

Securitization of Critical Food Infrastructure Against Economic Sabotage in the Philippines

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ABSTRACT: This study examined the securitization of critical food infrastructure in the Philippines by evaluating the legal and operational mechanisms under Republic Act No. 12022 to protect supply chains against economic sabotage. A qualitative, document-based comparative design was employed, analyzing legal statutes and government issuances through the lenses of Securitization Theory, Polycentric Governance, and Human Security. The findings reveal that the law successfully redefines large-scale smuggling, hoarding, cartels, and illegal arbitrage as acts of economic sabotage. However, institutional overlaps between centralized intelligence nodes and local offices create severe administrative friction and structural data gaps, leaving the framework vulnerable to digital laundering via cloned permits. This study concludes that statutory penalties alone cannot secure resource networks. Consequently, it is recommended that the council establish secure data-sharing protocols and transition to real-time, automated cryptographic permit verification systems to protect supply chain data integrity.

KEYWORDS: Critical Infrastructure Protection, Securitization, Polycentric Governance, Republic Act No. 12022, Supply Chain Data Integrity, Economic Sabotage

INTRODUCTION

State sovereignty in the 21st Century has shifted away from just protecting territorial borders to the protection of complex systems of operation that are essential to societal survival. With this modern governance model, the food supply chain is not simply a collection of agriculture and commercial operations, but has been formally reclassified as critical infrastructure to national stability. State sovereignty exists in an era marked by geopolitical and economic volatility, supply chain shocks caused by climate change, and market monopolization by multinational corporations, and therefore, the intentional manipulation of essential food products (core food resources) is an existential threat to state survival. The vulnerabilities associated with the logistics and geography of an archipelagic nation such as the Philippines are made many times worse due to the nation's geographic fragmentation. The distribution of essential commodities, therefore, is highly susceptible to domestic market cartel operations, collusive hoarding, and the activities of illegal syndicates. In the past, these abnormalities in the marketplace have been addressed by public administration through regulation and passive enforcement, or by imposing relatively minimal penalties for trade violations. However, the realities of the contemporary security environment require an aggressive transition to a defense-oriented strategy that integrates national security capabilities with agricultural supply chain intelligence.

The resulting legal structure building has been most clearly expressed through the passage of the Anti-Agricultural Economic Sabotage Act - Republic Act No. 12022. In this sweeping piece of legislation, the traditional administrative divisions of many crops have been dismantled and organized into a structure of economic sabotage against the security of the country by defining market manipulation of staff as an 'economic sabotage' versus the more modest definition of market manipulation as financial misdemeanour. By redesigning agricultural supply chains within an existential defence framework, the Anti-Agricultural Economic Sabotage Act is establishing new and unprecedented enforcement tools, such as intensive penal codes, enhanced penalty codes, and centralisation of enforcement through establishment of multi-agency task forces.

Brief Literature Review and Theoretical Framework

The transformation of Critical Security Studies (CSS) has shifted the traditional military focus of global security towards the safeguarding of interconnected and complicated social and economic systems within global society. This is based upon the

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Copenhagen School's Securitization Theory whereby security is recognized as a discursive practice consisting of the authoritative declaration of a particular issue as an existential threat to a specific referent object allowing for extraordinary administrative actions or the suspension of established legal procedures (Stępką, 2022; Flohr, 2025; Floyd, 2019; Trombetta, 2023). Within the arena of public administration, it can be noted that the definition of "referent objects" has also seen increased attention being paid to critical economic infrastructure as opposed to physical borders recognizing that logistical disruptions of supply chains could result in destabilizing nation-state sovereignty just as much as kinetic acts of warfare (Boin, 2009). Consequently, due to the securitization of the food supply chain, agricultural policy evolves from traditional socio-economic market based management to an active state security domain that is characterized by the integration of intelligence by states, the imposition of expansive penalties for violations and the establishment of centralized command units (Cowen, 2010).

Implementing a centralized, security-based (secure) administration in an archipelago (or island) model of governance will create administrative challenges that cannot be economically managed through top-down hierarchies. Therefore, this study links CSS (e.g., National Security Strategy) with polycentric governance (PG). Ostrom's framework defines polycentricity as an evolved form of institutional design that involves multiple independent decision centers operating under a common regulatory system (rather than a single command). Managing national infrastructure crises will require hybrid, multi-agency networks that will combine the strengths of centralised intelligence with the flexibility of local enforcement officials. However, these frameworks will create institutional stress because securitization will centralise authority while PG will distribute the execution of operational activities via multiple independent networks.

Legislation such as Republic Act No. 12022 imposes a centralized security approach on a decentralized marketplace through the creation of conflicts of interest and "turf wars" between government agencies trying to implement security measures; concurrently, this approach creates barriers between private and government entities that have information, as well as barriers to sharing information between government agencies (Boin, 2009; Wiwattanakornwong, 2025; Inquirer.Net, 2026; Nguyen, 2025). In addition to the challenges posed by centralized government security systems, businesses and governments must address asymmetric threats pertaining to the digital realm, including disruption of port logistics caused by cyber-kinetic events and the laundering of digital goods through falsified electronic transport documentation (Cowen, 2010). Most contemporary Philippine policy research focuses on increasing the productivity of agricultural production through increasing resilience to climate changes as well as agrarian reform; at present, there is a large gap within the literature as to how to convert the nation's defense posture into action regarding critical infrastructure protection (Salindo et. al., 2025).

Practical Applications and Strategic Mapping

The research presented in this document acts not only as an active evaluation tool for reviewing policies related to agricultural sabotage, but also as guidance for those responsible for implementation within these three groups: public administrators, national security strategists, regional planners. Using information about RA 12022's operational boundaries, this aspect of the study identifies specific ways in which the new regulatory agency created under RA 12022 (the Anti-Agricultural Economic Sabotage Council) will be able to coordinate effectively with local government units (LGU) so as not to impede ongoing governmental processes due to an inability or failure of very expensive coordination attempts. Also identified within the study are vulnerabilities present within the maritime and land logistics systems in the Philippines. For example, by demonstrating that the ports (and their associated nodes such as ship transport routes and regional distribution points) in which cartels operate create singular points of failure that are exploited by the cartels in order to artificially inflate prices (Arowosegbe et. al., 2024; Li et. al., 2026; Cowen, 2024), this analysis provides clear data regarding the need to stabilize the internal logistics process and eliminate these predatory marketing systems. Further, this investigation identifies the means by which local enforcement efforts can be connected with global regulatory systems. By supporting the stability of the internal logistics network and terminating the abuses of the predatory marketplace, the successful implementation of RA 12022 supports the United Nations Sustainable Development Goals (UN SDG) through the establishment of equitable access to food (SDG 2 – Zero Hunger) and through the dismantlement of corrupt organizations that undermine institutional compliance with the rule of law (SDG 16 – Peace, Justice and Strong Institutions) (UN, 2023).

Nature and Purpose of the Article

This paper will examine the statutory mechanisms established by Republic Act No. 12022 to determine whether they provide adequate legal and operational protections for the Philippines' sovereign food infrastructure, or if they establish patterns of institutional fragmentation and vulnerability to asymmetric digital threats instead. To accomplish this, the research will answer these three explicit research questions:

1. What is the impact of Republic Act No. 12022 to redefine cartels, hoarding, and illegal arbitrage as acts of industrial economic sabotage? How does this relationship redefine the domestic social contract within the state in terms of the state's social contract regarding the defense of resources?
2. What type of polycentric governance model exists for the Anti-Agricultural Economic Sabotage Council despite its various agency members? Does this create friction among any of its civilian, enforcement, or intelligence members?
3. What will be the changes needed to the enforcement mechanisms in Republic Act No 12022 in order to deal with asymmetric

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threats that are directed at supply chain data integrity including the cyber-kinetic disruptions associated with agricultural logistics and digital laundering of smuggled commodities?

Research Hypotheses and Qualitative Propositions

This qualitative policy design study employs analytical propositions as opposed to statistical metrics for its evaluations. There are two principal hypotheses that advance this research:

H1. Centralized enforcement mechanisms applicable to security under Republic Act No. 12022 are likely to create friction and communication barriers when integrating into existing decentralized, polycentric structures of Local Government Units (LGUs) and individual agricultural offices.

H2. Statutory frameworks of the Anti-Agricultural Economic Sabotage Council have systemic vulnerabilities to asymmetric threats unless the enforcement framework of the alternative regulation of supply chain data integrity also includes an evolution from physical interdiction to the prevention of the digital laundering of commodities.

METHODOLOGY

Through innovative qualitative approaches to investigating agricultural supply chains in the Philippines, this research looked at agricultural supply chains and how they could be transformed into critical infrastructure protection networks. The research evaluated how the empirical evidence of enforcement of laws relating to critical infrastructure protection can link statutory and non-statutory frameworks to produce effective and efficient defence strategies at the state level.

Research Design, Participants, and Sampling

A qualitative comparative design based on the Most-Similar-Systems (MSS) method was used in this analysis. The data for analysis came not from human participants but from three types of document-based primary units of analysis – institutional statutory documents, official directive enforcement instruments issued by the state, and public policy documents. The purposive sampling criteria used to isolate the textual records used for analysis were based on the same geographic region (i.e., Southeast Asian maritime states), but more specifically used the unique features of the geographic conditions of archipelagos within this region, as well as on the legal nature of the subject matter of the laws selected for the study. The primary focus of the operational aspects of this analysis were the Republic Act No. 12022, the Anti-Agricultural Economic Sabotage Act, and the Republic Act No. 10845 which is the Anti-Agricultural Smuggling Act enacted in 2016. The Republic Act No. 12022 was evaluated using the Republic Act No. 10845 as a historical reference point for comparison controlling for common structural variables while isolating newly developed legal reforms that are presented in the Republic Act No. 12022.

Apparatus and Materials

The evaluation of this documentary relied on primary and secondary statutory documents. The primary statutory documents were the unedited Republic Act No. 12022, its implementing rules and regulations, presidential issuances, and inter-agency memorandums of understanding. The secondary statutory documents were governmental artifacts, such as the chain of command and organizational charts of the newly established Anti Agricultural Economic Sabotage Council along with public minutes of council meetings, standard operating procedures, and technical data release documents for the required daily price index. This included Bureau of Customs data recording systems, statistics on agricultural seizure incidents, and public records describing interruptions in shipping or other maritime activities as well as electronic vulnerabilities in customs systems.

Details of Data Collection and Analysis

Systematic profiling was used to collect legal data including documents electronically retrieved from the Official Gazette of the Philippines' repository. The qualitative coding and process-tracing analysis occurred in a multi-stage process using three different theoretical frameworks. The first theoretical framework utilized is Securitization Theory by examining political speech acts to isolate specific language used to justify the need for the use of extraordinary penal measures during states of emergency. The second theoretical framework was Polycentric Governance, which involved the institutional mapping of the civilian enforcement (i.e., Bureau of Customs), intelligence (i.e., Philippine National Police Intelligence Group), and maritime (i.e., Philippine Coast Guard) nodes within the Anti-Agricultural Economic Sabotage Council (AAESC) and how these nodes coordinate their efforts and how they may experience conflicts of jurisdiction. Finally, the integration of Human Security parameters allowed for the evaluation of the enforcement's effect on public trust. Specific enforcement incidents, such as smuggling interdictions, as defined by the Daily Price Index, were process-traced to gain insight into how statutory provisions have been implemented. In correlation with the themes of extraordinary power, extraordinary measures, domain conflicts, data gaps, hacking risks, and impacts to public trust, incidents of enforcement that were processed and specific instances of interdiction were coded within the respective theme. Triangulating for validity through the continuous comparison of legal documents, incidents process-traced, and historical public registries was performed in an effort to triangulate and resolve conflicting data.

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Ethical Considerations

This research did not include human participants, direct intervention or private personal data, as it is a document-based evaluation using publicly available legislative statutes, state records and public governmental documents. Therefore, it was not necessary to seek institutional review board clearance to conduct research with human subjects; integrity of the data and verification of data was maintained; and academic transparency was maintained through uniform adherence to exact citations of laws, exact references to statutory sections and adherence to uniformity in applying the standard for APA 7th Edition referencing throughout this document.

RESULTS

Statutory Re-Engineering and the Legalization of Economic Sabotage (RQ1)

The review of the Republic Act No. 12022 shows that the Philippine state has made a number of significant changes to its social contract with respect to the defence of resources. This has had an impact on how illicit trade and market manipulation are adjudicated. Prior to Republic Act No. 12022, these activities were typically included within the definition of statutory violations under Republic Act No. 10845 (e.g., customs violations or misdemeanors for tax evasion). However, Republic Act No. 12022 has completely changed this classification, by classifying large-scale smuggling, hoarding, and cartelization of core agricultural commodities as acts of economic sabotage to national security and non-bailable offences. The text of Republic Act No. 12022 indicates a complete change from one operational model to another: When the market price of a core staple commodity such as rice or corn has a value of more than PHP 10 million (PHP 10, 000, 000), the security emergency trigger is automatically activated. This new legal construct re-characterises the existence of economic actors to become a threat to the state's referent object, which is the survival of the socio-economic medium of the domestic consumers. With the new law elevating the crime of market manipulation to a capital offense with a penalty of life in prison, the domestic social contract of the state as a result of this law has changed. The defence of resources as a trade regulation is no longer a passive activity; rather, it has now become an active and aggressive defence of critical infrastructure owned by the sovereign state.

Polycentric Architecture and Institutional Overlaps (RQ2)

The operational execution of RA 12022 is based on the structural design of the new Anti-Agricultural Economic Sabotage Council (AAESC), which brings together government agencies in an entirely new polycentric multi-agency entity as depicted on the AAESC document map. The AAESC was specifically designed as a bridge between crime investigation and prosecution by traditional civilian administrative offices and the national intelligence, maritime enforcement organs & agencies. The AAESC has a Distributed Command Structure consisting of: 1) Department of Agriculture; 2) Department of Justice; 3) Bureau of Customs; 4) National Intelligence Coordinating Agency (NICA); 5) Armed Forces of the Philippines; and 6) Philippines Coast Guard.

This polycentric configuration enables the growth of state control, yet there are significant points of structural friction related to institutional performance based upon the outcome from structural data profiling. The synergy of centralized intelligence protocols (i.e., national intelligence) and decentralized civilian bureaucracies (i.e., local governments) thus represents distinct domain conflicts or mission incompatibilities. In particular, as mandated by the law, the local government units (LGUs) and civilian trade monitors, which are responsible for providing market information and supporting the state's daily price index, create structural friction in two main operational domains: differences in how resources are governed and differences in standards of evidentiary proof. Because all military or intelligence nodes work under different security classifications (strictly classified information) than local civilians would work under, there exists an information asymmetry (to the point that) operational activities of local civilian enforcement nodes are paralyzed as far as being able to enforce any law (or enforce against non-compliance). Additionally, to lack the technical capacity to process logistics tracking in real-time significantly creates a data gap in local councils' poly-centric operational integration.

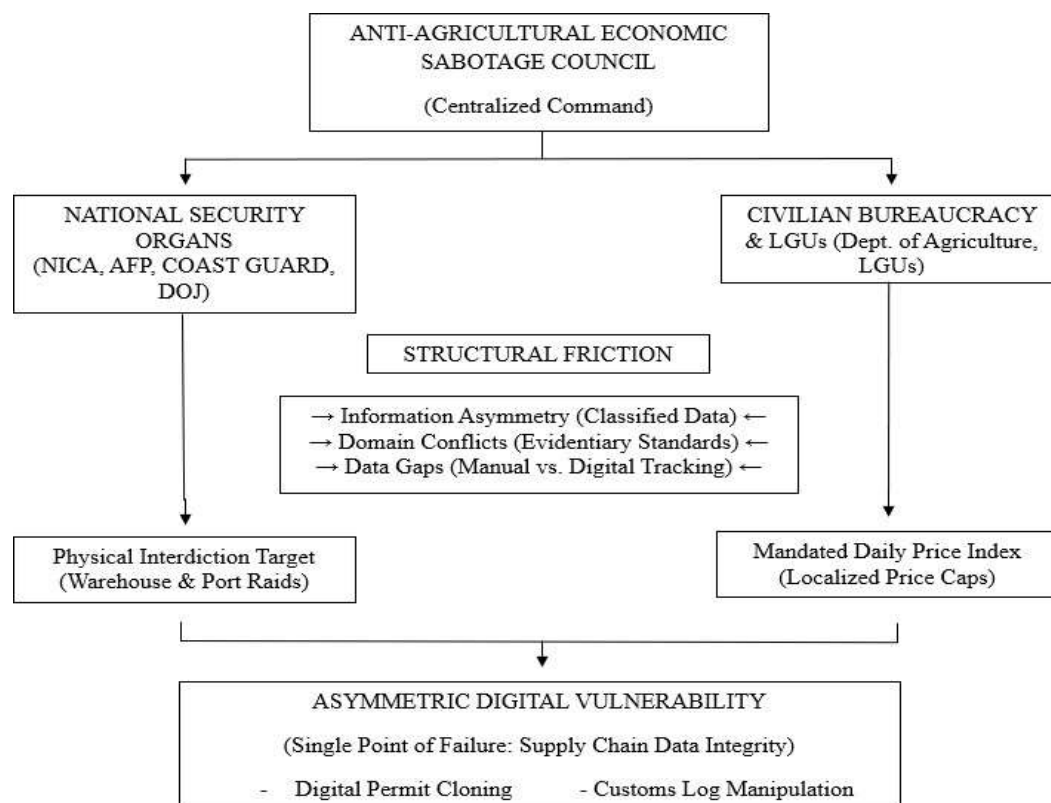


Figure 1: Structural Friction and Institutional Overlap Within the Anti-Agricultural Economic Sabotage Council Framework

Asymmetric Digital Threats and Supply Chain Data Integrity (RQ3)

The RA 12022 enforcement mechanisms mainly utilise physical interdiction such as maritime port raids, storage area seizures, and border checkpoints. Using structural text analysis, we also see that this statute has a very weak defensive structure with respect to contemporary asymmetric digital risks and threats. The Anti-Agricultural Economic Sabotage Act is 100% dependent on the authenticity of the automated supply chain transaction metadata in the electronic customs logs and digital phytosanitary certificates, as well as all of the automated transport permits issued by both the Bureau of Customs and the Department of Agriculture.

The findings show that organized crime syndicates have progressed from smuggling goods via physical transportation to now also using digital laundering. These crime syndicates take advantage of the technical vulnerabilities of the customs portals to clone legitimate digital transport permits and mix smuggled goods with the otherwise legitimate goods being imported into the country before they would be detected by a physical enforcement node, due to the fact that RA 12022 was created with the intention that the physical commodity would be inspected and determined to be authentic and no automated data verification systems exist in the customs ports. The integrity of the supply chain data is a singular point of failure, and therefore the cartels are able to circumvent the severe penal matrices put in place through the manipulation of automated documentation and the disruption of the cyber-kinetic operations of the port logistics registries.

DISCUSSION

The empirical findings of this research suggest that Republic Act No. 12022 is a major change in the structural features that comprise a nation's capacity to manage a secure resource public administration. In analyzing the transformation of legal frameworks supporting agricultural supply chains to be designed as a matter of national security, the study illustrates an inherent conflict between centralized state authority and the decentralization that exists throughout the markets.

Securitization and the Realignment of the Domestic Social Contract

Analyzing the results through the lens of Critical Security Studies reveals that the re-conceptualising of market anomalies into economic sabotage fundamentally changes the domestic social contract of the state. This move to redefine the baseline of governance from traditional socio-economic regulation of the market to an aggressive national defence model alters the speech-act concept of the Copenhagen School (Buzan & Wæver, 2020; Floyd, 2019). Changing the legal interpretation of market manipulation to economic sabotage in RA No. 12022 represents more than a gradual change to trade rules; it demonstrates a wholesale paradigm shift in the manner in which the government defends its "arteries of resource acquisition". The prior regulatory schema defined supply chain anomalies as either financial or tax irregularities. Now, by creating an automatic and objective threshold value of 10 million pesos, the definitions of large-scale smuggling, hoarding and cartelised arbitrage have all been elevated to non-bailable capital crimes

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punishable by life imprisonment. Henceforth, the state defines as critical to its national existence the stability of its food supply, permitting the government to resort to extreme measures and establishing a new administrative norm that prioritises the defence of the collective consumer baseline above all traditional marketplace freedoms (Trombetta, 2023).

Institutional Friction and Structural Data Gaps in Polycentric Governance

Polycentric Governance suggests that the Anti-Agricultural Economic Sabotage Council (AAESC) is structured fragmentedly. For a true Polycentric Governance model, there would be many independent decision-making centres that share a regulatory regime (Aligica & Tarko, 2022), thus creating a Hybrid-Centralised network (HCN) with significant domain conflict. Within the AAESC, the conflicts arise because there is a mismatch between the institutional mandates and operational goals, as conflicting institutional mandates drive the conflicts between the two groups. For example, while National Security and Intelligence Groups are bound by rules of confidentiality to protect sensitive tracking data, Local Civilian Offices (LCOs) and Local Government Units (LGUs) need to have open collaborative communication channels in order to carry out marketplace monitoring on a daily basis (Stępką, 2022; Flohr, 2025; Behnke, 2024; Kapucu, 2014). This lack of structural connection between the Councils indicates that the Councils are not currently functioning as a cohesive operational unit. Instead, they exist as separate (administrative) groups that are not properly communicating with one another. The lack of proper communication creates an information gap whereby local officials do not have access to the real-time information they need to enforce local price caps or to identify systemic hoarding. The information gap is indicative of a theoretical assumption that combining Centralised Security Measures and Bottom-Up Marketplace create internal conflict because there is not a common method of collaboration or standard for determining economic crimes (Boin, 2009; Wiwattanakornwong, 2025; Inquirer.Net, 2026; Nguyen, 2025).

Asymmetric Digital Threats and Supply Chain Data Integrity

This study has revealed a significant weakness in the enactment of R.A. 12022 due to complete reliance on physical enforcement methods, without any mechanism for the protection of designated cyber-kinetic infrastructure. The statement from the government that their methods of enforcement are purely based on physical raids of warehouses, physical inspections at ports of entry, and closing of borders demonstrates the government's tendency to engage in traditional methods of enforcement against modern cybersecurity crimes. As a result of innovations in digital laundering by sophisticated organized crime groups and exploitation of technology vulnerabilities of Customs' portals to digitally clone freight transport permits and to alter automated customs logs, utilizing only digital permits without automated methods of verification has created a single point of failure and jeopardized the ability of the infrastructure to support other nations. As no provisions have been made in R.A. 12022 to address this inherent risk, the state of enforcement architecture will continue to remain weak against cyber-kinetic threats and the cloning of documents. The transition to real-time automated methods of verifying permits is not simply a necessary upgrade of technology; it represents a critical transformation needed in the defense of the nation to resize the operational gap between static physical enforcement of permits and dynamic, asymmetric cybersecurity threats to permits (Arowosegbe et. al., 2024; Li et. al., 2026; Cowen, 2024).

The effectiveness of RA No. 12022 over the long term will ultimately depend upon whether domestic enforcement aligns with international development benchmarks. It will provide direct assistance to the United Nations Sustainable Development Goals through stabilization of internal logistics and disrupting corrupt trade networks. Specifically, the strategic implementation of this law will reinforce food access systems (SDG 2 - Zero Hunger) and strengthen the rule of law in key economic sectors (SDG 16 - Peace, Justice and Strong Institutions) (United Nations, 2023). However, the achievement of these goals requires a transition from strict physical punishment to a cooperative polycentric governance model that includes balancing national security with flexibility of the civilian market.

CONCLUSION AND RECOMMENDATIONS

Overall, this study illustrates that the Philippines, in its securitization of critical food infrastructure has had a significant shift in the country's approach to safeguarding national security and welfare. Since the enactment of RA 12022, the government has widely redefined large-scale smuggling, hoarding, cartelization, and illegal arbitrage as not merely ordinary economic offenses, but acts of economic sabotage, thereby directly threatening national security. This transformation reflects the country's recognition of food security as a fundamental pillar of state stability, public welfare, and economic development. In addition, through the application of Securitization Theory and Polycentric Governance, the study emphasizes how the protection of food supply chains has now required a redefined aggressive national defense model that combines legal authority, law enforcement, and inter-agency coordination. In addition, the findings, however, also reveal that strengthening legal sanctions alone is insufficient to ensure the security of the country's food infrastructure, as factors such as overlapping mandates, communication barriers among agencies, and the limited integration of local government units continue to hinder the effective implementation of the law. As such, the growing complexity of organized crime syndicates through digital laundering, cloned, and/or falsified transport documents have become challenges that the existing law clearly has no means to address. With this, the effectiveness of RA 12022 will depend not only on the severity of its penalties, but more importantly on the government's capability to withstand the said existing challenges by building more coordinated, technologically resilient, and adaptive and innovative governance mechanisms to better secure the food supply chain.

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systems. This study is limited given its qualitative, document-based research design, which relied solely on legislative statutes, policy documents, government and official issuances and records. As such, it did not involve human participants through interviews or focus group discussions. As a result, the findings are based solely on documentary evidence and did not include the experiences and perceptions of those involved in the implementation of RA 12022, such as the policymakers, concerned agencies, farmers, or consumers. Lastly, since the study was conducted within the Philippine context, its findings cannot be generalized to other countries especially those with different institutional systems.

Based on the analysis and findings in this study, the following recommendations are proposed to strengthen and resolve the institutional challenges that the study identified in RA 12022.

1. To address the redefinition of economic sabotage, the state should include food supply chain monitoring in its National Security Strategy. By classifying market manipulation as a major threat, the government can create consistent rules to protect the food supply and allow for consistent regulations that better protect consumers.
2. To reduce friction within the AAESC, the Council should implement a unified data access protocol. This would allow national intelligence agencies and local monitors like LCOs and LGUs to share information securely, balancing centralized security needs with local enforcement realities.
3. To counter asymmetrical digital threats, the state should replace manual inspections with an automated verification system. Real-time digital validation of permits and logs will eliminate security gaps and prevent the illegal laundering of goods. By investing in cybersecurity, the state can better protect its logistics infrastructure from organized crime.

Adopting these strategies will align Republic Act No. 12022 with modern security needs, creating a robust network to protect the nation's food infrastructure.

STATEMENTS AND DECLARATIONS

Funding Details

The authors declare that no funding was received for this research, nor were any governmental or private institution grants received to support the project investigators in conducting, analyzing or preparing the research for publication. The authors conducted all aspects of this research without any funds from outside sources.

Disclosure Statement

The research team declares there is no conflict of interest contained to the research. No funding was provided to the research or any outside influence. However, the research team was guided by the research adviser on the content accuracy and revisions of this research.

Acknowledgment

The authors wish to thank the faculty from the Department of Political Science of Leyte Normal University for their academic assistance during all facets of the preparation of this manuscript.

Ethical Approval

This report is considered to be a documentation-based qualitative evaluation of the public policy (i.e., documented laws, state records, and documented official government publications) and therefore did not include any human participants, animal subjects, or the use of personally identifiable information (PII). Therefore, no institutional review board (IRB) approval and/or ethics approval codes apply to this report.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

The authors utilized large language model technology (LLMT) to enhance syntax, optimize the relationship between words and their frequency, and confirm their works compliance with all institutional requirements for manuscript formatting while preparing this publication. After using this technology, they have gone over the content to ensure its quality and have accepted complete responsibility for the contents of this publication.

Credit Authorship Contribution Statement

All rights are attributed to the individual contributions of the research team for their rightful authorship of the following content:

- Shane Seannelle B. Cabuello: Abstract, Introduction, Research Questions, Methodology, Results, Discussion, Review, Editing, and Finalizing.
- Catherine J. Mendros: Discussion, Recommendations, and Review.
- Samantha Ysabelle T. Navarro: Abstract, Conclusion, and Review.
- Wynnell A. Royo: Methodology and Review.

Data Availability Statement

To uphold academic integrity, the research team ensures full transparency by confirming the public availability of all cited data. All visuals such as chart materials, as well as descriptive content, were accurately obtained from the original source and properly cited,

allowing for verification and minimizing ethical concerns.

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