

***Lembur Pakuan* in West Java: Agroecological Resilience, Food Sovereignty, and Defense Management**

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Abstract: Food resilience is increasingly a strategic concern because disruptions in production, land availability, market access, and external supply can reduce a state's capacity to maintain essential needs during crises. This study examines the Lembur Pakuan system in West Java as a local socio-ecological resource relevant to food sovereignty and Defense Management. Using a qualitative ethnographic approach, data were obtained through participant observation, semi-structured interviews, and archival analysis in Bogor, Cianjur, and Tasikmalaya. The findings show that huma, talun, and leuit form an interconnected local resilience mechanism: huma diversifies production, talun strengthens ecological and nutritional diversity, and leuit provides communal food reserves and social protection. These functions support food availability, access, utilization, and stability while reducing exposure to market volatility and excessive external dependence. From a Defense Management perspective, the significance of Lembur Pakuan lies not in treating traditional agriculture as a military capability, but in recognizing local food capacity as a supporting resource for national resilience and strategic autonomy. The principal constraints are land conversion, weakening intergenerational knowledge transfer, limited institutional recognition, and policy misalignment. The study proposes an integrated revitalization framework linking spatial protection, knowledge regeneration, institutionalization of leuit, and market support with national food resilience and defense-policy planning.

Keyword: *lembur pakuan, food sovereignty, agroecological resilience, strategic autonomy, defense management*

Abstrak: Ketahanan pangan semakin menjadi persoalan strategis karena gangguan terhadap produksi, ketersediaan lahan, akses pasar, dan pasokan eksternal dapat mengurangi kemampuan negara memenuhi kebutuhan dasar dalam kondisi krisis. Penelitian ini mengkaji sistem Lembur Pakuan di Jawa Barat sebagai sumber daya sosial-ekologis lokal yang relevan bagi kedaulatan pangan dan Manajemen Pertahanan. Dengan pendekatan etnografi kualitatif, data diperoleh melalui observasi partisipatif, wawancara semi-terstruktur, dan analisis arsip di Kabupaten Bogor, Cianjur, dan Tasikmalaya. Temuan menunjukkan bahwa huma, talun, dan leuit membentuk mekanisme ketangguhan lokal yang saling melengkapi: huma mendiversifikasi produksi, talun memperkuat keragaman ekologis dan pangan, sedangkan leuit menyediakan cadangan pangan komunal dan perlindungan sosial. Ketiganya mendukung ketersediaan, akses, pemanfaatan, dan stabilitas pangan sekaligus mengurangi kerentanan terhadap volatilitas pasar dan ketergantungan eksternal. Dalam perspektif Manajemen Pertahanan, arti strategis Lembur Pakuan bukan menjadikan pertanian tradisional sebagai kemampuan militer, melainkan mengakui kapasitas pangan lokal sebagai sumber daya pendukung ketahanan nasional dan otonomi strategis. Kendala utama meliputi alih fungsi lahan, melemahnya pewarisan pengetahuan antargenerasi, keterbatasan pengakuan kelembagaan, dan ketidakselarasan kebijakan. Penelitian ini mengusulkan kerangka revitalisasi terpadu yang menghubungkan perlindungan ruang, regenerasi pengetahuan, pelestarian leuit, dan dukungan pasar dengan ketahanan pangan nasional dan perencanaan kebijakan pertahanan.

Kata Kunci: lembur pakuan, kedaulatan pangan, ketangguhan agroekologi, otonomi strategis, manajemen pertahanan

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Article Info: [Submitted: Jan 2, 2026 | Revised: February 1, 2026 | Accepted: March 27, 2026 | Published: March 30, 2026]



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1. Introduction

The contemporary food system presents a strategic management problem rather than only an agricultural problem. Industrialized production can increase efficiency, yet concentration of production, land conversion, ecological degradation, and dependence on external inputs may increase vulnerability when markets, logistics, or supply chains are disrupted. In Indonesia, Law No. 18 of 2012 establishes food security as a national responsibility, while conditions in West Java illustrate the tension between agricultural production and competing land uses. The loss of fertile agricultural land and dependence on imported staple commodities indicate that food availability alone is insufficient to guarantee strategic autonomy. The central problem is therefore how national food resilience can be strengthened through locally embedded capacities that remain functional under ecological, economic, and supply disruptions (Bezner Kerr et al., 2021; Calo et al., 2021; Schreer & Padmanabhan, 2020).

This problem has a direct relevance to Defense Management. Indonesian defense policy places defense within a broader national effort involving national resources and sustained, integrated management. Law No. 3 of 2002 defines defense as a state function connected to national objectives, while Law No. 23 of 2019 emphasizes the preparation and management of national resources for defense in a total, integrated, directed, and sustainable manner (Republik Indonesia, 2002, 2019). Accordingly, food resilience should not be equated with military capability; rather, the capacity of communities and local institutions to maintain essential food access can be interpreted as a supporting condition for national resilience, crisis preparedness, and strategic autonomy. This perspective creates an analytical bridge between food sovereignty and defense management.

Food sovereignty provides a complementary perspective because it concerns who controls food resources, production choices, and local food systems. Agroecology strengthens this perspective by integrating ecological processes with social and economic considerations. *Lembur Pakuan* is particularly relevant because *huma*, *talun*, and *leuit* constitute a connected socio-ecological system rather than isolated agricultural practices. Previous studies have documented Sundanese food knowledge, homegarden agroforestry, and traditional agricultural practices, but the integration of these three components as a mechanism for food resilience and strategic autonomy has received limited analytical attention. The gap is therefore not the absence of studies on local wisdom, but the limited explanation of how local food capacities can be managed as part of broader national resilience (Abdoellah et al., 2020; Ali et al., 2022; Cita & Hasibuan, 2019; Iskandar et al., 2023).

The research problem addressed in this study is: how can the *Lembur Pakuan* system be understood and revitalized as a local food-resilience resource that contributes to food sovereignty, strategic autonomy, and the supporting dimensions of defense management? The study specifically examines three questions: (1) how do *huma*, *talun*, and *leuit* generate food resilience; (2) how do these practices reduce vulnerability to external supply, market, ecological, and institutional pressures; and (3) what management and policy measures are required to connect local food resilience with national resilience and defense planning without militarizing the agricultural system?

This study therefore aims to reposition *Lembur Pakuan* from a cultural practice into a strategic socio-ecological resource. It examines the operational mechanisms of *huma*, *talun*, and *leuit*; assesses their contribution to food security, food sovereignty, and local autonomy; identifies structural

barriers to continuity; and develops a defense management-oriented revitalization framework. The contribution of the study lies in connecting local agroecological resilience with strategic autonomy and national resilience, thereby expanding the analytical scope of food sovereignty from a welfare and agricultural issue toward a multidimensional national resilience concern.

2. Methods

This study employed a qualitative ethnographic approach to examine *Lembur Pakuan* as a socio-ecological food system and to interpret its relevance through a defense management lens. Data were collected through immersive participant observation, semi-structured interviews with key community stakeholders, and archival analysis in Bogor, Cianjur, and Tasikmalaya regencies. The analysis proceeded in two connected stages. First, the study identified the functions of *huma*, *talun*, and *leuit* in relation to food availability, access, utilization, stability, local autonomy, and agroecological resilience. Second, these findings were interpreted in relation to four strategic dimensions: strategic autonomy, national resilience, crisis preparedness, and the management of national resources that can support defense resilience. The analysis does not treat agricultural practices as military capabilities; instead, it examines the conditions under which resilient local food systems can reduce vulnerability and support broader state resilience.

3. Result and Discussion

3.1. The Tripartite Mechanism of *Lembur Pakuan*

The ethnographic data reveals that *Lembur Pakuan* is not a static tradition but a dynamic adaptive system. The *huma* practice, often misunderstood as primitive shifting cultivation, is actually a sophisticated method of soil regeneration. By rotating crops and allowing long fallow periods, *huma* maintains soil organic matter without synthetic fertilizers. This contrasts sharply with monoculture rice fields that require heavy chemical inputs. In terms of food security, *huma* contributes to availability by producing diverse secondary crops (corn, tubers, legumes) alongside rice, thereby diversifying the local diet.

The *talun* system, a home-garden agroforestry model, demonstrates high ecological efficiency. Its vertical stratification from canopy trees to root crops maximizes land use and creates a microclimate that retains moisture and supports biodiversity. This diversity ensures stability in food supply; if one crop fails due to pest or weather, others survive. Furthermore, *talun* provides year-round access to nutritious vegetables and fruits, directly enhancing the utilization dimension of food security by improving dietary quality (Abdoellah et al., 2020; Ali et al., 2022; Iskandar et al., 2023).

Perhaps the most socially significant component is the *leuit*. Unlike private storage, *leuit* operates on principles of mutual aid (*gotong royong*). Grain is stored collectively and distributed based on need rather than purchasing power. This mechanism acts as a social safety net, ensuring access to food for vulnerable households during lean seasons. It embodies the principle of solidarity, reducing inequality within the community.

3.2. *Lembur Pakuan*, Food Resilience, and Strategic Autonomy

Table 1 maps the three components of *Lembur Pakuan* not only against food security and food sovereignty, but also against their relevance to strategic autonomy and Defense Management.

Table 1. Comparative Analysis of Lembur Pakuan Components and Food System Principles

Component	Food Security Dimension	Food Sovereignty Principle	Mechanism of Action	Defense Management Relevance
Huma	Availability, Stability	Agroecological Resilience	Crop diversification and fallow periods reduce the risk of total harvest failure and maintain soil fertility.	Diversified local production reduces concentration risk and strengthens basic supply capacity during disruption.
Talun	Utilization, Access	Biodiversity Conservation	Multi-strata production provides diverse foods and supports continuous harvest cycles.	Ecological and nutritional diversity increases adaptive capacity and reduces vulnerability to single-crop or input shocks.
Leuit	Access, Stability	Local Autonomy & Solidarity	Communal storage buffers households from seasonal scarcity and market volatility.	A community reserve can function as a local preparedness mechanism that supports continuity of essential food access during crises.

Source: Field Data Analysis (2026)

The mapping shows that *Lembur Pakuan* contributes to strategic autonomy through distributed production, ecological diversification, and communal storage. *Huma* reduces dependence on a single production cycle; *talun* broadens the local resource base; and *leuit* provides an institutional buffer between food availability and household purchasing power. These functions do not constitute military assets in themselves. Their defense management significance lies in their potential to reduce societal exposure to supply shocks and to preserve essential food access when external markets, logistics, or production conditions are disrupted. In this sense, food sovereignty becomes a management resource for resilience rather than an alternative label for food security (Bezner Kerr et al., 2021; Mardhiah et al., 2025).

3.3. Structural Barriers to Food and Defense Resilience

Despite its adaptive capacity, the *Lembur Pakuan* system faces structural pressures that can weaken both food resilience and the strategic autonomy it potentially provides. First, land conversion fragments the ecological space required for *huma* and reduces the continuity of agroforestry landscapes. Second, the weakening of intergenerational knowledge transfer reduces the human capacity needed to reproduce the system. Third, policy incentives remain more strongly oriented toward industrial agricultural inputs, while *leuit* has limited formal institutional recognition as a village-level food reserve. These constraints reveal a management problem: the resilience of a local food system cannot be sustained by community effort alone when land, education, finance, and institutional authority are governed through disconnected policies (Calo et al., 2021; Sadarestuwati et al., 2023).

From a defense management perspective, these barriers represent vulnerabilities in the supporting environment of national resilience. A system that depends heavily on external inputs and concentrated supply chains may be efficient under normal conditions but more exposed to disruption. Conversely, diversified local production, ecological redundancy, and communal reserves can provide buffering capacity. The policy challenge is therefore to manage the relationship between local food autonomy and national systems so that local resilience complements, rather than competes with, national food policy.

3.4. Defense Management-Oriented Revitalization Model

The findings support a four-pillar revitalization model in which local food resilience is treated as a supporting component of strategic autonomy and national resilience. The model links community practices with policy, institutional, and preparedness functions: (1) spatial protection and resilience zoning. Local governments should protect agroecological landscapes in spatial planning so that *huma* and *talun* can continue to function as diversified production bases. Spatial protection should be connected to food-resilience mapping and contingency planning rather than treated solely as cultural conservation; (2) knowledge regeneration and human capacity. Vocational schools, universities, and community institutions should strengthen intergenerational transmission of agroecological knowledge. From a resilience perspective, this creates a human-capital base capable of maintaining local food functions during prolonged disruption; (3) institutionalization of *leuit* as a community food-reserve mechanism. Village regulations should recognize *leuit* as part of local food-reserve governance, with transparent rules for stock management, access, replenishment, and coordination with government food programs. Its function should be framed as civilian resilience and crisis preparedness, not as a military storage facility; (4) strategic market and supply-chain linkages. Certification, local procurement, processing support, and diversified distribution channels should improve the economic viability of agroecological products while reducing excessive dependence on a narrow set of external inputs. The objective is not self-sufficiency in isolation, but a more resilient balance between local capacity and national supply networks.

These four pillars translate *Lembur Pakuan* from a cultural conservation agenda into a management framework. The core logic is: local ecological diversity strengthens food availability; diversified food capacity reduces vulnerability; reduced vulnerability strengthens strategic autonomy; and stronger strategic autonomy contributes to national resilience. Within defense management, this creates a preventive and civilian-oriented approach to resilience that complements formal defense capabilities without militarizing local food systems (Mardhiah et al., 2025; Sarjito, 2024).

3.5. Implications for Defense Management

The main implication is that Defense Management should consider food resilience as part of the wider management of national resources and societal preparedness. Indonesia's defense framework emphasizes the integrated and sustainable management of national resources for defense (Republik Indonesia, 2019). The *Lembur Pakuan* case demonstrates a practical micro-level pathway: local ecological knowledge can sustain production diversity; communal institutions can preserve access to essential food; and spatial and educational policies can maintain the human and

ecological foundations of that capacity. Three management implications follow. First, food-resilience indicators can be incorporated into strategic risk assessment, especially dependence on external inputs, concentration of production, and availability of local reserves. Second, inter-agency coordination should connect food, agriculture, spatial planning, village governance, and defense-resilience planning. Third, resilience policy should prioritize civilian continuity and community capacity rather than militarizing food production. This positioning makes food sovereignty relevant to Defense Management through resource governance, preparedness, and strategic autonomy (Mardhiah et al., 2025; Sarjito, 2024; Prasetyo, 2025).

4. Conclusion

This study concludes that *Lembur Pakuan* should be understood not only as Sundanese cultural heritage or an agroecological farming system, but also as a locally embedded resource for food resilience and strategic autonomy. *Huma*, *talun*, and *leuit* perform complementary functions that diversify production, strengthen ecological redundancy, and buffer households from seasonal and market-related food shocks. Their combined value lies in maintaining essential food capacity through local institutions and knowledge.

The defense management relevance of *Lembur Pakuan* is indirect but strategically important. The system does not represent a military capability; rather, it strengthens the civilian and resource conditions that support national resilience. Land conversion, knowledge erosion, weak institutional recognition, and policy fragmentation therefore constitute resilience vulnerabilities that require coordinated management. The study recommends integrating agroecological landscape protection, knowledge regeneration, *leuit* institutionalization, and diversified supply-chain support into food-resilience planning. Future research should develop measurable indicators linking local food capacity with strategic risk, crisis preparedness, and national resilience so that the contribution of local food systems to defense management can be assessed more systematically.

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