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COMPETITIVENESS OF BULGARIAN FRUIT PRODUCTION IN THE WORLD MARKET

Desislava TOTEVA, Atanaska DZHODZOVA

Institute of Agricultural Economics, Agricultural Academy, Tzarigradsko shosse № 125, Bl.1, Sofia 1113, Bulgaria, E-mails: dtoteva@iae-bg.com, atanaska7@hotmail.com

Corresponding author: dtoteva@iae-bg.com

Abstract

The purpose of the present study is to determine the competitiveness of the fruits sector in the world market after the accession of Bulgaria to the European Union, what is the state of fruits production, what are the challenges facing the sector and the opportunities for the development of the sector in the future. The development of the sector is determined by the demand of fruits on the world market and the traditional demand of local fruits on the national market. The novelty in this study is that the competitiveness in a static aspect is determined by the ability of agriculture in Bulgaria to expand its market share and preserve and increase the added value of production on a national and global scale. In this way, a comprehensive assessment of competitiveness is made of the fruits sector, combining both the production side and the value side. The data regard the period 2007-2022 and they have been collected from Bulgarian Ministry of Agriculture – Agro statistics, International Trade Center, FAOSTAT and National Statistical Institute of Bulgaria. In order to reveal the share of local fruits production in domestic and world consumption and the change in the gross value of Bulgarian production on a national and global scale, per capita in the article is used the total index of competitiveness. In this case, the assessment of competitiveness is expressed as a quantitative value and an index, taking into account the development of the sector through selected main fruit species, which occupy a dominant share not only in production, but also in the consumption of the population. In most years of the analysed period, the production component of competitiveness exceeded the value component, which is important from the point of view of making the country's market positions more sustainable. When the value component of competitiveness exceeds the production one, it means that the country achieves higher export prices of the production, which in a highly competitive market such as the agricultural one, can hardly be sustained in the long term. The expected variability of the environment in which fruit growing in Bulgaria will function under the changed conditions of the agrarian policy creates uncertainty among producers. In this aspect, the application of the general index of competitiveness is a means to develop and define appropriate policies and decisions applicable in the coming years.

Key words**:** *fruit, competitiveness, total index of competitiveness, Bulgaria*

INTRODUCTION

Competitiveness is a widely debated topic. There is still no generally accepted definition of competitiveness. The reason for this may be due to the different level of consideration of competitiveness – economy, sector or firm level. Historically, have different approaches to the study of competitiveness. A. Smith [18] examined her from the point of view of specialization and the absolute advantages of the countries. A. Smith proved that in a market economy, the needs of consumers can be satisfied and the resources in society can be used most efficiently [18]. D. Ricardo [17] studied competitiveness by supplementing it with the theory of the effect of comparative advantages and differences in the technologies of production of goods. In an OECD study of approaches to measuring competitiveness and efficiency in agricultural production, L. Lattrufe [11] notes that there is no generally accepted definition of competitiveness in economic theory, and that it can be defined as the ability to be successful when faced with competition. Bris and Caballero present their own holistic approach to the study of competitiveness by listing a further thirteen different definitions of competitiveness [1]. According to M. Porter's theory [16], a competitive advantage exists when the enterprise provides the same benefits to consumers as other firms, but at a lower price (price leadership) or when the utility of the company's product is greater than that of competing products (product differentiation).

From the review of the scientific literature on international competitiveness, it can be said that it is measured as the competitiveness achieved by individual nations. National competitiveness is seen as a synthetic indicator, uniting product, company and industry competitiveness. In the risky sectors of agriculture, such as fruit production, climatic conditions are of great importance due to the strong dependence from they. A significant role is also played by the country's agrarian policy. In this regard, the detailed analysis of the level of competitiveness and the competitive potential of the sub-sectors and sectors of agricultural production would give an opportunity to adequately determine the set goals and priorities of state agrarian policy.

In the their article, Slovak scientists pay attention to the competitiveness of Slovak fruits within the EU by highlighting and focusing (with the availability of production skills and traditions in fruit growing in Slovakia) on the crucial importance of building modern irrigation systems and introducing new sustainable varieties fruits [15]. Economic analysis of Slovak fruit production is based on yield per hectare, production systems, costs and performance targets. The total production of selected fruit species is analyzed in detail, and average yields are compared with those of EU producers. The analysis of the real costs for each type of fruit is done in order to find the most cost-effective fruit [15] .

.In another study, Chinese scientists also analyzed the competitiveness of Chinese fruit products and its stability (for the period 2000-2016) by means of the Revealed Asymmetric Comparative Advantage (RSCA) Index [19].

Their results show that, for most fruit products, the competitiveness of the world market is greatly reduced, and that the level of comparative advantage of fruit products is far from the level at the beginning of the period. The competitiveness and overall comparative advantage of fruit products in China is gradually declining [19].

The overview of the presented research activity on the problems of the competitiveness of agricultural production in Bulgaria forms the opinion that there is a lack of a unified formulation regarding the essence of the concept. Most often, the competitiveness of agriculture and its sub-sectors is associated with the ability to maintain and expand the market share of the sector on the domestic and international market, based on the supply of goods at prices and with a quality better than those of other competitors, at the smallest opportunity costs to restore the value of the used resources [8]. As an economic activity, the development of which takes place in conditions of imperfect competition, agriculture is subject to a number of state interventions. The successful integration of political and economic priorities in the sector should be carried out against the background of the complex assessment of competitive positions, competitive potential and determinants of competitiveness in individual subsectors [8].

The evaluation of competitiveness in fruit growing in Bulgaria was made by the Institute of Agrarian Economics - Sofia, by calculating the competitiveness index of selected types of fruit, accepted as a reference group for the period 2007-2017 [9].

Unsatisfactory levels of competitiveness were found for the majority of fruits, including in the case of apples and pears (due to the significant lag behind the Bulgarian production of these fruits per head of the population compared to the world, lower sales prices, and hence lower added value) and a higher competitiveness in the rest, especially in the case of cherries, in which a higher market share in the world market stands out. Good levels and increasing competitiveness have been established for apricots and especially for peaches, whose competitiveness is defined as comparable to the average world levels [9].

In this context, the purpose of this research is to analyse the state of fruit sector in Bulgaria after its accession to the EU and to assess the competitiveness of the country in the international market emphasizing the challenges the sector is facing and the opportunities for its development in the future.

The paper is structured into two parts:

Part 1- The status of the Bulgaria fruit sector
Part 2- The calculation and interpretation of the competitiveness index.
Finally, the corresponding conclusions were drawn and important recommendations have been made for the future development of Bulgarian fruit sector.

MATERIALS AND METHODS

To conduct this research, the data were collected from FAOSTAT [3], Eurostat database [2], Agro statistics of the Ministry of Agriculture and Food of Bulgaria [12], as well as from the National Statistical Institute of Bulgaria [13] for the period 2007- 2022.
For analysing the status of Bulgaria's fruit sector ***in Part 1***, the following main indicators have been studied:
-The share of fruit production in crop output and agricultural production;
-The gross value added and its dynamics;
- The structure of agricultural gross output;
- Harvested areas in fruits sector;
- Fruit production value at producer's price;
- Fruits consumption.
- Share of apples and southern fruits in the total consumption of fruits.
The used methodology included:
- Dynamic analysis of the main indicators to identify the trends;
- Structural indices;
- Graphical representations;
- Comparison method to evaluate the changes in 2022 versus 2007.
For Part 2, it was determined the competitiveness in the fruit sector using the competitiveness index.
Competitiveness in a static aspect is determined by the ability of a specific production in Bulgaria to preserve and expand its local and market share and to maintain and increase the added value of its production on a national and global scale. Through this concept, through the analysis, an attempt is made to make a comprehensive assessment of the competitiveness of fruit growing by combining the production and value sides. If the market presence expresses the quantitative performance on the domestic and international markets, then the gross value of the output expresses the performance with the achieved economic results.
Based on this definition, a competitiveness index of fruit growing was compiled. A possible method for studying competitiveness was developed by [5] and tested by [7]. Competitiveness is equated per capita. The introduction of the per capita criterion enables a relative comparability, both to account for individual market sizes and to take into account resource security. Comparisons are made based on per person basis, taking into account the levels that exist in the markets where competitiveness is considered.
The **PICdc** component reveals the share of domestic production of the respective product in domestic and world consumption. This component has two variants depending on whether the country's level of self-sufficiency is secured or the country is non-self-sufficient. In case the country is self-sufficient for the particular product, then the formula for calculating **PICdc** is:

$$PICdc = \frac{MPbg}{\mathbf{MCbg+MCwr+MEbg}} \text{.....(1)},$$

where:
MPbg – Bulgarian production of the specific product per person of population, expressed in quantity;
MCbg – local consumption of a specific product per capita;
MCwr – consumption of a product in the world per capita, in quantity;
MEbg – exportation of a product in quantity.
When the country is fully self-sufficient, then production is higher than consumption and the difference between production and consumption is destined for export. The exported quantities must be included in the denominator to preserve the property of the production component of the competitiveness index **PICdc** to be in the range from 0 to 1, because otherwise this would not be possible.
In the second variant **PICdc** has the expression:

$$PICdc = \frac{\mathbf{MPbg}}{\mathbf{MCbg+MCwr}} \text{.....(2)}$$

The denominator of the equation is without **MEbg** – export of the relevant product from

Bulgaria because in cases where consumption is higher than production, the denominator will always be greater than the numerator and the coefficient will be in the specified range from 0 to 1. In these cases, the calculation of **MEbg**is:

$$MEbg = MPbg - MCbg \quad \text{..... (3)}$$

This applies when self-sufficiency is at levels where production exceeds domestic consumption and surpluses are destined for export, with export quantities obtained by formula (3).

The consumption of the product, which is the object of competitiveness measurement, is calculated per person of the population, and the aim is to see what share forms the value of the production of Bulgarian sector within the world production. The range of this index component is from 0 to 1. In theory, the index takes a value of 0 whenever there is a lack of domestic production. A value of 1 can be reached when national production is the only one in the world.

When the value of the Bulgarian and world production is equal, the index takes a value of 0.5. In formula (1), the importation of the specific product was omitted and exportations have been included in the denominator to account for the possibility of re-exports. When calculating the indicators related to world production and consumption, the Bulgarian presence in volumes must be taken into account. This is done by subtracting Bulgarian production **(MPbg)** from the world production of the product or good, and related to consumption, the world production, excluding the part of local production, is divided by the number of the world population, which does not include the population of Bulgaria. The **VICdc** component represents the change in the gross value of Bulgarian production in the studied sector, and is expressed by the equation:

$$VICdc = \frac{\mathbf{MVbg}}{\mathbf{MVbg+MVwr}} \quad \text{.....(4)}$$

where:

MVbg - is the gross value of production in the national sector, per capita, and **MVwr** is the gross value of production of the corresponding production in the world, per capita.

In formula (4), the greater is the difference between the gross value of domestic production and its value in world production, the greater than 0.5 is the value of **VICdc.** The calculation is based on the export prices of the products in Bulgaria and the world, which reflects not only the production, but also the added value along the value chain. The composite index of competitiveness is calculated according to formula (5).

In our opinion, market share and value added are equally important in their presentation, therefore, the components are equally weighted:

$$VICdc = \frac{\mathbf{PICdc+VICdc}}{\mathbf{2}} \quad \text{.....(5)}$$

It can take values in the range from 0 to 1. In theory, it takes a value of 0 when the country in question has no such production, and a value close to 1, theoretically whenever the world market is dominated by the country under study [5, 6].

RESULTS AND DISCUSSIONS

Part 1. The status of fruit sector in Bulgaria in the period 2007-2022

Bulgarian fruit growing takes its place in the country's economy as a sub-sector from the agricultural sector. Despite the fact that Bulgaria traditionally has extremely favorable conditions for the development of a large number of fruit species, after the accession of the country into the EU, a sharp drop in the share is observed, both in crop production and in the agricultural sectoras a whole (Fig. 1) in order to beamong other sectors of Bulgarian agriculture, into the group of the so-called vulnerable sectors.

In Fig. 1. the dynamics in the share of total production from fruit growing to that from crop production and agriculture of the country after the accession to the EU are depicted.

A downward trend can be outlined in both indicators from 2007 to 2014. Thus, from 13.8%, the share of fruit plantations from the total crop growing has reached 4.6%, and

similarly, as a share of agriculture has decreased from 7.1% to 3.1%. In the next few years until 2020, the trend has changed and the maximum for the remaining period has been reached in 2017, with the share of fruit growing from plant growing and from agriculture being 7% and 4.9%, respectively. In the last two years of the analyzed period, the lowest values were reported, and especially in 2022, namely 4% and 3.1%. All these dynamic changes in most cases negative for the sector, were observed against the background of the structural changes taking place between the two subsectors of crop growing and livestock growing [14].

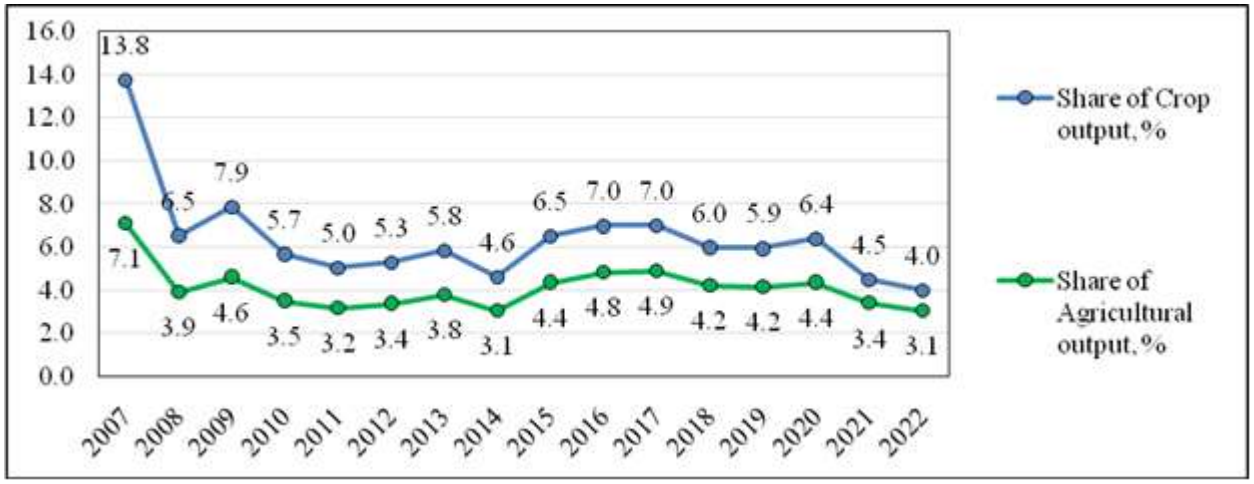

Fig. 1. Dynamics in the share Fruit output of Crop output and Agricultural output, %
Source: Eurostat and own calculations [2].

The significant changes that took place in the production structure of the agricultural sector from 2007 to the end of the period - 2022 are reflected in Fig. 2. The state of the gross output and of the gross added value in agriculture are a direct function of the production structure (Fig. 2), which in the considered period has significantly changed, the share of crop production has noticeably increased at the expense of animal production. In 2022 the crop growing forms almost 76.8% of GVA (thanks to the strong and progressive development of cereals and essential oil crops) in agriculture, and livestock production about 18.5%, the remaining 4.7% is created by the services in agriculture. Thus, sectors where the land is a direct productive force receive a greater incentive for development thanks to the subsidy policy implemented in the country, the support being based on area.

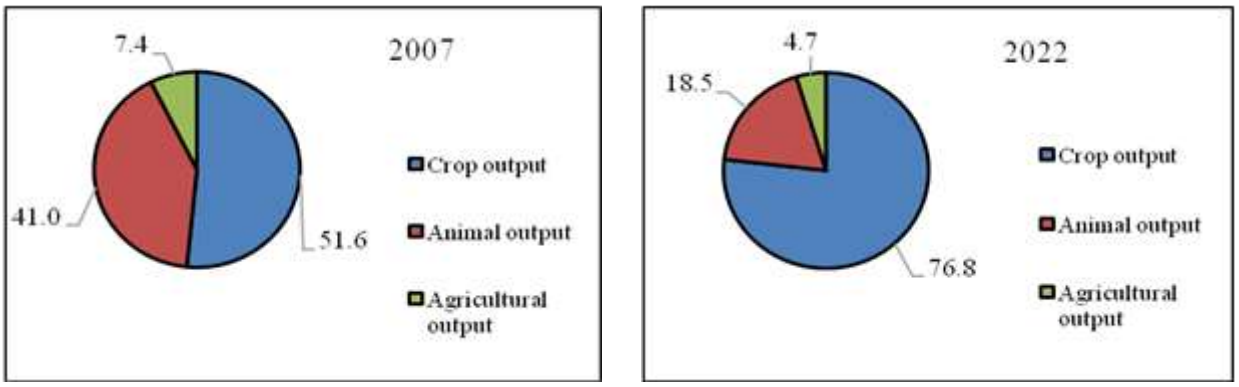

Fig. 2. Production structure of the gross output of agriculture, 2007 and 2022, %
Source: Eurostat and own calculations [2].

As for the impact of direct payments on area in fruit growing and especially as a share in the production value (Fig. 3), the impact of this support is not significant [10], since it cannot be assumed that that these payments affect the production cost. The main reason

for this is the high production costs, reported on the technological map for the cultivation of the respective crop.

With one of the most labor-intensive fruit types, such as the apple, it is not serious to think that with a 5-6% share of subsidies from all production costs, a significant impact of this form of support could be expected. The picture is similar for the other structure-determining crops in Bulgaria. The lowest level of support is for peaches, apples, etc. [8].

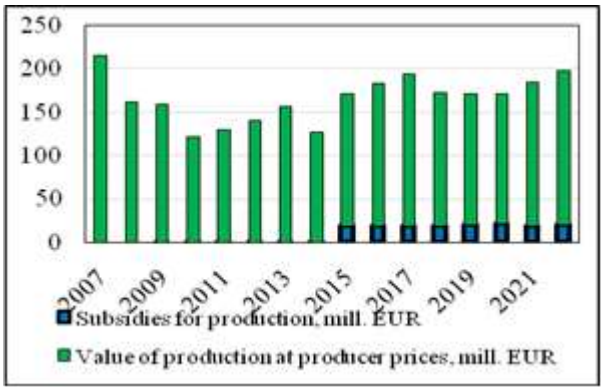

Fig. 3. Value of production from fruit growing at base prices (mill. EUR)
Source: Own design based on EUROSTAT data [2].

In terms of quantitative volumes, the total production of fruits in the country until the middle of the analyzed period shows significant fluctuations, which in the second half of the period, with the exception of 2020, maintain constant levels of total output, as for 2019 it amounts to at 234.6 thousand tons, and at the end of the period, respectively 222.2 thousand tons (Fig. 4).

It can be noted that the interest in fruit growing has gradually awakened in recent years, new plantations, as well as because of the aspiration to plant new fruit trees, (e.g. in 2022 the share of young plantations for plums was 12.5%, for peaches and nectarines - 10.2%, while for the apples it was 5.3%, and the same share was for apricots), part of the farms planning to diversify their activities. For the entire period, the areas increased more than 1.5 times, and the production more than 2 times (Fig. 4).

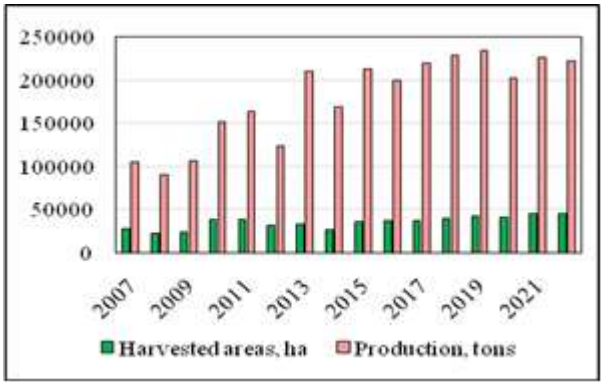

Fig. 4. Dynamics of harvested areas and production of fruit species in general for the country
Source: Own design based on the data from Ministry of Agriculture, Agro statistics, „Fruit production in Bulgaria“, 2008-2022 [12].

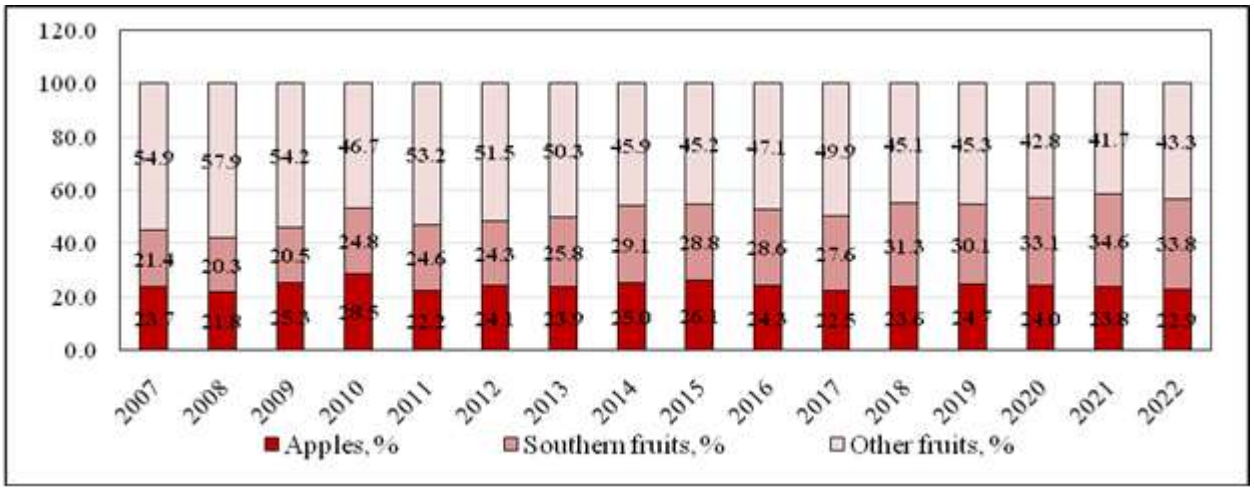

Fig. 5. Share of apples and southern fruits in the total fruit consumption on average per person from a household, %
Source: Own design based on the data from NSI, Household consumption of foodstuffs on average per person in households, 2007-2022 [13].

The dynamics of consumption of fresh and frozen fruit on average per person is shown in Fig. 5, from which it is clear that a significant part of the consumption per person is

represented by southern fruits, and this consumption significantly increased as a share of the total fruit consumption from 21.4% in 2007 to 33.8% at the end of the period.

Part 2. The competitiveness of Bulgaria's fruit sector

The purpose of the analysis is to assess the competitiveness of the fruit sector in the country compared to its development in a global aspect. This assessment will determine both dynamically and in comparatively, the development of the production of fruit crops in the country compared to the trends in the world. In this case, competitiveness is understood as a result from production in value terms. The assessment of competitiveness can be expressed as a quantitative value and as an index, taking into account the development of the sector through selected main fruit species, which occupy a dominant share not only in production, but also in the consumption of the population.

The expected variability of the environment in which fruit growing in Bulgaria will function under the changing conditions of the agrarian policy creates uncertainty among producers. In this aspect, the application of the general index of competitiveness is a means to develop and define appropriate policies and decisions applicable in the coming years.

The application of the mentioned method for establishing competitiveness, developed by [6] makes it possible to calculate the competitiveness levels of Bulgarian fruit growing.

The indicators used for the calculations are the local and world production, as well as the local and world consumption of the main fruit crops selected in this case, which represent 92% of the produced quantities of fruit in Bulgaria in 2022, namely: apples, cherries, sour cherries, peaches, nectarines and plums. Due to the particularly large share of the preference and consumption of southern fruits by the population in the country (as shown in Fig. 5), the group of citrus fruits such as oranges, limes and lemons is also included in the study.

For commensurability and comparability in calculations, competitiveness is equated to per cap. The introduction of the per cap. criterion enables relative comparability, both to take into account individual market sizes and to take into account resource availability [13].

Changes in the number of the population have a significant impact on agricultural production, both through food consumption and as one of the factors of production - labor force. The country's population is constantly decreasing, and between 2007-2021 - by 9.4% and in 2021 it is estimated at about 6.84 million people, while the world population is constantly growing and in 2021
it reaches 7.9 billion people, and the increase compared to 2007 is 17.6% (Fig. 6).

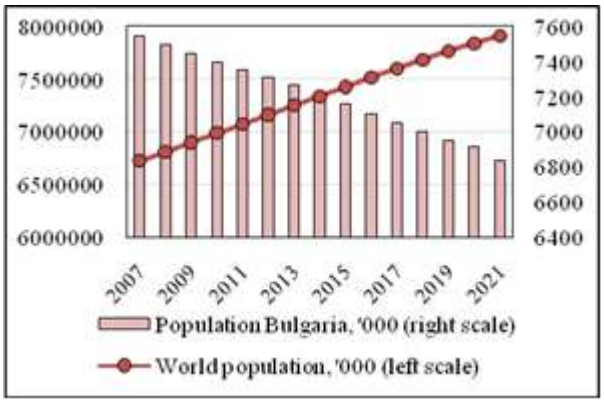

Fig. 6. Population dynamics in Bulgaria compared to the evolution of the world population (Thousand of people)

Source: Own design based on the data from FAOSTAT (2007-2021) [3].

The competitiveness index for fruit crops shows close values between the product and value components for 2009 and 2019 (Fig. 7). In the remaining years of the period, the production component is always of a greater value than the value component, which indicates lower prices of domestic production compared to the world one. With the exception of 2008, which is among the worst years in terms of production and yields for fruit crops in Bulgaria (IC - 0.28), in the remaining years of the analyzed period, the composite index (IC), which represents an arithmetic average between the two component, ranges between 0.30-0.49. According to the adopted methodology and criteria for interpreting the results of this index, in cases where the index is 0.30, this is an indicator of weak market positions on the global market, since according to the applied

methodology [6] index values falling between 0.21-0.45 – competitiveness is low, the country is not only not a factor, but is also at a level lower than the average for the compared community. With the maximum value of the index for the analyzed period in this case - 0.49, according to the same methodology [6], values of the index within the range of 0.44-0.55 indicate an average level of competitiveness, giving equal positions with world levels of production and prices, as well as a competitiveness of the country, comparable to other competitors on the relevant market.

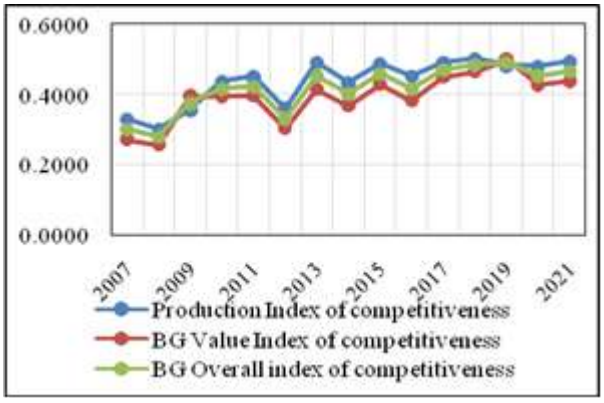

Fig. 7. Index of competitiveness of fruit in Bulgaria and the World
Source: Own calculations based on the data from FAO, NSI, ITC [3, 13, 4].

It is impressive that higher values and a relatively positive trend of the competitiveness index were reported after 2016 – from 0.45-0.49. This is largely due to the gradual recovery of production, which, thanks to coupled support and access to funding for the construction of new orchards, improves its competitive positions [6]. For some fruits, such as cherries, where the country has comparative advantages and production specialization, the competitiveness is high, which leads to production realization at good prices and to formation of good added value. In others, such as apples (which account for 23-25% of per capita fruit consumption by households), the country is at a low competitiveness level, where its presence in world markets is between the net importers and has lower indicators regarding the formation of the added value than the average world levels [6].

Discussions

The purpose of the current analysis is to establish the place of Bulgarian fruit production in the world fruit market, to trace the dynamic changes that have their impact on competitiveness in the years after its EU accession. The calculation of the levels of competitiveness in the fruit sector is carried out on the basis of data on national and global production, import and export, as well as on the per capita consumption of selected fruits.

According to the Ministry of Agriculture, in 2022 the production of fruit crops in the country was 222.2 thousand tons, which is nearly 2% less than in 2021 [12]. In this case, the largest quantities were produced from plums - 56.6 thousand tons, followed by cherries - 53.9 thousand tons.

In a comparative plan, the production of the selected fruits for the country and the world during the analyzed period according to [3] shows the following trends: growth in the production of the selected fruits, both in quantitative and value terms, as in the quantitative volumes for the country, the production has increased more than 2 times (which is mainly due to plums, cherries and sour cherries), while the world production has increased by 29% (due mostly to apples) (Fig. 8).

At the same time, the value of the production in Bulgaria has increased by 133.1%, and that of the world production value - by 51.8%.

Regarding the dynamics of production prices in Bulgarian production, although they increased at the end of the period, for all of the selected fruits except apples, they were significantly lower than the world ones, where an increase was also observed, with the exception of those from peaches and nectarines.

But comparing the production prices of Bulgarian fruits with those of the world in the last two years of the period, they are several times lower: for apples, cherries and sour cherries more than 2 times, for peaches and nectarines about 1.5 times and for plums - almost 4 times lower.

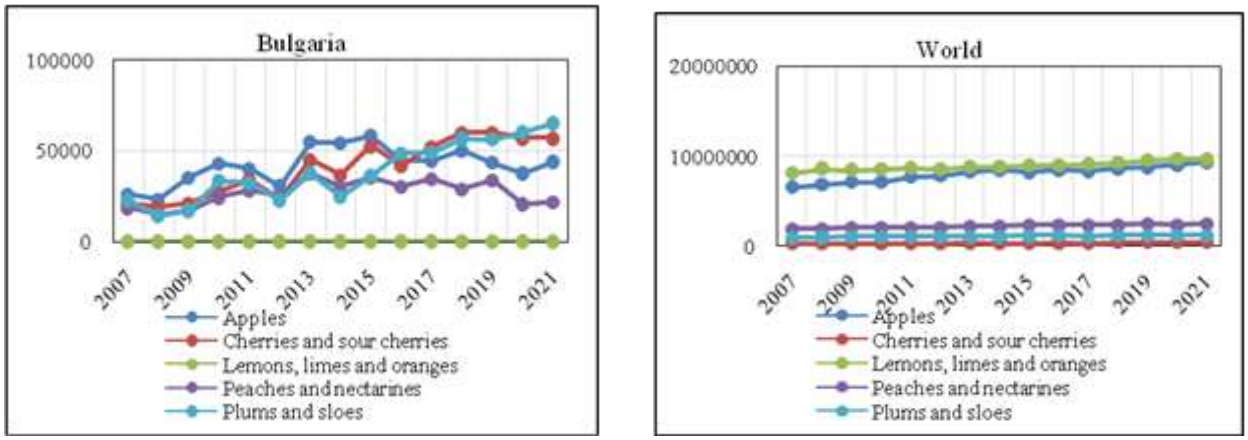

Fig. 8. Dynamics in the production of selected fruits (in relation to the applied methodology) in Bulgaria and the World (tons)
Source: Own design based on the data from FAOSTAT [3].

The average yields in the country and in the world show growth for all fruits, with the exception of apricots, which retain constant values in the world production and thus, in terms of average yields, the Bulgarian production is equal whit worlds. But what makes an extremely strong impression is that for all fruits, with the exception of plums, the country's average yields at the end of the period are below the level of the world's average yields in 2007 (Fig. 9).

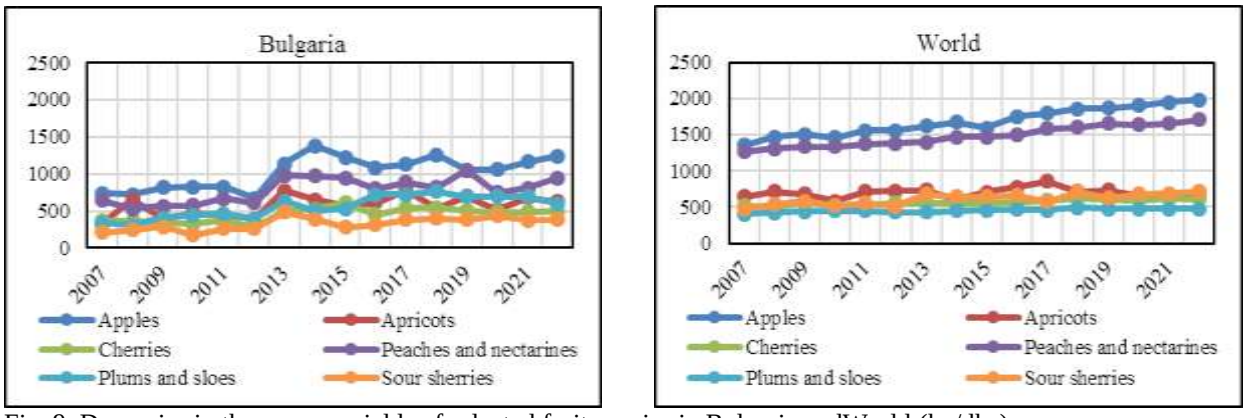

Fig. 9. Dynamics in the average yields of selected fruit species in Bulgaria andWorld (kg/dka)
Source: Own design based on FAOSTAT data [3].

In addition, the growth rate of average yields for Bulgarian fruits is much lower compared to the same ones in the world.

The reasons for these results are many, but at their core is the low productivity of the orchards and the poor condition of some of the plantations, along with a destroyed hydro-amelioration system leading to a strong dependence of Bulgarian fruit production on climatic factors and to unsustainable production through the years.

This put in the foreground the problem of irrigation and the almost destroyed irrigation system in the country.

The strong dependence of the manufactured product on the specific weather conditions brings to a great extent dependence and uncertainty among the producers.

In Fig. 10, it is reflected the average annual production of selected fruits in Bulgaria and the world but per person of the populationfor comparability to highlight the trends more clearly.

Bulgaria has better indicators than the average level for the world regarding the production of cherries and sour cherries, peaches and nectarines and especially plums as production in Bulgaria in 2021 is 9.5 kg/capita, but in the world this indicator is only 1.5 kg.

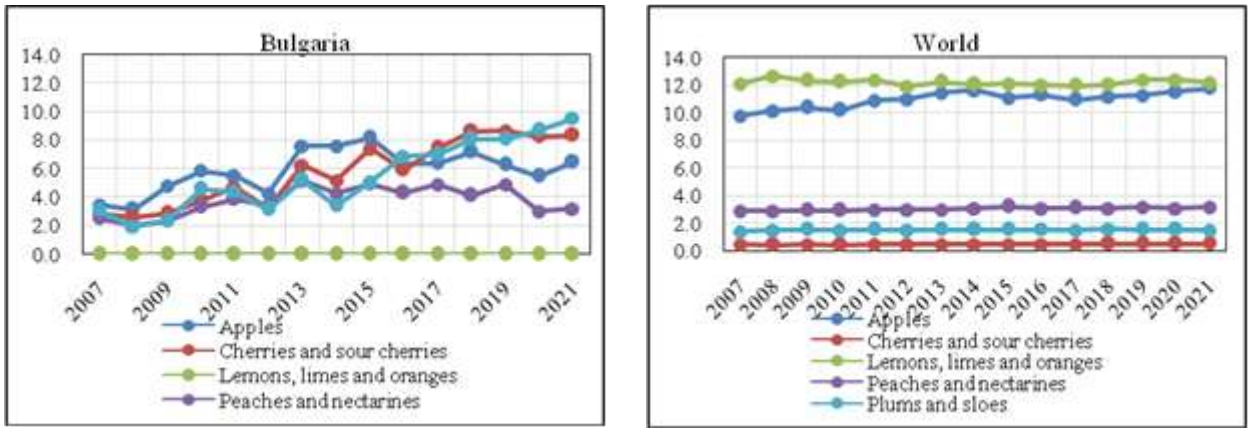

Fig. 10. Average annual production of selected fruit species per capita in Bulgaria and World (kg/capita)
Source: Own design based on FAOSTAT data [3].

The production of apples per capita in Bulgaria through 2021 is 6.4 kg which is significantly below the world average - 11.8 kg, and consumption per capita in the same year is 13.9, which is mainly from import (Fig. 11).

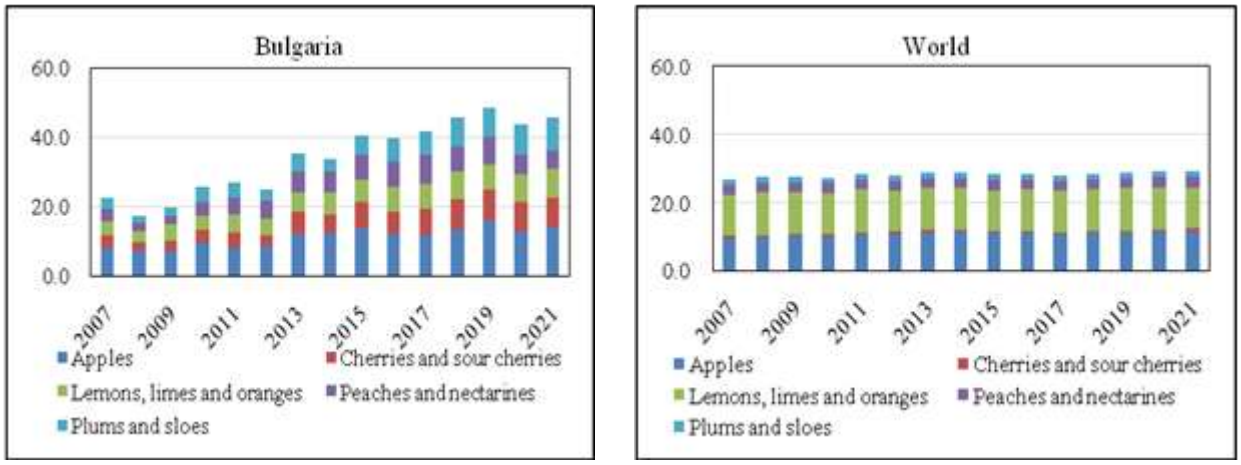

Fig. 11. Dynamics of the consumption of selected fruit species per capita in Bulgaria and World (kg)
Source: Own design based on FAOSTAT data [3].

Bulgaria is entirely a net importer of the citrus included in the study due to the lack of own production of these fruits. At the world output level, this indicator is the largest per person, followed by apples.

The listed citrus account for about 18% of the selected fruits average consumed per person per year in Bulgaria and this has the impact on the competitiveness of our fruit production.

Evaluation of the competitiveness of fruit sector in the country compared to development of the sector in the world depends on the quantity of the produced and exported products and its value is determined accordingly by the production and export prices of the products.

In Fig. 12, the main components are shown and compared which are important according to the applied methodology for establishing the level of competitiveness through the value component assuming that the greater is this value, the better the competitiveness result is.

The larger exported quantities per capita and the higher export prices are a prerequisite for reaching higher levels of competitiveness of the respective product.

Diminishing returns due to problems with productivity, finding the best prices, accessing the market and providing the production process with the necessary labour leads to an unsatisfactory ratio between gross incomes and production costs which makes specialized fruit production unattractive.

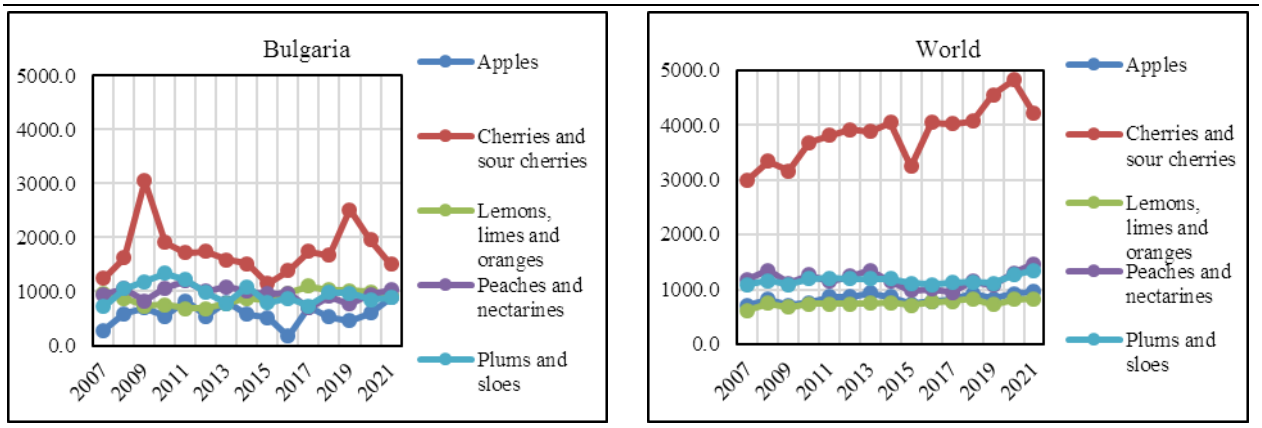

Fig. 12. Dynamics in export prices of selected fruit species for Bulgaria and World ($/ton)
Source: Own design based on FAOSTAT data [3].

The interest in recent years is to the possibilities of tied support as well as the access to use of investment funds under the Rural Development Program which should be aimed to increasing the result of these measures so as to increase the sustainability from the applied policy.

CONCLUSIONS

By researching the competitiveness of the fruit sector, the production and value growth of the market is established and what are the possibilities, ways and means for its improvement in relation to the scale determined by the methodology.

This is the starting point from which to start and to go in a direction of identifying and searching for the reasons and factors that determine this result.

Investigating the competitiveness of the fruit sector is establishing the production and value growth of the market and what are the possibilities, ways and means for its improvement in relation to the scale determined by the methodology. It is important in this case, which is also one of the advantages of the methodology, that the obtained competitiveness index be locked in the scale from 0 to 1.

Better levels of competitiveness can be achieved through higher quality production, and from there higher prices and, accordingly, better sales conditions, both on the domestic and foreign markets. This would also lead to a reduction of market risks for producers, which would be less possible when reaching higher levels of competitiveness.

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