

AI's Large Looting Models?

The Emerging Generative
Biology Stack as the Next
Frontier of Biopiracy



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Background and Context-Setting

Generative Biology (GenBio) is not simply another step in the evolution of biotechnology; it is the convergence of two of the most controversial technological trajectories of the past half-century: artificial intelligence and genetic engineering. Within just a few years, GenBio has shifted from speculative metaphor to concrete practice, with AI models redesigning genomes, proteins, and metabolic pathways. What makes this development unprecedented is not only the speed of its rise but also the scope of its ambition: GenBio deepens the reframing of living systems as code that can be programmed through computation, and as assets that can be commodified and traded within global markets.

This case study approaches GenBio as a frontier phenomenon—emerging faster than governance systems can respond, and already carrying profound implications for equity, sovereignty, and human rights. Big Tech’s entry into biotechnology reframes biodiversity as a digital input for AI models, accelerating biopiracy by design. Companies and governments are racing to stake claims in the emerging “bioeconomy,” dressing GenBio in narratives of curing disease, saving the climate, and securing food supplies. Yet behind these promises lies a different engine: the drive to feed artificial intelligence with ever-expanding streams of biological data and computational workloads. GenBio serves less as a solution to humanity’s crises than as a new frontier for AI and tech industries to grab data, expand their markets and entrench control.

Seen critically, GenBio is not a neutral innovation but a new form of enclosure: genetic resources are digitized, processed through black-box AI models, and turned into proprietary assets and speculative commodities. Its rise intensifies long-standing concerns over biosafety, corporate concentration, and biocolonialism, now amplified by the scale and speed of generative AI. This case study interrogates these dynamics to surface the stakes for economic, social, cultural, and data rights.

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Implications for Data Justice and Economic, Social and Cultural Rights (ESCR)

2.1 Data Injustices

Renewed bioprospecting and biopiracy: The need for the GenBio industry to ingest huge amounts of genomic data is fueling a new round of large-scale bioprospecting. Companies such as Basecamp Research are building proprietary databases from genetic material collected in biodiversity hotspots. Once genetic sequences are digitized and integrated into AI models, they are effectively beyond independent tracking and retrieval, making benefit sharing impossible in practice and at the whim of the model-makers.

Corporate control of the data pipeline: The entire GenBio “stack” is shaped by the interests of a small group of powerful actors: Big Tech supplies compute and models, Big Pharma directs applications toward what are guessed to be lucrative drugs, and consumer goods companies deploy synthetic substitutes in food and cosmetics. Tech giants (Google, Microsoft, Amazon, NVIDIA) dominate the compute and model layers of GenBio, embedding the field within their infrastructures. Nearly every major pharmaceutical corporation has partnered with GenBio startups, ensuring the sector is oriented toward high-profit-seeking drug discovery. Philanthropic funding linked to Big Tech (Gates, Chan Zuckerberg, Bezos and Ellison) adds legitimacy and accelerates their influence over public agendas.

Erosion of consent and benefit sharing: Much of the Digital Sequence Information (DSI) now used was collected long before GenBio existed, meaning communities never consented to this commercial application. Even when consent is sought, it is often procedural rather than substantive, leaving communities with little say in how their biodiversity is used or substituted. Existing Access and Benefit Sharing (ABS) regimes struggle to keep pace, allowing corporations to shape the rules to their advantage.

Digital biocolonialism: Genetic material is overwhelmingly sourced from biodiverse territories in the Global South, while the commercial value and decision-making are concentrated in Northern corporations. The result is a digital enclosure of biodiversity that echoes earlier colonial patterns, now reinforced through AI infrastructures.

Livelihood displacement and consumer disruption: AI-engineered substitutes threaten small farmers who grow crops like stevia, vanilla, or saffron. The rise of synthetic alternatives, already deployed in food and cosmetics by corporations such as Unilever, Procter & Gamble, and IFF, undermines producers' bargaining power, driving down prices and destabilizing local economies. Even when still in development, the prospect of these substitutes weakens farmers' negotiating position.

Biocultural rights at risk: Biodiversity is not only an economic resource but also embedded in cultural and spiritual practices. When genetic sequences are digitized and rebranded as "nature-identical" products, communities lose control over heritage that has been nurtured for generations, transforming it into speculative commodities and breaking ties between people and their ecosystems.

Regulatory evasion: GenBio models are opaque systems. Their decisions are unexplained and genetic edits and designs are difficult to interpret, making oversight almost impossible. Some techniques will intentionally stay below biosafety thresholds, creating loopholes that fast-track commercial products without proper scrutiny.

2.2 Implications for Economic, Social and Cultural Rights

- **Right to Science and Benefit Sharing (ICESCR Art. 15).** Communities are denied equitable participation in the benefits of scientific progress. Genetic heritage becomes raw material for profit and speculative capital rather than a shared global good.
- **Indigenous and Peasant Rights (UNDRIP, UNDROP).** Free, Prior, and Informed Consent (FPIC) is bypassed or hollowed out, undermining Indigenous sovereignty. Farmers' Rights to save, exchange, and govern seeds and biodiversity are threatened as DSI becomes detached from territories.
- **Right to Work and Livelihoods (ICESCR Art. 6).** Farmers and producers risk losing markets as synthetic GenBio substitutes replace natural crops. The economic survival of entire communities is put at risk.
- **Right to Health (ICESCR Art. 12).** Pharmaceutical R&D skews toward profitable compounds for wealthy markets, neglecting social diseases. Consumers may face risks from inadequately tested or unlabeled GenBio products.
- **Right to Water and a Healthy Environment.** The energy and water footprint of GenBio data centers, GPUs, and cloud infrastructure undermines environmental rights. Communities already facing scarcity bear the ecological costs of AI-driven biotech.
- **Collective and Cultural Rights.** Biocultural heritage is eroded when biodiversity is digitized and commodified. Cultural practices tied to the stewardship of crops and ecosystems are displaced by digital enclosures.



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Sector-Specific Pathways for Data and Development Justice

Recognizing biodiversity knowledge as shared heritage

GenBio's business model depends on transforming living resources into datasets and then further abstracting them into proprietary models. A fairer approach must start by treating biodiversity and associated knowledge as a collective inheritance, not as inputs for proprietary catalogues and algorithms. International mechanisms such as the Cali Fund could be strengthened by directing contributions toward communities who have maintained these resources for generations. This would shift the emphasis from corporate compliance to genuine redistribution and stewardship.

Updating consent practices for the digital age

Many of the genetic records now used in AI systems were collected under conditions that never contemplated machine learning or synthetic redesign. Consent in this context cannot remain a one-time transaction. Future frameworks should recognize the ongoing nature of data use and require continuous, community-led decision-making. This means ensuring that peoples affected by GenBio can set limits, revoke permissions, or demand benefit sharing when their biodiversity knowledge is repurposed.

Reinforcing the rights of farmers and Indigenous Peoples

The digital capture of plant genomes directly challenges the ability of farmers and Indigenous Peoples to control and exchange seeds. Instruments like the FAO Seed Treaty should evolve to acknowledge not only physical seeds but also their informational derivatives. By embedding rights over digital sequence information, governance could protect food cultures and agroecological practices that remain indispensable for resilience.

Precautionary approach to technological development

GenBio's pace outstrips regulators' ability to understand or assess risks. Some engineered edits will be designed to remain invisible under existing biosafety rules. To protect health and ecosystems, precaution must guide oversight. This includes requiring human rights and environmental impact reviews before GenBio enterprises extract data or products reach the market, and establishing liability mechanisms that prevent harms from being externalized to communities.

Addressing cultural loss and inequity

Beyond economics, GenBio's impacts touch cultural survival. When crops like stevia are stripped from their social and spiritual contexts and sold as synthetic "equivalents," what is lost cannot be measured in market terms. Justice requires recognition of biocultural rights, affirming that genetic knowledge is inseparable from the communities and traditions that sustain it. Any governance system must make space for these rights, not just for intellectual property claims.

Challenging the influence of private philanthropy

The strong presence of corporate-linked foundations in GenBio financing has tilted public narratives toward inevitability and optimism. This concentration of influence must be checked through independent public-interest institutions and transparent funding.

Cross-sector alliances

Because GenBio cuts across food, health, and digital policy arenas, responses cannot remain siloed. Alliances between food sovereignty networks, Indigenous organizations, environmental defenders, and digital rights groups are key to advancing alternatives. Such collaborations can reframe the debate: not whether GenBio will succeed commercially, but whether societies choose governance models that safeguard equity, rights, and ecological integrity.





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Read the full report [here](#)

