

Food Security in Remote Disaster-Prone Prisons: a Case Study of Nusakambangan as an Integrative Model of Disaster Resilience and Prisoner Rehabilitation

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Abstract

This research focuses on analyzing food security in remote prisons that are potentially vulnerable to disasters, with a case study focus on Nusakambangan Island, Central Java. The issue of food security in correctional environments is important because Nusakambangan's isolated geographical conditions cause complete dependence on external logistics supplies, especially from sea routes. When extreme weather, emergency conditions or disasters occur, food distribution is often disrupted, so internal production strategies are needed to maintain supply continuity. This research uses a descriptive qualitative approach with a case study method and analyzes field data from several prisons on Nusakambangan, including the Open Prison, Nirbaya, Gladakan, Kembang

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Kuning, Karanganyar, and Pasir Putih. The research findings indicate that the development of agricultural, livestock, and fisheries activities on Nusakambangan serves a dual role: as a food security strategy and as a means of inmate rehabilitation. The Open Prison and Kembang Kuning Prison are the most advanced models of food diversification with various commodities, while Nirbaya Prison demonstrates innovative adaptation to rocky land through a terracing system. This research concludes that food security on Nusakambangan can serve as an integrative model between correctional policies and adaptive food systems. Key recommendations include the establishment of an integrated food management institution, increased cross-ministerial technical support, and the development of a sustainable storage system and training for inmates. With institutional strengthening and agricultural innovation, Nusakambangan has the potential to become a national laboratory for resilient, productive, and equitable correctional food security.

Keywords: *Food security; Nusakambangan Prison; prisoner rehabilitation; resilience; food justice*

INTRODUCTION

Food security is a fundamental pillar that ensures the continuity of life and social stability of a nation. In the context of correctional institutions (Lapas), fulfilling the right to adequate, nutritious, stable, and sustainable food is not only an administrative obligation of the state, but also a manifestation of the principle of human rights as stipulated in *Law Number 39 of 1999 concerning Human Rights* and *Government Regulation Number 32 of 1999 concerning the Conditions and Procedures for the Implementation of the Rights of Inmates*. However, the implementation of this principle often has the potential Challenges posed by prisons located in remote and disaster prone areas, such as Nusakambangan in Cilacap Regency, Central Java. The island's isolated geography, reliance on sea transportation, and high risk of natural disasters make food security issues in this region particularly complex.

Food security has four components, according to the Food and Agriculture Organization's (FAO, 1996) conceptual framework: availability, access, usage, and stability. These elements present particular difficulties in Nusakambangan. The provision of food supplies to prisoners is frequently delayed by weather conditions and limited logistical options, which depend on maritime transit. The stability of the food supply is at risk because the delivery of basic supplies from the port of Cilacap to the jail on the island may be stopped for several days during the rainy season or during strong waves. This circumstance suggests that there is currently insufficient resilience in the food security system in remote correctional settings.



According to Holling (1973), resilience is the capacity of a system to withstand shocks and adjust without losing its fundamental functionality. Resilience theory should be used to examine food security at Nusakambangan Prison, where food production and logistics systems must be resilient to outside disruptions such as natural disasters, severe weather, and distribution limitations. This aligns with the notion of supply chain resilience (Christopher & Peck, 2004), which highlights the significance of logistical reserves, flexible distribution methods, and food source diversification in order to guarantee ongoing food availability.

A significant component of the integrative method in Nusakambangan is the rehabilitation of prisoners, in addition to the food security component. The application of the notion of correctional rehabilitation is reflected in the independence and work development programs centered on agriculture, livestock, and fisheries that are implemented in several prisons, including Nirbaya, Kembang Kuning, Gladakan, and Karanganyar (Ward & Maruna, 2007). According to this theory, engaging in constructive activities as a prisoner promotes social and psychological rehabilitation as well as a sense of accountability, autonomy, and self worth.

The food security program on Nusakambangan also holds strategic potential within the context of national policy. Based on data from *the Research and Development Agency for Law and Human Rights (2023)*, the government is striving to make Nusakambangan a *pilot project for food self-sufficiency-based correctional revitalization*. Prisons on the island, such as the Open Prison, Nirbaya Prison, Gladakan Prison, and Kembang Kuning Prison, have operated various food production units, including chicken, duck, cattle, and buffalo farms, rice and corn farming, horticultural plantations, and vannamei shrimp ponds. These activities demonstrate the integration of development functions and internal food security strategies.

However, significant obstacles remain in the implementation of this program. Based on field reports (Ketapang NK, 2025), most agricultural and livestock activities are still in their early stages and have not yet produced optimal harvests. Weather factors, pests, and rocky land conditions pose technical challenges that hamper productivity. Furthermore, limited formal collaboration with technical agencies such as the Ministry of Agriculture and minimal external training also hinder inmates capacity development. For example, at Nirbaya Prison, the cultivation of 10,896 m² of land has only yielded cassava, corn, Brazilian spinach, and sweet potatoes, as well as a 125 m² independently managed chicken farm.

Conceptually, the food security approach in Nusakambangan Prison can be positioned as a synergistic model between *the food security framework* and *the rehabilitation model*. When inmates play a key role in the food production system, they become not only beneficiaries but



also part of the solution. This activity builds *capability*, as proposed by *Amartya Sen (1999)* , namely the ability of individuals to live a life they value. Thus, development through food security activities can be viewed as a process of social recovery and economic empowerment.

Furthermore , the concept of *food justice (Reese & Sbicca, 2022)* emphasizes the importance of fairness in food access, production, and consumption, including in prison settings. This serves as a reminder that food security in prisons is not just a matter of logistical efficiency , but also the right of inmates to access adequate and nutritious food. With a just and sustainable approach, the food system implemented in remote prisons like Nusakambangan can serve as a model for good practice for correctional reform in Indonesia.

Therefore, this study aims to analyze food security in remote, disaster prone prisons, focusing on Nusakambangan Island. This study examines how agricultural, livestock, and fisheries activities contribute to meeting food needs and rehabilitating inmates, and how these management concepts and models can strengthen the resilience of the food system in correctional facilities vulnerable to logistical disruptions and natural disasters

THEORITICAL REVIEW

The Concept of Food Security and Its Key Dimensions

Food security is a concept encompassing various aspects, namely availability, access, utilization, and stability. The Food and Agriculture Organization (FAO, 1996) defines food security as the physical, social, and economic access to sufficient, safe, and nutritious food for all people, at all times, for an active and healthy life. This view was later expanded by the World Food Programme (WFP, 2021), which emphasized the need for sustainable food systems in the face of shocks such as climate change, pandemics, and natural disasters. In a correctional environment, these four aspects must be realized within a closed system with limited mobility. Therefore, food security management in prisons must simultaneously consider logistical, geographic, and social aspects.

The food security situation in prisons has unique characteristics compared to the general community. Within prisons, all food needs are controlled by the institution, and inmates do not have the freedom to seek or choose food sources. Therefore, supply stability is a key factor. A study by Shen et al. (2022) revealed that supply chain disruptions in island communities resulted in logistics delays of up to 40% during extreme weather. This situation is similar to that experienced by the Nusakambangan Penitentiary, which relies heavily on supplies from the mainland. Therefore, establishing food reserves, diversifying local commodities, and increasing



internal production are important elements of food security strategies in remote areas.

Resilience Theory and Supply Chain Resilience

The concept of resilience was first introduced by Holling (1973) in his study of ecosystem stability, emphasizing the ability of a system to absorb disturbances without losing its primary function. In the context of food security, this theory was adopted to explain how distribution and production systems can continue to function despite stressors such as disasters, economic crises, or social conflict. Christopher & Peck (2004) later developed the concept of supply chain resilience, highlighting four key elements: (1) operational flexibility, (2) source diversification, (3) supply chain visibility, and (4) rapid recovery capacity. Applying this theory to the food system in island prisons like Nusakambangan means building logistical redundancy, establishing local production units, and utilizing agricultural technologies that adapt to land and climate conditions.

Within a disaster risk management framework, food system resilience in island regions needs to be integrated with disaster risk reduction (DRR) strategies. According to the UNDRR (2019), a resilient food system must incorporate elements of risk management, preparedness capacity, and rapid recovery mechanisms. Therefore, a food security model in prisons must be oriented toward preventing logistical disruptions due to extreme weather, floods, or landslides by developing efficient backup storage and distribution systems. This concept is increasingly relevant in Nusakambangan, which, according to the National Disaster Management Agency (BNPB) (2023), is categorized as a red zone for hydrometeorological disaster risk.

Capability Approach and Food Justice

From a social perspective, the Capability Approach theory developed by Amartya Sen (1999) emphasizes that food security is not simply a matter of availability, but rather an individual's ability to obtain and utilize food. In prisons, inmates are often passive recipients of food aid. However, food self sufficiency programs that involve them in agricultural, livestock, and fishery activities can transform them into agents of production. In doing so, they gain new capabilities that not only support internal food security but also strengthen social and economic rehabilitation processes.

Furthermore, the Food Justice theory proposed by Reese and Sbicca (2022) expands the concept of food security to include issues of social justice. They highlight that prison food systems often reflect structural inequalities: poor food quality, limited access to nutrition, and the exploitation of inmate labor. In the context of Nusakambangan, implementing food justice



principles means ensuring that agricultural and livestock programs are not only economically productive but also ethical and humane respecting the rights of inmates as human beings, not simply as institutional labor.

Prisoner Rehabilitation and the Theory of Criminal Behavior Desistance

Prisoner rehabilitation is a fundamental goal of the correctional system. Ward & Maruna (2007) in their Correctional Rehabilitation Theory state that successful rehabilitation depends on changes in identity and behavior through engagement in meaningful activities. One effective approach is agriculture-based activities (prison agriculture). Research by Payne et al. (2023) shows that prisoners involved in agricultural and livestock work experience an increased sense of responsibility, discipline, and social empathy. These activities also reduce stress and aggression levels in prison, which are important indicators of successful rehabilitation.

Desistance Theory adds a psychosocial perspective that suggests that the process of desisting from criminal behavior is influenced by opportunities to acquire positive social roles. In the context of Nusakambangan Prison, prisoners involvement in food security activities serves as a means of identity transformation from convicts to food producers who benefit the community. Thus, food security activities not only have an economic impact but also strengthen social reintegration.

Prison Agriculture in a Global Perspective

Prison farming is not a new phenomenon. In various countries, this activity has become an integral part of national rehabilitation and food security systems. Moloko et al. (2018) documented the success of prison farming in Malawi, which can meet up to 70% of internal food needs and reduce operational costs by up to 30%. In Canada, Wilson (2023), through the Food Services Modernization Initiative, highlighted the integration of food sustainability and prisoner rights. Meanwhile, Andreoli et al. (2024) showed that in Europe, prison farming serves as a space for vocational learning and job skills training for prisoners, rather than solely as an economically productive activity. These findings emphasize the dual potential of prison farming for food security and social rehabilitation.

However, several critical studies, such as Hazelett (2023), caution that not all prison farming practices are ideal. In many cases, these activities can constitute a form of exploitation of prison labor without adequate compensation and legal protection. Therefore, any initiative in Indonesia must ensure a balance between production efficiency and social justice.



Nusakambangan's approach, which emphasizes the development, training, and empowerment of prisoners, can serve as an example of relatively ethical practice in a global context.

Food Security in Indonesian Correctional Institutions

Food security in Indonesian prisons has been a serious concern for the Ministry of Law and Human Rights since the implementation of the Productive Prisons program in 2020. The goal is to build economic independence in correctional institutions through the development of the agricultural, livestock, and fisheries sectors. The Agency for Research and Development of Law and Human Rights (2023) noted that by 2024, more than 80 prisons in Indonesia will have active agricultural units. Nusakambangan occupies a strategic position due to its large land area and relatively self sufficient geographic characteristics. Therefore, developing food security on this island can serve as a replicable model for other prisons in remote areas such as Maluku, Sulawesi, and Papua.

Conceptual Research Framework

Based on a synthesis of the various theories above, this study proposes a conceptual framework that combines three main components: (1) production based internal food security, (2) resilience to disaster risks and logistical disruptions, and (3) social rehabilitation through productive activities (corrective rehabilitation). These three elements interact in a mutually reinforcing system. Internal food production strengthens logistical independence; logistical resilience maintains continuity of supply, while prisoner rehabilitation ensures the social and moral sustainability of the program.

Theoretical Relevance in the Nusakambangan Context

In the Nusakambangan context, these theories complement each other. Resilience theory explains the need for food system adaptation to external disruptions, the capability approach emphasizes the importance of prisoner empowerment, and rehabilitation theory explains the social transformational value of productive work. The integration of these three theories makes prison food security not only a logistical solution but also an instrument for sustainable rehabilitation. Thus, Nusakambangan Prison can serve as a conceptual model for a national correctional policy that is both disaster resilient and humane in its development.



METHODOLOGY

Research Approach and Type

This study employs a qualitative, descriptive approach centered on a case study design. This methodological choice is driven by the need to gain a deep, contextual understanding of food security conditions within remote correctional facilities, taking into account the complex interplay of social, geographic, and institutional factors. As qualitative research seeks to uncover the meanings individuals or groups ascribe to a particular phenomenon (Creswell, 2018), this approach is well-suited for investigating how the food system on Nusakambangan Island is constructed and managed by the correctional administration, including the role of inmate participation and coordination with external partners.

The case study focuses specifically on food security across the prisons of Nusakambangan Island, which operate under the purview of the Ministry of Law and Human Rights Regional Office for Central Java. The research delves into how agricultural, livestock, and fisheries activities are woven into the prisoner development framework. It also examines the impact of geographical isolation, disaster risks, and logistical constraints on the long term viability of these programs. The case study method was selected because each prison on the island possesses unique characteristics regarding available resources, production capacity, and models of collaboration.

Research Location and Object

The study was conducted across the six primary correctional institutions on Nusakambangan Island: the Open Prison, Gladakan Prison, Nirbaya Prison, Kembang Kuning Prison, Karanganyar Prison, and Pasir Putih Prison. Spanning around 121 km², this island hosts Indonesia's largest complex of correctional facilities. Each institution runs distinct food security initiatives, varying in the types of commodities produced and their management structures.

1. The Open Prison operates the most diversified agricultural system, featuring layer chicken and duck farms, cattle and buffalo rearing, rice and corn fields, horticulture plots, and Vannamei shrimp ponds;
2. Gladakan Prison concentrates on cultivating rice, corn, and lemongrass across roughly 4.4 hectares. Recent harvests yielded 745 kg of rice and 6,000 kg of corn, supported by partnerships with companies like PT Padi Indonesia Maju and PT Agro Bumi Pangan Mandiri;
3. Nirbaya Prison manages cassava, corn, Brazilian spinach, and sweet potato gardens, alongside a chicken farm. Its operational area includes 10,896 m² of agricultural land and 125 m² of poultry housing;



4. Kembang Kuning Prison runs a Garut sheep farm, ponds for shrimp and milkfish, and a waste processing unit. Its development area covers four hectares, collaborating with partners including PT Suka Domba Perkasa and PT Bahari Bahagia;
5. Karanganyar Prison, classified as a high-security facility, implements horticulture and plantation programs. Due to limited inmate involvement, these are managed directly by PPNPN officers and staff;
6. Pasir Putih Prison focuses on marine food security through its fish farming operations.

This selection of locations provides a representative overview of the entire food security system on Nusakambangan, capturing the diversity of both terrestrial and aquatic ecosystems and commodities.

Data Sources and Types

The research relies on both primary and secondary data. Primary Data was gathered directly from the field through interviews, on-site observations, and periodic reports from the managers of the food security programs at each prison. This information covered commodity types, land area, production volumes, operational systems, training methods, and models of collaboration with other entities.

Secondary Data was compiled from various publicly available sources. These included open-access scientific journals, government reports, national media publications, and official documents from the Ministry of Law and Human Rights, the Ministry of Agriculture, and the National Disaster Management Agency (BNPB).

To fortify the theoretical foundation, the study also draws upon relevant international literature, such as the work of Moloko et al. (2018) on prison food security in Malawi, Wilson (2023) on integrating food justice in Canada, and Andreoli et al. (2024) on European prison farming practices. Key national references include reports from the Agency for Research and Development of Law and Human Rights (2023) and the Nusakambangan Food Security from research qualitative report, which offers recent empirical data.

Data Collection Techniques

Four principal techniques were used to collect data:

1. In-depth Interviews: These were conducted with correctional officers, the Heads of the Work Activities Sub-sections, and managers of the food security units at each prison. The goal was



to understand the strategies, encountered challenges, and successes in program implementation;

2. Field Observations: Researchers directly observed the agricultural, livestock, and fisheries activities. This included examining infrastructure, irrigation systems, and methods for storing products;
3. Document Analysis: Internal documents such as harvest reports, cooperation agreements (PKS), and data on food production and distribution were analyzed;
4. Source Triangulation: To ensure the validity of the findings, information from official reports was cross-checked with interview data and national policy documents.

Data Analysis Techniques

The data were examined using a thematic analysis approach, which unfolded in three stages: (1) data reduction, (2) thematic categorization, and (3) theoretical interpretation. During data reduction, information was sifted to focus on elements most relevant to the research questions, such as production capacity, institutional partnerships, and inmate guidance models. The categorization stage involved grouping the data into major themes, including internal food security, logistical resilience, inmate empowerment, and technical challenges. Finally, the interpretation stage connected the empirical findings from the field with established theories like food security (FAO, 1996), resilience (Holling, 1973), and rehabilitation (Ward & Maruna, 2007).

The analysis also incorporated a cross-case comparison, contrasting the practices and outcomes between different prisons. This helped identify variations in successful models and common obstacles. For instance, Gladakan Prison demonstrated effective collaboration with the private sector, whereas Nirbaya Prison primarily operated through its own internal efforts without significant external technical support.

Data Validity and Reliability

The research upheld validity through triangulation, using both multiple sources (interviews, documents, observations) and methods. Interview data were consistently verified against official records and media reports. Reliability was strengthened by meticulously documenting the entire analysis process and providing rich, detailed descriptions of the context. Furthermore, the findings were checked against national benchmarks, such as the standards outlined in Presidential Regulation Number 83 of 2006 concerning the Food Security Council.



Research Ethics

Conducting research within a correctional environment demands strict adherence to ethical principles. All data collection was carried out only after obtaining formal permission from the respective prison authorities and the Central Java Regional Office of the Ministry of Law and Human Rights. To ensure confidentiality, the identities of all individuals interviewed remain anonymous. The research was guided by the fundamental principle of "do no harm," ensuring that the study itself did not disrupt the rehabilitation processes or compromise institutional security.

Research Limitations

A key limitation of this study is the scarcity of comprehensive quantitative data on production outputs, as many of the agricultural and livestock programs are still in their early developmental stages. Additionally, the island's remote nature and limited accessibility posed challenges for conducting direct observations in all areas. Despite these constraints, the qualitative data gathered from a variety of sources offers a thorough and nuanced understanding of the food security management patterns within Nusakambangan's prisons. This foundation can support more extensive empirical research in the future.

RESULT AND DISCUSSION

The Food Security Landscape of Nusakambangan

Nusakambangan Island hosts one of Indonesia's most extensive correctional complexes, featuring multiple prisons with varying security levels and developmental programs. Its physical separation from the mainland creates substantial hurdles in consistently providing food for thousands of inmates and staff. Reliance on maritime transport renders the supply chain highly susceptible to weather disruptions and disaster related delays. Field data from the Ketapang NK initiative indicates a strategic shift towards a self-sufficient and sustainable food security model. In this approach, each prison cultivates its own food supplies through a mix of agriculture, livestock, fisheries, and product processing.

This local production model embodies the food security principles outlined by the FAO (1996), highlighting self reliance and sustainability at an institutional level. Bolstering internal production does more than just curb dependence on external sources, it directly enhances the stability and accessibility of food for the inmate population. Furthermore, engaging inmates in these productive activities functions as a powerful tool for development and rehabilitation, resonating with the corrective rehabilitation theory proposed by Ward & Maruna (2007).



Consequently, the food security framework in Nusakambangan represents a synergy of logistical, social, and psychological functions.

Open Prison: A Hub of Integrated Production

The Open Prison stands out with the most diverse and interconnected food security operations. Field observations confirm management across multiple sectors: layer chicken and duck farms, cattle and buffalo rearing, rice and corn cultivation, horticulture, and Vannamei shrimp farms. This deliberate commodity diversification puts into practice the supply chain resilience principle (Christopher & Peck, 2004), where a multi-source production design mitigates the risk of relying on a single commodity.

This integrated model also demonstrates resilience theory (Holling, 1973) in action. The system maintains stability during extreme weather by ensuring food availability from various sources. For instance, poultry and aquaculture provide consistent protein when crop yields suffer from heavy rains or floods. These activities double as inmate development programs. Operating under an assimilative work system with officer supervision, they strengthen the inmates capabilities (Sen, 1999), enabling them to take an active role in production and resource management.

Nirbaya Prison: Farming Adaptation on Rocky Terrain

Nirbaya Prison confronts a distinct ecological challenge. Its uneven, rocky landscape is ill suited for traditional farming. In response, the management innovated a terracing system, manually collecting stones from the land to create leveled plots reminiscent of mountainous agriculture. The operational area spans 10,896 m² for crops and 125 m² for a chicken farm. Cultivated commodities include cassava, corn, Brazilian spinach, sweet potatoes, with plans for glutinous rice and mokaf flour production.

This land adaptation showcases the local adaptive management principle central to Holling's (1973) work, where a socio ecological system adjusts to its physical constraints without resorting to advanced technology. The program also operates with significant autonomy, sourcing all seeds and seedlings through independent procurement. The layer hen farm is managed by inmates under the supervision of the Head of Work Activities, with revenue from sales being processed by the prison's finance unit, illustrating a direct link between production and internal economic management.

From a developmental standpoint, inmate involvement in these tasks serves as capacity



building. Agricultural and livestock work fosters character development, instilling responsibility and imparting practical skills valuable for social reintegration post release. This aligns with Desistance Theory (Ward & Maruna, 2007), which posits that engagement in productive activities can catalyze a shift away from criminal behavior through positive identity formation.

Gladakan Prison: A Model of Partnership and High Yield

Gladakan Prison exemplifies successful public-private partnerships in agriculture. Its food security program focuses on rice, corn, and lemongrass across 4.4 hectares of land. Recent harvests yielded 745 kg of rice grain and 6,000 kg of corn, while the lemongrass is still maturing. This productivity stems from collaborations with private entities like PT Padi Indonesia Maju and PT Agro Bumi Pangan Mandiri, who supply all seeds and seedlings. Inmates are responsible for planting and maintenance.

This partnership framework reflects an effective institutional collaboration model. The private sector contributes inputs and technical know-how, while the prison provides land and labor. Governed by formal cooperation agreements (PKS), these activities are run professionally, with harvests sold directly to collectors via a profit sharing system. This approach ensures economic sustainability and simultaneously applies the capability approach, equipping inmates with market relevant agricultural skills.

Kembang Kuning Prison: Diversification and Circular Economy

Kembang Kuning Prison is distinguished by its integration of three core areas: Garut sheep farming, shrimp and milkfish aquaculture, and a waste processing facility (TPA). The total management area covers 4 hectares, divided into 1 hectare for sheep, 1.5 hectares for ponds, and 1.5 hectares for the landfill. Partnerships with companies like PT Suka Domba Perkasa (sheep) and PT Bahari Bahagia (aquaculture) support these operations.

This model represents a fusion of food production and circular economy principles. Organic waste from livestock, for instance, can be repurposed as fertilizer or feed. The sheep breeding system enhances reproductive efficiency, while the ponds yield between 400 kg to 2 tons of fish and shrimp per harvest cycle. Inmates participate in production and maintenance, receiving initial training from vendor partners, particularly in areas like feed production and animal husbandry.

Viewed through the lens of resilience theory, the diversification at this prison boosts its adaptive capacity against crop failure. From a rehabilitation perspective, involvement in multi-



sectoral activities reinforces a strong work ethic and discipline, corroborating the findings of Payne et al. (2023) on the positive correlation between prison farming and inmate psychological well being.

Karanganyar Prison: Office Led Horticulture

As a high-security facility, Karanganyar Prison operates differently. Inmate involvement in work activities is minimal. Instead, the food security program is executed by officers and PPNPN staff, concentrating on horticulture and plantations. The produce is marketed through the Food Business Agency (BAMA), achieving a 90% success rate. A primary challenge here is pest infestation, including grasshoppers and monkeys.

This scenario underscores the critical need for pest risk mitigation and the adoption of disturbance resistant cultivation technologies. Theoretically, it presents a case of partial resilience model application, where adaptive capacity hinges on internal human resources. Nonetheless, the consistent yield stability demonstrates the effectiveness of robust internal coordination and a stringent monitoring system.

Synthesis: An Integrated View Across Prisons

Collectively, the food security initiatives across Nusakambangan reveal a spectrum of progress and strategic approaches. The Open Prison and Kembang Kuning excel in economic diversification and partnerships. Nirbaya stands out for its ecological adaptation, while Gladakan represents a model of high productivity through collaboration. Karanganyar offers insights into adaptation within a high security context. Together, these models reflect the incremental implementation of a sustainable, resilience based food system.

On a social level, the engagement of inmates as productive workers fosters a learning community within the prison walls. The knowledge transfer from officers and vendors to inmates becomes a form of active, practical rehabilitation. Therefore, food security here transcends mere logistics; it acts as a vehicle for social transformation, guiding inmates towards self-reliance. This supports the argument by Ward & Maruna (2007) that meaningful activities and tangible achievements are central to effective rehabilitation.

Persistent Hurdles and Future Directions

Despite notable progress, the food security program in Nusakambangan continues to face significant challenges. A primary constraint is the limited technical support from ministries like



Agriculture, most programs depend on prison initiatives or private partnerships. Secondly, weather volatility and pests remain major causes of fluctuating crop yields. Thirdly, the absence of a modern storage and distribution system often leads to suboptimal use of harvests.

Furthermore, several activities are still in the pilot project phase, lacking a solidified, permanent institutional framework. Achieving long-term, sustainable food security necessitates an integrated system that seamlessly connects production, distribution, and inmate development. This echoes the perspective of Andreoli et al. (2024), who noted that the sustainability of prison agriculture in Europe is contingent on strong institutional backing and secure, long-term funding.

CONCLUSIONS AND SUGGESTIONS

Conclusion

This study demonstrates that the food security initiative at Nusakambangan Prison represents a multifaceted approach, merging adaptive food production, social rehabilitation, and resilience against disruptions. The development of agricultural, livestock, and fisheries operations across the prison complex has effectively lowered reliance on outside sources while bolstering the institution's inherent capacity to manage logistical threats posed by its isolated location.

Engaging inmates in these productive tasks has proven to be a potent developmental instrument. This aligns with established rehabilitation theory (Ward & Maruna, 2007) and the Capability Approach (Sen, 1999), fostering greater self-reliance, accountability, and practical competencies for life after release. Nevertheless, obstacles persist, particularly concerning funding, technical expertise, and the need for more cohesive coordination among the different prisons. Institutional reinforcement and deeper inter agency partnerships are therefore crucial to secure the program's long term viability and expand its positive effects.

In essence, the Nusakambangan model showcases a correctional practice that is economically productive, structurally resilient, and fundamentally humane. This initiative simultaneously contributes to advancing the Sustainable Development Goals (SDGs), particularly those related to zero hunger, decent work, and social justice.

Proposed Recommendations

1. Create a dedicated coordination body to oversee all food security programs across the prison units, ensuring efficient and measurable management;
2. Deepen collaborative efforts with relevant government ministries and private sector partners to secure advanced technology, specialized training, and high quality seeds and livestock;



3. Initiate further studies that employ quantitative methods to precisely evaluate the program's economic benefits and its impact on inmate social development;
4. Enhance the current training framework for inmates by integrating a formal skills certification system, thereby improving their employability and reintegration prospects post release;
5. Position Nusakambangan as a national pilot site or "living laboratory" for developing food security models that are specifically designed for correctional settings, emphasizing both disaster adaptation and rehabilitation outcomes.

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