International Conference on Health Science, Green Economics, Educational Review and Technology| ISSN (e): 2986-1985
Volumes 7 No. 1 (2025)

STRATEGY FOR IMPLEMENTING FISH QUARANTINE POLICY IN NORTH SUMATRA IN THE CONTEXT OF PREVENTING THE ENTRY OF QUARANTINE FISH PESTS AND DISEASES BASED ON LAW NUMBER 21 OF 2019

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Received	: 21 April 2025	Published	: 30 June 2025
Revised	: 30 April 2025	DOI	: https://doi.org/10.54443/ihert.v7i1.472
Accepted	: 22 May 2025	Link Publish	: https://proceeding.unefaconference.org/index.php/IHERT

Abstract

Quarantine practices in Indonesia have evolved since the Dutch East Indies era and have undergone significant transformations, particularly with the enactment of Law No. 21 of 2019. This law integrates the quarantine of animals, fish, and plants, and aligns regulations with contemporary issues. However, its implementation faces challenges, especially in preventing the entry of Quarantine Fish Pests and Diseases (QFPD), such as the case of Koi Herpes Virus in Lake Toba. This study aims to analyze strategies to prevent the entry of QFPD in North Sumatra. The research employs a normative legal method with a prescriptive and statutory approach. Data were collected through literature review and analyzed descriptively and qualitatively. The findings of the study identify and analyze several strategies for preventing the entry of QFPD in North Sumatra, including: institutional integration of quarantine under the Indonesian Quarantine Agency (Barantin), utilization of digital systems and Big Data, a layered quarantine inspection approach (pre-border, at-border, and post-border), risk-based surveillance and inspection, strengthening diagnostic laboratory capacity through modern technology and inter-laboratory networks, stakeholder education and capacity building, enhancement of national and international cooperation, periodic monitoring and reporting for early detection, and strict law enforcement to ensure compliance with quarantine regulations.

Keywords: ***Legislation, Layered Surveillance, Law Enforcement***

INTRODUCTION

A. Background

Quarantine in Indonesia began during the Dutch East Indies colonial era, beginning with the spread of coffee leaf rust, caused by Hemileila vastatrix, in Sri Lanka. The Dutch East Indies' concern about coffee disease led to the issuance of the December 19, 1877, Ordinance (Staatsblad No. 262), which prohibited the import of coffee plants and beans from Sri Lanka. During the independence era of the Unitary State of the Republic of Indonesia, quarantine functions were emphasized through a series of regulations issued by the Minister of Agriculture. It was only in 1992 that the President of the Republic of Indonesia signed Law No. 16 of 1992 concerning Animal, Fish, and Plant Quarantine. Developments in the field of legislation continued with the issuance of Government Regulation (PP) No. 82 of 2000 concerning Animal Quarantine, then PP No. 14 of 2002 concerning Plant Quarantine and PP No. 15 of 2002 concerning Fish Quarantine.

During the reform era, the fish quarantine function was removed from the Ministry of Agriculture. President Abdurrahman Wahid, through Presidential Decree No. 355/M of 1999, on October 26, 1999, established the Ministry of Maritime Affairs and Fisheries, placing the fish quarantine function under the Ministry's echelon I unit.2 In 2019, Law Number 21 of 2019 concerning Animal, Fish, and Plant Quarantine was issued, which revoked Law Number 16 of 2019. The spirit of this new Law is to update the relevance of the articles to current conditions related to the issue of genetically engineered products, genetic resources, biological agents, and invasive alien species. In addition, it is the reunification of animal, fish, and plant quarantine. The Implementing Regulations of Law Number 29 of 2019 are set out in Government Regulation Number 29 of 2023, where Article 340 mandates that the establishment of a government agency that carries out government

duties in the field of quarantine be implemented no later than 6 (six) months since Government Regulation Number 29 of 2023 was stipulated on June 6, 2023.3 To accommodate the new institution that carries out government duties in the field of quarantine, Presidential Regulation Number 45 of 2023 concerning the Indonesian Quarantine Agency (BARANTIN) was issued on July 20, 2023, which was then followed by the issuance of Indonesian Quarantine Agency Regulation Number 1 of 2023 concerning the Organization and Work Procedures of the Indonesian Quarantine Agency on October 25, 2023 and the Regulation of the Indonesian Quarantine Agency

[1]*https://karantinaindonesia.go.id/hal/ Sejarah*, accessed on January 14, 2025.
[2]*https://id.wikipedia.org/wiki/Kabinet_Persatuan_Nasional, accessed on July 6, 2025.*
[3]*Government Regulation No. 29 of 2023*

Indonesia concerning the Organization and Work Procedures of the Technical Implementation Unit of the Indonesian Quarantine Agency dated October 25, 2023.4 In carrying out its quarantine duties and functions, the Technical Implementation Unit, which has recently undergone a change in its organizational structure, must move quickly to protect the country's sovereignty from threats to public health, disease outbreaks and food security coming from abroad. A potentially significant threat to the public is the massive influx of imports, necessitating strict government control to protect the public. This protection includes oversight by the Indonesian Quarantine Agency of animals, fish, and plants, as well as their derivative products, entering the Republic of Indonesia.

An example of a case that has occurred is the outbreak of Koi Herpes Virus disease that occurred in Lake Toba, North Sumatra at the end of October 2004. The disease outbreak spread throughout Lake Toba, resulting in losses of hundreds of billions of rupiah.5 Reflecting on this incident, the government has carried out regular monitoring of the possible threat of outbreaks of Quarantine Fish Pests and Diseases through HPIK monitoring activities which are carried out twice a year. Then the implementation of strict import supervision has been carried out in accordance with the mandate of Law Number 21 of 2019 Article 33 paragraph (1) that Every Person who imports Carrier Media into the territory of the Unitary State of the Republic of Indonesia is required to: a. complete a health certificate from the country of origin for Animals, Animal Products, Fish, Fish Products, Plants, and/or Plant Products. Examination of health certificates from the country of origin must be carried out for countries with or without a cooperation agreement.

The challenge ahead is the emergence of new diseases that could pose a threat due to the introduction of fish from outside Indonesia. On the other hand, emerging issues involve the readiness of facilities and infrastructure, human resources, and implementing regulations regarding technical supervision. Furthermore, the government needs to improve the capabilities of state-owned testing laboratories and enhance the human resource capacity to detect HPIK in carriers entering Indonesia. To achieve this, a priority policy is needed to allocate budgets for the procurement of testing equipment and improve the competence of laboratory personnel. In accordance with the mandate of Article 56 paragraph (1) of Law Number 21 of 2019, it is necessary to encourage the implementation of prevention of the threat of fish disease through quarantine measures in the country of origin. This certainly presents a challenge in how to build bilateral cooperation in the field of fish health.

[4]*Presidential Decree No. 45 of 2023*
[5]Sunarto S., Kusrini E. (2006). Case of Mass Mortality of Carp in Floating Net Cages in Lake Toba, North Sumatra. Aquaculture Media, 1(1)

The urgency of this research is to determine how existing regulatory instruments are implemented to prevent the entry of HPIK into North Sumatra and the challenges encountered in implementing these regulations.

B. Formulation of the problem

From the explanation of the background of this research, the formulation of the research problem is what strategy is implemented to prevent the entry of HPIK?

C. Research purposes

The aim of this study is to determine the strategies implemented to prevent the entry of HPIK in North

Sumatra.

D. Research methods

1. Research specifications

Legal research is the activity of discovering legal rules, legal norms, or legal doctrines, with the aim of addressing the legal problems faced. This is consistent with prescriptive legal research.6 Therefore, in terms of its form, this research is prescriptive, that is, research that aims to analyze the root causes of legal problems that arise in a legal case or specific legal issue. This research aims to gain a deeper understanding of the causes of the legal problem being faced and identify the root causes of those problems.7 Based on its type, this research is a normative research, namely legal research conducted by examining library materials or secondary data.8 According to Peter Mahmud Marzuki, normative legal research is a process to find legal rules, legal principles, and legal doctrines to answer the legal issues faced.9 The normative legal research approach used in this research is the Statute Approach which refers to Law Number 21 of 2019 concerning Animal, Fish and Plant Quarantine.

[6]Marzuki, PM (2008). Introduction to Legal Science. Jakarta. Kencana Prenada
[7]Amiruddin, Asikin, Z. (2004). Introduction to Legal Research Methods. Jakarta. National Library of the Republic of Indonesia
[8]Soerjono Soekanto and Sri Mamuji. (2013). Normative Legal Research: A Brief Review. Jakarta: Raja Grafindo Persada
[9]Marzuki, PM (2008). Introduction to Legal Science. Jakarta. Kencana Prenada
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2. Data Collection Techniques and Data Collection Tools

This research uses secondary data collection techniques sourced from library materials or literature related to the research object, namely:

a. The study of legal documents by collecting and reviewing various written legal materials for systematic analysis. Types of legal materials collected:
   - Primary legal materials, namely legal sources that are directly binding, such as: Laws, Government Regulations, Regulations of the Head of an Agency, Jurisprudence (court decisions), constitutions and international treaties.
   - Secondary legal materials, namely sources that explain and support primary legal materials such as: books, scientific journals, dissertations, theses, seminar results, scientific articles.
   - Tertiary legal materials, namely tools to help understand primary and secondary materials such as: legal dictionaries, legal encyclopedias, legal indexes or bibliographies.

b. Library research
   This technique is carried out by searching for legal documents from libraries, legal archives, state institutions, or online legal databases.

c. Scientific literature review
   This technique is carried out by collecting legal doctrines from experts which can be used to build legal arguments and interpretations of norms.

The data collection tools used in this research are as is customary in normative legal research, namely:

- Document Review Instrument
  It is a tool or work system for organizing, classifying, and assessing legal materials that have been collected, such as a list of legal material identification, a table of classifications of articles or legal norms, and a format for systematic analysis of regulations.
- Library Research Checklist
  Functions to direct researchers in tracing legal sources, recording important information from books, journals, articles, compiling citation notes and references.

- Legal content analysis instrument (Content Analysis Guide)
  It is a tool to help interpret legal articles or norms, group norms based on theme/substance, and examine doctrines from the opinions of legal experts.

- Supporting digital tools
  Although not a conventional data collection tool, in the modern context normative researchers also use: JDIH (Legal Documentation and Information Network) to access regulations, Online Law, Hein Online, Google Scholar to access legal journals, Mendeley/Zotero for citation management.

3. Data analysis

Data analysis is the systematic process of collecting, cleaning, transforming, and interpreting data to discover patterns, trends, or information useful for decision-making. It is a way of transforming raw data into actionable insights. The data analysis process involves several steps, including data collection, data cleansing (removing errors and inconsistencies), data transformation (changing data formats), and data interpretation. This study uses qualitative analysis with a descriptive analysis model. Descriptive analysis aims to provide a description or explanation of the research subjects and objects, as well as the results of the research conducted as is, without justifying the research results.10 The data analysis technique in this study was conducted using descriptive qualitative methods, namely through the statutory approach, the case approach, the historical approach, and the comparative approach. Conclusions were drawn through the application of a systematic interpretation method, namely by interpreting a legal product and then establishing correlations with other legal products relevant to the research object. The collected data can then be analyzed and conclusions drawn.

4. Research Schedule

The research was conducted from January 2025 to December 2025. The activity schedule in this research is presented in the table below.

[10]Suyanto (2023). Legal Research Methods: Introduction to Normative, Empirical, and Combined Research. : UNIGRES PRESS.

RESULTS AND DISCUSSION

A. Implementation of an Integrated Quarantine System

To achieve a good quarantine system, integrated quarantine measures are required, namely:

1. Institutional Reform

   On July 20, 2023, the Indonesian Quarantine Agency (Barantin) was established as an integrated agency, combining the animal, fish, and plant quarantine functions previously under separate ministries. This merger is mandated by Law No. 21 of 2019 and Presidential Regulation No. 45 of 2023, which serves as the legal basis for unifying quarantine functions within a single agency.

   The consolidation of quarantine functions under the direct coordination of the President is expected to improve coordination effectiveness, reduce bureaucratic red tape, and strengthen independence in budget planning and activity implementation. Through this integration, efforts to prevent the spread of pests and diseases, both in animals and plants, can be carried out more effectively and efficiently.
   By implementing fish import requirements from the country/area of origin according to the provisions.
2. Digital Systems and Big Data for Service Integration
   The implementation of digital systems and Big Data in quarantine services can provide benefits in the form of:
   - Early detection and risk monitoring
     Big data can provide historical trend analysis of fish import-export data, disease outbreak history, and environmental conditions, helping to identify potential risks of disease spread. Big data enables early detection of anomalies that indicate the presence of disease, even before clinical symptoms appear.
   - Disease Prediction and Modeling
     Machine learning algorithms trained with big data can be used to predict the likelihood of disease outbreaks based on weather patterns, water temperature, or fish movement between regions.Data-driven

simulations can predict disease spread scenarios and assist in response planning.
- Data integration from multiple sources
  With spatial and temporal data, maps of disease distribution and vulnerable areas can be created to focus quarantine monitoring.This allows for more efficient allocation of resources, such as dispatching officers or rapid testing kits to priority locations.
- Automation and rapid response
  A big data-based system can trigger an early warning system if patterns similar to previous outbreaks are detected. Quarantine processes can be accelerated through automation of paperwork, reporting, and fish tracking.
- Policy evaluation and continuous learning
  Historical data analysis allows for evaluation of the effectiveness of implemented quarantine policies, providing evidence-based feedback for improving SOPs and regulations.

3. Operational procedures: pre-border to post-border
   Implementation of quarantine supervision with a layered approach, namely:
   - Pre-border surveillance
     This pre-border monitoring aims to ensure that the country of origin has issued a valid electronic certificate and complies with health requirements prior to shipment. This can be achieved through cooperation in the form of an agreement between countries, such as the signing of a quarantine cooperation agreement. This cooperation will involve conducting inspections in the country of origin to ensure biosecurity is implemented in the cultivation, processing, and transportation systems implemented there.
   - At-border surveillance
     At-border surveillance is implemented through inspections of carriers at all entry and exit points, such as airports and ports. This surveillance activity is a common practice, but its implementation requires significant human resources (HR) to reach all designated control points.
   - Post-border surveillance
     Post-border surveillance involves monitoring and tracking after the carrier enters Indonesian territory. This involves conducting periodic HPIK monitoring at designated points to map potential disease outbreaks and trace the history of disease emergence in the area.

B. Risk-Based Supervision and Audit

Risk-based monitoring and inspection is a systematic approach used to regulate the intensity of inspections and oversight of carrier traffic based on the level of threat (risk) to fish health. This means that not all carriers are treated equally. Inspections are focused on carriers with a higher potential disease risk for efficiency and effectiveness. For this reason, it is necessary to prepare risk management as follows:

1. Risk identification, by determining risk factors that can cause the entry or spread of HPIK such as: type of fish, country/area of origin of the fish (whether an outbreak has occurred in that country), compliance profile of importers/business actors, condition of the carrier media (live, fresh, processed).
2. Conduct risk analysis by analyzing each risk which includes an assessment of the probability (likelihood of occurrence) and impact (consequences) of the risk.
3. Classify risks by grouping them into categories: high risk, medium risk, and low risk. This classification is based on historical data, audits, and international reports (such as those from WOAH, the ASEAN Fish Health Network, or the WTO's SPS Notification, as well as HPIK monitoring data).
4. Determining Quarantine Actions based on risk classification
   - High risk: physical examination, laboratory tests, intensive observation, or detention measures are performed.
   - Medium risk: document review, random physical examination, sample testing if necessary.
   - Low risk: just document verification and physical inspection.
5. Risk monitoring: This stage involves continuous monitoring of identified and evaluated risks. The goal is to ensure that implemented supervisory and inspection measures are effective and to identify new risks or changes to existing ones. Risk monitoring is carried out by establishing key risk indicators, namely carriers that test positive for HPIK, which are then monitored regularly. Periodic reviews are then conducted to ensure that the supervisory and inspection processes are effective and relevant to changes.

C. Laboratory Diagnostic Capabilities

Strengthening fish quarantine laboratories for the identification of HPIK diseases (bacteria, viruses, parasites, etc.) is carried out by modernizing laboratory testing capabilities with the latest technology that is more accurate and fast. The use of molecular technology and PCR continues to develop, and now a real-time PCR version is also available. Real-time PCR, or quantitative real-time PCR (qPCR), is a PCR method that is now widely applied in molecular biology. With the qPCR method, researchers can not only detect the presence of a specific gene but also determine the quantity of the target gene in a sample and compare gene expression across samples.11 In addition to modernizing laboratory equipment, improving the capabilities of laboratory human resources is also crucial. This is achieved through internships./training conducted in standard laboratories such as the Standard Testing Center, planning in-house training activities by inviting competent instructors. Establishing laboratory networks is also essential due to its numerous benefits, including improved testing quality, resource efficiency, and collaboration between laboratory institutions. Networking allows laboratories to exchange knowledge, experience, and resources, thereby enhancing their individual capabilities and overall testing capacity. The benefits of laboratory networks are detailed below:

1. Testing Quality Improvement
   Laboratory networks can facilitate the conduct of benchmarking and proficiency testing, allowing laboratories to validate their testing methods and ensure accurate and consistent results.

[11]Genetic Science.https://ptgenetika.com/real-time-pcr/, accessed on July 21, 2025

2. Resource Efficiency
   Through laboratory networking it is possible to share equipment, reagents/test materials, and other resources, thereby reducing operational costs and increasing the efficiency of resource use.
3. Collaboration and Learning
   Laboratory networks can facilitate collaboration between laboratories in research, development of new methods, and sharing of knowledge and experience, ultimately accelerating progress in science and technology.
4. Increased Testing Capacity
   With networking, laboratories can support each other in dealing with surges in testing demand, especially in emergency situations or disease outbreaks.
5. Human Resources Development
   Laboratory networks can facilitate training and development of human resources in the laboratory field, including technical training, competency enhancement, and knowledge transfer.
6. Strengthening Health Surveillance
   Networked laboratories can contribute to strengthening disease and health risk factor surveillance, as well as rapid response to outbreaks.

D. Stakeholder Development and Education

To maintain the sustainability of fishery resources and support a healthy and sustainable fisheries industry, fostering and educating stakeholders is a strategic step in preventing the spread of quarantine fish diseases. Quarantine fish diseases pose a serious threat that can cause economic losses, reduce aquaculture production, and disrupt the balance of aquatic ecosystems. This coaching and education activity aims to increase understanding, awareness and active participation from various parties, including fish farmers, fisheries business actors, exporters/importers.fishery commodities, local governments, and the general public. Education focused on the importance of implementing biosecurity principles, fish quarantine procedures, early detection of disease symptoms, and reporting procedures for suspicious cases. The coaching and education activities carried out included:

1. Provide coaching and education to:
   - Fish farmers: Prioritizing fish farmers at greatest risk of HPIK spread. Risk is assessed for fish farmers who actively import seeds from outside the region and sell their harvest outside the region, as well as farmers who have not implemented biosecurity in their fish farming systems.
   - Entrepreneurs exporting/importing fishery commodities, prioritizing entrepreneurs who actively export/import carriers in high risk categories.
   - Quarantine officers, by improving their competence and updating the latest information regarding the development of disease information at the global level.

- Local governments and educational institutions, through seminars, public lectures and coordination meetings.
- Increasing International and National Cooperation, by building bilateral/multilateral cooperation regarding a shared commitment to preventing the spread of quarantine fish diseases with the principles of justice and equality.

2. Coordinate with institutions such as:
   a. WOAH (World Organization for Animal Health)
      -The Indonesian Quarantine Agency actively exchanges information and reports incidents of notifiable aquatic animal diseases to the World Organization for Animal Health (WOAH). Reports are made through WOAH's World Animal Health Information System (WAHIS).
      -The Indonesian Quarantine Agency (BKI) is harmonizing quarantine and biosecurity standards by adjusting regulations and standard operating procedures (SOPs) to align with international standards, including the Aquatic Animal Health Code and the Manual of Diagnostic Tests for Aquatic Animals established by the WOAH. This is crucial to support safe exports and ensure international recognition of Indonesia's quarantine system.
      -The Indonesian Quarantine Agency is actively involved in sending representatives/officers to participate in activities organized by WOAH such as technical workshops, disease diagnosis training, training on the use of the WAHIS system, so as to improve the competence of human resources in the field of fish health and quarantine.
      -The Indonesian Quarantine Agency is actively involved in programs organized by WOAH, namely, controlling and eradicating priority aquatic diseases, improving cross-border disease surveillance, and being a partner or national point of contact in these projects.
   b. Ministry of Maritime Affairs and Fisheries
      Coordination of disease outbreak management in the event of a fish disease outbreak (e.g. KHV, WSSV, etc.), Barantin and KKP coordinate in a rapid response to: tracing the source of the disease, temporarily closing fish traffic, quarantine and sanitation measures, education and assistance to farmers.
   c. Directorate of Customs and Excise
      Operational coordination is carried out through the formulation of joint Standard Operating Procedures (SOPs) at inspection locations for exported and imported fish commodities. These joint inspections between the Indonesian Quarantine Agency (Barantin) and the Directorate General of Customs and Excise aim to ensure the completeness of quarantine and customs documents, verify the conformity of commodity types and quantities, and detect potential disease risks and attempts to smuggle prohibited species.
   d. Ministry of Trade
      Coordination is carried out in the issuance and validation of export/import documents. Barantin issues Fish Health Certificates for export, and the Ministry of Trade regulates Export/Import Approvals (PE/PI) and other commercial documents. Both systems are connected through the Indonesia National Single Window (INSW) to expedite licensing and customs processes. Both institutions coordinate document verification, ensuring that traded commodities meet health and quality requirements.

E. Fish Disease Monitoring and Reporting

HPIK monitoring is the activity of identifying and inventorying the types of HPIK, their hosts, and their distribution areas. HPIK monitoring activities aim to detect the presence of disease in an area early through disease monitoring and surveillance. Monitoring results are expected to accurately describe the presence of a disease and the health status of fish in a cultivation area over a specific period of time.12 Through this monitoring activity, the disease status of an area can be determined, whether it is free from HPIK or not. Data on a region's disease status can be used in decision-making and policy-making, thereby making monitoring of carrier traffic more effective.

F. Law Enforcement

Law enforcement is the final instrument for regulating and improving compliance among fisheries businesses. Without strong law enforcement, technical efforts such as inspections, testing, and certification can be ineffective, as violations will continue to occur without consequence. The following are the main functions of law enforcement:

- Ensure compliance with quarantine regulations.
- Prevent and eradicate illegal fish trade.
- Supporting emergency response measures for outbreaks.
- Provides a deterrent effect.
- Protecting biosecurity and competitiveness of fishery commodities.
- Supporting coordination between agencies.

[12]Decree of the Deputy for Fish Quarantine Number 7 of 2024 concerning Guidelines for Monitoring Quarantine Fish Pests and Diseases.

CONCLUSION AND SUGGESTIONS

A. Conclusion

1. The implementation of Law Number 21 of 2019 concerning Animal, Fish and Plant Quarantine in preventing the entry of HPIK must be optimized in all aspects.
2. The strategies implemented to optimize the implementation of Law No. 21 of 2019 are:
   - Implementation of an integrated quarantine system
   - Risk-based monitoring and auditing
   - Improving laboratory diagnostic capabilities
   - Stakeholder development and education
   - Fish disease monitoring and reporting
   - Law enforcement

B. Suggestion

1. Big Data implementation in quarantine services needs to be implemented immediately to effectively prevent the entry of quarantine fish diseases. Implementing digital systems and Big Data in quarantine services can provide the following benefits:
   - Early detection and risk monitoring.
   - Disease Prediction and Modeling.
   - Data integration from multiple sources.
   - more efficient allocation of resources, such as sending officers or rapid test kits to priority locations.
   - Automation and rapid response
   - Policy evaluation and continuous learning
2. Prioritize pre-border quarantine supervision, meaning that the imported carrier must first be guaranteed free of quarantine fish diseases. This precautionary principle minimizes risk better than importing the carrier first and then implementing quarantine measures to ensure it is free of quarantine fish diseases.

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