Climate Change and its Impacts on Environment

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Abstract- *Throughout the history of the earth the climate has never been the same it has been under the process of continuous change since beginning. The connection between the changing climate and environmental conditions has been established long before. With the change in the climate many species have evolved and many disappeared from the face of the earth. The biodiversity keeps on adjusting with the changing climate.The species which can adapt to the changing climate were survived with time and developed more resilience and those who can'tadapt with the changing climate eventually swept away by the time. Many species and various types of flora and fauna adapted to the gradually changing climate but only few can survived the rapid change in the climate. With the onset of industrialization and growing human interference the rate of climate change has dramatically accelerated.Keeping in view the various facts the present paper is an attempt to understand the basic concepts of climate change and environment. The present study also intends to analyse the interplay of the above two and their impacts on each other.*

I. INTRODUCTION

The Intergovernmental Panel on Climate Change (IPCC) have recently published in its reports (2001, 2007, 2012) that the greenhouse emissions has already started to change the global climate and have issued a warning that developing countries such as Africa which are dependent on agriculture will experience increased water stress, soil infertility resulting in decreased yield from rain-fed agriculture. The food insecuritymalnutrition will also increase in these countries (Donald, et. al. 2012). As a result of global warming the sea level will elevate and the area under semi-arid land will also increase. In a report IPCC (2007) stated that the global occurrence of extreme weather events will increase, occurrence of floods, droughts and tropicalstormsare also expected to rise in both frequency and intensity across the continents.

For common man the concept of Climate and Weather are quite confusing. The term "w**eather"**is the state of the atmosphere at a given point of time and at a particular place. In other word weather can be defined as what we observe and what we feel about the atmosphere of a particular location at a given time is said to be weather of that place. The patterns of weather vary from time to time and from place to place. In general terms the weather elements include temperature, precipitation, clouds and the wind that the people observe during the course of the day. There are some anomalies in the weather which are termed as hurricanes, tornadoes, blizzards and droughts.

On the other hand the term "**Climate"** is defined as the average weather conditions that persist over long period of time generally expanding to more than three decades. The weather can change in the span of few minutes but the climate remains quite constant and it changes over centuries. To identify changes in the climate it is essential to observe it over a long stretch of time in terms of several decades to centuries or longer. Change in the climate is usually seen asthe change in some or all the elements of the over a substantial period of time.

II. CLIMATE CHANGE

Change in the climate of the earth is an unambiguous fact which has been researched at all levels viz. global, national and local levels.Numerous studies have recorded multiple observations and found that the temperature of air and oceans is rising, the sea water level is increasing and on the other hand the amount of snow and ice is declining which in turn indicates the global change in climate (Climate and Health Assessment, 2018). Humans have been considered as the root cause of this large scale and rapid change of climate (IPCC, 2003).The United States National Climate Assessment Report (2014) stated that the rising temperature is resulting in increased frequency as well as the intensity of the natural hazards/ disasters, rise in sea water level, melting of the polar ice caps, snow and ice glaciers which have already started to play disrupting role in the lives of the people and damaging various sectors of the United States economy (Melillo, et. al., 2014).

III. ENVIRONMENT

According to the Environment and Ecology (2017) the literal meaning of the environment is "everything that surrounds you and everything that affects an organism during the course of his life."In other words the environment can be defined as the sum total of interrelationship between water, air and land resources and also its association with human being and other living organisms coming in contact with them and

being affected by them. The environment includes all the living and non-living things or in other words physical and biological surroundings and their interactions.

IV. EFFECTS OF CLIMATE CHANGE ON ENVIRONMENT

In the year 2010 Climate change and Environmental Objectives were set up in response to a call from the Swedish Environmental Protection Agencyfor research. The basic aim of the programme was to understand how and to what extent the climate change affects our potential to achieve the environmental objectives of sustainable development. It further aimed to develop a forecasting mechanism in order to understand the underlying processes. While looking at the peak levels of ozone in the atmosphere it can be observed that they have fallen significantly in the last century (Climate Change and Environmental Objectives, 2016). The concentration of ozone is far greater on the oceans than the continents. As forecasted if the current level of ozone forerunners decreases, then as stated in the Convention on Long-range Trans boundary Air Pollution (LRTAP) impact of ozone on the vegetation (measured as ATOM40) will not exceed till 2050. According to the World Wide Fund Report (2014) the present earth is under a severe pressure of rapidly declining biodiversity due to the rapid change in the global sea levels, temperature and precipitation change.

Apart from the environmental changes due to the global climate changes the impacts of global climate change can be observed and understood under the following headings:

V. IMPACTS ON HUMAN HEALTH

As we know that humans are very sensitive towards any type of extraordinary environmental and climate change. Therefore any fluctuation from the normality results in disruption of homeostasis which may adversely affect physical as well as mental health of people causing weakened immunity against diseases, stress, depression and other psychological issues which could be severe enough to hamper the normal living of an individual and even may cause death.There is a great risk to human health from the global warming which can result in health exhaustion, exacerbating, diseases and illness and reducing work capacity(Climate and Health Assessment, 2018). According to the World Health Report of 2002 poor conditions of sanitation, unsafe and unclean drinking water and lack of hygiene kills nearly seventeen lakh of people in a year. Lack of proper design of irrigation and water systems, shortage of housing facilities, unscientific disposal of waste and shortage of water due to the deforestation and loss of biodiversity contribute to the spread of the most common vector borne diseases such as dengue and malaria (World Health Report, 2002). The number of people being killed due to the vector borne diseases out of which mostly are African children under the age of five (World Health Report, 2003). The rise in vector borne diseases are the consequences of rise in the global temperature which enable the insects, pathogens and arthropods to grown in the wider portion of the earth.

VI. IMPACT ON BIODIVERSITY

Continuous rise in the global temperatures, sea level, forest fires and other disaster occurrences are the clear symptoms of changing climate and these changes in the climate have wide-ranging effects on the local and global wildlife as well as the fragile ecosystems (Climate Change Report, 2009).Due to the global warming the number of forests in the world is declining due to extreme climatic events at frequent intervals. In United Nations Environment Programme on Climate Change and Biodiversity (2018) the vulnerabilities of the biodiversity to the changing global climate were highlighted. They pointed out that the current global biodiversity is being affected by the instabilities of climatic elements such as atmospheric carbon dioxide, temperature, precipitation in the present geological era.

Hoffman (2017) reviewed the impacts of climate change on the biodiversity and mentioned that due to rapid change in climate many spices are being affected physiologically. He stressed that there is evidence that some species are more vulnerable physiologically to temperature fluctuations. Giving the example of green ringtail possum (an endemic species of Queensland's tropical rainforest) is unable to control its body temperature when the atmospheric temperature rises above thirty degree centigrade. So an extended heat wave in north Queensland can kill almost entire population of the species. There aremany more such type of example of how the change in the climate can and to an extent has killed many vulnerable species around the world.

VII. IMPACTS ON AGRICULTURE

Majority of the people in the developing countries identical to India are dependent on the agriculture for the purpose of fulfilling their basic needs and as a livelihood resource. The economy and livelihood of these people are highly vulnerable to the change in climate because they are heavily dependent of the rain-fed agriculture (Donald, 2012).Goswami (2017) highlighted in her report on the impacts of global warming on Indian farmers. The researcher reported that due to the global warming Indian agriculture have recorded loss of almost 1.5 per cent of the total GDP. It

was further pointed out that crops like wheat, rice, sorghum and maize are the worst affected due to the extreme weather events whereas on the other hand some crops like soybean and gram are having benefit from the global rise in the levels of carbon dioxide in the atmosphere. There was the time when Indian used to be considered as the water abundant nation has been pushed towards the water stressed region as at present is barely surviving with 1700-1800 cubic metres of water per person per annum.

Venkateshwarlu (2017), former director of International Central Research Institute for Dry land Agriculture (CRIDA) in his lecture at the Natural Farming Summit hosted by Sri Institute of Agricultural Science and Technology Trust (SSIAST) in Bengaluru pointed out that "Climate change affects all the three aspects of food security: availability, access and absorption. When production decreases, availability of food decreases. Climate change hits those who are poor the most. They don't have income to buy the food, so their access to it is affected. This, in turn, has an impact on health and affects absorption."

VIII. IMPACT ON WATER RESOURCES

Effects of the climate change and global warming have been seen on the entire cryosphere. The impact on mountain glaciers and ice caps has been studied in the form of surface runoff by various scholars such as Kaseret. al. (2003) and Box et, al. (2006). Some other scholars such as Haeberli and Burn (2002) focused on studying changing hazard conditions. Bindoff et,al. (2007) worked on over freshening due of excessive input of fresh water due to melting of polar ice caps and mountain glaciers. Some studies have also presented evidences of crustal uplift as an outcome of large scale glacier melting in Alaska (Larsen et al., 2005).

When we look at the global scale, there is concrete evidence that there is a broad coherent pattern of variation in the annual runoff of the water around the world. Where on one side some places have experienced an increase (Tao et al., 2003a, b, for China;Hyvarinen, 2003, for Finland; Walter et al., 2004, for the coterminous USA), usually at the places located at higher latitudes. At the same time in others areas the runoff of water have decrease(for example in parts of West Africa, southern Europe and southern Latin America (Milly et al., 2005). There is a direct link between the global rise of temperature and increase in the global runoff as four per cent increase is recorded per degree centigrade of rise in temperature in the twentieth century (Labat et al. 2004).

IX. IMPACT ON FREQUENCY AND INTENSITY OF DISASTERS

The rate of change of earth's climate has surpassed all the scientific predictions. Many families and communities around the world have started to feel the impacts of the change and now suffer from the consequences of the change in the form of Disasters (UNHCR, 2017). Due to the increasing rate of disaster both in terms of frequency and intensity,people have to leave their homes and have to search of new places to live and start afresh from the scratch. According to the United Nations High Commissioner for Refugees the global climate change is pushing the already scarce water resources to the limit where they are no longer available for majority of the population. With time people try to adjust and adapt to the change but for majority of the poor people this means moving to some other place in search for sustainable resources.

According to the global estimates of 2015 report compiled by International Displacement Monitoring Centre (IDMC) globally one person is displaced every second by one or other type of disaster. Since 2008 approximately 2.25 crore people have been displaced by climate or weather related disaster events around the world (IDMC 2015). The change in clime not just has impact on the average temperature but it also distorts the extreme temperatures which in turn increase the likelihood of occurrence of weather related natural disasters. The global warming pushed the global temperature to raise which results in less cold weather and increased the probability of more and more hot weather (Earth Observatory, 2018). This entirerise in the global temperatures is responsible for natural disaster and with time the intensity of the disaster will also increase due to more and more energy being stored into the system.

X. CONCLUSION

Global climate change is a natural phenomenon. The climate of the earth is always changing with time. But the rate of change is very slow usually thousands of years that allow the local flora and fauna to adapt to the changing environment. In the last few centuries especially after the industrialisation the rate of change is so fast that is have become impossible for the species to adapt and develop to this rapid rate of change.

It is proven fact now that the global temperatures are rising constantly. This is changing the global regime of climate across the continents and oceans. The change in the climate has increased vulnerability of human health, biodiversity, agriculture and have also threatened the loss of many natural resources such as water. The causes of climate change can be attributed to human activities such as industries and motor vehicles and unprecedented use of natural resources in the form of petrochemicals. The occurrence and intensity of the natural disasters have increased many times in the last century. Majority of the population being affected due to the climate

change is the poor. They are unable to adapt to the changing environment and are forced to move to new places. All of this needs our attention and our efforts to protect and conserve the earth's fragile balance of climate and to control the global warming at such an alarming rate or else we all will have to bear the consequence of the changing global climate.

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