GROW LIFE

DELIVERABLE 1.1

Needs Analysis

[*English*]

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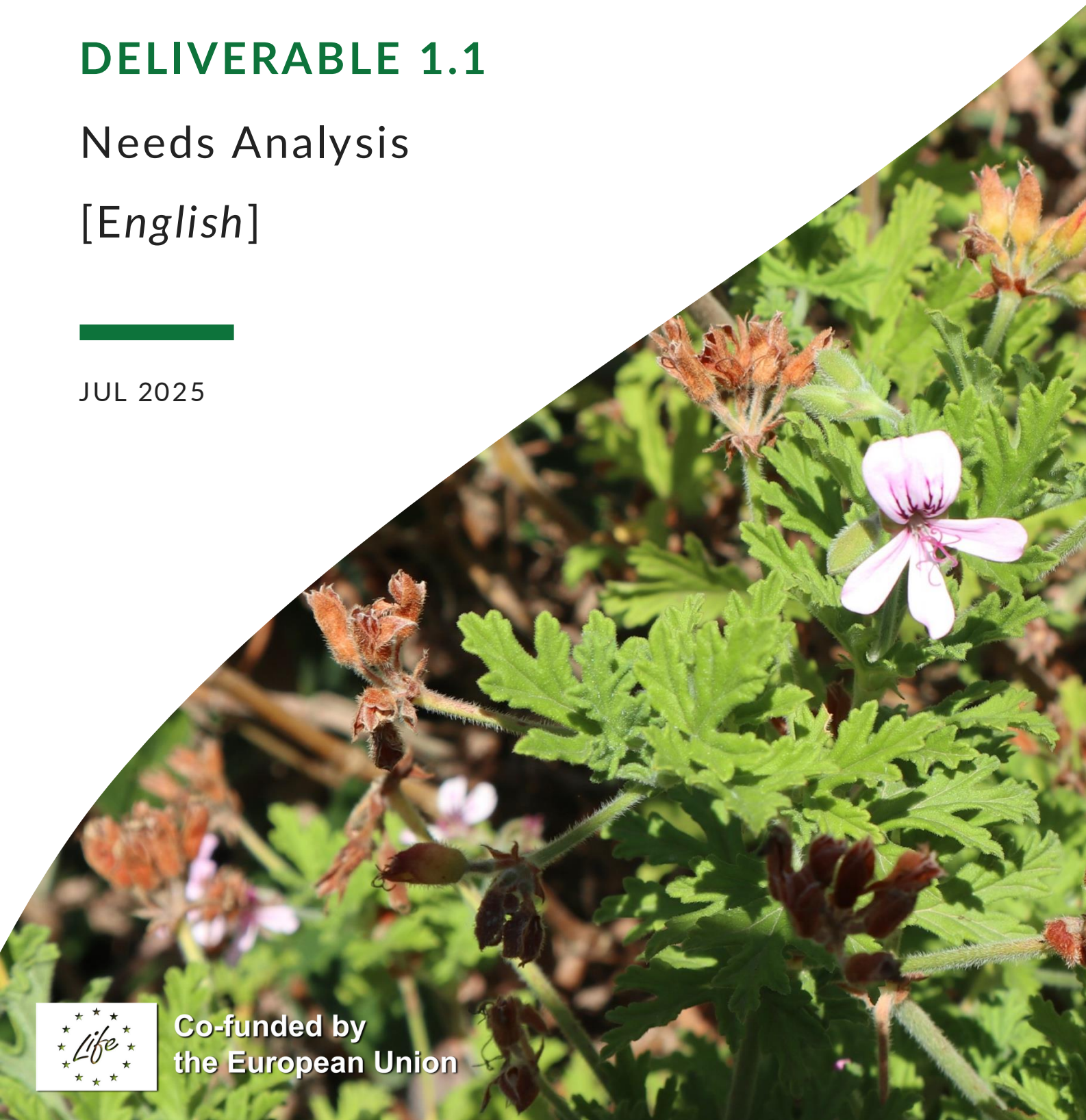

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Executive Summary

The present Needs Analysis compiles the results from three surveys launched targeting the four stakeholder groups targeted by GrowLIFE's activities across mainland Portugal: producers, consumers, policymakers and culinary students. The goal of these surveys was to assess stakeholder behavior, perception and needs regarding the sustainability of the food system.

Analysis of the collective data reveals a significant gap between producers and consumers, who mostly rely on supermarkets instead of local farms to shop for their produce. This gap presents an opportunity to strengthen local short supply chains, which can enhance access to sustainable products and support local farmers. Economic challenges faced by producers, including difficulties selling at planned prices, also highlight the need for greater economic and social sustainability in agriculture. The analysis also identifies regulatory and logistical barriers to establishing short food supply chains. Collaboration among various stakeholders—producers, consumers, municipalities, universities, and associations — is essential for overcoming these challenges. Key solutions include improving infrastructure, simplifying regulations, offering financial incentives, and increasing awareness through education. Furthermore, integrating sustainability principles into culinary education is crucial for bridging the gap between values and actions of culinary students. Educating future chefs about agroecology and sustainable practices can promote the use of locally sourced, seasonal ingredients, enhancing food system resilience and biodiversity.

Overall, this analysis provides a solid basis for GrowLIFE's implementation, emphasizing the need for collaboration, targeted education, and strategic policy changes to create a more sustainable and integrated food system in mainland Portugal.

Table of Contents

1. General Introduction

The Farm to Fork Strategy, a central component of the European Green Deal, aims to transition food systems towards sustainability, ensuring they are fair, healthy, and environmentally friendly. This strategy addresses the urgent need to redesign food systems, which currently contribute nearly one-third of global greenhouse gas emissions and result in significant biodiversity loss and negative health impacts. By promoting sustainable food practices, the strategy seeks to create resilient food systems that can withstand crises like the COVID-19 pandemic, while also providing fair economic returns for all actors, especially primary producers.[1]

In line with the Farm to Fork Strategy, the GrowLIFE project focuses on transforming the Portuguese food system to promote environmental, social, and economic sustainability. GrowLIFE is a collaborative effort between the Caravana AgroEcológica team from the Faculty of Sciences at the University of Lisbon and Turismo de Portugal, involving its 12 Schools of Hospitality and Tourism Schools. The project targets key stakeholder groups, including agricultural producers, consumers, policymakers, and culinary arts students, to foster behavioral change and sustainable practices throughout the food system.

To understand the perspectives and challenges faced by these stakeholder groups, GrowLIFE conducted three distinct surveys:

1. **Consumers and producers**: Engaging consumers is vital for driving demand for sustainably produced food, which can, in turn, influence production practices. This survey sought to capture consumer attitudes, behaviors, and awareness regarding sustainable food consumption. In addition, the survey also aimed to gather insights from agricultural producers on their current farming practices, their sales and income strategies and relevant success. The questionnaire circulated from May 2022 to February 2023, in 2-month intervals, through mailing lists, newsletters, websites of the local authorities and social networks to maximize reach and participation.

2. **Policy Makers**: Policy makers play a pivotal role in shaping the regulatory environment that can either facilitate or hinder the transition to sustainable food systems. Focused on municipal staff and local policymakers, this survey aimed to map existing strategies for implementing short food supply chains, identify barriers, and gather feedback for improvement. Distributed electronically across Portugal from February to June 2024, it received diverse responses from division chiefs, senior technicians, project managers, and other key municipal staff, ensuring a comprehensive understanding of local strategies and challenges.

3. **Culinary Arts Students**: As future chefs and food industry leaders, students' knowledge and attitudes towards sustainability are critical. This survey, conducted by Turismo de Portugal, targeted students from its 12 Hospitality and Tourism Schools to assess their knowledge and understanding of sustainable food practices. Running from November 2023 to January 2024, the survey evaluated students' comprehension of concepts such as sustainable nutrition, food waste, and biodiversity, aiming to inform the development of future educational programs.

By involving these diverse groups, GrowLIFE aims to create a well-rounded approach to transforming the Portuguese food system. In alignment with the results of these surveys, the project's activities will be designed to include peer-to-peer knowledge transfer, workshops, and multi-stakeholder discussions, with the aim to promote sustainable practices from farm to fork. This holistic strategy supports the broader goals of the European Green Deal, contributing to a climate-neutral Europe by 2050 while ensuring food security, nutrition, and fair economic returns for all actors in the food value chain.

2. Consumers and producers

General context

As the European Environment Agency states, the agricultural sector ranks fifth in the production of greenhouse gases [2,3], which makes intervention in agriculture, and in the food system in general, a key point for effectively mitigating climate change.

This report presents the answers given by a group of consumers and agricultural producers who took part in a survey that was used as a starting point to find out more about the Portuguese reality in relation to the current food system.

The questionnaire was available from May 2022 to February 2023, circulated every 2 months to maximize its reach. Dissemination by Local Development Associations was particularly important in getting the questionnaire out to producers (22%), while in the case of consumers the role of mailing lists and newsletters from the Caravana Agroecológica, Tagis, among others (20%) stands out. However, most of the consumers and producers surveyed found out about the questionnaire via the mailing lists and websites of their local councils (29% and 26% respectively), as well as via social networks (22%).

The main results are presented in the following chapters.

Demographic Profile of the Surveyed Population

A total of 187 people answered the questionnaire analysed here, 164 in the consumer category and 23 in the producer category. Most consumers surveyed are aged between 30 and 49 (54%) or 50 and 65 (33%) **(Fig. 1A),** around 80% have a university degree **(Fig. 1C)** and 65% are female. Most producers surveyed are also aged between 30 and 49 (35%) or 50 and 65 (39%) (**Fig. 1B).** However, unlike consumers, 57% of the producers who responded to this survey were male and only 48% had higher education (**Fig. 1D).**

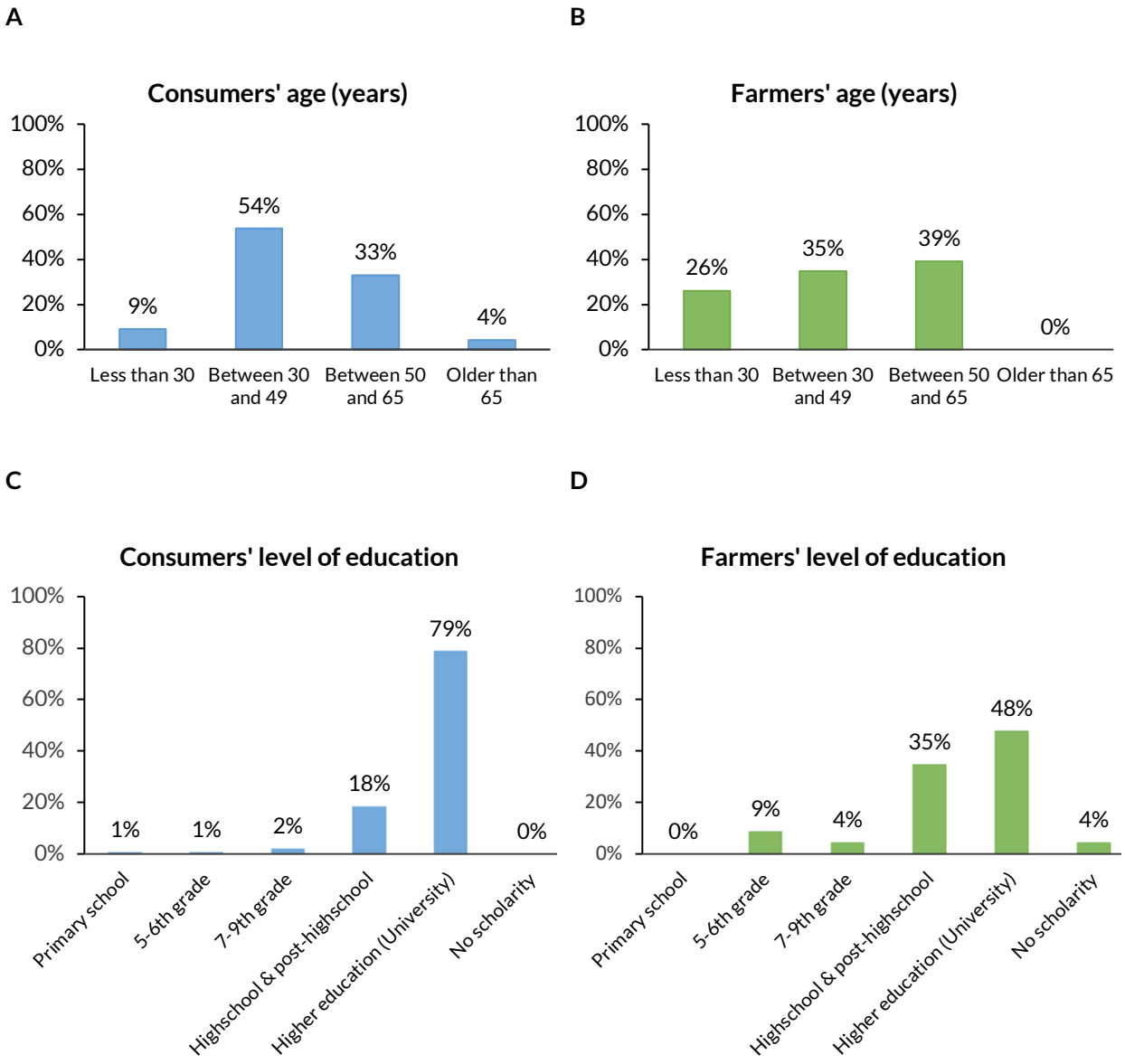


Figure 1. Percentage of consumers (A and C) and producers (B and D) surveyed in terms of age (in years, A and B) and level of education (C and D).

In total, residents of 56 different Portuguese municipalities were surveyed, 40 if only consumers are considered, 18 if only producers are considered **(Fig. 2).**

A

B

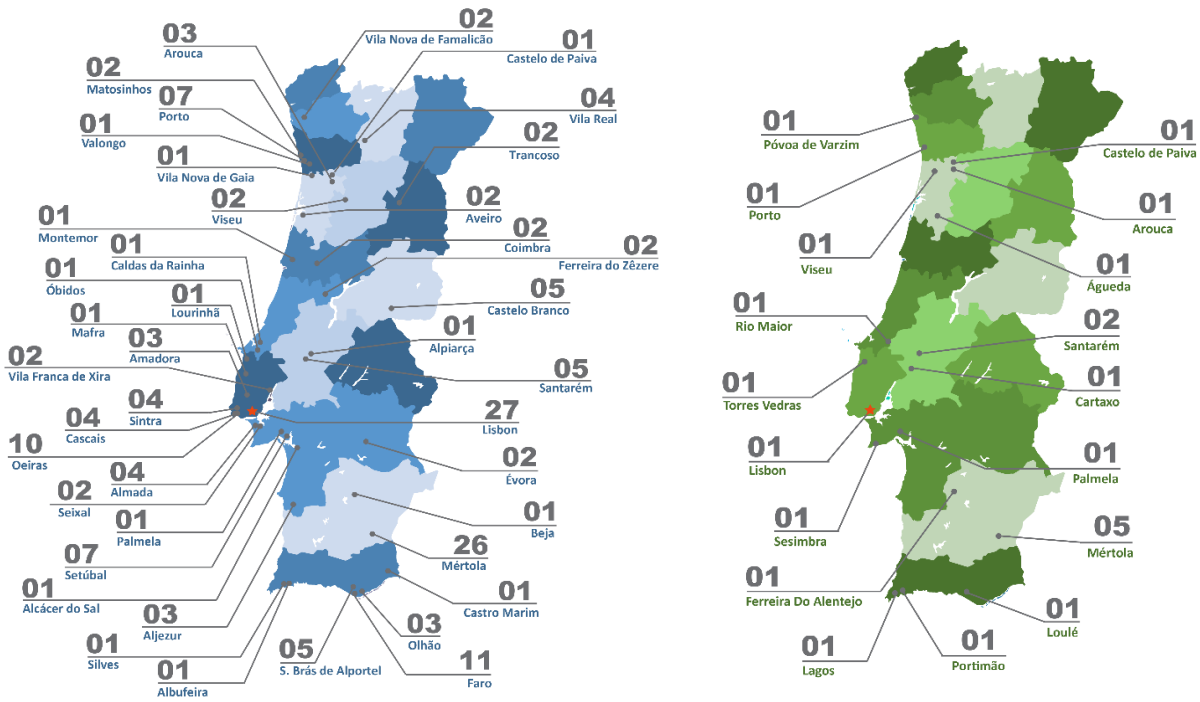


Figure 2. Location of consumers (A) and producers (B) surveyed by municipality.

Consumer perception

This chapter presents the findings from questions directed specifically at consumers, aiming to understand their food purchasing habits and the factors they consider important when buying food.

Shopping habits

Regarding supermarket shopping habits, over 40% of respondents visit once a week, while 25% shop several times a week or 1-2 times a month. The frequency of shopping at grocery and neighbourhood shops varies more widely, with 18 to 30% of respondents visiting these places from less than once a month to several times a week. Nearly half (46%) of those surveyed visit markets and fairs less than once a month, and 60% never purchase directly from producers or buy pre-made baskets. Only less than 15% use these latter methods at least once a week (**Fig. 3**).

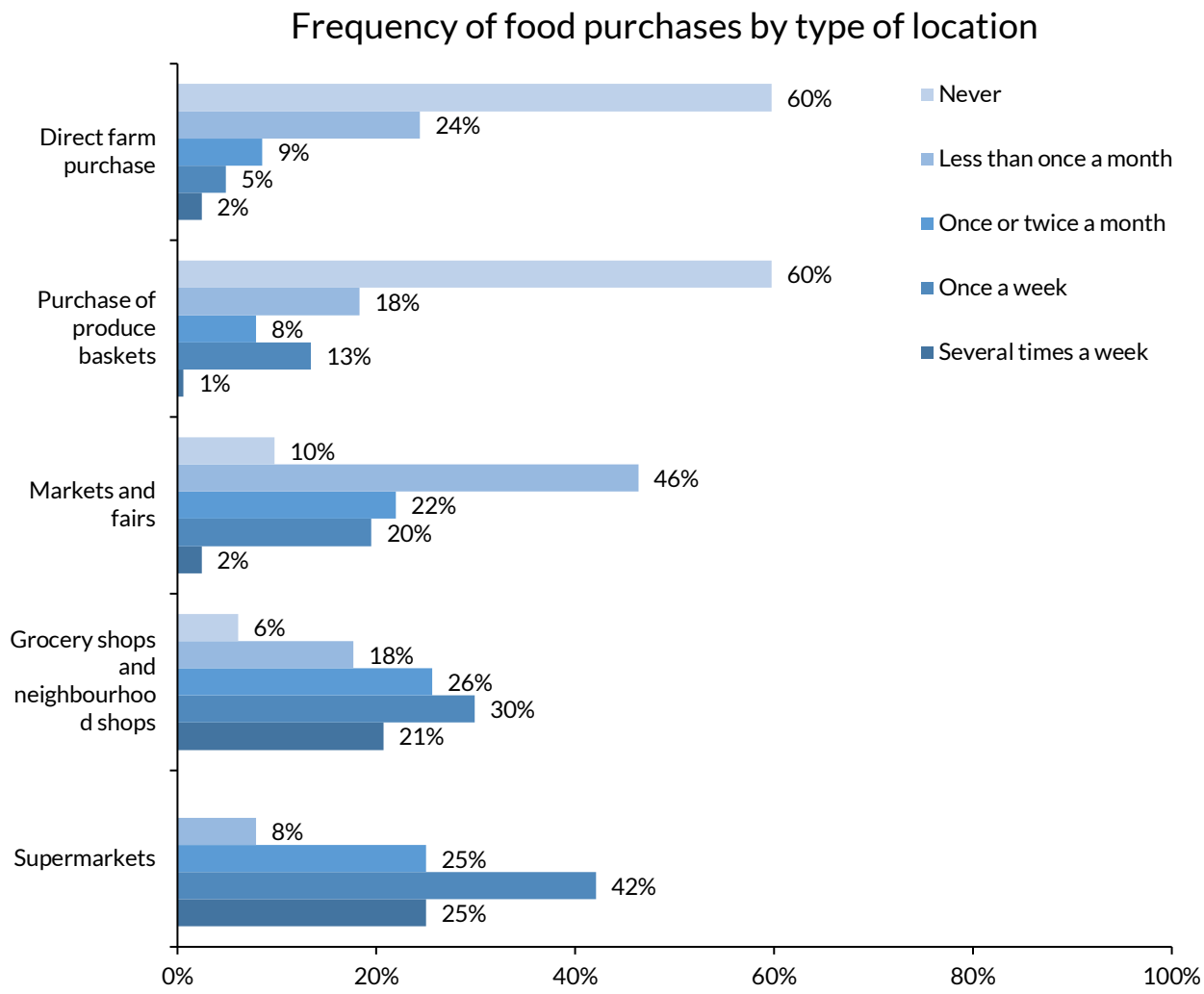


Figure 3. Frequency of food purchases by type of location.

Regarding the distance travelled to shop at each type of location, most consumers travel less than 5 km to shop at supermarkets (72%) or grocery and neighborhood shops (78%). For markets and fairs, 43% of consumers travel less than 5 km, and 24% travel between 5 and 10 km. Shopping directly at farms varies more, with 14% of consumers traveling between 10 and 50 km to purchase their products. **(Fig. 4)**.

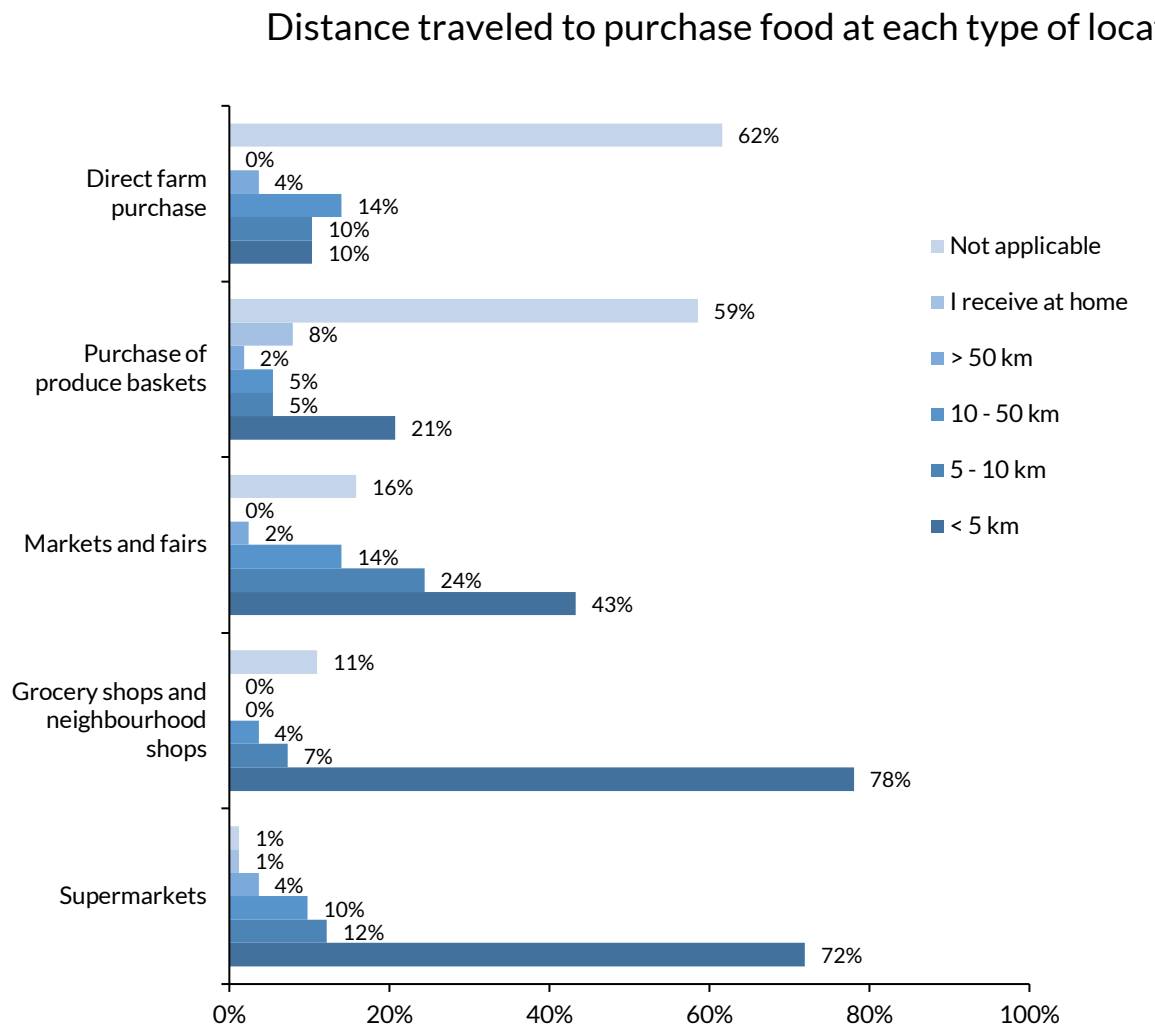


Figure 4. Distance traveled by respondents to purchase food at each type of location.

It is noteworthy that most consumers predominantly purchase their food from supermarkets, grocery stores, and neighborhood shops. These locations are frequented more often and involve much shorter travel distances compared to other venues. These findings underscore the importance of bringing consumers closer to producers and facilitating their access to sustainable products, particularly through the establishment and strengthening of short supply chains.

When asked to identify the places where they buy different categories of food (Fruit and vegetables, Meat and sausages, Fish and seafood, Eggs and dairy products, Bread and cereals, other food), the different categories of food are bought in a similar proportion in different places: approximately 30% to 32% of consumers buy food from all categories at grocery and neighborhood shops, while 26% to 27% opt for markets and fairs. Supermarkets account for 20% to 22% of food purchases, while direct farm purchases and the "basket" modality each represent 10% to 11% and 10% to 12%, respectively (**Fig. 5**).

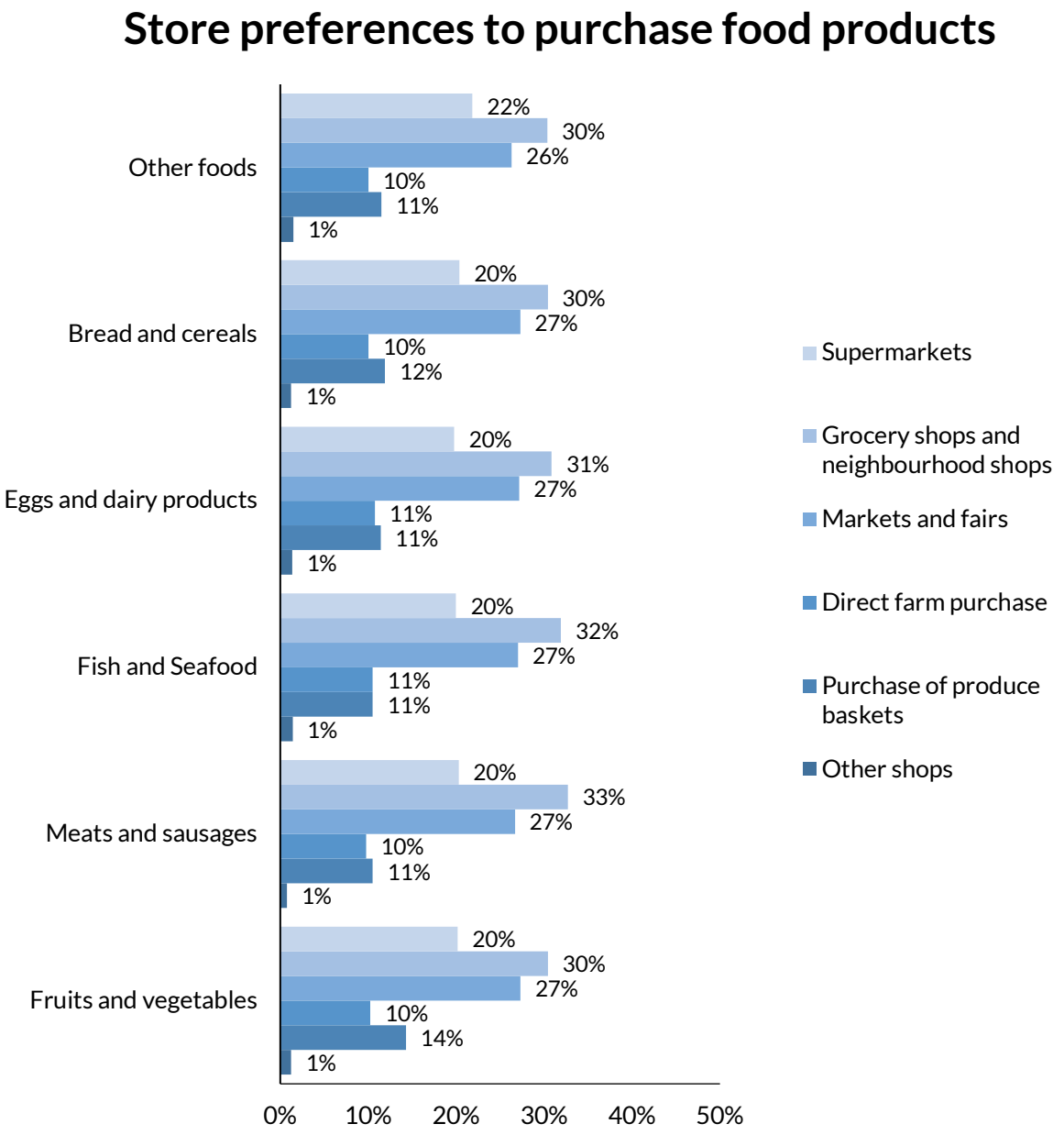


Figure 5. The chosen store by respondents for purchasing each category of food products.

Factors most valued by consumers when choosing food

Among the factors that consumers value most when choosing the food to buy, the quality of the producers (91%), health (71%) and the origin of the products (regional, national, EU, international, etc.; 63%) stand out as very important. However, it should be noted that at least 70% of consumers surveyed consider all the factors evaluated to be very or somewhat important **(Fig. 6)**.

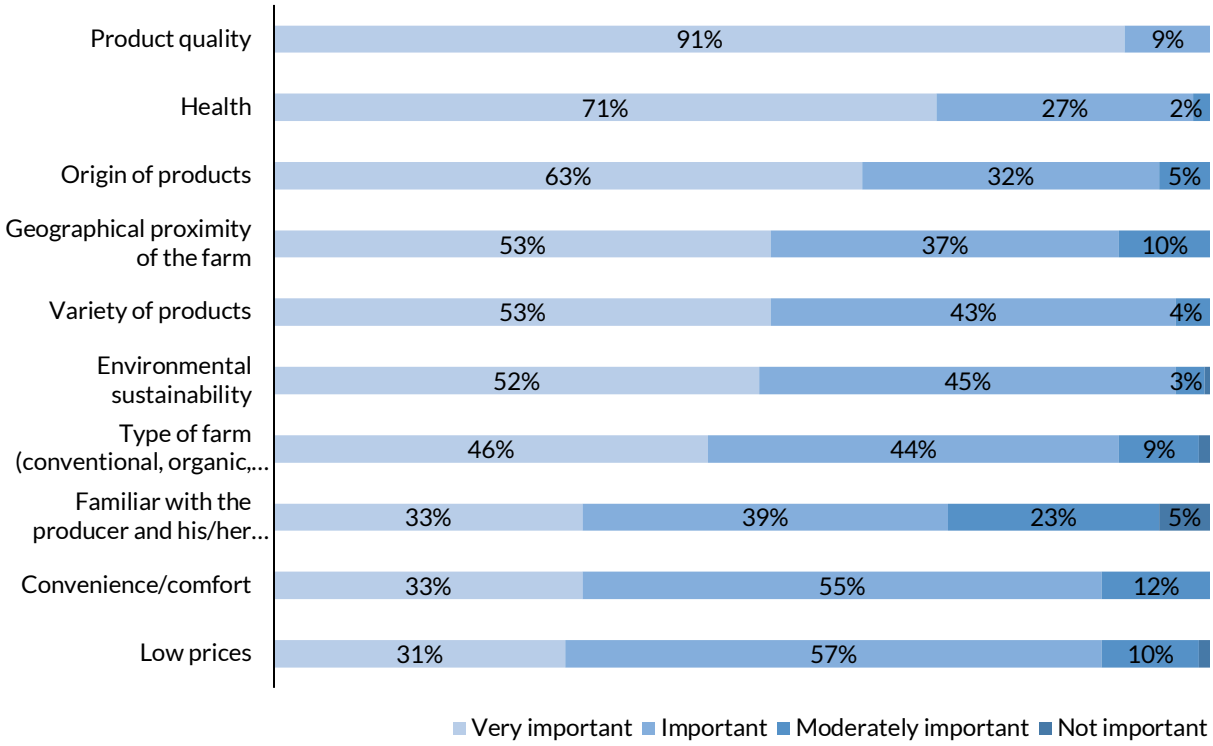


Figure 6. Level of importance assigned by respondents to each highlighted aspect when purchasing food products.

To elaborate on the previous response, respondents were additionally questioned about which factors they prioritized based on their shopping venues. In supermarkets, the primary factors valued were product variety (63%), convenience (61%), and competitive pricing (60%) (see **Fig. 7**). Convenience was also significant when shopping at grocery and neighbourhood stores (43%), where product quality (42%) was also notably important. At markets and fairs, consumers predominantly prioritized product origin (45%) and quality (43%). **(Fig. 7)**.

It is interesting to note that the factors most valued when buying baskets and purchasing directly from farms differ significantly from previous findings. Health (21%), product origin (19%), and production methods (18%) are prioritized elements when buying baskets, whereas consumers who buy directly from farms place high value on getting to know the producer and their farm (27%) **(Fig. 7)**

In the context of GrowLIFE, it is worth noting that approximately 78% of consumers find it very or somewhat important to know about the producer and their production methods. Additionally, 96% of respondents expressed interest in learning about sustainable agricultural production near their residences. These respondents were also asked to identify factors they consider relevant when visiting an agricultural production. The survey revealed that a significant majority of consumers find several factors to be very or somewhat important, with checking product quality (78%), understanding agricultural practices (74%), and learning about the products themselves (64%) being highlighted as the most crucial points **(Fig. 8).**

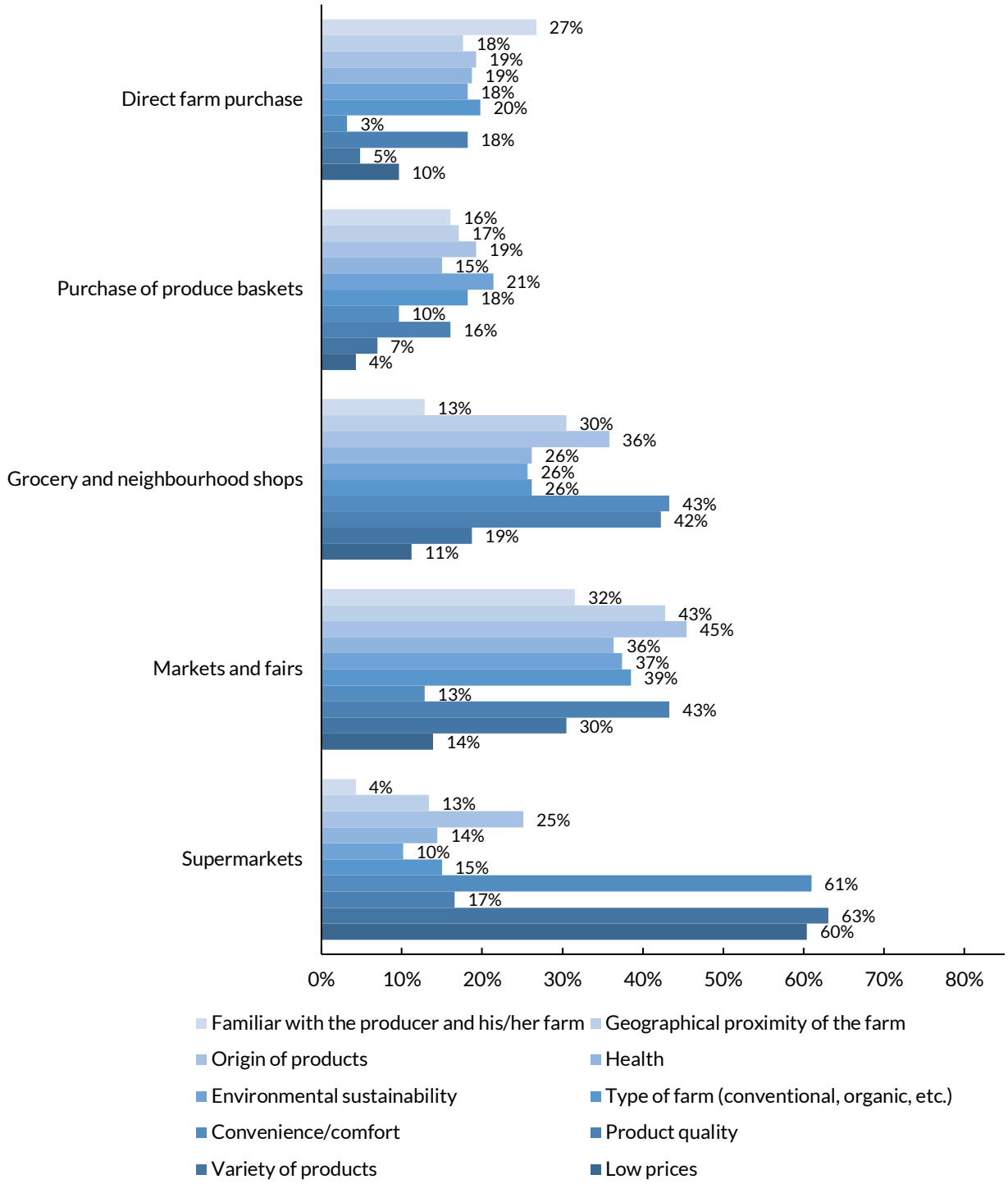


Figure 7. Level of importance assigned by respondents to each highlighted aspect when purchasing food, categorized by type of place.

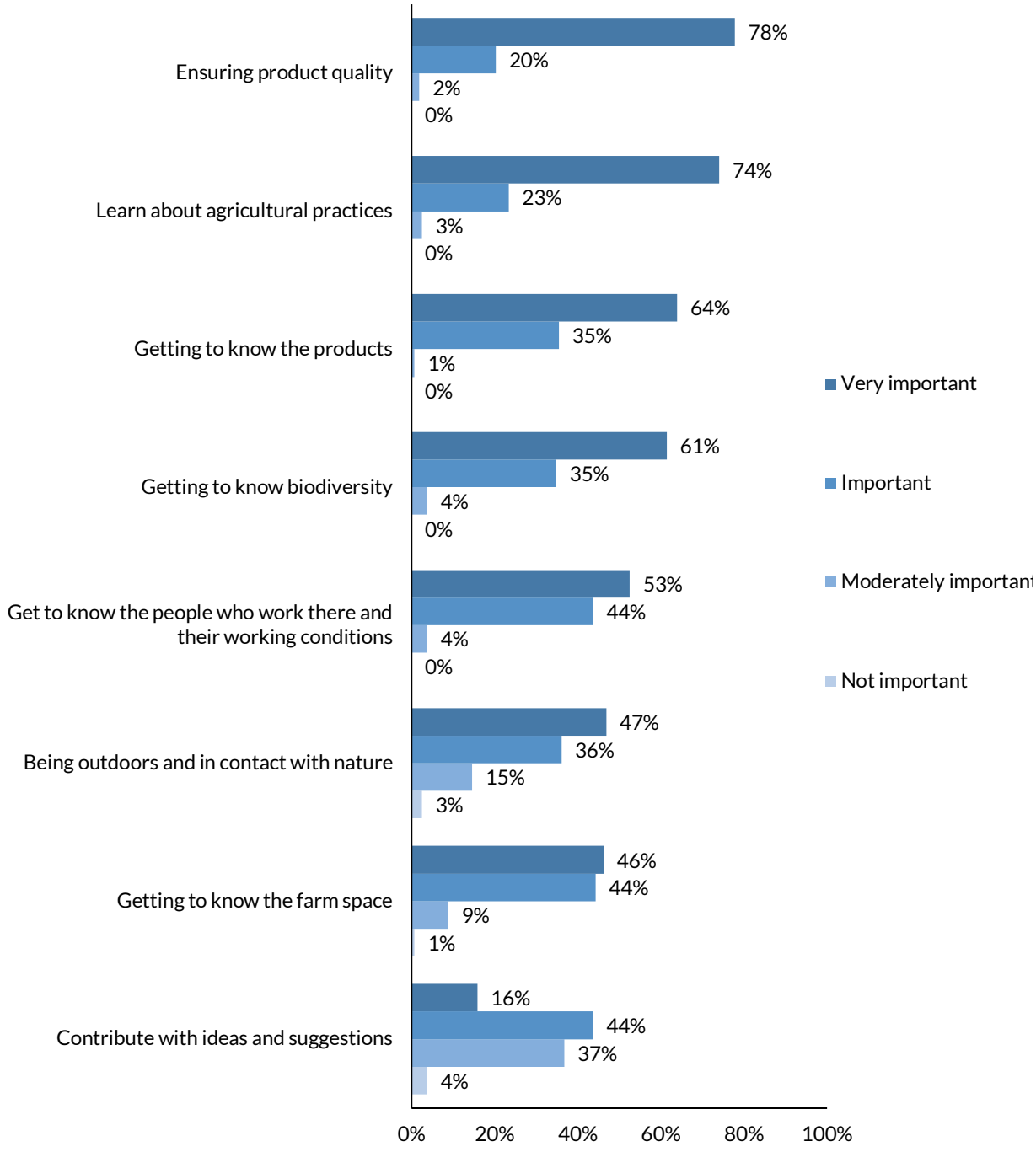


Figure 8. Importance given to the different benefits of visiting an agricultural production by the consumers surveyed who showed an interest in having closer contact with the productions from which the food they consume originates.

Farmer perception

This chapter presents the results of questions exclusively addressed to producers, aimed at characterizing agricultural production in mainland Portugal, including their farming practices and sales strategies.

Characterization of agricultural production

The farms of the producers surveyed are spread over 18 different municipalities. A total of 22% of the respondents have been producers for more than 20 years, 43% between 10 and 20 years and 35% for less than 10 years. Regarding the number of people working on each farm, 35% of farms employ 2 people, 26% between 3 and 5 people, 22% just 1, and 13% more than 5 people. The majority of productions are up to 9 ha in size (61%), with only 9% having an area larger than 50 ha **(Fig. 9A).**

Around 50% of producers produce fruit and/or vegetables, 14% produce livestock and/or animal products, 11% operate an olive grove, while the remaining categories are operated by less than 10% of the producers surveyed **(Fig. 9B).**

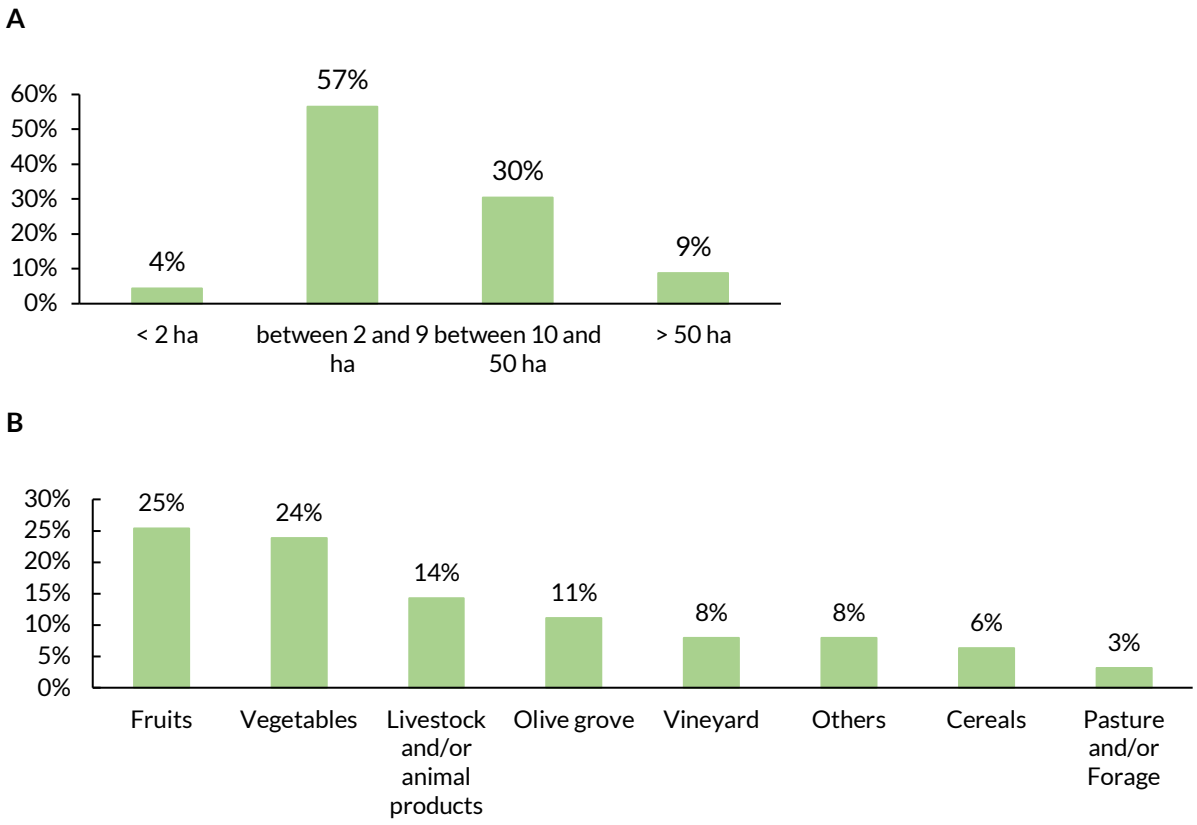


Figure 9. Characteristics of agricultural productions of respondents regarding the size of their farms (in hectares) (A) and the main types of crops produced (B). Note that in B, the category "Others" includes medicinal plants, herbs, legumes, orchards, or honey.

Characterisation of farming practices

Regarding the type of production practiced, 32% of surveyed producers engage in organic farming, while 17% practice regenerative farming or permaculture. Another 34% of respondents indicated they undertake other types of production, including syntropic farming (12%) and biodynamic farming (5%). Interestingly, only 7% of respondents reported practicing conventional agriculture (5%) or integrated production (2%) (**Fig. 10**). It is noteworthy that these results do not represent the entire Portuguese producer population, as the latest Agricultural Census (2019) shows that only 1.4% of the country's farms are engaged in organic production[4].

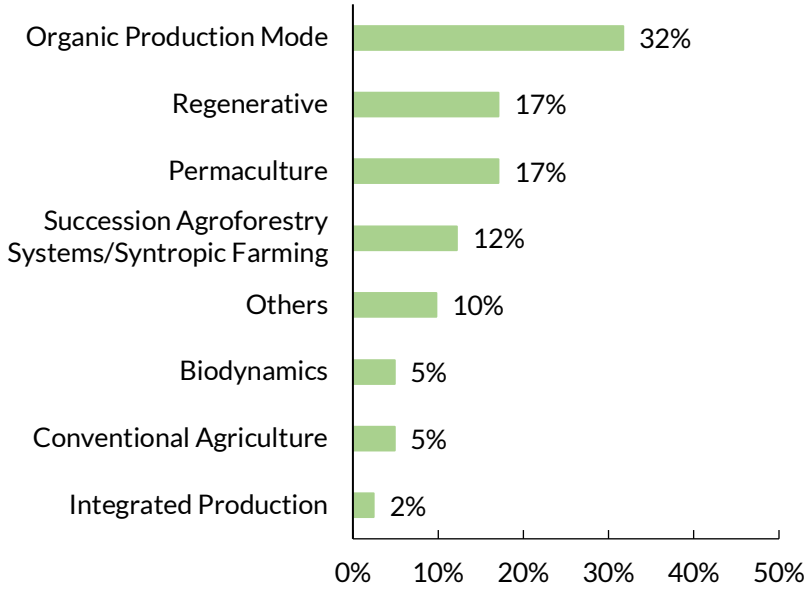


Figure 10. Type of farming practice carried out by respondents. Note that the "Other" category includes friendly farming practices, precision farming, traditional farming without chemicals and extensive grazing.

When asked about the types of fertilisers and/or soil improvers they used most often, 61% of producers said they applied some type of fertiliser and/or soil improver, with animal products (30%), mineral products (27%) and vegetable products (27%) being the most commonly used. On the other hand, only 9% say they use synthetic fertilisers/soil improvers **(Fig. 11A)**.

Regarding the destination of their organic waste, 34% of the producers surveyed compost it, 22% use it to feed their animals, 20% use it as soil cover and 14% incorporate it directly into the soil. Only 10% do not use the waste, with 6% of producers burning it and 4% putting it in the rubbish bin **(Fig. 11B)**.

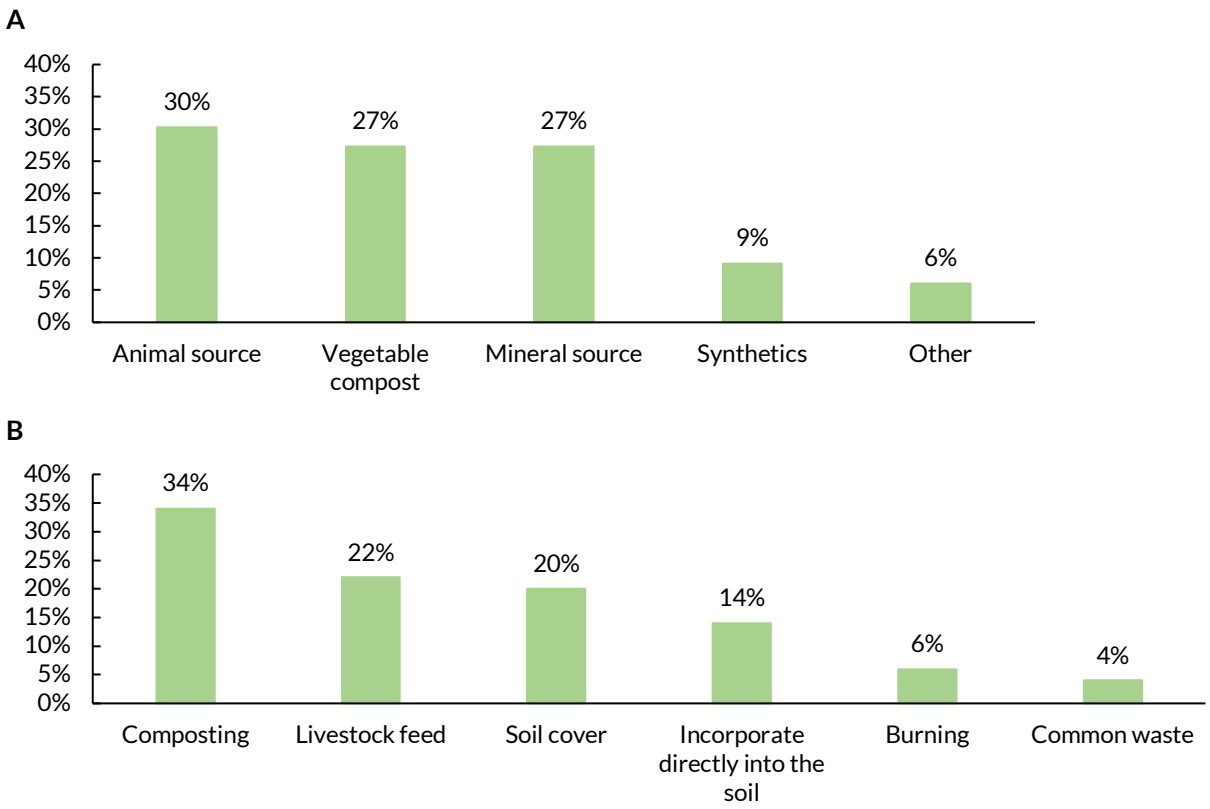


Figure 11. Characterization of the respondents' farming practices regarding the types of fertilizers and/or soil improvers most frequently used (A) and the destination of organic waste (B).

When asked about the techniques used to combat pests and diseases, 57% of respondents reported employing various methods. These include the application of biological pesticides (38%) or synthetic pesticides (15%), biological control (62%), biotechnical control (38%), and cultural practices (38%) **(Fig. 12)**.

Finally, when producers were asked about the importance of biodiversity on their farms, all groups were considered very important by 50% or more of the respondents. Insects were the most valued, with 73% of respondents considering them very important and 23% somewhat important. Birds and reptiles followed, with 68% of producers considering each very important and 23% and 27%, respectively, considering them somewhat important **(Fig. 13)**.

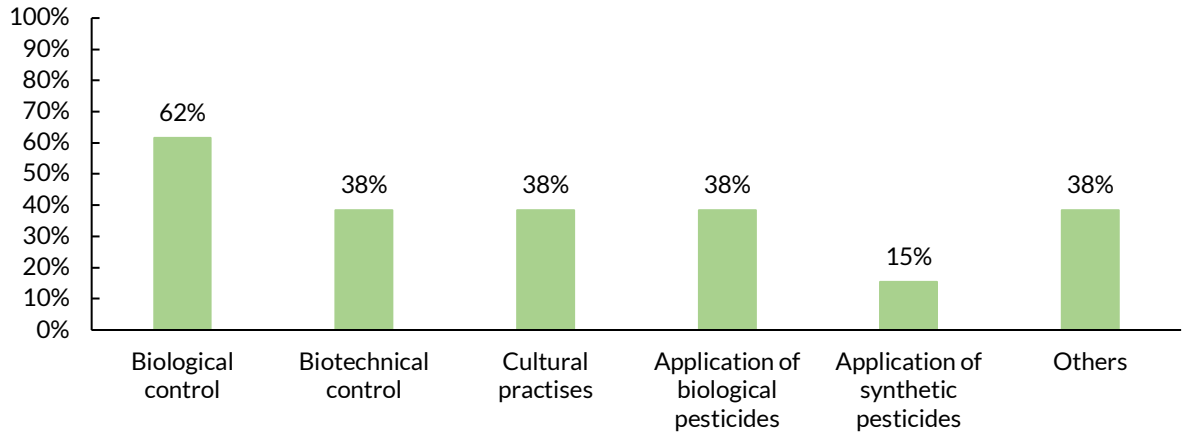


Figure 12. Types of techniques used by respondents to combat pests and diseases. Each category can include different examples of practices: "Biological control" includes techniques such as dropping, hedges, and coloured strips; "Biotechnical control" refers to traps, pheromone diffusers, and similar methods; "Cultural practices" encompass actions like ploughing or defoliation, among others; "Application of biological pesticides" includes insecticides and/or fungicides, whereas "Application of synthetic pesticides" involves herbicides, insecticides, and fungicides. Additionally, the "Others" category includes practices such as observation and manual elimination, farm-made preparations, crop rotation, auxiliary crops, or the use of diatomaceous earth.

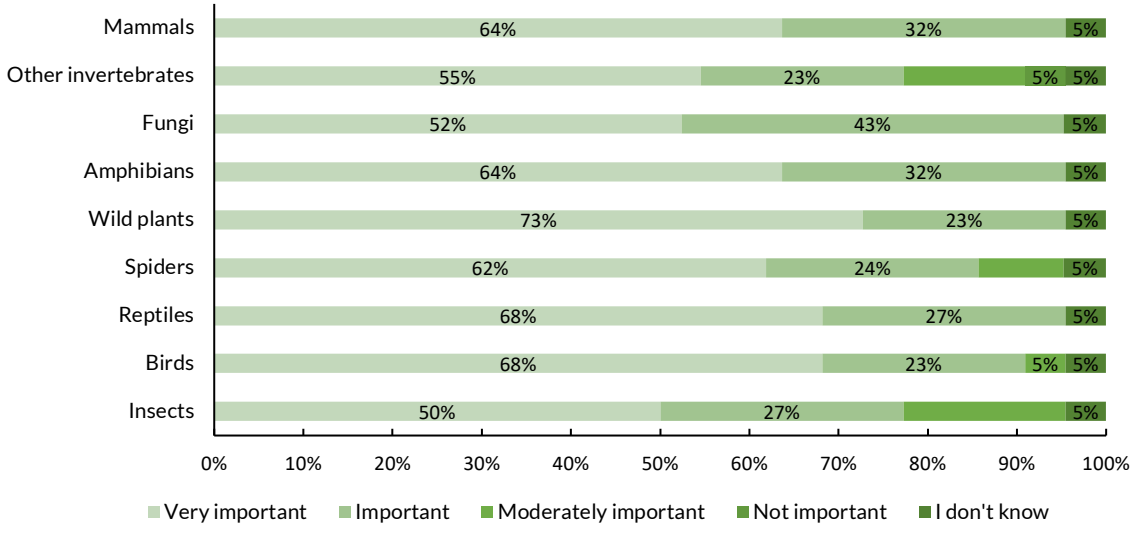


Figure 13. Importance attributed by respondents to maintaining each category of living organisms on their farm.

Sales/income strategies

Regarding the distribution of sales of the food they produce, 32% of the producers said they sell directly (**Fig. 14A**). Of these, 27% said they sold directly on the farm, 22% through baskets, markets, or fairs, followed by 18% who sold online. Those who reported selling their products in other ways (10%) mentioned methods such as Associations for the Maintenance of Proximity Agriculture (AMAP) / Community-supported agriculture groups (CSA), consumer groups, or roadside stands (**Fig. 14B).** In addition to direct sales, 26% of producers sell their products through retail outlets, 21% to distributors, and 21% to restaurants **(Fig. 14A)**

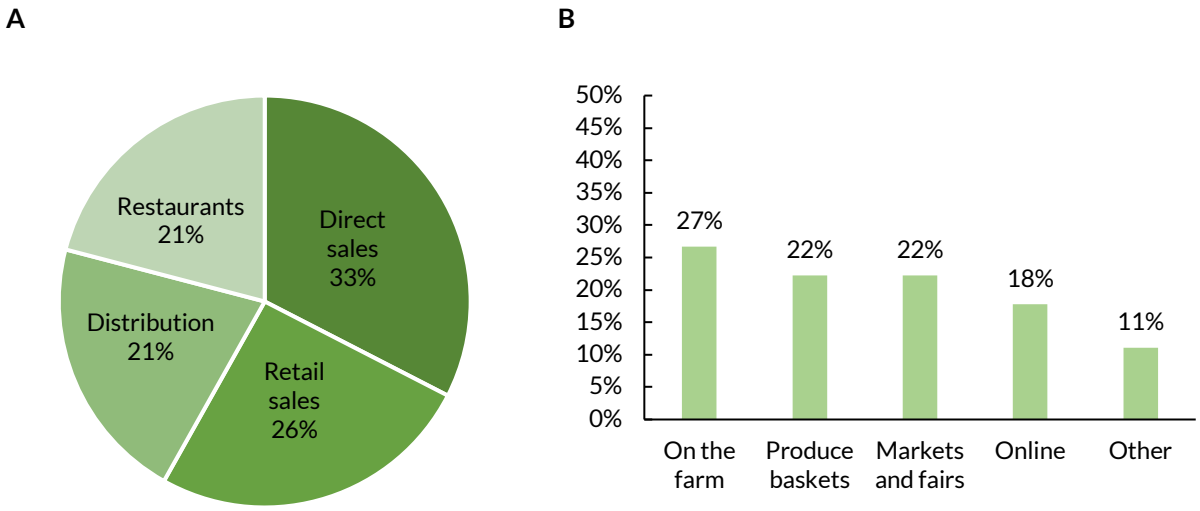


Figure 14. Methods of selling the products of respondents' farms (A). For respondents who practice direct sales, methods/locations of these sales (B).

Regarding sales success, more than 80% of producers report being able to sell all the products they produce, but only half (41%) do so at the planned price, while the rest sell at a lower price (41%). Only 9% find it difficult to sell their produce, and another 9% have excess demand **(Fig. 15)**. Additionally, 3 out of 23 respondents stated that they sell produce from other farmers, including vegetables and animal products, among others. The reasons for selling these additional products include the need to offer a diversity of products or to ensure their quality.

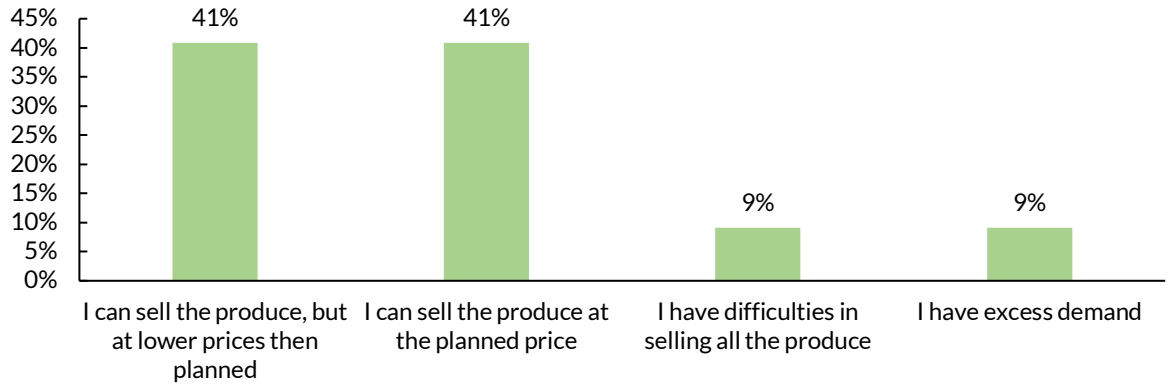


Figure 15. Respondents' sales success

Furthermore, most producers (91%) have other sources of income associated with their farm, particularly agri-environmental subsidies and support (39%), tourism (30%), teaching at courses/workshops (26%), and other sources (35%) (**Fig. 16**).

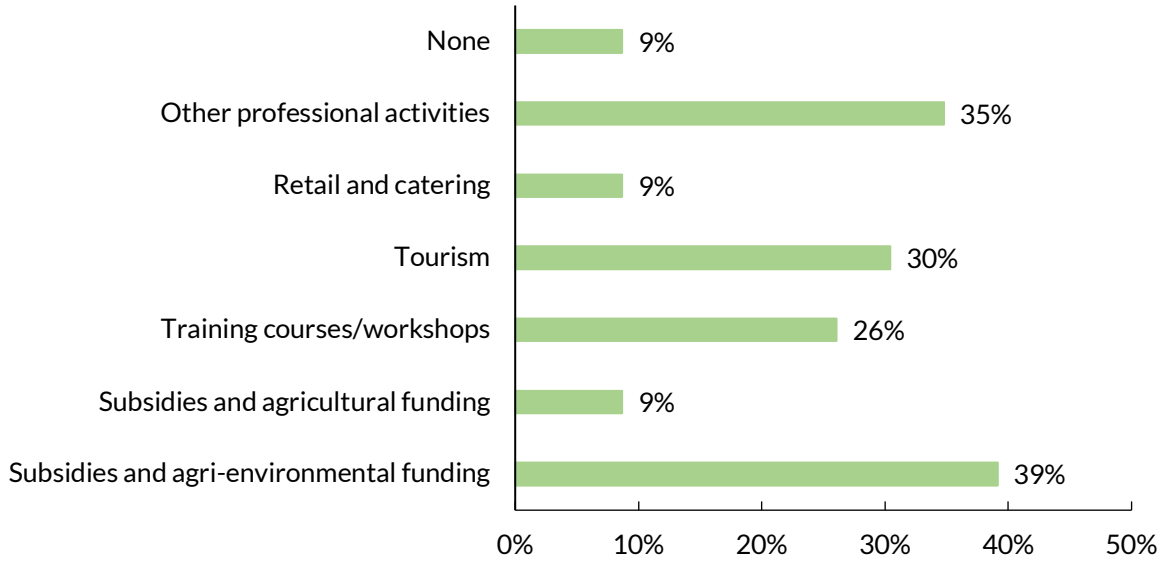


Figure 16. Sources of income associated with the farms of the respondents.

Conclusions

The results from these surveys underscore critical aspects of the Portuguese food system that are essential for informing GrowLIFE activities.

Figures 3 and 4 reveal a significant gap between producers and consumers. Most consumers surveyed rarely purchase food baskets or visit farms, with many doing so less than once a month (**Fig. 3**). Instead, most consumers frequently buy their food from supermarkets, grocery shops, and local stores (**Fig.3**), which are highly accessible (**Fig. 4**). These findings highlight the necessity of developing and consolidating local short supply chains and promoting initiatives that facilitate consumer access to sustainable products and local producers.

In addition, the results in Figures 15 and 16 also demonstrate the need to promote the economic and social sustainability of food production, since 41% of the producers surveyed said they were unable to sell their products at the planned price (**Fig. 15**), and only 9% said they had no source of income other than selling their products (**Fig. 16**). These results highlight the need to develop local initiatives and policies that promote the sustainability of agricultural production, so that it is economically and socially viable, valuing producers and their livelihoods.

According to the European Commission's Farm-to-Fork strategy and the Agricultural European Innovation Partnership, the consolidation of short supply chains, as well as the proximity of consumers to producers, are essential for promoting an economically, socially and environmentally sustainable food system.[1,5]The GrowLIFE project aligns its work plan with the findings of this report by fostering connections between stakeholders in the food system and establishing local supply chains across Portugal. This approach addresses the identified needs of consumers and producers, aiming to enhance the sustainability of the Portuguese food system comprehensively.

However, it is important to note that the sample of respondents in this needs analysis may not fully represent the broader diversity of Portuguese consumers and producers. Indeed, nearly all consumers surveyed expressed interest in discovering sustainable farms near their residence area (**Fig. 8**). Moreover, 32% of the producers surveyed reported employing the Organic Production Method on their farms (**Fig. 10**), whereas national adoption stands at only 1.4%. Therefore, it will be crucial throughout the project to prioritize extensive dissemination of activities and outcomes, aiming to raise awareness and engage a diverse range of stakeholders.

3. Policy makers

General context

The purpose of this survey was to map existing strategies at the municipal level for implementing short food supply chains, identify barriers and ways to overcome them, determine the most relevant actors and stakeholders in the process, and gather further feedback and ideas from policy makers.

A short food supply chain (SFSC), as defined by the EU, is a supply chain involving a limited number of economic operators, committed to cooperation, local economic development, and maintaining close geographical and social relations between food producers, processors and consumers.[6]

The survey was distributed electronically to municipal staff and local policy makers in all 308 Municipalities in Portugal (278 located in the Continent, 19 in Açores and 11 in Madeira) and remained open from February 28th to 4th June, 2024. A total of 34 valid responses were received from various municipalities nationwide (**Fig. 17**), including one municipality from Azores (not shown). Data was collected through an online questionnaire, which included multiple-choice and open-ended questions to gather qualitative feedback.

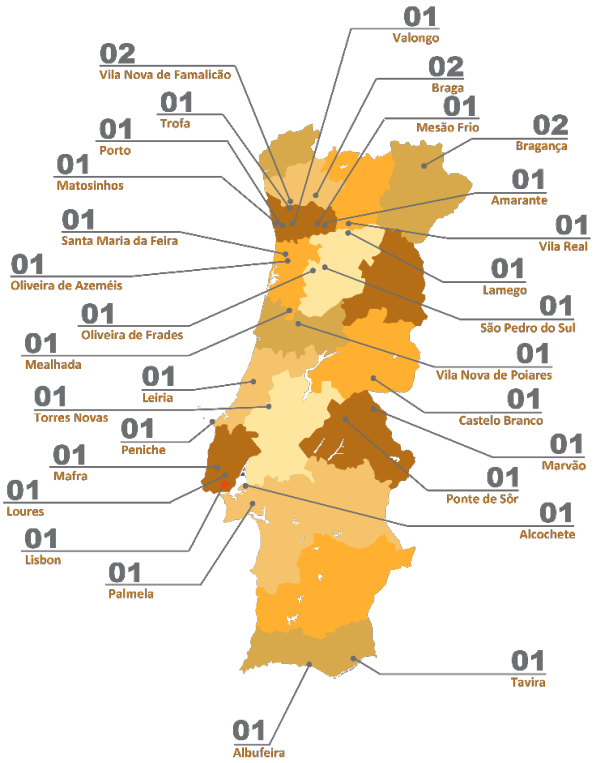


Figure 17. Municipalities where respondents are based.

The survey responses were collected from a diverse group of municipal staff and policy makers, including Division Chiefs, Higher Technicians, and Councillors. Additionally, responses were received from Vice Presidents, Project Managers, Department Directors, Heads of Municipal Agricultural Offices and Secretaries. This broad representation ensured a comprehensive understanding of the current strategies and challenges related to the implementation of short supply chains at the municipal level.

Existing modalities of Short Food Supply Chains in Portugal

The survey results indicate a variety of short food supply chain modalities currently implemented across municipalities. The most prevalent forms include direct sales to consumers at local fairs and markets, with 94% of respondents highlighting this method. Sales in local shops and supermarkets, as well as direct sales to consumers on the farm or in producers' physical shops, were also significant, each cited by 50% of respondents. Food baskets and online platforms for local products, along with direct sales to restaurants and/or hotels, were noted by 41% of respondents each. Direct sales to mass caterers, such as school canteens, were mentioned by 26% of respondents, while consumer communities and collective buying groups were identified by 18% of respondents. Less common methods included direct sales to potential consumers in strategic locations and selling online in a dedicated marketplace like Hortee, each mentioned by 3% of respondents (**Fig. 18**).

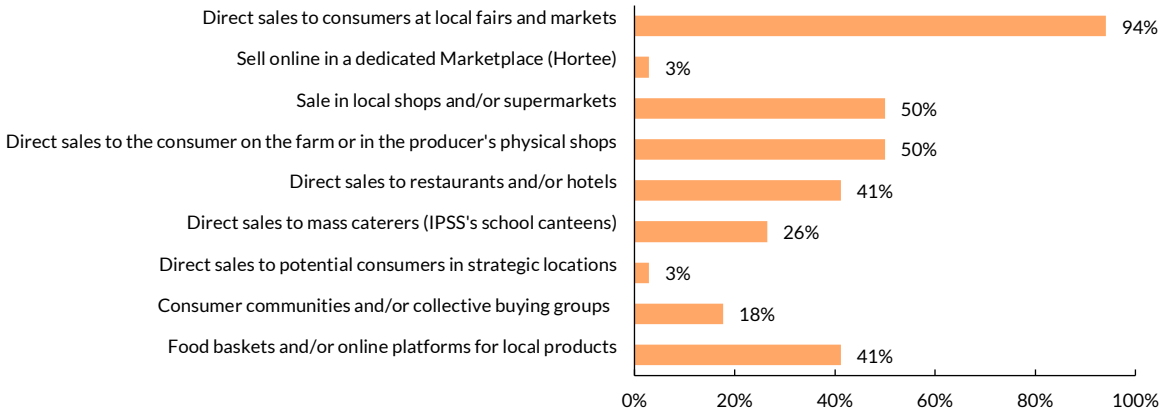


Figure 18. Modalities of Short Food Supply Chains identified.

Key challenges in implementing SFSC in municipalities

The survey responses highlight several challenges and barriers encountered in the implementation of short food supply chains across municipalities (**Fig. 19**).

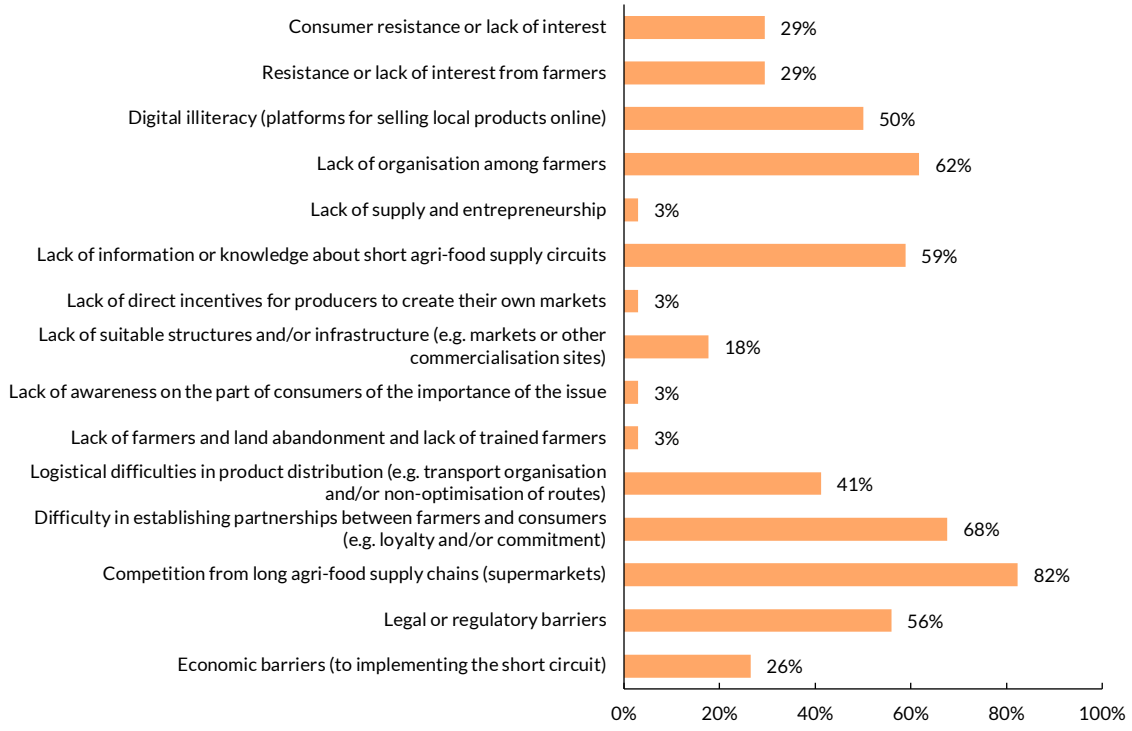


Figure 19. Barriers in the implementation of Short Food Supply Chains.

Competition from long agri-food supply chains, particularly supermarkets, was the most significant challenge to the implementation of SFCS identified, noted by 82% of respondents. Difficulty in establishing partnerships between farmers and consumers was identified by 68% of respondents. Lack of organization among farmers and lack of information or knowledge about short agri-food supply circuits were significant obstacles, mentioned by 62% and 59% of respondents respectively. Legal or regulatory barriers were cited by 56% of respondents. Digital illiteracy in using online platforms for selling local products was noted by 50% of respondents. Logistical difficulties in product distribution were identified by 41% of respondents. Both resistance or lack of interest from farmers and consumer resistance or lack of interest were mentioned by 29% of respondents each. Economic barriers to implementing the short circuit were noted by 26% of respondents. Lack of suitable structures and/or infrastructure, such as markets or other commercialization sites, was mentioned by 18% of respondents. Less common challenges included lack of awareness among consumers, lack of farmers and land abandonment, lack of direct incentives for producers to create their own markets, and lack of supply and entrepreneurship, each noted by 3% of respondents.

Strategies to Overcome Challenges in Implementing SFSC

Several strategies were proposed by respondents to overcome the challenges of implementing short food supply chains in municipalities. The most frequently mentioned strategy, endorsed by 74% of respondents, is the development of partnerships between local actors such as producers, consumers, associations, and municipalities. Promotion of campaigns to valorize local products followed, supported by 71% of respondents. Investment in efficient logistics and distribution of local products was highlighted by 59% of respondents. The creation of financial incentives or subsidies for farmers and consumers to buy and/or sell local products was supported by 56% of respondents. Promotion of workshops or training for farmers on direct selling was emphasized by 50% of respondents. Both the creation of fairs and markets to value local producers and investments in improving logistics infrastructure were highlighted by 41% of respondents each. Promotion of events to raise awareness and provide information on short agri-food supply circuits for consumers and farmers was noted by 38% of respondents. Simplification of legal procedures for purchasing local products received less emphasis, mentioned by 6% of respondents. Awareness-raising campaigns targeted at young people or parents/carers in schools were each mentioned by 3% of respondents (**Fig. 20**).

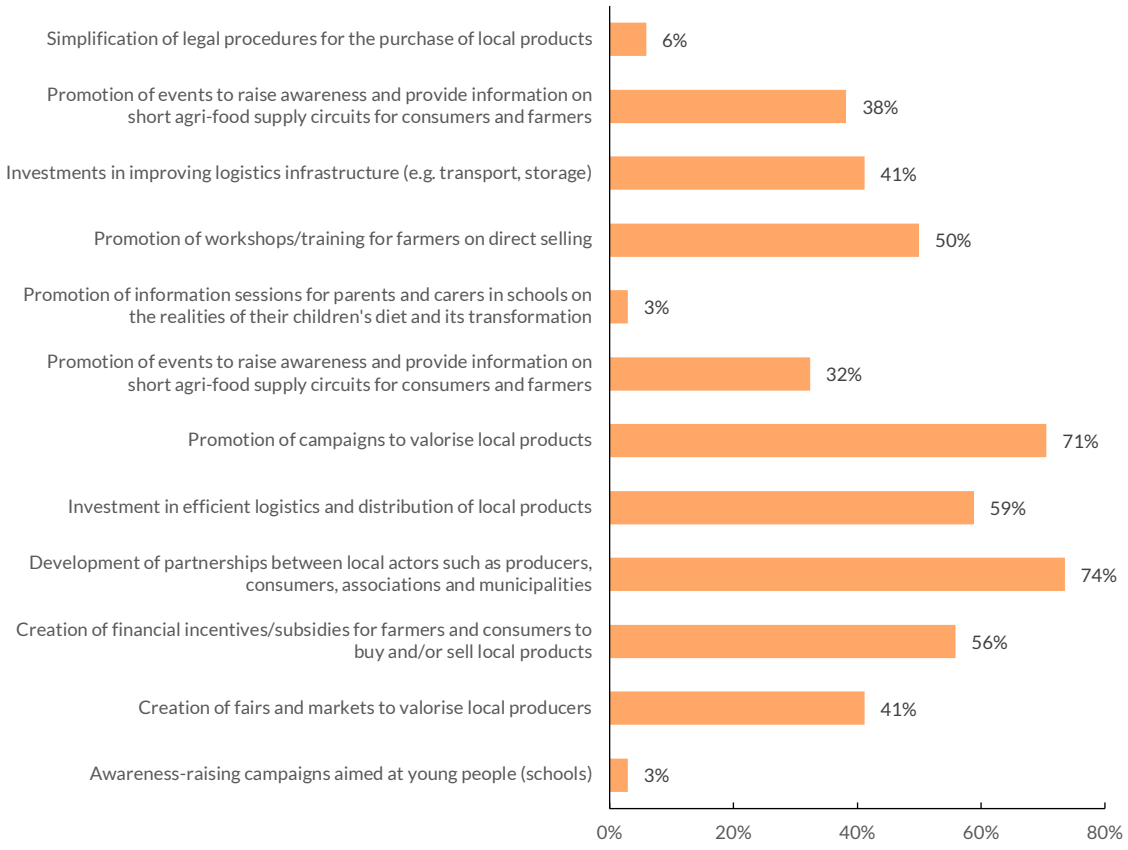


Figure 20. Strategies for overcoming challenges related to SFSC implementation.

Leading institutions for implementing actions in SFSC

In determining suitable institutions to lead the implementation of actions aimed at fostering short food supply chains, respondents highlighted a diverse range of organizations. Municipalities emerged as the most frequently endorsed leaders, with 76% of respondents identifying them as key players. Agricultural cooperatives, farmers' associations, and producers' organizations (see footnote below for clarification) also garnered substantial support, each mentioned by 74% of respondents. The Ministry of Agriculture was considered significant by 35% of respondents. Parish councils received minimal mention, noted by 6% of respondents. Local development associations and universities, consumer collectives, and central government were each identified by only 3% of respondents. These responses underscore the decentralized and collaborative approach necessary for effectively driving initiatives related to short food supply chains (**Fig. 21**).

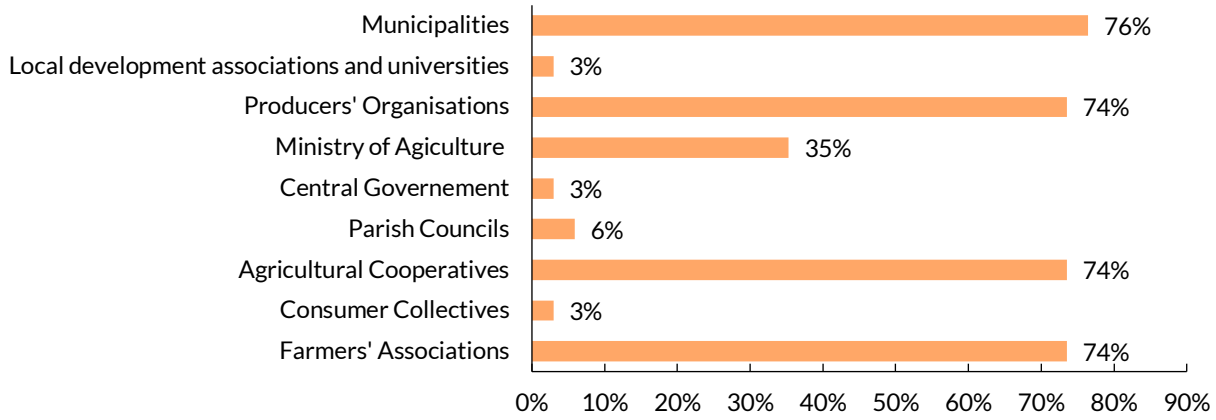


Figure 21. Respondents' view on which should be the leading institutions for practical implementation of SFSC.

Agricultural cooperatives: independent legal entities with variable capital and membership, formed voluntarily. Through member cooperation and adherence to cooperative principles, they aim to meet their economic, social, or cultural needs and aspirations on a non-profit basis.
Farmers' associations: group of agricultural professionals that develop activities that meet their collective needs and promote their interests, all while pursuing non-profit goals.
Producers' organizations: civil companies structured as private limited companies, focused on agricultural or agro-livestock activities. A small group of farmers share land, financial resources, and production factors, jointly managing the company and its labor needs in a manner similar to family farms.
Source: Portuguese Directorate General of Agriculture and Rural Development

Additional challenges identified for creating SFSC

In addition to the previously mentioned challenges, respondents highlighted several other significant issues crucial for establishing short food supply chains in their municipalities. These include the advanced age and demotivation of existing farmers, compounded by the lack of training and direct support in technical-scientific methods and management processes. Regulatory complexities in the food sector were also cited as a barrier, especially for local farmers unfamiliar with such demands. Furthermore, the preferences of modern consumers for processed foods and the lack of urban planning integrating food as a central component were also noted as challenges. Issues such as the ageing population, distance in large municipalities, and the necessity for improved structures and producer unity were also underscored as critical impediments. Respondents emphasized the need for incentive programs, greater inter-ministerial coordination, and the promotion of producer organizations to enhance the viability of short food supply chains.

Measures and actions for implementing SFSC

Respondents proposed a range of measures and actions to foster the creation and maintenance of short food supply chains in their municipalities. Key suggestions include the establishment of business-to-business and business-to-consumer platforms to facilitate direct sales between producers and consumers, alongside initiatives to encourage consumption of local products, particularly fresh produce and vegetables. Creating small niche markets and adapting existing markets to compete with large retailers were also highlighted. Legal changes to streamline procurement processes, training activities for farmers and entrepreneurs, and the development of campaigns to promote local products were emphasized as crucial steps. Collaboration among stakeholders—producers, consumers, associations, municipalities, and universities—was recommended to enhance awareness and motivation, as well as to coordinate distribution and storage logistics. Other proposals included developing an inter-municipal network, boosting agricultural production using sustainable techniques, and supporting producers with bureaucratic challenges. Overall, the respondents underscored the importance of comprehensive planning and partnership development to effectively implement short food supply chains.

Conclusions

The survey responses provide valuable insights into the challenges and opportunities associated with implementing short food supply chains in municipalities across Portugal. Key findings highlight a diverse array of obstacles, including regulatory complexities, logistical constraints, and the need for consumer awareness. Despite these challenges, there is a clear consensus on the importance of collaborative efforts among stakeholders—producers, consumers, municipalities, and educational institutions—to overcome barriers and promote local agricultural products. Proposed solutions emphasize the development of supportive infrastructures, policy adjustments to streamline processes, and educational campaigns to shift consumer preferences. These insights underscore the potential for short food supply chains to enhance local economies, sustainability practices, and community health, contingent upon tailored strategies that address regional specificities and foster inter-ministerial coordination.

1. **Diverse Challenges Exist**: The survey highlighted a wide range of challenges faced by municipalities in implementing short food supply chains. These include regulatory barriers, logistical issues in distribution, lack of consumer awareness, and the advanced age and demotivation among existing farmers.

2. **Importance of Stakeholder Collaboration**: There is a clear consensus on the necessity of collaboration among various stakeholders—producers, consumers, municipalities, universities, and associations. This collaboration is crucial for overcoming barriers, promoting local products, and establishing effective logistical and marketing strategies.

3. **Need for Supportive Measures**: Respondents identified several supportive measures needed to foster short food supply chains, such as creating business-to-business and business-to-consumer platforms, simplifying legal procedures, providing financial incentives, and promoting training and awareness among farmers and consumers.

4. **Infrastructure and Market Adaptation**: Improving infrastructure, including markets and distribution networks, emerged as critical for supporting local producers and meeting consumer demand. Adapting existing markets and creating niche markets were seen as essential steps.

5. **Policy and Regulatory Adjustments**: There is a call for policy adjustments to better support local producers, simplify bureaucratic processes, and ensure a level playing field between small producers and large retailers.

6. **Educational Campaigns and Awareness**: Raising awareness among consumers about the benefits of local products and the importance of short food supply chains is seen as fundamental. Educational campaigns targeting schools and workplaces were suggested to shift consumer preferences towards local and seasonal products.

7. **Regional Specificity**: The challenges and solutions proposed varied by region and municipality size, highlighting the need for tailored approaches that consider local contexts and resources.

8. **Inter-ministerial Coordination**: Coordination between different government ministries (e.g., Agriculture, Economy, Finance) was identified as necessary to address constraints and simplify processes affecting local producers.

In conclusion, while there are significant challenges to overcome, there is also a strong foundation of ideas and proposals from stakeholders that can guide the development and implementation of policies and initiatives supporting short food supply chains in municipalities. Collaboration, policy adjustments, infrastructure improvements, and educational efforts will be key to realizing the potential benefits of these initiatives for local economies, sustainability, and community health.

4. Culinary students

General context

The survey below was launched by Turismo de Portugal and remained open from the 27th of November 2023 to the 20th of January 2024 to a 1000 students, enrolled in level 5 courses (technological specialization courses), from its 12 Hospitality and Tourism Schools (EHT) across mainland Portugal. Its aim was to assess the future chefs' level of knowledge and understanding in key areas such as the environmental impact of their food production choices within the Hotel, Restaurant, and Catering (HoReCa) sector. It also covers important concepts such as sustainable and healthy nutrition, biodiversity, food waste, circular economy, among others. The goal was to gauge the overall understanding of these fundamental notions among today's students and identify areas for improvement. The findings from the survey will inform the design of a course and materials offered in the Hospitality and Tourism Schools, as part of GrowLIFE's WP5.

Profile of the surveyed population

There was a total of 106 respondents, belonging to 8 of the 12 Portuguese EHT (**Fig. 22A**). Most responses came from students from schools located in the north of the country, namely the EHT of Porto (37%) and Douro-Lamego (21%) (**Fig. 22B**). The students surveyed were mainly studying Catering and Beverage Management (30%) and Kitchen Management and Production (25%), with a considerable number of students also studying Tourism Management (14%) and Pastry Management and Production (14%) (**Fig. 22C)**.

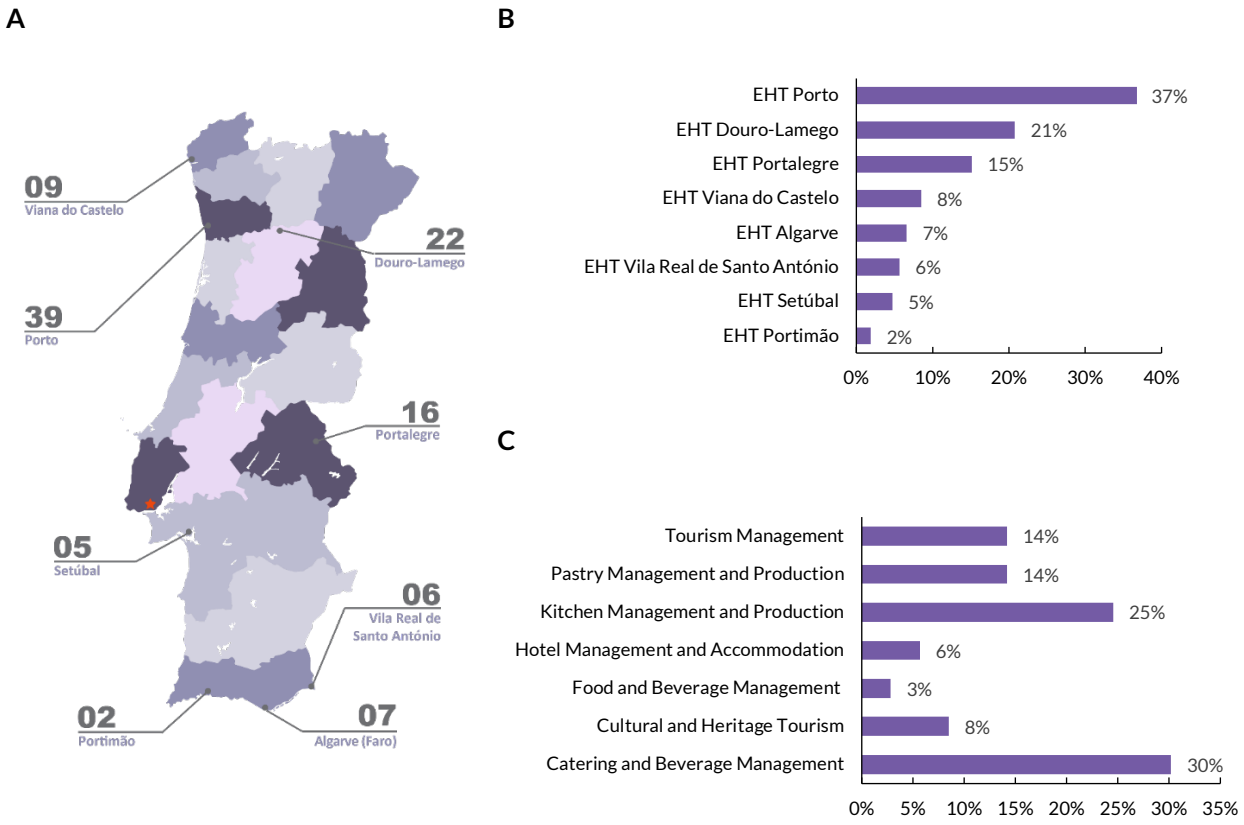


Figure 22. Geographic localization of the Hospitality and Tourism Schools (EHT) where respondents are studying (A), percentage of respondents per EHT (B) and courses in which respondents are enrolled (C).

The age group of respondents is primarily concentrated between 18 and 20 years old (60%) and 21 to 24 years old (20%) (**Fig. 23A**). The gender distribution is quite balanced, with female respondents at 51% and male respondents at 47% (**Fig. 23B**). Regarding educational qualifications, the vast majority of respondents holds a 12th-grade degree (87%) (**Fig. 23C**).

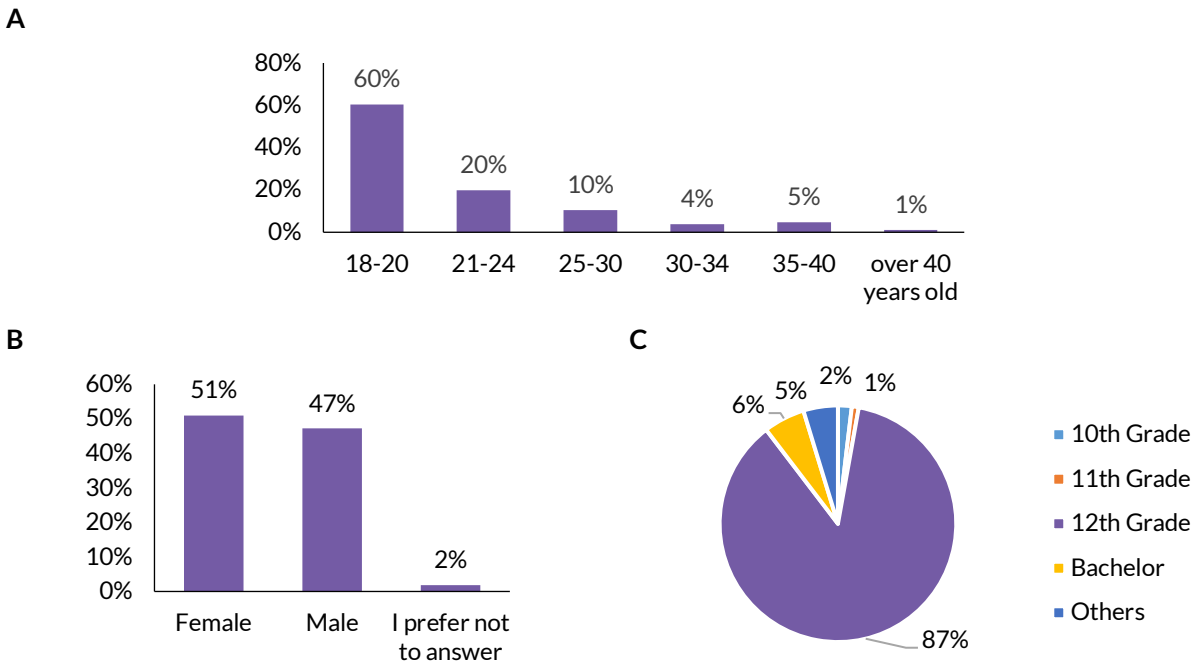


Figure 23. Characterization of respondent students by age (years) (A), gender (B) and academic qualifications (C).

Student perception

Concepts relating to sustainability

The survey assessed respondents' knowledge of various sustainability concepts, revealing several key insights (**Fig. 24**). High awareness was noted for terms such as environmental impact (97%), sustainable food (91%), and biodiversity (91%). Concepts such as greenhouse gas emissions (87%) and social responsibility (84%) also showed significant recognition. Conversely, there was less familiarity with terms such as short food supply chains (27%), green water-blue water (32%), and invisible water (27%), with over half of the respondents either unaware or having only heard the terms without understanding them. Additionally, while 97% of respondents were knowledgeable about food waste, and 75% understood the ecological footprint, only 45% were familiar with the concept of circular economy, and 49% knew about by-product valorization. Notably, a significant portion of respondents admitted to having heard certain terms but not knowing their meanings, highlighting areas where further education and awareness are needed.

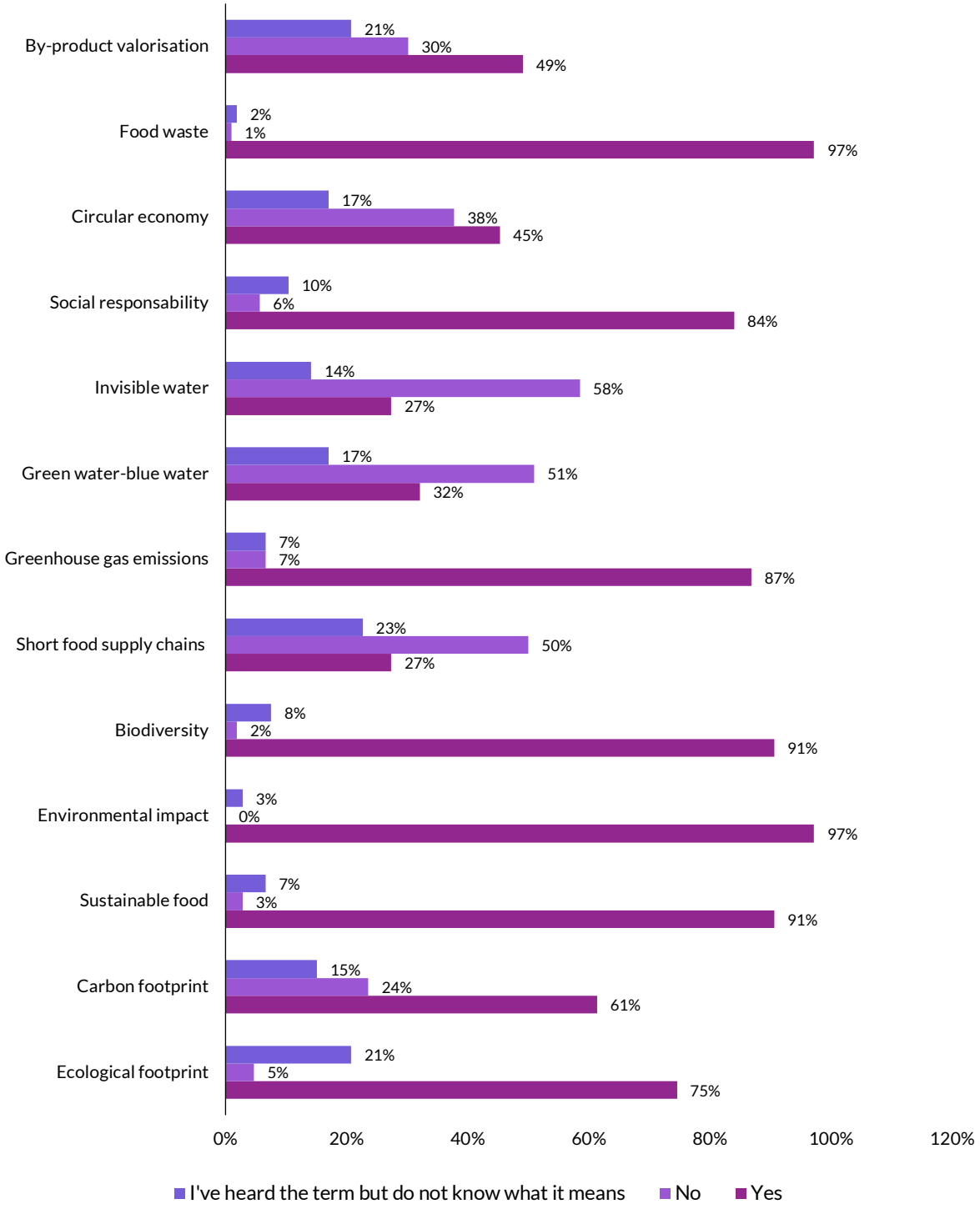


Figure 24. Respondents' perception of concepts related to Sustainability.

For educational purposes, efforts should be focused on improving understanding of lesser-known concepts such as "Invisible Water," "Blue Water - Green Water," "Valorisation of By-Products," "Circular Economy," and "Short Supply Chains." Enhancing knowledge in these areas will not only help future chefs develop a more comprehensive grasp of sustainability principles, it will also contribute to raising their awareness towards concepts and practices related to sustainable food systems, promoting adoption of such practices in their sector.

Concepts relating to sustainable food

To understand which factors were considered most important for sustainable food, respondents ranked various factors from 1 to 5 (not at all important to very important). For easier interpretation and presentation, the answers were categorized into three groups: the environmental aspect of food production (**Fig. 25**), social and economic factors (**Fig. 26**), and the type of food and cooking (**Fig. 27**).

In terms of environmental aspects (**Fig. 25**), respect for biodiversity was identified as the most critical factor, with 59% of respondents rating it as Very Important and an additional 26% considering it Quite Important. Organic methods of production were also highly valued, with 49% of respondents deeming them Very Important and 22% rating them as Quite Important. Additionally, low environmental impact was a significant concern, with 49% of participants rating it as Very Important and 22% as Quite Important. This data underscores a strong preference for practices that protect biodiversity, utilize organic methods, and minimize environmental impact among respondents.

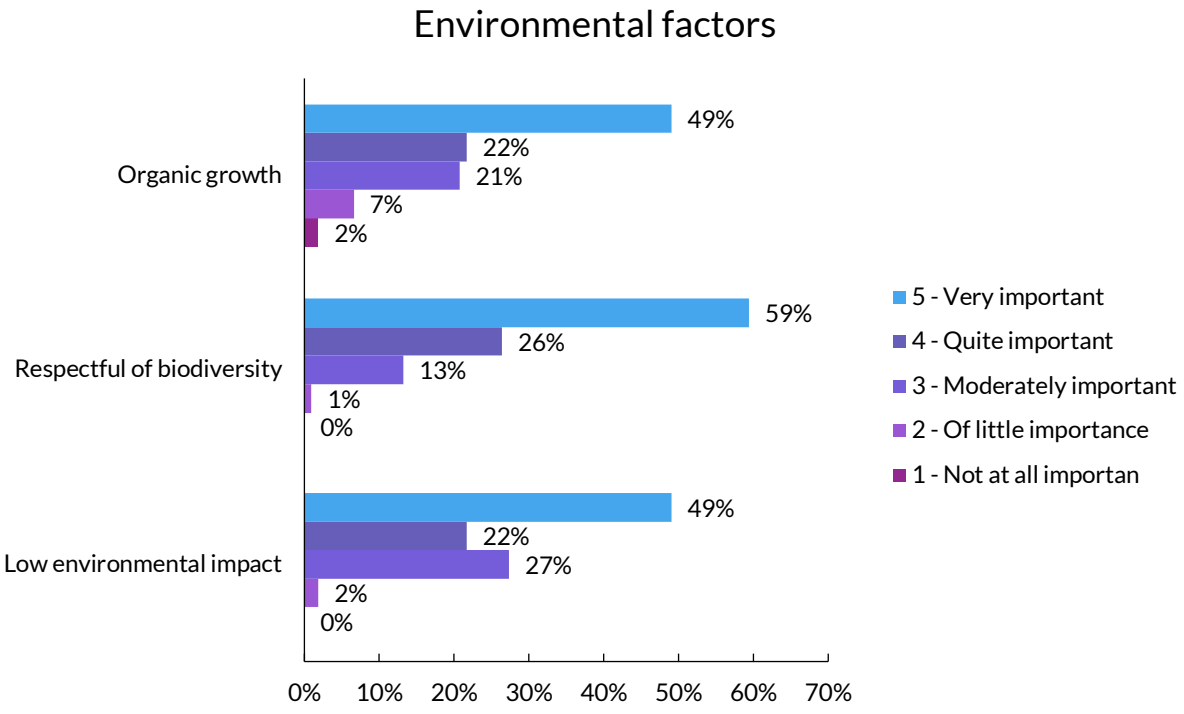


Figure 25. Student perception of concepts related to the environmental aspect of food production in terms of food sustainability, ranked from 1 – Not at all important to 5 – Very important.

Regarding socio-economic aspects (**Fig. 26**), affordability, transparency of the food chain and fair trading practices were evaluated by respondents on a scale from 1 (not at all important) to 5 (very important). Affordability was rated as very important by 56% of respondents, with 19% rating it as quite important, and 22% as moderately important. Transparency of the food chain was also significant, with 37% rating it as very important, 28% as quite important, and another 28% as moderately important. Fair trading practices were highly valued, with 43% of respondents rating them as very important, 22% as quite important, and 27% as moderately important. Only a small percentage of respondents rated these factors as not very important or not at all important (1-5%).

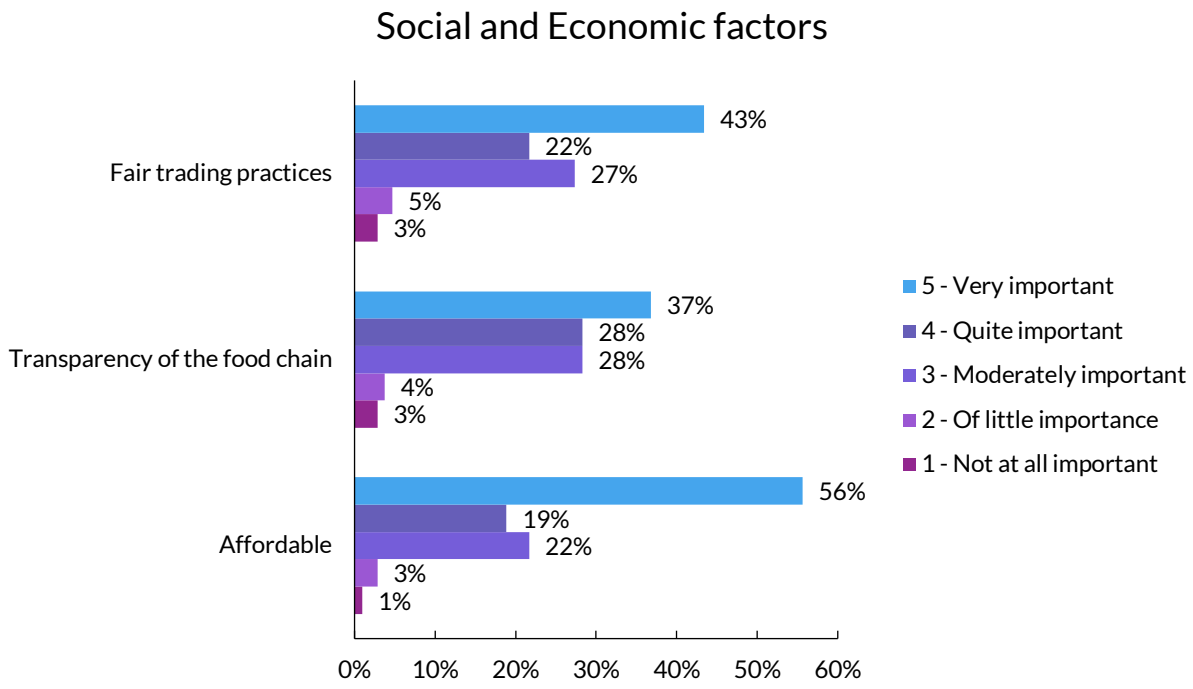


Figure 26. Student perception of concepts related to the economic factors of food production in terms of food sustainability, ranked from 1 – Not at all important to 5 – Very important.

For factors related to the type of food and cooking, the consumption of pulses was rated highly, with 48% of respondents considering it Very Important and 29% Quite Important (**Fig. 27**). Including many fresh products was also crucial, with 51% rating it Very Important and 25% Quite Important. Local cultural significance was valued, with 43% deeming it Very Important and 27% Quite Important. Easy-to-make meals were important for 34% of respondents (Very Important) and 25% (Quite Important). Meat consumption received a mixed response, with 31% rating it Very Important, 30% Quite Important, and another 30% as Medium Importance. Factors such as using little-processed foods (38% Very Important, 27% Quite Important) and avoiding additives (37% Very Important, 22% Quite Important) were also emphasized. However, the quantity of ingredients had varied importance, with 48% rating "Few ingredients" as Medium Importance. This suggests a strong emphasis on fresh, culturally significant, and minimally processed foods, with moderate importance placed on the simplicity of ingredient quantity and mixed views on meat consumption.

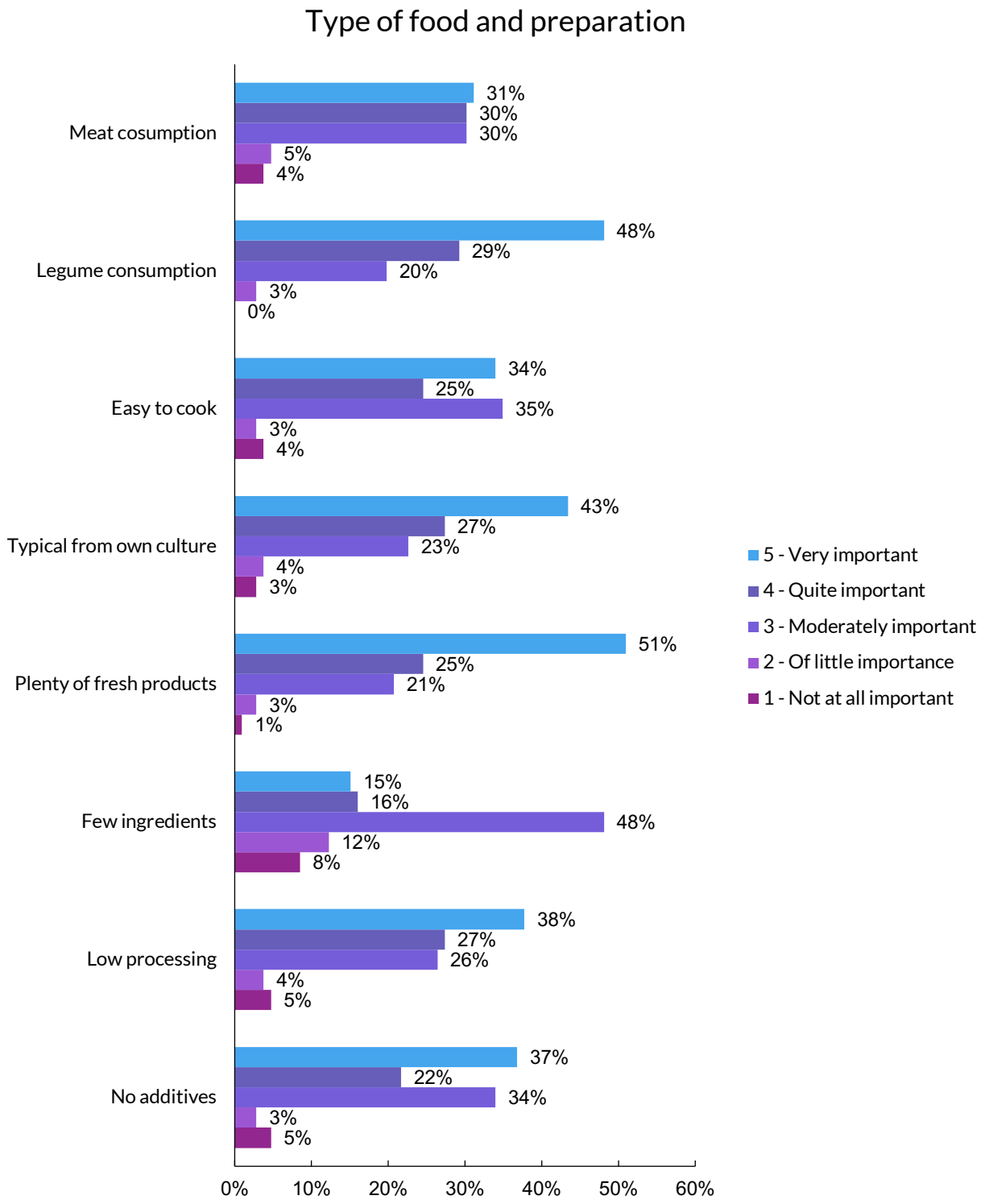


Figure 27. Student perception of concepts related to the the type of food and cooking in terms of food sustainability, ranked from 1 – Not at all important to 5 – Very important.

When asked whether the terms "sustainable food" and "healthy food" are related, 69% of respondents agreed that they are indeed related (**Fig. 28**). Additionally, 23% of respondents went further to assert that these are dependent concepts, indicating a belief that sustainable food and healthy food not only share a connection but also rely on each other. Only 8% of respondents did not see a relationship between the two terms. This data suggests a strong perception among the majority that sustainability and health in food are interconnected, with a significant portion recognizing an interdependency between the concepts.

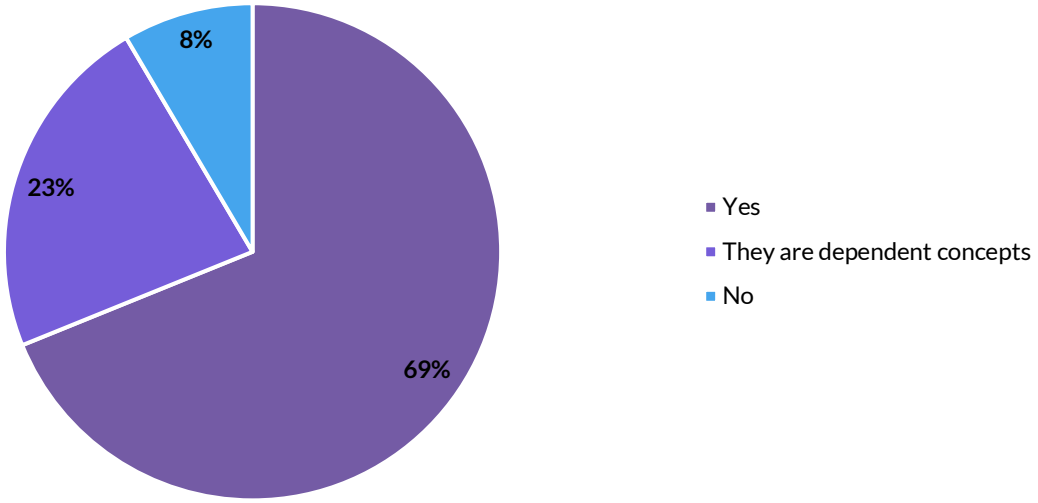


Figure 28. Student perception of the interdependency between the concepts of "sustainable food" and "healthy food".

The survey results reveal interesting insights into perceptions surrounding water expenditure in food production, particularly between foods of animal and plant origin. When it comes to food of animal origins, the responses reveal a spectrum of beliefs: 8% of respondents perceive these foods as requiring very little water, ranking them at the lowest level. Similarly, 10% of respondents place them at the second-lowest level in terms of water consumption. However, a substantial 47% of respondents expressed a neutral stance, neither considering the water expenditure high nor low. On the other hand, 17% of respondents ranked foods of animal origin at the fourth level of water consumption, suggesting a moderate perception. Finally, 18% of respondents ranked these foods at the highest level of water consumption, indicating a belief in significant water usage during their production (**Fig. 29**).

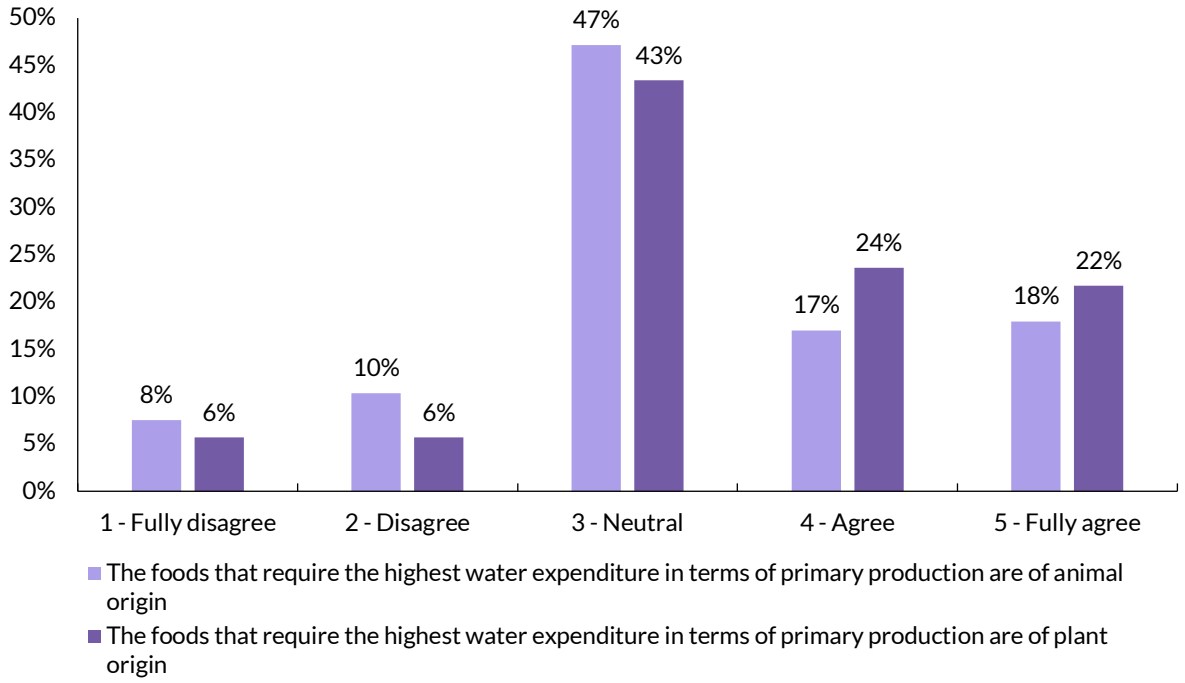


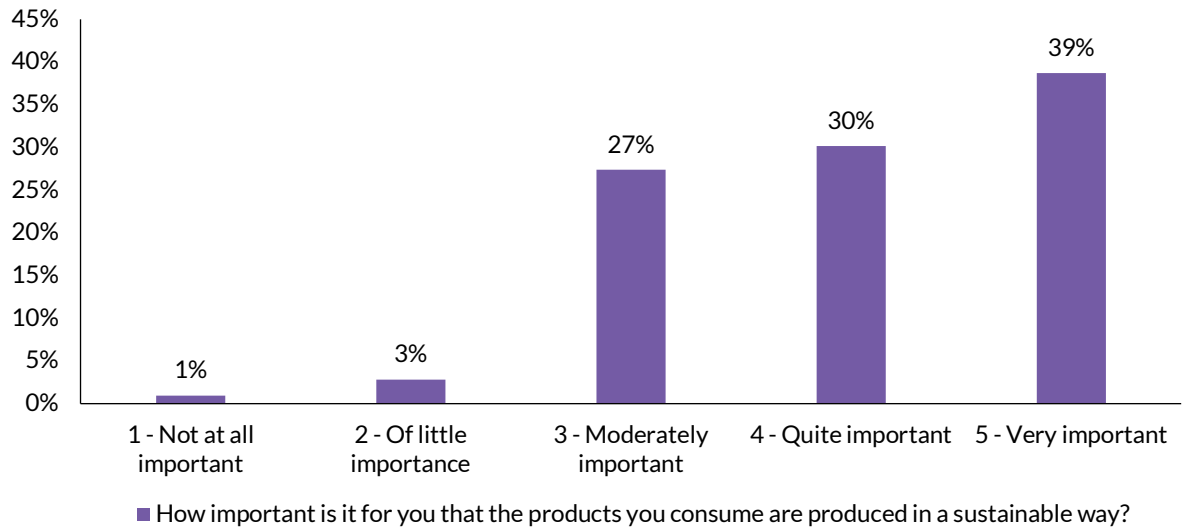
Figure 29. Students' perceptions regarding water expenditure in production of animal- vs plant-derived food, ranked from 1 – Fully disagree to 5 – Fully agree.

Moreover, according to respondents' perceptions, foods of plant origin exhibit varying levels of water expenditure in primary production. A significant portion of respondents, 6% each, perceive these foods as requiring very little water, ranking them at the lowest levels of 1 and 2 respectively. In contrast, 43% of respondents show a neutral stance regarding water requirements of plant-derived food production. Additionally, 24% of respondents believe that foods of plant origin necessitate a considerable amount of water, ranking them at level 4. Finally, 22% of respondents attribute the highest level of water expenditure to foods of plant origin, ranking them at level 5.

These diverse perceptions highlight the complexity of students' awareness and opinions regarding the environmental impacts of animal and plant-derived foods, particularly in terms of water resource management. Enhancing education on these matters can empower future chefs to contribute positively to water conservation efforts through their decisions, fostering greater environmental stewardship and resource efficiency.

When asked regarding the sustainability and price point, most respondents (39%) place high importance on products being produced sustainably (rank 5), with a significant proportion (67% combined from ranks 4 and 5) considering it quite to very important (**Fig. 30A**). However, while a substantial 42% of respondents are moderately willing to pay more for sustainable products (rank 3), a lower percentage (44% combined from ranks 4 and 5) are quite to very willing to pay extra (**Fig. 30B**). Overall, there is a noticeable level of concern among respondents regarding sustainability in product consumption, with a significant portion showing a willingness to support sustainable practices through their purchasing decisions. These findings demonstrate a growing awareness and willingness to prioritize sustainability, albeit with varying degrees of willingness to pay extra.

A



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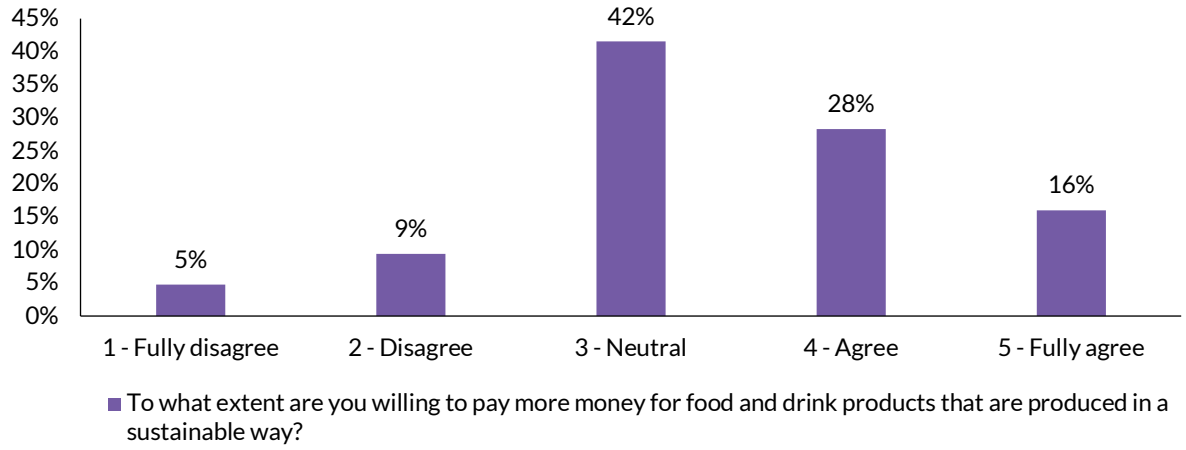

Figure 30. Importance attributed by respondents regarding the sustainability of products consumed (A) and financial commitment towards this consumption (B), ranked from 1 – Not at all important to 5 – Very important, or 1 – Not at all willing to 5 – Fully willing, respectively.

Dietary practices related to sustainable food consumption

Several interesting results were obtained when students were asked about their dietary practices, including sustainability preferences, consumption of fresh and seasonal products, efficient use of energy and environmental awareness (**Fig. 31**):

- **Sustainability Preferences:** The survey indicates a strong inclination towards sustainable food choices among respondents. Overwhelmingly, 66% of participants express a willingness to purchase sustainable food products more frequently if they were readily available. Moreover, a substantial portion of respondents, comprising 69%, report actively avoiding products that are transported from far away, reflecting a desire to support local and regional sourcing practices. Additionally, a significant majority of 73% indicate a conscientious effort to minimize food waste, suggesting a growing awareness of the environmental implications of food disposal and a willingness to adopt waste-reduction strategies in their daily lives.

- **Access to Fresh and Seasonal Products:** Access to fresh and seasonal produce emerges as a key consideration for respondents when making food choices. A substantial proportion, representing 69% of participants, express confidence in their ability to access fresh products when desired, indicating satisfaction with the availability of locally sourced and seasonal offerings. Furthermore, 59% of respondents report a preference for consuming seasonal produce, underscoring an appreciation for the flavor, nutritional quality, and sustainability benefits associated with eating foods that are in season.

- **Energy Efficiency and Environmental Awareness:** The survey reveals a mixed level of engagement with energy-efficient cooking methods and environmental awareness regarding food production and transportation. While a notable 55% of respondents express a commitment to using energy-efficient methods when cooking, there remains room for improvement in promoting sustainable cooking practices. Similarly, respondents demonstrate varying levels of mindfulness regarding the environmental impact of certain food production and transportation practices. While some express concern about the production of vegetables in greenhouses and the consumption of products transported by plane, others indicate less awareness or urgency regarding these issues. Additionally, there is a range of attitudes towards the consumption of meat and dairy products, with 51% showing a high degree of mindfulness about the environmental implications, while others exhibit less concern.

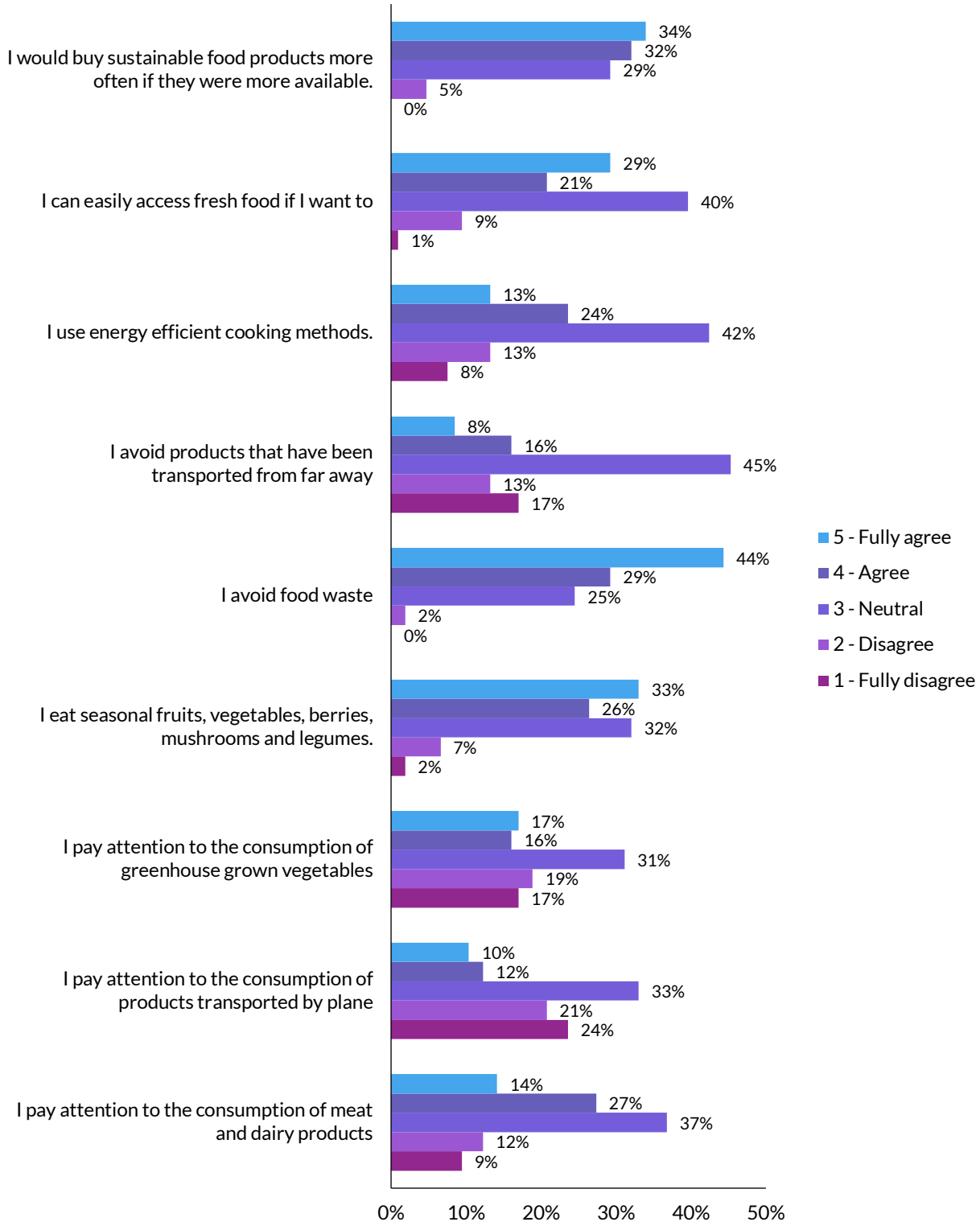

Figure 31. Students' perception and behaviour related to dietary pratices, including sustainability preferences, consumption of fresh and seasonal products, efficiency of energy use and environmental awareness, ranked from 1 – Fully disagree to 5 – Fully agree.

Finally, students were asked how important it was for them to acquire knowledge about sustainable food systems during their education on the EHTs (**Fig. 32**). According to the findings, there is a notable interest among students in acquiring knowledge about sustainable food systems during their professional education. A significant portion of respondents (31%) rated this knowledge as moderately important (rank 3), while an equal percentage (34%) found it quite important (rank 4) and another 34% considered it very important (rank 5). These results underscore a strong desire among students to understand the complexities of food systems, including the roles and interactions of all stakeholders involved. This indicates a growing recognition of the importance of sustainability in food production and consumption practices within the educational context beyond high school.

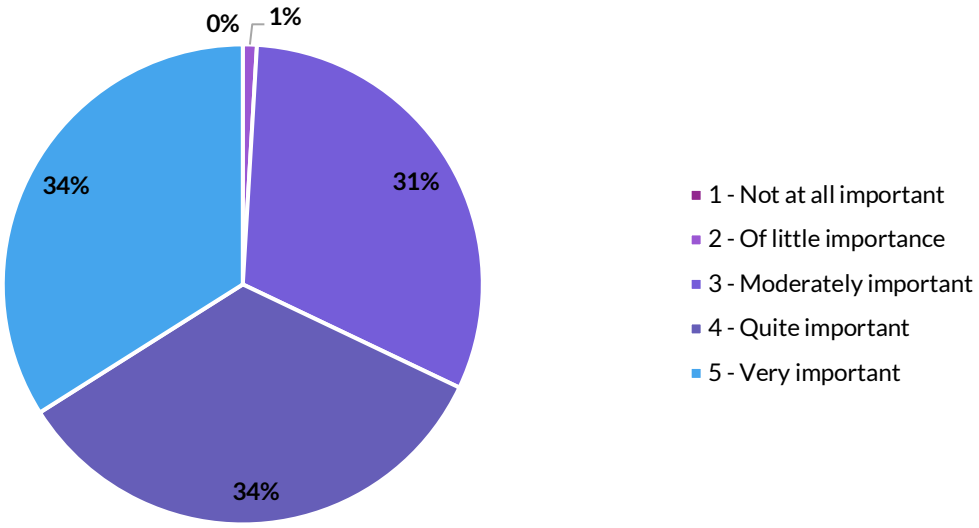

Figure 32. Importance attributed by respondents to acquiring knowledge on sustainable Food Systems during their training on the EHTs, ranked from 1 – Not at all important to 5 – Very important.

Conclusions

The education of students, whether in culinary arts or related fields, plays a pivotal role in transitioning to more sustainable food systems. As the survey data suggests, there is a growing awareness and prioritization of sustainability among them, yet a significant gap persists between values and actions. Culinary arts education can bridge this divide by instilling a deep understanding of sustainable food production practices and their environmental, social, and economic implications. Students should be equipped with the knowledge and skills to source and prepare locally sourced, seasonal, and sustainably produced ingredients, while also understanding the principles of agroecology. This involves educating them on the importance of regenerative agricultural practices, biodiversity conservation, and fostering resilient food systems that work in harmony with nature. By integrating sustainability principles, including agroecology, into the curriculum, culinary arts programs can empower future chefs to make informed decisions that prioritize the health of both people and the planet.

5. Final considerations

This comprehensive analysis of the Portuguese food system reveals crucial insights that will inform the GrowLIFE initiative. A significant gap exists between producers and consumers, with many consumers relying on supermarkets and local stores rather than engaging directly with local farms. This highlights an opportunity to develop and strengthen local short supply chains, promoting consumer access to sustainable products and supporting local producers.

Furthermore, survey results indicate that many producers face economic challenges, with a substantial portion unable to sell their produce at planned prices. This emphasizes the importance of promoting economic and social sustainability within food production to ensure the viability of local agriculture. The findings align with the European Commission's vision of enhancing local food systems through increased collaboration and accessibility, which GrowLIFE actively pursues by establishing connections among stakeholders across Portugal.

In addition to economic challenges, regulatory complexities and logistical constraints pose significant obstacles to implementing short food supply chains across Portuguese municipalities. Stakeholder collaboration — among producers, consumers, municipalities, universities, and associations — is identified as crucial for overcoming these barriers. Proposed solutions include developing supportive infrastructures, simplifying legal procedures, providing financial incentives, and raising awareness through educational campaigns.

Educational efforts are also essential, particularly in culinary arts and related fields, to bridge the gap between values and actions regarding sustainability. Integrating principles of agroecology into culinary education can empower future chefs to prioritize locally sourced, seasonal, and sustainably produced ingredients, thereby promoting resilient food systems and biodiversity conservation.

In summary, while challenges persist in developing short food supply chains, the insights gathered through this needs analysis provide a strong foundation for GrowLIFE's activity design and development. Collaborative efforts, targeted educational campaigns, and strategic policy adjustments are identified as essential to harnessing the potential benefits for local economies, sustainability, and community health. To advance a holistic approach and build innovative synergies, GrowLIFE will incorporate peer-to-peer knowledge sharing, workshops, and multi-stakeholder discussions to encourage sustainable practices throughout the supply chain and foster a more integrated and sustainable food system that meets the diverse needs of consumers and supports the livelihoods of local producers across Portugal.

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