Science, Policy and Purpose

My Journey Through India's Climate Action

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The year 2007 remains etched in my memory as a defining moment - not only in the global understanding of climate change, but also in shaping the trajectory of my own professional journey. The release of the Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC) fundamentally altered the way the world viewed climate science and its implications for humanity.

For the first time, the scientific evidence was presented with such clarity and confidence that there was little room left for doubt. Climate change was no longer a distant environmental concern or a subject confined to academic debate. It had emerged as an urgent developmental, economic, and societal challenge.

For India, the findings were especially alarming. The report pointed towards increasing water stress, vulnerability of Himalayan ecosystems, declining agricultural productivity, risks to coastal populations from sea-level rise, and a growing frequency of extreme weather events.

For policymakers, scientists, and administrators alike, it was a moment of reckoning.

A National Response Begins to Emerge

Recognising the seriousness of the issue, the Government of India initiated the process of preparing a coordinated national response. The Ministry of Environment and Forests was tasked with developing a broad climate framework, while a high-level drafting mechanism under the Office of the Principal Scientific Adviser (PSA) to the Government of India was established to guide the process. This ensured that the framework would be grounded in scientific evidence and practicality.

At the international level, too, India's climate engagement was evolving rapidly. During the Thirteenth Conference of the Parties (CoP-13) to the United Nations Framework Convention on Climate Change held in Bali in December 2007, the then Union Minister of Science & Technology and Earth Sciences was appointed to lead the Indian delegation. Though subtle, the decision reflected an important shift in thinking: climate change was not merely an environmental issue - it was fundamentally linked with science, technology, energy security, economic growth, and national development.

Soon thereafter, an inter-ministerial coordination mechanism was set up to steer the preparation of India's National Action Plan on Climate Change (NAPCC). The Union Minister of Science & Technology chaired the National Coordination Committee on Climate Change (N4C), and I had the privilege of serving as its Member Secretary. It was both an honour and a daunting challenge. Climate change was a highly complex and cross-sectoral issue. Any national strategy would need to reconcile multiple priorities - developmental aspirations, scientific realities, energy demands, international negotiations, and institutional capacities.

Building Consensus Across Systems: A Coordinated Teamwork

The process of preparing the NAPCC involved extensive consultations across ministries, scientific institutions, research organisations, academia and subject experts. These discussions were often intense and intellectually demanding. Each stakeholder brought a unique perspective, shaped by their institutional mandates and experiences. Reconciling these varied viewpoints required patience, sustained dialogue, evidence-based discussions, and a willingness to seek common ground. Yet, it was precisely this diversity of thought that enriched the final framework.

The drafting process was highly iterative, with repeated rounds of review, discussion, revision, and refinement. Every mission, recommendation, and implementation mechanism was examined carefully to ensure both ambition and practicality. Inputs from scientific institutions, different ministries, and national coordination bodies helped shape a comprehensive framework that balanced developmental priorities with environmental sustainability.

On 30 June 2008, the then Prime Minister, late Dr Manmohan Singh, formally launched the NAPCC. For me, it was a deeply satisfying moment - to witness the culmination of months of collective effort and to contribute, in some measure, to a framework that would shape India's climate response for years to come.

From Vision to Implementation

Following the approval of the NAPCC, attention shifted from policy formulation to implementation. The NAPCC identified eight National Missions addressing critical dimensions of climate change and sustainable development. Of these eight missions, four focused on mitigation, three on adaptation, and one on the science (knowledge) aspects of climate change.

S.No.	NAPCC Mission	Focus Area	Implementing Ministry/Dept
1	National Solar Mission	Mitigation	Ministry of New and Renewable Energy
2	National Mission on Sustainable Habitat	Mitigation	Ministry of Urban Development
3	National Mission for Enhanced Energy Efficiency	Mitigation	Ministry of Power
4	National Mission for a Green India	Mitigation	Ministry of Environment, Forest and Climate Change of India
5	National Water Mission	Adaptation	Ministry of Water Resources
6	National Mission for Sustainable Agriculture	Adaptation	Ministry of Agriculture
7	National Mission for Sustaining the Himalayan Eco-system	Adaptation	Department of Science & Technology (DST)
8	National Mission on Strategic Knowledge for Climate Change	Science/ Adaptation	DST

DST was entrusted with the responsibility of implementing the last two missions, namely:

- *National Mission for Sustaining the Himalayan Ecosystem (NMSHE)*
- *National Mission on Strategic Knowledge for Climate Change (NMSKCC)*

In May 2009, after completing my tenure with the Ministry of Science & Technology, I returned to DST to lead the implementation of these missions. A dedicated Climate Change Programme Cell was established to coordinate this effort.

It is relatively rare in government service to be involved both in the conceptualisation of a policy and later in its implementation. While this continuity offered intellectual satisfaction, it also brought a strong sense of accountability. The real challenge lay not in drafting mission documents, but in translating broad policy objectives into functioning institutional systems and impactful programmes.

Very soon, the magnitude of the task became apparent.

Rebuilding Institutional Foundations

By this time, a major structural shift had already taken place with the formation of the Ministry of Earth Sciences (MoES) in July 2006. Several premier institutions dealing with weather and climate sciences, including the India Meteorological Department (IMD), Delhi; the National Centre for Medium Range Weather Forecasting (NCMRWF), Noida; and the Indian Institute of Tropical Meteorology (IITM), Pune, had moved from DST to the new ministry. Consequently, DST no longer possessed a direct institutional base in climate and atmospheric sciences.

In many ways, we were tasked to take up these two missions almost from scratch. The initial years involved painstaking groundwork. Although the mission documents were conceptually robust, they required further detailing in terms of deliverables and timelines before implementation. This led to another extensive round of consultations across institutions and stakeholders nationwide. Nearly two dozen consultations were organised to refine implementation strategies and institutional mechanisms. Both NMSHE and NMSKCC documents were revised nearly a dozen times to reach final drafts, which were submitted to the Prime Minister's Council on Climate Change in August 2009 and received approval in October 2009.

Shimla Declaration on Sustainable Himalayan Development

The Himalayan Chief Ministers' Conclave was held in Shimla on October 29-30, 2009, to address glacial melting and the impacts of climate change on the Himalayan ecosystem. I was invited to make a keynote address on the implementation strategies for NMSHE. Discussions also centred on mitigating climate-induced changes in the micro- and macro-environment, adapting agriculture to erratic weather and protecting mountain livelihoods. The Conclave resulted in the Shimla Declaration on Sustainable Himalayan Development.

Creating a National Climate Ecosystem

After approval of mission documents, our next task was to build a scientific and institutional ecosystem capable of sustaining long-term climate research and action. We adopted an evidence-based approach. Using SCOPUS and other databases, we mapped leading Indian institutions, researchers, and thematic strengths in climate science, adaptation, mitigation, and related domains. This exercise provided a clearer understanding of the national research landscape and helped identify areas requiring capacity enhancement.

Based on this mapping, several important initiatives were launched:

- Centres of Excellence
- Major R&D Programmes
- Thematic Research Networks
- Human Capacity Building Programmes
- Thematic Task Forces

Among all the missions, the Himalayan Mission posed perhaps the greatest complexity. It was the

only mission under NAPCC with a distinctly location-specific focus. The Himalayas represented not only an ecologically fragile region but also a critical source of water and biodiversity for millions of people.

Addressing Himalayan sustainability required integrating multiple disciplines - glaciology, hydrology, biodiversity, agriculture, traditional knowledge systems, and socio-economic studies. Six thematic Task Forces led by premier institutions were created to address these interconnected dimensions.

DST collaborated closely with the Ministry of Environment and Forests to establish State Climate Change Centres across States and Union Territories. These centres played a crucial role in supporting State Action Plans on Climate Change and in creating regional institutional capacities. Several forward-looking initiatives were also undertaken, including Global Technology Watch Groups (GTWGs), Indo-Swiss collaborations on glaciology, the Fulbright-Kalam Climate Fellowship Program under Indo-US bilateral cooperation, and inter-university consortia focusing on Himalayan cryosphere studies.

A System Begins to Mature

As the programmes expanded, their impact gradually became visible. Research initiatives gained momentum. Institutional networks deepened. Young researchers began entering climate-related fields in larger numbers. Collaborative platforms strengthened interactions between scientists, policymakers, and practitioners.

More importantly, climate research in India began evolving from isolated institutional efforts into a more connected national ecosystem. The missions were no longer merely policy documents. They had evolved into living systems of action. The establishment of Centres of Excellence, thematic networks, research programmes, and State Climate Change Centres created institutional foundations that continue to contribute to India's climate preparedness and scientific capacity.

Reflections on the Journey

Looking back today, what stands out most is not merely the scale of programmes or institutional achievements, but the spirit in which the journey unfolded.

There were uncertainties. There were resource limitations. There were moments of doubt and institutional inertia. Yet there was also extraordinary commitment, collaboration, and belief that the effort mattered.

Climate change remains one of the most complex challenges humanity has ever faced. Addressing it requires much more than policy announcements or international negotiations. It demands scientific capability, resilient institutions, interdisciplinary thinking, and above all, sustained collective effort.

For me personally, the climate journey at DST was far more than an administrative assignment. It became an enriching experience in institution building, public policy, and national service. It taught me patience. It reinforced the importance of collaboration. And it offered the quiet satisfaction of contributing - however modestly - to a larger national mission whose significance will only grow in the years ahead.

In many ways, the story of India's climate action is still unfolding. The challenges ahead remain enormous, but so do the opportunities for science, innovation, and policy to work together in shaping a more resilient and sustainable future.

Acknowledgement

I remain deeply grateful to the many colleagues, experts, and institutions who contributed to this journey. While it is not possible to acknowledge everyone individually, their guidance, support, and collaboration were invaluable.