



Pulling Back from the Brink

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Introduction

Recent studies have observed that the planet is gradually experiencing an irreversible change in its temperature which is increasing continuously. Earth maintains its equilibrium in temperature and makes the survival of the various ecosystems sustainable on it. However, human presence in the stable epoch, Holocene has constantly affected the equilibrium. The social and economic transformations are pushing the planet to a “tipping point” beyond which it would not be able to stabilise its temperature.

Human influence on the Earth’s equilibrium

- Earth maintains its equilibrium by balancing the **positive and negative feedbacks**. Positive feedback magnifies the changes in the ecosystem as observed in the melting of greenland ice where the melt waters absorb sunlight and cause further melting. Negative feedback on the other hand, reduces the change as observed in the removal of carbon dioxide (CO₂) from the atmosphere after the chemical-weathering due to increase in CO₂.
- When positive feedbacks become stronger than the negative ones, the system may change abruptly and get pushed out of equilibrium.
- The process of increase or decrease in the warming impacts the equilibrium of earth’s biosphere. The present epoch, which is witnessing the **change in the geophysical system of earth under the human influence** is known as **Anthropocene**.
- Human activity, supported by the burning of fossil fuels and deforestation, led to an increase in greenhouse gas (GHG) emissions that are now causing global warming which is pushing the Earth’s system to a “**tipping point**”.

The Tipping Point

- A geophysical tipping point is a threshold beyond which a **system moves from one stable state to another**.
- The research studies have argued that the technology trend and decisions taken in the next decade can immensely impact the **regional tipping points** which in turn can irrevocably disrupt ecosystems **transforming the planet into a “hothouse”**.
- The destruction of Amazon forest due to wildfires, the loss of permafrost with warming, the weakening of CO₂ absorption by the oceans or the melting of polar ice caps can be seen as the various examples of regional tipping points that feed the overall balancing mechanism of the Earth.

Way Ahead

- Even if the Paris Agreement of 2015 is implemented and the warming is kept below 2 degree celcius, the risk of earth’s transformation into a “hothouse” may be unavoidable. The stabilisation of the planet would require the recognition followed by deliberate and sustained action to secure the earth’s system.
- **Deep cuts in GHG emissions, increasing carbon sinks, finding ways to remove CO₂** and finding innovative ways to deflect the solar radiation may modify the energy balance. Apart from all these **infrastructural, societal and institutional transformations, adaptation to the warmer conditions is the need of the hour**.
- Major changes in **technological innovation, behaviour, values and governance** along with **increasing contributions from renewables and improvement in energy efficiencies** hold the hope of avoiding the hothouse conditions for the planet.