



fish watch 2024

SOURCE: ISTOCKPHOTO

SUMMARY

1. ABOUT ALIANIMA.....	3
2. ABOUT ANIMAL WATCH	4
2.1 ABOUT FISH WATCH.....	5
3. INTRODUCTION.....	6
3.1 FISH FEEL	6
3.2 FISH PRODUCTION IN BRAZIL: CURRENT SCENARIO.....	9
3.2.1 FISH FARMING	9
3.2.2 FISHING.....	16
4. FISH WELFARE.....	18
4.1 CRITICAL POINTS IN FISH FARMING.....	18
4.2 PROPOSAL FOR IMPROVEMENTS IN FISH FARMING.....	26
4.3 CRITICAL POINTS IN FISHERIES	34
4.4 PROPOSAL FOR IMPROVEMENTS IN FISHERIES.....	39
4.5 LEGISLATION.....	44
5. ALIANIMA’S WORK.....	45
6. CONCLUSION	50
7. CONTACT.....	52

1. ABOUT ALIANIMA

Alianima is a non-profit organization that works closely with food industry leaders to identify and address key challenges faced by the animal production chain. We offer partnerships, consultancy and free technical support to companies committed to improving animals' living conditions, helping to implement sustainable practices and improved animal welfare.

We have a specialized technical team, which bases all its actions and materials on technical-scientific data. Our goal is to encourage an industry that is more attentive to and concerned about animal suffering, and to foster consumers who are more informed about the origin of their food, promoting critical and conscious consumption.

Find out more about our work at alianima.org.



SOURCE: ISTOCKPHOTO

2. ABOUT ANIMAL WATCH

In recent years, technological advances in access to information have aligned with growing concerns about health, the climate crisis, and animal abuse. These factors have driven the search for more knowledge about the origin of food, as well as the ethical principles practiced by the food industry.

The public announcement of animal welfare commitments by almost 200 companies in the food and hospitality sectors in Brazil has impacted the entire supply chain, mainly due to the definition of deadlines for their implementation, serving as catalysts for change.

In this context, Animal Watch, a platform developed by Alianima, aims to make visible the public commitments towards animal welfare of companies operating in the country, in addition to facilitating the monitoring of the transition process of these companies by civil society, so that the commitments are, in fact, fulfilled.

The platform also offers information and news about our work and the reality of the food production chain, highlighting the industry's role in promoting significant changes in the treatment of animals, with the aim of encouraging more critical and conscious consumption.



2.1 ABOUT FISH WATCH

The fish industry is a complex sector that includes both fish production (fish farming) and the fishing of these aquatic animals (fishery), involving hundreds of different species, each one with their own needs and natural behaviors. While this is a growing economic activity, there is insufficient consideration of fish in terms of their health and welfare.

In this sense, this first Fish Watch report provides an overview of the main aspects of fish welfare, highlighting critical points in both fish farming and fisheries. We present the main bottlenecks in this scenario, as well as proposals for improving animal welfare in the sector.

Furthermore, the report presents the Brazilian legislative scenario regarding the fish industry, as well as a national overview of the farming and fishing of these aquatic animals, emphasizing the importance of improving their welfare conditions and, therefore, of companies making public commitments in the near future.

“The Ministry of Fisheries and Aquaculture supports initiatives such as Alianima’s creation of the Fish Watch, so that producers and other components of the fish production chain, consumers, technicians, researchers, representatives of the government and of the third sector can discuss the various aspects of the sustainability of fishing and aquaculture, such as the issue of animal welfare; since the use of aquatic animals in farming brings with it an ethical responsibility to guarantee their welfare, promoting the sustainable development of aquaculture, as well as the safety and competitiveness of its products.”

Tereza Nelma da Silva Porto Viana Soares

National Aquaculture Secretary of the Ministry of Fisheries and Aquaculture

SOURCE: MARIO AGRA/CÂMARA DOS DEPUTADOS



**fish
watch**

3. INTRODUCTION

3.1 Fish Feel

The recognition of sentience is observed much more easily for animal species that present human-like similarities. As fish, on the other hand, display distinct facial and body expressions and live in a very different environment, – the aquatic one – they end up being neglected as individuals capable of feeling and/or suffering.

However, there is **clear anatomical, physiological, behavioral, evolutionary and pharmacological scientific evidence indicating that fish can feel pain, fear and other emotions**, just like other animals¹.



SOURCE: PIXABAY / UNSPLASH

¹ Pedrazzani AS, Fernandes-de-castilho M, Carneiro PCF, Molento C (2007). Bem-estar de peixes e a questão da sentiência. Archives of Veterinary Science, 11: 60-70

Although fish don't have a cerebral neocortex, its absence does not prevent them from experiencing affective states². Fish have all the necessary structures that allow them to detect painful stimuli, transmit this information to the brain^{3,4,5} and react through a series of complex behaviors.

While experiencing pain, fish exhibit abnormal behaviors, such as scraping the affected area of their body against substrates or rocks, and stopping feeding. They are also able to learn to avoid painful stimuli. **These are indicative of conscious reactions to potentially harmful stimuli**^{6,7}.

Additionally, fish have incredible cognitive abilities, such as:

- Good long-term memory^{8,9}
- Building nests and other complex structures with different functions¹⁰
- Tool use to obtain food¹¹
- Self-recognition ability¹²

2 Low P, Panksepp J, Reiss D, Edelman D, Van Swinderen B, Koch C (2012). "The Cambridge Declaration on Consciousness". Francis Crick Memorial Conference on Consciousness in Human and non-Human Animals. Cambridge, UK: Churchill College, University of Cambridge.

3 Sneddon LU, Braithwaite VA, Gentle MJ (2003). Do fishes have nociceptors? Evidence for the evolution of a vertebrate sensory system. *Proceedings of the Royal Society B*, 270: 1115-1121.

4 Dunlop R, Laming P (2005). Mechanoreceptive and nociceptive responses in the central nervous system of goldfish (*Carassius auratus*) and trout (*Oncorhynchus mykiss*). *The Journal of Pain*, 6: 561-568.

5 Braithwaite VA, Boulcott P (2007). Pain perception, aversion and fear in fish. *Diseases of Aquatic Organisms*, 75: 131-138.

6 Sneddon LU (2009). Pain perception in fish: Indicators and endpoints. *ILAR Journal*, 50: 338-342.

7 Sneddon LU (2015). Pain in aquatic animals. *Journal of Experimental Biology*, 2018: 967-976.

8 Csányi V, Csizmadia G, Miklosi A (1989). Long-term memory and recognition of another species in the paradise fish. *Animal Behaviour*, 37: 908-911.

9 Triki Z, Bshary R (2020). Long-term memory retention in a wild fish species *Labroides dimidiatus* eleven months after an aversive event. *Ethology*, 126: 372-376.

10 Bessa E, Brandão ML, Gonçalves-de-Freitas E (2022). Integrative approach on the diversity of nesting behaviour in fishes. *Fish and Fisheries*, 23: 564-583.

11 Brown C (2012). Tool use in fishes. *Fish and Fisheries*, 13: 105-115.

12 Kohda M, Bshary R, Kubo N, Sogawa S (2023). Cleaner fish recognize self in a mirror via self-face recognition like humans. *Anthropology*, 120: e2208420120.

“Awareness of fish sentience, that is, their ability to suffer, feel pain and perceive other emotions, both positive and negative, is not widespread in the fish industry. Despite the growing scientific evidence of the presence of sentience in fish, many people who deal with these animals daily don’t have this perception. Therefore, education about the behavior of this animal group is essential for people who work in the aquaculture sector.”

Professor Dr. Eliane Gonçalves de Freitas

Biologist, Professor of Animal Behavior at Unesp and
Member of the Fish Advisory Board at Alianima



These aquatic animals evolved in natural environments, developing their own adaptations, behaviors and relevant survival mechanisms¹³. However, **under farming systems or fishery situations, they are exposed to very different conditions**. Given the several production phases in different aquaculture systems, fish are inevitably subjected to various acute and chronic stressors¹⁴.

In aquaculture, it is common to find problems of restricted space, stocking densities higher than natural levels, monotonous environments, handling and transportation problems, among other stressors to which fish are not naturally adapted¹⁵. Furthermore, **slaughter is a critical moment** in terms of animal welfare, **but it often ends up being carried out inadequately**, causing a lot of stress and suffering for these aquatic animals. Therefore, the need to improve fish welfare conditions becomes evident.

13 Helfman G, Collette BB, Facey DE, Bowen BW (2009). The diversity of fishes: Biology, evolution, and ecology. John Wiley & Sons: Hoboken, USA.

14 Lefevre F, Cos I, Pottinger TG, Bugeon J (2016). Selection for stress responsiveness and slaughter stress affect flesh quality in pan-size rainbow trout, *Oncorhynchus mykiss*. Aquaculture, 464: 654-664.

15 Ashley PJ (2007). Fish welfare: Current issues in aquaculture. Applied Animal Behaviour Science, 104: 199-235.

3.2 Fish Production in Brazil: Current Scenario

3.2.1 Fish Farming

The aquaculture sector has been growing worldwide over the years. **In 2022, for the first time in history, the production of aquatic animals in aquaculture exceeded that of fisheries**, reaching a total of 94.4 million tons, which represents 51% of the world total¹⁶. This industry is growing at an average rate of 5.3% per year¹⁷, with a global estimate of 46.3% increasing by 2030¹⁸.

Fish represent 56% of all animal protein sources traded internationally, thus surpassing other protein sources from production animals, such as pigs, cattle, and chickens¹⁹.



¹⁶ FAO (2024). The State of World Fisheries and Aquaculture 2024: Blue Transformation in action. Rome, Italy.

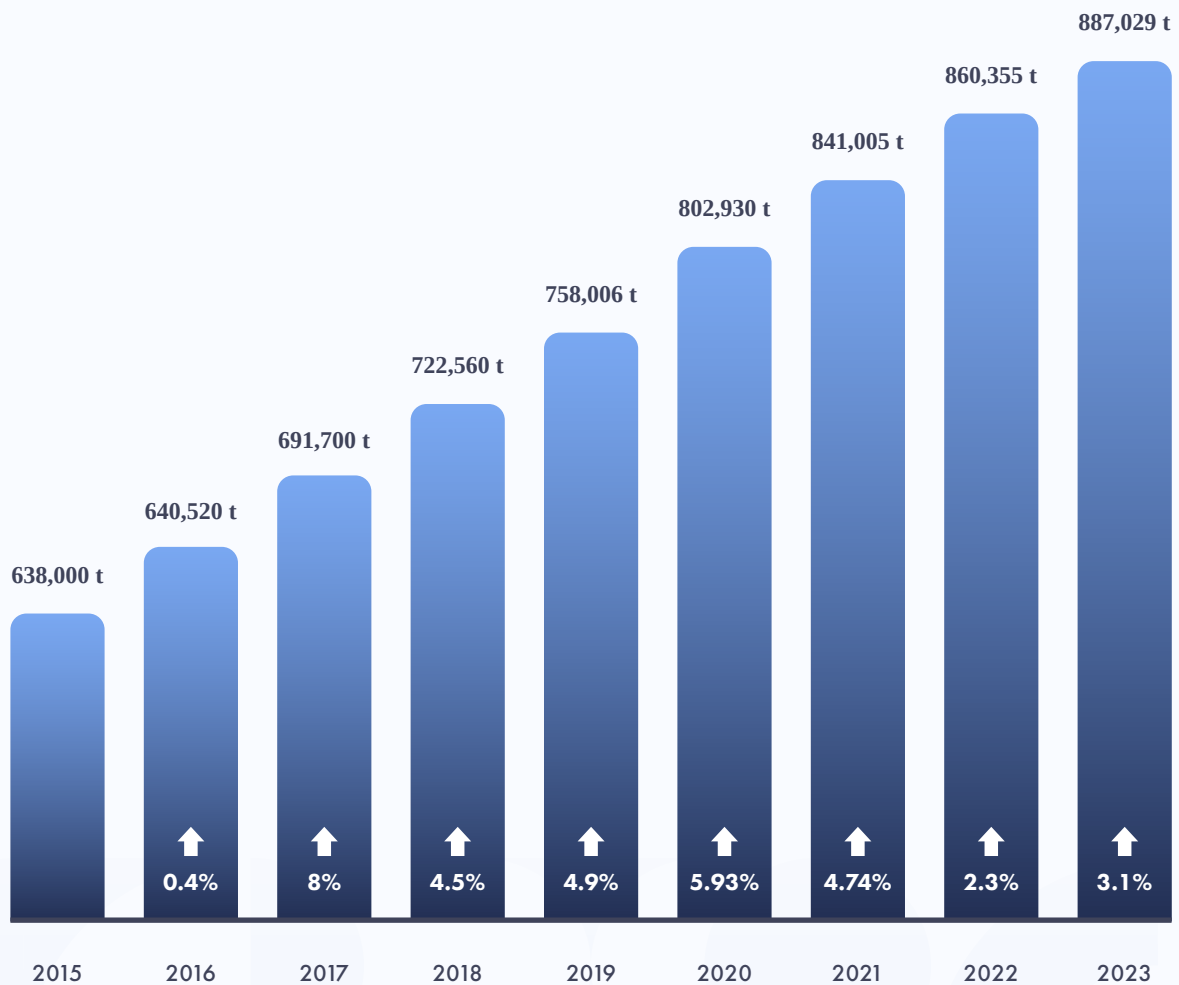
¹⁷ FAO (2020). The State of World Fisheries and Aquaculture 2020: Sustainability in action. Rome, Italy.

¹⁸ FAO (2018). The State of World Fisheries and Aquaculture 2018: Meeting the sustainable development goals. Rome, Italy.

¹⁹ FAO (2022). The State of World Fisheries and Aquaculture 2022: Towards Blue Transformation. Rome, Italy.

In Brazil, fish production in farms reached almost 890 thousand tons in 2023, marking an increase of 3.1% compared to the previous year, with a per capita consumption of 4.35 kg²⁰.

PRODUCTION OF FARMED FISH IN BRAZIL



SOURCE: PEIXE BR

²⁰ Peixe BR (2024). Anuário Brasileiro da Piscicultura; PEIXE BR 2024. Associação Brasileira da Piscicultura.

The southern region of the country leads the national fish production, and the Federal District has the highest per capita consumption of farmed fish in Brazil²⁰.

PRODUCTION OF FARMED FISH BY REGION IN 2023

NORTH

143,096 t

NORTHEAST

170,933 t

MIDWEST

110,850 t

SOUTHEAST

165,950 t

SOUTH

296,200 t

TOTAL

887,029 t

SOURCE: PEIXE BR

The most produced species in the country is the Nile tilapia (*Oreochromis niloticus*). Tilapia farming is expected to increase worldwide in the coming years¹⁷, including in **Brazil, which is the fourth largest producer of this species in the world**¹⁸.



In the last ten years, tilapia production has increased from 285 to 579 thousand tons in Brazil²⁰. In 2023, production of this species represented an increase of 5.3% compared to the previous year, with a per capita consumption of 2.8 kg²⁰.

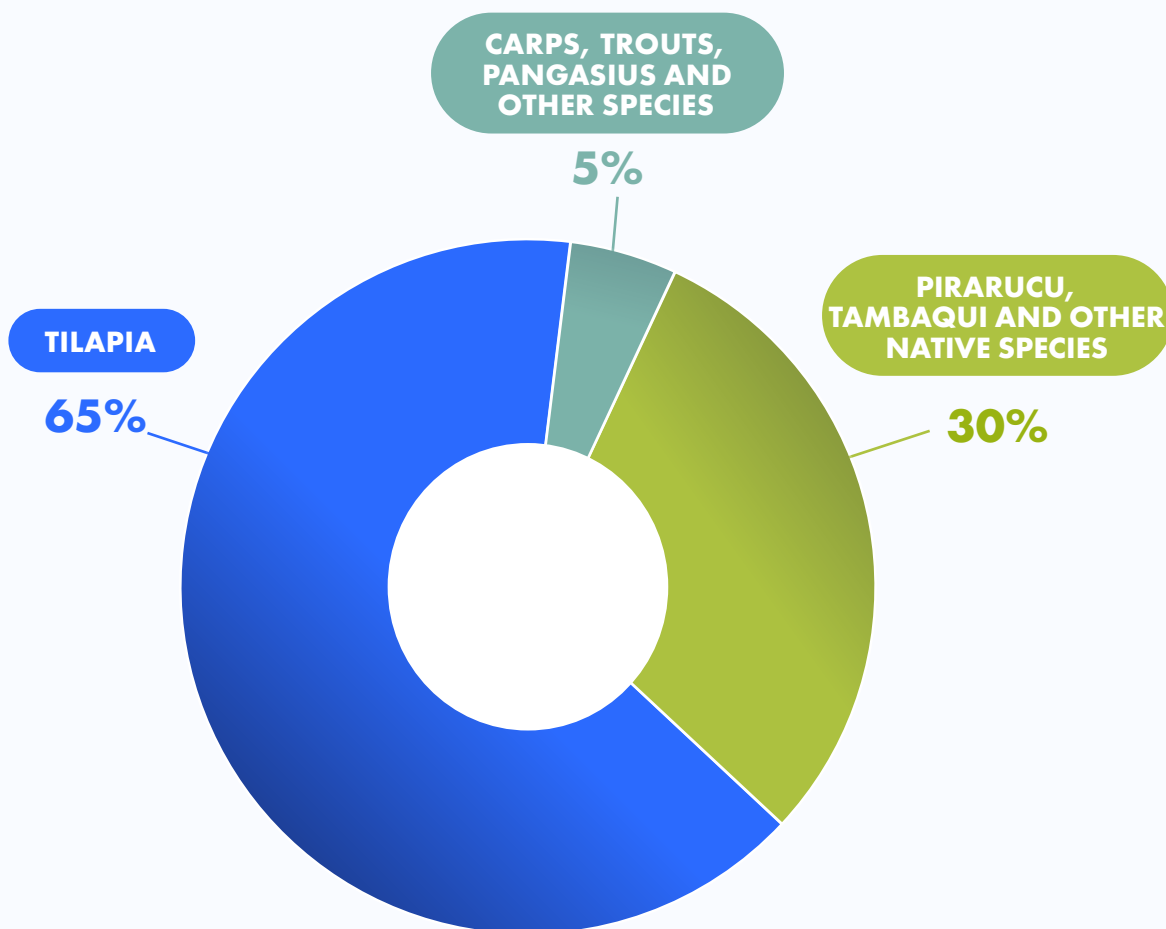
Paraná is the state that produces the most tilapia (209,500 t), followed by São Paulo (75,700 t) and Minas Gerais (58,200 t)²⁰. These three states account for the majority of all national fish production.

Some native fish, such as tambaqui (*Colossoma macropomum*) or pirarucu (*Arapaima gigas*), also stand out in the Brazilian fish farming scene. In 2023, production of native species reached almost 263,500 tons, thus representing a drop of 1.3% compared to more than 267 thousand tons recorded in 2022²⁰.



Other species, such as carps, trouts and pangasius, totaled almost 44,500 tons produced in 2023²⁰. **The Brazilian states that produce the most native fish are Rondônia (56,500 t), Mato Grosso (40,500 t) and Maranhão (38,343 t)**, while those that produce the most other species are Rio Grande do Sul (17,000 t), Santa Catarina (8,500 t) and Maranhão again (5,800 t)²⁰.

VOLUME OF NATIONAL FISH PRODUCTION IN 2023

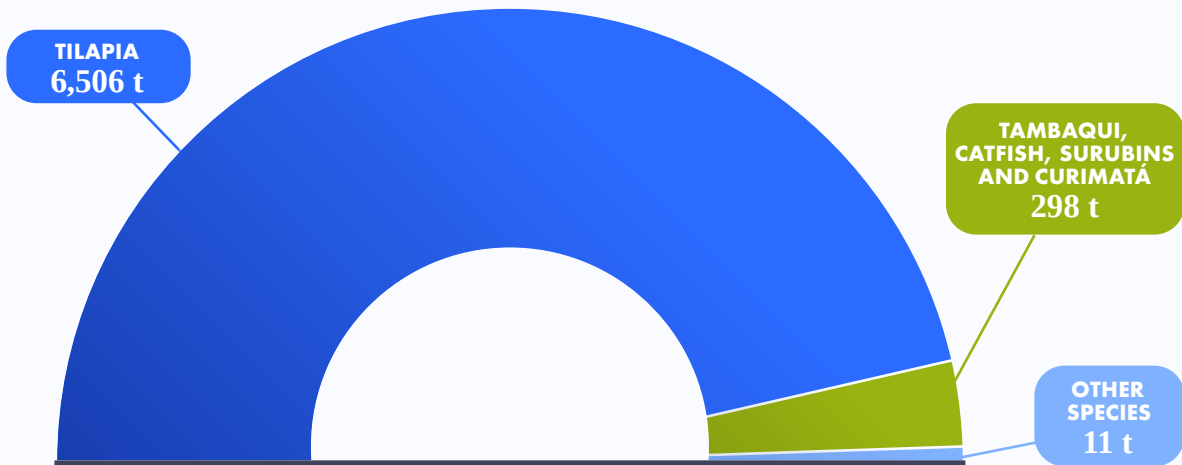


SOURCE: PEIXE BR

Regarding exports, **more than 6,800 tons of fish were exported in 2023²¹**, with almost 96% of the total volume of fish exported last year corresponding to Nile tilapia. Tambaquis, catfish, surubins and curimatás are other species that are prominent in national exports²¹. The main country that imports fish produced in Brazil is the United States, which is the destination for 88% of fish exported from Brazil²¹.

²¹ COMEXSTAT/Ministério da Economia (2024).

NATIONAL EXPORT VOLUME OF FARMED FISH SPECIES IN 2023

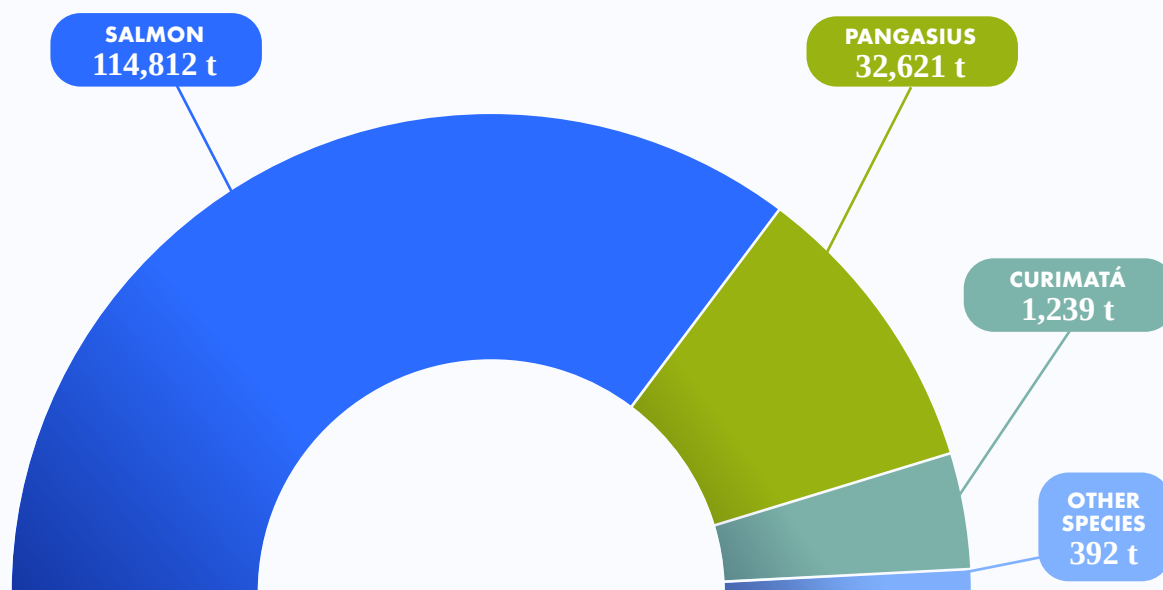


SOURCE: PEIXE BR

Considering fish imports, **salmon leads the ranking in Brazil**, representing around 77% of the total volume of fish imports last year²¹. Pangasius and curimatás also feature prominently in imports²¹. In total, **more than 149,000 tons of fish were imported last year²¹**.



NATIONAL IMPORT VOLUME OF FARMED FISH SPECIES IN 2023



SOURCE: PEIXE BR

3.2.2 Fishing

From a global perspective, **fishery activities of aquatic animals have generated between 86 and 94 million of tons per year since the late 1980s¹⁶**. In 2022, the sector produced 91 million tons of fish, of which almost 80 million tons were caught in marine areas and just over 11 million tons in freshwater¹⁶. With a share of 43% in 2022, marine fishery remains as a significant global source of aquatic animals for human consumption¹⁶. In contrast, **the rate of marine stocks that are fished within sustainable biological levels fell to around 62% in 2021 (2.3% lower than in 2019)¹⁶**.

In Brazil, there is still a serious problem regarding the visibility of catching data. **There is basically no official information available**, probably as a result of the ineffective presence of the State that has persisted for decades²². **Even the current [Fishing Law \(No. 11,959/2009\)](#) does not establish clear**

²² Oceana (2023). A pesca no Brasil segue invisível: Pescadores e pescadoras exigem a revisão da política pesqueira nacional.

government obligations to assess and monitor the health of national fish stocks²². When Brazilian fishing, including industrial fishery, is compared to other production chains, the problems generated by the lack of basic information to support appropriate sectoral policies become evident²².

Therefore, there is still no information available on how much is caught, nor on which species are fished the most, or on the distribution of fisheries and fished species by states or regions of the country. **This has serious impacts, not only in terms of animal welfare but also in terms of sustainability and long-term environmental impact.** Without monitoring fish stocks, it is not possible to know how they are responding to fishing pressure, nor how to find ways to balance use and conservation²².

In 2023, the Food and Agriculture Organization of the United Nations (FAO) organized a meeting with researchers from Brazil, Argentina and Uruguay to assess several fished species along the coast of the three countries²³. The main objective is to start changing this scenario and building data and estimates for the assessment of fished stocks in these nations²³.



SOURCE: HARTLEY, WILLIAM W., WIKIMEDIA COMMONS

²³ MPA (2023). Brasil acelera construção de dados da pesca.

4. FISH WELFARE

4.1 Critical Points in Fish Farming

In Brazil, **there is no standardization of practices in production systems**, causing enormous variation in the conditions in which fish are kept and handled on farms.

Despite this, **problems with space restrictions, above-natural stocking densities, monotonous environments with a lack of adequate stimulation, and handling and transportation problems are stressors commonly encountered in fish farming¹⁵**.

Although they are already a common concern for farmers, problems with feeding and water quality are also fundamental aspects that are directly related to the welfare of these animals.

It's not just fish welfare that is a relevant issue in the aquaculture industry. **The environmental impact caused by the production of these aquatic animals is also very significant.** For example, when animals are raised in net cages, i.e., in tanks made of nets that remain floating in rivers or seas, the animals' feces, as well as the remains of uneaten feed, fall directly into these water bodies, thus generating environmental problems, such as eutrophication.



Attention should also be paid to the use of river water to maintain tanks in fish farms, which must be properly treated before being returned to the natural environment. **The excessive use of antimicrobials in fish feed to prevent diseases is another serious problem** that also involves public health issues. Even if the animals' depuration time after being harvested is correctly maintained before slaughter, thus preventing the fillet from having antibiotic residues, **this excessive use of antimicrobials has facilitated the emergence of superbugs.**

“Disease prevention is one of the basic principles for the rational use of antimicrobials. Fish with high levels of welfare have a more functional immune system, which leads to a decrease in the occurrence of diseases, leading to a lower need for medication, such as antimicrobials. This helps contain antimicrobial resistance. The power of good practices to prevent diseases should guide the sustainable development of aquaculture in the coming years.”

Professor Dr. Leonardo José Gil Barcellos

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



Therefore, **it is not only at the time of slaughter that there must be concern for fish welfare.** During the entire time that these animals remain in fish farms, they are subjected to stress and suffering caused by several factors. **Among the aspects of fish welfare in farms, there are those that are currently considered as priority^{24,25},** and which are therefore highlighted in this report:

²⁴ Aquatic Life Institute (2022). Key Animal Welfare Recommendations for Aquaculture, 1ª edição.

²⁵ Alianima (2022). Por que e como melhorar o bem-estar de peixes?, 1ª edição.



WATER QUALITY

Just as the quality of the air we breathe is very important for our health, **water quality is essential for the health of fish**, which is often a natural concern for producers because it affects productivity. However, especially in intensive or even super-intensive systems, constant attention to water quality is very important. If the quality of the water is low, the fish will certainly not be well and may become stressed, sick and even die. **As the treatment of diseases in fish is still in early stages, maintaining high water quality is essential to prevent diseases** in these aquatic animals.

“Aquaculture activities depend on high quality water, whether freshwater or seawater. What we are seeing nowadays is an alarming increase in pollution in rivers and seas, in addition to the scarcity of freshwater, caused mainly by rampant deforestation. In this context, environmental degradation is a major threat to fish welfare. It is no news that livestock farming activities lack sustainable solutions. As with livestock farming, the future of aquaculture depends not only on animal welfare, but also on environmental awareness to address the water crisis.”

Professor Dr. Eliane Gonçalves de Freitas

Biologist, Professor of Animal Behavior at Unesp and Member of the Fish Advisory Board at Alianima

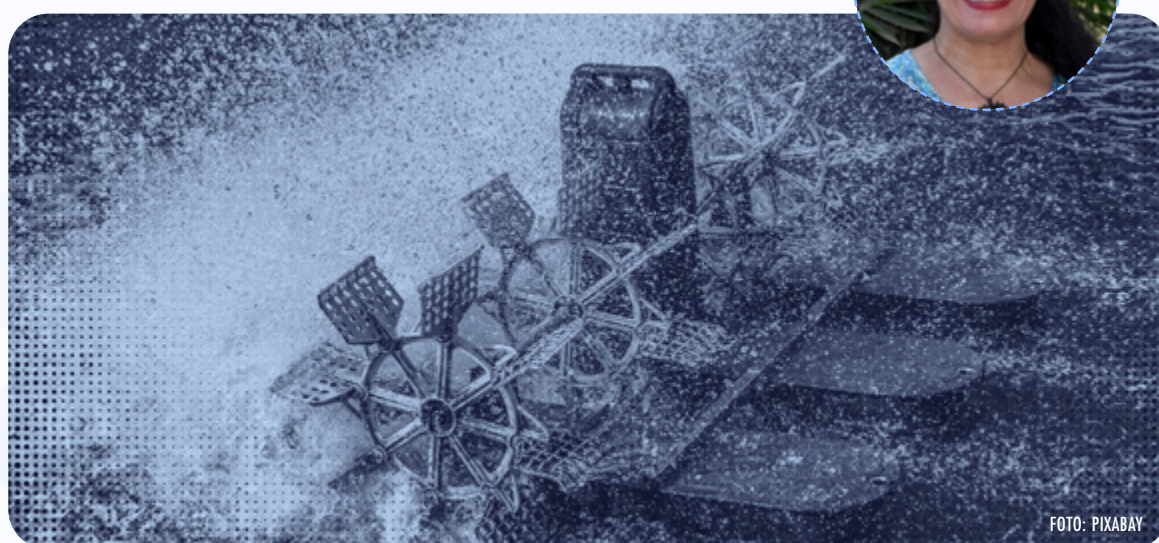


FOTO: PIXABAY



FEEDING

Although producers are usually aware that high quality feed is essential for a good growth and development of fish, problems in this scenario are also present in fish farms. **Unnecessary fasting practices, insufficient or excessive amounts of feed, or even inappropriate feed formats or their distribution can result in problems of health and welfare.** Special attention should be paid to the size of the pellets in relation to the mouth opening capacity of each life stage. Another problem in this scenario is offering concentrated feed in one or a few locations that only larger, more dominant fish can access. Overfeeding can impair water quality, which will negatively affect the animals.

Another important point is **the issue of feeding omnivorous or, mainly, carnivorous fish, since it involves the consumption of other animals, which creates long-term sustainability problems.** It is conservatively estimated that more than 1 trillion aquatic animals are used each year in the supply chain as feed for farmed fish^{26,27}.



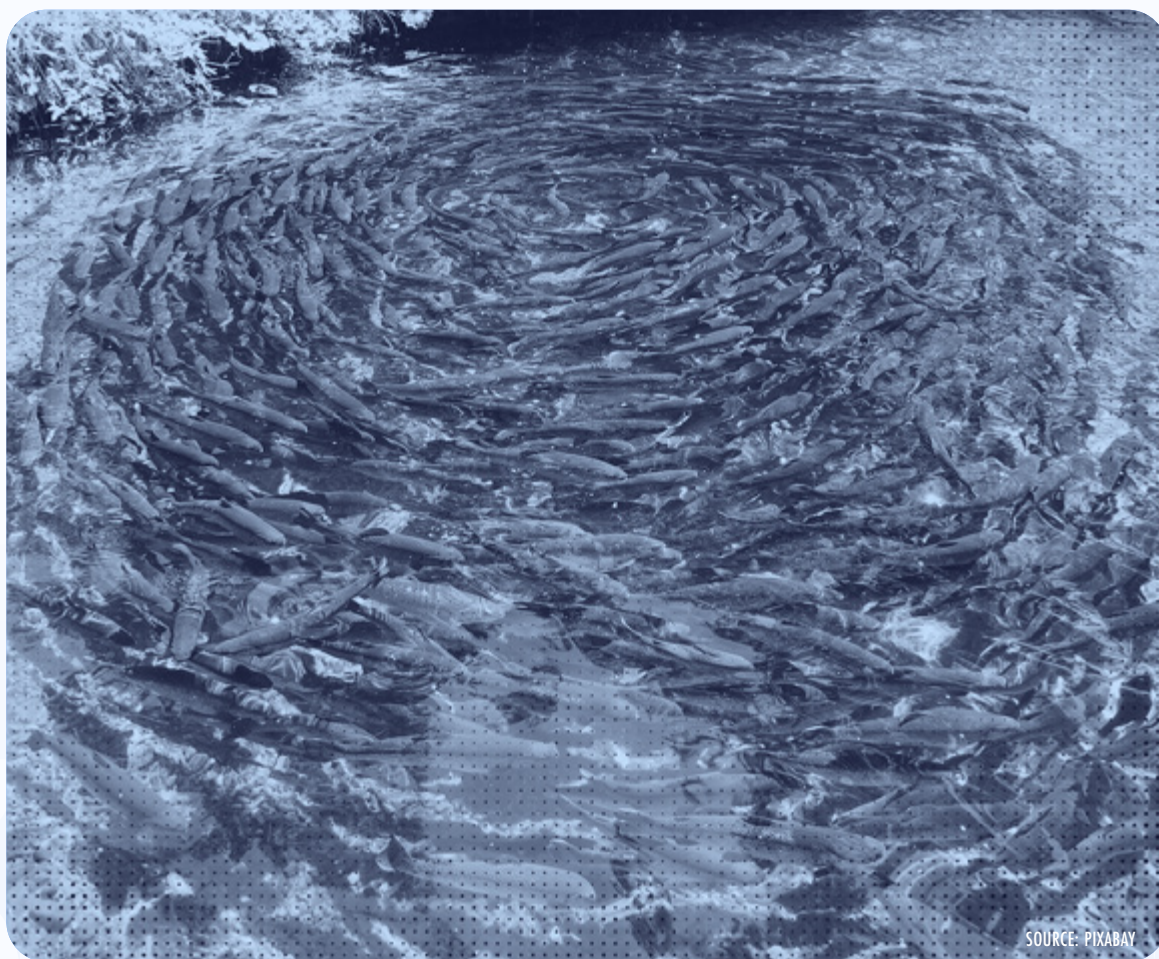
²⁶ Mood A, Brooke P (2019). Estimate of numbers of fishes used for reduction to fishmeal and fish oil, and other non-food purposes, each year. Fishcount.

²⁷ Borthwick M, Gonzalez T, Redaro C (2020). 'Blue Loss', estimating how many aquatic animals are hidden in the food system. Aquatic Life Institute.



SPACE AND DENSITY

In production systems, especially intensive or super-intensive ones, **it is common that fish stocking densities are far above the ones found in nature.** Some species tolerate high densities better than others, depending on how they live in nature, but such higher densities generally cause health problems and stress for fish. Stocking densities above the most appropriate ones for the respective species and its life stage also bring losses to the farmer, as the fish may have reduced growth under these conditions or even die. **Depending on the species or its life stage, very low densities can also be detrimental,** both for production and for animal welfare. A good example of this is the Nile tilapia, a territorial fish that aggressively defends territories which are more clearly established at low densities.



SOURCE: PIXABAY



ENVIRONMENTAL ENRICHMENT

In nature, the aquatic environment can be complex, with different types of substrates, structures that function as burrows or refuges, vegetation, or even structures that provide shade – something that is generally lacking in farms.

It is common that breeding environments are monotonous, that is, lacking in positive stimuli that motivate fish to interact according to their natural behaviors and needs. Thus, it is common for fish to suffer in production systems because they are constantly in an unenriched environment, which does not meet their own physiological, ethological and psychological needs.





STUNNING AND SLAUGHTER

To ensure that fish are humanely slaughtered, it is essential to immediately stun the animals and then carry out an efficient slaughter process before the fish can regain consciousness. **A serious common problem on farms is using the stunning and slaughter protocol inappropriately, or not even carrying out these processes.**

In a survey published in 2022²⁸, although all farms and slaughterhouses interviewed in 15 Brazilian states reported stunning fish, **placing them in ice slurry or ice water was the most mentioned procedure (82%), even though it is an inadequate method that causes a lot of suffering.** Furthermore, only about 41% of establishments reported carrying out slaughtering by bleeding or decapitation immediately after stunning, indicating that **fish must die by asphyxiation or during fillet processing in other slaughterhouses**²⁸.



²⁸ Coelho M, Pedrazzani A, Quintiliano M, Bolfe F, Molento C (2022). Fish slaughter practices in Brazilian aquaculture and their consequences for animal welfare. *Animal Welfare*, 31: 187-192.



HANDLING AND TRANSPORTATION

Another aspect of fish welfare on farms that also deserves attention is the issue of handling and transporting these aquatic animals. **The process of harvesting fish and then transporting them to the slaughterhouse poses major challenges to their welfare**, as it involves a series of potentially stressful procedures²⁹. Therefore, such procedures must be carried out calmly, quickly and efficiently to reduce the impact of transport on fish welfare²⁹.

Excessive crowding of animals in tanks, the passage of capture nets, aerial exposure, manual handling, high transport densities, poor quality of water during transportation and prolonged transport times are examples of problems that directly affect fish welfare at this moment. **The lack of adequate training of the team that works directly with the handling and transportation of fish often causes suffering to the animals** during this process. In addition, **the current procedure of “stunning” and preservation on ice for later transport needs to be replaced**, as it causes immense suffering to the fish²⁹.



SOURCE: WIKIMEDIA COMMONS

²⁹ MAPA (2022). Manual de Boas Práticas na Criação de Peixes de Cultivo, 1ª edição.

4.2 Proposal for Improvements in Fish Farming

As aquaculture becomes more intensive and professional, **it is essential that fish farming and production methods are tailored to meet the biological needs of such animals**, rather than solely to fit economic principles or scientific debates³⁰. The [Ministry of Agriculture and Livestock's Manual of Good Practices in Fish Farming](#)³⁰ provides an excellent compilation of detailed information on how to improve the living conditions of fish in production.

“The adoption of animal welfare practices must be integrated and encompass all life stages of aquatic farm animals, ensuring that they are treated with the highest standard of care, from birth to slaughter. Breaking taboos and accepting new paradigms within the land animal production sectors has been one of the greatest challenges for implementing animal welfare in practice. This trajectory should be no different in fish production.”

Professor Dr. Rosangela Poletto

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



There are several fish farming systems, including cages, earthen ponds, raceways, water recirculation systems (RAS), biofloc systems, etc. Each of these systems has its own specific characteristics that need to be taken into account when seeking to improve fish welfare in production. However, **there are points for improvement in each of the priority aspects of fish welfare that must always be taken into account**^{24,25}:

³⁰ MAPA (2022). Manual de Boas Práticas na Criação de Peixes de Cultivo, 1ª edição.

WATER QUALITY

To maintain high water quality in fish farming, **the main parameters that must be constantly monitored and controlled include:**

- **Dissolved oxygen and carbon dioxide levels**
- **Temperature**
- **pH**
- **Ammonia and nitrite concentrations**
- **Water turbidity**
- **Salinity levels**

These parameters must be maintained within the optimal levels for the species in question and their respective life stage. It is worth mentioning that **water quality assessments should be followed by an action plan in case problems are detected.** For example, if ammonia levels are high, it's important to check that the feed is not being offered in excess or whether there is poor water cleaning of the feces.



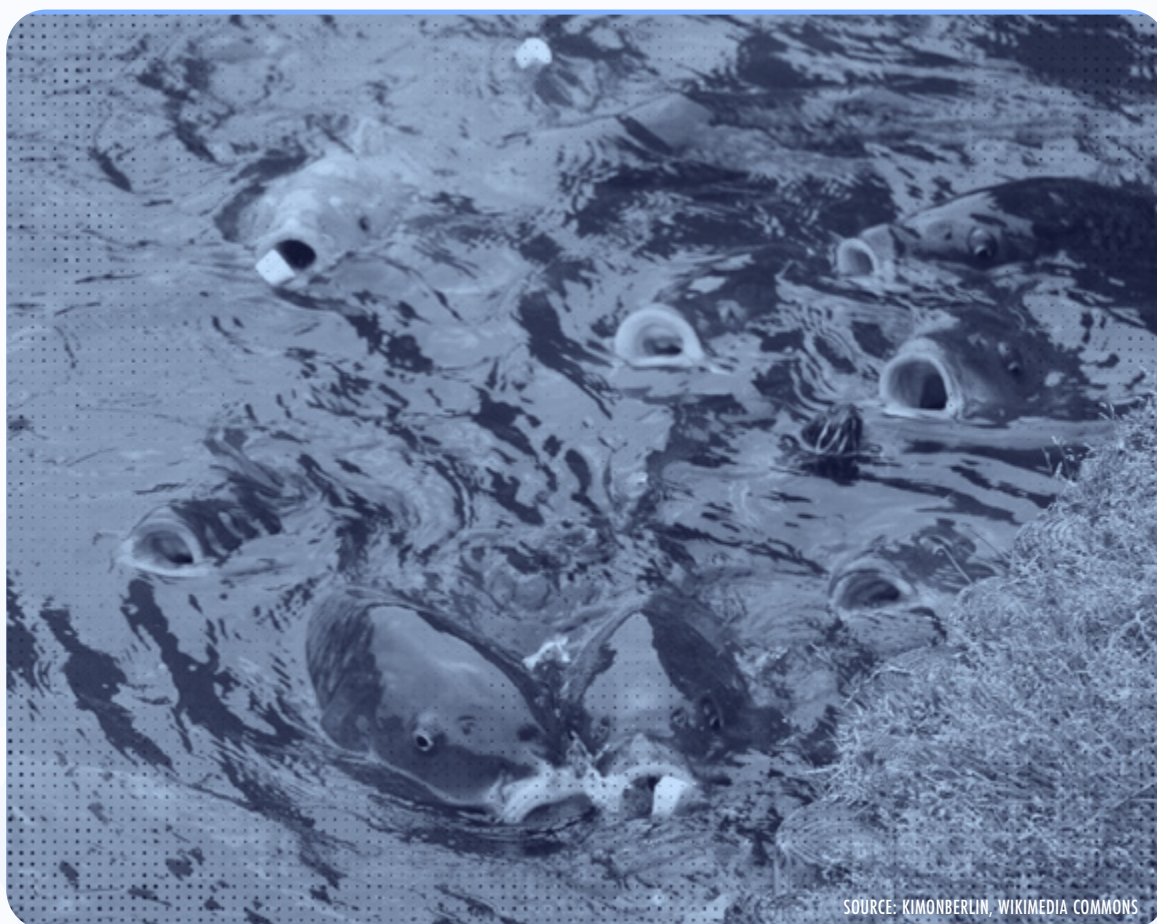
SOURCE: PIXABAY



FEEDING

Farmers should provide **feed in appropriate sizes according to the species in question and its respective life stages**. Feed should be provided in **adequate quantities, considering the number of fish and the time of year** (e.g., fish eat less in cold weather), and should be well-distributed throughout the production system, in an accessible way to all individuals. Additionally, **fasting should be avoided** and, when carried out, should be monitored by a veterinarian and must not exceed a period of 72 hours. Farmers should also seek **alternative sources that can replace, at least partially, feed of animal origin**.

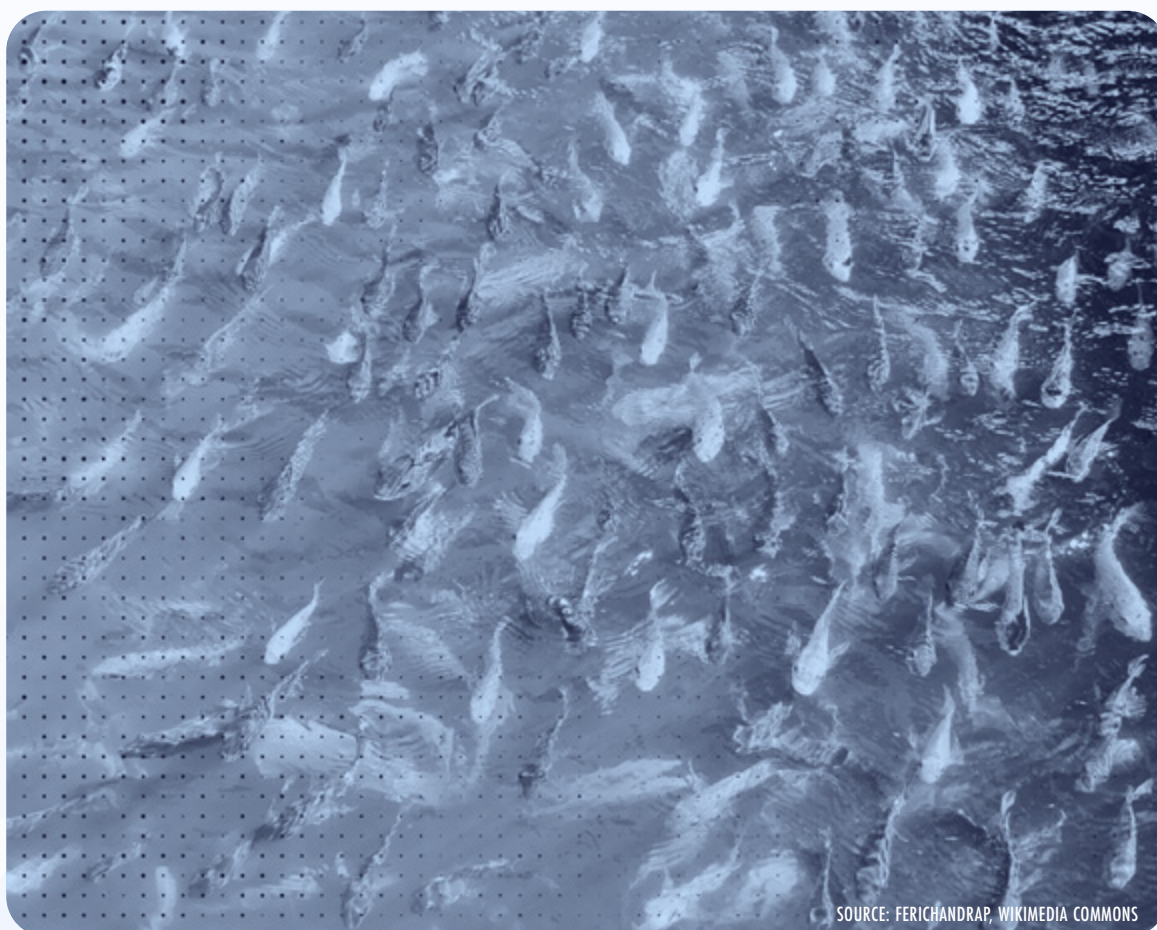
The replacement of carnivorous species by herbivorous or extractive species, as well as systems where animals and their feed are co-produced, are recommended for better sustainability.





SPACE AND DENSITY

Appropriate stocking densities for different species and life stages must be maintained to avoid negative impacts on fish welfare. To achieve this, **farmers should have a good understanding of the biology of the species as well as its natural habits and behaviors.** It's difficult to accurately define good levels of minimum and maximum stocking densities in fish farms, but **there are ways to select densities and monitor their effects on fish welfare,** integrating a solid assessment of animal welfare and good management practices³¹. Special attention must be paid to **avoid high densities for species that naturally live in more isolated conditions, such as tambaqui, for example.**



³¹ Saraiva JL, Rachinas-Lopes P, Arechavala-Lopez (2022). Finding the 'golden stocking density': A balance between fish welfare and farmers' perspectives. *Frontiers in Veterinary Science*, 9: 930221.



ENVIRONMENTAL ENRICHMENT

Environmental enrichment is a reliable and useful tool to make the farming environment more stimulating for fish. This strategy promotes changes in the characteristics of the environment, positively stimulating these animals. The goal is to reduce the occurrence of abnormal behaviors, such as swimming in circles, as well as increase the expression of natural behaviors.

To achieve this, it is essential to have a thorough understanding of the biology of the species in question, as well as their respective life stages. **Information about the natural habitat, including the species' natural needs and behaviors, is important for planning and offering environmental stimuli that, in fact, bring benefits** to these individuals in production systems.

The enrichment most frequently used for fish, presenting excellent results, is the physical/structural enrichment. This type of enrichment involves **adding structures that increase the complexity of the environment, ranging from substrates and burrows up to structures suspended in the water.**

Literature reviews have addressed the effects of different structural enrichments for fish in detail^{32,33,34}, as well as other types of enrichments³⁵.

32 Näslund J, Johnsson JI (2016). Environmental enrichment for fish in captive environments: Effects of physical structures and substrates. *Fish and Fisheries*, 17: 1-30.

33 Jones NAR, Webster M, Vea Salvanes AG (2021). Physical enrichment research for captive fish: Time to focus on the DETAILS. *Journal of Fish Biology*, 99: 704-725.

34 Zhang Z, Lin W, Li Y, Yuan X, He X, Zhao H, Mo W, Lin J, Yang L, Liang B, Zhang X, Liu W (2023). Physical enrichment for improving welfare in fish aquaculture and fitness of stocking fish: A review of fundamentals, mechanisms and applications. *Aquaculture*, 574: 739651.

35 Arechavala-Lopez P, Cabrera-Álvarez MJ, Maia CM, Saraiva JL (2021). Environmental enrichment in fish aquaculture: A review of fundamental and practical aspects. *Reviews in Aquaculture*, 14: 704-728.



STUNNING AND SLAUGHTERING

Asphyxiation in ice slurry or ice water, use of CO₂, salt or ammonia baths must not be used. It is highly recommended to follow the “Health Code for Aquatic Animals” of the World Organization for Animal Health³⁶.

The method that should be used for stunning must be scientifically validated and be adequate for the species in question and the size of the individuals, leaving the animals truly unconscious — not just immobilized — immediately.

The ideal approach is to achieve immediate and irreversible stunning, followed by induced slaughter without the possibility of recovery of consciousness. For some species, simultaneous stunning and slaughtering methods (e.g., by electrocution) are preferable. However, **stunning procedures such as electronarcosis or percussion followed by decapitation or exsanguination are acceptable.**

For more details on how to properly stun and slaughter fish, access the [Ministry of Agriculture and Livestock’s Humane Fish Slaughter Manual](#)³⁷.

“Low-cost strategies, such as mobile slaughterhouses and mechanical concussion equipment, are alternatives for low-volume slaughtering, thus meeting the needs of small producers and associations. Mechanical concussion can be automated to meet high slaughtering volumes, but it requires technological development. Training all links in the production chain, from the farmer to the end consumer, is essential to achieving a successful humane slaughter process.”

Dr. Daniel Santiago Rucinke Gonzalez

Veterinarian, Partner at Fish Welfare Solutions and Member of the Fish Advisory Board at Alianima



³⁶ OIE (2019). Aquatic Animal Health Code, 22ª edição.

³⁷ MAPA (2022). Manual de Abate Humanitário de Peixes, 1ª edição.



HANDLING AND TRANSPORTATION

Regarding the transportation and handling of farmed fish, these procedures should be carried out only when strictly necessary, aiming to minimize stress and disturbance to the animals as much as possible.

Handling should be carried out in the shortest possible time and, if it exceeds a few seconds, anesthetic drugs should be administered. In new facilities, it is recommended to set up a structure that allows slaughtering in the same place where the fish are raised, as this considerably reduces handling time and, especially, fish transportation time.

In the case of transportation, **it might be important to anesthetize fish before handling for placing them in bags or boxes, to reduce stress and prevent injuries.** Filling the empty space of transportation bags with oxygen or atmospheric air can be crucial to improving transport conditions for fish. **Adding appropriate amounts of salt to the transport water can also help to maintain better conditions for individuals of certain species,** as well as preventing the spread of diseases, since fish immunity tends to be reduced after transportation. Well-founded knowledge about ways to alleviate the transportation stress of each species is essential.



The producer must also be aware about fish densities during transportation, since very high densities should be more stressful, in addition to considerably worsening the quality of the transportation water. More details on ways to improve fish welfare during transport can be found in the [Ministry of Agriculture and Livestock's Manual of Good Practices for Fish Transportation](#)²⁹.

Other areas of concern regarding fish welfare can be accessed in detail in the Aquatic Life Institute manual²⁴. Furthermore, **the use of welfare protocols is a tool that can be very useful in improving the conditions of the fish species on farms.** Such protocols must always be based on technical-scientific knowledge and consider the behavioral characteristics and needs of each species and its respective life stage.

“Tilapia welfare assessment protocols, for example, are diagnostic and monitoring tools of the welfare levels of these fish when farmed in semi-intensive production systems. With the protocol in hand, the farmer can measure and monitor water quality daily, as well as detect diseases and handling mistakes during feeding, harvesting and slaughtering of tilapia. In addition to providing a better life quality for the animals, constant monitoring results in increased productivity, with a higher quality final product.”

Dr. Ana Silvia Pedrazzani

Veterinarian, CEO of Wai Ora Aquaculture and Environmental Technology and Member of the Fish Advisory Board at Alianimad



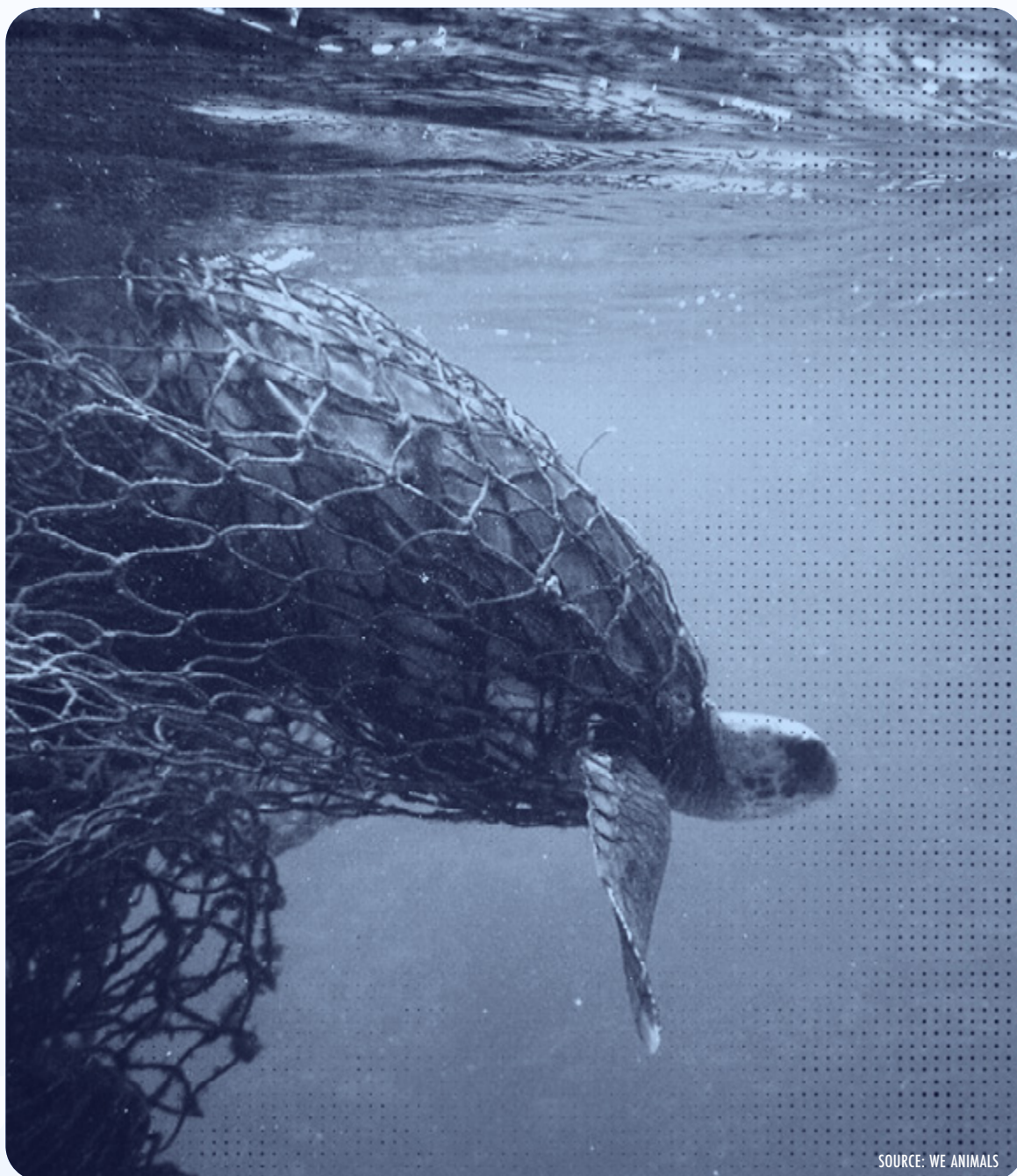
4.3 Critical Points in Fisheries

Although the catching process only involves a specific moment in the fish's life when they are caught and slaughtered, these aquatic animals can suffer at every stage of this process.

Risks to fish welfare are present from prospecting, which is the active search for these animals using lights or sonars — something common in purse seine fishing, to the moment of slaughtering or discarding of these animals, including problems of bycatch, which is the unintentional entanglement of animals that are not targets of fishing. These welfare risks are addressed by the [fair-fish database](#), an open-access online platform that publishes profiles of fished species.



Additionally, **ghost fishing** — conducted with abandoned, lost, or discarded fishing gear — brings a significant problem, **causing considerable suffering and environmental impacts, contributing to overfishing (excessive fishing) and water pollution**³⁸.



SOURCE: WE ANIMALS

³⁸ Aquatic Life Institute (2024). Marine Capture Fisheries: Best Practices for Aquatic Animal Welfare, 3ª edição.

It's also important to consider that different fishing methods (e.g. trawling, purse seine fishing, gillnets/trammel nets, pots and traps, etc.) can have distinct impacts on fish and the environment. For example, **trawling is not selective, leading to the bycatch of a wide variety of species, in addition to causing habitat destruction and contributing to the desertification of the seabed.** Furthermore, there are hundreds of fish species that are fished worldwide, each one with its own needs that must be considered. Considering such biological differences between species, there are those that will be more impacted by fishing because they are more sensitive.



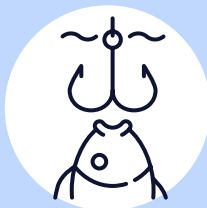
“There are several critical points in fishing that cause stress to fish during catching, handling and slaughtering. Fishing methods such as trawling and purse seine can cause abrasion and physical injuries due to crushing and suffocation, as fish may be held out of the water for prolonged periods. Fishing lines and hooks can cause severe injuries to the mouth, gills, or other parts of the body. When pulled out of the water, the animals struggle, thus increasing physiological stress, in addition to also suffering from hypoxia.”

Dr. Tavani Rocha Camargo

Biologist, Postdoctoral Fellow at Caunesp and
Member of the Fish Advisory Board at Alianima



According to the Aquatic Life Institute³⁸, **the capture of animals, their removal from the water, their handling and storage on board, as well as the stunning and slaughtering methods are the main critical points for the welfare of fish in fisheries**, as indicated below:



CAPTURE

At this stage, fish are caught using fishing gear, such as hooks, nets or pots/traps, depending on the fishing method. At this stage, **fish may experience suffering from overcrowding, hypoxia, injuries, and fatigue/exhaustion.**



WATER RETRIEVAL

When removing fish from the water, depending on the fishing method, **these animals may suffer from barotrauma (injury due to difference in atmospheric pressure), thermal shock, osmoregulatory stress, injuries, exposure to light, overcrowding, and emersion.**



ONBOARD HANDLING AND STORAGE

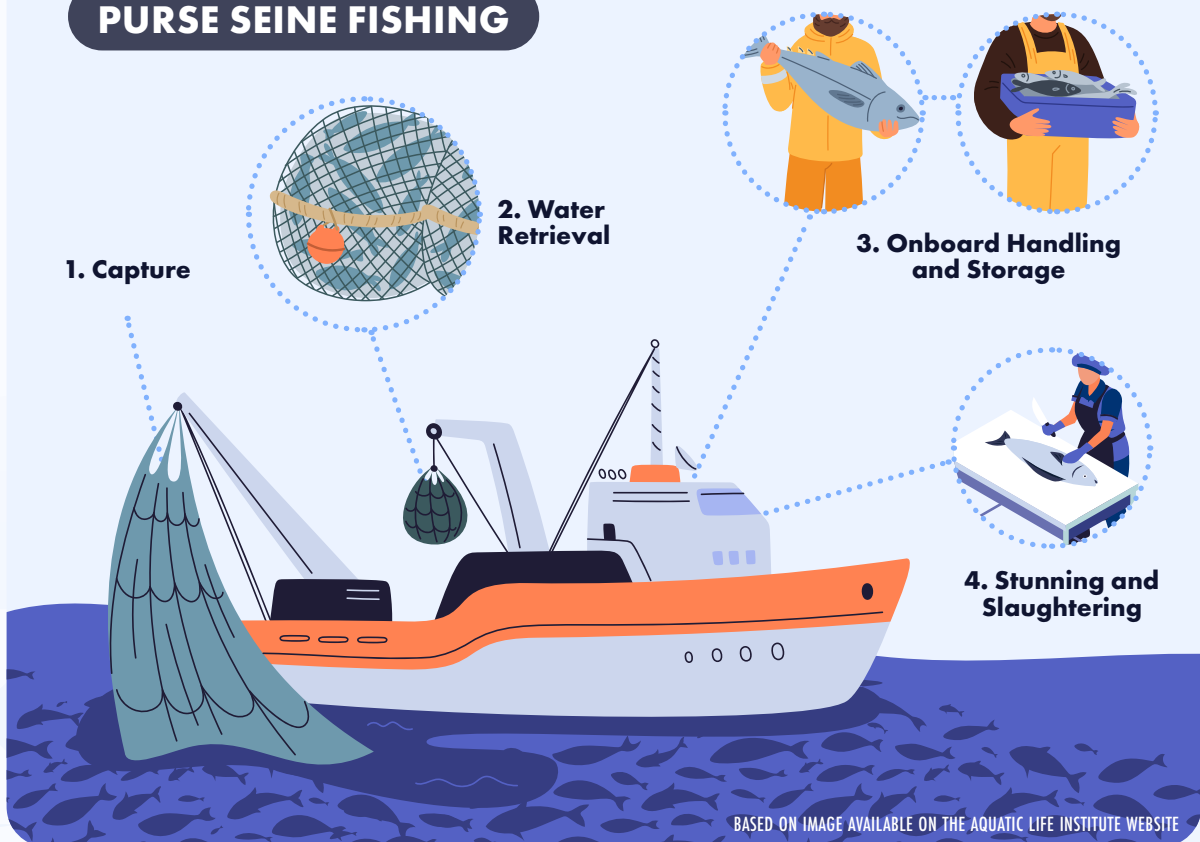
After the fish have been removed from the water and the fishing gear has been released, it is common for fish to be handled on board, including a sorting process that culminates in the discarding of unwanted individuals (whether of the same species or not) and the storage of the selected fish. At this stage, **fish can suffer from emersion, overcrowding, hypoxia, injuries, exposure to light, and heat shock.**



STUNNING AND SLAUGHTERING

Once sorted, selected and stored onboard, the fish are slaughtered. At this stage, these aquatic animals may undergo a deliberate slaughter process or simply die by being left out of the water or even placed in cold water/ice. During this process, **fish may suffer from emersion, overcrowding, heat shock, and hypoxia.**

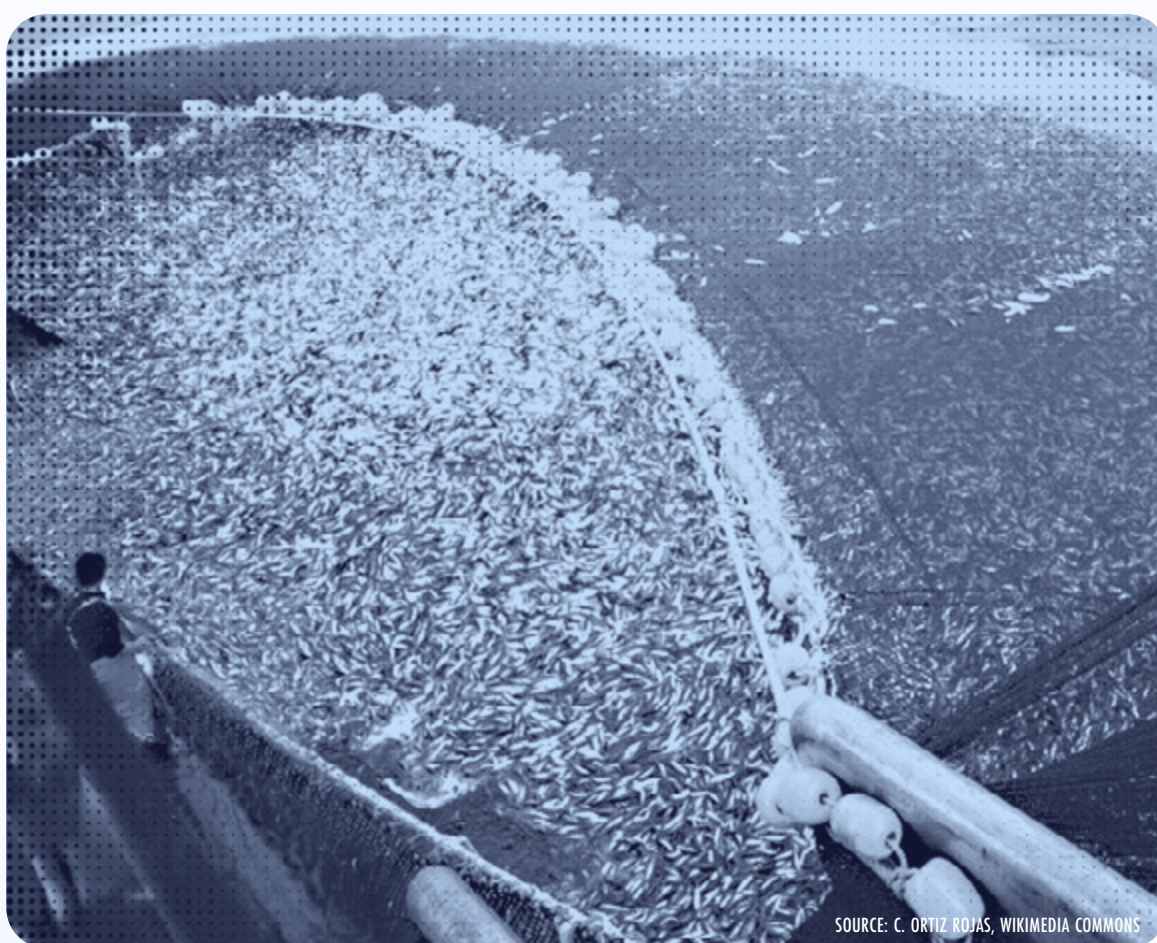
PURSE SEINE FISHING



4.4 Proposal for Improvements in Fisheries

Although the issue of fish welfare in fishery is still very incipient, we already know of **several points of improvement that can be implemented to reduce the suffering of these aquatic animals.**

For example, **in purse seine fishing, towing fish quickly and not too harshly should help minimize stress from overcrowding, compression trauma, injuries, and asphyxiation during the process³⁹. In addition, the use of appropriate release techniques is recommended** to increase the chance of survival of discarded or accidentally caught fish³⁹.



When transporting fish from the purse seine to the fishing vessel, **reducing the volume of individuals transported in nets or adjusting the flow and intensity of transport pumps may be necessary** to minimize stress and suffering to these animals³⁹.

³⁹ Carefish/catch Consortium (2023). Carefish report: Welfare assessment in purse seine fisheries, 7 pp.

In gillnet/trammel net fisheries, reducing the overall duration of the fishing process, which can range from a few hours to a few days, helps to reduce the suffering of caught animals in terms of stress, pain, injury, death by predation, suffocation and exhaustion⁴⁰. **Modifications to fishing gear, such as reducing the total length of the net, the suspension rate, the depth of the fishing, or even the tension of the net, should help to reduce the negative impacts on the target species of the fishery or even from bycatch**⁴⁰. Appropriate modifications to the net material or mesh shape, or even just reducing the speed at which fish are towed, can help minimize the negative impacts of this type of fishing⁴⁰.

In pots and traps fisheries, bycatch volume can be reduced by increasing the selectivity of fishing gear, changing such gear based on the target species, or implementing more effective management procedures⁴¹. Such procedures involve, for example, **a good adjustment of the distance between traps, the imposition of fishing ban periods, and restrictions on spawning areas**⁴¹.



SOURCE: PEDRO RAMIREZ JR./U.S. FISH AND WILDLIFE SERVICE, WIKIMEDIA COMMONS

⁴⁰ Carefish/catch Consortium (2023). Carefish report: Welfare assessment in gillnet and trammel net fisheries, 7 pp.

⁴¹ Carefish/catch Consortium (2023). Carefish report: Welfare assessment in pots and traps fisheries, 7 pp.

Furthermore, **reducing the towing speed of aquatic animals, minimizing the rate of catch rise and even reducing the immersion time of traps are recommended procedures** to minimize animal suffering in this fishing method⁴¹.

“Minimizing the time fish spend out of the water and using techniques that reduce stress, such as quickly releasing fish, are ways to improve the welfare of these animals. Gillnets and trammel nets with appropriate mesh sizes to prevent bycatch and hooks designed to minimize injuries must also be used. It’s important to teach fishers to use wet towels to hold fish and to avoid touching them with dry hands. Using tweezers to remove hooks and rubber nets, which cause less damage to the fish, are also recommended.”

Dr. Tavani Rocha Camargo

Biologist, Postdoctoral Fellow at Caunesp and Member of the Fish Advisory Board at Alianima



According to the Aquatic Life Institute³⁸, while technologies to reduce fish suffering in fisheries already exist, their practical integration into the catching process faces other complexities that have yet to be resolved, such as the occurrence of large volumes of mixed species caught together, as well as rough sea conditions. Despite these challenges, **there are improvements that can be implemented across fisheries as a whole**, as outlined below³⁸:



CAPTURE

Limiting catch volumes by using smaller nets, as well as reducing the duration of this process, helps to reduce stress on the fish that are the focus of the fishery. It is worth mentioning that this reduction in stress also leads to lower levels of lactic acid in your body, resulting in better meat quality as well as a longer shelf life for the fillet.



WATER RETRIEVAL

Immediately after the capture process, fish are removed from the water while being transported to the fishing vessel, which causes significant stress and injuries to these aquatic animals. **One effective way to minimize animal suffering during this process is to pump the fish onboard.** This method of pumping fish directly onto the vessel is considered a better practice than lifting nets onboard.



ONBOARD HANDLING AND STORAGE

At this stage of the fishery, there are two main factors that directly affect fish welfare on board: 1) the time the animals spend out of the water, and 2) how they are sorted/selected. **The duration that the fish remain out of the water during this process should be kept to a minimum.** This means that fish should be pumped on board to eliminate the problem of manual handling at this stage and transferred to tanks suitable for holding live fish of the respective species as soon as possible. **Only uninjured fish should be stored alive. Storage tanks must have a flat bottom and an adequate supply of oxygen,** which takes into account the quantities of fish stored, besides being continually monitored and adjusted.

“Confinement in small, overcrowded spaces is a critical issue, as water can become low in oxygen concentrations and poor in quality, then increasing stress and the likelihood of injury and mortality. Keeping water well oxygenated and in good condition during storage and transport, avoiding overcrowding and ensuring that fish have enough space to reduce stress, are possible improvements in terms of animal welfare.”

Dr. Tavani Rocha Camargo

Biologist, Postdoctoral Fellow at Caunesp and Member of the Fish Advisory Board at Alianima





STUNNING AND SLAUGHTERING

Nowadays, the technology for adequate stunning already exists for most species caught by commercial fishing vessels and should therefore be applied. **Appropriate techniques include electrical stunning (e.g., dry/semi-dry or water stunning) and mechanical stunning (e.g. percussive stunning, spiking).** It's worth mentioning that, in addition to improving animal welfare, an adequate stunning procedure followed by rapid and effective slaughtering also results in improved crew safety, as well as better meat quality and shelf life.



SOURCE: WE ANIMALS

4.5 Legislation

At an international level, there is already legislation that addresses fish welfare, especially in relation to humane slaughtering. However, **with a few notable exceptions such as the Spanish regulation (“Piscicultura: guía de prácticas correctas para el sacrificio”)**, **recommendations are generally vague** even when it comes to the European Union directive, which is seen worldwide as a model or pioneer⁴².

Although [Normative 1099 from 2009](#) of this directive points out that pain, anguish and suffering must be avoided during slaughtering, including for fish, there are no clear indications on how to do this. There are also no specifications on what could be observed in the behavior of these animals to evaluate the effectiveness of the method used, or on the prohibition of methods considered non-humane.



In Brazil, there is currently no regulatory or legislative support specifically regarding fish welfare, whether in farming or fishing.

[Ordinance 365](#) from 2021 of the Ministry of Agriculture and Livestock (MAPA) covers the technical regulation involving pre-slaughter handling and humane slaughtering nationally, as well as the stunning methods authorized by the same agency. This Ordinance includes aquatic animals, but then defines these as amphibians and reptiles, then excluding fish and invertebrate animals that make up most of aquatic species farmed and fished, such as mollusks and crustaceans. The Ordinance has undergone several revisions since its original publication in 2000, but the inclusion of fish as animals that must be slaughtered in a humane manner remains unsatisfactory.

Therefore, even in terms of humane slaughtering, **there is still no legislative support for the implementation and monitoring of appropriate methods in fish farming or fisheries.**

⁴² Barcellos LJJ, Pedrazzani AS, Maia CM, Rucinke DS (2023). O abate de peixes pode (e deve) ser humanitário? Panorama da Aquicultura, 32: 46-63.

5. ALIANIMA'S WORK

There are few organizations from the third sector working to promote better fish welfare practices in Brazil. Due to this and the high number of animals impacted by aquaculture and fishery in the country, **Alianima began its work on this agenda in 2020 when it became part of the international coalition [Aquatic Animal Alliance \(AAA\)](#)**, which works for the welfare and reduction of suffering of aquatic animals. This coalition, which currently counts on 150 organizations around the world, is coordinated by the [Aquatic Life Institute](#) (ALI), an aquatic animal advocacy center focused on mobilizing, connecting and coordinating the international movement for the welfare of these animals.

DECLARATION OF SENTIENCE IN FISH

In 2021, Alianima **published the Declaration of Sentience in Fish, signed by more than 40 professionals and researchers in the field**, which presents several technical-scientific evidence and argumentation in favor of the sentience of these aquatic animals.

[Access the Declaration of Sentience in Fish](#)

SCIENTIFIC DISSEMINATION

Alianima has also been working through **consistent scientific dissemination actions, seeking to raise reflection and awareness in society about issues related to fish suffering and welfare**, both in farms and fisheries.

“Combined with the relationship between animal welfare and disease prevention and, consequently, the reduction in the need for medication, aquaculture will have to change over the next decade, also due to public opinion issues, which should drive the need for sustainable development, traceability, and animal welfare, from the beginning of the production chain (reproduction and production of young animals) to the end of this process (humane slaughtering).”

Professor Dr. Leonardo José Gil Barcellos

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



SOURCE: ALABAMA EXTENSION, WIKIMEDIA COMMONS

WELFARE MANUALS AND PROTOCOLS

More recently, **Alianima has been producing fish welfare booklets**, which are well-founded educational materials focused on farmers, retailers or other potential industry stakeholders. To date, a general fish welfare booklet has been produced, as well as a booklet and a simplified protocol that specifically address Nile tilapia welfare issues.

[Access the Nile Tilapia Welfare Booklet](#)

LECTURES AND TRAINING

Alianima has also given lectures on this topic at universities and industry events, whether scientific or more technical ones, that is, more focused on the fish industry. Lectures have already been given at Unesp - Botucatu Campus (SP), at the University of Passo Fundo (UPF), at the Annual Ethology Meeting and at the International Fish Congress & Fish Expo Brazil. **The organization also offers specific training and consultancy for companies in the field.**



SOURCE: ISTOCKPHOTO

CORPORATE RELATIONS FOR THE IMPLEMENTATION OF GOOD WELFARE PRACTICES

Reaching commitments from companies in the aquaculture industry, with specific goals and deadlines, is a fundamental step towards achieving improvements in terms of animal welfare in fish production, especially in a scenario without legislative or regulatory support. This is why **Alianima has also been active in the public policy arena, as well as in a dialogue with international certifiers that work with welfare and/or sustainability in the context of fish production.**

“In addition to improving the reputation of farmers and differentiating their products in the global market, animal welfare certification offers significant advantages for the sector and consumers. It promotes responsible farming practices, contributing to environmental sustainability and the protection of marine biodiversity. Therefore, it’s expected that fish welfare certification will also become a reference for aquaculture throughout Latin America, including Brazil.”

Professor Dr. Rosangela Poletto

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



DIALOGUE WITH CERTIFYING BODIES

The dialogue with certifying bodies aims to better understand their methods of operation, encourage the inclusion or improvement of welfare standards in their audits and, above all, **seek to extend the operations of such companies in our country.**

PUBLIC POLICIES

Regarding public policies, **Alianima has been in dialogue with federal parliamentarians and representatives of the Ministry of Fisheries and Aquaculture (MPA), in addition to following the work of the Fisheries and Aquaculture Subcommittee, in the Chamber of Deputies, and the periodic meetings of the Sector Chamber of Fish Production and Industry to keep updated on the main issues discussed.**

In addition, last year, **Alianima produced [a technical note on the humane slaughtering of fish](#), which was submitted to the MPA.** The technical note requests that these aquatic animals be included in Ordinance 365/2021 of the Ministry of Agriculture and Livestock, or even that a new ordinance or regulation be published on the humane slaughtering of fish.

“I hope that in 10 years, fish will be included in the country’s humane slaughtering regulations (Ordinance 365), including a table with minimum parameters to be met to achieve effective unconsciousness in the main species farmed in the country. I also hope that slaughtering methods causing great suffering to fish (hypothermia, asphyxiation, CO₂, evisceration, bleeding, electroimmobilization), as well as the hanging of these animals while still conscious, are clearly prohibited.”

Dr. Daniel Santiago Rucinke Gonzalez

Veterinarian, Partner at Fish Welfare Solutions and
Member of the Fish Advisory Board at Alianima



6. CONCLUSION

Fish are sentient animals that deserve as much consideration for their welfare as any other farmed animal, whether in fish farming or fisheries. There are several critical points that directly affect the welfare of these animals. Improvements in water quality, feeding, stocking densities, environmental enrichments, handling/transportation issues and stunning/slaughtering of animals are essential on farms, while several measures can be taken to reduce welfare risks at all stages of fishing.

In Brazil, tilapia is the most farmed and exported fish, while salmon is the most imported species. Native species, such as tambaqui and pirarucu, also stand out in national fish farming, especially in the North region of the country.

On the other hand, Brazilian fishery lacks data, making a detailed assessment within the national scenario difficult.

As the fish production sector has been growing over the years, and there is no support in the Brazilian legislation regarding fish welfare, nor extensive coverage by certifiers in this sector, it's urgent to change this scenario to achieve improvements in this agenda. And it is precisely in this sense that Alianima has been working in recent years.



SOURCE: ISTOCKPHOTO

From this, the fundamental steps to advance the topic are:



1. **dissemination of intelligible technical-scientific knowledge** about fish sentience and welfare to civil society, farmers and industry.



2. **political advocacy** to consider fish in legal and sub-legal standards.



3. **in the future, seeking and monitoring well-established fish welfare commitments** with companies in the aquaculture industry.

“In recent decades, science has made many advances in recognizing fish as sentient animals. As a result, society has been changing its perception regarding how these animals have been treated in farming environments, especially at the time of slaughtering. This results in consumers becoming more aware and demanding when it comes to welfare issues. Therefore, certifications will be increasingly required, especially by the foreign market. Thus, farmers who are already applying good farming practices will be ahead in this highly competitive market.”

Dr. Ana Silvia Pedrazzani

Veterinarian, CEO of Wai Ora Aquaculture and Environmental Technology and Member of the Fish Advisory Board at Alianima

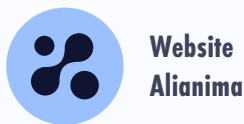


SOURCE: ISTOCKPHOTO

7. CONTACT

Be part of this great movement in favor of animals!

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



Scan and access our
social networks

REALIZATION



The 2024 Fish Watch was developed by Alianima, a non-profit organization, with the support of Open Philanthropy.

SUPPORT



Partial or full reproduction of this publication is permitted, provided that the source is duly cited and that it is not for commercial or profit-making purposes.