

# The seafood market in Portugal: Driving forces and consequences



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## ABSTRACT

Portugal has the third highest seafood consumption per capita in the world and current patterns of seafood consumption are linked to how seafood products were embodied in the Portuguese society. The objective of this research is to understand Portuguese seafood consumption's main drivers and its consequences. For that official statistics were analyzed and a literature review on seafood consumption was undertaken. Portuguese seafood consumption is characterized by a wide diversity of species and preparing modes, when compared to other countries in Europe. Cod (salted and dried), does not exist in Portuguese waters but due to several factors, such as politics, religion and tradition, became the main species in Portuguese seafood consumption, representing around 38% of the national seafood demand. Five drivers are suggested to explain why Portuguese eat so much seafood: geography, marine resources, fisheries, social forces and politics; and consequences for the environment, economy and health are discussed. Hence while most dietary recommendations advise an increase in fish consumption is not applicable to Portugal and a more sustainable seafood consumption for the future is advocated.

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## 1. Introduction

Human diet has undergone significant changes in recent decades contributing significantly to global environmental impacts [1]. As an example, livestock production is responsible for 10% of European greenhouse gas (GHG) emissions and several other consequences for the environment, such as habitat destruction, pollution and biodiversity loss [2]. The mitigation of some of these impacts should be implemented, not only by changing production systems, but also consumer preferences related to their diets [3].

Marine resources have been traded more than any other food commodity and represent one of the most nutritious and healthy foods, with high quality animal protein and a low fat content [4,5]. Fish is widely reported as an important source of essential amino acids, long-chain polyunsaturated fatty acids, vitamins, minerals, and trace elements [6]. It contributes with at least 15% of worldwide animal protein consumed and up to 50% in some coastal states [7,8].

The feasibility of increasing fish consumption, as a dietary recommendation, needs to be balanced with the sustainability of marine stocks [9]. In fact, around two thirds of the assessed fish stocks worldwide are overfished and lower exploitation rates are needed to reverse the collapse of vulnerable species [10]. One of

the reasons that make marine systems' vulnerable is the supply of the worlds' major seafood markets as EU, Japan and USA, which are largely dependent on seafood sources well beyond their domestic waters [11]. The worldwide supply of seafood from fisheries peaked in 1986 and farmed seafood has been increasing since 1970 at an annual rate of 7% [7]. It is fundamental to understand the reasons behind this global demand, as it represents a main driver of fishing pressure [12].

Dietary patterns are related not only to economic dynamics but also to cultural factors [13]. The main fish species used in meals have changed through time and the interest for species in higher trophic levels and vulnerable species have been increasing [14]. From historical, cultural, social, but especially ecological perspectives, it is important to understand how such behavior is influenced by several factors and identify the main drivers of change [15].

Portugal is the country with the highest seafood consumption in Europe and one of the largest in the world [16], but knowledge concerning which species are most consumed, its trends and forcing factors are extremely scarce. This study, addresses two main questions: i) what seafood do Portuguese eat? and ii) why do Portuguese eat so much seafood? To answer these questions the species and quantities of Portuguese seafood landings and consumption were investigated; and environmental, social, economic, and even the political factors that may be recognized as the main drivers of Portuguese diet habits were analyzed.

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## 2. Methodology

Diets are shaped by different drivers such as production, post-harvest chain, traditions, geography, demography, globalization, religion and culture [4]. Altogether they contribute to the dynamics of seafood consumption. In order to understand the different drivers and consequences of seafood consumption, both quantitative and qualitative data were combined. Looking at different indicators in an integrated way allow a comprehensive analysis of the seafood system. For the purpose of this paper, seafood includes all major captured and farmed edible aquatic food products entering in the human food chain, including fish, crustaceans, and molluscs. The data was obtained from two different sources: apparent consumption (Food Balance Sheet (FBS) from Food and Agriculture Organization (FAO) statistics (FAOSTAT) [17]) and market flows (namely Portuguese Food Balance database, household budget and population surveys).

The fundamental information on Portuguese fisheries and aquaculture was obtained from Portuguese National Institute of Statistics (INE), which produces annual reports on Fishery Statistics (*Estatísticas da Pesca*) since 1969 (INE) [18]. Earlier data exists, beginning in 1938, but has a weak resolution since most species are grouped in commercial categories, with only few species-level data (e.g. sardine). Publications such as the Portuguese Food Balance (*Balança Alimentar Portuguesa*) have been published in four volumes gathering different time periods (1963–1973; 1963–1975; 1980–1992; 1990–1997; 2003–2008) [19–23]. For previous periods information was collected from two publications with general information on Portuguese diets from the beginning of the 20th century: Abecasis [24] and Correia [25]. Portuguese National Health Surveys were conducted during 1987, 1995/1996, 1998/1999, and 2005/2006 [26,27]. The sampling frame included people living in individual housing and information on individual food intake. For the relative seafood consumption by species Rodgers et al. [28] was used, a report about fisheries products for the European Parliament's Committee, and Cardoso et al. [29], a research study based on internet surveys.

When interpreting consumption data, different data sources have different methodological limitations that need to be

considered. Data from both FBS and individual surveys are not directly comparable but can complement each other [30]. There are limitations related to the statistical sources and it is difficult to correctly assess values of per capita consumption by type of product [31]. The FBS reflects national per capita supply at retail level for human consumption and represents the food produced and imported into countries minus the food exported, food that was used to feed animals or otherwise not available for human consumption, divided by the population size [16]. The FBS can show long-term trends but it does not represent the amount of food that is actually consumed because it tends to overestimate food consumption when compared with individual surveys [4]. On the other hand individual surveys are biased, since it is difficult to cover population homogeneously and people participating in the study are influenced by different methodologies (e.g. internet surveys, face-to-face, phone).

To complement the quantitative data, descriptive information was used to understand the reasons behind seafood demand. Furthermore, relevant historical events were analyzed that influenced Portuguese society and its diet traditions. A detailed literature review was carried out concerning seafood in Portugal in order to build a narrative that describes the known demand [24,25,29,32–37]. Time periods were then defined with different seafood consumption patterns related to historical events. Based on the framework from Kearney [4], the main drivers that are considered important to shape current seafood consumption in Portugal were analyzed and their consequences were evaluated.

## 3. Results

### 3.1. Seafood market in Portugal

Portuguese seafood production from fisheries in recent years represents around 160 thousand tonnes and 270 million Euros, per year [17]. Portuguese fishery landings are composed of almost 40 different categories from different taxonomic groups, such as fish, cephalopods, crustaceans and molluscs, comprising ca. 200 different species. Marine pelagic fish landings in Portugal are

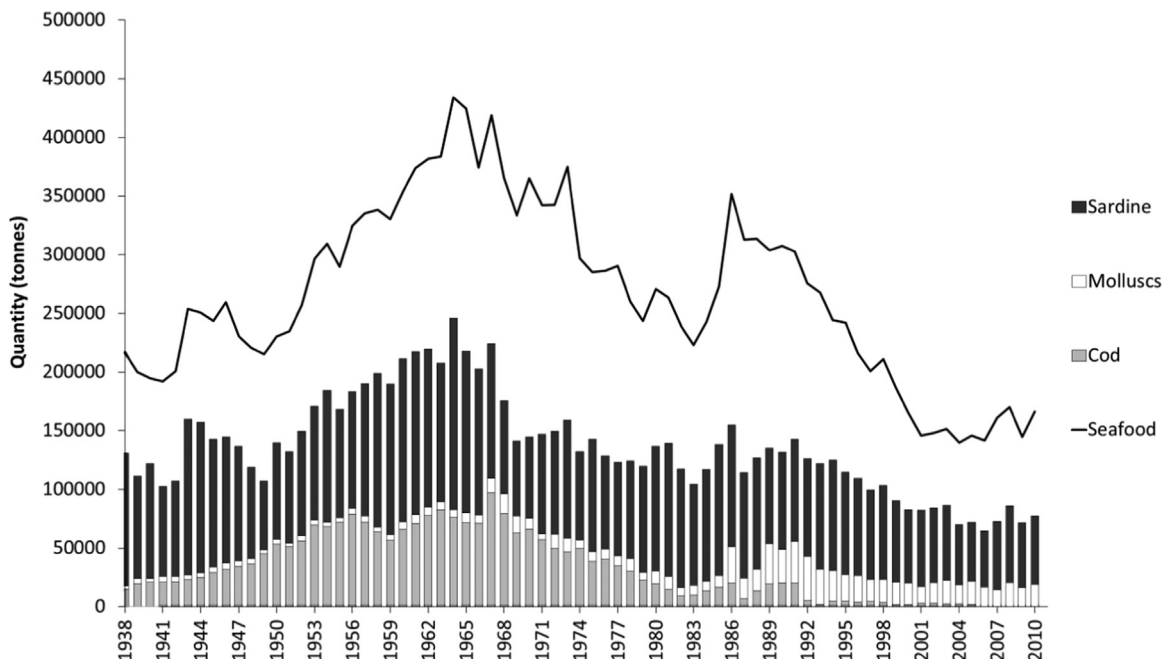


Fig. 1. Seafood landings between 1938 and 2010 in Portugal, with total (line) and individual production variation through the years for sardine, molluscs and cod. Source: INE [18].

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