



CLIMATE CHANGE ADAPTATION AND MITIGATION IN INDIA

**AN OVERVIEW OF GOVERNMENT APPROACHES AT THE
STATE AND NATIONAL LEVELS**

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INTRODUCTION

Diversity -- in biology, ecology, and geography, to say nothing of the countless forms of human diversity -- is undeniably one of India's greatest assets. One of seventeen megadiverse countries, India is home to roughly ten percent of the world's known plant and animal species. This biodiversity is due in large part to the geographic diversity: coastal plains and deserts, dense forests and the arcing cap of the Himalayas. Along with valuable natural resources, this also affords ample and hopeful opportunity to harness wind, solar, and hydropower. Unfortunately, for all of its benefits, India's unique geographical range puts its people at an equally devastating risk arising from climate change. Where other countries may have to focus nearly exclusively on mitigating drought or coastal erosion and sea-level rise, India must address these issues while also combating glacial melt leading to water shortages, heat waves, erratic monsoons and flooding, increasing demand for energy and fossil fuels, toxic air quality, and numerous other impacts of the changing climate. Cross-cutting issues such as food insecurity and public health are continuously exacerbated by increasing temperatures and extreme weather events.

Fortunately, while there is and always will be more work to be done, the Government of India (GoI), private sector companies, and individuals have taken major steps to address climate change and its attendant crises at the national, state, and local levels.

NATIONAL-LEVEL APPROACHES

Since being the first country to establish a government ministry dedicated specifically to non-conventional energy resources, the Ministry of New and Renewable Energy (MNRE), in 1980, India has continued to make strides towards mitigation and adaptation.

The Delhi Ministerial Declaration adopted at COP 8 in 2002 charged countries in the global north to transfer to the global south technology that could promote mitigation and adaptation while reducing emissions. The National Environment Policy of 2006 was implemented in order to ensure that environmental concerns were included in the economic development process. The GoI published its National Action Plan on Climate Change (NAPCC) in 2008, which laid the framework for eight National Missions dedicated to the most acute climate issues from agricultural sustainability and food security to water, solar, and knowledge management. Subsequently, the government established the National Clean Energy Fund in 2010, ratified the Paris Agreement in 2016, and adopted its latest National Electricity Plan in 2018.

Since 2010, the GoI has doubled the budget dedicated to renewable energy and increased from 5% to 16% its targeted electricity supply coming from renewable sources.

While greenhouse gas emissions are projected to have doubled their 2010 levels by 2030, this would still be within range of India's Paris Agreement targets and other projections show India actually overachieving on these targets.



NATIONAL POLICY MILESTONES

- 1980: India becomes the first country with a national ministry dedicated to alternative energy sources with the establishment of the Ministry of New and Renewable Energy
- 2006: National Environmental Policy requires environmental considerations to be included in economic development processes
- 2008: National Action Plan on Climate Change is published, forming eight ministries focused on environmental issues
- 2010: Establishment of National Clean Energy Fund
- 2016: Ratification of Paris Climate Accord
- 2018: Adoption of most recent National Electricity Plan, emphasizing commitment to moving towards cleaner renewable electricity

Steps have also been taken towards separating carbon emissions and economic growth by 2045; three research institutes were commissioned to begin work on the development of low-carbon or carbon-neutral economic growth strategies. Each of these pledges, initiatives, and policies have been key milestones in India's fight against climate change. But while these broad national-level approaches are critical, India's geographical diversity means that certain regions are more acutely affected than others and the most pressing concerns vary from state to state. As such, it is the way that these policies and programs are implemented at the state and local levels that will most directly affect and benefit people on the ground on a day-to-day basis, across the seasons, and indeed for generations to come.

STATE-LEVEL APPROACHES

The State Action Plan on Climate Change (SAPCC) is key to ensuring that the policies of the NAPCC are tailored and localized to the unique needs of individual states and are implemented down to the village level. The following examples provide useful insight into the ways in which individual states have approached the different issues affecting their citizens, particularly those most at risk, as well as the climate as a whole.

Chhattisgarh

At least 80% of people in Chhattisgarh depend on agriculture for their livelihood; nearly half of those people are marginal farmers who are particularly at risk due to their dependence on rain-fed monoculture. Over recent years, rains which typically last for 85 to 90 days have lasted for around 65 days, and total annual rainfall has decreased by 200 to 400mm.

While the state saw a 25% increase in productivity of cereals and a 6% decrease in productivity of pulses from 2003 to 2013, oilseed productivity rose by 47% over the same time period. This is important to note because oilseeds and pulses require less water than cereals and other crops, and their chemical composition makes them more beneficial for soil nutrients; as a result, they can help mitigate the effects of drought or erratic rainfall. While this increased productivity of oilseeds is a positive, the total amount of cereals grown is still significantly higher. Further risk -- for climate, ecology, and health -- comes from the fact that 80% of households in Chhattisgarh use firewood for their primary cooking fuel.

Fortunately, the NMSA declares that 50% of funding allocation must be utilized for marginal farmers. Solutions that this, and other dedicated funding, may promote include climate-resilient agriculture. Farmers in the northern and southern regions of the state may also benefit from funding allocated for water-harvesting structures such as tanks, ponds, and wells in hilly areas.

Other ongoing government schemes include solar-pump irrigation technology and integrated watershed management techniques that promote climate adaptation.

The ‘Narwa, Garuwa, Ghurwa, and Baadi’ scheme has been implemented in the state to help with the development of micro-watershed structures that promote groundwater recharge and an increase in surface-water irrigation. Other initiatives within this scheme include livestock development, composting, and the development of smaller kitchen gardens. The risk of health issues and deteriorating air quality, both indoors and out, can be mitigated by ongoing LPG subsidy schemes, and the state government has declared that it will no longer be building new coal plants, despite sitting on the third-largest coal reserves in the country.

Unfortunately, while these programs can and should benefit many of the marginal farmers in the state, there have been challenges with the uptake and benefits of other schemes. Attempts to use improved weather forecasting technology to make decisions on crop planting and harvesting have not been as useful for marginal farmers as they could be as a lack of digital literacy makes extracting the information and making informed decisions much more difficult. The government’s Pradhan Mantri Crop Insurance as well as its Restructure Horticulture-Based Crop Insurance schemes have seen limited utilization due to a lack of education provided to marginal farmers on how to access them.

Gujarat

As in Chhattisgarh, Gujarat has also announced that it will not allow the development of new coal plants going forward, with the aim of focusing on increasing renewable energy capacity instead. Additionally, beginning in 2019, the Government of Gujarat rolled out a pilot program focused on emissions trading, the first of its kind not only in India but in the world. This cap-and-trade scheme has been adopted by more than 150 plants and limits the amount of particulate pollution they can collectively emit. After two months of trials,

it formally launched in September of 2019, and has since seen a decrease in particulate emissions of 29% while simultaneously cutting costs.

Tamil Nadu

The state government of Tamil Nadu has recently developed a new strategy focused on electric vehicles (EV), which features a range of incentives. These include land subsidies provided to help set up EV charging stations and infrastructure needed for the manufacturing of EV. Tax exemptions are also available for EV owners. Transport is one of the fastest-growing sectors in the Indian economy, and along with other schemes dedicated towards mobility solutions and smart cities, EV-focused schemes could have lasting impact going forward. Nearly 15 other states have also begun the process of drafting and implementing EV policies.

Rajasthan

The Drip Irrigation Initiative implemented in Rajasthan is a successful example of a partnership-based scheme. Created in concert by local farmers, the state government and Department of Horticulture, Krishi Vigyan Kendra, Takedra, and Coca-Cola India, this Public-Private-Community Partnership (PPCP) has been useful in mitigating the over-taxation of groundwater sources arising from traditional flood-irrigation techniques. The result has been a savings in water, electricity, fertilizers, and pesticides, as well encouraging farmers to move from mono- to polyculture, increasing productivity and promoting soil health.



KEY TAKEAWAYS

While it is not possible within this space to detail all of the national and state government schemes and policies that have been implemented or are in continuing development, the above examples demonstrate that positive strides have been made in the facing of mounting challenges. Continuing to mitigate and adapt to climate change will require a concerted effort on the part of the GoI, state governments, private sector corporations, communities, and individuals on the ground.

National-level policies and commitments to curbing emissions and incentivizing sustainable solutions in agriculture, water and food security, transport, and urbanization, among other issues, are important as an umbrella under which more direct action by states and communities can take place. This national focus is also critical for continuing to build awareness of the challenges and potential mitigation and adaptation options, and keeping the issue of climate change at the forefront of everyone's mind.



Underneath this umbrella is likely where most of the real action will, and should, take place, however. Government schemes and programs must continue to be dedicated, at least in significant part, to the ground-level where the most at-risk communities and individuals can see the greatest benefit on daily life, whether that is ongoing LPG subsidies, improved cropping and irrigation techniques, or development of more sustainable, affordable, and reliable public transport. As seen in Chhattisgarh, however, these must be accompanied by capacity- and knowledge-building to ensure uptake and ongoing utilization. The PPCP model, as seen in Rajasthan, should also be a major focal point going forward as the cost, infrastructure, and knowledge requirements can be spread across multiple partners, helping to ensure sustainability. Many major companies, such as Mahindra & Mahindra, have made their own pledges towards mitigation and adaptation and should be targeted for partnership opportunities by government and community leaders.

At this point, climate change is an irreversible fact. Once again, there is and always will be more work to be done, but the combination of public and private approaches along with efforts of community leaders and individuals can go a long ways towards mitigating and adapting to the worst of its effects.