CIPS
Center for Indonesian Policy Studies

POLICY BRIEF

June 2025

Policy Brief No. 28

Indonesia's Food Estate in Context: Bridging Past, Present and Future for National Food Security

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Key Messages

- The food estate program was introduced in Indonesia in 1995, during the Soeharto era and continuing under presidents Yudhoyono (SBY), Jokowi, and now Prabowo. The primary goal of this policy is large-scale land conversion for agriculture to bolster food production.
- Despite its long history, the Food Estate has consistently failed to achieve its central aim of strengthening national food security.
- Despite a massive budget, the food estate program has never affected rice productivity over its duration from 1995 to 2024. Instead, it has had long-lasting detrimental social, economic and environmental impacts.
- Indonesia's food security efforts must shift from forest land expansion to sustainable intensification, focusing on existing agriculture lands, optimizing fallow lands, maximizing agri-tech use, and acknowledging local socio-economic resources during implementation.
- The food estate program should also contribute to modernizing agriculture, foster more bottom-up planning and implementation, and contribute to food diversification.

Overview of Food Estate

Approximately 3.65 million hectares[1] of peatlands and forest were cleared from the era of President Soeharto up to President Joko Widodo, primarily for the development of food estates. Another 3 million hectares of land are expected to be cleared to accommodate the food estate program during the current Prabowo-Gibran administration (Qodriyatun and Sawalman, 2024). The food estate initiative has been a top priority, aimed at securing national food security by boosting food crop production in Indonesia.

A food estate in Indonesia is defined as a large-scale agricultural area that integrates the development of food commodities, horticulture, plantations, and livestock. Currently, according to Law No. 59/2024 on the National Long-Term Development Plan 2025–2045, the main objective of the food estate is to provide food reserves for national food security. This goal is respectable, but in practice food estate projects have been plagued with governance issues.

During President Widodo's second term (2019–2024), the project was generously funded and included the controversial involvement of the Ministry of Defense, yet this did not guarantee results. The viability of the selected land plots for agriculture, the realized crop productivity, and the socio-environmental impacts resulting from this program all raised concerns (Khairunnisa, 2024; KT & Pantau Gambut, 2025).

President Prabowo's ambitious plan aims to achieve food self-sufficiency by 2029, particularly for staple food crops such as rice, maize, and sugar. In an attempt to halt the import of rice of 4.52 million tonnes in 2024 (Statistics Indonesia, 2025), the plan includes land extensification.

Land extensification involves clearing lands for agriculture—primarily peatlands, wetlands, and forest lands—to support the cultivation of food crops in regions including Merauke (Papua), South Sumatra, and Central, West, and South Kalimantan.

The food estate program is supported by several legal bases and policy frameworks that govern and oversee its implementation:

1. Law No. 59/2024 on the Long-Term National Development Planning for 2025–2045 emphasizes the Food Estate Program to strengthen national food reserves and increase farmers welfare.
2. Presidential Regulation No. 12/2025 on the Middle-Term National Development Planning for 2025-2029 specifies implementation of the first phase of long-term national development planning and includes food estates as national strategic projects (*Proyek Strategis Nasional*, PSN). The development of the food estate program as PSN will focus mainly in Central Kalimantan, South Sumatra, and South Papua with the Ministry of Agriculture (MOA) and the private sector serving as implementers, as detailed in Attachment I of the Presidential Regulation. This further details food estate development in North Sumatra, East Nusa Tenggara, Papua to support national food sovereignty.
3. Ministry of Environment and Forestry Regulation No. 7/2021 addresses forest planning, changes in the designation and function of forest areas, and the use of forest areas. It specifically highlights the management of forest areas for food security (KHKP) as a crucial component of the food estate development.
4. Food Estate Development Master Plan in Central Kalimantan and North Sumatra Province, issued by the Ministry of Development Planning (Bappenas) in 2023, explains the role of food estates in providing food reserves and preventing food crises in Indonesia.
5. Presidential Regulation No. 131/2024 on Food Estate Area Management Authority Agency of North Sumatra specifies agency authority on food estates— coordinating ministries, relevant ministries, and the governor of North Sumatra—to prepare master plan of food estate development in 2025–2045 and detailed development plan for 2025–2029 in 20,970 hectare-areas of food estates. Coverage areas for food estates include: national land, rights of land, and forest area.

[1] Data compiled from Barahamin et al (2022); Global Forest Watch (2024); KT & Pantau Gambut (2025); MOEF (2020); Pantau Gambut (2021b); Suriadikarta (2012).

Table 1.
Governance and Implementation

Policy Makers	Role
Bappenas, Coordinating Ministry of Economic Affairs (CMEA), Coordinating Ministry of Maritime and Investment (CMMI)	Strategic planning and area selection
Ministry of Agriculture	Area selection, irrigation, on-farm management, and off-farm relationships
Ministry of Public Works and Housing (PUPR)	Supporting infrastructure (irrigation, roads, and housing for farm workers)
Ministry of Environment and Forestry (MOEF)	Land clearance
Local Governments	Provision of workforce, human resources, and marketing support
Ministry of Cooperation and Small Medium Enterprises (KemenkopUKM) and State Enterprises (BUMN)	Processing and marketing support

Source: Food Estate Development Master Plan in Central Kalimantan 2023.

Apart from the roles of each ministry and local government stated in the Food Estate Development Master Plan in Central Kalimantan (Table 1), news reports and official statements from the Ministry of Defense (MOD) and Ministry of Public Works (PUPR) highlight the Ministry of Defense's direct role in managing the food estate in Gunung Mas, which focuses on cassava and field corn[2] (MOD, 2024). These crops are specifically cultivated for food reserves, biomedical reserves, and energy reserves under MOD's Strategic Logistics Reserve Agency. However, the Ministry of Defense's involvement in the food estate project is not mentioned as one of the ministries in the Central Kalimantan food estate management as outlined in the Master Plan. This shows the potential for overlapping authority and undermines the main objective of food estate in securing national food security

Food Estate as a Legal Mandate on Food

The prevention of food crises is mandated by Law No. 18/2012 on Food, which outlines the government's role in ensuring sufficient food supplies to meet the needs of the people by enhancing food security.

Article 1 (4) of Law No. 18/2012 further specifies that "food security means a condition in which food demand in a country is sufficiently fulfilled at the individual level, reflected by the availability of adequate food in quantity and quality, that is safe, diverse, nutritious, evenly distributed, affordable, and conforms to religious norms, beliefs, and cultural practices, enabling a healthy, active, and productive life in a sustainable manner."

However, since the planning and implementation of this program, there have been ongoing debates (Santosa, 2024; KT & Pantau Gambut, 2025) about how the food estate program disregards the mandate of Law No. 18/2012 on Food. The main criticisms center on four aspects:

1. **Ecological Vulnerability and Damage**: The conversion of forest lands has led to significant ecological damage.
2. **Unsuitable Land Characteristics**: The land designated for the food estate areas is often unsuitable for the crops being planted.
3. **Centralized Policy-Making**: The policy-making process tends to be top-down, lacking in research and studies, and neglecting the voices of the community and local governments.
4. **Low Crop Productivity**: Crop productivity is very low compared to the broader sector, despite the ecological costs and budgets incurred to implement this program.

[2] Field corn refers to corn that is used primarily for animal feed and other industrial purposes (i.e. biodiesel). This type of corn differs from the varieties normally used for human consumption, that is, sweet corn.

Despite the various controversies surrounding the implementation of the food estate program, the government plans another expansion of 3 million hectares of land to be cleared in 2025 (Qodriyatun and Sawalman, 2024). According to the Government Work Plan (*Rencana Kerja Pemerintah* or RKP) 2025, this program will go forward as part of efforts to strengthen national food security under a new name: "Food Production Center Zone" (*Kawasan Sentra Produksi Pangan* or KSPP).

Key Problems of the Food Estate Programs

The Economic Burden of the Food Estate Program

The food estate program has been highlighted by the government to provide a fast solution for food security issues, mainly by provisioning food crop reserves. Unfortunately, the costs associated with this program are underappreciated, resulting in high financial costs and burdening the state budget (Barahamin et al., 2022).

Although it is hoped the program can quickly address issues of food security, it is not new. Initiated under President Soeharto in 1996, and then called the One-Million Hectares of Peatlands Project (*Proyek Lahan Gambut Satu Juta Hektar*, PLG), the program aimed to open up one million hectares of wetlands, mainly in Kalimantan, to boost agricultural production, particularly of rice. This initiative was also known as the Mega Rice Project.

The One-Million Hectares of Peatlands Project / Mega Rice Project began with a significant budget increase for agriculture and irrigation, totaling IDR 13.3 trillion[3]—an additional IDR 7 trillion on top of the five-year development plan (*rencana pembangunan lima tahun*, *Repelita*) in 1995. This budget is equivalent to approximately IDR 113.7 trillion or USD 13.2 billion in present value (*see* Table 1). The additional budget was also from the President Support Fund of IDR 527 billion through President Decree No.83/1995.

Despite the immense budget—almost 37 trillion for food estates, and especially for '*cetak sawah*' rice field expansion, in Prabowo Era (Figure 1)—and the clearing of millions of hectares of forests to accommodate food estates, the lands actually cultivated for agriculture were miniscule at only 0.2%, 8.6%, and 2.4% during the Soeharto, Yudhoyono (SBY), and Jokowi eras, respectively. The budget allocated for food estate for the Prabowo era totals IDR 105,9 trillion, allocated through Presidential Regulation No. 12/2025 [Attachment III., PR No, 12/2025].

Additional funds required for the restoration and rehabilitation of degraded forest areas formerly designated for food estates were considerably higher than the benefits. For example, in the case of restoration in an ex-PLG area in Central Kalimantan, President Instruction No. 2/2007 On the Acceleration for Rehabilitation and Revitalization of Peatlands Area in Central Kalimantan stipulated a budget of IDR 3.9 trillion. The budget was then expanded to IDR 7 trillion, more than half of the initial budget allocated for the whole food estate program (Bappeda Kalteng, 2007). Crucially, this restoration budget covers only 400,000 hectares of the ex-PLG area.

[3] Based on the Financial Note 1995/1996 issued by the Finance Department (*Departemen Keuangan*).

Table 2.
Food Estate Implementation under various Presidential Administrations

	President Era			
	Soeharto	**Susilo Bambang Yudhoyono (SBY)**	**Jokowi**	**Prabowo**
Year of Implementation	1995–1998	2008–2014	2015–2024	2025–2029
Land Clearance	1.45 million ha	1.23 million ha (Merauke, Papua); 298,000 ha (Bulungan and North Kalimantan) and 100,000 ha (Ketapang, West Kalimantan)	1.2 million ha (Merauke, Papua); 10,000 ha (Keerom, Papua); 31,000 ha (Gunung Mas, Central Kalimantan)	3 million hectares (target)
Realization[4]	3000 ha [0.2% of land cleared]	140,000 ha in Merauke, 100 ha in Ketapang and 1024 ha in Bulungan [8.6% of land cleared]	30,000 ha (Central Kalimantan); 482 ha (North Sumatra) [2.4% of land cleared]	150,000 ha in 2025
Location	Central Kalimantan	Merauke, South Papua; North & West Kalimantan	Central Kalimantan, North Sumatra, East Nusa Tenggara, South Sumatra and Papua	Merauke (Papua), South Sumatra, Central, South and West Kalimantan
Allocated Fund	13.3 trillion	8.09 trillion	Data is not available[5]	105.9 trillion[6]
Year 2023 Currency converted* (IDR)	113.78 trillion	14.05 trillion	-	-
Budget Source (IDR)	101.35 trillion [State Budget 1995]	340.15 trillion [State Budget 2010]	-	Indicative Budget from PR No. 12/2025
Percentage from State Budget*[7]	13,12%	2,4%	-	-
Additional Funding (IDR)	527 billion through President Support Fund as in President Decree No 83/1995	-	-	-
Exit Policy	President Decree No 33/1998	-	-	-

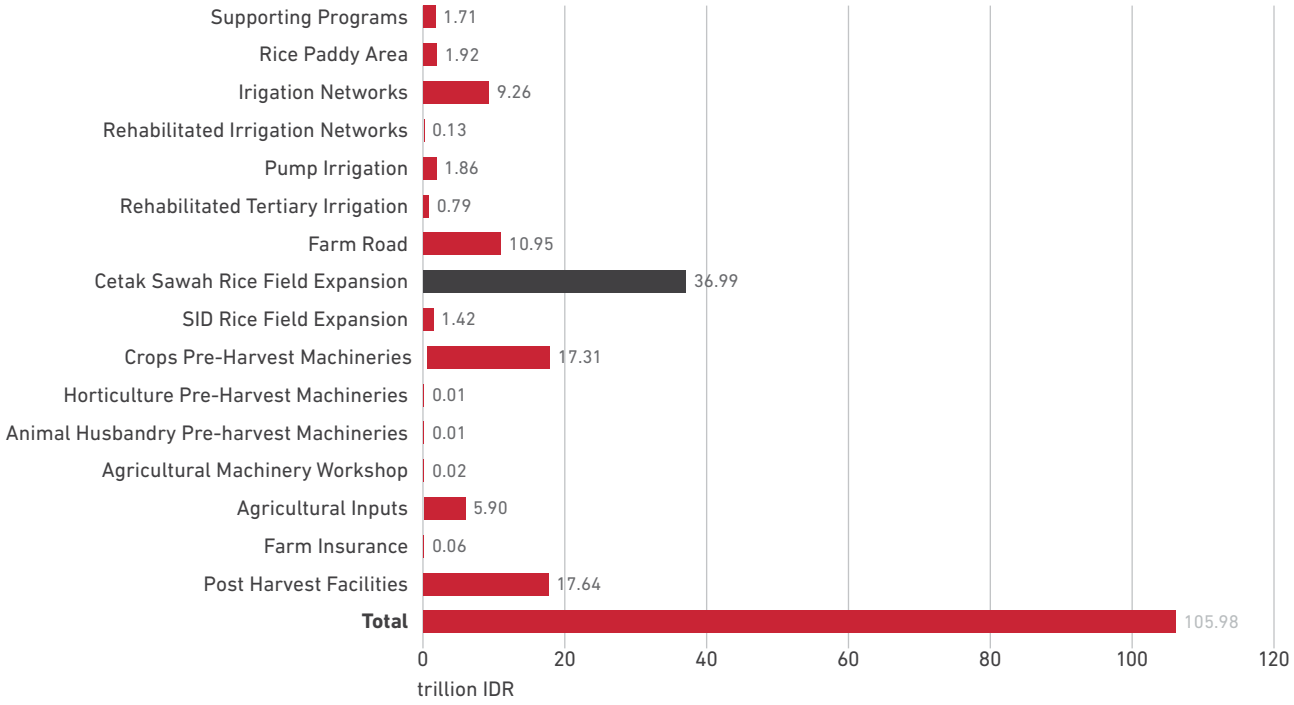
[4] Realization here means the area that has been deemed as successful to be used as agricultural land.
[5] Allocated fund was available under the food security budget of IDR 99 trillion at 2021 State Budget which included Food Estate, but not specifically addressed to the Food Estate Program.
[6] See details of allocation in Figure 2.
[7] Calculated as allocation to total state budget in the early year of program implementation.

	President Era			
	Soeharto	**Susilo Bambang Yudhoyono (SBY)**	**Jokowi**	**Prabowo**
Legal Bases and Policy Frameworks	President Decree 82/1995 on Peatlands Development for Crops in Central Kalimantan	President Instruction (PI) No 5/2008 on Economic Program Focus for 2008-2009; PI No 1/2010 Acceleration on National Development Priority in 2010; Government Regulation 18/2010 on Food Crop Production	President Regulation (PR) No 109/2020 Acceleration on National Strategic Project; PR No 108/2022 on Government Work Plan in 2023; Ministry of Forestry and Environment Regulation No 7/2021 on Forest Planning, Changes in the Designation of Forest Areas and Changes in the Function of Forest Areas, as well as the Use of Forest Areas for Food Security (KHKP)	Continuation from Jokowi: PR No 109/2024 on Government Work Plan in 2025; PR No 12/2025 on Mid-Term Development Planning 2025-2029
Focus Crop	Rice	Rice, Corn, Soybean, Sugar	Rice, Corn, Cassava, Shallot, Garlic	Rice, Corn, Cassava, Sugar
Stakeholders	Ministry of Transmigration and Forest Encroach for Settlements, Ministry of Development Planning, Ministry of Agriculture, Ministry of Forestry, Ministry of Environment, Ministry of Internal Affairs, Ministry of Public Works, Ministry of Agrarian, and Ministry of Finance	Ministry of Development Planning, Ministry of Agriculture, Ministry of State Enterprises, Ministry of Public Works, and Private Sectors	Ministry of Development Planning, Coordinating Ministry of Economic Affairs, Coordinating Ministry of Maritime and Investment, Ministry of Agriculture, Ministry of Public Works and Housing, Ministry of Forestry and Environment, Local Governments and Ministry of Cooperation and SMEs, State Enterprises, Ministry of Defense[8]	Ministry of Development Planning, Ministry of Agriculture, Ministry of State-Owned Enterprises, Ministry of Public Works, Ministry of Forestry, Ministry of Environment, Ministry of Cooperatives, Ministry of Transmigration, Ministry of Communication and Digital, Research and Innovation Agency, Meteorology Climatology and Geophysical Agency, and Statistics Indonesia, Local Governments, and Private Sectors

Source: Author compilation and calculation.*

[8] Referring to Bappenas Master Plan Development for Food Estate, which specifies the role of related stakeholders in the Food Estate Program. This document does not specify the role of Ministry of Defense (MOD), which contradicts in the press release by MOD in https://www.kemhan.go.id/2024/03/13/kementerian-pertahanan-ri-panen-raya-jagung-di-lahan-food-estate-kalimantan-tengah.html

Figure 1.
Food Estate Indicative Budget from 2025–2029

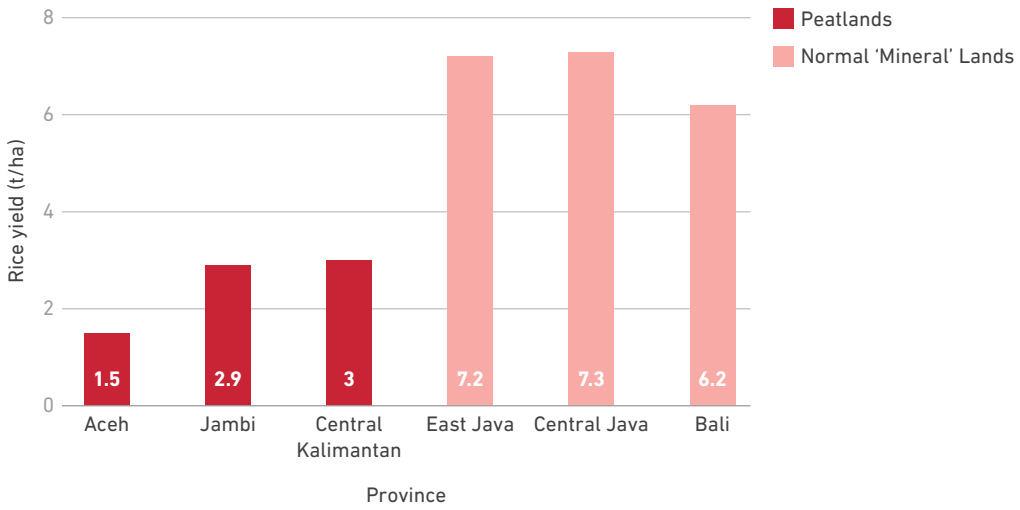


Source: Compilation from Presidential Regulation No.12/2025 on National Mid-Term Development Planning 2025–2029.

Suboptimal Productivity due to Land Unsuitability and Farmers' Knowhow

Despite its relatively large scale—1.5 million hectares of land cleared—the food estate area represents only about 11–14% of irrigated rice area. Food estates have not generated a large increase in outputs—in fact, rice production declined from 31.31 million tonnes of milled rice in 2019 (Statistics Indonesia, 2019) to around 30.90 million tonnes in 2023 (Statistics Indonesia, 2023a). The yield of rice from food estate projects in Central Kalimantan and peatland areas in Indonesia is also quite low, ranging from 2.7 to 3.2 tonnes/hectare (BPS Kalteng, 2020; Pantau Gambut, 2021a) (Figure 2).

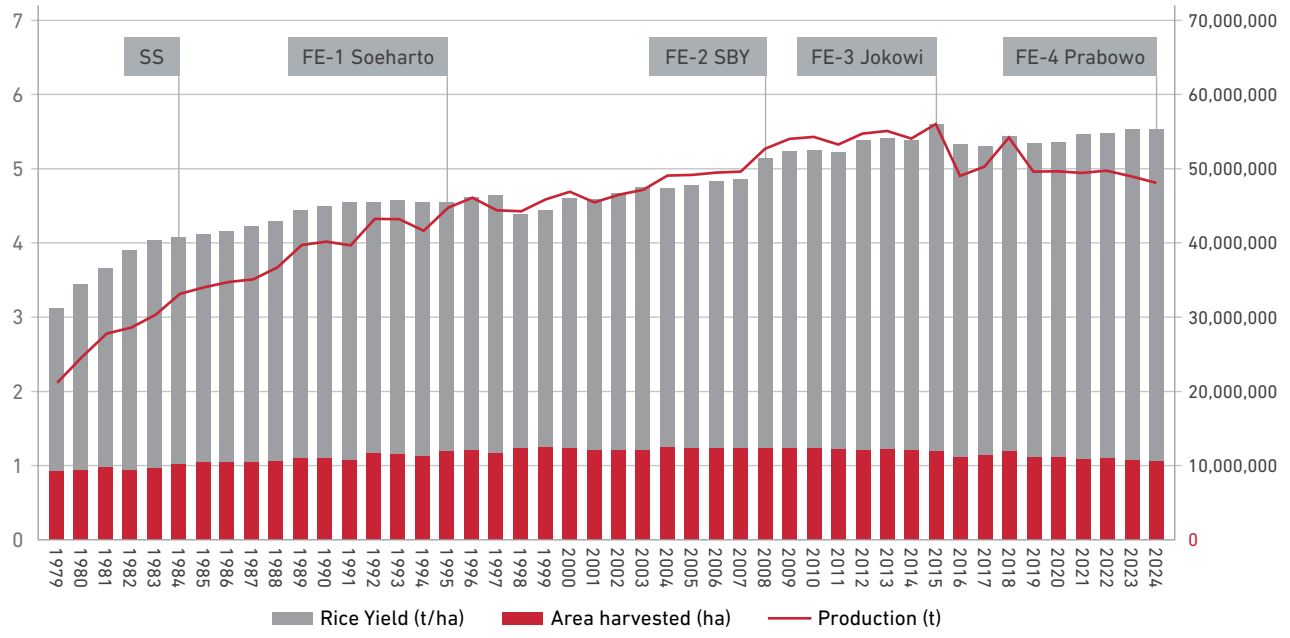
Figure 2.
Rice Productivity in Peatlands and Normal Lands in Indonesia



Source: author compilation reproduced from BPS Kalteng (2020) & Pantau Gambut (2021a).

The yield from these food estate projects is far below the national average of 5.1–5.2 tonnes/hectare (Figure 3). The optimum yield for rice is 6–7 tonnes/hectare, and the maximum yield in normal areas in Indonesia can reach 7-10 tonnes/hectare (Sulaeman et al., 2023). The average yield in Indonesia has never reached its optimum, even when Indonesia was self-sufficient in 1984, nor over the duration of the food estate program since 1995. Low yields are due to the unsuitability of peatlands, which leads to poor food crop production, along with minimal water and land use management in these areas.

Figure 3.
Average rice yield, production and area harvested in Indonesia from 1995–2024



[Notes: SS: Food Self-sufficiency; FE: Food Estate]

Source: Author compilation from FAOSTAT (2025) and Statistics Indonesia (2025).

Lower agricultural productivity might also be attributable to farmers' lack of knowledge and skills in cultivating a chosen commodity. In Ria-Ria, one of the food estate sites designated for potatoes, shallot, garlic, and corn, the farming laborers reportedly cultivated chili, sweet potatoes, and tomatoes instead of the designated commodities for two years after the project started. The different outcome was reportedly due to farmers choosing to cultivate crops they are more familiar with and that would offer higher profitability (Barahamin et al., 2022). This also suggests a lack of communication with local farmers and laborers in the program planning.

Addressing these issues involves carefully planning the site selection and treatment, manpower preparation, and coordination with local stakeholders.

Rather than using low-productivity peatlands, fallow land[9] could be prepared or repurposed for agricultural use. In 2019, Indonesia had approximately 20.5 million hectares of fallow land (Purnama, 2024). These are underutilized lands that have not been cultivated for agricultural purposes for an extended period. These lands can be better used by determining soil suitability and fertility using valid analytical methods (Priyantoro et al., 2024) to assist in decision-making regarding suitable locations and types of crops.

Next, empowering farmers through training is essential to help manage fallow land effectively. The availability of skilled labor is a key factor in improving agricultural productivity. Furthermore, coordination between the government, society, and the private sector is needed to create policies that support the dedication of fallow land to agricultural production to address food security.

[9] Fallow land here refers to *lahan tidur*: an agricultural land that has not been used for two consecutive years as the result of shifting cultivation; it also refers to unproductive or productive lands that have not been used for agricultural purposes outside forest areas.

Limited Impacts on Local Economy and Food Security

Despite its national ambition, and aside from its failure to increase national food production, the food estate program has failed to improve local conditions at the sites where it is implemented. The issue stems not only from a lack of planning and coordination, but also from how the project sites are basically designed as food reserves for key consumer markets in Java.

Reports suggest a decline in both farmers' income and food security at various food estate sites. Farmers in Ria-Ria, one of the food estate areas, experienced a drastic decline in rice harvests after being directed to cultivate other crops like potatoes and garlic. This shift not only failed to compensate for the lost rice yields but also led to insufficient food availability for many households, with up to 30% lacking enough rice for the year (Jong, 2022).

In Pulang Pisau, almost 90% of farmers did not achieve satisfactory rice harvests—in the 2021 harvest, farmers were only able to harvest 1.5 tonnes of rice per hectare from an expected 3.5–4 tonnes (Siborutorop, 2024). The food estate program has struggled to meet its production goals. Farmers did not gain anything from their new rice fields in the food estate program and decided to sell vegetables to increase their income (Triwibowo, 2024).

In Merauke, another long-time food estate location and one of the most underdeveloped districts in Indonesia, food insecurity has persisted since 2015 (WFP, 2015; NFA, 2024). Since 2010, the district has been the location of a mega-development for food and energy security, focusing on crops such as rice, sugarcane, and palm oil. The food estate is detached from local socio-cultural reality, because large plantations stand to benefit from the lands made available for the plantations, without having to consider the needs of the local community. As a result, instead of alleviating food insecurity, the program may exacerbate it within the region by redirecting resources and failing to provide sustainable agricultural outputs that support the needs of the local community.

Environmental Impacts

The conversion of forests to food estate land in Indonesia has become a contentious issue. Conversion aims to increase agricultural output with low regard on environmental impacts. Through Ministry of Environment and Forestry Regulation No. 24/2020, the government allows the clearing of protected forest areas to establish large-scale agricultural projects, primarily for staple crops like rice, under the food estate program. Article 19 of this regulation states that protected forest areas that can be converted to food estates are no longer fully protected areas according to the provisions of laws and regulations. The regulation does not detail how this is determined.

In Central Kalimantan, the transformation of forested areas into food estate areas has resulted in significant ecological damage. The alteration of land use has increased flooding risk, forest fires, air pollution, and exacerbated the ongoing climate crisis (Khairunnisa, 2024). The conversion of rich forest landscapes also endangers various species, including orangutans, whose habitats are increasingly encroached upon. Satellite imagery mapping by The Gecko Project shows that most of the targeted locations in Central Kalimantan were actually rainforest areas, where most of the area is orangutan habitat (The Gecko Project, 2021). The long-term implications of such habitat destruction could be devastating, leading to irreversible changes in local ecosystems that rely on biodiversity for resilience and stability.

In Merauke, approximately 2 million hectares of rainforest have been cleared to make way for agricultural development. A recent study by Askar (2024) showed that emissions could reach 782.45 million tonnes of CO_2 generated by the Merauke food estate alone. The practice also contradicts Government Regulation No. 98/2021, which aims to reduce greenhouse gas (GHG) emissions, enhance climate resilience, and establish an economic carbon value (NEK) to meet nationally determined contribution (NDC) targets, including a 2030 GHG emission baseline of 2,869 million tonnes of CO_2 equivalent. The food estate program could potentially hinder government NDC targets and reduce revenue from result-based payments (RBP), an incentive for reducing emissions, particularly from deforestation.

For all these reasons, the food estate program poses a major challenge to Indonesia's commitment to achieve net zero emissions by 2050 and undermine its obligations under the Paris Agreement.

Social Impacts: Conflicts with Local Communities

The food estate program has been criticized for top-down management, which often causes conflict between the government and local communities. This issue was evident in Pulang Pisau, where the food estate was planned on previous PLG land without consulting local communities (Hartono, 2021).

Top-down management also disrupts traditional farming practices, as communities are forced into large-scale farming operations that often do not directly benefit them. In Humbang Hasundutan Regency, North Sumatra, farmers were discouraged from using their traditional farming practices and had to strictly adhere to government-approved techniques (Siborutorop, 2023). This not only threatens local food security but also undermines cultural heritage and economic stability.

Moreover, there are significant concerns about the effects of the food estate program in Merauke on local indigenous communities and their traditional food systems. The project involves clearing approximately 1.3 million hectares of land for rice farming, threatening local food crops for indigenous populations who depend on sago and tubers (Arif, 2024). This exacerbates appropriation of customary lands (*tanah adat*) and the already tenuous tenurial rights situation in Indonesia.

A Way Forward

The food estate program aims to strengthen national food security by expanding agricultural areas for production—mainly by clearing lands or extensification. However, these methods have high social, economic, and ecological costs. The following recommendations provide a way forward by reevaluating current approaches. The focus should be on ensuring that these strategies are inclusive, sustainable, and efficient to overcome these burdens and ensure sustainable food security.

Intensification-based

The direction of food estates relies heavily on extensification of lands—clearing forested areas and using national land and land rights. This entails significant environmental costs and results in low-productivity agricultural yields from the use of nutrient-scarce lands. Moving forward, food estate policy should focus instead on intensification.

Intensification-focused policy would support Presidential Instruction No. 2/2025 on Accelerating Development, Increase, Rehabilitation, Operation and Maintenance of Irrigation Channel to Support Food Self-sufficiency, which specifies the roles of relevant ministries and local governments to improve irrigation channels in 14 major provinces: Aceh, North Sumatra, Riau, Jambi, Bangka Belitung, South Sumatra, Lampung, Central-North and South Kalimantan, South Sulawesi and South Papua; and other relevant provinces if necessary. These efforts to improve infrastructure facilities should be followed by increasing the adoption of high-yield crop varieties, which can increase productivity to reach the maximum of 7–8 tonnes/hectare for rice and corn. Policy should also foster research and development of adaptive technologies on climate change and shocks, especially related to pest and disease control, and optimizing fertilizer use.

Adhering to intensification rather than extensification could potentially produce 11.84 million more tonnes of rice[10] than the current projection of food estate aiming to secure 5 million tonnes[11] annually.

Modernizing Agriculture

The food estate program has been implemented labor intensively, maintaining minimal technological adoption and, in turn, perpetuating low productivity. Local and indigenous knowledge of farming is crucial for food security programs involving communities. This should be complemented by the modernization of agriculture.

[10] Calculated based on existing area for rice intensification in 7.4 million hectares of land multiplied by the difference at minimum productivity of rice 7 ton/ha (using high yielding varieties) with current productivity of 5.4 ton/ha (Statistics Indonesia, 2023a).
[11] According to Presidential Regulation No 12/2025 on Mid-term Development Planning 2025–2029.

Indonesian farmers are mostly small-scale farmers over 45 years old (Statistics Indonesia, 2023b). This modernization of agriculture goes beyond merely introducing more modern technology; it also involves improving access to finance, to digital tools such as precision agriculture, the Internet of Things (IoT) and smart farming systems, infrastructure, logistics and knowledge transfer to help farmers improve their productivity.[12]

From Top Down to Bottom-up

Food estates use top-down governance, where the central government controls planning and implementation with minimal participation from local communities. As a result, this program often does not meet local needs, causes agrarian conflicts, and threatens environmental sustainability and farmers' welfare. Shifting to bottom-up governance is essential to ensure the national food program is more inclusive and sustainable.

The current food estate system tends to treat local farmers as mere laborers or cultivators without improving the local agrarian system or increasing land ownership by farmers. Farmers often do not have secure ownership or control over the land designated for the food estate. For instance, when investors or large companies control land, local farmers risk losing access to it. Many farmers have been forced to rent their land to companies due to unsatisfactory yields and unfair profit-sharing arrangements with government-appointed host companies (Sinaga, 2024). This situation has made some farmers laborers on their land rather than independent owners.

To address these issues, a participatory governance model that emphasizes collaboration and includes local communities needs to be implemented. The involvement of local institutions such as cooperatives and BUMDes (Village-Owned Enterprises) is essential to assist farmers in marketing their crops and expanding market access.

The selection of food estate locations should also be carried out through a participatory approach involving local communities and based on science, through a comprehensive feasibility study covering land suitability, environmental, economic, and social aspects. This procedure is important to ensure the success of food estates in increasing national food security while maintaining ecological sustainability and the welfare of local communities.

A Local Context: Food Security is Not All About Rice

Finally, rice has always been the key crop proposed in every food estate program. This is mainly due to the dependency of the Indonesian diet on rice and thus its central significance to national food security. There is, however, a diversity of locally cultivated crops, including staple carbohydrates such as sago, cassava, and maize, and vegetable protein sources, such as different varieties of edible legumes or beans originated from Indonesia[13].

To reduce dependence on rice, food security efforts should include initiatives aimed at supporting community cultivation of these crops, as well as support for commercialization and research and development to improve the productivity and resilience of the crop varieties. These crops may also act as soil-fixating crops, apart from providing a source of food diversification in food security-related programs.

Diversification not only broadens the range of carbohydrate and protein sources but also supports local economies by encouraging small and medium enterprises (SMEs) to process local raw materials into value-added products, reducing dependence on imported wheat and other staples.

[12] See Alta et al (2021) for details on Modernizing Indonesia's Agriculture.
[13] See Mead (2020) for the complete list of edible legumes in Indonesia.

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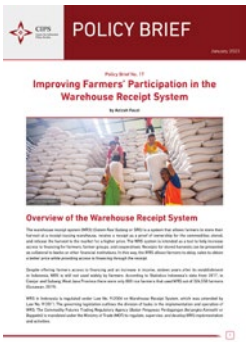

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