



Elemental Insight on Climate Change Perspective



Soumyendra Kishore Datta*

Department of Economics, India

***Corresponding author:** Soumyendra Kishore Datta, Department of Economics, DRS (SAP-II) Project Coordinator West Bengal, India

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Introduction

The importance of natural wealth in the perspective of production process has long remained unrecognised on the part of neoclassical economists. It was only during the second half of the last century with the publication of club of Rome report (Limits to Growth, 1972) that people from various disciplines began to discern the significance of protecting the earth's resources from unbridled exploitation. It was also recognised that in order to match the growing human demand for more and more material goods, there has occurred rampant defiling of the environment through activities in industrial, transport and even in agricultural sector. The emission of huge toxic gases in the air by industrial houses, random release of polluted effluents into watercourses, uncontrolled sprinkling of chemical fertiliser and pesticides in the crop fields have led to untoward impact on the biosphere. The adverse impact has largely taken place because of release of huge amount of green house gases like CO₂, CH₄, CFC, NO₂ etc. The result is nowadays perceptible in the form of rise in average temperature, changes in cloud cover, acidic precipitation over land, melting of ice caps, and glaciers, reduced snow cover, rise in land and ocean temperature etc. The adverse impact of climate changes are being felt in the form of uncertainties in agricultural output and forest vegetation, affected human health, unpredictable behaviour of water resources, threatened biodiversity and terrestrial ecosystems. Climate plays extremely great role in regulating the ecosystem process in terms of flow of energy through organisms and living species as well as the material environment. Again ecological processes contribute to the generation of stock and flow of several green house gases including CO₂ that have a bearing on climatic conditions.

The uncertainties associated with climate change issues are so complex and grave that one cannot infer about the likely impact on human environment even over a meaningful economic time horizon. This is because, the sustainability of human life is intricately related to the dynamics of life cycle of all other living objects and even inanimate things which get affected by and also has impact on climate change issues. Thus there is a complex feedback loop in the ecosystem process. The annual life cycle of many species is determined by their location of living and inherent proclivity to migrate during the timing of biological events in their

life or during seasonal changes. Climate change may have impact on habitat of species, their interactive behaviour, and the timing of their reproductive activities. This can substantially transform current ecosystems and adversely affect the food chains which might have deleterious impact on species survivability. Due to climate change many species are compelled to relocate their habitat in relatively ecologically fragile region than before or pursue such biological behaviour that might mismatch the food chain provision for their future younglings.

This is referred to as shifts in species' ranges (the locations for their survival) and shifts in phenology (the timing of their seasonal biological activities). With warming of the earth, many species are shifting their ranges to areas with more tolerable climate conditions, in terms of temperature, precipitation, and other factors. For some species with constrained mobility due to physical conditions required for their survival or because of physiological factors, their roaming ranges are gradually getting shrunk. Thus with the shrinking of sea ice, habitats of animals, such as polar bears and seals are contracting toward the North and South poles. Further biological events are also being impacted by climate change. According to some studies seasonal behaviours in many species now happen 15-20 days earlier than several decades back. For instance, in many cases migrant birds are appearing rather early, butterflies are coming out sooner than before, and budding and blooming in plants are happening faster. Had there been synchronised shifting in seasonal behaviour of all interdependent species, there would not have arisen any problem of mutual sustainability. But in case where the survival needs of one species is mismatched in terms of timing of emergence of another species, such mistiming in appearance of predator and prey may cause great problems.

Again human sustainability on this planet earth is organically related to the availability of right amount of natural resources and their location. Climate change poses threats to the amount of availability and locations of resources produced/controlled by natural systems. There may happen serious damage to resources in aquatic ecosystems that include lakes, wetlands, coastal regions and marine resources. There may occur irretrievable changes in the geographical distribution of species, reproductive instincts and

habits of diverse species of aquatic animal. The most adverse impact of temperature variation is likely to be felt by cool water species in low altitudes where biodiversity may decline and some species may be threatened with extinction. Changes in temperature, humidity and water balance may adversely affect agricultural productivity and seasonal arrival of diverse crops. Besides this, agricultural production may be hampered due to proliferation of invasive species, outbreak of diseases, spread of forest fire, unprecedented flood, weed infestation and variation in soil quality. Extreme events like wild fires and floods, and drought may exacerbate the problem. Projected warming could greatly aggravate the rate of species disappearance, especially in sensitive areas.

It is desirable that in order to mitigate the problems arising from climate change both developed and developing countries work together in a framework of shared responsibility and mutual dialogue and cooperation. However there are hindrances in the way of bringing the diverse group of countries on a common platform and discuss the agenda for a mutually acceptable treaty in the absence of any international institution that might administer, monitor and regulate the activities of the countries. The conditions conducive to international cooperation for reducing the climate change impacts may be briefly listed as

- a) Smallness in the number of participating countries.
- b) Existence of self enforcing type of agreement.
- c) Existence of linked benefits.
- d) A substantial convergence of interest among the negotiating parties.

- e) 'Renegotiation proof' type of agreement.
- f) Provision for punishment for cheating or breaking away the basis of the agreement in the form of economic sanctions or international noncooperation.

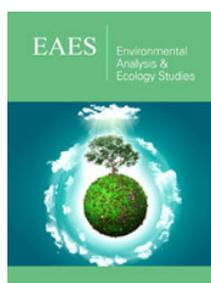
It is important in this context to mention that market failure and externality are involved regarding the issues of climate change. Each country gets better off from cooperation. But each of them has an incentive to free ride on others. Hence external free riding has to be controlled. Further internal free riding also needs to be deterred by provisioning in the agreement for preventing non-signatory countries from noncompliance with the clauses in the treaty. Game theory can analyse the complexity of climate change issues by employing prisoners' dilemma type of game, chicken game or even assurance game. Apart from international endeavours, individuals also can through their personal efforts contribute towards reducing the intensity of adverse impact resulting from climate change phenomenon. These constitute saving energy by non- using electricity in an imprudent manner, putting off the lights when not required, gradually shifting to renewable sources of energy, adopting green commuting, reducing waste and taking recourse to recycling, avoiding use of petrol driven vehicles, harvesting rain water, using LED bulbs, participating in local forestry to enhance the carbon pool capacity of nature. People should not sit tight on their extravagant lifestyle and should exercise prudence and frugality in order pass on a better climatic future to the future generations.



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