



# Climate Change and Mitigation

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## Abstract:

*Nowadays climate change is very critical problem to face. Our recent activities made the climate change very vulnerable. The possible reasons for the climate change are the characteristics internal procedures, external constraining, and anthropogenic changes in current atmosphere, increasing use of the land, etc. For any developing countries (i.e. India), the climate change is very critical problem as it affects the overall economy. IPCC (Intergovernmental Panel on Climate Change) has given a list of developing countries which are highly dependent on agriculture, which directly or indirectly affects the climate. Due to the climate change many nations may face problem of lack of fresh water, desertification, biodiversity loss, etc. Various greenhouse gases (i.e. CO<sub>2</sub>) are the main reason for climate change, so it is necessity to make their concentrations stable in atmosphere. The problem of energy shortage also goes hand in hand with the climate change. To overcome this problem we should use renewable energy resources more and more as well as reduce the usage of high-carbon energy resources. To make noteworthy improvement in facing of climate change problem, we should integrate mitigation and adaptation measurements to feasible development techniques. These issues are very intricate to resolve but we can start with adaptation and mitigation. The overall public of the nation should aware of the reasons and process and the consequences of climate change*

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**Keywords:** *Vulnerability, greenhouse gas, anthropogenic emissions, adaptations, mitigation*

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## 1. Introduction

### 1.1 Objective

Broad exchanges are occurring all around the world in all types of media regarding the matters of climate change and global warming. These exchanges point to the related inquiry of asset restrictions, given the way in which people are utilizing the planet's constrained/limited assets.

The main goal of writing this paper is to give knowledge about upcoming risks of global warming and what are the possible ways to overcome them. Actuaries can look at the changed situations for environmental change and utilization of assets to evaluate the risks and give direction through cost/advantage examinations. Given the multidisciplinary idea of these risks, actuaries can profit by working in participation with different experts.

### 1.2. Knowledge of risks

The effects of environmental change can be wide extending like outrageous atmosphere, expanded losses because of storms, rising ocean levels, food shortage, clean water lack, expanded disease, shortage of resources, limitations on energy utilize, etc.

The actuarial group can profit by discovering the impression of the distinctive bodies of how environmental change will influence the work done by them. The strategies for risk mitigation would be varying depending upon nature of the risks, but the initial steps would be risk acknowledgment and measurement for various situations.

## 2. The reasons and process behind the change in climate and its risks

The change in weather pattern over long period of time say decades because of artificial or human activities like the discharges of GHGs or misuse of land, etc. is called as climate change, which leads to ascent in worldwide temperature, an expansion in droughts, floods, storms, etc.

GHGs are responsible for catching the heat received from the solar radiation. This will maintain the temperature of the earth to support the mankind. We call this as the greenhouse effect, without which, the earth would be around 33°C cooler than it is in present. The main reason of global warming is the hike in GHGs. Figure-1 demonstrates the worldwide surface temperature drift (1880– 2012).

The biggest supporters of the expansion in climate change are carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>). Figure-2 demonstrates the rise in CO<sub>2</sub> concentrations.

An expansion in worldwide temperature by 1°C outcomes in around a 7% increment in climatic water vapors which also responsible for greenhouse effect. Aerosols outcome of mechanical outflows have attempted to balance around 26% greenhouse effect because of blocking sun rays.

The greenhouse effect happens when say rays retransmitted from the earth to climate as infrared thermal rays. GHGs (CO<sub>2</sub>) tend to absorb this radiation while anti-GHGs (O<sub>2</sub>) do not. Radiative Forcing (RF) is used to calculate the greenhouse effect [unit- W/m<sup>2</sup> (watts per square meter)].

Environmental change deals with natural, monetary, social effects. If the temperature increment goes past the 2°C edge, the consequences of that will be extremely intricate to overcome. The possible areas which can experience unfavorable effects will be floods, droughts, shortage of water resources, rising sea levels, change in Ecosystems, food security, human health, etc.

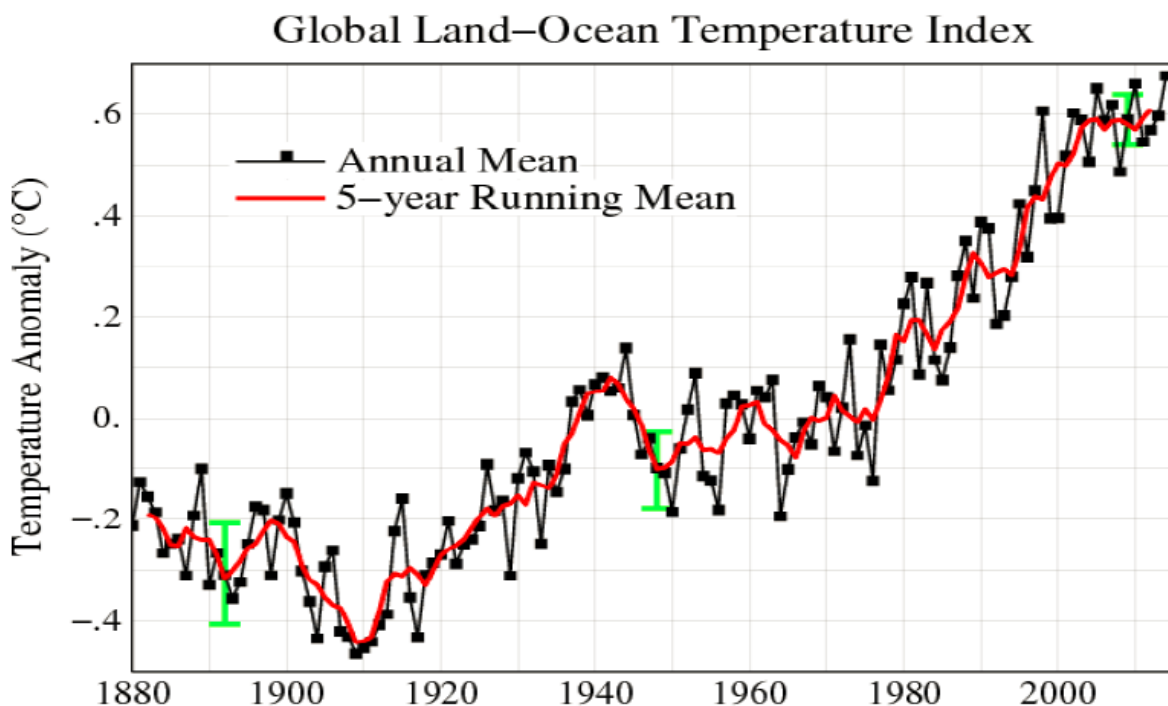
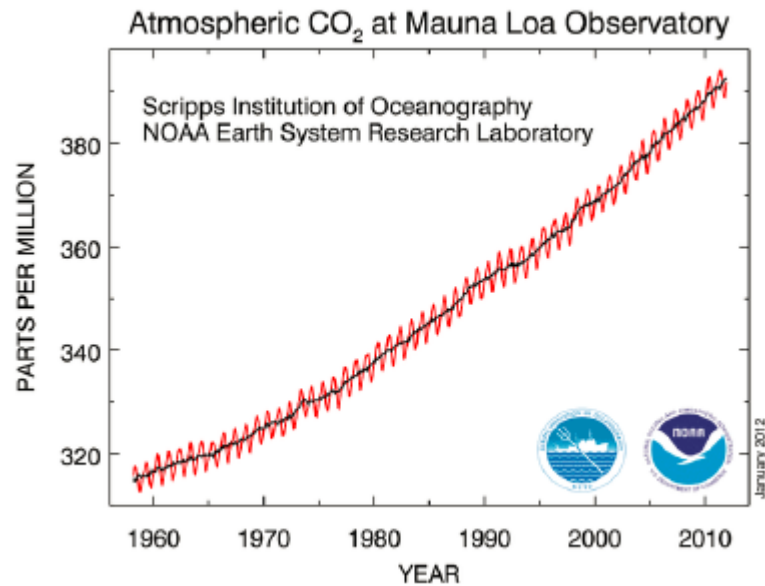


Fig-1: temperature data 1880-2012, Source: GISS.



**Fig-2: Rise in CO<sub>2</sub> concentrations: In 1960: 278 ppm (parts per million),  
In 2012: 401 ppm (parts per million), - 44% increase**

This all will have budgetary outcomes on numerous parts over the economy. Impacts on human wellbeing will grow the requirement for medicinal services and thus increases worry to existing social insurance frameworks. Economic improvement and efficiency may decay due to bad impact on agriculture, transportation, tourism, hydroelectricity, etc. fields. It is suggested by “Global Trends 2030: Alternative Worlds” of The U.S. National Intelligence Council, that as a result of increments in the worldwide populace (8 billion individuals in around 2030), it will increment the need of food, freshwater, energy, etc.

### 3. Climate change: Mitigation and Adaptation

A worldwide study suggests that the global warming ought to be constrained to 2°C. Keeping in mind the end goal to diminish the discharges of CO<sub>2</sub> to zero by 2100, the aggregate discharges up to 2050 should be constrained to 825 Gt and those from 2050 to 2100 to 125 Gt. To meet this CO<sub>2</sub> limits for whatever is left of this century, we should concentrate on reduced energy usage, low carbon energy power, efficient use of energy. The suggestions for this mitigation are described here.

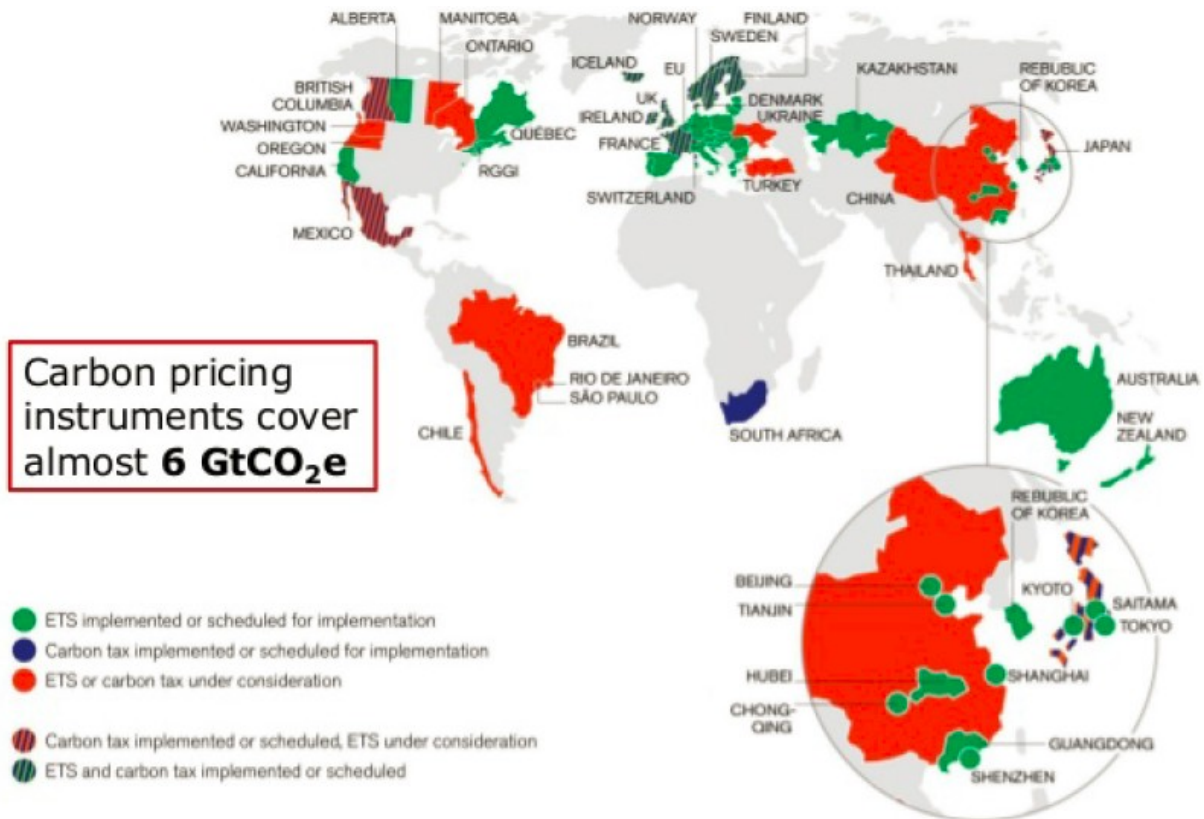
#### 3.1 To reduce CO<sub>2</sub> emissions

As of now, a noteworthy segment of the energy is produced utilizing petroleum derivatives coal, oil, and gaseous petrol (natural gas). These should be supplanted by low-or zero-carbon powers, for example, wind, atomic or solar. To limit the intensity of carbon in atmosphere, new technology (CSS) is developed which will try to catch most of the carbon and store it underground once and for all time. One should improve the performance of vehicle; make more use of public transportation, etc. It is important to consider reusing and recycling of industrial materials. In the field of agriculture, we should focus on soil management, reforestation as well as decrease in creature farming. Methane emanations are likewise an intense GHG that is transmitted by domesticated animals.

Carbon pricing should be done in order to reduce the usage of carbon; this can be done by two methods- cap & trade and carbon taxes. In case of cap & trade, the price is set by market while in case of carbon tax; the same is set by the government. Fig-3 shows the regions, which uses either of the methods for carbon pricing.

No nation can stand to stay separated in the overall endeavors to reduce GHG discharges. Without full global participation from all nations, it will be exceptionally hard to gain any important ground. There are various to accomplish the goal of a low-or zero-carbon world. There are a couple of nations who

don't acknowledge environmental change as a reality and accordingly they are attempting just tepid efforts. Maybe they fear for serious damage to GDP development by not using less expensive non-renewable energy sources. Region by region, the effect of climate change will fluctuate. Some regions will be extremely influenced; some may encounter small impacts at first. No region can stay unaffected from this worldwide issue for longer period of time.



**Fig-3: Different governments with adopted carbon pricing methods**

The earth has turned out to be hotter by around 1°C since 1900; this is revealed by worldwide temperature records. Different impacts of global warming are being experienced by different part of the world like floods, droughts, and rise in temperature, hurricanes, and so forth. Various governmental sectors and agencies can adjust the impacts of climate change by various techniques like land and sea-level planning, catastrophe risk management, water management, ecosystem management, poverty alleviation, human development, livelihood security, etc.

#### 4. Worldwide efforts made by various organizations

In North America, to give actuarial experiences on climate change, the CIA has collaborated with three other actuarial groups. They mainly research about how the global community is affected by climate change. It measures the changes in temperature, speed of wind, extraordinary precipitation, drought, etc. The CIA is a permanent member of IAA (International Actuarial Association) among other 67 members. Resource and Environment Working Group (REWG) was created in September'11 by IAA, with 70 members around the globe from 20 local actuarial associations.

Geneva Association was built up in 1973, mainly focuses on climate change and extreme events through its research project "Climate change & insurance" started in 2008. A lot of assets are committed for research projects by the World Bank. GEF (Global Environment Facility) provides support for climate change. The client countries of GEF are suggested to put resources into low-carbon as well as carbon-flexible advancement. They also give advice on how to minimize the climate risk by

different adaptation methods for empower sustainable water and land management and in turn to mitigate water contamination of rivers, aquifers, etc.

## 5. Conclusion

Due to increase in concentrations of the greenhouse gases like CO<sub>2</sub>, the atmosphere is becoming quickly warm. The reason behind this is more and more use of non-renewable energy resources. Due to this different parts of the world are experiencing high rise in temperature, storms, floods, rise in sea-level, droughts, etc. to give some of the examples. If no proper moves are made then this can lead the mankind to a final turning point. The resources are very limited to use and some renewable resources have restrains on the sustainability. And we, human are utilizing considerably a larger number of assets than the earth can restore. The world needs to act as one handle these problems. The developing countries have perception that the present situation of the earth is due to discharges from high emitter countries and now they should contribute more cost of shifting to low-carbon era. The whole world will be affected by climate change but some regions will be highly affected, some will not get any prompt consequences. At world level, many new risks are perceived by different organizations like actuarial associations. The actuarial associations should try to analyze the current situations and give suggestions accordingly for mitigation.

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