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## THE DOMESTIC FRUIT SUPPLY – EVOLUTIONS AND TRENDS

GAVRILĂ VIORICA<sup>1</sup>

### **Abstract**

*Domestic fruit supply stability is evaluated taking into consideration the dynamic interactions between production and consumption and testing the synchronization of the supply flow with the consumption demand. The statistical data series from the period 2002-2014 were used, and the forecast of fruit consumption, of the areas under orchards and of average yields was made through the exponential levelling method. The estimates indicate an increase of fruit consumption, except for apples, a decrease of areas and a slight increase of average yields. It can be noticed that under the background of decreasing areas, the slight increase of yields represents only an attenuation factor of foreseeable deficit.*

**Key words:** fruit, supply, demand

**JEL Classification:** Q 11

### INTRODUCTION

Agri-food supply availability and stability depends on domestic agricultural production, on world market conjuncture, on prices and trade policies, on food imports availability, on the level of stocks and on the existing of financial resources for these.

The continuous evolution of food security as operational concept in the public policy reflected the broader recognition of the complexity of involved technical and political problems (Clay, 2002). There is a long-lasting debate on whether food autonomy is a useful strategy to ensure food security. The supporters of this thesis consider that relying on the market to satisfy the food needs is quite a risky strategy due to food price volatility and to a possible interruption in the supply of foodstuffs. The opposite point of view claims that it is costly for a household (or country) to focus on food autonomy, rather than to produce in conformity with its comparative advantages and to procure only certain food commodities from the market (Minot & Pelijor, 2010). From the economic point of view, food security largely relies on the international trade. However, food crises and food price increases worldwide encouraged certain countries to aspire towards higher self-sufficiency levels.

Food supply stability and availability assessment is essential for the determination of the population's food security status in Romania, where agriculture is still facing serious competitiveness problems, a large part of the population is living on very low incomes and the domestic agricultural production is still far from satisfying the population's consumption needs.

Agricultural and food commodity market stability is important both for producers and for consumers: a stable market makes it possible for farmers to plan their production and grow their business and confers access to food at constant prices. An unstable market is characterized by high agricultural price and supply volatility, limiting the consumers' access to food. A stable supply with agricultural products presupposes constant quantities and quality, delivered on time and at relatively stable prices.

### MATERIAL AND METHOD

The multidimensional aspects of food security that can be taken into consideration, as regards both food quantity and food quality, are conform with four characteristics:

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1. Food availability – food in sufficient amounts and at adequate quality, supplied by domestic production or from imports (food aid included).
2. Food access – everybody has access (right) to adequate resources to get adequate and nutritious food; from the economic perspective, accessibility represents the possibility of individuals and households to procure food (either self-produced or bought food), without sacrificing other basic needs; physical access implies access to food of all persons, including the physically vulnerable persons such as children, sick people, disabled or elderly people.
3. Stability in availability and access – access to food should not be threatened by the occurrence of sudden shocks (economic crisis or weather factors, for instance) or cyclical events (e.g. seasonal food insecurity).
4. Nutritional health – the food products should respond to the nutritional needs, taking into consideration people's age, living conditions, health, etc.

The nutrition security concept completes the food security concept. Adding the health dimension, nutrition security implies the elimination of any major deficits in minerals and vitamins that most often affect the people who suffer from food deprivation.

The importance of fresh fruit consumption derives from the beneficial effects upon health. Fresh fruit are recommended due to their biochemical composition, mainly due to the content in complex carbohydrates, which are more difficult to digest. Unlike simple carbohydrates, these have multiple beneficial effects: they avoid the high glycemic variations, providing longer satiety and delay the sensation of being hungry. At the same time, it has been proved that on longer term fruit consumption positively influences the levels of “good” cholesterol and hence decreases the incidence of cardiovascular events (Graur, 2006).

Food security assessment is necessary for any development project from the very beginning, in order to identify the unsafe foodstuffs, to evaluate the food shortage and to characterize the nature of food insecurity (seasonal versus chronic food insecurity) (Hoddinott, 1999). Knowing the population's food and nutritional situation presupposes the existence of a set of information with regard to the availability of agri-food products nationwide. The food balance sheet represents the source of statistical data that provides a global framework in ensuring this set of information. By its nature, the food balance sheet represents a synthesis of quantitative information establishing an equilibrium between the resources of agri-food products and their utilization. The analyses of the consumers' real demand patterns for fruit are based on quantitative statistical data coming from the Household Budget Survey.

Fruit supply, as component part of food security, is investigated by two pillars of food security: *availability* and *stability*. Fruit availability presupposes a sufficient amount of fruit of adequate quality, supplied from domestic production or from imports. As stability factor, “food autonomy” is had in view, which reduces the vulnerability to the fluctuations on the foreign markets.

Domestic fruit supply stability is investigated from the perspective of the volatility of yields and prices, using the variation coefficient, calculated as the ratio of the standard deviation to the mean. The higher the variation coefficient, the more volatile are the supply and the prices.

For the estimation of target indicators, the statistical data series from the period 2002-2014 were used, and the forecast of fruit consumption, of areas under orchards and of average yields was possible by using the exponential levelling method.

## RESULTS AND DISCUSSIONS

According to Eurostat statistics, in the year 1990, the area cultivated with fruit trees in Romania totalled 230.8 thousand hectares, out of which 90.8 thousand hectares were under apple tree orchards, 8.4 thousand hectares pear tree orchards, 8.0 thousand hectares peach trees, 6.7 thousand hectares apricot trees, 12.2 thousand hectares cherry trees and 101.1 thousand hectares plum trees. The area cultivated with fruit shrubs totalled 3.3 thousand hectares.

In the investigated period, the total area of orchards was down by 86.7 thousand hectares

(-37.6%). The greatest decrease of areas was produced in the apple tree orchards by 34.7 thousand hectares (-38.2%) and in the plum tree orchards, which decreased by 34.5 thousand hectares (-34.1%).

As share in the area of the year 1990, the most drastic diminution of areas was noticed in the area cultivated with fruit shrubs, by almost 91% (3.0 thousand hectares), in the pear tree orchards by 58.3% (4.9 thousand hectares) and in all species of stone fruit, as follows: the area under peach trees was down by 6.3 thousand hectares, i.e. by 78.8%, the area under apricot tree orchards decreased by more than 3.7 thousand hectares (-55,2%), while the area under cherry orchards by 5.8 thousand hectares, by -47.5% respectively.

The establishment of a fruit tree plantation implies high investments, which add to the high maintenance costs until the fruit trees are on bearing. The decreasing trend of areas under orchards has been maintained for most species in the recent period, too, as the renewal rate of new plantations is lower than that of clearings.

Table 1. Evolution of areas under fruit tree plantations

Orchards:	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Apple trees	72.4	71.6	73.4	81.7	59.3	59	54.7	52.6	56.4	52.7	55	60.3	56.1
Pear trees	6.1	5.9	5.3	6.1	4.4	4.6	4.6	4.5	5.1	4.3	3.9	3.9	3.5
Peach trees	3.3	2.9	2.8	2.6	1.9	1.8	1.6	1.6	1.9	1.7	1.9	1.9	1.7
Apricot trees	3.9	3.8	3.5	4.2	2.9	3.3	2.9	2.6	2.6	2.5	2.5	2.8	2.9
Cherry trees	11.7	9.9	9.6	8.7	7.2	7.7	7.6	6.8	6.9	6.9	6.8	7.1	6.4

Source: Eurostat, [apro\_acs\_a]

The average yields in fruit are fluctuating, largely influenced by the weather conditions and the low yielding potential of orchards. For instance, in the case of apple-trees, 64% of the structure of orchards in Romania is represented by classical orchards, with a density of up to 400 trees/hectare and by old-aged orchards (55% of total area).

Table 2. Evolution of yields in the fruit-tree orchards -100 kg/ha

Orchards:	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Apple trees	67	112	150	75	98	80	83	98	97	116	82	95	99
Pear trees	107	172	86	135	136	134	113	143	114	151	133	145	167
Peach trees	39	61	63	106	88	93	101	99	55	121	84	85	137
Apricot trees	43	108	60	104	127	81	106	122	85	127	111	103	139
Cherry trees	55	97	53	120	141	84	87	97	98	116	100	119	125

Source: Eurostat, [apro\_acs\_a]

Yields feature instability in all the investigated fruit-tree species, with a high dispersion of the recorded values. In apple trees for instance, the range from the lowest to the highest value is almost twice the lowest yield. For the period 2002-2014, the variation coefficient of yields reveals a high heterogeneity of values in peach trees, of more than 31%, and a medium heterogeneity in the other species. By time intervals, the lowest variability was in the period 2006-2009. These high variations of yields are materialized into a fluctuating supply and consequently, into a high level of instability in supply.

Table 3. Variation coefficient of yields, %

	2002-2014	2002-2005	2006-2009	2010-2013
Apple trees	<b>22.21</b>	38	11	14
Pear trees	<b>17.96</b>	12	7	5
Peach trees	<b>31.43</b>	42	6	31
Apricot trees	<b>27.24</b>	41	19	16
Cherry trees	<b>25.98</b>	40	26	10

Source: calculations based on NIS data, Tempo online

Apple price is characterized by moderate volatility. However, under the background of the decreasing trend of domestic production, prices have the tendency to increase.

The total fruit production is fluctuating, with years with production peaks and years with poor harvests. The 2004-2014 average was 1372.3 thousand tons, but in the years with poor harvests the production is up to half of that in the very good years. This evolution is also the result of weather conditions (late frosts, drought and hail) and of the low yielding potential of orchards.

The diversification of the fruit production structure is weak. The assortment range is dominated by the production of apples and plums, which together represent almost 80% of the total quantity of fruit.

More than 99% of the fruit production is obtained in the private sector. Extending our analysis by assortments and types of farms, it can be noticed that in the year 2014, 92% of the total fruit production was obtained on the individual farms, as follows: more than 85% of apple production, more than 98% of the pear production; these produce almost 97% of the plum production, mainly used as raw material for distillation. The individual holdings produce 94% of the quantity of cherries and sour cherries and 86% of the quantity of apricots and peaches. The rest of production comes from the commercial companies and other types of holdings.

The supply is highly fragmented at the level of fruit producers, and consequently the production is non-homogenous, non-attractive for the great retail stores and for processors. Among the structural modifications of interest for the increase of self-supply in fruit, we can notice an increasing tendency of the number of holdings ranging in the size category 30-50 hectares.

The quantity of fruit available for consumption is fluctuating, generally following the trend of yearly production. The human consumption availability for fruit varies from year to year, with minimum values of 65.7 kg/capita to 78.2 kg/capita. By types of fruit, we can notice a decrease of consumption availabilities in apples and an increase of meridional and exotic fruit consumption. For the other types of fruit that are produced in Romania, the consumption availabilities are increasing.

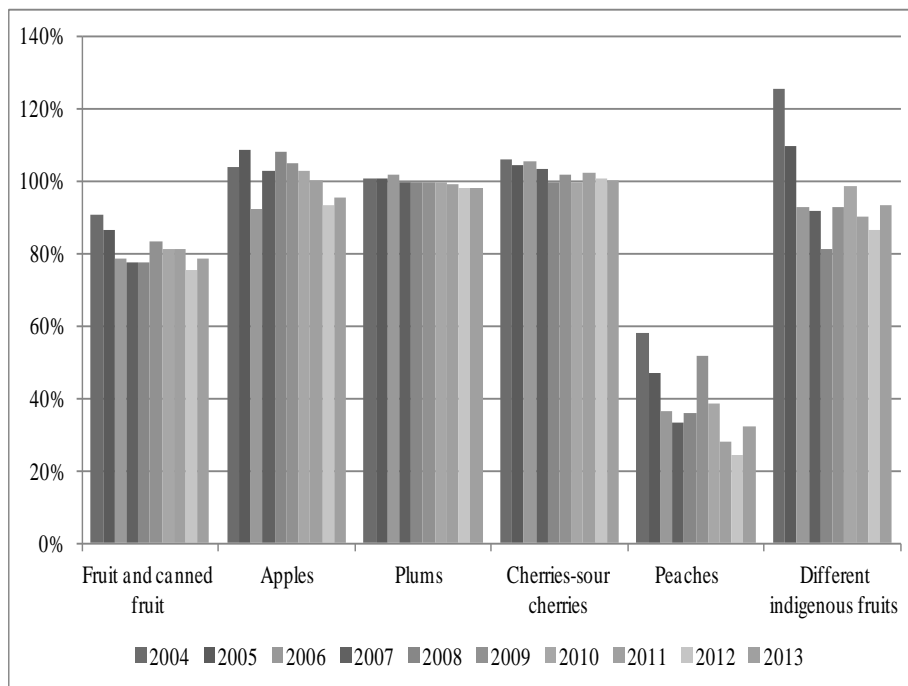
Table 4. Average yearly fruit consumption - kg/capita

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Fruit - total	78.2	77.0	84.7	69.9	69.8	65.7	67	74.7	71.1	<u>73.7</u>
Apples	35.2	36.9	34.5	23.6	17.7	20.3	22.5	26.2	24.3	<u>23.5</u>
Peaches	1.8	2.9	2.8	2.3	2.2	1.6	1.6	4	3.4	<u>3.1</u>
Apricots	2.1	2.3	2	1.5	1.6	1.6	1.3	1.8	1.6	<u>1.6</u>
Meridional, exotic fruit	18.1	16.2	24.7	22.8	26.1	19.4	20.9	19.2	20.6	<u>23.1</u>

Source: calculations based on NIS data, Tempo online

Self-sufficiency in fruit decreased over time, from 91% in 2004 to 79% in 2013; this phenomenon is manifested in all types of fruit. However, the most drastic decline was noticed in peaches, where, under the background of orchard ageing and clearings, self-sufficiency decreased from 58% to 32%.

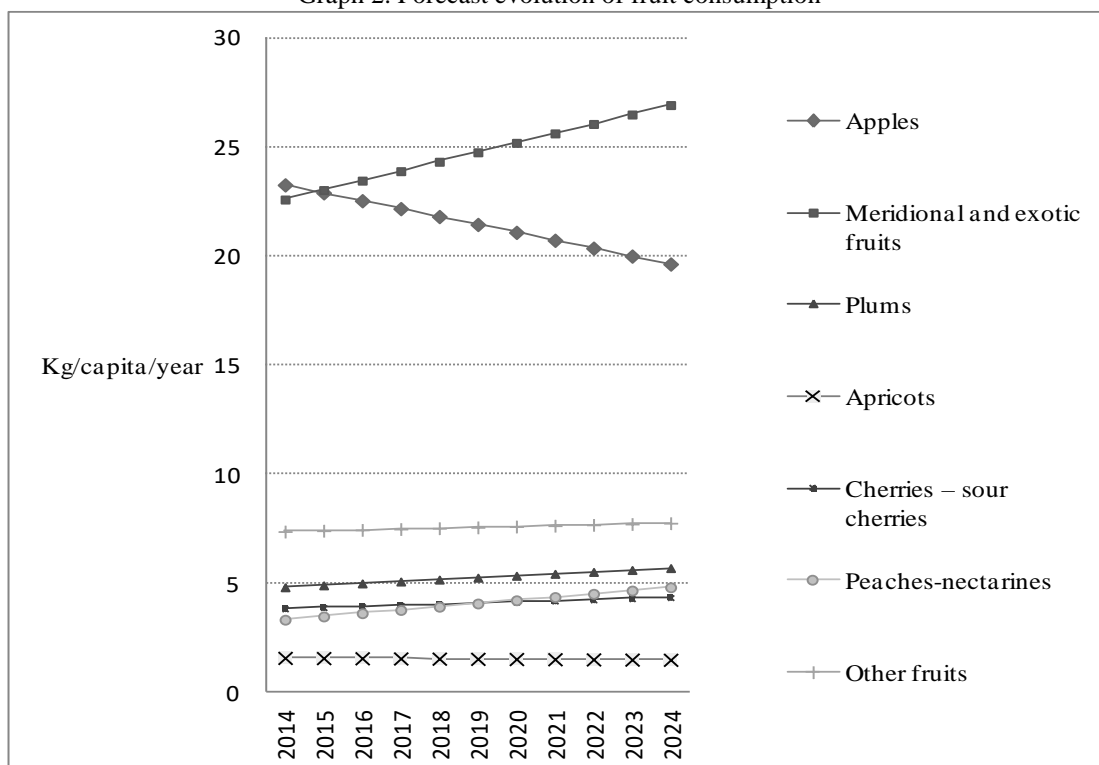
Graph 1. Self-sufficiency in fruit, in the period 2004-2013



Source: calculations based on NIS data, Supply balance sheets, 2004-2013

The estimates for the next ten years reveal fruit consumption increase, except for apple consumption, a diminution of areas and a slight increase of average yields. It is estimated that the consumption of meridional and exotic fruits will increase by 19%, while the apple consumption tends to decrease (by 16%). We estimate that the decreasing trend of apple consumption can be reversed, if the supply is adapted to the new market requirements. For peaches, the forecast indicates consumption increase by 44%, while for cherries and sour cherries by 13%.

Graph 2. Forecast evolution of fruit consumption



Source: calculations based on NIS data, Tempo online

The forecast evolution of areas and yields reveals the diminution of areas under orchards and a slight increase of average yields. The quite slow increase of fruit production will be accompanied by demand increase. In this context, under the background of decreasing areas, the slight increase of yields will offset the foreseeable deficits, yet it cannot fully cover the consumption needs.

Fruit production can increase mainly by the replacement of existing orchards and less by the enlargement of cultivated areas. The necessary investments for reaching the proposed targets can be made under the National Rural Development Plan 2014-2020, the Fruit-tree Subprogram, consisting of a set of specific measures that respond to the sectoral needs: increase of old orchards renewal rate, farm technical endowment, renewal of farmers' generations, adding value to products through processing, increasing the organization and cooperation level.

We estimate that in the period 2016-2020, the investments in new plantations should cover about four thousand hectares of apple and peach orchards respectively, while for cherry and sour cherry orchards about one thousand hectares so as to reach a self-sufficiency level of 86.5% for total fruit, while consumption per capita should increase up to 89 kg/capita, including the meridional and exotic fruits.

## CONCLUSIONS

The importance of fresh fruit consumption derives from the beneficial effects upon health, while in the multicriterial analysis of food security, nutrition quality increasingly influences people's health condition.

At present, the efforts for increasing the food security level focus on supply stability and stability of access to food. The autonomy provided by domestic production, excluding exports as a main supply source contributes to food security level increase.

Depending on the two criteria of productive potential evaluation, i.e. age and density classes, Romania's situation is quite unfavourable. This adds to the sector organization modality. There is a high fragmentation of fruit supply at producer level and consequently the production is non-homogenous, non-attractive for the large retailers and for processors.

So far, the main financing measure of the sector was represented by the financial support provided to the producer groups. As the support is devoted to the commercialization component, this measure has not responded to the concrete sectoral needs represented by great structural constraints.

Domestic supply stability is mainly disturbed by the high variability of yields and to a less extent by price volatility.

The estimates reveal the increase of fruit consumption, except for apple consumption, the diminution of areas and a slight increase of average yields. The apple consumption diminishing trend has taken place under the background of production diminution and price increase. This trend can be reversed, on the condition of constant supply and at relatively stable prices.

It can be noticed that under the background of decreasing areas under orchards, the slight increase of yields only attenuates the foreseeable deficits, and the successful implementation of the Fruit-tree Subprogram is crucial for the increase of self-sufficiency in fruit.

## REFERENCES

1. Clay, E. (2002). *Food Security: Concepts and Measurement*. Rome: Paper for FAO.
2. Graur, M. (2006). *Ghid pentru alimentația sănătoasă*. Iași: Editura Performantica.
3. Hoddinott, J. (1999.). *Choosing outcome indicators of household food security*. Washington, DC: International Food Policy Research Institute, .
4. Minot, N., & Pelijor, N. (2010). *Food security and food self sufficiency in Bhutan*. Washington, D.C.: International Food Policy Research Institute (IFPRI) and Ministry of Agriculture and Forests.