



Aquaculture and fisheries industry certifications in Chile, Colombia, Mexico, and Peru in the context of the Pacific Alliance Agreement

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Abstract

Aquaculture and fisheries certifications are key tools for ensuring sustainability, traceability, and social responsibility in the production and marketing of seafood products. In the context of the Pacific Alliance and the economic integration between Chile, Colombia, Mexico, and Peru, these certifications take on strategic importance for promoting international trade, diversifying markets, and meeting the standards demanded by global consumers.

The certification processes in the aforementioned countries ensure the quality, health, safety, and quality of seafood products, whether from fishing or controlled farming systems (aquaculture). Their marketing requires the participation of international inspectors who, in some cases, cross-check the products before shipping to ensure their preservation during transport from origin to destination. It is worth mentioning that, in addition to the ISO International Standard Quality certification family, which has been used for more than thirty years, certifications are now being incorporated in the food sector to improve processes and ensure the quality of export products, leading to constant improvement for companies engaged in these important activities in the primary industry.

In addition to aligning sustainability objectives with the Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda, an international framework that addresses economic, social, and environmental challenges, companies seek ways to translate this into improved internal and external export processes.

Finally, it is worth mentioning that the article reviews the certifications used in the Pacific Alliance Agreement countries, which have been adopted by the fishing and aquaculture industry to increase the export potential of small, medium, and large companies and make them more sustainable, not only based on maintaining a constant flow of income and constantly improving product quality.

Keywords: Certification, Aquaculture, Fisheries, Sustainability, Pacific Alliance

Introduction

In the context of the growing importance of sustainable water resource management, water industry certifications have become essential to ensure efficiency, transparency, and quality in water resource management in the Pacific Alliance region. The Pacific Alliance, comprised of Chile, Colombia, Mexico, and Peru, stands out as a region with many aquifer ecosystems and significant water-related economic activity.

In this context, certifications play a crucial role in setting standards, promoting best practices, and fostering international cooperation in responsible water management. This introduction will explore the role of certifications in the water industry within the framework of the Pacific Alliance, highlighting their importance for environmental sustainability, economic development, and social equity in the region.

The world is consuming more and more seafood, but this comes at a price: our oceans are in danger. Overfishing, pollution, and poor practices are depleting resources and damaging ecosystems. To address this, aquaculture and fisheries certifications emerged, ensuring that the products

we buy meet responsible and sustainable standards. In this article, we explored what these certifications are, which are the most important, and how they help protect the planet.

The same authors have stated the following

The essence of its development is that once the problem has been identified, the central idea is to raise awareness to ensure that the objectives set are met as soon as possible given the results obtained and the conclusions obtained. (Sánchez and Huerta, 2023, p. 6220)

Problem Statement

Aquaculture is a key industry for food security and the economies of coastal countries. However, it faces common challenges:

- **Environmental degradation:** Water pollution and loss of biodiversity.
- **Economic impact:** Global competition and fluctuations in product demand.
- **Sustainability:** The need to adopt practices that comply

with the UN SDGs, particularly those related to environmental protection and inclusive economic growth.

- **Regional collaboration:** The Pacific Alliance countries must optimize their joint efforts to enhance sustainable development in the region.

Today, the fishing and aquaculture sector faces serious problems. On the one hand, there is overfishing, which leads to the disappearance of species; On the other, bad practices in aquaculture, such as chemicals or non-sustainable foods, contaminate water and affect species. In addition, the consumer has more and more doubts. Where do you buy seafood? Is the purchase carried out sustainably? This is where certifications enter, but not all producers have them, and many times they are not easy to implement.

Study Objective

The study objective is to provide a comprehensive and detailed overview of the aquaculture industry certifications, focusing on current practices, economic impact, challenges, and opportunities facing the sector. It seeks to analyze how aquaculture companies operate to contribute to sustainable development and identify the key trends and innovations shaping the future of aquaculture.

Sheinbaum *et al.* (2009) ^[32] maintain that “highlight the importance of the application of sustainability indicators in Mexican politics” (p. 113).

Hypothesis

If the Pacific Alliance countries strengthen their aquaculture industry certifications consistently emphasize the importance of these certifications, improve technological innovation and sustainable management of aquaculture resources, and align their policies with the Sustainable Development Goals (SDGs), they can overcome current challenges and establish themselves as world leaders in responsible aquaculture.

Theoretical framework

What are aquaculture and fishing industry certifications?

They are recognized and awarded to individuals, organizations, or products that have met certain standards, requirements, or norms established by a recognized authority.

Types of certifications:

- **Product certifications:** These verify that a product meets certain standards of quality, safety, or efficiency.
- **Process certifications:** These verify that a process or system meets certain standards of quality, safety, or efficiency.
- **Person certifications:** These verify that a person has the skills, knowledge, or competencies necessary to perform a specific task. (Guide to Fisheries Certification - Marine Stewardship Council, n.d.).

Importance of Aquaculture

Aquaculture, also known as fish farming or mariculture, is the controlled farming of aquatic organisms for human consumption such as fish, salmon, trout, shrimp, crustaceans, mollusks, algae, and other aquatic species. As

the global demand for seafood continues growing and natural fisheries face overexploitation, aquaculture has emerged as a crucial solution to meet global food demand. Aquaculture is a fundamental industry that not only provides a source of food but also creates jobs and contributes to the economic growth of coastal communities.

Methodology

The methodology of this research is based on a multidisciplinary qualitative approach that includes a review and analysis of relevant academic literature, industry reports from industry experts, and case study analysis. Specific steps include:

- **Literature Review:** Compilation and analysis of scientific articles, books, and relevant publications on aquaculture, its practices, technologies, and challenges.
- **Report Analysis:** International organizations and aquaculture associations provide statistical data and current trends.
- **Case Studies:** Prominent aquaculture companies were selected for in-depth case studies, analyzing their business models, sustainable practices, and innovation strategies.
- **Data Analysis:** Qualitative methods were used to analyze the collected data, identify patterns, and draw conclusions about the state and future of aquaculture.

Development

Water industry certifications are recognitions granted to organizations, companies, or projects that meet specific standards for the management, conservation, and sustainable use of water resources. These standards can cover various aspects, such as water use efficiency, protection of aquatic ecosystems, water quality, community engagement, and compliance with environmental regulations.

Water industry certifications can be granted by various entities, such as government organizations, international organizations, NGOs, or industry associations. Their main objective is to promote responsible and transparent practices in water management, as well as to recognize and reward those who take measures to protect and conserve this vital resource.

A certificate to advance the sustainability of aquaculture

The farming and production of aquatic species is approaching the volume of catches from traditional fishing: almost 90 million tons per year. For aquaculture, sustainability is a priority. Companies and farms rely on ASC standards to achieve a harmonious final product with the environment and local communities.

When they are born at the river headwaters, salmon are almost invisible. For several years, the fry will have only one goal: to grow and strengthen for the adventure ahead. When they are ready, they descend to the ocean. There they transform into powerful, swift fish that can grow over a meter and a half in length, but their adventure doesn't end there. The time they spend in saltwater doesn't matter. At the perfect moment, they will find the mouth of the same river that gave birth to them and sail upstream to reproduce. The relationship between humans and Atlantic salmon is as old as history itself. However, in the last century, overfishing, the degradation of the river and coastal habitats

they inhabit, and obstacles in rivers (such as dams) have put the species on the ropes. Only in the wild, because, at the same time, captive salmon farming has boomed. Today, it is estimated that 70% of the salmon consumed worldwide comes from aquaculture, the farming and production of aquatic species.

Importance of Certifications

Certifications not only help protect the environment; they also have benefits for producers. In many international markets, such as the United States and Europe, uncertified products are not as readily available. They also allow consumers to trust what they are buying. For example, when they see the MSC or ASC seal, they know they are choosing a product that respects the planet.

On an environmental level, certifications help reduce overfishing, control the use of antibiotics in aquaculture, and prevent the destruction of habitats such as mangroves. All of this contributes to a balanced ecosystem and ensures that future generations can also enjoy seafood.

Challenges and Future

Huerta, J. J., Zubillaga, R. M., and Sánchez, V. H. (2024)^[14] suggest that “future research should include fieldwork to interview farm owners, detecting areas requiring greater technical support, and instructing aquaculturists on the use of easily understood records and control systems applicable to their productive units” (p. 44).

Although certifications are a great idea, they are not always easy to obtain. Often, small producers cannot afford the costs of certification. Furthermore, in some countries, there is insufficient government support or awareness of its importance.

Sánchez and Huerta (2022)^[27] argue that “Consequently, the main objective must be to significantly increase the trend toward strengthening exports rather than imports, thereby achieving increased economic growth for both nations and producing resources and sources of employment in both countries” (p. 65).

An interesting aspect is the future of certifications: there is increasing talk of including technologies like blockchain to track products from their origin to the consumer. This would make the process more transparent. On the other hand, organizations like the UN promote these certifications as part of the Sustainable Development Goals (SDGs), especially SDG 14, which focuses on life below water.

Aquaculture and fisheries certifications in Chile, Colombia, Mexico, and Peru are crucial to ensuring the sustainability, food safety, and quality of seafood products.

Chile is one of the world leaders in aquaculture, especially in salmon production. The main certifications include

- **ASC (Aquaculture Stewardship Council):** This certificate ensures aquaculture production meets environmental and animal welfare standards. Chile has 318 ASC-certified salmon farms.
- **Aqua Chile seeks:** to meet these standards to access demanding markets.
- **ISO Certifications:** These include ISO 9001 (Quality Management), ISO 14001 (Environmental Management), and ISO 45001 (Occupational Health

and Safety). These certifications are essential to guarantee quality and safety in the production process.

In Colombia, it has implemented several certifications to improve the quality and sustainability of its fisheries production

- **IRCA Certification, or International Register of Certified Auditors.**
- **Good Agricultural Practices (GAP) Certification:** Applies to fisheries production and seeks to ensure responsible practices in environmental management.
- **ASC Certification:** As in other countries, this certification is used by Colombian producers to demonstrate their commitment to sustainability.
- **BAP Certification:** This certification is also present in Colombia and focuses on animal welfare and responsible practices in aquaculture.

In Mexico, certifications seek to improve the competitiveness of the fishing sector

- **Good Aquaculture Practices (GAP) Certification:** Applies to all aquaculture activities, promoting responsible and sustainable management.
- **ASC Certification:** More and more Mexican producers are adopting this certification to access international markets that demand high sustainability standards.
- **Sanitary Certifications:** These include specific regulations to ensure that fishery products meet sanitary requirements before being exported.

In Peru, certifications focus on sustainability and fish quality.

- **Blue Certificate:** Water quality.
- **HACCP (Hazard Analysis and Critical Control Points):** Food safety.
- **Good Aquaculture Practices (GAP) Certification:** This certification is awarded to companies that meet specific standards to ensure sustainability and responsible management of aquatic resources.
- **GLOBALG.A.P. Certification:** This international standard ensures responsible and sustainable agricultural practices in aquaculture production. This is broader, as it covers not only aquaculture but also other sectors such as agriculture. It evaluates the entire production process, ensuring that good practices are followed.
- **ASC Certification:** Similar to Chile, Colombia, and Mexico, Peru has also adopted this certification to improve sustainability in its aquaculture sector.

In summary, the following certifications are generally practiced in the Pacific Alliance

Food Quality and Safety

1. HACCP (Hazard Analysis and Critical Control Points)
2. ISO 22000 (Food Safety Management System)
3. BRC (British Retail Consortium) - Food Safety Certificate

4. SQF (Safe Quality Food) - Food Safety and Quality Certificate

Sustainable Aquaculture

1. **ASC (Aquaculture Stewardship Council)** - Sustainable Aquaculture Certificate. It focuses on aquaculture products, such as salmon and shrimp. It ensures that they are raised responsibly, without polluting the water or harming local communities.

ASC is an international certification that guarantees that seafood products from aquaculture (such as salmon, shrimp, mussels, etc.) are produced responsibly and sustainably.

- **Reduced environmental impact:** ASC-certified farms minimize their impact on the environment by using practices such as:
 - Reducing water pollution
 - Conserving ecosystems
 - Using resources efficiently
- **Animal welfare:** They ensure that animals raised on these farms are well-being, avoiding unnecessary suffering.
- **Social responsibility:** ASC-certified farms must demonstrate that they operate fairly and respectfully with local communities and their workers.

Why is ASC certification important?

- **Conscious consumption:** By choosing products with the ASC seal, consumers support sustainable production and contribute to ocean conservation
- **Transparency:** ASC certification provides detailed information about seafood production, allowing consumers to make informed choices.
- **Continuous improvement:** ASC-certified farms are subject to regular audits to ensure they maintain sustainability standards.

2. **BAP (Best Aquaculture Practices)** - Best Aquaculture Practices Certificate is a globally recognized certification program that ensures farmed seafood is produced responsibly and sustainably at every stage of the process, from farm to plate.

- **Environment:** The environmental impact of the operation is assessed, such as the use of water, energy, chemicals, and waste management.
- **Animal Welfare:** Proper living conditions are ensured for farmed animals, reducing stress and disease.
- **Food Safety:** Hygiene and food safety practices are implemented to ensure products are safe for human consumption.
- **Social Responsibility:** Fair and safe working conditions for workers are promoted, as well as positive relationships with local communities.

Why is BAP certification important?

Consumer Confidence: BAP certification provides consumers with the assurance that the seafood they purchase comes from responsible and sustainable sources.

- **Market Access:** Many companies and retailers require BAP certification as a requirement for marketing seafood products.

- **Continuous Improvement:** BAP certification encourages continuous improvement in aquaculture practices, leading to greater efficiency and sustainability.

3. **GAA (Global Aquaculture Alliance)** - Global Aquaculture Alliance Certificate.

4. **GLOBALG.A.P.** is an internationally recognized standard that establishes a series of criteria and good practices for food production, including aquaculture. Its main objective is to ensure that aquaculture products are produced safely, sustainably, and responsibly, from farm to consumer.

- **Food safety:** Ensures that aquaculture products are safe for human consumption, complying with health and hygiene standards.

- **Animal welfare:** Promotes practices that guarantee the well-being of aquatic animals, from breeding to processing.

- **Environmental protection:** Establishes measures to minimize the environmental impact of aquaculture activities, such as the responsible use of natural resources and pollution prevention.

- **Worker health and safety:** Compliance with occupational health and safety standards is required to protect employees on aquaculture farms.

- **Legal compliance:** Ensures that aquaculture operations comply with applicable national and international legislation.

Why is GLOBALG.A.P. certification important?

- **Consumer confidence:** GLOBALG.A.P. certified products offer greater confidence to consumers, who know they meet high standards of quality and safety.

- **Access to new markets:** GLOBALG.A.P. certification can open doors to new markets, especially those that demand certified products.

- **Continuous improvement:** Certification encourages aquaculture companies to continually improve their processes and practices.

- **Market differentiation:** GLOBALG.A.P. certified products can differentiate themselves in the market, which can generate greater added value.

5. **SFP (Sustainable Fisheries Partnership)** - Sustainable Fisheries Certificate.

6. **FOS (Friend of the Sea)** - This label applies to both fishing and aquaculture. It also considers the impact of transportation and packaging and seeks to ensure that everything is sustainable.

7. MSC certification: awarded by the Marine Stewardship Council, this certification recognizes fisheries that meet standards of sustainability and responsible management of fishing resources.

The Marine Stewardship Council (MSC) is an international non-profit organization that certifies aquaculture farms that meet the highest sustainability standards. This certification guarantees that farmed seafood comes from farms that:

- **Respect the environment:** They minimize their impact on aquatic ecosystems, avoiding pollution and habitat destruction.
- **Socially responsible:** They comply with labor laws and promote fair practices throughout the supply chain.
- **Economically viable:** They use efficient and long-term sustainable farming methods.

Why is MSC certification important?

- **Responsible consumption:** By choosing MSC-certified products, consumers are helping to protect the oceans and ensure a sustainable supply of seafood.
- **Improved aquaculture practices:** MSC certification encourages farms to adopt more sustainable practices, benefiting the entire sector.
- **Transparency:** MSC certification provides consumers with clear and reliable information about the origin and practices of aquaculture farms.

This certification is like the "green seal" for fish products. It indicates that fishing was carried out without harming the ecosystem or catching unwanted species. It is common to find this seal on fish and seafood in supermarkets. To be eligible for MSC certification, assisted recruitment fisheries must meet certain criteria based on:

The relationship with a species in its natural environment or with its maintenance.

The way fish are fed and cared for. The impact that assisted recruitment fisheries have on habitats and the ecosystem in general.

8. Fair Trade USA: A Commitment to Sustainability and Social Justice, this certification, awarded by Fair Trade USA, guarantees that seafood products bearing its seal meet rigorous social and environmental standards. By choosing aquaculture products with this certification, you are supporting the following:

- **Better working conditions:** Workers in certified fisheries enjoy fair wages, reasonable hours, job security, and the elimination of child and forced labor.
- **Environmental protection:** Sustainable fishing practices are promoted to minimize the impact on marine ecosystems and contribute to species conservation.
- **Stronger communities:** Fishing communities receive an additional premium that they invest in social and economic projects that improve their quality of life.

- **Supply chain transparency:** Certification ensures that products are traced from origin to consumer, ensuring traceability and preventing deceptive practices.

Why is Fair Trade USA certification important?

- **Conscious consumption:** By choosing products with the Fair Trade Certified seal, consumers contribute to a fairer and more sustainable food system.
- **Product confidence:** Certification provides assurance that products meet high standards of quality and social responsibility.
- **Boosting sustainable fishing:** Certification incentivizes producers to adopt practices that protect the oceans and ensure the availability of marine resources for future generations.

9. FAO is an assessment system that ensures that fish and seafood farming practices meet certain quality and sustainability standards. These standards cover aspects such as:

- **Environmental:** Ensures that aquaculture does not harm ecosystems, reduce biodiversity, or pollute water.
- **Social:** Promotes worker well-being, respect for local communities, and fair trade practices.
- **Economic:** Ensures the long-term viability of aquaculture businesses and their contribution to local development.
- **Food safety:** Ensures that aquaculture products are safe for human consumption.

Why is FAO certification important?

- **Consumer confidence:** Consumers can be assured that certified products are produced responsibly.
- **Improving the sector's image:** Certification helps improve the reputation of aquaculture and differentiates it from less sustainable practices.
- **Access to new markets:** Many markets require certified products as a requirement for marketing.
- **Incentive for continuous improvement:** Certified companies are motivated to continually improve their practices.

10. Water Footprint ISO 14046

Water and water management play a key role in sustainable development. The requirements of ISO 14046 are a starting point for improving water management at both the local and global levels. ISO 14046 was created to harmonize requirements related to water footprint assessment, taking into account the impact on water quality. ISO 14046 certification is recommended for all organizations and government agencies wishing to promote sustainable development in the field of water management.

11. IRCA Certification: or International Register of Certified Auditors, is a highly prestigious and valuable international accreditation for quality programs in

various industries. In the specific case of water in Valle del Cauca, obtaining this certification guarantees compliance with the highest quality and safety standards.

12. Blue Certificate

Nearly 30 representatives from Peruvian companies gathered to gather proposals to optimize the Blue Certificate process, a recognition awarded by the National Water Authority to water-responsible companies in Peru.

Chile: Leader in Certified Aquaculture

Chile stands out as a regional leader in sustainable aquaculture certification, especially in salmon production, which represents a significant portion of its exports. MSC and ASC certifications are widely adopted, ensuring traceability and responsible resource management. Furthermore, the country has significantly reduced the use of antibiotics and implemented strict environmental standards to minimize negative impacts on coastal ecosystems. The Chilean government has also promoted international partnerships to strengthen the blue economy, seeking to balance economic growth with marine conservation. These initiatives are aligned with SDG 17, which promotes global cooperation for sustainable development.

Colombia: Infrastructure Challenges and Social Responsibility

In Colombia, MSC and ASC certifications have gained ground, particularly in the export of tilapia and shrimp. These initiatives not only focus on environmental sustainability but also on social responsibility, promoting fair labor practices and benefits for coastal communities. However, the country faces challenges in implementing adequate infrastructure and strengthening monitoring systems, which limits the full adoption of these international standards. Furthermore, Colombia has shown interest in incorporating circular economy strategies in fisheries and aquaculture, reducing waste and reusing materials whenever possible. This aligns with SDGs 12 and 14, which promote sustainable consumption and production patterns and marine conservation, respectively.

Mexico: Between Legislation and Sustainability

Mexico has taken important steps in certifying its fisheries and aquaculture activities. MSC and ASC certifications apply to various species such as shrimp and tilapia, with a focus on ensuring sustainable practices and product traceability. Furthermore, integrated aquatic resource management policies have been implemented within the framework of the blue economy, which seeks to maximize the economic value of marine resources without compromising their sustainability. The country also faces significant challenges. Limited management capacity and a lack of effective management of aquatic resources have been identified as obstacles to achieving comprehensive sustainable development. These issues become especially critical in the context of the "Decade of Ocean Science for Sustainable Development" (2021-2030), which calls for increased investment in research and technology.

Peru: Pioneer in Sustainable Fisheries Management

Peru is one of the largest exporters of fishery products in the world and has led significant efforts in the sustainable certification of key species such as anchovy. MSC certifications have been instrumental in regulating the fishing of this species, which is crucial to the marine ecosystem and the country's economy. Peru has implemented advanced monitoring systems to prevent overexploitation and ensure that fishing quotas are aligned with the species' regeneration capacity. These efforts have been supported by public-private partnerships seeking to integrate sustainable fishing practices into global supply chains, contributing to meeting SDGs 8 (decent work and economic growth) and 14.

All of the above-mentioned are reflected in summary in the following Aquaculture Certifications in the Pacific Alliance Countries - Comparative Table of Aquaculture Certifications:

Table 1: Aquaculture Certifications in the Pacific Alliance Countries Comparative Table of Aquaculture Certifications

Country	Certification	Issuing Body	Scope	Main Focus
Chile	National Aquaculture Registry	SERNAPESCA	National	Registration and traceability
Chile	AquaChile Certification	Private (AquaChile)	Business	Quality and safety
Chile	ASC (Aquaculture Stewardship Council)	ASC	International	Environmental and social sustainability
Colombia	IRCA Certification (International Register of Certified Auditors)	National Water Authority	National	Water quality
Colombia	BAP (Best Aquaculture Practices)	Global Aquaculture Alliance	International	Sustainability and good practices
Mexico	Good Aquaculture Production Practices - Buenas Prácticas de Producción Acuícola (BPP)	CONAPESCA (National Committee for Aquaculture and Fisheries - Comité Nacional de Acuicultura y Pesca)	National	Food safety and sanitary practices
Mexico	NMX-AA-157-SCFI-2015	SEMARNAT	National	Environmental management systems in fisheries
Mexico	Fishing Plant Certification Model	SENASICA/SAGARPA	National	Processing and export
Peru	Blue Certificate	National Water Authority - Autoridad Nacional del Agua (ANA)	National	Efficient water management
Peru	HACCP (Hazard Analysis and Critical Control Points)	SANIPES	National	Food safety
All	GLOBALG.A.P.	GLOBALG.A.P.	International	Good agricultural and aquaculture practices
All	ASC (Aquaculture Stewardship Council)	ASC	International	Environmental and social sustainability
All	MSC (Marine Stewardship Council)	MSC	International	Sustainable fishing

All	Friend of the Sea (FOS)	Friend of the Sea	International	Marine sustainability
All	ISO 14046 (Water Footprint)	ISO certifying bodies	International	Water resource management
All	Organic Certification	Various certifying bodies	International	Organic production

Source: Prepared based on the bibliographic references of this article.

Conclusion

The aquaculture certification ecosystem in the Pacific Alliance reflects the region's productive and regulatory diversity, as well as its growing integration with global markets. Strengthening these certification systems, particularly through regional harmonization and accessibility for producers of different scales, represents a strategic opportunity to consolidate the sustainable competitiveness of the aquaculture sector in the four countries. The trend toward certifications that integrate environmental, social, and economic dimensions, aligned with the Sustainable Development Goals, marks the future path for these sectoral governance instruments. Aquaculture and fisheries certifications are key to protecting the environment, ensuring sustainability, and improving consumer confidence. Although there are still challenges, such as costs and lack of support in some areas, their implementation is essential to ensure we can continue enjoying marine resources without destroying them. Choosing certified products is a simple way to support this cause.

Chile, Colombia, Mexico, and Peru have significantly progressed in implementing sustainable aquaculture and fisheries certifications. However, the path toward sustainable development faces common challenges, such as a lack of infrastructure, the need for increased financing, and strengthening local capacities. Overcoming these challenges will not only ensure compliance with the SDGs but will also position these countries as leaders in responsible practices in the global seafood market. Certifications such as the MSC and ASC are key tools in this process, as they provide a framework for coastal businesses and communities to transition toward a more sustainable and socially responsible model. The coexistence of national and international certifications has created a complex but functional ecosystem that addresses different dimensions of aquaculture sustainability. However, significant challenges remain in terms of accessibility for smallholder farmers and regional harmonization. The future of aquaculture certifications in the Pacific Alliance points toward greater integration of environmental, social, and economic criteria, aligned with global frameworks such as the SDGs, as well as toward the digitalization and simplification of processes that allow for broader adoption among farmers of different scales.

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