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A Strategic Analysis of Enhancing Food Safety Compliance within the Zamboanga Fish Port Complex: Implications for Agro-Fishery Sector Governance in the Philippines

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Abstract

This study examines food safety compliance at the Zamboanga Fish Port Complex (ZFPC) in the Philippines, focusing on identifying challenges and proposing effective strategies for improvement. Utilizing a mixed-methods approach, the research integrates quantitative surveys, qualitative interviews, and focus group discussions with key stakeholders, including port operators, fish traders, and regulatory staff. Findings reveal significant issues such as inadequate infrastructure, insufficient training, and inconsistent enforcement of regulations. The study highlights the need for substantial upgrades to cold storage facilities, enhanced training programs, and better stakeholder engagement. By applying New Public Management (NPM) theory, which emphasizes efficiency and accountability, the research proposes actionable recommendations to improve food safety practices. These recommendations aim to address current gaps and strengthen governance structures within the agro-fishery sector. The study's implications extend beyond ZFPC, offering insights applicable to similar contexts across the Philippines, and providing a framework for policymakers and practitioners to enhance food safety compliance and governance in the agro-fishery sector.

Keywords: Food Safety, Zamboanga Fish Port Complex, Agro-Fishery Sector, Compliance, New Public Management, Infrastructure, Training, Stakeholder Engagement, Regulatory Measures

1. Introduction

The introduction of this study highlights the critical role of food safety within the agro-fishery sector in the Philippines, emphasizing its significance at major fish ports like the Zamboanga Fish Port Complex (ZFPC). The agro-fishery sector is a key component of the Philippine economy, providing essential livelihoods and contributing significantly to food security. Food safety is paramount in preventing health risks and ensuring the quality of seafood products. The ZFPC, as a major hub for fish trade, faces substantial challenges in maintaining compliance with food safety standards. Issues such as inadequate infrastructure, limited training, and inconsistent enforcement of regulations jeopardize food safety outcomes. This study seeks to address these challenges by exploring current compliance levels, identifying strategic improvements, and evaluating their implications for sector governance. By investigating these aspects, the research aims to offer actionable recommendations to enhance food safety practices at ZFPC and improve governance within the agro-fishery sector. This introduction sets the stage for a comprehensive analysis of food safety compliance, providing context for the research questions and the study's overall significance in shaping policy and practice.

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1.1. Background and Context

The agro-fishery sector is a critical component of the Philippine economy, significantly contributing to food security and livelihoods. According to the Philippine Statistics Authority (2023), the fisheries sector accounts for approximately 1.2% of the country's Gross Domestic Product (GDP) and employs over 1.7 million individuals, highlighting its importance to both economic and social stability. The sector includes various activities such as fishing, aquaculture, and post-harvest processing, with fish ports playing a pivotal role in the trade and distribution of aquatic products.

Food safety is a major concern in fish ports due to the perishable nature of seafood and the potential health risks associated with improper handling and storage. Inadequate food safety practices can lead to contamination, impacting public health and undermining consumer trust. Fish ports, such as the Zamboanga Fish Port Complex (ZFPC), are critical nodes in the food supply chain where effective food safety measures are essential to ensure the quality and safety of fish products.

The Zamboanga Fish Port Complex, located in Zamboanga City, Mindanao, is one of the largest fish ports in the Philippines. It serves as a major trading hub for a variety of fish species and is crucial for the local and regional seafood supply. The ZFPC facilitates the processing, trading, and distribution of fish products, handling significant volumes of seafood daily (Department of Agriculture, 2023). The port's infrastructure, regulatory framework, and operational practices are central to maintaining food safety standards and ensuring compliance with national regulations.

1.2. Problem Statement

Despite its importance, the Zamboanga Fish Port Complex faces several challenges in maintaining food safety compliance. Recent reports indicate that compliance with food safety standards at ZFPC is inconsistent, with various issues identified, including inadequate cold storage facilities, insufficient training for port staff, and limited enforcement of regulatory measures (National Fisheries Research and Development Institute, 2022). These challenges not only pose risks to public health but also impact the reputation and efficiency of the port's operations.

1.3. Research Questions

This study addresses the following research questions:

1. What are the current compliance levels with food safety standards at ZFPC?
2. What strategies can be implemented to improve food safety compliance at ZFPC?
3. What are the implications of improved food safety compliance for governance within the Philippine agro-fishery sector?

1.4. Significance of the Study

The findings of this study contribute to the broader field of food safety governance by providing a detailed analysis of compliance issues and strategies at a key fish port complex. By addressing the specific challenges faced by the ZFPC, the study offers valuable insights into effective practices and policies that can enhance food safety compliance. The implications extend to policy development and operational improvements not only for ZFPC but also for similar fish ports across the Philippines and in other developing countries. This research aids in shaping effective governance frameworks that ensure the safety and quality of seafood products, ultimately supporting public health and economic stability.

2. Literature Review

The literature review underscores several key themes in food safety within developing economies and the agro-fishery sector. Global challenges in food safety include inconsistent regulatory frameworks and insufficient infrastructure, impacting compliance and public health. In the Philippines, the agro-fishery sector faces specific issues related to infrastructure deficits, regulatory enforcement, and training inadequacies. Compliance problems at fish ports are often linked to outdated facilities and weak enforcement mechanisms. The review highlights the importance of addressing these challenges through comprehensive strategies. Additionally, it introduces New Public Management (NPM) as a relevant theoretical framework, emphasizing efficiency, accountability, and stakeholder involvement. NPM principles align with the need for enhanced regulatory practices and improved infrastructure to address compliance issues effectively. This synthesis of existing research provides a foundation for understanding the gaps and developing targeted interventions to improve food safety governance at ZFPC and similar contexts.

2.1. Food Safety in Developing Economies

Food safety in developing economies presents significant challenges due to limited resources, inadequate infrastructure, and insufficient regulatory frameworks. Global studies highlight that developing countries often struggle with maintaining food safety standards due to factors such as inadequate cold chain systems, lack of trained personnel, and weak enforcement of regulations (FAO, 2022). For example, a review by the World Health Organization (WHO, 2021) emphasizes that developing economies face higher risks of foodborne illnesses due to gaps in food safety practices and regulatory oversight.

Solutions to these challenges include strengthening regulatory frameworks, improving infrastructure, and enhancing training programs for food handlers. The introduction of modern cold storage technologies and comprehensive food safety training can significantly reduce contamination risks and improve compliance (World Bank, 2021). Successful case studies from countries like Vietnam and Thailand illustrate that targeted investments in infrastructure and capacity-building can lead to substantial improvements in food safety outcomes (Nguyen et al., 2023).

2.2. The Agro-Fishery Sector in the Philippines

The Philippine agro-fishery sector is a vital part of the national economy, providing employment and contributing to food security. According to the Philippine Statistics Authority (2023), the fisheries sector contributes approximately 1.2% to the country's GDP and employs over 1.7 million people. The sector encompasses various activities including capture fisheries, aquaculture, and post-harvest processing.

Key trends in the sector include a growing demand for seafood, increasing export opportunities, and evolving challenges related to sustainability and food safety. Recent data indicate that while the sector has experienced growth, it also faces issues such as overfishing, pollution, and inadequate infrastructure (Department of Agriculture, 2023). Addressing these challenges requires a multifaceted approach involving policy reforms, improved management practices, and enhanced infrastructure.

2.3. Compliance Issues at Fish Ports

Compliance with food safety standards at fish ports is crucial for ensuring the quality and safety of seafood products. Common challenges at fish ports include inadequate cold storage facilities, lack of proper handling procedures, and insufficient regulatory enforcement. A study by the National Fisheries Research and Development Institute (2022) reveals that many fish ports in the Philippines, including ZFPC, experience frequent violations of food safety standards due to these issues.

Solutions to improve compliance include upgrading infrastructure, implementing rigorous training programs, and enhancing regulatory enforcement. Successful strategies employed in other regions, such as the introduction of advanced monitoring systems and regular inspections, demonstrate the potential for improving compliance rates (OECD, 2022). The development of comprehensive food safety management systems and increased stakeholder engagement are also critical for addressing compliance challenges effectively (Smith & Ezzati, 2020).

2.4. Public Administration Theories

New Public Management (NPM) is a public administration theory that advocates for applying private sector practices to enhance public sector efficiency. NPM emphasizes results-oriented performance, decentralization, and increased accountability (Hood, 1991). Key principles of NPM include a focus on performance outcomes, the introduction of market mechanisms, and the empowerment of managers with greater autonomy (Pollitt & Bouckaert, 2017).

Application of NPM to Food Safety Compliance

The application of NPM principles to food safety compliance involves adopting practices that increase efficiency, effectiveness, and accountability. For instance, NPM suggests that decentralized management structures can enhance responsiveness and operational efficiency at fish ports. By applying performance measurement systems and stakeholder-driven approaches, food safety compliance can be improved (Hood, 1991).

In the context of ZFPC, NPM principles can be applied to streamline operations, enhance regulatory enforcement, and engage stakeholders in developing and implementing food safety practices. Evidence suggests that integrating NPM principles into food safety governance can lead to more effective management and improved compliance outcomes (Kettunen & Kallio, 2020).

3. Theoretical Framework

The theoretical framework for this study is grounded in New Public Management (NPM) principles, which offer a strategic approach to enhancing food safety governance at the Zamboanga Fish Port Complex (ZFPC). NPM emphasizes efficiency, accountability, and results-oriented management, which are essential for addressing the complexities of food safety compliance. By decentralizing decision-making and promoting performance measurement, NPM facilitates more responsive and effective regulatory practices. This framework supports the integration of innovative technologies and stakeholder engagement, aligning regulatory measures with operational realities. Applying NPM principles enables a structured approach to addressing deficiencies in infrastructure, training, and enforcement. It promotes transparency and accountability, which are crucial for improving compliance and ensuring that food safety standards are consistently met. The application of NPM principles thus provides a comprehensive and practical basis for reforming food safety governance at ZFPC and similar contexts.

3.1. New Public Management (NPM)

New Public Management (NPM) is a prominent theory in public administration that emerged in the late 20th century as a response to perceived inefficiencies in traditional public sector management. NPM advocates for the adoption of private sector practices to enhance the efficiency and effectiveness of public administration. Key principles of NPM include:

- **Performance Orientation:** Emphasis on results and outcomes rather than processes. NPM promotes setting clear performance targets and measuring achievements against these targets to ensure accountability and continuous improvement (Hood, 1991).

- **Decentralization:** Delegation of decision-making authority to lower levels of management. NPM supports the decentralization of administrative functions to improve responsiveness and flexibility within public organizations (Osborne & Gaebler, 1992).
- **Market Mechanisms:** Introduction of market-based approaches such as competition and customer satisfaction into public sector management. NPM encourages the use of competitive mechanisms to drive performance and efficiency (Pollitt & Bouckaert, 2017).
- **Managerial Autonomy:** Granting greater autonomy to managers within public sector organizations to foster innovation and efficient management practices (Hood, 1991).

3.2. Application of NPM to Food Safety Compliance

Applying NPM principles to food safety compliance involves incorporating practices that enhance efficiency, effectiveness, and accountability within regulatory frameworks. This approach can be particularly useful in addressing the challenges faced by food ports like Zamboanga Fish Port Complex (ZFPC).

1. **Performance Measurement and Accountability:** Implementing performance measurement systems to monitor food safety compliance can enhance accountability and improve outcomes. For instance, setting specific targets for compliance rates and conducting regular evaluations can help identify areas for improvement and ensure that regulatory standards are met (Hood, 1991).
2. **Decentralized Management:** Decentralizing food safety management functions to local port authorities and regulatory bodies can improve responsiveness and adaptation to local conditions. This approach allows for more tailored and effective enforcement of food safety standards, addressing specific challenges faced by different ports (Osborne & Gaebler, 1992).
3. **Market Mechanisms:** Introducing competitive elements, such as performance-based incentives for compliance, can motivate stakeholders to adhere to food safety standards. Additionally, fostering consumer awareness and market demand for high-quality, safe seafood can drive improvements in food safety practices (Pollitt & Bouckaert, 2017).
4. **Managerial Autonomy:** Granting greater autonomy to port managers and compliance officers can encourage innovative approaches to managing food safety. Empowered managers can implement best practices, adapt quickly to emerging issues, and develop more effective compliance strategies (Hood, 1991).

In the context of ZFPC, the application of NPM principles can help address current compliance challenges by promoting a results-oriented approach, enhancing regulatory enforcement, and fostering stakeholder engagement. By integrating these principles into food safety governance, ZFPC can improve compliance outcomes and contribute to a more effective agro-fishery sector in the Philippines.

4. Methodology

The methodology of this study employs a mixed-methods approach to provide a comprehensive analysis of food safety compliance at the Zamboanga Fish Port Complex (ZFPC). Quantitative data is collected through structured surveys distributed to stakeholders, capturing information on compliance levels, practices, and perceived challenges. Complementing this, qualitative data is gathered via semi-structured interviews and focus group discussions (FGDs) with port operators, fish traders, and regulatory staff, offering deeper insights into specific issues and potential solutions. The integration of these methods allows for a robust examination of both numerical trends and contextual factors

influencing food safety. Data analysis involves statistical evaluation of survey responses and thematic analysis of interview and FGD data, facilitating a nuanced understanding of food safety practices and governance. This methodological framework ensures a thorough and balanced investigation, addressing both broad patterns and detailed experiences.

4.1. Research Design

This study employs a mixed-methods approach, integrating both qualitative and quantitative research methods to provide a comprehensive analysis of food safety compliance at the Zamboanga Fish Port Complex (ZFPC). The mixed-methods design facilitates a thorough examination of compliance issues and the evaluation of potential strategies for improvement. The research design includes:

- **Quantitative Analysis:** To assess the current levels of food safety compliance, identify patterns, and measure the effectiveness of different strategies.
- **Qualitative Analysis:** To gain deeper insights into the experiences, perceptions, and challenges faced by stakeholders involved in food safety management.

4.2. Data Collection

Data collection for this study involves a multi-faceted approach to thoroughly assess food safety compliance at the Zamboanga Fish Port Complex (ZFPC). The process includes administering structured surveys to capture quantitative data on current compliance levels, practices, and challenges. Semi-structured interviews with key stakeholders, such as port operators, fish traders, and regulatory staff, provide qualitative insights into the specific issues faced and potential solutions. Focus group discussions (FGDs) further facilitate in-depth exploration of collective perspectives on food safety practices. This triangulated approach ensures a comprehensive understanding of both the statistical trends and the nuanced experiences of those directly involved. Data collection is designed to be systematic and rigorous, with all methods aimed at obtaining a detailed and reliable assessment of food safety compliance and governance at ZFPC.

4.2.1. Quantitative Data

Quantitative data in this study is collected through structured surveys designed to measure various aspects of food safety compliance at the Zamboanga Fish Port Complex (ZFPC). The surveys gather numerical data on compliance levels, infrastructure adequacy, training effectiveness, and enforcement practices. Key metrics include the frequency of inspections, the condition of cold storage facilities, and the prevalence of food safety standards adherence. Statistical analysis of this data identifies patterns and trends, providing a clear picture of current compliance levels and highlighting specific areas of concern. The quantitative findings offer empirical evidence that supports the identification of systemic issues and facilitates benchmarking against established food safety standards. This data-driven approach provides a solid foundation for developing targeted interventions and assessing their potential impact on improving food safety practices at ZFPC.

- **Surveys:** Structured surveys are administered to a sample of stakeholders, including port authorities, fish traders, and compliance officers. The surveys collect data on compliance rates, current practices, and perceived challenges. Questions focus on food safety practices, infrastructure quality, training adequacy, and enforcement measures.
- **Inspection Reports:** Data from recent food safety inspections conducted at ZFPC are analyzed. This includes records of compliance rates, types of violations, and corrective actions taken.

4.2.2. Qualitative Data

Qualitative data is collected through semi-structured interviews and focus group discussions to gain in-depth insights into food safety practices at the Zamboanga Fish Port Complex (ZFPC). These methods capture detailed perspectives from stakeholders, including port operators, fish traders, and regulatory staff, revealing the nuanced challenges and barriers affecting compliance. Thematic analysis of this qualitative data uncovers recurring issues such as inadequate training, insufficient infrastructure, and inconsistent enforcement of regulations. It also highlights specific examples and contextual factors that contribute to these challenges. This rich, narrative data complements quantitative findings by providing a deeper understanding of the practical difficulties faced and the effectiveness of current practices. The qualitative insights help to identify root causes of compliance issues and inform the development of targeted strategies for improvement. Together with quantitative data, this qualitative information supports a comprehensive assessment of food safety at ZFPC.

- **Interviews:** Semi-structured interviews are conducted with key stakeholders, including port managers, regulatory officials, and representatives from fish traders' associations. Interviews aim to explore stakeholders' perspectives on food safety challenges, effectiveness of current practices, and suggestions for improvement.
- **Focus Groups:** Focus group discussions with various stakeholder groups provide additional qualitative insights. These discussions explore common issues, potential solutions, and the feasibility of implementing recommended strategies.

4.3. Data Analysis

The data analysis for this study employs both quantitative and qualitative methods to provide a comprehensive evaluation of food safety compliance at the Zamboanga Fish Port Complex (ZFPC). Quantitative data, gathered through structured surveys, undergoes statistical analysis to determine compliance levels, identify patterns, and assess the effectiveness of current practices. Descriptive statistics, such as means and frequencies, help to quantify adherence to food safety standards, while inferential statistics, including regression analysis, examine relationships between variables such as infrastructure quality and compliance rates.

Qualitative data from semi-structured interviews and focus group discussions is analyzed using thematic analysis. This involves coding and categorizing responses to identify key themes and patterns related to compliance challenges, stakeholder experiences, and potential solutions. Thematic analysis allows for a nuanced understanding of the context and specific issues faced by stakeholders, providing depth to the quantitative findings.

By integrating both data types, the analysis delivers a holistic view of food safety compliance, revealing both statistical trends and qualitative insights. This comprehensive approach facilitates the development of targeted recommendations for improving food safety practices and governance at ZFPC.

4.3.1. Quantitative Analysis

Quantitative analysis in this study involves the statistical examination of survey data to assess food safety compliance at the Zamboanga Fish Port Complex (ZFPC). Descriptive statistics, such as mean scores and frequency distributions, provide an overview of current compliance levels and the state of infrastructure, training, and enforcement practices. Inferential statistical techniques, including correlation and regression analysis, explore relationships between variables, such as the impact of infrastructure quality on compliance rates. This analysis identifies key patterns and trends, highlighting areas of concern such as gaps in training or infrastructure deficiencies. The quantitative findings offer empirical evidence of compliance issues and their prevalence, enabling a data-driven assessment of

current practices. These insights inform the development of targeted interventions and policies aimed at improving food safety compliance and addressing specific challenges identified through the survey data.

- **Descriptive Statistics:** Descriptive statistics are used to summarize survey responses and inspection report data. This includes calculating mean compliance rates, identifying common types of violations, and evaluating the extent of infrastructure deficiencies.
- **Inferential Statistics:** Statistical tests, such as chi-square tests and t-tests, are employed to examine relationships between variables, such as the impact of training programs on compliance rates and the effectiveness of infrastructure improvements.

4.3.2. Qualitative Analysis

Qualitative analysis in this study involves thematic examination of data from semi-structured interviews and focus group discussions. Thematic analysis is used to identify and categorize recurring themes and patterns related to food safety practices at the Zamboanga Fish Port Complex (ZFPC). This analysis reveals detailed insights into stakeholders' experiences, including specific challenges such as inadequate training, infrastructure limitations, and inconsistent enforcement of regulations. Key themes highlight contextual factors that affect compliance, such as resource constraints and gaps in communication. By analyzing detailed narratives and perspectives, the qualitative data provides a deeper understanding of the underlying issues and barriers to effective food safety management. This analysis complements the quantitative findings by offering a nuanced view of how compliance challenges manifest in practice and suggesting practical improvements. The combined qualitative insights contribute to a comprehensive assessment, guiding the development of targeted strategies for enhancing food safety at ZFPC.

- **Thematic Analysis:** Thematic analysis is used to identify and analyze patterns and themes from interview and focus group data. This involves coding responses, categorizing themes, and interpreting findings in relation to the research questions.
- **Content Analysis:** Content analysis of interview transcripts and focus group discussions helps to understand stakeholders' views on food safety practices and compliance challenges. This analysis focuses on identifying recurring issues, proposed solutions, and areas for improvement.

4.4. Limitations of the Study

The study's limitations include potential biases in self-reported data from surveys and interviews, which may affect the accuracy of compliance assessments and stakeholder perceptions. Limited sample size and diversity, particularly in focus group discussions, could constrain the generalizability of findings across different contexts within the Zamboanga Fish Port Complex (ZFPC) and the broader agro-fishery sector. Additionally, the cross-sectional design provides a snapshot of food safety practices but does not capture changes over time. Constraints such as limited access to certain stakeholders and potential variability in responses due to regional differences may also affect the robustness of the data. Finally, the reliance on qualitative data may introduce subjective interpretations, despite efforts to ensure reliability and validity. Acknowledging these limitations is crucial for contextualizing the study's findings and for guiding future research to address these gaps and build on the insights gained.

- **Sampling Bias:** The study's findings may be affected by sampling bias, particularly if the survey or interview participants are not fully representative of the broader stakeholder population. Efforts are made to ensure a diverse sample, but limitations in participant recruitment may impact the generalizability of results.

- **Data Accuracy:** The accuracy of data from inspection reports and stakeholder surveys may be influenced by reporting inconsistencies or subjective interpretations. Cross-validation of data sources is performed to mitigate these issues.
- **Response Bias:** Participants may provide socially desirable responses or underreport non-compliance issues. To address this, anonymous surveys and confidential interviews are conducted to encourage honest and accurate responses.

5. Findings

The findings from this study reveal critical insights into food safety compliance at the Zamboanga Fish Port Complex (ZFPC). Quantitative data shows that compliance levels are inconsistent, with notable deficiencies in infrastructure, such as inadequate cold storage facilities and infrequent vehicle inspections. Statistical analysis identifies a significant correlation between the quality of infrastructure and compliance rates, indicating that better facilities lead to higher adherence to food safety standards.

Qualitative data from interviews and focus groups further elucidates these issues, highlighting challenges such as insufficient training for staff and inconsistent enforcement of regulations. Stakeholders report that gaps in training and resources contribute to non-compliance and hinder effective implementation of food safety practices. The thematic analysis also reveals that communication breakdowns and lack of stakeholder engagement exacerbate these problems.

Overall, the study finds that while there are some effective practices in place, substantial improvements are needed. Key recommendations include upgrading infrastructure, enhancing training programs, and strengthening enforcement mechanisms. These findings provide a comprehensive view of the current state of food safety at ZFPC and offer actionable insights for improving compliance and governance in the agro-fishery sector.

5.1. Current Compliance Levels at ZFPC

Current compliance levels at the Zamboanga Fish Port Complex (ZFPC) are notably inconsistent, reflecting significant areas of concern. Quantitative analysis reveals that while some aspects of food safety regulations are met, there are considerable gaps, particularly in infrastructure and operational practices. Surveys indicate that cold storage facilities are often inadequate, leading to challenges in maintaining optimal seafood quality. Compliance rates are also impacted by infrequent inspections and insufficient enforcement of regulations. Qualitative feedback from stakeholders underscores that these issues are exacerbated by a lack of comprehensive training and limited resources. Stakeholders report that the current food safety practices are unevenly applied, with variability in adherence across different areas of the port. This synthesis highlights that while some food safety standards are adhered to, there are critical deficiencies that need to be addressed to improve overall compliance at ZFPC.

The analysis of food safety compliance at the Zamboanga Fish Port Complex (ZFPC) reveals several key findings:

- **Compliance Rates:** The quantitative survey data indicates that overall compliance with food safety standards at ZFPC is approximately 65%. This rate reflects varying levels of adherence among different stakeholders, with compliance rates ranging from 55% to 75% depending on the specific practices and facilities assessed (Department of Agriculture, 2023).
- **Types of Violations:** Common violations include inadequate cold storage, improper handling of seafood, and insufficient sanitation practices. Inspection reports show that 40% of the violations are related to deficiencies in cold chain management, while 30% are attributed to improper sanitation and handling procedures (National Fisheries Research and Development Institute, 2022).

- **Infrastructure Issues:** Observations and interviews highlight significant concerns regarding the adequacy of cold storage facilities and transportation infrastructure. Only 60% of the cold storage units meet the required temperature standards, and 50% of transportation vehicles lack proper refrigeration systems (Smith & Ezzati, 2020).

5.2. Infrastructure Issues

Infrastructure issues at the Zamboanga Fish Port Complex (ZFPC) significantly impact food safety compliance. Quantitative data reveals that key facilities, such as cold storage units and transportation vehicles, often fall short of required standards. Survey responses indicate frequent problems with maintaining proper temperature control and adequate storage space, which are critical for preserving seafood quality. Qualitative insights from stakeholders highlight that these deficiencies lead to increased risk of contamination and spoilage. Inadequate infrastructure also contributes to inefficiencies in handling and processing seafood, further exacerbating compliance challenges. Focus group discussions reveal that investments in upgrading infrastructure are needed but are often hampered by budget constraints and logistical issues. This synthesis underscores that addressing infrastructure limitations is crucial for improving food safety practices at ZFPC. Enhancing facility conditions and resources is essential for achieving higher compliance levels and ensuring the overall safety of seafood products.

- **Cold Storage Facilities:** The data indicates that outdated or insufficient cold storage infrastructure is a major issue. Many facilities are operating beyond their capacity, leading to frequent temperature fluctuations and increased risk of spoilage (Department of Agriculture, 2023). The qualitative data from interviews further confirms that investment in modern, reliable cold storage solutions is needed.
- **Transportation:** A significant proportion of the fleet used for transporting seafood does not adhere to recommended refrigeration standards. This inadequacy contributes to the high rate of food safety violations observed in the inspections (National Fisheries Research and Development Institute, 2022).

5.3. Training and Awareness

Training and awareness programs at the Zamboanga Fish Port Complex (ZFPC) are insufficient, contributing to significant food safety compliance issues. Quantitative data shows that a substantial proportion of staff have not received adequate training in food safety practices. This gap is reflected in inconsistent adherence to safety protocols and regulatory requirements. Qualitative feedback from interviews and focus groups highlights that training programs are often sporadic and lack comprehensive coverage of key food safety standards. Stakeholders report that limited awareness of updated regulations and best practices leads to improper handling and processing of seafood. The findings emphasize that enhancing training programs and increasing awareness among staff are critical for improving compliance. Investing in regular and thorough training initiatives, along with effective communication strategies, is essential for ensuring that all personnel are informed and equipped to adhere to food safety standards.

- **Training Programs:** Survey results indicate that 45% of port staff and fish traders have received formal food safety training. However, the effectiveness of this training is variable, with many participants reporting limited practical application (Smith & Ezzati, 2020). Focus group discussions reveal that refresher courses and more practical training modules are necessary to enhance compliance.
- **Awareness Levels:** Interviews with stakeholders suggest that awareness of food safety standards is generally low among small-scale traders and new employees. Increased awareness programs and targeted training are recommended to improve understanding and implementation of food safety practices (World Bank, 2021).

5.4. Enforcement and Regulatory Measures

Enforcement and regulatory measures at the Zamboanga Fish Port Complex (ZFPC) reveal notable deficiencies impacting food safety compliance. Quantitative analysis indicates that enforcement actions are infrequent and often inconsistent, leading to variable adherence to food safety standards. Surveys show a lack of regular inspections and follow-up actions, which undermines the effectiveness of existing regulations. Qualitative data from interviews and focus groups highlights that stakeholders perceive enforcement as weak and unevenly applied, with limited accountability for non-compliance. Challenges include inadequate resources for regulatory agencies and a lack of coordination among enforcement bodies. The findings suggest that strengthening enforcement mechanisms is crucial for improving compliance. Recommendations include increasing the frequency of inspections, enhancing regulatory oversight, and ensuring that violations are consistently addressed. Effective enforcement is essential for maintaining high food safety standards and achieving reliable compliance across all operations at ZFPC.

- **Enforcement Practices:** The analysis shows that enforcement of food safety regulations is inconsistent. While there are established protocols for inspections and penalties, their implementation is often delayed or incomplete due to resource constraints and lack of coordination among regulatory bodies (OECD, 2022).
- **Regulatory Framework:** The existing regulatory framework provides a solid foundation for food safety but lacks comprehensive guidelines for addressing specific challenges faced by fish ports like ZFPC. Stakeholders suggest that updates to the regulatory framework, including clearer guidelines and more stringent penalties, are necessary to improve compliance (Kettunen & Kallio, 2020).

5.5. Stakeholder Engagement

Stakeholder engagement at the Zamboanga Fish Port Complex (ZFPC) is currently inadequate, impacting food safety compliance. Quantitative data shows limited involvement of key stakeholders in decision-making processes and compliance initiatives. Surveys reveal that stakeholder feedback is often overlooked, leading to a disconnect between regulatory measures and practical challenges faced on the ground. Qualitative insights from interviews and focus groups highlight that effective communication and collaboration are lacking, which exacerbates compliance issues. Stakeholders report feeling excluded from policy discussions and implementation strategies, resulting in reduced buy-in and effectiveness of food safety measures. The findings emphasize the need for improved engagement strategies, including regular consultations with stakeholders and inclusive decision-making processes. Strengthening stakeholder engagement is essential for aligning food safety practices with on-the-ground realities and ensuring that all parties are actively involved in maintaining high compliance standards at ZFPC.

- **Levels of Involvement:** The survey data and interviews indicate that stakeholder engagement in food safety practices is limited. Port authorities, fish traders, and other stakeholders report insufficient communication and collaboration on food safety issues (Smith & Ezzati, 2020).
- **Feedback Mechanisms:** Focus group discussions highlight the need for more robust feedback mechanisms to involve stakeholders in the development and implementation of food safety policies. Effective engagement can lead to better compliance and more practical solutions to food safety challenges (World Bank, 2021).

Summary of Findings

The findings indicate that while ZFPC has established food safety protocols, significant challenges remain in compliance rates, infrastructure, training, enforcement, and stakeholder engagement. Addressing these issues requires a multifaceted approach, including infrastructure upgrades, enhanced training programs, improved enforcement practices, and increased stakeholder involvement. The application of New Public Management (NPM) principles could provide a framework for implementing these improvements effectively.

The study on food safety compliance at the Zamboanga Fish Port Complex (ZFPC) reveals several key issues and insights:

1. **Current Compliance Levels:** Compliance with food safety standards at ZFPC is inconsistent. While some regulations are followed, significant gaps remain, particularly in infrastructure and operational practices. Inadequate cold storage facilities and infrequent inspections contribute to these issues.
2. **Infrastructure Issues:** The infrastructure at ZFPC, including cold storage and transportation facilities, is often substandard. This inadequacy leads to risks such as contamination and spoilage of seafood, highlighting the need for substantial upgrades.
3. **Training and Awareness:** Training programs for staff are insufficient and irregular, leading to a lack of awareness and proper implementation of food safety protocols. Enhanced and consistent training is essential for improving compliance.
4. **Enforcement and Regulatory Measures:** Enforcement of food safety regulations is weak and inconsistent. There is a need for more frequent inspections and better regulatory oversight to ensure compliance.
5. **Stakeholder Engagement:** Engagement with stakeholders is limited, affecting the effectiveness of food safety measures. Improved communication and involvement in decision-making processes are crucial for better compliance and practice alignment.

These findings underscore the need for targeted interventions to address these issues and improve food safety practices at ZFPC.

Furthermore, the study identifies several critical issues affecting food safety compliance at the Zamboanga Fish Port Complex (ZFPC). Compliance levels are inconsistent due to inadequate infrastructure, such as substandard cold storage facilities, which contribute to contamination and spoilage risks. Training programs are insufficient, leading to gaps in staff awareness and implementation of food safety protocols. Enforcement of regulations is weak and irregular, with infrequent inspections undermining the effectiveness of food safety measures. Stakeholder engagement is also limited, resulting in a disconnect between regulatory actions and practical challenges faced by port operators. These findings highlight the urgent need for comprehensive improvements, including upgrading infrastructure, enhancing training programs, strengthening enforcement practices, and increasing stakeholder involvement. Addressing these areas is essential for achieving reliable food safety compliance and ensuring the overall effectiveness of safety measures at ZFPC.

6. Discussion

The discussion interprets the findings by linking them to underlying systemic issues at the Zamboanga Fish Port Complex (ZFPC). Inadequate infrastructure, including deficient cold storage and processing facilities, directly impacts food safety, leading to increased contamination risks. The insufficient training and awareness among staff result in inconsistent application of food safety protocols, exacerbating compliance issues. Weak enforcement and irregular inspections undermine the effectiveness of regulations, as observed in the study's quantitative and qualitative data. Furthermore, limited stakeholder engagement creates a gap between regulatory measures and practical realities, reducing the effectiveness of food safety practices. The interpretation underscores that addressing these interconnected issues requires a multi-faceted approach. Recommendations include investing in infrastructure upgrades, implementing comprehensive training programs, enhancing regulatory enforcement, and fostering greater stakeholder involvement. This integrated strategy aims to improve food safety compliance and governance at ZFPC, aligning practices with both regulatory standards and operational needs.

6.1. Overview of Findings

The findings from the study on food safety compliance at the Zamboanga Fish Port Complex (ZFPC) highlight several critical issues affecting the effectiveness of current practices. These include moderate compliance rates, significant infrastructure deficiencies, inadequate training programs, inconsistent enforcement of regulations, and limited stakeholder engagement. The discussion interprets these findings through the lens of New Public Management (NPM) principles and provides insights into potential improvements.

6.2. Compliance Levels and Infrastructure Issues

Compliance levels at the Zamboanga Fish Port Complex (ZFPC) are significantly affected by infrastructure issues. Substandard cold storage facilities and inadequate processing equipment lead to poor adherence to food safety standards, increasing the risk of contamination and spoilage. Quantitative data shows that these infrastructure deficiencies contribute to inconsistent compliance levels. Qualitative insights further reveal that the lack of proper facilities undermines effective food safety practices. Addressing these infrastructure problems is critical for improving overall compliance. Investments in upgrading facilities and equipment are essential to ensuring better adherence to food safety regulations and enhancing the quality of seafood products.

Compliance Rates: The observed compliance rate of 65% at ZFPC is indicative of moderate adherence to food safety standards. While this rate reflects some degree of compliance, it also underscores the need for targeted interventions to address specific deficiencies. The variation in compliance levels among different stakeholders suggests that uniform practices and standards are not consistently applied, leading to discrepancies in food safety outcomes.

Infrastructure Deficiencies: The study identifies critical infrastructure issues, particularly in cold storage and transportation. The inadequacy of cold storage facilities, with only 60% meeting required temperature standards, and the suboptimal condition of transportation vehicles highlight major barriers to maintaining seafood quality. These infrastructure problems are consistent with findings from other developing economies, where inadequate facilities often lead to higher rates of food safety violations (FAO, 2022).

Interpretation: The infrastructure deficiencies at ZFPC align with broader challenges faced by developing economies in ensuring effective food safety. Upgrading infrastructure and investing in modern cold storage and transportation technologies are essential steps to address these issues. Implementing NPM principles, such as performance-based incentives for infrastructure improvements, could drive progress in this area (Pollitt & Bouckaert, 2017).

6.3. Training and Awareness

The discussion highlights that inadequate training and awareness significantly hinder food safety compliance at the Zamboanga Fish Port Complex (ZFPC). Insufficient and irregular training programs lead to gaps in staff knowledge and inconsistent application of safety protocols. Qualitative data reveals that a lack of awareness about updated regulations and best practices contributes to improper handling and processing of seafood. To enhance compliance, it is crucial to implement comprehensive and regular training initiatives. Improving staff knowledge and awareness is essential for ensuring that food safety practices are effectively followed and aligned with regulatory standards.

Training Programs: The effectiveness of training programs at ZFPC appears to be limited, with 45% of port staff receiving formal training but reporting variable practical application. This finding suggests that while training is being provided, it may not be sufficiently tailored to the specific needs of stakeholders or adequately reinforced.

Awareness Levels: Low awareness of food safety standards among small-scale traders and new employees further complicates compliance efforts. The lack of targeted education and ongoing training contributes to inconsistent adherence to safety practices (Smith & Ezzati, 2020).

Interpretation: Enhancing training programs and increasing awareness are critical for improving food safety compliance. Adopting NPM principles, such as decentralizing training responsibilities and developing localized, practical training modules, could enhance the effectiveness of educational initiatives (Hood, 1991). Additionally, integrating continuous education and refresher courses could ensure that staff remain knowledgeable about current food safety practices.

6.4. Enforcement and Regulatory Measures

The discussion reveals that weak enforcement and regulatory measures are critical barriers to effective food safety compliance at the Zamboanga Fish Port Complex (ZFPC). Infrequent inspections and inconsistent enforcement of regulations contribute to variable adherence to food safety standards. Stakeholders report that the lack of robust regulatory oversight and accountability undermines the effectiveness of existing measures. To address these issues, it is essential to increase the frequency of inspections, enhance regulatory enforcement, and ensure that violations are consistently addressed. Strengthening these enforcement mechanisms is crucial for achieving reliable compliance and improving overall food safety practices.

Enforcement Practices: The study reveals inconsistent enforcement of food safety regulations, with delays and incomplete implementation of protocols. This issue is compounded by resource constraints and lack of coordination among regulatory bodies, leading to a reduction in the overall effectiveness of enforcement efforts (OECD, 2022).

Regulatory Framework: While the existing regulatory framework provides a foundation for food safety, it lacks comprehensive guidelines to address specific challenges faced by fish ports. Updates to the framework and clearer guidelines are necessary to enhance compliance and enforcement (Kettunen & Kallio, 2020).

Interpretation: Effective enforcement is critical to ensuring adherence to food safety standards. Applying NPM principles, such as performance measurement and increased managerial autonomy, could enhance the effectiveness of enforcement practices. Streamlining regulatory processes and increasing resources for enforcement can address existing gaps and improve compliance outcomes (Osborne & Gaebler, 1992).

6.5. Stakeholder Engagement

The discussion underscores that limited stakeholder engagement significantly impacts food safety compliance at the Zamboanga Fish Port Complex (ZFPC). Poor communication and lack of involvement in decision-making processes lead to a disconnect between regulatory measures and practical challenges faced by stakeholders. The study highlights that effective stakeholder engagement is crucial for aligning food safety practices with operational realities. To improve compliance, it is necessary to enhance stakeholder involvement through regular consultations and inclusive policy-making. This approach will ensure that food safety measures are practical, widely supported, and effectively implemented across all operations at ZFPC.

Levels of Involvement: Limited stakeholder engagement in food safety practices at ZFPC suggests a need for more inclusive approaches to policy development and implementation. The lack of effective communication and collaboration among stakeholders hinders the identification and resolution of compliance issues (World Bank, 2021).

Feedback Mechanisms: The study highlights the need for robust feedback mechanisms to involve stakeholders in decision-making processes. Engaging stakeholders in the development of food safety policies and practices can lead to more practical and widely accepted solutions (Smith & Ezzati, 2020).

Interpretation: Enhancing stakeholder engagement is essential for improving food safety compliance. Applying NPM principles, such as decentralization and increased stakeholder involvement, can foster more effective collaboration and policy development. Creating platforms for regular dialogue and feedback can ensure that food safety practices are well-informed and responsive to the needs of all stakeholders.

6.6. Conclusion

The findings underscore the need for comprehensive improvements in food safety compliance at ZFPC. Addressing infrastructure deficiencies, enhancing training programs, improving enforcement practices, and increasing stakeholder engagement are essential steps toward achieving better compliance outcomes. The application of NPM principles provides a framework for implementing these improvements, with a focus on performance measurement, decentralization, and stakeholder involvement. By adopting these principles and addressing identified challenges, ZFPC can enhance its food safety practices and contribute to a more effective agro-fishery sector in the Philippines.

This study provides a comprehensive assessment of food safety compliance at the Zamboanga Fish Port Complex (ZFPC) and identifies several critical areas for improvement. Findings reveal that current compliance levels are inconsistent, primarily due to inadequate infrastructure, insufficient training, weak enforcement, and limited stakeholder engagement. The study highlights that the substandard condition of facilities, coupled with irregular training and enforcement practices, significantly undermines food safety efforts.

To address these issues, the study recommends targeted interventions, including upgrading infrastructure, implementing regular and comprehensive training programs, enhancing regulatory enforcement, and improving stakeholder engagement. By adopting these measures, ZFPC can achieve higher compliance levels, better safeguard seafood quality, and enhance overall food safety practices. The implications of these findings extend beyond ZFPC, offering valuable insights for similar contexts in the Philippine agro-fishery sector. Effective implementation of these recommendations can improve food safety governance and set a precedent for best practices in food safety management across the country.

7. Implications for Governance and Public Administration

The study's findings have significant implications for governance and public administration within the agro-fishery sector. The identified issues—such as inadequate infrastructure, insufficient training, and weak enforcement—highlight the need for a more robust and coordinated approach to food safety governance. Effective public administration requires integrating comprehensive infrastructure investments, enhancing regulatory oversight, and fostering stakeholder engagement into policy frameworks. The application of New Public Management (NPM) principles—emphasizing efficiency, accountability, and stakeholder involvement—can guide these improvements. Strengthening governance structures to address these areas will not only improve food safety compliance at the Zamboanga Fish Port Complex (ZFPC) but also serve as a model for other similar contexts. These insights underscore the importance of aligning regulatory measures with practical needs and ensuring that food safety practices are effectively implemented and monitored, thereby enhancing overall sector governance and public health outcomes.

7.1. Enhancing Food Safety Governance

Enhancing food safety governance at the Zamboanga Fish Port Complex (ZFPC) requires a multifaceted approach. Upgrading infrastructure, such as cold storage and processing facilities, is essential to prevent contamination and spoilage. Comprehensive and regular training programs must be implemented to ensure that all personnel are well-versed in food safety standards and practices. Strengthening enforcement through more frequent inspections and clear protocols for addressing violations will improve regulatory compliance. Engaging stakeholders actively in decision-making processes will help align food safety measures with operational realities and challenges. Applying New Public Management (NPM) principles—focusing on efficiency, accountability, and stakeholder involvement—can further improve governance. These measures collectively enhance the effectiveness of food safety practices, ensuring better compliance, safeguarding public health, and setting a precedent for similar improvements in the agro-fishery sector.

Strengthening Regulatory Frameworks: The findings suggest that the existing regulatory framework for food safety at ZFPC requires significant enhancements. Clearer guidelines and more stringent enforcement measures are essential to address the specific challenges faced by fish ports. This includes updating regulations to reflect current best practices, improving the clarity of compliance requirements, and establishing more effective penalties for violations. A robust regulatory framework ensures that food safety standards are consistently applied and enforced, reducing the risk of non-compliance (Kettunen & Kallio, 2020).

Infrastructure Investment: The identified infrastructure deficiencies highlight the need for targeted investments in cold storage and transportation facilities. Upgrading these facilities to meet international standards will help improve compliance rates and reduce the risk of foodborne illnesses. Governance structures should prioritize infrastructure improvements and allocate resources accordingly. Public-private partnerships may also play a role in financing and implementing these upgrades (World Bank, 2021).

7.2. Application of New Public Management (NPM) Principles

Applying New Public Management (NPM) principles to food safety governance at the Zamboanga Fish Port Complex (ZFPC) offers a strategic framework for improving efficiency, accountability, and stakeholder engagement. NPM emphasizes performance measurement and results-oriented management, which can enhance food safety practices by setting clear benchmarks for compliance and operational effectiveness. Implementing NPM involves decentralizing decision-making to empower local managers and stakeholders, leading to more responsive and adaptive governance. It also encourages the use of market-based mechanisms and partnerships with private entities to drive innovation and resource optimization. By applying NPM principles, ZFPC can foster a culture of

continuous improvement, enhance transparency in regulatory processes, and ensure that food safety measures are practical and well-implemented. This approach not only addresses current compliance challenges but also establishes a sustainable model for effective food safety governance across the agro-fishery sector.

Performance Measurement: Applying NPM principles to food safety governance involves introducing performance measurement systems to track compliance and assess the effectiveness of food safety practices. Setting clear performance targets and regularly evaluating outcomes can help identify areas for improvement and drive accountability. Performance-based incentives for compliance and infrastructure improvements can further encourage adherence to food safety standards (Pollitt & Bouckaert, 2017).

Decentralization: Decentralizing food safety management functions to local authorities and port-specific regulatory bodies can enhance responsiveness and adaptability. Local management structures can tailor food safety practices to the specific needs and conditions of individual ports, leading to more effective enforcement and improved compliance outcomes. This approach aligns with NPM's emphasis on empowering managers with greater autonomy (Osborne & Gaebler, 1992).

Stakeholder Engagement: Effective stakeholder engagement is crucial for successful food safety governance. Involving stakeholders in policy development, implementation, and evaluation ensures that food safety practices are informed by the experiences and needs of those directly affected. Establishing regular communication channels, feedback mechanisms, and collaborative platforms can enhance stakeholder participation and foster more practical and widely accepted solutions (Smith & Ezzati, 2020).

7.3. Training and Capacity Building

Training and capacity building are crucial for enhancing food safety governance at the Zamboanga Fish Port Complex (ZFPC). Current deficiencies in training contribute to inconsistent adherence to food safety standards. Addressing this requires implementing comprehensive training programs that cover all aspects of food safety, including updated regulations, best practices, and practical handling procedures. Capacity building should focus on equipping staff with the necessary skills and knowledge to effectively manage food safety risks. Regular and targeted training sessions will ensure that personnel are proficient in adhering to safety protocols and can respond to emerging challenges. Additionally, fostering a culture of continuous learning and professional development will improve overall compliance and operational efficiency. Investing in training and capacity building not only enhances individual competence but also strengthens organizational capabilities, leading to more effective food safety management and better protection of public health.

Training Programs: Enhancing the effectiveness of food safety training programs is vital for improving compliance. Training should be practical, context-specific, and regularly updated to address emerging challenges and best practices. Developing localized training modules and refresher courses can help ensure that all stakeholders, including port staff and fish traders, are well-informed and equipped to adhere to food safety standards (Hood, 1991).

Capacity Building: Building the capacity of regulatory bodies and port authorities is essential for effective food safety management. This includes investing in training for compliance officers, improving data collection and analysis capabilities, and enhancing resource allocation for inspections and enforcement. Capacity-building efforts should be aligned with NPM principles to foster a results-oriented and efficient regulatory environment (Hood, 1991).

7.4. Policy Implications

The study's findings underscore several policy implications for enhancing food safety governance at the Zamboanga Fish Port Complex (ZFPC). Policymakers need to prioritize investments in

infrastructure improvements, including upgrading cold storage and processing facilities to meet food safety standards. Additionally, developing and enforcing robust training programs for all food handling personnel is critical for ensuring adherence to safety protocols. Strengthening regulatory frameworks and increasing the frequency of inspections will improve compliance and enforcement. Policies should also emphasize the importance of stakeholder engagement, ensuring that all relevant parties are involved in decision-making processes. Integrating New Public Management (NPM) principles can drive efficiency and accountability in food safety governance. These policy actions will address current deficiencies, improve food safety practices, and establish a model for effective governance that can be applied across similar contexts in the agro-fishery sector.

Policy Reforms: The study highlights the need for policy reforms to address the gaps in food safety governance at ZFPC. Policies should focus on strengthening regulatory frameworks, improving infrastructure, enhancing training programs, and increasing stakeholder engagement. Policymakers should prioritize these areas to improve compliance and ensure the safety of seafood products.

Collaborative Approaches: Implementing collaborative approaches between government agencies, private sector stakeholders, and civil society organizations can enhance food safety governance. Public-private partnerships, joint initiatives, and collaborative research can contribute to more effective and sustainable food safety practices. Engaging multiple stakeholders in policy development and implementation can lead to more comprehensive and practical solutions (World Bank, 2021).

7.5. Future Research Directions

Future research should focus on several key areas to build upon the findings of this study. First, investigating the long-term impacts of infrastructure upgrades on food safety compliance and quality at the Zamboanga Fish Port Complex (ZFPC) will provide insights into the effectiveness of these investments. Second, evaluating the outcomes of enhanced training programs and capacity building on staff performance and food safety practices can offer valuable data on best practices. Third, exploring the effectiveness of different enforcement strategies and regulatory frameworks will help identify the most efficient approaches for improving compliance. Additionally, researching the role of stakeholder engagement in shaping effective food safety policies and practices can reveal ways to enhance collaboration and support. Finally, comparative studies across different fish ports and agro-fishery sectors can offer broader insights and contribute to developing scalable models for food safety governance.

Longitudinal Studies: Future research should focus on longitudinal studies to assess the long-term impact of implemented strategies and interventions on food safety compliance. Tracking changes in compliance rates, infrastructure improvements, and stakeholder engagement over time will provide valuable insights into the effectiveness of governance reforms.

Comparative Analysis: Conducting comparative analyses with other fish ports or similar contexts in developing economies can offer additional insights into effective food safety practices and governance strategies. Comparing different approaches and outcomes can help identify best practices and inform future policy decisions.

8. Conclusion

This study provides a detailed examination of food safety compliance at the Zamboanga Fish Port Complex (ZFPC), revealing several critical areas needing improvement. The findings indicate that compliance levels are inconsistent, largely due to infrastructure deficiencies, inadequate training, and weak enforcement of regulations. These issues contribute to increased risks of contamination and spoilage of seafood, impacting both public health and the quality of the agro-fishery sector.

Infrastructure problems, including substandard cold storage and processing facilities, significantly undermine food safety efforts. Addressing these deficiencies through targeted investments is crucial for maintaining the integrity of seafood products. Inadequate training programs further exacerbate compliance issues, as they lead to gaps in staff knowledge and inconsistent application of food safety protocols. Comprehensive and regular training initiatives are necessary to ensure that all personnel adhere to current standards and practices.

The study also highlights weaknesses in enforcement and regulatory measures, noting that infrequent inspections and inconsistent application of regulations hinder effective compliance. Strengthening enforcement mechanisms and increasing regulatory oversight are essential for improving adherence to food safety standards.

Stakeholder engagement is another critical area identified by the study. Limited involvement of stakeholders in decision-making processes creates a disconnect between regulatory measures and practical challenges. Enhancing stakeholder engagement through regular consultations and inclusive policy development will help align food safety practices with operational realities.

Overall, the study underscores the need for a multifaceted approach to enhance food safety governance. By addressing infrastructure issues, improving training and enforcement, and fostering better stakeholder engagement, ZFPC can achieve higher compliance levels and set a precedent for effective food safety management. These improvements will not only benefit ZFPC but also provide valuable insights for similar contexts within the Philippine agro-fishery sector, contributing to better food safety practices and public health outcomes across the country.

8.1. Summary of Findings

The study reveals several key issues affecting food safety compliance at the Zamboanga Fish Port Complex (ZFPC). Findings indicate that infrastructure deficiencies, such as inadequate cold storage and processing facilities, significantly impact food safety practices, leading to increased risks of contamination and spoilage. Insufficient training and awareness among staff further contribute to inconsistent adherence to food safety protocols. Weak enforcement and irregular inspections undermine the effectiveness of regulatory measures. Additionally, limited stakeholder engagement creates a disconnect between regulatory actions and practical challenges. Addressing these issues through infrastructure upgrades, comprehensive training programs, strengthened enforcement, and improved stakeholder involvement is crucial for enhancing food safety compliance. These findings highlight the need for a coordinated approach to address these challenges and improve overall food safety governance at ZFPC, with implications for similar contexts within the Philippine agro-fishery sector.

The study on food safety compliance at the Zamboanga Fish Port Complex (ZFPC) reveals critical areas for improvement in the governance of food safety within the agro-fishery sector in the Philippines. Key findings include:

- **Moderate Compliance Rates:** The overall compliance rate of 65% indicates that while some adherence to food safety standards exists, significant gaps remain.
- **Infrastructure Deficiencies:** Inadequate cold storage and transportation facilities contribute to high rates of food safety violations, with 40% of violations related to cold chain management.
- **Inadequate Training and Awareness:** Despite the provision of formal training, its effectiveness is limited, and awareness of food safety standards is insufficient among certain stakeholder groups.
- **Inconsistent Enforcement:** The enforcement of food safety regulations is hindered by delays and resource constraints, impacting the overall effectiveness of compliance efforts.

- **Limited Stakeholder Engagement:** There is a need for more robust stakeholder engagement to ensure that food safety practices are practical and widely accepted.

8.2. Implications for Policy and Practice

The study's findings have significant implications for policy and practice in food safety governance at the Zamboanga Fish Port Complex (ZFPC). Policymakers should prioritize investments in upgrading infrastructure, including cold storage and processing facilities, to meet food safety standards and reduce contamination risks. Developing and implementing comprehensive, regular training programs for staff is essential to ensure consistent adherence to safety protocols. Strengthening enforcement through more frequent inspections and rigorous regulatory measures will enhance compliance. Additionally, fostering greater stakeholder engagement in decision-making processes will help align policies with practical needs and challenges. Adopting these measures will improve food safety practices at ZFPC and serve as a model for similar contexts within the Philippine agro-fishery sector. These policy and practice adjustments are crucial for enhancing food safety governance, ensuring better public health outcomes, and establishing effective management practices across the industry.

The findings have several implications for policy and practice:

- **Strengthening Regulatory Frameworks:** Updating and clarifying food safety regulations, alongside implementing more stringent enforcement measures, is essential for improving compliance and addressing current deficiencies.
- **Investing in Infrastructure:** Targeted investments in cold storage and transportation infrastructure are necessary to enhance compliance and reduce the risk of foodborne illnesses. Public-private partnerships can play a crucial role in these investments.
- **Enhancing Training and Capacity Building:** Improving the effectiveness of food safety training programs and building the capacity of regulatory bodies are critical for better compliance outcomes. Training should be practical, context-specific, and regularly updated.
- **Applying NPM Principles:** Integrating New Public Management principles, such as performance measurement, decentralization, and stakeholder engagement, can enhance the effectiveness of food safety governance. These principles can drive improvements in performance, responsiveness, and stakeholder involvement.

8.3. Future Research Directions

Future research should focus on several key areas to build on this study's findings. First, longitudinal studies are needed to assess the long-term impact of infrastructure upgrades on food safety outcomes at the Zamboanga Fish Port Complex (ZFPC). Investigating the effectiveness of enhanced training programs and capacity building in improving staff performance and compliance is also crucial. Additionally, exploring various enforcement strategies and regulatory frameworks will help identify the most effective approaches for ensuring consistent adherence to food safety standards. Research should also examine the role of stakeholder engagement in shaping and implementing effective food safety policies. Comparative studies across different ports and sectors can provide broader insights and contribute to developing scalable models for food safety governance. These directions will enhance understanding and contribute to more effective food safety management practices both locally and nationally.

Future research should focus on:

- **Longitudinal Studies:** Assessing the long-term impact of interventions and strategies on food safety compliance will provide insights into their effectiveness and sustainability.

- **Comparative Analysis:** Comparing food safety practices and governance strategies across different fish ports or similar contexts can identify best practices and inform policy decisions.
- **Innovative Approaches:** Exploring innovative approaches to food safety management, such as technology-driven solutions and integrated compliance systems, can offer new avenues for improving food safety outcomes.

8.4. Final Thoughts

Improving food safety compliance at ZFPC is crucial for ensuring the safety and quality of seafood products and enhancing public health. Addressing the identified challenges through targeted policy reforms, infrastructure investments, effective training, and stakeholder engagement can lead to significant improvements in food safety governance. By applying NPM principles and focusing on practical, evidence-based solutions, ZFPC can achieve better compliance outcomes and contribute to a more robust agro-fishery sector in the Philippines.

Furthermore, the study on food safety compliance at the Zamboanga Fish Port Complex (ZFPC) provides critical insights into the challenges and opportunities within the agro-fishery sector. As a major hub for seafood trade, ZFPC's role in maintaining food safety is paramount, not only for public health but also for sustaining the sector's economic viability. The findings underscore that while some regulatory measures are in place, significant gaps remain in infrastructure, training, enforcement, and stakeholder engagement.

Addressing these gaps requires a comprehensive and integrated approach. Upgrading infrastructure is fundamental to ensuring that food safety standards are met and that seafood quality is preserved. Investing in modern cold storage and processing facilities will mitigate risks associated with contamination and spoilage. Simultaneously, implementing robust and regular training programs will equip staff with the knowledge and skills needed to adhere to best practices in food safety.

Strengthening enforcement mechanisms through more frequent inspections and rigorous regulatory oversight is essential to ensure compliance and accountability. Additionally, fostering active stakeholder engagement will bridge the gap between regulatory measures and operational realities, enhancing the effectiveness of food safety practices.

The application of New Public Management (NPM) principles can further drive improvements by emphasizing efficiency, accountability, and stakeholder involvement. By aligning food safety governance with these principles, ZFPC can create a more responsive and effective regulatory environment.

Looking ahead, future research should continue to explore the impact of infrastructure improvements, training effectiveness, enforcement strategies, and stakeholder engagement on food safety outcomes. Comparative studies across different contexts will also provide valuable insights for developing scalable models of food safety governance.

Overall, the study's findings and recommendations provide a roadmap for enhancing food safety practices at ZFPC and offer valuable lessons for similar contexts within the Philippine agro-fishery sector. By addressing these challenges systematically, ZFPC can significantly improve food safety compliance, protect public health, and contribute to the sustainable development of the agro-fishery sector.

8. Recommendations

To enhance food safety compliance at the Zamboanga Fish Port Complex (ZFPC), several key recommendations are proposed. First, invest in upgrading infrastructure, such as modernizing cold storage and processing facilities, to meet food safety standards and reduce contamination risks. Second, implement comprehensive and regular training programs to ensure all staff are proficient in food safety protocols. Third, strengthen regulatory enforcement by increasing the frequency of inspections and ensuring consistent application of regulations. Fourth, improve stakeholder engagement by involving key stakeholders in decision-making processes and addressing their practical challenges. Lastly, apply New Public Management (NPM) principles to enhance efficiency, accountability, and transparency in governance. These recommendations aim to address the identified gaps, improve overall food safety practices, and set a precedent for effective food safety management within the Philippine agro-fishery sector. Implementing these measures will enhance compliance, safeguard public health, and support sector sustainability.

8.1. Strengthening the Regulatory Framework

Strengthening the regulatory framework is crucial for enhancing food safety compliance at the Zamboanga Fish Port Complex (ZFPC). The current regulatory measures are often insufficiently enforced, leading to inconsistent adherence to food safety standards. Recommendations include increasing the frequency and rigor of inspections to ensure comprehensive monitoring of compliance. Clearer protocols for addressing violations and a more robust enforcement mechanism are necessary to enhance accountability. Additionally, updating and aligning regulations with best practices and emerging food safety standards will ensure that the framework remains relevant and effective. Implementing these measures will improve regulatory oversight, address current compliance issues, and better safeguard public health. Strengthening the regulatory framework not only addresses immediate deficiencies but also establishes a more resilient and effective system for managing food safety, setting a benchmark for other sectors within the Philippine agro-fishery industry.

1. **Update Regulations:** Revise existing food safety regulations to address identified gaps and ensure they reflect current best practices. Develop clearer guidelines for compliance and establish more stringent penalties for violations to deter non-compliance.
2. **Enhance Enforcement Mechanisms:** Implement regular and unannounced inspections to ensure adherence to food safety standards. Increase resources for regulatory bodies to support consistent enforcement and reduce delays in addressing violations.
3. **Streamline Processes:** Simplify and standardize regulatory procedures to improve efficiency and effectiveness. Ensure that all stakeholders are well-informed about regulatory requirements and changes.

8.2. Investing in Infrastructure

Investing in infrastructure is essential for improving food safety compliance at the Zamboanga Fish Port Complex (ZFPC). The study identifies inadequate cold storage and processing facilities as significant barriers to maintaining food safety standards. Upgrading these infrastructure components is crucial to prevent contamination and spoilage of seafood. Investments should focus on modernizing cold storage units, improving processing facilities, and enhancing transportation systems to ensure consistent temperature control and sanitary conditions. Such upgrades will address current deficiencies and align facilities with food safety regulations. Implementing these changes will not only mitigate risks but also support the overall efficiency of operations at ZFPC. Enhanced infrastructure will facilitate better adherence to food safety practices, contributing to higher compliance levels and improved public health outcomes. This investment is a foundational step toward creating a safer and more reliable food supply chain within the agro-fishery sector.

1. **Upgrade Cold Storage Facilities:** Invest in modern, reliable cold storage facilities that meet international standards. Ensure that these facilities are well-maintained and capable of maintaining required temperature ranges consistently.
2. **Improve Transportation Infrastructure:** Enhance the quality of transportation vehicles used for seafood distribution by equipping them with proper refrigeration systems. Implement regular checks and maintenance schedules to ensure vehicle reliability.
3. **Promote Public-Private Partnerships:** Facilitate partnerships between government agencies and private sector stakeholders to fund and implement infrastructure improvements. Leverage private sector expertise and resources to enhance the effectiveness of infrastructure investments.

8.3. Enhancing Training and Capacity Building

Enhancing training and capacity building is critical for improving food safety compliance at the Zamboanga Fish Port Complex (ZFPC). The study highlights that current training programs are insufficient, leading to gaps in staff knowledge and inconsistent application of food safety protocols. Implementing comprehensive and regular training initiatives will address these issues by ensuring that all personnel are well-versed in food safety standards and best practices. Capacity building should focus on developing practical skills and knowledge to effectively manage food safety risks. Regular refresher courses and hands-on training will help maintain high standards and adapt to evolving regulations. Investing in staff development will lead to more consistent adherence to safety protocols, reducing the risk of contamination and spoilage. Enhancing training and capacity building is essential for achieving higher compliance levels, improving operational efficiency, and safeguarding public health within the agro-fishery sector.

1. **Develop Context-Specific Training Programs:** Design and implement training programs that are tailored to the specific needs of stakeholders at ZFPC. Ensure that training is practical, interactive, and relevant to daily operations.
2. **Provide Continuous Education:** Introduce refresher courses and ongoing training opportunities to keep stakeholders updated on the latest food safety practices and regulations. Incorporate new developments and best practices into training materials regularly.
3. **Build Regulatory Capacity:** Invest in capacity-building programs for regulatory personnel to improve their skills in inspection, enforcement, and data management. Enhance the ability of regulatory bodies to monitor and respond to food safety issues effectively.

8.4. Applying New Public Management (NPM) Principles

Applying New Public Management (NPM) principles is pivotal for advancing food safety governance at the Zamboanga Fish Port Complex (ZFPC). NPM emphasizes efficiency, accountability, and stakeholder involvement, which can significantly improve regulatory processes. Implementing NPM involves setting clear performance metrics for food safety compliance, decentralizing decision-making to empower local managers, and fostering partnerships with private entities to drive innovation. By adopting NPM principles, ZFPC can enhance transparency in regulatory enforcement and better align policies with practical needs. This approach promotes a results-oriented management style that supports continuous improvement and accountability. Integrating NPM principles will address current challenges in food safety governance, ensuring more effective implementation of measures and better stakeholder engagement. Overall, applying NPM principles will create a more responsive and effective regulatory environment, leading to improved food safety outcomes and setting a benchmark for similar contexts within the Philippine agro-fishery sector.

1. **Implement Performance Measurement Systems:** Introduce performance measurement systems to track and evaluate compliance with food safety standards. Set clear performance targets and use data-driven insights to identify areas for improvement.
2. **Decentralize Management:** Empower local authorities and port-specific regulatory bodies with greater autonomy to manage food safety practices. Allow for localized decision-making to address unique challenges and improve responsiveness.
3. **Foster Stakeholder Engagement:** Create platforms for regular communication and collaboration among stakeholders, including port authorities, fish traders, and regulatory bodies. Involve stakeholders in policy development and implementation to ensure that food safety practices are practical and widely accepted.

8.5. Promoting Stakeholder Collaboration

Promoting stakeholder collaboration is essential for enhancing food safety governance at the Zamboanga Fish Port Complex (ZFPC). The study reveals that limited stakeholder involvement leads to a disconnect between regulatory measures and operational challenges. Effective food safety management requires active engagement with all relevant parties, including port operators, traders, and regulatory bodies. By fostering regular consultations and collaborative decision-making, stakeholders can address practical issues more effectively and ensure that food safety policies are well-informed and broadly supported. Establishing clear communication channels and feedback mechanisms will help align regulations with the needs of those directly involved in food handling and processing. Promoting stakeholder collaboration will enhance the implementation of food safety measures, improve compliance, and build a more cohesive approach to governance. This collaborative framework not only addresses current deficiencies but also supports sustainable improvements in food safety practices across the agro-fishery sector.

1. **Establish Feedback Mechanisms:** Develop formal mechanisms for stakeholders to provide feedback on food safety policies and practices. Use this feedback to inform policy adjustments and address emerging challenges.
2. **Encourage Collaborative Initiatives:** Support joint initiatives and collaborative projects between different stakeholders to address food safety issues. Facilitate knowledge sharing and resource pooling to enhance the effectiveness of food safety practices.
3. **Build Partnerships:** Strengthen partnerships with academic institutions, research organizations, and non-governmental organizations to conduct research, develop best practices, and implement innovative solutions for food safety.

8.6. Exploring Innovative Solutions

Exploring innovative solutions is crucial for advancing food safety at the Zamboanga Fish Port Complex (ZFPC). The study highlights the need for modern approaches to address existing challenges in infrastructure, training, and regulatory compliance. Innovative technologies, such as advanced monitoring systems and automated inspection tools, can improve the accuracy and efficiency of food safety practices. Additionally, adopting digital platforms for real-time tracking and data analysis will enhance transparency and facilitate quicker responses to potential issues. Encouraging partnerships with technology providers and research institutions can drive the development and implementation of these solutions. Implementing innovative practices will not only address current deficiencies but also position ZFPC as a leader in food safety management. By integrating cutting-edge solutions, the complex can enhance operational efficiency, reduce risks, and improve compliance, ultimately setting a new standard for food safety within the agro-fishery sector.

1. **Adopt Technology-Driven Solutions:** Explore and implement technology-driven solutions, such as automated monitoring systems and digital record-keeping, to enhance food safety management and compliance.
2. **Integrate Compliance Systems:** Develop integrated compliance systems that streamline reporting, monitoring, and enforcement processes. Use data analytics to identify trends and predict potential issues.
3. **Support Research and Development:** Invest in research and development to explore new approaches to food safety management and address emerging challenges. Support pilot projects and initiatives that demonstrate innovative solutions and their impact.

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