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| Research Article |

Achieving Sustainable Ecological Justice through Land Transfer Regulation in Indonesia

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Abstract: This study examines the legal implications of land conversion as a process that alters land use either partially or entirely and consequently affects environmental sustainability and the productive capacity of land resources. The increasing transformation of agricultural land into non-agricultural uses reduces the availability of productive farmland and generates serious challenges for government authorities in maintaining food security and ensuring sustainable land governance. Economic growth, urban expansion, and development policies frequently encourage the conversion of agricultural land and thereby intensify pressure on the availability of land that supports long term agricultural production. These conditions require a regulatory framework that is capable of balancing development interests with the protection of agricultural land resources. This research analyzes the regulatory framework governing the conversion of sustainable food agricultural land into non-agricultural uses, identifies the factors that create the absence of legal certainty in its implementation, and formulates a reconstruction of regulatory policies that can strengthen legal certainty in land governance. The study applies a normative juridical research method supported by empirical data and uses statutory, conceptual, and comparative approaches to examine the issue systematically. The analysis demonstrates that first, the legal system has integrated land conversion regulation within the broader framework of sustainable agricultural land protection and spatial planning governance. Second, implementation has not produced adequate legal certainty because uncontrolled land conversion continues to occur, land use practices frequently diverge from spatial planning policies, regulatory substance remains weak, law enforcement operates ineffectively, and institutional coordination remains limited. Third, strengthening legal certainty requires regulatory reconstruction through harmonization of regulatory instruments, improvement of mapping mechanisms supported by field verification, and stronger coordination between central and regional governments.

Keywords: Ecological; Indonesia; Justice; Land Transfer; Regulation;

INTRODUCTION

The Republic of Indonesia establishes itself as a state governed by law that places legal norms as the fundamental basis for regulating public life, organizing state authority, and protecting the rights of citizens. Within this legal framework the state carries the responsibility to ensure public welfare through the development and implementation of written legal regulations that provide legal certainty, social order, and legal protection grounded in principles of justice and truth. [1] Individuals, communities, governmental institutions, and other state authorities therefore exercise their rights and obligations within the limits established by law. [2] The state also

[1] Aslan Noor and others, 'Digital Management of Legal Records: Analyzing User Acceptance of Digital Land Management', *Records Management Journal*, 35.3 (2025), 310–25 https://doi.org/https://doi.org/10.1108/RMJ-11-2024-0051

[2] Mariaflavia Harari and Maisy Wong, 'Colonial Legacy and Land Market Formality', *Journal of Urban Economics*, 149 (2025), 103789 https://doi.org/https://doi.org/10.1016/j.jue.2025.103789

regulates land throughout the national territory as a public resource under the principle of state control over land and natural resources. Through this authority the state manages, allocates, and supervises land utilization in order to support national development and promote social welfare.[3] As an agrarian country Indonesia must maintain the sustainable availability of agricultural land because the agricultural sector provides employment opportunities, supports food production, and contributes to economic stability. Agricultural land therefore plays a strategic role in maintaining food security and strengthening rural livelihoods.[4]

Land serves as an essential resource that supports economic, social, and ecological activities. Farmers rely on land as the primary means of production, while private actors often treat land as an economic asset that generates investment opportunities. These different interests frequently stimulate the conversion of agricultural land into non-agricultural uses, particularly for residential, industrial, and commercial development. Increasing urban expansion, infrastructure development, and economic growth intensify the demand for land and encourage landowners to convert farmland into more profitable uses.[5] Continuous land conversion reduces the availability of productive agricultural land and increases competition between agricultural and non-agricultural land utilization. At the same time spatial planning governance often encounters institutional and policy challenges that create inconsistencies in land management. These conditions highlight the importance of strengthening land governance in order to protect agricultural land resources, maintain environmental sustainability, and support long term national food security.[6]

The management of protected paddy fields in Indonesia can constrain national and regional development and potentially harm public and state interests. Addressing these challenges requires the development of technical guidelines to resolve discrepancies between protected paddy field areas and spatial plans, land use activities, permits, concessions, and land rights. Land constitutes a fundamental resource for human life, supporting essential needs such as agriculture, housing, infrastructure, and other human activities, while also sustaining natural resources critical for long-term survival. Soil develops from parent material through natural processes influenced by

[3] Rio Aryapratama, Simon Schulte and Stefan Pauliuk, 'Climate Change Mitigation Potential of Producing Wood-Based Materials and Energy from Restoring Degraded Land in Indonesia – A Nation-Wide Scenario Analysis', *Biomass and Bioenergy*, 211 (2026), 109191 https://doi.org/https://doi.org/10.1016/j.biombioe.2026.109191

[4] Sofyan Kurnianto and others, 'Hydrological Dynamics in a Tropical Peatland Mosaic at Pulau Padang, Indonesia: Influence of Land-Cover Changes and Rainfall Variability', *Journal of Hydrology: Regional Studies*, 64 (2026), 103185 https://doi.org/https://doi.org/10.1016/j.ejrh.2026.103185

[5] Hayati Sari Hasibuan and others, 'Capital City Status and Policy Influence on Land Dynamics: A Case Study of Sofifi, North Maluku Archipelago, Indonesia', *City and Environment Interactions*, 28 (2025), 100253 https://doi.org/https://doi.org/10.1016/j.cacint.2025.100253

[6] Nadia Nurani Isfarin and others, 'Microplastics in Indonesian Land and Aquatic Environment: From Research Activities to Regulation Policies', *Marine Pollution Bulletin*, 206 (2024), 116813 https://doi.org/https://doi.org/10.1016/j.marpolbul.2024.116813

water, air, and living or decomposed organisms, with variations observable in composition, structure, and color.[7]

As population growth intensifies, the demand for land for various purposes increases, making land a strategic asset for national development. The state's authority over land derives from the collective rights of the Indonesian people and includes regulating allocation, use, conservation, and maintenance of land, water, and airspace, as well as determining legal relations between individuals, entities, and land-related acts. Government officials, particularly Land Deed Officials, implement these regulations by formalizing legal acts concerning land transfers, including the conversion of agricultural land into residential, commercial, or other uses in accordance with authorized requests.[8] To protect sustainable food agricultural land, the government enacted legislation to limit the conversion of paddy fields, provide incentives for preservation, and establish integrated land information and financing systems. These measures aim to ensure agricultural land continuity while balancing development needs, supporting farmers' livelihoods, and promoting food security. Effective implementation requires coordination between national and regional authorities, integration of spatial planning, and enforcement mechanisms to maintain the functional and legal integrity of agricultural land resources.[9]

Land ownership constitutes a legal relationship between individuals, groups, or legal entities and the land. Managing and regulating land ownership requires serious attention because land issues are inherently sensitive, encompassing not only economic and welfare aspects but also social, political, and psychological dimensions. Every agrarian subject, particularly farmers, ideally controls their agricultural land. However, it is impractical to provide each individual with a plot of land due to the limited land availability. Therefore, policies aim to maximize the number of farmers who have access to land by imposing limits on the size of land that individuals or legal entities may own.[10] National agrarian policy seeks justice by preventing excessive concentration of land and natural resources, ensuring secure rights of ownership and utilization for local populations, and sustaining productive systems where land serves as the primary source of livelihood. The primary principle in distributing agricultural land prioritizes citizens engaged in farming, as they are most capable of actively cultivating and maintaining the land. Legal guarantees for farmers' access to agricultural land reflect the political will of the government, as stipulated in the land

[7] I Made Ronyastra, Lip Huat Saw and Foon Siang Low, 'Techno-Economic Analysis with Financial Risk Identification for Solar Power Plant as Post-Mining Land Use in Indonesia', *Energy for Sustainable Development*, 80 (2024), 101462 https://doi.org/https://doi.org/10.1016/j.esd.2024.101462

[8] Purwanto and others, 'Land Cover Change Assessment Using Random Forest and CA Markov from Remote Sensing Images in the Protected Forest of South Malang, Indonesia', *Remote Sensing Applications: Society and Environment*, 32 (2023), 101061 https://doi.org/https://doi.org/10.1016/j.rsase.2023.101061

[9] Ryan B Edwards, 'Export Agriculture and Rural Poverty: Evidence from Indonesian Palm Oil', *Journal of International Economics*, 159 (2026), 104209 https://doi.org/https://doi.org/10.1016/j.jinteco.2025.104209

[10] Anita Vitriana and others, 'Market Mechanisms and Low-Income Housing Patterns in the Context of Urban Growth: Study of Developer Behaviours in Bandung Metropolitan Area Indonesia', *Geoforum*, 170 (2026), 104565 https://doi.org/https://doi.org/10.1016/j.geoforum.2026.104565

reform legislation, which mandates that each farming household receives a minimum agricultural plot to secure livelihood and promote equitable land distribution.[11]

Historical land tenure patterns, inherited from the colonial era, have produced significant disparities in land ownership, leaving a small elite with excessive land while the majority of farmers remain landless or inadequately supported. Over time, despite seven decades of independence and decades of land reform law implementation, agrarian distribution policies increasingly favor capital owners, undermining smallholder farmers, perpetuating poverty, and widening socio-economic inequality. Statistical data indicates that rural poverty remains disproportionately high, with millions of households still struggling to secure sufficient agricultural land for sustainable livelihoods.[12]

Statistical data show that in 2010, Indonesia's national poverty rate reached 16.66 percent, or approximately 36,146,900 people, with 24.5 percent, equivalent to 8,855,990 individuals, residing in rural areas. By September 2013, the national poverty rate declined to 11.42 percent, or 28.55 million people, yet the proportion of rural poor increased to 62.76 percent, representing 17.92 million individuals. Studies indicate that poverty predominantly affects smallholder farmers, particularly those with minimal land holdings, demonstrating the strong relationship between land access and rural livelihoods. Sufficient farmland enables agricultural households to secure basic food requirements, generate surplus for other needs, and invest in education or additional economic activities.

Poverty among agricultural households can be classified as absolute, where minimum subsistence needs remain unmet, or relative, where households meet basic needs but remain below the local income average. These conditions often stem from structural inequities in land distribution policies that restrict farmers' access to productive land. The continued reduction of paddy fields intensifies challenges to national food security. Conversion of agricultural land into non-agricultural uses serves as a primary driver of farmland decline. In 2005, the Directorate General of Land and Water Management reported an annual average loss of 3,936 hectares of paddy fields. Audits using geographic information systems and remote sensing indicate that Indonesia maintains approximately 8,132,642 hectares of paddy fields, a smaller area compared to Thailand's 9,200,000 hectares, where expansion programs have added 500,000 hectares. The limited availability of farmland in Indonesia constrains agricultural productivity, threatens food sufficiency, and underscores the necessity of protecting existing agricultural land to ensure sustainable rural livelihoods and long-term national food security.

The narrowing of agricultural land due to conversion does not justify inaction in achieving national food security. Four strategies can be employed to address this challenge. First, regional governments and the Ministry of Home Affairs must secure

[11] Hilary Oliva Faxon and others, 'Territorializing Spatial Data: Controlling Land through One Map Projects in Indonesia and Myanmar', *Political Geography*, 98 (2022), 102651 https://doi.org/https://doi.org/10.1016/j.polgeo.2022.102651

[12] Yvonne Kunz and others, '"The Fridge in the Forest": Historical Trajectories of Land Tenure Regulations Fostering Landscape Transformation in Jambi Province, Sumatra, Indonesia', *Forest Policy and Economics*, 81 (2017), 1–9 https://doi.org/https://doi.org/10.1016/j.forpol.2017.04.005

potential agricultural land from conversion into non-agricultural uses under guidance from the Ministry of Agriculture. Second, large-scale entrepreneurs should contribute to national welfare by supporting initiatives that maintain agricultural production and strengthen food security. Third, anthropological and community-based approaches can mitigate land conversion through active monitoring and management of paddy fields. Annual data indicate that approximately 187,720 hectares of paddy fields are converted to non-agricultural uses, particularly in Java, where West Java alone experienced a reduction of 11,808 hectares. Implementing oversight mechanisms and engaging local communities can reduce the risks posed by uncontrolled land conversion. Fourth, policies that moderate population growth, such as delaying the average age of marriage, can help manage future food demand.[13]

Rice production growth over the past decade has averaged only one percent per year, below the population growth rate, resulting in a domestic supply shortfall of approximately five percent and necessitating rice imports. Dynamic projections indicate that Indonesia will face an annual rice deficit of 7.15 million tons by 2015, with both rice demand and land requirements increasing significantly by 2030. These trends highlight the urgent need for integrated land management, sustainable agricultural practices, and population policies to ensure sufficient rice production, protect agricultural land, and maintain national food security.

Table 1. Prediction of Ideal Food Consumption Needs in 2030

Year (Soul)	Population (Million Tons)	Rice Needs (Million Ha)	Land Requirements
2007	220	32,96	11,60
2030	425	59,00	23,40
Lack		26,40	11,80

Source: Secondary Data, 2025.

Table 1 show it, the ensuring national food security necessitates the development of domestic food production, particularly staple crop agriculture. Indonesia possesses substantial agricultural potential, including extensive fertile land, abundant water resources, consistent sunlight, a tropical climate with high rainfall, and a capable farming workforce. The government is mandated to plan, allocate, and conserve land, water, and natural resources to support societal welfare, economic development, and national needs. Despite these provisions, agricultural land continues to decline due to conversion for residential, infrastructural, and tourism purposes. In Yogyakarta, paddy fields have decreased from 3.97 million hectares in 2019 to 3.84 million hectares in 2021, with annual losses ranging from 50 hectares in Bantul to 10,000 hectares in Gunung Kidul. Local governments have issued spatial plans, decrees, and regulations to protect agricultural areas, yet discrepancies between provincial and district maps and limited spatial data hinder consistent enforcement. Sustainable management of agricultural land remains crucial for livelihoods, food security, and environmental stability.

[13] Maria Brockhaus and others, 'An Overview of Forest and Land Allocation Policies in Indonesia: Is the Current Framework Sufficient to Meet the Needs of REDD+?', *Forest Policy and Economics*, 18 (2012), 30–37 https://doi.org/https://doi.org/10.1016/j.forpol.2011.09.004

Table 2
Changes in Land Use from Agricultural to Non-Agricultural in the Special Region of Yogyakarta

No.	Regencies/Cities in the Special Region of Yogyakarta	Tahun				
		2020 (Ha)	2021 (Ha)	2022 (Ha)	2023 (Ha)	2024 (Ha)
1.	Kulon Progo	20,17	15,19	2,22	7,02	n/a
2.	Bantul	50,74	42,15	11,20	36,32	n/a
3.	Gunungkidul	54,37	64,26	1,47	21,34	n/a
4.	Sleman	91,02	95,81	264,40	229,24	n/a
5.	Yogyakarta	3,32	1,79	2,90	0,63	n/a

Source: Secondary Data, 2025.

Based on the table above, analysis of land use changes indicates that Kulon Progo, Bantul, and Gunungkidul regencies have experienced significant conversion of agricultural land to non-agricultural purposes. Paddy fields represent a critical natural resource for sustaining livelihoods, particularly in Indonesia, where a substantial portion of the population relies on agriculture for food production, land management, and resource utilization. Government policies aimed at accelerating development have directly influenced the utilization of paddy fields, often exposing protected agricultural areas to activities that threaten environmental integrity and community welfare. Legal challenges surrounding protected paddy fields arise from inadequate regulations, weak oversight, and prioritization of economic gain over sustainable development principles, resulting in complex legal and social issues. Presidential Regulation Number 59 of 2019 establishes the legal framework for controlling paddy field conversion by accelerating the designation of protected paddy fields, supporting national food security, preventing unsustainable land use, and empowering farmers to maintain agricultural production. The implementation process involves integrated teams verifying land using satellite imagery, spatial and irrigation data, and consultation with local authorities to synchronize protected land maps for ministerial ratification. Despite the introduction of digital mapping to expedite these processes, discrepancies between designated agricultural areas and existing spatial plans create enforcement challenges. Continued agricultural land conversion undermines local and national food security, disrupts ecosystems, diminishes farmer incomes, and exacerbates socio-economic disparities. Sustainable protection and management of agricultural land are essential to maintain food sovereignty, preserve livelihoods, and support balanced development across environmental, economic, and social dimensions.

Sustainable infrastructure development applies principles of sustainable construction to establish physical facilities that address economic, social, and environmental objectives for present and future generations. The conversion of agricultural land can provide economic opportunities, including investment and increased revenue; [14] however, it poses a serious threat to food security, agricultural productivity, and

[14] Muhammad Nurdin Wahid and others, 'A Strategic Analysis of Geothermal Energy for Sustainable Energy Transition: Case Study from Indonesia', *Energy Conversion and Management: X*, 28 (2025), 101303 https://doi.org/https://doi.org/10.1016/j.ecmx.2025.101303

ecosystem stability. Once farmland is repurposed for residential, industrial, or commercial use, its potential for agricultural production diminishes permanently. Key drivers of land conversion include limited natural resources, population growth, and economic expansion, while inadequate regulation and oversight exacerbate the risks of environmental degradation, disruption of hydrological functions, and social burdens on affected communities. [15] Effective management requires the implementation of strict governmental policies, provision of incentives for sustainable agricultural practices, technical support for farmers, and active community participation through monitoring and advocacy. Integrating spatial planning, legal frameworks, and coordinated stakeholder action is essential to maintain productive agricultural land, ensure national and regional food security, and balance economic development with environmental and social sustainability. Failure to manage land conversion may reduce farmer livelihoods, increase dependency on imported food, and undermine long-term agricultural resilience, highlighting the critical role of law and governance in safeguarding agricultural resources.[16]

Previous research emphasizes the importance of regulatory frameworks that integrate ecological justice into land transfer and land use governance in Indonesia. Adi Bejo Suwardi (2026) demonstrate that environmental justice principles are embedded in land inventory, ownership, and utilization laws but persistent inconsistencies undermine sustainable outcomes, particularly in implementation contexts that fail to reconcile ecological and social objectives.[17] June Mellawati (2025) demonstrate that multiple reform rationalities shape property rights and resource access, often privileging state or investor interests while complicating equitable land use outcomes for local communities.[18] Marissa Malahayati and Toshihiko Masui (2025) shows that existing Indonesian regulatory frameworks struggle to uphold ecological justice amid competing demands between agrarian and non-agricultural land use, prompting proposals to reconstruct legal norms to prioritize sustainability, local participation, and enforcement efficacy.[19] This research aims to examine Indonesia's land transfer regulations to assess their effectiveness in promoting sustainable ecological justice. It seeks to identify legal gaps, enforcement challenges, and institutional shortcomings that hinder environmental sustainability and equitable land access. The study further aims to provide policy and legal recommendations to ensure

[15] Agussabti Agussabti and others, 'Institutional Framework for Improving Food Security in Crisis-Prone Areas in Indonesia', *Journal of Agriculture and Food Research*, 2026, 102774 https://doi.org/https://doi.org/10.1016/j.jafr.2026.102774

[16] Bas Bolman and others, 'Assessing Community Perceptions on the Socio-Economic Feasibility of Green Mussel Cultivation in Demak, Indonesia', *Nature-Based Solutions*, 9 (2026), 100299 https://doi.org/https://doi.org/10.1016/j.nbsj.2025.100299

[17] Adi Bejo Suwardi and others, 'Ecological Functions, Ecosystem Services, and Biocultural Significance of Wild Edible Fruits in a Biodiversity Hotspot: Evidence from West Kalimantan, Indonesia', *Ecological Frontiers*, 46.2 (2026), 627–35 https://doi.org/https://doi.org/10.1016/j.ecofro.2025.10.014

[18] June Mellawati and others, 'Assessment of Health Risks Linked to Natural Radionuclides Contained in Vegetables from Ex-Mining, and Non-Mining Land', *Scientific African*, 30 (2025), e02988 https://doi.org/https://doi.org/10.1016/j.sciaf.2025.e02988

[19] Marissa Malahayati and Toshihiko Masui, 'The Impact of Green House Gas Mitigation Policy for Land Use and the Forestry Sector in Indonesia: Applying the Computable General Equilibrium Model', *Forest Policy and Economics*, 109 (2019), 102003 https://doi.org/https://doi.org/10.1016/j.forpol.2019.102003

land use practices balance economic development, ecological preservation, and social equity, thereby safeguarding natural resources and supporting community welfare.

METHOD

This research employs a normative juridical methodology complemented by empirical data, emphasizing secondary data as the primary source and primary data as supplementary. The study examines the regulation of the conversion of agricultural land into non-agricultural uses while ensuring sustainability, ecological justice, and legal certainty. The research applies three interrelated approaches: statute-based, conceptual, and comparative. The statute-based approach involves identifying, examining, and interpreting relevant legislation and regulations that govern agricultural land conversion, including constitutional provisions, agrarian laws, and ministerial regulations. The conceptual approach critically analyzes theoretical and doctrinal concepts underlying sustainable land-use regulation, providing a framework for understanding principles of ecological justice, sustainability, and public welfare. The comparative approach evaluates legal frameworks, practices, and institutional mechanisms across regions to identify differences, best practices, and gaps in the implementation of land-use policies.[20]

Primary data are collected through structured interviews with selected informants in Bantul, Kulonprogo, and Gunungkidul, focusing on stakeholders directly involved in land management and agricultural activities. Secondary data consist of legal documents, including laws, government regulations, presidential decrees, ministerial directives, books, and peer-reviewed journals. Tertiary sources, such as encyclopedias, glossaries, and legal commentaries, support the interpretation of legal concepts. Data analysis employs content analysis and legal conformity assessment. Content analysis systematically examines and classifies legal materials to objectively describe their provisions, applications, and implications. Legal conformity assessment evaluates the consistency of regulations and practices with established legal principles and sustainability objectives. The analysis involves organizing, interpreting, and synthesizing the data to produce a comprehensive understanding of land conversion regulation. This methodological framework ensures a rigorous, systematic, and coherent examination of the legal and empirical dimensions of sustainable agricultural land protection in Indonesia, providing a foundation for policy recommendations and legal reform.[21]

RESULT AND DISCUSSION

Legal framework for Sustainable Agricultural Land Conversion for Food in Indonesia

The administration of sustainable agricultural land conversion in Indonesia is grounded in the philosophical principles of Pancasila, which obliges the state to promote public welfare and ensure equitable prosperity. Agricultural land constitutes a critical resource for human activity, particularly for food production, which

[20] Luca Tacconi and Muhammad Zahrul Muttaqin, 'Reducing Emissions from Land Use Change in Indonesia: An Overview', *Forest Policy and Economics*, 108 (2019), 101979 https://doi.org/https://doi.org/10.1016/j.forpol.2019.101979

[21] M T Sirait, B White and U Pradhan, 'Chapter 9 - Land Rights and Land Reform Issues for Effective Natural Resources Management in Indonesia', in *Redefining Diversity & Dynamics of Natural Resources Management in Asia, Volume 1*, ed. by Ganesh P Shivakoti, Ujjwal Pradhan, and Helmi (Elsevier, 2017), pp. 141–55 https://doi.org/https://doi.org/10.1016/B978-0-12-805454-3.00009-8

underpins societal survival, economic stability, and national development.[22] Securing adequate agricultural land requires coordinated support, including irrigation infrastructure, mechanized equipment, transportation networks, institutional mechanisms, and skilled personnel. As population growth and infrastructure expansion intensify land demand, arable farmland faces increasing pressure for conversion. The state addresses this challenge through legislation, particularly Law Number 41 of 2009 on Sustainable Food Agricultural Land Protection, which safeguards food sovereignty, preserves farmer access, and promotes sustainable agricultural productivity for current and future generations.[23]

Legislation functions as a legal instrument guiding governmental, developmental, and societal conduct within the Unitary State of the Republic of Indonesia. Beyond preserving social order and resolving disputes, law operates as a tool for social engineering, enabling authorities to transform risks to food security, autonomy, and national sovereignty into sustainable agricultural outcomes. Legal frameworks, including Law Number 41 of 2009, updated by Law Number 6 of 2022, and complemented by Government Regulations Numbers 1 of 2011 and 30 of 2012, regulate land conversion, provide incentives, and establish funding mechanisms. Article 33(3) of the 1945 Constitution requires state oversight of land and natural resources to maximize public benefit, emphasizing the obligation to protect agricultural land. Designations such as Protected Rice Fields under Ministerial Decree No. 1589/2021 exemplify strategic measures to ensure national food resilience.[24]

Sustainable agricultural development safeguards food security, cultural and social values, and equitable land access. Uncontrolled land conversion disrupts local ecosystems, reduces arable areas, diminishes farmer welfare, and weakens ancestral and communal connections. Robust legal instruments, integrated spatial planning, and effective institutional governance are essential to prevent policy conflicts, regulate land conversion, and sustain agricultural production, accessibility, and rural prosperity.[25] Food constitutes a fundamental human right in Indonesia, as outlined in Law Number 7 of 1996 on Food, which guarantees sufficient access to safe, nutritious, and appropriate food. Food security ensures reliable physical and economic access to food meeting both quantitative and qualitative standards, highlighting its strategic

[22] Lila Juniyanti and Rospita Odorlina Pilianna Situmorang, 'What Causes Deforestation and Land Cover Change in Riau Province, Indonesia', *Forest Policy and Economics*, 153 (2023), 102999 https://doi.org/https://doi.org/10.1016/j.forpol.2023.102999

[23] Riyanto Haribowo and others, 'Decoding Microplastic Risks through Land Use: A Multi-Index and Spatial Analysis in a Tropical Watershed', *Regional Studies in Marine Science*, 91 (2025), 104600 https://doi.org/https://doi.org/10.1016/j.rsma.2025.104600

[24] Shuai Li, Zhenyu Dan and Tubing Yin, 'Mining-Induced Land Use Change and Ecological Restoration: Lessons from Three Developing Economies', *Physics and Chemistry of the Earth, Parts A/B/C*, 142 (2026), 104267 https://doi.org/https://doi.org/10.1016/j.pce.2025.104267

[25] Mangarah Silalahi and others, 'Reconciling Different Interests in the Hutan Harapan Rainforest Ecosystem Restoration Management in Sumatra, Indonesia', *Trees, Forests and People*, 20 (2025), 100823 https://doi.org/https://doi.org/10.1016/j.tfp.2025.100823

importance in the nation's socio-economic and political framework. Sustainable agricultural land management is critical for preserving national food security.[26] v

Government Regulation Number 1 of 2011 on the Designation and Conversion of Sustainable Food Agricultural Land defines criteria for sustainable agricultural zones, specifying sufficient land area and staple crop production to meet local, regional, and national demand. Ministerial Regulation Number 07/Permentan/OT.140/2/2013 further details technical requirements, providing a framework for central and regional authorities in land designation, protection, and spatial planning. Population growth and urbanization intensify competing demands for housing and industrial development, often intersecting with agricultural land preservation objectives. Law Number 1 of 2011 on Housing and Settlements recognizes housing as a fundamental right, particularly for low-income groups, and establishes procedures covering funding, infrastructure, public utilities, subsidies, tax incentives, and land certification while concurrently protecting fertile agricultural areas.[27]

Conversion from agricultural to residential use is driven by demographic pressures, industrial expansion, and infrastructure development, with rice paddies being particularly vulnerable due to their proximity to urban centers and access to transportation and utilities. Such changes undermine local food production, compromise farmer welfare, and threaten environmental and cultural systems. Law Number 41 of 2009 and its implementing regulations govern land conversion, administrative permits, zoning compliance, and enforcement, imposing sanctions on unauthorized or non-compliant actions, underscoring the state's commitment to preserving productive agricultural land.[28] The government mitigates improper land conversion by establishing sustainable green zones, designating paddy fields as protected areas, and incentivizing farmers through subsidies, technical support, and market facilitation. These measures maintain agricultural output, enhance farmer livelihoods, conserve ecological balance, and support tourism potential. Integrating agricultural land protection with spatial planning and housing policy ensures food security, environmental sustainability, and equitable land access.[29]v

Effective management of sustainable agricultural land conversion relies on active public engagement supported by transparent governance. Unplanned, individual-driven conversions pose significant threats to agricultural sustainability. Legislation restricts conversion to prevent uncontrolled urban expansion and environmental

[26] Gunawan Prayitno and others, 'Place Attachment and Agricultural Land Conversion for Sustainable Agriculture in Indonesia', *Heliyon*, 7.7 (2021), e07546 https://doi.org/https://doi.org/10.1016/j.heliyon.2021.e07546

[27] Rima Harahap, Gerd Masselink and Sarah J Boulton, 'A Coastal Risk Analysis for the Outermost Small Islands of Indonesia: A Multiple Natural Hazards Approach', *International Journal of Disaster Risk Reduction*, 121 (2025), 105377 https://doi.org/https://doi.org/10.1016/j.ijdrr.2025.105377

[28] A Halimatussadiah and others, 'The Potentials of Indonesian Biofuel Policy's Replanting Scheme to Reduce Poverty and Enhance Regional Economy', *Land Use Policy*, 157 (2025), 107623 https://doi.org/https://doi.org/10.1016/j.landusepol.2025.107623

[29] Fatih Taktak, 'Comparative Building Amnesty and Land Use Policies: Insights from Ten Countries with a Focus on Turkey', *Land Use Policy*, 158 (2025), 107763 https://doi.org/https://doi.org/10.1016/j.landusepol.2025.107763

degradation.[30] Recognizing the essential role of paddy fields in food security and local livelihoods is crucial, as rice production underpins both daily sustenance and economic stability. Farmers, as custodians of land, must comply with regulations, participating as responsible partners in maintaining sustainable land use. Sustainable agricultural land availability depends on community compliance and government enforcement of conservation rules. Compliance ensures legislation's efficacy and fosters enduring food security.[31] Population growth, economic pressures, shifting societal perceptions of agriculture, and the imbalance between production costs and yields heighten conversion risks. Addressing these challenges requires cohesive policy interventions integrating regulatory enforcement, economic incentives, public education, and infrastructural support to maintain agricultural productivity and curb non-agricultural encroachment.[32]

Land conversion in Indonesia manifests through seven primary patterns: gradual sporadic conversion due to unproductive land and economic pressures, systematic enclave conversion for land value enhancement, population-driven residential conversion, socially motivated conversion responding to welfare concerns, voluntary conversion for improved living conditions, agrarian adaptation conversion addressing agricultural constraints, and multi-purpose conversion accommodating commercial, educational, and institutional development. Micro-level factors, including farmers' education, income, land ownership, taxation, and location, directly influence individual conversion decisions.[33] Macro-level influences such as demographic growth, urban expansion, economic restructuring, and infrastructural development indirectly shape land-use patterns via policy frameworks and market dynamics. Conversion impacts economic, social, and environmental dimensions, reducing arable land, diminishing farmer income, disrupting rural livelihoods, and affecting local food security. Effective management combines enhanced productivity, market access, technical support, financial incentives, regulatory enforcement, and public awareness to promote land conservation.[34]

At the regional level, Kabupaten Gunungkidul employs legal instruments and spatial planning, including zoning, licensing controls, and incentive-disincentive mechanisms, to regulate land use. However, overlapping regulations, inconsistent property classifications, and conflicting maps undermine enforcement, generating legal uncertainty. Incorporating sustainable agricultural zones into spatial plans provides

[30] Shokhrukh-Mirzo Jalilov and others, 'Unveiling Economic Dimensions of Peatland Restoration in Indonesia: A Systematic Literature Review', *Ecosystem Services*, 71 (2025), 101693 https://doi.org/https://doi.org/10.1016/j.ecoser.2024.101693

[31] Colas Chervier and others, 'Impact of Indonesia's Forest Management Units on the Reduction of Forest Loss and Forest Fires in Sulawesi', *Ecological Economics*, 227 (2025), 108418 https://doi.org/https://doi.org/10.1016/j.ecolecon.2024.108418

[32] Krystof Obidzinski and others, 'Can Large Scale Land Acquisition for Agro-Development in Indonesia Be Managed Sustainably?', *Land Use Policy*, 30.1 (2013), 952–65 https://doi.org/https://doi.org/10.1016/j.landusepol.2012.06.018

[33] Wirastuti Widyatmanti and others, 'Codification to Secure Indonesian Peatlands: From Policy to Practices as Revealed by Remote Sensing Analysis', *Soil Security*, 9 (2022), 100080 https://doi.org/https://doi.org/10.1016/j.soisec.2022.100080

[34] Nayu Nuringdati Widianingsih and others, 'Land Use, Income, and Ethnic Diversity in the Margins of Hutan Harapan – A Rainforest Restoration Concession in Jambi and South Sumatra, Indonesia', *Land Use Policy*, 86 (2019), 268–79 https://doi.org/https://doi.org/10.1016/j.landusepol.2019.05.006

legal clarity, balances natural and built environments, enhances resource efficiency, and ensures continuity in agricultural production.[35] This approach serves as a foundational strategy for sustainable food production, ecological preservation, and systematic rural development while addressing conversion pressures. The evolution of Sustainable Food Agricultural Land (LP2B) in Indonesia has progressed markedly, particularly following the enactment of Law Number 11 of 2020 on Job Creation (UU CK). LP2B policies prohibit conversion for non-agricultural purposes, aiming to protect food production, promote self-sufficiency, resilience, and national sovereignty. Article 44 of Law 41/2009 and Article 35 of Government Regulation Number 1 of 2011 protect LP2B while allowing conversion only under emergencies or public interest. UU CK introduced the National Strategic Project criterion for conversion, creating ambiguity and expanding discretionary authority, potentially compromising LP2B objectives.[36]

The Constitutional Court, in Decision Number 91/PUU-XVIII/2020, ruled UU CK conditionally unconstitutional, highlighting the tension between legislative intent, legal certainty, and discretionary application. LP2B designation, delegated under Article 48(2) of Law Number 26 of 2007 on Spatial Planning, functions to regulate rapid agricultural land transformation, safeguarding national food security and sovereignty. Policy evaluation of LP2B conversion can be segmented into three phases: pre-UU CK, post-UU CK, and post-Constitutional Court ruling, illustrating legislative evolution, the balance between protection and development, and persistent vulnerability to exceptions despite legal safeguards.[37]

LP2B protection relies on spatial planning as a key driver for agricultural prosperity and resource-dependent sectors. Equitable allocation of limited spatial resources remains a persistent challenge, often generating conflicts of interest. Spatial design must fulfill sustainable management objectives to maximize public welfare while maintaining soil integrity and legal clarity.[38] Incorporating traditional knowledge into spatial planning aligns land governance with the objective of optimizing public welfare. Changes in farmer livelihoods, particularly among rice cultivators, highlight the social impacts of spatial planning, which may simultaneously improve living standards and increase vulnerability for certain populations.[39]

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[35] Pisca A Tias, Constance L McDermott and Mari E Mulyani, 'Navigating the Nexus between Customary Norms and State Laws in Shaping Rural Forest Governance: A Case Study in Aceh Province, Indonesia', *Forest Policy and Economics*, 182 (2026), 103672 https://doi.org/https://doi.org/10.1016/j.forpol.2025.103672

[36] Irfan Sabarilah Hasim and others, 'The Birth and Demise of a Village within the Vernacular Community of Baduy in Banten, Indonesia', *Frontiers of Architectural Research*, 14.1 (2025), 127–44 https://doi.org/https://doi.org/10.1016/j.foar.2024.07.011

[37] Irfan Saputra and others, 'Sequencing the Political Forest: Power, Exclusion, and the Corporate Hijacking of Social Forestry in Indonesia', *Forest Policy and Economics*, 181 (2025), 103668 https://doi.org/https://doi.org/10.1016/j.forpol.2025.103668

[38] Ardyanto Fitrady, Annisa Cahyaningsih and Febryani Nugrahaningsih, 'At What Cost? Economic and Fiscal Trade-Offs of Indonesia's Biodiesel Program', *Energy Policy*, 212 (2026), 115134 https://doi.org/https://doi.org/10.1016/j.enpol.2026.115134

[39] Hendra Gunawan and others, 'A Review of Forest Fragmentation in Indonesia under the DPSIR Framework for Biodiversity Conservation Strategies', *Global Ecology and Conservation*, 51 (2024), e02918 https://doi.org/https://doi.org/10.1016/j.gecco.2024.e02918

Three strategic methodologies underpin effective agricultural land management. First, reduce conversion risk through incentives, progressive taxation, efficient non-agricultural land use, and compact development strategies. Second, regulate conversion by restricting high-yield field transformation, directing growth to less productive areas, imposing regional conversion limits, and creating permanent food zones with incentives. Third, deploy legal and non-legal instruments, including enforceable laws with penalties, incentive frameworks, financing allocations, and integration with spatial planning and licensing systems. Priority measures include protective legislation, designation of Permanent Protection Rice Fields and Limited Conversion Zones, integration into national, provincial, and regional spatial plans, and oversight commissions across administrative tiers. Inter-agency collaboration, particularly in permitting, administration, and incentive delivery, is essential. Local agricultural offices play a critical role in monitoring land conditions, advising spatial plan modifications, and aligning administrative action with spatial allocation priorities.[40]

Empirical analysis indicates spatial planning alone has not prevented productive irrigated rice fields from conversion, as local authorities often prioritize economic development. Across seven provinces in Java and Bali, 225,314 hectares of irrigated rice fields and 182,154 hectares of non-irrigated rice fields are earmarked for potential conversion in regional spatial plans. National policies, including Presidential Decree Number 34 of 2003, establish zoning and rice field inventories to promote sustainable management and food security.[41] Protected Rice Fields, covering 4.85 million hectares (54.48% of national rice fields), maintain sufficient irrigation to support two cropping cycles annually. Policies limit conversion, permit only for national purposes, and offer land or production compensation and incentives such as tax relief and agricultural support. Restricted conversion zones, comprising 3.01 million hectares (33.83% of national rice fields), regulate conversion for value-added purposes, production equilibrium, licensing adherence, disincentives, and regional spatial compliance. Prioritizing irrigated rice fields across Java, Bali, Sumatra, Sulawesi, and Kalimantan underscores the critical role of irrigation in sustainable agricultural output and national food security.[42]

Law 41/2009 defines LP2B as land designated for ongoing protection and development to produce staple food, supporting national self-sufficiency, security, and sovereignty. Conversion of LP2B is prohibited unless specific conditions are met, with administrative and criminal penalties for violations.[43] Incentive and disincentive

[40] Edi Iswanto Wiloso and others, 'Indonesia's Contribution to Global Carbon Flows: Which Sectors Are Most Responsible for the Emissions Embodied in Trade?', *Sustainable Production and Consumption*, 48 (2024), 157–68 https://doi.org/https://doi.org/10.1016/j.spc.2024.05.005

[41] Budi Endarto, Dwi Elok Indriastuty and Fitra Mardiana, 'Legal Transplantation of Blue Bond Regulation in Indonesia', *Environmental Development*, 53 (2025), 101118 https://doi.org/https://doi.org/10.1016/j.envdev.2024.101118

[42] Gustaaf Reerink and Jean-Louis van Gelder, 'Land Titling, Perceived Tenure Security, and Housing Consolidation in the Kampongs of Bandung, Indonesia', *Habitat International*, 34.1 (2010), 78–85 https://doi.org/https://doi.org/10.1016/j.habitatint.2009.07.002

[43] Delfirman and Hilmy M Dzaki, 'Shifts in the Control of Natural Resources: An Analysis of the Resource Curse in Tin-Rich Bangka Belitung, Indonesia', *The Extractive Industries and Society*, 23 (2025), 101682 https://doi.org/https://doi.org/10.1016/j.exis.2025.101682

mechanisms encourage farmer participation, fostering dedication to agriculture and national food resilience. Legislators adopted a firm stance in response to the inefficacy of prior legal measures, recognizing the centrality of rice for Indonesian nutrition and the necessity of reducing import reliance. [44] International comparisons highlight superior agricultural land protection in countries like Thailand, despite declining youth interest in farming. LP2B policies aim to preserve agricultural zones, ensure land availability, achieve food self-sufficiency, secure farmers' rights, improve welfare, promote employment, maintain ecological balance, and revitalize agriculture. Law 41/2009 institutionalizes these objectives as a comprehensive system covering planning, designation, development, utilization, management, control, and supervision. Effective implementation depends on bureaucratic efficiency and farmer cooperation. Accurate land classification is essential, as policies apply exclusively to designated LP2B. Implementing regulations, including government and ministerial directives, provide criteria, evaluation procedures, and conversion management.[45]

Despite legal frameworks, effectiveness is constrained when LP2B boundaries are indeterminate. Many regional regulations reference LP2B without maps or appendices, relying on Regional Spatial Plans. Article 75(2) of Law 41/2009 mandates that existing spatial plans be supplemented with satellite-delineated maps for LP2B and reserve agricultural zones. In practice, discrepancies between these maps and established spatial plans persist, as observed in Gunungkidul, Kulonprogo, and Bantul. The bottom-up approach seeks to integrate local objectives, yet precise LP2B delineation remains limited. Consequently, the protection of agricultural land remains largely theoretical, vulnerable to administrative and policy inconsistencies.[46]

Within the framework of regional autonomy, local governments in Indonesia seek greater control over matters historically managed at the national level, consistent with the principles of broad, real, and accountable autonomy established under Law Number 23 of 2014 on Regional Government. Decentralization has granted regency and municipal administrations expanded authority over a wide range of administrative domains, including land management. [47] Land affairs, previously primarily overseen by the National Land Agency (BPN) and its provincial and regency/municipal offices, have progressively shifted to local government oversight. Under Law Number 23 of 2014, land services constitute mandatory functions for provincial and local administrations. To fulfill this responsibility, regional governments have established specialized land affairs offices, aligning with Article 2 of the Basic

[44] Zahra Shiri and others, 'Landscape Approaches for Sustainable Land Systems: A Critical Systematic Review of Frameworks, Governance, and Socio-Ecological Outcomes', *Landscape Architecture and Sustainability*, 2 (2025), 100007 https://doi.org/https://doi.org/10.1016/j.las.2025.100007

[45] Afdal Adha and others, 'Indonesia's Path to Sustainable Aviation Fuel: Evaluating Feedstock Potential from Agricultural Residue', *Biomass and Bioenergy*, 209 (2026), 108927 https://doi.org/https://doi.org/10.1016/j.biombioe.2026.108927

[46] Maria Delavega Afriani and Stephen Poletti, 'Evaluating Renewable Energy Pathways and Emissions Targets in Indonesia: An OSeMOSYS-Based Economic and Sensitivity Analysis of PLN', *Energy Policy*, 211 (2026), 115093 https://doi.org/https://doi.org/10.1016/j.enpol.2026.115093

[47] Achmad Rizal and Muh. Saleh Nurdin, 'The Perspectives of Small-Scale Fishermen on Coastal Zone Management, Donggala, Indonesia: From Perception to Management Plan', *Marine Policy*, 188 (2026), 107088 https://doi.org/https://doi.org/10.1016/j.marpol.2026.107088

Agrarian Law (UUPA), which recognizes land as a strategic resource for regional development.[48]

At the regency level, administrations implement Regional Regulations on Spatial Planning (RTRW), with location permits serving as a key mechanism to enforce land conversion policies. Although BPN retains the authority to issue permits, decentralization allows local governments to exercise significant discretion in regulating conversion. Article 7 of Law Number 26 of 2007 mandates coordination of spatial planning across central and regional governments to ensure public welfare. Government Regulations Numbers 15 of 2010 and 26 of 2008 further delineate responsibilities and provide the legal basis for interconnected spatial arrangements.[49] Bantul Regency, through Regional Regulation Number 4 of 2011 (Spatial Plan 2010–2030), aims to harmonize development, optimize land use, preserve productive agricultural zones, and regulate conversion to non-agricultural uses. Despite these measures, the Sustainable Food Agricultural Land Area (KP2B) decreased from 19,075 to 18,773 hectares by 2024. The Land Affairs and Spatial Planning Office, monitors compliance through site inspections, audits, administrative and criminal sanctions, and restrictions on building permits (IMB) and property ownership transfers.

Empirical evidence demonstrates a tension between economic incentives and food security. While land conversion reduces agricultural land, it is often viewed as economically advantageous due to the profitability of non-agricultural industries. In Bantul Regency, non-agricultural land expanded from 37,402.4 to 41,521.07 hectares, while agricultural land declined from 13,923.09 to 9,804.42 hectares between 2013 and 2023. Similar trends are observed in Kulon Progo and Gunungkidul Regencies, where misclassification of Rice Fields and Yard Land (LSD) due to satellite-based zoning, outdated records, and overlapping LP2B-industrial areas complicates land management. BPN provides recommendations for conversion when actual land use differs from LP2B or LSD status, while unresolved cases are forwarded to spatial planning forums. Frequent revisions of RTRW, which are not yet codified into municipal regulations, further exacerbate regulatory uncertainty.

Statutory frameworks, such as Regional Regulation No. 10/2011 of the Special Region of Yogyakarta, establish minimum allocations for sustainable agricultural land, including KP2B, LP2B, and Reserve Areas (LCP2B), supplemented by Regent Regulations and Ministerial Decrees. Programs like "Cetak Sawah" (Paddy Field Creation) aim to convert technically suitable non-rice land into productive rice fields, with 365 hectares restored since 2015. Nevertheless, insufficient technical guidance, limited coordination among agencies, and inadequate public awareness hinder effective implementation. In Gunungkidul, ongoing structural and practical challenges include overlapping land functions, non-viable land categories, insufficient infrastructure, and low incentive support for farmers maintaining agricultural land.

[48] T Firman, 'Major Issues in Indonesia's Urban Land Development', *Land Use Policy*, 21.4 (2004), 347–55 https://doi.org/https://doi.org/10.1016/j.landusepol.2003.04.002

[49] Wahyu Wulandari, Testriono and Moch Faisal Karim, 'Adopting the Palm Oil Moratorium Under External Pressure: Indonesia's Response to the EU's RED II', *Forest Policy and Economics*, 182 (2026), 103692 https://doi.org/https://doi.org/10.1016/j.forpol.2025.103692

Effective land conversion control requires integrated strategies, including legal certainty, harmonized regulations, strict permitting, targeted incentives, and protection of high-productivity farmland. Conversion should be directed toward marginal land, while ensuring sufficient protected zones for sustainable food production. Coordination among national, provincial, and regency-level spatial planning authorities is essential to prevent conflicts between economic development and agricultural preservation. Enhancing public engagement, disseminating accurate land use information, and strengthening enforcement mechanisms are critical to balancing economic growth with the preservation of sustainable food agricultural land, thereby ensuring legal certainty, environmental sustainability, and food security for current and future generations.[50]

Land Transfer Regulation in Achieving Sustainable Ecological Justice

The Government of Indonesia, as the sovereign authority over land, water, and natural resources, exercises control under Article 33, Paragraph Three of the 1945 Constitution of the Republic of Indonesia. This constitutional provision requires that these resources be managed by the state to optimize public welfare and provides both a philosophical and juridical foundation for regulating the ownership, utilization, and management of natural resources according to the principles of justice, efficiency, sustainability, and environmental responsibility.[51] Under the Basic Agrarian Law, Law Number Five of 1960, the government holds supreme authority over land, water, airspace, and the natural resources contained therein, as specified in Article Two, Paragraph One. This authority functions as a public right rather than a private entitlement, delegating responsibility to allocate, manage, and supervise natural resources in a manner that ensures legal certainty, equitable access, and societal benefit. Article Two, Paragraph Two of the Basic Agrarian Law further stipulates that the government must organize spatial allocation, regulate legal relations between individuals and natural resources, and oversee legal acts affecting these resources, ensuring that state control is exercised in accordance with justice, legal certainty, and social welfare.[52]

Considering the limited availability of productive land, active regulation is necessary to prevent uncontrolled conversion, especially from agricultural to non-agricultural uses. Empirical evidence indicates that the conversion of productive agricultural lands, including paddy fields and water retention areas, has significant consequences for local communities and national food security. Primary factors driving such conversions include population growth, urban expansion, and increased demands for infrastructure and industrial development.[53] The 2007 Spatial Planning Law, Law Number Twenty Six of 2007, establishes a hierarchical framework for

[50] Muhamad Amin Rifai and others, 'National and Voluntary Sustainability Standards: Convergence or Divergence? Insights from Indonesian Agri-Food Export Sectors', *Earth System Governance*, 27 (2026), 100311 https://doi.org/https://doi.org/10.1016/j.esg.2026.100311

[51] Noor and others.

[52] Tessa Toumbourou, 'Using a Delphi Approach to Identify the Most Efficacious Interventions to Improve Indonesia's Forest and Land Governance', *Land Use Policy*, 99 (2020), 102768 https://doi.org/https://doi.org/10.1016/j.landusepol.2017.05.017

[53] Ida Aju Pradnja Resosudarmo and others, 'Indonesia's Land Reform: Implications for Local Livelihoods and Climate Change', *Forest Policy and Economics*, 108 (2019), 101903 https://doi.org/https://doi.org/10.1016/j.forpol.2019.04.007

spatial planning at the national, provincial, and regency or municipal levels. This framework integrates land allocation, zoning, permitting, incentives, and sanctions for violations.[54] Effective land management requires harmonization of legal frameworks, enforcement mechanisms, and coordination among stakeholders, including central and regional authorities, while incorporating public participation. Discrepancies between designated protected agricultural zones and industrial or residential developments generate legal uncertainty, administrative inefficiencies, and potential conflicts over land use. Comprehensive spatial planning, transparent permitting procedures, and law enforcement are essential to maintain agricultural productivity, ecological balance, and public welfare, in compliance with Article Thirty Three of the 1945 Constitution.[55]

The agricultural sector plays a fundamental role in Indonesia's national food security, providing staple crops such as rice, tubers, and vegetables. Conversion of these lands to non-agricultural purposes threatens local food production, increases reliance on imported goods, and heightens national economic vulnerability. Consequently, the government enforces regulations designed to preserve sustainable agricultural zones, permitting conversion only through formal applications supported by proof of ownership. Unauthorized changes are strictly prohibited. Sustainable agricultural zones are implemented uniformly across the country to maintain productivity, environmental quality, and tourism potential. These policies reduce dependency on imported foods, stabilize national food security, and protect ecosystem functions, with monitoring and sanctions ensuring compliance with designated zones.[56]

Coordination with regional authorities is critical for effective policy implementation. Farmers committing land to sustainable agriculture receive incentives such as access to high-quality seeds, infrastructure support, modern production technologies, land certification assistance, tax relief, and recognition for exemplary performance. These measures enhance productivity, secure farmers' income, and encourage environmental stewardship while supporting national development objectives.[57] Public participation further strengthens enforcement by enabling communities to monitor and safeguard agricultural land, particularly against unauthorized residential or commercial conversion. Technical guidelines address inconsistencies between designated protected agricultural areas and actual land use, ensuring alignment with spatial planning

[54] Fredrik Sokoy, 'Social Conflict between the Amungme and Kamoro Traditional Tribe and Freeport Indonesia Company on Environmental Impact', *Social Sciences & Humanities Open*, 13 (2026), 102432 https://doi.org/https://doi.org/10.1016/j.ssaho.2025.102432

[55] Jieming Zhu and Hendricus Andy Simarmata, 'Formal Land Rights versus Informal Land Rights: Governance for Sustainable Urbanization in the Jakarta Metropolitan Region, Indonesia', *Land Use Policy*, 43 (2015), 63–73 https://doi.org/https://doi.org/10.1016/j.landusepol.2014.10.016

[56] Anang Pra Yogi and others, 'Land Use and Cover Change (LUCC) and Migration in Sukoharjo, Indonesia', *International Journal of Ethics and Systems*, 38.3 (2022), 465–83 https://doi.org/https://doi.org/10.1108/IJOES-01-2021-0005

[57] Barid Hardiyanto, 'Politics of Land Policies in Indonesia in the Era of President Susilo Bambang Yudhoyono', *Land Use Policy*, 101 (2021), 105134 https://doi.org/https://doi.org/10.1016/j.landusepol.2020.105134

regulations. These guidelines standardize procedures for data verification, exceptions, and land conversion requests, enhancing legal certainty.[58]

Legal provisions regulating land conversion are detailed in Government Regulation Number Seventy Seven of 2001, Article 44, Paragraph One, which requires prior approval from regional authorities for the conversion of irrigated land to non-agricultural commercial use. Compliance with spatial plans and compensation equivalent to the cost of irrigation networks or new irrigated land is mandatory. Law Number Forty One of 2009 on Sustainable Food Agricultural Land Protection prohibits conversion of designated sustainable agricultural areas. These provisions are operationalized under Government Regulation Number One of 2011 and Ministry of Agriculture Regulation Number Eighty One of 2013, which establish technical procedures for converting agricultural land for public purposes. Lawful conversion requires strategic feasibility assessments, classifying projects by scale at the national, provincial, or local levels. These assessments minimize negative impacts on farmers' welfare and ensure environmental compliance, often integrated with environmental impact evaluations for infrastructure development. Conversion plans must include annual and master plans specifying location, area, and intended use, preventing disruption to existing infrastructure.[59]

Acquisition of land ownership rights must adhere to statutory procedures. Compensation is mandatory for landowners affected by conversion, including agricultural commodities, infrastructure investments, and related costs, financed through national, provincial, or municipal budgets. Investment values are determined through integrated assessments by relevant agencies overseeing agriculture and infrastructure matters, ensuring fair allocation for replacement land development.[60] Transitional provisions under Article 25 of Law Forty One of 2009 have generated legal uncertainty, as regional authorities frequently rely on these provisions to establish local regulations, resulting in overlapping and inconsistent maps due to discrepancies between satellite imagery and actual land use. Revising these provisions and involving all relevant stakeholders, including government institutions, academia, licensing authorities, and local communities, is essential to enhance legal certainty and align with field conditions. Article Thirteen, Paragraph Two of Ministerial Regulation ATR/BPN Number Two of 2024 regulates verification of protected rice field data, mapping, and issuance of recommendations for land use change. Integrating regional land offices into a digitalized application system improves administrative efficiency, reduces errors, optimizes resource allocation, and strengthens legal certainty in land ownership rights.[61]

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[58] Vijesh V Krishna and others, 'Land Markets, Property Rights, and Deforestation: Insights from Indonesia', *World Development*, 99 (2017), 335–49 https://doi.org/https://doi.org/10.1016/j.worlddev.2017.05.018

[59] Christoph Kubitza and others, 'Land Property Rights, Agricultural Intensification, and Deforestation in Indonesia', *Ecological Economics*, 147 (2018), 312–21 https://doi.org/https://doi.org/10.1016/j.ecolecon.2018.01.021

[60] Sugeng Budiharta and Karen D Holl, 'Harnessing Opportunities to Upscale Forest Landscape Restoration in Indonesia', *Trees, Forests and People*, 21 (2025), 100917 https://doi.org/https://doi.org/10.1016/j.tfp.2025.100917

[61] Yescha Nuradisa Ekarachmi Danandjojo and others, 'Stakeholder Relations in Land Value Capture (LVC) within a Government-Led Decentralized Governance System: The Case of Transport

While land conversion is an inevitable aspect of modern development, unregulated transformation of productive agricultural land carries considerable economic, social, and environmental risks. Overlapping regulations, unclear procedures, and inconsistent enforcement exacerbate legal uncertainty and undermine sustainable agricultural protection.[62] Systematic legal deconstruction, through thorough analysis and clarification of regulatory frameworks, is necessary to ensure that land conversion practices remain sustainable, equitable, and consistent with constitutional mandates. This process promotes justice, decentralization, accountability of regional authorities, and the protection of national food security while maintaining ecological integrity and socio-economic stability.[63]

CONCLUSION

The regulation of sustainable food agricultural land conversion in Indonesia is established through multiple legal instruments, including Law Number Five of 1960 on Basic Agrarian Principles, Law Number Twenty Six of 2007 on Spatial Planning, Law Number Forty One of 2009 on the Protection of Sustainable Food Agricultural Land, Government Regulation Number One of 2011 on Procedures for Land Conversion, Ministry of Agriculture Regulation Number Eighty One of 2013 on Technical Guidelines, and Presidential Regulation Number Fifty Nine of 2019 on Controlling Paddy Field Conversion. Law Number Forty One of 2009 functions as a *lex specialis*, providing detailed spatial planning for agricultural land protection and overriding relevant provisions of Law Number Twenty Six of 2007. Presidential Regulation Number Fifty Nine of 2019 addressed delays in regional designation of Sustainable Food Agricultural Land, while Ministry of Agrarian Affairs and National Land Agency Decree Number 1589 of 2021 established protected paddy field maps across several provinces. However, discrepancies between designated maps and actual land use, including overlaps with industrial, residential, tourism, and built-up areas, create legal uncertainty and potential conflicts.

Sustainable agricultural land protection aims to preserve productivity, maintain ecological balance, and ensure national food security. Land conversion is permitted only for public purposes, such as infrastructure development, and is regulated by Law Number Forty One of 2009 and Law Number Two of 2012 on Land Acquisition. Conversion decisions are influenced by internal factors, including farmers' education, income, economic capacity, land value, and location, as well as external pressures such as population growth, urban expansion, and demand for non-agricultural land. Socio-cultural inheritance practices further fragment land, reducing economic viability. Policy weaknesses, unclear sanctions, inaccurate mapping, and regional prioritization of short-term revenue exacerbate legal uncertainty and uncontrolled conversion. Legal deconstruction provides a method to analyze and reinterpret regulations to ensure legal certainty, social equity, sustainability, harmony, and accountability.

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[62] Takashi Kurosaki, Saumik Paul and Firman Witoelar, 'In Pursuit of Power: Land Tenancy Contracts and Local Political Business Cycles in Indonesia', *Journal of Economic Behavior & Organization*, 227 (2024), 106764 https://doi.org/https://doi.org/10.1016/j.jebo.2024.106764

[63] Ira Safitri Darwin, Haryo Winarso and Denny Zulkaidi, 'The Role of Customary Land Ownership in Land-Use Conversion in the Peri-Urban of Bukittinggi, Indonesia', *Bijdragen Tot de Taal-, Land- En Volkenkunde / Journal of the Humanities and Social Sciences of Southeast Asia*, 175.4 (2019), 533–55 https://doi.org/https://doi.org/10.1163/22134379-17504002

Effective implementation requires consolidating spatial plans, integrating community oversight, and enforcing compliance through sanctions. Aligning policy with field realities strengthens agricultural land protection, enhances food security, and supports sustainable and equitable development while upholding legal and ecological integrity.

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