FRUITS AND VEGETABLES MARKET IN ROMANIA: BETTER UNDERSTAND CONSUMERS' PREFERENCES

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Abstract
The objectives of the paper are to identify the main trends of fruits market. Statistical data regarding demand, supply and prices provided by the Romanian National Institute of Statistics has been analyzed. The findings show that both demand and supply increased. Imports decreased in the last years, as well as its contribution to total supply. Differences between quantities purchased on the market and quantities consumed can be observed, for all species of fruits. It shows that self-consumption remains a feature of fruits market in Romania, as it was in the previous period. Forecasts of fruits consumption show a decreasing trend, which has negative implications to human health and markets transactions.
Keywords
fruits, market, self-consumption

Introduction

Fruits are important sources of vitamins and minerals and, therefore, they should be consumed in daily diet. Their market is dynamic and can be analysed using statistical data about demand, supply and prices. The article tries to answer the question: What are the main changes and trends of fruits' market in Romania? Findings will help farmers, processors and retailers to better understand the factors that changed consumption and production of fruits.
The objective of this study is to identify the trends of fruits market, and its future direction of development.
Fruits market is characterized by specific features, the most important are (Frone, 1999, Manole, 2003): atomicity of supply and demand, seasonality, specific areas dedicated to fruits production and a weak system of collecting, high degree of perishability, continuity of demand compared to seasonality of supply, assortment of fruits on the market is varied, and production of fruits has different destinations: for fresh consumption, processing and export which requires organizing distribution channels to consumers. Knowing the features of fruits market guides manufacturers and other businesses on the effective activities, less uncertain.
Previous research (Turek, 2008, Manole, 2005) show that fruits domestic production does not cover consumption; the main reasons come from the specificity of supply and demand of agricultural products and large losses in this sector. The latter are recorded in the field, during transport, due to its realization on roads in poor condition and storage, due to the lack of shelter, ensuring microclimate conditions they need (Boboc, 2004).
This study is needed to update information about fruits' market. A documentary study was carried out, aiming to identify the changes and trends of supply, demand and prices on fruits' market. In what follows, demand, supply and prices of fruits are examined, based on statistical data analysis.

1. Materials and methods

The information used for market research is collected from databases and publications of the National Institute of Statistics of Romania: balance sheets, which were collected data on resources, with its components (domestic production and imports) and uses with its components (export, domestic availability for consumption, intermediate consumption, losses, stocks and availability for human consumption); Statistical Bulletin of Prices, Supply balances, Coordinates of living in Romania: income and consumption. Data on prices, purchase and consumption of vegetables have been collected.

To study the demand and supply on market of fruit and vegetables, statistical data on products balances has been analyzed. This includes the supply and use of products, resources showing the source of supply: the production and import used and showing destinations offer uses: consumption, exports, stocks, losses. Furthermore, forecasts of annual consumption of food products for following years are made using different models: simple regression model, polynomial functions. The correlation is given by a function of the form $y = a_0 + a_1x_1 + a_2x_2$ (Falie, 2010). To find x and y, when y depends on x, was used Least Squares Method. Also, the standard error of the estimate and coefficient or R squared (R^2) were calculated.

Balance sheet for fruits is presented in Table 1. In 2012, 71.0% of total supply is provided by domestic production, and in 2013, 75.1 per cent. It means an increase of 416552 tons. Imports fill in the quantities missing to satisfy domestic consumption. They account for 29 per cent in 2012, and 24.9 per cent in 2013. As a result, in this period, the increase of total supply had been determined by the volume of domestic production. As utilizations, a decrease in quantities exported can be noticed, from 155,267 tons in 2012, to 134,012 tons, in 2013. Internal availabilities for consumption increased to 117 per cent from 2012 to 2013, and negative stock variations registered in 2012. As statistical data show, imports are higher than exports, indicating a deficit in trade balance of 13 per cent.

Table 1 Balance sheet for fruits and products from fruits

Specification	2012 (tons)	2013 (tons)	2013/2012 (%)
A. RESOURCES	2639109	3049665	115
1. Domestic production	1874979	2291531	122
2. Import	764130	758134	99
B. UTILIZATIONS	2639109	3049665	115
3. Export	155267	134012	86
4. Internal availabilities for consumption	2483842	2915653	117
5. Intermediary consumption	1039480	1344139	129
5.1. Seeds consumption	-	-	-
5.2. Fodder consumption	-	-	-
5.3. Industrial processing	1039480	1344139	129
5.4. Industrial transformation	-	-	-
6. Total losses	75096	82294	109
7. Stock variation	-56882	15450	*
8. Availabilities for human consumption	1426148	1473770	103

Source: Bilanturi alimentare, 2013. Romanian National Institute of Statistics, p.31

Total resources of fruits and products of fruits, in 2013, increased with 359,000 tons in 2013 compared to 2012 (Table 2). In 2013, from structural point of view, total supply is: 69 per cent domestic production, 8 per cent stocks and 23 per cent imports.

Table 2 Total resources of fruits and products from fruits (thousand tons)

Specification	2012	2013
Resources	2955	3309
Initial stock	316	259
Production	1875	2292
Import	764	758

Source: Bilanturi alimentare, 2013. Romanian National Institute of Statistics, p.8

Further on, balance sheets for apples, plums and peaches, the main fruits obtained in Romania, are presented. The approach is both economic and statistic, and data are expressed in tons of fresh fruits. In Table 3, balance sheet for apple is presented. Resources increased in 2013 compared to 2012 to 105 per cent. Domestic production has the main contribution to supply: 81.6 per cent in 2012, 86 per cent in 2013. Imports of apples reduced in the period 2012-2013 with 19268 tons, and export decreased from 71888 tons to 58665 tons. Internal availabilities for consumption increased with 44600, but availabilities for human consumption decreased with 16923 tons, in the period 2012-2013, because intermediary consumption and industrial processing increased. Trade balance for apples is negative, for both years: 2012 and 2013.

Table 3 Balance sheet for apples

Specification	2012 (tons)	2013 (tons)	2013/2012 (%)
A. RESOURCES	566165	597542	105
1. Domestic production	462935	513580	111
2. Import	103230	83962	81
B. UTILIZATIONS	566165	597542	105
3. Export	71888	58665	81
4. Internal availabilities for consumption	494277	538877	109
5. Intermediary consumption	23147	25679	111
5.1. Seeds consumption	-	-	-
5.2. Fodder consumption	-	-	-
5.3. Industrial processing	23147	25679	111
5.4. Industrial transformation	-	-	-
6. Total losses	31695	33139	105
7. Stock variation	-47063	10484	-
8. Availabilities for human consumption	486498	469575	95

Source: Bilanturi alimentare, 2013. Romanian National Institute of Statistics, p.32

Resources of plums increased 1.21 times within the period 2012-2013. Domestic production accounts for 98.2 per cent of total consumption. Imports represent 1.8 per cent of supply and export 0.17 per cent of demand. Trade balance is negative for plums, in 2012 and 2013; Romania exports 898 tons and imports 9227 tons (Table 4).

Table 4 Balance sheet for plums

Specification	2012 (tons)	2013 (tons)	2013/2012 (%)
A. RESOURCES	431588	521686	121

1. Domestic production	424068	512459	121
2. Import	7520	9227	123
B. UTILIZATIONS	431588	521686	121
3. Export	674	898	133
4. Internal availabilities for consumption	430914	520788	121
5. Intermediary consumption	339254	409967	121
5.1. Seeds consumption	-	-	-
5.2. Fodder consumption	-	-	-
5.3. Industrial processing	339254	409967	121
5.4. Industrial transformation	-	-	-
6. Total losses	12948	15651	121
7. Stock variation	-8424	5417	-
8. Availabilities for human consumption	87136	89753	103

Source: Bilanturi alimentare, 2013. Romanian National Institute of Statistics, p.34

As in the case of other fruits presented above (see balance sheets), there are variations in stock in 2012. Quantities of plums for industrial increased and availability for human consumption ranged from 87,136 tonnes in 2012 to 89,753 tonnes in 2013 (1.03 times).
The peaches and nectarines trade balance is shown in Table 5. Peaches and nectarines resources are provided from domestic production and imports. The largest share has external resources (76.5 per cent in 2012 and 68.7 per cent in 2013). Importing is massive, if we look at percentage, and especially with Romania's fruit growing potential. Domestic production increased by 11% in 2012-2013. Changes in inventories were negative in 2013 and availabilities for household consumption decreased 0.9 times. Obviously, deep gap between import and export can be noticed.

Table 5 Balance sheet for peaches and nectarines

Specification	2012 (tons)	2013 (tons)	2013/2012 (%)
A. RESOURCES	74062	60365	81
1. Domestic production	17428	19130	110
2. Import	56634	41235	73
B. UTILIZATIONS	74062	60365	81
3. Export	2113	1485	70
4. Internal availabilities for consumption	71949	58880	82
5. Intermediary consumption	-	-	-
5.1. Seeds consumption	-	-	-
5.2. Fodder consumption	-	-	-
5.3. Industrial processing	-	-	-
5.4. Industrial transformation	-	-	-
6. Total losses	13	16	123
7. Stock variation	3642	-2640	-
8. Availabilities for human consumption	68294	61504	90

Source: Bilanturi alimentare, 2013. Romanian National Institute of Statistics, p.33
In Romania, the domestic consumption of fruit and fruit products was increasing until 2012, the largest increase being in 2011-2012, when it reached 1,764,000 tons. Statistically, the ratio decreased between 2012-2013, almost reaching the level of 2008-2009, which is not encouraging, especially in terms of providing caloric needs.

Table 6 Internal consumption of fruits, including mellows (period of reference 1 st July previous year to 30 th June current year)

Specification	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013
Internal consumption, of which (thousand tons):	1505	1514	1663	1699	1764	1568
- human consumption (thousand tons)	1459	1468	1612	1647	1709	1520
- losses (thousand tons)	46	46	51	52	55	48
Population (thousand persons)	20882.980	20537.848	20367.437	20246.798	20147.657	20095.996
Human consumption per capita (kg per capita per year)	69.9	71.5	79.1	81.3	84.8	75.6

Source: Bilanţuri de aprovizionare, 2013. Romanian National Institute of Statistics, p.24, Statistical Yearbook of Romania 2014, p.48

Average monthly consumption of fruits varied depending on the type of fruits. The highest consumption was registered for apples and pears where the quantities are more than 1.5 kg per month per person. Average consumption of these fruits has increasing trend. At the other products there are variations that do not show, however, to eating normal physiological imbalances or other causes which would be related to the purchasing power of population (Table 7).

Table 7 Average consumption of fruits and preserved fruits, in the period 2012-2014 (kg/month/person)

Specification	2012	2013	2014
Total fruits, of which:	3.389	3.449	3.574
Apples and pears	1.490	1.512	1.518
Sour cherries and cherries	0.069	0.106	0.101
Apricots and peaches	0.164	0.161	0.168
Plums	0.130	0.131	0.131
Berries	0.043	0.049	0.72
Grapes	0.247	0.241	0.221
Jams, compote, jelly	0.293	0.305	0.318

Source: Coordonate ale nivelului de trai în România. Veniturile şi consumul populaţiei în anii 2013 şi 2014, Romanian National Institute of Statistics, p. 183-185; p.183-185

On average, in the 2013-2014 periods, a person bought 2.606 kilograms of fruit per month, of which about 40 per cent are apples and pears, grapes 10 per cent, 3.5 per cent plums, apricots and peaches 5.0 per cent. Purchases of processed and preserved fruit as jam, compotes and jellies jam declined in 2013-2014.

Table 8 Average quantities of fruits and preserved fruits purchased from the market, in the period 2012-2014 (kg/month/person)

Specification	2013	2014
Total fruits, of which:	2.462	2.75
Apples and pears	0.928	1.003
Sour cherries and cherries	0.058	0.065
Apricots and peaches	0.129	0.128
Plums	0.107	0.091
Berries	0.046	0.062
Grapes	0.152	0.254
Jams, compote, jelly	0.018	0.014

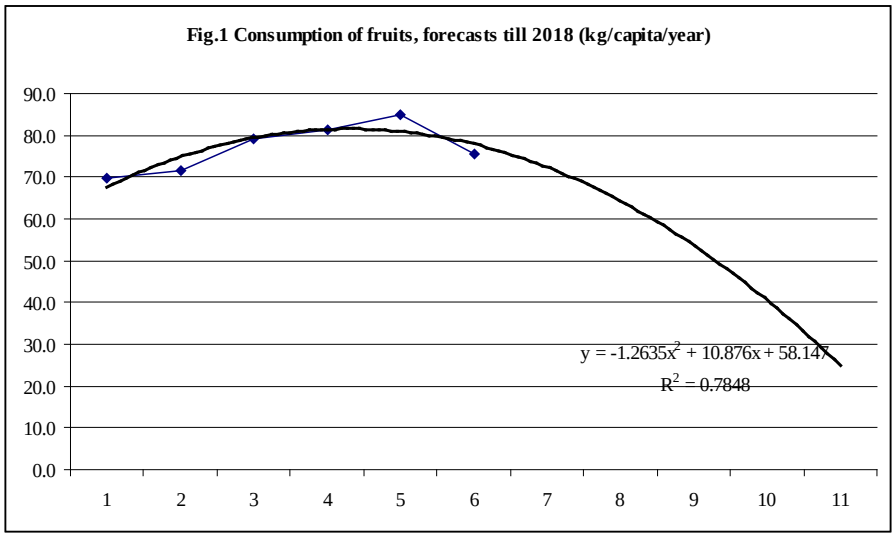
Source: Coordonate ale nivelului de trai în România. Veniturile şi consumul populaţiei în anii 2013 şi 2014, Romanian National Institute of Statistics, p. 170; p.173

2. Results and discussions

It should be noted that the volumes of fruits purchased in the market is different from that of consumption. The explanation lies in the fact that statistics do not indicate self-consumption, meaning what is produced and consumed within households. This is typical to the rural population where most farms provide domestic consumption of the family. Moreover, what remain, the excess products, is sold on urban markets in the form of fresh and canned products.

The above have enabled forecasts for fruits consumption. This study discusses consumption of fruits until 2018. Regression function has been used, in order to establish the trend of consumption. To do that, the type of function that expresses the link between consumption and time (in years) by plotting statistical data is tested. The data are represented in an XOY system of axes where the abscissa means years, and the ordinate shows the consumption of fruit. The correlation has a parabolic form. After identifying the type of function proceed in determining its coefficients.

According to figure 1 the correlation has the form $y=-1.2635x^2+10.876x+58.147$. Data interpretation shows a negative trend of fruit consumption. Also, regression model polynomial functions show that R^2 has the highest level, as closed as possible to 1, which means that exist a strong correlation between data inputs.



This negative trend of fruit consumption lays not only in statistical data and mathematical models, but also in economic conjuncture of the market. As seen in Table 9, prices of fruits increased in the last years and fruits become, as such, products less affordable to be purchased.

Table 9 Consumer price indices for fruits, % (2005=100)

Year	2013	2014
Consumer price indices for fruits	129	128

Source: Buletin Statistic de Preturi 2014, Romanian National Institute of Statistics, 2015, p.31

The fact that consumption of fruits decreases has both social and economic implications. Reduced consumption of fruits has negative effects on human health, considering their importance in ensuring vitamins and minerals in daily diet. From economic point of view, reduced consumption of fruits implies a decreasing demand on the market and, as such, indirect, a reduction of total supply and fewer economic transactions on the market.

Conclusions

The paper analysis demand and supply for fruits and products from fruits, as statistical data of total resources and utilizations of fruits and products from fruits show. Also, balance sheet for apples and plums, peaches and nectarines, domestic consumption of fruit and fruit products was studied. It has been observed that most of supply is provided by domestic production (71.0 per cent, in 2012, and 75.1 per cent, in 2013). The fact that the share of production in total supply increased means that, in Romania, production of fruits increased. As utilizations, a decrease in quantities exported can be noticed, from 155,267 tons in 2012, to 134,012 tons, in 2013. However, these results were not very discouraging because internal availabilities for consumption increased to 117 per cent from 2012 to 2013, and negative stock variations registered in 2012.

As regards human consumption per month, the consumption of apples and peaches was highest; the quantities consumed are more than 1.5 kg per month per person. Anyway,

average consumption of these fruits has increasing trend. At the other products there are variations that do not show, however, to eating normal physiological imbalances or other causes which would keep the purchasing power of the population. On average in the 2013-2014 periods, a person buys 2.606 kilograms of fruit per month, of which about 40% are apples and pears, grapes 10%, 3.5% plums, apricots and peaches 5.0%. Purchases of processed and preserved fruit as jam, compotes and jellies jam declined in 2013-2014.

As regards external trade balance, it is negative, for fruits and fruits products, as total, and for all species of fruits analysed, including apples and plums, which we expect to have positive trade balance, considering their importance in Romanian agriculture.

The results of this paper explained the occurrence of some events. These are formulated in forecasts about the consumption of fruits. According to figure 1consumption of fruit will decrease to less than 30 kilograms per person per year, which has negative social and economical implications, as regards human health and market transactions.

References

1. Boboc, D. 2004. *Procesarea produselor agricole*, Bucharest: ASE.
2. Falie, D., David, L., *New Algorithms of the Absolute Deviation Covariance and Correlation*, The 8th International Conference on Communication, p. 57-60, vol. I, Bucuresti, Romania, June 10-12, 2010
3. Frone, F. 1999. *Dicţionar de marketing*, Bucharest: Oscar Print.
4. Manole, V., Stoian, M., Ion, R.A. 2003. *Agromarketing*, Bucharest: ASE.
5. Manole, V., Boboc, D., Istudor, N., Ion, R.A. 2005. *Filiere agroalimentare*, Bucharest: ASE.
6. Turek Rahoveanu A., Turek, M., Zahiu, L., Ion, R. A., Zaharia, C., Dachin, A., Istudor, N., Manole, V., Dobre, I., Ignat, R. 2008. *Analiza filierei sectorului legume-fructe în România*, Bucharest: Cartea Universitară.
7. Bilanţuri alimentare. 2013. Romanian National Institute of Statistics
8. Buletin Statistic de Preţuri. 2014. Romanian National Institute of Statistics
9. Bilanţuri de aprovizionare. 2013. Romanian National Institute of Statistics
10. Coordonate ale nivelului de trai în România. Veniturile şi consumul populaţiei. 2014. Romanian National Institute of Statistics
11. Anuarul Statistic al României 2014. Romanian National Institute of Statistics, p.589, 590