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Right to Health and Environmental Safety under Article 21: Constitutional Challenges in Pesticide Regulation in India

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ABSTRACT: India, as one of the world's largest consumers of pesticides, faces a persistent tension between agricultural productivity and the protection of fundamental rights. Article 21 of the Indian Constitution, guaranteeing the right to life and personal liberty, has been expansively interpreted by the judiciary to encompass the right to health, a pollution-free environment, and dignified living. This includes safeguards against hazardous substances like pesticides, which cause acute poisoning, chronic illnesses (including neurological disorders, reproductive issues, and cancers), and widespread environmental degradation through soil, water, and biodiversity contamination.

Despite regulatory mechanisms under the Insecticides Act, 1968, Environment (Protection) Act, 1986, and Food Safety and Standards Act, 2006, significant gaps persist in enforcement, residue monitoring, and timely bans on hazardous chemicals. The draft Pesticides Management Bill, 2025, introduced to replace the outdated 1968 law, aims to modernize regulation but has been criticized for prioritizing industry ease over robust health and ecological protections, and for failing to adequately empower states or address the continued use of highly hazardous pesticides.

This paper examines the constitutional challenges arising from these regulatory shortcomings, drawing on landmark judicial expansions of Article 21—such as the right to a healthy environment (M.C. Mehta cases), occupational health safeguards, and the emerging recognition of protection from adverse climate and pollution impacts (e.g., M.K. Ranjitsinh v. Union of India, 2024). It analyzes high-profile cases involving pesticide tragedies (e.g., ongoing endosulfan aftermath in Kerala, with recent NGT directions in 2025 on missing barrels) and empirical evidence of rising health burdens, including pesticide-linked poisonings and residues in food chains.

Employing a doctrinal and analytical methodology, the study highlights implementation failures, federalism issues, and access-to-justice barriers for affected farmers and communities. It concludes that aligning pesticide governance with Article 21's imperatives requires urgent reforms: stronger application of the precautionary principle, mandatory health and environmental impact assessments, promotion of sustainable alternatives like integrated pest management and biopesticides, and enhanced judicial and institutional oversight to prevent irreversible harm to public health and ecosystems while supporting agricultural needs.

KEYWORDS: Article 21, Right to Health, Environmental Safety, Pesticide Regulation, Judicial Interpretation, Hazardous Pesticides, Precautionary Principle, Sustainable Agriculture.

I. INTRODUCTION

India ranks among the world's largest consumers and producers of pesticides, with agricultural intensification driving extensive use of chemical inputs to meet food security demands. As the second-most populous nation and a major agrarian economy, pesticide application has become integral to crop protection, contributing to higher yields in staples like rice, wheat, and cotton. However, this reliance has generated profound public health and environmental concerns. Acute and chronic pesticide exposure leads to poisoning incidents, long-term illnesses including cancers, endocrine disruption, and neurological disorders, while residues contaminate soil, groundwater, surface water, and food chains, threatening biodiversity and ecosystem services.

The Constitution of India, through Article 21, guarantees the right to life and personal liberty. Over the past four decades, the Supreme Court and various High Courts have interpreted this provision expansively to include the right to live with human dignity, the right to health, the right to a clean and healthy environment, and protection from hazards that impair life and well-being. Landmark judgments have established that any activity or regulatory failure endangering these rights constitutes a violation of fundamental freedoms enforceable under Articles 32 and 226.

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Pesticide regulation in India, primarily governed by the Insecticides Act, 1968 (now proposed to be replaced by the Pesticides Management Bill), the Environment (Protection) Act, 1986, and related statutes, has struggled to keep pace with scientific evidence of harm, enforcement challenges, and evolving constitutional standards. High-profile tragedies—such as the endosulfan disaster in Kasaragod, Kerala, Bhopal-like concerns with hazardous chemicals, and recurring reports of farmer poisoning—have repeatedly exposed regulatory weaknesses, prompting public interest litigation and National Green Tribunal interventions.

This research paper examines the constitutional challenges in pesticide regulation through the lens of Article 21. It traces the judicial evolution of the right to health and environmental safety, critiques the existing and proposed legislative framework, analyses implementation gaps and their impact on vulnerable populations (farmers, agricultural workers, rural communities, and consumers), and evaluates judicial responses. The study argues that persistent failures in timely restriction of highly hazardous pesticides, inadequate monitoring of residues, weak institutional coordination, and insufficient precautionary measures amount to violations of core constitutional guarantees.

The primary objectives are:

1. To map the judicial expansion of Article 21 to encompass protection from pesticide-related health and environmental risks.
2. To assess the adequacy of current and proposed pesticide regulatory mechanisms in light of constitutional obligations.
3. To identify key constitutional and practical challenges, supported by case law, empirical data, and policy critiques.
4. To propose reforms that better align pesticide governance with the imperatives of Article 21 while balancing agricultural productivity and sustainable development.

II. RESEARCH METHODOLOGY

This research paper adopts a doctrinal and analytical methodology, which is the traditional and most suitable approach for constitutional law studies in India. Doctrinal research involves the systematic collection, analysis, and interpretation of legal materials, including primary sources such as the Constitution of India, statutes (e.g., Insecticides Act, 1968, Environment (Protection) Act, 1986), subordinate legislation, and judicial precedents from the Supreme Court and High Courts. Secondary sources, including scholarly books, journal articles, policy reports (e.g., from CSE, WHO/FAO, Down To Earth), and government documents, are utilized to provide critical insights and contextual understanding.
The analytical component entails a critical examination of the evolution of Article 21 jurisprudence, identification of regulatory gaps and implementation failures in pesticide governance, comparative evaluation with international frameworks, and normative assessment of proposed reforms. This methodology ensures a rigorous, objective, and comprehensive analysis grounded in authoritative legal texts and precedents, enabling a robust evaluation of constitutional challenges in pesticide regulation.

III. LITERATURE REVIEW

The discourse on the right to health and environmental safety under Article 21 has evolved significantly since the post-Emergency era, transforming a narrow procedural guarantee into a substantive right encompassing dignity, health, and ecological integrity. Early scholarship focused on the doctrinal shift initiated in Maneka Gandhi v. Union of India (1978), where the Supreme Court expanded Article 21 to include due process and fairness, laying the groundwork for broader interpretations.

Subsequent works trace the incorporation of environmental rights. Vellore Citizens Welfare Forum v. Union of India (1996) marked a pivotal moment by reading the precautionary principle, polluter pays principle, and sustainable development into Article 21, treating them as part of customary international law enforceable domestically. Scholars like Armin Rosencranz and Shyam Divan in Environmental Law and Policy in India (2001, updated editions) highlight how this jurisprudence shifted environmental protection from a directive principle (Article 48A) to a fundamental right, enabling public interest litigation (PIL) as a tool for enforcement.

On health rights, key contributions include analyses of Consumer Education and Research Centre v. Union of India (1995), which recognized occupational health safeguards for workers exposed to hazardous substances, and Paschim

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Banga Khet Mazdoor Samity v. State of West Bengal (1996), affirming the right to emergency medical care. These cases underscore that state inaction or inadequate regulation in hazardous contexts violates Article 21.

Pesticide-specific literature remains fragmented but growing. Reports by the Centre for Science and Environment (CSE) on pesticide residues in food (e.g., periodic "Poison vs Nutrition" studies) and WHO/FAO assessments document high exposure levels in India, linking them to chronic diseases and ecological harm. Academic articles in journals like Economic & Political Weekly and Journal of Indian Law and Society critique the Insecticides Act, 1968, as outdated, emphasizing weak registration processes, delayed bans, and enforcement failures.

Recent developments reinforce the urgency. The Supreme Court's 2024 judgment in M.K. Ranjitsinh & Ors. v. Union of India recognized freedom from adverse effects of climate change as part of the right to life under Article 21, extending environmental protections to pollution and health linkages. In the endosulfan context, the National Green Tribunal in November 2025 directed the Plantation Corporation of Kerala and Central Pollution Control Board to trace hundreds of missing endosulfan barrels, assess contamination, and recommend remedial measures, highlighting persistent implementation gaps and victims' access-to-justice barriers.

The proposed Pesticides Management Bill, 2025, intended to replace the Insecticides Act, 1968, has been under discussion and drafting for several years, with the aim of modernizing registration, quality control, import/export norms, and penalties for violations. Analyses published in Down To Earth and Mongabay-India point out that the evolving draft retains several longstanding gaps, such as limited state-level regulatory powers, insufficient emphasis on precautionary approaches, inadequate provisions for highly hazardous pesticides, and concerns that it may prioritize industry facilitation and ease of doing business over robust protections for farmers, agricultural workers, consumers, and ecosystems.

Gaps in existing literature include limited integrated analysis of pesticide regulation through the exclusive constitutional lens of Article 21 in recent years, scant attention to federalism challenges in enforcement, and insufficient interdisciplinary linkage between judicial precedents, empirical health data, and the ongoing legislative reform process. This paper addresses these by synthesizing constitutional jurisprudence, regulatory critiques, and contemporary developments to argue for a rights-based overhaul of pesticide governance that prioritizes precautionary protection over reactive measures.

IV. EVOLUTION OF ARTICLE 21: RIGHT TO HEALTH AND ENVIRONMENTAL SAFETY

Article 21 of the Constitution of India provides: "No person shall be deprived of his life or personal liberty except according to procedure established by law." Initially interpreted narrowly as a safeguard against arbitrary state action on physical liberty, the provision underwent a profound transformation following the landmark decision in Maneka Gandhi v. Union of India (1978). The Supreme Court held that the "procedure established by law" must be fair, just, and reasonable, and that Article 21 is interconnected with Articles 14 and 19, expanding its scope to protect substantive rights inherent in the concept of life and liberty.

This expansive interpretation paved the way for recognizing the right to live with human dignity as an integral part of Article 21. In Francis Coralie Mullin v. Administrator, Union Territory of Delhi (1981), the Court observed that the right to life includes the right to basic necessities and conditions that enable a dignified existence. Subsequent judgments built on this foundation to incorporate health and environmental protections.

Incorporation of the Right to Health

The judiciary has consistently held that the right to health is implicit in the right to life. In Parmanand Katara v. Union of India (1989), the Court affirmed that preserving life is of paramount importance, obligating medical professionals and the state to provide emergency care. More relevant to hazardous exposures, Consumer Education & Research Centre v. Union of India (1995) recognized the right to occupational health and safety for workers exposed to toxic substances, mandating preventive measures, periodic health check-ups, and compensation for occupational diseases. The Court linked this to Article 21, stating that the state must ensure a healthy working environment free from hazards that shorten life or impair well-being.

In Paschim Banga Khet Mazdoor Samity v. State of West Bengal (1996), the Supreme Court emphasized the state's positive obligation to provide medical facilities, holding that denial of timely treatment violates the right to life. These

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precedents establish that state inaction in regulating hazardous substances, including pesticides that cause acute poisoning or chronic illnesses, constitutes a breach of constitutional duty.

Emergence of Environmental Rights under Article 21

Environmental jurisprudence under Article 21 crystallized in the 1980s and 1990s. In Subhash Kumar v. State of Bihar (1991), the Court explicitly held that the right to life includes the right to enjoyment of pollution-free water and air, as pollution impairs health and quality of life. M.C. Mehta v. Union of India (1987, Oleum Gas Leak case) introduced the principle of absolute liability for hazardous industries, reinforcing those enterprises engaged in dangerous activities must compensate for harm and that the state must prevent such risks.

The landmark Vellore Citizens Welfare Forum v. Union of India (1996) integrated international environmental principles—precautionary principle, polluter pays, and sustainable development—into domestic law, declaring them part of Article 21. The Court observed that a clean environment is essential for the enjoyment of life and liberty. In Indian Council for Enviro-Legal Action v. Union of India (1996), the polluter pays principle was applied to hold industries liable for remediation costs in chemical pollution cases.

Intersection with Pesticide Regulation

Pesticides, as hazardous chemicals, directly engage these expanded rights. Cases involving chemical pollution and occupational hazards provide analogous frameworks. In Research Foundation for Science Technology National Resource Policy v. Union of India (2005), the Supreme Court addressed hazardous waste management, including pesticides, emphasizing precautionary measures and state responsibility to protect vulnerable populations. The endosulfan tragedy in Kerala has been a recurring context, with PILs and NGT proceedings underscoring violations of health and environmental rights due to prolonged exposure.

More recently, in M.K. Ranjitsinh & Ors. v. Union of India (2024), the Supreme Court recognized the right to be free from the adverse effects of climate change as part of Article 21, broadening protections against environmental threats that impact health and life. This judgment reinforces that regulatory framework must proactively address cumulative risks from pollutants, including persistent pesticides that contribute to ecological degradation and long-term health burdens.

Through this evolutionary jurisprudence, Article 21 has evolved into a robust shield against state or private actions that endanger health or the environment. In the context of pesticides, it imposes a constitutional mandate on the state to regulate strictly, ban hazardous substances where evidence of harm exists, ensure monitoring and enforcement, and provide remedies to affected communities, thereby preventing violations of the fundamental right to a healthy and safe life.

Regulatory Framework for Pesticides in India

Pesticide regulation in India operates through a multi-layered framework comprising central legislation, subordinate rules, and complementary environmental and food safety laws. The primary statute remains the Insecticides Act, 1968, enacted to regulate the import, manufacture, sale, transport, distribution, and use of insecticides with a view to prevent risks to human beings, animals, and the environment.

Key provisions of the Insecticides Act, 1968, include:

- Establishment of the Central Insecticides Board (CIB) to advise the central government on technical matters.
- Constitution of a Registration Committee (RC) responsible for registering insecticides after scrutinizing data on efficacy, safety, and environmental impact.
- Requirement for licensing manufacturers, formulators, and dealers.
- Powers to prohibit or restrict use of hazardous insecticides, with 27 pesticides banned or restricted in phases (e.g., endosulfan banned in 2011 following Supreme Court intervention).
- Penalties for violations, including imprisonment and fines.

The Insecticides Rules, 1971, provide detailed procedures for registration, labeling, packaging, and sampling.

Over the years, this framework has been supplemented by other laws to address broader environmental and health concerns:

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Environment (Protection) Act, 1986 (EPA): Serves as an umbrella legislation empowering the central government to take measures for environmental protection, including regulation of hazardous substances. Rules under EPA, such as the Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989, and Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, apply to pesticide manufacturing and disposal.

Food Safety and Standards Act, 2006 (FSS Act): Administered by the Food Safety and Standards Authority of India (FSSAI), it sets maximum residue limits (MRLs) for pesticides in food commodities, conducts surveillance, and enforces standards to protect consumers from contaminated produce.

Biological Diversity Act, 2002: Regulates access to biological resources and associated traditional knowledge, indirectly influencing biopesticide development and use.

National Green Tribunal Act, 2010: Empowers the National Green Tribunal (NGT) to adjudicate environmental disputes, including those related to pesticide pollution (e.g., endosulfan contamination cases).

Institutional mechanisms include:

- Central Insecticides Board and Registration Committee under the Ministry of Agriculture and Farmers Welfare.
- Central Pollution Control Board (CPCB) and State Pollution Control Boards for monitoring environmental impacts.
- Directorate of Plant Protection, Quarantine & Storage for implementation and enforcement.
- Coordination with international obligations under the Stockholm Convention on Persistent Organic Pollutants (India banned several POP pesticides like aldrin, dieldrin) and Rotterdam Convention on Prior Informed Consent for hazardous chemicals.

Despite these provisions, the framework faces persistent criticisms for being outdated, fragmented, and enforcement-deficient. The Insecticides Act, focused primarily on "insecticides," does not comprehensively cover all pesticides (e.g., herbicides, fungicides were later included via notifications), lacks strong provisions for post-registration monitoring, health impact assessments, or compensation mechanisms for victims. Overlaps between ministries (Agriculture, Environment, Health) lead to coordination gaps, while federal structure creates inconsistencies in state-level enforcement.

A long-pending reform is the proposed Pesticides Management Bill, intended to replace the 1968 Act. Discussions on this bill have continued for over a decade, with the aim of modernizing registration processes, introducing stricter quality controls, traceability, penalties for sub-standard products, and better alignment with international standards. Analyses indicate that drafts seek to address some gaps but retain concerns over centralized powers, limited state autonomy in bans, and insufficient integration of precautionary principles or farmer/consumer protections.

This regulatory architecture, while providing a foundation, has struggled to prevent widespread pesticide misuse, residue violations in food (as documented in FSSAI and CSE surveys), occupational poisonings among farmers, and ecological damage, thereby raising questions of constitutional compliance under Article 21.

Constitutional Challenges in Pesticide Regulation

The regulatory framework for pesticides in India, while comprehensive on paper, reveals significant constitutional challenges when viewed through the lens of Article 21. These challenges manifest in persistent violations of the right to health, the right to a clean and safe environment, and the right to dignified living, particularly for farmers, agricultural laborers, rural communities, and consumers exposed to hazardous pesticides.

Health-Related Challenges

Pesticide exposure remains a major public health crisis in India. Acute poisoning from improper handling, suicidal ingestion, and accidental exposure leads to thousands of deaths annually, while chronic exposure is linked to cancers, neurological disorders, reproductive issues, developmental problems in children, and endocrine disruption. Empirical evidence from NCRB reports, WHO estimates, and CSE studies indicates high incidence rates in pesticide-intensive regions like Punjab, Haryana, and Kerala. The state's failure to enforce strict occupational safety norms, provide adequate protective equipment, or ensure timely medical intervention for exposed workers constitutes a direct infringement on the right to health as articulated in Consumer Education & Research Centre v. Union of India (1995)

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and related cases. Inadequate residue monitoring under the FSS Act results in contaminated food reaching markets, further endangering consumer health and breaching the positive obligation to protect life under Article 21.

Environmental Challenges

Pesticides contribute to soil degradation, groundwater contamination, loss of biodiversity (including pollinators like bees), and bioaccumulation in food chains. Persistent organic pollutants and highly hazardous pesticides persist in ecosystems long after application, violating the right to a pollution-free environment recognized in Subhash Kumar v. State of Bihar (1991) and Vellore Citizens Welfare Forum v. Union of India (1996). The precautionary principle, incorporated into Article 21, demands proactive restriction of substances with potential irreversible harm, yet delays in banning or restricting such pesticides (despite scientific evidence) persist due to regulatory inertia and industry influence.

Implementation and Enforcement Gaps

The Insecticides Act, 1968, suffers from outdated provisions, fragmented institutional roles, and weak post-registration surveillance. Registration processes often prioritize efficacy over long-term safety, with insufficient mandatory health and environmental impact assessments. Federalism issues exacerbate problems: while the center controls registration, states bear enforcement responsibility, leading to inconsistent application and limited state powers to impose additional restrictions. Corruption, inadequate laboratory facilities for residue testing, and lack of farmer awareness compound these failures.

High-profile cases illustrate these gaps. The endosulfan tragedy in Kasaragod, Kerala, continues to highlight regulatory lapses, with the National Green Tribunal in November 2025 directing the Plantation Corporation of Kerala and Central Pollution Control Board to trace hundreds of missing endosulfan barrels, assess ongoing contamination, and recommend remedial actions. Such orders underscore persistent threats to health and environment despite the 2011 ban. The proposed Pesticides Management Bill, intended to replace the 1968 Act, has been under discussion for years to address these issues through modernized registration, digital traceability, and stronger penalties. However, analyses in publications like Down To Earth and Mongabay-India highlight those drafts retain critical shortcomings, including limited state regulatory autonomy, insufficient precautionary mechanisms, and potential prioritization of industry facilitation over farmer and ecosystem protection.

Judicial Responses and Access to Justice Barriers

The judiciary has intervened through PILs and NGT proceedings, enforcing Article 21 rights in pesticide contexts. Yet, marginalized groups—small farmers, tribal communities, and victims—face barriers in accessing justice, including lack of awareness, high litigation costs, and delays. While judicial activism has prompted bans and compensation in some cases, systemic reforms remain elusive.

These challenges collectively demonstrate that current pesticide regulation falls short of constitutional standards under Article 21. State inaction or inadequate action in preventing foreseeable harm from hazardous pesticides amounts to deprivation of life and liberty without due process, necessitating urgent alignment of regulatory mechanisms with fundamental rights imperatives.

Comparative Analysis

A comparative examination of pesticide regulation in India with select international frameworks reveals significant structural and substantive gaps that contribute to ongoing constitutional challenges under Article 21. India's regulatory approach continues to be largely reactive and fragmented, often responding to harm only after it becomes evident through crises or litigation. In contrast, several leading jurisdictions have adopted more precautionary, integrated, and rights-oriented models that place greater emphasis on prevention, continuous evaluation, and protection of vulnerable populations, thereby offering valuable lessons for strengthening health and environmental safeguards in line with the expanded interpretation of Article 21.

The European Union operates one of the most stringent precautionary regimes for pesticides, primarily governed by Regulation (EC) No 1107/2009 on the placing of plant protection products on the market and Regulation (EC) No 396/2005 on maximum residue levels in food. This system mandates comprehensive risk assessments that cover both human health effects—including acute and chronic toxicity, endocrine disruption, and developmental impacts—and environmental consequences, such as risks to pollinators, aquatic life, and soil biodiversity. Approvals are granted for limited periods of up to fifteen years, followed by systematic re-evaluation, and highly hazardous substances face swift bans or severe restrictions. For instance, neonicotinoids were phased out due to their impact on bees, and chlorpyrifos

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was banned in 2020 based on neurodevelopmental concerns. The EU framework also strongly promotes integrated pest management and low-risk alternatives such as biopesticides. This proactive and preventive orientation aligns closely with the precautionary principle embedded in Article 21 jurisprudence, whereas India's Insecticides Act lacks mandatory periodic re-evaluation for most registered pesticides and has historically demonstrated slower responses to emerging scientific evidence of harm.

In the United States, the Environmental Protection Agency administers pesticide regulation through the Federal Insecticide, Fungicide, and Rodenticide Act and the Food Quality Protection Act. The system requires rigorous pre-market submission of data, cumulative risk assessments that account for combined exposures and special protections for vulnerable groups such as children, and mandatory periodic reviews every fifteen years. The EPA has banned or restricted numerous substances—including DDT, paraquat (phased out), and certain organophosphates—based on clear evidence of health risks. Transparency is enhanced through public dockets, citizen petitions, and broad stakeholder participation. India's registration committee, while functional, does not incorporate equivalent mandatory cumulative risk assessments or robust mechanisms for public involvement, which often results in prolonged delays in addressing chronic and long-term risks to health and the environment.

Sri Lanka offers a compelling regional example of decisive reform. Confronted with exceptionally high rates of pesticide-related suicides and widespread health concerns, the country imposed outright bans on several highly hazardous pesticides, including paraquat in 2021, and attempted a nationwide transition toward organic farming. Although the organic policy faced partial rollback due to short-term economic and productivity pressures, the experience demonstrates that aggressive restrictions can meaningfully reduce acute poisoning incidents and align regulatory measures with the protection of life and health. This approach provides practical insights for India on how to balance agricultural needs with stronger precautionary interventions.

Several key lessons emerge from these comparisons. International models prioritize prevention through hazard-based criteria and systematic phase-outs, whereas India's predominantly evidence-based and reactive approach has allowed prolonged use of risky substances, as seen in the delayed endosulfan ban until 2011 despite decades of documented harm. Federalism and decentralization also differ markedly: EU member states and U.S. states enjoy considerable flexibility to impose additional restrictions tailored to local conditions, while India's highly centralized registration system restricts state-level autonomy and contributes to enforcement inconsistencies. Victim remedies and accountability mechanisms are more developed abroad, with statutory compensation and remediation frameworks, compared to India's heavy reliance on judicial intervention through public interest litigation and National Green Tribunal orders. Finally, active promotion and subsidization of integrated pest management and biopesticides is far more advanced in the EU and U.S., whereas India's efforts in this direction remain limited despite streamlined registration for biopesticides.

These international contrasts underscore that India's regulatory lag in adopting best practices for precaution, ongoing monitoring, public participation, and equitable protection exacerbates violations of the fundamental rights to health and a clean environment under Article 21. Incorporating elements such as mandatory re-registration cycles, enhanced precautionary thresholds, greater state involvement, and stronger support for sustainable alternatives could significantly improve alignment with constitutional standards while preserving agricultural productivity and food security.

Recommendations and Way Forward

To align pesticide regulation in India with the constitutional imperatives of Article 21, a comprehensive, rights-based reform is essential. The primary focus must be on strengthening the precautionary principle, which requires proactive restriction of highly hazardous pesticides even in the absence of complete scientific certainty of harm, especially when vulnerable populations such as farmers, agricultural workers, children, and rural communities face disproportionate risks.

The proposed Pesticides Management Bill should be revised to incorporate mandatory periodic re-evaluation of registered pesticides, cumulative risk assessments for chronic and combined exposures, and explicit provisions for health and environmental impact studies before approval or continued use. Centralized registration must be balanced with greater state-level powers to impose additional restrictions or bans based on local agro-climatic conditions, health data, and ecological sensitivities, thereby addressing federalism challenges and improving enforcement.

Institutional reforms are equally critical. The Central Insecticides Board and Registration Committee should include independent experts in public health, toxicology, and environmental science, with transparent decision-making processes and mandatory public consultation for high-risk approvals. Strengthening residue monitoring under FSSAI,

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expanding accredited laboratories, and integrating real-time data sharing between agriculture, health, and environment ministries would help detect violations early and prevent contaminated food from entering supply chains.

Promotion of sustainable alternatives must become a policy priority. Government support for integrated pest management (IPM), biopesticides, organic farming, and agroecological practices should be scaled up through subsidies, training programs, extension services, and research funding. Farmer education on safe handling, protective equipment, and non-chemical methods can significantly reduce occupational exposures and poisoning incidents.

Judicial and quasi-judicial mechanisms also require enhancement. The National Green Tribunal should be empowered with specialized benches for pesticide-related disputes, including fast-track remediation orders and compensation schemes for victims of chronic exposure. Public interest litigation under Article 32 and 226 must be supplemented by statutory victim redressal funds and no-fault liability provisions for manufacturers and importers.

Finally, India should draw from international best practices while adapting them to its agrarian context. Adopting EU-style hazard-based criteria for bans, U.S.-inspired periodic reviews, and Sri Lanka's emphasis on reducing reliance on highly hazardous pesticides can guide reforms. Long-term success depends on multi-stakeholder collaboration involving government, industry, civil society, farmers' organizations, and scientific institutions to ensure that agricultural productivity is sustained without compromising the fundamental rights to health, a clean environment, and dignified life guaranteed under Article 21.

These measures, if implemented holistically, would not only mitigate the constitutional challenges identified but also contribute to sustainable development, public health resilience, and environmental justice in one of the world's most pesticide-intensive agricultural systems.

V. CONCLUSION

The examination of pesticide regulation in India through the constitutional lens of Article 21 reveals a persistent and multifaceted tension between the imperatives of agricultural productivity and the fundamental rights to health, a clean environment, and dignified living. The judiciary's expansive interpretation of Article 21—encompassing the right to a pollution-free environment, occupational health safeguards, protection from hazardous exposures, and freedom from adverse ecological impacts—has established a clear constitutional mandate for the state to prevent foreseeable harm from toxic substances like pesticides. Landmark decisions from Maneka Gandhi to M.K. Ranjitsinh have reinforced that life under Article 21 cannot be meaningfully enjoyed in the presence of unchecked environmental degradation or health risks arising from regulatory failures.

Yet, the existing framework under the Insecticides Act, 1968, supplemented by environmental and food safety laws, falls short in several critical respects. Outdated provisions, fragmented institutional responsibilities, weak post-registration monitoring, delayed bans on hazardous chemicals, inadequate precautionary mechanisms, and limited state-level autonomy have allowed widespread pesticide misuse, acute poisonings, chronic illnesses, residue contamination in food chains, and ecological damage to persist. High-profile cases, such as the enduring endosulfan tragedy in Kerala and recurring NGT directions for remediation, illustrate how implementation gaps translate into direct violations of constitutional rights, disproportionately affecting vulnerable groups including small farmers, agricultural laborers, rural communities, and consumers.

Comparative insights from the European Union, United States, and Sri Lanka demonstrate that more proactive, precautionary, and decentralized models can effectively reduce risks without undermining agricultural output. These approaches—emphasizing periodic re-evaluations, cumulative risk assessments, public participation, victim remedies, and active promotion of sustainable alternatives—highlight pathways India could pursue to better align its pesticide governance with Article 21 obligations.

Ultimately, the constitutional challenges in pesticide regulation are not merely technical or administrative; they reflect a deeper failure to prioritize human dignity and ecological integrity over short-term economic considerations. Addressing these challenges demands urgent and holistic reforms: modernizing legislation through a strengthened Pesticides Management Bill that embeds precautionary principles, mandatory health and environmental impact assessments, enhanced federal coordination, and robust enforcement mechanisms; scaling up support for integrated pest management, biopesticides, and organic practices; improving access to justice and victim compensation; and fostering multi-stakeholder collaboration among government, industry, civil society, and farming communities.

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Only through such comprehensive measures can India fulfill its constitutional commitment to protect the right to life in its fullest sense—ensuring that the pursuit of food security does not come at the irreversible cost of public health and environmental sustainability. The path forward lies in transforming pesticide governance from a reactive, industry-accommodating system into one that is rights-centered, science-driven, and preventive, thereby preventing future "silent springs" and securing a healthier, safer future for generations to come.

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4. Publications in Journal of Indian Law and Society critiquing the Insecticides Act and proposed reforms.

(iii) Policy and Media Analyses

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2. Mongabay-India. Critiques of pesticide regulation modernization and public health protections.
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