

# Carbon Pathway to Net Zero India's Emissions By 2070

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DOI: <https://doi.org/10.5281/zenodo.17307299>

### ABSTRACT:

As a signatory to the Paris Agreement, India has pledged to contribute to mitigating greenhouse gas emissions and building resilience against climate change. The country's managing its responsibility under the national and internationally determined contribution, through emission reduction policies, strategies, long-term policies and augmentation of carbon sinks to achieve net zero emissions by 2070, demonstrates India's willingness to take climate action. The pathways for such action will be determined by the policy measures that the country adopts now and in the future.

### KEYWORDS:

Net Zero, Carbon, Taxonomy, Goble.

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### Introduction

The introduction of a national taxonomy will display India's aspiration of ramping up its contribution to the global net-zero vision. At present, green finance in India is still a "cottage industry". Articulating a taxonomy will help "industrialise" green finance, transforming it "from a trickle to a flow" which will in turn influence India's ambitious green transition. Introduction Today, according to Global Assessment of Land Degradation and Improvement (GLADA), nearly one forth area of our world land has been degraded (Arora, 2024). The United Nations Convention to Combat Desertification (UNCCD) is leading the issues of soil or land degradation to restore valuable natural resources for achieving a land degradation neutral world by 2070 Recent heavy rainfall has triggered landslides and flash floods across northern India. In himachal Pradesh, Punjab, Haryana, and Chandigarh in the year 2023, 2024 and 2025, respectively are the glaring examples. These floods remove top fertile soil and nutrients, resulting in decline in crop productivity for years, unless and until proper management strategies are invoked. This huge salt affected area results losses of about 240 billion INR every year which is expected to rise with further increase in salt affected area to 16.2 MH by 2050 (CSSRI, 2015). The ICAR-Central Soil Salinity Research

Institute has been working since decades in developing technologies for reclamation of salt affected soils, subsurface drainage for saline soils with lower ground water table, alternate land use, salt tolerant crop varieties of rice, wheat and mustard varieties. These technologies have helped in greening a vast tract of barren unproductive land in India and thereby enhanced SOC level and ultimately will help in achieving land degradation neutral India by 2070.

### **Impact of government initiatives to achieve carbon neutrality Pradhan MantriKrishiSinchayeeYojana (PMKSY)**

Government of India has so far initiated so many schemes for the benefit of farming and farmers. One of them is the PMKSY. The major objectives of PMKSY are increasing investments in the field of irrigation for expanding area under cultivation of assured irrigation at the field level; improving on-farm water use efficiency by efficient utilization of water and reduced the wastage of water; enhancing the area under precision agriculture and adoption of high-tech/ improved irrigation technologies; promotion of other water saving technologies such as drip (More crop per drop), recharging of ground water through adoption of different water conservation technologies and recharge of tube well and reusing municipal waste water after treated for peri-urban agriculture; and encouraging private investment in the field of precision irrigation system. The scheme will aid to conserve natural resources and bring more area under cultivation as more efficient utilization of water that will enhance greenery, biomass and SOC storage which ultimately help to achieve carbon neutrality.

### **ParamparagatKrishiVikasYojana (PKVY)**

The PKVY is a sub-component of Soil Health Management (SHM) scheme under National Mission of Sustainable Agriculture (NMSA) with the aim to develop sustainable models of organic farming through the mixture of traditional wisdom with modern science and technology to conserve natural resources, to ensure long term soil fertility build up, and to help in climate change adaptation and mitigation. It primarily focuses on increasing soil fertility and production of healthy food through organic practices without the use of agro-chemicals. This scheme will help substantially in promotion of integrated and sustainable farming systems through natural resource conservation, and thereby reduce the cost of production through sustainable integrated organic farming. all these

practices will pave the pathway of green India through achieving carbon neutrality.

### **Research needed**

1. It is essential to calculate critical and saturation level of SOC for estimation of SOC saturation deficit under different agro-climatic conditions and soil types to identify key spots for enhancing C sequestration.
2. Carbon sequestration varies with soil type, climate, vegetation, crop production and management factors, thus, it is important to identify most important site-specific key factors governing C sequestration.
3. Zero tillage has well known technology for achieving carbon neutrality but further research is needed to test its potential under different climate and soil types through long term experiments.
4. It is necessary to develop agro ecosystem-based soil, water and land management strategies to address the “Soil health problems” for agricultural development because production constrains and soil properties vary with ecosystem.

Various initiatives and policies by the government of India to deal with Climate change:

### **Domestic Level initiatives:**

The National Action Plan on Climate Change (NAPCC) serves as India’s comprehensive policy framework for climate action, outlining strategies for both adaptation and mitigation.

The National Mission on Sustainable Transport is in development to promote efficient, cost-effective transportation solutions that consider environmental, social, and economic factors.

National Biodiversity Action Plan: Aims to protect and conserve biodiversity, which is vital for climate resilience.

Schemes like Green Hydrogen Mission, PM Ujjwala, and Soil Health Card, all are directed toward reducing carbon emissions.

### **International Level Initiatives:**

Mission Life: It primarily focuses on the reduction of the carbon footprint of individuals through eco-friendly practices. International organizations like the International Solar Alliance, and Global Biofuel Alliance, formed by India’s active role aimed at working to reduce the dependency on fossil fuels.

Kigali amendment: This aims to phase out the global warming

chlorofluorocarbon substances.

**Global stocktake:** Under the Paris Agreement India presented its first-ever global Stocktake in 2023 at COP 28.

**Coalition for Disaster Resilient Infrastructure (CDRI):** An initiative to promote resilience in infrastructure systems to climate-related disasters, fostering international cooperation.

**Bharat Stage Emission Standards (BSES):** Aligning vehicle emission norms with international standards to reduce air pollution and improve air quality.

What are the challenges that Limit India to achieving net zero emissions

**Development vs climate change:** India is a developing country even though its per capita emission is less overall. India is the third largest emitter in the world.

**Climate finance:** A major issue not only for India but all developing countries is climate finance, most countries including India are lacking in climate finance.

**Technology Transfer:** India lacks the technology to mitigate and adapt to the effects of climate change.

**Vulnerability:** According to the IPCC report, India is one of the most severely vulnerable countries.

**Lack of international collaboration:** global countries are not on the same page when it comes to climate change. India is finding it difficult to navigate these challenges.

**Dependency on Fossil fuel:** Still India is dependent on coal-based energy sources. Around 50 percent of electricity is produced by using coal-based resources.

**Slow transition:** The slow transition to renewable energy and green energy is slow and steady vis to the climate change effect.

**Agricultural Challenges:** Agriculture, a major sector in India, faces pressures from climate change itself. Transitioning to sustainable practices while ensuring food security is complex.

**Policy and Regulatory Framework:** Inconsistent policies and regulatory barriers can slow down the implementation of renewable energy projects and climate initiatives.

### **Steps to Achieve the Net-Zero Emission Target by 2070:**

**Green Energy:** India's path to achieving this target passes through

green energy initiatives like Green hydrogen are welcome steps in this regard.

**Collaboration with countries:** India and other countries like the US have a clean energy mechanism to collaborate on climate change issues.

**Sustainable agriculture practices:** The use of sustainable practices such as hydroponics and climate-smart agriculture is needed to reduce GHG emissions.

**Investment in Climate Resilient Infrastructure:** the green steel industry and charcoal roads are the beginning of such climate-resilient infrastructure. The special allocations of funds are such initiatives that would help to reduce the climate impacts.

**Leadership at the international level:** India's International Solar Alliance and other international-level initiatives will help India get the needed finance and help other third-world countries.

**Technology and innovations:** The fight against the climate remains empty if India ignores the technology. So India needs to be more focused on technological developments.

**Active citizenry:** active and aware citizens can reduce the emissions of the GHG and would help to reduce the carbon footprints.

**Preservation of biodiversity:** India is one of the top bio diverse countries in the world and this diversity needs to be protected. The forest can act as the natural reservoir for the carbon. India's forest policy also aims to cover  $\frac{1}{3}$  area of India under the forest. The mission of Sustainable Habitat needs to be implemented at the grassroots level.

### **Why in the News**

Recently NITI Aayog CEO said that NITI Aayog is working on strategies to achieve the target of Net Zero Emission by 2070.

### **What is Climate Change**

Climate change refers to long-term changes in temperature and weather patterns. While such shifts can occur naturally due to factors like variations in solar activity or volcanic eruptions, human activities have been the primary cause of climate change since the 1800s. The burning of fossil fuels—such as coal, oil, and gas—has led to significant greenhouse gas emissions. These gasses act like a blanket around the Earth, trapping heat and raising global temperatures.

### **Net- Zero emission or carbon neutrality:**

Net-zero carbon emissions refer to the balance between the amount

of greenhouse gasses emitted into the atmosphere and the amount removed from it. Achieving net zero means that any carbon dioxide (CO<sub>2</sub>) emissions produced by human activities are balanced by an equivalent amount of CO<sub>2</sub> removed from the atmosphere, resulting in no net increase in atmospheric CO<sub>2</sub> levels.

### **India and Climate Change**

Climate change is a global challenge and requires collective global action to avert and minimize the impacts of climate change. International efforts to address climate change are guided by the United Nations Framework Convention on Climate Change (UNFCCC) and its two instruments, namely the Kyoto Protocol and the Paris Agreement. As a responsible global player, India is a Party to the UNFCCC and its instruments.

### **Conclusions**

India is the only G20 nation that achieved its commitment under the Paris Agreement well before the time and the need is to keep this momentum continuing. The initiatives like The NITI Aayog strategy will help India set up short-term and long-term goals to achieve the target by 2070. In the 21st Century, to produce sufficient food for the increasing population of the country without any harmful effect on natural ecosystem, proper implementation of the above-mentioned innovations and practices are very much essential. For this purpose, awareness generation among the farmers is necessary. The National Agricultural Research System (NARES) with vast network in the country is well prepared and very much capable to achieve the carbon neutrality by successful implementation of those policies in the years to come. These will also help the country to cope up with the future climate change scenarios.

**Funding:**

This study was not funded by any grant.

**Conflict of interest:**

The Authors have no conflict of interest to declare that they are relevant to the content of this article.

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