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PREFERENCES OF POLISH CONSUMERS IN FRUIT CONSUMPTION AS A FACTOR IN THE ORGANIZATION OF THE MARKET FOR THESE PRODUCTS

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Purpose: The purpose of the survey was to assess consumer demand for fruit, as well as to evaluate the factors influencing that demand.
Methodology: In the study, as a background for the study of consumer preferences, the results of macroeconomic analyses were presented on changes in the consumption of fresh as well as processed fruits, broken down by their individual categories, in Poland over the years 2015-2022, by Central Statistical Office.The main part of the paper consists of analyses of primary data from surveys conducted using the CAWI method, on a group of 255 respondents, throughout Poland, in 2023. Analyses were performed using Statgraphics plus 4.1. Due to the lack of normal distribution and unequal groups, the significance of differences was tested using non-parametric Mann-Whitney U statistical tests for two grouping variables and Kruskal-Wallis ANOVA test for questions where there were more than three grouping variables. A significance level of $\alpha = 0.05$ was used in the analyses.
Findings: In the last years, Poles began to appreciate fruits health-promoting properties more. In addition, as a result of changes in consumer preferences and tastes, looking for more and more new flavors and preferring healthy lifestyles, it is difficult to expect a significant decline in the consumption of fruits in general, even with an increase in their prices, which, in the context of the current organization of the market, is a positive development.
Originality/value: The article shows current trends in fruit consumption in Poland. It also presents guidelines for further organization of the fruit market, as well as policies for shaping correct attitudes about fruit consumption.
Keywords: fruit, consumer preferences, consumption.
Category of the paper: research paper.

1. Introduction

Fruit production plays an important role in Polish agriculture. With its volume at 5.4 million tons in 2022, our country is among the largest producers of this assortment in the European Union. Also noteworthy is the fact that with apple production at 3-4 million tons, Poland is the largest producer of apples in the European Union, and the third largest producer in the world, just behind China and the US (FAO, 2024). Similar results are achieved in the production of raspberries, cherries, currants and blueberries, although their volume is much lower than apples, establishing our country as a significant producer on world markets. It should be added that the production of this assortment has a major impact on the food market, and thus on the formation of prices and demand for fruit.

Despite such a large scale in the production of many fruits, however, household surveys published by the Central Statistical Office show that the consumption of fruits in Poland, especially fresh ones, has been at a low level for many years, and is further declining, especially domestic ones. Taking into account the still lower level of consumption of fruits, but also vegetables in Poland in relation to the recommendations of the World Health Organization (WHO), it therefore becomes important to study the reasons for this decline, in order to create the basis for proper organization of the market, but also for the promotion of their consumption which aims to increase consumer interest in these products. Therefore, based on macroeconomic analysis and survey research, the purpose of the study was to assess the demand for fruits among consumers. Identification of factors influencing consumers' purchase preferences was carried out, such as frequency of purchase and consumption, choice of place of purchase, factors influencing purchase decisions, level of spending on fruits and vegetables and changes in consumption with respect to the previous year, among others. Changes in fruit consumption in Poland based on data from the Central Statistical Office (CSO) were shown as a background to the study.The literature shows that consumption and consumer behavior are determined by a number of factors, both consumer-dependent and environment-related. Internal factors include disposable income, owned assets and savings, labor force participation, as well as the previous level and structure of consumption. External factors, on the other hand, include the country's socio-economic situation and the influence of the international environment (Sobczyk, 2018). Hence, it should be added that the events that were observed in part during the years under analysis, such as the Sars-Cov 2 virus pandemic and the outbreak of armed conflict in Ukraine, had a huge economic impact. In addition, the increase in prices of goods and services, entailed an increase in inflation from 3.2% in 2021 to 17.5% in 2022 (Żurek, 2023). Problems with product availability also became apparent, all of which could affect consumers' purchasing decisions.

2. Factors shaping demand and the role of fruits and vegetables in the human diet

Food supply and demand are the main factors that affect the operation of the market mechanism, with prices playing an important role in the formation of these two factors. Price is a fundamental element of any offer and is a key factor that influences consumers' purchasing decisions. Its importance and the ability to effectively manage this marketing tool becomes increasingly important, especially in crisis situations (Waniowski, 2021). This was evident in 2021, when, as a result of the pandemic and warfare in Ukraine, the rise in food prices contributed to a sharp increase in inflation, although according to a survey conducted by Sekścińska (2022) on a group of consumers aged 18-81, it appears that inflation contributed very little to the reduction in food spending in Poland. Nearly half of those surveyed have not changed their eating habits. In contrast, only 1% of respondents have definitely reduced their food spending.

Fruits as well as vegetables are the foundation of the Food Pyramid, which emphasizes their key role in the human diet. Health organizations recommend diets based on their regular consumption (Bieniek-Majka, 2022). Many scientific studies point to the effects of a shortage of fruits and vegetables in the diet and the increasing incidence of chronic non-communicable diseases. According to the WHO, malignant tumors are the most common cause of death worldwide, causing more than 8 million deaths annually. Dietary factors are estimated to be responsible for about 30% of cancer cases in industrialized countries. An adequate diet is the second most important factor, after avoiding smoking, in reducing cancer risk. Regular physical activity, combined with a balanced diet based mainly on fruits and vegetables, is crucial for the optimal development and health of children and adolescents. Fruits and vegetables provide a variety of nutrients, such as vitamin C, pro-vitamin A, zinc, selenium and potassium, which play an important role in neutralizing free radicals in the body. In addition, the method of preparation and heat treatment affect the mineral and nutrient content of these products (Oleśków, 2017; Doniec et al., 2020). One of the key factors influencing the consumption of fruits and vegetables is their quality. The quality of food products is most often defined by their characteristics. According to one of the most well-known and frequently quoted definitions, food quality includes the degree of health safety, sensory appeal and availability from the perspective of the consumer and society, taking into account the constraints of raw materials, technology and price provided for these products (Kijowski, Sikora, 2003). According to the recommendations of the World Health Organization (WHO), daily consumption of an adequate amount of fruits and vegetables is an essential part of a healthy diet. According to the latest WHO position for adults, it is recommended to consume about 400 g of fruits and vegetables in five servings per day (Devirgiliis et al., 2024). According to Eurostat (2019), it appears that one in three EU citizens do not consume any fruits and vegetables during the day. Research by

Freshfel Europe (2021), as well as Goryńska-Goldmann (2024), shows that in 2021, the daily consumption of fruits and vegetables in EU countries was 365 grams per person. Which indicated that the level of fruit and vegetable consumption in all EU-27 countries, however, corresponded to WHO dietary recommendations. Moreover, according to the data, Poles were the few who met the WHO recommendations. It should be added that the above study was carried out on the basis of FAO balance sheet data, which differ significantly from the data from the CSO's survey of household budgets. Thus, in Poland, the average annual consumption of fruits and vegetables in 2019-2021 per capita according to the balance sheet data was 180.9 kg (Goryńska-Goldmann, 2024), while the survey of household budgets shows that the Polish consumer on average annually consumes a total of 102.3 kg of fruits and in vegetables (own calculations based on CSO, 2023). The amount of fruit and vegetable consumption depends on gender. Women were more likely than men to declare that they eat fruit at least once a day. Women consume more fruits and vegetables than men, which may be related to greater knowledge about healthy eating. Men are less aware of dietary recommendations and the risks associated with unhealthy habits, while women are more likely to link a healthy diet with a higher intake of fruits and vegetables (Bieniek-Majka, 2022).

According to Goryńska-Goldman (2024), Polish society, in terms of the amount of fruit and vegetable consumption on a macroeconomic scale, was most similar to many societies in Central Europe (i.e., Latvia, the Czech Republic, Lithuania, Hungary, Slovakia and Bulgaria), as well as to that of Cyprus. Poland ranked 38th as a fruit producer in the world in 2022, while in terms of vegetables it ranked 27th (Hałasiewicz et al., 2023). According to the Institute of Agricultural and Food Economics, there was a negative trade balance for both fruits and vegetables in 2022. This meant that more of these products were imported to Poland than were exported to other countries (Nosecka, 2023). This also demonstrates the changes taking place in the structure of fruit and vegetable consumption, which is the result of changing consumer preferences, seeking more and more new products and flavors.

3. Material and methods

In the study, as a background for the study of consumer preferences, the results of macroeconomic analyses were presented on changes in the consumption of fresh as well as processed fruits, broken down by their individual categories, in Poland over the years 2015-2022. The primary source of information for macroeconomic analyses was data from the survey of household budgets, conducted by the Central Statistical Office. The year 2015 was taken as 100%, from which the basic statistical parameters giving a summary description of the analyzed phenomenon were calculated, including fixed-base indices, with the help of which changes in the size of absolute data in the last analyzed year in relation to the base year were analyzed.

By calculating chain indices (with a variable base), the average annual rate of the changes under study was determined, the measure of which in the period under study (t0, t1) was the difference between the average chain index of the period and unity (Górczyński, 2004). The coefficients of variation, which are the quotient of the standard deviation and the arithmetic mean of the values studied, were also calculated.

The main part of the paper consists of analyses of primary data from surveys conducted using the CAWI method, on a group of 255 respondents, throughout Poland, in 2023. Women accounted for the largest share of the surveyed population, i.e. 60.0% of the total, taking part in the research. Men, on the other hand, accounted for 40.0%. The survey also established four age groups of respondents, i.e. 18-30 years old, 31-45 years old, 46-60 years old and over 60 years old. The largest group, 116 people (45.5%), were respondents aged 18-30. The percentage of respondents aged 31-45 was 30.2%, while those aged 46-60 and over 60 were 15.7% and 8.6%, respectively. Another factor characterizing the survey population was the place of residence. The largest group of study participants were residents of cities with a population of less than 50,000 (30.2%). The second smaller group among the survey participants were residents of cities with more than 250,000 residents accounting for 27.5%. The share of rural residents was 26.7%, while the smallest group, only 5.9% of people, lived in a city of 52 to 99.9 thousand residents.

Taking into account the monthly disposable income per person in the household, the largest number, 44.7%, of respondents had incomes above PLN 3000. The second largest group, in terms of numbers, were respondents with income between 2001 and 3000 PLN. The least numerous group of respondents (6.3%) were those with per capita incomes of up to PLN 1000.

This division made it possible to assess the diversity of respondents' opinions depending on selected factors. In this case, it was investigated whether there were statistically significant differences between selected factors, including the size of consumption or feelings about the increase in the price of fruit, and factors characterizing the respondents. Analyses were performed using Statgraphics plus 4.1. Due to the lack of normal distribution and unequal groups, the significance of differences was tested using non-parametric Mann-Whitney U statistical tests for two grouping variables and Kruskal-Wallis ANOVA test for questions where there were more than three grouping variables. A significance level of $\alpha = 0.05$ was used in the analyses.

4. Analysis of fruit consumption based on CSO data

The analysis carried out showed that the per capita consumption of fruit and preserves in total in Poland, in households, throughout the whole of the analyzed multi-year period increased on average annually by only 0.4% kg/person and was at the level of 44.4 kg/person in 2022, which means that it was only 3.1% higher than in 2015 (Table 1). It is noteworthy that in the case of fresh and chilled fruits, consumption in 2022 was at the same level as in the first year of the analyzed period. Over the entire multi-year period under study, the highest decrease in consumption (by 3.3% on average from year to year) was recorded for apples, and this was a total decrease of 20.9% from 13.2 kg/person in 2015 to 10.4 kg/person in 2022. Also, a negative rate of change was recorded in the consumption of stone fruits and berries, which averaged 2.5% and 1.3% annually. As a result, stone fruit consumption was 16.2% lower in 2022 than in 2015, while berry fruit consumption was 8.5% lower. Of the group of fresh and refrigerated fruits, the highest average annual rates of change of 4.4% and 4.3% were recorded for the consumption of bananas and the group of other fruits, respectively. Thus, in 2022. Poles consumed 35.3% more bananas on average than in 2015. Noteworthy is the increase in the consumption of other southern fruits, including a 9.2% increase in citrus fruits in the last year of analysis compared to the base year. The highest, 13.3% and 10.4% average annual rates of change over the entire analysis period were recorded in the consumption of processed fruit and frozen fruit, respectively. Thus, the increase in consumption of fruit preparations, which include jams, mousses, purees, among others, was at 140% in 2022 compared to 2015. In turn, the consumption of frozen fruits doubled in the same period. It should be added that these were the groups of fruits with the highest coefficient of variation, which for frozen fruits was at 37.6%, while for fruit preparations it reached 31.8%. In contrast, all other fruit groups analyzed recorded low variability, as evidenced by coefficient of variation values below 25%.

Table 1.
Fruit consumption in households in Poland in 2015-2022

Specification	2015		2016		2017		2018		2019		2020		2021		2022		Average annual rate of change	Coefficient of variation
	kg per person	%	kg per person	%	kg per person	%	kg per person	%	kg per person	%	kg per person	%	kg per person	%	kg per person	%		
Fruit and preserves	43,1	100,0	43,9	101,9	43,7	101,4	45,0	104,5	45,2	105,0	46,3	107,5	47,4	110,0	44,4	103,1	0,4	3,2
Fresh and chilled fruit	41,3	100,0	41,9	101,5	41,6	100,9	42,7	103,5	42,8	103,8	43,4	105,2	44,3	107,3	41,3	100,0	0,0	2,6
apples	13,2	100,0	13,0	98,2	12,0	90,9	11,6	88,2	12,1	91,8	11,3	85,5	11,2	84,5	10,4	79,1	-3,3	7,8
berries	5,6	100,0	5,2	91,5	4,9	87,2	5,0	89,4	4,8	85,1	5,0	89,4	5,2	91,5	5,2	91,5	-1,3	4,8
stone fruit	4,4	100,0	4,4	100,0	4,0	89,2	5,2	116,2	4,7	105,4	3,6	81,1	3,5	78,4	3,7	83,8	-2,5	14,1
citrus	7,8	100,0	8,2	104,6	8,0	103,1	8,0	103,1	8,5	109,2	8,8	112,3	9,4	120,0	8,5	109,2	1,3	6,0
bananas	6,1	100,0	6,8	111,8	7,9	129,4	7,8	127,5	7,8	127,5	9,4	152,9	9,1	149,0	8,3	135,3	4,4	13,6
others	3,8	100,0	4,3	112,5	4,8	125,0	5,0	131,3	4,9	128,1	5,4	140,6	6,0	156,3	5,2	134,4	4,3	13,3
Dried fruit and nuts	1,2	100,0	1,2	100,0	1,2	100,0	1,3	110,0	1,3	110,0	1,4	120,0	1,6	130,0	1,4	120,0	2,6	10,1
Frozen fruit	0,1	100,0	0,1	100,0	0,1	100,0	0,1	100,0	0,1	100,0	0,2	200,0	0,2	200,0	0,2	200,0	10,4	37,6
Fruit preparations	0,6	100,0	0,7	120,0	0,7	120,0	0,8	140,0	1,0	160,0	1,2	200,0	1,3	220,0	1,4	240,0	13,3	31,8
Fruit juices	9,6	100,0	9,5	99,0	9,7	101,3	10,0	103,8	10,6	110,0	11,4	118,8	11,9	123,8	11,5	120,0	2,6	9,1

Source: own analysis according to IERiGŻ PIB study based on CSO data.

5. Survey results

Grocery shopping, is one of the basic activities performed almost daily. It was therefore important to determine, the frequency of purchasing fruits during such activities. The survey showed that the vast majority of respondents purchased conventionally grown fruits very often and frequently. In the case of fruits, very frequent and frequent purchases were indicated by 42.0% and 46.3%, respectively. Respondents, on the other hand, rarely bought fruits labeled BIO, as indicated by 32.5% and 32.5% of respondents, respectively. It is worth noting that one-fifth of the survey participants did not purchase these products at all (Fig. 1). Also, a study conducted by Zmarlicki (2010) on a group of Skierniewice students shows that the willingness to purchase fruits, but also vegetables from organic farming more than a decade ago was also negligible. The implication is that despite the passage of years, consumer attitudes toward buying this type of food are still incidental. The most of respondents indicated that they would be able to purchase BIO fruits if their price was similar to conventionally grown products. Another issue of lack of interest in organic products indicated by the above author was their often unattractive appearance, which did not encourage consumers to purchase them.

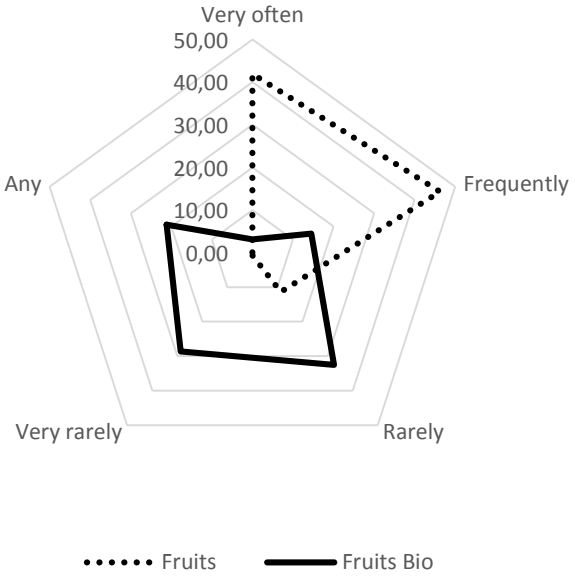

Figure 1. Frequency of fruit buying by respondents (in %).

Source: own research.

The analysis shows that the significant proportion of respondents consumed fruit daily, as indicated by 47.8% of respondents. Several times a week fruit was consumed by 37.6% of respondents, while only once a week fruit was consumed by 11.4% None of the respondents indicated that they consumed fruit less than once a month (Fig. 2).

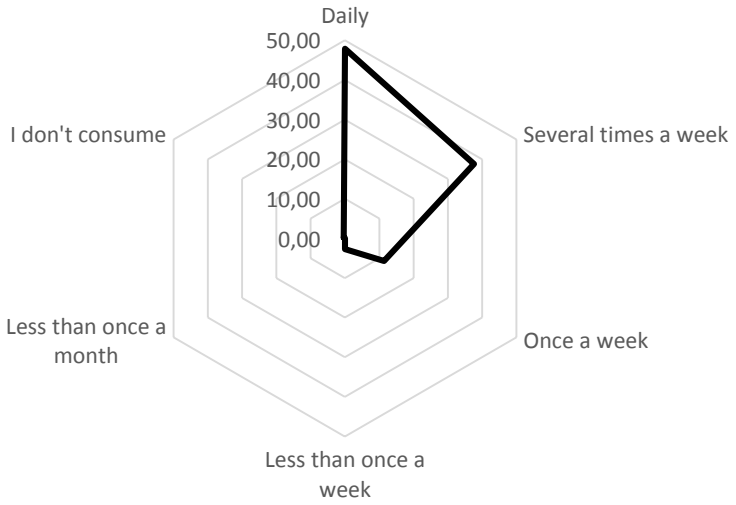

Figure 2. Frequency of fruit consumption according to respondents (in %).
Source: own research.

Among the most frequently purchased fruits were apples and bananas. Purchases of these fruits were indicated by 80.8 and 76.5%, respectively. Fruits such as cherries, grapes, oranges and pears were frequently purchased by 15.7 to 23.5% of respondents. Other frequently purchased fruits, whose purchases were indicated by a total of 75.3% of respondents, included kiwis, raspberries, tangerines, plums, strawberries, pineapples, avocados, blueberries, lemons, mangoes, peaches, grapefruits, cherries, watermelons, nectarines (Fig. 3). However, it should be pointed out that many of these species are seasonal fruits, which certainly translates into uneven consumption throughout the year. A study conducted by Ilow et al. (2011) also showed that apples and bananas were the most frequently consumed fruits among respondents.

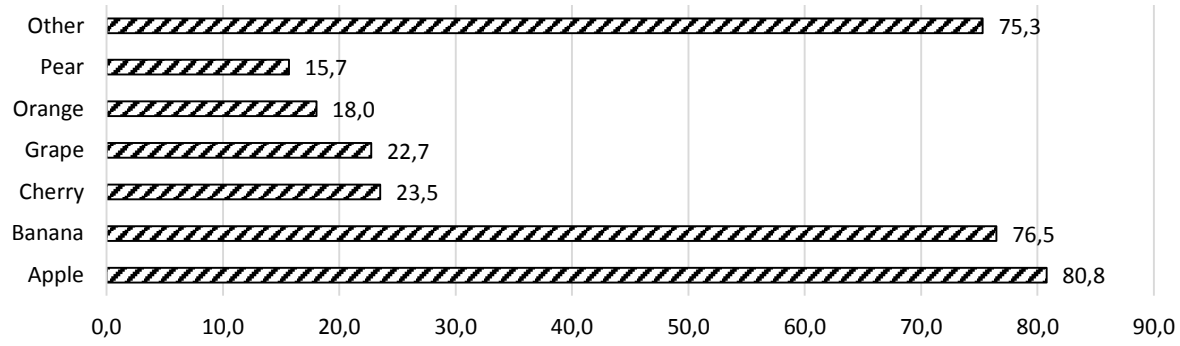

Figure 3. Most frequently purchased fruits in the opinion of respondents (in %).
Source: own research.

The analysis shows that the vast majority of respondents purchased fruit very often (42.4%) and often (35.3%) from large grocery stores, i.e. hypermarkets or discount stores. In contrast, respondents very rarely bought fruit in small grocery stores (31.4%) and from street sales (28.2%). It is worth noting that almost 1/3 of the respondents did not buy at these stores at all (Fig. 4). A study conducted by Czernyszewicz (2008) in Lublin shows that consumers more than 15 years ago most often purchased fruit at markets and fruit and vegetable stores, although, according to the author, this depended on particular groups of fruit and even species. In general, comparing the above results, it is reasonable to assume that the importance of these fruit distribution channels has clearly declined over this time.

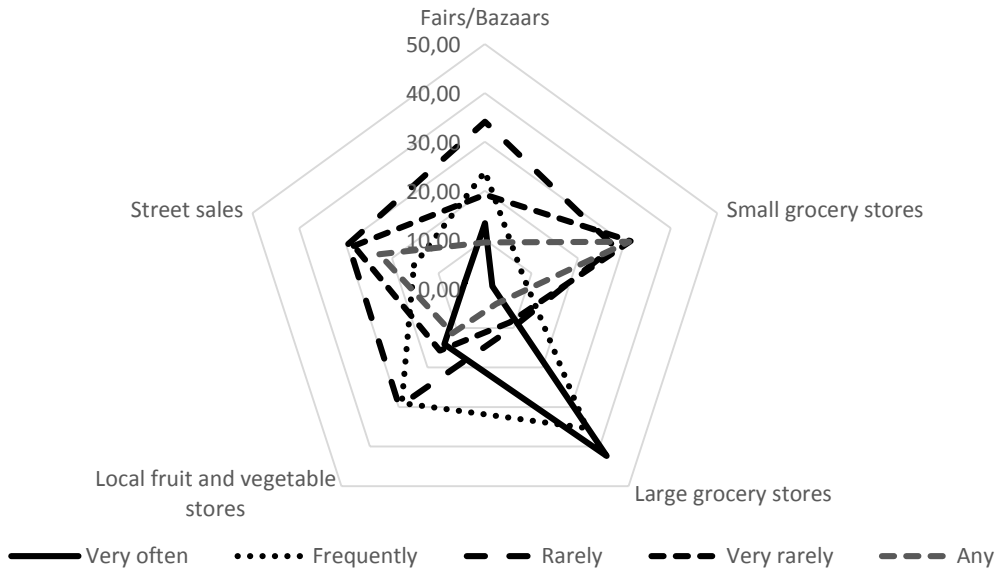

Figure 4. Frequency and place of fruit purchase by respondents (in %).
Source: own research.

When purchasing fruit, the most important factor was its freshness and quality, as indicated by 89.4 and 72.9% of respondents, respectively. Nutritional value and the species itself were also of great importance to respondents. It is worth pointing out that the brand/manufacturer of the fruit for 43.5% of the survey participants was indifferent (Figure 5). Similarly, a study conducted by Kierczyńska (2010) on a group of students at the University of Life Sciences in Poznań showed that taste was the most important factor in choosing fruit, followed by appearance and freshness, and then health values.

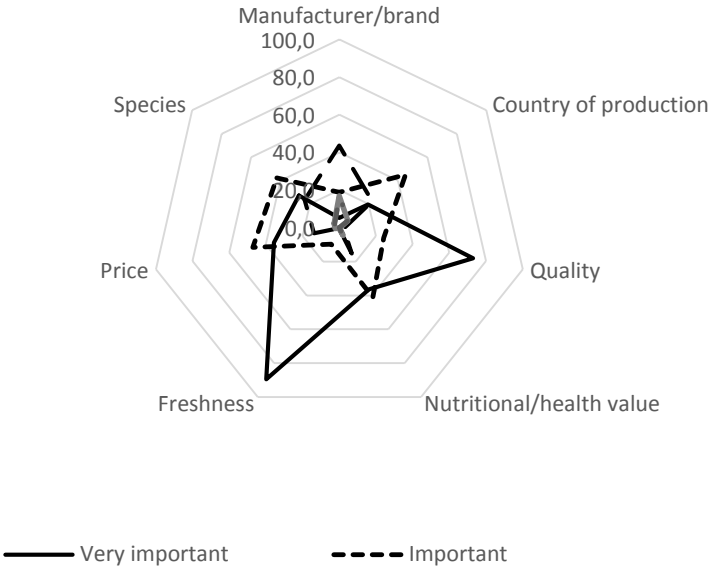

Figure 5. Factors influencing the purchase of fruit by respondents (in %).
Source: own research.

The survey showed that of all the factors determining the choice of where to buy fruit, the most important for respondents was the location near their place of residence, which was indicated by nearly 3/4 of the respondents. It is worth pointing out that this factor was more than 80% most often indicated by those over 60 years of age. It is also noteworthy that low prices at the point of sale ranked only fourth among the factors for choosing where to buy fruit, although it was indicated by more than 50% of respondents. More than 60% of respondents, when choosing where to buy, were guided by the high quality of the products and the wide assortment of sales. On the other hand, the cleanliness of the store, discounts offered, helpful staff and advertising were factors that influenced consumers' decisions on choosing a place to buy to a lesser extent (Fig. 6).

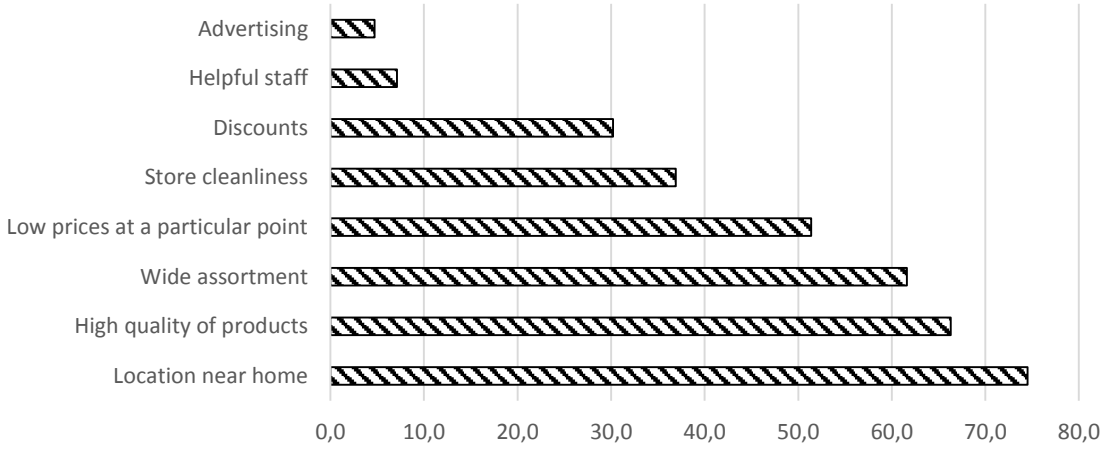

Figure 6. Factors influencing respondents' choice of where to buy fruit (in %).
Source: own research.

The survey shows that more than half, 58.4%, of the respondents consumed the same amount of fruit compared to the previous year. Noteworthy is the fact that despite the increase in inflation during the period under review, as well as the increase in prices, 22.4% of all respondents increased their fruit consumption compared to the previous year. Considering the gender of respondents, both 58.2% of women and 58.8% of men said they consumed the same amount of fruit (Table 2). In contrast, 22.9% of women and 21.6% of men, respectively, increased their consumption. It is interesting to note that considering age groups, the largest number of respondents within each group indicated that they bought the same amount of fruit compared to the previous year. However, taking into account the individual characteristics of respondents, it is worth noting that in the case of those aged 18-30, as many as 36.2% of them consumed more fruit compared to 2022. In the case of income groups and place of residence, there were no clear differences in attitudes towards fruit consumption. However, it is worth pointing out that 40.9% of students, as well as 66.4% of employees working in a company or office, 75.0% of people not working anywhere, and 80.0% of retirees consumed the same amount of fruit compared to the previous year. The analysis also shows that 48.7% of self-employed opinion leaders consumed the same amount of fruit, but 35.9% of people indicated that they consumed more fruit than in the previous year. A study conducted by Jąder (2016) shows that the highest fruit consumption was observed among pensioners and pensioners, as well as among those living in households with the highest income.

The statistical analyses conducted showed significant differences for the age of the respondents and for the socioeconomic situation and the amount of fruit consumption compared to the previous year, as indicated by the values of the Z statistic and the H of the Mann-Whitney U and Kruskal-Wallis ANOVA tests and p-values. The differences were that, younger people (18-30 years old) proportionally increased fruit consumption more than other people. Also, students and the self-employed increased their consumption than other respondents from other socioeconomic groups. The survey shows that more than half, 58.4%, of the respondents consumed the same amount of fruit compared to the previous year. Noteworthy is the fact that despite the increase in inflation during the period under review, as well as the increase in prices, 22.4% of all respondents increased their fruit consumption compared to the previous year. Considering the gender of respondents, both 58.2% of women and 58.8% of men said they consumed the same amount of fruit (Table 2). In contrast, 22.9% of women and 21.6% of men, respectively, increased their consumption. It is interesting to note that considering age groups, the largest number of respondents within each group indicated that they bought the same amount of fruit compared to the previous year. However, taking into account the individual characteristics of respondents, it is worth noting that in the case of those aged 18-30, as many as 36.2% of them consumed more fruit compared to 2022. In the case of income groups and place of residence, there were no clear differences in attitudes towards fruit consumption. However, it is worth pointing out that 40.9% of students, as well as 66.4% of employees working in a company or office, 75.0% of people not working anywhere,

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Table 2.
Amount of fruit consumed by respondents compared to the previous year (in %)

Specification		Respondents' indications (in %)			Number n	Value of statistics	
		More	Less	Same		p-value	Z or H*
Overall		26,7	14,9	58,4	255		
Gender	F	26,1	15,7	58,2	153	0,8536	-0,1846
	M	27,5	13,7	58,8	102		
Age	18-30 years	36,2	15,5	48,3	116	**0,0447**	8,0642
	31-45 years	20,8	13,0	66,2	77		
	46-60 years	17,5	20,0	62,5	40		
	Over 60 years	13,6	9,1	77,3	22		
Education	Average	24,2	15,4	60,4	91	0,8250	0,9017
	Vocational	37,5	12,5	50,0	8		
	Higher	27,7	14,8	57,4	155		
Residence	Village	29,4	8,8	61,8	68	0,5462	3,0700
	Town up to a 50 t. inhabitants	26,0	13,0	61,0	77		
	Town from 51 to 99 t. inhabitants	26,7	13,3	60,0	15		
	Town from 100 to 250 t. inhabitants	20,0	20,0	60,0	25		
	Town over 250 t. inhabitants	27,1	21,4	51,4	70		
Monthly disposable income	Up to a 1000 zł	18,8	12,5	68,8	16	0,5694	2,0145
	1001-2000 zł	28,6	18,4	53,1	49		
	2001-3000 zł	32,9	13,2	53,9	76		
	Over 3000 zł	22,8	14,9	62,3	114		
Socio-economic situation	Student	40,9	18,2	40,9	66	**0,0070**	14,0929
	Self-employed	35,9	15,4	48,7	39		
	Company/office employee	19,7	13,9	66,4	122		
	Pensioner	10,0	10,0	80,0	20		
	Currently not working anywhere	12,5	12,5	75,0	8		

* Z for Mann-Whitney U, H for Kruskal-Wallis.

Sources: Own research.

Based on the analysis, it can be indicated that as many as 73.3% of all respondents allocate a greater amount of cash for fruit purchases compared to the previous year. Taking into account the gender of the respondents, the most of women (76.5%) as well as men (68.6%) said that they allocate a greater amount of cash compared to the previous year (Table 3). It is interesting to note that considering age groups, each of them allocated more cash for fruit purchases. In the case of income groups, place of residence, monthly disposable income and socioeconomic situation, no clear differences were observed in the allocation of cash for fruit. Each of these groups allocated more of them compared to the previous year.

The statistical analyses conducted showed significant differences for respondents' education, socioeconomic situation and monthly disposable income per person in the household and the amount of cash allocated for fruit compared to 2022, as indicated by the values of the Z statistic and the H of the Mann-Whitney U and Kruskal-Wallis ANOVA tests and p-values. The differences are that those with vocational and secondary education spent less or the same amount of money in the past year, while the significant proportion of those with higher education, spent more money on fruit purchases compared to the previous year. In the case of monthly income, those in the income group from PLN 1001 to 2000 stood out from the other income groups in that, the vast majority of them (85.7%) allocated more cash for fruit purchases compared to the previous year, while the same amount of cash was allocated by only 2.0% of respondents in this group. Also, 80.0% of retirees stood out in that they allocated more cash for fruit purchases compared to the previous year, while only 5.0% of respondents in this group allocated less.

Table 3.
Amount of money spent on fruit purchases by respondents compared to the previous year (in %)

Specification		**Respondents' indications (in %)**			Number n	**Value of statistics**	
		More	Less	Same		p-value	Z or H*
Overall		73,3	7,8	18,8	255		
Gender	K	76,5	7,8	15,7	153	0,3288	-0,9766
	M	68,6	7,8	23,5	102		
Age	18-30 years	72,4	9,5	18,1	116	0,6428	1,6738
	31-45 years	75,3	7,8	16,9	77		
	46-60 years	70,0	5,0	25,0	40		
	Pow. 60 years	77,3	4,5	18,2	22		
Education	Average	65,9	5,5	28,6	91	**0,0048**	12,9292
	Vocational	62,5	25,0	12,5	8		
	Higher	78,7	8,4	12,9	155		
	Village	72,1	2,9	25,0	68		
Residence	Town up to a 50 t. inhabitants	74,0	6,5	19,5	77	0,1824	6,2333
	Town from 51 to 99 t. inhabitants	80,0	6,7	13,3	15		
	Town from 100 to 250 t. inhabitants	68,0	16,0	16,0	25		
	Town over 250 t. inhabitants	74,3	11,4	14,3	70		

Cont. table 3.

Monthly disposable income	Up to a 1000 zł	68,8	6,3	25,0	16	**0,0042**	13,2248
	1001-2000 zł	85,7	12,2	2,0	49		
	2001-3000 zł	67,1	5,3	27,6	76		
	Over 3000 zł	72,8	7,9	19,3	114		
Socio-economic situation	Student	72,7	13,6	13,6	66	**0,0109**	13,0734
	Self-employed	69,2	5,1	25,6	39		
	Company/office employee	76,2	6,6	17,2	122		
	Pensioner	80,0	5,0	15,0	20		
	Currently not working anywhere	37,5	0,0	62,5	8		

* Z for Mann-Whitney U, H for Kruskal-Wallis.

Sources: Own research.

Based on the analysis, it can be indicated that 46.7% of all respondents felt the increase in fruit prices very strongly compared to the previous year. Considering gender, 57.5% of women felt the price increase very strongly and 51.0% of men felt the price increase only strongly (Table 4). It is interesting to note that considering age groups, more than 80.0% of respondents from all groups felt very strongly or strongly about the increase in fruit prices compared to 2022. Similarly, that is, the vast majority of survey participants felt very strongly or strongly about the increase in fruit prices regardless of their place of residence, monthly disposable income and even socioeconomic situation.

Statistically significant differences existed, among others, in the case of gender and feeling the increase in fruit prices compared to the previous year. Women were significantly more strongly affected by the increase in fruit prices than men. This confirms a study by Suliga (2012), which found that women over the age of 30 consume fruit significantly more often than men. It is worth pointing out that the group of women in the present study accounted for more than 60% of the respondents.

Table 4.
Respondents' feelings caused by the increase in fruit prices compared to the previous year (in %)

Specification		**Respondents' indications (in %)**				Number n	**Value of statistics**	
		I feel very strongly	I feel strongly	I feel slightly	I don't feel		p-value	Z or H*
Overall		46,7	38,0	13,3	2,0	255		
Gender	K	57,5	29,4	11,1	2,0	153	**0,0435**	-2,0191
	M	30,4	51,0	16,7	2,0	102		
Age	18-30 years	41,4	40,5	15,5	2,6	116	0,8242	0,9053
	31-45 years	55,8	33,8	9,1	1,3	77		
	46-60 years	52,5	32,5	12,5	2,5	40		
	Over 60 years	31,8	50,0	18,2	0,0	22		
Education	Average	44,0	37,4	17,6	1,1	91	0,6028	1,8561
	Vocational	25,0	62,5	12,5	0,0	8		
	Higher	49,0	37,4	11,0	2,6	155		
	Village	42,6	45,6	10,3	1,5	68		

Cont. table 4.

Residence	Town up to a 50 t. inhabitants	49,4	31,2	16,9	2,6	77	0,2008	5,9782
	Town from 51 to 99 t. inhabitants	40,0	46,7	13,3	0,0	15		
	Town from 100 to 250 t. inhabitants	68,0	20,0	12,0	0,0	25		
	Town over 250 t. inhabitants	41,4	42,9	12,9	2,9	70		
Monthly disposable income	Up to a 1000 zł	62,5	31,3	6,3	0,0	16	0,0519	7,7330
	1001-2000 zł	51,0	44,9	4,1	0,0	49		
	2001-3000 zł	40,8	44,7	13,2	1,3	76		
	Over 3000 zł	46,5	31,6	18,4	3,5	114		
Socio-economic situation	Student	34,8	50,0	15,2	0,0	66	0,1515	6,7190
	Self-employed	46,2	28,2	23,1	2,6	39		
	Company/office employee	54,9	32,8	9,0	3,3	122		
	Pensioner	35,0	50,0	15,0	0,0	20		
	Currently not working anywhere	50,0	37,5	12,5	0,0	8		

* Z for Mann-Whitney U, H for Kruskal-Wallis.

Sources: Own research.

The above survey results are confirmed by a report by the Center for Public Opinion Research (CBOS) published in 2023, according to which Poles have been greatly affected by inflation. The most disruptive was the increase in food prices. According to the research published in this report, respondents reduced their daily purchases and used substitutes.

6. Summary and conclusions

The analysis shows that fruit consumption showed an upward trend from 2015 to 2022, but it was a small increase, averaging 0.4% per year. The highest growth rate was recorded for frozen fruit, processed fruit and citrus fruit bananas and the group of other fruits. In contrast, the largest decrease in consumption was in apples, berries and stone fruits.

The results presented in the survey allow us to conclude that almost half of the surveyed consumers consume fruit on a daily basis. The most frequently consumed fruits are apples and bananas, whose consumption was indicated by 80.8% and 76.5% of surveyed consumers, respectively. In addition, the survey showed that most respondents purchase fruit very often. Purchases are mainly made at hypermarkets and discount grocery stores. Slightly less important are markets and local vegetable stores. In addition, the most important factor in respondents' choice of where to buy fruits and vegetables is the location close to where they live, which was indicated by more than 70% of respondents. A significant proportion of respondents choose places that offer a wide assortment and high quality produce. When shopping, respondents pay attention primarily to the freshness and quality of fruits.

Based on the analysis, it can be indicated that 46.7% of all respondents felt very strongly about the increase in the price of fruits, compared to the previous year, i.e. 2022. And although as many as 73.3% of all respondents spent more money on fruit purchases, compared to the previous year, this was not reflected in an increase in the consumption of these products. Thus, the survey showed that more than half, 58.4%, of respondents in 2023 consumed the same amount of fruit compared to the previous year, indicating that the amount of fruit consumed is due to certain eating habits. The price increase did not significantly decrease fruit consumption. Instead, consumers may have opted for lower-quality or substitute products. In addition, it is noteworthy that despite the increase in inflation during the period under review, as well as the increase in prices, as many as 22.4% of the total respondents increased their fruit consumption compared to the previous year. It is worth adding, as the literature shows, that during the pandemic period there was a very strong increase in fruit consumption, but also in vegetable consumption. This is due to the fact that in the face of massive COVID cases, taking care of their health, Poles began to appreciate their health-promoting properties more. In addition, as a result of changes in consumer preferences and tastes, looking for more and more new flavors and preferring healthy lifestyles, it is difficult to expect a significant decline in the consumption of fruits and vegetables in general, even with an increase in their prices, which, in the context of the current organization of the market, is a positive development.

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