Sukant K. Chaudhury and Pavitranand Ramhota

ECOLOGY, CLIMATE CHANGE AND GLOBAL WARMING: SOME ISSUES

Abstract

Environmental issues have not been of much concern in the 19th century, in fact, not even in the first half of 20th century. The major problems came up after the intensification of industrialisation, urbanisation, consumerism and building of large scale infrastructure. The ecological balance including the mangroves, marshlands, oceans and polar regions face terrible risks. Today ecology at the global level is facing large scale imbalances. Climate change and global warming have entered into our lives which are probably the deadliest thing to happen to human beings. We have already seen many epidemics, several wars including two World Wars but global warming could be more dangerous than the above. In light of the above, this article concentrates on explaining some ideas on ecology and discussing Anthony Giddens' concept of Politics of Climate Change. Further it also discusses the various problems erupting out of global warming and tries to end the discussion with some analysis on sustainable development.

Keywords: Ecology, Climate Change, Global Warming, Oceans, Earth

Today climate change and global warming are vital issues for all of us to understand the crises confronted by the living species including the humans. Both the above issues are intricately linked with ecology. All the countries are always concerned with economic growth but not much concerned with the ecological equilibrium(see Chaudhury 2006 and 2014). Both organic and inorganic inputs for GDP growth have direct and indirect impacts on the environment. They range from resource depletion to acid rain to carbon emission; all causing environmental degradation. Ecology is the study of relationship between living species and their physical and biotic surroundings through the exchange of calories, material and information. It is concerned with all properties having a direct and measurable effect on the demography, development, behaviour and space-temporal position of an organization. Both

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sociologists and anthropologists have dealt with environmental issues since long. Anthropological theories have revolved around culture; it has been viewed as the product of adaptation to a given environment. The various approaches have dealt with environmental determinism, and environmental possibilism. Determinism tells us about the deterministic role of environment in shaping culture, i.e. variables like distance from sea, climate type, temperature, humidity, wild rivers or mountains. They determine personality, physical features, morality, politics, government, religion, material culture, kinship, marriage, etc. On the other hand possibilism, mainly started by Boas, says that environment is only one factor, there are other factors like the historical tradition, geographical, biological & psychological factors (Chaudhury 2014).

Now, we will have a discussion on ecology, where Guha and Gadgil's contributions are immense(I wrote earlier as well, see Chaudhury 2014). Guha (2000) gave five basic categories of social ecology: (i) Ecological infrastructure (soil, water, forests, etc.), (ii) Economy (forces of relations of production, trade), (iii) Social structure (family and kinship, caste and community), (iv) Polity (relations of power, law, the state), (v) Culture (religion, ideology) Guha has raised four important problems out of ecological research (Guha 2000:6-7): first it is class and the use and abuse of natural resources, here the analysis is to examine class influences on natural resource use and abuse of how rich farmers, industrialists and bureaucrats selectively channelize water, forests and other natural resources for their own benefit, but only at a substantial cost to the environment and disadvantaged social groups.

The second is social structure and natural resources, here the question arises with the role of traditional institutions in mediating human interactions with nature. Guha asks – did for e.g., the division of labour between the sexes in different peasant and tribal communities, give rise to fundamentally different attitudes to nature on the past of women? Again, what were the responsibilities of caste and village institutions in regulating the use of forests, water and other common resources? What have been the effects of recent environmental degradation a gender relations, or on the autonomy of the caste and the village, The third is conflict and natural resources, here conflicts over natural resources are an increasingly visible presence in the social landscape of contemporary India. At the time of writing, conflicts over forest – so prominent in the seventies and early eighties – are now being superseded by conflicts over water, in particular the popular opposition to large dams. The ongoing movement against the Sardar Sarovar dam on the Narmada River, that will displace tens of thousands of villagers, is a recent of this. The Indian environmental movement has its genesis in these conflicts, in contrast to the west where aesthetic and biological concerns have been more important in creating a constituency for environmental protection. For the sociologist of conflict and social movements, past and present conflicts over nature are an important if neglected field of enquiry.

The Fourth is culture and environment, where Guha says a distinction should be made between folk culture and high culture. In case of the former, one may ask what are the various representations of nature in folk cosmology and art? What kinds of knowledge have local communities had of their natural environment? Are recent patterns of social and environmental change affecting folk cosmology and knowledge systems? Whereas, high culture is the proper environment debate, i.e. the study of the altitudes of different religious and political philosophic to nature and the emergence of the new theories of environment and development. Thus there is a rich ideological debate on development options in contemporary India. At one end of the spectrum stand technological optimists who reject the notion of ecological limits to growth; at the other end, romantic environmentalists who wish India to turn its back on economic development altogether. There is in between a vast middle ground, occupied by those who try to reconcile, through technical and institutional means, the often competing claims of environmental sustainability and rapid economic growth.

On the consumption of natural resources there are three types of people in India: (a) Ecosystem people are those who depend on the natural environments of their own locality to meet most of their material needs. They are India's poor masses numbering about four-fifths of India's rural people and over half of the total population. According to Gadgil and Guha (*ibid*.) they earn barely enough to fill their bellies. They have to scratch the earth and hope for rains in order to grow their own food, must gather wood or dung to cook it, must build their own huts with bamboo or sticks of sorghum dabbed with mud and must try to keep out mosquitoes by engulfing them with smoke from the cooking hearth. (b) Ecological refugees are those who are the victims of shrinking capacity of ecosystems. They are the displaced millions of India's peasants and tribals constituting about one third of the population. They live on the margins of islands of prosperity, as sugarcane harvesters in western Maharashtra or farm labourers in Punjab, as hawkers and domestic servants of Patna or Hyderabad. (c) Omnivores are the remaining one-sixth of India's population who are the real beneficiaries of economic development. They include rich landowners, entrepreneurs, urban professionals, government and semi-government employees. They are rapidly gaining wealth and prestige and have good purchasing power. They enjoy the produce of the entire biosphere.

Thus, it is clear that ecological equilibrium is essential, which has been lost due to climate change and global warming.

Climate Change and Global Warming

Climate change is an important phenomenon these days. People of different countries have expressed their concern over it. It has been widely discussed and analysed by Anthony Giddens, in his book *Politics of Climate Change* (2009). Global warming and climate change are intricately related.

Imagine in about 60-70 years, hence the earth will be warmer by 4 degree Celsius, what will happen to our future generations. We are all falling into the trap of greenhouse gases which is causing global warming. They are CFC (Chlorofluorocarbons through regular use of gadgets like refrigerators and air conditioners, CH2(through wetland) and CO2 (through industries, SUVs, gas, oil, coal etc).

To tackle this problem our leaders have met several times, they met at Rio de Janeiro in 1992, Kyoto in 1997, Bali in 2007 and Paris in 2015. These climate conferences were wonderfully settings the goals to limit the temperature by taking multi-dimensional steps. But things were not good at the level of implementations. On 2nd Dec 2018 about 28,000 representatives from 200 countries met at Katowice in Poland. The main objective was to determine how to implement the Paris agreement which committed all countries to reduce Green-house emission and limit global temperature to rise below 1.5 degree Celsius above pre industrial levels by 2030.

Further the Intergovernmental Panel on Climate Change (IPCC) Report of 2015 predicted that if global warming continues at the current rate then it may rise by 14 to 26 degree Celsius between 2046 and 2065 (Sarkar 2020). Sarkar (2020) says that IPCC predicted occurrence of more severe events which will affect rainfall, snowmelt, river floods and groundwater. In the warm climate water evaporation from land and ocean will increase, then the hydrological cycle will be more intense with higher rainfall, floods, drought, erosion, sedimentation and silt deposition due to the change of course of rivers. Besides he pointed out that the growth of algae is dangerous for aquatic life as well as human life as algae becomes toxic. He also says that due to climate change, ocean gets warm leading to water expansion and rising of sea level. It adversely affects quality of water, contaminates fresh water, groundwater becomes saltier. The emissions from power industry will increase in the coming years leading to severe problems. Sarkar suggests that India must enhance its groundwater storage capacity as it contributes to 62 percent in irrigation, 85 percent in rural water supply and 45 percent in the urban water supply (Sarkar 2020).

Climate change in terms of global warming is causing large scale damage to the sea,i.e, there has been an uneven sea level found over the last 25 years, reported by Mumbai Mirror(2018:22) in a news item. The report says that the Journal of Proceedings of the National Academy of Science suggests that regions of the world where seas have risen at higher than average rates can expect the trend to continue as the climate warms. The rising sea level would pose severe threat to the coastal communities. Today the global rate of rise has been averaging 3 millimetres per year. But there has been regional imbalance.

Writing about effects of Climate Change in Mauritius, Vadamootoo

(2020) says that there has been human induced climate change in Mauritius. In a small isolated island like Mauritius, people should be solely responsible for sustaining their own environment. There has been excessive consumption of water and electricity and excessive use of beaches in Mauritius. With a gradual rise in the sea level, erosion of the beaches has become a regular phenomenon. Therefore Vadamootoo suggested planting of coqueluche trees which are strong and also spread roots and also huge bolder fencing measures. He suggested a paradigm shift by changing the mindset of the people such as minimising the use of water and electricity, building family friendly parks with walking tracks, play equipment for children and picnic areas for all age groups. He stressed on the importance of use of solar panels.

A news report said that India could gain 3 trillion to 8 trillion dollars of health benefits by making efforts to limit global warming to 1.5 degree Celsius by the end of this century as reported by WHO. It says that over one million lives can be saved every year worldwide from air pollution alone by 2050 by meeting the goals of 2015 Paris Agreement. The values of the health gains is estimated to be around twice the cost of the policies, while the largest gains would be expected in China and India. Over two million deaths occur prematurely in India due to pollution, accounting for 25 percent of the global deaths due to air pollution, said the WHO Report titled "Health and Climate Change".

Hindustan Times. 2019. "India must step up efforts to tackle climate change", Hindustan Times, 9 August ("Climate Change and Land", August 8th 2019). An Editorial Analysis of Hindustan Times- The UN Report said that land is heating faster than the oceans. The average surface temperature is now 1.5 degree Celsius higher than in the late 19th century. This is affecting food security as heat, drought and changes in rainfall damage crops. India faces a grim situation. The analysis quoted the idea given by TERI (A New Delhi based Think Tank), that an economic loss of 2.5% of GDP due to land degradation in India. Already 30% land degradation has taken place in India. Degradation can also be controlled by cutting emissions, providing sustainable food and reducing poverty, conservation and efficient use of natural resources. It also pointed out to the UN Report which said that meat consumption must fall to curb global warming, reduce growing strains on land and water and improve food security and biodiversity. It indicates going for climate sensitive food and less wastage. Alternative grains may cope better than continuing rely on water intensive rice and wheat (Hindustan Times, 8th August 2019).

As said earlier climate change particularly in terms of global warming would lead to both cyclones and droughts. Amitav Ghosh, a renowned award winning author and anthropologist, who is also an authority on climate change, said that the cyclones both in Odisha and West Bengal, especially in Kolkata are partly occurring due to warming up of Bay of Bengal. He gave the instances of (The Times of India, 2020) several cyclones: Cyclone Alia struck in 2009, Cyclone Bulbul struck in 2019

and many more. In fact, I have witnessed many cyclones as I belong to Odisha. In my childhood days I recollect only one or two cyclones in 1970-71. But the 1999 super cyclone was terrible which killed thousands of people, uprooted lakhs of trees, killed many animals and spoiled lakhs of acres of agricultural land.

Then cyclone Phailin struck in 2013, cyclone Hudhud struck in 2014, cyclone Fani struck in 2019. Thus, it shows that climate change particularly global warming has been dangerously occurring in the past thirty five years. We have seen warmest years and every year the warmth is breaking its own records. A report on global temperature rise said that the planet's average surface temperature has risen about 0.9 degree Celsius since the late 19th century. The change has been mainly driven by increased carbondioxide and other human made emissions into the atmosphere. Further it says that most of the warming occurred in the past thirty five years. The global sea level rose about 200 millimetre in the last century. The rate in the last two decades, however, is nearly double that of the last century and is accelerating slightly every year. The oceans have absorbed the increased heat, i.e., the top 700 metre of the ocean showing warming of more than 0.4 degree Fahrenheit since 1969. It also reported that since the beginning of the Industrial Revolution, the acidity of surface ocean water has increased by about 30 percent. This increase is the result of humans emitting more carbon dioxide into the atmosphere and hence more being absorbed into the oceans. The amount of carbon dioxide absorbed by the upper layer of the oceans is increasing by about 2 billion tonnes per year (The Times of India, 2020).

The Times of India in a piece titled, 'A Lonely Planet' discussed the environmental and ecological situation consisting of marshlands, mangroves, oceans and polar regions. Marshlands consist of fresh-water marshes found at lakes and river mouths. They cover about 6 percent of the earth's surface and prevent soil erosion. The regions are rich in biodiversity having insects and birds but climate change has altered the water levels and fishing, hunting and dam building have threatened extinction of marshland species. There have been many endangered species like the whooping crane, the whistling duck, the Western swarm tortoise, the pirate perch and the glorious kingfisher bird (The Times of India, 2020).

A mangrove is a tidal swamp which forms along lagoon islands and tropical deltas. It is marked by high salinity and its ecology combines both fresh water and oceanic ecosystem. However due to the rising sea levels, there has been a threat to mangroves. Further agrochemicals and oil spill pollution are destroying mangrove habitats (The Times of India, 2020).

The aquatic ecosystems are found in all five oceans spread throughout the world, i.e., Arctic, Atlantic, Pacific, Indian and Southern or Australian Ocean covering about 70 percent of earth's surface. But all the oceans are under serious threat from fishing, whaling, plastic pollution, oil spills and pesticides are all destroying the habitats of most of the organisms of the oceans (The Times of India, 2020).

Polar regions means the polar ecosystem found in the North and South Poles. It has floating ice caps in the frozen land and oceans having polar barrens and tundra. It also has polar vegetation and the temperature dropping to -50 degree Celsius in the Arctic and -89 degree Celsius in the Antarctic. Because of climate change there have been severe extinction risks. It has caused melting of ice caps, destruction of habitats (The Times of India,2020).

The New York Times reported (The Times of India,2020) in a piece titled "Preserving Ecological Balance is Crucial for Us", that all the dangers due to climate change and global warming can be controlled up to some extent. The humans can stop or at least limit the damage. For example, deforestation accounts for about 10 percent of worldwide greenhouse gas emissions. It can be controlled through afforestation and preservation of forests. It suggested that ecosystem matters because of many factors including ecosystem's balance of life through marshlands, oceans, polar regions etc. The rich Tropical Rainforest works as a Carbon Sink for about 50 percent of all atmospheric carbon released annually. Tropical Rainforests recycle water vapour and thus impact cloud formation and rainfall. The Tropical Rainforest ecosystem power about 28 percent of world's oxygen turnover, transformingcarbon dioxide into oxygen through the process of photosynthesis. Therefore, some control and limit to maddening consumerism and excessive natural resource exploitation have to be done. The Times of India.2020. 'A Lonely Planet'

The green thinkers have been lamenting on excessive growth model, resource depletion, and pumping toxicity. They disagree with the notion of G.N.P. as an indicator of welfare particularly in the developed countries. On one hand oil and gas prices are growing up and other hand global warming and climate change are intensify, hence attention should be given to increasingly green factors. It is a question of responsibility and accountability which lies with the politicians. Giddens supports the idea of "Limits to Growth" and "Polluter Pay". For instance, he talks about people use SUV and says people do not know what kind of dangerous things it contributes to. He says that the drivers have to be aware that they are contributing to a crisis of epic proportions concerning the world's climate (Giddens 2009: 1).

The politics of climate change has to cope to with the "Giddens's paradox". It states that since the dangers posed by global warming are not tangible, immediate or visible in the course of day to day life, however awesome they appear, many will sit on their hands and do nothing of a concrete nature about them. When something serious and visible comes then it will be too late. Giddens(2009)provides his advice to policy makers to follow four themes:

i) Promote political economic convergence in an active way, make policies in an innovative and energetic ideas so that entrepreneurs could maximise the economic advantage of an enlightened environment policy. It should have wide spread public support that it should develop less dependence SUV's and reducing carbon emission

- ii) People should be made to realise that climate change is problematic in everyday life, therefore target fulfilment approach should be avoided. Carbon taxation is one of the alternatives.
- iii) Avoid making political capital out of global warming, all should work together with consensus across political parties.
- iv) Set up detailed risk assessment procedures stretching into the long term.

Brian Davey says that Giddens does not like risk management approaches and green emphasis on localism, decentralization and participatory democracy. Further he does not like a typically green distrust of corporate interest. He provides a list of new ideas for an establishment real politic approach to climate change. In fact the then president of U.S.A. Bill Clinton hailed the book as a land mark Giddens wants both public and business to change and adopt a lower carbon way of doing things. However, this is not alarming vision because the climate scientists speak about radical majors which requires tougher targets. Giddens is interested to change the public policy climate scientist Fred Pearce earlier said that there will be alarming scenarios concerning environmental degradation and climate change. Adding to that he also said that nature may take revenge and there may be violent and sudden changes. In fact the recent flood in Uttrakhandvalley in India has been totally violent and changes were sudden. Giddens question that now does one know 'Nature will take revenge' for our influence? I think Giddens was taken with a surprise with regard to the above question in light of many natural calamities. Thus, both politicians and peoples do not gauge the alarming danger ahead. The last time the word's temperature rose by 6 Celsius and 95% of all species became extinct. In this manner it is required the political will to rise to the challenge posed by the climate science(Chaudhury 2014).

Undoubtedly we are not the culprits, the US and China are producing maximum greenhouse gases. However the common man can contribute their best to limit things like not having shampoo bath daily. It prevents him using more water in fact we are in a campaigning mode, i.e., saying we must stop abusing nature and not in action mode, which we got to do at the earliest.

Green Party

This party has come up recently which is an urbanized political party based on principals of green politics such as social justice, grass roots democracy, non-violence and environmentalism. Greens believe that for establishing world piece the above issues are intricately linked with each other. Green party exists in about 90 countries. Green party is a party which emphasizes on environmental causes whereas, formally organized green parties

follow a convenient ideology which include not only environmentalism but also other factors such as social justice, consensus decision making and non-violence. The Global Greens Charter has 6 guiding principles: ecological wisdom, social justice, participatory democracy, non-violence, sustainability and diversity. Depending on the local conditions or issues the platforms and alliances may vary. Green parties are often form in a given jurisdiction by a coalition of scientific ecologists, community environmentalists and local or national leftist group or groups concerned with piece or citizen rights.(Chaudhury 2014).

Ecofeminism

It deals with the relationship between feminism and ecology. There is a connection between women and nature as both of them have faced the oppression of the patriarchal society in general and the western society in particular. It was mainly propagated in India by Vandana Shiva and Maria Mies through their book *Ecofeminism* (1993) who criticize modern science and its acceptance as a universal and value free system. Modern science projects mainly western men's values because scientific knowledge is controlled by men; they provided the examples of medicalization of child birth and the industrialization of plants reproduction. Earlier child birth was dependent on midwife knowledge and now it is dependent on specialized technologies and experts. Agriculture today is dependent on technological input including industrially produced seed and fertilizer. The patriarchal structure justifies the dominance through religious and scientific constructs. Women have a special connection with environment particularly in small scale societies they worship trees, hence, nurture them, local knowledge should be given priority over technological knowledge for which ecofeminism would be more effective. (Chaudhury 2014).

Sustainable Development

As said earlier there is an intimate link between ecology and culture in human societies in general and small scale societies in particular. Economy forming the cultural core is conditioned by changes in ecological cycle for small scale societies as people mainly depend on nature and its products. Hence, any attempt to control externally the ecological system culminates in a disastrous situation. Such a situation has come in our country because of two chief reasons (a) large scale destruction of environment due to construction of river dam projects, heavy industries & other developmental activities and (b) maddening consumerism. Here we do not want to undermine the small scale consumers like the tribals. They are also involved in the sequential exhaustion process through their continued dependence on forest resources. For instance, the Bhutias of Chamoli use the stem of a freshly cut mid-sized tree for the Devi worship every month. Large scale shifting cultivation, use of minor forest produce among other things are only a few instances of such consumption.

For instance, among Kondhs, shifting cultivation still continues (Chaudhury 2004). No doubt the unscrupulous consumption is only by the civilized modern people. Hence, the concept of sustainable development pertaining to ecology becomes supreme (see for details Chaudhury 2006).

Sustainable development, has come as a sigh of relief in the light of large scale depletion of forest cover. Brundtland Commission firmly put forward that all must ensure that sustainable development must meet the needs of the present without compromising the ability of future generations to meet their needs. It tells us about the use of eco-friendly technology and at the global level agreements have been reached upon among the nations to respect each other's needs. There are few important concepts in it-population, resources, environment and development. Poverty is antithetical to sustainable development. As poverty increases, the environment is degraded, when environment is degraded, prospect for further livelihood decreases. Environmental degradation generates more poverty, thus accelerating the cycle.

Two main problems of sustainable development are (a) people do not believe in an alarming future where resources are finished and (b) political parties in power always see spectacular achievements now and inaugurate many projects, without any proper social cost-benefit analysis. Further, economic inequality persists and it is increasingly found with the rising globalization of culture.

Several suggestions from various studies have come up which are the real issues today: (a) Blending of modern technology with traditional for maximum use of rural resources, so that migration can be controlled. (b) To integrate principles of eco-sustainability with those of eco-efficiency and social equity in development and dissemination of rural technology. (c) Strengthening of organizational & delivery system in the rural area. (d) Efficient and sustainable use of natural resources. (e) A continuous and steady growth of production system which also protects and improves village environmental capital stocks. (f) Integration of conservation and development. (g) Satisfaction of basic human needs. (h) Achievement of equity and social justice. (i) Provision for social self-determination and cultural diversities. (j) Maintenance of ecological integrity. (k) Separate policy for the tribals pertaining to their right on forest. (l) Small scale eco-friendly projects (m) Just consumerism. (n) Mass awareness (o) Increasing education for masses and not only primary education.

In this manner, sustainable development in terms of consumption, agriculture, use of water, use of energy, use of food material, etc are mandatory for the future generations. The endless greedy nature leads to unreasonable exploitation of resources which has raised not only the temperature, but also the sea level, causing harm to the marshlands, mangroves, oceans, polar regions, and so on. Even the deserts and tropical rainforests require a control on global warming. Deserts having low rainfall also support some flora and fauna such as the heat resistant zerophyte plants which store water. The flora and fauna also include the cacti,

some nocturnal animals, birds and reptiles. However, global warming is threatening all of the above. The same thing is happening with the tropical rainforests which are marked with high rainfall and humidity, but they are facing large-scale extinction, particularly their biodiversity. Several governments, civil society organisations, and eminent personalities including Amitav Ghose have expressed their precarious desire to save the planet from the dangerous consequences of global warming. It is the first and foremost duty of all of us to contribute towards the limiting of rising temperature in some way or the other.

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