

## **Relation between Climate Change and Economic Development --- A Study in World's Perspective**

**Sri Abhijit Pakira**

*Lecturer, MBA, Vidyasagar University Midnapore, West Bengal*

---

**Abstract:** *In the present article an endeavour has been made by the authors to explore the each and every aspects of climate and its change and also whether it is right or wrong. Related changes in processes of economic activities which in turn boosted the economic development rather the global commercial scenario. If it is right, the climate change should bring an anomaly in production processes both directly and indirectly in the agricultural sector, other industrial sector agro industrial sector, health sector due to re-orientation of different diseases, and so on. So it would be a global scope for big wings, as they would get the richest chances to handle the third worlds' global market.*

*On the contrary, if it is wrong, yet the global contemporary environmental issues have developed a fear psychosis, which in turn encourages economic development rather a critical type of consumerism and it may be a market oriented commercial development but not at all a sustainable development which incur the development for all.*

**Key words:** *Climate Change, Economic Development, Epochs, Economic Growth*

---

Date of Submission: 15-06-2012

Date of acceptance: 30-06-2012

---

### **I. Introduction:**

Climate is very important component for a Healthy World. Good Environment helps to create and maintain good Climate for a region. Climate encompasses the statistics of temperature, humidity, atmospheric pressure, wind, rainfall count and other meteorological elemental measurements in a given region over long periods. A region's climate is generated by the climate system, which has five components: atmosphere, hydrosphere, cryo, sphere and land surface that is biosphere as a whole.

The climate of a location is affected by its latitudinal location, terrain, and altitude, as well as nearby water bodies and ocean currents. Climates can be according to the average and the typical ranges of different variables, most commonly temperature and precipitation (rainfall in particular).

### **Objectives of the Study:**

The present study has been undertaken to address the following objectives:

- To unearth the essence of the term climate change and as a lot of confusions exist as to the real meaning and interpretation of the term.
- To identify the parameters that stands / contributes positively towards real economic development of the country.
- To explore the relationships (if any) between climate change and economic development based on the common aspects of both climate change and economic development.
- To determine the evaluative aspects of climate change through thorough literature survey.

### **II. Literature Review:**

The economic analysis of climate change is a comparatively new area of research, numerous research studies have estimated the impacts of climate change on economic growth in different regions of this world. Most of these research studies are statistical and numerical in nature. Few of them are a bit speculative but they do provide a solid and strong foundation for future research.

Because of climate change, some sectors of the economy can grow faster in comparison to the others and at the same time, the size and composition of some countries' gross domestic product (GDP) may change accordingly. Climate change can also affects the long-term growth potential of any country. Furthermore, the effects of climate change are heterogeneous within the countries; it was found that agriculture, coastal zones and elderly people are more heavily affected than their counterparts residing in other parts of the country. (O'Brien, Sygna and Haugen, 2004; Parry and others, 2007;). According to Stern and others (2006), in the next fifty years or so, world temperatures are expected to rise 2-3°C. This increase will have severe negative consequences on economic development as it would affect quality of water, agricultural productivity and health of the human

beings. It was calculated further that about 5 per cent of global GDP per annum can be lost by these impacts. Weitzman (2007) had criticized these findings by indicating that there are uncertainties associated with the measurement of the impacts of climate change on economic development and the conclusions were drawn based on a very low discount rate.

Dell, Jones and Olken (2008) found that because of climate change, the economic growth rate of poor countries can be reduced by 0.6 to 2.9 percentage.

According to Fankhauser and Tol (2005), climate change does affect capital accumulation and people's propensity to save more money, which, in turn can reduce economic growth.

However, Calzadilla, Pauli and Roson (2007) concluded that extreme weather and bad climatic condition would result in savings. Global damage would increase the tendency of the common people across the globe to save more money. Notably, extreme weather is expected to boost investment on the other hand.

According to Lecocq and Shalizi (2007), GDP will be affected directly by variations in demand structure of the products and services even though it seems there is no direct effect of climate change on it. Climate change could result in resource scarcity, which may lead to violent conflict. In consequence it can reduce economic growth in the long-run (Zhang and others, 2007; Tol and Wagner, 2010; Butkiewicz and Yanikkaya, 2005).

### **III. Research Methodology:**

The present study is partly conceptual and partly explorative. Most of the study is based on empirical observations of the authors and thorough literature review which serve as a major source of data base for the study. No primary data has been collected for undertaking this instant study. Information has been gathered to fulfil the predetermined objectives.

#### **Climate Change – The Concept:**

The contemporary issue "Climate Change" sometimes is used to refer specially to changes in climate caused by human activity, as opposed to changes in climate that may have resulted as part of Earth's natural processes. In this former sense, used especially in the context of environmental policy, the term climate change of today is synonymous with anthropogenic global warming. Within scientific journals, however, global warming refers to surface temperature increases, while climate change includes global warming and everything else that increasing greenhouse gas amounts will affect.

The most general definition of climate change is a change in the statistics of the climate system when considered over a long periods of time, regardless of cause. Accordingly, fluctuations over periods shorter than a few decades, such as El Nino, do not represent climate change.

Climate change is a significant and lasting change in the said climate conditions over a periods ranging from hundred to millions of years. So only it is logically possible to make a remark on climate when one could observe and precisely measure and record the amount of different climatic elements throughout the whole earth for coming 100 years or so. Climate is the average of 90 to 100 years. It is possible to include all the variations of the large globe in a span of only 35 to 40 years?

#### **Causes of Climate Change:**

Climate change may be due to natural internal process or external force, or to persistent anthropogenic changes in the composition of the atmosphere or in land use as a new saying.

So far our knowledge goes: the Earth is the only planet in our solar system that supports life. The complex process of evolution occurred on Earth only because of some unique environmental conditions that were present: water, an oxygen-rich atmosphere, and a suitable surface temperature. Only the Earth has an atmosphere of the proper depth and chemical composition. Only very small amount of solar energy reaches the earth, warming the air, oceans, and land, and maintaining an average surface temperature of about 15 degree C and finally by the process of heat balance of the energy is reflected back to space regularly. We must think about the atmospheric gaseous balance of the energy is reflected back to space regularly. We must think about the atmospheric gaseous balance of the globe and so we must consider all geo-chemical cycles and their importance. Since, the atmosphere contains numerous self regulating natural mechanisms, it is not necessary that a minor intermittent increase or decrease in solar radiation would cause a general rise or fall in global temperature. Sun's spots are the most conspicuous features on the solar surface which are simply the huge magnetic storms that occur on the sun's surface, and called solar flare. There is a close relationship between the solar activity and the number of sunspots which increases and decreases in a cyclic manner. Since the climatic conditions are primarily controlled by the Sun any appreciable change in the radiant solar energy would cause climatic variations temporarily. There is circumstantial evidence to prove that over the past 1000 years small advances of valley glaciers in mountain regions are correlated with the changes in solar activity. However, variation in temperature has also occurred in the past – the best known is the Little Ice Age that had struck Europe in the

early Middle Ages, bringing about famines, etc. It is therefore difficult to determine whether current observations of increasing temperature are due to natural variability or whether they have been forced by anthropogenic (man-made) activities.

Scientific studies, different projections are getting further complicated by the fact that the changes in temperature that they have been observing do not occur uniformly over different layers of the lower atmosphere or even different parts of this earth.

The Earth's climate system constantly adjusts so as to maintain a balance between the energy that reaches it from the sun and the energy that goes from Earth back to space. This means that even a small rise in temperature could mean accompanying changes in cloud cover and wind patterns. Some of these changes may enhance the warming (positive feedback), while others may counteract it (negative feedback). Negative feedback (causing a cooling effect) may be the result of an increase in the levels of aerosols (small particles of matter or liquid that may be produced by natural or man-made activities). Positive feedback may result from an increase in water vapour (because of greater evaporation with temp rise), which itself is a GHG and can further add to the warming effect.

All the parameters described above do complicate the work of scientists who try to predict the fallout of climate change. Despite the different uncertainties, the Third Assessment Report published by the IPCC clearly states, 'there is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities'.

#### **Climate Change and Sustainable Development:**

In this juncture, the Contemporary issues like Climate Change and Sustainable Development, we have to go through the core concept of economic development. Economic development basically refers to the sustained, concerted continuous actions of policymakers and communities. These economic developmental activities promote the standard of living and economic health of a specific area. These developmental actions and initiative can involve multiple areas including development of human capital, development of infrastructure, regional competitiveness, environmental sustainability, health and hygiene social inclusion, safety, literacy, and other initiatives.

#### **Climate Change and Economic Development:**

Economic development differs from economic growth. Environment has a big role in both Economic Development and also in Economic Growth. Economic Development is a policy intervention endeavour with the objectives of economic and social well-being of people on the other hand Economic Growth is a phenomenon of market productivity and rise in GDP.

The scope of economic development includes the process and policies by which a nation improves the economic, political, and social well-being of its people. 'Economic development' is a term that economists, politicians, and others have used frequently in the 20<sup>th</sup> century. The concept, however, has been in existence in the Westernization, and especially Industrialization are other terms people have used when discussing economic development.

Mansell and Wehn also state that economic development has been understood since the World War II to involve economic growth, namely the increases in per capita income, and (if currently absent) the attainment of a standard of living equivalent to that of industrialized countries. Economic development can also be considered as a static theory that documents the state of an economy at a certain time. According to Schumpeter (2003), the changes in this equilibrium state to document in economic theory can only be caused by intervening factors coming from the outside. However economic development includes various developmental works and constructions and which also maintains the development of socio-environmental space. So developmental works or economic activities involve the environment directly.

Differentiation in climate is a common phenomenon throughout the globe. So we get different types of climate regions such as tropical monsoon climate region, hot desert climatic region and so on. These climate regions show a wide variation year after year which is also common natural phenomena. As for instance the recorded temperature at Kolkata a weather station of tropical monsoon climatic region must not experience same amount of temperature in each and every particular June day or August Day for all years or all decades. However climatic features which are related with an amount of different climatic elements are completely dynamic, not static and it is an average.

Actually Climate change is a natural and inevitable phenomenon of the nature or globe itself. In this juncture, we can recapitulate the different geological eras and epochs to understand the paleo climate or past climate. It is well known to all that in the Jurassic period /era the climate was largely different and which developed the animal like dinosaur and large gigantic trees also. Again we can remember that situation of Pleistocene age when much of the land surface was covered by ice-sheets and so think about the climatic situation of those days. In those day on one was there for deforestation or fuel-fossil combustion or to emit the factory smoke.

It is quite normal that if we go to a country or village side we must feel cooler environment than the chaotic metropolitan city. So locally, the weather of a region differs due to various other factors mainly like situational vacant space. So breathing problem of a metropolitan city is inevitable but not related with the global climate.

Anthropogenic causes for climate change is a big question. Actually it is the anthropogenic causes for troublesome weather and not the climate. As for example, we can feel the change in dramatic weather situation in a metropolitan city in day and night, or between town and village.

Much discussed culprit green house gases and related ozone hole, also the global warming and global climate change which is a contemporary burning issue of today which is still under discussion and not a final statement. Ozone gas is not a solid plate like matter so normally it becomes thin and by the by become covered by its own gaseous characteristics, it is connoted as hold but actually it is thinning out which is normal dynamic situation cannot be judged as the obligation of man.

The chronological order the geological time scale shows long span of different era with their periods and related epochs namely Hadean, Archean, Proterozoic, Paleozoic, Mesozoic Pleistocene etc and recent which is now continuing in the Epoch Holocene. It is notable that all those eras, periods and epochs had their own characteristic features such as presence of flora and fauna, nature of landmass and specially the **CLIMATE** associated with polar wandering. In this topic, where in general view, human activities are becoming the culprit for the climate change, it is very essential to observe the geological periods/ epochs with glacial activities as a strong document. A geological period of widespread glacial activity is designated as "ice age", when global climate was completely different. The most recent ice age was that of the Pleistocene epoch of Cenozoic era and Quaternary period with massive scale, Within the Pleistocene itself, many important fluctuations of **CLIMATE** took place, where there were no human activities like GHG emitting factories, giving alternating "glacial and interglacial" periods. Besides Pleistocene ice age there were other old ice ages. It is notable and quite normal periods. Besides Pleistocene ice age there were other old ice ages. It is notable and quite normal that interglacial periods are warm and glacial periods are cool. So global climate change is a completely natural phenomena which probably human interference on nature. Now we are living in the habitable interglacial period and waiting for another glacial period which is inevitable phenomena of the natural global environment.

Each and every components of the globe have their own life time and consequential depreciation. The globe has its own life span and consequential depreciation, variation too. The variations in the globe must be included and which requires a wide range of average because Earth and its family is completely dynamic in nature. Several challenges have been accepted in 21<sup>st</sup> century along with many questions. In particular, pertinent questions should come in mind – what is the real embodiment of climate change? Who are the think tanks of this issue? And what is the nature of gathering?

The initial kick of 21<sup>st</sup> century shows us up to what extent the climax of neo- colonization can reach its goal. If we observe the real world we may visualize the radical growth of commercial science in lieu of benevolent classical one.

We admit or not it is very distinct issue that commercial science with a love knot of overwhelmingly publicized so called so called environmental science is invading in the broad absolute space and mental space in lieu of classical science in recent world for profit making culture only, not at all for the sustainable development. It is true that world wide LPG scheme has the authority and a tremendous power to expand the global market sectors for the affluent sections of the third world countries where inequality is the bane in all respect. But it would not be wise to think that poverty stricken large societies would get a minute drop of oozing sweet cream from the upper hierarchy. Because commercial science, which encashes the natural environment ruthlessly, has been targeted a bird's eye profit for themselves only. In the school level economics book (up to XI), industrialization and urbanization have been discussed as main culprits for the changes in climate; It is a peril for the human wisdom as the school going young shoots compel to be distracted by this type of wrong notion and they become the catalyst for the anti industrialization, anti urbanization and above all the antidevelopment programmes although all those functions are needful for their own. However creation of a threatful situation in everyone's mental in the main curriculum of the so called global commercially motivated environmental scientists in recent century for the economy of the western loc. Have we ever been asked or searched the starting period of worldwide precise climatic data record system in all countries through maximum number of weather stations? Actually scientific climate recording system is a recent phenomenon after Second World War and the progress in satellite science. So there are questions related with the climatic data recording system, technology, distributional pattern of weather stations in all regions of all continents and all countries .climate change is a normal part of the Earth's natural variability, which is related to interactions among the atmosphere, ocean and land, as well as occasional fluctuations in the amount of solar radiation reaching the earth. The geographic record includes significant evidence for large scale climate changes in Earth's past. There are numerous potential effects of climate change. Extensive research is being done around the world – a good deal within

NOAA (National Oceanic and Atmospheric Administration) – to determine the extent to which climate change is occurring, how much is of it is being caused by anthropogenic (manmade) forces, and its potential impacts. In some of these areas the consensus among scientists is not felt and in fact, there are often conflicting points - of- view and studies found among the scientists. However, with further research, no doubt many questions regarding impacts will be resolved in the future. Potential impacts most studied by researchers include the effects on sea level, draught, local weather and hurricanes. So it is not considered as global climate change. Most of our current knowledge of global change comes from General Circulation Models (GCMS). At present, GCMs have the ability to provide us with a mean annual temperature for the planet that is reliable. Regional and local temperature and precipitation information from GCMs is at present unreliable. The core theme of the topic is the relation between climate change and Economic Development as a global aim/ target to ensure to ensure LPG scheme. So now we have to observe the actual relationship between these two. The basement for the limited but high intensity/ potential market has already been ready through the preparation of mental set up of consumers.

Now -a day, consumerism and related economic progress for few corporate houses are presenting innumerable goods which are directly related with the global warming, environmental degradation and so called climate change. As for example the sudden boom of sales of air condition machine to a large extent and as if present day's intolerable temperature is a now climatic condition. Recent media culture and their propaganda for their marketing are motivating us tremendously such as: Climate change, necessity for trees, so use of plywood and interlinked import. Climate change, global warming and carbon trading is another distinct example. Climate change so the reorientation of fatal diseases and their increasing intensity brings different types of vaccines, medicines and boost up the profit of corporate by the large market threat convinced mass. Climate change, Global warming and related harmful effect of ultraviolet rays is motivating us to us different types of lotions with sun protection factors. Present day's so called climate change inclines towards the avoidance of our existing food habit as it is harmful for heart, kidney etc. So, we have to change the edible oil and as a consequence it has strengthened the other edible oil economy of foreign country. Have we ever made any endeavour to search sun flower production field in our country. The answer is 'no'. The environmental degradation and associated business with water is also notable. So called climate change and its harmful effect on cop such as plant disease, low production and so new variety of corporate supplied seeds, FDI in retail marketing etc are the new horizons in the name of "CLIMATE CHANGE". So polarized economic development is a must in the 'blue coloured sky'.

Progress of trade & commerce, expansion of market, creation of new economic activities, increase in sale etc are inevitable and needful too, but it must not be permissible to encash the environment, and climate in particular, for the above mentioned progress in the 3<sup>rd</sup> world countries like India; because wide variety of Indian mass and the related level of acceptance would be submerged in a critical livelihood situation by pincer movement.

#### **Climate Change Impacts on Global Economy:**

Economic research on climate impacts has long revealed that only a limited fraction of the market economy is vulnerable to climate change: agriculture, forestry, tourism and water resources can be badly affected by this climate change. (Pearce et al. 1996). The impact of climate change on economic development is not that huge. But the impact is felt in different developing countries. The economies of many countries are more vulnerable to climate change then the developed countries. They also tend to be in the low latitudes where the impacts to these sectors will be the most severe. The countries in low latitudes remain too hot for the most profitable agricultural activities and any kind of further warming would further reduce the productivity. Up to 80 percent of the damages from climate change could be concentrated in low-latitude countries. Thus it is becoming country specific in nature.

Other sectors that could be damaged across the world include timber, water, energy, coastal, tourism and recreation. Water models tend to predict there would be damages as flows in major rivers would decline. However, the size of the economic damages could be greatly reduced by allocating the remaining water effectively and efficiently (Hurd et al 1999; Lund et al. 2006).

#### **IV. Conclusions:**

So we should have to go through the way of real classical science and understand the plotted way of distraction which is increasing in the name of Climate Change and environment (nature) – a soft target. Unipolarized global diplomacy has been put forward a pair of issue in front of 3<sup>rd</sup> world countries where item one is economic development with big talk 'sustainable development' and item number two is the 'environmental degradation' along with the 'threat of climate change'. These two items are interrelated and here lies the distraction. So the peoples, on the hors of dilemma, are refusing any act of developmental work for their own welfare by the plotted threat of environmental degradation and related climate change. Harmony or conflict

between nature and economic activities, environment ethics – human right and higher needs – sustainable development have been mingled up to form a complex situation of livelihood. So we may hope only that people would be able to rend the snare through proper learning and wisdom.

**Reference:-**

- [1]. Adams, R. M., C. Rosenzweig, R. Peart, J. Ritchie, B. McCarl, J. Glycer, B. Curry, J. Jones, K. Boote, and L. Allen. 1990. "Global Climate Change and U.S. Agriculture." *Nature* 345: 219–224.
- [2]. Butkiewicz, J.L., and H. Yanikkaya (2005). The impact of sociopolitical instability on economic growth: analysis and implications. *Journal of Policy Modeling*, vol. 27, No. 5, pp. 629-645.
- [3]. Calzadilla, A., F. Pauli, and R. Roson (2007). Climate change and extreme events: an assessment of economic implications. *International Journal of Ecological Economics and Statistics*, vol. 7, No. 7, pp. 5-58.
- [4]. Dasgupta, P. 2008. "Discounting Climate Change." *Journal of Risk and Uncertainty* 37: 141–169.
- [5]. Dell, M., B.F. Jones, and B.A. Olken (2008). Climate change and economic growth: evidence from the last half century. Working Paper, No. 14132. Cambridge, MA: National Bureau of Economic Research.
- [6]. Fankhauser, S., and R.S. Tol (2005). On climate change and economic growth. *Resource and Energy Economics*, vol. 27, No. 1, pp. 1–17.
- [7]. Hurd, B., J. Callaway, J. Smith, and P. Kirshen. 1999. "Economic Effects of Climate Change on US Water Resources." In R. Mendelsohn and J. Neumann, eds., *The Impact of Climate Change on the United States Economy*. Cambridge, UK: Cambridge University Press.
- [8]. Kurukulasuriya, P., and R. Mendelsohn. 2008a. "A Ricardian Analysis of the Impact of Climate Change on African Cropland." *African Journal Agriculture and Resource Economics* 2: 1–23.
- [9]. Lecocq, F., and Z. Shalizi (2007). How might climate change affect economic growth in developing countries? Policy Research Working Paper, No. 4315. Washington, D.C.: World Bank.
- [10]. Lund, J., T. Zhu, S. Tunaka, and M. Jenkins. 2006. "Water Resource Impacts." In J. Smith and R. Mendelsohn, eds., *The Impact of Climate Change on Regional Systems: A Comprehensive Analysis of California*. Northampton, MA: Edward Elgar Publishing.
- [11]. Mendelsohn, R., W. Nordhaus, and D. Shaw. 1994. "Measuring the Impact of Global Warming on Agriculture." *American Economic Review* 84: 753–771.
- [12]. Neumann, J., and N. Livesay. 2001. "Coastal Structures: Dynamic Economic Modeling." In R. Mendelsohn, ed., *Global Warming and the American Economy: A Regional Analysis*. England: Edward Elgar Publishing.
- [13]. Ng, W., and R. Mendelsohn. 2005. "The Impact of Sea-Level Rise on Singapore." *Environment and Development Economics* 10: 201–215.
- [14]. Nicholls, R. J. 2004. "Coastal Flooding and Wetland Loss in the 21st Century: Changes under the SRES Climate and Socio-Economic Scenarios." *Global Environmental Change* 14: 69–86.
- [15]. O'Brien, K.L., L. Sygna, and J.E. Haugen (2004). Vulnerable or resilient? A multiscale assessment of climate impacts and vulnerability in Norway. *Climatic Change*, vol. 64, No. 1-2, pp. 193-225.
- [16]. Pearce, D., W. Cline, A. Achanta, S. Fankhauser, R. Pachauri, R. Tol, and P. Vellinga. 1996. "The Social Cost of Climate Change: Greenhouse Damage and the Benefits of Control." In *Climate Change 1995: Economic and Social Dimensions of Climate Change*. Intergovernmental Panel on Climate Change. Cambridge, UK: Cambridge University Press.
- [17]. Seo, N., and R. Mendelsohn. 2008a. "A Ricardian Analysis of the Impact of Climate Change on South American Farms." *Chilean Journal of Agricultural Research* 68: 69–79.
- [18]. Sohngen, B., R. Mendelsohn, and R. Sedjo. 2002. "A Global Model of Climate Change Impacts on Timber Markets." *Journal of Agricultural and Resource Economics* 26: 326–343.
- [19]. Stern, N., and others (2006). *Stern Review: the Economics of Climate Change*. London: HM Treasury.
- [20]. Tol, R.S.J., and S. Wagner (2010). Climate change and violent conflict in Europe over the last millennium. *Climatic Change*, vol. 99, No. 1-2, pp. 65-79.
- [21]. Weitzman, M. (2007). A review of the Stern Review on the Economics of Climate Change. *Journal of Economic Literature*, vol. XLV, pp. 703-724.
- [22]. Zhang, D., and others (2007). Climate change and war frequency in Eastern China over the last millennium. *Human Ecology*, vol. 35, No. 4, pp. 403-414.
- [23]. National Oceanic and Atmospheric Administration ([www.Noaa.gov](http://www.Noaa.gov))
- [24]. [En.wikipedia.org/wiki/Climate\\_change](http://En.wikipedia.org/wiki/Climate_change)
- [25]. [www.unep.org/climatechange](http://www.unep.org/climatechange)
- [26]. [Envfor.nic.in/cc/index.htm](http://Envfor.nic.in/cc/index.htm)
- [27]. [www.epa.gov/climate\\_change](http://www.epa.gov/climate_change)
- [28]. [www.indiaclimateportal.org/how-climate-change-affects-india](http://www.indiaclimateportal.org/how-climate-change-affects-india)
- [29]. [Climate.nasa.gov](http://Climate.nasa.gov)