

PA #7 The Portuguese Bioeconomy and supporting knowledge on the transition to a local circular bioeconomy

Portugal's rural bioeconomy is characterized by its significant diversity and potential, driven by varied climates and landscapes that support robust primary sectors in forestry, agriculture, fisheries, and aquaculture. The country's extensive maritime territory and strategic geographical positioning enhance its bioeconomy capabilities.

Forestry: The Norte and Centro regions are heavily forested, making forestry a key primary activity. The pulp and paper industries are particularly significant in these areas, contributing €885 million in Gross Value Added (GVA) in 2019. Key products include eucalyptus, maritime pine, and cork oak (EC, 2020¹).

Agriculture: Portugal's Utilized Agricultural Area (UAA) spans 3.6 million hectares, approximately 39% of the land surface. Agriculture is the main activity in the Alentejo region, producing 80% of Portugal's olive oil, 60% of cereals, and 50% of livestock. Other key agricultural outputs include corn, rice, tomatoes, potatoes, apples, oranges, and grapes for wine production. Small farms, which constitute 71% of the 258,980 farms, play a crucial role in this sector (EC, 2020).

Fisheries: Distributed along the entire continental coast and in Madeira and Azores, fisheries generated €307 million in 2020, with aquaculture producing €100 million. In 2021, fisheries captured 185,417 tons of fish and seafood, emphasizing the importance of the maritime sector. The main areas for fisheries are Lisbon and Oporto (INE, 2022²).

Portugal's UAA is dominated by permanent crops (19%) and permanent grasslands (52%). In 2021, winter cereals covered 100,000 hectares producing 200,000 tons, while corn occupied 80,000 hectares yielding 752,000 tons. Other significant crops include rice, tomatoes for industry, potatoes, apples, oranges, and olives. The country's agricultural production supports a significant portion of the rural economy (EC, 2020).

Portugal's livestock sector includes 1.68 million bovines, 2.22 million pigs, 2.29 million sheep, and 364,000 goats. In 2021, meat production included 103,000 tons of bovine meat, 377,000 tons of pig meat, and 313,000 tons of chicken. Additionally, Portugal produced significant quantities of milk (cow, sheep, and goat), eggs, and various dairy products such as butter, powdered milk, and cheese (EC, 2020).



Figure 1: Portuguese rural area

Source: <https://www.freepik.com/>

¹ EC - European Commission. (2020). Agriculture, forestry and fishery statistics 2020. Retrieved February 20, 2023, from <https://ec.europa.eu/eurostat/web/forestry/publications>

² INE - Instituto Nacional de Estatística. (2022). Estatísticas da Pesca 2021. Retrieved February 21, 2023, from https://www.ine.pt/ngt_server/attachfileu.jsp?look_parentBoui=562836995&att_display=n&att_download=y



In 2020, the food industry generated €11.7 billion in sales, with significant contributions from the meat, bakery, dairy, and animal feed sectors. The beverage industry added €2.8 billion, with wine contributing €1.56 billion, followed by beer and soft drinks. The tobacco industry generated €676 million, with a significant portion of sales occurring within the EU market (INE,2023³).

Forests cover 36% of Portugal, producing key forestry products including paper and pulp, cork, and wood products. The forestry sector supports significant employment and industrial activities, with key outputs including 923,000 tons of paper and pulp products, 397,000 tons of cork, and 271,000 tons of wood products.

The pine natural resin sector is also showing signs of recovery (EC, 2020).

Portugal's coastline extends 942 km, and its Exclusive Economic Zone (EEZ) is the third largest in the EU. In 2020, the fisheries and aquaculture sectors generated €307 million and €98 million, respectively. The majority of fish captures were sold fresh or refrigerated, highlighting the economic significance of the fishing industry (INE, 2022).

The bioenergy sector is well-established in Portugal, with forest biomass power plants primarily located in the Central region. As of April 2022, the installed capacity of these plants was 679 MW, producing over 3,200 GWh of electricity annually. In 2020, renewable energy sources accounted for 30% of primary energy consumption, with biomass contributing 45% (DGEG, 2022⁴).

Several industrial sectors in Portugal utilize biological resources, including chemicals, textiles, and leather. In 2020, the chemical products sector had a sales value of €3.85 billion, textiles €2.71 billion, and leather €1.93 billion. These sectors play a crucial role in the national economy and provide substantial employment (EC, 2020).

Portugal's bioeconomy holds significant potential, supported by strong primary sectors and key secondary sectors like the chemical and biotech industries. The Sustainable Biomass Action Plan (SBAP) highlights the potential of biomass residues for high-value products, such as lignin and biopolymers. The textile industry also offers opportunities for producing bio-based textiles and biocomposites (APA, 2021⁵).

The SBAP promotes sustainable production and smart utilization of regional biological resources, fostering research and innovation. Key sectors identified for bio-based business models include textiles, clothing, footwear, and natural resins. These policies aim to enhance the bioeconomy by leveraging Portugal's strengths in various sectors.

Examples of small-scale bio-based solutions in Portugal include community-level forest residue recycling in Viseu and pellet production from olive oil industry residues. The [ALGAVALOR project](#) focuses on microalgae production for various applications, using agro-industrial residues, which demonstrates the innovative approaches being adopted at local levels.

³ INE - Instituto Nacional de Estatística. (2023). Estatísticas da Produção Industrial. Retrieved February 15, 2023, from https://www.ine.pt/ngt_server/attachfileu.jsp?look_parentBoui=641444445&att_display=n&att_download=y

⁴ DGEG - Direção Geral de Energia e Geologia. (2022). Energia em Números. Retrieved February 14, 2023, from <https://www.dgeg.gov.pt/pt/destaques/energia-em-numeros-edicao-2022/>

⁵ APA - Agência Portuguesa do Ambiente. (2021). Plano de Ação para a Bioeconomia Sustentável. Retrieved February 21, 2023, <https://apambiente.pt/apa/bioeconomia>



In summary, Portugal's rural bioeconomy is characterized by significant diversity and potential, supported by strong primary sectors, innovative industrial applications, and strategic policies aimed at sustainable development and circularity. These elements position Portugal as a key player in the European bioeconomy landscape, with opportunities for further growth and development in various bio-based sectors.



Figure 2: Portuguese fruits and fields

Source: UC



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