



Research Paper

From Climate Pledges to Progress: Insights from Global Stocktake and India's Commitments

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ABSTRACT

Climate change has hazardous implications for ecosystems and human well-being. The time frame to ensure that everyone has a green and habitable future is shrinking quickly. The effects of climate change are becoming more noticeable at current levels of global warming, and projections of increased warming will amplify existing impacts. Damage to human and environmental systems has already been noted. Infrastructural damage, decreased crop yields, heat-induced labour productivity losses, and species extinctions are expected to accelerate with every fraction of a degree of temperature rise. The effects of climate change are already undermining prior development accomplishments, and the absence of adaptation strategies will make achieving human developmental goals more challenging. This article takes a look on GST: analysing its achievements, the necessity for progression in reduction promises and fund flow from developed nations. It also focuses on India's progress on promised NDCs and its updated targets. The study assesses the extent to which the GST has achieved its two-fold mandate of providing a comprehensive assessment of action and informing the upcoming round of NDCs by referencing primary UNFCCC documents, peer-reviewed literature, and recent policy developments.

KEYWORDS: Climate Change, Greenhouse Gas Emissions, Paris Agreement, Global Stocktake (GST), NDCs, India, Progression.

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The human induced Climate change has caused widespread adverse impacts and irreversible damage to ecosystem and human well-being. The scientific community has become aware of the climate problem and has warned the world about the damaging effects of anthropogenic activity that raises the amount of greenhouse gases in the atmosphere. However, because there was not enough political will to acknowledge it, it did not receive corrective care. The opportunity to secure a sustainable and livable future for everyone is dwindling fast. The effects of climate change are becoming more apparent and are predicted to get worse soon if no action is taken to check it. Global action is necessary to deal with menace of climate change since national efforts alone will not be sufficient. Infrastructural damage, decreased crop yields, rising sea levels, heat-induced labour productivity losses, and species extinction are just a few examples of the harm that has occurred to human and natural systems at the current pace of warming. Each unit of temperature rise that brings warming closer to and over 1.5 °C will further exacerbate the climate crisis and put humanity and ecosystems under increased risk of survival.

The IPCC, both an intergovernmental body of the United Nations and an independent scientific institution, was established by the United Nations Environment Programme and the World Meteorological Organization in 1988 to reconnoiter the threats posed by climate change and analyse societal response. In light of its Fifth Assessment Report published in 2014, the international community concluded the Paris Agreement in 2015 to strengthen the global response towards the climate crisis. It reaffirmed the target of limiting global temperature rise to below 2 degrees Celsius compared to pre-industrial levels and endeavoured to hold it to 1.5 degrees Celsius. Additionally, nations pledged to focus on climate change adaptation and to align international fund flows with these targets. Since then, execution of the objectives of the Paris Agreement has become a greater focus of research on climate change mitigation and resilience development [1].

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The Paris Agreement has designed the Global Stocktake process to weigh the response of nations towards the climate crisis at the gap of every five years. The first stocktake was concluded during COP28. It is a mechanism to evaluate global progress on slashing GHG emissions, building adaptability to climate impacts, and ensuring finance and support to cope with the calamity. The Global Stocktake, anchored in Article 14 of the Paris Agreement, is intended to inform member countries of the agreement about their progress against the targets agreed upon by them under Nationally Determined Contributions (NDCs). Parties to the agreement are required to periodically review its implementation in order to evaluate the progress achieved in accomplishing its long-term objectives and purpose. It enables nations and other stakeholders to assess their progress towards achieving set objectives and also to identify areas in which they are falling short. It aims at examining all aspects of global climate action and support, determining gap areas, and working together to come up with solutions to safeguard our future [2].

The Paris Agreement has spurred tremendous advancements in global mitigation and adaptation efforts. Since its ratification, it is widely seen as playing a pivotal role in initiating universal action to combat climate change by adopting nationally determined targets and communicating to the world the urgency to address the climate catastrophe. Although the Paris Agreement has resulted in contributions that substantially reduce the pace of future warming, the world is still not on track to accomplish the agreement's long-term objectives [3].

Every party to the agreement has submitted its mitigation targets through NDCs and long-term low-emission development strategies (LT-LEDS). Emissions gaps are the variation between the average emission levels of globally modelled mitigation avenues consistent with keeping warming to 1.5 or 2 degrees Celsius and the total emission limits suggested by NDCs. Implementation gaps are the extent to which current laws and procedures fail to accomplish specified objectives. Current NDCs predict that the gap to emissions associated with keeping warming to 1.5 °C in 2030 is between 20.3 and 23.9 Gt CO₂ eq². To accomplish the set targets, action is required to raise the NDCs' mitigation ambitions and their implementation. The parties decided in Paris to work towards global peaking of greenhouse gas emissions as quickly as feasible, while acknowledging the fact that developing member nations will require more time to achieve this peak. According to the IPCC's Sixth Assessment Report, to keep warming limited to the temperature target set at Paris, global GHG emissions must peak between 2020 and 2025. Though emissions in developed and some emerging nations have peaked, global emissions have not. Rapid and significant cuts in emissions must be made by all parties in the decades following the peak. More specific mitigation targets are needed to reduce GHG emissions quickly and to align with each country's LT-LEDS toward balanced transitions to emission-free status by 2050. The Paris Pact states, among other things, that each member country's next Nationally Determined Contributions should be based on their national circumstances, their highest goals, their common but differentiated responsibilities (CBDR), and their capabilities, as well as the evaluation of the Global Stocktake. The industrialized member states had to set an example by pledging to adhere to stringent emission reduction commitments. In light of the distinctive national circumstances, developing countries are urged to continue improving their mitigation efforts and to progressively move toward economy-wide reduction commitments. To achieve net zero emissions, unrestricted usage of fossil fuels needs to be slowly phased out, deforestation must be checked, both demand-side and supply-side regulations must be introduced, and reliance on renewable energy needs to be ramped up. Although to address the emissions generated from buildings, transportation, manufacturing, and other sectors, ambitious adaptation plans and promises are being made, the majority of efforts remain sector-specific, fragmented, constant, and widely distributed across different areas. Both member and non-member nations must adopt long-term, sustainable reforms that integrate climate change risks into every facet of planning, decision-making, and implementation. Limiting warming to the global temperature target set forth in the Paris Agreement will greatly lessen the dangers and effects of climate change [4].

The ratification of the Paris Accord by a sufficient number of nations in 2016 has triggered global action to combat climate change by fixing ambitious targets and demonstrating to the world the urgency to deal with the catastrophe. Despite these initiatives, the world community is still far-flung from achieving the long-term goals agreed upon in the agreement. In early 2025, the average annual concentration of CO₂ in the atmosphere was 427 parts per million, comparatively much higher than it had been in at least 2 million years. As per the report released by the World Meteorological Organization in 2024, the concentrations of carbon monoxide and nitrous oxide in the year 2023 were recorded at 1934 ppb and 336 ppb, which is 265% and 125% above pre-industrial levels, respectively. According to the latest data available with NASA, global surface temperatures have risen by almost 1.47°C in 2024 over the pre-industrial average. The amount of GHG emissions emitted by various sectors is not in tune with the long-term reduction targets pledged by nations nor with anticipated mitigation strategies to achieve the Paris Agreement's global temperature goal, i.e., to keep temperature rise below 1.5°C [5].

In accordance with the provision of the progression to be followed by member countries in their successive NDCs to be submitted every five years, the updated NDCs submitted on the completion of the first round in 2020 for the next five years, i.e., 2025, demonstrate greater determination for mitigation. Nevertheless, these targets are inadequate, as only 22 member countries accounting for 21% of global emissions have updated

their NDCs for the second round, and 175 countries accounting for 79% of emissions have not volunteered any progression in their previously submitted NDCs [6]. Progression may involve establishing more comprehensive and stringent targets to accelerate emission reductions. The developed nations are prompted to spearhead efforts to deal with the menace of climate change by committing to absolute economy-wide reductions, i.e., nationally determined quantifiable targets that delineate the intended reductions to be achieved across all economic sectors. While developing nations are urged to progressively pursue comprehensive emission reduction targets, considering their differential national circumstances. Therefore, the projected timeline for achieving net zero emissions will vary from nation to nation, but all must adopt a comprehensive strategy and develop plans for cutting down CO₂ and GHG emissions to net zero. To guarantee effective energy use, demand-side strategy needs to be improved, renewable sources of energy must be boosted, and, conversely, sustained dependence on fossil fuels must be swiftly decreased by switching to alternative sources, specifically, ammonia and hydrogen. Efforts should also be made to maintain ecological balance, restore degraded areas, minimize deforestation, protect prairies and ocean-based sinks, and modify agricultural practices.

Developed nations voluntarily agreed at Copenhagen in 2009 to mobilize \$100 billion USD annually by 2020 for supporting mitigation efforts in underdeveloped nations. Article 9 of the Paris Agreement specifies that developed member countries shall provide financial assistance to developing member countries for carrying out both mitigation and adaptation actions. While taking a lead to assist developing nations in their efforts to combat climate change, developed nations at the COP29 conference established the New Collective Quantified Goal (NCQG), hoping to raise at least \$300 billion a year for developing nations by 2035, with a larger target of \$1.3 trillion in climate finance. As a part of the Financial Mechanism, the Global Environment Facility (GEF) and the Green Climate Fund (GCF) were created to keep track of financial flow [7]. But financing in adaptation still lags well behind that in mitigation, and that too is out of proportion to the world's increasing demand to recover from the impacts of climate change. To cope with the adversities of climate change and to increase the competence of developing nations, including those with low capacity, speedy action is vital to scale up climate finance from all sectors.

INDIA'S CLIMATE ACTION: TARGETS VS OUTCOMES

India has demonstrated its dedication to tackling the issue of climate change and is focusing its efforts on environmental sustainability. It fervently supported the principles of equity and "common but differentiated responsibilities" and played a significant role in promoting the interests and perspectives of underdeveloped nations. Given that developing countries contribute relatively little to global greenhouse gas emissions and have a substantially lower share in per capita terms. It urges that responsibility to address climate change should be shared fairly and acknowledges the historical connection between industrialized nations' higher levels of development and their role in the depletion of environmental resources.

India pushed for climate finance, technology sharing, and the creation of an adaptation fund during the time frame ranging from 2000 to 2009 and was part of the run-up to the Copenhagen Climate Summit to set a new climate regime following the 2012 deadline. India's shift to a more adaptable, shared, and comprehensive strategy was signaled by the phase, which spanned Copenhagen in 2009 and Paris in 2015. By establishing aggressive targets aimed at cutting down emissions and moving toward an economy with low carbon footprints, India is demonstrating a strategic approach to climate change. In order to enable the nation to fight against the ill effects of climate change and enhance the ecological sustainability of India's development path, it launched a National Action Plan (NAPCC) with eight national missions [8].

India's voluntary commitments and emission reduction targets were debated at COP21 in Paris. Since then, India has concentrated on implementing policies to meet its 2020 targets and has demonstrated significant political leadership. The Paris Agreement's "ratchet mechanism" required all parties to submit their progression over their previously submitted NDCs by 2021. In its first Nationally Determined Contribution (NDC) in 2015, India agreed to shrink its GDP's carbon footprint by 33 to 35 percent by 2030 compared to 2005 levels and additionally install roughly 40 percent of electricity generation from renewable energy sources by the same year. India had already fulfilled its commitments well in advance. As of the end of October 2023, 43.8 percent of the total electricity generation is produced by renewable energy sources, and it experienced a 33 percent drop in its carbon footprint by 2019 [9].

A deadline to reach "net-zero" emissions was included for the first time in India's updated NDCs, which Prime Minister Narendra Modi announced during the summit as 'Panchamrit' or five nectar elements. These updated commitments are achieving a net zero target by 2070, reaching 500 GW of non-fossil energy capacity, and using clean energy to meet half of its total energy requirements by 2030. It will cut its overall anticipated carbon emissions by one billion tons and reduce carbon intensity by around 45 percent of its GDP by the year 2030. India pledged to create an additional carbon sink, producing 2.5 to 3 billion tons of CO₂eq through expanded forest and tree cover. It also promised raising finance for development projects to strengthen adaptation in areas vulnerable to climate change, especially the agricultural sector, water resources, the region around the Himalayas,

coastlines, physical well-being, and disaster prevention and response. It seeks to accelerate the swift adoption of sophisticated climate technologies by constructing the necessary infrastructure both domestically as well as internationally to promote collaborative research and development and to expedite their rapid adoption in India [10]. But implementation of these NDCs is conditional on the availability of climate finance, technology transfer, and capacity-building measures provided by industrialized nations.

Unfortunately, India's plans for mitigating and adapting to climate change tend to be splintered, compartmentalized, and inadequate for dealing with the complicated and aggravating nature of the climate challenge. COVID-19 serves as a clear reminder of the holistic and recurrent nature of the growing hazards in a society that is becoming increasingly interrelated and reliant on one another. COVID-19's devastating, both immediate and lasting, effects on health, socio-economic status, and finances have extended to other sectors and affected not only India but the entire world. The crisis was made worse by severe meteorological conditions, namely scorching temperatures, tropical cyclonic storms, and excessive rainfall that affected India.

The revised NDC serves as the underpinning for India's economic shift toward cleaner energy. In its fight against climate change and the setting up of a clean economy, India needs to pursue strategies different from the ones followed by the West to accomplish its ambitious goals for emissions reduction while focusing on its economic growth at the same time. India is one of the biggest and most populous developing nations; thus, it would be challenging for it to achieve its committed targets and become carbon neutral without assistance from industrialized nations by way of transfer of scientific and technological advancements and financial aid. As per the estimates of the Union Environment Ministry, India would need to raise around USD 1 trillion in climate finance by 2030 to meet its climate objective. India has so far mostly used its own resources to fund its climate initiatives.

PATHWAYS TO CLIMATE ACTION

All nations, communities, and individuals throughout the world are apprehensive about the potential risks of climate change. The gradual elimination of unregulated use of fossil fuels should be done in an economically viable manner. To achieve the net zero emissions target and carry out positive adaptation, we must enhance existing procedures and accelerate climate change response through a whole-of-society approach. Adaptation and decisive actions are necessary to combat climate loss and damage, particularly for those who are most exposed to disastrous events. Underdeveloped nations, and some sectors in particular, cannot afford to make the quick transition away from fossil fuels. For a brief time, fossil fuels could continue to play a significant role in such nations and crucial industrial uses. Phase-out dates may vary depending on the CBDR of nations, but any unabated coal power must be phased out as quickly as possible. It is challenging to anticipate and react simultaneously due to a lack of accountability, inefficient leadership, and inadequate resources at the disposal of developing nations. Ignoring climate change projections and their impact on human civilization, be it political, economic, or infrastructural, weakens reaction capacities and escalates risk factors. To accelerate innovation in developing countries, governments, private businesses, educational and research institutions, and international collaborators ought to team up to develop advanced technology and ensure the exchange of knowledge rather than working in watertight compartments.

To overcome the global crisis, industrialized nations, as part of the UNFCCC and Paris Accord, have committed to transmitting advanced technology along with providing monetary assistance to developing nations. But progress on this front is sluggish, and they are yet to meet their target of raising USD 100 billion a year by 2020. The Paris Agreement has led to improved NDCs, but there is still a gap in member countries' pledges to limit warming to 1.5°C by 2030. At the same time, fairness must be assured in achieving those goals. We will not be able to fix the problem unless we address the main cause, which is the usage and support of fossil fuel substitution. Fossil fuels continue to supply more than 90% of the energy needed to power the transportation sector. Nations should increase the share of non-fossil fuel transportation in total passenger transit by rapidly increasing the number of electric vehicles to at least 75% by 2030 and prioritizing public transportation. Wealthy nations must satisfy their \$100 billion pledge to climate finance and make up for the deficit since 2020. The new climate financing agreed upon at COP 29 is to triple funding for developing nations from \$100 billion to \$300 billion per year, with an equitable emphasis on mitigation and adaptation [11].

All nations, irrespective of being member countries or non-member countries to climate agreements and their territorial boundaries, are at peril from the mounting effects of climate change. Despite the promising NDCs communicated by parties to the Paris Accord, collective progress towards long-term goals has proved to be inadequate. Ardent efforts are required to improve adaptive capacity, furthering resilience and scaling up financial support both at domestic and international levels. However, parties to the agreement have shared their mitigation targets and are working consistently on national mitigation plans while emphasizing low-emission development policies and plans, as well as absolute economy-wide emission reduction goals [12].

CONCLUSION

The GST is a significant milestone aimed at assessing progress achieved in the light of long-term goals agreed upon in the Paris Agreement at the gap of every five years and to chalk out a plan of action and enhanced future commitments. It warns the world that if stronger action is not taken by nations to combat climate change before the second Global Stocktake in 2028, the globe may witness the devastating repercussions of rising global temperatures. The first GST assesses measurable progress in increased dependence on renewable energy in place of fossil fuels, emission reporting, and progressive updated NDCs by at least 22 member countries, while others have given positive affirmation for the same. But still the world remains off track to meet the target of limiting temperature rise to 5°C. There exists an incessant gap between the targets pledged by nations and actual emission reductions required to meet agreed targets.

Despite lagging behind the committed targets, it has successfully established a baseline of collective understanding and kept the momentum intact by providing a clear signal for increased ambition. It has laid the procedural groundwork for ensuring transparency, international cooperation, and bolstering trust among parties for sustained climate action. It has acknowledged the progress achieved in areas such as increased reliance on renewable energy, enhanced commitments to climate finance, and strengthened adaptation planning, and at the same time identified the gap areas that are to be addressed in the future course of time. The GST not only shows a mirror of where the world stands but also a roadmap providing direction to proceed. The success of GST will hinge on how the nations respond to the outcomes of the first GST at COP 28 and how these are translated into policies with enhanced ambition, implementation plans, and increased financial contribution by the developed world and support for capacity building. It is a forward-looking orientation, serving not only as a diagnostic tool but also as a foundation of hope for more effective and just international climate architecture. With sustained political will of global leaders, enhanced international cooperation, and continued innovation, the GST has the potential to keep the nations on track to deliver on the Paris Agreement's promise of a resilient, low-carbon future for all. It is yet to be seen whether the Paris Accord can fulfil its promise of 'a just and sustainable climate future.'

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