RESEARCH ON THE CURRENT SITUATION OF FRUIT SHRUB CROPS IN ROMANIA

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RESEARCH ARTICLE

Abstract

The cultivation of fruit shrubs represents a profitable opportunity for both family farms and larger agricultural producers operating in Romania's diverse agricultural landscape. However, this niche segment of agriculture is not without its multifaceted challenges, which include, but are not limited to, issues related to the availability and quality of labor, sales market dynamics, the complexity surrounding area subsidies, and the accessibility of critical information and resources. The main objective of this scientific work is to highlight the significant challenges faced by fruit shrub growers, while also highlighting additional pertinent factors, such as the area of cultivated land, the species most frequently cultivated in this sector, the geographical regions involved in berry production, the varied levels of development in these areas, as well as the specific needs and requirements of farmers operating in this field. Using an online platform, a comprehensive survey was conducted through Google Forms, ensuring the confidentiality of correspondents and was strategically disseminated on various Facebook groups dedicated to fruit shrub growers in Romania, in addition to being shared in several WhatsApp profile groups for a period between September 5, 2023, and September 5, 2024. In the end, a total of 198 completed questionnaires were collected, and the conclusive results undoubtedly reflect the range of challenges currently faced by farmers involved in berry cultivation in Romania.

Keywords: shrubs, berries, farmer,
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INTRODUCTION

The diverse geographical and climatic conditions present in Romania contribute significantly to its ability to cultivate a wide range of fruit shrubs, which thrive in such varied environmental conditions. Determining the most suitable regions for this agricultural cultivation depends on a multitude of factors, including but not limited to the specific types of soil present in those areas, the prevailing climatic conditions, and the inherent adaptability of different shrub species.

It is worth noting that advances in modern agricultural technologies have made it possible to create controlled growing conditions, whereby, for example, shrubs can now be grown in protected environments, thus mitigating the development of modern agricultural technologies.

Today, after a long period of economic and health crisis, it is necessary to have unrestricted access to fresh and nutritious food for all social groups of the population living in large cities. The effects of COVID-19 indeed make an urgent transition to a more sustainable and resilient food system necessary (Maknea K.I., et all.,2021).

In rural Romania, agriculture is the predominant economic activity. However, due to limited land and resources, many farms operate at a subsistence level. Promoting fruit shrubs can diversify sources of income, reducing dependence on traditional crops and increasing financial stability for rural households (Rahoveanu & Risnoveanu, 2017).

Growing and processing fruit shrubs can create direct and indirect employment opportunities. This includes jobs in agriculture, processing, packaging and marketing, which are crucial for rural development and reducing urban migration (Bizotto et al., 2012), (Vasiliu, 2012).

(Todirica, 2022) is of the opinion that the use of local resources for fruit cultivation supports sustainable development by reducing environmental impact and promoting biodiversity. This approach also helps to maintain food diversity and cultural heritage, which are important for rural identity and tourism.

As for the fruit market in Romania (Leonte et al., 2020) they state that the potential is growing, but it requires diversification and modernization to compete effectively. By introducing high-performance hybrids and

expanding the range of fruit products, Romania can increase its competitiveness on the European market. The development of a robust fruit shrub sector can contribute to the economic resilience of rural areas, providing a stable source of income, which is less susceptible to market fluctuations compared to traditional crops (Panait, 2022).

The phenomenon of competition, especially analyzed in the context of the diversity and variety of products in the specific category of berries, takes the form of niche products at the general European level, which has significant implications for the agricultural practices and market strategies of Romanian farmers, who are therefore forced to go through a process of adaptation to the evolving demands and requirements of the market in order to increase their competitiveness.

While the economic benefits of promoting fruit shrub cultivation are substantial, challenges such as access to credit, modern agricultural technology, and effective marketing strategies, including local government measures making at a local level (Timofte, 2016) must be addressed to fully realize these benefits. In addition, the integration of agritourism could further enhance economic opportunities, although current governance issues and limitations on market access are significant barriers (Vîntu et al., 2016).

Researchers and scientists in Romania are diligently engaged in extensive efforts aimed at aligning with contemporary trends associated with the cultivation of newly identified shrub species that have demonstrated remarkable potential for successful growth in this geographic region.

MATERIAL AND METHOD

Using a sophisticated online platform specially designed for data collection, a meticulous and comprehensive survey was conducted through the Google Forms application, which not only ensured the utmost confidentiality of all correspondents participating in the survey, but was also strategically disseminated in various Facebook groups dedicated to the interests and concerns of fruit shrub growers in Romania; in addition, the survey was distributed in several dedicated WhatsApp groups, all of which took place over an extended period that stretched from September 5, 2023, to September 5, 2024. In the end, diligent efforts resulted in the successful collection of a total of 198 completed questionnaires, and the conclusive results obtained from this comprehensive survey undoubtedly reflect the wide spectrum of challenges currently faced by farmers who are actively involved in the cultivation of different types of berries in the Romanian context.

An exhaustive questionnaire, which was methodically structured in four distinct segments with the explicit aim of optimizing the data collection process, served as the main tool for this scientific documentation; It is particularly important to note that the first segment, designated as Section One, comprised a total of four questions designed to elicit accurate and reliable answers from participants regarding their perceptions of the agricultural region and its geographical positioning in the context of the study (see Table 1).

In the next segment of the questionnaire, called the second section, five questions were asked to obtain information on the different crop species, together with the general state of development of the agricultural farm examined (see Table 2).

The third segment of the questionnaire was constructed to collect relevant information on several key aspects, including the farm's legal and associative framework, the total number of employees involved in its operations and the prevailing challenges faced by the farm, which were structured into a total of six carefully designed questions (see Table 3).

The fourth section also contains six questions, which concerned the collection of data on the valorization of production processes, the primary characteristics of the customer base, as well as the various forms of financing and support mechanisms accessible for the agricultural operation (see Table 4).

Table 1

First section of the questionnaire: farm positioning, area

		Items
1.	In which region of Romania is your farm located?	Transylvania Oltenia Muntenia Moldova Bukovina Dobrogea Crișana Banat Maramures
2.	At what altitude is the farm located?	0-200 meters 201 - 400 meters 401 - 700 meters 701 - 1000 meters over 1000 meters
3.	In which of the following situations are plantations grown?	In the open field In greenhouses/solariums In the low tunnels Anti-hail system
4.	What area is the area of land cultivated with fruit shrubs?	Up to 1 hectare. Between 1 and 3 hectares. Between 3 and 5 hectares. Between 5 and 10 hectares. Between 10 and 15 hectares. Between 15 and 20 hectares. Between 20 and 50 hectares. Over 50 ha

Table 2

Second section of the questionnaire: cultivated plants and farm development level

		Items
1.	What fruit shrubs do you grow?	Bilberry Hazel Aronia Sea buckthorn Currant Mur Goji Black Elderberry Sweetness rose Raspberry Other shrubs
2.	Do you grow any other plants on the farm besides fruit shrubs?	NOT YES, fruit trees YES, vines YES, large grain crop
3.	Fruit harvesting is carried out:	textbook Mechanized mixed (manual and mechanized) Other method
4.	Do you have storage spaces with controlled fruit temperature and humidity on the farm?	YES NOT
5.	Do you have a fruit processing point on the farm?	YES NOT

Table 3

Section three of the questionnaire: legal and associative form, number of employees and biggest challenges

Items	
1.What is the legal status of your farm?	Producer certified only by UAT (City Hall) PFA (Authorized Individual) LLC SRLD Other form
2.Are you enrolled in an associative form?	YES NOT
3.Is the farm certified organic?	YES NOT Other certification
4.Does your farm have an engineer/horticulturist specialized in the field?	YES NOT YES, with higher education, but in another field
5.How many employees do you need for a year on your farm?	2-5 5-10 10-15 15-20 20-25 25-30 30-35 35-40 40-45 45-50 over 50
6.What are the biggest challenges you face?	Lack of labor. Market instability. Lack of equipment with specific equipment. Legislation in force. Bureaucracy. Lack of forms of financing. Others

Table 4

Fourth section of the questionnaire: Valorisation of production, customers, forms of financing and support

Items	
4.1 How many berries do you get annually on the farm?	1-5 tons 5-10 tons 10-20 tons 20-30 tons 30-50 tons 50-100 tons 100-500 tons over 500 tons
4.2 The average selling price of fresh fruits at the farm gate in 2023/2024 was:	1-3 euro/kg 3-5 euro/kg 5-7 euro/kg 7-10 euro/kg across 10 euro/kg
4.3 Do you also use other products from the shrubs you produce?	NOT Foliage Buds Flowers Roots Others
4.4 Where do your customers come from?	We sell locally, within a radius of 10-50 km. We sell locally, within a radius of up to 100 km. We only sell to customers in EU member states We sell both locally and to customers in other EU countries
4.5 Your farm has partnerships/contract	It does NOT have any partnership/contract YES, with local stores/resellers

	s with:	YES, with local and regional stores/resellers YES, with a Retail chain in Romania YES, only with partners from the European Union Other form
4.6	Has the farm you manage obtained European funding through the national projects made available?	ALSO NU

RESULTS AND DISCUSSIONS

The complex questionnaire, which was composed of four distinct and well-defined sections specifically designed with the aim of collecting extensive and comprehensive information, was methodically distributed in a variety of groups on the Facebook network that are explicitly dedicated to people who are involved in the cultivation of fruit shrubs as well as in the WhatsApp group Blueberries Romania, which has several 221 farmers. Throughout the complex data collection process, it is essential to emphasize that no personally identifiable information has been requested or documented; Instead, this aspect of maintaining anonymity was clearly communicated to respondents, thanks to the people who generously dedicated their time to completing and sending the questionnaire for the purpose of developing this study. As a direct consequence of the systematic centralization and subsequent thorough analysis of the data provided by the respondents, we were finally able to achieve the following significant and noteworthy results:

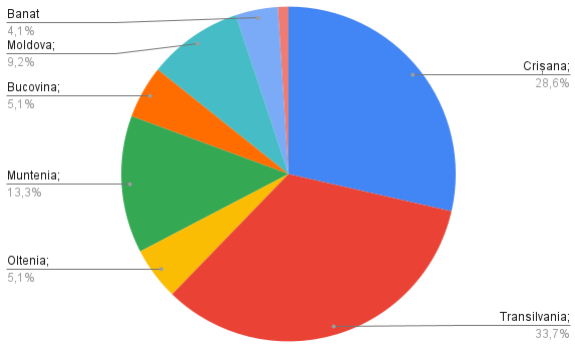

Figure 1 **Regions and percentage of farmers who participated**

The pre-eminent proportion of the farmers concerned, which can be attributed to the respective regions (Figure 1), was observed to come predominantly from Transylvania, where the percentage reached an impressive figure of 33.7%, closely followed by farmers from the Crișana region, whose representation is 28.6%, while farmers from Muntenia represent 13.3% of the total, and those from Moldova represent a share of 9.2%, it is also worth noting that Oltenia has an equal distribution with Bucovina, each having a representation of 5.1%, followed by the Banat region with only 4.1%, in the end the percentage of 0.9% being attributed to those who did not want to express this detail.

In the analysis of the phenomenon of altitudinal zoning, it is observed that the predominant percentage of 37.6% indicates the existence of fruit shrub cultivation farms in the lowland regions located in the altitudinal range from 0 to 200 meters above sea level, while the subsequent representation is composed of farms located in the hilly regions that fall within the altitudinal range of 200 to 400 meters, which is a notable percentage of 29%. Moreover, in the hilly to mountain regions, a representation of 22.6% of the participating farms can be identified that is associated with the altitudinal range of 400 to 700 meters, in addition to a smaller segment, which rises to 8.6%, in the altitudinal range of 700 to 1000 meters and, finally, there is an extremely minimal percentage of only 2.2% of farmers occupying areas above the altitude threshold of 1000 meters, reflecting a significant gradient in terms of altitudinal distribution in the different areas.

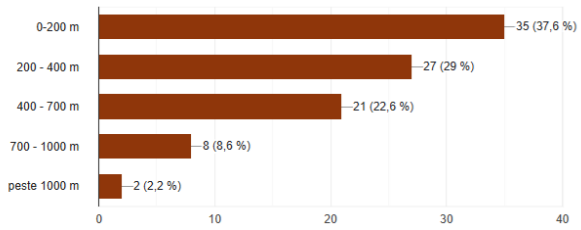

Figure 2 **The altitude at which the farm is located**

The results regarding the way of carrying out the activities on the farm had the following values:

- In a percentage of 78.7% of the farms have production activity in the open field.
- 14.3% in greenhouses and protected areas.
- 3.1% in low tunnels.
- 3.9% have an anti-hail protection system

Comprehensive examination of agricultural land used by farmers for cultivation purposes, it is worth noting that the cultivation of berries occupies a significant part, as indicated by a substantial percentage of 52.6% which refers to land not exceeding the size of 1 hectare, while the latter category, which comprises land areas ranging from 1 to 3 hectares, represents a considerable percentage of 22.7%, followed by a notable 12.4% of cultivated land falling within the range of 3 to 5 hectares, then a lower percentage of 9.3% refers to those areas that extend between 5 and 10 hectares, and finally, for plots of land that exceed 10 hectares, Representation is relatively minimal, at just 2.1%.

In the second section of the questionnaire, it was observed that the farmers who participated in this study give priority to the cultivation of blueberries, which constitutes a significant percentage of 32.5%, thus establishing it as the most cultivated shrub among the survey respondents, while the cultivation of raspberries follows closely with a percentage of 28.2%, indicating a strong interest in this particular shrub as well; in addition, blackberry cultivation accounts for 9.1%, which, although lower than the previous two, still represents a notable proportion of respondents' agricultural activities, while currants are grown by a smaller segment of farmers, with only 4.8% of them engaging in this practice; in addition, hazelnut is represented by 3.3% of farmers, and sea buckthorn is cultivated in a percentage of 2.9%, reflecting a minor, but present, interest in these fruit varieties; In addition, aronia is cultivated by 2.7% of respondents, signaling a marginal commitment to this shrub and finally, it is worth noting that the collective percentage of 16.6% is attributed to the category of other fruit shrubs, which encompasses a diverse range of species, including but not limited to: goji, jam roses, elderberry, fig or Canadian blueberry (Saskatoon berry) illustrating the varied interests and agricultural practices among the farmers surveyed.

Regarding agricultural practices related to the cultivation of other plants beyond fruit shrubs, it was observed that a significant proportion, 50% of the farmers engaged in this study, do not engage in the cultivation of other plants on their farms, thus limiting their agricultural diversity. Moreover, it is worth noting that 35.3% of these farmers simultaneously engage in the cultivation of fruit trees, indicating a preference for perennial crops that produce edible products, while 8.3% of farmers diversify their agricultural efforts by cultivating vines as well.

A smaller segment, comprising 6.4% of farmers, are expanding their agricultural activities to include the cultivation of cereals, which are essential staple crops that play a crucial role in food security and nutrition.

In the context of fruit harvesting practices, it is worth noting that a substantial majority, especially 94.8 percent of farmers, use manual techniques for the purpose of fruit harvesting, while a relatively smaller segment, worth 5.2 percent, uses a hybrid approach that incorporates both manual and mechanized methods of fruit harvesting. It is also important to emphasize that there is currently no variant of fruit harvesting that is exclusively mechanized, as evidenced by the absence of any recorded percentage, which is unequivocally represented as 0%.

The prevalence of agricultural units equipped with storage spaces that meticulously regulate temperature and humidity conditions is recorded with an astonishingly low percentage of 22.7%, which contrasts sharply with the overwhelming majority, comprising 77.3% of farmers, who, unfortunately, do not have access to such specialized storage spaces designed to maintain optimal levels of temperature and humidity for the preservation of the fruits grown on those farms.

The complex procedures involved in the processing of berries are carried out on agricultural farms, representing a specific proportion of 14.9%, while a significantly larger majority, representing 85.1%, refrain from involvement in the processing of fruits that are harvested from the cultivation of different species of fruit shrubs, thus highlighting the disparity of operational practices in the agricultural sector.

The third section of the study carried out a comprehensive analysis that meticulously

examined not only the existing legal and associative structures, but also considered the substantial number of employees working in these frameworks, as well as the most significant challenges that farmers commonly face in their daily operations.

Legal classification of agricultural enterprises, it was found that 40.2% of these entities hold a producer certificate that has been duly issued by the respective administrative-territorial units, followed later by a percentage of 36.11% that belongs to the name of the limited liability company (LLC) and, in addition, there is a segment of 12.4% that is classified as authorized natural persons (PFA), while an additional 11.3% includes other legal forms, such as limited liability companies (LLCs), partnerships, and various other associations.

A significant proportion of the farming community, particularly 27.6%, indicated that they participate in some form of associative organization, while on the contrary, a notable majority, amounting to 72.4%, reported that they were not affiliated with any such associative entity, thus highlighting a substantial division in the levels of participation between farmers in these collaborative frameworks.

In terms of certification status, it was noted that the prevalence of eco-certification among farmers is recorded at 17.5%, which means a relatively modest commitment to environmentally sustainable practices, while an even smaller fraction, especially 5.2%, obtained other forms of certification, leaving a staggering 77.3% of farmers without any certification, thus illuminating a critical gap in recognized agricultural standards.

A substantial proportion of 58.8% of agricultural enterprises do not employ a specialized horticultural engineer with the necessary expertise in this field, while a smaller proportion, namely 36.1%, indicate that these farms do indeed have access to a horticultural engineer who is competent in the field of horticulture; conversely, a minimal fraction, which constitutes 5.1%, reports the presence of an engineer who holds a higher education qualification, but unfortunately specializes in a distinct discipline other than horticulture.

Over the course of an entire agricultural year, within the specified farms in question, it has been established that a substantial majority, exactly 67.7%, of these farms require a workforce that usually varies from a minimum of 2 employees to a maximum of 5 employees, while a slightly smaller fraction, representing 16.7%, require a workforce composed of between 5 and 10 people, and an even smaller segment, in particular 4.2%, considers it essential to employ between 10 and 15 people, while 3.1% of farms require between 15 and 20 workers, closely followed by a minority part, represented by 2.3%, which hosts a workforce of between 20 and 25 employees throughout the agricultural season; In addition, it is worth noting that the other categories, which involve higher employment figures, are characterized by significantly lower representations, the least common category being registered at only 1%, which refers to farms that require the employment of more than 25-30, 30-35, 35-40, 40-45, 45-50, more than 50 people in total.

The most significant challenges faced by agricultural producers underlined the critical and alarming observation that:

1. Labor shortages are a prevalent problem, constituting an alarming 38% of the challenges they face.
2. This is further compounded by the pervasive instability of market conditions, which constitutes a substantial 21.8%,
3. In addition to the pressing lack of essential equipment, especially specialized machinery, which is not only a practical concern, but also represents another layer of complexity in this sector, comprising 4% of the challenges identified.
4. In addition, the unavailability of accessible financial resources, which hampers operational viability, accounts for 7.4% of the difficulties faced by farmers.
5. The impact of existing legislative frameworks, which can often be cumbersome and restrictive, contributes to 3.2% of challenges.
6. Burdensome nature of bureaucratic processes, which can significantly hinder progress and efficiency, amounts to 2.1% and,
7. Finally, a variety of other challenges, encapsulating a broad spectrum of unclassified issues, collectively make up a notable 11.1%.

In section 4 of the questionnaire, emphasis was placed on the different ways in which customers engage in the use of

production, along with an in-depth exploration of the different forms of financial assistance and support that are offered to farmers in their agricultural efforts; In addition, the annual quantities of berries harvested on the farm were represented in the visual representation labeled as figure number 3, which serves to provide a comprehensive understanding of agricultural production during an agricultural year.

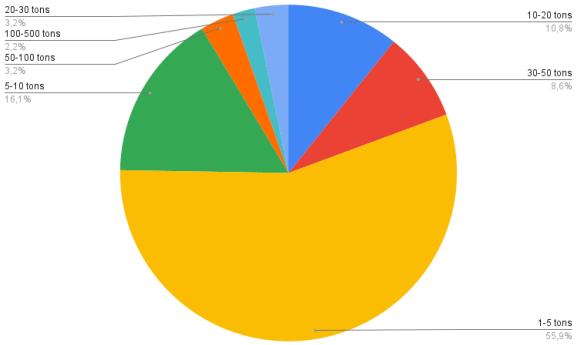

Figure 3 **The amount of fruit obtained annually on the farm**

The average selling price of fresh agricultural products, in particular fruit, observed at the farm's point of sale, shows considerable variability, with prices ranging from a minimum of one euro per kilogram to values exceeding ten euros per kilogram; However, the prevailing price range, which represents a significant part of the market, is between 3 and 5 euros/kg, representing an impressive 54.2%, as clearly shown in the graphical representation in figure number 4.

Following this primary category, the subsequent classification of prices from EUR 1 to EUR 3/kg comprises a remarkable percentage of 26%, while the price range between EUR 5 and EUR 7/kg holds a percentage of 17.7% and, finally, to the category capturing the smallest market share, which is between EUR 7 and EUR 10/kg, it is allocated a relatively modest percentage of 2.1%.

In response to the questionnaire on the use of additional products derived from fruit shrubs grown by farmers, a significant majority, exactly 76.8%, indicated that they do not use additional products; But a smaller fraction of 4.2% attributed value to both the leaves and buds of these shrubs, while an even more modest 1.1% recognized the value of the flowers produced by these plants and another 3.2% of respondents reported that they also attribute value to the roots, thus revealing that a notable segment, comprising 14.7%, fall into the category of the use of various other forms of exploitation beyond the commonly recognized products.

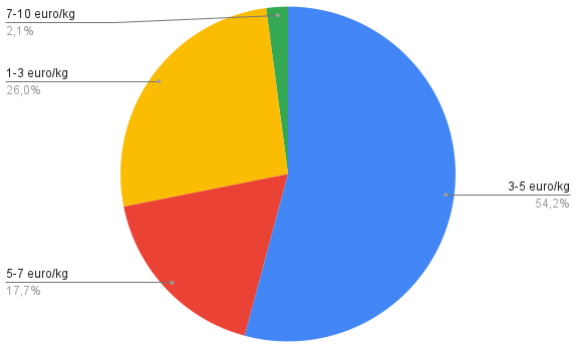

Figure 4 **Average price of fruits on the farm**

Farmers claim that 45.3% of their clientele comes from a geographical radius that extends up to 50 kilometers around the agricultural unit, which means a strong presence on the local market. In addition, a further 35.2% of the farmers surveyed indicated that their fruit is distributed and sold over a wider radius of up to 100 kilometers, thus highlighting the extensive coverage of their products beyond the immediate localities. In addition, a smaller segment, representing 9.3%, markets its products exclusively to consumers residing in the Member States of the European Union, which illustrates a specific approach to a certain demographic market category. Finally, a notable 10.2% of farmers engage in sales comprising both local transactions and those directed at customers in other European Union countries, reflecting a dual strategy that leverages both proximity and the wider EU market.

In the context of contractual agreements and collaborative partnerships between agricultural producers and various marketing entities, it was observed that an overwhelming majority, namely 73.2%, do not engage in any form of partnership or contractual arrangement with any external party. In contrast, a relatively modest 7.2% of respondents reported that they had established partnerships with local retail stores and resellers, while 9.3% indicated that they had formed alliances with both local and regional distributors.

Moreover, a relatively small proportion, representing 4.1% of respondents, said that they have cultivated a partnership with a retail chain operating in Romania, while an extremely minor segment, which constitutes only 1%, reported that they have collaborative ties with

partners in the European Union. In addition, 5.2% of participants expressed that they had engaged in alternative forms of partnerships specifically related to fruit exploitation.

Finally, a substantial proportion of 75.2% of agricultural producers expressed the claim that they had not obtained European or national funding through various instruments made available to them; on the contrary, a smaller segment, exactly 24.8%, indicated that they had secured financial resources and subsequently progressed in their agricultural efforts by using the range of support mechanisms made available in Romania specifically for the development and improvement of agricultural activities.

CONCLUSIONS

The results of this research indicate that a significant proportion of agricultural producers come from Transylvania (33.7%) and Crișana (28.6%), followed by Muntenia (13.3%) and Moldova (9.2%). In terms of altitude classification, 37.6% of agricultural units are in lowland areas (0-200 m), while 29% are in hilly regions (200-400 m). Operational activities are carried out mainly in open fields for 78.7% of farms, 52.6% of land plots having an area of less than 1 hectare. These statistics highlight the regional and altitudinal heterogeneity of agricultural enterprises, along with a visible inclination towards smaller land holdings and open field farming practices.

The study concludes that participating farmers give priority to blueberries and raspberries, with preferences of 32.5% and 28.2% respectively. There is also interest in blackberries (9.1%) and currants (4.8%), along with less cultivation of hazelnuts, sea buckthorn and arony. A diversity of species is noted, 16.6% attributed to other fruit shrubs reflecting the varied interests of farmers.

In terms of crop diversification, half of the farmers do not grow other plants, limiting agricultural diversity, while 35.3% grow fruit trees and 8.3% cultivate vines, indicating a preference for perennials. A smaller percentage, 6.4%, grow cereals, underlining their importance for food security.

Harvesting is predominantly manual, with 94.8% of farmers using this method, while only 5.2% use a hybrid approach, indicating the need to modernize harvesting techniques.

In terms of storage spaces, only 22.7% of farmers have specialized areas for temperature and humidity control, revealing a critical need for improved fruit preservation. In addition, only 14.9% of farmers engage in fruit processing, suggesting potential for development in this sector. The fig tree is a species of fruit loved by Romanians, inhabitants of a temperate continental country. For many, the fig tree and the fruit have a biblical significance, for many others it is just a species of exotic fruit that can be grown under special conditions and with special attention. In many parts of Romania with more moderate climates, especially in the wine-growing areas, scattered fig trees are found. But the largest number of figs are present in private gardens across the country, generally planted on the southern fade of buildings. (Stănică., 2017)

Agricultural enterprises have diverse legal structures, 40.2% holding producer certificates and 36.11% structured as limited liability companies. Participation in associative organizations is limited to 27.6% of farmers, while e-certification is adopted by 17.5%, reflecting a modest inclination towards sustainability.

Most farms (58.8%) do not use specialized horticultural engineers, and 67.7% require 2 to 5 employees annually. Farmers face significant challenges, including labour shortages (38%), market instability (21.8%), insufficient equipment (4%) and limited financial resources (7.4%).

The findings underline the imperative to improve infrastructure and human resources in the agricultural sector, alongside the adoption of sustainable and efficient practices to address the prevailing challenges.

The fluctuation of fruit selling prices mainly falls within a range of 3 to 5 euros per kilogram, which represents 54.2% of the total market. A substantial proportion of farmers (76.8%) do not exploit additional products that can be derived from fruit shrubs, while 45.3% of the consumer base is within a radius of 50 kilometers from the agricultural unit.

In terms of collaborative efforts, 73.2% of farmers do not have formal contractual agreements with external organizations, and only 24.8% have obtained funding from European or national sources. These findings underline the imperative to increase market access and financial support for farmers, in addition to promoting the diversification of the range of products available.

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Your contributions are indispensable for a comprehensive understanding of the challenges and requirements in the agricultural sector, thus facilitating the development of solutions that effectively support you in your daily efforts.

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