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Innovative agro-food industries in the EU Outermost Regions

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Abstract

This paper provides an overview of agro-food value chains in the EU Outermost Regions (EU ORs). It assesses emerging trends, discusses opportunities and challenges, reviews the policy frameworks and tools that can strengthen the beneficial participation of EU ORs in international agro-food value chains, and proposes priority actions. The paper is developed within the framework of the EU-OECD project on Global Outermost Regions.

Foreword

The global economic landscape is uncertain, complex and fast changing. Governments, businesses and societies are endeavouring to better understand and, ultimately, govern the ongoing reorganisation of global trade with a view to optimising exchanges, preserving openness and inclusiveness, and achieving an environmental and sustainable transition.

This paper is part of the OECD-EU project on “Transforming economies in EU outermost regions (EU ORs): fostering learning and making the most of global interconnectedness”, funded by the European Commission Directorate General for Regional and Urban Policy. Between 2021 and 2023, this project has supported a process of dialogue and knowledge sharing between EU ORs and international partners to identify opportunities for sustainable value creation and enhanced participation in global and regional value chains.

The European Outermost Regions (EU ORs) are EU member states’ territories located in the Atlantic Ocean, Caribbean basin, South America and the Indian Ocean and they are an integral part of the Union. They include Guadeloupe, French Guiana, Martinique, Réunion, Saint Martin and Mayotte (France), the Azores and Madeira (Portugal), and the Canary Islands (Spain). Due to their remoteness, insularity, small size, difficult topography and climate they benefit from targeted support measures. Thanks to their distinctive characteristics and assets, including a rich biodiversity and strategic location, the EU ORs can play an important role in the overarching EU internationalisation and co-operation strategy and policy.

This paper provides an overview of the agro-food value chains in the EU Outermost Regions (EU ORs), revealing their unique strengths and growth opportunities. The study emphasises the potential for international collaborations with a wide range of partners. It also clarifies future opportunities for increasing internationalisation and co-operation with partners beyond the EU, including neighbouring countries in Africa, Latin America and the Caribbean and other developing and emerging economies like Small Island Developing States (SIDS). Furthermore, the paper identifies opportunities for future reforms to make the most of the multi-annual planning and resources of the EU, including the Communication on “Putting people first, securing sustainable and inclusive growth, unlocking the potential of the EU’s outermost regions” adopted in 2022.

This paper is one of several outputs of the project, which include two Production Transformation Policy Reviews: Spotlight on the Azores’ and Guadeloupe’s internationalisation and four policy papers on the innovation and patenting, ocean economy, renewable energies, and cultural and creative sectors.

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Abbreviations and acronyms

ABC	Brazilian Low-Carbon Agriculture Plan
ARSO	African Organisation for Standardisation
CAP	Common Agricultural Policy
CARICOM	Caribbean Community
CARLs	Caribbean Reference Laboratories in Metrology
CCA	Caribbean Cooperation for Accreditation
CEN	European Committee for Standardization
CIRAD	French Agricultural Research Centre for International Development
EAGF	European Agricultural Guarantee Fund
EARDF	European Agricultural Fund for Rural Development
EMFAF	European Maritime, Fisheries and Aquaculture Fund
EMFF	(Former) European Maritime and Fisheries Fund
GI	Geographical Indication
GSO	Gulf Cooperation Council Standardization Organization
GVA	Gross Value Added
ICIA	Canary Institute of Agricultural Research
ILAC	International Laboratory Accreditation Cooperation
INSEE	National Institute of Statistics and Economic Studies (France)
NABs	National Accreditation Bodies
NSBs	National Standards Bodies
PLG	Peer Learning Group
POSEI	Options Specific to the Remote and Insular Nature of the Outermost Regions
PTB	German National Metrology Institute
R&D	Research and Development
SLP	Support to Local Production
SMEs	Small and Medium-sized Enterprises
SRDEII	Regional Scheme for Economic Development, Innovation, and Internationalisation
SSA	Specific Supply Arrangements
TFEU	Treaty on the Functioning of the European Union
VAT	Value Added Tax

Executive summary

The European Outermost Regions (EU ORs), including Guadeloupe, French Guiana, Martinique, Mayotte, Réunion, and Saint-Martin (France); the Azores and Madeira (Portugal); and the Canary Islands (Spain), are strategically positioned in the Atlantic Ocean, Caribbean basin, South America, and the Indian Ocean. Their extensive maritime economic zones, unique biodiversity, and natural attributes make them ideal laboratories for developing sustainable and resilient agro-food value chains.

Agriculture in most EU ORs is centred around permanent crops like sugar cane and subtropical fruits and vegetables, with food processing as the primary industrial activity. These regions have been proactive in redefining their agricultural strategies, diversifying their crop portfolios, and expanding both agricultural land and the number of farms. Moreover, they encompass 80% of European biodiversity and are situated in 25 global biodiversity hotspots.

However, the EU ORs face shared challenges, including small farm structures, limited domestic markets, high dependence on imports, remoteness, and import dependency for essential inputs. Moreover, the distances from mainland countries and principal markets, ranging from 1 500 to 9 000 km, present logistical and transport challenges, increasing costs.

The EU ORs are uniquely positioned to develop resilient and sustainable agro-food value chains. They can overcome challenges and position themselves as key players in the agro-food sector, contributing to local development and global sustainability efforts. To address these challenges and fully harness the potential of their agro-food sectors, four policy priorities are proposed:

- Invest in quality infrastructure: Improve quality infrastructure systems and policies to ensure food safety, traceability, and standards compliance.
- Signal and brand quality: Focus on signalling and branding quality, standards, and certifications to tap into global market opportunities.
- Invest in environmental sustainability: Prioritise investments in environmental sustainability to adapt to changing climates and reduce environmental impact.
- Connect innovation ecosystems: Strengthen innovation ecosystems through increased investment and support for science, research, and innovation. Encourage collaboration within and among EU ORs and with neighbouring countries.

1 Introduction

The nine EU Outermost Regions (ORs) include Guadeloupe, French Guiana, Martinique, Mayotte, Réunion, and Saint-Martin (France); the Azores and Madeira (Portugal); and the Canary Islands (Spain) and are important actors of the European Union around the world. Strategically located in the Atlantic Ocean, the Caribbean basin, South America and the Indian Ocean with distinctive assets such as unique biodiversity, favourable climates for specific crops and products that are the pillars of emergent and dynamic agro-food systems. While different in many historical, natural and socio-economic aspects, the EU ORs also face similar challenges, including remoteness, small size, and high vulnerability to climate change and natural disasters that affect the development of their agro-food production systems' value chain.

This paper, developed in the framework of the EU-OECD project on Global Outermost Regions, provides an overview of the agro-food value chains in the EU ORs. It provides a snapshot of the development of the agro-food industries over time and discuss the opportunities and challenges that the EU ORs are facing in light of emerging global trends. It also lays out some priority actions to consider a more sustainable and resilient internationalisation of agro-food with and beyond EU partners.

Box 1.1. The European Union Outermost Regions and the Commission's new Communication to support them

The EU outermost regions (EU ORs) are nine European territories geographically located in the Atlantic Ocean, the Caribbean basin, the Amazonian Forest and the Indian Ocean. They include French Guiana, Guadeloupe, Martinique, Mayotte, Réunion and Saint-Martin (France), the Azores and Madeira (Portugal), and the Canary Islands (Spain). In total, they are home to 4.8 million citizens, the equivalent of 1% of the total EU population. Due to the idiosyncratic challenges related to remoteness, vulnerability to climate change, small market size and high economic dependence on the mainland, the EU provides specific provisions for the OR in EU law and measures in accordance with Article 349 of the Treaty of the Functioning of the European Union (TFEU). With their rich biodiversity and unique ecosystems, they are unique assets for the EU as whole.

The European Commission adopted on 3 May 2022 a Communication on "Putting people first, securing sustainable and inclusive growth, unlocking the potential of the EU's outermost regions". This Communication reflects the Commission's commitment towards the EU ORs in line with Article 349 TFEU. The Communication presents the priorities for EU action with and for the EU ORs to foster their development, as well as recommendations for action by the EU ORs and their Member States – France, Portugal and Spain. Following the strong impact of the coronavirus pandemic on the EU ORs, the Commission sets forth action needed to foster a sustainable recovery and growth in these regions. The Communication focuses on:

1. Putting people first – improving living conditions for people in the EU ORs, ensuring people's quality of life, tackling poverty, and developing opportunities for the youth.
2. Building on each region's unique assets such as biodiversity, blue economy or research potential.

3. Supporting a sustainable, environmentally-friendly and climate-neutral economic transformation grounded on the green and digital transition.
4. Strengthening regional co-operation between EU ORs and neighbouring countries and territories.
5. Intensifying partnership and dialogue with the EU ORs via, among other aspects, administrative capacity to enhance their participation in EU programmes.

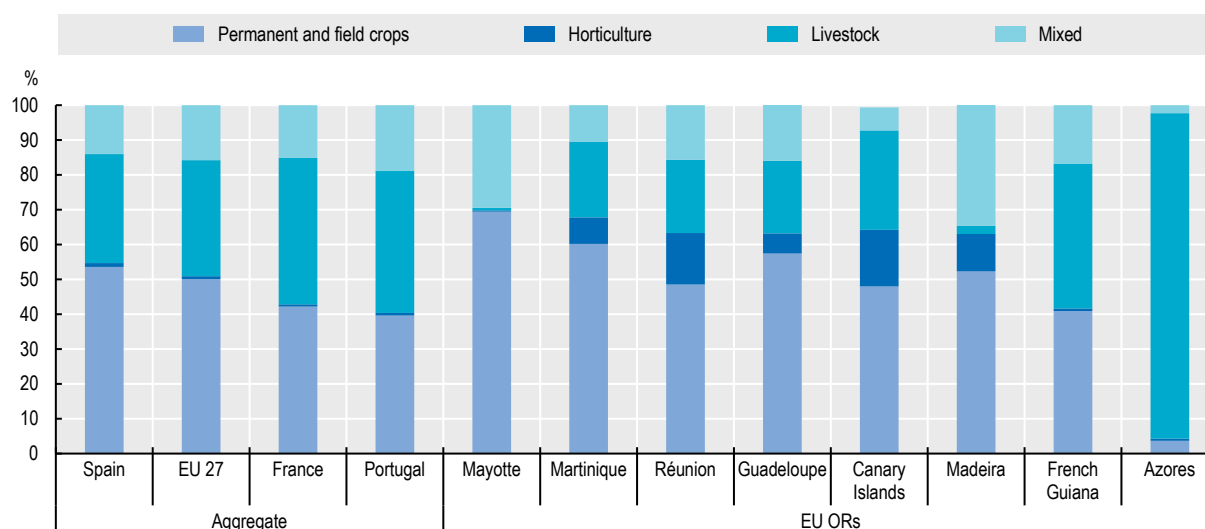
Source: European Commission (2022^[1]), "Putting people first, securing sustainable and inclusive growth, unlocking the potential of the EU's outermost regions", https://ec.europa.eu/regional_policy/en/information/publications/communications/2022/putting-people-first-securing-sustainable-and-inclusive-growth-unlocking-the-potential-of-the-eu-s-outermost-regions.

2 Agro-food is among the key economic activities in the EU ORs

The variety of climate conditions, biodiversity, and the unique natural assets of the EU ORs provide for favourable conditions for agro-food production. Together, the nine EU ORs are located in 25 global biodiversity hotspots and represent for 80% of the European biodiversity (European Commission, 2017^[2]; Urban Climate Adaptation, 2018^[3]). Permanent crops like sugar cane and subtropical fruits and vegetables including horticulture products and flowers, characterise the agriculture systems in the majority of the EU ORs (Figure 2.1).

Figure 2.1. Different specialisation partners in agriculture in the EU ORs

Farm distribution by type of agricultural activity, EU ORs 2021



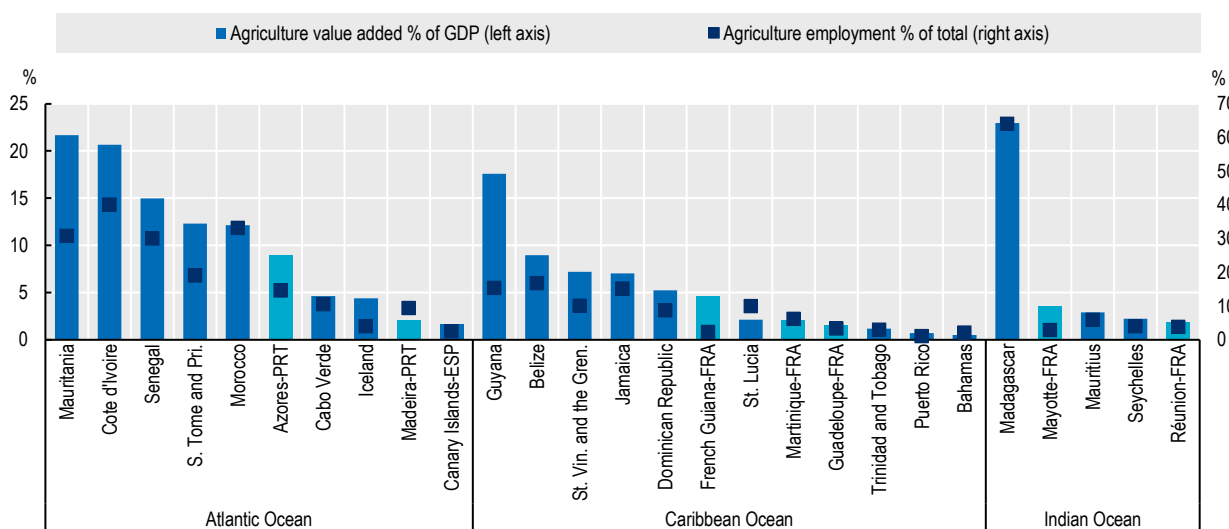
Source: Based on Eurostat indicators by agricultural area, type and economic size of the farm, share of consumed production, legal status of the holding and NUTS2 region, <https://ec.europa.eu/eurostat>.

With EUR 740 million of gross value added (GVA), the Canary Islands have the largest agricultural sector among the EU ORs, followed by Réunion and the Azores with EUR 320 million and EUR 290 million respectively.¹ Agricultural value added in Réunion, Mayotte and French Guiana grew above the EU average at 1.3% in 2010-19 (Figure 2.2). In Réunion, traditional sugar cane production remains the main staple covering 37% of farms. Alongside sugar cane production, a more diversified agricultural sector is emerging, which includes fruits such as citrus and pineapples and livestock. Mayotte, which became an

¹ Saint-Martin with 267 hectares of agricultural land is not reported in official agricultural statistics at EU level and with limited information available from French sources.

EU OR in 2014, is witnessing a slow but deep transformation. Next to the traditional and self-sufficient agriculture focused mainly on banana and cassava, which account for 65% of agricultural land, farming activities such as cattle and poultry are also emerging (Figure 2.3). In French Guiana, the positive performance in GVA growth has been driven by the expansion of both agricultural land (+40%) and the number of farms (+12.5%), an exception in the landscape of French regions (Agreste, 2021^[4]; INSEE, 2021^[5]).

Figure 2.2. Value added and employment in agriculture, forestry, and fishing activities, 2019



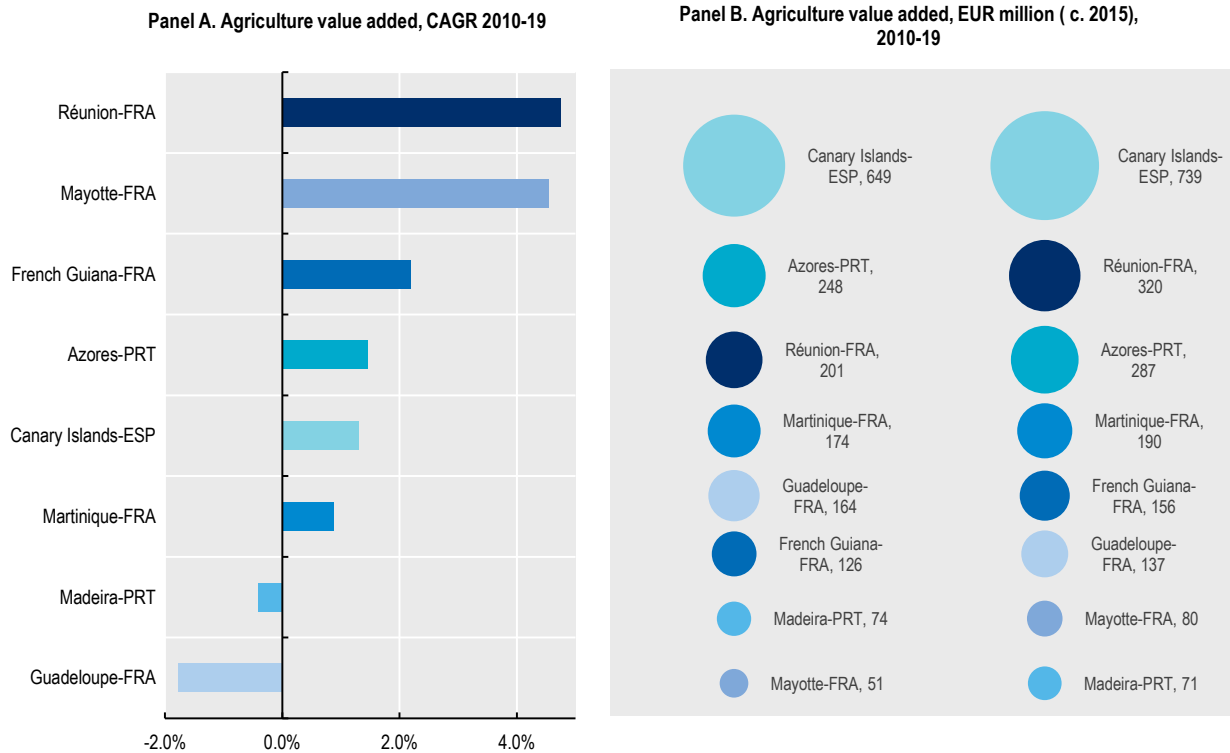
Note: 2018 for Guadeloupe, Réunion, Martinique, Mayotte, French Guiana; 2019 for Canary Islands, the Azores and Madeira and EU27.

Source: Based on OECD Regional statistics, <https://stats.oecd.org>, French, Portuguese and Spanish National Regional Institute of Statistics and Economic Studies, <https://www.insee.fr>, <https://srea.azores.gov.pt/>, <https://estatistica.madeira.gov.pt/>, <http://www.gobiernodecanarias.org/stac>.

In the Azores and the Canary Islands, agricultural output grew on par with the EU average, driven by their traditional agricultural products as milk and dairy for the Azores and aquaculture, horticulture, and fruits for the Canary Islands. Guadeloupe, Martinique, and Madeira have below average or even negative agriculture output over the last decade in comparison to EU average. In Guadeloupe and Martinique, extreme weather events have negatively impacted agricultural production. For example, in 2017 hurricane Maria destroyed the vast majority of banana trees in Martinique and Guadeloupe. Shipments to continental France ceased for seven months, creating a shortfall of 200 000 tonnes (INSEE, 2019^[6]). In addition, both territories are still facing the consequences of soil contamination due to the use of chlordecone in the 1970s-90s that severely affected local agriculture. In Madeira, the loss of arable land (-11% in 2010-19) due to rising urbanisation and lack of proper land management is behind the decline of agricultural production (Castanho, 2018^[7]).

Food processing is the main economic activity in the EU ORs. While manufacturing is a marginal activity in the EU ORs – 5% of regional GVA compared to 15% in France, Spain, and Portugal – it is mostly related to food processing, accounting on average for 30% of production units and 40% of employment (Figure 2.4). The development of food processing is particularly challenging due to the high costs related to insularity and remoteness that induce higher transport cost, time to market and limited production capacities. As such, companies tend to integrate production stages and pursue economies of scope rather than scale. This is the case for dairy production in the Azores or sugar value chains in Guadeloupe, Martinique and Réunion, which are often organised in cooperatives that aim to reduce the dependency on foreign markets for intermediate inputs and reduce shipping costs.

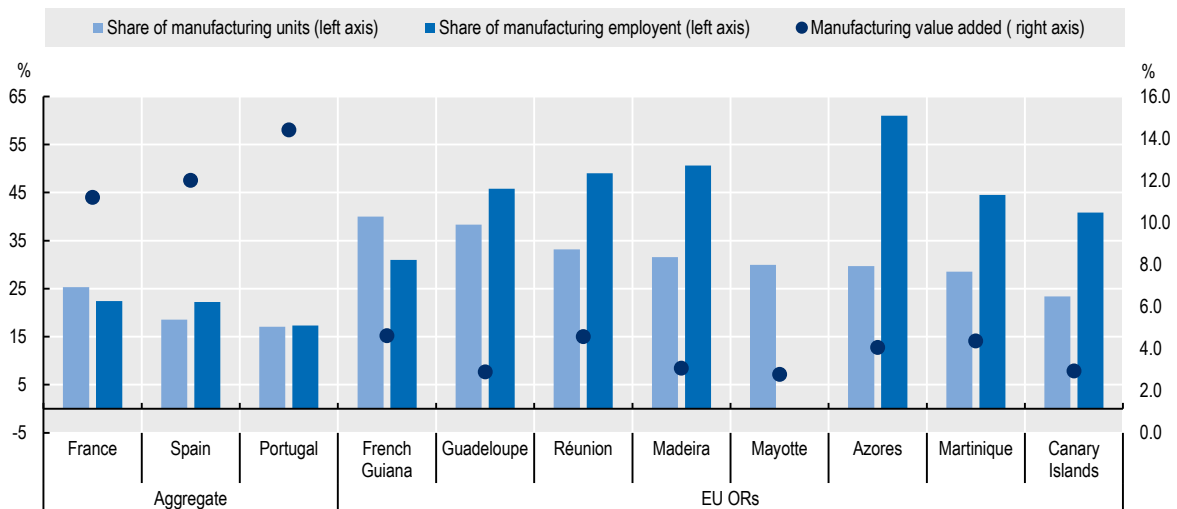
Figure 2.3. Evolution of agricultural output in the EU ORs



Source: Based on OECD Regional Statistics, <https://stats.oecd.org>, and Eurostat, Structural Business Statistics 2020, <https://ec.europa.eu/eurostat/web/structural-business-statistics/data/database>.

Figure 2.4. Food processing is the main industrial activity in the EU ORs

Share of manufacturing units and employment of food and beverage industries and manufacturing value added as a share of total value added, 2021 or last available year.



Note: For manufacturing value added: 2018 for Guadeloupe, Réunion, Martinique, Mayotte, French Guiana; 2020 for the Canary Islands, the Azores and Madeira; and 2021 for aggregate values.

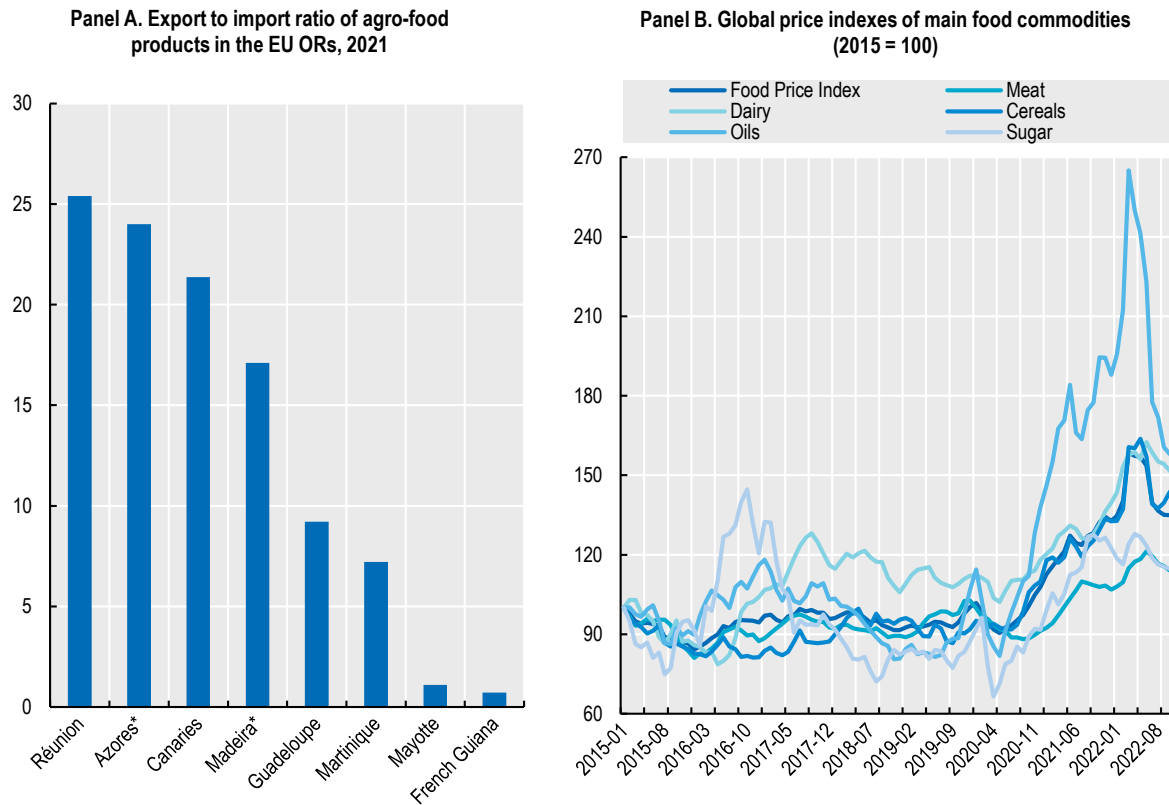
Source: Based on OECD Regional Statistics, <https://stats.oecd.org>, and Eurostat, Structural Business Statistics 2020, <https://ec.europa.eu/eurostat/web/structural-business-statistics/data/database>.

Agro-food accounts on average for 45% of the export of goods by EU ORs, ranging from 4% for French Guiana to 85% for the Azores. Export markets differ depending on geographical location, specificities of production and historical and cultural ties. Around 80% of EU ORs' agro-food production is exported to France, Spain and Portugal, followed by other EU countries such as the Netherlands, Germany and Italy). However, the EU ORs are increasingly exporting to global markets beyond the EU. The Azores, for example, export to North America (United States and Canada) and to Africa (Cabo Verde, Mauritania, Morocco and Mozambique). For Guadeloupe and Martinique, intra-Caribbean trade accounts for 45% (including other French ORs) whereas for Réunion, 30% of exports are directed to neighbouring countries located in the Indian Ocean, including Madagascar, India and Mauritius.

Despite the differences in their specialisation and geographical location, the EU ORs face similar challenges with respect to value chain development in agro-food. These include, principally:

- **Small farm structure.** The EU ORs have small territories because they tend to be islands or archipelagos, which is why their farms are usually relatively small. On average, 80% of farms cultivate less than 5 hectares, whereas the EU average is 62%. As such, there are limited opportunities to pursue economies of scale and scale-up investment. However, there are some differences. Madeira, the EU OR with the smallest agricultural land, has 99% farms with less than 2 hectares. On the flip side, Guadeloupe, Martinique and Réunion, which rely on permanent field crops such as sugar cane with few producers, tend to have larger holdings.
- **Limited market size.** The EU ORs have small domestic markets – ranging from 2 million inhabitants in the Canary Islands to 35 000 inhabitants in Saint-Martin. Although these markets are complemented by tourism activities, not all EU ORs can rely on tourism. During the high season, the population of the Canary Islands increases five-fold due to international inbound tourism, but this does not necessarily apply for other regions such as Mayotte, which attracts a mere 30 000 visitors (i.e. 12% of the local population). Moreover, the recent disruption induced by COVID-19 severely affected tourism in all EU ORs. Available data indicate that tourist numbers decreased by approximately 70% from 2019 to 2020 across the EU ORs depriving them of potential additional customers (European Commission, 2021^[8]).
- **Remoteness and import dependency.** The EU ORs face additional and complementary constraints due to their location, which include logistics and transport challenges, and import dependency for key inputs. The distance of EU ORs from their mainland countries and other principal markets, ranging between 1 500 km and 9 000 km, pushes up the cost of transport and creates logistical challenges. For example, all things being equal, some estimates indicate that the cost of transport for each kilogramme of meat to the mainland from the Azores is EUR 2 more expensive with respect to a competitor in mainland Portugal. Such vulnerabilities were accentuated during the COVID-19 pandemic, which disrupted maritime and air connections (Autoridade Tributária Aduaneira, 2021^[9]). Moreover, the EU ORs largely rely on imported agro-food products both in terms of intermediate inputs, such as fertilisers, and final products to meet local demand. In a context of soaring global food prices, this might lead to further uncertainty and higher production and consumption costs (Figure 2.5).

Figure 2.5. The EU ORs rely heavily on imported agro-food products



Note: * For the Azores and Madeira disaggregated data on agro-food domestic trade with mainland Portugal are not available. The export-import ratios are based on the quantity (tonnes) of agro-food goods loaded and unloaded at the regional ports in 2020. Caution should be taken in making cross-regional comparisons.

Source: Based on French, Portuguese and Spanish national and regional statistics, <https://www.insee.fr>, <https://srea.azores.gov.pt/>, <https://estatistica.madeira.gov.pt/>, <http://www.gobiernodecanarias.org/istac> and FAO <https://www.fao.org/worldfoodsituation/foodpricesindex/en/>.

3 The EU ORs count on targeted policy support for agro-food

The EU ORs benefit from specific targeted policy support for agro-food, implemented by the local and the national governments as well as by the EU. The EU ORs benefit from a set of derogations from EU law in accordance with Article 349 of the Treaty on the Functioning of the European Union (TFEU). For example, the traditional agricultural rum from the French ORs benefits from a reduced taxation of a maximum 50% when purchased in France. In addition, some alcoholic beverages that are produced locally in Madeira and the Azores benefit from a reduced excise duty of between 50% to 75%, depending on whether they are sold for consumption locally or in mainland Portugal. Likewise in the Canary Islands, the AIEM (*Arbitrio sobre Importaciones y Entregas de Mercancías en las Islas Canarias*) provides a tax exemption up to 15% for local products to support local industries. Some 31 agro-food products such as processed vegetables and fish, dairy and wine are included (European Union, 2012^[10]; European Council, 2020^[11]). The EU ORs benefit from ad-hoc measures related to the Common Agricultural Policy (CAP) including, among others, a maximum rate of co-financing of up to 85%, above the average 70% of other EU funds.

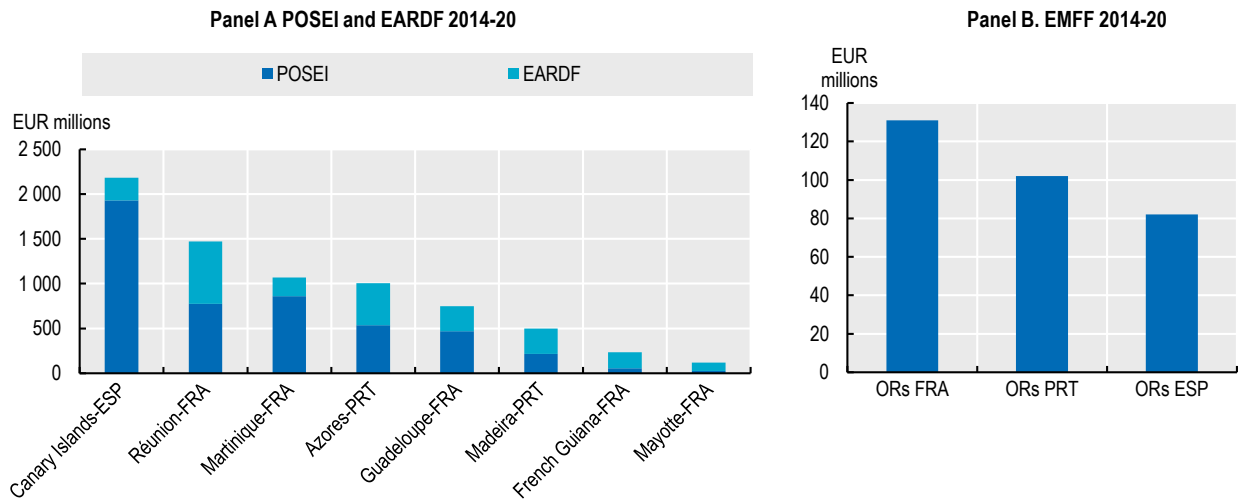
The largest policy support programme is the “Programme of options specific to the remote and insular nature of the outermost regions” (POSEI), which replaces the measures of the first pillar of the CAP. POSEI, financed by the European Agricultural Guarantee Fund (EAGF), aims to: guarantee the supply of essential agricultural products shipped to the EU ORs; to secure the development of the livestock and crop-diversification sectors; and maintain the development of traditional agricultural activities. This is implemented with two specific instruments. First, the Specific Supply Arrangements (SSA), which exempt import duties from third countries and allow aid for the transport of products manufactured in the European Union to the EU ORs. Secondly, the Support to Local Production (SLP) supports the production, processing and marketing of traditional and emerging local agricultural products. The total amount of the POSEI schemes for 2014-20 was EUR 4.8 billion and is maintained at its current level under both the 2021-22 CAP transition period and the 2023-27 CAP period. The strategic allocation of the SSA and SLP differ among the EU ORs according to their needs and agro-food structures (Figure 3.1). For example, for the SSA the Azores and French ORs prioritise support of feed and cereals for animal consumption, whereas the Canary Islands and Madeira focus on products for direct human consumption and on support to processing. Regarding the SLP, all the ORs tend to allocate most resources to traditional sectors – more than 75% – whereas they only allocate 25% to diversification measures (European Commission, 2021^[12]).

The EU ORs also benefit from rural development support (i.e. the second pillar of the CAP), which is financed by the European Agricultural Fund for Rural Development (EAFRD). The EAFRD provides several instruments including loans, microcredit, guarantees and equity to farmers and entrepreneurs in agriculture, forestry and rural areas. The total amount for the 2014-20 financing period was EUR 2.5 billion including both EU and national resources. The Azores, the Canary Islands, Guadeloupe, Martinique and French Guiana allocated more than 40% of resources to the competitiveness of SMEs. Madeira and Réunion allocated more than one-third of resources to environmental protection. Mayotte and French Guiana are the only ones that allocated more than 30% to social inclusion. Overall, the French ORs are the only ones that allocated more than 12% of resources to Research and Innovation activities, whereas the Portuguese ORs allocated relatively more resources to climate change (around 22%). Although the

total resources allocated to the EAFRD for the 2021-27 period were lower compared with the previous programming period, the Recovery and Resilience Fund (European Commission, 2019^[13]) could make up for these shortfalls. For example, as part of the French Recovery Plan (*France Relance*), Martinique has submitted 33 specific agricultural restoration projects to the ministry of Agriculture for a total of EUR 4.5 million (Ministère de l'Intérieur et des Outre-mer, 2022^[14]).

An additional, relevant support measure comes from the European Maritime, Fisheries and Aquaculture Fund (EMFAF), which used to be called the European Maritime and Fisheries Fund or EMFF. It contributes to the sustainable exploitation and management of fisheries and aquaculture resources. With a contribution of EUR 315 million for both 2014-20 and 2021-27, the EMFAF is managed at country level. For the EU ORs, the main investment is supporting the modernisation of fishing vessels and port infrastructures. Moreover, the Azores, Madeira and the Canary Islands are also providing funding for research and innovation in aquaculture (European Commission, 2022^[15]).

Figure 3.1. EU support to agro-food for the EU ORs



Source: Based on cohesion open data platform, <https://cohesiondata.ec.europa.eu/>, and national sources.

4 The ongoing transformations of global agro-food industries open up new opportunities for the EU ORs

New trends and emerging risks are reshaping the global agro-food industry. As the population in some regions continues to grow, demand for agro-food is expected to continue to increase, although at a slower pace than in the previous decade (Box 4.1). The industry is experiencing a rapid transformation, requiring new skills and competences to reap the benefits of a growing market. Also, the global pandemic is accelerating pre-existing trends towards shorter value chains to ensure environmental sustainability and minimise the risks associated with trade disruptions (Figure 4.1). These trends have also induced further reflections on self-sufficiency and self-reliance policies at global level. Among these trends, three are of particular importance for the EU ORs: climate change and environmental sustainability; growing demand for agro-food quality, safety and traceability; new technologies and innovation in the value chain.

Box 4.1. Agricultural and food markets: Key projections from the OECD/FAO Agricultural Outlook 2021-2030

The agricultural and food sector has demonstrated high resilience in face of the global COVID-19 pandemic compared to other sectors of the economy, but the compounding effect of income losses and inflation in consumer food prices have made access to healthy diets more difficult for many people. However, the evolution of the COVID-19 crisis adds uncertainty to the macroeconomic assumptions underlying the projections of the OECD/FAO Agricultural Outlook 2021-2030.

Some of the key projections for the next decade include:

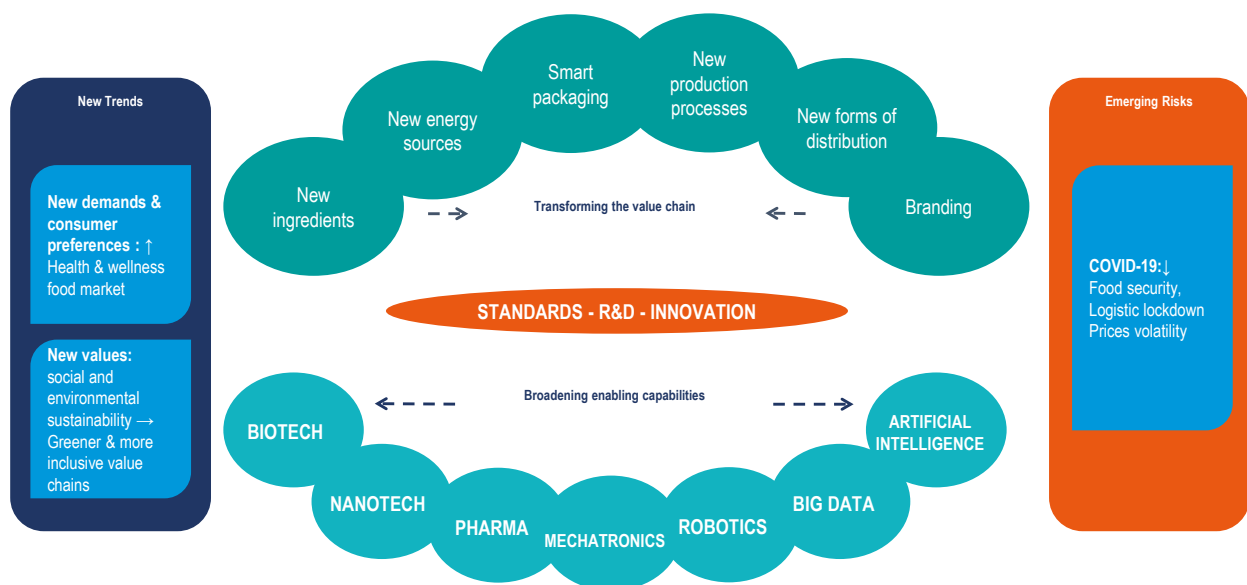
- Agricultural demand growth is slowing and mostly driven by population growth. Global demand for agricultural commodities is projected to grow at 1.2% yearly over the coming decade; well below the growth experienced over the last decade (2.2% p.a.). This is mainly due to an expected slowdown in the growth of demand in the People's Republic of China (0.8% p.a. compared to 2.7% p.a. over the last decade) and other emerging economies, and lower global demand for biofuels. The bulk of additional demand will originate in regions with high population growth such as Sub-Saharan Africa, South Asia, Middle East, and North Africa. Given the proximity of some EU ORs to these regions, this could provide new market opportunities particularly for agricultural products.
- Low- and middle-income countries are driving global production growth. Over the coming decade, global agricultural production is projected to increase by 1.4% p.a.; a slowdown compared to the growth in output experienced over the last decade (1.7% p.a.). Production growth in agriculture is expected to come mainly from emerging economies and low-income countries. It is likely to be driven by productivity-increasing investments in agricultural

infrastructure and research and development, wider access to agricultural inputs and improved management skills in these regions. An additional driver of growth will be investments to mobilise production resources (e.g. land, irrigation, water).

- Global agricultural emissions are set to increase, but the carbon intensity of agricultural production is expected to decrease over the next decade. In all regions, the growth in agricultural production is expected to exceed the growth in direct GHG emissions from agriculture. This development is driven both by yield improvements and by a declining share of ruminant production in total agricultural production.

Source: OECD/FAO (2021^[16]), *OECD-FAO Agricultural Outlook 2021-2030*, <https://doi.org/10.1787/19428846-en>.

Figure 4.1. The future of global agro-food: New trends and challenges



Source: OECD/UNCTAD/ECLAC (2020^[17]), *Production Transformation Policy Review of the Dominican Republic: Preserving Growth, Achieving Resilience*, <https://dx.doi.org/10.1787/1201cfea-en>.

Climate change and environmental sustainability

Extreme and unpredictable events caused by climate change are stressing production, particularly commercial fruit and vegetable production, which can only be grown in specific ecosystems. The geography and prevalence of pest and diseases is also shifting as temperature and weather patterns change (FAO, 2021^[18]). For example, the citrus greening disease, transmitted through a bacterial pathogen, was endemic to Asia and was spotted in the United States in 2005. Within three years, it led to damages of over USD 1 billion to citrus orchards in Florida and has spread to other states (New York Times, 2012^[19]; Singerman and Rogers, 2020^[20]). In addition, agro-food production is a major stress for the environment, accounting for between 21-37% of anthropogenic greenhouse gas emissions (OECD, 2021^[21]).

The shifting risk environment and rising uncertainty faced by farmers and other actors in the agricultural sector has put renewed emphasis on the importance of risk management in agricultural policy frameworks. The policy principles agreed by OECD Ministers in 2016 emphasise the need to bolster farmers' ability to handle risk and cope with more frequent, unpredictable events (OECD, 2020^[22]). To deal with these

challenges, farmers are increasingly focusing on de-risking and diversifying fruit and vegetable production, reducing post-harvest food loss and waste and implementing integrated pest and pollinator management practices.

The EU ORs are highly exposed and particularly vulnerable to the impact of climate change and are also particularly concerned by the need to preserve their ecosystems. For example, in the Caribbean basin, beside the impact of hurricanes over the years, the incidence and size of algal blooms (sargassum) has been growing due to rising water temperatures and increased fertiliser release into the ocean. The sargassum is causing increasing damage to the environment, biodiversity and coastal ecosystems and is restricting the supply of oxygen available to fish (FAO, 2022^[23]).

Growing demand for agro-food quality, safety and traceability

Consumers worldwide increasingly value quality, traceability, and sustainability of agro-food production and the awareness of the consequences of long and complex food value chains for the environment and health is increasing. The COVID-19 pandemic posed difficulties for lower-income groups to access nutritious foods. In particular, some EU ORs such as French Guiana and Mayotte – where poverty rates are between four and five times higher than in Mainland France – had to rely on aid. In 2021, the Red Cross distributed food assistance to 16 000 people in Mayotte (Croix-Rouge Française, 2021^[24]).

The market for healthy food is growing, linked to the increased attention of middle classes to overall well-being, and not only price. The global market for natural and organic cosmetics reached USD 18.5 billion in 2020 and is expected to increase up to USD 32.3 billion by 2027 (PR Newswire, 2021^[25]). This trend is also readily seen by the rapid growth of voluntary labels and certificates for food. According to estimates, about 2% of total agricultural land is certified organic among other certifications (Meemken et al., 2021^[26]). In the EU ORs, some entrepreneurial activities in these areas are emerging. In Guadeloupe, Phytobôkaz (a local enterprise with an R&D laboratory) leverages local natural assets to produce organic and innovative products including cosmetics, pharmaceutical fibres and 100% natural dyes such as blue indigo.

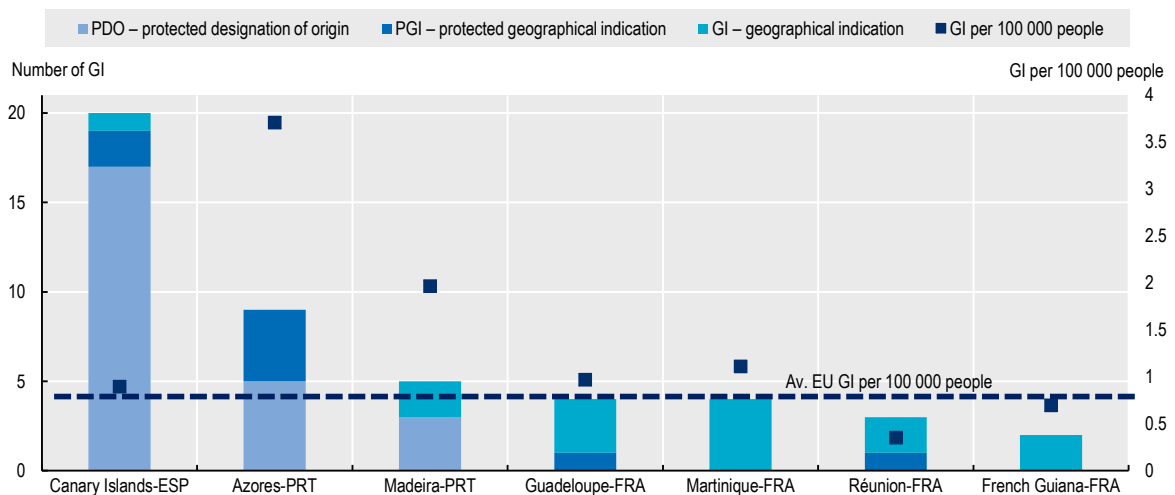
However, while consumers value sustainability, creating a market for sustainable products is challenging. A survey conducted by Global Market Research and Public Opinion Specialist (IPSOS) on behalf of the International Fresh Produce Association, which surveyed US consumers in 2018, found that while 69% of consumers considered sustainability to be extremely or very important, sustainability ranked below quality, price and nutrition as a criterion for purchasing fresh fruits, vegetables, meat fish and poultry. When choosing dairy and frozen foods, the brand name was seen as being more important than whether the product was organic or not. Investments in branding could increase competitiveness in a global market where image and reputation are important signals for safety and quality in agro-food and can help products stand out amidst multiple offerings.

The EU ORs are already taking steps to highlight the uniqueness and authenticity of their products and increase their visibility internationally and locally. Five out of the nine EU ORs (the Canary Islands, the Azores, Madeira, Guadeloupe and Martinique) have more Geographical Indication (GI) products per 100 000 people than the average of the EU, Spain, Portugal and France (Figure 4.2). Some of the GI products that are already well known beyond borders include volcanic wines from the Canary Islands, the Azores and Madeira; spirits (traditional rum in the French Antilles) and specific sub-tropical fruits (the “melon de Guadeloupe”); and dairy products (the Canary Islands and the Azores). However, branding initiatives often lead to the multiplication of labels, creating competition within regions and diminishing international impact. To address these issues, the Azores created the *Marca Açores* brand in 2015, a regional brand to promote the identity and cultural value of the Azores, but also to provide a label of origin for food and non-food products, crafts, services and facilities. Following the example of the Azores, Réunion is currently developing its own territorial brand, which will serve as an overarching theme for all

the existing local brands. In addition, to ensure greater awareness of EU ORs agro-food products, a dedicated logo was introduced at the European level as an optional sign of quality in 2013 (European Parliament/Council of the European Union, 2013^[27]).

Figure 4.2. The EU ORs are branding quality local agro-food products

Number of protected geographical indications (GI) by type and per 100 000 people, EU ORs and EU average, 2022



Note: Mayotte and Saint Martin do not have registered geographical indications.

Source: Based on EU geographical indications register eAmbrosia, <https://ec.europa.eu/info/food-farming-fisheries/food-safety-and-quality/certification/quality-labels/geographical-indications-register/>.

New technologies and innovation in the value chain

Digital technologies are affecting production, marketing, logistics and retail. Smart farming, the Internet of Things, and Big Data are enabling precision agriculture through advanced monitoring system. These advances can increase yields and productivity while reducing environmental impact and mitigating damage from natural disasters (OECD/UNCTAD/ECLAC, 2020^[17]). New models of production, such as vertically integrated food systems, also hold potential to harness scientific advances to increase the efficiency of resource use and transform the relationship between agricultural and urban environments. At the same, the increased uptake of digital and other emerging technologies is widening the set of capabilities that are required to compete in this industry, including data scientists, bio technologists and engineers, which are becoming essential in leveraging local assets and developing new innovative products.

The EU ORs firmly believe that innovation is at the heart of their agro-food development strategies and actively engage in research to improve the potential of the sector, underpinned by the efforts of local universities, and specialised academic institutes. Supporting eco-friendly and sustainable agro-food systems requires investing in innovation. For example, the Canarian Institute of Agricultural Research (ICIA) regularly engages in projects that aim at generating, adapting and transferring agricultural technologies. Among other projects, the ICIA is leading a consortium involved in the FRUTTMAC project (2019-20) as part of the Interreg Macaronesia programme (co-financed by the EU) with partners from the Azores, Cabo Verde and Madeira to diversify and improve sustainability and efficiency of exotic fruit agriculture. It aims to do so by developing and disseminating, to the private sector, plant genetic resources complemented by information on how to adapt and grow these species locally. Nevertheless, to unleash innovation, it would be necessary to scale up and modernise partnerships between different actors along the value chain. This includes enhancing links between academia and the private sector both to and from

EU ORs and mainland Europe. It also means improving ties between agro-food and other sectors of the economy, such as tourism and pharmaceuticals. Amplifying opportunities for innovators to commercialise technologies is also important. Close co-operation between industry, government, and academia, coupled with strong government support for the creation of bio-tech start-ups, was a key factor in the development of a flourishing biotech sector in Iceland (Box 4.2). A coherent and comprehensive strategy for attracting investment comes from the Flanders region in Belgium. The Flanders investment promotion agency provides a one-stop-shop that connects local universities and enterprises with potential investors in strategic sectors for the region including agribusiness biotech. While the EU ORs might not have the infrastructure or administrative capacities to fully integrate such processes, a possible option could be to leverage and partner with national investment promotion agencies such as the Spanish Institute for Foreign Trade ICEX in Spain, which has already participated in specific projects developed with the Canary Islands.

Box 4.2. Bringing the private sector in: Innovating in Iceland

Although a small, remote and sparsely populated island, Iceland has a flourishing agro-food sector that accounted for 9.8% of the country's gross domestic product (GDP) in 2019, the second highest in the OECD after Colombia (10.4%). One of the country's main sectors is fisheries, with Iceland being the second largest producer of seafood in Europe after Norway (FAO, 2021^[28]).

Iceland's strategy for raising the quality and innovation content of agro-food has relied on working closely with the private sector to commercialise new technologies, by fostering a highly skilled workforce, strengthening co-operation between industry, government and academia, and channelling public support for start-up development. Widening access to capital has been an important dimension of the country's efforts in this regard. Iceland has in place the Technology Development Fund in 2004, hosted by the Icelandic Centre for Research that support research activities that drive industrial innovation, and is open not only to universities and research institutes, but also to business enterprises and individuals. It disburses different types of grants tailored to a product's stage of development, with co-financing requirements similarly ranging from 0% for seed projects to 50% for grants aimed at market expansion. In 2020 it disbursed a total of EUR 9 million (Icelandic Centre for Research, 2022^[29]). Similarly, the AVS R&D Fund by the Ministry of Fisheries and Agriculture supports projects that aim to increase the value of fisheries.

Several biotechnology start-ups and spin-offs have emerged in Iceland to exploit the country's natural marine resources by venturing into new sectors such as medicine, pharmaceuticals and nutraceuticals. For example, Kerecis, which started commercial operations in 2013, develops skin graft "band aids" from fish skins, and early research for the product was supported through a grant by the Technology Development Fund, followed by additional investments from venture capital (Fréttablaðið, 2020^[30]). Now the company has more than 200 employees and three regional headquarters in Iceland, Switzerland and the United States.

Source: Viðarsson, J. (2021^[31]), "Innovation success stories from the high-north: How Iceland fosters innovation in food value chains", Division of value creation, Matis ohf. (Icelandic food & biotech R&D), Presentation at the First Peer Learning Group (PLG) Meeting "Innovating in agro-food value chains", 21 January 2022.

5 Policy priorities for agro-food in EU ORs

The EU ORs represent unique territories for the EU; they are rich in biodiversity and have an untapped potential for developing resilient and sustainable agro-food value chains. Despite the progress made so far, further effort is required to reduce the challenges associated with the structural constraints and the major development at global level in agro-food. Moving forwards, the following policy areas seem to be the most important to continue progressing in the agro-food value chains.

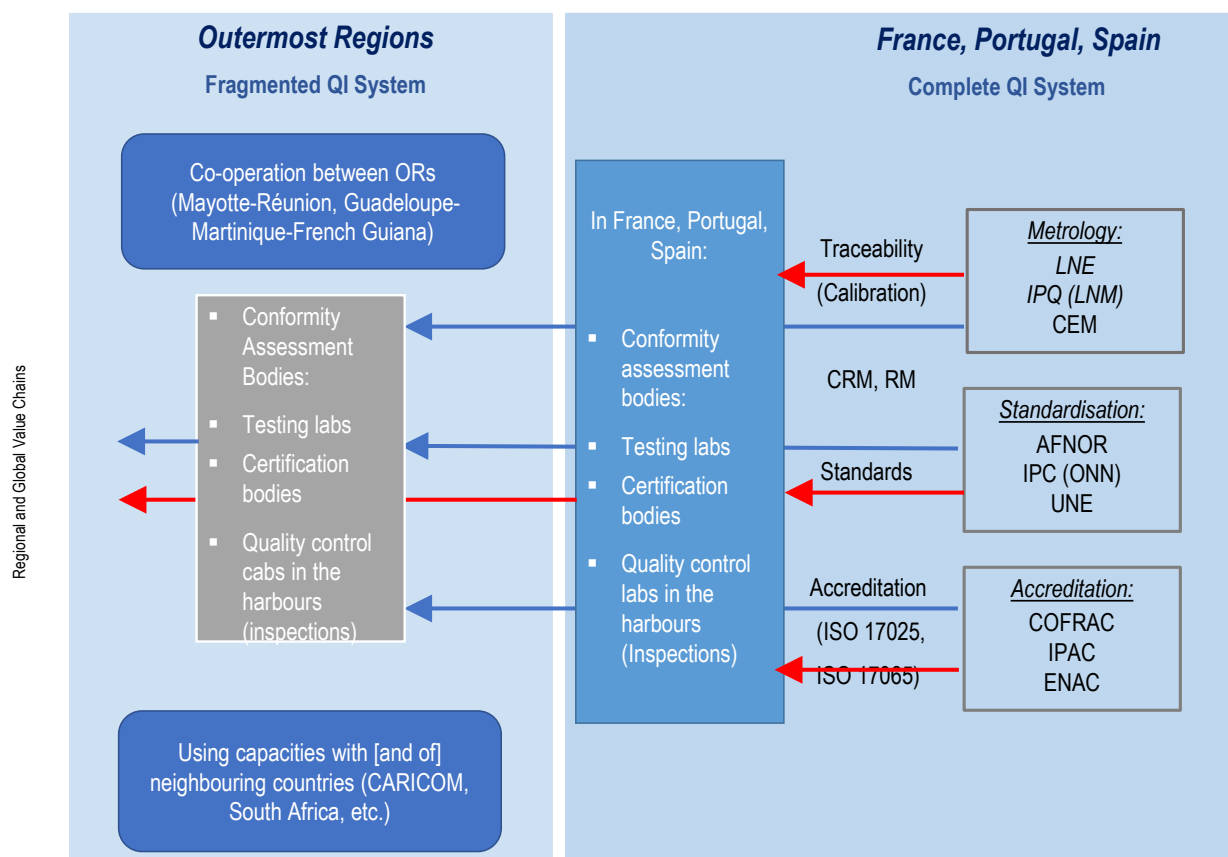
Improving quality infrastructure systems and policies

Signalling and branding quality will be increasingly relevant. Standards and certifications are essential for food security and for tapping into global markets opportunities. Public and private investment in metrology standardisation, accreditation and conformity assessments and skills will be more important than ever in the future. It provides the basis for securing food safety and production quality, which contributes to reducing food waste and it also guarantees conformity with trade standards and international market requirements, potentially opening up new business opportunities (Figure 5.1). Certification with quality management standards and mutual recognition of certification through international agreements creates trust between trading partners and increases bilateral trade. For example, some studies show that a one percent increase in the number of certificates such as ISO in the exporting country increases exports by 0.30-0.60% point in the agro-food sector (Blind, Mangelsdorf and Wilson, 2013^[32]). The integration of EU ORs into their respective national quality infrastructure systems varies and is occasionally fragmented. Due to their small size, EU ORs sometimes lack the complete institutions in charge of quality infrastructure (metrology, accreditation, standardisation and certification). Due to their remoteness, it can be impractical to access services on the mainland. For example, in French Guiana and Mayotte there is currently no accredited agro-food testing laboratories, putting constraints on assuring quality in exports in an affordable and fast way. In many cases, ORs are part of the national QI system of the mainland. What will be important in the future is to develop conformity assessment bodies for the main value chains and products providing traceable, confident and comparable test results and certifications. If access to quality services on the mainland is impractical, then co-operation with neighbouring countries should be developed.

Targeting investments in quality systems for important products, or fostering co-operation among EU ORs and with neighbouring countries and regions, could also help solve some of the identified constraints. In the Caribbean, regional co-operation has emerged as a solution to foster access to a full-fledged and accessible system for quality metrology, certification and accreditation, which would otherwise be unavailable at national level due to size and resource constraints (Box 5.1). The EU ORs could provide services and technical expertise to several close countries in their respective geographical areas. For example, both Martinique and Guadeloupe host certified microbiology laboratories that could provide services to firms in nearby countries eager to access EU markets. Since 2013, the Spanish Algae Bank (*Banco Español de Algas*) has been providing technology transfer and technical co-operation to the Ministry of Higher Education, Science and Innovation of Cabo Verde in the area of biotechnology and

molecular. This initiative provides an opportunity for Cabo Verde to develop expertise in areas such as biofuels and agro-food. This type of initiative could be scaled up to include specific professions within the different Interreg programmes in which the ORs are involved. Also, the EU ORs could leverage their strategic location and become involved in existing partnerships with regional and subregional standardisation bodies. One such example includes the European Committee for Standardization (CEN) and African Organisation for Standardisation (ARSO) and the Gulf Cooperation Council Standardization Organization (GSO).

Figure 5.1. Quality infrastructure services for agro-food value chains in EU outermost regions



Source: Göthner, K. (2022^[33]), "Quality infrastructure services for product and export diversification in EU Outermost Regions", German National Metrology Institute (PTB), Presentation at the First Peer Learning Group (PLG) Meeting "Innovating in agro-food value chains", 21 January 2022.

Box 5.1. Regional quality infrastructure co-operation: CARICOM in the Caribbean

The CARICOM Regional Organisation for Standards and Quality (CROSQ) was established in 2002 as part of the Caribbean Community and Common Market (CARICOM) to facilitate the co-ordination and the development of an efficient quality infrastructure system in the region. The system is in line with international standards and rules, and national needs. Most CARICOM countries already have national standards bodies (NSBs), but they often lack the resources and skills to offer all the standardisation, metrology, accreditation, and conformity assessment services needed to ensure quality, particularly for international markets. CROSQ aims to fill this gap and to reduce technical barriers to trade among CARICOM countries by fostering standards harmonisation across members and by supporting

co-operation in the development of quality metrology, accreditation and certification services. For example, among the most recent results of CROSQ's work include:

- The establishment of Caribbean Reference Laboratories in Metrology (CARLs), which enables all countries to benefit from the three accreditation labs that currently exist in Jamaica (for mass and volume) and the Trinidad and Tobago (for temperature). CROSQ points to also developing CARLs for time and frequency in the future.
- The Caribbean Cooperation for Accreditation (CCA) scheme is based on the principles of mutual co-operation and collaboration amongst national accreditation bodies (NABs), national accreditation focal points and CROSQ. Currently, there are only two NABs within CARICOM, based in Trinidad and Tobago and Jamaica respectively, that are part of the scheme. The Jamaica National Agency for Accreditation is also a signatory to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement for the scope of testing laboratories and can therefore confer international status to qualifying service providers. Through the CCA, CROSQ aims to provide cost-effective professional accreditation services at the regional level and foster the development of NABs over time.

Source: Göthner, K. (2022^[33]), "Quality infrastructure services for product and export diversification in EU Outermost Regions", German National Metrology Institute (PTB), Presentation at the First Peer Learning Group (PLG) Meeting "Innovating in agro-food value chains", 21 January 2022.

Investing in environmental sustainability

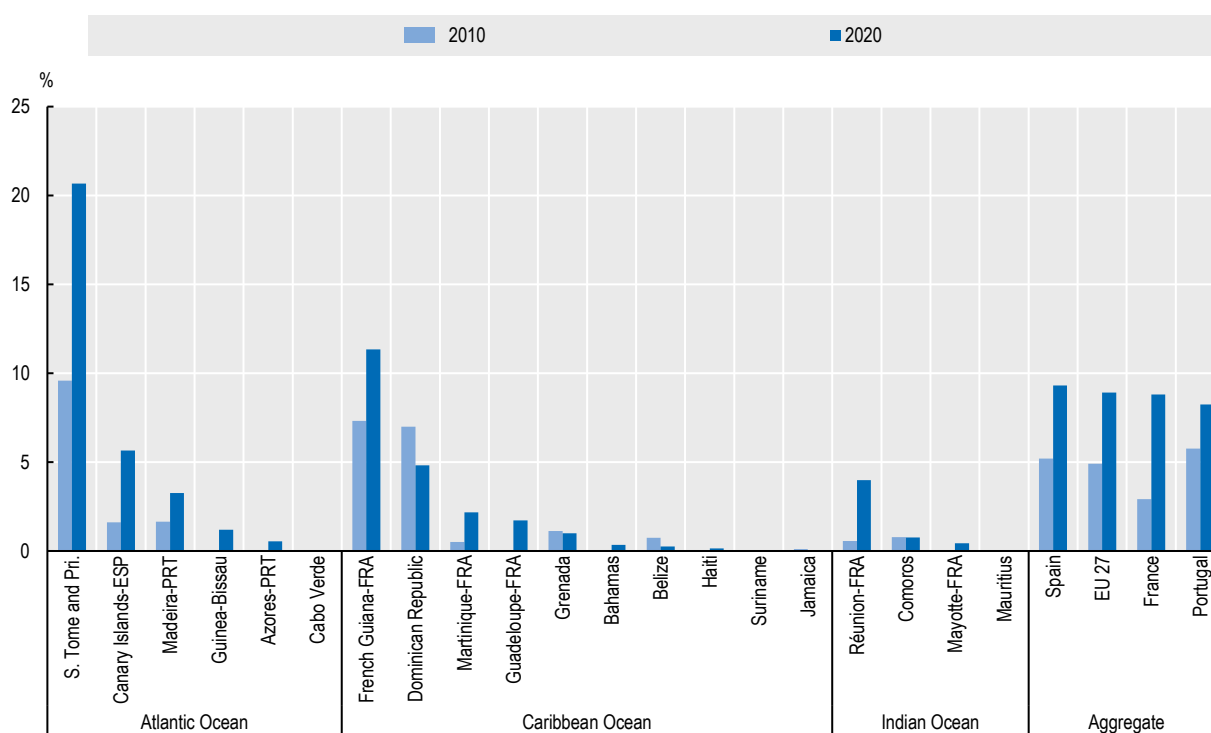
The intensification of agriculture has increased food availability over recent decades. However, it also has adverse environmental impacts, such as increases in nitrogen over-supply, eutrophication of land and water bodies, as well as greenhouse gas (GHG) emissions. Likewise, pollution caused by arsenic and mercury produced by illegal gold washing in the Amazon basin jeopardise crop production in French Guiana. The introduction of organic agriculture and circular economy practices provide opportunities to increase sustainability of land use and self-sufficiency. Particular attention should be paid to organic production that can support farmers to adopt more flexible and less intensive crop rotation, which requires less fertilisers, which EU ORs must import, while establishing an ecological balance to prevent soil fertility or pest problems. Organic is not necessarily the only option. Integrated pest management or integrated soil fertility management could also reduce pesticide and fertiliser use while at the same time preserving yields (Seufert and Ramankutty, 2017^[34]). Some EU ORs have developed good practices and methods such as the use of bio-waste as compost in the public parks in the Canary Islands. However, these efforts are not enough. For example, only 4% of agricultural land in the EU ORs is devoted to organic production on average, whereas in mainland Europe this figure stands at around 9% (Figure 5.2).

The EU ORs are committed to supporting farmers in moving towards more environmentally friendly production methods through several types of tools and initiatives. Several EU ORs provide dedicated financing to farmers through national and EU funding mechanisms. For example, the Azores Agricultural Innovation Support Programme (i9agri) aims to enhance farmers' access to new technologies by disbursing financial support (EUR 1 000-20 000) for investments in computerisation and digitalisation, decision-making tools, residue and by-product valorisation, environmental sustainability, precision agriculture, among others. They also provide infrastructure solutions. For example, in the case of Guadeloupe, the government fosters the clustering of activities that combine sustainable farming with the promotion of local high value products through the Agropark Caraïbes Excellence programme, which hosts a business incubator, an agro-processing platform and a commercial hub. The EU ORs are also active in

diffusing information on sustainable methods, by offering extension services or by operating dedicated platforms, such as the portal of the Agricultural Innovation and Transfer Networks in French ORs.

Figure 5.2. Organic agriculture can lead the way towards sustainability

Share of agricultural land devoted to organic production, 2010-20



Source: Based on FAO Statistics, <https://fao.org/faostat>, and Eurostat, Agricultural Statistics 2020, <https://ec.europa.eu/eurostat/web/structural-business-statistics/data/database>.

Strengthening these policy instruments by linking them to the branding strategy will be crucial to not only foster sustainability more widely, but also turn the uniqueness of each region into an asset for further expanding into and upgrading regional and global markets. Providing farmers with up-to-date integrated support that includes both financing and technical services to improve traceability and assess the carbon and nutritional content could also boost the competitiveness of the entire agro-food value chain. Through its low-carbon agriculture plan (ABC), Brazil aims to foster climate adaptation and reduce carbon emissions by supporting farmers to adopt integrated agriculture and livestock systems that aim to rejuvenate degraded pastures, improve irrigation systems and better manage agro-food waste (Box 5.2). Integrated crop-livestock systems can be applied to EU ORs such as the Azores that aim at diversifying and increasing agriculture output while making cattle farming more environmentally friendly (Box 5.3).

Box 5.2. Promoting climate-resilient and sustainable agriculture in Brazil: The ABC+ plan 2020-30

Agricultural production occupies 30% of the total area of Brazil. The sector is greatly influenced by environmental conditions and climate change is one of the most important risks to sustainable production. In 2012, Brazil committed to increase and strengthen the sustainability of its agricultural systems and to promote resilient production with the Brazilian national plan for agriculture and climate change, the ABC Plan. The Brazilian government intends to continue its efforts in this direction with the Brazilian Agricultural Policy for Climate Adaptation and Low Carbon Emission – 2020-2030 or ABC+ plan. The ABC+ Plan is a national policy developed in synergy with regional policies and with the involvement of private stakeholders. The plan fosters the adoption of standardised practices and technologies through technical extension, dedicated financial instruments, and empowerment through the ABC Platform. ABC+ also expands the goals for Brazil in its efforts to combat climate change. For example, during the period of 2020-30, Brazil aims to mitigate 1.1 billion tonnes of CO₂ equivalent, compared to 133-163 million tonnes during 2010-20.

The ABC Platform, a multi-institutional monitoring and evaluation of the ABC Plan, evaluates studies and indicators regarding the resilience of agricultural systems and what constitutes the adaptive capacity of such systems. The platform has information and planning instruments, such as Sisdagro (a decision-support system for agriculture from the National Meteorological Institute), ScenAgri (simulation of future agricultural scenarios) and the SOMABRASIL (an observation and monitoring system for agriculture in Brazil), which are both co-ordinated by Embrapa. These systems are increasingly adjusting their methodologies to climatic uncertainty in order to improve decision-making by farmers and governments.

Source: Crespolini, M. (2022^[35]), “Innovation in agro-food value chains”, Department of Sustainable Production and Irrigation, Secretariat for Innovation, Rural Development and Irrigation, Ministry of Agriculture, Brazil, Presentation at the First Peer Learning Group (PLG) Meeting “Innovating in agro-food value chains”, 21 January 2022.

Box 5.3. Engaging the EU ORs with other EU rural territories: the case of LIVERUR

LIVERUR is a Horizon 2020 project with a total budget of EUR 4 million that aims at expanding an innovative business models called Living Labs in rural regions. It includes a consortium of more than 20 partners from peripheral and rural areas of the EU and partner countries. The objective is to create and foster long-term open-innovation ecosystems operating at territorial level by integrating research and innovation process within a public-private partnership.

Among the many projects and pilots, the Terceira Island in the Azores is particularly noteworthy. With the support of the Science and Technology Park of Terceira (TERINOV) and in collaboration with the Regional Directorate for Agriculture and Rural Development, the pilot project identified innovative business models that match with traditional entrepreneurial approaches. The activities include, better use of natural resources, implementation of eco and sustainable agricultural techniques that can lead to high value-added products. The pilot project also identifies potential features for replicating good practices in other rural areas.

Source: (Silva, 2022^[36]), “Presentation at the First Peer Learning Group (PLG) Meeting “Innovating in agro-food value chains”, 21 January 2022”, Regional Secretary of Agriculture and Rural Development of the Azorean Government, Azores, Portugal.

Harnessing synergies with other value chains

The ORs have untapped potential when it comes to expanding the agro-processing activities that take place locally and increase their sophistication. Beside the traditional inter value chain opportunities with other important activities such as tourism and gastronomy there is scope to explore synergies with highly sophisticated value chains. The EU ORs' rich biodiversity presents opportunities to identify and exploit both primary and secondary raw materials of interest that could have applications in a variety of sectors, such as health, well-being and cosmetics as well as support the development of new businesses in the area of the circular economy. Examples of this include the development of fibre-based products from agricultural waste developed jointly by Fibrenamics, the international platform of the University of Minho, and the Regional Laboratory of Civil Engineering of the Azores, and the use of biotechnology for producing pharmaceutical molecules in Guadeloupe and in French Guiana, or in the conservation, dissemination and use of the genetic resources of vanilla, and tropical garlic in Réunion. New projects involving biomolecules and green chemistry are also emerging in the use of the banana molecule for bio-cosmetics in Martinique.

However, in order to enable businesses to make these investments, it is important to provide support, not only for upstream innovation activities, but also for downstream investment in processing and marketing activities. For example, Mauritius regards agro-food as a strategic sector and is matching its strategic vision for the sector with dedicated financial incentives to enable companies to invest in food processing and nutraceutical plants and lower costs to reach international markets (Box 5.4). Couching the policy mix in a strategic vision is crucial to ensure coherence and maximise linkages with other key sectors of the economy, such as tourism. Réunion, for example, launched the Regional Scheme for Economic Development, Innovation, and Internationalisation (SRDEII) in 2022, which outlines policies for seven key thematic areas (business support, innovation, internationalisation, real estate, attractiveness, inclusivity and gender) and six key economic sectors (agro-food, blue economy, energy, tropical construction, digital and tourism). Under the SRDEII, Réunion Island is looking to chart the local agro-food chain to identify opportunities for diversification in the future.

Box 5.4. Supporting agro-food firms to diversify in Mauritius

Agro-food is an important industry for Mauritius, accounting for 32% of total exports during 2018-20, with sugar accounting for about one-third of total output (UNCTAD, 2022^[37]). Over time, the industry in Mauritius has modernised and diversified, along three axes:

- Developing new and improved quality products: Low Glycaemic Index (GI) sugar and other refined and special sugars have emerged next to more traditional raw sugar offerings.
- Using existing crops to diversify into new industries. For example, Mauritius generates 11% of its electricity from biofuel, most of which is bagasse, a pulp left over after sugarcane juice has been extracted. The country has also developed a burgeoning rum industry (rum Agricole) that is made from sugar cane juice. Today, it is home to 20 rum operators and seven big distillers that focus on making products infused with local flavours that have potential for high brand value.
- Exploiting local biodiversity to venture into new markets. For example, although currently a nascent industry, Mauritius seeks to develop its indigenous medicinal plants for the production of nutraceuticals and pharmaceuticals.

This process of diversification and upgrading has gone hand in hand with a supportive public policy environment and institutional setting. Mauritius has put in place a strategy to diversify and raise the value added of its agricultural production, enshrined in the Strategic Plan (2016-20) for the Food, Crop, Livestock and Forestry Sectors, while the sugar sector is supported through special plans and initiatives,

such as the Sugar Industry Efficiency Act 1988/2001 (amendments 2011-18). The Economic Development Board (EDB), an apex body operating under the Ministry of Finance, Economic Planning and Development, plays a critical role in meeting policy objectives by ensuring coherence in the implementation of policies, promoting investments and exports and working with ministries and private stakeholders to set goals.

The country's agro-food strategy also includes a policy mix that is geared towards enabling investments in strategic activities and promoting the industry's internationalisation. For example, the EDB offers different fiscal incentives to investors, such as income tax holidays (up to eight years for selected activities, such as bio farming, food processing and investments in nutraceuticals), VAT exemptions on production equipment, sea and air freight rebate schemes for exporters (refund of 25% of cost, up to USD 600 per 40-tonne containers to all African ports; and up to 60% of air freight costs to the United States, Europe, Japan, Australia, Canada and the Middle East) and waiving building and land use permit fees.

Source: Ramdenee, D. (2022^[38]), "Innovation in agro-food value chains: International experiences - Mauritius", Department Ocean & BIO Economy, Economic Development Board (EDB), Mauritius, Presentation at the First Peer Learning Group (PLG) Meeting "Innovating in agro-food value chains", 21 January 2022.

Connecting innovation ecosystems

Increasing the investment and support in science, research and innovation will be essential to develop resilience and efficient agro-food value chains in the future. Together the EU ORs are already engaging in research and innovation activities. The EU-funded FORWARD project launched in 2019 under Horizon 2020 and concluded in 2022 intended to improve ORs' excellence in research and innovation potential, supporting their participation in EU-funded projects. Co-ordinated by the Canarian Agency for Research, Innovation and Information Society (ACIISI) together with other 23 institutions and a total budget of EUR 4.3 million was the first attempt to pull together resources and skills from all nine outermost regions in the areas of research and innovation.

Despite efforts, the innovation ecosystem in the EU ORs is still limited if compared to other EU territories. R&D investment is below 0.5% of regional GDP, well below the national and OECD average (2.7%) and similar to developing and emerging economies in Latin America. Despite the relative larger incidence of agriculture on GDP, the EU ORs often lack R&D resources and skills to support diversification and resilience of agro-food systems and the large potential for research activities associated with their natural laboratories remains unexplored and fragmented. Prioritising a holistic, multi-level and multi-scale approach, while exploring innovation activities among the EU ORs and with neighbouring countries will be essential. This can be done in several ways: strengthening local R&D activities by involving the private sector as well; encouraging more innovation within established frameworks (e.g. several Interreg programmes); or getting involved in well-known cross-country research projects with a specific focus or challenge (Box 5.5). The important objective is to direct innovation efforts not only towards improving profitability but rather towards establishing a research agenda that encompasses both sustainability and market dynamics from farm to fork (OECD, 2019^[39]).

Box 5.5. The shared value of the bioeconomy: Brazil and France joint research in the Amazonia

The Partnership Facility Amazonia (*Dispositif en Partenariat-DP AMAZONIE*) is a French and Brazilian scientific partnership that includes the Brazilian Agricultural Research Corporation EMBRAPA and the French Agricultural Research Centre for International Development (CIRAD), collaborating around the major issues of sustainable agriculture and the rural development in the Amazonia from the Nordeste Pareense in Brazil to French Guiana. Established in 2011, the partnership underpins research activities, based on a multidisciplinary approach, combines participatory modelling, sociology, agronomy, economics, zootechnics, ecology and geography. DP Amazonia implements several activities including training and scholarships for PhD and master students.

The scientific partnership has several objectives, including:

- Promoting the dynamics of the ecological intensification of agricultural and livestock activities at farm and territorial scale.
- Understanding the consequences of wood harvesting on the functioning and services provided by forest ecosystems in order to develop sustainable forest management methods.
- Sharing knowledge on ecological, social and innovation processes, social processes of innovation and design sustainable socio-technical systems, through innovative support mechanisms for farmers.
- Supporting the collective and institutional organisation of territories, and the territorialisation of public policies, in particular concerning the integration of family farming.

Source: Cote, F. (2022^[40]), "Environmental preservation and value generation? A research point of view", Department of Performance Production Systems, French Agricultural Research Centre for International Development, Presentation at the 19th Plenary Meetings of the OECD Initiative on Global Value Chains.

6 Conclusion

The paper provided an overarching perspective of the development of agro-food value chains in the EU ORs. It shows that agro-food is among the most important economic activities for these regions. Structural challenges (including distance from mainland, limited market size and large import dependency) hamper the economic sustainability of the agro-food systems in the EU ORs. However, they are also coming under pressure from external factors such as climate change, extreme weather events and price fluctuation.

The EU OR also provide a unique and diversified reservoir of agro-food products for the entire European Union and their respective countries. With the volcanic wines in Macaronesia, rum in the French Antilles and sub-tropical fruits and dairy products, the agri-food sector in the EU ORs has a unique opportunity to flourish by tapping into high-end markets and becoming a 'pull' factor to develop other economic activities such as tourism.

However, considering the current global trends that point at more quality, sustainable and short agro-food value chains further steps are needed in this direction. These include: i) improving quality infrastructure systems with particular focus on regional and basin integration, ii) investing in environmental sustainability by exploring new farming techniques and providing modern extension services, and iii) harnessing synergies with other value chains and connecting innovation ecosystems in order to increase value added and provide more sustainable and long term resilient agro-food value chains.

In doing so, it will be important to make the most of EU and National support to sustain the current production levels while, at the same time, fostering diversification and sophistication by exploring the untapped potential of organic and circular economies.

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