

The State and Natural Resources: 250 Years of Rice Production in Portugal, 18th-21st Centuries

Estado e recursos naturais: 250 anos de produção de arroz em Portugal, séculos XVIII-XXI

L'État et les ressources naturelles: 250 ans de riziculture au Portugal, XVIIIe-XXIe siècles

Carlos Manuel Faísca, Dulce Freire and Cláudia M. Viana



Electronic version

URL: <https://journals.openedition.org/lerhistoria/9542>

DOI: 10.4000/lerhistoria.9542

ISSN: 2183-7791

Publisher

ISCTE-Instituto Universitário de Lisboa

Printed version

Number of pages: 241-262

ISSN: 0870-6182

Electronic reference

Carlos Manuel Faísca, Dulce Freire and Cláudia M. Viana, "The State and Natural Resources: 250 Years of Rice Production in Portugal, 18th-21st Centuries", *Ler História* [Online], 79 | 2021, Online since 20 December 2021, connection on 23 December 2021. URL: <http://journals.openedition.org/lerhistoria/9542> ; DOI: <https://doi.org/10.4000/lerhistoria.9542>



Ler História está licenciado com uma Licença Creative Commons - Atribuição-NãoComercial 4.0 Internacional.

THE STATE AND NATURAL RESOURCES: 250 YEARS OF RICE PRODUCTION IN PORTUGAL, 18TH-21ST CENTURIES

241

Carlos Manuel Fáisca

Center of Interdisciplinary Studies, University of Coimbra, Portugal
carlos.faisca@uc.pt

Dulce Freire

Center of Interdisciplinary Studies, Faculty of Economics, University of Coimbra, Portugal
dulce.freire@fe.uc.pt

Cláudia M. Viana

Center for Geographical Studies, Institute of Geography and Spatial Planning, University of Lisbon, Portugal
claudiaviana@campus.ul.pt

This article analyses rice production in Portugal from its establishment in the late eighteenth century to the present. Today, not only are the Portuguese the main consumers of rice in Europe, but this cereal is the second most-produced by Portuguese agriculture. However, the historical analysis of rice production in Portugal is limited to specific eras and/or geographies. This research aims to contribute to filling several research gaps, providing a long-term view of a current problem, as the terms of public support for rice production have recently been discussed. Thus, based mainly on statistical sources, the conclusion is that rice, after a phase of slow growth, established itself from the 1930s onwards as one of the main crops of Portuguese agriculture. In fact, rice was the only cereal in Portugal that managed to keep up with the increase in productivity of the other European countries. To this end, in conjunction with favourable agroecological and market factors, public policies were decisive, such as seed selection and the introduction of more productive varieties, the elimination of public health problems and the construction of major agricultural hydraulic public works.

Keywords: rice, food, Portuguese agriculture, agricultural policy.

Resumo (PT) no final do artigo. Résumé (FR) en fin d'article.

Rice is the most important crop for human consumption and forms the basis of the diet of about half the world's population. Although there are consumers in all continents, most of them are concentrated in Asia, where the average annual consumption exceeds 100 kg per capita (Costa 2017, 50). Asian rice fields occupy approximately 86% of the world rice

area, which corresponds to more than 146 million hectares, producing 90% of the planet's rice, about 705 million tons per year. In the global context, the role of European rice production is modest, occupying about 630 thousand hectares, which produce little more than 4 million tons per year (FAO 2020). Even so, in some Southern European countries, rice farming has become an important agricultural activity. Starting from the analysis of Portugal, this study aims to contribute to identify the circumstances that have made the cultivation of this tropical plant possible in the agroecological conditions that, between the eighteenth and the twenty-first centuries, have characterised the Mediterranean region.

In recent decades, rice production in Portugal has been the second largest of all national cereal crops, after maize, the average per capita consumption in Portugal being the highest in Europe, at over 17 kg/year (Oliveira *et al.* 2019, 1210-1215). Historically, the Portuguese contributed to the global spread of rice, notably through the introduction of Asian varieties (*Oryza Sativa L.*) on the west coast of Africa in the sixteenth century (Gilbert 2015, 212-228), which from here supported the expansion of cultivation to the Americas. At the same time, a recent study argues that African rice (*Oryza Glaberrima Steud*) was also introduced to Europe and the Americas as a result of the flow of people, technology and seeds that transoceanic travel provided (Carmo *et al.* 2020). However, despite the recognized historical leading role of the Portuguese in disseminating the production and consumption of rice, as well as the importance of this cereal in the Portuguese diet, paradoxically, historiography lacks a long-term analysis to explain this journey. This absence, already mentioned by some historians (Mendes 2005, 51-63), contrasts with what occurs in other European rice producing countries, namely Spain (Calatayud Giner 2002).

This study of rice production in Portugal ranges from the second half of the eighteenth century, when its cultivation spread across the territory, to the present day when it has become the country's second most produced cereal. With this long-term perspective, rather than filling the gap identified in the historiography, the aim is to identify the dynamics of rice production since 1758, relating them to the action of the government, under national policies and, since 1986, under the Common Agricultural Policy (CAP). As the period under study coincides with the consolidation of the modern state, which has given priority to national agricultural activities, it is necessary to understand to what extent public policies are associated with the performance of production and productivity recorded over the more than 250 years analysed. In contrast, unlike other cereals, during this period rice reached productivity levels similar to those recorded in other southern

European countries. Thus, this research has two main objectives: to trace the evolution of national rice production and to assess how the government has influenced its performance.

After this introduction, this article presents the sources and methods used in this research focused on Portugal. This is followed by the characterisation of the agroecological conditions required for rice cultivation. Subsequently, the changes in national production are examined, showing how, from the middle of the twentieth century, rice production asserted itself in the context of cereal production, and is currently the second most produced gramineous crop in Portugal, only surpassed by maize. It is concluded that the public policies implemented since the eighteenth century were decisive for the agricultural and economic performance recorded in rice production in Portugal, thus being considered successful. In this sense, the reduction in public policy incentives for rice production at the beginning of the twenty-first century went against decades of state development initiatives. In the absence of public support measures, rice farming would return to a circumstance it has not experienced since the eighteenth century, which could jeopardise Portugal's century-old rice production.

1. Sources and Method

This article aims to analyse the evolution of rice production in Portugal, relating it to the directives of the state, from the end of the eighteenth century to the present day. By combining qualitative and quantitative sources, a long-term national overview is provided. In the process of collecting sources, priority was given to surveys, studies, reports and legislation issued by public bodies since the eighteenth century. The aim was therefore to identify not only the proposals, but above all the actions carried out by public bodies, including both the different organic services of the state and the corporate bodies that carried out activities of collective interest. For the statistical data we used an over 150-year old statistical series on rice production, which began to be built under the “Portuguese Agriculture: food, development and sustainability project (1870-2010)”, which is available in digital format and is updated until 2018, and qualitative data recollected under “ReSEED project – Rescuing seed’s heritage”.¹ By cross-referencing the results of these projects, it becomes possible to provide

¹ Data base available at <http://www.ruralportugal.ics.ul.pt/data-files/> (accessed 05.08.2020). For ReSEED see <https://reseed.uc.pt/> (accessed 15.09.2021).

a long-term perspective on the dynamics of rice production, helping to fill a gap long identified in the historiography and to raise new questions related to the impact of public policies on the use of the country's natural and agricultural resources. Taking into account the specificities required by the compilation of the statistical series, the methodology used must be presented in more detail.

In compiling the statistical series for rice production, we begin by collecting agricultural production data from the Agricultural Statistics published annually by the Portuguese National Statistics Institute (*Instituto Nacional de Estatística*) since 1943. For earlier periods we use the Statistical Yearbook of Portugal (*Anuário Estatístico de Portugal*), published intermittently since 1884, whose editorial responsibility has always been the Portuguese central state administration. However, in order to make up for the various gaps that still exist, different printed and manuscript sources were used. The former includes the Reports on the State of Public Administration in the Administrative Districts of the Kingdom's Mainland and Adjacent Islands (*Relatórios sobre o estado da administração pública nos districtos administrativos do continente do reino e ilhas adjacentes*), covering the period from 1856 to 1866, as well as the Agricultural Annals of the districts of Leiria and Portalegre, published by the respective Agricultural District Councils (*Conselhos Distritais de Agricultura*), from the end of the 1870s to the beginning of the following decade. As for handwritten sources, we consulted the maps of agricultural production existing in different district archives. This documentation was essentially produced by the respective civil governments and is almost always included in the corresponding documentary holdings existing in the district archives. At the National Archive of Torre do Tombo (*Arquivo Nacional da Torre do Tombo*), statistical data was extracted from the records of the Ministry of Agriculture (*Ministério da Agricultura*), the Ministry of the Kingdom (*Ministério do Reino*) and the Ministry of Public Works, Trade and Industry (*Ministério das Obras Públicas, Comércio e Indústria*). Finally, it is also worth noting the data on rice production already published by a number of researchers (Vaquinhas 1991; Lains and Sousa 1998; Silva and Faisca 2015).²After collecting quantitative data in primary and printed sources, several issues had to be clarified in order to be able to present, with due consistency, long series of rice production. For earlier years, the first obstacle stemmed from the need to convert the rice production data still recorded in the Old Regime's measurement system to the current

² On agricultural statistics in Portugal and the construction of the database that supports this article, see Freire and Faisca (2021) and Viana *et al.* (2021).

metric-decimal system. In these cases, the conversion tables published by Joaquim Fradesso da Silveira (1868) were used. The transformation of the vast majority of production data for the nineteenth century, which were expressed in measures of volume – decalitres and hectolitres – into a measure of weight – tonne – was more laborious. For this, we used the conversion factor in which 100 litres of rice correspond to 72.5 Kg already used by economic historiography (Lains and Sousa 1998, 965). It should be noted that it was only possible to obtain a complete statistical series of rice production from 1860 onwards, as for earlier periods the prevalence of gaps in the data did not allow the application of interpolation methods for the reconstruction of national rice production (Viana *et al.* 2021).

2. Historical Background of Rice Cultivation in Portugal

Of the three cereals that form the basis of human nutrition worldwide – wheat, maize and rice – rice developed later in Portuguese agriculture. The chronology of the introduction of rice in Portugal is still not consensual in historiography. It is sometimes attributed to the Muslim presence that began in the eighth century (Daveau, Ribeiro and Lautensach 1988, 1020; Vaquinhas s.d., 15), sometimes to the reign of King Dinis (1279-1325), to a single source from the sixteenth century onwards (Mendes 2005, 56), or even to the beginning of the sixteenth century (Miranda 2017, 85). However, there is unanimity in the theory that rice farming did not flourish in Portugal until the end of the eighteenth century. Before this period very few regions that cultivated it were known (Silbert 1978, 512; Daveau, Ribeiro and Lautensach 1988, 1020; Vaquinhas 1991, 689; Martins 2005, 230; Costa, Lains and Miranda 2011, 230) and it would have been limited to small areas in the hydrographic basin of the River Tagus (Faustino 2006, 28; Miranda 2017, 86; Braga 2020, 347-353).³In the “Memórias Paroquiais”, a survey of almost all the parishes in the kingdom in the mid-eighteenth century, rice is mentioned as an important crop only in one village at the mouth of the Sado River estuary.⁴ It is known, however, that in the same period there was a small production of this gramineous crop near the Mondego River (Vaquinhas s.d., 15) and, at the end of the eighteenth century, there are references to new rice fields in the hydrographic basin of the Tagus

³ In places such as the wetlands of Ota, Asseca and Muge.

⁴ This is the case of the extinct parish of Palma, in the Alcácer do Sal municipality, whose “Memória Paroquial” dates back to 1758.

River (Cornide 1893-1897).⁵ In the same vein, in 1804 the botanist Avelar Brotero restricted early national rice-growing to the Mondego and Sado estuaries and other areas in the Alentejo (Brotero 1804, 596).⁶ However, even before the end of the eighteenth century, rice was not unknown to the Portuguese. Since the fifteenth century, several documents attest to the acquisition or consumption of this cereal. This is the case of the Princess Maria's cookbook, dating from the end of the fifteenth century, in which rice appears in several recipes (Manupella 1986). In the middle of the sixteenth century, it is known that the sale of sweet rice was common in the city of Lisbon: "[...] fifty women, black and white, slave and free-folk going out at dawn in the streets to the riverside with big pots full of rice [...]" (Brandão 1993, 72). This cereal was also purchased in considerable quantities by various institutions, such as the All-Saint Royal Hospital in Lisbon (Silva and Faisca 2015, 108),⁷ the Royal Hospital of Caldas da Rainha (Rodrigues 2010, 58) or even the College of Arts of Coimbra (Oliveira 1971, 349-350). This taste for rice continued, as indicated in the 17th and 18th centuries cookery books of Domingos Rodrigues (1693), Francisco Borges Henriques (around 1715) (Freire 2020) and Lucas Rigaud (1780).

The existence of this demand would probably be met by importing rice from overseas territories, since rice farming in Europe was of little significance, being limited to meeting regional needs (Calatayud Giner 2002, 40). Thus, since the end of the fifteenth century and during the sixteenth century, there is evidence of the purchase of African rice by Portuguese settlers established in Cape Verde islands, who would send it to Lisbon (Carmo *et al.* 2020, 50). Later, after the development of rice growing in British America, this region became the main supplier for the Portuguese market, which, to a lesser extent, also imported this cereal from Spain and Italy (Silva 1995, 80). In the eighteenth century, it was Brazil that ensured the rice supply for consumption in Portugal, following a mercantile policy on the part of the Portuguese Crown that successfully stimulated rice production in that territory. In this sense, since the beginning of the eighteenth century rice was the only cereal exported by Brazil, reaching between 1768 and 1777 in Maranhão alone a total volume of about 6,300 tons per year, an amount superior to cocoa, cotton and coffee (Pereira 2002, 91; Valentin 2006, 11-12). From the nineteenth century onwards, Brazil's independence contributed to the fact that Portuguese government measures tended to

⁵ Specifically, in Muge (Salvaterra de Magos) and Longomel (Ponte de Sor).

⁶ Montemor-o-Velho, Sines, Grândola, Comporta and other locations (*et alibi*) in Alentejo.

⁷ In the year 1565 alone, this hospital acquired approximately 661 kg of rice for the sick.

encourage domestic production, ensuring the supply of a demand which was already socially widespread.

The contribution of the Portuguese appears to have been essential in the process of globalisation of production and consumption. In fact, the introduction of Asian rice varieties (from the *Oryza Sativa L.* species) on the Atlantic side of Africa, where there was already significant local production of another rice species – *Oryza Glaberrima Steud* –, is thought to be due to the action of the Portuguese in the mid-sixteenth century (Gilbert 2015, 212-228). On the other hand, the possible introduction of African rice into Europe and the Americas, once again by direct action of the Portuguese, is currently being discussed (Carmo *et al.* 2020). Similarly, on the American continent, despite the existence of indigenous and wild rice varieties consumed by local populations, European colonisation was responsible for the implementation of rice farming. In Brazil, although there is no historiographical unanimity on the subject, rice production seems to date back to the middle of the sixteenth century, brought by Portuguese colonisers who had come from Cape Verde (Pereira 2002, 47; Ferrão 2005, 178).

Uncertainty remains as to which species of rice could have been cultivated in Portugal before the eighteenth century (Custódio 2016, 174-176; Carmo *et al.* 2020). However, it is recognised that in the modern and early modern periods only “Asian rice”, scientifically called *Oryza sativa L.*, was cultivated in Portugal. It is the most widespread rice species on the planet and is believed to have been domesticated in the Yangtze River valley some 13 to 14 thousand years ago (Sweeney and McCouch 2007, 952-953). This rice species is the seed of a plant of tropical origin of the gramineous family that needs specific climatic conditions to achieve full development, especially as regards water levels and temperature. Although the different varieties of *Oryza sativa L.* species can withstand different climatic conditions, they all require abundant water and high temperatures to achieve maximum development.

Normally, the seeds of this rice species germinate between 12 °C and 40 °C, but 30 °C to 35 °C is considered the optimum range. Flowering occurs with a minimum temperature above 22 °C, but the best yields are achieved if the temperature stays between 29 °C and 32 °C (Faria and Pinto 1980, 3). This explains why Asian rice did not spread to the colder regions of Portugal. Another decisive factor is the need for daily temperature fluctuations to remain around 4 °C (Seabra 1938, 62). The water submersion to which the rice fields are subjected mainly serves to correct the climate conditions. It is therefore very important to guarantee the water supply during the plant’s vegetative cycle, which runs from April to September,

thus corresponding to the entire summer period in Portugal. In Europe, climatic constraints, essentially low temperatures, mean that only countries with a Mediterranean climate cultivate rice, such as Italy, Spain, France, Greece, and Portugal. However, there is a need to be able to reconcile the prolonged Mediterranean summer with a high availability of water, implying that the geographical distribution should be restricted to the proximity of permanent rivers and/or the existence of agricultural hydraulic works. In the Portuguese territory, the climate also imposes some limitations, as it is considered that north of the Tagus River no longer provides good conditions for rice growing, which includes the basins of the Mondego and Vouga rivers (Faria and Pinto 1980, 13-16). However, rice is still produced in the Mondego valley and for decades it also grew along the banks of the Vouga. This area corresponds to the north-western limit of rice production in the European continent, as this gramineous crop has never been cultivated, in Portugal, north of the Aveiro region (Daveau, Ribeiro and Lautensach 1988, 1021).

3. Rice Production in Portugal: A Long-Term Perspective

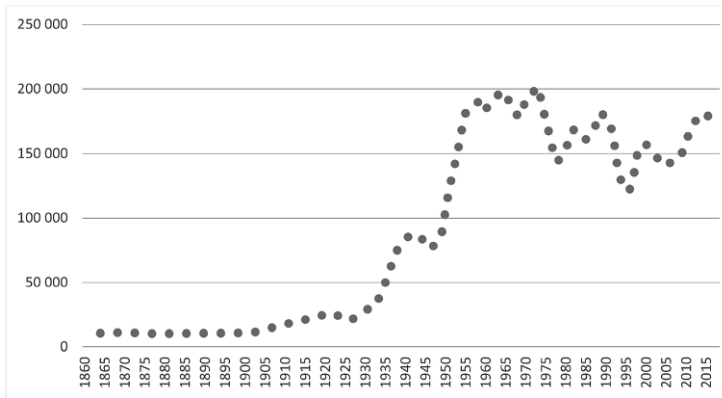
The protectionist intervention measures of the Portuguese Crown regarding rice became more evident from the end of the eighteenth century, beginning in 1781, with the issuing of a decree that prohibited the importation of rice produced outside the economic area of the empire (Martins 2005, 230). Still in the first half of the nineteenth century, the state increased its stimulus to Portuguese rice cultivation by penalising, with the Customs Tariff of 1837, any importation of rice, even if it came from within the empire (Martins 2005, 231). It is in this context of public incentive that the first rice fields were systematically established alongside permanent water courses in central and southern areas of Portugal. In addition to state incentives, the demand for rice cultivation was also due to economic factors: in production, to the high productivity of this cereal (Calatayud Giner 2002, 49-50), which was even higher than that of maize; in the market, to the favourable market prices that lasted at least until the 1880s (Vaquinhas 1991, 694; Calatayud Giner 2002, 54). At the same time, from an agroecological point of view, rice can be cultivated on marshy land where other crops would hardly be viable (Seabra 1938, 7). Finally, from a social perspective, the high productivity of this gramineous crop has made it possible for family farming, based on smallholdings, to produce rice both for the markets and for self-consumption.

On the other hand, the disadvantages of this crop have been highlighted by various authors. Particular attention was paid to the association of rice cultivation with the spread of *sezonism*,⁸ a disease whose aetiology was unknown until the twentieth century, making prevention the only way to combat it, which led to the publication of legislation conditioning the expansion of rice cultivation, as well as to protests, sometimes violent, by local populations (Vaquinhas 1991). The theory that intermittent fevers were caused by *miasmas* – emissions from decomposing organic matter – was in vogue at the time, especially in areas with stagnant water, such as rice fields (Silva and Faísca 2015, 109). However, the laws that sought to restrict rice cultivation, such as the law 1 July 1867 or the decree 23 November 1871, were countered by customs protection reconfirmed in the Tariff of 1852 and throughout the rest of the nineteenth century (Vaquinhas 1991, 692).

One of the results of the balance between the measures to encourage rice cultivation and those that, in the opposite direction, sought to restrict it, was a near absence of growth in production in the second half of the nineteenth century, as can be seen in Graph 1, usually around ten thousand tons per year. Productivity at that time was the lowest in Europe, averaging 1.13 tonnes per hectare in 1879, while in the Valencia region, for example, it was around 3.80 tonnes per hectare in 1881 (Moniz 1917, 23; Calatayud Giner 2002, 68). Despite the customs penalty, the increase in rice imports, which represented 2.5% of total Portuguese imports at the beginning of the twentieth century (Lains 1995, 136), suggests an increase in the consumption of this cereal in Portuguese society. In short, it can be said that, despite having secured a permanent place in Portuguese agriculture, rice continued to occupy a marginal position. Rice fields covered only 6,000 to 7,000 hectares (Silva 1955, 64) of a total agricultural area of more than 3 million hectares at the end of the nineteenth century (Lains 2009, 339). In the same sense, the crop was not very significant amongst national cereal production as a whole, since rice corresponded to little more than 1% of the total cereal production, as shown in Graph 2. In this period, the 10 to 11,000 annual tons of rice were insignificant compared to the more than 450,000 tons of maize, 210,000 tons of wheat or 160,000 tons of rye.⁹ From the beginning of the twentieth century, rice production

⁸ *Sezonism* is synonymous with paludism and malaria. We prefer the term *sezonism* because, as Ricardo Jorge states, this expresses the disease by the phenomenon through which it manifests itself (*sezon* – intermittent fevers) and avoids the etiological problems of the others (Jorge 1903, 2). Paludism, of French origin, is a language error, as *palude* (marsh/swamp) does not cause fevers; malaria, of Italian origin, involves the ancient concept of airborne transmission (*mala aria*).

⁹ All these agricultural production statistics are available at <http://www.ruralportugal.ics.ul.pt/data-files/>.

Graph 1. National rice production, 1860-2018 (tonnes)

Source: Database of the Agriculture in Portugal: Food, Development and Sustainability project (1870-2010) (1); Portugal. National Statistics Institute, Agricultural Statistics (2011-2018). **Note:** 5-year moving average.

increased slightly but steadily, reaching 30,000 tons per year by the end of the 1920s. This situation was surely due to the publication, in 1916, of a new public health law – decree no. 2,223, 17 February – which was more lenient than the previous ones. This arose from a change in the sanitary context in force, since it is known that the *Anopheles* mosquito is the only transmitter of zoonosis, rice cultivation by itself is no longer considered a direct cause of the disease (Saavedra 2010, 120), as long as running water is used. This meant a significant relief in the previous restrictive measures regarding the extent of cultivation area – for instance law of 1 July 1867 or the decree 23 November 1871 as mentioned above. It was understood that it was not the rice fields but the stagnation of the water that created the ideal environment for the reproduction of the mosquitoes that transmitted zoonosis. Thus, tax benefits were granted for rice cultivation with running water, whenever cultivation resulted from the drainage of marshy land and/or stagnant water.

In addition, the 1916 law also stipulated a set of rice development initiatives by public bodies. These included the distribution of selected national and foreign seeds, the promotion of public works of agricultural hydraulics and the award of cash prizes to farmers who perfected rice-growing techniques. Although the largest agricultural hydraulic works were only carried out in the middle of the twentieth century, the references in the historical sources allow us to see that practices such as seed selection and improved cultural processes were expanded, which would be responsible for

increasing rice productivity to 2.37 tons per hectare (Moniz 1917, 23). A concrete example is the introduction of other rice varieties, such as the so called “Chinês Originário”, after a mission organised by the Agricultural Bureau (*Serviços Agrícolas*) to Italy (Seabra 1938, 41). In fact, it is known that in the mid-1930s, with the exception of the Aveiro region, the main varieties of rice grown in Portugal were no longer the former so called “da terra” (local) variety, an early strain with low productivity and poor eating quality. Besides “Chinês Originário”, the most productive variety with a long vegetative cycle, used mainly in the south of Portugal, varieties with intermediate vegetative cycles and productivity were also common, such as “Allorio” and “Novelli”, dominant, for example, in the Mondego region (Seabra 1938, 42-43).

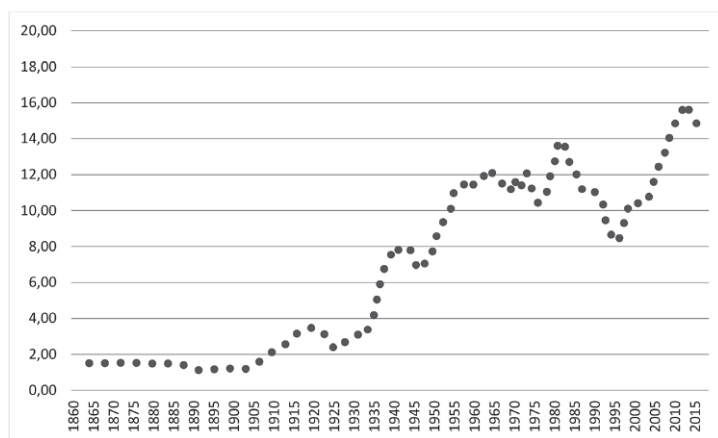
It can therefore be concluded that, in addition to the autocratic measures of a protectionist nature that had been adopted since the eighteenth century, the state also began to provide technical and scientific support for the development of rice farming. The inclusion of these components within the scope of state action is in line with the expansion of public services to assist agriculture, which as in Europe had been taking place in Portugal since the end of the nineteenth century (Branco and Silva 2017, 217-244). This period was also characterised by a rise in rice prices throughout Europe, which led to a general increase in production in Mediterranean countries (Calatayud Giner 2002, 64). Even so, the growth of rice cultivation did not raise it to a level of great importance in cereal production as a whole, even though in the first third of the twentieth century rice accounted for around 3% of total Portuguese cereal production, as shown in Graph 2, and occupied a cultivated area that varied between 11 and 13 thousand hectares (Silva 1955, 66-68).

The period that begins with the establishment of the Portuguese New State (Estado Novo), in the 1930s, until the early 1960s corresponds to the phase of greatest growth in Portuguese rice production. From an annual average, in the 1930s, of little more than 60,000 tons, by the 1960s it had reached values close to 190,000 tons. It is during this period that, on six occasions, Portuguese annual rice production exceeded 200,000 tonnes.¹⁰ This was followed, until 1974, by a stabilisation of rice production around this order of magnitude. Several factors contributed to this sharp growth. Firstly, economic policy, which not only maintained tariff protection, but also extended it through the administrative setting of a remunerative price

¹⁰ In 1955, 1961, 1962, 1964 and 1970, more than 200,000 tons of rice were produced in Portugal, and the 1970 yield, with more than 227,000 tons, was the highest on record.

through the Rice Trade Regulatory Commission (*Comissão Reguladora do Comércio do Arroz*) (Baptista 1993, 127). In the public health sphere, the incidence of sezonism became increasingly reduced, partly as a result of action by the Malaria Institute (*Instituto de Malariologia*) and the Anti-Sezonism Services Directorate (*Serviços Anti-Sezonáticos*), until total eradication at the end of the 1950s.¹¹ At the same time, rice farming underwent a certain “modernisation”, in line with the green revolution model that was becoming hegemonic in the world’s agriculture. There was a renovation in cultivation techniques, for instance from the late 1930s onwards the substitution of sowing for transplantation allowing higher yields per surface unit, as well as saving water (Seabra 1938, 50-55). But also, the selection of seeds, greater use of fertilisers, integration of agricultural machinery and expansion of agricultural hydraulic works, helped rapidly increase physical productivity. In fact, in Portugal, rice was the only cereal that managed to keep up with the productivity growth of other European countries throughout the twentieth century (Soares 2005, 164).

Graph 2. Ratio of rice production to total Portuguese cereal production, 1860-2018 (percent)



Source: Internal calculations from the same sources as in Figure 1. **Note:** 5-year moving average.

Again, public investment in rice cultivation, which has materialised in various ways, should be highlighted. Firstly, the creation of experimental

¹¹ A summary of the legislation and the action of these bodies based on a local example can be found in Silva and Faisca (2015).

posts between 1937 and 1941 in the main rice production areas in Portugal – Mondego, Sado and Tejo estuaries –, that were attached to the Arboreal Cultivation Service of the Agricultural Services General Directorate (*Serviço de Culturas Arvenses da Direção-Geral dos Serviços Agrícolas*), with the intention of helping local farmers introduce innovations. Then, the work developed at the National Agronomy Station (*Estação Agronómica Nacional*), starting in 1941, in the selection, hybridisation and distribution of seeds with better yields (Silva 1955, 57). Finally, it was during this period that the first major public works of agricultural hydraulics were inaugurated, as shown in Table 1, whose water was largely used for irrigating rice (Daveau, Ribeiro and Lautensach, 1988; Baptista 1993; Freire 2013). In fact, the impact of modern irrigation systems on rice production has exceeded what was predicted by the experts who assessed the potential of these infrastructures. This was due to the profitability of rice production, meaning that several hydraulic projects, which were supposed to use water for animal fodder and horticultural crops, were in practice dominated by rice and tomatoes (Baptista 1993, 85).

In this context, and for the first time, there were some years of production that exceeded consumption. However, as the lack of competitiveness of Portuguese rice prevented its export to international markets, a problem of overproduction arose (Baptista 1993, 129). This occurred mainly in the 1950s, but was overcome in the following decade, due to the increase in consumption as production stagnated. This trend in rice production is related to the expansion of other crops, such as industrial tomatoes, which competed for land and water. Despite stagnation in production around the 1960s and 1970s, during this period rice became one of the most important cereals in Portugal, exceeding 12% of the total cereal production in the country in some years. It's noteworthy that the growth of rice production occurred mainly in regions (centre and south of Portugal) where large property and/or capitalist agriculture (Coimbra region) predominated. Several reasons can explain this. On one hand, smallholder and family farming didn't have sufficient capital for the investment in the modernisation of production (for instance in the Aveiro region) (Baptista 1993, 130-132). On the other, state intervention regarding irrigation, especially in the centre/south of the country and in Coimbra area conceded a major advantage in those regions since rice cultivation consumes large amounts of water. Furthermore, the south already had a more favorable climate to grow rice due to temperature (Faria and Pinto 1980, 3) and thus new seeds with potential for higher productivity could only thrive there. This provoked a reordering of rice production distribution in Portugal, a subject that will be explored in a forthcoming study.

Table 1. Public works on agricultural hydraulics with a direct impact on rice production, 1938-1967

Dam	Municipality	Hydrographic basin	Year of conclusion	Irrigation system	Irrigated area forecast (Ha.)
Magos	Salvaterra de Magos	Tejo River	1938	Sorraia valley	16,351
Maranhão	Avis		1957		
Montargil	Ponte de Sor		1958		
Pego do Altar	Alcácer do Sal	Sado River	1949	Sado valley	9,641
Vale de Gaio	Alcácer do Sal		1949		
Campilhas	Santiago do Cacém	Sado River	1954	Alto Sado	6,067
Divor	Arraiolos	Tejo River	1965	Divor	488
Caia	Elvas	Guadiana River	1967	Caia	7,271
Roxo	Aljustrel	Sado River	1967	Roxo	5,041
Total					44,859

Source: Baptista 1993, 94-125.

The end of the Portuguese New State (Estado Novo) brought a slight drop in rice production which, on average, was close to 150,000 tonnes per year. This was a period of some governmental indecisiveness with regard to support for rice cultivation, but it never fully stopped, as shown by the data on state subsidies presented in Table 2. Due to the generalised reduction in cereal production, rice has not lost any relative value among Portuguese cereals, reaching a share of 14%, despite occupying relatively small areas, between 30 and 35 thousand hectares (Silva 1995, 147). Since Portugal's entry into the European Economic Community (EEC), now the European Union (EU), in 1986, Portuguese rice production has registered a slight increase, with averages a little above those of the previous period. This increase, in a general tendency of a decrease in other cereals, raised the relative importance of rice in Portuguese agriculture even more. In fact, the European Union has a deficit in rice production and has identified this crop in the Common Agricultural Policy (CAP) as strategic. Thus, from then until 2003, the CAP encouraged rice production in two ways: by intervening in the price of rice, which at the beginning of the twenty-first century was €298.5 per tonne, and by subsidising production, that in the same period was €318.53 per hectare (Costa 2017, 36).

However, the 2003 CAP reform led to a reduction of the rice intervention price to 150 EUR/t and of the additional payment to €177/t (Costa 2017, 37). At the same time, the price of rice fell between 1999 and 2014 by about 21%, while operating costs increased due to the rise in the price of

production factors, with the consequent loss of profitability of rice farming in Portugal (Costa 2017, 50-51). Nevertheless, even in this adverse situation, production remained more or less stable at slightly over 150,000 tonnes per year, with a small reduction in cultivated area, which was offset by gains in productivity. Thus, the unfavourable context did not have a strong direct impact on Portuguese production, not even when, in 2014, the Business Profitability of Cultivation from rice was already negative (Costa 2017, 53).

Table 2. Evolution of rice production subsidy, 1974-1984

Year	Subsidy (in escudos, PTE)	Variation (%)
1974	0\$30/Kg	–
1975	0\$30/Kg	0
1976	1\$44/Kg	380
1977	2\$18/Kg	51
1978	2\$95/Kg	35
1979	2\$50/Kg	-15
1980	10.000\$00/ha	19
1981	11.800\$00/ha	18
1982	21.000\$00/ha	78
1983	23.000\$00/ha	10
1984	10.000\$00/ha	-57

Source: Silva 1995, 148.

The explanation for this behaviour can be found in the combination of two main factors: the difficulty in reconverting rice-growing areas to other agricultural activities and the producers' expectation that there would be an increase in public aid to the agricultural sector in the short term. The first factor is the high ecological, agricultural and economic costs of reconverting rice fields (Calatayud Giner 2002, 42; Costa 2017, 53). The soil sealing of the beds, which increases year after year due to rice cultivation, makes it difficult in the short term to grow other crops with high yields that do not require flood irrigation such as rice (Costa 2017, 53). In addition, the know-how held by rice farmers, the rearrangement of the property with the destruction of the beds and the scrapping of very specific equipment that had been acquired in the meantime, can lead to greater resistance to the process of agricultural reconversion. As for the second factor, it was noted that the stagnation of rice production, coupled with the generalised increase in consumption led to the growth of the Portuguese trade deficit in this product. Producers' expectations of extending public support for

rice production in Portugal have proved to be appropriate. The data available indicate that, since 2017, rice production has received public support amounting to €194 per hectare. This can also be justified by sustaining the entire economic chain that includes, among others, the husking industry (Barreiros 2018, 17).

In 2018, the National Strategy for the Promotion of Cereal Production (*Estratégia Nacional para a Promoção da Produção de Cereais*) presented precisely as an objective the achievement of balance in agricultural trade within eight years, that is, support for rice farming is being intensified (Barreiros 2018, 5). It is part of a national strategy to achieve self-sufficiency in rice by 2023, covering 80% of industrial needs and domestic consumption (Barreiros 2018, 80). Among the measures envisaged is the regulation of market prices, so that they protect national production against competition from countries that are not subject to the same food hygiene and safety standards, which contributes to lower production costs (Barreiros 2018, 82-86). Since the mid-1980s, with Portugal's increasing integration into the European economic area, rice production has stabilised in a general context in which all other cereals have experienced significant falls, with the exception of maize. This reduction in production is particularly noticeable in wheat. Even in Alentejo, a region associated with wheat for centuries, rice production currently doubles that of wheat (Faisca 2019, 51). Thus, currently, rice is already the second most produced cereal in Portugal, corresponding, in some years, to almost 16% of the national total, despite occupying a cultivated area of about 30,000 hectares out of a total of nearly half a million devoted to cereal production (Costa 2017, II).

It should be noted that, in comparison with the other cereals (maize, wheat and rye) grown in the Iberian Peninsula, rice productivity has been quite high since the nineteenth century. For example, in the nineteenth century, in the Valencia region (Spain), it was more than twice as productive as irrigated wheat, which in turn was already six times as productive as non-irrigated wheat (Calatayud Giner 2002, 50). In Portugal, throughout the twentieth century, rice was also the cereal with the highest productivity (Soares 2005, 164), having recently been overtaken by maize, but still maintaining very substantial levels.¹² As stated above, this increase in the productivity of rice was due, especially from the second half of the twentieth century, to the usual factors related to the green revolution – renovation in

¹² In the 2017 harvest, maize yield was 8,612 kg/ha; rice yield was 6,211 kg/ha; barley yield was 2,382 kg/ha; hard wheat yield was 2,261 kg/ha and soft wheat yield was 2,020 kg/ha. Portugal, National Statistics Institute. *Estatísticas Agrícolas 2017* (Lisbon: National Institute of Statistics, 2018), p. 23.

cultivation techniques, greater use of fertilisers, integration of agricultural machinery, expansion of agricultural hydraulic works and selection of seeds. At the present development of the research, it's difficult to hierarchise them and, above all, to make a quantitative estimate of the contribution of each factor. However, several authors from different disciplines have emphasised the introduction of new varieties as a major factor in the increase in the productivity of grain. According to Kloppenburg (2004, 5), in the United States, since 1935, yields of all the major crops have at least doubled, and half of these gains are attributable to genetic improvements. For Russia, Morgounov *et al.* (2010, 101) estimate an annual increase in grain productivity of 0.7% in the twentieth century. Finally, Pujol-Andreu (2011, 76) quotes a study claiming that in Catalonia between 1977 and 2008 the introduction of wheat varieties contributed to as much as half of all the productivity gains.

In this specific matter, public policies also played a very important role in rice cultivation, but private initiative was also not irrelevant. The first introduction of new rice seeds by public organisations in Portugal followed the initiative of a private farmer in the district of Coimbra, who, in 1910, cultivated “new” seeds of Asian origin imported from Italy. This resulted in an official public mission being sent to that country. Several seeds were brought and these, among others, were then given directly to the farmers. The distribution of seeds became a regular task of public Agricultural Services (*Serviços Agrícolas*) (Seabra 1938, 41). Later, in 1936, a Division of Rice Improvement (*Secção de Melhoramento de Arroz*), within the Department of Genetics and Improvement (*Departamento de Genética e Melhoramento*), was created in the National Agrarian Station (*Estação Agrária Nacional*). This state-run organisation continued to distribute selected seeds to farmers, through a network of regional stations, until the late 1980s (Borges, Silva and Sá 1986, VII). After this hiatus, since 2003 the improvement of seeds in Portugal continues through COTArroz, a scientific research organisation owned by public and private entities. State action regarding the development and introduction of new varieties was undoubtedly important and, although it is premature to draw any conclusions, it seems unlikely that private initiative has had the greater impact. This analysis of more than two centuries, cross-referencing the economic performance of rice production with rice-oriented public policies, indicates that the high demand of the domestic market has not been sufficient to guarantee production. The viability of this agricultural activity in Portugal requires continued government support.

4. Conclusion

258

Despite being part of the Portuguese diet since at least the fifteenth century, rice cultivation was almost non-existent in Portugal until the end of the eighteenth century. It was then that, based on protectionist stimulus initiatives, rice growing was consolidated in areas capable of ensuring abundant water and the minimum temperature conditions required for the full development of this tropical plant. The high productivity of this cereal and a significant remuneration for the producer complemented the favourable tariff framework. However, while Portuguese economic policy favoured domestic production by penalising imports, at the same time it legislated to restrict rice-growing areas due to the perception of this activity as unhealthy. Indeed, until the early twentieth century, rice cultivation was associated with a higher incidence of malaria, a disease that was often fatal. The result of this paradox was that rice did not disappear from Portugal, but neither did it assert itself in Portuguese cereal farming for more than a century.

However, at the beginning of the twentieth century, a change in the scientific paradigm led, on the part of the state, to a lifting of existing restrictions for public health reasons. At the same time, in addition to tariff protection, new public policies to stimulate rice production were considered, which related not only to agricultural practices but also to the construction of public works of agricultural hydraulics. The construction of these public works coincided with the process of eradicating sezonism from the national territory, which was part of state public health measures. In this context, national rice production increased considerably from the 1930s, when a new incentive factor emerged, the administrative price-fixing of a beneficial selling price for the producer. Alongside state action, the producers' initiative led to the introduction in Portugal of the innovations then emerging in international rice farming (use of fertilisers, new cultivation techniques, etc.), which also benefited from public support, and also covered other agricultural activities.

Rice productivity remained high, with growth in line with the rest of rice farming Europe, while profitability remained positive for the vast majority of farmers. The favourable conditions meant that, from the middle of the twentieth century, rice established itself as one of the main cereals in Portuguese agriculture, and this is still the case today. Neither the slight fall in total production that occurred after the end of the Portuguese New State (*Estado Novo*) in 1974, nor, at the beginning of the twenty-first century, the momentary easing of public incentives under the Common Agricultural

Policy, led to a fall in the relative proportion of rice in Portuguese cereal production. On the contrary, due to the fall in cereal production in Portugal, rice production is the second largest of all cereals grown in Portugal, with a share of over 15% of the national total, only surpassed by maize. Between high public intervention and private initiative, the rice subsector has been one of the “success stories” of Portuguese agriculture. This research shows that this economic performance of rice farming has historically been linked to public policies for this sub-sector. It can therefore be said that it also reflects the success of these public policies. Further research can be carried out into the behaviour of the demand, of prices and of production costs and their relationship with the production of rice. This can be also done by comparison with international data, especially from other Mediterranean countries like Spain or Italy, thus understanding more accurately why market incentives aren't sufficient for rice production to increase.

Acknowledgements

The research for this paper was done within the scope of ReSEED project that is financed by the European Research Council under the European Union's Horizon 2020 research and innovation programme (grant agreement n° 760090) having Dulce Freire as principal investigator, at the Center of Interdisciplinary Studies at the University of Coimbra (UIDB/00460/2020). This paper reflects only the authors' view. The European Commission and European Research Council Executive Agency are not responsible for any use that may be made of the information it contains. Also, some of the data used were collected under the project “Portuguese Agriculture: food, development and sustainability (1870-2010)” (FCT-PTDC/HIS-HIS/122589/2010) funded by the Fundação para a Ciência e a Tecnologia (2012-2015) and coordinated by Dulce Freire. English translation and revision by Linguarama, Serviços Linguísticos, Unipessoal, Lda.

■ References

- Baptista, Fernando Oliveira (1993). *A Política Agrária do Estado Novo*. Porto: Afrontamento.
- Barreiros, Luís Souto (coord) (2018). *Estratégia Nacional para a Promoção da Produção de Cereais*. Lisboa: Ministério da Agricultura, Florestas e Desenvolvimento Rural.
- Borges, M. de Lourdes; Silva, M. Vianna; Sá, Nair (1986). *Estação Agronómica Nacional: 50 anos de actividade, 1936-1986*. Oeiras: Estação Agronómica Nacional.
- Braga, Isabel Drummond (2020). “O arroz em Santarém e a globalização dos produtos alimentícios”, in C. Fiolhais, J. E. Franco e J. P. Paiva (dir), *História Global de Portugal*. Lisboa: Temas e Debates, pp. 347-533.
- Branco, Amélia; Silva, Ester Gomes da (2017). “Growth, Institutional Change and Innovation, 1820-1930”, in D. Freire, P. Lains (eds), *An Agrarian History of Portugal, 1000-2000*. Leiden: Brill, pp. 219-245.
- Brandão, João (1993). *Grandeza e abastança de Lisboa em 1552 [1552]*. Lisboa: Livros Horizonte.
- Brotero, Felix Avelar (1804). *Flora Lusitânica*. Lisboa: Typographia Régia.
- Calatayud Giner, Salvador (2002). “Tierras inundadas. El cultivo del arroz en la España Contemporánea (1800-1936)”. *Revista de Historia Económica*, 20 (1), pp. 39-80.
- Carmo, Miguel *et al.* (2020). “African knowledge transfer in early modern Portugal: Enslaved people and rice cultivation in Tagus and Sado rivers”. *Diacronie*, 44, pp.45-66.

- Cornide, D. Jose (1893-1897). *El Estado de Portugal en el año de 1800*. Madrid: Imp. Viuda y Hijos de Manuel Tello.
- Costa, António Pedro Quadros e (2017). *Evolução da PAC e da Agricultura Portuguesa no período 1998-2015: o caso das principais culturas na região do Alentejo*. Lisboa: Universidade de Lisboa (dissertação de mestrado).
- Costa, Leonor Freire; Lains, Pedro; Miranda, Susana (2011). *História Económica de Portugal, 1143-2000*. Lisboa: Esfera dos Livros.
- Custódio, Jorge (2016). “A Fábrica de descasque de arroz da Casa Cadaval. Património Industrial de Muge”. *Revista Cultural de Salvaterra de Magos*, 3, pp. 167-220.
- Daveau, Suzanne; Ribeiro, Orlando; Lautensach, Hermann (1988). *Geografia de Portugal*. Lisboa: Sá da Costa.
- Faisca, Carlos Manuel (2019). “A produção agrícola no Alentejo (1929-2018): uma primeira abordagem”. *Revista de Estudios Económicos y Empresariales*, 31, pp. 39-64.
- Faria, Pedro Lynce de; Pinto, Pedro Aguiar (1980). “Zonas climáticas mais favoráveis para a cultura do arroz em Portugal”. *Congresso da Ordem dos Engenheiros*. Coimbra: Ordem dos Engenheiros, pp. 1-18.
- Faustino, Vitor (2006). *Mosquitos, arroz e sezões: A erradicação da malária no Vale do Sado*. Lisboa: Instituto de Ciências Sociais da Universidade de Lisboa (dissertação de mestrado).
- Ferrão, José Mendes (2005). *A Aventura das Plantas e os Descobrimentos Portugueses*. 3ª ed. Lisboa: Instituto de Investigação Científica Tropical.
- FAO – Food and Agriculture Organization of the United Nations (2020). *Rice Statistics*. (<http://www.fao.org/faostat/en/#data/QC/visualize>, accessed 2020.07.26).
- Freire, Dulce (2013). “Entre sequeiro e regadio. Políticas públicas e modernização da agricultura em Portugal (século XX)”. *XIV Congresso de História Agrária*. Badajoz: Universidad de Extremadura.
- Freire, Dulce (coord) (2020). *Receitas e remédios de Francisco Borges Henriques. Inícios do século XVIII*. Lisboa: Ficta Editora.
- Freire, Dulce; Faisca, Carlos Manuel (2021). “Estatísticas agrícolas regionais em Portugal (séculos XIX a XXI): fontes, problemas e historiografia”. *Revista Portuguesa de História*, 52, pp. 391-420.
- Gilbert, Erik (2015). “Asian Rice in Africa: Plant Genetics and Crop History”, in F. Bray *et al.* (ed), *Rice: Global Networks and New Histories*. New York: Cambridge University Press, pp. 212-228.
- Jorge, Ricardo (1903). *Sobre o estudo e o combate do sezonismo em Portugal*. Coimbra: Imprensa da Universidade.
- Kloppenborg, Jack (2004). *First the Seed: The Political Economy of Plant Biotechnology, 1492-2000*. Wisconsin: Wisconsin U. Press.
- Lains, Pedro (1995). *A economia portuguesa no século XIX: crescimento económico e comércio externo, 1851-1913*. Lisboa: Imprensa Nacional-Casa da Moeda.
- Lains, Pedro (2009). “Agriculture and economic development in Portugal, 1870-1973”, in P. Lains, V. Pinilla (eds), *Agriculture and economic development in Europe since 1870*. London: Routledge, pp. 333-352.
- Lains, Pedro; Sousa, Paulo Silveira e (1998). “Estatística e produção agrícola em Portugal, 1848-1914”. *Análise Social*, XXXIII (149), pp. 935-968.
- Manuppella, Giacinto (ed) (1986). *Livro de cozinha da Infanta D. Maria: códice português I.E. 33 da Biblioteca Nacional de Nápoles*. Lisboa: Imprensa Nacional-Casa da Moeda.
- Martins, Conceição Andrade (2005). “Agricultura”, in P. Lains, A. F. Silva (eds), *História Económica de Portugal, 1700-2000: vol. III, O século XX*. Lisboa: Imprensa de Ciências Sociais, pp. 219-257.
- Mendes, José Amado (2005). “O arroz no Baixo Mondego: da gastronomia ao turismo rural”, in I. Vaquinhas, J. A. Mendes, *Canteiros de Arroz: a orizicultura entre o passado e o futuro*. Montemor-o-Velho: Câmara Municipal de Montemor-o-Velho, pp. 51-63.
- Miranda, Susana Münch (2017). “Coping with Europe and the Empire, 1500-1620”, in D. Freire, P. Lains (eds), *An Agrarian History of Portugal, 1000-2000*. Leiden: Brill, pp. 69-100.
- Moniz, Aureliano Botelho (1917). *Um ensaio orizícola no Alentejo*. Lisboa: Instituto Superior de Agronomia.

- Morgounov, A. et al. (2010). "Genetic for grain yield in high latitude Spring wheat grown in West Siberia in 1900-2008". *Field Crop Research*, 117 (1), pp. 101-112.
- Oliveira, António (1971). *A vida económica e social de Coimbra de 1537 a 1640*. Coimbra: Instituto de Estudos Históricos.
- Oliveira, Fátima et al. (2019). "Sustainability of Rice Production Systems: Agro-economic analysis of Baixo Mondego and LIS irrigation Districts, Portugal". *Proceedings of the X International Agriculture Symposium*, pp. 1210-1215.
- Pereira, José Almeida (2002). *Cultura do arroz no Brasil: subsídios para a sua história*. Teresina: Embrapa.
- Pujol-Andreu, Josep (2011). "Wheat Varieties and Technological Change in Europe, 19th and 20th Centuries: New Issues in Economic History". *Historia Agraria*, 54, pp. 71-103.
- Rigaud, Lucas (1780). *Cozinheiro moderno, ou nova arte de cozinha, onde se ensina pelo methodo mais facil*. Lisboa: Of. Francisco Luiz Ameno.
- Rodrigues, Domingues (1693). *Arte de cozinha devidida em tres partes*. Lisboa: Of. Manuel Lopes Ferreira.
- Rodrigues, Lisbeth (2010). "Os consumos alimentares de um hospital quinhentista: o caso do hospital das Caldas em vida da rainha D. Leonor", in I. G. Sá, M. G. Fernández (eds), *Portas adentro: comer, vestir, habitar* (ss. XVI-XIX). Coimbra: Imprensa da U. de Coimbra, pp. 58.
- Saavedra, Mónica Alexandra (2010). "*Uma Questão Nacional*": *enredos da malária em Portugal, séculos XIX e XX*. Lisboa: Instituto de Ciências Sociais da Universidade de Lisboa (tese de doutoramento).
- Seabra, António Luís (1938). *O arroz: preceitos para a sua cultura racional*. Lisboa: Companhia União Fabril.
- Silbert, Albert (1978). *Le Portugal Méditerranéen à la fin de l'Ancien Régime*. 2ª ed. Lisboa: Instituto Nacional de Investigação Científica.
- Silva, Ana Isabel; Faisca, Carlos Manuel (2015). "A orizicultura em Ponte de Sor: economia e saúde pública (1850-1950)". *Abelterium*, 1 (2), pp. 107-120.
- Silva, Carlos (1995). *Clima e Orizicultura no Baixo Mondego*. Coimbra: Faculdade de Letras da Universidade de Coimbra (dissertação de mestrado).
- Silva, Manuel Vianna (1955). *Elementos para a história do arroz em Portugal: separata do Boletim da Federação dos Grémios da Lavoura da Beira Litoral*. Coimbra: Imp. Casa Minerva.
- Soares, Fernando Brito (2005). "A Agricultura", in P. Lains, A. F. Silva (eds) *História Económica de Portugal, 1700-2000: vol. III, O século XX*. Lisboa: Imprensa de Ciências Sociais, pp. 157-185.
- Sweeney, Megan; McCouch, Susan (2007). "The Complex History of the Domestication of Rice". *Annals of Botany*, 100, pp. 951-957.
- Valentin, Agnaldo (2006). *Uma civilização do arroz: agricultura, comércio e subsistência no Vale do Ribeira (1800-1808)*. São Paulo: Universidade de São Paulo (Tese de Doutoramento).
- Vaquinhas, Irene (1991). "Um espaço em transformação: a extensão da cultura do arroz nos campos do Mondego, 1856-88". *Análise Social*, XXVI (112-113), pp. 689-703.
- Vaquinhas, Irene (s.d.) *Saberes e sabores do arroz carolino do baixo Mondego: enquadramento histórico*. S.l.: Associação dos Agricultores do Baixo Mondego.
- Viana, Cláudia; Freire, Dulce; Abrantes, Patrícia; Rocha, Jorge (2021). "Evolution of agricultural production in Portugal during 1850-2018: A geographical and historical perspective". *Land*, 10 (8), 776.

ESTADO E RECURSOS NATURAIS: 250 ANOS DE PRODUÇÃO DE ARROZ EM PORTUGAL, SÉCULOS XVIII-XXI

Este artigo analisa a produção de arroz em Portugal desde o seu estabelecimento definitivo, em finais do século XVIII, até à atualidade. Presentemente, não só os portugueses são os principais consumidores europeus de arroz, como este cereal é o segundo mais produzido pela agricultura portuguesa. Contudo, a análise histórica da produção de arroz em Portugal encontra-se circunscrita a épocas e/ou geografias específicas. Esta investigação pretende contribuir para colmatar esta lacuna, concedendo uma visão de longo prazo a uma problemática atual, pois recentemente discutiu-se o apoio público à orizicultura.

Assim, a partir sobretudo de fontes estatísticas, conclui-se que o arroz, após uma fase de lento crescimento, se afirmou, a partir da década de 1930, como um dos principais produtos da agricultura portuguesa. Aliás, o arroz foi o único cereal que em Portugal conseguiu acompanhar o aumento de produtividade dos restantes países europeus. Para tal, em conjugação com fatores favoráveis, agroecológicos e de mercado, foram decisivas políticas públicas como, por exemplo, a seleção de sementes e a introdução de variedades mais produtivas; a eliminação dos problemas de saúde pública; ou ainda a construção de grandes obras públicas de hidráulica agrícola.

Palavras-chave: arroz, alimentação, agricultura portuguesa, política agrícola.



L'ÉTAT ET LES RESSOURCES NATURELLES: 250 ANS DE RIZICULTURE AU PORTUGAL, XVIIIIE-XXIE SIÈCLES

Cet article analyse la production de riz au Portugal depuis son établissement définitif à la fin du XVIIIe siècle jusqu'à nos jours. Aujourd'hui, non seulement les Portugais sont les principaux consommateurs européens de riz, mais cette céréale est la deuxième plus produite par l'agriculture portugaise. Cependant, l'analyse historique de la production de riz au Portugal est limitée à des époques et / ou des géographies spécifiques. Cette recherche vise à contribuer à combler ces lacunes, en offrant une vision à long terme d'un problème actuel, comme les conditions du soutien public à la production de riz ont récemment été discutées. Ainsi, en se basant principalement sur des sources statistiques, la conclusion est que le riz, après une phase de croissance lente, s'est imposé à partir des années 1930 comme l'un des principaux produits de l'agriculture portugaise. En fait, le riz est la seule céréale du Portugal à avoir su suivre l'augmentation de la productivité des autres pays européens. À cette fin, en conjonction avec des facteurs agroécologiques et marchands favorables, des politiques publiques spécifiques ont été déterminantes, comme la sélection des semences et l'introduction de variétés plus productives, l'élimination des problèmes de santé publique liés à la riziculture et la construction de grands travaux publics hydrauliques agricoles.

Mots-clés: riz, aliments, agriculture portugaise, politique agricole.