SOCI0-ECONOMIC IMPACT OF CLIMATE CHANGE; A SPECIAL REFEFERENCE TO INDIAN HEALTH CONDITIONS

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Abstract: Discussion on problems of climate and environmental changes i.e. global warming has grabbed the world's attention in recent years. Every major newspaper publishes multiple editorials or op-ed pieces on the topic, the broadcast media and researchers regularly discuss the issue, and thousands of Web pages and blogs provide definitions and information and suggest causes and consequences of action and inaction. Under the situation why are we adding to congestion on the subject?

In the present paper, science of climate change is not evaluated as the authors do not have the expertise to contribute on this matter but the paper respond to socio-economic effects of the climate and environmental changes and have attempted to draw the attention of the readers towards a vicious circle formed by the effects of climate change and GDP which needs urgent attention and serious intervention of the policymakers towards this issue and design an anti-dote to break this vicious circle.

Index Terms *- Climate change, socio-economic impact, vicious circle, anti-dote.*

I. INTRODUCTION

PREFACE:

Climate change, an environmental problem was exposed by scientists and explore by economists in relation to its far reaching economic consequences. It was realizing after penetrate studies that humanities is at peril with rapidly growing world economy with excessive exploitation of natural resources and nature itself. The resultant effects were realized by human being and non-human beings and it turned out to be threat to planet's finite resources and the consumption.

Climate change has brought about possibly permanent alterations to Earth's geological, biological and ecological systems. These changes have led to the emergence of a not so large-scale environmental hazards to human health, such as extreme weather, ozone depletion, increased danger of wild land fires, loss of biodiversity, stresses to food-producing systems and the global spread of infectious diseases. The World Health Organization (WHO) estimates that 160,000 deaths, since 1950, are directly attributable to climate change. The climate change is a serious environmental problem for it distort the functioning of Earth's ecosystem, the biodiversity and the ability of the atmosphere to absorb green house gases (GHGs) emitted by humanity from fossil fuels and other agricultural and industrial processes. It must be noted that these threats are human-induced climate change, resulting from the building of GHGs including carbon dioxide, methane, nitrous oxide and some other industrial chemicals. The built-up GHGs destroy our food crops and farm system, locations of plants and animals, the location of cities, key infrastructure, and public health. In brief a fairly stable temperature of earth becomes unstable.

EFFECTS OF CLIMATE CHANGE:

The inherent variability of regional climates in the past and projections of the future suggest that climate change poses serious and potentially dramatic challenges to the any economy. In part, the magnitude of these challenges depends upon the nature of the overall weather response to the build-up of Green House Gases (GHG). The economic impact of which depends on the time frame under which climate changes occur. As with temperature projections, there is no consensus on a specific time period for major economic damages to materialize. One possibility is that they are small and isolated for twenty to fifty years, after which they are cumulatively larger. If this is correct, then may make sense for modest emissions abatement programs initially while the economy begins to adjust, more technology and learning are developed, and more information is generated [National Academy of Sciences, 2008, Nordhaus, 2008 and Kousky, Rostapshove, et. al., 2009].

Temperature:

A sustained wet-bulb temperature exceeding 35° is a threshold at which the resilience of human systems is no longer able to adequately cool the skin. A study by NOAA from 2013 concluded that heat stress will reduce labor capacity considerably under current emissions scenarios [John P. Dunne; Ronald J. Stouffer; Jasmin G. John, 2013]. There is evidence to show that high temperatures can increase mortality rates among foetuses and children. And the health impacts and risks of higher temperatures also reduce learning and worker productivity, which can impact a country's economy and development.

Water:

The freshwater resources that humans rely on are highly sensitive to variations in weather and climate. In 2007, the IPCC reported with high confidence that climate change has a net negative impact on water resources and freshwater ecosystems in all regions. The IPCC also found with very high confidence that arid and semi-arid areas are particularly exposed to freshwater impacts.

As the climate warms, it changes the nature of global rainfall, evaporation, snow, stream flow and other factors that affect water supply and quality. Specific impacts include:

Warmer water temperatures affect water quality and accelerate water pollution.

Sea level rise is projected to increase salt-water intrusion into groundwater in some regions. This reduces the amount of freshwater available for drinking and farming.

In some areas, shrinking glaciers and snow deposits threaten the water supply. Areas that depend on melted water runoff will likely see that runoff depleted, with less flow in the late summer and spring peaks occurring earlier. This can affect the ability to irrigate crops.

Increased extreme weather means more water falls on hardened ground unable to absorb it, leading to flash floods instead of a replenishment of soil moisture or groundwater levels.

Increased evaporation will reduce the effectiveness of reservoirs.

At the same time, human demand for water will grow for the purposes of cooling and hydration.

Under these facts a major question, then, is how adaptable is the economy?

Agriculture would be particularly vulnerable if temperature and precipitation become more erratic with larger and frequent changes.Electricity demand and pressure on utilities also likely would increase.

Human beings/Health would be affected;And, ultimately,Growth rate of GDP would be affected.

Impact on Health:

A fundamental global environmental change, affecting physical systems and ecosystems, will affect human health in many ways. However, many details are debated. What health effects will occur? When will they take place? Will there be both beneficial and adverse effects?

The climate-health relationships that are the easiest to define and study are those in relation to heat waves, the physical hazards of floods, storms, and fires, and various infectious diseases (especially those that are vector-borne). Other important climatic risks to health, from changes in regional food yields, disruption of

fisheries, loss of livelihoods, and population displacement (because of sea-level rise, water shortages, etc) are less easy to study than these factors and their causal processes and effects are less easily quantified.

Transmission of infectious disease is determined by many factors, including extrinsic social, economic, climatic, and ecological conditions and intrinsic human immunity. Many infectious agents, vector organisms, non-human reservoir species, and rate of pathogen replication are sensitive to climatic conditions. Both salmonella and cholera bacteria, for example, proliferate more rapidly at higher temperatures, salmonella in animal gut and food, cholera in water. In regions where low temperature, low rainfall, or absence of vector habitat restricts transmission of vector-borne disease, climatic changes could tip the ecological balance and trigger epidemics. Epidemics can also result from climate-related migration of reservoir hosts or human populations. In many recent studies investigators have examined the relation between short-term climatic variation and occurrence of infectious disease—especially vector-borne disease. Studies in south Asia and South America (Venezuela and Columbia) have documented the association of malaria outbreaks with the ENSO cycle.

High temperatures in particular affect vector and pathogen. The effect of rainfall is more complex. For example, in tropical and subtropical regions with crowding and poverty, heavy rainfall and flooding may trigger outbreaks of diarrhoea, whereas very high rainfall can reduce mosquito populations by flushing larvae from their habitat in pooled water.

Increased notifications of (non-specific) food poisoning in the UK and of diarrhoeal diseases in Peru and Fiji have accompanied short-term increases in temperature. Further, strong linear associations have been noted between temperature and notifications of salmonellosis in European countries and Australia, and a weak seasonal relation exists for campylobacter.

It is critical that adaptation and mitigation decisions and policies be developed with a sound basis in the best current science on climate change and its effects. There are gaps in our understanding of the relationship between climate change, the environment, and human health. In its 2010 report, A Human Health Perspective on Climate Change (Full Report) , the NIEHS-led Interagency Working Group on Climate Change and Health identified major research areas that need to be further explored and understood. These include the following:

Asthma, Respiratory Allergies, and Airway Diseases

Cancer

Cardiovascular Disease and Stroke

Effects of Heat

Food borne Diseases and Nutrition

Human Developmental Effects

Mental Health and Stress-Related Disorders

Neurological Diseases and Disorders

Vector borne and Zoonotic Diseases

Waterborne Diseases

Weather-Related Morbidity and Mortality

Attempt is made in the current paper to present future projections (India) of some of the above mentioned health issues which have aggravated due to climate change.

CURRENT ESTIMATES AND FUTURE TRENDS IN CHRONIC HEALTH CONDITIONS THAT INTERACT WITH THE HEALTH RISKS ASSOCIATED WITH CLIMATE CHANGE IN INDIA

Health Conditions	Current Estimates	Future Trends	Possible Influences of Climate Change
CANCER	approximately 1.093 million new cases were registered in 2011	it is estimated that by 2026 the number would increase to 1.869 million	due to climate change there is massive urbanization and globalization leading to change in life-style and habits which aggravate the cancer chances
DIABETIES	approx. 61 million diabetic patients	estimated is crossing the mark of 100 million by 2030	it increases sensitivity to heat stress, medication and dietary needs may increase vulnerability during and after extreme weather events
ASTHAMA	apprx. 13 million cases were registered in 2016	the increase in Asthma cases is apprx. 30% annually.	asthma is exacerbated by exposure to air pollution affected by change in temperature, humidity and wind
MENTAL ILLNESS	approx. 28 million in 2013	apprx. 38.1 million in 2025	mental illness may impair responses to extreme events like heat stress.
VECTOR-BORN & ZOONOTIC DISEASES	more than 973 million persons were exposed to vector-born diseases in 1998	the estimates vary a lot due to severe fluctuations in the climate change	due to climate change there is a combined positive influence of temperature and humidity on survival and development of mosquitoes and parasites; recent epidemic of malaria, chikungunya and dengue.

Social –Economic Impact:

The consequences of climate change and poverty are not distributed uniformly within communities. Individual and social factors such as gender, age, education, ethnicity, geography and language lead to differential vulnerability and capacity to adapt to the effects of climate change. Climate change effects such as hunger, poverty and diseases like diarrhea -and malaria, disproportionately impact children; about 90 percent of malaria and diarrhea deaths are among young children. Children are also 14–44 percent more likely to die from environmental factors, again leaving them the most vulnerable. Those in urban areas will be affected by lower air quality and overcrowding, and will struggle the most to better their situation.Climate impacts will not be uniform. Those of low socio-economic status will likely to be the most affected by the health impacts of climate change, as they have the least adaptive capacity**These diseases impact not only the wellbeing, but can also hold back the economic growth of the country due to increased healthcare expenditure and diminished productivity.**

As the World Meteorological Organization explains, "recent increase in societal impact from tropical cyclones has largely been caused by rising concentrations of population and infrastructure in coastal regions." Pielke et al. (2008) normalized mainland U.S. hurricane damage from 1900 to 2005 to 2005 values and found no remaining trend of increasing absolute damage. The 1970s and 1980s were notable because of the extremely low amounts of damage compared to other decades. The decade 1996–2005 has the second most damage among the past 11 decades, with only the decade 1926–1935 surpassing its costs. The most damaging single storm is the 1926 Miami hurricane, with $157 billion of normalized damage [Pielke, Roger A., Jr.; Gratz, Joel; et al., 2008].

The American Insurance Journal predicted that "catastrophe losses should be expected to double roughly every 10 years because of increases in construction costs, increases in the number of structures and changes in their characteristics." The Association of British Insurers has stated that limiting carbon emissions would avoid 80% of the projected additional annual cost of tropical cyclones by the 2080s. The cost is also increasing partly because of building in exposed areas such as coasts and floodplains. The ABI claims that reduction of the vulnerability to some inevitable effects of climate change, for example through more resilient buildings and improved flood defenses, could also result in considerable cost-savings in the long term.

Effect on GDP:

Pindyck Robert S (2009) while developing the “damage function” expects warming to affect the growth rate of GDP as opposed to the level i.e. he assumes that in the absence of warming real GDP and consumption would grow at a constant rate but warming will reduce this rate, for three reasons:

First, some effects of warming are likely to be permanent; for example, destruction of ecosystems from erosion and flooding, extinction of species, and deaths from health effects and weather extremes. If warming affected the level of GDP directly it would imply that if temperature rise but later fall, for example, because of stringent abatement or Geo-Engineering, GDP could return to its but-for path with no permanent loss.

Second, resources needed to counter the impact of higher temperatures would reduce those available for research and development (R & D) and capital investment, reducing growth. Adaptation to rising temperatures is equivalent to the cost of increasingly strict emission standards, which, as Stokey (1998) has shown with an endogenous growth model, reduces the rate of return on capital and lowers the growth rate.

And third, there is empirical support for a growth rate effect. Using historical data on temperatures and precipitation over the past fifty years for a panel of 136 countries, Dell, Jones, and Olken (2008) have shown that higher temperatures reduce GDP growth but not levels.

The Vicious Circle:

Climate change and its impact on the economy’s growth are very much inter-woven and interrelated. The climate change itself is a result of the excessive exploitation of natural resources and nature itself for satisfying the hunger of growth of man. We can observe a vicious circle formed by the effects of climate change and lower rates GDP.

Climate change has immediate effect on temperature, water and climate resulting increase in various diseases, decrease in agricultural production, dislocations due to natural calamities, poverty, decrease in human productivity, increase in cost of living, etc. This results in lower GDP. To counter the loss in national product and the rising temperature more and more resources would be used, say more energy would be used for sheltering from scorching heat exploiting more fossil fuels, increase in production to combat the fall in GDP creating increased stress on climate. This action would add to the Green House Gases aggravating the speed of climate change.

This vicious circle has in fact lead to the alarming situation created by the effects of climate change and a serious intervention is needed by policy makers to bring the economies out of this vicious circle and save humanity and attain a sustained growth.

CONCLUSION:

Climate change is a natural process depends on behavior of nature which is variable, but it is partly to do with human-induced pursuit for rapid growth with scientific and technological process. It is a very complex system, and predictability remains a question. The exact connection of the climate scale is an area of active research. What we need to understand is the dynamic processes of nature and human instinct for material progress.

It has been suggested that decarbonisation can reduce CO2 and a deep decarbonisation of the world economy is necessary to remain within the 2oC limit. Since most of the CO2 comes from burning fossil fuels, we therefore need a sharp reduction in the use of fossil fuels or a large-scale system to capture and sequester the CO2 that is used.

If we take into consideration the practical problem-solving approach then each region of the world needs to implement a sensible, economically efficient, deep decarbonisation program built on the three pillars of energy efficiency, low-carbon electricity and fuel switching.

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