestrian infrastructure remains woefully underdeveloped. In the center of many major American cities, bus service is expensive, inconvenient and infrequent. In the sprawling suburbs, it is nonexistent, as almost every person is dependent upon automobiles for commuting to work, education and basic necessities. Proper sidewalks and other spaces for walking are also sparse, which is one of the reasons why the United States has such high pedestrian mortality rates (Schmitt 2020).

There are numerous historical reasons for this. Despite generalized claims about the prevalence of "car culture" in the United States, the reality is that plenty of Germans, Japanese and French people also love their automobiles. But those countries have constructed cities where it is much easier to access non-energy intensive forms of mobility. In the United States, the form of our sprawling suburbs makes them uniquely dependent on automobiles (Wells 2020). Much of this has to do with the country's history of suburban racial segregation, where white residents were hostile to all forms of housing density, but also public transportation, because they

believed it would bring about integration.

During and after the American Civil Rights Movement, public buses and trains became racialized space, as millions of whites retreated to the private automobile rather than be forced to ride on an equal basis with people of color. They then vociferously opposed the expansion of transit lines into white suburbs, restricting Black mobility, but also increasing their own dependence on independently driven automobiles.

It was through this process that the automobile became fully naturalized in the United States, as something that was assumed would be the primary means of mobility for every American. This has had devastating consequences for the inequality and the health of the country and the planet. In most cities, public transit is seen as an option of last resort, only used by the poor, elderly or infirm. In fact, many systems depend on the subsidies provided by the federal government to transport the elderly and permanently disabled. This means there is little incentive to improve service, as it seen as the option of last resort, almost like a form of charity that users should be grateful to have.

And because both poverty and charity are racialized in the United States, this leads to a broader social and political delegitimization of public transit. Investments to improve transit infrastructure are dismissed as "boondoggles" that rob taxpayers, all while roads and highways receive continuous and constant flows of public funds. In my home city, Cincinnati, it took years and three separate voter referendums to build a tram line in the downtown district. Even after it was built, it was derided by opponents as a waste of money.

The result of this means that the United States is invested in a landscape of private mobility where even those who might prefer to walk, cycle or take a train for their daily commute have little choice but to drive. Which brings us back to the electric car. Although experts have promoted these as key to fighting climate change, they are still a resource intensive form of mobility. Modern automobiles are extraordinarily complex pieces of technology, and the energy and resource footprint for producing an even modest sized electric vehicle is large. It increases significantly with the newest electric pickup trucks and Hummer sport utility vehicles. This is not to mention the very local but destructive impacts of mining for metals like lithium.

All of these new vehicles still be driving hundreds of kilometers a week around America's sprawling suburbs, drawing electricity from a system that is still very much based on fossil fuels. Americans will still have to drive everywhere for work, to school, to shop, to shuttle their children to every manner of enrichment activity. Intercity trips will still be via car or plane instead of high-speed trains.

The electric car will not save the United States, or any other country, from climate change. We need to have a much better conversation about how to fully shift our economy away from energy and resource intensive forms of mobility.

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4

COP26 and Ocean Policy: Positive Outcomes and Challenges Ahead

Punyasloke Bhadury
Institute of Science Education and Research Kolkata

The long-awaited United Nations Climate Change Conference COP26 in Glasgow came to a close after two weeks of intense deliberations, exchange of ideas and release of a number of summary documents highlighting progress in some aspects to tackle imminent threats from climate change. The COP26 has been particularly significant from the viewpoint of nature. This is the first COP where nature took the centre stage; in particular there was strong mobilization of ocean communities which led to endorsement from numerous NGOs, scientists, policy makers, national governments and international organizations. The mobilization resulted in the declaration of 'Ocean for Climate' and Ocean being mentioned in the preamble of the Glasgow Pact stating "the importance of ensuring the integrity of all ecosystems, including forests, the ocean and the cryosphere […]". Moreover, article 21 of the final decision took into account the importance of oceanic ecosystems as "carbon sink" and highlighted the need to protect, conserve and restoration oceanic ecosystems along with terrestrial counterparts in order to ultimately reduce greenhouse gas (GHG) emissions and thereby re-emphasizing the broader viewpoint of 1.5 degrees C goal alive. The importance of oceans and inclusion as one of the outcomes of COP26 is a landmark since oceans and linked policies did not receive due significance in previous COPs.

The significance of ocean climate nexus received much needed attention in COP26 with endorsement from around twenty countries supporting the 3rd "Because the Ocean" declaration. This was followed by unprecedented support and leadership from countries led by Colombia, Costa Rica, Ecuador and Panama towards strengthening and protection of the Eastern Tropical Pacific Marine Corridor, one of the largest and most biologically rich corridors known globally. In COP26, the High-Level Panel for a Sustainable Ocean Economy was formally integrated by the United States of America thereby bringing the spotlight back on sustainable ocean and linked economy. The need to explore innovation linking ocean, climate and society were part of several panel discussions led by numerous experts so as to target resilient, nature-positive and net-zero future ahead. In this COP, PROBLUE, a multi-donor fund administered by the World Bank received significant financial support from United Kingdom and thus will support initiatives that intend to protect ocean and blue economy. This will be particularly important for the regional seas and oceans of South Asia including in India. Moreover, Article 60 of the final decision (1/CP.26) of COP26 emphasized the need to have work programs and framed bodies under UNFCC to explore ocean-based actions more inclusively in existing and workplans. This decision in COP26 reflects the importance of ocean in policies including a key component of climate negotiations. The importance of knowledge of local communities in tackling or developing resilience to climate change received due importance in this COP. In this context, it may be worthwhile to state that numerous discussions on resilience and adaptation highlighting available knowledge of indigenous and local communities were the basis of several panel discussions including

with a focus on Sundarbans as well as rest of South Asia.

While ocean has been formally included in climate as nexus, however COP26 has been largely challenged with respect to climate finance, in particular with respect to adaptation. The Glasgow COP failed to link climate change with sea level rise and the imminent threats faced by numerous countries, in particular for Small Island Developing States (SIDS). The target of securing USD 100 billion as part of adaptation fund fell well sort of in COP26 and seems the goal may get extended to 2025 based on the declaration of article 27. The discussion and ensuing negotiation on 'loss and damage" ended up as a major fault line in this COP and the concerns of many of the vulnerable countries reeling from dire consequences from climate change including sea level rise and inundation were not reflected in terms of mobilization of new fund.

While ocean-climate and biodiversity nexus did get much needed attention in COP26 there were shortcomings when addressing mitigation, resilience and financial support. The target to maintain 1.5 degrees Celsius by the States was not sufficiently addressed in COP26 and thus the climate action commitments (NDCs) to be met by 2030 as agreed earlier by States in Paris Agreement remains elusive to date. While COP26 has shown some steps and targets to tackle issues that are explicitly linked to climate change; however, there are a number of challenges that need to be addressed which could have consequences on health of oceans and human society. It therefore needs to be seen what COP27 can achieve in a more concrete and coherent manner so as to safeguard our oceans, society and planet.

About the author: Punyasloke Bhadury is a Professor of Biological Sciences at IISER Kolkata and heads the interdisciplinary Centre for Climate and Environmental Studies. Professor Bhadury was actively involved in discussions pertaining to nexus between ocean, climate, society and innovations as part of COP26.

5

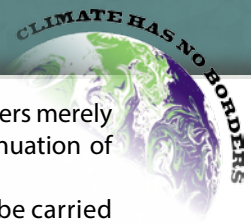
Glasgone – Did we Miss a Chance to Help the World's Most Vulnerable?

Dominic Hinde
University of Glasgow

The COP 26 climate summit was heralded as the last best chance to prevent catastrophic climate change and prevent some of the world's most vulnerable communities from being decimated.

With things going right to the wire, it was disappointing to see that India of all countries was pushing for the continuation of coal power as an important part of the energy mix, but also that the US, Europe and China were unprepared to give the finance necessary for developing nations to use clean technologies as they seek to bring people out of poverty.

The irony of India pushing on with coal is that India has some of the most vulnerable coastlines in the world when it comes to extreme weather and sea level rise, as well as extreme heat inland. During the COP we developed a short film looking at adaptation



around the world, including in the Bengal Sunderbans through the work of the Indian Institute of Technology's Jenia Mukherjee.

Together with voices from Tanzania and Chile, we were able to show just how acute climate change has already become in many regions far from Glasgow and its blustery but temperate November weather. The failure of the Glasgow negotiations to develop meaningful tools for dealing with loss and damage will have longstanding consequences, but also well shows the cognitive dissonance on display from many developed countries.

In the UK and elsewhere the agreements struck in Glasgow were framed as being a sign of progress. The real question, however, is not what is written down on paper but what actually needs to happen to follow through on those promises. This is not just a question of decarbonisation but a long-term re-assessment of the relationships between north and south, and between historic polluters and developed countries.

Behind all of this is the question of finance, and unsurprisingly money that does not lead to orthodox returns in the form of technological development and green industry was hard to come by. Many of the countries worst impacted by climate change still suffer with complex structures of debt held by governments and banks based in the global north, but this fact was not always prominent in coverage of the negotiations.

We are now at a strange point in the history of climate action. There is complete consensus on the severity and causes of manmade climate change, but what is missing still is an appreciation of the structural global processes which have made it so hard to tackle. As President of the COP the UK's Alok Sharma pushed international capital to participate in decarbonisation and it is quite clear that the UK, US and others merely see climate mitigation as a continuation of business as usual.

Whether this dissonance can be carried forward remains to be seen. Just a few days after the COP the Kenyan activist Kevin Mtai shared footage of cattle and wildlife dead from dehydration on the ground in East Africa. Meanwhile in Western Canada the whole of British Columbia was paralysed by an atmospheric river, severing all major rail and road lines. Climate change may not yet have come to Washington, Tokyo or London to the degree to put things into sharper focus, but it is hitting vulnerable zones hard.

The fact this message failed to reach negotiators was not down to lack of trying. Glasgow was full of protestors from around the world, including indigenous peoples from the Americas, Asia and Africa. They were on the outside, whilst inside the UK Government Green Zone it was more like a trade fair. Everyone wanted to be at the COP, but many people did not seem to know exactly why they were there.

So it was here in Glasgow, one of the birthplaces of the coal age and the British Empire's technological supremacy that its legacy was put in the spotlight. The imperial grandeur of 1800s Glasgow is faded and the post-industrial problems of Glasgow are well known. A green renaissance and a place in global history as a turning point in fossil modernity were not to be though. The last leaves of Autumn are falling across the city and the mood is one of ambivalence, with hope replaced by indifference now that the roadshow has moved on.

There will be more COPs and there will be worsening climate change impacts. Kicking things into the long grass is easy with a negotiation deadline looming and tired eyes, but it is not a long-term strategy.

6

Enough on Emissions, Let's Talk Entanglements!

Placing Environmental Humanities in Climate Conversations and Controversies

Jenia Mukherjee, Raktima Ghosh and Shreyahsi Bhattacharya
Indian Institute of Technology Kharagpur

The Australian environmentalist Tim Flannery's (2005) moaning comment in *The Weather Makers*, "One of the biggest obstacles to making a start on climate change is that it has become a cliché before it has even been understood" appears more real than ever during the immediate post-COP26 climate summit in Glasgow. Yet another not legally binding agreement to cut down carbon emissions through frivolous eye-catching buzzwords such as 'net zero' and 'phase out', making way to and succumbing to the market logic since the passage of the Kyoto Protocol of 1997. Outside the conference doors, hundreds of young activists from Brazil, Uganda, Kenya and other African countries who are incinerated with extreme droughts, erupted against the procedural negotiations happening inside. "We need to protect indigenous people because they are the future, they are the past and they always stand up for the forests", asserts a climate activist from Brazil. Twelve years before, in COP-15 at Copenhagen, the rich nations pledged to channelize US$100 billion per year by 2020 to the global South in support of arresting further increase in temperature (Gupta 2021). Unsurprisingly, the promises are eclipsed. "…our political leaders have wasted decades through denial and inaction," the sharp-edged truth being blurted by the 16 years old Greta Thunberg is the bitter truth awaiting actions.

The fiery criticisms put forward by Simon Lewis and Yanis Varoufakis who perceive COP26 as a 'spectacular debacle' and 'net zero' as the 'brilliant cover' to impede emissions echo perspectives of Ecological Marxists John Bellamy Foster who vehemently drew our attention to the politics of climate change than climate change itself, steering the transgression of nine planetary boundaries and its unequal and unjust ramifications beyond redemption. Trail-blazing policies and propositions like carbon quotas, technology transfers, mitigation-adaptation frameworks, capacity building for the 'poor' and vulnerable have proven to be mere gimmick floated by the power-mongers and geared to ruthless profits at the costs of planet and her species.

Within this repetitive context, we are thinking loud to instil fresh thoughts into the climate conversation. We want to shift our attention from emission as the locus of debate to entanglements that determine our very own and concurrent cosmic existence, to finally argue how this larger notion of an entangled belonging is an enabler to fight against climate injustices through an episteme-axiological alteration towards a 'phased down' emission epoch.

All-encompassing postulations and convictions 'Entanglements' and 'interspecies intersectionality' that have flooded the environmental humanities scholarship of our times, gaining ever more prominence and relevance during the 'pandemocene', we argue are anchored within the Marxian dialectical ecological materialism. "A materialist viewpoint that is also dialectical in nature…sees *natural world* as a process of transmutation of forms in a context of interrelatedness that excludes all absolute distinctions" (Foster 2000: 16). That the climate crisis and environmental risks are outcomes of 'metabolic rift' implying "…the

material estrangement of human beings in capitalist society from the natural conditions of their existence" (Foster 1999: 383) is the largest contribution of Karl Marx and the historical-environmental-materialist tradition critiquing second and third agricultural revolutions leading to over-exhaustion of soil and inflicting cruelties on animals (through the institutionalization of feedlots or intensive animal farming) respectively. Industrial farming accounts for at least 18% of GHG emissions and CO_2 emissions from animal processing accounts for several tens of millions of tonnes per year (Steinfeld 2006). Since 1980s, non-western countries like Brazil, China and India have become increasingly engaged with industrialized animal production practices as it supports bulk production per unit area compared to extensive non-industrial systems. Today India has the world's largest population of livestock, annually producing around 5.3 million tonnes (MT) of meat, and being the third largest producer of eggs, the fourth largest of chicken, the second largest of goat meat and the world's largest exporter of beef (Krishna 2020)! Apart from being extravagant emitters, capitalist live farming practices and virus ecology shares a difficult correlation manifested along the outbreaks of back-to-back deadly diseases around the globe – Ebola, SARS, Nipah, SADS, avian influenza (H5N1) and COVID 19. Live farming practices and the illegal trafficking of animals have appeared to be the greatest social, ecological and health-hygiene threats of the contemporaneous. The animal farm production and trade inflicting cruelty on non-human species has emanated "…out of an increasingly dysfunctional relationship between human communities, other animals, and the broader environment" (Dooren 2020). These illegal trafficking networks are regulated by the powerful nexus of multi-national corporations in alliance with biotech companies and local collaborators, ever hungry for profits against irreversible socio-ecological costs (Mukherjee and Sen 2020).

Thus, joining hands with Ecological Marxists and their path-breaking provocations regarding *What every Environmentalist needs to know about Capitalism* (Magdoff and Foster 2011) and the most recent reflections of Varoufakis (2021), we also argue that the reason why COP 26 is a fiasco is simply capitalism! Everything has been commodified including humanity. "By cynically placing net zero at its centre, COP 26" can be considered nothing more than an expensive cover-up for continued toxic emissions" (Varoufakis 2021). The future lies in perspectivizing the planet from the non-Anthropocentric prism of environmental humanities that aspires for the same planet yet a different world or rather world order by its episteme-ontological emphasis on more-than-human entanglements that is the largest cosmic candour shaping our essential and existential entities.

Local, diverse, small production circuits can ensure a low-emission regime can simultaneously protect small-holder farmers, fishers and non-human species, bringing back and ensuring socio-ecological metabolism through the larger consciousness of microbial interconnectedness of our bio-ecological lives. From solving the climate crisis to addressing pandemics, the solution lies in the entangled worldview and praxis connecting the (non)human multitude as the collaborative collective.

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Epilogue

Disillusioned but Not Dead! Rising Hopes against Soaring Temperatures during and after COP26

"It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of light, it was the season of darkness, it was the spring of hope, it was the winter of despair."

– Charles Dickens, *A Tale of Two Cities*

Crisis needs to be cherished as it's not tragedy! Crisis is imbricated with possibilities and potentials to get transcended into opportunities through moral impulses and social actions to address injustices and injuries at all levels – micro-meso-macro, local-regional-global.

Gone are the days when political leaders from the developed world denied climate change as the reality and spoke loud about fuelling growth in the first world economies and its perverted transplantation in the liberated colonies through technology transfer and capacity building of the otherwise 'incapable' multitude, emitting through ever-increasing, unproductive numbers. The lesson learnt during my university days while studying well-designed courses on globalization, decolonization and ecological history about the invincible tendency of capitalism to quilt its own fault-lines to ensure its very own survival, has left a stubborn mark on the (sub) conscious being, to be dealt with forever. But radical worldviews are anchored with optimistic hankerings of a just world order through systemic-structural-cultural transformations, leaned to spot avenues of 'slow hope' (Mauch 2019) which are "starting points and signposts that can direct us into an alternative future" (3).

The opinion pieces in this special issue comprise fresh insights from and just after the Glasgow meet by a group of interdisciplinary academic-activists who aspire to tread the same planet but a different world during their very own lifetimes. They neither buy the Brundtland proclamation on 'sustainable development' and its ever-lasting legacy concretized through the implementation of

green(washing), smart technologies nor the doomsday warnings admonished by hyper climate crisis mongers, deviating humanity from the crux of real climate change scenarios.

Within the context of COP26, the six essays on current climate controversies have unpacked diverse dimensions of the multi-layered and multi-pronged climate crises. Yet, the contributors and the contributions are aligned on the big elephant in the room: capitalism and its ruthless spatio-cultural proliferation awaiting the birthing of the contemporaneous commune sheltering (non) humanity.

While the biologist turned sociologist specializing on in-vitro meat, Abergel dispatches her frustrations emanating from her personal presence during the very first week of COP26, vocalizing the virulence of capitalism, the Max Planck Institute for Social Anthropology based anthropologist Harms unfurls the growth-de-growth dilemma, inflaming the north-south divide finally ensuring the filling up of pockets of super-rich global giant capitalists and their semi-rich allies. Gioielli's insider's views from the US offers a powerful validation to the emission gimmick promulgated and practiced by the developed world. The natural scientist Bhadury is partially hopeful about the 'pro-blue' agenda laid out in the Glasgow pact with the World Bank and the UK as messiahs to fund such initiatives, yet as part of the adaptation-resilience panel in Glasgow, he is critical about how COP failed to systematically link the global climate change crisis with the local ramifications of cyclones and inundations making southern coastlines the most vulnerable. Hinde, the media academic and author with Scottish roots, empathetic to climate brutalities against the global South – an outcome of his exposure to fellow colleagues from India, Latin America and Africa at the Mecca of Environmental Humanities – the Rachel Carson Center for Environment and Society (RCC), Munich draws our attention to what should be the 'long-term' strategy. As part of the RCC-University of Glasgow initiative, Hinde also exhibited a documentary at COP26 on 'Three stories from a changing planet' bringing together voices from Tanzania, Chile and India and attesting that "Climate change may not yet have come to Washington, Tokyo or London to the degree to put things into sharper focus, but it is hitting vulnerable zones hard." Mukherjee, Ghosh and Bhattacharya's essay come as the healing ointment to the burning expositions disseminated by the other five practical-radical-honest contributions. The discussion does not wane away but for the time-being ends with hope and the pre-requisite to thinking with and consciously become part of our entangled existence. The larger, deeper cosmic code shapes the universe – it's time to entangle us with this universal truth beyond mundane materialities and animate agenthoods.

The penury and protests, the struggles and convictions of the multitude cannot go in vain. In the long run, we are not dead!

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Jenia Mukherjee
Indian Institute of Technology Kharagpur

COP26: A 'net nothing' Summit that the UN Termed a Global Compromise

Jayanta Basu
Environment and Climate Columnist

The 26th Conference of Parties (COP26) to the United Nations Framework Convention on Climate Change (UNFCCC) at Glasgow came to an end late evening November 13, 2021, which was early November 14 morning in India. The end came more than 24 hours after the scheduled completion deadline, with a deal that the United Nations termed 'a global compromise'.

Countries like India and China got the fruit of this compromise when under pressure from them, the phrase 'phase out' of coal, used in the earlier text, was changed to 'phase down' in the final agreement. This effectively means that their coal-based power programmes will continue, albeit in a low key manner over the future.

A senior Indian negotiator criticised the developed countries' effort to single out coal and leave other fossil fuels like oil and natural gas, as these are of interest to them:

All fossil fuels are bad for the environment. Singling out coal without talking about other fossil fuels like natural gas, etc is not the best way forward. But India, in the spirit of compromise, helped evolve language that was acceptable to all, including many developing countries.

The UNFCCC claimed that a "wide-ranging set of decisions, resolutions and statements" was taken after intense negotiations within close to 200 countries over two weeks.

But developing countries and independent climate experts argued that key actions, particularly regarding the ground flow of financial support from developed to developing countries, were missing in the Glasgow declaration.

The UNFCCC final statement only said:

There was consensus on the need to continue increasing support to developing countries (and) the duty to fulfil the pledge of providing $100 billion annually from developed to developing countries was also reaffirmed.

The UNFCCC pointed out establishing "a work programme to define the global goal on adaptation" and strengthening the Santiago Network to support countries to address and manage loss and damage; among others as successes at Glasgow.

The Santiago Network is a network to enable loss and damage fund flow from developed to developing countries.

Alok Sharma, COP26 president, fighting back tears, also claimed to have kept "1.5 degrees alive" but admitted that "its pulse is weak and it will only survive if we keep our promises and translate commitments into rapid action"

"There are hardly any actions. Even if there are a few, they can hardly be qualified as rapid," a negotiator from least developed countries told this journalist in Glasgow.

Sunita Narain, director-general of New Delhi-based non-profit Centre for Science and Environment, pointed out that the much-vaunted summit had either failed, or could not progress beyond earlier status, regarding the most contentious points, be it climate justice or the question of coal.

"Has the Glasgow Climate Pact succeeded in going far enough to keep the world below a 1.5 degrees Celsius temperature rise … the answer is a resounding 'no'," said Narain.

Several high carbon emitter countries have only settled for long-term 'Net Zero' targets in the face of several scientific studies. These clearly point out that the next two decades would be crucial in the context of temperature rise and climate change whose impacts are to become more frequent and forceful.

"COP26 has betrayed the poorest of the poor and the most vulnerable in south Asia," Sanjay Vashisht, director of Climate Action Network South Asia, said. He criticised how developed countries continued to talk without real money on the table.

Harjeet Singh, an advisor to Climate Action Network International, said COP26 had failed to respond to the urgency of acting on climate change despite a series of recent scientific reports highlighting that time was running out.

He criticised the way "rich countries, particularly the United States, Australia. Japan and the European Union, had brushed aside the developing countries' proposal to set up a mechanism to mobilise and channel money to vulnerable people."

"The Glasgow summit was built up by United Kingdom Prime Minister Boris Johnson as a Net Zero summit, hyped as being the next best thing after Paris. But it has turned out to be a net nothing one," said one senior negotiation tracker.

Courtesy: *Down to Earth*

Can We Hear the Tick-Tock of Climate-Clock?

Rahul Ray
Environment Activist

The answer to the above headline needs to be directly acknowledged that yes, of course it has been heard for quite some time. Climate change is here. Many are thinking deeply about it. Not all of them are celebs, politicians, scientists etc. at all. To name such, a very little-known sharp-eyed 14-year-old girl from Tamil Nadu is Vinisha Umashankar. Vinisha gave a fiery speech at the Glasgow Climate Conference when State leaders like US President Joe Biden, British Prime Minister Boris Johnson and Indian Prime Minister Narendra Modi were in the audience. "We are angry and frustrated at world leaders who've made empty promises. Our generation is disgusted with the state leaders like you, because you have only promised, you have not acted," she showed her courage on the stage of COP26 staring at these statesmen. Vinisha told, "Today I ask, with all due respect, that we stop talking and start doing. We, the Earthshot Prize Winners and Finalists, need you to back our innovations, projects and solutions, not an economy built on fossil fuels, smoke and pollution. We need to stop thinking about old debates because we need a new vision for a new future. So, you need to invest your time, money and effort in us to shape our future!" "On behalf of The Earthshot Prize Winners and Finalists, I invite you to join us. I invite you to stand with us…. we'll build the future, …. please

Vinisha Umashankar

accept my invite and I assure you, you will not regret it," Vinisha pinpointed. The young Indian activist warned that when it comes to climate change, there's no 'STOP button'. The statesmen of the world's powerful countries had to remain silent. Vinisha Umashankar was invited by Prince William to speak at a meeting discussing clean technology and innovation at the climate conference. She invented solar-powered street ironing cart replacing dirty charcoal with clean energy from the sun. Her spirit reminds us the young Swedish environment activist Greta Thunberg, who, at the last climate conference keeping an eye on the then-US President Donald Trump asked, "What have you done to protect the environment?"

Protests, Rallies vis-à-vis Greater Common Good

Various decisions have been taken at various international environmental conferences held around the world to save endangered earth. But over time, states have often failed to implement these decisions. As a result, the environment is deteriorating fast. People are suffering from the evils of climate change. That is why various protests and movements of common people are increasing. For those who have not kept promises, people are now directly questioning them. They are pressurizing the authorities to implement decisions taken at various international environmental conferences. Various voluntary organizations are taking part in this movement as pressure groups through protests.

Before the beginning of 26th Conference of Parties (COP26) protestors resented after being kept out of COP26 climate talks, despite Cabinet minister Alok Sharma, event's President, promised the Glasgow conference would be "the most inclusive COP26 ever". Teresa Anderson, climate policy coordinator at Action Aid, said, "We have never been excluded like this before at previous Cop summits. Preventing civil society from watching governments and holding them accountable could have real climate consequences with communities on the front line of the climate crisis suffering the most. Even though this is a critical moment for the planet's future, it's becoming harder than ever to hold polluters' feet to the fire." Many of the meetings though claimed to be 'open', non-ticket holders were restricted to attend, The Independent reported. The summit had been criticised as most privileged ever after visa problems, lack of Covid vaccines and the changing travel rules that prevented many frontline activists of climate crises from participation.

Many climate-activists frame global warming as a problem of justice. John Paul Jose, a young climate activist in Kerala, India, where a series of flash floods linked to climate change have taken lives of hundreds of people since 2018, wants far-reaching emissions cuts ought to be promised at COP26, along with thoughtful fiscal aids from rich countries, that have historically emitted the most, toward poor communities where impacts are worst. At COP16 in 2010, wealthy nations promised to send $100 billion a year to developing countries by 2020, but climate-specific net assistance is currently more like $20 billion a year (Oxfam International).

In a demand to end destructive industrial fishing methods, coincided with high-level negotiations taking place in Glasgow at COP26, protesters bared all as they targeted Scotland's First Minister Nicola Sturgeon to take the lead and help keep the ocean alive from environmental damages. Slogans in English and French were heard on the frontage of Bute House in Charlotte Square. Messages included 'Save the fish, Sturgeon; 'Don't touch my bottom' and 'Boris is tangled in industrial fishing', as well as 'La mer est vide (The sea is empty)'.

The largest protest so far at the COP26 of about 100,000 people marched in Glasgow to demand more action on the climate problem. As per the reports of BBC, around 21 scientists were detained when they chained themselves together and blocked a road bridge over the River Clyde. A group of social activists was also detained. Teen activist Greta Thunberg also marched with them. She labelled the crucial COP26 meeting a 'failure' criticising the world leaders for turning the climate conference into a "PR event to fight for the status quo." She commented that COP26 had become a 'global north greenwash festival'. "Politicians in power pretend to think about our future, they are not worried at all," Greta vehemently complained during the Glasgow conference.

In another event, at the 'Global Day of Action for Climate Justice', a rally began at Kelvingrove Park in the west of the city and Queen's Park in the south and proceeded to Glasgow Green. According to BBC, representatives from 100 countries, including Kenya, Turkey, France, Brazil, Australia and Canada organised climate change demonstrations. Ugandan campaigner Vanessa Nakate cautioned protestors that the climate and ecological catastrophes are already here. In Australia's Sydney, Paris, Seoul, and Kenya, several rallies, awareness marches, and climate events were organised where millions gathered to mark the Global Day for Climate Justice, according to COP26 LIVE broadcasts from Glasgow. As many as 250,000 protesters gathered in demonstrations against climate change in Glasgow alone demanding the world leaders to act immediately to tackle climate crises. Climate protests also took place in London, Paris, Dublin, Copenhagen, Zurich, and Istanbul among other cities around Europe. Protesters throughout the world reprimanded government officials, claiming that the climate talks have so far failed to achieve the necessary actions. "We are taking to the streets across the world this weekend to push governments from climate inaction to climate justice," Asad Rehman, a spokesperson for the COP Coalition, told reporters of Euronews. Over a thousand people gathered in London's iconic locations including the Bank of England to Trafalgar Square where they made their voices heard- "Less talk more action" and "No More COP outs."

In France, hundreds of thousands gathered on the streets with pro-climate banners displaying 'Climate inaction = crimes against

Young Swedish climate activist Greta Thunburg at a rally

the living' outside the Paris City Hall. Another large flag displayed 'Inactive at COP26: Dying in 2050' and was later stationed on the Olympics rings. Protests and rallies were also seen in the Philippines, South Korea, Indonesia, the Netherlands. Belgian arm of the Extinction Rebellion gathered in a street in Brussels claiming urgent climate change actions.

The main outcome of the COP26 should have been not to escape the reality of climate injustice, but to erase it for the future on the principle of common but differentiated responsibility. This simply means that the rich countries would reduce carbon emission, create space for the emerging world to grow and the emerging world would grow differently with enabling funds and technology. We cannot have an aspiring agreement unless it is equitable.

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COP26: Where does it would lead us to

Soumen Basu
West Bengal Biodiversity Board

Chapter 32 of Srimad Bhagabat Gita says -

kalo'smi loka-kshaya-krit pravriddho
lokan samahartum iha pravrittah
rite 'pi tvam na bhavishyanti sarve
ye 'vasthitah pratyanikeshu yodhah

In response to Arjun's question regarding who he is, Supreme Lord Krishna said 'I am mighty Time, the source of destruction that comes forth to annihilate the worlds. Even without your participation, the warriors arrayed in the opposing army shall cease to exist.'

Srimad Bhagabat Gita is quoted to compare the scale of climate change-fuelled apocalypse, just lurking around the corner, with its sheer strength of devastation by altering the natural elements of air, water and soil, which sustains life on earth.

According to Bible, after the Great Flood humankind got its act together and began speaking a common language. For nearly three decades the United Nations (UN) has been bringing together almost every country on earth for global climate summits – called COPs – which stands for 'Conference of the Parties'. In this time climate change has gone from being a fringe issue to a global priority. This year it is the 26th annual summit – giving it the name COP 26. With the UK as President, COP 26 took place in Glasgow.

It is the warming planet that is causing the world to sit up and notice with awe the fast pacing changes in the climatic conditions reducing the life expectancy, destroying lives and livelihood, desertification, sea level rising - threatening to inundate coastal as well as island nations, depletion of potable water level, spreading vector borne and zoonotic diseases, as is currently evidenced from notorious COVID-19. Precious lives are being lost in millions either by diseases, pollution, famine, unfit water consumption or from recurring natural disasters which is tearing apart the man-made systems. Most of the climate onslaughts are borne by the poorer countries for lacking climate resilient infrastructure and technology. If the current pace of warming is not controlled the doomsday for human civilisation is not far behind as predicted by scientists.

In the Paris Agreement a legally binding international treaty on climate change was adopted by 196 Parties at COP-21 in Paris, on 12 December 2015 and entered into force on 4 November 2016 to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels. It was pledged that developed countries should take the lead in providing financial assistance to less privileged ones. Capacity building and technology transfer to poorer nations were also pledged at the conference with much noise but the outcome is muted. The reality is starkly different. Latest findings of IPCC shows that Nationally Determined Contributions (NDCs), a country's climate action, of over 190 countries would increase about 16% in global GHG emissions in 2030 compared to 2010.

Even after six long years the issues of

finance, adaptation, loss & damage, carbon market etc. are unresolved. Developing countries are now facing destruction unleashed by climate crisis which is taking lives, destroying infrastructure, homes, putting pressure on limited resources to meet the cost of relief and reconstruction, health services etc. Developed countries, those who attained prosperity by using carbon power are now preaching the developing countries for decarbonisation which requires huge investments to transition from coal to non-coal economy.

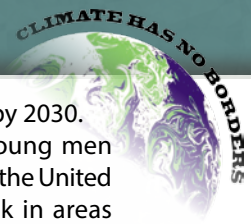
Asia-Pacific is home to some of the world's largest carbon emitters — and experts say much of global efforts to fight climate change depend on Asian countries cutting their reliance on coal. The region accounted for 52% of global carbon dioxide emissions last year, according to the latest edition of BP's Statistical Review of World Energy, a widely cited report. But the region's move away from fossil fuels toward renewable sources is a far cry for want of huge funding as most of the countries of the region are on growth trajectory on the strength of conventional energy sources. The pledge of providing $100 billion a year by rich nations to poorer ones in climate aid underlining adaptation to worsening climate conditions is yet to be met.

CO_2 emissions of data of 2016 of top 10 emitters are given below.

Sl. No.	Country	CO_2 Emissions (tons, 2016)	1 Year Change	Population (2016)	Per capita	Share of world
1	China	10,432,751,400	-0.28%	1,414,049,351	7.38	29.18%
2	United States	5,011,686,600	-2.01%	323,015,995	15.52	14.02%
3	India	2,533,638,100	4.71%	1,324,517,249	1.91	7.09%
4	Russia	1,661,899,300	-2.13%	145,275,383	1A CO1.44	4.65%
5	Japan	1,239,592,060	-1.21%	127,763,265	9.70	3.47%
6	Germany	775,752,190	1.28%	82,193,768	9.44	2.17%
7	Canada	675,918,610	-1.00%	36,382,944	18.58	1.89%
8	Iran	642,560,030	2.22%	79,563,989	8.08	1.80%
9	South Korea	604,043,830	0.45%	50,983,457	11.85	1.69%
10	Indonesia	530,035,650	6.41%	261,556,381	2.03	1.48%

Just a small example of how devastating the effect is right on our own courtyard – Kolkata. A new study by 'C40 Cities' – a network of the world's megacities committed to addressing climate change – reveals that Kolkata has the highest number of premature deaths due to coal-fired thermal power plant emissions in 2019. Around 20% of India's coal powered electricity is generated within 500km of the city. Air pollution (PM2.5 annual concentration) in Kolkata is nearly 7 times above the WHO guidelines and nearly twice above the national guidelines. Moreover, Kolkata, our beloved 'City of Joy' is expected to face the same fate as Atlantis, to be gone underwater, unless drastic policy changes take place.

Apart from physical damage caused by adverse climate events people are gripped by eco-anxiety. As news of higher temperature and natural disasters are becoming common many people, especially the youths are experiencing despair and existential crisis over the planet's sustainability. A recent global survey of 10 countries found that 60% of young people were worried about climate



change globally while in India the figure is 68%. Children are the most vulnerable section to bear the brunt of climate condition. Major sections of the child are exposed to flood, heat wave, pollution, water crisis, food scarcity. According to World Bank estimate by 2030 near about 132 million people will be pushed into poverty by climate change. This means more kids will lose education, dignity of life, early entry into job market, exploitation, lost childhood, wastage of human resources. Justifiably, the youths all over the globe have raised their voice to demand action from global leaders instead of making some sounds. Governments should be more committed to curbing carbon emission fast enough to keep the global warming to 1.5˚C above pre-industrial level to secure the aspirations of future generations.

In COP 26 the role of India is promising in declaring to become a net zero nation by 2070. India made a robust negotiation and initiated to form International Solar Alliance (ISA) in what may be a major boost to increasing the renewables like solar power globally. So far 101 countries have responded to this clarion call by India. The transnational global green grid initiative – One Sun One World One Grid (OSOWOG) would be an important contribution to deploy more rapid deployment of solar globally. The vigorous negotiation by India in changing the paragraph in the final text in replacing 'phase out' to 'phase down' didn't go down well to some of the influential stakeholders of COP 26 though it would definitely offer some preparation time to the developing nations to completely phase out coal use. India has made some ambitious pledges of a 50-year deadline to achieve net-zero emissions and some bold 10-year targets, including 500 GW of renewable energy capacity and 50% of energy needs from renewable by 2030.

A band of Indian youth, 18 young men and women have been selected by the United Nations for their pioneering work in areas ranging from conserving water in restaurants to saving olive ridley turtles from trawlers, from turning factory waste to fashion to using community radio to spread awareness in local dialects for a climate campaign called "We The Change". So, overall the role of India is positive but not without criticism.

This mega global event is over but left some unanswered questions. A lot of terminology was used in the conference – net zero, climate finance, climate focus, climate catastrophe etc. Apart from this some group of nations negotiated with others in their own interest of finance and climate change which sometimes resembled colonial mind-sets. Terminologies used in this connection are AOSIS (Association of Small Island States), LMDCs (Like Minded Developing Countries), LDC (Least Developing Countries) etc. These are proof that a unified front against Climate Change is still an opiated notion.

The positives are not bad altogether. Though the COP 26 did not deliver everything, it helped in keeping the hope alive. Final text of the Paris Agreement rulebook is done which will act as the roadmap. Holding nations accountable by periodical assessments is provisioned in the framework for enhancement of long-term finance. Developed nations have agreed to scale up the finance for adaptation, make up for loss & damage, technology transfer etc. to developing nations. All these developments keep one hopeful about a carbon neutral world. But the answer lies in the womb of future till the next COP reassembles in Egypt to assess the scale of targets accomplished.

COP26 : "...Alive, but its Pulse is Weak"

Sreeja Das, Ria Ghosh and Puja Ray
Department of Life Sciences, Presidency University

Introduction

Increasing temperature, warming oceans, shrinking ice sheets, melting glaciers...there's a lot more, and to sum up, it's the climate change, which is unequivocally the outcome of human activity. A recent investigation has shown the fact that human-induced emissions create the supplementary hassle in the atmosphere (Yue and Gao 2018). The mitigation in biodiversity impeding the ecological and economical equilibrium as the consequential circumstances of alterable environmental gradients and greater commercial opulence (Habibullah et al., 2021). Increasing carbon di-oxide in the atmosphere and ocean acidification due to the anthropogenic greenhouse gases emissions, are the prime concerns for the global atmospheric changes and jeopardizes the comprehensive robustness of the ecosystems (Malhi et. al., 2019). A rise in just a couple of centigrade might sound trifling but can bring about results, harrowing enough to make the world leaders, scientists, and organizations, zero in on a road towards solution, thus climate change, emerging from being off the Broadway to becomes the global priority, eliciting in the international treaty, the United Nations Framework Convention on Climate Change (UNFCCC). Several national and international organizations including World Wide Fund for Nature, International Institute for Sustainable Development, Conservation International and many others, aiming towards the goal of sustainable development to ensure a preserved atmosphere for our future generation.

So, Unfolded the Movement Against Climate Change…

'Earth Summit', Rio de Janeiro, 1992, the convention was adopted with the accord coming into force in 1994 and 196 countries validating it. It produced a broader agenda and a blueprint reconciling economic development with protection of the environment and non-renewable resources. The achievements towards net zero targets against the global climatic change are able to discern since 1995, the time of Conference of Parties (COP1) at Berlin, Germany like the UK has reduced their greenhouse gases emissions by 44% during a period of twenty years (from 1990 to 2019) with their progressing civilization (COP26, 2021). But, the first major leap was in the COP3 on 1997, the Kyoto Protocol. The protocol dictates industrialized countries and economies in transition to limit their emission of greenhouse gases to agreed individual targets by implementing variegated technological amelioration such as Clean Development Mechanism (CDM), carbon sinks by re-plantation and vegetation management in the forests and agricultural lands, and other measures. Certified emissions reduction unit, emissions reduction unit, assigned amount unit, and the removal unit are the cardinal proposals of this particular protocol (Fawzy et al., 2020). Being

at the bottom of the top-down model of the trophic cascade, plants constitute the most significant allocation among all the categories as they meet the essential commodities for living - food and shelter for the living ones in both uninterrupted and deviating manner (Corlett, 2016). The biological diversity denotes the heterogeneity of different living organisms along with independent gene pool and the steadiness of the atmosphere by the germane cyclic motion of biotic and abiotic variables into the biosphere (Verma, 2017). Despite everyone's consensus for the climatic changes and its perilous impacts on the ecosystems, the negotiations and endorsements have never been a trouble-free task as different countries with conflicting interests, are associated with the Conference of Parties. The participating countries met every year to estimate progress in dealing with climate change and reviewed national communications and emission inventories. Likewise the countries were to meet for the 26th time in 2020, had it not been for the covid-19 pandemic, resulting in the 26th Conference of Parties being hosted on and from 31st October to 12th November at Glasgow, UK.

Aims of the 26th Conference of Parties

1. Secure global net-zero by mid-century and 1.5 degrees within reach

Carbon emissions have to stop. Reducing them is not sufficient, says the science behind the carbon budget. Net-zero or carbon neutrality typically means, the amount of emission is exactly balanced by the amount of absorption. The extent of global warming is proportional to the total amount of carbon dioxide emitted due to human activities. The methane emission has also attracted the eyes of the global leaders and addressed recently. So to strike a balance, the emissions should fall to zero, as countries like the United Kingdom, Germany, France, Spain are asked to come forward with the ambitious target of emission reduction by 2030 and zero emissions by the mid-century. COP26 has provided attention to the use of renewable natural resources for energy production and the UK has already paved the way by being the greatest offshore wind-energy producer of the globe (COP26, 2021). Fulfilling the pledges apart, global warming is estimated to reach 1.5°C of the pre-industrial level, between 2030 and 2052. The BBC has drawn a map showing that major cities including Calcutta and also Bangkok (Thailand), Ho Chi Minh City(Vietnam), Amsterdam (Netherland), Savannah and New Orleans (US), George Town (Guyana) will be flooded if the sea level rises even by 1m.

2. Adapt to protect communities and natural habitats.

Even if global warming were brought to an end, its shock waves would be raging for centuries, and millennials to come such as the rise in sea level. An increase by 2°C above the pre-industrial level would approximately change 13% of the world's land ecosystems into entirely different ones. Environmental changes mostly coupled with the adverse and detrimental influences for the biodiversity. Shifting in population dynamics - habitat fragmentation, invasiveness, loss of indigenous species due to debilitated adaptation for the fluctuating habitat parameters, is hampering the ecosystems (Prakash and Srivastava, 2019). The morphological, physiological and molecular alterations provide the individual species powerful endeavours for acclimatizing against the atmospheric changes. These changes also substitute the ecological services including productivity (Weiskopf et. al., 2020). Heat and ozone-associated morbidity is assumed to increase. For example, heat-related deaths in the UK can be trebled by 2050s. Warmers airs could in turn lead to a higher prevalence of vector-borne diseases. Short, intense spells of rains, increasing chances of flood, draught, storms

rise in the price of food and there's a lot more. The natural calamities are another sources for carbon di-oxide emissions (Fawzy et. al., 2020). At the COP26, global warming affected countries are encouraged to (i) protect and restore ecosystems; (ii) build defenses, warning systems, and resilient infrastructure to avoid loss of homes, livelihood, and lives.

3. Mobilize finance

Further to deliver the first two goals, every financial decision must take into account, the climate. For the bigger change, every government, company, financial firm, bank, and investor must change, and help fund technology and innovations, turning billions of public money into trillions of climate investments. A financial escalation must be considered for safeguarding the nature. This also includes support for the developing countries. Developed countries must fulfill their word to mobilize at least $100 billion in climate finance.

4. Work together to deliver

We can take part in this pivotal movement in the fight against climate change collaboratively (COP26 2021) with unprejudiced motivation. Construction and implementation of the proper laws is also required. It is found that the suitable enforcement of schemes can reduce more than 20% green house gas emissions in a time period of ten years (Villoria-Sáez et al. 2016). The COP26 aimed at (i) finalizing the Paris Rulebook and (ii) accelerate action to tackle the climate crisis through collaboration between governments, businesses, and civil society.

COP 21 and the Paris Agreement

The Paris Agreement aims at limiting global warming well below 2°C. Preferably 1.5°C, as compared to preindustrial levels. This agreement has been a critical point in the climate change process because, for the first time, a pact was to bring all countries together for a common cause, that is to fight climate change and adapt its effects. Its implementation asks for the transformation of both economic and social, based on the available technologies. The Paris Agreement works on a 5-year cycle with countries coming forward with ambitious climate action plans called the Nationally Determined Contributions. Through the NDCs, the countries communicate actions they'll undertake to reduce their Green House Gas emissions. Popularly known as the Paris Rulebook provides guidelines on how countries can proceed towards the vision of a zero-carbon future.

The Paris Rulebook and COP26

With the majority of issues being agreed on, at the 24th climate conference held in Poland, 2018, there were still a few key issues that were too difficult to agree on. So COP26 was to be the platform for finalizing the Paris Rulebook. To obligate the participating countries towards adequate emission targets, transparency in progress, and financing the developing countries, the rulebook should be made more stringent, pointed out experts. Finally, after six taxing years of negotiations and hours of meeting, COP26 resulted in the completion of the Paris Agreement rulebook, keeping the Paris targets alive, providing another chance towards limiting global warming to 1.5°C. As aforesaid, 195 countries set a target to keep the average global temperature rise to 2°C and if possible, to 1.5°C. Before COP26, the planet was on the way towards a menacing 2.7°C, but based on new announcements, experts now predict that the rise would somewhat be between 1.8°C to 2.4°C, maintaining the upper end of the Paris Agreement.

Outcome: The Glasgow Climate Pact and coal 'phase down'

The outcome of the COP26 known as the Glasgow Climate Pact, has been the first of its kind in the sense that it mentions an explicit plan to reduce coal, the worst fossil

fuel for the greenhouse gases. The targets- (i) Revisiting emissions-cutting plans next year to try to keep the 1.5°C target reachable; (ii) The first-ever inclusion of a commitment to limit coal use; and (iii) increased financial help for developing countries. But, "Singling out coal without talking about other fossil fuels, is not the best way forward but India, in the spirit of compromise, helped evolve language that was acceptable to all, including many developing countries.", said a senior Indian negotiator as India and China failed to arrive at a consensus regarding the promise of 'phasing out' of coal, settling for a 'phase down' instead. Finally, the conference ended in minor dissensus as the COP26 president Alok Sharma adds, " China and India will have to explain themselves and what they did to the most climate-vulnerable countries in the world.", apologizing, " for the way this process has unfolded."

Despite the weakening of language around coal, some experts still view the agreement as a victory, underlining that it is the first time coal is being earmarked in the UN documents.

"They changed a word but they can't change the signal coming out of this COP- that the era of coal is ending" (quote: Greenpeace international executive, Jeniffer Morgan)

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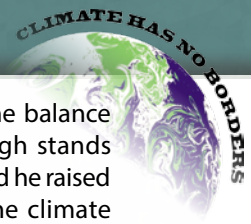
Not about 'what we can do but to do what we can' COP26: A Brief Review

Suman Pratihar
Assistant Professor in Zoology, Sukumar Sengupta Mahavidyalaya, Keshpur

Is that how the tale of the smartest species, doomed by the all too human characteristic of failing to see the bigger picture in pursuit the short time goal? Have we ever achieved the most ambitious goal of the 2015 Paris accord — to limit Earth's warming to 1.5 degrees Celsius (2.7 Fahrenheit) above preindustrial levels? In tune, Aminath Shauna, the Maldives' Minister of the Environment, Climate Change and Technology, screamed at the Summit, "The difference between 1.5 and 2 degrees is a death sentence for us."With this context we need to close our eyes and take a deep breath to visualize the COP26 agreement and history of world climate crisis.

Back to the Dinosaurs era?

Our world had five times more carbon dioxide than there is present on Earth today during Dinosaur, era 250 million years ago. Earth tectonic movements made the oceans close up and the tectonic plates sink into the Earth. This process, called subduction, led to volcanism at the surface, with rocks constantly melting and emitting CO_2 into the atmosphere. The scientists commonly used a paleoclimate model to calculate how all the volcanic CO_2 emissions at the time would have added up. Because there was also less CO_2 being removed from the atmosphere by vegetation and by weathering rocks than occurs today, total atmospheric CO_2 levels were probably five times higher than they are today. For the entire 2.5 million years of the Ice Age epoch, called the Pleistocene, it was a low-carbon world. Atmospheric carbon dioxide soared around 230 parts per million. *Homo sapiens* evolved on a low-carbon planet, as did *Homo erectus* and most other human species now known only from fossil evidence in Europe and Asia. This long history of a planet kept cool and stable by low levels of greenhouse gas in the atmosphere continued long after the discovery of fire, the Stone Age, the Bronze Age, the Iron Age, the fall and rise of empires and the Industrial Revolution. In 1965, carbon dioxide levels pass 320 ppm, after a century of exploitation of fossil fuels that released ancient carbon back into atmospheric circulation. By 2019, the carbon dioxide concentration in the atmosphere had reached 410 ppm and is still silently rising. In less than a century, human greed had raised planetary average temperatures by around 1°C. At existing rates, this average could reach 3°C by the end of this century. Between 2010 and 2017, total global CO_2 emissions have increased from 33.1 gigatons (GT) to 36.2 GT and are expected to continue increasing. In 2017 China emitted 9.3 GT of carbon, United States 4.8 GT, India 2.2 GT, Russia 1.5 GT, Japan 1.1 GT. With 9.3 GT, China was the largest emitter of CO_2 in the world in 2017. This is about 28% of the world's total emissions. However, when we consider the per capita carbon emission picture, things change suddenly. With 1,444,216,107 population, China's per capita emission is 6.59



whereas United States per capita emission is 15.53. On the contrary, Indian's per capita carbon emission is 1.58. Resource extraction has more than tripled since 1970, including a 45% increase in fossil fuel use. Demand for natural resources is sky-high and continues to grow - for food, clothing, water, housing, infrastructure and other aspects of life. We can all live sustainably and help build a better world for everyone but inequality is practical. We have to live and understand how our lifestyle choices impact the world around us. We make hundreds of thousands of decisions during the passage of our lives. The choices we make and the lifestyles we live have a weighty impact on our mother planet. Carbon inequality always fluctuated across income groups and nations. The richest 10% of the world's population contribute approximately 34% of the global greenhouse gas (GHG) emissions, whereas the bottom half contributes only 15% to global emissions. Prominent CO_2 emissions inequality is observed in developing countries. China and Russia exhibit the highest social average CO_2 emissions. The social average CO_2 emissions of Indonesia are ranked third, which are equivalent to the total emissions of South Africa and Turkey. India, in sixth place, exhibits twice the social average CO_2 emissions of Mexico and Brazil. Patricia Espinosa, who is currently serving as the Executive Secretary of the United Nations Framework Convention on Climate Change, advised that the future of modern societies as we know them is at risk. Just 70,000 years ago we were an average animal like baboons and aardvark. Our tiny numbers stabilized just 10,000 years ago. The global temperature has not increased by 1°C until now. Now we will all feel the impact, some of which are unavoidable.

In COP26 we saw that a future potential mother is horrified at the thought of bringing a child into the world. Students are screaming about their melting world. Nature is a key ally. Whenever we restore the wild it will recapture carbon and help us bring back the balance of our planet. David Attenborough stands straight in Glasgow without fear and he raised an optimistic voice to combat the climate challenges with hope. Working together we are powerful enough to solve the climate problem.

Our scheduled togetherness blink in nineties as Conference of the Parties .

When and why COP

In November 1988, the United Nations Environment Programme (UNEP) arranged the Ad Hoc Working Group of Experts on Biological Diversity to explore the need for an international convention on biological diversity. Soon after, in May 1989, the Ad Hoc Working Group of Technical and Legal Experts prepared an international legal instrument for the conservation and sustainable use of biological diversity. In 1991, the Ad Hoc Working Group had become known as the Intergovernmental Negotiating Committee. Its work concluded in 1992 with the Nairobi Conference for the Adoption of the Agreed Text of the Convention on Biological Diversity. The Convention was opened for signature on 5 June 1992 at the United Nations Conference on Environment and Development, known as the Rio "Earth Summit". It remained open for signature until 4 June 1993, by which time it had received 168 signatures. The Convention came into force on 29 December 1993, which was 90 days after the 30th ratification. The first session of the Conference of the Parties was scheduled for 28 November – 9 December 1994 in the Bahamas. The first United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties took place from 28 March to 7 April 1995 in Berlin, Germany. The COP 21 was organized in Paris from 30 November to 12 December 2015. Negotiations resulted in the adoption of the Paris Agreement on 12 December, governing climate change reduction measures from 2020. As Brazil and Chile withdrew the hosting, the UN Climate Conference (COP25)

was held from 2 to 13 December in Madrid (Spain) under the presidency of Chile. COP 26 was initially scheduled to take place from 9 to 19 November 2020, in Glasgow, United Kingdom, but was deferred to 31 October to 12 November 2021 due to the COVID-19 pandemic.

A new industrial revolution powered by millions of sustainable innovations is essential and is indeed already beginning. The science has been clear to us for a long time. Genuine earnestness and a strong, confident willingness to match words with actions and to close the jaw-dropped gap between promises and exhaustive, short-term strategies are still missing.

From Paris to Glasgow, promise after promise.

The Paris Agreement sets out a global agenda to avoid dangerous climate change by limiting global warming to well below 2°C and chasing efforts to limit it to 1.5°C. It also aims to strengthen countries' ability to deal with the impacts of climate change and support them in their efforts. The Paris Agreement is the first-ever universal, legally binding global climate change agreement, adopted at the Paris climate conference (COP21) in December 2015.

What they promised in 2015

- **a long-term goal of keeping the increase in global average temperature to well below 2°C above pre-industrial levels,**
- **to aim to limit the increase to 1.5°C, since this would significantly reduce risks and the impacts of climate change,**
- **strengthen societies' capacity to deal with the impacts of climate change,**
- **provide continued and enhanced international support for adaptation to developing countries,**
- **acknowledge the need to cooperate and enhance the understanding, action and support in different areas such as early warning systems, emergency preparedness and risk insurance,**
- **the EU and other developed countries will continue to support climate action to reduce emissions and build resilience to climate change impacts in developing countries,**
- **developed countries intend to continue their existing goal to mobilise USD 100 billion per year by 2020 and extend this until 2025.**

Present time, 2021 in Glasgow

COP26's momentous registration numbers and gender-responsive funding initiates are a step forward, but it is critical that those most affected by climate change (women, youths and indigenous peoples) have a chair at the decision-making table.

- In short, COP has brought us nearer to being on track for a 1.5°C world. Guesstimates range from 1.8°C to 2.4°C. A year ago, we were looking at 3.5°C.
- COP26 marks a turning point for alternatives of fossil fuels. Let's not forget that never before has there been a single word uttered on fossil fuels in any COP agreement. So, the agreed text is significant.
- Over 40 countries committing to phasing out coal-fired power and over 30 countries and institutions are now committing to pausing international finance for fossil fuels.
- To avert cascading climate risk, most wealthier countries need to meet and go beyond their annual $100bn promise and make available more finance focused on helping countries to manage the impact of climate change.
- We also realized that compromise is needed on a number of unanswered issues from Paris, like the complex matter of how countries can work together to reduce emissions. It might not seem like much, but the fact that countries have agreed to a set of rules that will guarantee honest emissions reductions the world over is really imperative.

It was very inspiring to see the world's two biggest sources of greenhouse gases – China and the US – signalling their intention to work together again to drive down emissions.

President Biden is aggressive with a domestic spending plan that includes US$550bn for climate action. "We are taking an "all-of-government" approach to climate action that means, in my view, every minister is now a climate minister." That is how James Shaw, New Zealand's Minister of Climate Change approached the COP. It will also be essential to monitor the implementation of all pledges made at COP26 and to hold governments to account.

From India's point of view: not about just "phase out" to "phase down"

During the Carboniferous period, 359 to 299 million years ago, fossil fuels like coal and natural gas are found on every continent. Coal is the single largest source of electricity generation globally, providing 37% of the world's energy. It is projected that coal will remain the leading energy source into the 2030s, Global distribution of natural resources is not even – India and China have significant coal resources, but relatively little natural gas. The UK has reduced its carbon emissions from coal power to natural gas. Coal generated 41% of the country's electricity in 2012, while natural gas made up 25%. Now, natural gas is the largest source and coal is almost non-existent in the UK's energy mix. Natural gas is generally carbon and hydrogen. This mixture has a very high energy content relative to other fuels, and so, it produces comparatively less CO_2 emissions for each unit of energy. Natural gas burns cleaner than coal is due to a quirk of chemistry. Sulphur, found as a common impurity in coal, increases the quantity of CO_2 generated for each unit of heat. Even the highest quality coal produces double the CO_2 emissions of natural gas per unit of energy. Per person, carbon emissions in both China and India are still substantially lower than almost all developed countries. India's per person emissions are less than one-quarter of the global average and roughly one-tenth of those of the US. Converting from coal to gas offers a rapid and partial win for reducing CO_2 emissions, but doing it depends on geology and geography. A rapid switch to renewable energy sources is easier when energy demand isn't growing as fast, like it is in rapidly developing countries. Developing countries need financial assistance from richer countries to make that jump. Until that is delivered, developed countries have no right to lay the disappointment of COP26 at the feet of China and India. Mia Mottley, the Barbados Prime Minister, was vocal in COP26 on how climate finance to frontline, small island developing countries declined by 25% in 2019. "Failure to provide enough critical funding in small island nations is measured in lives and livelihoods in our communities. This is immoral and it is unjust." The speech was delivered in the presence of US President Joe Biden and British Prime Minister Boris Johnson.

Jenifer Morgan, Executive Director of Greenpeace said, "Glasgow is a test for who we are as humans. If we authentically and respectfully cooperate as a species, we can win a safer, finer, greener future for all". Sir David Attenborough hopefully argued the rewriting of our story. Just keep in mind, we are the greatest problem-solvers that have ever existed on Earth.

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Economists' Perspectives on Climate Change

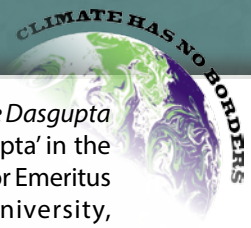
Achin Chakraborty
Director, Institute of Development Studies Kolkata

How many of us have ever thought that governments across the world pay people far more to exploit nature than to protect it? With myriad of subsidies – implicit and explicit – or selling of rights to exploit natural resources at a price which is far less than what it should be if all the losses were taken into account, the governments have played a major role in plundering the ecosystem with abandon. It is rather ironic that the same entities are now expected to do the opposite, to wit, save the natural world from destruction.

Our heavy reliance on consumption of ecosystem services, such as fossil fuels, water, agriculture, and so on, has made it difficult to reduce or withdraw subsidies on them. No government would dare to do it for the fear of losing political support of the people. Instead of complete withdrawal, rationalisation of subsidies to maintain a balance between distributive justice within the present generation and that between the present and the future generations is now considered to be a 'win-win' option by entities like UN whose reports – especially those on the Sustainable Development Goals – are never tired of repeating pious-looking easy platitudes and avoid any attempt to provide analytical insights into the deep structural conflicts.

On the contrary, at the present moment, the dominant discourse around climate change is overwhelmed by a kind of moral indignation ("how dare you") which often gets in the way of understanding analytically why the governments do what they do. It is one thing to say "do it now" and quite another to figure out "how". To make any headway in this direction a variety of analytical perspectives has to be drawn on, and in this endeavour economists do have a bit to contribute, even though the opinion widely-held in the populace suggests that they are the ones who should be blamed squarely for this mess – partners in crime, so to speak.

True, until the mid-seventies in the past century, economists were hardly seen pricking their brains with the questions of the climate, let alone its change. We knew a bit of environmental economics, the core idea of which was 'externalities'. The canonical story used to go like this. A manufacturing firm pollutes the environment by dumping its effluent in the nearby source of water, which a laundry uses for cleaning clothes. The laundry owner is therefore forced to shell out extra money to treat the water. Thus one firm's production imposes extra cost on another producer. Here comes the environmental economist who first tells you that this is a case of 'negative externality in production', and then goes on with her heavy artillery as follows: Since it is unclear whether the manufacturing firm has the right to dump its effluent in the water or the laundry owner has the right to access clean water, the two parties cannot strike a bilateral deal, such as, the firm agrees to compensate the laundry-owner for her loss, or alternatively, the laundry owner pays for the extra cost that the firm would



incur in order to control the effluent. In other words, they could 'trade' pollution for money between them and happily live ever after, provided the two parties had their rights clearly specified. What was an 'externality' is turned into a commodity, with a sleight of hand. Needless to say, an externality like pollution is a 'bad' rather than a 'good' and therefore its price will be negative.

The analytical insight that we draw from here is that the problem of overexploitation of ecosystem services could be avoided if we priced them appropriately, meaning internalising all possible costs, including future costs. This is vehemently opposed by the environmental activists and dismissed outright, ostensibly on the ground that it legitimises the plunderers because they can buy the right to pollute the environment at a price. There is some ground for criticism though, as the economist's perspective tends to advocate regulation rather than outright ban of activities. Second, this perspective takes no particular stand on the distributive consequences of allocation of property rights. However, in their hurry to throw away the bathwater, the critics throw away the economist's baby, which is a rather modest piece of wisdom that pricing often acts as a more effective deterrent than an outright ban. Banning activities is politically infeasible, especially in the developing country contexts, but rejection of the pricing option and an ineffective ban holds us back to the status quo. For example, even though it is well-known that for sustainable use and equitable distribution of potable water specific pricing schemes can be devised and implemented, the political class often shows reluctance in introducing water tariff for the fear of losing popularity.

From the environmental economics of the sixties and seventies to the economics of biosphere and climate change of today, economists have come a long way. To understand what economic wisdom can contribute to the fight against climate change, the interested reader may take a look at *The Economics of Biodiversity: The Dasgupta Report* published this year. 'Dasgupta' in the title is Sir Partha Dasgupta, Professor Emeritus of Economics at Cambridge University, who was invited by the Chancellor of the Exchequer of the UK Government to prepare the Report. There was an earlier equally high-powered *Stern Report on the Economics of Climate Change* released in 2006. Almost everything that an economist would possibly say on climate change and biodiversity finds a place in at least one of the reports.

The core idea is this. The natural world is to be treated as an *asset*, which means that we need to include it in our portfolio of all durable entities called asset – house, health, car, stocks, deposits, rare painting etc. There is a big difference, though. It would be wrong to treat nature merely as an economic good, as characterised by its use value and exchange value. What makes the nature really different from other assets is its 'existence value' – it is valuable just for being there. Once we acknowledge this, asset portfolio management takes a rather different turn. Nevertheless, the approach remains one of portfolio management. Since an economy can attain a high rate of growth of GDP by depreciating its ecosystem assets, growth in GDP must not be taken as an exclusive evaluative criterion. Sir Dasgupta and others have been advocating a different accounting of a country's GDP that takes into account the nature's depletion. And this is perhaps why the *Review* was commissioned by the UK Treasury, not the department of environment – loss of nature is supposed to be viewed as an economic issue, not simply an environmental issue.

The other major insight of the *Review*'s approach is that to mitigate climate change we need proper global institutions. Climate is a global public good, meaning no one can exclude oneself from her 'consumption' of the climate. If I am living on earth I must consume the earth's biosphere. Alternatively, any improvement in the climate will benefit

all no matter how many are living on earth. That is, if I 'consume' the polluted atmosphere (since I am in it) it is available to others in undiminished quantity. A piece of bread is therefore not a public good since if I swallow the piece it is not available to others. Since the climate is a public good, as a self-interested individual I have no incentive to prevent it from deterioration if prevention requires sacrifice of my private benefits that I am deriving from my current activity. The same logic applies to countries as well, and therefore it is so difficult to make the countries agree on what is to be done. A corollary of this analytical construct is that if the global community wants to prevent destruction of the Amazonian rain forests, it has to compensate the people of Brazil.

Dissonance, Denial and Inaction in Combating Climate Change

Satyajit Das Gupta
Director, Post-Graduate Diploma Course in Counselling (Affiliated to University of Calcutta), Legal Aid Services – West Bengal

"We do not inherit the earth from our ancestors, we borrow it from our children."

Native American Proverb

The entire human kind is facing an apocalypse. Shamelessly unhindered exploitation of nature for the purpose of recklessly unorchestrated development has already brought our planet on the brink of an immanent collapse of what the sanity of the civilized mind had once cherished to preserve and protect. Yet we live in stupendous denial and remain inactive at this hour of all-pervading crisis. The most obvious manifestation of it all could be observed at the bread-and-butter level of our existential logic wherein flagrant violations and aberrations stand justified in terms of varied livelihood compulsions and /or 'lived-in' realities of culture. Just think of the huge environmental backlash coming from the politically organized movement of the auto drivers who resisted tooth and nail the use of LPG in place of an adulterated fuel at a much lower operating cost. Our triumphant efforts to pollute air, lakes, rivers and seas for religio-cultural or economic reasons are the other burning examples of such denial and wilful inaction.

It has been pointed out that several psychological factors "impede behavioural choices that would facilitate mitigation, adaptation, and environmental sustainability". In this context an obvious reference has to be made to Robert Gifford's (Department of Psychology, University of Victoria, British Columbia, Canada) contention about the "seven categories of psychological barriers": limited cognition about the problem, ideological worldviews that tend to preclude pro-environmental attitudes and behaviour, comparisons with key other people, sunk costs and behavioural momentum, discredence toward experts and authorities, perceived risks of change, and positive but inadequate behaviour change.[1] In a systematic review of the scientific literature on environmental science denial published in the last 25 years, which was based on 161 peer-reviewed academic articles published in English

between 1990 and 2015 and located through an extensive search in three databases: *Web of Science*, *Scopus*, and *Philosopher's Index,* it was inferred that this denial indeed has had a significant negative impact on societal debates and decision-making and irrespective of the ambitions of environmental goals, science-based policies are always preferable and it therefore stood as urgent as ever that the scientific community should increases its efforts in dismantling false claims, disclosing the schemes of denialists, and developing effective and efficient strategies to counter science denial. [2]

At the same time it's also absolutely crucial to take into account a far wider range of concerns and considerations that come in the way of dealing with the immensely multilayered problem of denial by undertaking an "in-depth analysis of how strategic communication by interest groups is contributing to climate change inaction." Some of the more persisting concerns and considerations are: the power of persuasive narratives and discourses constructed to support climate inaction by lobbies and think tanks, the dominant human supremacist view and the patriarchal roots of denialists and advocates of climate change alike, the knowledge coalitions of the climate think tank networks, the denial strategies related to climate change of the nuclear, oil, and agrifood lobbies, the role of public relations firms, the anthropocentric roots of public relations, taboo topics such as human overpopulation and meat-eating, and the technological myth.[3]

The root of this psycho-social implications of this denial goes far deeper than just mentioning these causal factors we always have to grapple with at the surface of the contemporary climate change analytics either of the natural or the social science variety.

In this context of recognizing the paramount need to understand the significance of taking an exploratory approach to placing the psychology of climate change denial at the centre stage of all overhaul-seeking and palliative activities for climate change endeavours, it's instructive to note that mental health professionals are playing an increasingly important role to make the victims and stakeholders aware of the fact that rising temperatures "are linked to multiple psychiatric disorders and suicide rates " and "the overarching threats of a changing climate also incite despair and hopelessness as actions to address the 'wicked problem' of climate change seem intangible or insignificant in comparison to the scale and magnitude of the threats."[4]

Using "a novel economic paradigm that allows to attach 'environmental consequences' to 'laboratory decisions' and basing their findings on 56,000 pollution decisions from 2273 participants in more than 30 countries", Sebastian Berger and Annika M Wyss have shown that "climate change skepticism predicts self-interested choices and showcases that skeptics have an insensitive acceptance of emissions, reaping benefits no matter how large the climate costs are or how small the personal benefits become." Consequentially, these findings generate "meta-analytic evidence" and sustain the argument that "downstream behavioural consequences are small to medium in their effect size". They also discuss "the use of experimental economic paradigms as a crucial innovation tool for psychological research addressing people's willingness to engage in climate action". [5]

Thus it stands pretty much obvious that at the lowest rung of our day-to-day commonsensical unwillingness, inability or avoidance to follow most of the imperatives or requisites of a climate-friendly way of living remains overwhelmingly paradoxical in both it's 'intentionality' and 'lived reality'. Tendentiously or otherwise, we remain prisoners of our own ignorance, avarice and inertia. In the exquisite words of Kofi Annan, Former Secretary-General of the UN:

"The world is reaching the tipping point beyond which climate change may become irreversible. If this happens, we risk denying present and future generations the right to a healthy and sustainable planet – the whole of humanity stands to lose."

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Ever Mine, Ever Ours

Chandrima Biswas
Assistant Professor, Department of Sociology, Government General Degree College, Singur

Since inception, human groups struggled to fulfil two basic conditions of survival. First deals with the question of how to procure food, the second, with finding a shelter. Answers to these questions are essentially related to natural environment surrounding that group. At the same time this relationship between nature and human effort to survive actually provides the necessary focal point around which a particular type of culture and society emerges. In order to understand the relationship between humans and environment in simplest terms, one must take into account the journey of human batch living, slowly taking the form of society as we know it, while fulfilling those two conditions of survival. Groups doing hunting and gathering or engaged in practice of herding, are found with no permanent abode to return. But with the occupation of agriculture, humans found a way of living that allowed more food for more people, and for the first time, a home. In all three types of living, human dependency on nature was clear and evident which also shaped their way of addressing nature.

Mother Nature

Nature has always been perceived as possessing supreme power and control over human life. In Totemism, the most elementary forms of religious life as described by Emile Durkheim, we find an association between human groups and individuals and specific animals or plants. Durkheim suggested that it was the clan worshipping itself in the form of the totem. Later thinkers like Malinowski offered a matter-of-fact explanation: namely, in order to survive people had to have detailed knowledge and control over animals and plants, especially the indispensable species. Although this aspect of functional utility as an explanation was questioned by thinkers like Evans-Pritchard stressing metaphorical use of this relationship, nevertheless, the resemblance between these two sides is never denied. Claude Levi-Strauss concluded that the differences between animals or plants were used by humans to affirm differences between themselves. Nature is worshipped everywhere in different forms

and through various modes. In order to please Gods, who exhibit their anger through various natural calamities, humans performed various rituals which even went to the extent of offering sacrifices.

Alienating Nature

But this reverential figure of nature went through massive transformation with the advent of industrial society. Machines were invented with the promise of making human living smoother and easier. Nature is no longer a figure to be afraid of. As Enlightenment removed the shadowy curse of superstition and prejudices related to theological thinking, nature started being seen as the supplier of needed raw materials to keep the mills running and producing goods. Machine-made goods produced through assembly line are considered to be of having better quality, effective ensuring universal standard compared to handmade products. Along with this emerged a culture which championed mechanisation and everything related to machine became the most sought-after object. Machines became the mighty emblem of development.

Defilement of nature is the unabashed practice which accompanied Industrial era. With this emerged the process of othering nature, a trend which is latent but omnipresent even in the ongoing 'green' ritual being celebrated worldwide. The term nature always brings to our mind a consortium of plants and animals, devoid of any human touch. Nature is something distant, something different from human; something we have long forgotten, left far away. The prevalent application of the phrase 'reconnecting with nature' reinforces this belief, that human existence is possible, albeit in troubled form, being isolated from nature. By doing this, it has been claimed that nature and humans are two different units and the gap between them should be bridged for the benefit of both parties. But through this journey humans have chosen to forget the most important fact about their existence, that they are just another fragment of nature, no matter how much illusory distance they have created in between. There is another perspective. Whenever a natural calamity strikes, or an outbreak of disease occurs, affecting lives of countless people, the discourse about nature taking revenge begins occupying space in public discourse or scholastic sphere. Such position assumes nature in the role of some angry giant, who hates to be disturbed while sleeping, again as an entity living outside human existence. Such process of demonization forces humans to make a peace pact with nature by performing various rituals on auspicious occasions such as planting trees on world environment day. We feel safe, secured and relieved after performing such ritual cleansing hoping such bribery would bring us the desired result the way it does with other humans.

Back to Nature

People tired of the monotonous urban industrial life going to countryside for spending vacation has been a common practice all along. But lately, cities which once owned the rank of the most preferred place for living are slowly losing their status. Those who can afford to travel long distance with comfort are choosing to live in the outskirts of the city. This trend has got an impetus after COVID-19 became headlines, especially in the

Western world. People are paying hefty sums to learn about farming, growing fruits and vegetables, things their predecessors used to do as a regular part of living only two or three generations back. These practices are now being seen as required to enhance health and quality of life of the people who once used to look down upon such tasks as something menial. There has been a shift in the choice of foods also, though the pace is much slower. Organically grown foods and products are being sold in the urban supermarkets with much higher prices. People are choosing them over industrially grown products being certain of their tastes and benefits. An emphasis on consuming locally grown foods is emerging too.

Nature of Future

By watching this trend, one recalls Oswald Spengler's cyclical theory of social change. In his famous work *The Decline of the West* Spengler presented a theory which propounds that everything alive goes through the same cycle of life, and larger human unit follows the same path; that is, birth, growth, maturity, decay and death. After hitting the bottom, life begins all over again. In Spengler's view every culture goes through the same cycle, everywhere. After reaching the pinnacle of its span, its downward journey begins, and thereby it starts losing the same attributes it once earned in its growing years. Therefore, this transition where hedonistic cultural practices promoted by industrial living are getting replaced by learning agricultural work in one's leisure time arouses scholastic interest with a focus on changing preference for food and place of living.

Whether this transition is just a momentary shift or indicative of upcoming cultural change, is a matter to be studied for longer period. Embracing nature is a pre-requisite of our everyday existence, a practice forgotten long back. This process involves necessary removal of a collective delirium that we should 'protect' environment. By attempting to protect an entity, we become certain of their vulnerability and at the same time ensconce ourselves to a superior position. Neither demonizing nature has brought any good as that makes nature a wild creature waiting to be tamed by beings boastful of their rational attribute, something that ecofeminists revolted against. Only identifying ourselves as a mere extension of natural world can reshape our approach and action and instil necessary urgency to do what should have been done long ago. Saving nature is saving us. United Nations has already announced 'Code Red for Humanity' in their report on climate change published in August 2021. Nature existed before and will continue to exist after us. It is not alien, neither demon, nor god. It's time we remind ourselves, nature is us.

It will flourish, if naturalists, chemists, antiquaries, philologers and men of science, in different parts of Asia, will commit their observations to writing, and send them to the Asiatick Society at Calcutta; it will languish, if such communications shall be long intermitted; and it will die away, if they shall entirely cease

Sir William Jones

Climate Change in the Indian Ocean World

Rila Mukherjee
Professor of History, University of Hyderabad

In the sixteenth and seventeenth centuries (Akbar's to Aurangzeb's reigns) northwest and central India underwent a climate crisis with low solar activity that lessened rainfall during the monsoon season, causing severe droughts and famine. Yet, despite Abdul Hamid Lahori's and Peter Mundy' eyewitness accounts, the Gujarat and Deccan famines of the 1630s were not regarded as displaying a wider pattern of recurring shortages and mortality. Subsistence crisis only in the 'most narrow sense' was seen. Scholars thus failed to link Shah Jahan's 1636 Deccan invasion and Aurangzeb's campaigns of the 1680s to a sustained economic crisis in these regions that again manifested from 1662 to 1665 (Uberoi 2012).

I Climate Anomalies

This note sees a link between climate, economic distress and political turmoil in Asia. The seventeenth-century climate crisis has a long lineage, resulting from the Medieval Climate Anomaly ca. 850-1250/1300. Variability in solar activity correlated with decrease in rainfall intensity in Indian Ocean monsoons during this period, as compared with the medieval warm period. The medieval anomaly had assisted agriculture in much of South China, Southeast Asia, South Asia and northern Europe—an anomaly precipitated by changes in solar radiation and by oscillations in the heat economy of ocean currents. The Indian Ocean had become warmer, monsoon rainfall patterns had shifted with increased summer precipitation from eastern India into Southeast Asia and central China. But a warmer Indian Ocean also resulted in *reduced* summer precipitation throughout the Horn of Africa and into the southern Arabian Peninsula. Textual and documentary evidence from Egypt indicates a ten-fold rise in the number of droughts between 950 and 1072 compared with the preceding 650 years, culminating in a seven-year famine between 1065 and 1072 and a period of social collapse known as the 'great calamity'. This crisis was a direct counterpart to the Medieval Warm Period then favouring western Europe with longer growing seasons and population increase. The 'great calamity' dictated, to a large extent, the Fatimid turn towards Indian Ocean trade (Liu et al. 2014; Vogt et al. 2011; Lambourn 2018; Graham et al. 2011).

II Climate and Silver

Because wars, drought and famine affected commercial production and trade (Surat, the premier Gujarat port decayed and a fall in its staple *bafta* cloth production forced merchants to source them elsewhere), we link the seventeenth century crisis to silver flows into western India.

In the late sixteenth and early seventeenth centuries, some twenty years after Spain, India experienced a money supply expansion because much of the American silver was re-exported. As in Spain, silver influx caused consumer price inflation. Northern India

saw a grain price rise; Gujarat saw sugar and indigo prices soaring. Supplies contracted between 1605 and 1630 when Portugal's retreat disrupted African, Red Sea and Persian Gulf routes, resulting in acute silver shortage in India. The widespread deflationary effect on prices of European goods in India is evident from European reports. Factors also noted difficulties in obtaining Indian goods, suggesting either fall in production or breakdown of commercial networks (Haidar 1996). The synchronicity with the Gujarat and Deccan famines of the 1630s is apparent.

The terrible famines that struck Japan and China in the late 1630s and early 1640s also resulted from large bullion amounts that had entered circulation in East Asia from the mid-sixteenth century. That bullion facilitated high levels of public expenditure, rapid urban growth and intense economic competition, all of which ultimately proved to be socially, economically and politically disruptive. Tokugawa Japan closed its borders to foreign military threats in 1639; this would remain the case until Commodore Perry's forcible opening of Japan in 1853. Ming China fell in 1644 because it simply did not have the funds to continue its operations.

III Fifteenth-Century Omens

The seventeenth century climate crisis was apparent by the fifteenth century in Asia. Analysis of extensive historical sunspot records show the sun's anomalous behavior, with very low sunspot activity between 1450 to 1750 (Uberoi 2012). Climate change and Tai invasions prompted Khmer decay by the 1440s. Tree-ring evidence for episodes of severe fourteenth to fifteenth-century droughts in southern Southeast Asia attest to this decline. Khmer hydraulic works collapsed in north Thailand and Cambodia, as did almost concurrently those of Bagan and Lanka. In 1431 Angkor was abandoned, jungle gradually engulfed its palaces and temples. Proxy records from central China show clear evidence for aridity. But documentary records from southeast China indicate inverse precipitation variability compared with central China. This pattern of opposing variability in monsoon rainfall over southern and northern China is well documented, apparently related to temperature shifts in tropical Pacific and Indian Oceans. In China climate change through natural disasters (volcanic eruptions, cold spells, ca. 1435-95) was particularly severe—there were droughts, locust infestations, and famines. The *Ming Shilu* and Tripura's *Sri Rajmala* repeatedly reference meteors, plagues, earthquakes and locust attacks. Ice-core data from the Qinghai-Tibetan Plateau in northwest China and Mongolian tree-ring data indicate temperatures cooling during the mid-fifteenth century. Effects were exacerbated by the mid-fifteenth century Eurasian bullion famine, leading to escalation of Mongol pressure on the Mings that culminated in a destructive invasion of north China in 1448/49. These help to explain the economic and political unrest in Western and Central Asia, and explain the 1433 Ming Indian Ocean withdrawal, an event that has puzzled historians (Atwell 2002; Lieberman 2010).

These events can be linked to a visible dearth of silver in India. The late fifteenth and early sixteenth centuries were a signficant period in world history—the passage from the medieval to the early modern when currencies were devalued everywhere. Although the relatively rich Gujarat sultanate (est. 1403) extended and operated the classic tri-metallic currency system of Delhi, there too the weight of the silver tanka was permanently reduced by half into a coin which later gained immense reputation as *mahmudi*. Following a monetary crisis in southern Europe and the Levant, fourteenth-century Indian Ocean trade was increasingly financed with gold from South India which maintained its gold standard in the fifteenth century, enabling it to maintain an export surplus by sending spices to the Levant. It was out of

this gold, acquired from trade and tribute from the Deccan, that Gujarat maintained the circulation of *muzaffarshahi*, the heaviest gold coin (185 grains) ever issued by a Indian ruler with the exception of Jahangir. In North India, precious metal coinage disappeared under the Lodis (1451–1526) and billon and copper coins dominated markets from the last quarter of the fourteenth century. A key factor behind these developments was a severe silver crisis in the regions aligned on the Mediterranean-Indian Ocean axis. In a 1473 letter written to Venice's Doge, the Mamluk Egypt's sultan complained the silver brought to Alexandria in Venetian galleys was so heavily alloyed with copper that it yielded only 40 per cent of fine metal, resulting in silver crisis and fall in trade volumes and exchange. There is evidence of a sizeable flow of Egyptian copper coins (fils) and their employment in the Indian Ocean trade. It seems that the bullion crisis affected silver currency areas much more than those based on gold or copper which increasngly financed maritime exchanges. Gold coins offset effects of silver shortage to a great extent, but this would be difficult during the seventeenth-century crisis by which time the Indian Ocean economy was heavily silverised (Haidar 2007).

IV Seventeenth Century General Crisis

Although the year ca.1600 marked the end of Eurasian waves of destruction, conquest, plunder, and large-scale human displacement in the overland sphere, the Indian Ocean world experienced a monetary crisis. The Ottoman economy, a significant conduit of European silver to Asia, slowed down after 1600 (Flynn & Giraldez 2009). Safavid Iran, whose foreign trade was driven by its need to acquire gold and silver which served as the basis for its money supply, needed bullion to finance imports from India. Bullion shortage led to wildly fluctuating and ultimately declining silk exports (which also financed its international trade) from the second half of the seventeenth century through the Levant, Russia and Cape routes (Floor & Clawson 2000; Herzig 1992). Ottoman Turkey and Safavid Iran would never again reach earlier prosperity levels, and sections of the overland Silk Route fell into disuse. Russia underwent the 'Time of Troubles' with crop failure (1601) in the Little Ice Age, followed by bad harvests (1602/03), famine and collapse of Muscovite Russia. The first Romanov tsar was elected in 1613.

Climate therefore again played a part in the seventeenth century crisis. Although there were regional differences because the southern part of peninsular India and eastern India did not show much rainfall variation during episodes of low solar activity, fluvial shifts in Bengal had left swampy marshlands, dislocating communities and contributing to recurring pestilences. *Ahom Buranji* and *Fathiyya-i-Ibriyya* noted severe famines in eastern India during 1662-66. *Ahom Buranji* recorded a cholera epidemic in 1663. Tripuri, Manipuri and Ahom chronicles record smallpox (1637, 1651, 1672, 1685 and 1699), and Manipur recorded cattle and horse epidemics (1651, 1654, 1660, 1672, 1685, and 1699, Mukherjee 2009). Declining productivity was reflected in shrinking revenue estimates, and a slave trade appeared in the region. A crisis was visible as Southeast Asian polities, nodal points on the Maritime Silk Road, contracted into slave-owning societies (Reid 1993). Between the late 1630s and early 1640s monetary and other problems, many of which were directly related to the New World's economic and political problems, virtually paralysed Manila's economy. Less rain in 1642 in southern Luzon meant the rice crop could not be sown; similar dry spells affected agriculture in the Ryukyu Islands and Taiwan (Atwell 1990).

Increased maritime trade had been paralleled by a population increase to around 35 million in Southeast Asia by 1800. But during the 1600s the climate cooled significantly, causing less frequent rains and occasional famines in these green lands. Effects of climate change weakened

Southeast Asian states in their competition with the West. On mainland Southeast Asia some twenty states in the fourteenth century were reduced to fewer than twelve by the early eighteenth, with Toungoo Burma, Siam, and Vietnam clearly dominant (Lockard 2009).

During mid-century, violence swept much of Asia, including Japan's Shimabara Revolt and the peasant rebellions that ended China's Ming dynasty. The Ming-Qing transition reflected this crisis; China withdrew from the Indian Ocean. Warfare increased as borderlands were brought into state ambits. Qing China expanded into Eurasia. Tsarist Russia exploded into Siberia, creating a small Northeast-Asia-Pacific-centred economy. Vietnam split into Trinh and Nguyen domains between 1600 and 1800. With fewer global networks Tokugawa Japan and Choson Korea escaped the crisis' worst effects, but Korea's climate upsets aggravated domestic issues with epidemics and invasion by Qing China in 1636/37. Tokugawa Iemitsu's (1623–50) decree prohibited the construction of large ships that could be used in overseas trade, and Japan's merchant marine became restricted to small vessels engaged in limited coastal commerce among the home islands. Expansion of overseas trade and commerce ended abruptly in a general economic slowdown in Asia.

V Discussion

A factor in the turmoil was therefore climate. The Deccan-Maratha wars in the seventeenth century's second half were Mughal attempts to tap overseas trade in a period of climate crisis. Maratha admiral Kanhoji Angria was moving beyond coastal patrols, claiming jurisdiction over sea lanes and exercising his right to issue maritime passes. In response the Ghogha shipyard, already constructing sea-going vessels, was made Mughal base of operations against the Marathas in 1672, but European maritime empires had already filled the vacuum, so the wars ultimately finished off the Mughal empire.

Colder temperatures were not the only—or, in many parts of the world, the most important—climatic factor in reducing agricultural yields during the Little Ice Age. Severe economic problems in China, Japan, Korea and Phillipines were at once interrelated and strikingly similar to those that were occurring in other parts of the world at about the same time. Along with the long-term cooling trend went significant shifts in global wind patterns that led to sharp yearly fluctuations in rainfall as well as in temperature. While one area might experience abnormally hot or dry conditions, another might suffer from unusual cold or dampness, or both. In Japan, for example, a series of unusually cool summers in the north, and floods and droughts elsewhere, drastically reduced grain yields in the late 1630s and early 1640s. This contributed to the great famine (Kan'ei kikin), the first major famine to occur in Japan after the rapid urban and demographic growth of the late-sixteenth and early-seventeenth centuries that had made the Japanese dependent on others for their food supply, killed off large numbers of people and livestock from starvation and disease. At virtually the same time that grain prices were rising to striking levels in Osaka, Kyoto, Hiroshima and many other cities, the same was happening in many parts of China. Adverse weather conditions had been affecting agricultural production for some time, and by the late 1630s, some of the richest areas in China were suffering from food shortages, outbreaks of epidemic disease, flights of peasants and armed insurrections. Unlike their counterparts in Japan, Ming officials proved incapable of coping with the situation. Food costs soared, lawlessness grew, and in April 1644 Beijing fell to a rebel army from the economically devastated northwest. Six weeks later it fell permanently to Manchu invaders (Atwell 1986, 1990).

Afterword

Can we ascribe these changes to a monocausal event such as climate change? Do societies change when climate changes? And if so, how? (Blom 2019). While the link between climate change, economic decline and political turmoil is seemingly indisputable over the *longue duree*, what is still not clear is what came first or which factor acted as the trigger for change. While cyclones and floods may have acted as immediate triggers for societal and political change, tipping points—culmination of a long series or cycles of events or disasters such as those described here—are more difficult to discern. Also, patterns were sometimes uneven. If parts of fifteenth-century mainland Southeast Asia showed decline, maritime Southeast Asia retained vigour in its port-cities: Melaka (1402), Mrauk U (ca. 1431), Ayutthaya (ca. 1438). New systems of accounting and exchange, new mint technology, new nautical technologies, and new religions and cults (Bhakti, Islam and Christianity) and a military revolution appeared, along with the growing strength of Theravada Buddhism supported by Lanka and Bagan. Nonetheless, the link between climate crisis and societal change which re-made the Indian Ocean world is too momentous to be ignored.

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Climate Change and History of Cyclones in Colonial Sundarbans

Mahua Sarkar
Professor, Department of History, Jadavpur University

The world's major climate conference, where hundreds of world leaders have negotiated plans for tackling climate change, has just ended in Glasgow on 12th November 2021.It has been decided that the world has to avoid impacts of increasing natural disasters due to climate change. Earlier the Intergovernmental Panel on Climate Change in its report observed that the global mean temperature may increase anywhere between 1.4 to 5.8 degree Celsius by 2100. The increase is expected to have severe impacts on various aspects of the climate system including global hydrological system like changes in monsoon patterns. Developing countries are particularly vulnerable to the impact of climate change. This is so because in developing countries ecological environments are fragile, the susceptibility of economic systems risks is high and the low income levels of most citizens constrain their ability to cope. The impact of climate change is not unprecedented and can be traced from the history of the colonial Sundarbans. This area of coastal Bengal is a part of the world's largest mangrove delta formed by the rivers Ganga, Brahmaputra and Meghna. Among the calamities that overtake the region are great inundations caused by cyclones or hurricanes. In fact the monsoon in this part of Bengal consists of a series of severe cyclonic storm or depression, borne in the the Bay of Bengal. It is now scientifically proved that the mangroves prevent the cyclones from inland intrusion. Increasing human intervention since the colonial times had caused massive destruction of the mangroves of the area. As a result there was a growing record of human displacement due to increase in the number of storms .

The term 'cyclone' was coined in 1848 by Henry Piddington, British meteorologist, and is derived from the Greek word 'kuklos', that is the coil of a snake that the air flow of the storm resembles it. While tropical cyclones can produce extremely powerful winds and torrential rain, they are also able to produce high wave and damaging storm-surge as well as spawning tornadoes. Heavy rains, however, can produce significant flooding inland and storm surges can produce extensive coastal flooding up to 40 km. / 25 miles from the coastline. In the Sundarban area, tropical cyclones with variable wind speed of 63 km. / hr - 87 km. / hr are regular phenomena. Each period of general heavy rainfall is, in fact, initiated by the advance of a cyclonic storm, which gives concentrated rainfall over long narrowish belts of the country. In popular parlance, however, the term 'cyclone' is reserved for the most violent storms which burst more especially in the transition periods, i.e. in May, before the monsoon is fully established and in October when it has not altogether disappeared. Increasing number of cyclones in the Sundarbans, are examples of the most intense tropical storms. The shifts of wind accompanying them are very rapid and dangerous to vessels, and October is the most critical period of navigation in the Bay of Bengal.

This has been recorded in the colonial British reports. O'Malley, in his Gazetteer of 24 Parganas (1914) noted that there is "no safeguarding against the sudden fury of a cyclone." The earliest cyclone of which there is a historic account appears to have been that of 1582 AD, which swept over Sarkar Bakla i.e. Bakergunj, (in present Bangladesh) causing the loss of 200,000 lives and the destruction appears to have been caused mainly by a storm wave. For five hours the hurricane and thunderstorm destroyed houses and boats and only some Hindu temples having a strong foundation were spared. In 1585 another tropical storm hit the eastern side of Bakergunj near the mouth of the Meghna river estuary, causing huge devastation to crops. In 1699 a severe cyclonic storm crossed the Sundarban coast and killed 50,000 people. The cyclone of 1737 devastated Calcutta and the Sundarbans. Sir Francis Russell wrote that "the whole place looked like a place that had been bombarded by an enemy. Such a havoc did it make that it is impossible to find words to express it." Again in 1767 a cyclone with a surge height of 13.03 m / 43 ft. crossed the Bakergunj coast, killing around 30,000 lives. The nineteenth century witnessed many severe cyclonic storms in the Sundarbans region, which resulted in huge damages to life and property. In June 1822 a severe cyclonic storm with a hoast of hurricane winds crossed the coast of Bakergunj at Sarkar Bakla, killing 50,000 people along with about 100,000 cattle. The storm wave is known to have swept away the collectorate records. On 31st October 1831, another severe cyclonic storm crossed the Barisal coast and was accompanied by a surge height of 2.12-4.55 m (7-15ft). The storm killed 22.000 people and 50.000 cattle. In May 1833 a powerful cyclone hit Sundarban coast. The Saugor Island was submerged in 10 feet water and the whole population, between 3000-4000 souls, together with some of the European superintendents perished. On this occasion the ship, an East Indiaman, Duke of York, was carried into the rice fields at Falta, and left there high and dry. Already in June 1823 a storm had destroyed the roads, embankments and crops on the island. O'Malley noted that "the most disastrous cyclone within living memory is that of 1864". The destruction caused by the cyclone was twofold. First, the violence of the wind caused widespread destruction to houses and trees. Secondly, the storm wave brought up by the gale swept over the country to a distance of 8miles;inland on either side of the Hooghly as far north as Achipur. This wave rose in some places to a height of 30 feet sweeping over the strongest embankments, flooding the crops with salt-water and carrying away entire villages. At Saugor Island it was 15ft above land level and appeared to cut a channel straight across the island, dividing it into two halves. The embankments, houses, huts, golas and buildings were destroyed and out of a population of nearly 6000, less than 1,500 survived. Those that did escape were saved by climbing up trees or floating on the roofs of their houses, which the waves swept away and carried many miles inland. The distress and suffering to which the survivors in the affected tracts were exposed after the disasters were very great. For several days food was not obtainable, for the huts had been swept away, relief could not be sent from Calcutta. In some places which escaped the storm-wave, the stores of the rice merchants were broken open and plundered. In others a kind of grass was eaten as food. The cyclone also wrought immense havoc among the shipping in the river.Again on 1st November 1867 a part of 24 Parganas was hit by a storm traversing the country nearly due east from Calcutta to Basirhat on the Ichamati river. In this line, villages were blown down wholesale and their destruction was accompanied by loss of human life, the more populous places suffering severely. The effect of the hurricane was most disastrous in Port Canning, where the gale was accompanied by a storm wave, the water of which passed over

the town with fearful violence. The station house, goods-shed and railway hotel were all blown down. The Port Canning Company's store bulk was carried away over a large portion of the railway jetty. The storm wave, beginning from Saugor Island, extended to the extreme east of the district, and in some rivers the water rose to six feet above flood level. Another disastrous cyclone appeared in 1870 which destroyed a large area where the water raised up to 10 feet. The submersion of land was so heavy that in a rough estimate during 1882, it was found that the exposed land area in Sundarbans which was not under water was only 786 sq miles. On 29 October - 7 November 1876 Sundarban region was hit by a very severe cyclonic storm known popularly as the famous/great Bakergunj Cyclone of 1876. It was an extremely severe cyclonic storm with a core of hurricane winds. It crossed the coast of Bakergunj near Meghna estuary and was accompanied by a surge height of 3-13.6 m. /10-45 ft. An account of this famous cyclone has been left by Sir John Elliot. At that time over 400,000 people were drowned in the floods by the simultaneous action of the tidal wave and the storm wave in the districts of Bakergunj, Noakhali, and Chittagong. The flood water is said to have reached 45 ft of Meghna and was about 10-20 feet on the average in the total area inundated. The total area affected by the cyclonic storm extended over 3000 sq miles. On 16th May 1869 another cyclone destroyed 250 lives in Morrelgunge alone and caused an immense loss to property. This picture was found throughout the twentieth century. Before independence the Bakergunj area witnessed another terrible cyclonic storm on 25th May 1941, sweeping over the islands at the mouth of Meghna and the adjoining districts of Barisal and Noakhali. It caused widespread destruction of life and property. The loss of life had been estimated at five thousand to ten thousand and destruction of property at amounts running to crores. The economic life in the stricken regions had been ruined.This picture of cyclones has been intensified as a result of a gradual climate change and man-made destruction of the mangroves.The *Amphan* of 2020 is a recent instance of that environmental crisis.

Devastating Storm in Sunderbans Recorded in Ā'in-ī-Akbarī

The Sarkār of Baklā extends along the sea shore. The fort is surrounded by woods. On the first day of the new moon the sea steadily rises until the fourteenth, and from the fifteenth till the end of the month as gradually falls. In the 29th year of the Divine Era, a terrible inundation occurred at three o'clock in the afternoon, which swept over the whole Sarkār. The Rājah held an entertainment at the time. He at once embarked on board a boat, while his son Parmānand Rāe with some others climbed to the top of a temple and a merchant took refuge in a high loft. For four hours and a half the sea raged amid thunder and a hurricane of wind. Houses and boats were engulfed but no damage occurred to the temple or the loft. Nearly two hundred thousand living creatures perished in this flood.

Source: Allami, Abul Fazl, *The Ā'in-ī-Akbarī*, Tr. H. S. Jarret, Annotated by Jadunath Sarkar, The Asiatic Society, Kolkata, 2010, Vol. II, pp. 135-136.

The Supercops' Meet on Environment Ended With a Big Bang for Business

Subhasis Mukhopadhyay
Formerly Professor, Department of Biophysics, University of Calcutta

The near-extinct species called environmentalists and the corporate and finance lobby met among strikes and protests in Glasgow, UK, between November 1 and November 12, 2021 to discuss about as to how to mitigate the impending global crisis called Climate Change. About the cause, the common consensus is global warming. The text, purported to be the sacred document for such a blueprint, with rounds of drafts, finally agreed upon by a number of countries (and not agreed upon by a sizeable minority) with a last minute amendment by India and China, sealed the fate of this blue planet. Most environmentalists were disappointed by what was told with great fanfare and what was agreed upon, the gap of several light years is hoped to be bridged in the coming sessions and rounds of COP(Conference of Parties), to be held in the next year in Egypt in coming November.

It all began in the 1972. In Stockholm, Sweden, United Nations convened a conference which signaled the beginning of the confluence of science and technology, environment with profit, finance and corporate domination over the fate of our planet. The real globalization in some sense began from a footnote appeared in the communiqué in the Stockholm conference. It then led to the creation of United Nations Environment Program (UNEP) and commitments were pledged towards safeguarding the natural environment. As a passing reference, in a footnote it mentioned the "purely scientific inquiry about climate change and the rise in global atmospheric temperature", also to be addressed by this conference in future.

As scientists were concerned about the indications of Climate Change (the change of global environmental parameters, like the average global temperature, the change in the composition of gases in the Earth's atmosphere and the like, over a long period of time), so were the corporate and financial lobby elated to find a new opportunity for global investment. The culprit, responsible for the queered behaviour of the Earth's environment, was identified to the Green House Gases, or CHGs. In quick succession, two global conferences were held, the first World Climate Conference (1979) and the Torento Conference on the Changing Climate (1988). In the same year, the World Meteorological Organization (WMO) and UNEP established the Intergovernmental Panel on Climate Change (IPCC) for assessing, as a purely scientific pursuit, the likely impact and the options available to counter the effects of Climate Change. The IPCC was expected to come out with periodic reports, the last, or the seventh report is expected to be out in 2021.

18 years after, in 1990, the IPCC published its first report, directly linking the cause of climate change with the rise in global average temperature and the reason for rise is temperature was supposed to be due to "emissions resulting from human activities"

" substantially increasing the atmospheric concentrations of greenhouse gases." Though there were skeptics to such a straightjacket assertion, as the IPCC was composed entirely of scientists who are all for this statement. There were many contrary indications, yet the IPCC wanted to go by the "consensus", a methodology rejected long ago by the scientists as metaphysics.

This momentous assertion led to the international initiative of creating the UN Framework Convention on Climate Change, or UNFCCC, which was adopted for ratification leading to the Earth Summit, 1992 at Rio de Janeiro, Brazil attracting a membership of 197 countries. They were described as "Parties". The major industrialized countries, the USA, Europe had been squarely held responsible for giving rise to such a global problem. After the Brazil summit, the Conference of Parties, COP, was being held annually to take a stock of mitigating measures to halt the global rise of temperature by mutually agreed upon procedures, protocols, agreements and stuff like that, i.e., adopting "clean technology and industrial practices". The latest one was held in Glasgow, UK, which produced nothing new, only a new way of surrendering the fate of our future to corporate interest.

Let us see how all these have come about. The first such initiative was held in Kyoto, Japan, known as COP-1, the first Conference of Parties, in 1995, which set the target for the industrialized world to reduce the emission of their share of GHGs, mainly CO2 in the atmosphere. Thermal power plants, the life line of industrialization were the major contributor of CO2 , has been identified as the target of reduction. The industrialized world was obliged to reduce their share of carbon (the carbon dioxide and other contributing GHGs was reduced to carbon-equivalent by some dubious method, not supported by any serious scientific methodology) in the atmosphere by an amount which is just 5 percent less than of what they released in the atmosphere in 1990!

The less-industrialized countries had been given some bonus period to reduce their quota of carbon emission at a later date. Alarmed by the prospect of losing profit, the corporate lobby and the financial institutions ganged up and increased their presence in the IPCC and representation in the COP and added a provision of carbon-trading by which the industrialized countries would earn credits, known as carbon-credit which would be valued by the same methodologies as the tangible assets for securitization, thereby opening up a new vistas for trade and commerce.

No harm in having newer and newer derivatives for trade and commerce, but when the global environment, the real common of all the citizens across all the nation-states, irrespective of caste, class and creed, was put to for a commercial bid, it is only expected that responsible citizens of world community would rise in protest. That was what we witnessed in Cancun, Bonn, Doha, Paris and now in Glasgow. During all these intervening years, the industrialized countries decided not to reduce their emission quota, continued with their carbon-based profit-making empire, enthusiastically supported eviction of population for coal-mining and not supplying the long-promised environment mitigation fund to the less industrialized countries.

In Doda round, a new agreement was arrived at and the commitment according to Kyoto Protocol (that is, carbon-trading as the main instrument for mitigating GHG emission) , as it had come to be known, extended till 2020. Nothing tangible was visible after this much-touted agreement while the adverse effect of this calculated inaction rendered one-third of the population of our planet environmental refugees and economically a ruined lot.

USA walked out from this accord in 2001 and "adopted" its own protocol which is even more heavily based on carbon and carbon trading. It was the carbon-trading that the business lobby was interested in. Through

their disproportionate representation in the Conference of Parties negotiation table (on an average 500 to 700 corporate representatives were present), they deferred the full implementation of Kyoto protocol till 2020 in Doha round of talks !

In the successive Conference of Parties meeting nothing new had happened as the corporate lobby wanted a firm basis for their unchecked carbon-trading activities. In USA and Europe, Carbon Trading Stock exchanges were set up, even India was not left far behind. India has its own Carbon Trading mechanism through State Bank of India, but investment in "carbon-mitigation procedures" were not surging ahead in volume and extent to lure the financial lobby to pump in enough fund. They wanted more free-hand in this derivative business, which needs to be re-negotiated.

In 2015, the Paris round finally gave them the required ammunition in their arsenal in the form of Article 6, about which the business lobby was very much eloquent and supporting it with whole hog. Instead of a mandatory reduction of carbon-load in the atmosphere, the countries responsible for increasing carbon-load in the atmosphere were given a free option of determining their " Nationally determining contribution" of reduction target, thereby eliminating the responsibility of the industrialized countries of their greater share of obligation. Who would believe that when there were international pressure and monitoring, the industrialized countries did not reduce just a meager amount of carbon-load, they would now voluntarily determine a quota, which would be an addition to what they did not achieve plus their determined quota? What a pity!

Paris agreement had set an agreed-upon deadline that Parties should come out with their respective country wise plan for a mitigating measure. This time the ambition was too high— to come out with such measures so that the global temperature rise would be limited to at least 1.5 degree Celsius or less, that too, all voluntarily!

In this backdrop, the CPO-21 at Glasgow was held. Nothing was done during the intervening period. The global temperature curve maintained an upward trend. Carbon-based economy, instead of being phased out, it is being rejuvenated throughout the globe. The countries having a firm coal reserve (Australia, India and others) embarked upon an ambitious coal-based power generation program with a projection of 50 years, far beyond the period allotted for implementing the Glasgow accord. Carbon-trading impediments had been ironed out in this round, trade and commerce are expected to receive a great boost. Instead of phasing out the carbon-based economy, the lords of poverty decided to "phase down" the "carbon-based power generation"

The blue planet is heading towards a crisis to catastrophe! We, the Indians now have to prepare ourselves to leave the cities like Kolkata, Mumbai and Chennai as a good part of these cities with teeming millions would be inundated by the ingress of sea-water as the polar-caps melt, may be in a couple of decades hence!

Global Concern for Green Globe: International Initiatives for Protecting Environment

Sabyasachi Chatterjee
Department of History, University of Kalyani

The 2021 United Nations Climate Change Conference gave us an opportunity to look back. We are looking back the previous international initiatives with special reference to environmental conferences in a nutshell. The journey was started in 1970s. Undoubtedly the first major international environmental on environment was held in 1972 in Stockholm, Sweden. But before that Ramsar Convention on wetlands was held in Ramsar, Iran. To protect the wetlands of the world a list of significant wetlands was made which is called as Ramsar Wetland Sites.

Stockholm Conference (1972) is very well known. This UN Conference on Environment and Sustainable Development was the first environmental summit where the head of different states participated. Since then, the 5th of June, has been celebrated to mark the first day of this Conference as World Environment Day. The Stockholm Declaration agreed upon 26 principles on development and the environment. This was the first time at a global convention that countries acknowledged their responsibility to the environment. It also influenced the creation of the United Nations Environment Programme (UNEP) and brought environmental issues to the forefront.

The Convention on the Control of International Trade in Endangered Species of Wild Fauna and Flora was held in Washington, USA in1973. The First World Climate Conference (WCC-1) was held in 1979 in Geneva, Switzerland by the World Meteorological Organisation (WMO), with several other major organisations as "a world conference of experts on climate and mankind". The WCC-1 resulted in the formation of the World Climate Programme, the World Climate Research Programme, the UN Environmental Programme (UNEP) and later the establishment of the Intergovernmental Panel on Climate Change (IPCC) in 1988. In the same year (1979) the Bonn Convention on the Conservation of Migratory Species of Wild Animals was held in Bonn, Germany.

In 1980s a number of major international initiatives were taken to save environment. The World Conservation Strategy (WCS) was prepared in 1980 by the International Union for Conservation of Nature and natural resources (IUCN), UNEP, and the World Wide Fund for Nature (WWF), UNESCO, and the Food and Agriculture Organization (FAO). It emphasized on the interdependence of conservation and development. After a decade of Stockholm Conference, UN Conference on Human Environment was held in Nairobi in May 1982. 105 States participated in that Conference. A declaration called 'Nairobi Declaration 1982' was signed by the participating states. The declaration was endorsed by the UNEP in 1987 and also by the UN General Assembly. Ten years after the Stockholm conference, the UN General Assembly adopted the World Charter for Nature (1983), which set forth principles of conservation by which all human conduct affecting nature is to be guided and judged. It is an example of

a non-binding international instrument of broad application. In the very same year, the World Commission on Environment and Development (WCED) was formed. The WCED was established by the UN General Assembly and chaired by the Norwegian Prime Minister Gro Harlem Brundtland. The commission was established outside the control of the governments and the UN system. The year 1984 marked the publication of "The Resourceful Earth: A Response to Global 2020". In 1987, the World Commission on Environment and Development (WCED) published a report entitled "Our common future". The document came to be known as the "Brundtland Report" after the Commission's chairwoman, Brundtland.

Mention must be made of Vienna Convention (1985) that was held for the protection of Ozone layer. That was the first convention to be ratified by all its members at the time, later becoming universally validated in 2009. The agreement was framed to reduce chlorofluorocarbon (CFC) production worldwide, and is viewed as one of the most successful treaties because of approval from 197 countries. To mark the validation of the Protocol, the UN set apart the 16th of September as the International Day for the Preservation of the Ozone Layer. That was followed by adoption of Montreal Protocol (1987). It was an international environment protocol on substances that deplete the Ozone layer. It came into force in 1989. The year also marked the Basel Convention. It was a convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. It came into force in 1992.

The most significant summit on environment after Stockholm was undoubtedly The Rio Summit held in 1992 in Rio de Janeiro, Bazil. That UN Conference on Environment and Development was also called the Earth Summit or the Rio Summit. It was the largest gathering of world leaders at the time to address the environmental issue. The Summit called on governments worldwide to reconsider the environmental impact of economic decisions, policies and projects. It led to many important documents, 'The Rio Declaration on Environment and Development', 'Agenda 21' and 'Forest Principles'. It also produced the Rio Convention which included the Convention on Biological Diversity, the UN Framework Convention on Climate Change and the UN Convention to Combat Desertification. The Rio Declaration adopted "right to development so as to equitably meet development and environmental needs of present and future genera¬tions."

Smt Indira Gandhi, Former Prime Minister of India, at the Stockholm Conference in 1972

United Nations Framework Convention on Climate Change, an international environmental treaty governing actions to combat climate change through adaptation and mitigation efforts directed at control of emission of Green House Gases (GHGs) that

cause global warming was adopted in the very same year 1992. It came into force in 1994. Before that "Caring for the Earth: Strategy for Sustainable Living" was adopted in 1991. The International Union for Conservation of Nature and Natural Resources (IUCN), UNEP, and WWF came out with the strategy. To secure a commitment to sustainable living, that was basically a follow up of World Conservation Strategy. That strategy concentrated on various areas relating to the environment like energy, human settlements, forest lands, fresh water, farm and range lands, oceans and coastal areas, etc. Following that, the UN Commission on Sustainable Development (CSD) was established by the General Assembly in December, 1992, under the umbrella of Economic and Social Council (ECOSOC), to follow up on adoption of Rio Declaration and Agenda 21.

In 1997, the UN General Assembly held a special session (Rio +5) to appraise the status of Agenda 21. The Assembly recognized progress as "uneven" and identified key trends, including increasing Globalisation, widening inequalities in income, and continued deterioration of the global environment. The focus of the Rio+5 Forum was to move sustainable development "From Agenda to Action."

1990s witnessed the starting of yearly Conference of the Parties (COP) under the auspices of "United Nations Climate Change". The process was initiated in 1995 at Berlin, Germany. The COP is the supreme decision-making body of the Convention. All States that are Parties to the Convention are represented at the COP, at which they review the implementation of the Convention and any other legal instruments that the COP adopts and take decisions necessary to promote the effective implementation of the Convention, including institutional and administrative arrangements. A key task for the COP is to review the national communications and emission inventories submitted by Parties. Based on this information, the COP assesses the effects of the measures taken by Parties and the progress made in achieving the ultimate objective of the Convention. This Glasgow Conference of 2021 is the 26th edition of COP. One may recall the occurrence of earlier conferences of COP between 1995 and 2021.

The conversations at COP 1 ultimately lead to the Kyoto Protocol (1997), a more legally binding and accepted agreement. It led to adjustments in mechanisms, such as the Clean Development Mechanism, to limit emissions in such a way that developing countries would not bear the costs. Basically, it was an international protocol to reduce greenhouse gas emissions. Meanwhile the adaptation of United Nations Convention to Combat Desertification (UNCCD) in 1994 need to be mentioned.

In June 2000, the first meeting of the Global Ministerial Environment Forum adopted an action-oriented Malmo Declaration that helped in setting up the environ¬mental agenda for the 21st century. The Declaration made important references too many topical environmental issues. For example, it recognized the importance of environmental compliance, enforce¬ment, and liability. The World Summit on Sustainable Development (2002) took place in Johannesburg, South Africa ten years after the first Earth Summit in Rio de Janeiro; it was thus also known as "Rio+10". It ended in a major disappointment as no new commitments were made to tackle any crisis and the lack of progress demonstrated the unenthusiastic response of the governments, even as the environment continued to deteriorate. It ended with weak and non-binding agreements to promote sustainable development. After a decade another Earth Summit did take place in the same place, Johannesburg in 2012. That conference centered on Agenda 21. It was considered revolutionary in the sense that it essentially created the term sustainable development and created the global environmental agenda for the next 20 year. Beside the

earth summit or COP mention may be made of Rotterdam Convention (1998) on "Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade"; Cartagena Protocol (2000) on "Biosafety to the Convention on Biological Diversity", adopted in 2000; United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation (UN-REDD) of 2008; Nagoya Protocol (2010) on "Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (ABS) to the Convention on Biological Diversity (CBD)"; Kigali Agreement (2016), which is an amendment to the Montreal Protocol and Minamata Convention (2013), an international environmental treaty intended to protect health and the environment from the adverse effects of mercury.

The COP1 at Berlin flagged off the continuous commitment to address the issue of climate change. The COP26 is the culminating point of that continuous process till date. Undoubtedly there are a number of criticisms, most of those are very valid. But it should be admitted that global bodies are no-longer mere spectator of the climate change. The concerns for environment are constantly noticed globally. These concerns have been manifested in numerous conferences, conventions and policy papers.

Aerial View of Amazon Rainforest.

Courtesy: Wikipedia

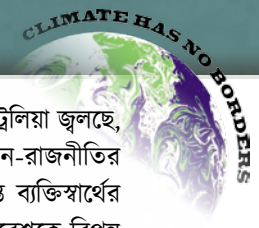
প্রকৃতিই যদি না থাকে?

কুমার রাণা
প্রাবন্ধিক ও গবেষক

সহস্রাব্দের আনন্দ উদযাপনের মধ্যেই পৃথিবী একটা সাবধানবাণী ও শুনল: এতদিন পর্যন্ত কিছু বিজ্ঞানী, সমাজকর্মী এবং আদিবাসী গোষ্ঠীর মানুষ যে কথাটা বলে আসছিলেন, সে কথাটাকেই যেন শিলমোহর দিয়ে ইন্টারগভর্নমেন্টাল প্যানেল অন ক্লাইমেট চেঞ্জ-এর তৃতীয় মূল্যায়ন প্রতিবেদনে লেখা হল: নতুন এবং জোরালো সাক্ষ্যপ্রমাণ থেকে দেখা যাচ্ছে যে গত পঞ্চাশ বছরে পৃথিবী যেভাবে উষ্ণতর হয়েছে, তার মূলে আছে মানুষেরই নানাবিধ কাজকর্ম, বিশেষত জীবাশ্ম জ্বালানীর নির্বিচার, বিবেচনাহীন ব্যবহার। কিন্তু, কোন মানুষ সেটা করছে? গোটা মানব প্রজাতিটাই কি এই কাজের জন্য দায়ী? এখানেই সরকারি দলিলপত্র, এমনকি বিদ্যাচর্চাপ্রসূত অনেক লেখালেখিরও সমস্যা। যেখানে মানব প্রজাতির মধ্যেকার নানাবিধ শ্রেণিবিভাজনই মানব-দুর্দশার উৎস, এবং পৃথিবীতে প্রাকৃতিক মহাসংকটের মূলেও আছে এই বিভাজন, সেখানে সমগ্র মানব-প্রজাতিকেই সমস্যাটার সাধারণ স্রষ্টা বলে চিহ্নিত করাটা সত্যের সঙ্গে বিশ্বাসঘাতকতা।

কিন্তু পৃথিবীতে এমন একটা ব্যবস্থা গড়ে উঠেছে, যার ভিতরটায়, কার্ল মার্কসের ভাষায়, এমন এক পচন ধরেছে যার ফলে সম্পদের পরিমাণ বেড়েই চলেছে, কিন্তু দুর্দশার হ্রাস ঘটে না। এ পচনটার দুটো আলাদা, কিন্তু পরস্পর-সংযুক্ত দিক: একদিকে বিপুল মানুষের ওপর কতিপয়ের আধিপত্য, এবং অন্যদিকে প্রকৃতিকে সেই কতিপয়ের ক্ষুদ্র গোষ্ঠীর নিজের দাস মনে করে নেওয়া। অর্থশাস্ত্রী কৌশিক বসু লিখেছেন, "প্রাচীন কালের তুলনায় বর্তমান পৃথিবী শ্রেষ্ঠতর হলেও আপাতদৃষ্টিতে আমাদের পূর্বজদের তুলনায় আমাদের যতটা সৌভাগ্যবান বলে মনে হয়, আমরা ঠিক ততটা নই।" নই, তার একটা বড় কারণ, পৃথিবীর বহু মানুষ, যেমন নারী, শ্রমজীবী, কৃষক, এবং বিভিন্ন আদিবাসী গোষ্ঠীগুলোর কতিপয়ের আধিপত্য। এই আধিপত্য এতটাই প্রবল যে, এটাই সভ্যতা, সংস্কৃতি, বিবেক, ইত্যাদির মানদণ্ড ঠিক করে দিল। ফলে, পৃথিবীর আদি বাসিন্দাদের মৃতদেহের উপর দাঁড় করানো হল নতুন আমেরিকার সৌধ, অথচ আধুনিক বিবেক রইল অবিচল। তেমন ভাবে, যে বিধানে অরণ্যজীবীদের অপসারণকে আদর্শ জনপদের শর্ত বলে নির্দিষ্ট করে দেওয়া হল, এবং অধিপতি সমাজের বিবেক সেই ঘোর অন্যায্যতাকে স্বাভাবিক বলে মেনে নিল, সেই ধারাবাহিকতাকেই কাজে লাগিয়ে ব্রিটিশ দখলদাররা ভারতে 'সভ্যতার আলো ফোটাতে লাগল'। শুরু হল ভিন্ন এক মাত্রায় অরণ্য, খনিজ এবং অন্যান্য প্রাকৃতিক সম্পদের বেহিসেবি লুণ্ঠন। তাৎক্ষণিক মুনাফাই ছিল দেশে দেশে ঔপনিবেশিকদের আরাধ্য। হাওয়ার্ড জিন তাঁর পিপলস হিস্ট্রি অব আমেরিকা বইতে দেখিয়েছেন, মুনাফার লোভে, কী ভয়ানক নিষ্ঠুরতা নামিয়ে আনা হয়েছিল আমেরিকার আদি বাসিন্দাদের ওপর। অমিতাভ ঘোষ তাঁর সম্প্রতি প্রকাশিত গবেষণাগ্রন্থে দেখাচ্ছেন কীভাবে এশিয়া-আফ্রিকা-আমেরিকা জুড়ে পুঁজিবাদী শোষণ ও তার পরিণামে যুদ্ধ শুধু যে লক্ষ লক্ষ মানুষের অকালমরণ ঘটিয়েছে তাই নয়, পৃথিবী থেকে উচ্ছেদ করে দিয়েছে বহু ভাষা, সংস্কৃতি, যুগ যুগ ধরে অনুশীলনলব্ধ জ্ঞান, বহু প্রাণী ও উদ্ভিদ প্রজাতি; ধ্বংস করে দিচ্ছে মৃত্তিকা, নদী, অরণ্য, সমুদ্র ও বাতাস। ওয়ার্ল্ড হেলথ অর্গানিজেশন থেকে নিয়ে নানান বিশ্বস্তরীয় সংস্থার প্রতিবেদন থেকে জানা যাচ্ছে কী ভাবে রোগ, দারিদ্র, অনাহার, অপুষ্টি, এবং ঊনমানবীকরণের ভয়ানক এক বাস্তব মানুষের অস্তিত্বটাকেই বিপন্ন করে তুলেছে।

লুণ্ঠনের মাত্রায় যে তীব্রতা যোগ হল, সেটা শাসকদের বিদেশি হওয়ার কারণে নয়, বিশ্ব জুড়ে বিকাশশীল এক নতুন আর্থ-রাজনীতিক ব্যবস্থায় এই



শাসকদের নেতা হয়ে ওঠার জন্য। তাদের দার্শনিক ভিত্তি ছিল পুঁজিবাদ, যা ভবিষ্যতে কী হবে তার চিন্তা না করে বর্তমানের, এই মুহূর্তের, মুনাফাকেই একমাত্র সত্য হিসেবে প্রতিষ্ঠিত করে ফেলল। গাত্রচর্ম, জন্মভূমি নিমিত্তমাত্র— যে দক্ষ বাজিকর তাদের চালিত করছিল, সেটা পুঁজি। এরই প্রেরণা বা তাড়নায় অরণ্য ও খনিজ সম্পদে পরিপূর্ণ এলাকাগুলো থেকে গৃহহারা, বাস্তুহারা হয়ে বহু দূর ভিন্‌দেশে বসত গড়তে বাধ্য হলেন লক্ষ লক্ষ মানুষ, যাঁদের বেশির ভাগই আদিবাসী। ধ্বংস হল পরিবেশ, আর তার মধ্যে, তার সঙ্গে জীবন গড়ে তোলা মানুষকে ঠেলে দেওয়া হল এমন এক কলে, যেখানে সে নিজেই নিজের স্বপ্ন নিংড়ানো জ্বালানিতে জ্বলে শেষ হয়ে যায়।

এবং ঠিক এই কারণেই, স্বাধীন ভারতেও এই প্রক্রিয়ার ব্যত্যয় ঘটল না। প্রকৃতিকে নির্বিচারে লুণ্ঠন করার পরম্পরা চলতেই থাকল। চলতে থাকল 'দেশের উন্নয়নের যজ্ঞে' কিছু বাছাই করা লোকগোষ্ঠীর 'স্বেচ্ছায়' আত্মবিসর্জন; কৌটিল্যের অর্থশাস্ত্র-তে যাঁরা অটবি, ঔপনিবেশিক অভিধায় তাঁরা তফশিলি জনজাতি। ব্রিটিশ শাসকেরা যেমন ভারতকে 'সভ্য করে তোলার' প্রতিজ্ঞায় পরিবেশ ও মানুষের সম্পর্কটাকে ভুলিয়ে দিয়েছিল, স্বাধীন ভারতের শাসকেরাও তেমনই উন্নয়নের তাগিদে এই সম্পর্কটাকে অস্বীকার করে। বর্তমানের লাভান্বেষণ হয়ে উঠল মোক্ষ, ভবিষ্যৎ দুর্বিপাকের চিন্তা কি নীতি, কি 'মূলস্রোতের জনসমাজ'— কোথাও স্থান পেল না। উন্নয়নের ভাবনায় পরিবেশ, পরিবেশকেন্দ্রিক মানবাধিকারের মতো জরুরি বিষয়গুলো তেমন ভাবে পরিস্ফুট হল না। এমনকি, রাজনৈতিক ইতিহাস সংক্রান্ত বিদ্যাচর্চাতেও এই দিকটি যথাযোগ্য গুরুত্বের সঙ্গে আলোচিত হল না। উন্নয়ন ও পরিবেশ সুরক্ষার মধ্যে বৈর সম্পর্কটাই প্রধান রূপে দেখা দিল। পরিবেশ সুরক্ষা যে উন্নয়নের আবশ্যিক শর্ত, এ দিকটাকে যেমন পুলিশ-মিলিটারির জোরে ভুলিয়ে দেওয়া হল, আবার উল্টো দিকে পরিবেশ ভাবনায় একটা প্রগতি-বিরোধিতা স্পষ্ট হয়ে উঠতে লাগল।

ব্যক্তিস্বার্থের ভয়াল আগ্রাসনে ভারত শুধু নয়, গোটা পৃথিবী জ্বলছে। পরিবেশ ও মানুষের সমঞ্জস অগ্রগমনের খণ্ড খণ্ড সংগ্রামগুলো পৃথিবী জুড়ে যে খণ্ডিত সাফল্যগুলো অর্জন করেছিল জন-রাজনীতি, সেই সংগ্রামগুলোকে অবহেলা করেছে, তার যে মূল্য দিতে হচ্ছে তা ভয়ানক। আমাজন জ্বলছে, অস্ট্রেলিয়া জ্বলছে, ক্যালিফর্নিয়া জ্বলছে। এই প্রজ্বলনে জন-রাজনীতির দুর্বলতার সুযোগ নিয়ে দক্ষিণপন্থী, চূড়ান্ত ব্যক্তিস্বার্থের রাজনীতির উত্থানের ভূমিকা বিরাট। পরিবেশকে বিপন্ন করে, মানুষকে তার স্ব-ভূমি, স্ব-সংস্কৃতি, স্ব-জন থেকে উৎখাত করে পুঁজির জন্য নিষ্কণ্টক পথ করে দিতে অতি দক্ষিণপন্থী রাষ্ট্রনেতারা উদ্‌গ্রীব। পুঁজি, আমাদের কালে আর্থনীতিক-ইতিহাসবিদ অমিয় বাগচী দেখাচ্ছেন, যেখানে নিজেকে প্রতিষ্ঠিত করেছে, সেখানেই সে তা করেছে বীভৎস রক্তস্রোতের মধ্যে দিয়ে।

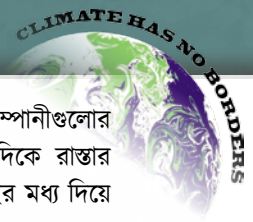
এর থেকে বাঁচার উপায় কী? নিজের শিকড়ে ফেরা। মানুষের সভ্যতার অগ্রশর্ত হচ্ছে প্রকৃতির সঙ্গে নিরন্তর আলাপ-সংলাপের মধ্যে দিয়ে বিকশিত হওয়া। সারা পৃথিবী জুড়েই বিভিন্ন আদিবাসী গোষ্ঠী এর উদাহরণ রেখে এসেছেন। যেমন, যে অরণ্যনিধনের ফলে আজ তাবৎ "সভ্য" পৃথিবী ত্রাহি ত্রাহি করছে, সেই বনের সঙ্গে কীভাবে একটা মর্যাদাপূর্ণ প্রতিবেশ গড়ে তুলতে হয় তার বহু নমুনা আফ্রিকা থেকে নিয়ে লাতিন আমেরিকা, ভারত থেকে নিয়ে অস্ট্রেলিয়া পর্যন্ত ছড়িয়ে আছে। একটা কাহিনি শোনাই: এক সহকর্মী ও বন্ধুর সঙ্গে গিয়েছিলাম দুমকা জেলার মহুলো গ্রামে। চারিদিকে ঘন অরণ্য। তার মধ্যে গোটা পঞ্চাশ সাঁওতাল পরিবারের বাস। বেলা আটটা হবে। দুই স্ত্রী-পুরুষ বেরোচ্ছেন জঙ্গলে কাঠ আনতে। তাঁদের সঙ্গে আমরাও চললাম। হাঁটতে হাঁটতে জঙ্গল পেরিয়ে, কেটে নেওয়া ধানজমি পেরিয়ে, পাহাড় – হাঁটা আর শেষ হয়না। পাহাড়ের পাকদণ্ডী ধরে উঠছিতো উঠছি, বদলে যাচ্ছে গাছপালার প্রজাতি। সেই পাহাড়ের একেবারে ছাদে, একটুখানি সমতল জায়গায় দেখা গেল প্রচুর শুকনো ডালপালা। জানা গেল, মাল পাহাড়িয়া জনজাতির লোকেরা যাঁরা সাঁওতালদের মতো স্থায়ী কৃষিতে দক্ষ হয়ে ওঠেননি তাঁরা পাহাড়ে পাহাড়ে কুরাম চাষ করেন। কতকটা জায়গায় গাছগুলোকে দেড়-দু মানুষ ওপর থেকে কেটে ফেলে তার নীচে খন্তা বা শাবল দিয়ে গর্ত করে তাঁরা পোঁতেন বরবটি, ভুট্টা, শিম। ফসল কেটে নিয়ে যাওয়ার পর অন্তত তিন বছর তাঁদের সেই জঙ্গলে ঢোকা নিষেধ – এই অবসরে জঙ্গল নিজের মতো জীবন ফিরে পায়। ফসল তোলার পর গাছের কাটা, শুকনো ডালপালাগুলো কুড়িয়ে নিয়ে যান আশেপাশের গ্রামের মানুষ – দু-তিন ঘন্টার হাঁটা পথ এঁদের কাছে আশপাশ। এত দূর আসা কেন, যখন

ঘরের পাশেই আছে জঙ্গল? কারণ, আদিবাসীরা যতক্ষণ সম্ভব কাঁচা কাঠ কাটবেন না, শুকনো ডালপালা দিয়ে কাজ চালাবেন। তাঁদের বোধটা আপাত সরল, কিন্তু গভীরতম প্রজ্ঞায় নির্মিত: "চাঁদ বল, সূর্য বল, পাহাড়-বন-পশুপাখি বল, সবাই মানুষের পড়শি। এক মানুষ যেমন আর এক মানুষের পড়শি, তাদের মধ্যে কথাবার্তা হয়, দেওয়া নেওয়া হয়, কিন্তু তারা এক নয়, আলাদা। তুমি যদি সেটা না মানো, তাহলে তারাও মানবে না, আর, রেগে গেলে মহা অনর্থ হবে।" তাঁরা বলেন, "পাহাড়ে আমাদের ঠাকুরের ঘর, সে পাহাড়ে আমরা যদি গাছ কাটি, চাষ করি, কিম্বা মাটির তলা থেকে কিছু তুলতে যাই, তাহলে ঠাকুর থাকবে কোথায়? পাহাড়টা আছে বলে ঠাকুর আছে, ঠাকুর আছে বলে আমরা আছি। সবার সঙ্গে কথা না বলে কিছু করা চলে না।" ধনতান্ত্রিক লোভকেই আধুনিকতা বলে জানা লোকেরা কথাগুলোকে বুজরুকি বা বোকামি বলে উড়িয়ে দিতে চাইবে। তাই চেয়েছে।

এত শ্রমে যাঁরা হাজার হাজার বছর ধরে বনকে রক্ষা রক্ষা করার বিদ্যা শিখে এসেছেন, বনকে রক্ষা করে এসেছেন, আজ সেই বনে তাঁদেরই বসবাসের অধিকার নেই, তাঁদেরই বলা হচ্ছে অরণ্য ধ্বংসকারী! ব্রিটিশ অধিকারের পর থেকে এই মানুষদের ক্রমাগত তাঁদের স্বভূমি থেকে উৎখাত করে চলা হচ্ছে। যা ছিল তাঁদের নিজস্ব অর্জন, সেই প্রকৃতির সঙ্গে তাঁদের সম্পর্ককে বিনষ্ট করা হয়েছে, তাঁদের ঘর-বাড়ি, তাঁদের মাটি, তাঁদের অরণ্য কেড়ে নিয়ে খনি হয়েছে, বাঁধ হয়েছে, কারখানা হয়েছে। বিনিময়ে তাঁরা পেয়েছেন তাঁদের কাছে এযাবৎ অজানিত শঠতা, বঞ্চনা। সেই অপরাধের নামমাত্র প্রতিকারটুকুও রাষ্ট্র আজ ফেরত নিয়ে নিচ্ছে। দীর্ঘ দিন ধরে অরণ্যবাসী মানুষ যে অন্যায্যতা ও অত্যাচার সয়ে এসেছেন, তার যতসামান্য সংশোধন করার পদক্ষেপ বন-অধিকার আইন ২০০৬। কিন্তু আমাদের মতো সভ্য-সমাজে আইন তৈরি হয় লঙ্ঘিত হবার জন্যই। আইন বলেছিল, আদিবাসী ও অন্যান্য বনবাসী মানুষের জন্য বনভূমিতে বসবাস, কৃষি ও বনজ সম্পদের ওপর স্বত্বের মধ্য দিয়ে জীবিকা অর্জন সুনিশ্চিত করতে। মানা হয়নি। আইন তৈরি হবার এক দশক পরও দেখা গেছে, যত মানুষ তাঁদের হকের জন্য দরখাস্ত করেছেন তার মাত্র ক্ষুদ্র এক ভগ্নাংশকেই কাগজে কলমে সেই হক দেওয়া হয়েছে। কেন দেওয়া হলনা? তাঁরা নাকি তাঁদের অধিকার সংক্রান্ত যথেষ্ট প্রমাণ দেখাতে পারেননি। যাঁরা নিজেরা দরখাস্তটুকুও লিখতে পারেননা – যাঁদের সেই সামর্থ্য অর্জন করার সুযোগ দেওয়া হয়নি – তাঁদের হয়ে দরখাস্ত লিখে দিতে হয় অন্যদের, তাঁরা যোগাড় করবেন প্রমাণ? প্রমাণ যোগাড় করার মালিকতো সরকার, তথাকথিত সভ্যসমাজের প্রতিনিধি।

যখন ছত্তিশগড়ের দান্তেওয়াড়াতে কোনও গ্রামে, যেমন আনারুলাতে, খনির জন্য আদিবাসীদের জমি দখল করতে হয়, তখন প্রমাণ যোগাড় করে সরকার। যেহেতু আদালতেরই রায় আছে আদিবাসী এলাকাতে গ্রামসভার অনুমতি ছাড়া খনি বা ওই জাতীয় বাণিজ্য-ব্যাপার করা যাবেনা, এবং ওড়িশার নিয়মগিরি পাহাড়ে বেদান্ত নামক কোম্পানীকে পিছু হঠতে হয়েছিল, সরকার ও পুঁজিপতিরা নিজেদের একটু অন্যভাবে শিক্ষিত করে তুলল – আনারুলাতে এমন ৯১ জন লোককে নিয়ে গ্রামসভা করে ফেলা গেল, যাঁদের একজনও সেখানকার বাসিন্দা নন। ঝাড়খণ্ডের গোড্ডা জেলায় কয়েক হাজার একর জমি দখল নিয়ে নিল আদানীর কোম্পানী। তাদের হয়ে প্রমাণ ও পুলিশ দুই-ই যোগাল সরকার। রাজ্যে রাজ্যে এমনই সব সরকার ক্ষমতায় আসীন যারা যাবত প্রাকৃতিক সম্পদ – বন-নদী-খনিজ – যত তাড়াতাড়ি সম্ভব তথাকথিত শিল্পোদ্যোগীদের হাতে তুলে দিয়ে কৃতার্থ হয়। এবার তাদেরই হাতে যখন পড়ে আইন রূপায়ণের ভার তখন যা হবার তাই হয়, দোষ চাপে বনবাসীদের হাতে – ওরা নিজেদের হকের প্রমাণ দেখাতে পারেনি। অতএব তাদের উৎখাত করো। আদিবাসী ও অন্যান্য বনবাসীদের হয়ে আদালতে লড়ার কেউ নেই। লড়বার কথা ছিল সরকারের, তার দায় নেই। আদালতে এ প্রশ্নটাও কেউ করেনি, কেন্দ্র ও বিভিন্ন রাজ্য সরকারগুলো যে বন আইন রূপায়ণে ব্যর্থ হয়েছে তাদের কী শাস্তি হবে। প্রশ্নটাও ওঠেনি যে উন্নয়ন প্রকল্পের নাম করে যে লক্ষ লক্ষ বনবাসীকে ঘরছাড়া করা হয়েছে, তাঁদের জীবন জীবিকার ওপর আক্রমণ নামিয়ে আনা হয়েছে সেই অবিচারের প্রতিকারে কী ব্যবস্থা নেওয়া হল।

জতুগৃহের দহন থেকে বাঁচবার জন্য পঞ্চপাণ্ডব ও তাঁদের ন্যায়শীলা মাতা আদিবাসী রমণী ও তাঁর পঞ্চপুত্রকে অগ্নিদগ্ধ করতে দ্বিধা করেননি। বেদাভ্যাসের অপরাধে শম্বুককে হত্যা করতে মর্যাদা পুরুষোত্তমের হাত কাঁপেনি। ন্যায্যত অপ্রাপ্য গুরুদক্ষিণা হিসেবে



একলব্যের আঙ্গুল কেটে নিতে বিবেক কুণ্ঠিত হয়নি গুরু দ্রোণাচার্যের। আমরা সংখ্যাগরিষ্ঠ বিবেকে বিশ্বাসী। বেহক হওয়া আদিবাসী-বনবাসী পরিবারগুলোর সংখ্যা দশ লক্ষাধিক বইতো নয়, ভারতের মোট পরিবারের সংখ্যা সিকি কোটিরও বেশি। অতএব আমরা পশুর অধিকারে যুদ্ধে যাব। রাষ্ট্রীয় ন্যায়ের সুদর্শনা দেবির কাছে, মানুষ – কিছু মানুষ – এবং পশুর মধ্যে পার্থক্যই বা কতটুকু! এবং তাদের বিরুদ্ধে যুদ্ধজয়টা যেহেতু অতীব সহজ!

ক্ষীণ হলেও, একটাই আশার কথা, প্রাকৃতিক বিপর্যয়ের মোকাবেলায় স্থানীয় মানুষের এই ভূমিকা বিশ্বস্তরে গুরুত্ব পেয়েছে। ২০০৫ সালে জাপানে অনুষ্ঠিত ওয়ার্ল্ড কনফারেন্স অন ডিজাস্টার রিডাকশনের একটি উদ্দেশ্যই ছিল 'সমস্ত স্তরে, বিশেষত স্থানীয় স্তরে বিপর্যয় মোকাবেলার প্রাতিষ্ঠানিক ব্যবস্থাপনা ও ক্ষমতা গড়ে তোলা'। সাম্প্রতিকালে করা তুরস্ক, জাপান, জামাইকা, মালয়েশিয়া, বাংলাদেশ, থাইল্যান্ড, প্রভৃতি দেশে করা গবেষণা দেখাচ্ছে, বিপর্যয় মোকাবেলায় বিজ্ঞান, প্রযুক্তি, সরকারি অর্থবরাদ্দ যতখানি জরুরি, ততখানি জরুরি হচ্ছে স্থানীয় মানুষের যোগদান। এই যোগদানের গুরুত্ব নিয়ে নানা অভিমতগুলোর মধ্যে একটাই সাধারণ সূত্র: 'বিশেষজ্ঞরা অনেক কিছু জানেন, কিন্তু আমাদের অঞ্চলটাকে আমরাই ভাল জানি।' আর স্থানীয় মানুষের যোগদানে সাফল্যের অন্যতম পূর্বশর্ত হচ্ছে তাঁদের হাতে সিদ্ধান্ত নেবার ক্ষমতা এবং আর্থিক ক্ষমতা নিশ্চিত করা।

জ্ঞানবান অনেক মানুষ আদিবাসী বিশ্বের কাছে জ্ঞানের জন্য হাত পাতছেন, বিশ্বপ্রকৃতির সঙ্গে কথা বলা শিখতে চাইছেন। না শিখে উপায় নেই, প্রকৃতির নিকটতম প্রতিবেশী হিসেবে এঁরা যুগ যুগ ধরে বেঁচে এসেছেন, প্রতিবেশ ব্যাপারটা এঁরাই জানেন। যখন ব্যবসায়ী-সরকার গোষ্ঠী কার্বন নিঃসরণ কমানোর মিথ্যা বাগাড়ম্বরও করে আসছে, আবার নদীকে বেঁধে, পাহাড় কেটে, বন আর মৃত্তিকা উজাড় করে উন্নয়নের ঢাকও পিটিয়ে চলেছে, তখন আধুনিকতার স্বঘোষিত অগ্রবাহিনী নীরব। এমন অবস্থায় প্রকৃতিকে রক্ষা করার জন্য সারা পৃথিবী জুড়ে ছোট-বড় নানা আকারের আন্দোলন সংগঠিত করে আসছেন এই আদিবাসী সমুদয় – নিজেদের জন্য, এবং গোটা পৃথিবীর জন্য। যেমন, পৃথিবীর শ্বাসতন্ত্রের অতি গুরুত্বপূর্ণ অংশ আমাজন অঞ্চলে ওয়াওরানি জনজাতীয়রা তেল কোম্পানীগুলোর আক্রমণের বিরুদ্ধে একজোট হয়ে একদিকে রাস্তার আন্দোলন ও অন্যদিকে আদালতের লড়াইর মধ্য দিয়ে পাঁচ লক্ষ একর গভীর অরণ্য রক্ষা করতে সক্ষম হয়েছেন। পাশাপাশি, আরও সাত লক্ষ একর অঞ্চলে তেল কোম্পানীগুলোর পা রাখা নিষিদ্ধ করাতে পেরেছেন (ভারতীয় বিচারবস্থাকেও যদি এভাবে নড়ানো যেত!)।

আপাতদৃষ্টিতে এ আন্দোলন আদিবাসীদের উৎখাত হওয়া আটকানোর আন্দোলন, কিন্তু এর পরিধি ব্যাপক: আমাজন যদি না বাঁচে তাহলে পৃথিবী বাঁচবে? আদিবাসীদের উচ্ছেদের সঙ্গে ভৌত পৃথিবীর বিপন্নতার যোগটার সঙ্গে আর একটা যোগ হল আদিবাসী মানুষের বসত, প্রাকৃতিক বৈচিত্র এবং ভাষা-সংস্কৃতিগত সমৃদ্ধির এক আশ্চর্য সমানুপাতিক সম্পর্ক। পৃথিবীর মোট ছ' হাজার সংস্কৃতি এবং সমসংখ্যক ভাষার বেশির ভাগটাই আদিবাসীদের। আবার, যে অঞ্চলের জৈব গুরুত্ব যত বেশি সেই অঞ্চলে আদিবাসীদের বসবাসও তত বেশি। তাই ইকুয়াডোরের পরিবেশ আন্দোলনের ওয়াওরানি নেত্রী নেমন্তে নেঙ্কিমো জোর দিয়েই বলতে পারেন: "আদিবাসীদের আন্দোলনগুলো হল সারা পৃথিবীকে রক্ষা করার আন্দোলন, এগুলোতে আদিবাসীদের স্বার্থের চেয়ে অনেক বেশি জড়িয়ে আছে সমগ্র মানবসমাজের স্বার্থ।" দুর্ভাগ্য, এই সহজ ব্যাপারটাকেও গুলিয়ে দেওয়ার জন্য অনেকে উন্নয়নের নামে ব্যবসায়ী-সরকার গোষ্ঠীর নায়েব-গোমস্তার ভূমিকায় অবতীর্ণ হন। কেউ আবার বিজ্ঞান-প্রগতির দোহাই দেন। কিন্তু, প্রগতি কীসের? মানুষই যদি না বাঁচে, তার স্রষ্টা প্রকৃতিই যদি না বাঁচে? যে আমেরিকান সেনাবাহিনী পৃথিবীতে সবচেয়ে বেশি জীবাশ্মজ্বালানী পোড়ায়, সাম্প্রতিক খবর, তাদের ঘাঁটিগুলোর কাছে সমুদ্র বিপদসীমা অতিক্রম করে আছড়ে পড়ছে। এতদিন যারা যুদ্ধকেই ব্যবসা হিসেবে চালিয়ে এসেছে, সেই পুঁজিপতিরাও কি সুরক্ষিত? কোভিড একটা সংকেত, কিন্তু জোরালো সংকেত, একটা সাবধান বাণী – পরিবেশের জন্য একটা সামগ্রিক, বিশ্বব্যাপী আন্দোলনে নামা। আদিবাসী বিশ্ব সে আন্দোলনের পথপ্রদর্শক হবার জন্য দাঁড়িয়ে আছে, আর পুঁজিবাদী গোষ্ঠীস্বার্থ সে আন্দোলনকে অংকুরে নষ্ট করার জন্য উদ্যত হয়ে আছে। পথ বেছে নেবার জন্য হাতে সময় নেই।

Climate Change and Its Impact on Agriculture Land Use in the Arid Western Part of Indian Subcontinent

Amal Kar
Formerly of Central Arid Zone Research Institute, Jodhpur

Accelerated climate change, triggered by the technology-driven human activities, is now threatening the life and livelihoods of many global communities, especially as the frequencies and the intensities of major climate parameters have started to behave in less predictable manners. One of the regions facing the problem is the arid western part of Indian subcontinent (hereafter called the 'Arid West'), encompassing the sandy Thar Desert of India and Pakistan, the adjoining Saraswati Plain in the north, the Indus Plain in the west, as well as the North Gujarat Plain, the Kachchh and the Saurashtra Uplands, and a marshy delta in the south (Fig. 1).

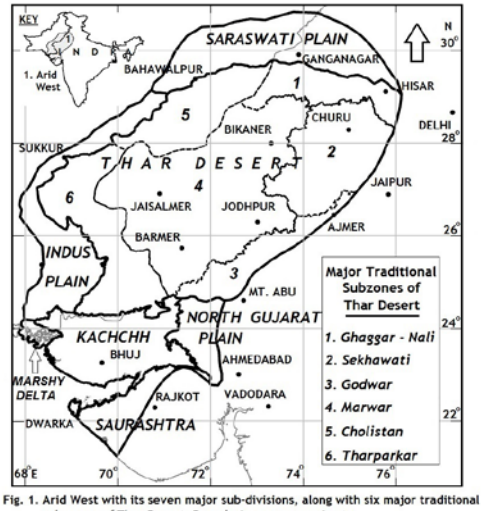


Fig. 1. Arid West with its seven major sub-divisions, along with six major traditional sub-zones of Thar Desert. Boundaries are approximate.

The region is served by two major rain-bearing wind systems, the Southwest Monsoon of June to September (JJAS), and the Westerlies from the Mediterranean region during January to March (JFM), but it also occasionally receives some rains during the transitional pre-monsoon months of April-May (AM). While the JJAS rainfall hugely benefits farmers in Kharif cropping, the scanty JFM rain helps to grow some un-irrigated crops like gram during Rabi season when high-value irrigated crops are grown widely. The AM rainfall is often seen as a hindrance to the arrival of SW Monsoon.

Based on the General Circulation Models (GCMs) and the Regional Climate Models (RCMs) several pan-India studies have predicted changes in climate parameter under different socio-economic scenarios, and their impacts on agriculture. Rupakumar et al. (2006) simulated the future climates of India under A2 scenario (moderate economic growth, and a high population growth rate), according to which the summer and winter temperatures across Thar Desert and the northern plains will increase by 2-5°C in 2075-2100, but arid Gujarat may experience lesser increases. Nights may become warmer by ~5°C in most parts. Monsoon rainfall may decline by 20-30% in northwest Rajasthan and adjoining Punjab, and increase by up to 25% in east Rajasthan and Haryana. Winter-spring rains may increase by 20-40%,

especially in arid Gujarat and south Rajasthan. They also suggest more episodic rainfall and higher frequencies of droughts and floods. Moderate and severe droughts may increase from the present 1-2 per decade to more than 3 by the mid-century (Krishnan et al., 2020). Such changes will impact the yield of rice, wheat and legumes, while rise in humidity may aggravate the pest problem (Challinor et al., 2007; Joshi and Kar, 2009; Chauhan et al, 2014).

For a better understanding of the evolving pattern we carried out geospatial analysis of a range of major GCM datasets for A2 scenario (Kar, 2012), and for the currently suggested SSP 585 (Shared Socio-economic Pathway) scenario. Data from GFDL (USA), IPSL (France) and MPI-ECHAM (Germany) were found to broadly mimic the observed data on rainfall, temperature and wind. To understand the continuity from the Harappan period we also analysed the rainfall pattern of 1000-6000 years before present (HadCM3 model output from Beyer et al., 2020), and the historical data. The calculated rainfall deviation from the observed mean during 1901-1930 in different time periods reveals the opportunistic gains of the northern areas from the changes, which possibly was a determinant for denser Harappan settlements (Table 1).

Table 1. Percent deviation of SW monsoon rainfall of June-September (JJAS), winter-spring rainfall of January-March (JFM) and pre-monsoon summer rainfall of April-May (AM) from the 1901-1930 gridded mean recorded values** in Arid West

Time	Season	Region						
		Thar Desert	Saraswati Plain	Indus Plain	North Gujarat Plain	Kachchh Upland	Saurashtra Upland	Marshy Delta
6000 BP*	JJAS	25	40	18	11	4	17	10
	JFM	6	22	-116	1	-11	-89	4
	AM	31	65	45	-57	16	-78	73
5000 BP*	JJAS	21	32	35	7	11	19	30
	JFM	-7	11	-165	-60	-23	-100	8
	AM	18	57	24	-152	-14	-118	76
4000 BP*	JJAS	29	45	25	15	25	16	27
	JFM	2	19	-180	6	-180	-26	-27
	AM	10	57	13	-151	13	-29	63
3000 BP*	JJAS	21	31	21	11	12	25	23
	JFM	9	24	-171	19	-13	34	-24
	AM	9	57	14	-135	-19	-89	64
2000 BP*	JJAS	18	29	16	7	8	21	20
	JFM	-7	15	-201	-4	-40	6	-35
	AM	5	56	6	-181	-32	-85	65
1000 BP*	JJAS	5	26	5	-6	-5	3	12
	JFM	-21	2	-177	-22	-35	-73	-23
	AM	1	53	1	-210	-40	-147	64
1970-2000#	JJAS	-1	-10	1	0	-6	-8	-13
	JFM	-26	-1	-165	-7	-100	-82	-56
	AM	-9	44	29	-62	-66	-45	61

Time	Season	Region						
		Thar Desert	Saraswati Plain	Indus Plain	North Gujarat Plain	Kachchh Upland	Saurashtra Upland	Marshy Delta
2021-40#	JJAS	14	10	12	12	18	23	21
	JFM	-31	-7	-10	-10	-104	-82	-45
	AM	-30	-10	-173	-173	-236	-119	-80
2041-60#	JJAS	10	10	-1	6	14	25	13
	JFM	-33	-15	-172	-10	-104	-82	-45
	AM	-34	-18	-36	-173	-236	-119	-80
2061-80#	JJAS	9	9	4	10	18	26	19
	JFM	-34	-14	-174	-10	-104	-82	-45
	AM	-11	43	28	-67	-75	-43	62
2081-2100#	JJAS	22	20	18	28	34	34	29
	JFM	-35	-7	-170	-10	-104	-82	-45
	AM	-13	44	29	-67	-75	-43	62

Primary data sources: ** http://climate.geog.udel.edu; * Beyer et al. (2020); # www.worldclim.org (for WorldClim ver.2.1 precipitation data for 1970-2000, and CMIP6-GFDL-ESM4 precipitation data for 2021-2040 to 2081-2100 under ssp585, both downscaled at 10 minutes resolution).

Using the GFDL data we calculated the annual moisture availability index from 2001 to 2050, which suggested the likely occurrence of protracted droughts from 2021-2025 onwards, the worst happening during 2036-40 when large parts may experience 10-16% higher aridity than in 2001-05. Calculation of land surface dryness over time suggests that despite a steady rise in temperature, the desert experienced a gradual decline in dryness from 1951-1955 to 1996-2000 (except the mid-1980s), which could be attributed to a fall in wind speed and higher cloudiness across northern hemisphere, as well as to surface solar dimming. The wind has picked up gradually since then. Calculation of wind erosion index (WEI) from the ECHAM data revealed the lowest mean values during 2001-05, especially as wind speed dropped significantly from the mid-1980s. WEI may gradually rise again from 2016 onwards, attaining a peak in the mid-century, followed by a series of high-magnitude changes till the end of the century (Fig. 2).

The above trends may sharply increase the atmospheric dust load, especially from 2016-20. Since dust emissions also depend on the land uses and vegetation cover, the current

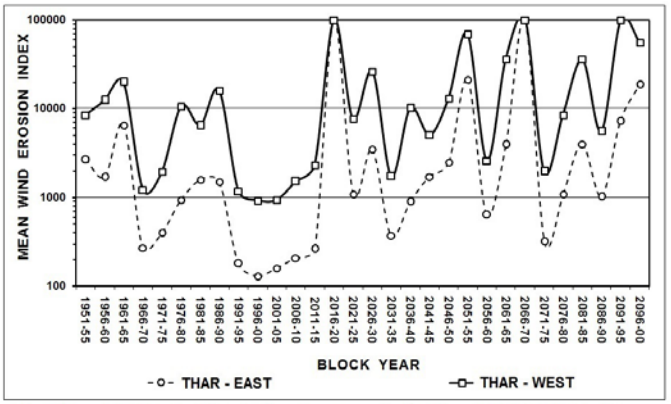


Fig. 2. Mean Wind Erosion Index for Thar Desert as calculated from ECHAM-20C-3M and ECHAM 5.1 simulation data for A-2 scenario.

trend of deep ploughing of the sandy landscape and progressive clearing of vegetation in natural pastures will increase the dust load manifold with each increase in WEI value. This will get accelerated if the present groundwater-dependent irrigation system fails due to overuse. The overall groundwater exploitation in the region has increased from 48% of the rechargeable reserve in 1991 to 149% by 2011 (over-exploited). About 87% of this water is used for irrigation and only 13% is available for drinking and other purposes. At the current rates of use the shortfall will be about 4300 mcm by 2025, which may force large-scale conversion of Rabi croplands back to kharif lands. As soil moisture is dwindling faster, and crop cover more uncertain due to increasing temperature and longer gaps between JJAS rainfall events, increased bare-grounds may enhance sand mobilization and dust emission. This calls for urgent action to stabilize the aeolian bedforms across the desert.

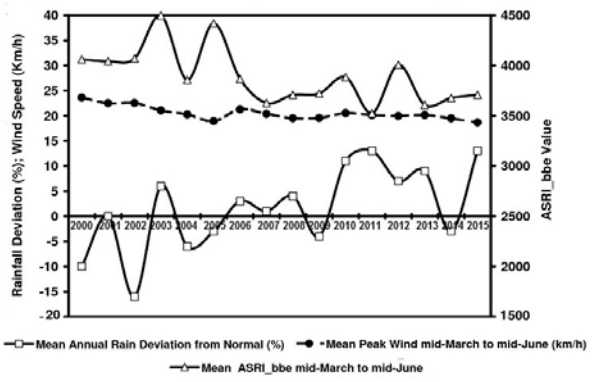


Fig. 3. Relationship between mean annual rainfall deviation from normal (%), peak wind speed for mid-March to mid-June and mean ASRI_bbe values for mid-March to Mid-June in Thar Desert (2000-2015).

In order to monitor the sand reactivation pattern in the desert from Modis satellite sensors we developed an Aeolian Sand Reactivation Index, which we calculated for every 8-day period from mid-March to mid-June (2000-2015), and fortified the values with the pattern of broadband emissivity from different land surfaces (ASRI_bbe). Plotted against the patterns of rainfall and summer wind speed we find that ASRI_bbe has started to disregard the fall in wind speed (Fig. 3), which is due to the reduced resistance power of the sandy surface to the prevailing wind after deep tractor ploughing. Fortunately, farmers have started to make course correction to adopt some sustainable land use practices and input management. A glimmer of hope is also provided by the increased AM rainfall in the western part of the desert, which can be utilized for pasture development to strengthen the traditional animal-based economy.

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Conservation Based Sustainable Tribal Livelihood

S. B. Roy[1] and Raktima Mukhopadhyay[2]
[1]Chairman, IBRAD (Indian Institute of Bio Social Research and Development), Kolkata
[2]Executive Director (Indian Institute of Bio Social Research and Development), Kolkata

Panch Gadiya and unique approach developed by IBRAD – Rainwater harvesting and using it for five livelihood generation activities, irrigation for kitchen garden, home herbal garden and fruit tees, fish cultivation and nursery raising.

The conservation of biodiversity, water and maintaining soil health is the fundamental requirements for sustainable livelihood. Most of the tribal community have their habitation in or around the forest. The forest and the agricultural farm, water bodies, wildlife, livestock together form an interdependent coherent "Forest Agriculture Mosaic Ecosystem".

The tribal livelihoods are one of the most at-risk dimensions of climate change. In general, the livelihoods of the tribal community depend on the diversity, health, and productivity of ecosystems and humans. The survival of many vulnerable tribes and poorest communities largely depends on the simple extraction of natural forests or coastal resources

Excessive use of natural resources such as forests have adverse impacts, such as loss of biodiversity, use of chemical fertilizers, increasing greenhouse gas emissions, gender injustice and social inequality, undermining health conditions due to malnutrition, and disturbing the natural ecosystems.

We have to have some efficient means for biodiversity conservation and secure survival. Sustainable development is to find a win-win means for sustainable livelihood and climate-related issues with efficiency.

What is sustainable livelihood ? The FAO defines the concept of sustainable livelihoods, a set of "capabilities, assets (both material and social reso urces) and activities required for living that can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in

the future, while not undermining natural resource bases."

And then what is Climate Resilient Livelihood?

A Climate-Resilient, Low-Emission, Sustainable Livelihood is a set of capabilities, low-carbon assets (both material and social resources), and activities required for living. It can anticipate, resist, absorb, cope, accommodate, adapt to, transform, or recover from climate risks in a timely and efficient manner while maintaining its capabilities and assets now and in the future, ensuring the health and regeneration of the ecosystem and its natural resource bases, economy, and peoples, and contributing to social justice and equity.

For the intervention to be recognized as a climate-related action, strategies, approaches, and actions must be responsive to climate projections and scenarios and corresponding exposures, and vulnerabilities must be considered.

In the context of climate extremes, both current and future climate hazards, exposures, and vulnerabilities must be factored into the analysis. This constitutes the required climate risk analysis.

Climate-resilient, sustainable, and low-carbon initiatives must be responsive to the climate risks resulting from risk assessments, contributing to the resilience and sustainability of peoples, ecosystems, and livelihoods and contributing to climate mitigation.

We all have witnessed the depletion of biodiversity, which is the primary source of livelihood of the forest dwellers, tribes in particular. It has also been realized how the birds, butterflies, fishes, amphibians, lizards, dung beetles and bats are disappearing. Such loss of biodiversity has been witnessed by the tribal communities too over forest degradation gradient, from primary over secondary to plantation forest.

There is a growing call for integrated landscape approaches. Landscape actors discuss trade-offs between different land uses to reach a negotiated decision on land use allocation.

Keeping such challenges in mind, IBRAD (Indian Institute of Bio Social Research and Development) has developed a unique approach of Forest-agriculture mosaic landscape management that providing livelihood sources such as fruits, NTFP, food, fuel, fibre and varieties of crops. This helps in the improvement of the ecosystem service in nutrition recycling, filtering freshwater, preserving biodiversity, pollination generating habitats for many species, and mitigating climate change by sequestering carbon from the atmosphere. Of course, the cultural services from the forest is well known. Community participation, capacity building, adoption of appropriate technology, and place-based management of the forest ecosystems have been found an effective way to improve the flow of ecosystem services of the people and reduce poverty.

Identification of medicinal plants by involving the community

Conservation of traditional seeds and facilitating community seed banks

The main approaches used were agro-ecology and green energy for sustainable livelihoods.

Among the specific interventions used were creating awareness in such a way that the community develops some of the socially recognized plans for conservation of biodiversity, establish outreach centre as 'Prashikshan Shivir" in the line of Farmer Field Schools, introduce organic farming, facilitate to establish nutrition gardens, water conservation, fodder cultivation, vermicomposting, community seed banking to enhance farming, family managed nurseries and value-adding of Non Timber Forest Produces (NTFP).

IBRAD has involved Baiga and Lodha, the Particularly Vulnerable Tribal Groups (PVTGs) of Ghoghra and Nedam villages in Chhattisgrah and Odisha states respectively for conservation based climate resilient sustainable livelihood development. One of the important issues is loss of genetic diversity in these tribal habitats due to various drivers of degradation that further causing loss of traditional knowledge and practices. To promote *ex situ* and *in situ* conservation of the medicinal plants diversity available in the area community herbal gardens are established. Identification of the medicinal plants and their therapeutic properties are steer headed by involving the local vaids (traditional healers) of the area. Seasonal availability, collection pattern and marketing of these medicinal plants are documented in both the villages. In the exercise the plants that are getting rare and endangered locally are also identified and a digital repository is prepared. The herbal garden in Nedam is established with 32 such plant varieties and in Ghoghra with 12 varieties. The root stocks are collected from the natural forest areas surrounding the village. Furthermore, home herbal gardens are also established by the individual villagers in Nedam village. Thus attempt is made to conserve both the genetic diversity and the traditional knowledge and practices associated with it and its's inter-generational transmission by involving the youth in the process of conservation. It opens up a new avenue of livelihood for the community with training on quality control, primary processing, storage and marketing.

To facilitate *in situ* conservation of the medicinal plants community members are oriented for developing mechanism for non-destructive and sustainable harvesting practices. This helps in attaining the goals of conservation as well as maintaining the health and vitality of forest ecosystems for maintaining their protective and environmental roles.

Continued Education Program has been designed for year-long activities for biodiversity conservation through forest conservation, community orchard, and water conservation through rainwater harvesting by digging ponds. Livelihood diversification is achieved through introduction of fishery in the rain water harvesting ponds.

Some of the future plans include a green audit, promotion of biogas technology, biomass training, and the use of solar irrigation. Accompanying social institution building, capacity building with skill development, some community resource persons are developed to sustain the initiatives at the local level.

Recognizing Local Communities' Rights in Forest Policy to meet Climate Targets

Bidhan Kanti Das
Faculty of Anthropology, Institute of Development Studies Kolkata

More than 200 countries agreed to limit global warming to 1.50C above pre-industrial levels at COP 26 in Glasgow. The role of forests in halting climate change risks failed to get much traction among the participating nations, including India. However, the world could achieve about one-fifth of emissions mitigation required by 2030 by protecting and restoring forests. Forest ecosystem conservation, restoration and management can play a crucial role as an important climate mitigation strategy through carbon sequestration and reduction of green house gas (GHG) emissions. Similarly, such practices can buffer local communities from the impact of climate change. For example, flood plains and mangroves can act as natural protection against extreme weather events and rising sea levels. It is argued that more diverse the ecosystems, greater would be the likely range of tolerance of the included species, and more would be the likelihood of some species to contribute to ecosystem functioning under different stresses (UNEP-WCMC 2014). Sustainable management of forest ecosystems reduces GHG emissions and thus contributes towards climate change mitigation. On the other hand, poorly conceived interventions may damage biodiversity and constrain resilience to climate change. Therefore, there is a need for proper policies and programmes that avoid detrimental impacts on biodiversity and the local communities who depend on them for livelihood.

Forest and wetland ecosystem act as important carbon stocks and are considered to be safe and affordable, particularly for developing countries. Forest restoration has the potential to conserve global biodiversity and mitigate climate change (Lewis et al 2019). Scholars focus on replenishing tree

Western Ghats

cover as a nature-based climate solution. According to IPCC, the total area of global forests could store about one-third of the atmospheric carbon required to meet the 1.50C target (2018). An initiative has been taken by the German government and the International Union for Conservation of Nature known as the Bonn Challenge, which aims to restore 350 Mha of forest by 2030. About 43 countries in the tropics and sub-tropics, including India, China and Brazil, have committed to restore about 300 Mha of degraded lands (Lewis et al 2019). Analysis of countries' reports revealed that about half of the pledged areas have become plantations of commercial trees like acacia, rubber and eucalyptus. Thus, planting vast monoculture trees is the most popular reforestation plan since it is a profitable enterprise. This has been planned in countries like Brazil, China, Nigeria and the Congo. In Brazil, 82 percent of the promised restoration is actually monoculture plantations rather than natural forests, while the figure is 99 percent for China. The participants of the Bonn challenge have planned for species-rich natural regeneration, which is the easiest and most cost-effective strategy, in only about one-third of their total areas. Thus, two-thirds of the area in these 43 countries has been committed for growing crops under their global reforestation plan. There is a wide consensus that plantations are much poorer than natural forests in terms of storing carbon. The harvesting time is much shorter (10-20 years), thereby allowing them to sequester carbon for shorter periods, while natural forests continue to sequester carbon for many decades (ibid). An estimate suggests that natural forests, on average, are 6 times better than agro-forestry and 40 times better than plantations at storing carbon. An interesting experiment in the Western Ghats of India, a bio-diversity hotspot, observed that natural forests store about 300 tons of carbon per hectare, much higher than both teak and eucalyptus plantations. Similarly, moist-deciduous forests stored more carbon than eucalyptus plantations (Osuri et al 2020). Furthermore, assessment of quantity and quality reveals that natural forests can sequester more carbon than plantations in the face of perturbations like droughts. Hence, policies that promote transforming natural forests to plantations – such as the compensatory afforestation programme in India – may have a detrimental effect on carbon sequestration, besides posing a significant threat to biodiversity (ibid). Natural forest restoration provides two benefits – one, multi-species plantations instead of monocultures could help in better climate mitigation, and two, it offers valuable co-benefits for biodiversity conservation and ecosystem services to local communities for livelihood.

Woods Hole Research Center in Massachusetts, United States, estimated that if the degraded tropical forests were allowed to regrow, they could absorb 3 billion tons of carbon annually for more than 60 years. Realising the potential of forests and trees in reducing global warming, global initiatives such as the World Economic Forum's 'One Trillion Trees Initiative' has been launched, to grow, restore and conserve trees across the globe in 2020. The 'One Trillion' is also the target for other international organisations such as Plant-for-the-Planet's 'Trillion Tree Campaign' and the 'Trillion Trees' collaboration between the World Wide Fund and the Wildlife Conservation Society. Sadly, such campaigns are promoting plantation of monocultures or limited numbers of species, significantly reducing potential of carbon sequestration and biodiversity. Lewis and his colleagues estimated that if 350 million hectares of degraded and deforested lands were to regenerate naturally, those lands would sequester about 42 billion metric tons of carbon by 2100. On the other hand, if those lands planted single species, carbon storage drops to about 1 billion metric tons (2019). For reforestation, China launched a forest programme called "grain for green". More than

100 million farmers were given incentives to plant trees; this has restored more than 108,000 square miles of forests. An analysis based on some case studies, however, showed that the impact on biodiversity was negative (Pearce 2019). For example, in Hainan Island, the reforestation replaced traditionally bio-diverse farming systems with monoculture of eucalyptus and rubber. The government subsidies in Chile reduced natural forest cover by promoting plantations of shrub lands or marginal agricultural lands where forests might have naturally regenerated (Heilmayr et al 2020). Conversely, when the government provided incentives to land users to cultivate new forests of wild species, forest cover recovered by more than 50 percent in Costa Rica. Similarly, about 17,000 community forest user groups, with rights to manage their forests and control access, have increased forest cover by about 20 percent in the last three decades in Nepal. On the other hand, India lost 66,000 hectares of humid natural forest cover between 2017 and 2019, according to Global Forests Watch dashboard (Despande 2021). If we consider tree cover as measured by all vegetation taller than 5 metres in height, then India lost 1.93 million hectares since 2000, which is about 14 times of the size of Delhi. Though India has committed to increase forest cover to 33 percent of total geographical area, land diversion continues for various industrial activities. About 258,000 hectares of forest land has been diverted for non-forest purposes under Forest Conservation Act 1980, as reported in the Lok Sabha in March 2021. Legal Initiative on Forests and Environment (LIFE), an NGO, reported that more than 493.83km2 of natural forest was diverted for development projects in 2017-18 alone. One estimate suggests that for a coal mining project in Sambalpur district of Odisha, about 130,721 trees (10.38km2 of forests) were earmarked for felling in 2019 (Banerjee 2020).

To achieve a target of additional 250 crore tonnes of carbon sink by 2030 as committed to in 2015, India intends to create a 140,000km tree line on both sides of National Highways, and grow plantations along the river Ganga as a part of Green India Mission. But it is not interested in natural forest regeneration. Those afforestation programmes are funded by the Compensatory Afforestation Fund Management and Planning Authority (CAMPA). Several state governments, including those of Gujarat, Tamil Nadu, Telengana and Maharashtra, promote tree plantations with subsidies and incentives. CAMPA plantation data, based on e-Green Watch portal, revealed that more than half of the 235,000 hectares of plantations created as reforestation measures between 2015 and 2018 are of five or fewer species (Heilmayr et al 2020). It is argued that massive monoculture plantations funded by CAMPA are creating land conflicts and curtailing rights of forest-dependent local communities, as well as affecting biodiversity.

Forest reforestation has been considered an important strategy for climate mitigation and conservation of biodiversity (Lewis et al 2019). Poorly designed and poorly enforced campaigns to plant trees could be counterproductive, as observed in Chile (Heilmayr et al 2020). About 300 million people across the globe lived on land where tropical forests could be restored. Empowering local communities living on this land is essential for global reforestation to mitigate climate change. It is argued that forest landscape restoration has considerable potential to include local populations and improve their livelihoods (Erbaugh et al 2020). It addresses human wellbeing since local people can access ecosystem services, including material and cultural resources. It is observed from case studies that positive human and environmental outcomes become visible if local communities have rights to manage and use forests. It is widely recognized that tenurial rights are critical for the wellbeing

of forest–dependent communities and a necessary condition for empowering them for biodiversity conservation (Bawa et al 2011). The implementation of provisions under India's Forest Rights Act 2006 can be considered as an important step for forest restoration. It aims to recognise forest-dwellers' ownership and land use rights at individual and community level on one hand, and to integrate conservation of forest resources on the other hand (Das 2019). The responsibility of and authority over various individual and community forest rights (IFRs and CFRs) and protection and management of forests and biodiversity for maintaining ecological balance and strengthening conservation regime, has been vested in the Gram Sabha (village assembly) at hamlet level. The most radical provision under the Act is CFRs that enable local communities to protect and manage customary rights. From the forest governance perspective, the rights to protect and manage community forest resources are crucial as they provide a legal basis for community ownership and governance. Further, CFRs might be cost-effective in meeting India's Intended Nationally-Determined Contributions (INDC) to sequester an additional 2.5 billion tonnes of carbon (MoEFCC 2015). Thirdly, a draft proposal to amend IFA 1927 seeking to create 'production forests', does little to tackle climate change or preserve biodiversity. Increasing forest cover by monoculture plantations would capture only a small fraction of carbon compared to natural forests. Natural forests can store 40 times more carbon than a plantation harvested every 10 years, as reported by Yale Environment 360 (TOI, 5 May 2019). As the local people have been managing and using forest produce for their livelihood for generations, they will nurture and protect diverse bio-resources in their own interests, if community forest rights are recognised.

To stem global warming, restoration programmes should return all degraded lands to natural forests across the globe. To maintain and conserve biodiversity which provides provisioning services, local communities should be empowered with tenurial security and rights over forest resources they depend.

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Renewable Energy- A Possible Climate Change Solution- Perspective from Rural India

Shakko Mukherjee
Alumnus of University of Petroleum & Energy Studies, Dehradun

The Climate Change Problem

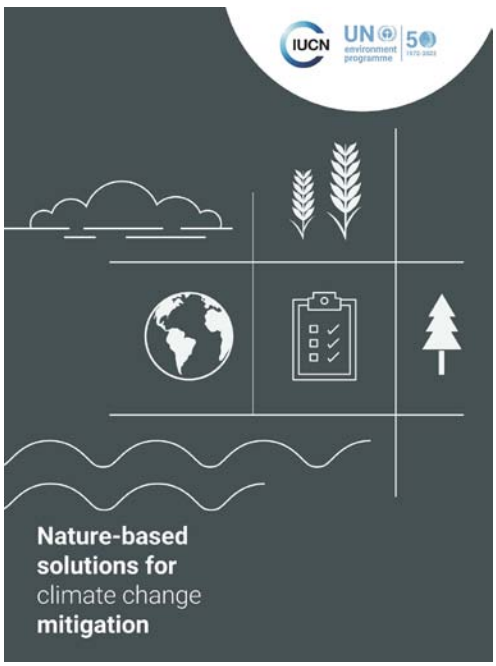
The demand for energy and its uses are fast changing, to meet the social and economic development and to improve human welfare and health. All societies require energy services to meet basic human needs and to serve productive processes. Since 1850s the global use of fossil fuels (coal, oil and gas) has increased steadily to dominate the sources of energy supply, leading to a rapid growth in carbon dioxide (CO_2) emissions.

About 1.4 billion people around the world rely on traditional fuels like coal and wood to meet their basic energy needs. This is not only harmful to the environment; it can also lead to premature deaths for millions of people, especially women and children. By 2035, global energy demand is projected to grow by more than 50 percent and the rate of growth will be faster in developing countries. All these new consumers need clean energy that will not hurt them or the environment.

Climate Change Mitigation

UN Environment Programme defines Climate Change Mitigation as actions & efforts to reduce or prevent emission of greenhouse gases, to limit global warming and its related effects. Mitigation can mean using new technologies and renewable energies, retrofitting buildings to make them more energy efficient, making older equipment more energy efficient, or changing management practices or consumer behaviour. It can be as complex as a plan for a new smart city, or as simple as improvements to a cook stove design for grater energy effectiveness. Efforts are underway around the world ranging from high-tech subway systems to bicycling paths and walkways.

The 2018 Intergovernmental Panel on Climate Change (IPCC) Special Report on 1.5° of Warming highlights the urgency of the needed climate actions: global emissions will



need to peak by 2030 and rapidly decrease to net-zero by 2050 if we are to be able to stay within the safety limits established by the Paris Agreement. The IPCC report is very clear; we need to act, and we need to act now. It's not just about introducing new technologies nor is it just about saving a little energy. It's about fundamentally changing our approach to dealing with energy in an environmentally responsible and climate-friendly way. This affects everyone, whether governments, corporations, or individual citizens. Every Government, every company, and ultimately every consumer has a responsibility. We need a social consensus that change is necessary and positive, and that sustainability has value.

According to International Renewable Energy Agency, Renewable energy mix could supply four-fifths of the world's electricity by 2050, massively cutting carbon emissions and helping to mitigate climate change. But for this, solar and wind power must be fully integrated, with sustainable bioenergy providing another key part of the mix, to ensure and provide 24hr round-the-clock energy availability. To achieve net zero, the share of electric cars and the contribution of biofuels for heavier vehicles will have to reach 84% by 2070, the majority section of industry will have to shift to cleaner biofuels or hydrogen.

Need for research & pilot projects

To be able to achieve net zero, we require to speed up research and innovation in technology and business, and above it all, taking action to promote renewable energy today. This will also help to spur investment in clean technologies. We need to leverage technology quickly. We need to build partnerships, more demonstrator plants, and more pilot projects to test the capabilities of clean innovations, which can then be rapidly replicated and ramped up. Higher prices for goods and services need to be accepted to safeguard the planet.

Renewable energy as a development catalyst and climate change solution

One of the key areas where significant climate change mitigation measures can be adopted with visible impact is in Rural India, where this transition to renewable energy sources can provide efficient solutions for lighting, agriculture, heating, cooling, production and transport, to put a check on rise in global temperatures and combat climate change.

Since around 2014-15 many private organizations like Mera Gao Power, Husk Power Systems, Mlinda, OMC Power, Gram Oorja Solutions, PRADAN - Professional Assistance for Development Action, have been working very effectively in rural areas of Uttar Pradesh, Bihar, Jharkhand, West Bengal which were either off-grid or didn't have a reliable power supply for a major part of the day. The Rockefeller Foundation launched Smart Power India (SPI) in 2015, which has supported establishment of 300 operating mini grids, run by a diverse set of private companies, and is currently benefiting more than 2.5 lakh customers.

One of the largest business conglomerates in India, Tata power has also set up a rural electrification Company by the name of Tata Power Renewables MicroGrid Limited in partnership with The Rockefeller Foundation in 2019 and is expected to complete installation work of 200 micro grids and make them ready for use by 2021-22.

These Renewable Energy micro/ mini grids also help meet many UN's Sustainable Goals like:

1. SDG 7 - Ensuring access to affordable, reliable, sustainable, and modern energy, by providing reliable electricity at affordable cost.
2. SGD 8 - Promoting inclusive and sustainable economic growth, employment, and decent work for all. Providing reliable energy truly unlocks latent economic potential, livelihoods and enables aspirations of the community.

3. SDG 13 - Taking urgent action to combat climate change and its impacts, by drawing/ generating power from renewable energy sources.

I have been fortunate enough to work with one of the above-mentioned private organizations in remote and inaccessible villages in Jharkhand and have witnessed the positive impact of renewable energy powered mini grids on these communities. While the Government power grid supplied power for about 6 hours a day, the mini grids supported by Battery Energy Storage System (BESS) provided 24 X 7 reliable electricity. This enabled farmers to migrate to electrical irrigation pumps run on clean energy, because of the availability of power they were able to water the fields at any time of the day or night. We were able to introduce electric rice de-husking machines and wheat grinders instead of the existing diesel-powered machines.

Running these mills on electricity was inconceivable before the solar powered mini grids were commissioned in these villages.

People were dependent on kerosene for their lighting requirements at night. Not only was kerosene polluting, but also the light emitted from these lamps was insufficient and was affecting the studies of the children as well as the women working in productive economic activities. Earlier women had to return from the farms with few hours of daylight to spare to be able to cook dinner for their households, but with reliable energy efficient lighting at home, they were able to work longer in the farms or run small entrepreneurial ventures like tailoring, photocopier machines, Mobile Recharge shops etc till evening. This opportunity unlocked the economic potentials of many enterprising women and men who could set up small businesses to earn a little more, while significantly eliminating the use of harmful fossil fuels like diesel & kerosene.

Many households in these villages maintain poultry as a source of additional income and being able to have a light bulb was very useful to maintain warmth (infra-red bulbs) and to monitor the health of the chicks even at night.

Conclusion

With an aim to reduce carbon emission by tackling major source of the emissions, and by providing value to the community to help enable their transition from conventional energy sources to RE powered electric machines, many organizations can effectively tap this underserved market of rural India by providing opportunity to :

1. Enable people in the villages to increase their income.
2. Arrest distress migration to cities by providing equivalent or better revenue opportunities to people in the villages.
3. Educate and sensitise people on the need to adopt clean technologies to protect environment.
4. Increase village GDP to improve overall satisfaction.

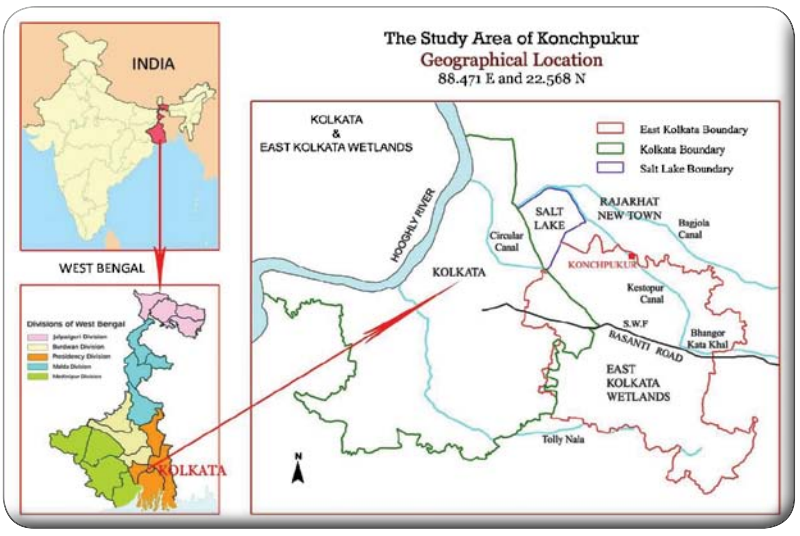
If these goals are met one can say with certainty that it will serve the dual purpose of rural empowerment and also position India on the path to meet one of the most ambitious targets set by a developing country to combat climate change, i.e Achieving net zero carbon emissions by 2070.

Kochpukur: A Prospective Archaeological Site from East Kolkata Wetland Area

Punarbasu Chaudhuri[1], Kaushik Gangoapdhyay[2*], Moumita Saha[3] and Shyamal Kumar Ghosh[4]
[1]Department of Environmental Science, University of Calcutta
[2]Department of Archeology, University of Calcutta
[3]Deshkal, Dum Dum, Kolkata,
[4]People's Green Society, Kolkata

Introduction

This paper addresses a very crucial issue of understanding archaeological site in the suburban Kolkata. The main area of investigation is located beside East Kolkata Wetland (EKW), an important Ramsar Site of West Bengal. It is a stretch , wetland which stretches spread over 125 sq. km along the Eastern side of Kolkata City. This wetland is home to a variety of faunal and floral species. However, till recently the early history of this wetland was virtually unknown. During a recent field visit in this region, the authors came across an archaeological mound providing, for the first time, archaeological evidences for early human habitation in this zone in the timescale of c. 2000 yrs BP. At present, although the age is based largely on the typology of artefacts found at the site, detailed investigation is desideratum. The site in question is Kochpukur, under the Bamanghata gram panchayat (Bhangar II block), South Twenty Four parganas. This is a large village of about 89.37 Ha. The village has 450 houses and 2500 individuals. The majority of the people in the village are farmers or fishermen. The village is adjacent to the Rajarhat, a well-planned satellite township of Kolkata (Map 1).



Map 1:
The Location of the site.

Geological background

The site of Kochpukur is located in the delta plain of the recent to sub-recent geological time scale and is composed of poorly drained fine loamy soils associated with upper delta plain with clayey surface and subject to severe flooding. Kochpukur is located in the extreme South-East corner of the map classified as 'older tidal plain'. In the earlier CSMEi map the geomorphology is marked interpreted as 'coastal valley margin fan'. More sophisticated classification has led to a farther interpretation of this region as 'oldest Tidal plain'" and also 'wetland' located in the lower delta plain. Considering these factors, it is possible to suggest that the site of Kochpukur is the first substantial archaeological site located in the oldest deltaic plain and more specifically in East Kolkata Wetland. Therefore, the importance of the site in the context of the deltaic archaeology and early historic study of Bengal cannot be over emphasized.

Drainage

The major drainage near the site is Bidyadhari river. According to the local people, in the past the site was located on the bank of this river, which has now shifted. Other than Bidyadhari, there is pond called kochpukur, from which the village gets its name.

Present day Environment

East Kolkata Wetland (EKW) was declared as Ramsar site (Internationally important wetland) in 2002 due to its wise use in terms of converting the city waste of Kolkata to fishery and agricultural resources through traditional practices. *Kochpukur* area is situated in the northeastern side of EKW. The prospecting site is nearly 1.04 acre area covered with dense vegetation. Major trees dominating the mound area are *Ficus infectoria, F. religiosa, Streblus asper, Anona squamosa, Anona squamosa, Azadirachta indica, Artocarpus lacucha* etc. Local people use Medicinal plants like *Achyranthes aspera*, *Glycosmis pentaphylla*, *Clerodendrum infortunatum* etc from this site. Ground vegetation is dominated by the invasive alien species *Chromolaena odorata.* Among the faunal diversity several types of birds, butterflies, dragonflies, reptiles were observed.

Archaeological background

The archaeological background of the site can be related to the archaeology of the Twenty four parganas (North & South), which forms the administrative boundaries of region discussed. The region has been explored by several scholars, which has brought to light several archaeological sites from the early historic period to the medieval and late medieval period iii. The most important site from the region is Chandraketugarh, which has been excavated by the Asutosh museum of artiv The chronology of Chandraketugarh is from 4th century BCE to 4th century CE and it was a large urban center of about 2 sq km in extent, and possibly fortified. The finds from Chandraketugarh reveals the wealth of people of deltaic West Bengal during the early historic period. One of the major economic pursuits of the people in the delta was international trade. A Greek text written in the first century CE testifies that items of trade from the ports of Bengal were Malabathron *(Tezpatra),* spikenard and cotton and silk garments, which were traded to the Mediterranean region from the port of *Gangev*, which is identified with the archaeological site of Chandraketugarh. The other sites which were excavated are Atghara, Tilpi and Dhosa, Kankandighi, Deulpota and Harinarayanpur near diamond harbour. Other than these sites, materials belonging to the early historic period and early medieval have been found at several places on several islands of the *Sundarban* region. The sites are associated with extant fluvial system, mapped as extinct proto-padma meander belts and older distributaries of the Bhagirathi river. However, only few sites have been found in

the old tidal plain. The only excavated site in this region was Dumdum mound, which proved the existence of an early historic site within the precinct of the Calcutta municipality. The sites in this geomorphic unit provides crucial connection between Chandraketugarh in the moribund delta and the sites located farther to the South within the present mangrove marsh. The site of Kochpukur, is therefore only the second early historic site which can be said to be existing in the valley margin fan of the delta flank.

The site of Kochpukur

The site measures about 1 acre and is about 4 m high. The most important modern cultural feature existing at this particular site is a *Majhar* or a shrine, which belongs to a Muslim saint (*pirbaba)* although people from all faith can visit such shrines. In the local history, there is an interesting story concerning this particular shrine and the *Pribaba*. In the past the site was located on the banks of navigable Vidyadhari river and was used by merchants. . The *Pirbaba* who stayed at the site watched one day seven vessels of this merchant sailing and a red starling bird perched atop the last vessel. The *Pirbaba* requested the merchant to give him the bird. The merchant refused and as a result, the *Pirbaba* drowned the ships in the river. The merchant then pleaded with the *pirbaba* to return his ship and heading his prayers the *Pirbaba* exhumed those six ships from the river-bed. The bird however, was dead, the *Pirbaba* then took the dead body of the bird and a *Majhar* was constructed on top of it. This *Majhar* exists till date and can be seem on top of the mound, known as *Baba Madar Shaheber Kabarsthan.*

The land now belongs to Diwan family of the village of Kochpukur, whose ancestors orginally belonged to Murshidabad and had cleared the land from forests after the *Pirbaba* appeared in their dreams and instructed them to do so. The site is within a grove of medicinal plants used by members of the Diwan family in the past to practice traditional medicinal practices[vi]. At present the site is used as a graveyard of the Muslim community of the village of Kochpukur.

According to the local history researchers '*Baba Madar Saheber Kabarsthan*' of Konchpukur village is an important historical site. Their assumption is based on its proximity with the three well known archeological places viz., Chandraketugarh of Deganga Block, Balanda of Haroa Block, Dum Dum House (Clive House) of South Dum Dum Municipality under the jurisdiction of North 24 Parganas district of West Bengal, India. All these are interlinked through navigable river *Bidyadhari* flowing from North to South 24 Parganas.

Chandraketugarh is described as the site "....securingly represents the market town of Ganga of the Periplus (1st cent AD) and Gangaridae of Ptolemy (2nd cent AD)." Balanda is compared with famous Nalanda at Bihar. Dum Dum House was excavated by Archaeological Survey of India (ASI) in the early first decade of 21st century after prolonged persistent of local historians under the initiative of Deshkal. ASI discovered huge archaeological objects and expected to get more from there. Similarities of the said four mound-shaped sites are situated nearer to the bank of river Bidyadhari. The researchers feel that riverine civilization could be traced at *'Baba Madar Saheber Kabarsthan'* of Konchpukur if proper scientific investigation to be done.

Plate 1: The high mound of Kochpukur showing pottery in the foreground.

Plate 2 : Close up of the mound surface showing scattered pottery.

Description of artefacts collected from the mound

The artefacts collected from the surface of the mound includes pottery and building materials. Following is a description of major pottery.

Plate 3: Coarse Grey ware with paddle marks

Greyware: The collected grey ware from the site is both in fine and coarse fabric. The coarse fabric of the grey ware is prepared fromill-levigated clay and consisted of fine sand and mica. The core of the sherd is of greyish red to reddish grey on colour, and the thickness of the visible section is between 5.8-4.4 mm. The most distinctive feature of the coarse grey ware are the parallel grooves and paddle marks on the body. The shapes of these types are few and one shape, which could be documented is a bowl with everted rim and a vase with the preserved rim with roundish cross-section. The precise dating of this ware is a problem how paddle marks The fine grey ware: In contrast to the coarse grey ware, the fine grey ware is made of well-levigated clay with a uniform grey core. The body paste is also fine and where sand like feeling is absent. The surface of the pottery was treated with a grey or black wash. The fine grey ware did not show any decoration or forming mark on the body such as paddle marks or grooves.

The fine grey ware can be dated tentatively to the early historic period as similar fabric is known from the well-dated early historic levels at sites like Chandraketugarh and Tamluk. The common shape of this variety is the dish with convex sides and flat base. The thickness of the extant section was 7.2 mm. Another shape was Vase with everted rim & triangular cross section with a groove on top of rim. One sherd is noticed with a brownish slip.

Plate 4: Sherds of Fine Grey ware

Chocolate and black ware: This is another coarse fabric from the site. The surface of the pottery feels much like the coarse grey ware but the core of this ware is dirty red, indicating oxidizing condition of firing as opposed to the reduced firing of the grey ware. The shapes of this ware is not ascertained and the cannot be precisely dated.

Bicolour ware: Bicolour pottery in coarse

fabric with red out side and grey inside has also been found. This ware is coarse and sandy in fabric with mica visible on the surface. The section is 4.4 mm in thickness and grey in colour indicating reduced firing. The sherd was treated with an external slip or wash. The shape could not be ascertained.

Bicolour ware (b): This ware can also be called the Black and Red ware. It is very coarse and with a thick section of 9 mm. The core is dirty red indicating quick firing inside a kiln. The body has groove marks 1.4 mm and was treated with a wash on the outside and also on the inside. The shape could not be ascertained.

Red ware: The red ware is commonest type of pottery, which has been found from the surface of the site. The red ware can again be divided into coarse and fine ware. The coarse ware was made of very ill levigated clay to ill-levigated clay because of which the very coarse variety of the ware has a gritty and sandy texture. Large flecks of mica are also visible on the surface.

The exterior surface treated with a slip. The average thickness of the very coarse and coarse varieties of the red ware is 6.5 mm, making it a rather sturdy ware category. Most of the sherds found on the surface are body sherds, designs on sherds are parallel grooves with 0.9 mm . However, one particular shape recorded in the variety of red ware is a vase with thickened rim, roundish in cross-section.

Plate 5 : Slanting design on the coarse red ware variety

The fine red ware found at the site was made of well-levigated clay and has a smooth surface. The fine red ware was treated with a slip on the outside. The average thickness of the section was 5 mm indicating the finer variety of the ware. The core of the red ware appears grey, indicating reducing environment of firing but the red colour could be achieved as a result of application of red haematite rich slip. The sherds were only body sherds. Desings consists of parallel grooves with 2.2 mm in length possibly made by paddle. One particular sherd shows an interesting 'net' design. Unfortunately, the shape could not be ascertained.

Plate 6 : Fine Red ware with 'net'desings.

Terracotta tiles: The building materials from the site are grooved tiles in red fabric. These tiles not only indicate habitation but also chronology of the site. The thickness of tiles from the site is 11.6 mm and this can be compared to excavated tiles from other well-dated sites.

Plate 7: Terracotta tiles with double grooves of the early historical period.

Chronology.

The site can be placed in the early centuries of Christian era as evidenced from the artefact. Comparable artefacts are available from excavated sites in the coastal zone of West Bengal, including Chandraketugarh, Tamluk and Bahiri. The fine grey ware indicates and early dating of the site and some of the paddle impressed and decorated pottery may also go back to the early historic period. The most important indication is the presence of grooved tiles. The tiles do not go back beyond the 4th century CE and those tiles were also recovered from the base of the mound. Pottery typology and the height of the mound indicate the continuation of the settlement which must be ascertained in future.

Conclusions.

Evidences from the site of *Kochpukur* has provided new insights into the history of human settlement in the deltaic region of West Bengal. The opinion of the earlier researchers that most early historic sites in the delta are buried can now be refuted and reinvestigated with the evidence from Kochpukur. The 4 m high mound of *Pirbaba* is an anthropogenic deposit. This is proved recorded from the tile pieces. The tiles were part of roofs of early historic structures, which possibly were placed atop wooden posts to construct the buildings. The early historic period could have been succeeded by early medieval and medieval period. The cultural sequence can be ascertained after small-scale stratigraphic excavations on the site.

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Impacts of Climate Change on Women: Reflections from the Glasgow Climate Change Conference (COP26)

Parama Chatterjee
Research Fellow in Women's Studies, The Asiatic Society

Climate change is transforming countries the world over, and the South Asian subcontinent is no exception. Floods, heatwaves, weak monsoons and unseasonal rains are increasingly unpredictable and are adversely affecting millions of people (Ramanathan et al. 2005; Amarnath et al. 2017; Vinke et al. 2017; Gunaratna 2018, Pant et al. 2018). Worst affected are the poor and marginalized living in 'climate hotspots', namely, coastal areas, mountain ranges, semi-arid regions and cities (De Souza et al. 2015; Ford et al. 2015; Sivakumar and Stefanski 2010). Those whose livelihoods are directly dependent on agriculture and the agrarian economy remain the most vulnerable (Farooqi et al. 2005; Gentle and Maraseni 2012).

There is growing recognition in research on climate change. The perceptions of risk and its impacts on people are associated with social stratification and identity, in particular gender, and of the ways in which this intersects with other factors like class, caste/ethnicity and age (Dankelman et al. 2008; Mac Gregor 2010; Goodrich et al. 2019).

The impacts of climate change could prove particularly severe for some women, but very little disaggregated and contextually embedded research is available (Cannon 2002; Demetriades and Esplen 2008; Djoudi et al. 2016; Pearse 2017). The gendered experiences on climate change around the world shows how it aggravates the existing gender inequality. We live in a world with existing unequal power relations between women and men across social groups (Rao and Kelleher 2005; Rao et al. 2019). This has been acted upon by climate change vulnerability to affect women of the marginal population in a severe way.

Women have locational and cultural vulnerabilities, they have less experiences and opportunities. So they face difficulties

in order to sensitively address issues of adaptation. They are more susceptible to harm from exposure to stresses associated with environmental and social change and the absence of capacity to adapt (Adger 2006: 268; Otto et al. 2017).

Gender roles and responsibilities are a social construct and vary across communities and geographies (Rao, Nitya et al,2018; Pearse 2017). This is because the immediate effects of changing climate are felt in the natural resource-dependent sectors – agriculture, forestry and water – where women's involvement in farming, water collection and use, or biomass collection for cooking, is historically sizeable (Dixon-Mueller 2013).

The Glasgow Climate Change Conference (October – November, 2021) was held in Glasgow. COP stands for "Conference of the Parties" and The Glasgow Climate Pact was reached at the COP26 Summit. This global agreement is not legally a bound but will set the global agenda on climate change for the next decade. The goal is to keep cutting emissions until they reach net zero by mid-century. It was also agreed in the agreement that the countries will meet next year to pledge further cuts to emissions of carbon dioxide (CO2) – a greenhouse gas which causes climate change (BBC, 2021).

Gender was one of the areas of concern expressed in the conference. There was focus on disproportionate climate impacts suffered by women and girls across the world "Climate change is sexist", a US Government official mentioned in the summit. According to UNFCC, 80 percent of people displaced by climate change are women and children. "But women and girls are also leading efforts to tackle climate change in communities around the world", mentioned COP26 chairman, Alok Sharma. The countries pledged for gender-sensitive climate policies and funding. Thus gender was put at the forefront of climate action. Sharma also mentioned that we still have a mountain to climb in order to limit global warming to 1.5 degrees Celsius.

A think tank named Climate Action Tracker released new forecasts saying current climate policies put us on track to 2.7 degrees warming – or 2.4C if all governments met their 2030 targets (Euronews, 2021).

As explained earlier, women and children bear a disproportionate impact of climate change. In the COP2 Summit, women's rights advocates and policymakers negotiated gender responsive climate action that protects and empowers women and girls. The COVID 19 pandemic has already deepened inequality worldwide and stakeholders are eager to establish concrete solutions and funding to prepare marginalised groups for a future of climate change.

Women will experience heightened risk in the face of climate change. Women are more exposed to economic instability, displacement, sexual violence especially in the developing nations. Younger women are removed from school or have early marriages. We should first address gender inequality in order to address climate change. Policymakers tend to focus more on technological solutions which is not enough to address the gender inequality related to climate change. In the Glasgow summit people raised the issue that women are affected differently by climate change. But it did not end up with the concrete solutions that were needed to address this gender disparity.

Many major advocates at COP26 (United Nations Girls Initiative, Women and Gender Constituency, Project Drawdown, Malala Fund and Plan International) demanded the need for a climate change education which can offset gender inequality. Other key solutions include investing in female entrepreneurship and grass-roots organisations. Combating gender norms, protecting access to clean water and promoting sexual and reproductive health and rights are also ways of advocating climate justice. There should be a gender lens in order to combat the effects of climate change (Quackenbush, C, 2021).

To conclude we can say we should address

gender inequality and gender disparity to combat the effects of climate change, Women are worst hit by climate change and their voices must be heard. The conference is an important step but is not enough to combat climate change and their impacts on women. Their needs and problems should not be overlooked while making agendas in the climate change conferences. The Global Women's Assembly for Climate Justice has laid out a call for action at the UN general assembly including demands of the COP26 meeting at Glasgow. The demand also include promotion of women's leadership and equity, protection of the rights of indigenous people, improving food security, recognising human right to water, protection of forests, oceans and ecosystems. The change should be systemic and gender sensitive in order to implement the solutions (Harvey, F, 2021).

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High on Promises

India's Emission Control Dreams versus Reality

Fiona Mukherjee
Doctoral Student, Cornell University

What's higher than Vallabhai Patel's statue right now in the Indian sky? Of course it is the price of petrol! Is the government to be blamed or does this expose the world-wide volatility of fossil fuel which can finally nudge us into a rapid transition to non-polluting and cheaper renewable energy sector? This speed of transition from fossil fuels to clean energy is what was on the agenda when the heads of about 200 countries met to discuss at the U.N. summit COP26, at Glassgow last month.

While the world realizes that climate change due to increasing amounts of greenhouse gas in the atmosphere is real, it is easier said on paper. At this point, it is technically and financially unfeasible to achieve net-zero carbon emission for a country whose economy and energy sector vastly stands on the shoulders of coal. Two-thirds of the country's net emission can be traced back to the energy sector while the rest comes from agriculture or land and other commercial usage. Despite this, India has managed to maintain a rather

pro-active image in front of the world so far in light of the plans set out for India under the Paris Agreement in 2015. India has argued repeatedly that the West has lagged far behind in meeting its financial commitments to developing countries that they had promised in acknowledgment of the fact that they are primarily responsible for the climate crisis.

I'll do my part and tell you how exactly the current scenario looks like. Under the Paris Agreement, India has set two targets. First, 40 percent of its installed electricity generation capacity will rely on non-fossil-fuel energy sources by 2030, second, set up 175 gigawatts' worth of renewables-based energy-generation capacity by the end of 2022. It is worth noting here that non-fossil-fuel is not at all synonymous with renewable. Currently, 38% of India's power is generated hydrothermally which has a high carbon footprint and ecological cost but comes under non-fossil-fuel power generation, however, this gets excluded in the later target of 175 gigawatts'. While meeting the first goal would be a cakewalk for us, it is remotely possible to meet the second one. India is at 100 gigawatts and has added 6.5 gigawatts through all of last year. Understandably, Covid had a role to play, but looking at the plans laid out in the pre-Covid era, Covid hasn't really affected this sector too much. Come to the picture COP26, which includes a promise for India to get 50% of its energy from renewable resources by 2030, and by the same year to reduce total projected carbon emissions by one billion tonnes. Guess what, India panicked! At the summit, India and China jointly opposed a reduction in unabated coal (coal that burns without carbon capture and storage) to nil while negotiating the final terms. The good news for coal miners is that India plans to boost up coal mining with 60 gigawatts more expected to be added in a decade. Even from an economic point of view, the Institute for Energy Economics and Financial Analysis has criticized this because they think new coal mines stand at a risk of being stranded assets in near future. However, as long as there are investors like Adani, Modi doesn't worry about it. Evidently, they bought a majority of the 38 coal mines auctioned last year.

India's total electricity capacity stands at 388 GW, out of which only 21.26% comes from renewable sources[1]. What oil is to Saudi, sun is to India! But technology to harness solar power is still not quite there yet. Current technology requires a coverage of 1.7-2% coverage of the country's surface area. With a beaming population density of 423.88 per kilometer square, we would literally have to give up our houses and start living in trees to accommodate India's solar dreams.

At COP26 India was under a pressure to commit to a mid-century net-zero target, we did not, but the question is are we ready yet? In 2012, when solar parks were just taking off in India, a joint survey by the National Resources Development Centre and the Council on Energy, Environment and Water, found that most of the solar projects "are in remote locations where the primary contentious issues are conflicting land claims and land allocation for grazing."[2]

There has been a steady rise in litigations against energy-projects by local communities since, which has led to a slow, if not stunted growth of the renewable energy sector in the country. Let's go back to November 2019, when the Rajasthan government gave away a stretch of 94,536 hectares of government-held land near Pokhran to Adani Green Energy project for the public-private funded 1500 MW Fatehgarh Ultra Mega Solar Park project. Interestingly, this piece of land, that the government projected as 'wasteland' was home to 1500 families in the district of Nedan, Jaisalmer. The population in Nedan comprises a marginalized community who do not own the land legally but have traditionally depended on it for their livelihood. The Rajasthan government's decision was followed by two lawsuits from local protesters

and after a long dispute the government finally yielded to the local pushback to cancel the land allotment to Adani earlier this year. No, this isn't a philosophical dichotomy of 'kill a few to save a million' but rather a projection of the bleak situation of legal framework in India to deal with such disputes. Disputes from early 2000s regarding land usage in forestry and agricultural led to 2013 Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, but it only covers a scheme for compensation to private owners of land. However, large parts of Madhya Pradesh, Rajasthan, Gujrat and Uttar Pradesh, which are topographically most significant for solar energy projects are retained by local communities who do not have legal titles over the land and hence, are not eligible for a compensation for resettlement. Clearly, energy projects in the country face large looming questions because on one hand the government is setting up solar panels to address energy security and the environment, but at the same time if it's built on creating social injustice, where is the legitimacy? You must be thinking why we don't use our roofs to install solar panels? Brilliant! But poor policy precedes the trajectory of rooftop solar-power generation as well. Once again we have big promises: of the 175 gigawatt commitment, 40 gigawatts is to be from rooftop solar power. So far, however, only 7.7 gigawatts of this has been installed.

At the Glassgow summit, is it easy to see why India has gone on a self-defensive mode about climate change, blaming the developed countries for the issue and neglecting our actions to cut down emissions to zero as a nation unnecessary in light of a budding economy. However, progress is slow but steady. Change has never been an easy process. Funding new start-ups on renewable energy projects is something that is picking up pace and needs to be boosted and with more grant allotments to fundamental research, because the foremost challenge lies in the lack of an efficient technology. Of the good things that have happened since 2015, the IFC and World Bank supported Rewa Solar Park established a record low tariff for renewable energy competitive with power produced from non-renewable sources, the tariff has made new investments in coal plants far less attractive. SolaRISING India[3] is another program that is working closely with World Bank, to invest in three more upcoming solar park projects. However, even if the government insists on portraying India's image as a 'green new world', there is much to do before we see hit accomplishment. And as for petrol, India is definitely not alone. Yes, there is an increase in the global market for hybrid cars, but if the battery cost doesn't come down, or if we don't miraculously stumble across an oil reservoir, growing a pair of wings seems more plausible than waiting for petrol price to soar low.

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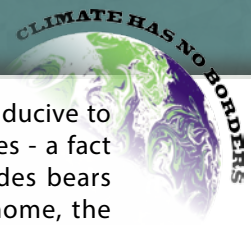
Climate Change - A Glimpse of the Days to Come

Arko Bhaumik
Junior Research Fellow, Indian Statistical Institute, Kolkata

In October 2021, one half of the Nobel Prize in Physics was awarded to two climate scientists "for the physical modelling of Earth's climate, quantifying variability and reliably predicting global warming". For the illustrious award which has conventionally recognized fundamental breakthroughs in pure physics ever since its inception, this declaration, which pays tribute to one of the most complex and active areas of interdisciplinary STEM research, comes as a breath of fresh air. It also comes at one of the most crucial junctures in the 4.5 billion years of our planetary history, for the sheer scale of anthropogenic activities has finally reached the tipping point where current policies hold the power of either making or breaking the future. The coming decades are expected to bear witness to some of the most dramatic consequences of climate change, and we, as a species, will bear the brunt of it.

From oceanic overturns to the frigid ice ages, Earth's climate has varied naturally to vast extents across geological timescales, occasionally causing large-scale extinction events in its wake. The alarming nature of the change in recent times, on the other hand, stems from its entirely artificial origin. Set off by the Industrial Revolution of the 19th century and accelerating steadily ever since, the unprecedented human-induced change in global climate is more rapid than any natural process can cause. This artificiality is reflected, for instance, in the systematic deforestation of large parts of the Brazilian Amazon basin. Over the course of a single year between August 2020 and July 2021, the Brazilian Amazon has suffered a loss of more than 10,000 km^2 of primal forest cover. The area, which is roughly ten times larger than greater New York City, shows no sign of shrinking as illegal deforestation continues to run rampant in the region.[1] The dismal scene is hardly unique to South America. It finds an equally grim counterpart on the other side of the Atlantic, right in the middle of the Congo basin, where highway construction, industrial logging, and slash-and-burn agricultural practices show up as the prime culprits.[2] Efforts of afforestation and reforestation usually fail to compensate for the removal of such historical forests. Improper methods of afforestation have also been associated, on occasions, with loss of native biodiversity in the target region - a concern which has recently brought Beijing's 15-year ecological protection plan under scrutiny.[3] There is considerable evidence now which suggests that the destruction of Earth's original forests is irreversible for the most part.[4]

In order to stay within the safe threshold of 1.5°C of global warming over the course of the current century, global carbon emission for the next 80 years needs to be restricted to less than 300 gigatonnes. At the current annual rate of almost 40 gigatonnes, this budget will be depleted in less than nine years.[5] It goes without saying that we are on the verge of a dangerous precipice - a fall which will propel Earth into levels of environmental disaster never seen before by the human species. Let us review a few currently ongoing and projected consequences of climate change, which



serve as ominous portents of this dreary reality.

Between 1994 and 2017, polar ice reserves and mountain glaciers all over the world have shrunk in mass by nearly 28 trillion tonnes. The annual rate of depletion, currently estimated to be 1.2 trillion tonnes, has accelerated from 0.8 trillion tonnes of the '90s. Since 1985, the Arctic belt has lost a mind-numbing 95% of its thick sea ice, and Himalayan and Alpine glaciers are retreating faster than ever before in recorded history.[6] Besides this steady decline, Antarctic ice shelves are experiencing ever- increasing levels of structural disintegrity. In 2019, the Amery ice shelf witnessed the disappearance of a huge ice-covered lake over the course of only three days due to collapse of the underlying ice bed - an event that released more than 20 billion tonnes of water into the ocean at one go![7] In May 2021, the A-76 iceberg calved off the Ronne ice shelf and floated out into Weddell Sea. With a surface area of almost 4,320 km^2, this massive chunk of ice holds the record of being the largest iceberg known till date.[8]

The drainage of icemelt water into the oceans is inextricably linked to rising sea levels and unwelcome changes in seawater salinity. At current rates of greenhouse gas emission, the Intergovernmental Panel on Climate Change (IPCC) predicts a total sea level rise of 52-98 cm over the entire span of the 21st century. To put it in perspective, a 50 cm rise in sea levels would result in massive coastal flooding in prominent Indian port cities like Kolkata, Mumbai, and Chennai, endangering the lives and livelihoods of more than 28 million people in our country alone. Taking the rest of the world into account, even the most conservative of estimates crosses a staggering 800 million, and puts hundreds of low-lying cities like Dhaka, Amsterdam, Shanghai, and New York at risk of significant flooding as soon as 2050.[9]

Warmer oceans are more conducive to the formation of intense cyclones - a fact which the past couple of decades bears ample testament to. Close to home, the Arabian Sea has witnessed a dramatic increase in both frequency and intensity of severe cyclonic storms posing increasing levels of threat to the west coast of India. In the North Atlantic Basin, the average annual number of tropical storms has climbed to 15 over the last two decades from 11 of the preceding century, with four of the ten most damaging hurricanes in US history having made landfall between 2017 and 2018. Current trends of climate change would make category 5 cyclones more commonplace with each passing season, with certain studies even suggesting the possible emergence of hitherto unseen category 6 storms in near future.[10]

For many parts of US and Canada, July 2021 was officially the hottest summer till date, with record-breaking heat waves, droughts, and forest fires that ravaged large swathes of North America. The situation was equally bleak across Europe and northern Africa. A series of wildfires devastated the *taiga* forests of Siberia following unprecedented heat and drought, and for the first time in human history, its smoke could be seen travelling all the way to the North Pole.[11]

According to climate specialists, the summer of 2021 is only a minuscule fraction of what is to come, should climate change continue unabated. The nightmarish impact of human-induced climate change on the biosphere is speeding up what is being called the Sixth Mass Extinction in the planet's history. It currently puts nearly half a million existing species at risk by either directly destroying their habitats or forcing behavioural and/or physiological changes which threaten their survival. By 2070, one-third of all present plant and animal species could go extinct.[12] Even from an extremely anthropocentric point

of view, this would pose insurmountable odds against our own survival - the rapid decline of the bee population, for example, might start showing its cataclysmic effects on agriculture very soon.[13]

Lastly, a plethora of diseases could wreak havoc all over the world due to a rapidly changing climate. Outbreaks of infectious water-borne diseases like cholera and diarrhoea are likely to become more frequent due to global warming. The list also includes Lyme's disease, malaria, and dengue fever, which might be exacerbated in subtropical regions with poor healthcare facilities. Apart from existing diseases, climate change may also lead to the emergence and rapid mutation of new pathogens unknown to current medical science. Taking into account the possibility of epidemics caused by such novel microbes, worst case scenarios mirror dystopian futures where inadequately evolving medical infrastructure would be overrun by a challenge it is not equipped to handle.[14]

This year's COP26 summit at Glasgow was an ambitious attempt at implementing the goals of the Paris Agreement of 2015. However, the meet failed to reach adequate consensus on a number of crucial agendas, with the proposals becoming mired in conflicts of interest among developing and developed nations. According to certain bodies of experts, the decisions taken fall drastically short of achieving the desired ends, and project a devastating 2.4°C increase in global temperature by the next turn of the century.[15] A significant reason behind these shortcomings - in the context of the so- called "ratchet mechanism" which expects participating nations to periodically present new pledges and national policies to combat climate change - is the lack of punitive measure against the failure to deliver on those pledges. There are also concerns about how broadly addressed "clarion calls" for urgent action keep shifting the onus of from one party to another, thereby locking society within a vicious cycle of inaction and blame game. Without any concrete mechanism to break out of that cycle, the world can only look at itself spiral alarmingly out of control.

We are currently witnessing changes which should occur over geological timescales take place across the average human lifespan. To be able to process this upheaval, it is of paramount importance to first accept the stark reality of the impending catastrophe - what has never happened before is happening right here and right now, and it's happening fast. For an intelligent species which has only one pale blue dot in the cosmos to call its home, this decade might very well be our last chance to learn how to be better stewards of our planet.

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Climate Change and Wildlife: Where Do We Stand?

Dishari Dasgupta
Research Scholar, Indian Institute of Science, Education and Research (IISER), Kolkata

For the last couple of years we are getting accustomed to frequent super cyclones, severe draughts, forest fires and hurricanes worldwide. In 2020 itself between May-June our country witnessed two super cyclones with a time gap of just two weeks. Amphan hit the east coast in May and Nisarga hit the west coast two weeks after. The media reports made us all aware of the tragic human and economic loss our country encountered because of the two super cyclones. But, what about wildlife? Endangered white backed vulture population was reduced to almost half after Nisarga hit coastal Maharashtra. Between the last few months of 2019 and beginning of 2020, Australia witnessed the worst case of bushfires wherein almost 15000 bushfires took place. These consecutive catastrophic events during the summer came to be known as Black Summer in Australia. Research teams reported that almost 143 million mammals, 2.46 billion reptiles, 180 million birds and 51 million frogs were severely affected.

The common thread that binds the occurrence of all these events is climate change. It is the root cause of these events that transcends all geopolitical barriers. The rate of natural disasters have doubled up from what it was during previous history of 89 years and the developing nations are usually the worst hit. As per the Germanwatch Global Climate Risk Index (CRI), India ranks 14 among the 30 most affected country list. Climate change has been fuelled by human actions

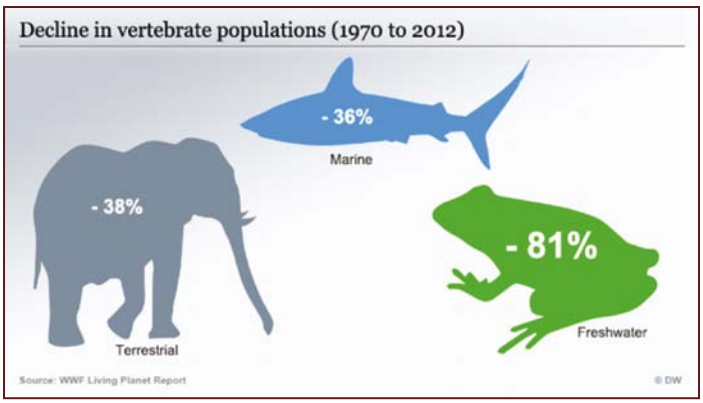

Figure: Pictorial representation of decline in vertebrate terrestrial, marine and freshwater species due to climate change. (Source: WWF)

and inactions, so much so that it has reached a point of no return. Most of the strategies undertaken by several governments worldwide are anthropocentric in nature and does not put much emphasis on wildlife. We have come up with strategies to combat climate change that puts central focus on human survival and welfare, overshadowing wildlife and rest of Nature. And this needs to be altered. We need to change our approach towards climate change and make it more inclusive, wherein the strategies taken by the government includes the benefit of wildlife.

Recent studies report that almost 47% of mammals and 23% birds under the IUCN Red List category has been severely affected by climate change. This has triggered several research worldwide which correlated climate change with detrimental effects on animals. Severe draught in Zimbabwe in 2019 caused almost 200 elephant deaths. The bee population in Europe and North America has reduced by 1/3rd in last few decades, which will have serious implication on crop produce worldwide.

Climate change has significantly contributed in the rise of mortality in wildlife. India is one of the 27 countries that is vulnerable to rise in sea level due to climate change. Infact, this has resulted in natural subsidence of the lower Ganga-Brahmaputra delta on which Sunderban exists. As a result of which, there is increase in salinity in the area affecting both flora and fauna that depends on freshwater for their living. In the Himalayas, almost 30% of snow leopard's habitat is expected to be lost in near future due to climate change, affecting the population of the species. The inhabitable conditions of the Bharatpur Lake has affected the migration of Siberian Cranes as their visit has declined over the years. Mammals like Musk deer, Kashmir stag and Himalayan Mouse hare are likely to be affected by the climate change that altered the ecological parameters in their habitat. The species residing in Western Ghats too face an uncertain future. Researchers using modelling techniques have predicted that the habitat of several species is set to contract due to climate change, especially for the endemic species like brown mongoose, Nilgiri langurs and lion-tailed macaques.

In a recent study undertaken in Australia, it was observed that climate change also affects the gender of sea turtle population. It was observed that almost 99% of the sea turtles found were female. In the developmental stage of its life cycle, ambient temperature of the eggs determine the gender of the species. At low temperature, sea turtles that hatch out of eggs turn out to be males whereas at higher temperature they hatch out to be females. With rise in temperature due to global warming, the gender of the species has been directly affected by it. If this continues to be so, the future of this species appears to be bleak.

Polar bears too are facing an uncertain future due to climate change. Polar bears use sea ice as platform to hunt seals. Now, with rise in sea temperature due to global warming, sea ice is melting at a faster pace. Scientists predict that with decline in sea ice, polar bears will face severe stress due to shortage of food which might lead to decline and extinction in the animal from this world. However some believe that some polar bears might adapt to the climate change and become dependent on land for its foraging, but most of the population will decline. Thinning of ice sheets has also caused decline in several arctic birds that depend on ice for its nesting and foraging. Change in ambient temperature, precipitation has also lead to extinction of Golden Toads in Costa Rica and decline in amphibian population worldwide.

The threat that looms over wildlife due to climate change has received attention of the policymakers worldwide. Several strategies have been initiated to ameliorate the effect of climate change. It includes establishment of green corridors, assistance for migration

of endemic species residing in mountain tops and maintenance of open landscapes for animals that might be displaced due to habitat destruction. However, it is getting very hard to keep up with the pace of rapid climate change. A study undertaken by the University of Arizona claimed that due to climate change, 50-70% of the 538 species they studied can go extinct by 2070. The response of a specie to climate change is of utmost importance and we need to keep track of it so that we can come up with better effective ground reality based solutions.

Despite several strategies being undertaken worldwide, at the heart of these strategies lies the benefit of humans and we need to do away with this anthropocentric approach. As said by Randall S. Abate, we need an eco-centric paradigm in our approach as it will include Nature in its whole self, including both human and non-human life under its umbrella. Hence when we think about climate change we need to incorporate wild life at the heart of our thought process.

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Climate Change: A Major Issue in North-South Dialogue

Urja Priyadarshini Chaudhury
PG Student in Environment Development and Policy, University of Sussex

In the past month there has been a lot of buzz about COP26 in both the news as well as social media, and while most people are conscious that it has something to do with climate diplomacy, what is COP exactly and why is it so important?

The term "COP" is an abbreviation for "Conference of the Parties" which is the supreme decision-making body of the United Nations Framework Convention on Climate Change (commonly referred to as the UNFCCC). This convention was ratified and adopted in 1992 during the historic 'Earth Summit' in Rio de Janeiro, wherein a treaty

was unanimously signed by 196 member nations from all around the world.

The first-ever Conference of the Nations was held in Berlin, Germany in March 1995 and since then has been conducted on a fixed annual basis with the exception of 2020. A host of significant action plans, mandates and protocols have been produced, endorsed and implemented over the years in each of the COPs including but not limited to the Kyoto Protocol and the Paris Agreement. This conference thereby provides a space for diplomacy, science, activism and public opinion to engage with each other for achieving the ultimate goal of a planet of 8-billion people to live harmoniously together in material comfort.

"COP26" is specifically meant to refer to the 26th UN Climate Change Conference that was hosted in the UK in partnership with Italy earlier last month from 31st October to 12th November. This two-week conference was attended by all 197 member nations that are currently included in the UNFCCC and a total of 39,509 participants thereby (provisionally) making it the most well-attended COP in history.

The anticipation for this year's conference has been tremendous, not only because we abstained from having one last year due to the pandemic, but also because 2020 was a pivotal year wherein the effects of climate change was simultaneously experienced first-hand by a vast majority of the world. The average global surface temperatures last year were amongst the hottest on record which consequently lead to methane concentration, increasing sea levels, and carbon-dioxide absorption by the ocean reaching its highest record as well. In real-life terms, this translates to 2020 being reported as one of the hottest years to date with an increased frequency and potency

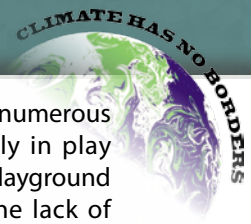
of heat waves, hurricanes, droughts, floods, forest fires and other natural disasters all around the world.

The future of not only our planet but also the human civilization is therefore profoundly dependent on the measures we must actively pursue right now in order to structurally limit greenhouse gas emission along with curbing our over-dependence on fossil fuels. This conference, hence, provided the ideal platform for country representatives and diplomats to interact not only amongst themselves but also with the media, lobbyists, activists, artists, scientists, and businesses from all around the world. The goals that COP26 set out to achieve are extensive in its formulation and includes -

1. Securing global net-zero by mid-century (2050) and keeping the 1.5 degrees of warming within reach
2. Promote adaptation to protect and preserve communities and natural habitats
3. Mobilizing finance so that developed nations can live up to their pledge of raising 100 billion dollars a year for climate finance
4. Businesses, governments and civil society working together to achieve climate prosperity

To achieve each of these ambitious goals, there is a dire necessity to uniformly recognize the urgency for climate action, so that all parties can come to a consensus regarding the process of implementation. However, like in the case of most of the COPs in the past, this is easier said than done.

The sheer number of participants and voices playing a role in this conference, and the varying backgrounds that each come from can make it very difficult for the council to come to unanimous decisions. According to the COPs rules for consensus, the final stand of the committee will always be set by the least willing. In this context of COP26, it is interesting to note that India has been one of the most vocal opponents in expressing its unwillingness to embrace the committee's goals and has declared that it will only become carbon neutral by 2070 - which is 20 years beyond what experts claim as the period of action to avert catastrophic climate impacts. The argument of "unfairness" that India has thereby set forth



is rather interesting, and one that is shared by most poor and developing countries.

Developed countries majorly belonging within the Global North are the ones who are historically responsible for causing the greatest destruction to the planet through their extractive mechanisms and policies. However, presently, those very same nations are the ones that are comparatively most affluent and thereby have inspired and influenced other countries to follow the same route for development as they did. In the prevailing global warming context, this policy for "development" is impossible to achieve without completely destroying the planet that we live on. Hence, for countries like India that are still developing with evergrowing populations, the challenge is not just to minimize its destructive environmental impacts in order to avoid climate catastrophe, but also to develop its economy and society in spite of it.

For this reason, developed nations have been handed the historic responsibility for implementing more radical changes and providing aid to their developing counterparts. This was further actualised by a pledge taken by wealthy nations 12 years ago in Copenhagen (COP15), where they agreed to channel at least US$100 billion dollars a year as climate adaptation finance to less wealthy nations by 2020. Recent figures, however, revealed that they failed to follow through on this promise which particularly fuelled frustrations and tensions between the developing and developed countries. The reason for this failure is mainly attributed to the disagreement over accounting methods that exist between countries that were a part of this negotiation. Moreover, charitable organizations such as Oxfam have argued that the estimates of contributions made to Climate Finance are in reality even lower than they were represented in the conference.

Hence it is safe to say, even amongst the Global North there still remains a severe dearth in leadership and accountability for historic emissions. While there are numerous multilateral institutions currently in play trying the even the inequitable playground that we currently function in, the lack of unanimity in consensus has made it weak and its procedures inefficacious.

This issue of unfairness has therefore been an extremely relevant bone of contention stagnating most COP decision-making mechanisms. While developed nations contend for more drastic measures to be executed, developing nations of the Global South usually do not have the resources to match up to expectations. This conflict has been plaguing the COP since its very inception, but even more so recently with the increased vigilance on the climate crisis.

All of that being said, some progress has still been made in COP26, the most vital one being the agreement to limit global warming within the 1.5-degree mark. All parties have also agreed to urgently improve their ambition for national decarbonisation plans within 2022, by simultaneously phasing down the production and dissemination of coal power and lowering fossil fuel subsidies. A degree of agreement was also established over the financialization of aid, although, it was not as concrete as one had hoped it would be. Furthermore, a rulebook for the Paris Agreement of 2015 was also concretized as a part of the Glassgow Climate Pact.

In the end, however, the overall outcome of this COP feels quite disappointing, as diplomats were seemingly more focused on arguing over technicalities and passing over responsibility to future generations instead of establishing concrete steps of action for the present. There is therefore still a very significant gap that continues to exist between the pledges each country has committed itself to and the goals to achieve the Paris Agreement and stay within the 1.5-degree mark. Global South countries (such as India) although valid in their hesitation to partake in these negotiations also need to start engaging with the climate crisis more earnestly because it is, after all, its own people

who will end up experiencing the primary burden of the climate catastrophe.

There was, however, more exhilaration and hope to be seen in the activism that was occurring outside of the COP26 rather than the conference itself. Activist groups, organizations, businesses and academics from all around the world unified and mobilized to push for more radical and dynamic pathways for change. The Race to Zero Campaign is one such example of a large-scale alliance that has grown to encompass over 700 cities, 3000 businesses, 600 education institutions and 170 big investors that are all committed to achieving net-zero targets by 2050.

I have always recognised civil society advocacy as a key actor behind all transitions made in society, and the ability of public resistance to formulate into policy transformation. So whatever it may be that the future holds for us, we are not going down without a fight!

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World Leaders at COP 21 in Paris.

Cancer from Environment and Its Prevention

Sankar Kumar Nath
Medical Science Secretary, The Asiatic Society

Everything around us is our environment. They constitute living bodies as well as nonliving elements along with the effects of these objects on the human life. The living objects are animals, plants, microbes, birds, forest, fisheries etc. and the nonliving objects are land, water, mountains, rocks, sunray and air surrounding the earth. They are indeed inter dependendable for their existence in nature. It is needless to say, they have been maintaining a wonderful discipline vis-a-vis to protect their natural existence. But we, the greedy people for our own limitless comforts, are breaking the rythm of natural components of the environment and for that matter inviting lot of diseases including cancer.

In the context of research on cancer the meaning of environment denotes those which enter our body from outside and interact. This is known as exposure that causes cancer. Thus the environmental exposures include sunray, other rays, hormone, virus, bacteria, parasite, harmful chemicals through water, air and foodstuff etc. These are known as carcinogens. Apart from these factors it also includes change of life style like uses of tobacco, alcohol, sedentary life, multiple sexual partners etc.

In 1775 English surgeon Pereival Pott (1714-1788) first demonstrated the cancer from environment by showing the formation of cancer of the scrotal skin due to long association with exposure to chimney soot.[1]

A long time have passed since the first environmental carcinogen was discovered (soot). But this is really an ongoing proces and everyday newer and newer carcinogens are being discovered threatening the whole mankind. The international Agency for Research on Cancer (IARC) has already given a long list of environmental carcinogens, a few of them is given below—arsenic, benzene, formaldehyde, coal gas, radon, nickel compounds, vinyl chloride, wood dust, asbestos, aflatoxins,

coal tar, benzidine, soot, sodium nitrate etc. People working in wood, metal, rubber, tar, iron industries are very much prone to get cancers of different systems in our body.[2]

Now let us discuss some other environmental risk factors :

Smoking

This is now an established fact that tobacco can cause cancer. Tobacco is used in the form of cigarette, ciger, cheroot, chutta, pipe, betelnut, khainee, dokta, jarda, gurakhoo, pan-masala, snuff etc. It is worth to note 80 percent of the oral cavity cancer and lung cancers are caused by the tobacco use. Second hand smoking also increases 5 percent more risk of cancers. In tobacco smoke nearly 4000 chemicals are identified of which at least 400 are harmful to human health, 10 percent (40) of these are known to be carcinogenic. So please be cautions and give up using all sorts of tobacco.[3]

Alcohol

It is considered to be a group-1-carcinogen according to World Health Organization (WHO) and causing 3.6 percent of all human cancers like cancers of oral cavity, esophagus, stomach, liver, colon, prostate, ovary, breast etc. The risk is increased 35 percent higher while smoking is simultaneously added. So limit taking alcohol.[4]

Foods

Habit of taking fat at random specially from the red meats, increases the risk of cancers of colon, breast, rectum, prostate, uterus. So limit consuming red meats.

Certain fungi contain a carcinogen, known as aflatoxin which can cause liver cancer. Therefore, avoid fungus infested foodstuff, cooked or uncooked.

Non-permitted dye like metanil yellow, malachite green, lead oxide etc. are often used as additives to our foodstuff which can increase the risks of gastrointestinal cancers. Please avoid.

Nevertheless, the Nature contains lot of cancer-protective foodstuff like cabbage, pea, bean, cauliflower, sweet-potato, legume, carrot, pumpkin, rice, wheat, maize, green vegetables etc. Apart from these, grapes, turmeric, ginger, onion, garlic, lemon, guava, oranges, tomato, cucumber, fish-fat, different fruits are all cancer-fighting foods. Please remember, foods rich in fibers are always cancer-protective—the skin of the fruits and vegetables contains fibers in abundance.[5]

Occupation

People have to come in contact with lot of carcinogens in relation to their occupations. These carcinogens are benzene (causing blood cancer), Vinyl chloride (causing liver cancer), Arsenic (causing lung and skin cancer), Nickel (causing lungs and nose cancer), Asbestos (causing mesothelioma and lung cancer), Ethylene oxide (causing blood cancer), Formaldehyde (causing pharyngeal and nasopharyngeal cancer) etc. and a lot more.

So, people involved with those concerning occupations, must be taken care of with periodical health check up.

Sunray and Ionizing Radiations

There are several radiations found in our environment. Some of them are certainly carcinogenic, like ultra violet rays. UV rays, x-rays, δ-rays are all ionizing radiations, prolonged exposure to which can lead to formation of cancers. UV rays coming from the sun, sunlamps and tanning booths, can cause skin cancer. So try to avoid direct sunlight between 10am and 4pm.[7]

Viruses and Bacteria

Some of the viruses and bacteria can cause cancers after entering into our biological systems. Human Papilloma Virus (HPV) is responsible for cancer of cervix. Hepatitis B and Hepatitis C viruses are the causative carcinogens for liver cancer. Epstein-Barr

Virus (EBV) is linked to Burkitt's lymphoma. We have had now vaccines against HPV and Hepatitis B.

People suffering from bowel irregularities for a long time, may have been infected with a notorious bacterium, known as Helicobacter Pylori which can cause cancer of stomach. So do not neglect bowel problems. Likewise Salmonella typhi bacterium increases the risk of Gall Bladder cancer.[8]

Pesticides

There is a strong link between pesticides and cancers, and use of pesticides at random in the agricultural industry adds fuel to the fire. The pesticide-induced cancers are cancers of Urinary Bladder, bone, brain, breast, cervix, kidney, ovary, prostate, testicle, thyroid, leukemia etc. Environmental Protection Agency (EPA) prepared a list of 165 such pesticides that can cause cancers.

Now let us known how to remove these contact pesticides from the surfaces of the vegetables. Take 2 percent salt water and all the vegetables are drowned within this and stirred vigorously for at least 5 minutes and then washed them out in running water. Thus at least 80 percent of pesticides will be removed.[9]

A few words more

Long ago in 1977 scientists Higyinso, Muir, Doll and Peto had shown that 80 percent of all cancers were due to the environmental factors.

Remember—'We have more than 100,000 chemical elements in our environment in which 30,000 of them have been analyzed. Out of 30,000 analyzed ones, only 275 of them proved to be carcinogenic'.[10]

So, we are to modify our life style with a view to keeping the environment Eco-friendly.

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Reality of 'Green' Digital

Samik Biswas
Publication Section, The Asiatic Society

In the era of OTT and Cryptocurrency, the purview of carbon footprint monitoring system needs to be redesigned to address the issue of the sustainable global practices. According to forbes.com, if the internet were a country, it would be the seventh largest polluter in the world. In spite of that COP 26 by and large remain silent on the impact of digitalisation on environment. The International Energy Agency calculates that while in 2007 only 54 exabytes (54 billion gigabytes) of data were transferred over the web, this amount got multiplied by 20 in 2017 to 1.1 zettabytes (1,100 billion gigabytes). The same organisation estimates that annual data traffic will quadruple by 2022, reaching 4.2 zettabytes.

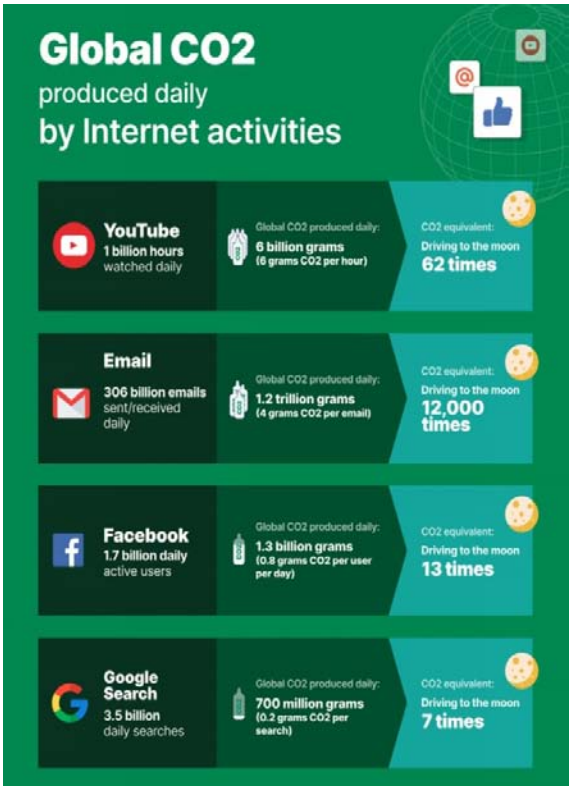
Background

Digital activity has become a multi-faceted entity, comprising everything from video streaming and online gaming, to cryptocurrency trading and digital banking. These mediums, while often beneficial and progressive in their own title, accompany an environmental price. As social media use grows day by day among all demographics, the environmental footprint of those activities must be seriously considered. A study by the United Kingdom's OVO Energy found that the UK could reduce its carbon output by over 16,433 tonnes, just by each adult sending one less email per day. According to forbes.com, digital technologies now represent 4% of the world's total carbon emissions, and their energy consumption is increasing by 9% per year. Offsetting the environmental impact of the increased internet usage in 2020 alone, it is estimated, would require a forest which is twice the area of Portugal, enough water to fill 317,200 Olympic-size swimming pools, and land the size of Los Angeles.

Algorithmic efficiency is a major blind spot in most of the green digital initiatives, which focus on physical device production, not on the daily emissions occurring over the life of the device and the software it runs. A study of the Shift Project (2019) shows that in 2017, energy consumption in the use of digital technologies surpassed that of the production of digital devices by more than 5%, with a continuously rising share. Increased use of digital technology during the COVID pandemic is not the only cause of rising carbon footprint in digital world. COVID has merely accelerated the growth in digital carbon emission. Therefore, it cannot be expected that the carbon footprint of digitalisation will decrease after the pandemic. Already today, the total carbon emissions of digital technologies surpass those of global air traffic by a factor of two. According to g20-insights.org, in 2019 all air traffic combined accounted for about one billion tonnes of carbon emissions and 2% of overall emissions. In the same year, digital technologies emitted about two billion tonnes, or about 4%, of the entire human-induced CO_2.

Environmental Cost

The impact of digital technologies on the consumption of natural resources and electricity has long been ignored. For example, take the case of 'digital cloud'. A cloud is often seen as something efficient and green alternative. No one actually counts the amount of energy needed to maintain these mammoth data centres. A recent study showed that energy demand in European data centres increased by 40% between 2010 and 2018. According to a study conducted by reset.org, energy requirements of all data centres worldwide range from 200 to 500 billion kWh per year, an estimated 3% of the world's electricity. Predictions for the year 2030 range between 200 billion and 3,000 billion kWh. Unavailability of any official figure and reluctance on the part of the many big operators are the main reasons behind this wider range of variation as the researchers have to collect real information via detours. On an average, mechanical cooling is responsible for around 25% of the total power consumption of a data centre. The heat produced by these giant centres just gets released into the atmosphere.



Source: WebFX

Companies such as, Google, Microsoft, Meta etc rely tremendously on digital technologies for their activities. But they continue to neglect the environmental impact of their servers. They also tend to think in terms of compensation by financing reforestation operations which has several feasibility problems. Also, the philosophy of 'the more the merrier' of social networking and OTT platforms is of grave concern in the backdrop of carbon footprint. According to the Shift Project, the average CO_2 consumption of streamed online video is more than 300 million tonnes per annum, the equivalent of Spain's annual emissions. Jens Gröger of the Öko-Institut estimates that each search query emits around 1.45 grammes of CO_2. An individual using a search engine to make around 50 search queries per day can produce 26 kilogrammes of CO_2 per annum. Google itself, in its 2017 Environmental Report puts its electrical energy consumption at 6.2 terawatt hours (TWh).

Most cryptocurrencies also consume large amounts of energy. One example of this is Bitcoin, probably the best-known digital currency. According to calculations by the Bitcoin Energy Consumption Index (2018), a single Bitcoin transaction consumes around 819 kWh. The same amount of energy could be used to make one 150-Watt refrigerator running for about eight months.

According to g20-insights.org, researchers at the University of Massachusetts Amherst have studied the training life cycles of several

common Artificial Intelligence (AI) models and found that the energy consumption, and therefore the carbon emissions, of developing advanced neural networks are significant. The training of one specific AI model required about 300 tonnes of CO_2 equivalents, which equals the carbon emissions of the life cycle of five cars including fuel, or 300 round-trip flights from New York City to San Francisco.

Preventive Measures

In order to combat the menace of carbon footprint, energy efficient digital gadgets can be developed. Energy intensive cryptocurrencies should be banned. Also, AI models need to be revisited in order to make it less energy intensive. Improvement of repairability index of the various electronic products should be prioritised. Heat produced by the data centres can be utilised to meet the demand of the households. Sweden is an example in this regard. From a consumer perspective, it is relatively easy to try not to spend too much time in front of screens outside of work. Following this you can also extend your devices' lifespan. Also, buy technological equipment that is as sustainable as possible. As suez.com rightly points out that we must also try to make our habits greener through small changes, such as turning off our internet box at night. While we have been spending more time in virtual meetings with teleworking we need to use our webcams more wisely and activate them just when it needed.

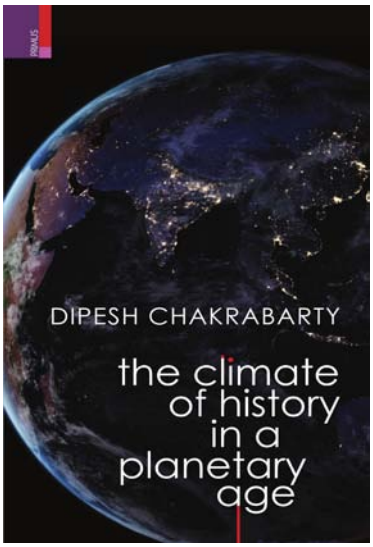
In the end it can be said that we have to change our perception about the digital technologies. Like any other technology it is also heavily dependent on energy. To make online culture sustainable, we must know the difference between our need and greed. Therefore, advocates of digitalisation must be aware of the impact of it on environment and seriously think about the judicious use this astonishing weapon.

LATEST ISSUE OF THE JOURNAL

Reflections on Climate Change

Arun Bandopadhyay
Historical and Archaeological Secretary, The Asiatic Society

Whatever may be the implications of the recently concluded, United Nations sponsored Conference of Parties (COP 26) in Glasgow (31 October-12 November 2021), there is no denying the fact that it has highlighted the urgency of immediate measures to tackle the problem of climate change in no uncertain terms. This emphasis is so critically noted by current analysts as to mark it as the most significant one since the Paris Conference in 2015. What are, however, *The Climate of History in a Planetary Age,* Dipesh Chakrabarty, Chicago and London: The University of Chicago Press, 2021, and the first Indian edition, Delhi: Primus Books, 2021 often ignored are the avowed and subtle implications of the huge literature created by the climate scientists, historians and philosophers on the entire issue of climate change, and the urgency of re-working the humanist thought on the subject. It may not be a mere coincidence that Dipesh Chakrabarty's highly provocative study on the meaning of climate change is also published in a book form in 2021.



The Climate of History in a Planetary Age, Dipesh Chakrabarty, Chicago and London: The University of Chicago Press, 2021, and the first Indian edition, Delhi: Primus Books, 2021

Chakrabarty's book is a complex one, and a thorough discussion of the issues raised by him is beyond the purview of the present short note. My immediate purpose in this note is to reconsider the relevance of four reflections, characterized as "Four Theses" in the very beginning of the book, in the current context of the scholarly debate on the subject. However, I wish to proceed evaluating these reflections only after giving the briefest, if not the crudest, account of the book. There are five cardinal features of this account. There is a global and planetary aspect of the environmental crisis as faced by the world today. There is also a distinction between human history and geological history. The author develops a complex argument about the plurality of human action as derived from Hannah Ardent's *The Human Condition* (1958) with reference to meanings of her thoughts on labour, work and action, modified further by a reading of Carl Schmitt (*The Concept of the Political*, 1996) who argues that even if humans are capable of being rational and creative, there would not be a single rational consensus. It appears, therefore, that there is scope for a radical re-assessment of the capitalist/colonial impact on environment. Finally, though there are obvious limits of being 'political' in the

planetary context, still there is some scope for taking recourse to political action *collectively* about the world's environment even today.

I do now wish to focus on four reflections which Chakrabarty presents as "four theses" of climate change in human understanding. I consider these basic thoughts of the author with their wide implications on the humanist discourse on the subject (causality, process, urgency and eventuality). It is also important to note that this chapter on four theses is an updated and revised version of an article of the author, published in *Critical Inquiry* as early as 2009. It seems these reflections have been constantly in the form of change and modifications in the next twelve years.

The first of these reflections is on the anthropogenic explanations of climate change and its resultant impact on a **visible collapse of the distinction between Natural History** and Human History. This collapse is important for the very understanding of history in more than one sense. As Collingwood (1889-1943) argued, it is plausible to posit a case that nature could not have history quite in the same way as humans have it. "The events of nature are mere events, not the acts of agents whose thoughts the scientist endeavours to trace." Hence his conclusion was that "all history properly so called is the history of human affairs". Benedetto Croce

(1866-1952), Italian philosopher and historian, went further and proclaimed that there is no world but the human world, and then said, echoing Vico, that we can know the human world because we made it. In the Marxist philosophy of history, the Stalinist position (*Dialectical and Historical Materialism,* 1938) was sort of a consideration of geographical change of "any importance" in terms of millions of years, "whereas a few hundred or a couple of thousand years are enough for even very important changes in the system of human society". Fernanad Braudel (1902-1985) rebelled against the kind of argument where environment is shown as a silent and passive backdrop in historical narrative, and put it as "a history of constant repetition, ever-changing cycles", but he shared a fundamental assumption of Stalin that the history of man's relationship to the environment was so slow as to be "almost timeless".

If Braudel's postion is regarded as a significant breach in the binary of natural/ human history, the rise of environmental history in the late twentieth century made the breach wider. It can even be claimed that environmental historians were going to produce natural histories of man. But an important difference remains. It is one thing, Chakrabarty argues, to proceed on "understanding of the human being" that these environmental histories have been based on, and it is another thing to consider "the agency of the human now being proposed by scientists' writing on climate change". Simply put, this environmental history has looked on human beings as biological agents, as Alfred Crosby has done it so eminently in many of his publications. Even Daniel Lord Smail's recent attempt (*On Deep History and the Brain,* 2008) to connect evolutionary sciences and neurosciences with human histories is based on his nuanced arguments on the relation between human biology and culture than any line of thinking on the newly acquired geological agency of the humans. Crosby's masterly survey of the field of environmental history in 1995 (*The American Historical Review*, Vol.100) had much to do with biology and geography but not on man's impact on the planet on a geological scale. Here man is depicted "as a prisoner of climate" but not as the maker of it.

By contrast, climate scientists' claims about human agency introduce a question of scale. Humans can become a planetary geological agent only historically and collectively, and by that way may become cause of mass extinction of species. Chakrabarty argues, following many of the scholars in the field, that this agency became apparent only since

the onset of the Industrial Revolution three hundred years ago, "but the process really picked up in the second half of the twentieth century". Hence comes his proposition: the distinction between human and natural histories has begun to collapse, and human is no longer taken merely in terms of her/his interaction with nature. Humans *now* are a force of nature in the geological sense.

The idea of Anthropocene and the qualification it makes on the humanist history of modernity and globalization is the second thesis that Dipesh Chakrabarty talks about. *Freedom* underwent radical changes in its meaning through various revolutions, class struggles, rights movements of communities, citizens and minorities in the writing accounts of human history in the last 250 years. But in no discussion of freedom during Enlightenment, there was any awareness of the geological agency of the human beings that was being acquired. The geological time and the chronology of human histories thus remained unrelated. It was during the period, "from 1750 to now", that human beings switched from wood and other renewable fuels to large-sale use of fossil fuels – coal, oil and gas. The geological age we are now living is called Holocene, which came about with a warmer climate in the wake of last ice age or Pleistocene around twelve thousand years ago. It was Paul J. Crutzen, the Noble Prize-winning Chemist, and his collaborator Eugene F. Stoermer, a marine science specialist, who first emphasized the central role of mankind in geology and ecology by proposing to use the term 'anthropocene' for the current geological epoch in 2000. Later Crutzen elaborated it in an article in *Nature* (2002) thus: "Because of these anthropogenic emissions of carbon dioxide, global climate may depart significantly from natural behavior for many millennia to come."

Chakrabarty asks two relevant questions: Is the Anthropocene a critique of the narratives of freedom in the last three hundred years? Is the geological agency of humans the price for it? He gives a partial positive answer in the beginning. But then he qualifies his position. It is true that human beings have "tumbled into being a geological agent through their own decisions" but the relationship between Enlightenment themes of freedom and the collapsing human and geological chronologies seems more complicated than a simple binary. Dipesh moves a step forward and finds the logical need of "the Enlightenment (i.e. reason) even more than in the past" in this era the Anthropocene. Politics is one channel through which freedom takes common shape in human society, but the problem about it is that "politics has never been based on reason alone".

For Dipesh Chakrabarty, a number of issues loom large in this broad thesis of the Anthropocene. First, the crisis of climate change should produce anxieties precisely around futures that "we cannot visualize". Second, scientists' hope for reason is often modified by the actual politics of the scientists, as argued by Bruno Latour (*Politics of Nature:How to Bring the Sciences into Democracy*,1999). Edward Wilson (*The Future of Life*, 2002) further articulates it by bringing the sense of practicality as a philosopher's hope by writing thus: "Perhaps we will act in time". Mark Maslin (*Global Warming: A Very Short Introduction*, 2004) is more pessimistic as he thinks that it "is unlikely that global politics will solve global warming", and further suggests that "we must prepare for the worst and adapt". In the last analysis, therefore, the question of human freedom remains under the cloud of the Anthropocene.

How can we place Global Histories of Capital in conversation with the Species History of Humans? The answer to this question appears to Chakrabarty as the third important thesis of climate change. It is generally accepted that climate change may end up accentuating all the inequities of the capitalist order if the interests of the poor and vulnerable are neglected. The problematic

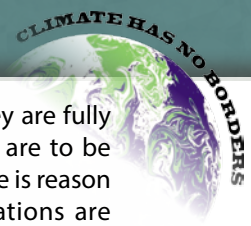
of globalization, however, often leads us to read climate change as only a crisis of capitalist management, but critique of capital is not sufficient to address all the questions concerning the crisis of climate change.

Here scholars make a distinction between the recorded history of human beings and their deep history. As Wilson has put it, "Human behavior is seen as the product not just of recorded history, ten thousand years recent, but of deep history, the combined genetic and cultural changes that created humanity" over hundreds of thousand years. The intellectual appeal of deep history is further strengthened by Smail's work. Second, considering the current phase of global warming as anthropogenic in nature is not enough unless we can ponder about its consequences. "The consequences make sense if we think of humans as a form of life and look on human history as part of life on the planet." Global warming threatens not only the geological planet but also the very conditions, both biological and geological, on which the survival of human species and other forms of life depends. Thirdly, the importance of species thinking has also to be understood as a useful category in thinking about the nature of the current crisis. As species thinking connected to the enterprise of deep history, we need a longer view not only to understand our species but more firmly to secure its future. In addition, the idea of species may induce a powerful degree of essentialism in our understanding of humans.

Some doubts linger about the use of the idea of species in the context of climate change. One instance is that all the anthopogenetic factors are part of a larger story: the unfolding of capitalism in the West and its worldwide impact. Chakrabarty thinks that is only a partial story. There is nothing inherent to the human species that has pushed it finally into the Anthropocene. The way to it was no doubt industrial revolution. But the narrative of capitalism is not sufficient as a framework for interrogating the history of climate change and understanding of its consequences. They are connected with the history of life in the planet, the way different life forms connect to each other, and the mass extinction of one species could spell danger for another. "Without such history of life, the crisis of climate change has no human 'meaning'."

Probing the limits of historical understanding in the context of species history and the history of capital forms the last part of the theses considered by Dipesh Chakrabarty. 'Historical consciousness' is constituted in the accepted tradition of the subject as a mode of self-knowledge gathered through critical self reflections on one's own and others' (historical actors) experiences. In this context, there can be experience of capitalism, as brilliantly reconstructed the working class counterpart of it by E. P. Thompson. But humans can never experience themselves as a species. They are only an instance of the concept species along with any other life form. But one never *experiences* being a concept.

A thoughtful objection to it has been raised by Ursula Heise (*Imagined Extinction: The Cultural Meanings of Endangered Species*, 2016). She argues that "humans may not normally be able to experience themselves as species – any more than they are able to experience themselves as a nation" but institutions, laws, symbols and forms of rhetoric also can serve as abstract categories. Here Chakrabarty's answer is evasive. He, however, more forcefully speaks of a certain dominant collectivity that even contains non-living things such as technology as part of itself. Secondly, discourses on the crisis of climate change can produce "affect and knowledge about the collective human pasts and future that work at the limits of historical understanding". A new universal history of human may flash up in the moment of danger that is climate change, but we can never *understand* this universal. It neither



arises out of the movement of history nor something related to a universal of capital. It can be called a "negative universal history". Heise, again. criticizes this negative universal as it lacks any concrete, positive content. Chakrabarty partly accepts this criticism but extends its meaning in different ways.

One such extension is to see climate crisis as a problem to be solved in historical time by bringing humans and non-humans closer together. Another possible elaboration is to allow the particular to "express its resistance to its imbrications in the totality without denying being so imbricated". Chakrabarty knows that a "negative universal history' in the age of the Anthropocene cannot simply be about humans alone. The non-human should be able to make itself heard without having to be anthropomorphized or without having to speak the language of humans. At this moment, it may work as an ethical adversary at best. Chakrabarty thinks that someday in the future it may be possible to fill up the negative universal history by bringing the concrete identities of humans and non-humans. "Or it may not."

Our examination of the four major reflections of Dipesh Chakrabarty on climate change is not to propose that they are fully exclusive categories or that they are to be uncritically accepted. Indeed, there is reason to believe that Dipesh's formulations are closely connected and they can be stated to represent the combined arguments of a variety of scholarships created from several disciplines, from sciences as well as humanities, in the last 30 years. His unique contribution is, however, to highlight the distinction between global and planetary in the entire exercise. Often global politics and planetary crisis went hand in hand, in the same or opposite direction. We should also not miss the distinct aspects of his arguments: causality and process of climate change, and the urgency and eventuality of its 'solution'. The world's predicament in 2021 is not a far cry from climate change literature. Judged from this perspective, the success/failure of COP 26 should not be assessed from merely the 'face' of it, i.e. the limited range of its 'final' recommendations and their efficacies, but from the deep-seated analogy of the wide scholarship on climate change, generated in the last several decades by a variety of practitioners, scientists, philosophers and historians.

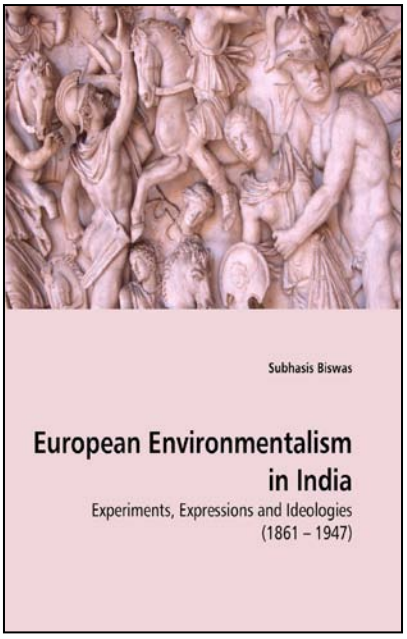
Forestry in British India

Sohini Das
Researcher, Department of History, Jadavpur University

Environmental history had its inception in America during the 1970s and since then it has emerged as an important field of historical enquiry. However, in case of South Asia, it started gaining momentum from the 1990s. Since then, the discipline has enriched from remarkable contributions by stalwarts like Ramachandra Guha, Madhab Gadgil, Richard Grove, Vinita Damodaran, Mahesh Rangarajan, K. Sivaramakrishnan, Ajay Skaria, Archana Prasad, Arun Bandopadhyay, Mahua Sarkar, Ranjan Chakrabarti and Subhasis Biswas. The book, *European Environmentalism in India: Experiments, Expressions, Ideologies (1861-1947)* by Professor Subhasis Biswas is indeed an important addition to the existent knowledge on the history of Forestry in India. He was the one of the earliest historians who

have dealt with the history of forestry in India. The book provides a comprehensive history of forest management in India and focuses chiefly upon the European endeavors taken in India with regards' to Forestry post 1860s till 1947. Professor Biswas has lucidly demonstrated how the imperialistic ties bound all the actors- the forest officials, Christian missionaries and contemporary English authors together.

The book is divided into five chapters. The introductory chapter titled 'Environment, Environmentalism and Environmental History' focuses upon the changing dynamics between man and nature whereby the earlier God centric idea of Nature gave way to a rather anthropomorphic approach. The author traces this development as the natural outcome of Industrial Revolution and the first wave of environmentalism which rather believed in 'Ordering the natural world'. This period also witnessed geographical and scientific discoveries and the beginning of European domination over Asia, Africa and America.



European Environmentalism in India: Experiments,Expressions, Ideologies (1861-1947), Subhasis Biswas, VDM Verlag Dr. Muller, 2010.

The second chapter, 'Experiments: Forestry, Forestry Research and Foresters', builds upon the reminiscences, private diaries and official notes of the forest officials. Tracing the earliest development of forestry in India, the book focuses upon the seven forest officers including Dietrich Brandis. While acknowledging the early afforestation efforts by the botanists, silviculturists and scientists, the author does not consider them innocent of imperial motives. This in turn challenges the central premise of Richard Grove's argument. Professor Biswas has provided a rich account of the individual forest officials and their individual efforts at forest conservancy, management of natural resources etc. while simultaneously revealing their contradictions. For example, F.W. Champion who served as a member of the Indian Forest Service in Uttar Pradesh while writing about Indian forests never discussed about the forest people with whom he had interacted, as the forest officer, for 15 years. He points out that despite their training in Germany or England which made them conscious about preserving the flora or fauna, while in service they chiefly served the imperial needs.

The third chapter, 'Expressions: Literatures', focuses upon literary expressions which included personalities like Jim Corbett, Rudyard Kipling and even poets like P.B. Shelly, Lord Byron and their writings on the Orient. From the works of the early Romantics like Shelly, Byron, Coleridge Keats in case of England and John Muir, Henry David Thoreau in America we find glimpses of early environmental degradation. These writers tried to defend nature and were opposed to industrial developments, big towns, degradation of forests and criticized such domination of nature. But the writings of the Romantic poets particularly, Byron and Shelley, created an imagination of the Orient as lush green landscape with abundant forest resources. 'The Assassins' by P.B. Shelley portrays a picture of an ideal society where

'European Enlightenment had joined hands with idealized Upanishadic age'. Such mystic portrayal of the Orient finds its greatest manifestation in the writings of Rudyard Kipling. Through analysis of Kipling's literary works, Subhasis Biswas has shown how from the early days his literary works reflected a strong imperialist tendency despite enormous number of references to Indian forests in his works. Though Kipling's work had no impact on early foresters who came in the nineteenth century, he had significant impact upon later foresters like Harry Champion. Even Corbett's writings and activities reflect such strong imperialist tendencies. Whether it was his affirmation with colonial government's policy of marking certain tribes as criminals or idealizing the inability of people to protest, he was very much complicit in the entire process of empire building.

The fourth chapter titled, 'Ideologies-Missionaries', brings to focus an important and to some extent a lesser discussed aspect, the impact Christian theology had on Indian Environment. The post Enlightenment philosophy of anthropocentric world moved away from the metaphysical and religious explanations of the world. This was opposed to the religious view that prevailed amongst the various tribal communities in India. An important observation has been made by Professor Biwas in this regard where he identifies how despite not having a direct connection with the state, the missionaries acted as an arm of the colonial state machinery. The conversion to Christianity hence detached the tribals from the natural world which they revered as well as protected.

The concluding chapter, 'Towards an Understanding of European Environmentalism in India' argues that the book deals with a particular form of environmentalism that developed in the period after 1860s particularly after the establishment of Forest Research School in Dehradun in 1861 and the first Forest Act in 1865. He reiterates his difference with Richard Grove and has emphasized how the environmental crisis aggravated with the establishment of the Railways. He even pointed out how the global approach by Ramachandra Guha does not take into account the analysis of psychological factors of individuals. He also points out that it is difficult to present a uniform philosophy guiding the literary personnel, forest officials and Christian missionaries alike but it cannot be denied that a common thread of imperialism bound them all.

The central theme of the book revolves around forestry in British India: the agendas of the imperial officers, forest management as well as the personal experiences of the forest officials. Often their personal experiences contradicted their official view which the book has tried to highlight. It aims to bring out the real motives of the European foresters through the analysis of the activities and writings of many Europeans writers, academicians and the Christian missionaries. Instead of finding out one single ideology, the author has brought out the similarities among the perception of various actors. The book celebrates the achievements as well as points out the contradictions and limitations within imperial forest policies and linked these issues with the environmental crisis of colonial India.

The author, Life member of The Asiatic Society, died of COVID on 15th September 2020. It is a severe loss for the academic world.

Books on Environmental Science in the Collection of the Library of The Asiatic Society

Sl. No.	Call No.	Accession No.	Title of the Book	Author	Year of Pub.
1.	577.27 A261e	65124	Environmental scenario for 21st century	S.K. Agarwal	2003
2.	891.21080355 G595e	64766	Environment & ancient Sanskrit literature	Aruna Goel	2003
3.	155.9 B391e	56747	Environment and behavior: an introduction	Robert B. Bechatel	1997
4.	307.7152054 G942e	68493	Environment and ethnicity in India	Sumit Guha	1999
5.	362.196980954 E61s	72919	Environment and health	Abha Lakshmi Sing(ed.)	2010
6.	363.70526 O58e	72191	The environment and international relations	Kate O'Neil	2009
7.	333.73 E61m	69854	Environment and marginality in geographical space	Roser Majoral(ed.)	2000
8.	628.309541 W678e	76703	Environment and pollution in colonial India	Janine Wilhelm	2016
9.	341.762 B274e	68162	Environment and statecraft: the strategy of environmental treaty-making	Scott Barrett	2003
10.	363.70091724 G977e	67216	Environment and the developing world: principle policies and management	Avijit Gupta	2000
11.	364.168 C368e	66215	Environment crime: enforcement, policy & social responsibility	Mary Chifford	1998
12.	333.7 E61w	72233	Environment, development and sustainability: perspectives and cases from around the world	Gordon Wilson(ed.)	2010
13.	362.870954133 S187e	75408	Environment. Displacement and resettlement	Kishor C. Samal	2012
14.	RR 363.7003 E61e	62502-62511	The environment encyclopedia	Ruth A. Eblen(ed.)	2001
15.	304.2 M912e	72887	The environment in world history	Stephen Mosley	2010

Sl. No.	Call No.	Accession No.	Title of the Book	Author	Year of Pub.
16.	333.14 R234e	66360	Environment management: hopes and faith, morality and spirituality	P. Rathnaswamy	2003
17.	346.95414 B215e	58435	Environment, population and human settlements of Sundarban delta	Anuradha Banerjee	1998
18.	111.85 P843e	57154	Environmental aesthetics: ideas, politics and planning	J. Douglas Porteones	1996
19.	923.3 F533e	59212	Environmental and resources economics: selected essays of Anthony C. Fisher	Anthony C. Fisher	1995
20.	304.2 E61k	75191	Environmental anthropology to day	Helen Kopnina(ed.)	2011
21.	577.0954 D225e	70777	Environmental awareness in ancient India	S.P. Das Gupta	2003
22.	371.9044 N264e	59399	Environmental education	Dr. Nasrin	1999
23.	RR 574.503 E61c	59576	Environmental encyclopedia	William P. Cunningham(ed.)	1999
24.	304.28 H893e	72906	An environmental history of the world: humankind's changing role in the community of life	J. Donald Hughes	2010
25.	925.745 E61a	53700	Environmental issues and researches in India	S.K. Agarwal(ed.)	1988
26.	344.046 E61e	70159-70160	Environmental law and economics	David Campbell(ed.)	2007
27.	628 E61w	66214	Environmental modeling: finding simplicity in complexity	John Wainwright(ed.)	2004
28.	333.7 D533e	59279	Environmental networks: a framework for economic decision-making and policy analysis	Kanwalroop Kathy Dhanda	1999
29.	333.7 E61r	70393-70396	Environmental policy: critical concepts in the environment	Jane Roberts(ed.)	2007
30.	577.27 M278e	68646	Environmental pollution	N. Manivasakam	2006
31.	363.73 E56k	72557-72560	Environmental pollution and its control	Amy Klein	2010
32.	344.046 A634e	75108	Environmental protection and human rights	Donald K. Anton	2011
33.	363.7 E61c	68246	Environmental protection in transition: economic, legal and socio-political perspective on Poland	John Clark(ed.)	1998

Sl. No.	Call No.	Accession No.	Title of the Book	Author	Year of Pub.
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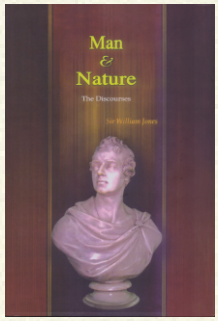

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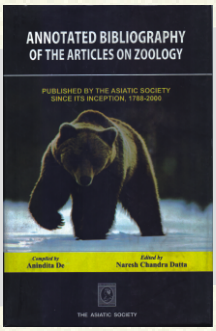

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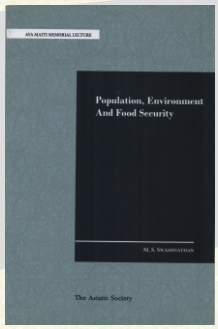

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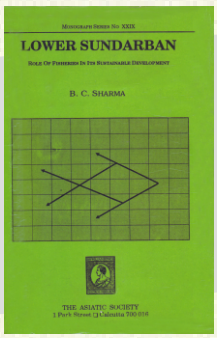

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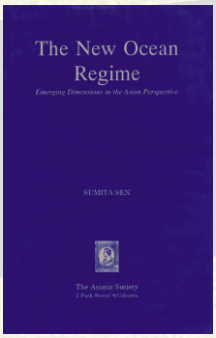

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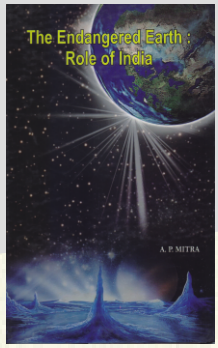

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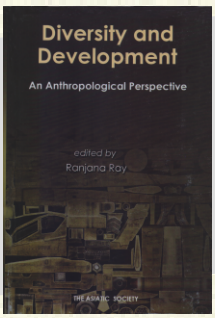

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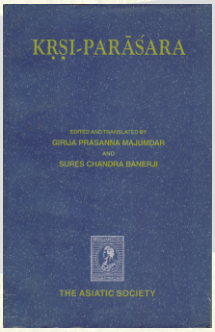

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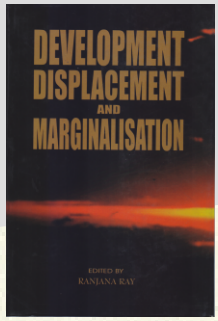

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Theme Song of Protest Movement in Glasgow Summit

All we ever hear from you is blah blah blah

So, all we ever do is go ja ja ja

And we don't ever care about what they say 'cause it's

Ja ja ja ja

Blah blah blah blah

Songwriters: Andrew James Bullimore / Joshua Peter Record / Armin J J D Van Buuren

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