



Rethinking Intellectual Property in the Age of AI: A Policy Framework for Agricultural Biotechnology

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Abstract. Traditionally human authorship is recognized by national copyright legislations and international instruments like Berne Convention, TRIPS Agreement, etc. The notion is now challenged by the advent of Artificial Intelligence. Artificial Intelligence is playing a pivotal role in predicting protein structure with atomic precision and genetic sequences that are improvising modern crop science as well as agricultural biotechnology. These AI generated outputs generated falls into ownership vacuum of human- authorship requirements.

The paper discusses the doctrinal criticism of the existing international framework dealing with copyright protection and Indian Copyright Act, 1957, while elaborating with judicial pronouncement across the globe on copyright protection to exclusion of AI generated scientific outputs. The research also incorporates an empirical study of agri- biotech researchers, policy makers, lawyers on the global practices and how a possible solution to the AI- human generated outputs. The research paper also proposes a framework for a new multilateral instruments that can incorporate innovation incentives with the new age technology.

Keywords: AI-Generated Works, Copyright Authorship, Agricultural Biotechnology, Protein Structure Prediction, Genomic Sequences, Berne Convention, TRIPS, WIPO, India, Multilateral Instrument, Empirical Legal Study.

1. Introduction: The Collapsing Author-Genius Myth

In 1710, the Statute of Anne vested copyright in authors for a fixed term, presupposing a human being who laboured intellectually over a creative work. [1] Three centuries later, the Berne Convention [2] enshrined this human-centric logic into international law, and TRIPS extended it globally as a non-negotiable minimum standard. The entire superstructure of international copyright rests on what scholars have called the 'author-genius' myth: the idea that creative or scientific output originates in the autonomous intellectual effort of an individual human mind.

This foundational premise is now empirically false in large segments of the agri-biotech research pipeline. DeepMind's AlphaFold 2, released publicly in 2021, predicted the three-dimensional structures of over 200 million proteins — a scientific output that would have required decades of experimental crystallography if performed by human researchers.[3] The system produced these outputs without any human directing the specific scientific insight in each prediction. Similarly, large language models fine-tuned on scientific literature now generate first-draft research papers, hypothesis formulations, and literature reviews in plant genomics and crop protection science. Automated annotation pipelines produce genomic sequence annotations —

identifying gene functions, regulatory elements, and phenotypic associations — at scales impossible for human annotators.

2. Doctrinal Landscape: The Authorship Requirement and Its Discontents

2.1 The Berne Convention and the Human Author Requirement

The term “author” has not been defined in The Berne Convention for the Protection of Literary and Artistic Works (1886, revised Paris Act 1971, since human is presumed to be only capable of producing a Literary and Artistic Works. Article 2 of the Convention which protects “literary and artistic works” has been interpreted since more a century to be human centric and giving due credit to the human creator. For instance, Application of moral rights which includes right to attribution and integrity (Article 6b) is inapplicable to non-human creators. Same applies to duration of copyright which is attributed to life of creator and fifty or seventy years, such a clause loses meaning to a system where there is no life.

The WIPO Performances and Phonograms Treaty (1996) [4] and the WIPO Copyright Treaty (1996) [5] extend copyright protection to artistic works in the digital environment. This inclusion also fails address AI generated works, to give Berne Convention protection to all creators irrespective where their work can be accessed. Inclusion of Berne Convention by WIPO makes it binding on all 164 WTO Members.

Pertinent question for discussion is whether national laws can give protection to AI generated works that was exclusive for human generated works under the treaty. There is a difference of opinion among legal academicians on whether such protection is needed since economic inducement and attribution incentive provided by Copyright is not needed for AI generated work.

2.2 The Indian Copyright Act 1957: Computer-Generated Works and Section 2(d)

Section 2(d)(vi) of the Copyright Act 1957 (as amended by the Copyright (Amendment) Act 2012) [6] defines “author” in relation to “any literary, dramatic, musical or artistic work which is computer-generated” is “the person who causes the work to be created.” Indian Copyright Act is among the pioneers of addressing computer generated work. The term “computer generated work” is not defined in the Act itself, but, when the provision came into effect during early programming and automation period, the general understanding was computer generated work was directly attributable to human inputs. [7] The section was never intended for GenAI generated work where the work of the person who created the outputs provides only natural language prompts or commands.

The phrase ‘causes the work to be created’ is critically ambiguous in the context of large language models, protein structure predictors, and genomic annotation pipelines. Does it refer to the developer of the AI system (e.g. DeepMind, OpenAI, a public research institution)? The operator of the system (the university, agrochemical corporation, or research council running the inference)? The user who formulates the prompt? The dataset contributors whose labelled data trained the model? Current Indian jurisprudence provides no authoritative answer, and the Copyright Office has not issued interpretive guidance.

Big companies that have a lot of lawyers and money can claim they own AI-generated information about agriculture and biotechnology, and they can even put this in the fine print of their website terms. This means they are basically taking control of

this information, while universities and small organizations that help farmers are left wondering if they have any rights to it.

2.3 Comparative National Approaches

Broadly countries have adopted three approaches on AI generated works. First approach is human creativity requirement. US, EU and Australia taken up this approach after 2023. According to this approach copyright cannot be given to entirely AI generated work which does not need any material human intervention. A mere natural language prompt or a minimal control over the output won't be protected by copyright. The approach is clearly stated in by the US Copyright Office's 2023 guidance and the Full Federal Court's reasoning in *Thaler v Commissioner of Patents* (Australia) [8].

Second approach is conditional granting of copyright to computer generated work approach which is followed in UK, India, Ireland, New Zealand. Copyright attributed to the person who makes the arrangements necessary for the creation of the work, for a reduced term (50 years in the UK under CDPA 1988 s.9(3)). [9]

Another approach which is followed in several WIPO member states is that any computer generated work without human creative input will be in the public domain and not be protected by Copyright. Germany's Federal Court of Justice has gestured toward this position. [10]

Since there is no international common practice for treatment of AI generated work, this creates a problem of forum shopping for the corporations. Corporations apply for copyright protection in the jurisdictions offering broadest proprietary protection, regardless of where the underlying research is conducted or where its agricultural applications will be felt.

2.4 Genomic Sequences and Protein Structures: The Database and Sui Generis Layer

Beyond copyright, AI-generated genomic annotations and protein structure predictions raise distinct questions under database law. The EU Database Directive 96/9/EC [11] gives special protection to databases built through serious investment in collecting, checking, or presenting data—and crucially, this protection doesn't depend on whether the content is original or creative. Britain kept a comparable rule after leaving the EU. India has no such safeguard, which leaves AI-generated genomic datasets from Indian public research institutions in a precarious legal position.. [12]

How copyright, database rights, and patent law interact throughout the agri-biotech pipeline remains murky and largely uncharted. Take a protein structure prediction churned out by AI: it probably can't be copyrighted since it's machine-generated; it might enable a patentable discovery without being patentable itself; if folded into a larger dataset, it could attract database protection; and it may also qualify as "digital sequence information" under the Nagoya Protocol's access and benefit-sharing rules. Currently there is absence of any international instrument to address these complex issues.

3. Judicial Treatment: Indian Case Law

3.1 Indian Jurisprudence

Since AI related disputes are emerging in last few years. Indian Courts are yet to decide on the ownership of the AI generated works. Earlier decision on attribution of copyright can be analysed for understanding Indian perspective on authorship. In the case of *Eastern Book Company v. D.B. Modak* [13], the Supreme Court of India came up with "modicum of creativity" principle. The principle states that work should be result of author's intellect not merely a mechanical, labour intensive activity. The position was

more extensively explain in the case of Delhi High Court in Navigators Logistics Ltd. v. Kashif Qureshi & Ors. [14] Where, the court explained requirement of human author’s skill and judgement to process an output. In an ongoing case of ANI v. OpenAI [15], which concerns with Copyright infringement by OpenAI to train its models on copyrighted material for commercial use. One the earliest case, R.G. Anand v. Delux Films [16], Supreme Court emphasized on the human factor for need of originality of work. The same opinion was also taken up in the case of Anil Gupta v. Kunal Dasgupta [17] where it states expression of idea rather than idea and raw data can be copyrights if originated for a human mind.

From the above decision we can understand the Indian position which needs substantial human cognitive agency as a precondition to copyright protection. In the recent case Indian Copyright Office also recognized RAGHAV, an AI painting app as a Co- author for a picture which partially included original image captured by main author [18].

No such policy has been created for fully autonomous outputs. That gap was flagged in the Law Commission of India's 2022 consultation on emerging technology and intellectual property, and it remains unresolved.

4. Empirical Study: Ownership Uncertainty in the Agri-Biotech Research Pipeline

4.1 Study Design and Methodology

The paper presents an empirical study conducted between March 2026 and April 2026. The study employed a structured survey questionnaire.

4.2 Survey Instrument

A 47-item structured questionnaire was administered to 312 participants across India, United States, United Kingdom, Germany, Kenya, and Brazil. Participants broadly belonged to four (4) groups for this study:

- (a) agri-biotech researchers at universities and research institutes (n=118);
- (b) Officials dealing with technology transfer and licensing (n=76);
- (c) Lawyers specialising in biotech and Intellectual Property Rights (n=68); and
- (d) Policy makers (n=50).

The survey was administered in English The response rate was 71.4%.

4.3 Survey Findings

Finding 1: The Ownership Question Has No Agreed Answer

First question referred to 'When your institution or a partner institution publishes an AI-generated genomic annotation or protein structure prediction, who does your institution believe owns the copyright?', responses were not unifom:

— **Table 1:** Perceived ownership of AI-generated scientific outputs across jurisdictions (n=312)

Response Category	India (%)	US (%)	UK (%)	Germany (%)	Kenya (%)	Brazil (%)
The AI developer / software licensor	31%	24%	18%	12%	38%	29%
The institution	28%	41%	45%	38%	22%	31%

deploying the AI						
The researcher directing the AI	18%	20%	22%	19%	14%	16%
No one — public domain	9%	8%	10%	24%	7%	11%
Uncertain / no institutional policy	14%	7%	5%	7%	19%	13%

Finding 2: Commercial Platforms Are Quietly Capturing Publicly Funded Research

Among the technology transfer officers and policy makers surveyed, 48% said their institution had encountered a situation where a commercial AI platform asserted ownership over outputs generated through its tools in the course of publicly funded research. Of that group, 67% reported that the platform's standard terms of service purported to vest ownership of those outputs in the platform operator. Only 22% of affected institutions had managed to negotiate any modification to those terms to preserve their own rights.

This is worth flagging. The standard contracts that govern how AI platforms get deployed are quietly handing ownership of publicly funded science over to private companies—and most of the researchers involved have no idea it's even happening. The researchers generating the outputs are not party to these negotiations and often do not know the terms under which they are working.

Finding 3: The Problem Falls Hardest on Institutions Least Equipped to Handle It

Kenyan and Brazilian respondents recorded the highest levels of uncertainty and the weakest rates of institutional policy across the entire sample. Thirty-eight percent of Kenyan respondents believed that the AI software developer owned the outputs — a view that, if it reflects actual legal practice, would mean that genomic knowledge about African crop varieties, developed using international AI tools, could in principle be owned by foreign corporations. Sixty-one percent of Kenyan respondents and 54% of Brazilian respondents said their institutions did not have the legal capacity to negotiate IP ownership provisions when entering into AI platform licensing agreements. The concern here is not abstract. It is that the countries with the most at stake in terms of crop biodiversity and food security research are the least positioned to protect their interest in the knowledge their researchers generate.

Finding 4: Uncertainty Is Suppressing the Publication of Research

Perhaps the most direct evidence of harm in the dataset is this: 43% of agri-biotech researchers said that uncertainty over AI-output ownership had led them to delay or actively reconsider publishing findings generated with AI tools. Their concern was twofold — either that they lacked sufficient rights in the work to control its use, or that publishing would expose them to a claim by the platform operator. Copyright law is built on the assumption that protection encourages disclosure. These findings suggest that, in the AI-generated research context, the uncertainty surrounding protection is producing the opposite effect.

— **Table 2:** Behavioural impacts of AI-output ownership uncertainty (selected groups)

Impact of Ownership Uncertainty	Researchers (%)	TT Officers (%)	IP Attorneys (%)
Delayed publication of AI-generated findings	43%	38%	N/A
Modified research design to avoid AI authorship issues	31%	N/A	N/A
Advised institution to limit AI use in research	N/A	29%	52%
Refused to advise on AI-output ownership (insufficient law)	N/A	N/A	61%
Sought foreign jurisdiction for IP registration	N/A	18%	34%

5. Normative Framework: The Protocol on AI-Generated Scientific Outputs (PASO)

Different national Laws without any harmonious approach creates problems of forum shopping, inequal treatment and a systematic disincentive to publish. There is a need for a collective action through an international instrument, since robust AI generated copyright protection can become safe haven for the enclosure of globally significant scientific knowledge and restricted approach will lead risking AI investments.

The paper suggests a protocol on AI-Generated Scientific Outputs (PASO) for WIPO similar to Marrakesh Treaty on Access for Persons with Print Disabilities (2013) and the Beijing Treaty on Audiovisual Performances (2012).

5.1 Architecture of PASO

This paper proposes a Protocol on AI-Generated Scientific Outputs (PASO) built on five core pillars:

Pillar 1: Classification Regime

PASO would establish a tripartite classification of AI-generated scientific outputs:

1. **Class A — Human-AI Collaborative Works:** This covers outputs where a human researcher made meaningful creative decisions about the actual content—not just typing a prompt or picking a tool. These would get ordinary copyright protection, with ownership going to the human researcher. The AI developer's role gets noted, but it doesn't give them any ownership stake.
2. **Class B — Operationally AI-Generated Works with Institutional Funding:** This class covers research generated by AI developed under Institutional Research funding by Research Institutions. These would attract a short-term sui generis protection right (10 years maximum) vesting in the deploying institution, subject to mandatory open-access obligations after the initial term..
3. **Class C — Fully Autonomous AI-Generated Outputs:** Outputs generated without material human creative direction. These would enter the public domain immediately upon generation and could not be claimed as proprietary by any party.

The classification test would focus on the degree of human creative direction over the specific intellectual content of the output — not over the deployment of the system generally. This test is demanding by design: the presumption would favour public-domain status, with the burden on the party asserting protection to establish Class A or B status.

Pillar 2: Mandatory Open Access for Publicly Funded Research

PASO would require that all AI-generated scientific outputs produced in whole or in part using public research funding — whether national, multilateral, or foundation-funded — be made available under open licences within 12 months of generation. This provision would function analogously to open-access mandates in the research funding framework but would operate as an international legal obligation, overriding contrary terms in AI platform licensing agreements. It directly addresses the commercial capture dynamic identified in the empirical study.

Pillar 3: Benefit-Sharing Fund for Developing Nations

Drawing on the architecture of the Nagoya Protocol and the proposed multilateral mechanism for digital sequence information under the Kunming-Montreal framework, PASO would establish a voluntary multilateral fund — the Scientific Knowledge Access Fund (SKAF) — to which commercial AI developers and deployers claiming Class B protection over agri-biotech outputs would contribute a percentage of commercial revenues derived from such outputs. Fund proceeds would be directed toward: (a) capacity building for AI governance in LMICs; (b) open-access publication subsidies for researchers in developing nations; and (c) technical assistance in negotiating AI platform licensing agreements.

Pillar 4: Training Data Transparency and Provenance

PASO would require AI developers seeking Class A or B protection over scientific outputs to maintain publicly accessible registers of the training datasets used, including the provenance, funding source, and access conditions of each dataset. This provision would operationalise the benefit-sharing principle for training data contributors — including public gene banks, CGIAR collections, and national genomic research programmes — and would provide the evidentiary basis for benefit-sharing claims.

Pillar 5: National Treatment and Minimum Standards

PASO would impose minimum standards obligations on Member States, requiring each to: enact a statutory classification test consistent with PASO's tripartite regime; abolish any AI-platform licensing provision that purports to vest ownership of Class C outputs in the AI developer; establish a competent authority for PASO classification determinations; and provide effective enforcement mechanisms including administrative review of wrongful ownership claims.

6. Conclusion

Since last three decade international copyright law only granted authorship only to humans. In the recent years in agricultural biotechnology sector has seen a rise in AI assisted research. The growth of AI-generated research papers, protein structure predictions, and genomic annotations represents a new category of knowledge — produced by non-human intelligence, often trained on publicly funded data, commercially claimed through legal fictions, and governed by an international framework that its architects never imagined would face such challenges.

This paper iterates the lack of uniformity in recognition of AI generated works is resulting into commercializing of research, forum shopping and resulting into penalizing of research work. These harms are systemic and structural, therefore changes in national legislation is not enough.

The Protocol on AI-Generated Scientific Outputs proposed here is calibrated, technically feasible, and politically grounded in the interests of the majority of WIPO Member States. It preserves innovation incentives while fundamentally reorienting the default presumption toward public-domain access for autonomous AI outputs. It incorporates the access and equity concerns of developing nations — including India — as first-order design criteria rather than afterthoughts. And it draws on the best precedents of the multilateral IP system: the targeted, purpose-specific flexibility of the Marrakesh Treaty, the benefit-sharing architecture of the Nagoya Protocol, and the minimum-standards discipline of TRIPS.

The romantic figure of the lone human author laboring over a manuscript by candlelight was always a legal construct designed to serve social ends. AI requires us to be honest about those ends — and to build the international legal architecture needed to achieve them in a world where the most consequential scientific outputs are generated without a human mind directing their content. The author-genius is dead. The law must now decide, honestly and multilaterally, what comes next.

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