International Journal Of Humanities Education And Social Sciences ***(IJHESS)*** *E-ISSN:* **2808-1765**
Volume 5, Number 4, February 2026, *Page. 1676 – 1686*
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Interoperability Strategy Of The Indonesian National Armed Forces And National Police In Securing National Food Resources Through A Holistic Security Approach

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Abstract

Food security is a vital component of national stability, particularly amid multidimensional threats such as climate change, land-use conversion, and illegal food distribution. Riau Province faces serious food security vulnerabilities due to environmental degradation, frequent forest and land fires, and a strong dependence on external food supplies. These conditions highlight the urgent need for an integrated food security strategy supported by synergy among defense and security institutions. This study analyzes the interoperability strategy between the Indonesian National Armed Forces (TNI) and the Indonesian National Police (Polri) in securing national food resources through a holistic security approach, with a specific focus on Riau Province and Pekanbaru City. Using a qualitative descriptive method and a case study approach, the research incorporates policy analysis, literature review, and secondary data from government agencies. The findings indicate that TNI–Polri coordination remains fragmented and lacks a structured interoperability mechanism. Key challenges include weak policy alignment, limited data sharing, and insufficient technological support for monitoring. Nevertheless, synergy opportunities exist through establishing a joint command center, developing technology-based food intelligence systems, and strengthening cross-sectoral regulatory frameworks. Overall, a holistic TNI–Polri interoperability strategy offers a strategic pathway to reinforce food security and enhance national resilience against non-traditional threats.

Keywords: Food Security, Holistic Security, Interoperability, TNI–Polri, Riau.

INTRODUCTION

Food security is a fundamental component of national stability and is categorized as a non-traditional security issue because it directly affects public welfare, economic stability, and social order. According to Indonesia's legal framework—such as Undang-Undang Nomor 18 Tahun 2012 on Food and Peraturan Pemerintah Nomor 17 Tahun 2015 on Food and Nutrition Security—food includes all biologically sourced products for human consumption, while food security refers to the availability, safety, accessibility, and stability of nutritious food. The Food and Agriculture Organization (FAO, 2024) further outlines four pillars of food security: availability, accessibility, stability, and utilization. In Indonesia, these encompass agricultural, livestock, fisheries, and horticultural products that form the backbone of national food systems.

Given Indonesia's population of approximately 281 million in 2024, food security has become increasingly strategic and sensitive, influencing political, social, and economic stability. The government places food security and self-sufficiency as national priorities (Kementerian Pertahanan RI, 2025). Scholars such as Mansyur (2022) and Sutrisno (2022) highlight the role of food security in guaranteeing fundamental human rights, developing quality human resources, and strengthening national resilience. Although agriculture remains a national strength—supported by vast land potential and abundant labor—it faces challenges including land conversion, labor decline, and dependence on food imports, which heighten vulnerability to global price fluctuations (Zebua, 2018).

In the context of national food security, Riau Province holds significant potential in agriculture and fisheries due to its strategic location and rich natural resources. However, the region simultaneously confronts major threats such as climate change, land-use conversion,

resource exploitation, and heavy reliance on external food supplies. These factors make Riau's food security a strategic national concern requiring a comprehensive security-based approach (Badan Pangan Nasional, 2024). Strengthening sustainable resource management and technological innovation is therefore necessary to boost domestic production and reduce import dependence, which—if left unaddressed—could undermine economic resilience and national stability in the long term.

Table 1. Provincial Food Security Rankings and Index (IKP) 2024

Rank	Province	IKP	Rank	Province	IKP
1	Kalimantan Selatan	77.62	20	Jawa Timur	71.04
2	Kalimantan Timur	77.57	21	Jawa Tengah	70.78
3	Bali	77.02	**22**	**Riau**	**69.64**
4	Banten	76.97	23	Kalimantan Barat	69.26
5	Kepulauan Bangka Belitung	76.41	24	Gorontalo	67.95
6	Sumatera Selatan	76.30	25	Aceh	67.90
7	Sumatera Barat	76.00	26	Sulawesi Tengah	66.92
8	DI Yogyakarta	75.69	27	Bengkulu	65.89
9	Nusa Tenggara Barat	75.49	28	Sulawesi Tenggara	65.70
10	Jambi	74.25	29	Sulawesi Barat	65.70
11	Kepulauan Riau	73.21	30	Papua	57.39
12	Sulawesi Utara	72.97	31	Maluku	57.36
13	Kalimantan Tengah	72.50	32	Maluku Utara	57.30
14	Jawa Barat	72.31	33	Papua Barat	56.95
15	Sulawesi Selatan	72.00	34	Nusa Tenggara Timur	56.27
16	Lampung	71.91	35	Papua Barat Daya	54.52
17	Kalimantan Utara	71.57	36	Papua Selatan	51.87
18	Sumatera Utara	71.45	37	Papua Tengah	43.91
19	DKI Jakarta	71.23	38	Papua Pegunungan	34.56

Source: Badan Pangan Nasional (2025)

Based on Table 1.1, the provinces with the highest Food Security Index (IKP) in Indonesia in 2024 are South Kalimantan (77.62), East Kalimantan (77.57), Bali (77.02), Banten (76.97), and Bangka Belitung Islands (76.41), reflecting strong food security supported by stable production, adequate availability, efficient distribution, and supportive regional policies. In contrast, the lowest-scoring provinces—Highlands Papua (34.56), Central Papua (43.91), South Papua (51.87), Southwest Papua (54.52), and East Nusa Tenggara (56.27)—face major challenges such as limited food access, dependence on external supplies, inadequate infrastructure, and climate-related disruptions. Meanwhile, Riau ranks 22nd with a score of 69.64 ("Secure"), yet still struggles with agricultural land conversion, climate impacts on productivity, and limited adoption of modern agricultural technologies, all of which pose risks to regional food availability and supply stability.

In this context, the interoperability strategy between TNI and POLRI is essential to strengthening national food resource security in Riau through a comprehensive and holistic national security approach. Synergy between the two institutions can be realized through monitoring food distribution, securing agricultural land from illegal activities such as forest encroachment and food smuggling, and supporting farmers and local communities in improving sustainable domestic production. This approach not only enhances regional food security but also integrates food security into broader economic stability and national security.

One of the greatest challenges to food security in Riau is the impact of climate change. Unpredictable weather patterns disrupt food production in both agriculture and fisheries, affecting planting and harvesting cycles and reducing productivity (IPCC, 2023). Rising temperatures and extreme rainfall have caused crop failures in key commodities such as rice and palm oil, while warming seas have reduced fish populations due to shifting aquatic ecosystems (Suryadi, 2024). Without effective mitigation strategies, Riau's food security will become increasingly vulnerable to external disruptions, threatening long-term economic and social stability.

Agricultural land conversion to industrial zones and oil palm plantations has significantly reduced local food production. BPS data shows that rice field area in Riau declined from 62,689 hectares in 2019 to about 51,910 hectares in 2023, with local rice production covering only 20–25% of demand. Production has fallen by an average of 10.61% per year since 2016, increasing dependence on supplies from West and North Sumatra. Additional issues include limited agricultural infrastructure, aging and declining farmer populations, and high production costs. Addressing these challenges requires stricter spatial planning, improved irrigation, and the adoption of modern farming models such as those in Bunga Raya, Siak, alongside better water management and market access for farmers (Suryadi, 2024).

Unsustainable exploitation of natural resources significantly threatens food security in Riau. Deforestation caused by oil palm expansion and illegal mining has led to severe ecosystem degradation, reducing soil fertility and agricultural productivity (Tsegaye et al., 2023). Water pollution from industrial and plantation activities also endangers local fisheries, a key protein source for the population. Without stricter regulations and effective oversight, continued degradation will undermine Riau's ability to meet its own food needs (Angraini et al., 2020). Food insecurity can further trigger social instability, as rising food prices and declining purchasing power may fuel protests, crime, and opportunities for organized crime or separatist movements (Fikadu, 2019; Hasanah, 2023). Strengthening food diversification and community-based programs is therefore essential for reducing dependence on a limited number of commodities and increasing local resilience (FAO, 2024).

Urban expansion and land-use change in Pekanbaru intensify pressures on food production. Rapid urbanization has reduced productive farmland and increased reliance on imported food, mirroring trends observed in developing regions (Gardi et al., 2021). Forest and land fires (karhutla) also contribute to soil degradation and declining crop yields, while worsening climate impacts through increased carbon emissions (Atkinson & Alibašić, 2023). Riau's reliance on moniculture, particularly oil palm, further limits local food availability and heightens price volatility (Hasudungan et al., 2024). Illegal trade in agricultural and fishery products, including goods entering from neighboring Malaysia, disrupts local markets, harms farmers, and poses public health risks due to poor food safety standards (FAO, 2024).

Climate change compounds these structural vulnerabilities. Rising temperatures, shifting rainfall patterns, and increased drought risk directly reduce agricultural productivity, making harvest outcomes increasingly uncertain (IPCC, 2023). At the same time, climate-induced ecological changes contribute to higher pest and disease prevalence, further threatening food supply stability. Mitigating these risks requires comprehensive policies, including stricter control of land conversion, enhanced monitoring of food trade, and climate-adaptive agricultural strategies. Diversification and improved supply-chain efficiency, as suggested by Richardson et al. (2018), can help build long-term resilience in the region.

In the context of national defense, protracted warfare involves not only conventional conflict but also non-military threats such as food crises that weaken societal endurance. Food insecurity driven by resource exploitation, climate change, and social conflict can serve as part of an adversary's asymmetric strategy to undermine national stability. In Riau, the complexity of threats such as land conversion, karhutla, and illegal food trade requires an integrated response.

Interoperability between TNI and POLRI becomes essential for developing long-term food security strategies grounded in defense principles. Through Operations Other Than War (OMSP), TNI supports food security by safeguarding agricultural resources, assisting farmers, and improving agricultural infrastructure and logistics. Programs like TMMD contribute to expanding road access and irrigation systems, enhancing agricultural productivity and preventing illegal land conversion that can exacerbate food crises (Nabilah & Rahaju, 2022).

In the context of protracted warfare, control over food resources becomes a decisive determinant of national endurance. The TNI contributes through border patrols to prevent foreign infiltration that may exploit food scarcity as a strategy to weaken the national economy, aligning with FAO's (2024) findings that long-term food deficits increase vulnerability to internal conflict and external threats. This underscores that the TNI's involvement in food security is an integral part of national defense strategy rather than merely social assistance. Meanwhile, the Polri plays a critical role in combating illegal trade in agricultural and fishery products, which undermines local economies and national food sovereignty. Rezazade et al. (2022) highlight that such illegal trade is often driven by transnational criminal networks, while Polri also enforces laws related to land and forest fires (karhutla) that diminish productive farmland. Given the long-term impact of karhutla on food ecosystems, as noted by Rezazade et al. (2022), coordinated TNI–Polri collaboration—as illustrated by joint programs like the East Java Food Self-Sufficiency initiative—is essential.

Protracted warfare demands not only combat readiness but also strong economic and resource resilience, including secure food supplies. Interoperability between TNI and Polri in safeguarding food resources in Riau functions as a long-term defense strategy for maintaining national stability. This strategy relies on enhanced operational coordination to secure farmland, distribution networks, and prevent agricultural smuggling; strengthened regulations that clarify the legal basis of TNI–Polri involvement in food security; and the optimization of technology and intelligence systems such as drones and food-security monitoring tools. Richardson et al. (2018) emphasize that sustainable food security is directly linked to geopolitical stability, as disruptions in food supply often serve as triggers for prolonged conflicts. In Riau specifically, food security faces threats from land conversion, karhutla, and smuggling of agricultural and fishery products (Tsegaye et al., 2023), requiring effective interoperability to maintain regional resilience amid the pressures of protracted conflict (FAO, 2024).

Despite its importance, coordination between TNI and Polri in securing food resources in Riau remains largely sectoral and insufficiently integrated. The TNI focuses on protecting agricultural land and preventing illegal land conversion through Operations Other Than War (OMSP), oriented toward maintaining territorial security (Napitupulu, 2024). The Polri, on the other hand, prioritizes law enforcement related to agricultural smuggling, food-related criminal networks, and karhutla (Rezazade et al., 2022). Although both institutions actively perform their respective duties, the absence of a unified coordination mechanism leads to reactive rather than preventive responses to food-security threats. Limited data sharing and minimal integration of TNI–Polri in regional food-security planning—still dominated by the Ministry of Agriculture, Ministry of Marine Affairs and Fisheries, and BNPB—highlight a persistent gap between *Das Sein* (current reality) and *Das Sollen* (what should be done), underscoring the need for more integrated strategic action.

The research centers on developing a comprehensive understanding of how TNI and Polri can strengthen national food security through an interoperable and holistic security approach, with Riau Province and Pekanbaru as the primary loci. As stated by Creswell & Creswell (2018), the research focus determines the direction of the study; therefore, this work investigates how both institutions collaborate in safeguarding food resources amid increasing non-traditional security threats. The study also outlines several sub-focuses, including assessing food security threats in Riau, analyzing the roles of TNI and Polri, formulating an integrated interoperability

model, and designing strategic recommendations to enhance national food resilience within the broader context of protracted conflict.

Based on this framework, the research problem formulation addresses four key questions related to regional threats to food security, institutional roles, interoperability mechanisms, and strategic collaboration. These questions are developed in line with qualitative research design principles that emphasize the alignment between research problems, objectives, and analytical outcomes (Creswell & Creswell, 2018). The research objectives correspond to these problem statements by aiming to analyze regional vulnerabilities to food security, evaluate the roles of TNI and Polri, identify feasible interoperability models, and formulate strategic policy recommendations. Conceptually, the study is grounded in the multidimensional understanding of food security, which includes availability, access, utilization, and stability as outlined by the Food and Agriculture Organization (FAO, 2024).

The study also emphasizes theoretical contributions by integrating national security perspectives with food system resilience. Food security is increasingly recognized as a strategic component of national security, particularly in the context of non-traditional security threats such as climate change, land degradation, natural disasters, and global supply chain disruptions (Buzan et al., 1998; World Bank, 2017). By adopting Sugiyono's (2019) framework on the importance of theoretical development and research contribution, this study seeks to enrich academic discourse on the intersection of food security, defense economics, and interagency collaboration. The integration of holistic security concepts with emerging environmental and socio-economic risks reflects the contemporary shift toward a comprehensive security paradigm.

In practical terms, the research offers strategic benefits for multiple government institutions, including the Ministry of Defense, Ministry of Agriculture, Ministry of Political, Legal, and Security Affairs, the National Disaster Management Agency (BNPB), as well as TNI and Polri. Strengthening coordination among these institutions is essential for addressing complex risks such as illegal food trade, land encroachment, forest and land fires, disaster-induced agricultural losses, and supply chain disruptions. Previous studies highlight that effective governance of food security requires cross-sectoral coordination, institutional interoperability, and integrated risk management approaches (FAO, 2024; World Bank, 2017). By providing policy-oriented recommendations to enhance interagency collaboration and operational synergy, this research contributes to the development of a more resilient, adaptive, and integrated national food security system.

RESEARCH METHODS

This research employs a qualitative method with a post-positivist paradigm, emphasizing naturalistic inquiry and deep interpretation of data, as outlined by Sugiyono (2013). The qualitative approach enables the researcher—who acts as the primary instrument—to explore the dynamics of TNI–Polri interoperability in safeguarding national food resources through holistic security strategies. Data collection follows purposive and snowball sampling, triangulation techniques, and multiple instruments such as in-depth interviews, document analysis, and observation. The analytical process adopts the Miles et al. (2014) model, which includes data reduction, data display, and conclusion drawing to identify patterns related to coordination mechanisms, operational challenges, and the effectiveness of food security policies.

The research design follows a descriptive qualitative model (Sugiyono, 2019) using a case study approach focused on Riau Province. This design allows the study to capture the real-world context of cooperation between TNI, Polri, and other stakeholders amid issues such as forest fires, illegal activities, and disruptions to the food supply chain. Data collected through interviews, observations, and documents provides a comprehensive understanding of

institutional synergy, obstacles to coordination, and determining factors affecting interoperability. The case study approach is particularly relevant given Riau's strategic position in national food security and its vulnerability to environmental and security-related threats.

Aligned with Creswell & Creswell (2018), the research setting covers various strategic institutions—including Mabes Polri, Kodam 031/WB, Polda Riau, Kodim 0301 Pekanbaru, Pangkalan TNI AL Dumai, Lanud Roesmin Nurjadin, Polresta Pekanbaru, and defense-security academics—ensuring contextual richness in data. The study is scheduled from July to December 2025, covering proposal development, data collection, analysis, seminars, and thesis defense. A flexible timeline is applied to accommodate access to key informants and operational data, while the structured schedule supports systematic execution of all research stages, including triangulation and refinement of findings based on cross-sectoral coordination and institutional capabilities.

RESULT AND DISCUSSION

Threats to Food Security in Riau and Pekanbaru

Food security in Riau Province, particularly in Pekanbaru, faces a series of structural vulnerabilities that significantly influence national food stability. Local rice production is only able to meet around 20–25% of regional consumption needs, resulting in a pronounced dependence on imports from neighboring provinces (Suryadi, 2024). This condition represents a critical Weakness in the SWOT framework, indicating that regional food availability is highly susceptible to disturbances in interprovincial supply chains. Environmental pressures—such as climate variability, drought, and recurring forest and land fires (karhutla)—further compound this vulnerability, aligning with major Threats identified in contemporary climate and environmental risk studies (Atkinson & Alibašić, 2023; IPCC, 2023).

Ecological degradation has intensified these structural weaknesses. The accelerated conversion of agricultural land into palm oil plantations and industrial zones has reduced the availability of productive farmland, thereby constraining efforts to achieve regional food self-sufficiency. Existing research demonstrates that land-use change contributes to declining agricultural output and heightens dependency on externally sourced food commodities (Gardi et al., 2021). Additionally, climate-related disruptions—such as irregular rainfall, soil degradation, and heightened pest infestations—further reduce agricultural productivity. These dynamics correspond to external Threats in the SWOT assessment, highlighting ecological instability as a central driver of food insecurity in Riau (IPCC, 2023; Richardson et al., 2018).

Socioeconomic and market-related factors also exacerbate regional vulnerabilities. Illegal food trade across Riau's maritime borders distorts local price structures and weakens market regulation, while inadequate logistics and storage infrastructure hamper the efficient distribution of commodities within the province (FAO, 2024). With approximately 75% of essential food products sourced from outside the region, Riau remains highly exposed to supply chain disruptions that may quickly escalate into shortages. In SWOT terms, this reflects a structural imbalance: existing opportunities, such as maritime logistics development and agricultural diversification, remain insufficiently exploited, whereas external threats—including trade irregularities and logistical limitations—continue to intensify.

Collectively, these ecological, structural, and security-related challenges form a multidimensional threat landscape with direct implications for national food security. Given Riau's strategic economic position, production deficits, unstable supply flows, and recurring price volatility generate ripple effects that extend beyond provincial boundaries. Such conditions weaken national food availability, stability, and accessibility, consistent with the pillars of the FAO's food security framework (FAO, 2024). The overall SWOT analysis illustrates that despite

identifiable strengths and potential opportunities, persistent structural weaknesses and escalating external threats pose serious risks to regional and national food resilience, underscoring the urgent need for integrated, cross-sectoral policy interventions.

The Role of TNI–Polri in Securing Food Security in Riau and Challenges Faced

The Indonesian National Armed Forces (TNI) and the Indonesian National Police (Polri) play a strategic role in supporting food security in Riau by protecting agricultural land, safeguarding distribution routes, and maintaining stability in areas vulnerable to ecological disruption. Their involvement reflects the principle of holistic security, in which food availability, distribution, and accessibility are integral components of national resilience ((FAO, 2024). TNI contributes through territorial development, farmer assistance, and logistical support for distribution processes, especially in regions isolated by geographic barriers and limited infrastructure. Meanwhile, Polri strengthens market regulation, secures supply chains from illegal trade, and maintains public order amid fluctuations in food prices. These institutional contributions constitute important Strengths within the SWOT framework, demonstrating their capacity to reinforce food systems beyond conventional civilian mechanisms.

In agricultural zones, TNI's territorial elements—particularly at the district level—provide hands-on support to farmers aimed at improving productivity and optimizing the use of underutilized land. Their activities include assistance in irrigation management, land preparation, and maintaining continuity of food-security programs despite environmental disturbances. These efforts align with national strategies designed to decrease dependency on external food supplies and enhance local resilience. Nonetheless, environmental constraints—such as land degradation, peatland conditions, and climate-induced hazards—continue to impede agricultural productivity, thereby reinforcing core structural Weaknesses in Riau's food system (IPCC, 2023).

Polri further contributes by ensuring the security of food-distribution networks, monitoring supply-chain integrity, and combating illegal food trade that undermines market stability. In maritime areas such as Dumai, unauthorized cross-border food inflows distort domestic price structures and create unpredictable supply conditions, representing a persistent Threat in the SWOT analysis (FAO, 2021). Additionally, inadequate storage, transportation, and irrigation infrastructure limit Polri's ability to ensure stable food flows within the province. As highlighted in regional food-security assessments, Riau's heavy dependence on external supplies exacerbates the security burden carried by both TNI and Polri, demanding continuous monitoring and rapid response capabilities (Bapanas, 2025).

Despite their significant contributions, TNI–Polri operations face several systemic and operational obstacles. Key challenges include limited agricultural capacity, weak intersectoral coordination, ongoing environmental degradation, and a gap between national policy expectations (Das Sollen) and regional realities (Das Sein) in the governance of food security (Rezazade et al., 2022). The SWOT analysis indicates that substantial opportunities exist—such as expanding maritime logistics, strengthening interagency cooperation, and promoting agricultural diversification—but these opportunities remain underutilized due to entrenched structural weaknesses and growing ecological threats. Consequently, although TNI and Polri serve as crucial stabilizing actors, their combined efforts have yet to evolve into a fully integrated and comprehensive model for long-term food-security protection that national resilience requires.

A more coordinated TNI–Polri interoperability model in securing food security

A more coordinated interoperability model between TNI and Polri is essential to address the multidimensional threats to food security in Riau. Existing arrangements remain largely sectoral, with each institution operating within its own functional boundaries, resulting in fragmented and often reactive responses to food-security disruptions. To strengthen regional resilience, an integrated interoperability framework is needed—one that unifies territorial security, law enforcement, and agricultural support in accordance with the principles of non-

traditional security and the FAO's food-stability indicators (FAO, 2024). Such an approach aligns with the Opportunities identified in the SWOT analysis, where cross-institutional collaboration can leverage the complementary strengths of both institutions to mitigate systemic weaknesses within Riau's food-security architecture.

Within this framework, TNI's territorial structures—from Kodam down to Babinsa—would concentrate on securing agricultural zones, preventing land degradation, and supporting food-production activities. Polri, on the other hand, would maintain supply-chain stability, regulate markets, and combat illegal food circulation that distorts prices and disrupts market predictability. This integration is particularly urgent given the persistent ecological threats—such as climate variability, land-use conversion, and recurrent forest and land fires—that continue to undermine food availability in the region (IPCC, 2023; Atkinson & Alibašić, 2023). By linking territorial security with law-enforcement functions, the interoperability model enhances early detection, rapid response, and preventive capacities at both provincial and municipal levels.

A coordinated TNI–Polri system should also incorporate joint intelligence activities, shared data platforms, and synchronized logistics operations. This includes establishing early-warning mechanisms for supply-chain disruptions, integrating agricultural monitoring with environmental surveillance, and developing a unified operational command structure during emergency periods. Evidence from regional food-security indices indicates that Riau's dependence on external supplies and its infrastructural constraints heighten the need for synchronized actions, especially when distribution routes face climate-related or security-related disturbances (Kementerian Pertahanan RI, 2025). Through the combined use of TNI's logistical capabilities and Polri's regulatory authority, interoperability becomes a central mechanism for stabilizing highly vulnerable food systems.

Moreover, optimizing this interoperability model requires strong policy alignment between national and regional authorities. The persistent gap between policy expectations (Das Sollen) and actual regional conditions (Das Sein)—in areas such as agricultural capacity, ecological limitations, and institutional implementation—reflects enduring structural Weaknesses that can be reduced through cross-sectoral coordination (Rezazade et al., 2022). A refined and effective framework should therefore include formalized joint procedures, integrated planning documents, and routine interagency evaluations. Through these mechanisms, TNI–Polri interoperability can shift from reactive coordination toward a proactive and adaptive governance system capable of strengthening long-term food resilience in Riau and enhancing national food-security stability.

TNI–Polri interoperability strategies to strengthen food security in Riau by involving relevant agencies

Strengthening food security in Riau requires interoperability strategies that integrate the capacities of TNI–Polri with those of relevant civilian agencies across agricultural, environmental, and logistical sectors. The systemic vulnerabilities in Riau—such as dependence on interprovincial supplies, rapid land-use change, climate-induced disturbances, and limited agricultural productivity—necessitate a coordinated, multi-agency approach aligned with national food-security frameworks (Kementerian Pertahanan RI, 2025). Within the SWOT analysis, these vulnerabilities emerge as structural Weaknesses and ecological Threats that extend beyond the operational mandates of any single institution. Therefore, interoperability must emphasize shared responsibility among security forces, regional governments, agricultural departments, and environmental agencies to ensure comprehensive and collective resilience.

A critical strategic focus lies in integrating TNI's territorial infrastructure—ranging from Kodam, Korem, and Kodim to Koramil and Babinsa—with agricultural extension services and local food-security councils. This collaboration facilitates land optimization, adoption of modern farming practices, and revitalization of abandoned or low-productivity agricultural areas. Such synergy is particularly important given the reduction of productive farmland and the persistent

pressure of land conversion documented in studies on environmental degradation and food-security decline (Gardi et al., 2021; Tsegaye et al., 2023). Through joint programs involving TNI territorial units, the Agriculture Department, and community organizations, Riau can capitalize on SWOT Opportunities such as diversification of food production and expansion of strategic commodities that align with the region's ecological characteristics.

Another key strategy involves strengthening the protection and regulation of food-distribution networks by combining Polri's law-enforcement authority with logistical and transportation support from TNI and local government agencies. Illegal food trade, maritime vulnerabilities, and infrastructure deficits—identified as major Threats in the SWOT analysis—require coordinated monitoring of coastal zones, enhanced market surveillance, and consistent enforcement of food-quality and safety standards (FAO, 2024). Integrating Polri's oversight functions with TNI's logistical capabilities ensures that distribution routes remain secure and operational during environmental or security disruptions. Meanwhile, local governments must address limitations in storage facilities, irrigation systems, and transportation networks that have historically undermined food stability in Riau (IPCC, 2023).

A further dimension of interoperability is the development of unified early-warning systems and joint operational protocols across institutions. This includes real-time data sharing on climate risks, land-use dynamics, production shortfalls, and supply-chain disturbances. Such measures directly confront the persistent gap between policy formulation and local implementation—framed as the mismatch between Das Sollen and Das Sein in regional food-governance systems (Rezazade et al., 2022). By harmonizing planning processes among TNI–Polri, the Food Security Agency, environmental authorities, and regional planning institutions, Riau can transition from reactive crisis response to a proactive resilience-building model. Ultimately, this multi-agency interoperability framework will enable the region to overcome entrenched structural weaknesses and more effectively safeguard national food stability.

CONCLUSION

The study shows that food security in Riau Province faces multidimensional threats, including land-use conversion, forest and land fires, environmental degradation, illegal food trade, and climate-related disruptions. These challenges weaken regional food production capacity and increase dependency on external supply, creating vulnerabilities that may affect national stability. Although both the TNI and Polri have carried out their respective duties in territorial security and law enforcement, their roles in securing food resources remain sectoral and not yet supported by an integrated interoperability mechanism. Strengthening food security therefore requires a holistic security approach that views food as a strategic component of national defense.

To enhance national food security, the study recommends establishing a more coordinated and technology-enabled interoperability model between TNI and Polri, supported by clear regulations and joint operational frameworks. This includes forming a joint command center for food-security monitoring, improving intelligence and data-sharing systems, and intensifying collaborative operations against illegal trade, land crimes, and environmental violations. Additionally, the government should integrate TNI–Polri roles into national food-security policies and strengthen cooperation with local institutions to build a sustainable multi-sector ecosystem capable of anticipating future non-traditional security threats.

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