

# Global warming—an alarming issue for climate change

## Editorial

Accumulation of gases mainly from the combustion of fossil fuel and forest clearance results in the greenhouse effect (a concept recognized since 19<sup>th</sup> Century). In 1957, it was observed by scientists that geophysical experiments are being carried out at a large scale by human beings which have not occurred in past and will not be replicated in future. These anthropogenic activities will result in returning the stored carbon in sedimentary rocks over billions of years to the atmosphere and air within few decades. There has been a parallel rise of the carbon dioxide (CO<sub>2</sub>) concentration in the Earth's atmosphere and temperature for decades, with the former reaching 400 ppm with a global warming increase of 1.5°C. The climate change models forecast that a business as usual approach, i.e., no effort for control of carbon dioxide (CO<sub>2</sub>) emissions from fossil fuel combustion would lead to an increase in annual average surface temperature to greater than 2°C by 2034. Air pollution increases due to global warming. Decrease in effectiveness of policies by regulatory bodies for pollution reduction with climate change is showcased by the perception of climate gap.

Nearly 200 countries (195 nations and the European Union) approved the Paris Agreement in December 2015 at the UNFCCC (United Nations Framework Convention on Climate Change) COP 21 (21<sup>st</sup> Conference of the Parties). The objective of the agreement was to bound increase of global mean temperature to 2°C above pre-industrial level and develop methods for limiting it to 1.5°C. The Paris Agreement neither explains the temperature regarding pre-industrial levels nor the time period for its basis, but many authorities recognized it to be the temperature when burning of coal was increased shortly after the industrial revolution i.e. in the late 18<sup>th</sup> and 19<sup>th</sup> Century. It is after the end of the Little Ice Age, which itself was accompanied by recovery of mean temperature and it was autonomous of the leisurely increase of greenhouse gases (mainly carbon dioxide (CO<sub>2</sub>), nitrous oxide (NO) and methane (CH<sub>4</sub>)) that happened all over the 19<sup>th</sup> century. Global Climatic impacts might vary from one place to another for a given increase in global mean temperature. It was found from various studies regarding 2°C and 1.5°C targets of global warming that over the globe, highest warming occurs in the high-altitude areas in Northern Hemisphere. Moreover, warming of land areas is considerably quicker than that of oceans. Likewise, the fluctuations in global temperature, the extreme temperature is also of high importance to the world as it is more sensitive to global warming. For example, the hot temperature extreme would rise to around 3°C in the Mediterranean and the cold temperature extreme would rise to around 5.5°C in the Arctic for the global warming target of 2°C. In general, there would be increased hot events and decreased cold events. 1°C of temperature rise has already been faced by the world and if the situation continues, we will soon be exhausting the target emissions of carbon by 2030 associated with warming of 1.5°C. Even though the goal of 1.5°C is widely known, there is least understanding that meeting this target would not assure the protection from the perspective of change in global climate. Certainly, if it were to be broadly recognized that change in global climate has already contributed to the rise in worldwide food

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**Ashok K Rathoure**

Managing Director, Biohm Consultare Pvt. Ltd, India

**Correspondence:** Ashok K Rathoure, Managing Director, Biohm Consultare Pvt. Ltd, India, Phone +919450501471, Email asokumr@gmail.com

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prices which led the 2010 drought, Syrian war, wildfire season in the Northern Hemisphere in 2018 and heatwave in Russia in 2018, then the verge of threat might already been widely seen as having surpassed prevalent back.

Currently, the impacts of climate change are continuously increasing and bothering. Mean global temperature are rising continuously, seemingly by a process more stepped than as a tendency with record worldwide climate. Melting of ice both from Greenland and Antarctica is accelerating and the degree of rise in sea levels is accordingly increasing. Due to rise in sea levels, values of Properties might soon fall in parts of East Coast of U.S. There is rising concern about fire getting worse by drought and heat, heavy rainfall, increase in sinuosity of jet streams and weakening of Gulf Streams, which leads to cold temperatures at lower altitudes even if the mean global temperature is increasing.

Evidences of intensifying response of greenhouse effect are also increasing in the Earth's atmosphere which might result in release of huge amount of CO<sub>2</sub> (carbon dioxide) and CH<sub>4</sub> (methane), independent of combustion of fossil fuels, deforestation or agriculture, from sources such as increased fires both from forests and peat and warming tundra. This release of gases could lower the saving in climate change which is likely to be made by the effective implementation of Paris Agreement. The ability of oceans to sink carbon is also reducing. If the current trend continues, temperature rise of the land, atmosphere and ocean is to be expected. 1.5°C warming has been given little or no attention since all the previous efforts were done for global warming target of 2°C because of the severe impacts to be caused with an additional temperature rise of 0.5°C. Even with a warming of 1.5°C, rigorous impacts will be faced by the world and these impacts would get extensively worsen with warming of 2°C. Some of the impacts of this 0.5°C difference are as follows:

- Approximately 2.7 times increase in exposure to severe heat waves of the world population.
- Approximately 10 times increase in sea-ice-free summer conditions.
- Approximately 0.06 meters rise in sea level.

- d) Approximately 2 times loss in species of vertebrates, fisheries and plants and 3 times loss in species of insects.
- e) Approximately 1.9 times increase in land area where shifting of ecosystems to a new biome would occur.
- f) Approximately 2.3 times decrease in crop yield.
- g) Almost all coral reefs would decline.
- h) Approximately 38% increase in thawing of the arctic permafrost.

Limiting climate change to 1.5°C and 2°C would require immense transformation by all economies, geographies and industries. Industries by 2030, annual emissions must be reduced to 25–30 GtCO<sub>2</sub>e at an average to limit global temperature change to 1.5°C with little or no exceedance. If we continue emissions at the current stage, the resulting emissions would be 52–58 GtCO<sub>2</sub>e, which is greater than double the amount to be limited by 2030. 20% reduction in annual emissions are required below 2010 levels in 2030 for limiting warming to 2°C whereas 40–50% reduction is required for 1.5°C. To limit warming to 1.5°C, emissions of carbon dioxide (CO<sub>2</sub>) are required to reach a net-zero value by 2050 and around 2075 for 2°C.

The consequences of limiting global warming to 2°C would be extensively worse than the impacts which follow by temperature rise of 1.5°C. With rise in temperature, growth of adaptation is required. Redeeming this change in temperature of 0.5°C will involve immense efforts. Nevertheless, these efforts would be valuable to recompense safe ecosystems, community and economy as this is high time to wake up and do something for our mother earth, its ecosystem, biodiversity, lives and all other creatures.

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