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OPINION

Climate data democracy is essential for climate action

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1. Understanding climate data democracy

When NASA provided free worldwide access to the Landsat data archive, scientists greatly expanded the analysis of new locations and novel topics [1]. Of course, data democracy is not *just* for scientists. When citizens own the rights to generate and access data that speaks to their concerns, democracy is strengthened [2].

Data democracy began to gain prominence in the early 2000s, with the growth of the open data movement [3]. In today's era of climate change, the term assumes increasing significance. Yet despite the large volume of opensource climate data, access remains largely limited to academia and business.

Climate data democracy enables all sections of society to access climate data; understand how to use and interpret it; and be able to use data for climate action. Given the lack of data and severity of the crisis in the Global South, we argue that these regions must take the lead in driving conversations around climate data democracy [4].

2. Academia as enablers

Climate datasets are scattered in different locations, held by different organizations, with economic, social and political barriers limiting access. These data have been collected using diverse methods, at different spatial and temporal scales, stored in different formats at varying levels of detail and quality. They must be cleaned, gap-filled, aggregated, harmonized, and constantly updated. The complex information in these datasets needs to be made legible and translated for wider use–without over-simplifying or degrading data, impacting the capacity to analyze complex data signals and interpret trends.

Academia is uniquely positioned to take an enabling role in climate data democracy. Universities have the required domain expertise and technical knowledge, and an inherent social commitment to advancing societal knowledge through teaching, training and capacity building. While academia is not free of bias or vested interests, it provides a relatively trusted source of expertise, one that is less likely to be driven by specific agendas, vested interests or profit motives.

3. For whom? identifying levers of change

As academics in the Global South, working on local and global issues of climate change—with a combined total experience of over sixty years in climate and environmental research—we have witnessed firsthand the challenges associated with accessing and utilizing climate data for public purpose. Since 2019, through the Centre for Climate Change and Sustainability at Azim Premji University, we have experimented with a range of approaches to advance climate data

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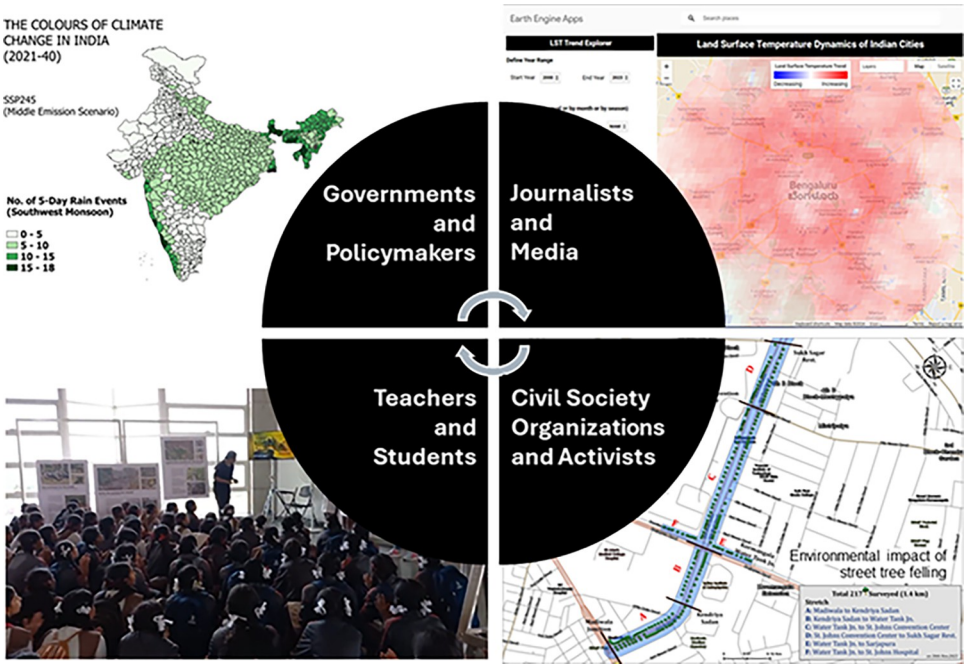

Fig 1. Mobilizing climate data democracy through levers of change. A. Map depicting the projected number of 5-day rain events across all districts in India for the period 2021–2040, using bias-corrected CMIP6 data. B. Interface for a web-based application to monitor land-surface temperature dynamics for 166 Indian cities. The image presents variations in land-surface temperature trend in Bengaluru and its surroundings, based on the MODIS LST dataset (MOD21). C. Map of street trees in Koramangala, Bengaluru, created as part of an environmental impact assessment of tree felling by Azim Premji University, to assist citizen groups working towards tree protection. D. School students participating in the Forests of Life climate festival, at Azim Premji University, Bengaluru, in November 2023.

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democracy. Motivated by core concerns of climate justice, we identify and work with levers of change–priority groups with the capacity to use data to amplify change–tailoring our approach to the needs and context of each group (Fig 1).

3.1 Governments and policymakers

Elected governments and policymakers play an essential role in shaping democratic climate action policies. Climate forecasts are often generated at coarse spatial scales, for distant time periods such as 2100, rarely on the radar of elected representatives. This creates obstacles for data-driven policy making, especially in the Global South. For instance, our work in India demonstrates that only 0.3% of questions raised in parliament over a 20-year period in India pertained to climate change, despite its increasing importance to the country's future [5]. By integrating data from a range of climate models to create an ensemble of models, and generating fine scaled (25X25 km) climate maps at near-time resolutions (2021–2040), we aim to empower local, regional and national governments to appreciate the urgency and magnitude of the crisis and use this data to strengthen climate adaptation strategies.

3.2 Journalists and media

Media plays a critical role in informing and shaping public opinion on climate issues–yet journalists are rarely trained in climate data handling [6]. Over the past two years, we have run a series of workshops for senior journalists and editors on climate data journalism in multiple Indian cities. Responding to their expressed need for ready data, we have also developed apps

that can be used to cover topical issues such as urban heat waves in Bangalore, through maps and visual storytelling (see Fig 1).

3.3 Teachers and students

Young people are increasingly anxious about climate and environmental change yet feel disempowered to act [7]. Drawing on the Indian idea of a public festivals, we use climate festivals as an empowering approach to tackle data education, celebrating a different theme each year–Rivers in 2022, Forests in 2023, and Mountains in 2024. In this, we democratize climate education by emphasizing storytelling by young interns and working with indigenous communities to incorporate traditional knowledge. We also integrate science with art, music, and theatre, to stimulate embodied engagement with the climate, and invite practitioners to inspire students with stories of hope. Our multilingual festivals, in Kannada, Hindi and English, have already attracted close to 30,000 visitors, largely teachers and students from different rural and urban locations. Through illustrated books, and newsletters with riddles, puzzles and art, we further engage teachers and students to translate data to action in non-conventional ways that stimulate creativity [8–10].

3.4 Activists and civil society organizations

Mobilizing civil society through education, activism and advocacy is critical to accelerate climate action. We engage with environmentalists and civil society groups working on air pollution, lake restoration and afforestation in Indian cities. Our independent reports provide information on the carbon sequestration and biodiversity benefits of urban trees, and document their role in reducing air pollution and ameliorating microclimate (e.g. [11]). These reports have been used by advocacy groups to lobby urban governments to protect urban ecosystems.

4. Climate data democracy: Into the future

Climate Data Democracy is critical to open up a new era where climate data does not remain a commodity whose access is restricted to the learned or moneyed few. With the climate crisis unfolding around us, the need for informed action has never been as urgent, or apparent, as it is now. Data should not act as a barrier to action, as it does today. We argue for academia to take an enabling role, acting as a node to connect governments, business, civil society and other critical stakeholders.

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Project administration: Harini Nagendra.

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