

Case Studies

Sustainability and the Sea: Environmental Policy and the Portuguese Canned Fish Sector

Zoe E. Shockites¹

¹ Haslam College of Business, University of Tennessee at Knoxville

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Portugal's canned fish industry, once a dominant force in global seafood exports, has faced significant economic and structural challenges over recent decades. This paper examines how environmentalism and evolving European Union regulations have impacted the Portuguese fish canning sector. New policies have imposed restrictions intended to mitigate overfishing, reduce bycatch, as well as inform consumers. Canning and fishing companies must adapt their production methods and marketing strategies. This study investigates how selected Portuguese canning companies have responded to these regulations, while balancing profitability and environmental responsibility. Findings suggest that while some firms have embraced sustainability through certifications and responsible sourcing, others continue to struggle with rising costs and shifting consumer expectations. This paper highlights the need for ongoing adaptation and proposes future strategies to enhance economic resilience while maintaining environmental integrity within the industry.

Introduction

Since before the world wars, Portugal had become a large exporter of fish, specifically canned fish (Almeida, Vaz, et al., 2015). Portugal has 20 fish canning facilities that produce an annual amount of 44,000 tons of canned fish, 65% of which are exported all around the world. While this is still a strong industry in Portugal, it has taken a significant decline in the past three decades, due primarily to a shift in the supply chain, which can be attributed to new government regulations (European Commission, 2017b). With the growing popularity of sustainability policies and environmental initiatives, specifically within the European Union, the fishing processing industry has been put in a position where it must react. The Portuguese canning companies must be able to profit even with new regulations and restrictions, while also being conscious about how their actions are perceived in the eyes of environmentally conscious consumers. Some of these regulations were first introduced in the 1970s, but many more were implemented more recently in 2013 and 2019 (Almeida, Karadzic, et al., 2015; European Parliament and of the Council, 2019). These regulations focus on stock mitigation and protection of different fish species, as well as mitigating the amount of unwanted caught fish. This research examines the current actions of select tinned fish companies concerning such policies and explores potential steps to enhance sustainability while mitigating negative economic impacts. This paper will use the thematic framework as its organizational method and strive to answer the question: How has the Portuguese canned fish industry adapted to be more en-

vironmentally conscious because of governmental policies and what changes can be implemented to positively impact profits and reputation to be more successful in both their profits and reputation?

One must first have background knowledge of the industry as well as the policies that have affected the industry before we can examine how companies have and should react. There are many reports about the consumption of fish in Portugal and how that has changed over the years. While this paper briefly addresses this, its main focus is on the production of fish, mainly canned fish, as an export to other countries, not how it is consumed within Portugal.

Portuguese Fish Industry

Portugal's geographic location has made it a leading producer of fish for centuries; however, in the twentieth century, Portugal would become a net importer of fish (Trond Bjørndal et al., 2015; *Portugal: The Portuguese Seafood Sector*, 2021). The Portuguese diet primarily consists of seafood, and as Portugal's population increased, the fisheries could not keep up and turned to countries such as Norway and Spain (Almeida, Karadzic, et al., 2015). This trend, however, does not apply to the canned fish industry in Portugal. Portugal became one of the top world leaders in exporting canned fish in 1912, and this legacy would continue for the next century to come (Dias & Guillotreau, 2004). Today, Portugal primarily cans cod, tuna, and sardines. While Portugal is not on track to be the number one exporter of tinned fish, they have still been successful and profitable. Canned sardine production specifically peaked

in 1967 with a production of 74,000 tons, but since then has dropped to 50,000 tons on average annually. This is still a strong number as Portugal ranks number three in the world for exporting canned sardines, behind only Morocco and Algeria. Portugal's tinned sardine exports represent 8% of the world's sardine supply (Almeida, Vaz, et al., 2015).

Many factors have played into Portugal's fluctuation in this industry, whether that be political unrest, such as the Portuguese colonial war, which was from 1961 to 1974, or most notably Portugal's integration into the EEC, which is now commonly known as the EU, in 1986 (Ferraz, n.d.). This integration gave Portugal access to both the help and the funds from the European Union, thus meaning that Portugal could now improve their fisheries and factories with the assistance of EU finances (Dias & Guillotreau, 2004). By joining the European Union, countries such as Portugal gained access to the EU budget, which allowed them to join initiatives such as the "Cooperation for restoring cockle shellfisheries & its ecosystem services in the Atlantic Area" (European Commission, 2017b). This was one of the more recent EU-funded initiatives designed to improve marine wildlife data management systems in Portugal and neighboring countries, supporting fish stock inventory management and pollution reduction. The EU contributed 224,921,571 Euros to the five countries, Portugal included, that were involved in the project, which illustrates the scale of the monetary gain that the industry benefited from by joining the EU. It also allowed for access to the European Maritime and Fisheries Fund, specifically the Operational Programme of Fisheries in Portugal (Trond Bjørndal et al., 2016). This is a special subsidy that allows fisheries and processing facilities to fund everything from equipment to marketing their products. It is even promoted to help cover costs associated with a part of the Common Fishery Policy that requires transparency in the stages of production for traceability. To give some scale of the value of funds like these, the larger European Maritime and Fisheries Fund, which serves all of Europe, has a budget of 6.4 billion Euros to be used from the years 2014 to 2020 (European Maritime and Fisheries Fund (EMFF), 2015). The goal of funds like these is to help companies adjust and adapt to sustainable fishing practices and policies and each participating country gets to manage this fund and decide how to use it in compliance with its original intention, which is how Portugal's Operational Programme of Fisheries became enacted (Trond Bjørndal et al., 2016).

However, the integration into the European Union also had negative effects. For example, the tariffs were lowered on canned sardines from Morocco (Dias & Guillotreau, 2004). This posed a threat to the Portuguese canneries, as consumers could possibly get imported Moroccan sardines at a lower price point than the Portuguese ones, which would lead to a decrease in Portugal's market share. Joining the EU also gave individual fishermen more power and rights; having standardized European Union policies supporting them increased their bargaining and negotiation power. There were now greater safety protocols that would take funds to implement successfully. While both have positive social impacts, they put an even greater financial

strain on local fisheries and canneries. After Portugal was officially in the European Union, it began to be governed by many EU policies that helped the industry become more sustainable overall.

Current Policies Affecting the Portuguese Canned Fish Industry

Stock Mitigation Policies

One of the main focuses of several EU governmental policies is to help with fish stocks. This focus stems from past declines in fish populations, where increased fishing mortality and juvenile discards led to commercial endangerment (Almeida, Karadzic, et al., 2015). In 1993, the cod population in the Eastern Atlantic fell so low that a temporary prohibition was imposed on cod fishing. Overfishing in countries such as Portugal became cumbersome not only for the industry but also for the environment. When areas are overfished, they can eventually become completely obsolete, so the European Union enacted "minimum conservation reference sizes," which aim to protect juvenile marine species by allowing them time to reproduce (European Parliament and of the Council, 2019). This means that fishermen must only keep fish that are above a certain length; for example, sardines (*Sardina pilchardus*) must be at least eleven centimeters to be kept (*Exclusive Economic Zone - an Overview | ScienceDirect Topics*, n.d.). This ensures that the fish are not being caught too prematurely, and they can continue to reproduce and thrive.

Part of this regulation also established fish stock recovery areas, which are geographic locations that not only uphold the size requirements but have even stricter regulations on commercial fishing, some locations cannot even be fished (European Parliament and of the Council, 2019). Areas like these have existed in Europe for over a hundred years, under the name Marine Protected Areas, or MPAs (Roberts et al., 2012). MPAs, however, were not properly managed and only covered 0.01% of Europe's oceans. Notably, no MPAs are in the surrounding waters of Portugal as of 2012. Conversely, the new fish stock recovery areas cover 10 to 20 percent of Europe's oceans and are managed with fewer oversights and more effectively. Fish stock recovery areas allow for species in specific areas to increase their population numbers in a similar way to how farmers rotate their crops so as not to deplete the soil nutrients in certain areas. By rotating zones that are allowed to be fished, the stocks are never completely depleted, and time promotes a healthy repopulation. This also serves to increase populations by protecting habitats for vulnerable species. If areas are not fished as frequently, there will consequently be less water traffic in this area, allowing for less destruction, especially in shallower areas, as well as less pollution from fuel discharge or spillage.

Fishermen must also use appropriate gear for the species and size of the fish they are targeting and even go as far as providing "evidence demonstrating that those measures result in selectivity characteristics for specific species or combination of species" (European Parliament and of the Council, 2019). By using specific gear for specific sizes and

species of fish, unwanted catches are minimized, and there is a less likely chance of species being overfished in short periods of time. Fisheries are not only required to comply with these gear regulations but also be ready to provide evidence of why they are using the gear that they chose.

A secondary layer to the governmental policies is those aimed at reducing the waste of unwanted catches. According to the European Parliament and of the Council, fishermen must aim to avoid and reduce unwanted catches (2019). For example, if a commercial fishing boat deployed a large net and unsystematically trawled the ocean for hundreds of yards, capturing numerous unintended species that were subsequently too injured to be safely returned to the sea, it would not be adhering to efforts aimed at reducing unwanted catches. Due to the discard ban, throwing unhealthy fish back into the ocean is also prohibited under these regulations, forcing fishing boats to creatively use their fishing waste, which will be discussed later in this paper (Leitão & Baptista, 2017).

Common Fisheries Policy

The European Union started the Common Fisheries Policy, whose “goal is to foster a dynamic and profitable fisheries and aquaculture industry and to ensure good socio-economic conditions in coastal communities” (*Common Fisheries Policy - an Overview | ScienceDirect Topics*, n.d.). There are many layers to the Common Fishery Policy, but its focus is on benefiting the consumer. One aspect of the policy requires the canning facilities to label their packaging with a detailed list of the stages of that product. This is a requirement for all fish and “aquaculture products,” and these stages are everything from where the fish was caught to how it was processed. This allows the consumer to have more understanding of where their food comes from and make better purchasing decisions, some of whom may even be willing to pay a higher price due to knowing the provenance of that product. However, this not only adds some accountability for where they are sourcing their fish but also an extra step for the canneries and fisheries, which results in extra costs, especially for their packaging.

Yet another layer to these limitations is the total allowable catch or TAC limits (European Commission, 2020). These have similar intentions to that of the minimum size requirements, in that the goal is to prevent overfishing and promote a healthy population. The TAC limits are determined by the maximum sustainable yield of a species, which changes constantly, thus resulting in the TAC limits to fluctuate often, as well. This is an added challenge for Portuguese fisheries, as they must keep up with changing catch limits and ensure they comply. In some instances, however, the changes in limits could work to benefit Portuguese fisheries. For example, in 2019, species such as mackerel saw a 29% increase in their total allowable catch limit, which meant that fisheries could now catch 29% more mackerel than in 2018 (DGRM, 2019). One cannot assume that all the Portuguese fisheries were able to take advantage of this increase, as some likely did not have the resources or capacity to increase their catches by 29% in one year, but it provided the option. It also meant that the stock

management protocols that had been put in place were effective enough to allow for this increase, and the mackerel population was sustainable that year.

Economic Policies

Not all the policies, however, are solely environmental and sustainability-driven; some are politically and economically motivated. In the early 1970s, Exclusive Economic Zones were established in Portugal. An EEZ “is an area where sovereign states have jurisdiction over resources” (*Exclusive Economic Zone - an Overview | ScienceDirect Topics*, n.d.). As a result of these international water zoning and restrictions, cod production saw what would be its first major decline beginning in the 1970s (the second being that from the temporary ban of cod fishing in the Eastern Atlantic in 1993) (Almeida, Karadzic, et al., 2015). Portuguese cod fisheries and canneries faced significant losses as a result of these EEZ restrictions and lost some of their market share as countries began to rely on importing their cod from cheaper places. Portuguese canneries began to import their cod from other countries as well, instead of purchasing domestically. This is an ongoing threat to the canned fish industry, as commercial fishing boats now must avoid both EEZs and stock recovery areas.

Industry Regulation Compliance and Effects

Government agencies are enforcing new regulations to correct the environmental damage caused by unsustainable fishing, forcing Portuguese fisheries and canneries to adapt (Almeida, Karadzic, et al., 2015). One way that Portuguese canneries have adapted is by outsourcing their fish and importing it from countries such as Spain or Morocco and then processing and canning it in one of Portugal’s nineteen fish canning companies (European Commission, 2017a). Under European Union regulations, tariffs are much lower on raw materials, which would include fresh or frozen fish (Trond Bjørndal et al., 2015). This means that if Portuguese canneries cannot get their fish domestically, they import it at a similar price point from neighboring countries, however, there is now the extra cost of transportation and adequate labeling to adhere to the Common Fishery Policy to inform consumers where the fish is coming from. If Portugal imports from countries outside the EU, such as Morocco, the EU loses out on the growth of its GDP. As an offset to these costs, the EU strives to promote Portuguese fish processing by adding a duty to processed products, i.e., canned fish. While Portugal may be importing fresh fish at a larger rate to combat overfished waters and environmental regulations, Portuguese consumers are more likely to buy Portuguese canned fish rather than imported canned fish, because it is at a lower price since it is duty-free. As a result, the fish processing industry in Portugal has grown.

Regarding the Portuguese canning industry’s dependence on imported fish, it is helpful to examine the implications for the Portuguese sardine as an example of how the industry has been affected. Out of the 19 Portuguese fish canning facilities, 14 of them process sardines, a relatively good indicator of the fish processing industry as a

whole (European Commission, 2017a). Up until 2011, Portuguese canneries used primarily domestically caught sardines with the occasional importation of frozen sardines, if necessary. However, after 2011, it became evident that Portuguese companies were now having to rely on imports in lieu of administrative regulations and a rapid decline in the sardine stock. As a result, the canned sardine prices in Portugal have tripled. This is problematic for the canned sardine producers, whose main competitor is the fresh sardine market, in which consumers are generally more apt to pay a premium price. So, although in some respects the fish processing industry has grown as a result of these regulations, they now must face numerous supply chain problems that result in price fluctuations and possible loss of business to substitutes.

Local Sourcing and Sustainability at Poveira

Several Portugal-based companies pride themselves on being strictly Portugal-based, thus meaning that they do not rely on imports for their tinned fish and remain sourcing them domestically, regardless of the economic implications discussed above. Poveira is one such company (*Quem somos | Conservas A Poveira*, 2024). Their production is one hundred percent Portuguese. They have been canning fish since 1938 and have survived the ups and downs that the industry has experienced over the last century. Poveira strives to use its environmental resources responsibly, and with every action, it attempts to minimize the subsequent environmental impacts. They also state that at Poveira, they are “committed to producing safe products, in accordance with the agreed technical specifications and with the legislation in force, guaranteeing the quality and authenticity of all products and preventing food fraud.” They do this to not only comply with the discussed regulations set by the European Union and Portugal but also to appeal to environmentally conscious consumers. Because of Poveira’s disdain towards imported fish, price is likely not their unique value proposition, so instead, they boast numerous certifications to provide the consumer with the peace of mind that they are acting ethically and sustainably.

Poveira was awarded with the Marine Stewardship Council blue Eco-label which demonstrates their commitment to sustainability (*Quem somos | Conservas A Poveira*, 2024). Government bodies such as the European Union are the primary forces when it comes to regulations on the canned fish industry, but international nonprofits such as the Marine Stewardship Council certification program award fisheries this title if they are using sustainable and well-managed fishing practices (Marine Stewardship Council, n.d.). This certification requires that the fish are sourced sustainably and that Poveira only fish healthy stocks to not deplete a species that is vulnerable to overfishing (Marine Stewardship Council, n.d.). This is not a label that is just achieved and then forgotten; a company like Poveira must continue to adhere to sustainable practices as they are reassessed every five years, and every year they are evaluated by a representative of the Marine Stewardship Council to ensure that they are progressing in the right direction. This distinct blue label is displayed on every one of their products,

educating consumers that they can purchase a Poveira tin of fish and know that they are not contributing to the negative environmental impacts of the fish processing industry.

Branding Approach at The Fantastic World of the Portuguese Sardine

To see what other companies are doing to remain profitable in this difficult industry, we can examine a second Portuguese tinned fish company: The Fantastic World of the Portuguese Sardine. The Fantastic World of the Portuguese Sardine is produced in conjunction with the Comur canning facility, which began at the height of the Portuguese canning industry in 1942, during World War II (*The Fantastic World of The Portuguese Sardine*, 2015). As the height of the Portuguese canning industry began to dwindle, the Comur canning facility struggled to stay profitable in the new era of fish shortages and the exponential cost that came along with abiding by governmental policies. This was until 2015 when the Comur canning facility joined the O Valor do Tempo Group. The O Valor Tempo Group prioritizes economic, social, and environmental sustainability with all its 13 brands, all of which have one thing in common: they are distinctly Portuguese (*The Group – O VALOR DO TEMPO*, 2015). This means that the Comur canning facility is not importing its fish from countries like Spain or Morocco, but only using Portuguese fish, like Poveira, but unlike many of its competing factories. So, how are they still able to profit in such a challenging industry? By embracing their strictly Portuguese ingredients, they created a unique value proposition centered around Portuguese culture.

The O Valor Tempo Group rebranded the nearly century-old Comur canning facility’s tinned fish products into what they are today: The Fantastic World of the Portuguese Sardine. They have taken an industry that historically used low prices as their unique value proposition over competitors in the fresh and frozen fish industries and instead capitalized on Portugal’s culture and creative branding (*The Fantastic World of The Portuguese Sardine*, 2015). One tin of sardines in olive oil costs nearly 13 US dollars, whereas other brands, such as Poveira, price theirs at only three US dollars. However, consumers, especially tourists, are willing to pay this premium price. They created fish tins for each major city in Portugal and wrapped them with beautiful, original artwork, which made them not just a convenient food source, but a collector’s item. This has been so successful that The Fantastic World of the Portuguese Sardine has twenty store locations across Portugal and just invested four and a half million Euros to open its twenty-first in New York City (Stilwell, 2023). The brand’s marketing director, Sónia Santiago Felgueiras, commented on the opening of the New York location and stated that “we are very satisfied with the results of our presence in New York, not only because of the way the store is running, but because it represents an emotional embassy of Portugal there” (*The Fantastic World of the Portuguese Sardine*, 2025). By joining the O Valor Tempo Group, the Comur cannery was able to not only stay afloat but also become very profitable while remaining true to its Portuguese roots. In doing so, it also

did not sacrifice complying with environmental regulations or practicing unsustainable fishing practices (*The Fantastic World of The Portuguese Sardine*, 2015). Since *The Fantastic World of the Portuguese Sardine* has distinguished itself as a higher-end tinned fish, they do not focus on mass production, making quantity not a top priority, thus reducing the temptation and need to overfish the Portuguese waters. Although they are still able to produce 2.5 million tins of fish each year (Stilwell, 2023). *The Fantastic World of the Portuguese Sardine*, however, does not boast certifications such as the Marine Stewardship Council blue Eco-label, like other, more environmentally conscious brands (*The Fantastic World of The Portuguese Sardine*, 2015). While other brands may look to the *Fantastic World of the Portuguese Sardine's* take on differentiation and marketing to increase their own profits, they are not at the forefront of environmentally conscious brands, but have been able to be profitable under Europe's strict sustainability regulations.

New Opportunities for Sustainability

Many Portuguese canneries and fisheries are overcoming many of the challenges that originate from the negative environmental repercussions, such as fish shortages, and have been able to adapt to the governmental regulations that have been put in place to combat those sustainability issues (European Commission, 2017a). However, these companies could be taking further steps to enhance their corporate social responsibility.

Compared to the fresh or frozen fish industries, the canning industry has a much more significant environmental impact, specifically, a kilogram of canned sardines has seven times the environmental impact of a fresh or frozen kilogram of sardines (Almeida, Vaz, et al., 2015). This disparity has emerged due to factors such as water waste, packaging materials, and water pollution. Due to the nature of the fish processing and canning industry, most of the factories are located on bodies of water, whether that be canals or rivers, which causes a lot of water pollution from disposed materials (Cristóvão et al., 2012). A possible and economical solution to waterway pollution is organic coagulation methods. This would allow fish processing plants to use organic materials to solidify pollution matter, such as oil or fish bodily fluid and debris, making it easier to dispose of and stopping the polluted runoff from entering waterways. Another major contributor to the water consumption problem is the inevitable water waste. The University of Porto research team had several small yet impactful ideas on how to lower water consumption in these factories. These included substituting the hot water needed for fish defrosting with either warm water or humidity, or even something as simple as using a smaller nozzle when washing the fish was noted to have a big impact in the long run. These companies do not have to make major changes to their facility to be more environmentally conscious, and pour in millions of dollars in updates, small, simple changes can go a long way.

The fish are not the only factors that have environmental implications. The environmental impacts of packaging materials such as olive oil and aluminum also must be consid-

ered when looking at possible sustainability improvements for the fish canning industry. Olive oil has significantly greater environmental impacts than any other aspect of canning fish (Almeida, Vaz, et al., 2015). While fish can be canned in other liquids like water or tomato sauce, olive oil is a very popular canning agent for consumers. Of the fish canning process, the production of olive oil contributes to 55% of the ozone depletion potential. This is due to factors including but not limited to the fertilizers used when growing olives, waste from producing olive oil, and the transportation of the olive oil from places like Spain and France to the canning facilities in Portugal. Given that they are companies other than Poveira or *The Fantastic World of the Portuguese Sardine*, they rely on Portuguese olive oil, thus reducing these transportation effects (*Quem somos | Conservas A Poveira*, 2024; *The Fantastic World of The Portuguese Sardine*, 2015). Providing that consumers continue to prefer and purchase fish packed in olive oil. It is an unavoidable necessity to continue packing fish such as sardines in olive oil. However, during the filling stage of production, around 7% of the olive oil is wasted (Almeida, Vaz, et al., 2015). The tins often overflow, and currently, in most facilities, there is no infrastructure to reuse the overflow, but by implementing this infrastructure or reworking the way cans are filled to reduce spillage, a lot of the olive oil waste could be reduced. Not only would this be a positive environmental impact but an economic one as well; theoretically, canneries would have to purchase 7% less olive oil.

Aside from olive oil, another aspect of the packaging that is not the most environmentally friendly is the can or tin itself (Almeida, Vaz, et al., 2015). Aluminum can production is the primary contributor to things such as the global warming potential and the cumulative energy demand when looking at the environmental impact of a can of fish. The cans are typically cut from sheets of aluminum, often leaving a lot of unusable scrap material to go to waste, and the lids are cut from sheets of tin, which is an even greater contributor to greenhouse gas emissions than the aluminum cans. Cheila Almeida and her colleagues suggest using plastic packaging for at least one aspect of the packaging: the lid or the can itself. This would cut greenhouse gas emissions of the packaging in half, and would likely be cheaper than aluminum, as aluminum prices have been on the rise in the past year (*Aluminum Chart - Investing.Com*, 2025). However, plastic comes with its own negative environmental effects as well, and brands such as *The Fantastic World of the Portuguese Sardine*, which heavily relies on the aesthetic of the tin for branding, would likely not make the switch to plastic, but it is an option for other companies to consider.

One of the many previously discussed European Union policies that fisheries and canneries must abide by is the discard ban (European Parliament and of the Council, 2019). Commercial fisheries caught and did not report many different species that were not their target species, but 89% of these unwanted and unreported catches had retail value, meaning that they could be sold for a profit instead of being illegally dumped back into the ocean (Leitão & Baptista, 2017). This is a creative economic opportunity

for these fisheries to increase profits while simultaneously reducing waste. By innovating this sector of the industry, fisheries in Portugal would be able to sell their otherwise wasted species to canneries or other fish processing plants, which would also decrease the need for importing fish from other countries and positively contribute to Portugal's overall GDP. It is estimated that by selling these otherwise discarded species, fisheries could see anywhere from a ten to a 53% increase in sales revenue. Since the discard is so new and not all the monitoring systems are in place yet, fisheries are having to adapt in real-time and actively create ways to profit sustainably, and selling discards will likely gain popularity as the discard ban becomes more strictly enforced.

Conclusion

Canned fish: what once was a thriving industry in Portugal has now been challenged by depleting fish stocks,

and government policies that are attempting to increase this industry's sustainability as well as increase the overall economic gain and captivate consumers' attention. Some companies have been able to successfully navigate these changes and remain profitable, while others are still struggling, however, many of these policies and challenges are very new, so only time will tell how fisheries and canneries will react. Although several companies have made sustainability a priority through their fishing practices or certifications, additional research could explore alternatives for improvement. As for the consumer, this could mean that what once was a very conventionally cheap protein source could experience a price increase that is made in proportion to the extra costs these factories are now facing to act sustainably and keep this industry around for at least another century.

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References

- Almeida, C., Karadzic, V., & Vaz, S. (2015). The seafood market in Portugal: Driving forces and consequences. *Marine Policy*, 61, 87–94. <https://doi.org/10.1016/j.marpol.2015.07.012>
- Almeida, C., Vaz, S., & Ziegler, F. (2015). Environmental Life Cycle Assessment of a Canned Sardine Product from Portugal. *Journal of Industrial Ecology*, 19(4), 607–617. <https://doi.org/10.1111/jiec.12219>
- Aluminum Chart - Investing.com. (2025, March 7). Investing.Com. <https://www.investing.com/commodities/aluminum-streaming-chart>
- Bjørndal, T., Brasília, A., Ramos, J., & Tusvik, A. (2015). The Portuguese fish processing industry from the 1960s to the present.
- Bjørndal, T., Brasília, A., Ramos, J., & Tusvik, A. (2016). Fish processing in Portugal: An industry in expansion. *Marine Policy*, 72(0308-597X), 94–106. <https://doi.org/10.1016/j.marpol.2016.06.011>
- Common Fisheries Policy - an overview | ScienceDirect Topics. (n.d.). Wwww.Sciencedirect.Com. <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/common-fisheries-policy>
- Cristóvão, R., Botelho, C., Martins, R., Rui Boaventura, & Frias, R. (2012). Pollution prevention and wastewater treatment in fish canning industries of Northern Portugal. *Unitec Research Bank (Unitec Institute of Technology)*, 32.
- DGRM. (2019). ANNUAL REPORT PORTUGUESE FISHING FLEET – 2019. https://oceans-and-fisheries.ec.europa.eu/document/download/499b3bae-909c-4a74-8542-32ad7783d7a1_en?filename=2019-fleet-capacity-report-portugal_en.pdf
- Dias, J. F., & Guillotreau, P. (2004). Nearly two centuries of fish canning: A historical look at European exports of canned fish. *ScholarsArchive@OSU*. https://ir.library.oregonstate.edu/concern/conference_proceedings_or_journals/1n79h5572
- European Commission. (2017a). Case Study: Canned Sardine in Portugal. In *European Market Observatory for Fisheries and Aquaculture Products*. <https://eumofa.eu/documents/20124/73907/Price%2Bstructure%2Bin%2Bthe%2Bsupply%2Bchain%2B-%2Bcanned%2Bsardine%2Bin%2BPT.pdf/5a86e2d9-2ef3-97df-4d79-e4e209e52fb9?t=1703088785063>
- European Commission. (2017b). Cooperation for restoring cockle shellfisheries & its ecosystem-services in the Atlantic Area | Kohesio. Europa.Eu. <https://kohesio.ec.europa.eu/en/projects/Q4298392>
- European Commission. (2020). ANNUAL REPORT ON THE PORTUGUESE FISHING FLEET – 2020.
- European Maritime and Fisheries Fund (EMFF). (2015, January 23). *Oceans and Fisheries*. https://oceans-and-fisheries.ec.europa.eu/funding/european-maritime-and-fisheries-fund-emff_en#the-fund
- European Parliament and of the Council. (2019, June 20). *REGULAMENTO (UE) 2019/1241 DO PARLAMENTO EUROPEU E DO CONSELHO*. https://www.dgrm.pt/documents/20143/94422/CELEX_32019R1241_PT_TXT.PDF/8ca841f3-af89-9598-fa95-fe38c41b65ad
- Exclusive Economic Zone - an overview | ScienceDirect Topics. (n.d.). Wwww.Sciencedirect.Com. <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/exclusive-economic-zone>
- Ferraz, R. (n.d.). THE FINANCIAL COSTS OF THE PORTUGUESE COLONIAL WAR, 1961-1974: ANALYSIS AND APPLIED STUDY. *Revista de Historia Economica - Journal of Iberian and Latin American Economic History*, 1–30. <https://doi.org/10.1017/S0212610921000148>
- Leitão, F., & Baptista, V. (2017). The discard ban policy, economic trends and opportunities for the Portuguese fisheries sector. *Marine Policy*, 75, 75–83. <https://doi.org/10.1016/j.marpol.2016.10.012>
- Marine Stewardship Council. (n.d.). *US & Canada - English*. <https://www.msc.org/en-us>
- Portugal: The Portuguese Seafood Sector. (2021, March 18). USDA Foreign Agricultural Service. <https://www.fas.usda.gov/data/portugal-portuguese-seafood-sector>
- Quem somos | Conservas A Poveira. (2024, October 7). Conservas a Poveira. <https://www.apoveira.pt/quem-somos/>
- Roberts, C., Hawkins, J., & Environment Department, University of York, UK. (2012). *Establishment of Fish Stock Recovery Areas* (V. Kelmelyte, Ed.). European Parliament. [https://www.europarl.europa.eu/RegData/etudes/note/join/2012/495827/IPOL-PECH_NT\(2012\)495827_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/note/join/2012/495827/IPOL-PECH_NT(2012)495827_EN.pdf)
- Stilwell, A. (2023, September 5). *Portuguese Sardines shine a beacon in Times Square*. Portugal Resident. <https://www.portugalresident.com/portuguese-sardines-shine-a-beacon-in-times-square/>
- The Fantastic World of The Portuguese Sardine. (2015). The Fantastic World of the Portuguese Sardine. <https://portuguesesardine.us/pages/comur>
- The Fantastic World of the Portuguese Sardine. (2025, January 7). *The Fantastic World of the Portuguese Sardine is featured in Imagens de Marca, on TV channel SIC Notícias. The program assumes [Post]*. LinkedIn. <https://www.linkedin.com/posts/the-fantastic-world-of-the-portuguese-sardine-the-fantastic-world-of-the-portuguese-sardine-activity-7271617322937692161-f6yH/>
- The Group – O VALOR DO TEMPO. (2015). Ovalordotempo.pt. <https://www.ovalordotempo.pt/en/the-group/>