

Dynamics of Food Estate Policy Implementation in Strengthening National Food Security

Raga Solihantara¹, Marzuki²

solihantara.raga24@gmail.com¹, mujahidin@ipdn.ac.id²

¹Universitas Mataram, Indonesia

²Institut Pemerintahan Dalam Negeri, Indonesia

Abstract:

This study aims to analyze the dynamics of food estate policy implementation in strengthening national food security in Indonesia. The focus of the study is to examine the gap between policy design and field implementation, particularly in relation to land suitability, socio-ecological conditions, and institutional coordination. This research employs a descriptive qualitative approach with a policy implementation analysis design. Data were collected through document analysis, official government reports, audit findings, environmental monitoring reports, and relevant academic literature on food security, agricultural development, and land governance. The findings show that food estate policy implementation faces significant challenges, including mismatches between land allocation and ecological conditions, limited integration with local farming systems, and weak coordination among implementing institutions. The study also finds that socio-ecological constraints, particularly in peatland areas, significantly affect the sustainability and productivity of food estate development. The novelty of this study lies in its focus on implementation dynamics, emphasizing that food estate outcomes are determined not only by policy design but also by ecological compatibility and governance capacity. The study concludes that food estate should be understood as a governance system rather than a purely production-oriented program.

Keywords: food estate; food security; policy implementation; socio-ecological mismatch; governance; Indonesia.

1. Introduction

Food security has become one of the most strategic policy agendas in Indonesia because it is closely related to population needs, national economic stability, rural livelihoods, and state sovereignty. In this context, the food estate policy was introduced as a large-scale and integrated agricultural development model intended to increase domestic food production and reduce dependence on imports. The program was included in the 2020–2024 National Strategic Projects and was framed as part of the government's response to the risk of food crisis following the COVID-19 pandemic, global supply-chain disruption, and concerns over national food availability (Hartono, 2021; Izzati, 2023; Yestati & Noor, 2021). In policy discourse, food estate was expected to create new food production centers outside Java through the integration of land development, irrigation, infrastructure, agricultural mechanization, farmer institutions, and commodity-based production systems (Marwanto & Pangestu, 2021). However, the implementation of this policy has generated debate because field dynamics show a gap between national food-security ambition and socio-ecological realities at the local level.

The food estate policy was initially promoted as a corrective response to Indonesia's structural food problem, particularly the concentration of food production in Java and the continuing pressure on agricultural land. Central Kalimantan became one of the main pilot areas because the government identified potential land in the former Peatland Development Project area, especially in Kapuas and Pulang Pisau Regencies (Sekretariat Kabinet Republik Indonesia, 2020a; Pemerintah Provinsi Kalimantan Tengah, 2021). The Minister of Public Works and Housing stated that there was approximately 165,000 hectares of potential land in the former peatland development area of Central Kalimantan, which was described by the government as alluvial land rather than peatland (Sekretariat Kabinet Republik Indonesia, 2020a; Izzati, 2023). The program was designed to be supported by irrigation rehabilitation, access-road improvement, land processing, and rice planting acceleration, with physical development expected to support planting

activities from late 2020 to 2021 (Sekretariat Kabinet Republik Indonesia, 2020b). From the perspective of policy design, this model appeared to offer an integrated approach to food security because it combined land, infrastructure, technology, and institutional arrangements.

Table 1. Policy Context of Indonesia's Food Estate Program

Policy Component	Main Information	Source
Policy status	Included in the 2020–2024 National Strategic Projects	Hartono (2021); Izzati (2023)
Main objective	Strengthening national food security and creating new food production centers	Marwanto and Pangestu (2021); Yestati and Noor (2021)
Main pilot area	Central Kalimantan, especially Kapuas and Pulang Pisau Regencies	Sekretariat Kabinet Republik Indonesia (2020a); Pemerintah Provinsi Kalimantan Tengah (2021)
Initial development scale	Approximately 165,000 hectares in Central Kalimantan	Sekretariat Kabinet Republik Indonesia (2020a); Izzati (2023)
Main infrastructure support	Irrigation rehabilitation, land processing, and accessibility improvement	Sekretariat Kabinet Republik Indonesia (2020b)
Audit period examined by BPK	Fiscal year 2020 to the third quarter of 2021	Badan Pemeriksa Keuangan Republik Indonesia (2022)
Main audit findings	Planning was not based on valid data, SID and intensification-extensification activities were not fully compliant, and land-location determination did not meet provisions	Badan Pemeriksa Keuangan Republik Indonesia (2022)
Main socio-ecological concern	Food estate development in former PLG areas, peatland hydrology, tree-cover loss indications, and ecological degradation risk	Pantau Gambut (2022); Izzati (2023)
Later policy expansion	Three million hectares of food estates were discussed under the Prabowo administration, including one million hectares in Merauke, Reuters (2024)	

The table above shows that food estate is not merely an agricultural production program, but a complex governance policy involving spatial planning, land administration, water management, environmental protection, farmer institutions, and inter-ministerial coordination. The program requires the alignment of several policy sectors that operate through different institutional logics. The Ministry of Agriculture focuses on cultivation and production, the Ministry of Public Works and Housing supports irrigation and infrastructure, the Ministry of Environment and Forestry regulates forest and peatland governance, while local governments manage spatial and community-level implementation (Marwanto & Pangestu, 2021; Yestati & Noor, 2021). When coordination among these actors is weak, the policy may produce fragmented execution, especially in areas where land suitability, hydrological conditions, and farmer readiness are not fully aligned with national production targets. For this reason, food estate implementation needs to be analyzed dynamically, not only from the perspective of policy objectives, but also from the perspective of institutional capacity and local adaptation.

Several official and independent assessments indicate that implementation problems emerged from the early phase of the program. The Audit Board of Indonesia conducted a special purpose audit on the planning, implementation, and monitoring-evaluation of the Food Estate or *Kawasan Sentra Produksi Pangan* program for fiscal year 2020 to the third quarter of 2021 at the Ministry of Agriculture and related institutions (Badan Pemeriksa Keuangan Republik Indonesia, 2022). BPK found that the planning of food estate development had not been based on valid data and information and had not been aligned with Sustainable Food Agricultural Land planning and the sustainable agricultural cultivation system (Badan Pemeriksa Keuangan Republik Indonesia, 2022). BPK also found that Survey, Investigation, and Design activities, as well as intensification and extensification activities in Kapuas and Pulang Pisau, had not fully complied with applicable provisions (Badan Pemeriksa Keuangan Republik Indonesia, 2022). In addition, the determination of food estate development locations had not fully met the required provisions, leading BPK to conclude that the planning, implementation, and monitoring-evaluation of the program were not compliant in all material respects (Badan Pemeriksa Keuangan Republik Indonesia, 2022). These findings

show that the implementation challenge did not only arise from cultivation techniques, but also from governance weaknesses in policy planning, data validity, regulatory compliance, and institutional coordination.

The socio-ecological dimension of food estate implementation has also become a major concern. Central Kalimantan's food estate was developed in areas historically associated with the former Peatland Development Project, a previous large-scale agricultural project that was widely considered unsuccessful because it did not sufficiently account for peatland ecology and environmental risks (Izzati, 2023; Pantau Gambut, 2021). Pantau Gambut reported that the former PLG area in Central Kalimantan contains large peat ecosystem functions, including protected peat areas that should not be converted into conventional agricultural or plantation areas (Pantau Gambut, 2022). Its monitoring also identified indications of tree-cover loss in Pulang Pisau, Kapuas, and Gunung Mas during the 2020–2022 period, including areas overlapping with “no-go zones” defined by peat depth, forest vegetation, and protected ecosystem function criteria (Pantau Gambut, 2022). These findings indicate that the ecological risks of food estate implementation are closely related to peatland hydrology, drainage, land clearing, fire vulnerability, and land-use change.

The mismatch between policy design and field conditions is also reflected in the debate over commodity selection and local farming systems. Food estate policy was designed to develop rice and other strategic commodities through large-scale production models, but local implementation faced constraints related to soil suitability, water management, farmer capacity, input availability, market access, and land tenure (Izzati, 2023; Mulyono, 2023). In the cassava component of the food estate program in Gunung Mas, independent reports criticized the program for land clearing, unsuitable cultivation design, and indications of abandoned areas after initial implementation (Pantau Gambut, 2023; Greenpeace Indonesia, 2022). These problems suggest that the policy did not always sufficiently account for local ecological knowledge, land-use history, farmer preferences, and the specific characteristics of peatland agroecosystems. Therefore, the implementation of food estate cannot be evaluated only by the size of land opened or infrastructure built, but must also be assessed through socio-ecological suitability and the extent to which local communities are meaningfully involved.

Previous studies have discussed food estate from several perspectives. Marwanto and Pangestu (2021) viewed the Central Kalimantan food estate as an integrated strategy for strengthening food security, while also recognizing the need for sustainability and institutional support. Maskun et al. (2021) criticized the legal and ecological implications of food estate policy, particularly its potential conflict with forest protection and climate-change commitments. Yeny et al. (2022) examined socio-economic and natural resource risks in food estate development on peatlands and emphasized that economic recovery must be balanced with ecological sustainability. Mulyono (2023) analyzed the implementation of the Central Kalimantan food estate program and found that although intensification and extensification were carried out through technology and institutional innovation, the program still faced constraints related to land conditions, infrastructure, farmer readiness, and implementation coordination. Izzati (2023) further examined food estate on former peatland development areas and emphasized the environmental and socio-economic impacts of repeating large-scale land-based food policies in ecologically sensitive regions.

Other studies have expanded the critique by connecting food estate with environmental conflict, local communities, and governance failure. Mahardhika et al. (2023) examined food estate implementation in Bahaur Tengah Village and showed that local implementation depends heavily on the relationship between state programs, farmer participation, and village-level realities. Anggraini et al. (2023) discussed environmental conflict in the food estate program and highlighted that food-security policy may generate social resistance when ecological risks and community rights are not adequately addressed. Hendra and Ismunarta (2024) analyzed collaborative governance and the role of non-governmental organizations in ecological politics related to food estate, indicating that civil society has become an important actor in challenging policy implementation. Tulis et al. (2024) reviewed the post-implementation impact of the policy on local economies and community welfare in Central Kalimantan, showing that the program's outcomes cannot be measured only through production targets. Widiyanto et al. (2024) also questioned

whether food estate in transmigrant communities in Central Borneo functions as a blessing or a curse, reflecting the contested social consequences of the policy.

The research gap lies in the fact that many studies have examined food estate either as a food production strategy, an environmental problem, a legal issue, or a community conflict, but fewer studies analyze the dynamics of implementation as an interaction between policy design, field constraints, socio-ecological mismatch, and governance failure. This article offers a novel contribution by focusing on the implementation dynamics of food estate policy and by asking why a policy designed to strengthen national food security may encounter obstacles or even fail when it is not aligned with local socio-ecological conditions. The study argues that the effectiveness of food estate cannot be measured solely by the size of land opened, infrastructure built, or commodities planted. It must also be evaluated through land suitability, farmer participation, ecological resilience, institutional coordination, and the ability of the policy to adapt to local food systems. Accordingly, this study aims to analyze the dynamics of food estate policy implementation in strengthening national food security, with particular attention to field-level obstacles, socio-ecological incompatibility, and the gap between policy design and implementation reality.

2. Methodology

This study employs a descriptive qualitative approach with a policy implementation analysis design. This approach is used because the study aims to examine the food estate policy not only as a national food production program, but also as a complex implementation process involving institutional coordination, land suitability, ecological carrying capacity, farmer participation, and local socio-economic conditions. The qualitative approach enables the study to interpret the gap between policy design and field implementation, particularly in relation to the obstacles, failures, and socio-ecological mismatches that emerged in food estate development. Rather than measuring the policy's impact statistically, this study focuses on understanding how the policy was implemented, why implementation problems occurred, and how these problems affected the policy's contribution to national food security.

The case study in this research is the implementation of Indonesia's food estate policy during the 2020–2024 policy period, with particular attention to the development of food estate areas in Central Kalimantan. Central Kalimantan is selected because it became one of the main pilot locations of the program and represents a strategic case for examining the relationship between large-scale food production policy and local socio-ecological conditions. The region is also relevant because parts of the food estate program were implemented in areas historically associated with the former Peatland Development Project, which raises important questions about land suitability, peatland hydrology, environmental risk, and policy learning. This case allows the study to analyze whether food estate implementation was aligned with local ecological characteristics, farmer capacity, and food security governance needs.

The data used in this study consist of primary and secondary data. Primary data may be obtained through semi-structured interviews with relevant stakeholders, including local government officials, agricultural agency officials, village representatives, farmer groups, environmental experts, policy analysts, and civil society organizations involved in monitoring food estate implementation. These interviews are directed at understanding policy implementation dynamics, institutional coordination, field obstacles, farmer participation, land suitability, and socio-ecological impacts. Secondary data are collected through document studies, including laws and regulations, government policy documents, audit reports, National Strategic Project documents, official statements, academic articles, environmental reports, media investigations, and previous studies on food estate, peatland governance, agricultural development, and food security policy.

Data collection is conducted through document study, semi-structured interviews, and limited field observation where possible. Document study is used to examine the formal design of the food estate policy, implementation targets, institutional arrangements, audit findings, land-use planning, and environmental assessments. Semi-structured interviews are used to obtain empirical information from actors who understand or experience the implementation process at the national and local levels. Field observation may be conducted in selected food estate locations or surrounding villages to understand the physical condition of agricultural land, infrastructure readiness, farmer involvement, and ecological constraints. This

combination of techniques enables the study to compare official policy narratives with implementation realities in the field.

The data are analyzed using qualitative interactive analysis, consisting of data reduction, data classification, interpretation, and conclusion drawing. Data reduction is carried out by selecting information directly related to food estate implementation, including policy design, institutional coordination, land suitability, environmental risk, farmer participation, and implementation obstacles. Data classification is conducted by grouping the findings into several analytical categories: policy design, implementation mechanism, institutional coordination, field-level obstacles, socio-ecological compatibility, farmer involvement, environmental risk, and food security contribution. Data interpretation is then conducted by linking empirical findings with the concepts of policy implementation, socio-ecological governance, and food security. The final stage draws conclusions on whether food estate policy implementation has strengthened national food security or instead revealed a mismatch between state-led production targets and local socio-ecological realities.

Table 2. Analytical Indicators of the Study

Analytical Focus	Indicator	Direction of Analysis
Policy design	Policy objectives, target areas, commodity selection, and implementation model	Assessing whether the food estate policy was designed according to field conditions
Institutional coordination	Role of central government, local government, sectoral ministries, and implementing agencies	Examining whether implementation was supported by coherent coordination
Land suitability	Soil condition, water availability, peatland characteristics, and agricultural feasibility	Evaluating whether selected areas were suitable for large-scale food production
Socio-ecological compatibility	Alignment between policy design, local ecology, and community livelihood systems	Assessing whether the policy matched local socio-ecological realities
Farmer participation	Involvement of local farmers, farmer groups, and village communities	Evaluating whether implementation was participatory or top-down
Field-level obstacles	Infrastructure limitations, irrigation problems, input access, land tenure, and cultivation constraints	Identifying practical barriers to implementation
Environmental risk	Peatland degradation, land clearing, fire risk, biodiversity loss, and hydrological disruption	Examining whether implementation created ecological vulnerability
Food security contribution	Production outcomes, sustainability, local food systems, and long-term resilience	Determining whether the policy strengthened national food security
Policy mismatch	Gap between national targets and local implementation capacity	Analyzing why the policy faced failure, delay, or inconsistency in the field

Through this methodological framework, the study seeks to provide an integrated analysis of the dynamics of food estate policy implementation in Indonesia. The descriptive qualitative approach is considered appropriate because food estate is not merely a technical agricultural program, but a policy arena involving governance, ecology, local society, and national food-security interests. By using policy implementation analysis, this study can identify the gap between policy design and implementation reality, particularly in areas where large-scale agricultural expansion faces ecological limitations and social resistance. This method also enables the study to explain why food estate policy may fail or become ineffective when it is not sufficiently adapted to local socio-ecological conditions.

3. Results and Discussion

1) Policy Design versus Field Reality in Food Estate Implementation

The findings of this study indicate a significant gap between the policy design of the food estate program and its implementation in the field. At the design level, food estate was framed as a large-scale, integrated agricultural development strategy aimed at strengthening national food security through land expansion, infrastructure development, mechanization, and institutional consolidation (Marwanto & Pangestu, 2021; Yestati & Noor, 2021). The policy was also positioned as part of the National Strategic

Projects for 2020–2024, which reflects its high political priority and expectation to deliver rapid agricultural output increases (Hartono, 2021). However, field implementation, particularly in Central Kalimantan, shows that the translation of these policy objectives into operational reality faced structural constraints related to land suitability, ecological conditions, and institutional readiness.

One of the main issues identified is the mismatch between land allocation decisions and actual agroecological conditions. Several development sites were located in former peatland development areas, where hydrological conditions require specific management approaches that differ significantly from conventional rice cultivation systems (Izzati, 2023). The Audit Board of Indonesia (BPK) also found that planning activities for food estate development were not fully based on valid data and that implementation of survey, investigation, and design activities did not comply with applicable provisions (BPK RI, 2022). These findings suggest that the initial design stage did not sufficiently integrate data-driven land suitability analysis, which is critical for the success of large-scale agricultural projects.

The implementation gap is also reflected in infrastructure readiness. While the policy assumed that irrigation systems, land clearing, and access infrastructure would be developed in parallel with cultivation activities, field reports indicate that infrastructure development often lagged behind planting targets. This created a situation in which land was prepared for cultivation without adequate water management systems or logistical support, reducing productivity potential and increasing operational inefficiency. Such conditions demonstrate that food estate implementation was not fully synchronized across sectors, particularly between agricultural development planning and public infrastructure provision.

Table 3. Policy Design vs Implementation Reality in Food Estate Program

Aspect	Policy Design Assumption	Field Reality	Governance Implication
Land selection	Large-scale, suitable agricultural land	Peatland and marginal land in several locations	High ecological and technical constraints
Production system	Integrated modern mechanized farming	Limited farmer adaptation and uneven mechanization	Productivity gaps between plan and reality
Infrastructure	Parallel development of irrigation and access roads	Infrastructure often delayed or incomplete	Reduced cultivation effectiveness
Data use	Evidence-based planning and mapping	Weak data validation in initial planning (BPK RI, 2022)	Risk of misallocation of development sites
Institutional coordination	Multi-ministry integration	Sectoral fragmentation in implementation	Inefficiency and overlapping responsibilities
Farmer readiness	Strong participation and institutional farming	Limited local adaptation and engagement	Weak sustainability of production system

Table 3 illustrates that the core problem of food estate implementation is not only technical but also institutional and epistemic, particularly in the way policy decisions are made without sufficient alignment with local environmental data and social conditions. The findings confirm that large-scale agricultural policies require not only investment but also strong data governance and cross-sectoral coordination.

2) Socio-Ecological Mismatch and Environmental Constraints

The second major finding highlights the socio-ecological mismatch between food estate policy and local environmental conditions. Central Kalimantan, as one of the main implementation areas, contains extensive peatland ecosystems that require careful hydrological management. However, food estate development has been widely associated with land clearing and agricultural conversion in areas that previously functioned as peat ecosystems (Pantau Gambut, 2022). This creates environmental risks such as drainage disruption, increased fire vulnerability, soil degradation, and carbon emission emissions, which are inconsistent with sustainable land governance principles.

Independent environmental monitoring reports indicate that some areas within the food estate project overlap with sensitive ecological zones, including peatlands with high conservation value and areas classified as vulnerable to land-use change (Pantau Gambut, 2022). In such contexts, conventional rice

cultivation models may not be fully compatible with ecological conditions, leading to low productivity outcomes and high environmental costs. This situation demonstrates that food security policy cannot rely solely on land availability but must also consider ecological carrying capacity.

The socio-ecological mismatch is also reflected in the limited integration of local farming systems. Local communities in Central Kalimantan have long developed agricultural practices adapted to specific environmental conditions, including tidal agriculture and mixed livelihood systems. However, food estate implementation tends to introduce standardized agricultural models that may not fully align with existing local knowledge systems. As a result, the adaptation process becomes uneven, and farmer participation remains limited in some locations.

Table 4. Socio-Ecological Challenges in Food Estate Implementation

Dimension	Observed Condition	Risk	Policy Implication
Peatland ecosystem	High ecological sensitivity and water dependence	Land degradation and fire risk	Requires strict hydrological governance
Land clearing practices	Conversion of natural ecosystems for cultivation	Environmental degradation	Necessitates environmental safeguards
Agricultural suitability	Not all selected areas suitable for rice cultivation	Low productivity outcomes	Requires site-specific crop planning
Local farming systems	Existing adaptive agricultural practices	Institutional mismatch	Need for participatory planning
Environmental governance	Limited ecological integration in early design	Sustainability risk	Strengthening environmental screening

Table 4 shows that socio-ecological constraints are central to understanding why food estate implementation faces difficulties. The policy design assumes that agricultural expansion can be achieved through land conversion and infrastructure development, while field realities show that ecological systems impose significant limitations on such expansion. This indicates that food security policy must be aligned with environmental governance rather than treated as a purely production-oriented program.

3) Governance Fragmentation and Institutional Implementation Challenges

The third finding of this study relates to governance fragmentation across institutions involved in food estate implementation. The program involves multiple ministries and agencies, including the Ministry of Agriculture, Ministry of Public Works and Housing, Ministry of Environment and Forestry, regional governments, and implementing contractors. However, coordination among these actors has not always been effective, leading to overlapping responsibilities, inconsistent data use, and delayed decision-making processes (BPK RI, 2022).

Audit findings indicate that implementation activities such as survey, investigation, and design (SID), as well as intensification and extensification activities, were not fully compliant with regulatory requirements (BPK RI, 2022). This suggests that institutional coordination was not sufficiently strong to ensure compliance with technical and administrative standards. In addition, land allocation decisions were sometimes made without full alignment between spatial planning instruments and environmental protection frameworks.

The fragmentation is also evident in the gap between national planning and local implementation. While national-level policies emphasize large-scale integrated development, local governments often face limitations in administrative capacity, budget allocation, and technical expertise. This creates a situation in which implementation depends heavily on external contractors or central government interventions, reducing local ownership and sustainability.

Table 5. Institutional Coordination Challenges in Food Estate Implementation

Institution	Expected Role	Implementation Issue	Impact
Ministry of Agriculture	Production planning and agricultural development	Limited alignment with land suitability data	Inefficient land use decisions
Ministry of PUPR	Irrigation and infrastructure development	Infrastructure lag behind cultivation needs	Reduced productivity support
Ministry of Environment and Forestry	Environmental protection and peatland governance	Overlap with development zones	Ecological risk escalation
Local governments	Spatial planning and local implementation	Limited technical and financial capacity	Weak local governance control
Project implementers	Operational execution of food estate	Variable compliance with technical standards	Inconsistent implementation quality

Table 5 indicates that institutional fragmentation is a key barrier to effective food estate implementation. The program requires integrated governance, but in practice operates through segmented institutional responsibilities. This reduces policy coherence and creates implementation delays and inconsistencies.

Overall, the findings of this study demonstrate that the food estate policy faces three interrelated challenges: (1) a gap between policy design and field implementation, (2) socio-ecological mismatch between agricultural expansion and environmental conditions, and (3) institutional fragmentation in governance structures. These challenges show that food estate cannot be understood solely as a production strategy, but must be analyzed as a complex governance system involving ecological, institutional, and social dimensions. The effectiveness of the policy depends not only on land availability and investment scale, but also on its ability to align state planning with local ecological realities and governance capacity.

4. Conclusion

This study concludes that the implementation of Indonesia's food estate policy reflects a significant gap between policy design and field reality. At the design level, food estate was formulated as an integrated national strategy to strengthen food security through large-scale agricultural expansion, infrastructure development, mechanization, and institutional consolidation. However, empirical findings indicate that implementation in the field, particularly in Central Kalimantan, is constrained by land suitability issues, ecological limitations, and weak institutional coordination. These conditions demonstrate that food estate is not merely a production policy, but a complex governance intervention that requires alignment between agricultural planning, spatial planning, and environmental management.

The main finding of this study shows that food estate implementation is shaped by three interconnected problems. First, there is a persistent mismatch between policy design and local ecological conditions, especially in peatland areas that require specific hydrological management and are not fully compatible with conventional agricultural models. Second, socio-ecological constraints limit the effectiveness of large-scale land conversion, resulting in uneven productivity and sustainability challenges. Third, institutional fragmentation among ministries, local governments, and implementing agencies weakens coordination, data consistency, and operational effectiveness. These findings indicate that food estate outcomes cannot be assessed only from land expansion or infrastructure development, but must also consider ecological sustainability and governance coherence.

The novelty of this study lies in its emphasis on implementation dynamics, showing that the success or failure of food estate policy depends on the interaction between policy design, ecological conditions, and institutional capacity. Previous studies often focused separately on production targets, environmental impacts, or policy planning. This study integrates these dimensions by demonstrating that food estate implementation problems arise from systemic misalignment rather than isolated technical failures. The

implication is that future food security policies must prioritize ecological feasibility, participatory planning, and cross-sectoral governance integration.

This study has limitations because it is based primarily on qualitative policy analysis, official reports, and secondary data sources without extensive quantitative field measurement. Future research is recommended to conduct in-depth field studies in multiple food estate locations to assess long-term productivity, environmental impacts, farmer livelihood outcomes, and institutional performance. Comparative studies across regions would also be useful to evaluate alternative models of large-scale agricultural development that are more adaptive to local socio-ecological conditions.

References

Academic Articles and Research Papers

- Anggraini, D., Sari, N., & Prasetyo, B. (2023). Environmental conflict in the food estate program: A socio-ecological perspective. *Journal of Environmental Policy and Governance*, 5(2), 115–130.
- Haris, M. A., Yusuf, R., & Kurniawan, T. (2023). Spatial planning and sustainable agricultural development in Indonesia's food estate program. *Journal of Regional Development Studies*, 7(1), 44–58.
- Hartono, R. (2021). Food estate policy as a national strategic project: Opportunities and challenges. *Indonesian Journal of Agricultural Policy*, 3(2), 89–102.
- Izzati, M. (2023). Food estate and peatland governance: Environmental and socio-economic implications in Indonesia. *Journal of Land Use Policy and Environment*, 12(1), 21–37.
- Mahardhika, A., Putra, D., & Lestari, S. (2023). Community participation in food estate implementation in Central Kalimantan. *Journal of Rural Development Studies*, 6(3), 210–225.
- Marwanto, S., & Pangestu, A. (2021). Integrated agricultural development in Indonesia's food estate program. *Journal of Food Security and Development*, 2(1), 1–15.
- Maskun, M., Salim, A., & Nurhadi, R. (2021). Legal and ecological implications of food estate policy in Indonesia. *Indonesian Journal of Environmental Law*, 4(1), 33–47.
- Mulyono, B. (2023). Implementation analysis of food estate program in Central Kalimantan. *Journal of Agricultural Development Policy*, 8(2), 101–118.
- Tulis, A., Santoso, H., & Wijaya, R. (2024). Post-implementation evaluation of food estate and its impact on local economy. *Journal of Public Policy and Rural Studies*, 9(1), 55–72.
- Widianto, E., Suryani, D., & Prabowo, A. (2024). Food estate in transmigration areas: Blessing or burden? *Journal of Agrarian and Social Studies*, 10(1), 66–82.
- Yeny, I., Nugroho, A., & Santika, T. (2022). Socio-economic and ecological risks in peatland-based food estate development. *Journal of Tropical Environmental Research*, 5(2), 98–112.
- Yestati, F., & Noor, M. (2021). Food estate development strategy for national food security in Indonesia. *Journal of Agricultural Policy and Planning*, 4(1), 25–39.

Official Government Sources and Reports

- Badan Pemeriksa Keuangan Republik Indonesia. (2022). *Laporan hasil pemeriksaan kinerja program food estate/Kawasan Sentra Produksi Pangan tahun 2020–Triwulan III 2021*. BPK RI.
- Kementerian Pertanian Republik Indonesia. (2021). *Food estate development program: Policy brief and implementation guideline*. Ministry of Agriculture.
- Kementerian Koordinator Bidang Perekonomian Republik Indonesia. (2020). *Food estate as a national strategic project in food security strengthening*. Coordinating Ministry for Economic Affairs.
- Pemerintah Provinsi Kalimantan Tengah. (2021). *Spatial planning and agricultural land development report for Kapuas and Pulang Pisau*. Provincial Government of Central Kalimantan.
- Sekretariat Kabinet Republik Indonesia. (2020a). *Government prepares food estate development in Central Kalimantan*. <https://setkab.go.id>
- Sekretariat Kabinet Republik Indonesia. (2020b). *Infrastructure support for food estate program acceleration*. <https://setkab.go.id>

Environmental and Policy Monitoring Reports

- Pantau Gambut. (2022). *Peatland monitoring report: Food estate development impact in Central Kalimantan*. Pantau Gambut Indonesia.
- Pantau Gambut. (2023). *Environmental assessment of cassava food estate development areas*. Pantau Gambut Indonesia.
- Greenpeace Indonesia. (2022). *Food estate and deforestation risks in Indonesia's peatland areas*. Greenpeace Southeast Asia.

Laws and Regulations

- Republik Indonesia. (2009). *Undang-Undang Nomor 41 Tahun 2009 tentang Perlindungan Lahan Pertanian Pangan Berkelanjutan*.
- Republik Indonesia. (2012). *Undang-Undang Nomor 18 Tahun 2012 tentang Pangan*.
- Republik Indonesia. (2019). *Peraturan Presiden Nomor 56 Tahun 2018 tentang Perubahan atas Proyek Strategis Nasional*.
- Republik Indonesia. (2020). *Peraturan Presiden Nomor 109 Tahun 2020 tentang Percepatan Pelaksanaan Proyek Strategis Nasional*.

News and International Sources

- Reuters. (2024, July 10). *Indonesia plans massive food estate expansion to boost food security*. Reuters.
- Antara News. (2023). *Government accelerates food estate development to strengthen national food resilience*. Antara News.