



fish watch

2025 | 2nd EDITION



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1. ABOUT ALIANIMA

Alianima is a non-profit organization that works in close collaboration with leaders of the food industry to identify and address the main challenges faced by the animal production chain. We provide partnerships, free consultancy and technical support to companies committed to improving animals' living conditions, assisting in the implementation of sustainable and animal welfare practices.

Our technical team is highly specialized, and all actions and materials are grounded in solid technical and scientific data. Our goal is to foster an industry that is more attentive to animal suffering and to encourage consumers who are better informed about the origin of their food, promoting critical and conscious consumption.

Learn more at alianima.org



2. ABOUT THE ANIMAL WATCH

The Animal Watch is a platform developed by Alianima with the purpose of increasing transparency regarding the public commitments of food and hospitality companies in Brazil related to animal welfare, thereby facilitating monitoring by civil society and ensuring that such commitments are effectively fulfilled.

Since 2024, four annual reports have been published: the [Egg Watch](#), the [Pig Watch](#), the [Broiler Watch](#), and the [Fish Watch](#). The latter two stand out not only for their pioneering approach but also for focusing on categories of animals strongly impacted by food production, both in terms of the number of individuals involved and the low level of welfare generally afforded by regular management practices. These reports present updated overviews of production and animal welfare, aiming to raise awareness among actors in the respective supply chains and encourage the adoption of public commitments in Brazil in the near future.

The Animal Watch also provides information and news about our work and the reality of the food production chain, highlighting the role of the industry in promoting significant changes in animal treatment. Its goal is to foster more critical and conscious consumption, greater corporate responsibility, and concrete advances in animal welfare promotion in Brazil.

Access: observatorioanimal.com.br



2.1 ABOUT THE FISH WATCH

Although there are still no regulations in Brazil addressing key aspects related to fish welfare — such as their slaughter — there is a growing global demand for more responsible aquatic animal management practices, especially concerning humane slaughter. The European Union, for instance, has guidelines that, while vague in some respects, recognize the need to prevent pain and suffering at this stage of the production process (see [Fish Watch 2024](#)). This is an important point for Brazil, given Europe's role as a strategic export market.

In the field of certification, although still incipient in Brazil, relevant advances have been made. In 2025, the organization [Certified Humane](#) launched its [Animal Welfare Standards for Farmed Tilapia](#). Until then, there had been little action by fish welfare certifiers in the country. Additionally, in 2024 the same organization released, in Spanish, the Animal Welfare Standards for Farmed Atlantic Salmon, a species not produced in Brazil but heavily imported from Chile. These milestones reflect international trends and may positively influence the supply chains serving the Brazilian market.

In parallel, several countries already rely on consolidated certifiers, most of which are assessed annually by the Benchmark of the Aquatic Life Institute (ALI), an international organization dedicated to the defense of aquatic animals. This annual analysis compares certification schemes worldwide based on clear, well-established animal welfare criteria. These advances, combined with growing demands for transparency, position certification as a strategic response to market pressures.

Against this backdrop, the Fish Watch has the mission of fostering debate and increasing transparency on the living conditions of fish in the complex seafood industry, promoting concrete advances in animal welfare in this sector in Brazil. This second edition of the report provides an overview of national production, with emphasis on fish farming, and presents a more targeted and in-depth approach through two case studies: Nile tilapia, Brazil's most produced and exported species, and Atlantic salmon, the main fish imported by Brazil.

These case studies allow the identification and detailing of critical points along these production chains — from handling to slaughter — while proposing feasible paths for improvement. The report also discusses how fish welfare can be integrated as a value strategy in the sector, adding differentiation and competitiveness to companies while meeting the growing demands of consumers and markets.

Thus, this second edition continues the work initiated by the first Fish Watch report. Despite some progress, particularly regarding certification, there is still a significant gap in terms of clarity, enforceability, and scope of regulations applicable to fish welfare. The importance of advancing in this area is evident, especially given the movement of companies in the sector toward making well-grounded public commitments.



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3. INTRODUCTION

3.1. FISH PRODUCTION IN BRAZIL: CURRENT SCENARIO

3.1.1. Fish Farming

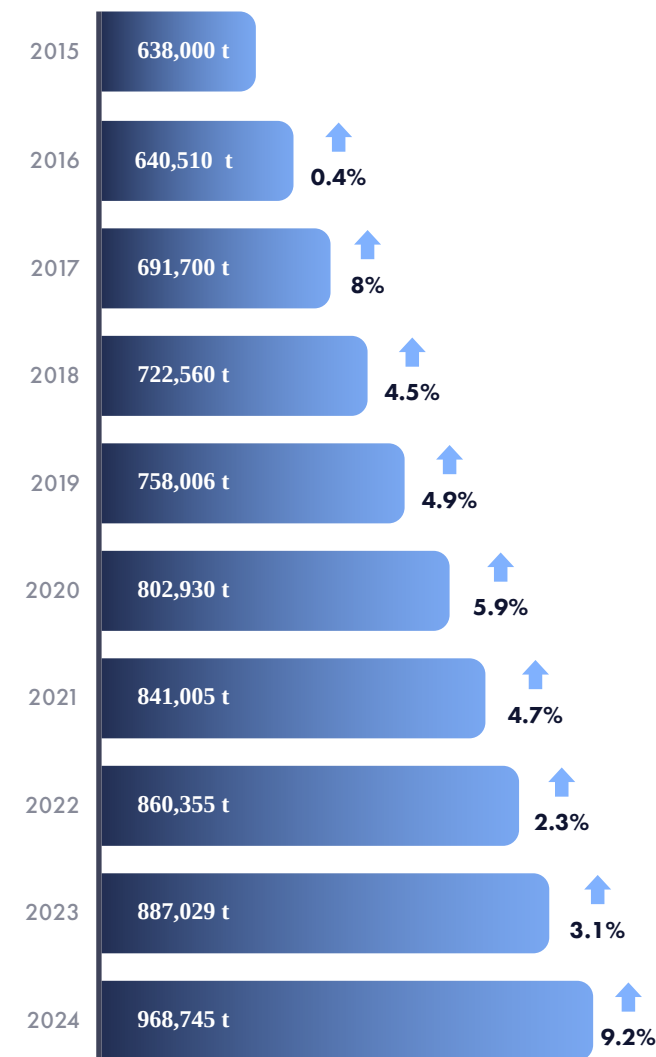
Fish farming has expanded worldwide over the years. According to the Food and Agriculture Organization of the United Nations (FAO)¹, the production of aquatic animals is expected to grow by around 10% by 2032, driven mainly by the expansion of aquaculture and the gradual recovery of fishing activities. **It is estimated that total fish volume will reach around 205 million tons in 2032, of which 111 million will come from aquaculture and 94 million from fisheries¹.**

Of this total, up to 90% will be destined for human consumption, while the remainder will be used for fishmeal and fish oil production, animal feed, pharmaceuticals, aquaculture inputs (e.g., as fry), bait, livestock raising, or even the ornamental trade.

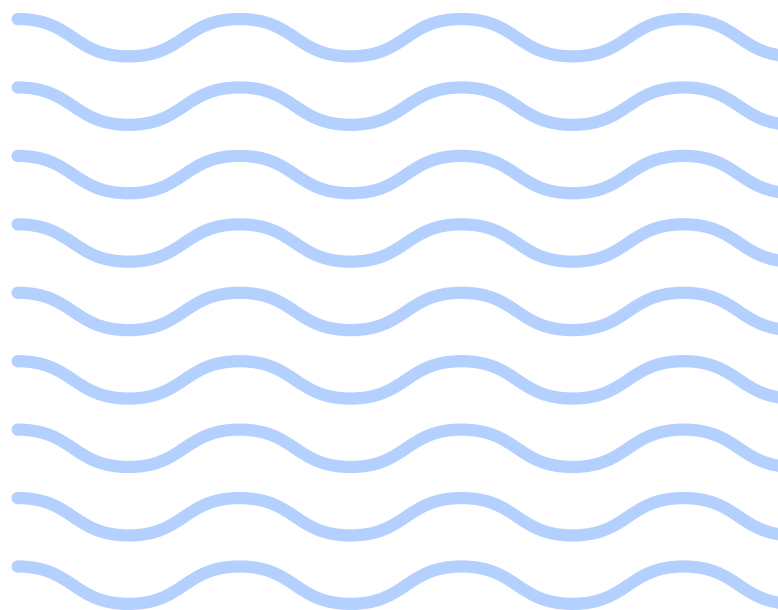
In this global context, fish production in controlled systems has advanced in Brazil, despite structural and environmental limitations. **In 2024, Brazil's farmed fish production reached nearly 969 thousand tons²**, representing a 9.2% increase compared to the previous year.

While the South Region of the country remains in the lead with nearly 334 thousand tons of fish production last year, the Southeast Region recorded the highest growth, with an increase of more than 14% compared to 2024—thus surpassing the total production of the Northeast Region². Paraná, São Paulo, and Minas Gerais are the states leading fish production in Brazil².

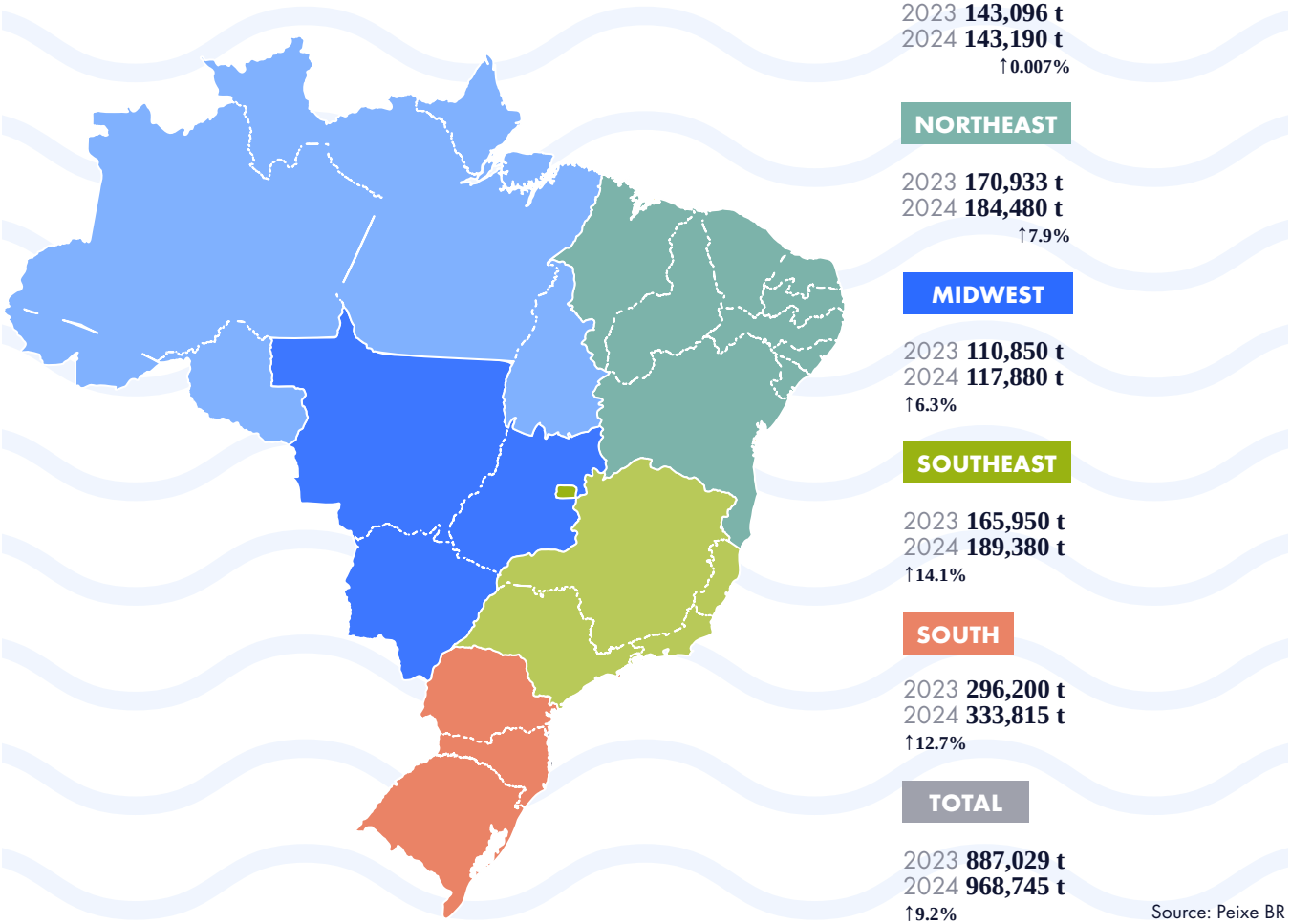
FARMED FISH PRODUCTION IN BRAZIL



Source: Peixe BR



FARMED FISH PRODUCTION BY REGION



TOP 10 FARMED FISH PRODUCERS IN BRAZIL (2024)

Position	State	Tons
1st	Paraná	250,315
2nd	São Paulo	93,200
3rd	Minas Gerais	72,800
4th	Santa Catarina	59,100
5th	Rondônia	56,900
6th	Maranhão	54,500
7th	Mato Grosso	44,520
8th	Mato Grosso do Sul	40,500
9th	Bahia	36,450
10th	Pernambuco	35,700

Source: Peixe BR

The most produced species in the country is Nile tilapia (*Oreochromis niloticus*), representing over half of national fish farming production (about 68%²). In 2024, more than 662 thousand tons of tilapia were produced — a historic increase of over 14% compared to the previous year.

Other species also stand out, especially native fish such as tambaqui (*Colossoma macropomum*) and pirarucu/arapaima (*Arapaima gigas*), more common in the North and Midwest regions. In 2024, native fish production totaled around 259 thousand tons, a 1.8% drop compared to the previous year². Rondônia (~57 thousand t), Mato Grosso (~40 thousand t), and Maranhão (~39 thousand t) are the main producing states². Despite

the slight decline, these species remain important production alternatives in some regions.

Species such as pangasius, carp, and trout account for a smaller share of total production but retain local relevance. In 2024, production of these species reached nearly 48 thousand tons, an increase of 7.5% from the previous year². Pangasius production grew notably in the Northeast region, while Rio Grande do Sul leads for carp and trout².

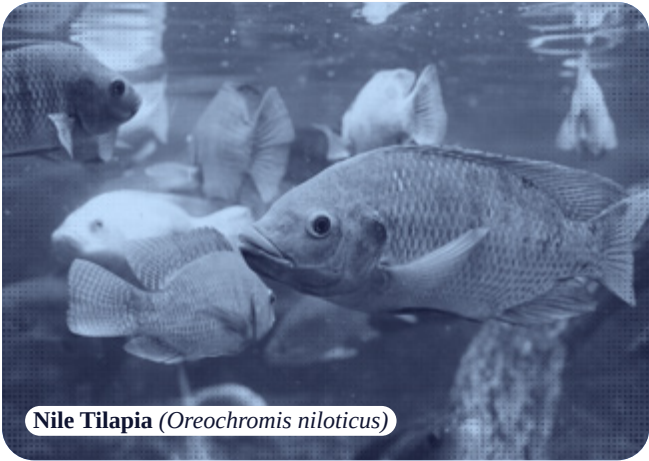
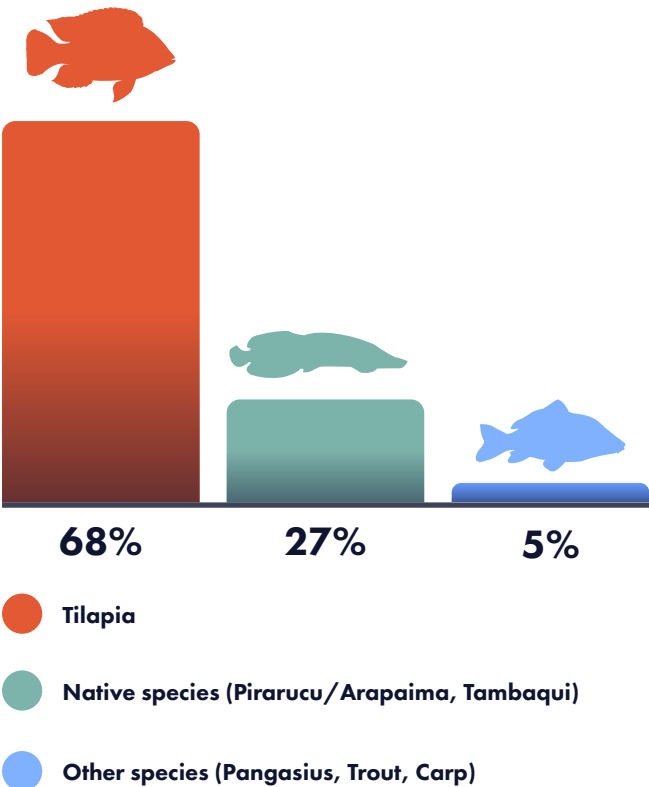


Photo: iStock

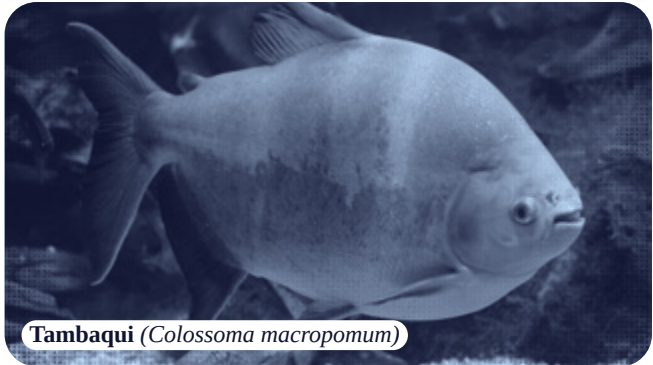


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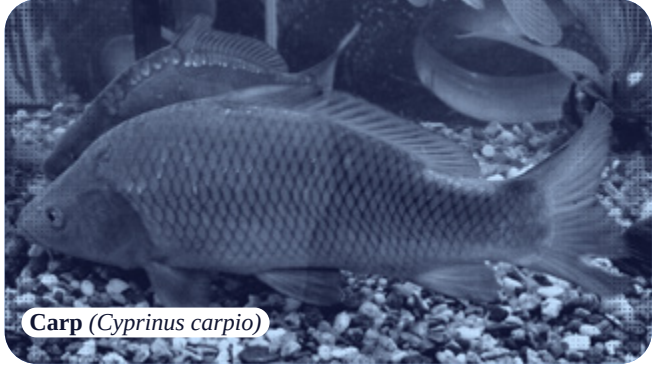


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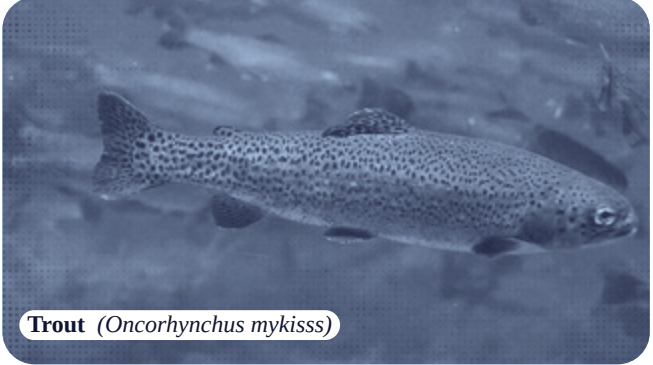
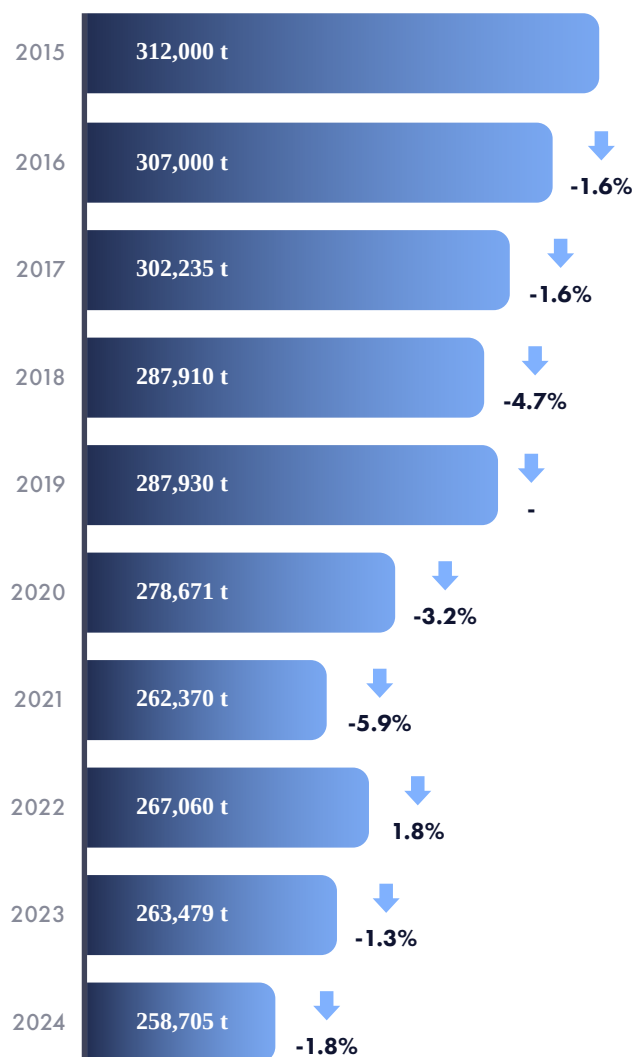


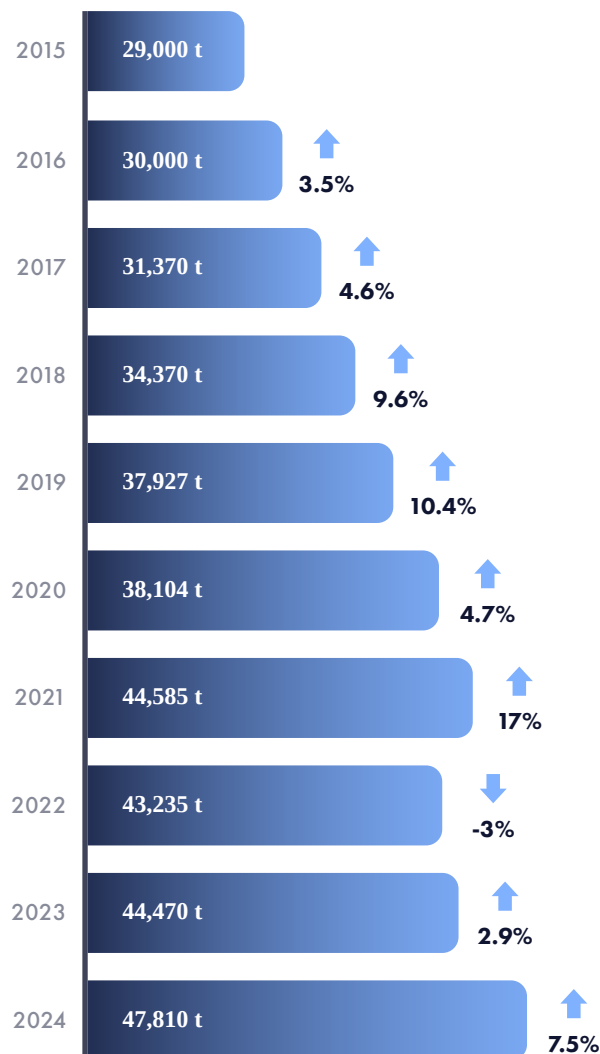
Photo: Engbretson Eric, Wikimedia Commons

TRENDS IN THE PRODUCTION OF NATIVE FISH



Source: Peixe BR

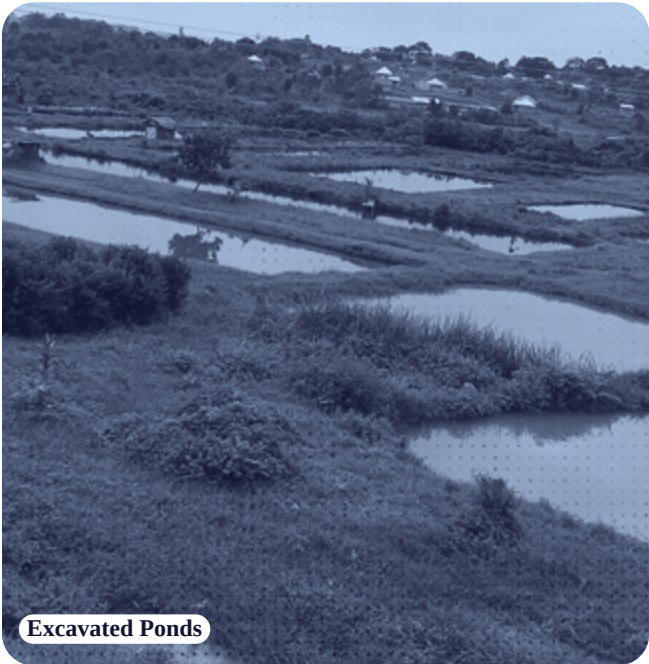
TRENDS IN THE PRODUCTION OF OTHER FARMED SPECIES



Source: Peixe BR

Regarding production systems, **Brazil currently has around 780 thousand ponds (including earthen ponds and dam reservoirs) and more than 75 thousand net cages installed in continental waters²**. The use of these systems varies depending on geographic and hydrological characteristics in each region.

The presence of net cages predominates in the North and Northeast regions, taking advantage of large reservoirs and water bodies. Excavated ponds, on the other hand, are more common in the Midwest and Southeast Regions, especially in states such as Minas Gerais, with more than 105 thousand ponds and only 21,500 net cages, and São Paulo, with nearly 57 thousand ponds and just over 13,500 net cages². Despite regional variations, both systems continue to expand.



Excavated Ponds

Photo: Geossegiawa, Wikimedia Commons



Net-cages

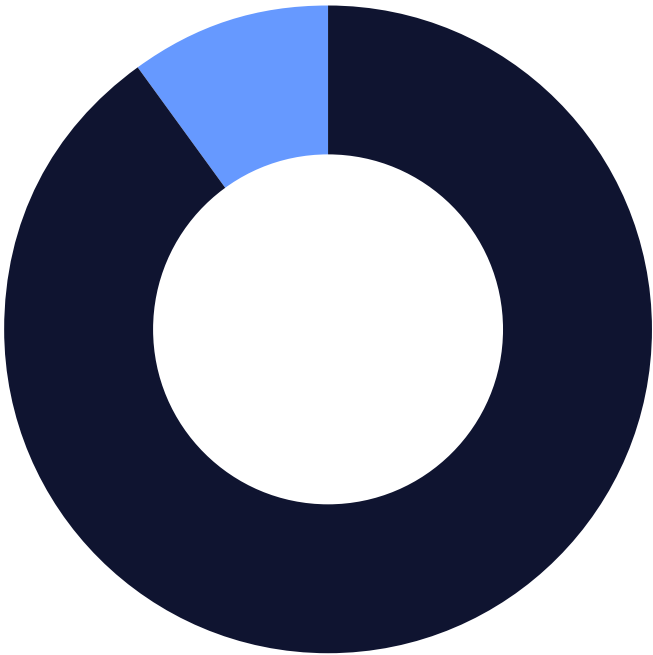
Photo: AsikBinRahim, Wikimedia Commons



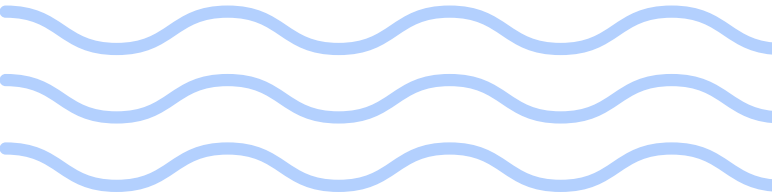
EXPORTS AND IMPORTS

In 2024, exports of farmed fish increased 102%, reaching almost 14 thousand tons. Tilapia accounted for 90% (around 12.5 thousand tons) of this total². Performance in exports reflects the growing consolidation of Brazilian tilapia in markets such as the United States, destination of about 89% of exports². The main states exporting tilapia are Paraná, São Paulo, and Mato Grosso do Sul². Smaller export volumes of curimatás, pacus, tambaquis, and catfish were also recorded.

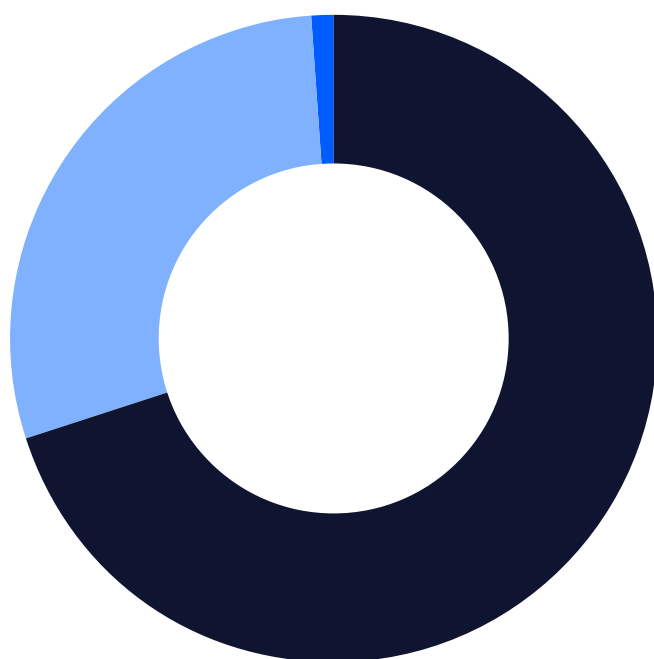
EXPORTS BY SPECIES (2024)



- 90% - Tilapia
- 10% - Curimatás, Pacus, Tambaquis, Catfish



IMPORTS BY SPECIES (2024)



- 70% - Salmon
- 29% - Pangasius
- 1% - Other species



Pangasius (*Pangasianodon hypophthalmus*)

Photo: Citron, Wikimedia Commons



Atlantic salmon (*Salmo salar*)

Photo: Petter Fjeld, Wikimedia Commons

On the other hand, Brazil continues to import large volumes of fish. **In 2024, more than 173 thousand tons were imported, with salmon accounting for about 70% (over 120.5 thousand tons)².** Pangasius also stood out with over 50.5 thousand tons, representing 29% of imports².

3.1.2. Fisheries

Fishing remains present in several regions of Brazil but facing structural weaknesses, such as the lack of official and systematized data. For more details, see [Fish Watch 2024](#). **The absence of official statistics hinders the formulation of public policies and proper management.** Low monitoring and inspection capacity also limit the implementation of more responsible and sustainable fishing measures.

Internationally, policymakers, industry leaders, and public opinion are increasingly highlighting the urgency of addressing tuna welfare in fisheries. In this context, the [Aquatic Life Institute \(ALI\)](#) launched in 2025 a [guide](#) with best practice recommendations for tuna fishing³. Historically, tuna welfare has been largely overlooked, and these new policies have the potential to drive significant transformations in a multi-billion-dollar sector.

In Brazil, tuna fishing is carried out mainly by artisanal and small-scale vessels, particularly in the Southeast and Northeast regions, according to the [Ministry of Agriculture and Livestock \(MAPA\)](#). This operational profile favors the progressive adoption of these practices. Incorporating ALI's guidelines has the potential **to position Brazil as a reference in commercial fisheries welfare initiatives.**

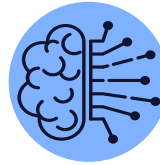


SHARKS, “CAÇÃO,” AND CONSERVATION: A WARNING ABOUT NATIONAL CONSUMPTION

The organization [Sea Shepherd Brasil](#) has drawn attention to the commercialization of shark meat in the country under the generic label “cação”, which makes traceability difficult and conceals the impact on threatened species.

Brazil is currently the world’s largest consumer and importer of this meat, with about 40 thousand tons per year, with an estimate suggesting that 83% of species sold as “cação” are at risk of extinction, as stated by [Sea Shepherd](#). In addition, there are public health risks, as shark meat has been found to contain heavy metals, pesticides, and petroleum derivatives. The organization proposes measures such as species-specific labeling and restrictions on government procurement within public food policies.

3.2. FISH SENTIENCE & WELFARE



SCIENTIFIC EVIDENCE OF FISH SENTIENCE

The growing expansion of aquaculture in Brazil and worldwide has intensified the debate on fish welfare. However, as demonstrated in the first edition of [Fish Watch \(2024\)](#), **science has for decades provided more than substantial evidence that fish are sentient beings**. Several lines of research — including anatomy, physiology, pharmacology, and ethology — **show that fish are capable of experiencing pain, fear, stress, and other complex emotions**⁴.

Even in the absence of a neocortex, fish have neural structures capable of detecting harmful stimuli, processing them in their central nervous system, and responding with various behavioral changes⁵⁻⁹, often similar to those observed in mammals.



Leopard shark (*Triakis semifasciata*)

Photo: Matthew Field, Wikimedia Commons

These reactions are not mere automatic reflexes but include complex behaviors such as avoidance of aversive stimuli, changes in feeding patterns, and active pursuit of pain relief. Moreover, **fish demonstrate surprising cognitive abilities ranging from long-term memory^{10,11} to self-recognition¹² and even task division¹³ in some species.** These elements show that their welfare can no longer be ignored or neglected.



CHALLENGES IN MANAGEMENT AND SLAUGHTER IN BRAZILIAN FISH FARMING

Although scientific evidence on fish sentience is strong, the current fish production scenario in Brazil is far from ideal. Fish face a wide range of stressors throughout their life cycle in farms¹⁴. **Common issues include high stocking density, monotonous environments without environmental enrichment, poor handling, and inadequate transportation¹⁵.**

While the quality of water and feeding are monitored with some frequency, they still require more attention. **High concentrations of toxic substances (such as ammonia and nitrite), inadequate temperatures, low oxygenation, improper fasting practices, uneven feed distribution, reduced feeding frequency, or excessive use of antimicrobials negatively affect fish health and welfare.**

The issue is even more serious regarding slaughter. Most reports from producers and slaughterhouses indicate that **ice is used as the main method of stunning to render fish unconscious. However, this is not recognized as a humane method, as it causes prolonged suffering¹⁶.**

Moreover, although there are reports of slaughter practices involving gill bleeding or decapitation following ice-induced stunning, **these procedures are applied inconsistently and only in a minority of processing plants. As a result, fish often die either by asphyxiation or during fillet processing¹⁶, causing intense suffering.**

And all these aspects—namely, water quality, feeding, space and stocking density, use of environmental enrichment, management and transport practices, as well as stunning and slaughter methods, in addition to physical health—are considered fundamental aspects for the welfare of aquatic animals^{17,18}, **also affecting their productivity.**

“Improving animal welfare has direct effects on animal health and product quality, reduces the need for treatments, and increases disease resistance, potentially even contributing to biodiversity preservation. Aquaculture is no exception to this strategy, and there is already a strong scientific basis for addressing the welfare of aquatic animals. It is imperative that research and the development of solutions to improve fish welfare follow this scientific foundation, adapting existing knowledge to the species produced in aquaculture.”

Prof. Dr. João Luis Saraiva

Biologist, President of the FishEthoGroup Association, Researcher at the Centre of Marine Sciences – CCMAR (Portugal) and Member of Alianima’s Fish Advisory Board



Aspects such as feeding carnivorous or even omnivorous species with feed or oil derived from aquatic animals also raise ethical and sustainability concerns. **It is estimated that more than 1 trillion aquatic animals are used annually as inputs for the feeding of farmed fish^{19,20}.** This figure contributes to a scenario of intensive ocean exploitation and calls into question the long-term sustainability of the aquaculture supply chain.

The environmental impacts of intensive fish farming also cannot be overlooked— **the release of feces, feed residues, and antibiotics into water bodies can cause eutrophication and compromise entire ecosystems, or even accelerate the emergence of superbugs,** which is also a serious issue for human health.



FISHING PRACTICES AND THE CHALLENGES FOR ANIMAL WELFARE

In fishing, fish welfare is often compromised at different stages of the process, even though the interaction with humans is brief. From prospecting—actively locating these animals with lights or sonar—and capture, to handling on board and slaughter²¹, **fish face severe stressors such as overcrowding in nets, asphyxiation, injuries and trauma, thermal shock, and fatigue^{21,22}.** After capture, fish are rarely stunned before slaughter, and are generally left to die by asphyxiation or in contact with ice—practices that prolong suffering.

It is worth noting that the impacts on animals and the environment vary according to the different fishing methods. Practices such as **trawling and set-net fishing, for example, are particularly harmful,** not only to fish but to marine biodiversity as a whole. Because they are non-selective, these methods cause **the accidental capture (bycatch) of a wide variety of species²².**

Trawling also causes severe physical and environmental impacts, contributing to the desertification of the seabed. In addition, as detailed in the previous edition, **ghost fishing—caused by gear abandoned or lost at sea—also represents a constant risk to the life and welfare of aquatic animals,** even affecting species that are not the target of fishing²².

3.3. LEGAL GAPS AND INTERNATIONAL ADVANCES

Despite the urgency of improving the current scenario, **Brazil still lacks official data on fisheries.** There is no information on how much is caught, which species are most fished, or the distribution of fishing activity by state or region. Nor is there specific legislation addressing the welfare of fish and aquatic invertebrates.

[Ordinance No. 365/2021](#) of the Ministry of Agriculture and Livestock (MAPA), which deals with the handling and humane slaughter of farm animals, includes “fish” (pescado) within its scope, but **explicitly excludes fish and aquatic invertebrates from the definition of fish.** This represents a critical gap that prevents the regulation and enforcement of more ethical practices in production and commercialization chains. Further details on these gaps can be found in the previous edition of this report ([Fish Watch 2024](#)).

While the Brazilian regulatory framework remains stagnant, important milestones have been achieved globally. **International organizations that are part of the [Aquatic Animal Alliance \(AAA\)](#) — a global coalition dedicated to aquatic animal protection — have mobilized efforts with companies and governments, achieving concrete commitments toward fish and aquatic invertebrate welfare.** Among the advances obtained are improvements in stunning and slaughter methods, stricter control of stocking density, and implementation of environmental enrichment.

One of the main examples of this, involving commitments to animal welfare in both aquaculture and fisheries, was the two-year **collaboration between the [Lever Foundation](#) and Espresso House** to develop and implement its **[first aquatic animal welfare policy](#)**, launched in February 2025. **The policy applies to more than 500 stores across Europe and requires aquaculture systems to comply with animal welfare standards defined by [Global Animal Partnership](#), [RSPCA](#) or [Naturland](#).**

Mandatory criteria include controlled stocking densities, environmental enrichment, humane handling, and strict limits on the time animals spend out of the water. Moreover, daily water quality monitoring and proactive disease prevention are also requested .

For aquatic animals from capture fisheries, the policy prohibits the most harmful methods and practices, such as bottom set-nets, trawling, the use of explosives or live fish as bait, and the removal of body parts from fish. It also establishes strict limits on the time between capture and exposure out of the water.

Given this, it is essential that producers, slaughterhouses, distributors, and retailers pay attention to this new landscape. **Fish welfare is not only an ethical issue but also a strategic one: consumers, certifiers, and international markets are raising their standards, increasingly demanding transparency and responsibility.** Adopting science-based best practices aligned with international guidelines can represent a **competitive advantage for the Brazilian aquaculture sector.**

“With the accelerated expansion of Brazilian tilapia farming, the foreign market becomes increasingly attractive, as can be seen from the rising figures for Brazilian tilapia exports. In this context of seeking new markets, issues such as animal health and welfare are vital and increasingly important. This raises the question: Can imports of animal products be ‘barred’ or ‘conditioned’ on animal welfare grounds? Well, it is clear that the world is changing, that people care more and more about animal welfare, about where their products come from, and what type of industry their purchase promotes.”

Prof. Dr. Leonardo José Gil Barcellos
Veterinarian, Professor at UPF, and Member of Alianima’s Fish Advisory Board



4. TILAPIA: BRAZIL'S MOST PRODUCED AND EXPORTED FISH

The production of Nile tilapia, [as described by the FAO](#), is composed of well-defined stages. **Reproduction** is usually carried out in tanks or excavated ponds, with periodic collection of fry. It is common to perform **sex reversal** on very young fry through medicated feed, producing predominantly male populations — mainly because males perform better in growth and to avoid uncontrolled reproduction in production systems. Next, fish go through a **nursery** phase, where they are raised for up to three months until they reach around 30–60 g, generally in tanks or ponds. **Grow-out** can occur in excavated ponds, cages, or even in Recirculating Aquaculture Systems (RAS), ranging from **semi-intensive to intensive systems**. The **harvest** stage involves draining tanks or using nets and requires careful handling. The **processing** stage includes slaughter, which is frequently carried out on ice or in cold water, followed by manual or mechanized filleting.

Tilapia are widely recognized for their high resistance to variations in environmental conditions and handling. Nevertheless, **even as a robust species, tilapia welfare can be severely compromised in production systems — especially in intensive systems, which often lack elements essential for their natural behaviour**, such as a sandy (or muddy) substrate and adequate space. **These deficiencies directly impact not only the animals' quality of life but also their zootechnical performance**, compromising growth, reproduction, and health — which generates economic losses for producers.

The main critical points and proposed improvements related to the welfare of this species in production settings are summarized below, based on the work of Pedrazzani and colleagues (2023)²³, the MAPA Manual of Good Practices for Fish Transport²⁴, and the public species profiles based on literature reviews and available on the open-access [fair-fish database](#)^{25,26}.

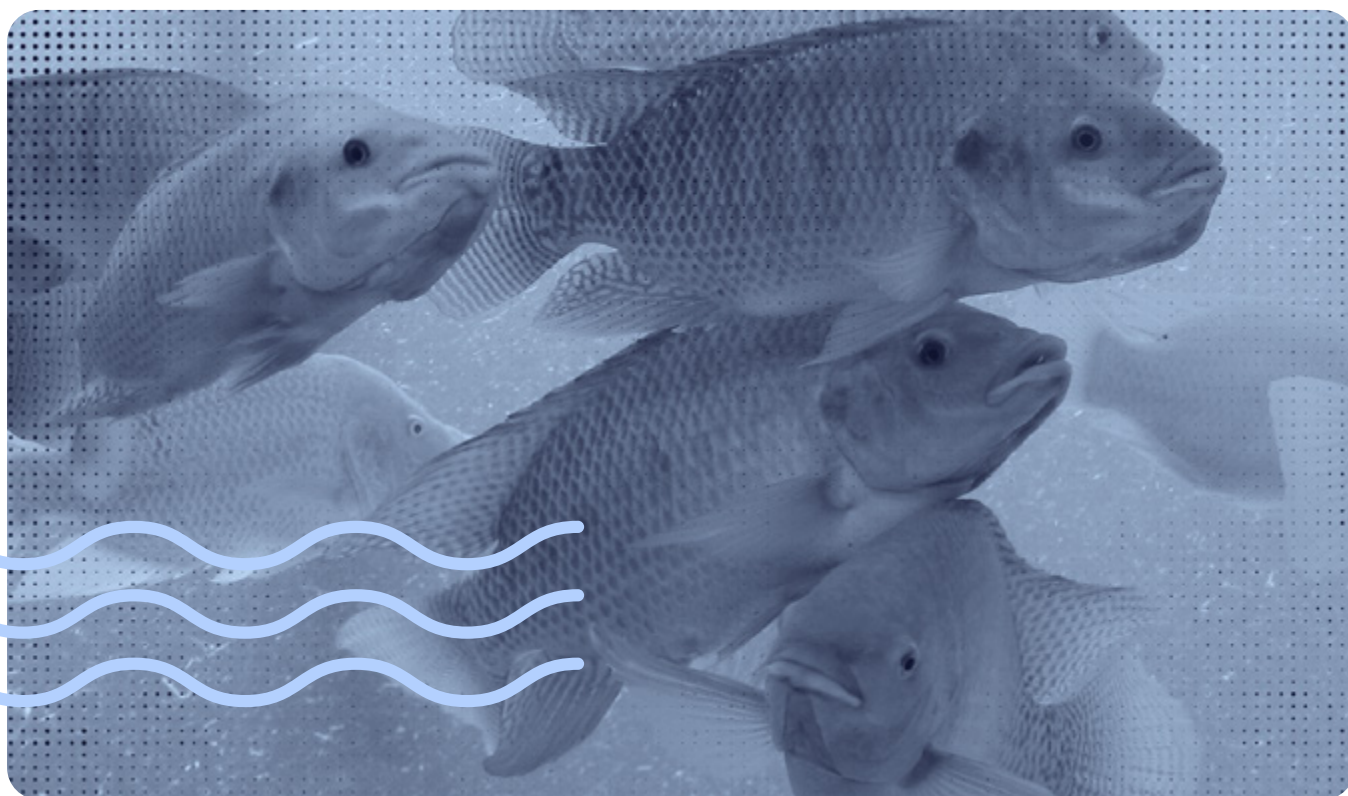


Photo: iStock

“The potential to incorporate good animal welfare practices into tilapia production in Brazil is enormous. It is known that welfare improvements from larviculture to slaughter lead to higher survival rates, lower morbidity, reduced need for treatments, in addition to superior product quality. Training of personnel who work daily with the fish is essential for changes to be effective and long-lasting. This allows their work to be valued and handling procedures to be less stressful, including for workers.”

Dr. Daniel Santiago Rucinke Gonzalez
Veterinarian, Partner at Fish Welfare Solutions
and Member of Alianima’s Fish Advisory Board



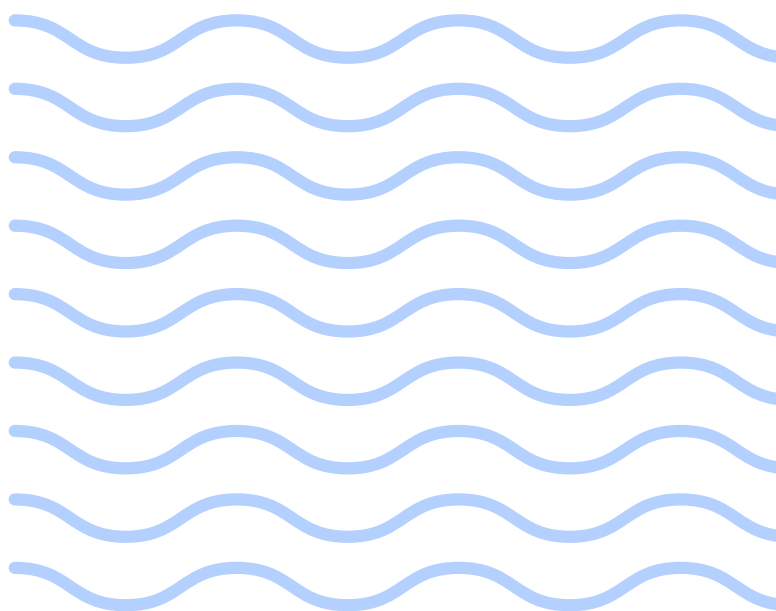
DOMESTICATION, LINEAGES AND GENETIC EDITING

Nile tilapia is at a well-advanced level of domestication and is considered fully domesticated by Teletchea & Fontaine²⁷, who highlight the application of selective breeding programs focused on species-specific objectives. **In Brazil, tilapia production often uses lineages selected by genetic improvement**, such as the *Chitralada* and *GIFT* (Genetically Improved Farmed Tilapia), which aim to improve productive traits. **However, the recent advances in gene editing — exemplified by the “editable tilapia” developed by [Brazilian Fish](#)** to enhance productive performance and fillet yield (a technology that, according to reports, can compress ~20 years of conventional breeding progress into about one year) — **raise concerns about possible impacts of such editing on animal welfare**. Gene editing aimed at performance improvements can affect other traits, including behaviour. Even genetically improved lineages like *GIFT* have already shown issues in this regard, such as excessive aggressiveness among individuals.



To learn in detail about our considerations and priority proposals for a corporate tilapia welfare commitment aligned with the national context, access our [Tilapia Welfare Commitment Guide](#)

ACCESS HERE!





HEALTH & WATER QUALITY

Water quality has a direct relationship with fish health. **When water problems exist, fish become more susceptible to disease, which can even lead to increased mortality.** We therefore recommend always adopting preventive measures to preserve tilapia health, such as keeping water quality at appropriate levels. **Some signs of health problems include lesions on the eyes, jaws, opercula, skin, spine, fins and gills, as well as scale loss** — which can be perceived, for example, by loose scales in the water.

Recommended water quality parameters:

- Dissolved oxygen: maintain at least 5 mg/L, with daily monitoring.
- Toxic ammonia (NH_3): should not exceed 0.05 mg/L, with weekly monitoring.
- Nitrite (NO_2^-): should be below 0.3 mg/L, with weekly monitoring.
- Temperature: ideal range 25–31 °C.
- pH: maintain between 6.0 and 8.5.
- Water transparency (Secchi disk): 30–40 cm.



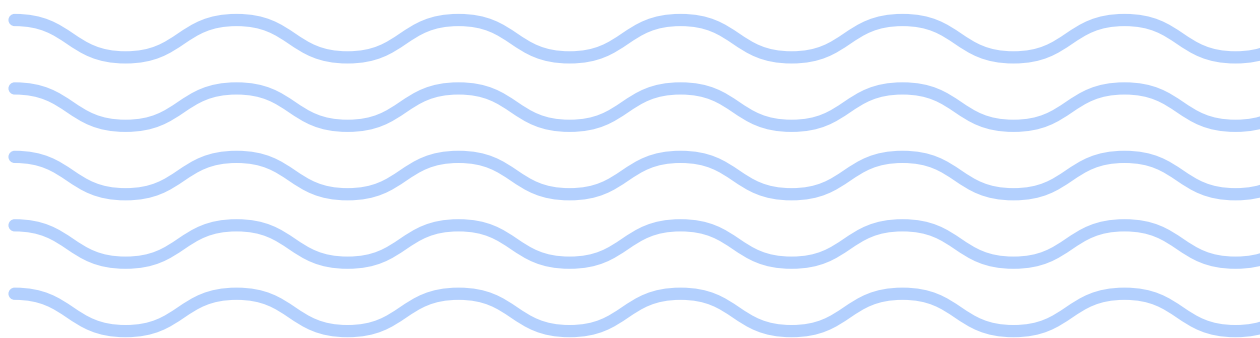
FEEDING

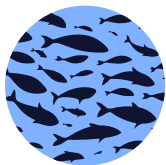
Feeding must be planned considering tilapia's omnivorous habits. **Feed should be offered several times a day, in quantities such that fish consume all the feed within 3–5 minutes**, avoiding underfeeding (which impairs growth) and preventing overfeeding (which harms water quality).

To address the social hierarchy of tilapia issue — which generates aggressive confrontations among fish — **feed should be distributed at multiple points in the tank to ensure access for all individuals.**

The replacement of fishmeal and fish oil with more sustainable plant-based sources, such as soybean supplemented with lysine or microalgae, is recommended. If fishmeal or fish oil are used, they should not be produced from animals sourced directly from capture fisheries.

Furthermore, **the use of antimicrobials in feed as growth promoters or prophylactically must be banned** to minimize the emergence of potential superbugs and to prevent environmental impacts from drug residues entering water bodies (especially in cage systems).





SPACE & STOCKING DENSITY

Stocking density directly influences tilapia health, behaviour and growth.

- Fry: maximum recommended density 500 individuals/m³.
- Juveniles (grow-out): density should not exceed 50 individuals/m³.

Very low densities can increase aggression, whereas excessively high densities cause stress and compromise development. **Management must also consider dissolved oxygen levels and the availability of adequate physical space.**

In natural reproductive contexts, many males aggregate in a display arena, exhibiting for females, digging and defending nests in the substrate and performing elaborate behaviours. Therefore, **broodstock should not be kept solely as isolated single pairs (one male + one female) for spawning.**

Additionally, to guarantee safety and avoid stress and mortality **during the fry stage, production systems should include predator protection (e.g., containment screens) that prevent external attacks.**



ENVIRONMENTAL ENRICHMENT

Captive environments — including production systems — are often monotonous and do not provide the positive stimulation necessary for animals, thereby harming tilapia behaviour and welfare.

Environmental enrichment is an effective strategy to improve this scenario by expanding the repertoire of natural behaviours and reducing abnormal behaviours (e.g., stereotypies).

For tilapia, which use the bottom substrate to forage and to build nests during reproduction, **offering a natural substrate (sand or mud) at the bottom of ponds is recommended;** therefore, tarpaulins that prevent fish contact with the substrate are contraindicated.

The inclusion of submerged and floating bamboo structures, or additions of these to the bottom of tanks/ponds, stimulates the growth of periphyton (a community of microorganisms and detritus) that serves as an additional natural feed source and encourages natural foraging behaviour.

Thus, adding substrates that stimulate periphyton growth is also beneficial for producers, helping to reduce feed costs.



“I hope the tilapia production sector understands the benefits of welfare across the chain and quickly assimilates the gains already observed in the Brazilian egg and poultry markets, and in the Chilean milk and salmon markets, for example. The decision to adopt effective animal welfare practices usually results from commercial opportunities perceived by the sector, not solely from the desire to improve handling practices, but always aiming to increase productivity.”

Prof. Dr. Rosangela Poletto

Veterinarian, Professor at IFRS-Campus Sertão and member of the Certified Humane Scientific Committee



Photo: Pexels



**CAGE PRODUCTION:
IMPACTS ON WELFARE AND
THE ENVIRONMENT**

Because cages are floating enclosures, **these systems prevent fish from accessing bottom substrate — essential for expression of important natural behaviours in Nile tilapia** — thereby compromising their welfare.

In addition, as cages are directly exposed to water bodies, **residues such as feces, uneaten feed and medicines are discharged into the aquatic environment, potentially causing eutrophication** (excess nutrients that trigger uncontrolled algal and aquatic plant growth) **and degrading water and soil quality. Intensive use of antibiotics in cage systems also fosters the emergence of superbugs**, representing a serious public health risk. Given these environmental, sanitary and animal welfare consequences, **cage production should be avoided or submitted to strict controls.**



HANDLING & TRANSPORT

Inadequate handling generates high stress and can increase tilapia mortality, harming both welfare and producer economics. **It is therefore essential to have a well-trained team, minimizing the time fish are exposed to air, avoiding prolonged confinement, and reducing handling to that strictly necessary.**

During capture, it is recommended to observe fish behaviour: **disordered swimming, lateral flotation, immobility or lesions** are signs of stress and indicate the need to review handling procedures. **For transport of adult fish destined for slaughter, transport should be in water, never on ice, with a maximum density of 550 kg/m³, and for the shortest time possible.** A pre-transport fasting period of 24 hours is recommended to assure better water quality during transport and reduce mortality risk.



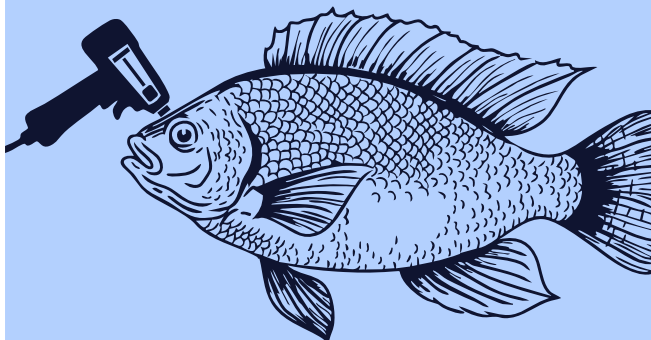
STUNNING & SLAUGHTER

Tilapia slaughter must follow humane protocols that ensure full and correct stunning prior to death. **Animals should be rendered unconscious within a few seconds by the stunning method, which must be immediately followed by the slaughter procedure before animals have the chance to regain consciousness.** Adopting correct stunning techniques not only respects animal welfare but also **contributes to final product quality and compliance with legal and ethical requirements of modern aquaculture.**

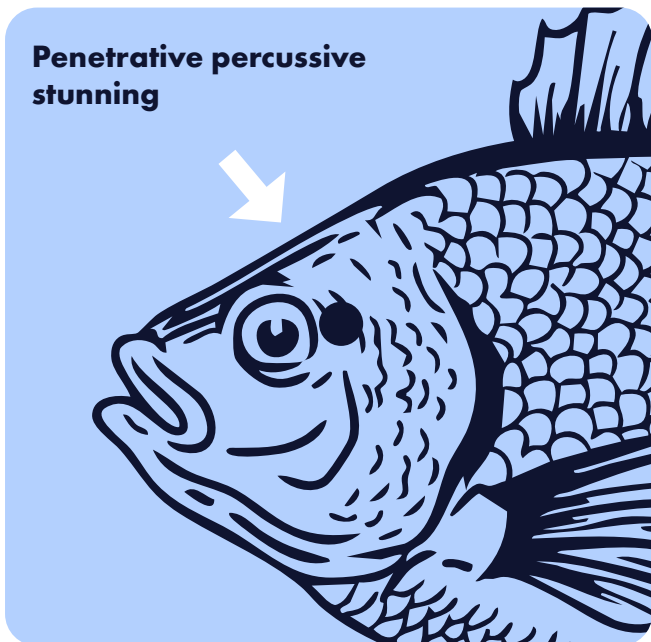
In Brazil, tilapia are **commonly placed on ice or in ice slurry as a supposed form of stunning, and may or may not subsequently undergo gill bleeding or decapitation** to secure slaughter. **These methods are not considered humane because animals can remain conscious throughout the whole process. The current recommended methods are electrical stunning or percussive/mechanical stunning (penetrative or non-penetrative), followed by gill bleeding or decapitation.** It is worth noting that **scientific research is still underway to more precisely assess the effectiveness of these methods and their practical viability in processing plants, especially given the large variation of fish species produced worldwide, each with its own needs and particularities.**



Non-penetrative percussive stunning



Penetrative percussive stunning



These illustrations are based on images from MAPA's Manual of Humane Slaughter of Fish.

"Without humane slaughter we cannot speak of animal welfare, and without animal welfare we cannot speak of sustainability."

Dr. Daniel Santiago Rucinke Gonzalez
Veterinarian, Partner at Fish Welfare Solutions
and Member of Alianima's Fish Advisory Board



ANIMAL WELFARE
CERTIFICATION: CERTI-
FIED HUMANE STAN-
DARD FOR TILAPIA IN
BRAZIL

Recently, the first welfare certification standard specific for Nile tilapia was launched in Brazil by [Certified Humane](#). This unprecedented initiative in the country aims to promote and improve fish welfare in national aquaculture by offering guidelines to producers of the species. It is important to note that other recognized international certifications (e.g., [ASC](#) — Aquaculture Stewardship Council, and [BAP](#) — Best Aquaculture Practices) include tilapia welfare criteria within their protocols.

However, Certified Humane's initiative stands out for being the first made available in Portuguese with a focus on Nile tilapia and with auditable criteria tailored to the Brazilian context. **Tilapia certification can add value to the final product, increase consumer confidence and encourage more ethical and sustainable practices.**



“The Certified Humane® tilapia standard is inclusive of various production systems, but within specific limits regarding stocking densities and the maintenance of water quality parameters in which the fish are raised. It was developed with the support of experts from the sector, academia, and industry. From its conception to the final version, field visits were carried out in different production contexts, and professionals from various areas of the supply chain were consulted to ensure a standard with real applicability and adoption potential for those who wish to innovate and place sustainability and animal welfare at the center of their fish farming or business.”

Prof. Dr. Rosangela Poletto

Veterinarian, Professor at IFRS-Sertão Campus and Member of the Certified Humane Scientific Committee



5. SALMON: BRAZIL'S MOST IMPORTED FISH

According to the [FAO](#), Atlantic salmon production consists of several well-defined phases, beginning with **reproduction in controlled freshwater environments**, such as hatcheries and larval rearing tanks, where fertilized eggs are kept until hatching and the completion of larval development.

After the larval stage, the fish are transferred to **tanks or net cages (nursery systems)**, where they grow until completing the **smoltification**—a **physiological transformation that prepares them for migration to saltwater**. At around 8–16 months of age, the juveniles are transferred to **grow-out systems in the open sea**, mainly in net cages, where they remain for approximately 12 to 24 months until they reach harvest weight.



Photo: Petter Fjeld, Wikimedia Commons

The **harvest** is carried out by concentrating the fish in the tanks, requiring careful handling. According to the [WelfareCheck profile of Atlantic salmon on the fair-fish database](#), processing includes **slaughter by asphyxiation, chilling on ice or the use of gas, followed by gill bleeding**. More humane methods use **mechanical (percussive) stunning followed by bleeding and immersion in ice-cold water (ice slurry), or electrical stunning followed by bleeding**.

Being naturally a cold-water species, **salmon is not commercially produced in Brazil**, but it is the country's most imported fish species, **with the majority coming from Chile — the world's second-largest producer**. Despite its commercial value, **salmon welfare is severely impacted** at several points in the production system, **especially during the grow-out phase in open-sea cages**. In these systems, fish are kept at **high densities, without access to substrate, and exposed to unpredictable environmental conditions** such as fluctuations in temperature, salinity and water quality, **in addition to being susceptible to diseases and parasites like sea lice**. These adversities directly compromise the animals' health, behaviour and zootechnical performance, and also represent significant environmental risks.

Below we present the main critical points and proposed improvements related to the welfare of Atlantic salmon in production, based on the work of Arechavala-Lopez and colleagues (2021)²⁸, updated data on international certifications applied to salmon production in Chile²⁹, and the public species profiles based on literature reviews and available on the open-access [fair-fish database](#)^{30,31}.



DOMESTICATION AND LINEAGES

Atlantic salmon is considered a highly domesticated species, as pointed out by researchers Teletchea and Fontaine²⁷, who highlight **the use of genetic improvement programs aimed at specific productive traits**. It is known that the techniques employed seek to maintain the health and growth of fish in intensive systems, but **they generally neglect issues related to animal welfare**. Although **advanced domestication contributes to efficient management, it does not eliminate challenges related to stress and living conditions in production systems**, especially in cages in the case of salmon.



HEALTH & WATER QUALITY

Maintaining water quality is a critical factor for salmon health, since inadequate parameters can lead to stress, disease development, and high mortality.

- Dissolved oxygen should be maintained at a concentration equal to or greater than 7 mg/L, monitored continuously.
- Temperature should remain within the range of 4–17.5 °C, which is suitable for the species.
- pH must be maintained between 6.8 and 7.9.
- Concentrations of ammonia and nitrite, which are toxic substances, must not exceed 0.012 mg/L and 0.1 mg/L, respectively.

In addition, **parasite control** — such as the **crustacean known as sea lice** — and **other diseases is essential**, since severe infestations cause skin lesions, discomfort, stress, and may lead to death. Practices such as chemical treatments, biological treatments, and integrated management are used to mitigate these problems, **but the use of certain substances such as pesticides and, above all, the excessive use of antibiotics in this context is a growing environmental and public health concern.**

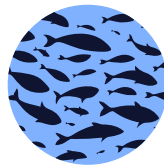


FEEDING

Salmon is a carnivorous species that requires a protein-rich diet for healthy development. **However, fishmeal or fish oil in feed can be partially replaced with more sustainable ingredients** such as plant proteins and algae oil — a strategy that should be adopted to reduce the environmental impact of salmon production.

Competition for feed, which is common at high stocking densities, can result in aggressiveness and stress. **Therefore, feed should be distributed at multiple points, in several meals per day, to ensure adequate consumption.**

Moreover, the amount of feed offered is crucial to avoid decreasing water quality, which directly affects fish health. **While lack of feed causes hunger, overfeeding combined with fish feces pollutes the water and ends up reaching the ocean from cage systems, also causing serious environmental impacts.**



SPACE & STOCKING DENSITY

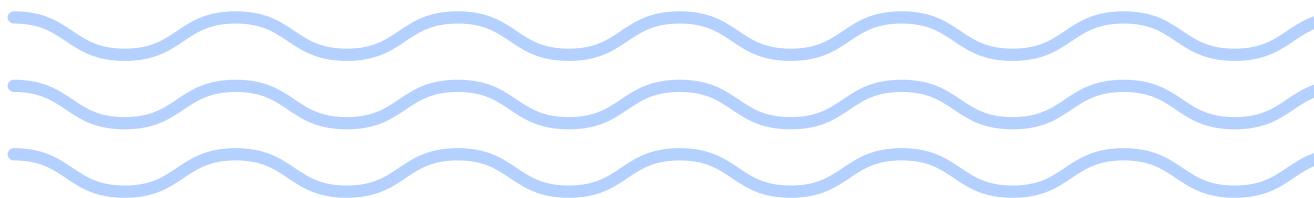
An important first aspect in terms of space and density is **to ensure a safe environment for salmon, protecting them from predators by using covers or nets, if necessary.**

In addition, population density in cages directly affects salmon behavior, health, and therefore welfare. **Very high densities generate stress and may increase the incidence of diseases**, thereby impairing growth, survival, and meat quality.

On the other hand, **very low densities affect the social behavior of the species, which forms shoals during migration, in addition to increasing aggressiveness, and are economically unfeasible.**

Thus, the recommendation is that **density be balanced to allow free swimming and the expression of typical behaviors such as shoaling. In the grow-out stage of salmon, which occurs in seawater, the maximum stocking density should not exceed 60 kg/m³.**

It is worth remembering that when it comes to farming systems, especially intensive and super-intensive ones, **the main concern must be to avoid densities far beyond those natural for the species.**





ENVIRONMENTAL ENRICHMENT

Salmon production systems, especially cages in the marine environment, are generally sterile and with little environmental variability. This lack of stimuli compromises fish welfare, hindering the expression of natural behaviors and favoring the expression of abnormal behaviors such as stereotypies or excessive aggressiveness. **Environmental enrichment is therefore a fundamental strategy to promote behavioral health and reduce stress levels in these animals.**

For salmon, a migratory and active-swimming species, it is essential to offer conditions that favor their natural activity patterns. **Artificial currents, for example, can be used to stimulate physical exercise through** continuous swimming, an essential behavior for welfare, growth, and development during the grow-out stage.

Providing bottom substrates is also important for the species, which uses gravel, pebbles, and stones as shelter and also for reproduction.

In addition, **providing structures that serve as shelters or offering some variability in environmental characteristics — such as varying water levels — can work well to enrich salmon environments**, helping reduce stress. **Adding suspended structures in the water (e.g., suspended plastic conduits) also helps improve fish welfare** and increases feed conversion rates.

Although adoption of these practices is still limited in the salmon industry, studies have shown that in addition to improving fish welfare, **environmental enrichment has the potential to improve zootechnical performance, reduce mortality rates, and increase disease resistance of the animals, bringing economic benefits to producers.**

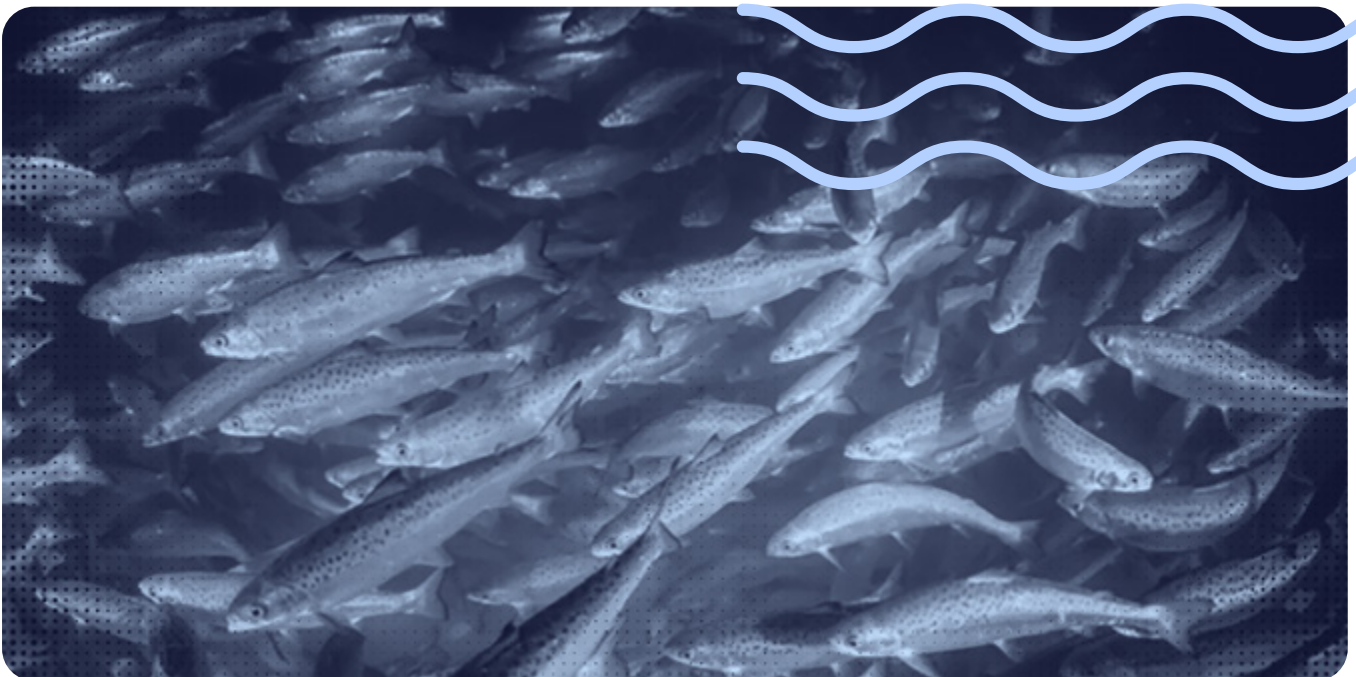


Photo: Ryan Hagerty/USFWS Wikimedia Commons



CAGE PRODUCTION: IMPACTS ON FISH WELFARE AND THE ENVIRONMENT

Cage production, predominant in salmon farming in Chile, presents significant environmental and animal welfare challenges. **The high concentration of fish in cages installed in natural environments limits the dispersion of production residues, such as medicines, uneaten feed, and feces, causing eutrophication and degradation of local marine ecosystems. The intensive use of antibiotics to prevent diseases is another environmental and public health concern, fostering bacterial resistance and contaminating natural environments.**

These conditions also affect fish welfare, subjecting them to chronic stress. Thus, **the industry faces growing pressure to adopt more sustainable practices, increasing transparency, and developing less impactful alternative systems.**

Another risk associated with salmon farming in cages is the accidental escape of fish into the natural environment. **In Chile, where Atlantic salmon is not native, escapes result in the introduction of an exotic, carnivorous, and territorial species (which aggressively defends territories) into new environments.** An iconic case was recorded in 2018, with the escape of nearly 700,000 fish, [according to Oceana](#) and the magazine [Panorama da Aquicultura](#). Escaped salmon compete for food and space with native species, may transmit diseases, hybridize with them, and become predators of species not naturally adapted to this threat. Therefore, **strict control of containment structure integrity is essential to prevent escapes and their ecological impacts.**



HANDLING & TRANSPORTATION

Handling during harvest and salmon transportation requires care to minimize stress, injuries, and mortality. **Salmon become highly stressed with water level reduction, overcrowding, loading and pumping, as well as confinement conditions.**

In this scenario, **team training is a crucial first step to ensure procedures that guarantee better animal welfare**, with special attention to fish handling, which should be performed for the shortest possible time, **and using anesthetics if air exposure exceeds 15 seconds.**

In addition, stress during transportation can compromise fish immunity, increasing infection risks and also affecting final product quality. Therefore, **transport must be carried out in water of high quality — especially regarding dissolved oxygen levels — with lower densities and for the shortest possible duration.**



STUNNING & SLAUGHTER

Humane techniques must ensure rapid and effective stunning (unconsciousness), followed by immediate slaughter to prevent possible recovery of consciousness before death.

Currently, recommended methods include electrical stunning or percussive (mechanical) stunning, which must render fish unconscious within a few seconds, followed by gill bleeding, and, in the case of percussive stunning, also immersion in ice-cold water.

Traditional practices such as asphyxiation by air exposure or direct immersion in ice/cold water are inadequate, even when followed by gill bleeding, since they prolong animal suffering.

Adopting ethical protocols is important not only for animal welfare but also to meet the requirements of markets that value responsible production. **Continuous research aims to improve techniques and make their large-scale implementation feasible on farms.**

“In the past two years, the Certified Humane® animal welfare certification standard for Atlantic salmon has made it possible to standardize procedures and ensure the welfare of millions of animals produced annually, at critical points such as stocking densities, water quality, population traceability, out-of-water handling, transport, and slaughter. Brazil, as a major partner of the Chilean salmon industry, can now purchase differentiated products, allowing consumers to make conscious purchases of products that guarantee better animal welfare practices.”

Dr. Daniel Santiago Rucinke Gonzalez
Veterinarian, Partner at Fish Welfare Solutions,
and Member of Alianima’s Fish Advisory Board



ANIMAL WELFARE CERTIFICATION: CERTIFIED HUMANE STANDARD FOR ATLANTIC SALMON AND ITS IMPACTS ON THE BRAZILIAN MARKET

In 2024, [Certified Humane](#) launched the first specific welfare certification standard for Atlantic salmon production, considering the particularities of Chile, the world’s second-largest exporter of the species. This standard establishes strict criteria for management, transport, and slaughter, promoting practices that aim to ensure fish health and better welfare conditions throughout the whole production cycle, in addition to mitigating negative environmental impacts. **Brazil, as a significant consumer market for Chilean salmon, already has companies that adopted this certification this year.**

In addition to this initiative, **other international certifications such as [ASC](#) (Aquaculture Stewardship Council) and [BAP](#) (Best Aquaculture Practices) incorporate welfare criteria into their protocols for Atlantic salmon.** The adoption of these certifications adds value to the final product, expands access to demanding markets, and responds to growing consumer demand for more ethical and sustainable practices. **The presence of these certification labels helps raise aquaculture standards and can be a strategic tool to differentiate products in both domestic and international markets.**

6. FISH WELFARE AS A VALUE STRATEGY IN THE SECTOR*



CERTIFICATION AND ACCESS TO INTERNATIONAL MARKETS

The incorporation of animal welfare as a strategic component in the aquaculture value chain has become increasingly evident, particularly in light of changes in consumption preferences, the intensification of international regulations, and the consolidation of certification systems. **The aquaculture sector, historically focused on productivity and technical efficiency, now faces a growing demand for more ethical and sustainable practices, with direct implications for product valuation in the market.**

In this context, **fish welfare is no longer seen merely as an external requirement and increasingly constitutes a competitive differentiator and a tool for accessing more demanding markets.**

“With the vast variety of products, consumers can now choose between animal protein and new alternatives. Thus, it seems clear that the only way for aquaculture producers to remain viable in this market is by offering high-quality products focused on animal welfare. In the context of global markets, such as the European Union, which has already introduced minimum welfare standards, exporting to these countries will require that welfare be an essential part of production, including the proper certifications. Considering this scenario, pursuing the enhancement of fish welfare standards in Brazilian aquaculture is an irreversible, necessary, and indispensable trend.”

Prof. Dr. Leonardo José Gil Barcellos

Veterinarian, Professor at UPF, and
Member of Alianima’s Fish Advisory Board

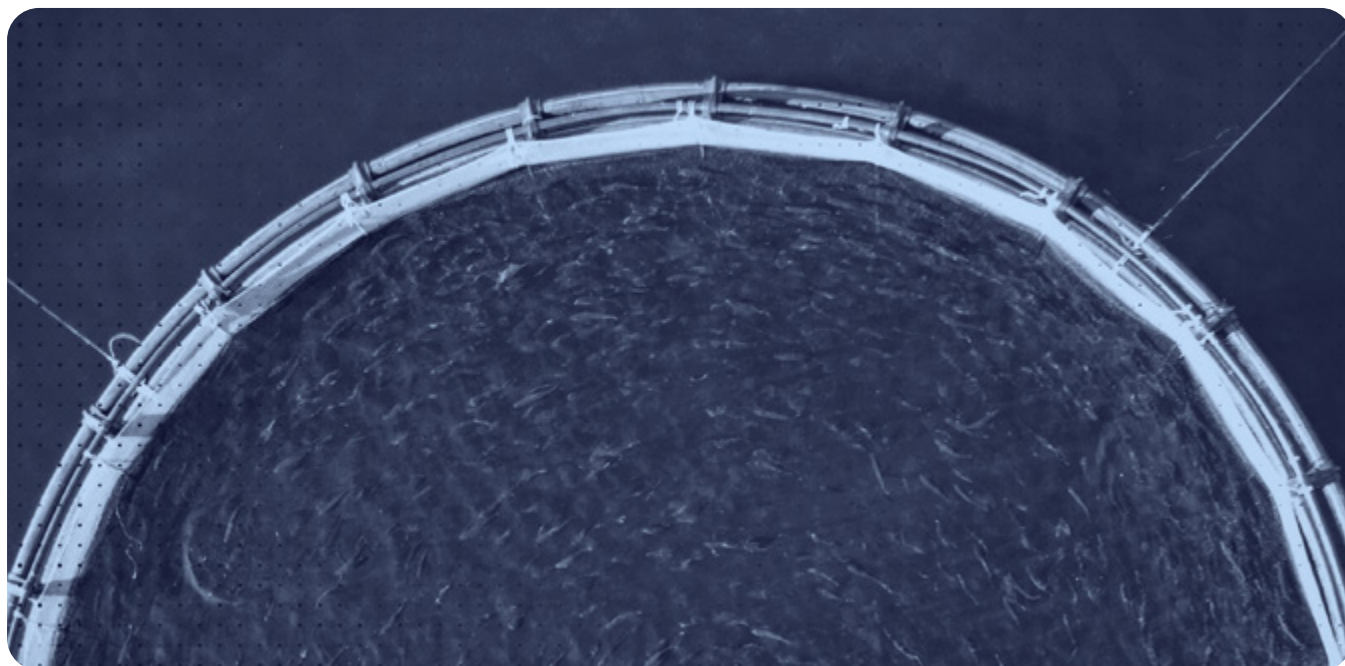


Photo: Pexels

*The content presented here is based on the article “O bem-estar animal na aquicultura e o acesso ao mercado internacional,” published in *Panorama da Aquicultura* magazine.

Certification systems for animal welfare, widely developed in Europe and the United States, are also expanding in Latin America, with initiatives that take into account the specificities of local production. **In Brazil, a relevant milestone was the development of the welfare assessment protocol for Nile tilapia.** The first protocol for the species was proposed at the end of 2020 by Pedrazzani and collaborators³², initially focused on the grow-out phase and, more recently, updated and expanded to also cover the reproduction and larviculture phases³³. **The protocol is based on four categories of indicators – health, nutrition, environment, and behavior – and allows continuous, practical management adaptable to field realities.**

To facilitate its application, **the [Tilapia Welfare App](#) was launched by [FAI Farms](#), which digitizes the data and provides producers with the ability to monitor animal welfare in real time**, promoting ongoing corrections and improvements.

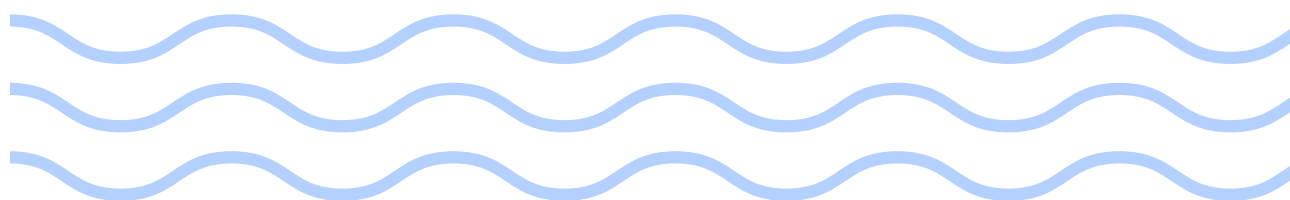
Recently, other important advances in Latin America, already presented in this report, have contributed to consolidating the topic in the region. **In 2024, a welfare certification standard specific to Atlantic salmon was launched, aimed at the Chilean context. In addition, this year the standard specific to Nile tilapia welfare certification in Brazil came into effect, officially published in Portuguese**, reinforcing the country's alignment with international standards and facilitating the engagement of national producers in the certification process. **These regulatory instruments provide not only technical guidance but also market credibility.**

From a commercial perspective, animal welfare certification functions as a tool for differentiation and value addition. **Internationally recognized labels validate that the product meets higher criteria in terms of animal welfare, making it more attractive to high-standard markets.** Importing countries, especially in the European Union, have adopted policies that prioritize the purchase of certified products or those originating from production systems that meet minimum animal welfare criteria.

Even though such requirements are not yet uniformly consolidated in sanitary agreements, there are already legal precedents for their adoption as justifiable technical barriers, including within the scope of the [World Trade Organization \(WTO\)](#).

The WTO recognizes that animal welfare can be incorporated into multilateral agreements as part of the production process, especially when related to labeling, protection of public morals, or the defense of local producers. In other words, **even if an export is not formally “blocked” due to issues directly related to fish welfare, the absence of evidence of good practices may affect its competitiveness, influencing purchasing decisions and impacting access to strategic markets.**

On the other hand, compliance with these requirements can represent a significant differentiator: **consumers are increasingly willing to pay more for products they consider ethical, transparent, and sustainable.**



“Animal welfare certification is a market-based solution. The producer gains access to strict and clear management criteria for welfare in production, traceability control, and consequently, the opportunity to receive a certification label that communicates their achievement to the consumer. The presence on supermarket shelves of a value-added product provides the consumer with the choice to purchase in favor of animal welfare. In Brazil and abroad, the availability of a wide variety of animal-derived products, such as meat, milk, eggs, and derivatives, reflects market demand. In some countries, such as the United Kingdom and Chile, this already occurs with aquaculture products, such as salmon certified with a welfare label.”

Prof. Dr. Rosangela Poletto

Veterinarian, Professor at IFRS-Campus Sertão, and Member of the Certified Humane Scientific Committee



Another fundamental aspect in this scenario is the sector’s engagement with the possibilities of fish certification in the Brazilian context. For animal welfare certification to be accepted and valued by consumers and international markets, it needs to be based on robust technical criteria and transparent processes. **It is essential that certification schemes are auditable, regularly updated, and grounded in clear scientific evidence.**

The credibility of the system also depends on the independence of certifiers, that is, the absence of financial ties with the evaluated companies, which prevents conflicts of interest and ensures trust in the audits^{34,35}.

Furthermore, **protocols should be publicly accessible and include clear criteria to identify non-compliances in critical points such as water quality, stocking density, and slaughter methods, for example.** The adoption of these criteria allows corrective actions to be applied objectively, strengthening the technical management of production.

This level of technical rigor is particularly important in a sector still undergoing institutional maturation, such as fish farming. **Leading the development and application of these welfare certification standards represents a strategic advantage for the country, enabling it to anticipate future regulatory requirements.**



PRODUCTIVITY GAINS AND VIABLE PRACTICES

Despite these advances, it is still common for many producers in the sector to perceive requirements related to animal welfare as synonymous with increased costs and bureaucracy. However, **several studies have shown that simple, cost-effective practices can significantly improve fish welfare, with direct positive impacts on productivity.**

In the case of tilapia, for example, the use of simple environmental enrichments, such as bamboo structures or those that artificially mimic water hyacinths, results not only in better welfare for these fish but also in improved growth and/or gains in meat quality, with firmer fillets and better commercial appearance^{38,39}. **Such outcomes represent real economic benefits, including the reduction of losses due to mortality and discards, thereby enhancing production profitability.**

The importance of strategic anticipation cannot be underestimated. With the expansion of Brazilian tilapia farming and the growing interest in exports, **establishing minimum welfare standards – aligned with best practices and international regulations – is an indispensable condition for the sustainability and growth of the sector.** The publication of technical manuals by MAPA^{24,36,37} was an important step in this scenario, but **it is necessary to consolidate a favorable regulatory environment, as well as to invest in producer training.**

“Technical training of producers and companies is fundamental for Brazilian aquaculture to reach international production and animal welfare standards. With the increasing demands of markets such as the European Union and North America, mastering specific protocols and good practices has become a competitive differentiator. Online and in-person courses, such as those offered by FAI Farms, for example, allow professionals at different levels to acquire up-to-date and practical knowledge on humane management, nutrition, and ideal environmental conditions.”

Dr. Ana Silvia Pedrazzani

Veterinarian, CEO of Wai Ora Aquaculture and Environmental Technology, and Member of Alianima's Fish Advisory Board



TECHNICAL TRAINING AS A PILLAR FOR THE SUCCESS OF WELFARE PRACTICES

For the effective adaptation of production to the standards prescribed for a high level of animal welfare, **it is essential to invest in the technical training of the various links in the production chain, including input-supplying companies, such as feed manufacturers, as well as the producers themselves.** Continuous improvement in management, water quality, feeding, structuring of the aquatic production environment, and transportation and slaughter procedures only becomes a reality with well-trained teams informed about best practices and the scientific foundations of welfare.

This training is crucial to ensure that protocols do not remain merely on paper but are incorporated into daily routines, guaranteeing better health, growth, development, and welfare of the fish, as well as enhancing the quality of the final product and competitiveness in the international market. In this context, the use of new digital technologies can be an interesting tool to facilitate the process.

7. ALIANIMA'S WORK

The welfare of aquatic animals used in aquaculture and fisheries is still a topic with little visibility and, as previously mentioned, scarce regulation in Brazil. In this context, **Alianima has established itself as one of the few Brazilian civil society organizations working continuously and strategically on this agenda.**

Since the beginning of its work on this topic in 2020, the organization has sought to build bridges between science, public policies, and the production sector, always focusing on the promotion of evidence-based good practices and technical dialogue.

“It is highly recommended to strengthen engagement with the industry so that the development and implementation of new technologies in the field of welfare are carried out smoothly, in close contact with the realities of aquaculture production. However, given the complexity and sensitivity of the animal welfare field, it is also imperative that this implementation be tested and validated through rigorous scientific processes. It is therefore urgent to consolidate collaboration with aquaculture companies in this area so that the sector can keep pace with international best practices.”

Prof. Dr. João Luis Saraiva

Biologist, President of the FishEthoGroup Association, Researcher at the Centre of Marine Sciences – CCMAR (Portugal), and Member of Alianima's Fish Advisory Board



ONGOING AND STRENGTHENING INITIATIVES

In this new cycle of action, many initiatives developed by Alianima represent extensions of efforts previously undertaken. We highlight below four key initiatives that continue to influence the organization's work:

- **Member of the [Aquatic Animal Alliance \(AAA\)](#)**, an international coalition coordinated by the [Aquatic Life Institute \(ALI\)](#), which currently brings together around 160 organizations worldwide and has the mission of promoting welfare and reducing suffering of aquatic animals.
- **The [Fish Sentience Declaration](#) (2021)**, signed by more than 40 experts, which scientifically supports the capacity of these animals to feel and the need for public policies and specific practices to improve their welfare conditions.
- **[Technical note](#) submitted to the Ministry of Fisheries and Aquaculture (MPA)**, advocating for the establishment of specific standards for humane slaughter of fish in Brazil, currently absent in MAPA Ordinance 365/2021.
- **The booklet [How to Assess and Improve Tilapia Welfare](#)**, presenting the main foundations, critical points, and proposals for improving the welfare of the main species produced and exported in Brazil.



POLITICAL ENGAGEMENT AND COLLABORATION WITH PUBLIC AUTHORITIES

Alianima has expanded its presence in the public and institutional debate around the welfare of aquatic animals. **Between 2024 and 2025, the organization actively participated in public consultations organized by various federal agencies, providing technical contributions for the inclusion of welfare guidelines in regulations related to fisheries and aquaculture.**

In addition, the organization has maintained technical dialogue with representatives of the National Congress and the Executive Branch, systematically attending meetings of the Sectoral Chamber for Fish Production and Industry and monitoring the activities of CONAPE (National Council for Aquaculture and Fisheries). **The organization also seeks to collaborate with the [Aquaculture Multipliers program](#), promoting the inclusion of animal welfare in sector discussions.**

Alianima has also engaged in technical and legal discussions with the NGO [Oceana](#) regarding the [Bill establishing the Sustainable Fisheries Development Policy](#), currently under consideration in the Federal Senate. The objective is to include general fish welfare guidelines in the Brazilian fisheries legal framework, taking into account the specificities of the text and the different Brazilian contexts. Alianima will work, through dialogue with parliamentarians, to include these points in the legislation.



PRODUCTION OF TECHNICAL MATERIALS AND DISSEMINA- TION OF BEST PRACTICES

The production of technical and educational materials aimed at producers, retailers, or other potential stakeholders in the industry is one of Alianima's central strategies to expand access to qualified information on the topic.

In 2025, the organization launched the [Tilapia Welfare Commitment Guide](#). The content was developed through a collaborative and technical process, with contributions from Alianima's Fish Advisory Board, the [Aquatic Animal Alliance](#) (AAA), and other partner organizations. **The guide establishes fundamental items for the commitment, including stocking density limits, recommendations for dissolved oxygen saturation in the water, and maximum concentrations of ammonia and nitrite (toxic substances for fish), as well as the need to protect production systems from potential predators, particularly in the case of fry.**

Furthermore, the guide also presents other important suggested items, involving the adoption of environmental enrichment practices, the prohibition of antibiotics for prophylaxis, the reduction of fishmeal and fish oil in feed, and some specific recommendations regarding the transportation of animals for slaughter.





TRAINING, CORPORATE RELATIONS, AND CERTIFIERS

The promotion of best practices depends largely on the training and engagement of actors involved in the production chain. Therefore, **Alianima has offered lectures, training sessions, and specialized technical support for the aquaculture sector, both in Brazil and in Latin American countries.**

A highlight of this cycle was **the technical training provided to the team in Paraguay responsible for a conservation project at the [Itaipu Binacional](#) hydroelectric plant.** The project involves the production of thousands of fish, which are sold to producers or directly to consumers to minimize the impact on these animals and the environment in the region.

The training covered from basic aspects of sentience to practical recommendations for improvements in stocking density, environmental structuring, transportation, and fish slaughter

“It was an excellent introduction to the topic, explained with very illustrative examples.”

Maria Eugenia Alderete

Environmental Engineer – ITAIPU Binacional (Paraguay)

In the field of corporate relations, the organization has maintained dialogue with companies, retail networks, and certifiers, always seeking to provide technical support on fish welfare issues in production. **Alianima encourages companies to adopt tilapia welfare commitments and to implement rigorous and clear fish welfare criteria in certification protocols.**

Small Changes, Big Impacts: How about making a commitment to tilapia welfare? Producers and retailers can make a difference!

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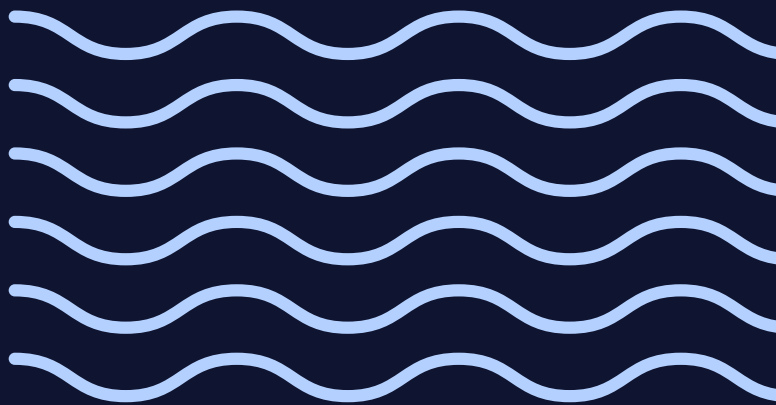
SUPPORT FOR CIVIL SOCIETY AND SCIENTIFIC DISSEMINATION

In addition to its direct actions on social media and national media, Alianima collaborates with initiatives from other civil society organizations. One example is **its support for the “[Stop the Plastic Tsunami](#)” campaign by the NGO [Oceana](#), which highlights the impacts of plastic pollution on aquatic ecosystems and their inhabitants.**



8. CONCLUSION

This year's report provides clear evidence that fish welfare in Brazilian aquaculture is a strategic agenda for the sector, going beyond important ethical considerations for animals and also impacting competitiveness, sustainability, and access to international markets. The main points supporting this vision and indicating the way forward are highlighted below:



1. Animal Welfare as a Competitive Differentiator

- Global markets, especially the European Union and North America, are already requiring strict animal welfare standards for the import of fish such as tilapia.
- Internationally recognized certifications add value to products and expand export opportunities.
- Consumers are increasingly willing to pay more for products that are ethical, more sustainable, and transparent.

2. Technical Advances for Fish Welfare

- Specific scientific protocols suitable for tilapia and salmon guide practices based on indicators of health, feeding, densities, environment, and behavior.
- Accessible practices, such as setting limits for stocking densities and rigorous control of water quality, promote improvements in animal welfare and benefits for production and the quality of the final product.
- Technical training and the use of digital technologies facilitate continuous monitoring and effective implementation of recommended practices.

3. Challenges and Opportunities for the Sector

- It is essential to consolidate a regulatory environment that recognizes and values animal welfare in fish farming and fisheries.
- Effective engagement of producers, retailers, and certifiers, supported by training and technical dialogue, is the next essential step to transform fish welfare commitments into consolidated and continuous practices.

FINAL PERSPECTIVE

Animal welfare represents a unique opportunity for the Brazilian fish industry, especially in tilapia production and salmon trade, to advance in ethics, quality, sustainability, and global integration. The work of Alianima and the various actors in the production chain lays the foundation for consistent and lasting progress. The future of fish farming is directly linked to the incorporation of fish welfare as a central pillar, ensuring responsible, valued products that are aligned with international demands.



Photo: iStock

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10. GLOSSARY

Air exposure time

Time during which the fish remains out of the water. It should be minimized to reduce stress and suffering.

Animal welfare certification

Formal assessment process based on technical and scientific criteria to ensure that fish production follows practices that guarantee better animal welfare conditions.

Antimicrobials

Medications used to inhibit the growth of or eliminate pathogenic microorganisms, such as bacteria.

Aquaculture

Controlled production of aquatic organisms (including fish, crustaceans, mollusks, and aquatic plants) for human consumption or other purposes.

Aquaculture Multipliers

Program aimed at training and disseminating best practices in the aquaculture sector.

Bacterial resistance

Occurs when microorganisms evolve and stop responding, or respond less, to antimicrobial treatments. The phenomenon is accelerated by excessive and/or inappropriate use of antibiotics.

Bleeding

Slaughter method in which the animal's gills are cut to drain blood.

Bycatch

Unintentional capture of non-target species or individuals during fishing operations, often discarded dead or injured.

Cação

Popular commercial term in Brazil applied to various cartilaginous fish from the elasmobranch group (which includes sharks and rays).

Carnivorous

Animal that feeds exclusively on the flesh of other animals. Salmon is a carnivorous species.

Death by asphyxia

Occurs when the fish is removed from water and can no longer obtain oxygen through its gills, leading to loss of consciousness and death after a prolonged period, which varies by species.

Environmental enrichment

Addition of elements to the production environment to stimulate natural behaviors and improve the animals' welfare.

Ethology

Science that studies animal behavior, seeking to understand the physiological and neurological mechanisms underlying these behaviors, how they develop, their functions, and how they evolved.

Eutrophication

Imbalance caused by excess nutrients in the water (from feed, feces, and medications, for example), promoting abnormal algae growth and impairing water quality.

Excavated pond

Type of pond that is excavated in the soil (such as tanks or artificial lagoons) used for fish production.

Fish farming

Fish production in controlled environments, such as ponds or net cages, for commercial or subsistence purposes.

Fry

Early developmental stage of fish, occurring soon after egg hatching. Fry are small, vulnerable, and require special care.

Genetic editing

Technology that allows alteration of an organism's DNA. It is used to improve productive traits but raises ethical and animal welfare concerns.

Ghost fishing

Accidental capture of animals by fishing gear abandoned or lost at sea, such as nets and lines.

Grow-out (production phase)

Final stage of fish rearing, in which animals grow until harvest weight, usually in systems such as net cages, excavated ponds, or RAS (Recirculating Aquaculture Systems).

Harvesting

Procedure for removing fish from tanks or ponds at the end of the production cycle. It may involve draining ponds or using nets.

Humane slaughter

Slaughter method that minimizes pain and suffering of the animal, ensuring a rapid death while the animal is unconscious.

Hybridization

Process by which individuals from different species (or distinct subspecies) crossbreed, generating hybrid offspring, normally infertile. It can affect biodiversity and pose risks to the balance of aquatic ecosystems.

Larviculture

Initial stage of fish production in which larvae are cared for and managed — the phase immediately after egg hatching. It is considered a critical stage, as larvae are typically very sensitive to environmental variations and management failures.

Lineage (genetics)

Group of animals with specific genetic characteristics, usually selected through genetic improvement. Example: Chitralada and GIFT lineages in tilapia.

Microalgae

Microscopic organisms present in aquatic environments. They can be used as an alternative and sustainable source of nutrients in fish feed.

Net cage

Submerged cage-like structure installed in water bodies, which are used for fish production in natural environments such as rivers, lakes, and reservoirs.

Nursery (production phase)

Production stage in which young fish (fry) are kept in a controlled environment to grow until reaching a size suitable for the grow-out phase.

Omnivorous

Animal that feeds on both plant and animal sources. Tilapia is an omnivorous species.

Operculum

Bony structure that protects the gills of fish.

Overcrowding / High stocking density

Excessive number of fish in a limited space, compromising their health and welfare.

Periphyton

Set of microorganisms and particles that grow attached to submerged surfaces. It can serve as a natural food source for fish.

RAS (Recirculating Aquaculture System)

Closed fish farming system with water recirculation, allowing greater control and lower external environmental impact.

Seafood

The term is used to designate fish and other aquatic animals (shrimp, octopus, oysters, lobsters, etc.) intended for human consumption.

Sea lice

Parasite (crustacean) that attaches to the skin of fish, causing wounds, stress, and even death. It is a common problem in open-sea salmon farming.

Sentience

Ability of an organism to feel, experience, or perceive something through its senses; refers to the capacity to feel basic emotions such as pain, fear, or pleasure.

Set netting

Passive fishing gear, also known as gillnets, which remain in the water waiting for fish to swim into them and become trapped by their gills, body, or fins. This type of net can be positioned at the surface, in the water column, or near the bottom, depending on the target species.

Sex reversal

Technique used to modify the sex of fish, usually through medicated feed to produce predominantly male populations.

Smoltification

Physiological process in salmon preparing it to migrate from freshwater to seawater.

Social hierarchy (among fish)

Social organization in which some individuals establish themselves as dominant while others as submissive, usually through aggressive confrontations.

Stereotypies

Repetitive behaviors with no apparent function, common in animals kept in poor or stressful environments. They indicate welfare problems.

Stocking density

Number of fish kept per unit of volume or area in aquaculture production systems.

Stunning

Process aimed at rendering the animal unconscious before slaughter, avoiding unnecessary suffering.

Superbugs

Microorganisms, primarily bacteria, have developed resistance to multiple antibiotics, making infections difficult to treat.

Sustainability

Practice aimed at balancing production, social justice, environmental protection, and animal welfare, promoting responsible use of resources.

Trawling

Fishing method in which a large net is pulled by vessels, sweeping the bottom or the water column to capture large quantities of fish and other aquatic organisms.

Water bodies

Natural or artificial environments that accumulate or convey water, such as rivers, lakes, reservoirs, and ponds.



11. CONTACT

Join this great movement in favor of animals!

If your farm or company wishes to obtain additional information about our work or clarify specific questions related to animal welfare, please contact us through the following channels:



Instagram
@alianima.br



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@alianima



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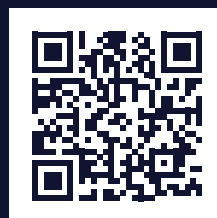
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