

Climate Change Impacts on Drinking Water: A Review

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Abstract

The topic of climate change is well known worldwide. It cannot be denied that climate change is the biggest challenge facing the global society at present and it has become a great necessity at the present time. Statistics show that the average surface temperature of the Earth's surface has risen by about 1.62 degrees Fahrenheit (about 0.9 degrees Celsius) since the late 19th century. Apart from this, sea level has also been increased by about 8 inches since last century. Statistics make it clear that this is the time to seriously consider climate change. Climate change will also have an impact on biodiversity. Any species needs time to adapt. A sudden change in the environment will lead to his death in the absence of adaptation. Climate change will have the greatest impact on the marshy vegetation found in the coastal areas of the sea, which provide stability to the coast as well as being an ideal site for breeding sea creatures. The risk of ecological imbalance will increase as a result of biodiversity degradation.

Keywords: Climate Change. Effect of Climate change, Green House Gases. Biodiversity. Rain Fall. Sea Level

1. Introduction

The word weather also originates from the Arabic word *mausim*. There is no time limit set for the weather, while for the climate, the International Meteorological Department has set a period of 31 years¹⁻⁴. Weather is endemic, changing depending on location and time, while climate has regional and world class similarities⁴⁻⁶. Climate change is local, while climate change is observed globally, such as in the Pleistocene ice age. Weather is a condition of climate i.e.; climate is the integration of weather⁷⁻¹⁰. The main elements of climate are temperature, insolubility, air pressure, humidity and precipitation, quantity of wind and cloud cover. In fact, all these elements are very variable, yet some symmetry can be observed in these elements¹¹⁻¹⁴. Due to variation in quantity, intensity and distribution of the above-mentioned elements on the ground floor, climate of one state is different from climate of another state^{15, 16}. The serious problem of climate change has arisen due to combustion of fossil fuels and excessive exploitation of natural resources. If climate change is not stopped in time, millions of people will suffer from adversities like starvation, water crisis and floods¹⁷. This crisis will affect the whole world. Although the most impact of climate change will be on poor countries. With this, the countries that are most responsible for climate change will have to suffer the most. Backward and developing countries will be at greater risk of problems arising from climate change. Climate change is affecting the Arctic region, Africa and small islands more. The North Pole (Arctic) is warming at twice the rate than the rest of the world¹⁸. According to scientists, the North Pole ice will melt during the summer in the next few years. According to another study, this can also happen during six years. Antarctica's temperature has doubled in the last 100 years¹⁹. Due to this, the icy area of Antarctica has also decreased. Thus, due to the changes in the ecology there, all the organisms present there are also affected. If the increase in temperature continues in this manner, by the end of this century, about 80 percent of the glaciers of the Alps mountain range will melt. It is a matter of concern for us that the glaciers of the Himalayan region are melting faster than the glaciers of other regions of the world. Due to the increase in the temperature of the earth, the ice melting speed of glaciers and polar regions has increased, as a result of which the water level of the oceans²⁰⁻²² has risen by an average of 27 centimetres. According to climatologists, if the greenhouse gases in the atmosphere continue to accumulate, the temperature of the earth will continue to rise, as a result of which the melting speed of glaciers and polar regions will increase the risk of sinking of ocean coastlines and increasing of oceans. The presenting paper we have the climate impacts on drinking water system.

2. Reason of Climate Change

The impact of climate change²³ will be seen in all regions of the world. India too will not survive from the ill effects of climate change. India will also face many problems due to the rising temperature of the earth. It is estimated that by the end of this century, the average temperature in India will increase by 4 °C. The Indian Space Research Organization (ISRO) has said that the Indian sea is rising at a rate of 2.5 millimetres per annum, based on data obtained from satellites. It has been speculated from a study that if this trend of rising sea level of the seas bordering the Indian border continues, by 2050, the sea level may rise by 15 to 36 centimetres. Many areas will be submerged as sea level rises²⁴ by 50 cm. Over a dozen islands in India's Sundarbans delta are under threat of drowning, affecting over 70 million population.

2.1 Greenhouse Gases

A layer of greenhouse gas remains around the Earth, this layer includes gases such as methane, nitrous oxide and carbon dioxide. This layer of greenhouse gases is essential in maintaining the temperature balance on the surface of the Earth, and according to analysts, if this layer is not there, the Earth's temperature will decrease significantly. As human activities are increasing in the modern era, the emission of greenhouse gases is also increasing and due to which the global temperature is increasing²⁵⁻²⁸.

2.2 Main Greenhouse Gases

2.2.1 Carbon dioxide

It is considered that most important greenhouse gas is emitted for both natural and human reasons. According to scientists, the most emissions of carbon dioxide are from burning fossil fuels for energy. Statistics show that after the Industrial Revolution, there has been a 30 percent increase in the amount of carbon dioxide globally²⁹.

2.2.2 Methane

Decomposition of biomass is a major source of methane. It is noteworthy that methane is a more effective greenhouse gas than carbon dioxide, but its volume in the atmosphere is less than that of carbon dioxide³⁰.

2.2.3 Chlorofluorocarbons

It is mainly used in refrigerants and air conditioners³¹ etc. and has a great adverse effect on the ozone layer.

3. Effects of climate change

In recent decades, due to the green-house effect, the average temperature has increased in many areas. According to the prediction of scientists, by the year 2020, the temperature of the whole world will be the highest compared to the last 1000 years³². The Intergovernmental Panel on Climate Change predicted in 1995 that if the current trend continued, temperatures would rise from 3.5 to 10 degrees Celsius in the 21st century. In the twentieth century, the average surface temperature of the world increased by 0.6 °C. Globally, 1998 was the warmest year and the 1990s was the warmest decade yet, proving that climate change has begun as a result of the greenhouse effect³³. Climate change will have many consequences, most of which will be harmful. Climate change will have the following effects on water resources-

3.1. Rainfall

As a result of climate change, the monsoon regions of the world will increase rainfall, which will cause problems like floods, landslides and land erosion. Water quality will decline. There will be serious effects on the supply of fresh water. As far as India is concerned, there will be less rainfall in central and northern India, while in the northeast and southwest states of the country there will be more rainfall³⁵. As a result, due to lack of rainwater, there will be a drought like situation in Central and Northern India, while due to excess rainfall in the Northeast and South Western states, there will be a problem like flood. In either case, agricultural productivity will be adversely affected. During droughts and floods the availability of clean water for drinking and washing clothes will be less. Water will be polluted and drainage systems will be damaged³⁶.

3.2. Sea level

Due to climate change due to melting of polar ice, the average sea level of the world is 9 to 88 cm by the end of the twenty-first century. It is expected to increase by more than half of the world's population, which is 60 km from the sea. Says the distance, but will have the opposite effect. The Ganges-Brahmaputra Delta of Bangladesh, the Nile Delta of Egypt and the Marshall Islands and several small islands including the Maldives will cease to exist by the year 2100. In order to attract the attention of the entire world towards this danger, in October 2009, the Cabinet of Maldives Government conducted a unique experiment sitting inside the sea. In this meeting a manifesto for the Copenhagen Conference of December 2009 was also prepared. The Solomon Islands of the Pacific Ocean are on the verge of sinking due to increased water levels³⁷. As a result of climate change, coastal areas of India's states of Orissa, Andhra Pradesh, Tamil Nadu, Kerala Karnataka, Maharashtra, Goa, Gujarat and West Bengal will be affected by submergence. As a result, more than 10 crore people will be displaced in the surrounding villages and cities, while the increase in sea level will end the existence of Lakshadweep and Andaman and Nicobar Islands of India. Increasing sea level will contaminate freshwater sources resulting in drinking water problem.

Climate change will have an impact on the biodiversity rich coral reefs found in the sea, which is called the tropical rainforest of the oceans. The heat in the seawater will result in adverse effects on the algae (microbial flora) that provide food and colour to the coral reefs. Warm ocean will be the factors of the bleaching process that will destroy these high productivity ecosystems. In 1997, the intensity of heat in the Pacific Ocean due to Alnino has become the most serious cause of death of corals³⁸. It is estimated that about 10 percent of the earth's coral reefs have died, 30 percent have been severely affected and 30 percent have eroded. The Global Coral Reef Monitoring Network (Australia) estimates that by 2050 all coral reefs will die.

3.3 Biodiversity

Biodiversity is being adversely affected by climate change as a result of global warming. Climate change not only affects biodiversity but erosion of biodiversity causes seasonal changes. In this way, we are hurting the means of dealing with the problem of global climate change through our activities³⁹. India is also counted among the world's most biodiversity countries in which 60-70 percent of the world's biodiversity is present. The negative impact of global climate change is clearly visible on Caribbean fishes. Due to this, the fish there are becoming very poisonous. University of Florida researchers said this after the study. Principal researcher Dr. Glenn Morris stated that toxic elements are developing in Caribbean fish due to frequent environmental changes. The humans who eat it are also becoming very toxic, due to which they are vulnerable to many serious diseases. Morris pointed out that sea temperatures are rising significantly due to frequent changes in the weather and this is also causing seaweeds called *Gambiar discus*. These algae are quite toxic. He said that vegetarian fish living in the sea survive only with the help of algae. Due to the increasing number of toxic algae, the fish are forced to survive by eating it. Fishes become poisonous as soon as they eat it. After this, when humans eat these fish, then they also fall prey to poison. Morris said that the poison inside the fish is very dangerous. No matter how much the fish is cooked, these toxic elements are not eliminated. In recent years, many people eating these fish have come in the grip of serious diseases. After eating these poisonous fish, people first vomit and then after this, many people also fall prey to diarrhea. When this disease starts to increase, it takes serious form. After this, shivering starts on hands and feet and face. Apart from this, there is a lot of pain in the body and the body becomes very weak. Sometimes it causes unusual symptoms. As cold water also starts heating up. Morris explained that to deal with this problem one must first think about its main component, which is the constantly changing climate⁴⁰. He said that its culprits are

mainly human and now its negative effects are being seen all over the world. First of all, an effective step should be taken to look for these reasons, so that our environment can also be saved.

3.4 Change in water content

The main reasons for the current pressure on water resources in India are often increasing population, increasing competition for water, low quality, environmental claims and ground water⁴¹. This pressure on water resources will be further unbalanced and exacerbated by climate change. The availability of water, in addition to reduced rainfall and increased temperatures as a result of this pressure, will affect domestic, agricultural and industry sectors. Based on only a moderate climate change, it is estimated that by 2025, water scarcity in important countries of the world may be around 34% (1995) to 63%.

3.5 Changes in water quality

Changes in the quality of water may be due to changes in the pattern of rainfall. There is a possibility of increasing the salinity of water in places where there is a high-water surface due to high temperature. Other reasons for this are intensive irrigation and increased evaporation of temperature. In addition, ground water will be affected due to the natural calamities like floods, when the waste discharged from the soil gets into the ground water. Due to sea level rise, the groundwater saline in coastal areas will have a bad effect on the quantity and quality of clean water and will affect the population living there⁴².

3.6 Changes in water availability

As a result of water cycle excesses, there has been increased competition for available water due to reduction in water content and contamination. Demand for water in agriculture and interior areas will be more important, especially in times of summer and drought. India is an agricultural country. And most of the water is used for agriculture⁴³. Rising temperatures, low rainfall and increasing population have increased irrigation requirements. Due to uncertainty of rain and over exploitation of water sources, water sources will be clouded by crisis.

3.7 Climate Change Impact Area

Water has an important role in water use and development and sustenance of human life in food security and industrial activities. Availability and utilization of water can cause competition in various fields like agriculture, industry and health etc. It is estimated that more than one billion people have safe water^{44, 45}. While more than two billion people lack water. Changes in quantity, quality and accessibility of water will have a significant impact on human population due to agriculture, food security, health and other activities.

4. Conclusion

There is a great need to make efforts at the local, regional, national and international level in time to stop the climate change i.e., rising temperature on the earth plane. Different strategies can also be devised in different regions according to location, region and time. Climate change policy measures have three dimensions-in-depth research and observation of the climate system and its impact on development, reducing the risk of climate change by reducing human contribution to factors affecting climate change and adapting itself to change, take action. Therefore, climate change is not only a threat to our environment but also to growth and development. The current assessment shows that climate change has more harm to human welfare than the expense of reducing the threat it poses. While making our development policy, we also have to keep in mind the impact of carbon and the world affected by it. The real challenge of climate change at the national level is that we include climate-related threats in development policies and programs. In the current perspective, it will also be mandatory to bring public awareness about this subject.

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