Centring local communities in digital climate technologies

Tanya Kak and Maya Chandrasekaran

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- *Digital technologies hold promise for climate action, but their deployment often raises questions of equity, inclusivity, and sustainability.*
- *Climate tech must be built from the ground up, integrating local knowledge and social networks to ensure long-term adoption and meaningful impact.*
- *Reimagining technology as an enabler, not a standalone solution, is essential to create need-based, contextually relevant innovations for a sustainable future.*
- *The views in the commentary are that of the authors.*

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Have you ever wondered why the cyclone days predicted by artificial intelligence (AI) is different from those predicted by the fisherfolk who've read the tides for generations? Precision agriculture promises to optimise water and fertiliser use with drones and sensors, yet smallholder farmers are burdened with high financial costs to use these technologies and partake in 'tech-driven sustainable farming'. And, while algorithms analyse biodiversity loss, mining for rare earth metals that power these systems can sometimes threaten the ecosystems they aim to protect.

The promise of digital tech is dazzling, but behind every climate dashboard is a set of hard questions about equity, sustainability, and who gets to steer this digital revolution. How do we make sense of the challenge and the opportunity that comes with developing and deploying digital innovations for climate action?

There is a sense of disconnect and even dissonance between what was considered climate technology and what is experienced and needed by communities. At its core lies a critical tension: the interplay between innovation and inclusivity, efficiency and equity, and progress and preservation.

As governments, civil society, and markets navigate this space, there are questions around ethics and equity when shaping the use of digital technologies for climate action. Many of these ideas emerged in a discussion hosted by Rohini Nilekani Philanthropies, examining the impact of co-developing digital technologies with communities and asking: Whose digital future is it anyway?

In the race to innovate, the persistent digital divide looms large, raising urgent questions about accessibility and fairness. Are we building bridges or inadvertently deepening chasms, particularly for those on the frontlines of climate change and systemic inequities? Equity isn't just a checklist — it's a compass, constantly demanding recalibration.

Solar panels support a renewable energy-based value chain created for non-timber forest produce. As governments, civil society, and markets navigate digital technology, there are questions around ethics and equity when shaping the use of digital technologies for climate action. Image by The Form Co. and India Climate Collaborative.

Governance, ownership and community

Donors and technologists often try to find the most cost-effective and impactful innovation to test on the ground. However, what happens to the communities and the ecosystems much after the projects and funding run out? Communicating how the data was used, what has worked and what hasn't, back to the communities to facilitate stewardship becomes important. Equally, can the role of communities be reimagined from passive recipients of digital technologies for climate action to co-owners of these technologies and data from the get-go?

Technology is never neutral — it carries the imprints of its creators, and sometimes, their blind spots. How do digital tools honour the depth of local knowledge and traditions, rather than flattening them into uniform algorithms? There's a delicate dance taking place between fostering collective action and unintentionally isolating individuals behind screens.

Can the digital age keep its sustainability promises?

Sustainability isn't just about longevity, it's about adaptability, resilience, and the ability to grow with shifting environmental, social, and technological landscapes. Given the speed and scale of the climate challenge, we are quick to measure success for digital technologies with narrow and tangible metrics. Are we just counting downloads and clicks, or are we also able to pause and measure meaningful, lasting change?

Today, a distinction can be made between non-digital innovations (such as solar-powered dryers and cold storages), deep-tech (such as direct air carbon capture), and digital innovations (such as platforms and Digital Public Infrastructure or DPI), and the role and opportunities for each to support and enable community resilience in the context of climate change. DPIs in particular can help in creating the building blocks or infrastructure on top of which other innovations could be built and value created both exponentially and by the ecosystem.

Farmers growing pearl millet in Maharashtra. Climate digital technologies need to build from the ground up, with community needs at the forefront, write the authors of this commentary. Representative image by Lokparyaya via Wikimedia Commons (CC BY-SA 4.0).

By centring the community lens, a very different imagination is possible of what this infrastructure could encompass and who could build it.

CoRe stack (Commoning for Resilience and Equality), is a digital public good with participatory tech platforms. It takes a similar ecosystem view to community-based DPI. It views innovations as a network of co-creation, or a collaboration between researchers, product developers, community, and eventually policymakers/government programmes. Starting with the questions about the community's use-case and how it can build genuine empowerment, the CoRE stack uses an equity lens to understand ecosystem vulnerability and build participatory tools and processes. It envisions distributed problem-solving and a more democratic access and use of data to generate ready-to-use outputs for many common use-cases. Central to this co-creation is the tenet that end goals are articulated first-hand by the community, not the market or state.

A key point behind the philosophy of CoRE stack is that of empowering rather than merely creating additional efficiencies. The Open Agriculture Network for example, is an

interconnected and future-ready agricultural supply chain network (Unified Krishi Interface 2024). Envisioned as a platform to enable more efficient transactions across stakeholders, reduce acquisition costs, increase access to services, and increase trust and credibility, the OAN intends to reshape agriculture with the farmer's lived experience at the centre of all features.

Collaboration between climate technologies and communities is of critical importance. Climate digital technologies need to build from the ground up, with community needs at the forefront, and communities need to leverage emerging technologies and platforms to innovate on top of existing infrastructure, strengthen their impact, resilience, and ultimately create value for each other.

But there is concern about the guard rails provided for the use of emerging and often cutting-edge innovations and the unintended consequences they can have. There is a need for combining scientific rigour, best efforts, and the importance of post-intervention validation, quantification, and scientific data to inform the application of any climate technology.

While technology is crucial for accelerating climate action, technical robustness alone doesn't guarantee adoption or impact. Even the most well-tested technologies can falter when influenced by human behaviour and social networks, which shape their co-development and deployment within specific ecosystems. Therefore, incremental, localised solutions are essential to form a foundational layer on which climate tech innovations can rest.

In that sense, creating a web of carefully planned inter-operable solutions that are need-based and contextually relevant becomes crucial. Instead of everyone rushing to think digital-first, can we re-imagine a world where technology can serve as an enabler for local knowledge and human connection to drive climate innovation rather than a solution in search of a problem?

Tanya Kak is Climate Portfolio Lead at Rohini Nilekani Philanthropies and Maya Chandrasekaran is co-founder of the climate investment firm Green Artha.

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Banner image: Researchers and field staff of Water, Environment, Land and Livelihoods (WELL) Labs use a double ring infiltrometer as part of a study being conducted in Maharashtra's Jalna district. By centring the community lens, a very different imagination is possible of what digital infrastructure could encompass and who could build it. Image by Lakshmikantha Narasi.