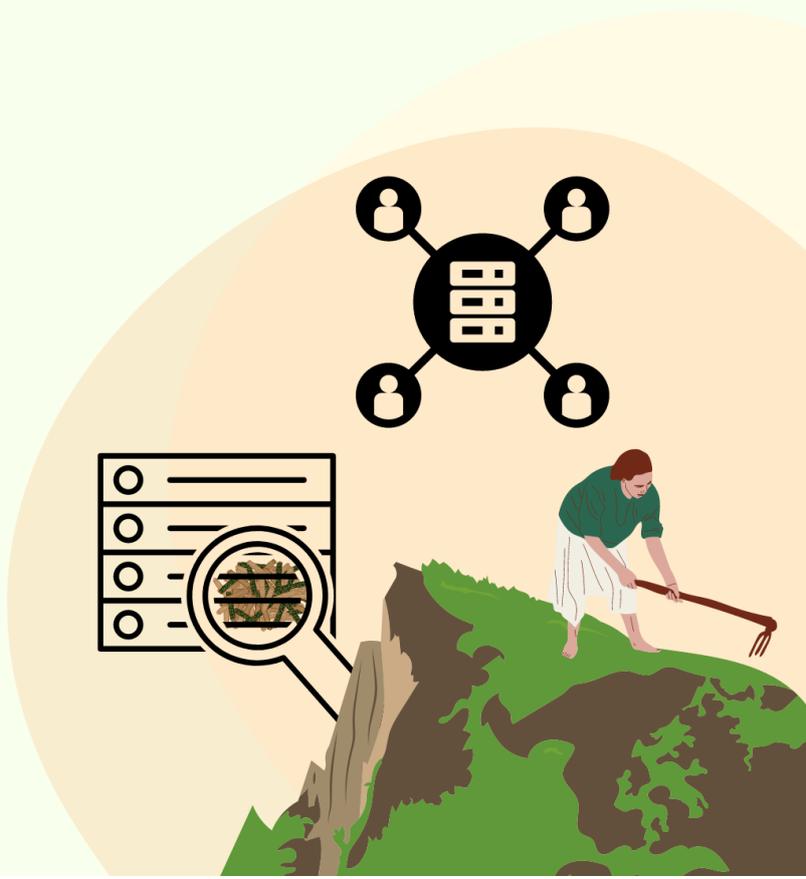


Recasting Land Tenure Rights in the Data Epoch

Insights from a Country Case Study of India

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Recasting Land Tenure Rights in the Data Epoch: Insights from a Country Case Study of India

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1. Introduction: From Land Records Databases to Agri-data Exchanges

After the failure of successive land reform and redistribution measures to address the gaping inequity in land ownership and access, land records digitalization was initiated by the Government of India in the 1990s. The effort, coinciding with the shift to formalization and unambiguous documentation of property rights in landholdings, rendered legible the country's rural hinterlands for an expanding real estate market (Nayak, 2021). Launched by the state government of Karnataka at the World Bank's Annual Conference on Development Economics in 2003, the Bhoomi Project was the first large-scale land record digitalization program in India (Benjamin et al., 2007).

At the core of Bhoomi was a simple yet revolutionary proposition: the creation of an interoperable, centralized database of digitized land records, bringing together information about the physical characteristics of land (shape, size, soils); productivity (soil, cropping); and economic claims (legal rights, registration, and taxation) that could be accessed in real time by government departments and private agencies seeking to verify ownership claims in land parcels (Chawla & Bhatnagar, 2004).²

Land records digitalization has by no means been a straightforward success story in India. The interplay of the technological and social is firmly embedded in power relations. Depending on the socio-structural premises and pathways characterizing technological adoption, digital processes mediate reality and lead to varying outcomes for the subjects of development. Scholarship recognizes databases as a combination of infrastructure and commerce, and as an overpowering discourse that produces a far lighter and easier maintained super-panopticon (Poster, 1995). Unlike the Foucauldian panopticon where the subjects became interiorized, conscious, and aware of their own self-determination through an awareness of the presence of surveillance, subjects produced through databases are dispersed and diverse, and often unknown to their embodied counterpart. Nayar (2012) talks about how marginalized citizens are left with no recourse when last-mile failures in biometric authentication lock them out of access to food rations. Presented as *fait accompli*, the techno-political

²Official records show that the claims of over 6.7 million farmers in the state have been registered, 50% of bank branches integrated with the database, and the time taken to record mutations in landholdings reduced from 31 days to two days (MeitY, 2019). However, Benjamin et al. (2007) have critiqued these claims of efficiency; field research at various rural taluks show that Bhoomi has not only increased time taken to record mutations by a few weeks, but has also "systematized" bribery, since agents appointed by Bhoomi have been given sole access to create/modify land records, who now (through their own centralized networks) extort additional fees across taluks, unlike one-off, localized events of money exchange.

authority of database welfare regimes subverts the bodily characteristics of rightsholders to deny them their rightful claims.

Essentially constructed within an over-valorized market narrative of ICTs and development, the Bhoomi Project witnessed the reinforcement of social power hierarchies governing agrarian property relations and the intensification of land grabs by the power elite. The trajectory of technology for development was thus firmly ensconced within India's pro-market, neoliberal shift, dovetailing with policy reforms introduced in the 90s. Just a few years into the implementation of the Bhoomi project, it became evident that the shift from presumptive land titles³ to conclusive land titles⁴ through the creation of centralized land records databases was actually threatening to permanently disenfranchise vulnerable communities of their traditional claims in common lands. Bhoomi was not able to document the diversity of tenure types. As Binswanger-Mkhize and Deininger (2009) observe, land tenure is not reducible to a homogenous universal system of private ownership rights without attention to context. Out of the 1500+ forms of tenure that were traditionally in vogue, only 256 types made it to the digital record (Benjamin et al., 2007).

This process of standardization and the consequent loss of legibility of claims unable to be appropriately datafied has adversely affected tenure rights. Most susceptible to such exclusion were the customary claims of marginal farmers, such as usufruct rights in the traditional common property resource regimes governing land use (ibid). Lands with complex possession claims were also reclassified as *sarkari* (government) land (ibid). De-localized modes of recording land claims, thus, resulted in widespread delegitimization and dispossession, leading to an erasure of myriad historical claims.

Bhoomi has been the inspiration for a range of other state government programs,⁵ including the Union government's Digital India Land Records Modernisation Programme (DILRMP) launched in 2008. The DILRMP aims at enabling single-window processing of land records – with accuracy guarantees for cadastral records and titles, and automated updation of mutation/ownership changes. Official statistics suggest that 31 of the 36 states and Union territories in India have made some progress on land digitization (Ministry of Electronics and Information Technology [henceforth referred to as MeitY], 2019). But on-ground evidence reveals that real-time updation of land records is not the norm, with outdated digital records distorting the truth about the reality of claims (Patnaik & Roy, 2019).

³The traditional land titling system followed in India where only possession rights are acknowledged and disputes over ownership are to be settled with the titleholder.

⁴The new land titling system being introduced post land records digitalization program, where land titles designate actual ownership verified and guaranteed by the government. Here, disputes over title have to be settled with the government, and not the original titleholder.

⁵Such as the land records digitization programmes in Maharashtra, Telangana, and others.

The advent of the Big Data age presents new challenges and contradictions in the trajectory of techno-development. As data becomes central to market efficiency, power in the 21st century becomes tied to control of data assets. A celebratory discourse of the new datafied economy as the driver of growth and innovation animates policy circles. McKinsey and Company's 2019 strategy roadmap for unlocking India's digital economy developed for MeitY recommended a Digital Land 2.0 strategy as the next phase of the DILRMP (MeitY, 2019). Digital Land 2.0 intends to merge the disparate land records databases of all states into an interoperable, centralized database that will serve as a unified point of land records information for citizens and public/private agencies engaged in land ownership verification (for example, banks and insurance companies); accessible over mobile apps and linked to an open-record system that enables citizens to voluntarily register for resurveying titles and so on (MeitY, 2019). In 2021, as part of this new strategy, the Government of India initiated the Unique Land Parcel Identification Number (ULPIN) initiative, which assigns a geo-referenced 14-digit alphanumeric unique ID⁶ for each land parcel surveyed in the country. Popularly known as the Aadhaar⁷ for land, this digital identifier aims to create a single land database for the entire country (Chowdhury, 2021). From Bhoomi to Digital Land 2.0, what is at work in the policy narrative of land records digitalization is the creation of an immutable, centralized database as a methodology to establish what is often referred to as 'a single source of truth' about land claims.

Recent years have also seen the emergence of data infrastructures for data exchange/data markets in different economic sectors, including in relation to the agricultural data commons. In 2021, the Department of Agriculture, Cooperation and Farmers Welfare, Government of India (henceforth referred to as DoAC&FW), released a consultation paper introducing AgriStack – a government-backed data exchange in agriculture that enables the aggregation of digitized land records with farmer profiles and other agricultural data of non-human origin (meteorological, soil health, hydrology, and so on). The purported intent is to aid the creation of personalized, data-enabled support services all along the agricultural value chain – from production support, financing, and farmer advisories upstream, to marketing and consumer linkages downstream – for enhancing farm productivity and doubling farmer incomes (DoAC&FW, 2021).

AgriStack may be best understood as an Indian equivalent of the EU common data space in agriculture. Land records and farmer profiles are sought to be collected with informed consent from individual farmers and combined with other non-personal, non-human origin agricultural datasets held by

⁶ This development is contemporaneous with the global expansion of the industrial agricultural paradigm, and its championing by international institutions. In 2017, the World Bank introduced a new indicator – the formalization of land rights – in its Ease of Business in Agriculture index, and a few years after the ULPIN initiative received a fillip (Mousseau, 2019).

⁷ Aadhaar is a 12-digit individual identification number which serves as proof of identity and proof of address for residents of India. Aadhaar forms the core of the India Stack, an identification and digital payments infrastructure developed by the Indian state as digital public goods.

government agencies to create an aggregate data pool that enables the creation of personalized services for individual farmers and for research and innovation. The ostensible goal is to tackle long-standing productivity⁸ challenges faced by the farming community at large, with participation from government, academic, private sector, and not-for-profit institutions.

Some state governments have also initiated such data exchanges. Last year, the government of Karnataka initiated the e-Sahamathi initiative (Ranjan & Kaushik, 2022) that enables the sharing of agriculture and horticulture data from its database of more than 7 million farmers with start-ups/service providers from its Farmer Registration and Unified Beneficiary Information System (FRUITS) platform. Similarly, the government of Telangana, in partnership with the World Economic Forum, is launching an agriculture data exchange, ADEX, to encourage data sharing for private sector innovation.

In summary, the ongoing digitalization and datafication of land records in the Indian context presents a number of challenges with respect to the realization of secure tenure rights, equitable access to land, and sustainable agricultural livelihoods. Addressing these challenges is pivotal to food sovereignty, and as has been recognized by the FAO Voluntary Guidelines on the Responsible Governance of Tenure (2011), the very fundamental and urgent goal of eradication of hunger and poverty.

The subsequent sections of this paper lay out key insights in this regard, with recommendations to reclaim the transformative potential of the digital paradigm for tenure rights and farmer empowerment. The insights are based on literature review and key informant interviews with civil society experts.

⁸“To build a National Digital Agriculture Ecosystem, to elevate Indian Agriculture Sector to higher levels of efficiency and productivity, and to improve the welfare and income of Farmers”, as quoted from the Consultation Paper on the India Digital Ecosystem of Agriculture (DoAC&FW, 2021).

2. Key Insights

2.1 Insight #1

The ‘single source of truth’ approach in the creation of land records databases serves the interests of the power elite in local land markets, disenfranchising vulnerable communities of access to their common lands and penalizing individual farmers for non-updation of land titles.

2.1.1 De-recognition of Traditional CPR Regimes in Land Records Databases

The Digital India Land Records Modernisation Programme (DILRMP) continues on the slippery slope of de-recognition of traditional claims of marginal farmers in common property resources noted in the early phases. Most notably, the customary tenure rights of marginal farmers, tribal groups, and indigenous peoples do not find place in the Program. In fact, the state of Meghalaya has expressed unwillingness to implement the ULPIN component of the scheme, noting that it will undercut the collective land rights bestowed on local communities under traditional law (Sharma, 2022). Similarly, in the southern state of Karnataka as well, there is considerable dissatisfaction about the failure of the DILRMP to record collective claims in *jamma* lands – paddy wetlands held collectively by local clans in Coorg district and traditionally endowed with non-transferrable titles.⁹

Reflecting on the effects of the DILRMP rollout on tenure rights in *jamma* lands, Leo Saldanha¹⁰ (key informant interviewed for the study) observed:

When they digitized land records in Coorg, the communal rights (in jamma lands) became recorded as individual rights. There was a rush to fence off the commons and claim it as one's own, leading to the degradation of land and fragmentation of society. The diversion of the commons – forests especially – is becoming more aggressive now.

2.1.2 Legitimization of Erroneous Land Records in Databases, with Cascading Exclusions

The DILRMP has failed not only in recording collective claims in common lands, but also individual rights. Marginalized populations often lack the resources to record mutations in land titles, resulting in revenue records¹¹ not being updated for many years (Patnaik & Roy, 2019).

⁹See, *Save Jamma Land*. <https://www.kodavas.in/jamma-land/>

¹⁰ Founding trustee at the Environment Support Group (ESG)

¹¹Revenue records are synonymously used with land records, codified partly due to existing, pre-colonial (*Zamindari*) and colonial (*Ryotwari*) revenue collection systems (Bastin, 1954; Singh, 1989). Currently, the term, revenue records, almost always refer to the Record of Rights, a body of documents that capture various kinds of proprietary land rights recorded in India, including ownership rights, homestead rights, sharecropper rights, lease rights, etc. (Nayak, 2021).

Imperfect records are created through the DILRMP and other such land digitalization programs and linked to larger data exchanges, such as the AgriStack, sans verification processes.

Rohin Garg¹² (key informant interviewed for the study), observed how these defects in the abstraction/capture of individual land tenure rights are likely to be etched in perpetuity with limited recourse for dispute settlement:

There are several cases of errors on paper itself, which then shift onto the digital. The issue is that digital carries more legitimacy, and people tend to believe it as a source of absolute truth...you (now) have schemes like AgriStack, already rolling out using these (imperfect DILRMP) land records. Another similar scheme – SVAMITVA Yojana (Survey of Villages and Mapping with Improved Technology in Village Areas) – is facing issues in capturing tenure diversity and disputes, but there is no access to redress for errors and exclusions, as its implementation is, ultimately, being conducted by private companies on the ground.

Nachiket Udupa¹³ (key informant interviewed for the study) shed light on the enormity of exclusions:

Digitization of land records ends up limiting the definition of farmers to landowners, a basically faulty assumption that leads to an entire segment of farmers who are not landowners completely losing out. Farmers working on leased land or through sharecropping arrangements, landless farmers and agricultural laborers, pastoralists, livestock farmers, and fisherpeople do not necessarily have agricultural land in their name. How will these people obtain benefits if land titles become the basis of welfare?

¹² An independent researcher and policy expert

¹³ Steering Group Member, ASHA Kisan Swaraj

2.2 Insight #2

Data exchanges combining land records with farmer profiles and other agricultural datasets enable the state to aggrandize its powers, disrupting and denying people's historical rights and relationship with land.

2.2.1 Misclassification of Commons and Small Farmer Landholdings as 'Sarkari' (Government) Land

In 2013, the Government of India overhauled its colonial, British-era legislation on land acquisition.¹⁴ The successor legislation – the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act (henceforth referred to as LARR Act) – was introduced in a bid to curb the abuse of the powers of eminent domain by state authorities, and expand compensation for land loss to not just titleholders but all those whose livelihoods are adversely impacted through an act of land acquisition (Varshney, 2019). The new legislation aimed at clearly de-limiting the list of “public purposes” for which land could be acquired, mandatory public participation in acquisition hearings, and enhanced compensation to affected parties (CPR, 2017). Unfortunately, in the absence of administrative and bureaucratic reforms, LARR has not succeeded in eliminating the inequities embedded in the land acquisition process, particularly in addressing the claims of tribal communities in Scheduled Areas¹⁵ where land losers often do not have individual land titles (ibid).¹⁶

Digitalization reduces complex claims in land to computational categories that are more or less limited to the 'individual owner paradigm'. This trend has continued through the 2000s, from Bhoomi to the Dharani land records digitalization project launched by the Telangana government in 2019.

¹⁴Land Acquisition Act, 1894

¹⁵The designated, geographic areas where autonomous self-rule has been guaranteed to tribal communities under the Fifth and Sixth Schedule of the Indian Constitution.

¹⁶ Land laws are on the concurrent list of the Indian constitution which means that the Central and state governments can both enact legislation in this domain. A few years after the LARR Act was enacted, the state governments of Gujarat, Andhra Pradesh, Telangana, and Jharkhand used their legislative powers to enact state-level land acquisition laws and rules overturning some critical progressive provisions of the central legislation (Aryan, 2018).

Kavya Chowdhry¹⁷ (key informant interviewed for the study) noted how the Dharani project¹⁸ alienates people from their land:

In the digitization of land records under Dharani, there are reports of the land of small farmers being turned over to the government. This was a way of forcing them to give up their land, basically a form of coercive land acquisition. Schemes such as Dharani and the legibility of landholdings they enable help the state assemble them and make them into an asset (for global investors).

2.2.2 Data-enabled Valuation of Land and Intensified Risk of Abuse of Eminent Domain

The AgriStack data infrastructure exacerbates the risk of abuse of eminent domain, as the aggregation of land records with other crop and climatic documentation can be for land valuation and demarcation of landholding into ‘productive’ and ‘unproductive’ categories, bolstering the state’s narrative of coercive acquisition as a necessary strategy for job creation and economic development through industrialization and urbanization routes, in the face of agricultural decline (Reuter et al., 2021).

In the specific case of India, data-based valuation and reclassification of landholdings is likely to worsen the existing blindspot of the LARR 2013, permitting the release of culturable wastelands¹⁹ supporting local food security for non-agricultural purposes. Varsha Ganguly²⁰ (key informant interviewed for the study), summed this up pithily:

Land acquisition in India has historically been a contentious process by which the state acquires private property for (ostensible) public good, disproportionately impacting small-scale farmers and Dalit, Adivasi, and indigenous groups. The turn to datafication will only intensify this dispossession of land.

¹⁷ Researcher from the ETC Group.

¹⁸ Launched in 2020, the Dharani project is Telangana’s land digitization project, modelled after Bhoomi (MeitY, 2019). Under Dharani, one can register both agricultural and non-agricultural land with the help of *Tehsildars* (revenue officers) and Sub-Registrars (ETGovernment, 2020).

¹⁹ Wastelands are a classification of degraded land in India, that are deemed either cultivable or uncultivable. The National Remote Sensing Agency (NRSA) has identified 11 categories of degraded land (Indian Council of Agricultural Research, 2010). Since wastelands are not under cultivation, the Revenue Department - through the principle of eminent domain - has taken over all ownership of wastelands (Singh, 2013).

²⁰ Professor at the Institute of Law, Nirma University.

2.3 Insight #3

The Big Data turn in land is accelerating the corporatization of agricultural value chains and corporate appropriation of local knowledge.

2.3.1 AgriStack: Risks for Data Sovereignty and Land Sovereignty

AgriStack opens up an entire Pandora's box of concerns about the commodification of the agricultural data commons, paving the way for farmer profiles and land records to be delivered to the agri-tech market (Shagun, 2021). The DoAC&FW has signed 10 MoUs – including with transnational companies such as Amazon Web Services and Microsoft, and domestic companies such as Jio Platforms, Star Agribazaar and NinjaCart – for the development of pilot value added services for farmers in different locations using AgriStack data (Beriya, 2022). This is troubling because India lacks a data protection law, and the AgriStack program lacks the necessary institutional framework for data sharing and use. Also, these pilots have been launched without public consultations. The possible risks of data abuse and free riding present a worrisome picture, with the data commons appropriated by corporations in the name of innovation. While it is unclear how profiling and targeting of farmers may enhance farm-based value and farmer benefits, what is already evident is that these pilots are enabling public data to be transferred into corporate enclosures. Some of the corporations have already built a highly granular picture of local agrarian futures that they seek to monetize through targeted offerings such as insurance and credit.²¹ The case of the state-level data exchange being set up in Telangana poses additional concerns with government officials declining information requests from citizens regarding the extent of corporate involvement in the development of its policy framework, under the Right to Information legislation.²²

Research on a precursor to AgriStack – the data exchange system of the government of Andhra Pradesh's Climate Resilient Zero Budget Natural Farming initiative – suggests a high risk of consolidation of the nexus between state agencies, corporate actors, and global philanthropies in such data exchanges (Saldanha, 2018). In the wholesale market capture of valuable agricultural data commons, we see a transfer of local information and knowledge into corporate-controlled intelligence systems, a hollowing out of public agri-extension through de-facto privatization of information services, and loss of autonomy of small and marginal farmers over their local livelihood cycles.

²¹In a civil society meeting convened in May 2022, the representative of Star Agribazaar, one of the companies with whom the Ministry has entered into an MoU for data innovations on AgriStack, shared plans to link targeted data advisories based on farmer profiles with the company's own downstream services (Mousseau, 2019).

²²Internet Freedom Foundation, India had filed a Right to Information request in order to understand the nature of corporate involvement in the development and implementation of the Telangana Agriculture Data Exchange (ADEx). The government's response can be found here.

Evidence from across the world suggests that the current mode datafication of land records is only servicing the financialization of agricultural value chains. Recent civil society fact-finding exercises reveal how the world's largest asset management companies like Blackrock, Vanguard, State Street, Capital Group, and Fidelity own 10–30% of shares of both top agri-food firms and e-retail and cloud services, with an eye on future high-frequency trading markets. Large-scale, aggregated food system data combined with AI provides real-time insights that drive end-to-end control of the food chain, commodity speculation, and deepening of fintech markets, with little regard for “labor, equity and ecological impact(s)” (IPES-Food & ETC Group, 2021). In other words, today's data grabs pave the way for tomorrow's land grabs, as Srinivas Kodali²³ (key informant interviewed for the study), observed:

The way these systems (data exchanges such as AgriStack) are designed will allow the market players to own and use data as they deem fit, leading to the risk of farmers losing their property rights (in lands). Farmers will lose the ownership of both their data and their material resources!

2.3.2 Land Records Data and Unregulated Fintech

In 2019, the Steering Committee on Fintech Related Issues of the Ministry of Finance identified the promotion of fintech services leveraging farm-specific data as a critical strategy for financial inclusion (Department of Economic Affairs [Ministry of Finance, Government of India], 2019). However, the absence of proper regulation of the fintech sector presents risks of data-based profiling by fintech service providers operating on the AgriStack. For instance, the non-banking finance company Avanti Finance entered into a partnership with the ag-tech services initiative, Dvara e-registry, that leverages traditional and alternative data sources to build financial profiles of farmers to roll out targeted farmer loans in three Indian states. The USP of this initiative is the e-registry's AI-based farm (land) productivity scoring tool 'Khetscore' that forms the basis of the creditworthiness assessment (Dvara E-Registry, 2021). Participation on a data exchange like AgriStack will help non-banking finance companies, such as Avanti Finance, exponentially expand the scope of their data- and algorithm-enabled farmer profiling for targeted and hyper-personalized marketing of fintech services, often with grave consequences for privacy and autonomy.

²³ Independent data activist

Garg traced a continuity of such land productivity scoring and farmer profiling with the dismal historical trajectory of exploitative microfinance industry practices in the country:

It is a given that agri-fintech companies will take your harvest data. Using this, they will find their own ways to minimize their costs, for example, by waiting for the crop to rot before purchasing it. Additionally, real-time data on transportation used by farmers to reach markets can be made available, all under the banner of digital financial inclusion.

2.3.3 Data-enabled Valuation of Land Productivity and Green Grabbing

Another specific risk to be vigilant about is that of the data commons of agriculture becoming a decoy for green grabs in the guise of climate financialization – the process where economic incentives are used in order to “reward” actions that apparently mitigate climate change, while at the same time, providing “commercial opportunities for climate action”(UNEP, n.d.).

Neth Dano²⁴ (key informant interviewed for the study) elucidated how the data-enabled valuation of the productivity of landholdings can deepen this risk:

Big Data techniques enable landholdings to be valued on the basis of information about harvests (yield) and climatic documentation – rainfall, soil, and temperature (fertility). In this process, what tends to happen is that common areas used by local communities – for cropping and for gathering medicines, etc. – end up being re-classified as wastelands. This re-classification as unprofitable/no longer lucrative for agricultural use releases these lands for market investments, especially in biofuel production.

In the case of AgriStack, the data available could also enable companies in the business of carbon offsetting to identify cultivable wastelands or low productivity landholdings more easily, thereby luring vulnerable communities into exploitative land leasing arrangements (Ahmed, 2014; Howson, 2020). Tech-enabled initiatives aim to transform Indian agriculture into a “climate-positive” activity, where the farmland has been identified as a vital resource for offsetting greenhouse gas emissions through soil carbon sequestration; small farmers are now incentivized to optimize their agricultural and degraded lands for GHG offsetting (“carbon farming”) by selling carbon credits for additional income (Sawhney, 2022).

²⁴ Coordinator and Asia Director, ETC Group

Garg also shared his field research anecdotes on the exploitative nature of these carbon credit contracts:

Farmers (in India) have also started to use their lands for carbon offsetting. They get into contracts with these companies – during my conversations with farmers, I have noticed that contracts they signed were exploitative. The farmers were being offered Rs. 500 (USD 6.28) per acre per season, which is nothing.

3. Reflections and Way Forward

The discussion above demonstrates how mainstream data systems informed by neoliberal imaginaries reorient social relationalities underpinning traditional livelihoods ecosystems. The extractive agri-data paradigm decouples land and lifeworlds from people's ways of knowing, being, and doing. The idea of a "single source of truth" upon which data infrastructures are predicated transfers control of people's agrarian destinies to corporate-controlled intelligence systems. As corporations aggrandize local knowledge by divesting the autonomy of communities, the latter's historical relationships and embedded frames of belonging and sense-making are wrested away.

In the current conjuncture, land and livelihoods sovereignty, thus, becomes intermeshed with data sovereignty. Farmers' rights in their data (personal data and other data generated from their landholdings) and their individual and collective claims in the social resource of the agricultural data commons need a new farmer-centric vision of data infrastructures and their governance. In order to realize this vision, society needs a fundamental shift in thinking about data and data justice. An integrated set of rights in data is needed that protects laboring communities from harm, promotes benefits for autonomous and flourishing livelihoods through public innovation, and nurtures the ability of communities to participate in and determine the building blocks of the governance of their data – about themselves and the resources that sustain them.

The infrastructural turn in data systems brings new concerns for large scale, societal initiatives like the AgriStack. Though the DoAC&FW aims to create an enabling policy environment with appropriate institutional mechanisms for the participation of various agricultural service providers on AgriStack, we are yet to see how such market-driven innovations will promote equitable development in agriculture and benefit farmers. Time is of the essence as the arc of datafication redefines value creation – and new policies and new institutional rubrics are key to ensure that data technologies can create and distribute social and public value. The initial choices about "Digitalization for whom? Towards what? And in

whose interests?” are critical, as course corrections become more and more difficult in the afterlife of data.

Some considerations for the way forward are discussed below:

1. Personal data protection and privacy safeguards must be instituted for all acts of data sharing on AgriStack, both in primary uses (provision of specific data-based services to individual farmers who sign up), as well as secondary uses (research and innovation on the basis of aggregated, anonymized agricultural datasets). This should include individual and group profiling safeguards in anonymized data-sharing processes and penalties for reversal of anonymization. Most importantly, there should be case-specific clearance of every request from data seekers seeking to participate on the data exchange, by an independent institution entrusted with the protection of farmer interests in data sharing.

Sectoral data regulation for the agricultural sector – governing the bundling of fintech with agri-tech services by private players, and the rules governing the collection and processing of data from IoT or drones in smart farming experiments must be clearly set, to uphold the public interest.

2. No free riding on the commons of agricultural data should be permitted. All actors, including private sector organizations engaged in the development of data-enabled services on top of the AgriStack, should be obligated to share the APIs and source codes and inferred analytics from their downstream innovations, furthering reciprocity to sustain the commons. In particular, we need regulatory guardrails to prevent vertical consolidation and monopolistic market tendencies that characterize data-driven businesses from vitiating the democratizing possibilities of the agricultural data commons. Participants on the AgriStack should only be allowed to operate in the data-enabled services and intelligence analytics layer. They should be prohibited from holding stakes in infrastructural support businesses along the farm value chains (such as private markets or downstream support for farm logistics). This is important to prevent lock-ins.

3. A clear framework for farmer data rights should be developed and implemented in the agricultural sector. Farmers should have the rights to access, contest, and audit their data held in centralized databases and individual profiles developed by state and private sector agencies. This is particularly pertinent in the case of land records. A fiduciary/trusteeship mechanism for the protection of collective farmer interests in the aggregate data commons should be established, involving partnerships between *gram panchayats* (local governance institutions) and Farmer Producer Organizations at the community level.

4. Public sector innovation in agriculture must be re-invigorated by seizing the transformative power of the agricultural data commons, entering into partnerships with farming communities for sustainable data-supported innovation, and addressing locally important needs and challenges. Farming, forest, and fishing communities must be able to self-define their autonomous pathways to

enhancing livelihood security and food sovereignty through leveraging the power of data-based intelligence. This means that local data trusts/data cooperatives/fiduciary mechanisms for community-centered data innovation must be set up in partnership with these communities. Agricultural extension workers must be trained and empowered to provide context-appropriate technical expertise, and data systems must be seen as an aid and not a replacement for human agency and wisdom.

5. A new policy vision for digitalization in agriculture has to be evolved by the Government of India in consultation with farmer constituencies, producer organizations, social enterprises, and digital rights activists, so that farmer interests, rather than those of the capitalist market, drive the agenda.

References

- Ahmed, N. (2014, July 3). *World Bank and UN Carbon Offset Scheme 'complicit' in genocidal land grabs - NGOs*. The Guardian. <https://www.theguardian.com/environment/earth-insight/2014/jul/03/world-bank-un-redd-genocide-land-carbon-grab-sengwer-kenya>
- Aryan, A. (2018, December 10). *SC issues notice to 4 states for amending land acquisition act, seeks reply*. Business Standard News. https://www.business-standard.com/article/economy-policy/sc-issues-notice-to-4-states-for-amending-land-acquisition-act-seeks-reply-118121001181_1.html
- Bastin, J. (1954). Land Revenue In British India and Java. In *Raffles' Ideas on the Land Rent System in Java and the Mackenzie Land Tenure Commission* (Vol. 14, pp. 1–14). Brill. <http://www.jstor.org/stable/10.1163/j.ctvbqs4s2.5>
- Benjamin, S., Bhuvanewari, R., & Rajan, P. (2007). Bhoomi: 'E-Governance' or an Anti-politics Machine Necessary to Globalize Bangalore? *CASUM-m Working Paper*.
- Beriya, A. (2022). India Digital Ecosystem of Agriculture and Agristack: An Initial Assessment. *ICT India Working Paper*, 68.
- Binswanger-Mkhize, H. P., & Deininger, K. (2009). History of Land Concentration and Redistributive Land Reforms. In H. P. Binswanger-Mkhize, C. Bourguignon, & R. van den Brink, (Eds.), *Agricultural land redistribution: toward greater consensus*. (pp. 45-86). World Bank Publications.
- Chaturvedi, S. (2016, May 4). *Land reforms fail; 5% of India's farmers control 32% land*. The Wire. <https://thewire.in/agriculture/land-reforms-fail-5-of-indias-farmers-control-32-land>
- Chawla, R., & Bhatnagar, S. (2004). Online delivery of land titles to rural farmers in Karnataka, India. In *Scaling Up Poverty Reduction: A Global Learning Process and Conference* (pp. 25-27).
- Chowdhury, S. (2021, May 18). *Without addressing legacy issues, can digitising Land Records in India be a game changer?* The Wire. <https://thewire.in/rights/land-digitisation-ulpin-land-records-legacy-digital-india>
- Department of Agriculture, Cooperation & Farmer Welfare, Government of India. (2021). *Consultation Paper on IDEA (India Digital Ecosystem of Agriculture)*. https://agricoop.nic.in/sites/default/files/IDEA%20Concept%20Paper_mod01062021_1.pdf
- Department of Economic Affairs; Ministry of Finance, Government of India. (2019). *Report of the Steering Committee on Fintech Related Issues*. https://www.dea.gov.in/sites/default/files/Report%20of%20the%20Steering%20Committee%20on%20Fintech_1.pdf

Dvara E-Registry. (2021, August 9). *Dvara e-registry partners with Avanti finance to provide farmer loans in 3 states*. PR Newswire: press release distribution, targeting, monitoring and marketing.

<https://www.prnewswire.com/in/news-releases/dvara-e-registry-partners-with-avanti-finance-to-provide-farmer-loans-in-3-states-884194796.html>

ET Government. (2020, October 24). *Telangana: CM KCR to launch dharani portal on Oct 29*. ET Government. <https://government.economictimes.indiatimes.com/news/digital-india/telangana-cm-kcr-to-launch-dharani-portal-on-oct-29/78846243>

FAO. (2022). *Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security*. <https://www.fao.org/3/i2801e/i2801e.pdf>

Howson, P. (2020). Climate crises and Crypto-Colonialism: Conjuring value on the Blockchain frontiers of the global South. *Frontiers in Blockchain* (pp.3, 22).

Indian Council of Agricultural Research. (2010). *Degraded and Wastelands of India: Status and Spatial Distribution*. <https://icar.org.in/files/Degraded-and-Wastelands.pdf>

IPES-Food & ETC Group. (2021). *A Long Food Movement: Transforming Food Systems by 2045*. https://www.ipes-food.org/_img/upload/files/LongFoodMovementEN.pdf

Ministry of Electronics and Information Technology, Government of India. (2019). *India's Trillion-Dollar Digital Opportunity*. https://www.meity.gov.in/writereaddata/files/india_trillion-dollar_digital_opportunity.pdf

Mousseau, F. (2019). *The highest bidder takes it all: The World Bank's new scheme to privatise land in the Global South*. Bretton Woods Project. https://www.brettonwoodsproject.org/wp-content/uploads/2019/03/The_highest_bidder_takes_it_all-2.pdf

Nayak, P. (2021). From land reform to guaranteeing title to land (secure property rights) in India: Implications for democracy. In P.R. deSouza, M.S. Alam, & H. Ahmed (Eds.), *Companion to Indian Democracy* (pp. 115-131). Routledge India.

Nayar, P. K. (2012). 'I Sing the Body Biometric': Surveillance and Biological Citizenship. *Economic and Political Weekly*, 17-22.

Patnaik, I., & Roy, S. (2019, February 6). *India's woeful land records will have trouble identifying a farmer eligible for rs 500/Month*. The Print. <https://theprint.in/opinion/indias-woeful-land-records-will-have-trouble-identifying-a-farmer-eligible-for-rs-500-month/188360/>

Poster, M. (1995). Databases as discourse, or electronic interpellations. In *The second media age* (pp. 78-94). Cambridge: Polity Press.

Ranjan, J., & Kaushik, P. (2022, March 29). *Here's how India can unlock the power of agricultural technology through private public partnerships*. World Economic Forum.

<https://www.weforum.org/agenda/2022/03/unlock-the-power-of-agricultural-technology-through-private-public-partnerships/>

Reuter, T., Singh, S., Sinha, A. K., & Mehta, S. (2021). Land Grab Practices and a Threat to Livelihood and Food Security in India? A Case Study from Aerocity Expansion Project from SAS Nagar, Punjab. *Journal of Land and Rural Studies*, 9(1), 97-118.

Saldanha, L.F. (2018). *A Review of Andhra Pradesh's Climate Resilient Zero Budget Natural Farming Programme*. Environment Support Group.

https://www.researchgate.net/publication/337330938_A_Review_of_Andhra_Pradesh's_Climate_Resilient_Zero_Budget_Natural_Farming_Programme

Sawhney, D. (2022, May 18). *Millions of India's smallholder farmers could soon access carbon credits — that's good for them and the planet*. World Economic Forum.

<https://www.weforum.org/agenda/2022/05/carbon-credits-could-help-india-reach-net-zero-2070/>

Shagun. (2021, June 23). *AgriStack: The new digital push in agriculture raises serious concerns*. Down To Earth. <https://www.downtoearth.org.in/news/agriculture/agristack-the-new-digital-push-in-agriculture-raises-serious-concerns-77613>

Sharma, S. N. (2022, May 28). *Digitizing land records in India: Centre's Challenge to alleviate concerns around it and bring states on board*. The Economic Times.

<https://economictimes.indiatimes.com/news/economy/policy/digitizing-land-records-in-india-centres-challenge-to-alleviate-concerns-around-it-and-bring-states-on-board/articleshow/91859437.cms?from=mdr>

Singh, A. K. (1989). British Land Revenue Administration in N.W.P. and the Office of The Tahsildar in the 19th Century. *Proceedings of the Indian History Congress*, 50, 455–461.

<http://www.jstor.org/stable/44146080>

Singh, S. (2013). Common lands made 'wastelands': Making of the 'wastelands' into common lands. *14th Global conference of the international association for the study of the commons*, June, (pp. 03-07).

UNEP. (n.d.). *Changing the Finance, Financing the Change*. <https://www.unep.org/explore-topics/climate-action/what-we-do/climate-finance>

Varshney, A. (2019, August 29). *Despite New Land Acquisition Act, farmers remain vulnerable to poor compensation as many states dilute law for several sectors*. Firstpost.

<https://www.firstpost.com/india/despite-new-land-acquisition-act-farmers-remain-vulnerable-to-poor-compensation-as-many-states-dilute-law-for-several-sectors-7241221.html>

Wahi, N., Bhatia, A., Gandhi, D., Jain, S., Shukla, P., and Chauhan, U. (2017). *Land Acquisition in India: A Review of Supreme Court Cases from 1950 to 2016*. Centre for Policy Research. <https://cprindia.org/wp-content/uploads/2021/12/Land-Rights-Report-Final.pdf>

