DECOLONISING SMART CLIMATE ADAPTATION?

A TOOLKIT FOR TRANSFORMATIVE FUTURES

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About this Toolkit

This toolkit grows out of the three-year Digital Climate Futures project, which combines a global mapping of digital adaptation platforms with ethnographic fieldwork. Digital adaptation landscapes emerge not as neutral rollouts of technology but as deeply contested terrains where global capital, state power, and vernacular resistance collide. The project's two strands raise questions about whose knowledge digital climate systems encode, whose labour they extract – often without recognition, and whose vulnerability they 'manage' without addressing its structural causes.

A note on positionality: this toolkit emerges from a UK-based research project. Fieldwork centred the voices of Dalit women farmers and wage workers in rural India. Power asymmetries inherent in Northern institutions examining Global South realities require naming, not bracketing. The patterns documented here have structural parallels across diverse contexts of digitalised climate governance, from which we hope the readers will be able to obtain lines of reflection relevant to their local focus.

SECTION 1. WHY A DECOLONIAL LENS ON DIGITAL CLIMATE ADAPTATION?

What This Toolkit Is Responding To

A wave of digitalisation has swept across climate adaptation governance. Smartphone platforms deliver crop advisories to smallholder farmers. Satellite systems trigger automated flood insurance payouts. AI-driven tools promise to scale resilience at speed and low cost. The claim behind each of these interventions is consistent: better data, faster delivery, and algorithmic precision will help the world's most climate-vulnerable communities adapt.

The claim, however, deserves scrutiny. Digital technologies actively configured the climate problem rather than merely solved it. Since the 1970s, global institutions framed climate change as a calculable threat requiring granular data. This framing embedded specific assumptions. It reduced adaptation to risk management, equated more data with better solutions, and converted vernacular knowledge into mere data inputs. Smart adaptation merges digital solutionism with the urgency of the climate crisis (Gioli and Bettini, 2026). Standard evaluation frameworks emerge from this precise genealogy. They assess whether better data manages vulnerability, but structurally fail to ask whether data resolves the root conditions of that vulnerability.

The Digital Climate Futures project examined this landscape through global mapping and grounded fieldwork in rural India (Bihar). We tracked how communities navigate digital tools within stratified social terrains. The findings converge: digital climate tools function as active political agents rather than neutral delivery mechanisms. They reproduce the structural inequalities of the landscapes they enter. We term this process digital climate coloniality. The structural logics driving these dynamics are not unique to Bihar; they recur wherever digital platforms enter agrarian economies shaped by histories of colonial governance and postcolonial stratification.

What does the Adaptation Scholarship Establish

The climate adaptation literature has reoriented over two decades, away from technical framings and towards political ecology. Adaptation interventions do not enter neutral social environments; they collide with existing power geometries. Class, gender, caste, and ethnicity dictate who captures the benefits of technological solutions and who absorbs the residual risk (Eriksen, Nightingale and Eakin, 2015). Social stratification constitutes the terrain on which adaptation operates, not merely its background (Garcia and Tschakert, 2022).

Climate coloniality sustains historical hierarchies within contemporary governance (Sultana, 2022). Northern expertise assumes universal validity while presenting market mechanisms as politically neutral tools. This depoliticized adaptation deliberately obscures the structural determinants of vulnerability, such as land tenure insecurity or racialised credit exclusion (Mikulewicz, 2024). Interventions that simply restore disrupted systems to business as usual secure elite accumulation. They foreclose the structural transformations required to dismantle vulnerability (Thomas, 2023). Community resistance, under these conditions, constitutes a precise political interruption rather than an irrational anomaly (Mills-Novoa and Mikulewicz, 2025).

What does a Decolonial Lens Add

Three analytical moves distinguish decolonial engagement from standard evaluation frameworks.

First, structural inequality is constitutive of what a technology does, not merely contextual to it. A platform deployed into a stratified agrarian economy activates specific relations of land tenure, labour extraction, and epistemic authority that predate it. Standard outcome metrics do not capture this.

Second, colonial logic operates both along North-South gradients and internally within postcolonial societies. The conversion of social life and ecological knowledge into data assets constitutes a new form of accumulation (Couldry and Mejias, 2019). In many contexts, this requires attending to how

internal structural hierarchies based on caste, ethnicity, gender and or class shape who digital systems see and who they render invisible. Anti-caste thought, alongside racial capitalism scholarship and Black ecology traditions, is an essential interlocutor for decolonial digital analysis.

Third, resistance is generative, not merely reactive. Communities contest digital dispossession, and their contestation produces material alternatives that warrant analytical attention in their own right.

> *Reflexive question:*
>
> *Whose understanding of vulnerability is encoded in adaptation interventions? Whose knowledge, insights and views are treated as authoritative in determining what adaptation requires? What could an evaluation framework look like that asks whether data addresses the conditions of vulnerability rather than manages them?*

SECTION 2. CONCEPTUAL ANCHORS

Four analytical frameworks shaped the inquiry, illuminated structural patterns, and exposed tensions that resisted easy resolution. Each is detailed below alongside the specific contradictions it revealed in our case study in India. These frameworks offer analytical lenses for interrogating digital deployments in other agrarian contexts; they are not a closed system.

Data Colonialism

The conversion of ecological knowledge into data assets constitutes a novel form of capital accumulation. Colonial extraction extends into human life through datafication rather than territorial seizure (Couldry and Mejias, 2019). Climate-smart programmes reconfigure agrarian subjectivities, pushing them towards digital, service-based agriculture. This shift frequently deepens existing stratifications of class, gender, and caste (Malik, 2023). The datafication of climate risk transforms a lived hazard into an index, an index into an insurance product, and that product into a financial instrument. The smallholder farmer occupies a dual position: simultaneously the target beneficiary and the raw material for data value.

In Bihar, this framework interrogated the political economy of extraction. When an advisory platform geo-references a farmer's plot, logs their soil conditions, and photographs their crop, ownership of that granular reality shifts. The data becomes the platform provider's intellectual property. Farmers receive generic recommendations; the platform retains the algorithmic capital. The model renders the political economy of land and tenure structurally invisible.

Reflexive question: Who owns the data the platform generates? Who captures the surplus value, and who provided informed consent for this specific extraction?

Climate Coloniality

Colonial hierarchies persist through contemporary climate governance (Sultana, 2022). Institutions position Northern expertise as universal and

frame market mechanisms as politically neutral tools. Differentially produced vulnerabilities become naturalised conditions requiring technical management rather than political redress. Interventions that merely restore disrupted systems to their prior arrangements secure elite accumulation while foreclosing the structural transformations required to dismantle vulnerability (Thomas, 2023).

In Bihar, this framework directed the examination of epistemological dominance. Standard evaluation metrics routinely elide a critical tension regarding resilience: whose definition the platform embeds and whose it excludes. Agricultural advisory applications presupposed autonomous resource access, formal land titles, and individual smartphone ownership. A stark inverse relationship emerged: the more exposed a farmer was to climate risk, the less applicable the platform's resilience model proved.

Reflexive question: Whose definition of resilience does the platform encode? What alternative definitions survive within the community, and what structural shifts are required to treat them as equally authoritative?

The Political Ecology of Adaptation

Climate interventions intersect with and contribute reshaping existing social relations. Resources and risks flow through pre-existing channels of local power. Adaptation operates directly upon the terrain constituted by class, gender, race, ethnicity, and caste (Eriksen, Nightingale and Eakin, 2015; Garcia and Tschakert, 2022). A platform presenting a gender-neutral design systematically disadvantages women whose access to formal documentation remains restricted by patriarchal land tenure. Transparency portals within digital welfare systems frequently automate existing exploitation.

Provocation: Prior to deployment, have the architects mapped the existing power geometries through which the digital tool will operate? Which structural hierarchies will dictate who ultimately claims the promised benefits?

Generative Resistance

Subaltern resistance to climate adaptation interventions constitutes a precise political interruption of techno-managerial governance, rather than evidence of implementation failure (Mills-Novoa and Mikulewicz, 2025). Resistance articulates a sophisticated argument about power rather than demonstrating the mere absence of technical capacity (Scott, 1985). Communities deploy rightful resistance, weaponising the state's own legal commitments to contest local elite capture (O'Brien and Li, 2006). Refusal pushes this contestation further: it rejects the foundational premise of the intervention rather than.

> *Reflexive question:*
>
> *When communities do not comply with or reject a digital climate intervention, what is the most analytically rigorous interpretation of that refusal? What specific structural assumptions does this resistance diagnose and dismantle?*

SECTION 3. HOW DIGITAL DISPOSSESSION WORKS

Five recurring mechanisms expose the structural architecture of digital dispossession. These patterns span welfare platforms, agricultural advisories, and climate insurance schemes. They are not incidental glitches. They form the foundational logic of algorithmic governance.

Mechanism 1: Epistemic Violence and the Information Deficit Myth

Digital adaptation platforms consistently frame climate vulnerability as an information deficit. This logic converts entrenched structural inequalities into technical problems requiring digital solutions. Marginalised farmers do not lack better data. They lack the material conditions, including land tenure, credit access, and water rights, necessary to make data actionable. Platforms built upon this premise generate recommendations that assume non-existent resource access. Community knowledge regarding local microclimates, informal tenure arrangements, and seasonal risk timing consistently proves more accurate than the encoded parameters. This gap represents a deliberate design choice rather than a digitisation failure.

Mechanism 2: The Extraction of Relational Labour

Digital climate platforms rest on a concealed foundation: the unrecognised, undercompensated relational work of frontline community workers. Digital advisories and chatbots do not function autonomously. They demand human intermediaries to translate technical outputs, navigate village social complexities, and cultivate trust. This workforce remains disproportionately female and informally contracted. The system systematically devalues this care work, treating it as a free resource rather than a material foundation.

Gray and Suri (2019) term the human effort required to sustain this technical facade ‘ghost work’. Algorithmic efficiency does not generate itself; it rests entirely upon a concealed foundation of relational labour. Fraser (2017) frames the systematic devaluation of this work as a profound crisis of social reproduction. The pristine metrics justifying smart governance actively conceal this political economy. Institutions extract their technological success directly from the most precarious workers in the deployment chain.

Mechanism 3: Strategic Caste-Blindness and Structural Inequality

Digital adaptation platforms claim universal applicability by designing for an undifferentiated user. They systematically ignore how structural hierarchies dictate whose farms benefit and whose vulnerability deepens. This is not oversight. It is what Mohamed et al. (2020) call strategic ignorance: claiming objectivity through the deliberate exclusion of structural social facts. Where borewell ownership tracks land ownership, which tracks caste hierarchy, an irrigation advisory issued to all registered farmers produces radically different outcomes depending on who can implement it. The platform recommends optimal timing. Whether the farmer can access water at that time is outside the model.

Mechanism 4: The Architecture of Illusory Accountability

Digital governance deploys auditability as its primary legitimating claim. Where severe power asymmetries persist, digitalisation actively intensifies extractive capacity. It constructs the infrastructure of accountability without delivering its material substance. The digital record displays a completed transaction. The political economy enabling that transaction remains entirely obscured. The dashboard does not lie. It simply remains blind to the realities it was not programmed to see.

> *Reflexive Question:*
>
> *What exact reality does the digital audit trail capture, and what extraction does it conceal? Who ultimately profits from that discrepancy?*

Mechanism 5: Temporal Extraction and Platform Abandonment

Smart adaptation is often theorised as a cohesive, totalising regime. Grounded fieldwork reveals systemic fragmentation. Donor-funded platforms operate through brief, time-bound pilots designed to gather data for subsequent institutional fundraising. Each intervention represents a temporary socio-technical assemblage. The platform exits when the funding cycle concludes. The community remains.

This dynamic constitutes temporal extraction: the cyclical appropriation of community time, trust, and adaptation energy before transformation has

time to consolidate. These pilots legitimate actors, affirm knowledges, and secure institutional relationships through which climate finance flows, without requiring stated goals to be achieved (Gioli and Bettini, 2026).

SECTION 4. GRASSROOTS EPISTEMOLOGIES AND THE POLITICS OF REFUSAL

Digital climate platforms routinely treat local and traditional knowledge as input to be processed rather than expertise to be recognised. Our research, and the literature it draws on, point to what an epistemologically pluralist approach to digital climate governance might look like: not as a design template, but as a set of practices and principles already in use in various forms across the communities we engaged with.

1. Relational Infrastructure as an Alternative System

Feminist political ecology positions women's care labour not as a supplement to agrarian infrastructure, but as the infrastructure itself (Puig de la Bellacasa, 2017; Nelson, Faxon and Ehlers, 2024). In Bihar, the relational labour of the Jeevika programme's federated Self-Help Groups sustains digital climate platforms. While algorithms dispense standardised advisories, it is this human network that tests, contextualises, and builds the trust required for adoption. Digital platforms rely entirely upon this concealed, uncompensated labour (Gray and Suri, 2019).

2. Selective Appropriation as Collective Risk Management

Marginalised farmers do not simply reject technology; they engage in selective, rational appropriation based on material constraints (Scott, 1985; Taylor, 2014).

In Bihar, women readily adopt text-message weather alerts requiring no land title, while rejecting algorithmic crop advisories that presuppose inaccessible credit and tenure security. Crucially, this evaluation is both collective and gendered. Through shared demonstration plots, agrarian networks distribute trial risk before committing to wider adoption. Consequently, platform metrics recording 'low adoption rates' capture a structural disparity in material conditions rather than an informational deficit or cultural resistance.

3. Counter-Documentation as generative infrastructure

As governance becomes increasingly digitised, the terrain of contestation shifts. The state's legal commitments are now mediated by algorithms, necessitating new forms of 'rightful resistance' (O'Brien and Li, 2006).

Bihar MGNREGA Watch exemplifies this through paper-based counter-documentation. By maintaining handwritten attendance records across 450 villages, movement coordinators confront officials with physical proof of workers erased by algorithmic dashboards (Sharan 2021). These deliberately low-tech ledgers do not aim to repair the digital system; rather, they constitute a parallel epistemological claim, materially diagnosing structural failures in adaptation architectures (Mills-Novoa and Mikulewicz, 2025).

4. Rights-Based Reframing

Political refusal is a generative act, a rejection of the terms on which engagement is offered (Simpson, 2014). Rooted in anti-caste struggles (Yengde, 2019; Soundararajan, 2022) and resistance to climate coloniality (Sultana, 2022), communities in Bihar actively contest the reduction of constitutional rights (adhikar) to managed administrative benefits (labh). This reframing was visceral during the December 2024 Muzaffarpur dharna, where women occupied state space using regional languages (Bhojpuri and Magahi) structurally excluded from digital platforms.

> *Reflexive question:*
>
> *In what exact legal register does the intervention operate: conditional benefits or constitutional rights? And whose structural analysis determined that framing in the first place?*

SECTION 5. THOUGHT PROVOCATIONS

This toolkit does not prescribe. Context-blind recommendations reproduce the techno-solutionist logic it questions. What follows are provocations grouped under three audiences, arranged from grounded to structural. They are offered as entry points for situated analysis, not checklists for compliance.

For Policy and Platform Architects

- Formal documentation requirements: Does the eligibility architecture recognise informal land tenure, or does it encode structural exclusion as a technical requirement? Who is structurally excluded before the platform is even accessed?
- Relational infrastructure: Do evaluation metrics capture the uncompensated care labour of frontline workers? Where the extension worker effectively functions as the platform, what would it mean to value her labour as core infrastructure rather than peripheral overhead?
- Legal register: Does the platform mediate conditional benefits or binding rights? This distinction determines what marginalised communities can legally demand when algorithmic governance fails, and it shapes the accountability architecture around failure.
- Institutional displacement: The deployment of smart adaptation frequently coincides with the dismantling of non-digital service pathways. What public infrastructures are being removed to necessitate this specific digital solution, and who bears the cost of that removal?

For Grassroots Organisers and Community Practice

- Existing documentation: Communities maintaining independent records of algorithmic failures possess evidentiary infrastructure rather than mere anecdote. What vernacular documentation practices already exist locally, and who controls this data?
- Disaggregation of collective claims: Algorithmic platforms routinely convert collective political claims into individual complaints. When a

WhatsApp group replaces a collective protest, what shifts in the balance of power, and who benefits from that shift?

- Political horizon: The most durable outcomes in the fieldwork came from movements that connected immediate digital governance failures to structural demands: land rights, labour rights, caste abolition. At what point does a campaign about a digital platform become a campaign about the structural conditions that make the platform harmful?

For Researchers

- Research origins: Research questions that emerge from community-identified needs produce different knowledge than those derived from academic or funder priorities. How did the questions being asked get decided, and by whom?
- Structural imbalances: Power asymmetries between researchers and communities require naming, not obscuring through participatory rhetoric. What would honest accounting of those asymmetries look like in project design and outputs?
- Research relationships: Decolonising methodologies does not permit research relationships to remain extractive while calling themselves participatory (Tuhiwai Smith, 2021). What is the research relationship your project has actually built?
- Implementation barriers: The 'barrier to implementation' framing converts resistance into a technical problem for researchers to solve. What does it mean, methodologically, to treat resistance as a political signal that diagnoses something about the intervention rather than something about the community?

SECTION 6. FURTHER RESOURCES

Toolkits and Frameworks

Climate Justice

Decolonizing Climate Action Toolkit (Indigenous Climate Action, Canada): created through Indigenous leadership with Mi'gmaq, Kanien'kehà:ka, Anishinaabe, and Cree reviewers. indigenousclimateaction.com

Climate Justice and Resilience Toolkit (Edith Cowan University, Australia): co-produced with Aboriginal Traditional Owners. Interactive website with Process Hub and Resource Library.

CARE Principles for Indigenous Data Governance: Collective benefit, Authority to control, Responsibility, Ethics. gida-global.org/care

OCAP® Principles (First Nations Information Governance Centre, Canada): community Ownership, Control, Access, and Possession of data. fnigc.ca

Design Justice

Design Justice Network Principles: ten principles for community-led technology design, available in eight languages. designjustice.org

Costanza-Chock, S. (2020). Design Justice: Community-Led Practices to Build the Worlds We Need. MIT Press. Open access.

Organisations and Networks

AlSur Consortium (Latin America): eleven organisations across eight countries monitoring digital technologies in climate governance. alsur.lat

IT for Change (India): digital governance, data commons, policy advocacy. itforchange.net

LibTech India: research and campaigns on MGNREGA and digital welfare governance. libtech.in

WoMin African Alliance: feminist political ecology and women's climate assemblies across West and Central Africa. womin.africa

La Via Campesina (Global): food sovereignty and climate adaptation. viacampesina.org

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