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DYNAMICS OF THE AREAS, PRODUCTION, IMPORT AND EXPORT IN FRUIT AND VEGETABLES SECTORS AND LABOUR RESOURCES IN BULGARIA'S AGRICULTURE - TRYING TO ACHIEVE THE GOALS OF THE "FARM TO FORK" STRATEGY

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Abstract

The Farm to Fork Strategy is part of the European Union's ambitious Green Deal and aims to create sustainable and efficient food systems that reduce the negative impacts on the climate, the environment and public health. This strategy focuses on the transition to greener agriculture and food processes, aiming to provide enough food for a growing population without depleting natural resources and damaging ecosystems. The aim of this study is to analyse the ability of Bulgarian agriculture to achieve the goals set out in the Farm to Fork Strategy through assessment of the development of its production, trade and labour resources. To achieve this goal, the following points should be addressed: the key points of the Farm to Fork Strategy should be clearly stated; the production base and production of the agricultural sector should be valuated; labour as a significant factor should also be studied in regards to the development of new eco-policies in order to propose vectors for improvement. For the purpose of this study a policy review of the Farm to fork strategy was done. For analysis of the dynamics of production, trade and labour resources of Bulgarian agriculture data from multiple sources was used, mainly from the Agrostatistics database of the Ministry of food and agriculture and the National statistical institute of Bulgaria. The data from internal sources was aggregated and cross-referenced with the Eurostat database as well as UN databases – Comtrade and Faostat. As a result form this research we can conclude that Bulgarian fruit and vegetable markets rely heavily on imports and the local agricultural sector needs to increase its production to meet the consumer demands in order to achieve the goals set in the Farm to fork strategy of the European union.

Key words**:** *sustainability, food supply, agricultural labour*

INTRODUCTION

The European union's farm to fork strategy, is a key pillar in the transition to a sustainable food system in the union and has been launched in 2020. it provides a comprehensive plan for the transformation of the agricultural sector, focusing on shortening the distance between "farm" and "fork", with the aim of reducing carbon emissions, increasing food safety and ensuring sustainable agriculture (Schebesta, et.al., 2020) [21]. a key aspect of the strategy is the close link with the objectives of the eu's common agricultural policy (cap), which should play a key role in maintaining sustainable agriculture and reducing the environmental impact of agricultural production (Wesseler, 2022) [24].

In this context, the Farm to Fork strategy requires radical changes and shortening food supply chain, a key factor in achieving its goals (Mezzacapo, 2024) [12].

The Farm to Fork Strategy aims to create an efficient, fair and sustainable food system. It seeks to propose innovations in the agricultural sector (Harizanova and Kabadzhova, 2024) [8] that reduce the negative impact on the environment and climate, while ensuring food safety and quality (Marek and Tosun, 2023) [10]. Based on the global need to reduce carbon emissions and increase food security, the strategy calls for a strategic approach to reducing carbon footprints, with one of the main areas of focus being the shortening of food supply chains. By reducing the distance between food producers and consumers, the EU hopes to achieve several key objectives: reducing transport costs and pollution, ensuring more stable incomes for farmers (Omar and Thorsoe, 2024) [19] and protecting

biodiversity (Molitorisova, et.al., 2023) [16]. At the same time, shortening these chains leads to support for local economies and a reduction in dependence on globalized food supply chains, which are often vulnerable to economic shocks and natural disasters (Sniadach, 2024) [22]. The strategy therefore has profound social and economic dimensions, aiming to reduce trade inequalities and create conditions for a higher degree of social justice. The focus of the strategy is the transition to sustainable agriculture, which is not only a response to global climate challenges, but also a response to the growing need to reduce pollution associated with the use of chemical plant protection products in agriculture (Derunova, et.al, 2024) [5]. The EU has set itself the goal of significantly reducing the use of chemical fertilizers and pesticides, as one of the main measures for the transition to cleaner and environmentally sustainable production methods (Goulas and Papachatzis, 2024) [7]. A key part of the strategy is the promotion of biodiversity and the implementation of agroecological and organic practices, which not only reduce dependence on chemicals but also increase the resilience of agricultural systems to climate change.

At the same time, reducing the use of fertilizers and pesticides also leads to a significant reduction in the negative impact on water sources and soils, which are often polluted by nitrates and other chemical elements applied in traditional agriculture. In addition, the strategy includes innovations in agricultural resource management technologies, such as the use of sensors, drones and precision farming technologies, which can optimize the use of fertilizers and reduce their environmental footprint, as well as reduce waste generated by the activity (Bonciu, et.al, 2021) [2].

Changes in consumption habits can have important long-term benefits for public health, while reducing the carbon footprint of the food industry (Mensah, et.al., 2024) [11]. Promoting short supply chains is an important element of this process, as it enables consumers to choose healthier, local and seasonal products, which often have lower energy costs for transportation and better quality (Burgaz, et.al., 2024) [4].

Although sustainable agriculture strategies are often perceived as burdensome for producers, the Farm to Fork Strategy also places an emphasis on social justice by ensuring fair incomes for farmers who commit to the transition to sustainable practices (Stojanovic, 2021) [23]. This includes not only supporting small and medium-sized farmers but also stimulating direct trade relations between producers and consumers by shortening supply chains.

Reducing intermediaries in the food trade not only enables farmers to earn better incomes (Milev and Mutafov, 2024) [13], but also leads to a reduction in food waste and increases the resilience of local economies (Pinta, 2024) [20]. However, such transitions require targeted investments in innovation and the development of new business models that ensure the financial stability of small producers.

The Farm to Fork Strategy plays a crucial role in the transition to sustainable agriculture and food systems in the European Union. It combines environmental, social and economic aspects of the food chain and offers a holistic approach to solving global challenges facing the agricultural sector. By reducing the distance between producers and consumers, promoting local and sustainable production and processing methods, the strategy has the potential to create healthier, more efficient and socially just food chains. At the same time, its successful implementation requires innovation, close cooperation between different stakeholders and a commitment to creating sustainable practices at every level of the food chain.

In this context, the purpose of the paper is to analyze the dynamics of the horticultural sector regarding the surfaces covered by orchards by fruit tree types and fruit production by fruit sort as well as import of fruit and vegetables in order to identify the changes in the period 2020-2023.

Also, it was studied the dynamics of labour force and average net salary in agriculture and at the national level, in order to reflect the changes and differences in the period 2008-2023.

All these are destined to illustrate the efforts made by Bulgaria trying to align the EU's Farm to Fork strategy.

MATERIALS AND METHODS

In order to assess the ability of Bulgaria's agricultural sector to align to the goals of the "Farm to fork strategy" multiple points of interest were analysed. The data reflecting land use of Bulgarian agriculture was supplied by the Ministry of Agriculture and Foods' own statistical department – Agrostatistics [14]. The data needed for the analysis of the agricultural labour resources was sourced from the National Statistical Institute [17].

The period analysed in this study varied based on the relevant information for the analysis and points made in different sections [1].

The cultivated areas and productions for the fruit sector and vegetables sector was studied in the interval 2020-2023.

Labour resources based on their specifics and mobility needed to be studied for a longer period of time – 16 years, between 2008 and 2023, than the trade flows and land use.

To analyse the dynamics of production, trade, and labour resources in Bulgarian agriculture, data from various sources was utilized, primarily from the Agrostatistics database of the Ministry of Food and Agriculture and the National Statistical Institute of Bulgaria, which was aggregated and cross-referenced with the Eurostat database, as well as with UN databases, including Comtrade and FAOSTAT.

RESULTS AND DISCUSSIONS

Land use as the main production factor for agriculture

Bulgarian farmers' ability to maintain a steady food supply and comply to market demands is based on optimisations of land use, as the country has a various terrain, and areas are suited to different productions. These limitations are studied trough the current land use data and farmers production choices.

Orchards area and fruit production

The total area of fruit, nut and berry plantations in agricultural holdings in Bulgaria in 2023 was 59,904 ha, which is 5% below the level of the previous year [3]. In 2022 it was 63,327 ha, which is 3% below the level of the previous year, and in 2021 it was 65,497 ha, which is 1% above the level of the previous year (Table 1).

The largest share of the harvested area in 2023 was occupied by cherries - 23.6%, followed by plums - 22.7% and walnuts - 18.4%. Almost all major fruit crops recorded a decrease in harvested areas compared to 2022, ranging from 1.5% for plums to 41.5% for peaches and nectarines. An increase was observed only for raspberries by 0.4% and hazelnuts by 12.9%. These changes in the peaches and apricots harvested areas is alarming, due to the high local demand for these products and the long preparation period for such production.

Table 1. Orchards areas and fruit production

	Orchards by fruit tree type (ha)				**Production by fruit type (tons)**			
	2020	**2021**	**2022**	**2023**	**2020**	**2021**	**2022**	**2023**
Apples	3,555	3,778	3,720	3,562	37,874	44,030	46,403	34,933
Pears	503	545	575	468	2,830	3,038	3,100	2,511
Peaches	2,775	2,673	2,533	1,483	20,740	21,698	24,182	10,799
Apricots	1,838	3,064	3,049	2,199	9,516	20,701	19,040	10,855
Plums	8,573	9,275	9,398	9,556	60,024	65,123	56,650	57,737
Cherries	10,631	10,754	10,799	9,648	52,326	52,615	53,920	46,222
Sour cherries	1,101	1,183	1,111	934	4,809	4,414	4,260	3,274
Walnuts	7,097	8,066	8,327	7,509	4,750	4,731	4,035	3,450
Almonds	928	1,284	1,506	1,077	473	828	960	622
Hazelnuts	1,337	1,561	1,529	1,727	846	692	759	799
Raspberries	1,829	1,632	1,566	1,572	6,167	5,563	5,691	5,656

Source: MFA, Department "Agrostatistics" [14].

The labour shortage in some areas of the country impacted the producers decisions to move away from some of these highly labour intensive productions. The largest share of

harvested areas in 2022 was occupied by cherries - 23.7%, followed by plums - 20.6% and walnuts - 18.3%. Compared to 2021, the harvested areas of plums, walnuts, pears and almonds increased by between 1.3% for plums and 18.3% for rose hips, while the remaining observed crops recorded a decrease within 0.5% for apricots and 6.1% for sour cherries.

The largest share of harvested areas in 2021 cherries occupy 23.9%, plums 20.6% and walnuts 17.9%.

Almost all main fruit crops recorded an increase in harvested areas compared to 2020, ranging from 1.2% for cherries to 66.7% for apricots. There was a decrease only for peaches and nectarines by 3.7% and raspberries by 10.8%.

In 2023, a total of 179,613 tons of fruit were produced in the country - 19.2% less compared to the previous year, due to the unfavourable climatic conditions in the country as well as due to the reduction of the production base for some fruit cultures. An increase in production compared to the previous year was recorded for plums by 1.9% and hazelnuts by 5.3%. For the other fruit species, production is lower, with the largest decrease in peaches and nectarines by 55.3%, followed by apricots -43.0%, almonds -35.2% and apples -24.7%.

Almost all - 97% of the fruit produced in 2023 was sold on the local and international markets. The largest share of production intended for direct sales and in the trade network is 56%. The quantities for processing account for 37%. The local market has a high demand for locally produced foods and the "Farm to fork" strategy can be implemented to recover some of the lost ground by fruit producers. To achieve such goals, increase in the levels of public support for fruit production in some areas must be seriously considered by policymakers.

In 2022, the total production of fruit in agricultural holdings amounted to 222,177 tons - 1.7% below the previous year's level, mainly due to a decrease in plum production by 13%. The harvested quantities of sour cherries by 3.5%, apricots by 8% and walnuts by 14.7% were also lower than in 2021.

In 2022, the largest relative share of the total fruit production was formed by plums - 25.5%, followed by cherries - 24.3%, apples - 20.9% and peaches and nectarines - 10.9%.97% of the fruit produced in 2022 was sold. The largest share of production was intended for direct sales and in the retail network - 52%, and 41% was directed for processing.

In 2021, 226,118 tons of fruit were produced in the country, which is 11.6% more on an annual basis. The largest relative share of the total fruit production during the year was formed by plums - 28.8%, followed by cherries - 23.3% and apples - 19.5%.

Compared to 2020, there was a significant increase in the production of apricots and almonds - more than twice and by 75.1%, respectively. The harvested quantities of peaches and nectarines, pears, plums, apples and cultivated rose hips were also significantly larger - by between 4.6% and 37.3%.

At the same time, the production of sour cherries, raspberries and hazelnuts decreased from 8.2% to 18.2%. The production of cherries and walnuts is close to that reported in the previous year. Almost all - 98% of the fruits produced during the year were sold. The largest share of the production is intended for direct sales and in the retail network - 51%.

Cultivated area with vegetables and vegetables production

The total open areas with vegetables in 2023 are 28,988 ha - 1.2% less than in 2022. By crop groups, an increase in areas is observed for fruit vegetables by 9.6% and tuber and onion vegetables by 23.9%, and a decrease in potatoes by 23.4% (Table 2).

With the largest relative share of the total areas with vegetables during the year are those occupied by potatoes - 24.2%, watermelons - 12.8%, onions 10.4%, melons - 9.6% and tomatoes - 8.8%.

By types of vegetable crops, in 2023, a significant growth on an annual basis is reported in the areas with gherkins (more than double), cucumbers by 47.9%, melons by 34.3% and onions - mature by 30.1%.

The total production of vegetables in 2023 is 594 thousand tons - 5.6% less than the previous year, mainly due to a serious decline in the amount of potatoes harvested.

The production of open areas is shrinking by 6.5% on an annual basis, to 485.9 thousand

tons, and the greenhouse production - by 1.5%, to 108.1 thousand tons.

In 2023, the largest production is potatoes - 119.2 thousand tons (20.1% of the total vegetable production), tomatoes - 115.7 thousand tons (19.5%), watermelons - 80.1 thousand tons (13.5%), pepper - 52 thousand tons (8.8%), cucumbers - 50.1 thousand tons (8.4%).

Almost all groups of vegetables reported an increase in the quantities harvested from open areas compared to the previous year, reaching 30.4% in tuber and onion vegetables.

Table 2. Vegetable areas and production

	Cultivated area with vegetables (ha)				Vegetables production (Tons)			
	2020	**2021**	**2022**	**2023**	**2020**	**2021**	**2022**	**2023**
Tomatoes	2,587	2,427	2,488	2,540	115,790	116,418	126,455	115,650
Cucumbers	490	432	219	324	50,202	51,414	51,025	50,131
Gherkins	206	156	53	128	3,434	2,268	1,242	2,383
Eggplants	369	321	415	357	9,921	7,804	9,689	10,238
Zucchinis	220	131	165	154	4,315	2,094	3,659	3,049
Melons	2,242	2,952	2,080	2,794	25,453	29,203	21,493	29,487
Watermelons	4,421	4,747	3,338	3,714	87,251	107,342	79,978	80,130
Peppers	2,597	2,866	2,215	2,371	50,992	61,576	46,793	52,005
Onions	2,620	2,351	2,318	3,016	28,443	29,874	27,459	38,956
Carrots	591	459	359	446	8,702	12,056	9,544	9,707
Garlic	369	272	336	226	1,600	1,031	1,287	1,073
Potatoes	9,946	10,902	9,159	7,019	192,331	195,639	172,209	119,239

Source: MFA, Department "Agrostatistics" [14].

Among the more significant crops, a significant increase in the production obtained from open areas was observed in mature onions by 41.9%, melons by 37.2%, cucumbers by 32.4% and peppers by 9.3%, and a decrease in potatoes by 30.8% and tomatoes by 14.2%.

In 2022, the main areas used for vegetable production in agricultural holdings were 30,942 ha, which is 16.5% less on an annual basis. The open areas planted with vegetables shrank by 16.9%, to 29,869 ha. Greenhouse areas also reported a decrease, but to a lesser extent - by 3.1%, to 1,073 ha.

By crop groups, there was a decrease in areas for tuber and onion vegetables by 2.1%, potatoes by 16%, fruit vegetables by 24.9% and leaf or stem vegetables by 26.1%.

The areas with the largest relative share of the total area with vegetables in 2022 were the areas occupied by potatoes - 31.2%, followed by those with watermelons - 11.4%, tomatoes - 8.5%, peppers - 7.5%, melons - 7.1%.

The areas with eggplants and zucchini were also significantly higher - within 26% - 29.3%. On the other hand, the areas with gherkins are seriously decreasing by 66%, cucumbers by 49.3%, watermelons by 29.7%, melons by 29.5% and pepper by 22.7%.

The total production of vegetables - harvest 2022 is 629.2 thousand tons - 8.8% below the level of 2021. Production from open areas is shrinking by 10.7% on an annual basis, to 519.4 thousand tons, while greenhouse production is reporting a slight increase of 1.1%, to 109.7 thousand tons.

In 2022, the largest production is of potatoes - 172.2 thousand tons (27.4% of total vegetable production), tomatoes - 126.5 thousand tons (20.1%), watermelons - 80 thousand. tons (12.7%), cucumbers – 51 thousand tons (8.1%), pepper – 46.8 thousand tons (7.4%).

Among the more significant crops, a significant increase in the production obtained from open areas is observed for eggplants by 25.3% and tomatoes by 20.9%, and a decrease – for cucumbers by 42.7%, pumpkins by 32.5%, melons by 26.4%, pepper by 25.8%, watermelons by 25.5%, potatoes by 12% and ripe onions by 8%.

In 2021, the main areas used for vegetable production in agricultural holdings are 37,072 ha, which is 1.6% more than the previous year. The open areas planted with vegetables are 35,965 ha. Greenhouse areas increased by 23.3% on an annual basis, to 1,107 ha.

Open areas with vegetables during the year increased by 4.1% compared to 2020, with an

increase by crop groups in fruit vegetables by 6% and potatoes by 9.6%.

The areas with the largest relative share of the total open areas with vegetables in 2021 were the areas occupied by potatoes - 31.1%, followed by those with watermelons - 13.5%, melons - 8.4%, pepper - 8.2%, tomatoes - 6.9%, etc.

The total production of vegetables – harvested in 2021 amounted to 690.1 thousand tons - 5.9% above the level of the previous year. Production from open areas increased by 4% on an annual basis, to 581.6 thousand. tons, and greenhouse production – by 17.2%, to 108.5 thousand tons.

In 2021, the largest production was of potatoes – 195.6 thousand tons, tomatoes – 116.4 thousand tons, watermelons – 107.3 thousand tons, pepper – 61.6 thousand tons and cucumbers – 51.4 thousand tons

Among the more significant crops, a noteworthy increase in the production obtained from open areas was recorded for watermelons by 23%, pepper by 20.6%, melons by 14.6% and onions by 5%, and a decrease – for eggplants by 22.1%, tomatoes by 17.4% and cucumbers by 11.6%. Potato production increased by 1.7% on an annual basis.

Considerations on the dynamics of fruit trees and vegetables area and production

The dynamics of development of Bulgarian agriculture in recent years for different sectors of agriculture has been different – for grain and technical crops it is positive, and for various vegetable production it is negative (Mitova, 2024) [15].

In Bulgaria, the development of the fruit and vegetable market follows the trends in the EU, but at the same time is influenced by a number of other factors, such as the volume of local production and trade with neighbouring countries, including those that are not members of the Union, progressive technologies and the growing demand for direct sales. All this affects consumer demand.

According to Ivanov and Dimitrova (2018) [9], increased incomes in Bulgaria and the world are one of the factors for increasing the demand and consumption of food, and especially food that provides healthy nutrition. This contributes to the growth of the market and direct trade.

The type and quantity of food that is produced and consumed, as well as the amounts of food losses and waste generated, have a significant impact on the sustainable use of natural resources.

A huge economic cost, with a high social and environmental cost, is the loss and waste of food. From an environmental point of view, the loss of food leads to the waste of valuable natural resources. These foods contribute to the generation of a large percentage of greenhouse gas emissions. At the same time, damage is caused to the use, and arable land for the production of agricultural products. (Georgieva and Karavasileva, 2022) [6].

According to Nikolaeva (2022) [18], in order to increase and improve sustainable consumption of agricultural products, their demand and supply must be increased and they must be produced and delivered in a sustainable manner. But for this, it is necessary to coordinate policies and instruments in different areas - health, environment, social policy, regional governance and society as a whole.

For the period from 2022 to 2024, a decrease in the production of fruits and vegetables in the country was observed compared to previous years (Tables 1 and 2). Accordingly, the decrease was by 1.7% and 8.8% compared to 2021. And in 2023, compared to 2022, 19.2% less fruit and 5.6% less vegetables were produced. This trend in the reduction of the volume of fruit and vegetable production is influenced by climatic conditions (untraditionally low temperatures, leading to frosts in areas, heavy rains, prolonged summer droughts), increased production costs, shrinkage of the cropped areas for vegetables, changes in coupled support schemes. This is a prerequisite for the volume of production not to be large.

By the end of the studied period - 2023, on an annual basis, there is a serious decrease in the production amount of peaches, apricots by between 43% and 55%, and cherries, walnuts, pears, sour cherries and apples - by between 14.3% and 24.7%. Among vegetables, the most significant decrease on an annual basis is noted

in the production of potatoes by 30.8%, tomatoes (by 8.5%) and cucumbers (by 1.8%). In the other main types of vegetables, an increase in production is observed compared to 2022, with the largest growth in onions (by 41.9%) and melons (by 37.2%).

The areas for fruit and vegetable production in Bulgaria are largely influenced by targeted support, market realization, the lack of permanent irrigated fields, the lack of an insufficient policy to support producers, the different nature and size of producers, external pressure from large and competitive companies, and the introduction of innovations in production (Mitova, 2024) [15].

Bulgaria's trade with agricultural products

Bulgaria's agricultural trade in 2023 is in the amount of 14,142.2 million euro. This is 5.3% less than in 2022. Exports of agricultural goods are down by 4% compared to 2022, and imports are down by 7%(Table 3). The agricultural sector, which accounts for 15% of the total trade for the year, retains its importance in 2023 in the country's foreign trade. Bulgaria carries out a large part of its agricultural trade with the countries of the European Union.

Table 3. Import and export of fruits in Bulgaria (tons)

	Imports				**Exports**			
	2020	**2021**	**2022**	**2023**	**2020**	**2021**	**2022**	**2023**
Apples	52,933	51,157	60,825	53,782	1,590	269	104	108
Grapes	9,406	9,877	10,051	432	751	961	59	395
Peaches and nectarines	20,959	18,874	23,285	23,145	3,406	3,575	1,689	1,762
Apricots	3,916	2,907	5,618	5,547	453	725	1,570	219
Plums and sloes	1,135	423	2,463	1,231	660	1,290	255	80
Cherries	2,854	3,300	2,026	6,298	844	583	556	3,373
Strawberries	3,363	4,325	4,576	4,556	654	1,090	569	561
Watermelons	35,687	42,067	50,592	43,679	3,875	2,909	22,573	13,825
Other (incl. citrus and bananas)	228,681	253,042	234,478	249,753	39,414	47,999	49,438	49,034
Total fruits	**358,934**	**385,972**	**393,915**	**397,534**	**51,646**	**59,400**	**76,812**	**69,357**

Source: NSI and MAF [17, 14].

Table 4. Import and export of vegetables in Bulgaria (tons)

	Imports				**Exports**			
	2020	**2021**	**2022**	**2023**	**2020**	**2021**	**2022**	**2023**
Potatoes	44,327	46,242	48,010	49,932	25,600	2,557	2,819	1,977
Tomatoes	86,320	99,726	89,880	98,671	9,400	15,775	13,989	17,207
Onions	24,005	22,067	23,099	22,134	441	149	221	712
Cabbage	8,350	9,123	8,259	6,102	2,835	2,665	920	805
Carrots and turnips	17,206	16,300	17,749	17,080	291	263	153	186
Cucumbers	18,977	19,518	21,835	25,554	7,653	6,944	6,017	5,693
Gherkins	9,965	14,950	8,130	4,353	6,009	9,410	4,627	2,284
Pepper	25,999	33,162	26,443	30,193	5,753	6,273	3,967	5,523
Other	37,073	44,286	41,402	42,541	13,318	11,959	5,755	4,857
General vegetables	**272,221**	**305,374**	**284,806**	**296,599**	**48,261**	**55,995**	**38,469**	**39,245**

Source: NSI and MAF [17, 14].

In 2022, according to data from the National Statistical Institute and the Ministry of Agriculture, 393.9 thousand tons of fresh fruit were imported into Bulgaria, which is 2.1% more than in 2021.For the same period, 284.8 thousand tons of fresh vegetables were also imported, or 6.7% less than in 2021 (Table 4).

In 2023, the country imported 0.9% more fresh fruit (397.5 thousand tons) and 4.1% more fresh vegetables (296.6 thousand tons) than in 2022. This shows a significant increase in the import of fresh vegetables. In Bulgaria, the import levels of fruit and vegetables depend mainly on the level of fulfilment of domestic consumption with local production and the size of production (Tables 4 and 5).

The consumer attitudes create favourable conditions for the implementation of the “Farm to fork” strategies’ goals in the country. Bulgarian consumers will welcome the shortening of food supply chains and will choose to consume local products if given the opportunity to do so at competitive prices.

Table 5. Import and export value of fruits and vegetables in Bulgaria (thousand euro)

	Imports				Exports			
	2020	**2021**	**2022**	**2023**	**2020**	**2021**	**2022**	**2023**
Fruit; citrus or melon	228,486	275,166	303,981	353,097	104,476	127,849	168,793	154,242
Vegetables, plants, roots and tubers	191,646	221,165	251,857	299,756	114,674	141,289	166,677	170,197

Source: NSI and MAF [17, 14].

In 2022, the leading imported group of fresh fruits remained the import of citrus fruits and bananas, a total of 48.4% of all fresh fruit imports for the year, 9.3% below the level of the previous year. These products cannot be produced competitively in Bulgaria due to lack of absolute advantages of the country. In this regard the shortening of the supply chain of such products must focus on sourcing them from neighbouring, or closest countries that have those production advantages.

A relatively large share was also represented by the supplies of apples and watermelons, as well as grapes, strawberries, peaches and nectarines, which increased by 1.8% - 23.4% more compared to 2021. The quantities of cherries supplied in 2022 were 38.6% less compared to 2021.

In 2023, the total import of fresh fruits was again formed by citrus fruits and bananas, with supplies being 4.2% more compared to 2022. A relatively large share in imports was occupied by the supplies of apples (13.5%), which decreased by 11.6% (53.8 thousand tons). Imports of strawberries, peaches, apricots, grapes and watermelons are down by between 0.4% and 13.7% year-on-year. Imports of cherries are three times higher than in 2022, and plums are down by up to 50%.

The strongly negative trade balance for fruits and vegetables clearly shows that the local market actors rely broadly on imports and focus exclusively on their economic goals. To achieve its goals, the "Farm to fork" strategy has to create economic incentives for local market actors to promote or require the local production of fruits and vegetables, that the country can produce efficiently. These economic incentives can have a positive implication for the development of Bulgaria's agricultural sector by diversifying it and thus increasing its sustainability in the long term. These necessary changes to the agricultural sector will lead to changes in the modes of production in some areas of the country and the factor requirements for it. As the country has variable land resources, the main productive factor that must be studied in order to use its ability to adjust and comply to the new requirements of the "Farm to fork" strategy's goals is the labour resources.

Labour resources in Bulgaria's agriculture

Labour availability and use of labour resources by the agricultural sector in Bulgaria

The peculiarities of agriculture are associated with a high share of production costs, low wages, different purposes of finished products, seasonality and short shelf life of production, etc. Unlike other industries, the agricultural sector is largely dependent on natural and climatic conditions.

The research period is 16 years, respectively from 2008 to 2023, and it is notable that the number of employed persons in the agricultural sector decreases with each subsequent year, reaching 166.4 thousand in 2023.

This negative trend is evident in the 84 thousand people or 33.75% less employed in agriculture compared to the initial period taken as a base (Table 6).

At the same time, the total number of employed persons in Bulgaria is also decreasing, but by a smaller percentage or 12.76%, which is evidence of the lack of desire and attitude of persons of working age to prefer to work in this sector.

In agriculture, men predominate, who exceed the number of women more than twice.

The number of people employed in the agricultural sector in the period 2008 – 2013 varied in the range of 5 to 7% of the total number of employed persons in Bulgaria, with the lowest value calculated in the last year amounting to 5.68%.

Table 6. Number of employed persons in Bulgaria and in the "Agriculture, Forestry and Fisheries" sector in the period 2008 - 2023

	Number of employed in agriculture			Number of employed in Bulgaria	Share of employed in agriculture, %
	Overall	Male	Female		
2008	251,200	160,000	91,200	3,360,700	7.47
2009	230,700	149,000	81,800	3,253,600	7.09
2010	209,600	134,800	74,700	3,075,300	6.82
2011	201,000	133,800	67,300	2,965,200	6.78
2012	189,000	129,300	59,700	2,934,000	6.44
2013	195,500	133,800	61,700	2,934,900	6.66
2014	208,900	144,900	64,100	2,981,400	7.01
2015	207,900	146,200	61,700	3,031,900	6.86
2016	203,700	143,800	59,900	3,016,800	6.75
2017	221,000	154,400	66,600	3,150,300	7.02
2018	207,400	145,100	62,300	3,152,700	6.58
2019	214,100	149,500	64,600	3,233,100	6.62
2020	205,600	144,100	61,500	3,121,700	6.59
2021	178,100	124,200	53,800	2,877,200	6.19
2022	184,900	127,900	57,000	2,940,600	6.29
2023	166,400	117,100	49,300	2,931,900	5.68

Source: NSI and MAF [17, 14].

Table 7. Average monthly gross salary for the country and for the sector "Agriculture, forestry and fisheries" in the period 2008 - 2023

	Average monthly net salary (BGN)		Difference (BGN)	Ratio of difference (in %)
	Overall, for Bulgaria	in agriculture		
2008	538.33	373.67	164.67	44.07
2009	602.25	442.00	160.25	36.26
2010	645.42	476.08	169.33	35.57
2011	696.83	517.25	179.58	34.72
2012	735.92	582.08	153.83	26.43
2013	774.83	649.92	124.92	19.22
2014	818.33	677.58	140.75	20.77
2015	883.17	711.75	171.42	24.08
2016	944.83	784.75	160.08	20.40
2017	1,041.67	834.75	206.92	24.79
2018	1,130.58	933.58	197.00	21.10
2019	1,261.17	989.42	271.75	27.47
2020	1,374.08	1,005.33	368.75	36.68
2021	1,537.42	1,098.17	439.25	40.00
2022	1,739.17	1,279.92	459.25	35.88
2023	1,990.75	1,435.17	555.58	38.71

Source: NSI and MAF [17, 14].

Table 7 presents the data regarding the average monthly salary by year in agriculture, and again the same negative trend is observed related to the lower income from activities in the sector compared to the remuneration received in the country. The average gross salary in the agricultural sector is lower than the average salary for the country and varies approximately from 19% to 44%, with the highest values recorded at the end of the period. The labour as a production factor has a significant impact on the results of the functioning of the production system.

Maintaining information on the quantitative and qualitative characteristics of labour makes it possible to assess the production potential of this factor, and from there the production capabilities of the entire system.

Labor in agriculture is characterized by low attractiveness as a result of:

- The work performed in the industry is "outdoors" - under the direct influence of natural and climatic conditions.
- The presence of technological interruptions related to the seasonality of production, which implies short-term employment of labour for a partial working year, part-time work and, in particular, work under non-employment legal relationships and oral agreements.
- Weak organization of production caused by the lack of the necessary educational and qualification level.
- High labour intensity associated with insufficient equipment and modern technology in processing agricultural products.
- Low and uneven payment of the workforce in the sector and hence low social and health insurance, most often the minimum social security income and others. Most often, a piecework form of labour payment is applied.

All these characteristics describing Agriculture and the peculiarities of the labour force as the main production factor in the sector are a great challenge not only for entrepreneurs in this area but also for the state.

To overcome the labour resource shortages that are evident form the analysis and increase the number of employed in agriculture required for more labour-intensive fruit and vegetable production economic incentives must be created.

The vast difference between the average salary in the country and in the sector must be overcome to attract more of the local labour resources.

CONCLUSIONS

In Bulgaria, the development of the fruit and vegetable market is in line with trends in the European Union, while at the same time being influenced by several other factors, including the volume of local production, trade with neighbouring countries and the mounting demand for direct sales. These factors have a significant impact on consumer demand.

The consumption of fruit and vegetables in Bulgaria depends on the income of the population, the price levels of products, consumer preferences and cultural and educational qualifications. The increase in the standard of living and income of the population leads to changes in the consumption of fruit and vegetables, as well as in the trade channels.

When analysing labour resources, it is observed that the increase in remuneration from activities related to the agricultural sector is increasing at a much slower pace compared to those of workers in other sectors and in Bulgaria as a whole. It is interesting that the wage in agriculture for 2023 compared to 2008 increased by 284.07%, which is 14.27% more than the increase in remuneration in the country for the same period and amounts to 269.80%.

During the studied period labour resources in agriculture remained with lower remuneration values compared to the average for the country in terms of salary per number of employees, which again proves an unattractiveness in the sector.

Thus, people of working age are not interested and motivated to engage in activities related to agriculture.

An important aspect of the "From Farm to Fork" strategy is the promotion of healthy and sustainable diets.

The transition to plant-based foods and a reduction in the consumption of processed foods and meat not only has an environmental impact but is also a response to growing public health problems, such as diabetes, cardiovascular disease and obesity.

Promoting healthy foods involves both changes in production methods and information campaigns to raise consumer awareness of the importance of food quality.

New economic incentives must be implemented through Union-wide policies to address the labour resource deficiencies identified in the analysis and to increase the workforce in agriculture necessary for more labour-intensive productions. The significant disparity between the national average salary and those within the sector must be mitigated to attract more local labour resources. Additionally, the workforce demands posed by the “Farm to Fork” strategy’s short food supply chains may surpass the availability of local labour, necessitating the consideration of both internal and external migration to meet these requirements.

The significantly negative trade balance for fruits and vegetables for Bulgaria’s agricultural sector underscores the heavy reliance of local market actors on imports, with a predominant focus on economic objectives.

If Bulgaria aims to achieve the goals of the “Farm to Fork” strategy, it is crucial to establish economic incentives that encourage local market participants to prioritize or mandate the domestic production of fruits and vegetables that can be efficiently cultivated within the country. At the current state of resources available for local economic support for such actions, Bulgarian policy makers must rely on larger support from the EU. These incentives however could positively impact the development of Bulgaria’s agricultural sector by diversifying its production base, thereby enhancing long-term sustainability.

The necessary adjustments of the agricultural sector will require modifications in production practices across various regions and alterations in the factors of production.

Given the country's diverse land resources, the key factor that must adapt and meet the new requirements set forth by the “Farm to Fork” strategy is the availability and suitability of labour resources.

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