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MILK CRISIS IN ROMANIA REFLECTED BY FOOD BALANCE, 2014-2021

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Abstract

The aim of this study is to analyze milk resources availabilities and utilizations in their dynamics in the period 2014-2021 pointing out the state of production, import, export and availabilities for human consumption in order to assess in what measure food security and efficiency in milk trade are assured. The data provided by National Institute of Statistics were processed using fixed basis index, regression equations, determination coefficient, graphically illustration and comparison method. In 2021 versus 2014, the results reflected that: utilizable internal production declined by 9.3%, accounting for 51,750; availabilities for human consumption remained relatively stable, in 2021 being 48,881 thousand hl (+ 0.53%). The weight of availability of milk for human consumption in utilizable internal milk production increased from 85.21 % to 94.45%. Import reached 12,988 thousand hl, being 2.58 times higher. The share of import in availability for human consumption increased by 16.28 pp, reaching 26.57%. Milk export was by + 57.28% higher attaining 3,152 thousand hl. The share of export in utilizable production went up from 3.51% to 6.09%. Export/import ratio declined from 0.40 in 2014 to 0.24 in 2021, reflecting a negative milk trade balance. Milk consumption per capita reached 255.6 kg in 2021, being by 4.66% higher than in 2014. In 2021, a Romanian could consume in average 721.3 g milk per day compared to 689.1 g in 2014. The self-sufficiency rate decreased from 95% in 2014 to 84.02 % in 2021, due to the decline in utilized internal production. To diminish milk crisis, it is needed to offer more subsidies for sustaining dairy farming and to stop the decline in the number of dairy cows, in milk production and marketed milk and reduce imports. Processors have to offer Euro 0.5 per milk kg to Romanian farmers and not a discriminatory price of Euro 0.2.-03. Imports have to be reduced and export to be encouraged after assuring the market requirements by internal production. In this way, both self-sufficiency rate and the efficiency in milk trade could be improved.

Key words**:** *milk, resource availability, production, import, utilizations, consumption, export, Romania*

INTRODUCTION

To enable an active life and good health, people need to have at their disposal "enough safe and nutritious food which cover their dietary needs and food preferences" [4].
Any country has to take corresponding measures to ensure food security, but, at present, globally many countries are passing through a period of food crisis due to "limited resources, conflicts, economic shocks, climate change, reduction of fertilization etc" and 783 million people are facing chronic hunger"[26].
Milk is a basic food, compulsory to be consumed at any age by humans and animals because it is a complex food containing many nutrients. Cows are the main milk sources and their milk contains: 87% water and the remaining of 13% are: protein, fat, carbohydrates, vitamins (A, B2, B6, B12) and minerals (Calcium, Potassium, Phosphorus etc).
For this reason, it is recommended to be consumed a cup of milk every day. A cup of 240 g whole milk (3.5%fat) has 140 calories, 7.5 g protein, 12 g natural sugar, 4.5 saturated

fats, 2 monosaturated and 0.5 polysaturated. In a cup of low fat milk (1% fat), there are 102 calories, 8 g protein, 12.5 g sugar, 1.5 saturated fats, 0.7 monosaturated fats and 0.1 polysaturated fats [5].

A cup of 240 g cow milk has a content in Calcium equivalent to 10 cups of raw spinach or 6 cups of brown rice or 3 cups of red kidney beans or 3.5 cups of broccoli or 1 cup of almonds [6].

Milk has to be consumed for maintaining health and preventing osteoporosis, cardiovascular diseases, diabetes, cancer etc.

The highest annual milk consumption in the world in 2023 in 1,000 metric tons is in India (87,450), EU (23,650), USA (20,900), China (16,700), Brazil (10,881), Russia (6,800), United Kingdom (6,000).

In Europe, the highest consumption is in Finland (361.19), Sweden (355.36), Netherlands (320,15) and Switzerland (315.78). In Romania, the annual consumption per capita was 255.6 kg in the year 2021 [25].

In the EU-27, in 2022, the milk consumption per capita is one of the highest in the world [23].

Milk consumption is assured by milk deliveries from internal production and import from which export must be subtracted [11].

In the EU, in 2022, milk balance shows that milk deliveries were 144,652,499 tons, imports of milk equivalent were 2,959,444 tons, exports in milk equivalent were 22,983,276 and as a result, the self-sufficiency rate accounted for 116% [1, 3].

Romania has a good milk producing potential and a long tradition in raising dairy cows, buffaloes, sheep and goats. But, in the last decades dairy farming was affected by many negative factors which led to the decline in milk production [18].

Among the main factors we may specify:

- the extreme climate phenomena like high temperatures and long and severe drafts which reduced the forage production;

-the increased forage price on the market due to the non balanced ratio between high demand and low offer;

-the high price for other farm inputs (fuel, energy, medicines, services etc) [9, 10].

-the growth of production cost [13, 14].

-the low price of raw milk at delivery imposed by milk processors [14].

-problems with milk quality due to the milking system practiced in most of the small farms [22].

- the low subsidies not able to sustain dairy farmers to enhance their business;

-the existence of a non corresponding farm structure, where about 80% farms are small sized subsistence farms raising 1-2 cows, 13 % semi-subsistence farms raising 3-5 cows, and only 0.32% are commercial farms having more than 50 dairy cows, while in the EU-27, the average farm size is 17.4 cows per farm [19, 24].

-milk productivity in term of yield is small accounting for about 3,500 kg/cow/year in average at national level [21].

As a result, a part of the farmers failed, other farmers sold milk in Bulgaria to get a better price, a few farmers sold a part of their cows to other breeders, other farmers sold dairy cows to slaughterhouses [12].

In consequence, in Romania the number of dairy cows started to decline and milk production as well [17, 2] and milk deliveries to the market decreased, favouring imports of milk [16] to supplement the offer for meeting the population milk requirements and reducing the efficiency in milk trade [12, 15, 19, 20].

In this context, the paper aimed to study the dynamics of milk availabilities and utilizations in the period 2014-2021 emphasizing on internal production destined for consumption, imported amounts and exported quantities, to determine the availabilities for human consumption and self-sufficiency rate. In addition, it was determined the export/production and export/import ratio to assess in what measure milk trade is efficient or not.

MATERIALS AND METHODS

First, from the literature on the topic, there were selected the aspects of interest in this study.
The empirical data were collected from Milk Food Balance provided by National Institute of Statistics for the period 2014-2021 for which the data were available.
From "Milk Resources"(MR), there were used the data for Utilizable internal production (UIP) and Import (I), which together form this category in Food Balance, according to the formula:

MR = UIP + I .....(1)

From "Milk Utilizations"(MU), there were used the data concerning: Export (E) and Internal Availabilities for internal consumption (AFC), which together form total utilizations, according to the formula:

MU = E + AFC .....(2)

Availabilities for internal consumption (AFC) include: Intermediary consumption (IC) (forage and industrial transformation), Losses (L), Stock variation (SV) which result from the difference between the Final stock (FS) and Initial stock (IS), and finally Availability for human consumption (AHC), which is calculated using the formula:

AHC = AFC - (IC + L + SV) .....(3)

This methodology belongs to NIS regarding Food Balances [7].
In this research, the dynamics of the following indicators was studied: Utilizable internal production (UIP), Availability for human consumption (AHC), Import (I), Share of Import in Availabilities for internal consumption (AFC), Export (E), the ratio Export/ Utilizable internal production (UIP), the ratio Export (E)/Import (I) and Milk consumption per inhabitant (MCI), and also Self-Sufficiency Rate (SSR).
These indicators were analyzed in their dynamics using fixed basis index, whose formula is
Fixed basis indices, whose formula is:

$I_{FB}=(y_t/y_0)*100$ ..... (4)

Average growth rate, having the formula:

$$\bar{R}_a = (\sqrt[n-1]{\frac{y_n}{y_0}} - 1)*100 \quad .....(5)$$

Regression function to identify the trend according to the formula:

$\widehat{yt}$= bt + a ..... (6)

The data were displayed in illustrative graphics for a better understanding.
Comparison method was used to show the discrepancies between the analyzed indicators level at the end of the period versus with its beginning.
The results were correspondingly interpreted.

RESULTS AND DISCUSSIONS

Dynamics of Utilizable internal production (UIP)

This indicator reflects the capacity of the country to assure milk production from different sources, especially from cows and buffaloes and for different destinations or utilizations.
Its dynamics in the studied interval reflects a continuous decrease from 57,055 thousand hl in 2014 to 51,750 thousand hl in 2021, meaning a loss by 9.3% (Fig. 1).
The decline is a consequence of the reduction of the dairy cows stock, and yield low level determined by the reduced forage production and forage low quality and also due to breed milk potential and other factors.

Dynamics of Availability for human consumption (AHC)

The milk availabilities for human consumption results from Availabilities for internal consumption (AFC) of which Intermediary consumption (IC), Losses (L), and Stock variation (SV) are subtracted.
In the analyzed period, AHC has relatively remained stable, as in the year 2021 it was just 48,881 thousand hl, by 0.53% higher than in the year 2014, when it accounted for

48,620 thousand hl. However, in 2021 it was recorded the highest AHC, while in 2017 it was registered the minimum level (Fig. 2).

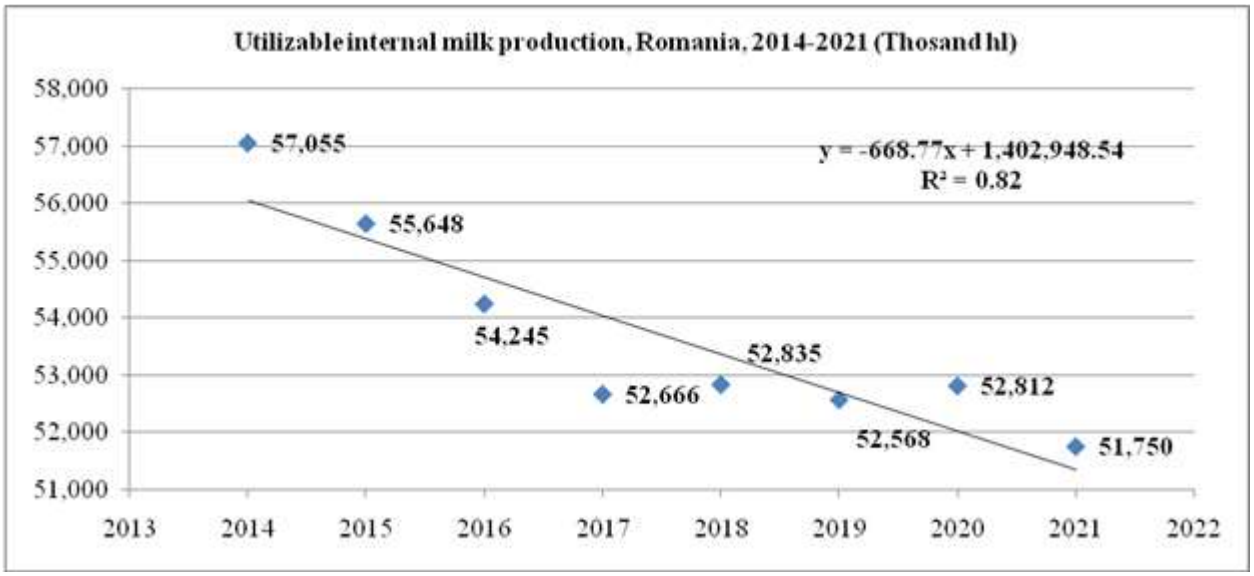

Fig. 1. Dynamics of Utilizable internal milk production, Romania, 2014-2021 (Thousand hl)
Source: Own design and calculation based on the data from NIS [8].

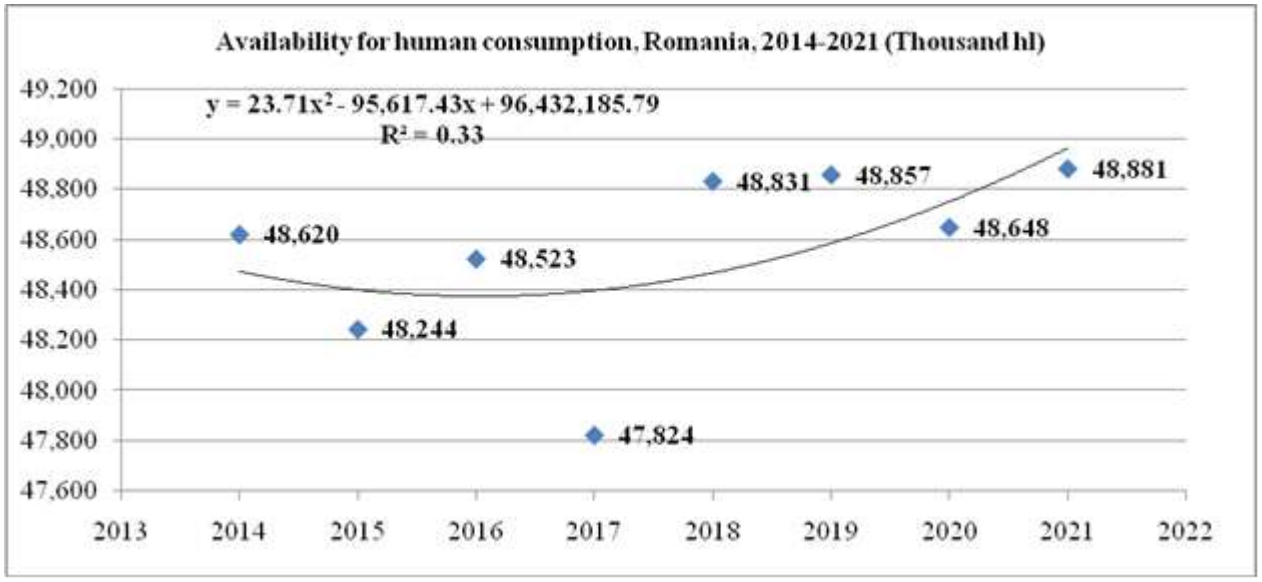

Fig. 2. Dynamics of Availability for human consumption, Romania, 2014-2021 (Thousand hl)
Source: Own design and calculation based on the data from NIS, 2023 [8].

The share of Availability for human consumption (AHC) in Utilizable internal milk production (UIP)

Taking into account the values for AHC and UIP, it was assessed the proportion in which in Romania, the availability for human consumption is assured from utilizable internal milk production. From this point of view, it was noticed an increasing percentage from 85.21 % in the year 2014 to 94.45% in the year 2021 (Fig. 3).

This increase is a positive aspect, not forgetting that Utilizable internal production declined in the same interval.

The explanation lies in the fact how intermediary consumption, losses and stock variation have influenced availability for human consumption.

In the analyzed period 2014-2021, the data showed that intermediary consumption increased by 7.28%, a growth determined by the high increase of 33.49% of industrial

transformation and also by the reduction of -3.02% of forage. Also, losses increased by 4.18% and stock variation by 2.81%.

Therefore, the main contribution to the growth of the share Availability for human consumption (AHC) in Utilizable internal production (UIP) was given especially by industrial transformation of raw milk.

The share of milk for human consumption (AHC) in utilizable internal production is closely connected with the level of food security for this product in Romania.

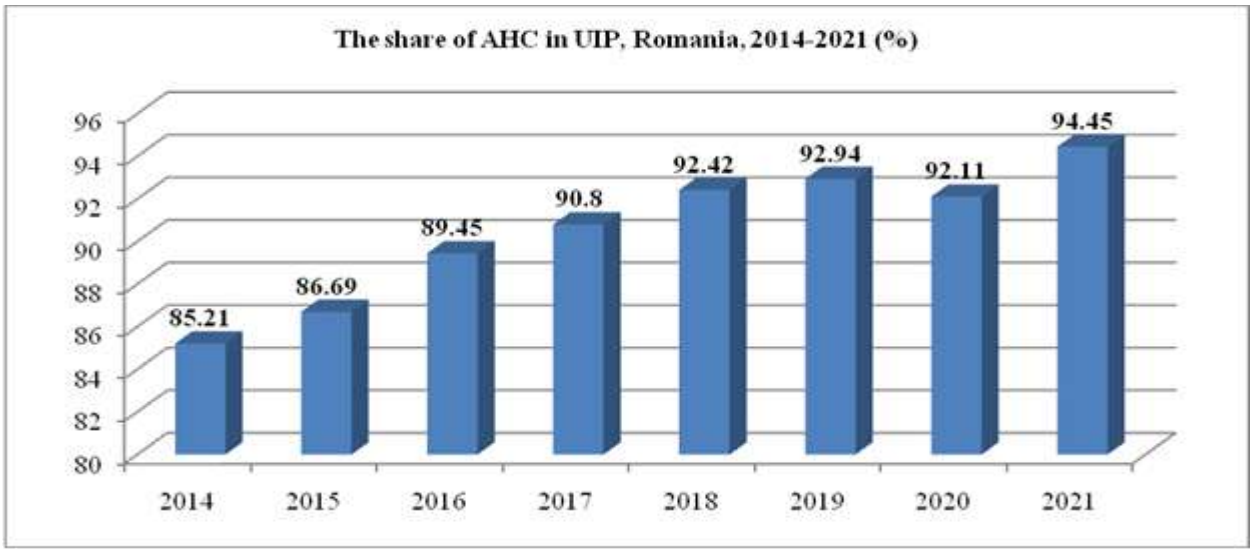

Fig. 3. Dynamics of the share of Availability for human consumption (AHC) in Utilizable internal production (UIP), Romania, 2014-2021 (%)

Source: Own design and calculation based on the data from NIS, 2023 [8].

Quantitative import of milk in milk equivalent of 3.5% (I)

In the studied period, milk import increased by 159.68%, in 2021 reaching 12,988 thousand hl, being 2.58 times higher than in 2014 when it accounted for only 5,003 thousand hl (Fig. 4).

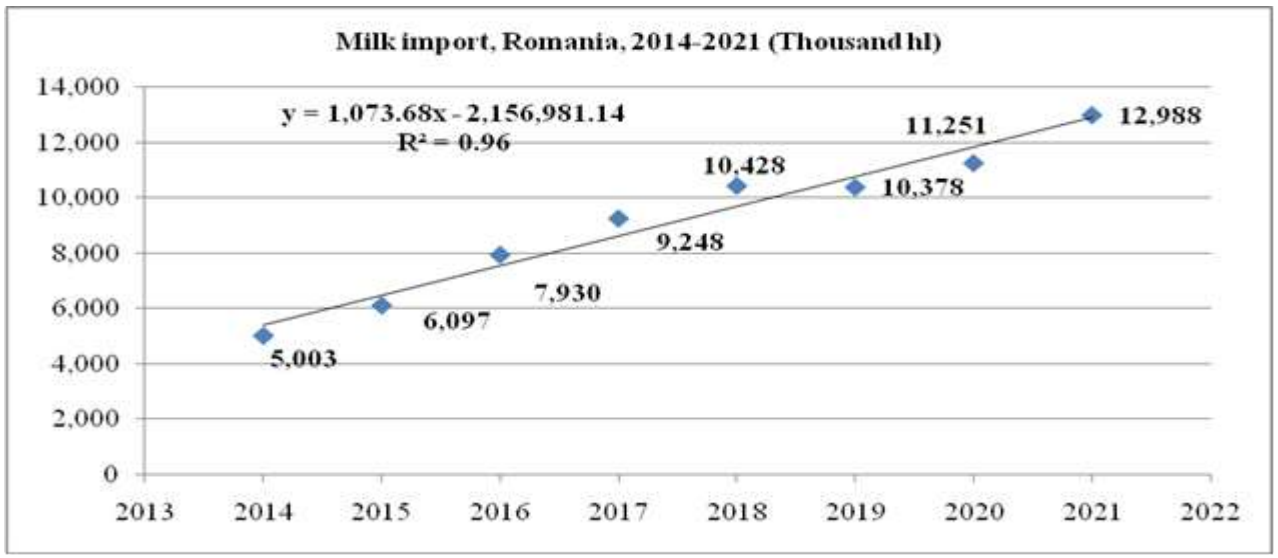

Fig. 4. Dynamics of milk import (I), Romania, 2014-2021 (Thousand hl)

Source: Own design and calculation based on the data from NIS, 2023 [8].

Import was necessary to counterbalance the reduction in usable internal milk production as specified before, due to the decline in the number of dairy cows, low milk yield, high

production cost, low price at farm gate, low subsidies, bankruptcy of some farms, and losses in dairy farming.

The share of Import (I) in Availability for human consumption (AHC)

The imported milk quantities were higher and higher from year to another which has also raised their share in the availability of milk for human consumption. In 2021, this share was 26.57% by +16.28 percentage points higher than in the year 2014, when it accounted for 10.29% (Fig. 5).

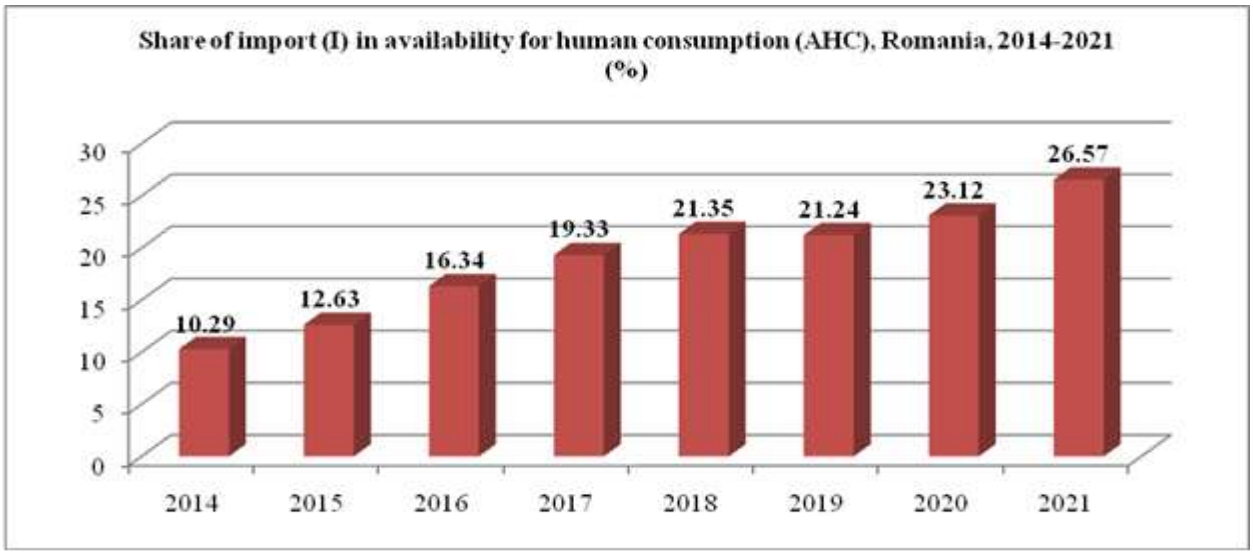

Fig. 5. Share of milk import (I) in Availabilities for human consumption (AHC), Romania, 2014-2021 (%)
Source: Own design and calculation based on the data from NIS, 2023 [8].

Exported milk quantities in milk equivalent of 3.5% (E)

Milk export had an ascending trend from 2,004 thousand hl in the year 2014 to 3,152 thousand hl in 2021, meaning + 57.28% (Fig. 6).

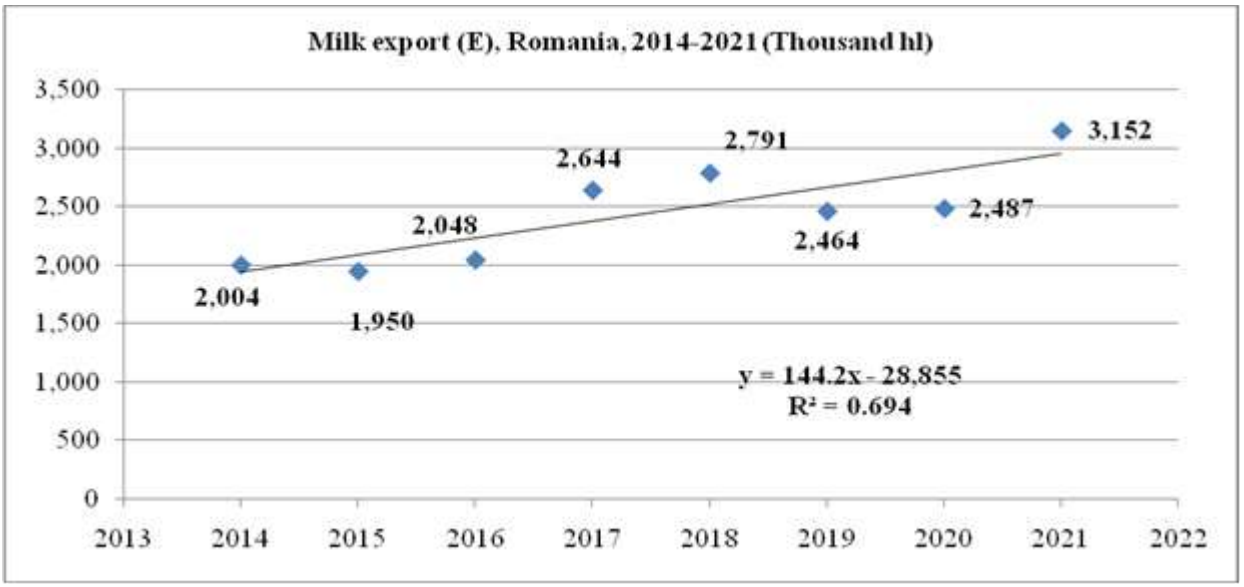

Fig. 6. Dynamics of milk export (E), Romania, 2014-2021 (Thousand hl)
Source: Own design and calculation based on the data from NIS, 2023 [8].

This is a positive aspect, taking into consideration an increased export could bring more foreign currency in the payment balance.

However, it could be also considered a negative aspect because, due to the low milk price at delivery offered by processors in Romania, some farmers sold the milk in Bulgaria for getting a higher price.

The share of Export (E) in Utilizable production (UIP)

Due to the increase in exported amounts, and decline in utilizable production, the share of export (E) in Utilizable production (UIP) has went up from 3.51% in 2014 to 6.09% in 2021, therefore, it became almost double (Fig. 7).

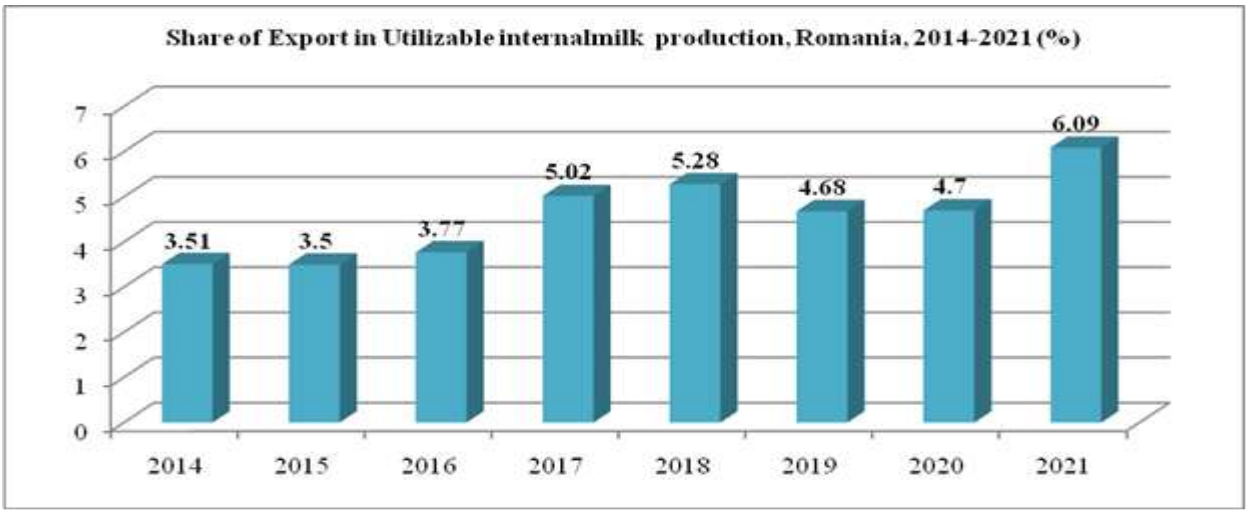

Fig. 7. Share of milk Export (E) in Utilizable internal milk production (UIP), Romania, 2014-2021 (%)
Source: Own design and calculation based on the data from NIS, 2023[8].

This could be considered a positive aspect, reflecting the capacity of the country to valorise this milk and milk products in milk equivalent of 3.5% fat, under the condition to respect quality standards and to be competitive on the external markets.

Milk Export/Import ratio

This ration between milk export and import is small and has a subunit level. If in 2014, its level was 0.40, in 2021, it declined to 0.24, which reflects that the imported milk quantity is higher than the exported amounts, and in consequence, it reflects a non efficient milk trade of the country (Fig. 8).

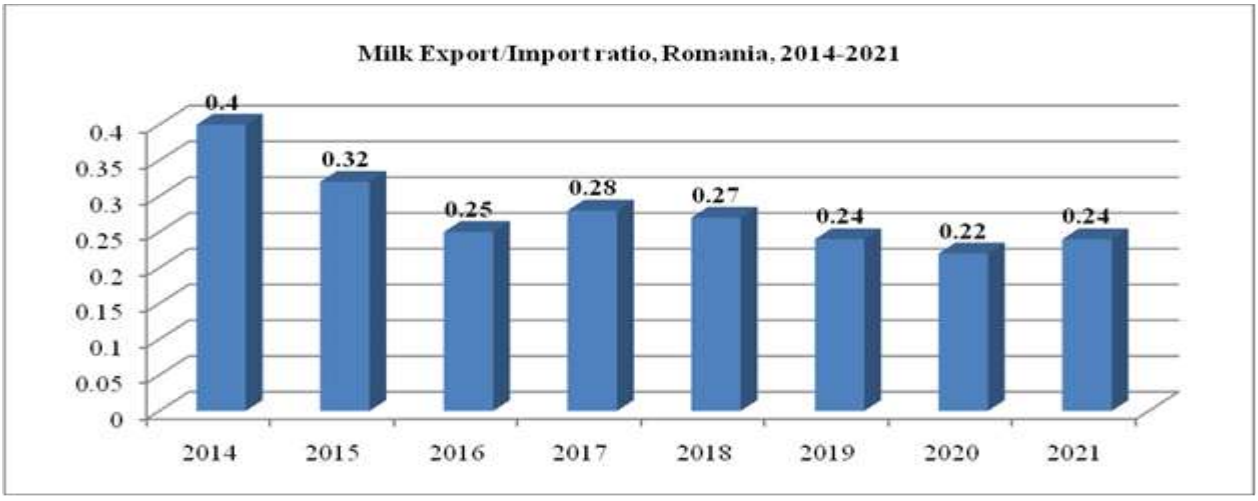

Fig. 8. Dynamics of Milk Export/Import ratio, Romania, 2014-2021
Source: Own design and calculation based on the data from NIS, 2023[8].

Dynamics of average annual Milk consumption per inhabitant

Milk consumption per capita increased year by year so that in 2021 it accounted for 255.6 kg/inhabitant being by 4.66% higher than in 2014 when it was 244.2 kg. This is a positive aspect (Fig. 9).

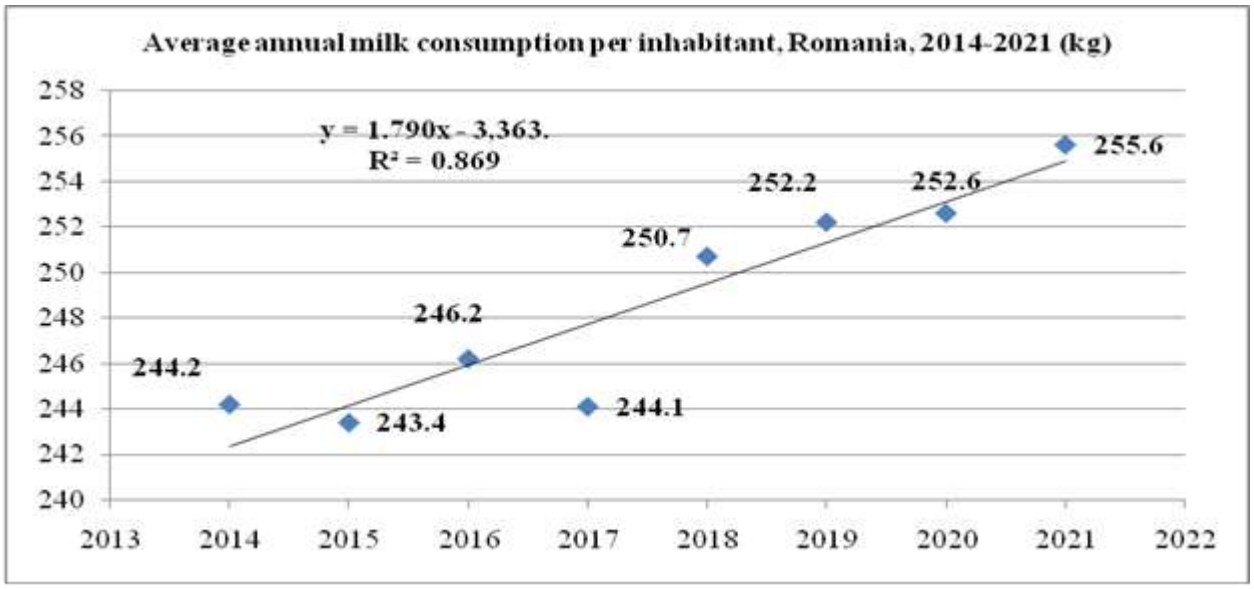

Fig. 9. Dynamics of average annual milk consumption per inhabitant, Romania, 2014-2021 (kg/capita)
Source: Own design and calculation based on the data from NIS, 2023 [8].

Dynamics of average daily milk consumption per inhabitant

Taking into account the milk consumption per year and capita, the average daily milk consumption increased by 4.67% from 689.1 g in 2014 to 721.3 g in 2021 (Fig. 10).

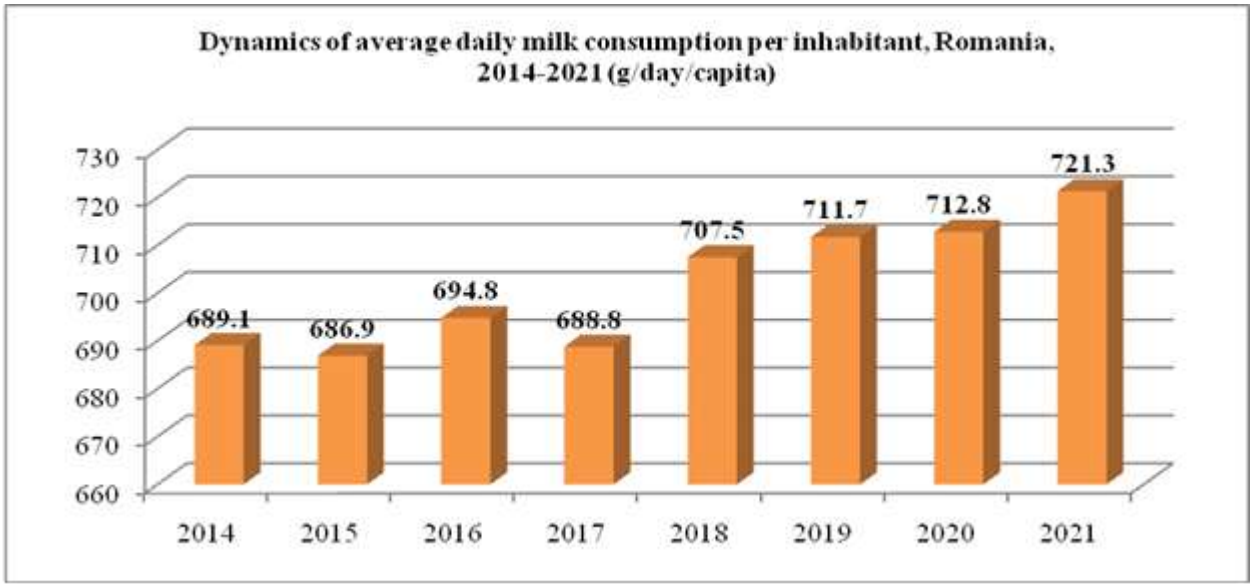

Fig. 10. Dynamics of average daily milk consumption per inhabitant, Romania, 2014-2021 (g/capita)
Source: Own design and calculation based on the data from NIS, 2023 [8].

Dynamics of milk self-sufficiency rate (SSR)

Self-sufficiency rate was determined according to the formula:

$SSR_{\%}$ = Milk delivery (C)/ (Milk delivery C + Import I - Export E)

In this case, milk delivery (C) was considered Utilizable milk production. The self-sufficiency rate registered a descending trend from 95% in the year 2014 to 84.02 % in the year 2021. This situation is explained by the decline in the utilizable milk production, increased imports and also increased exports. But, the main factor is the lower utilizable milk production, caused by the factors mention before (Fig. 11).

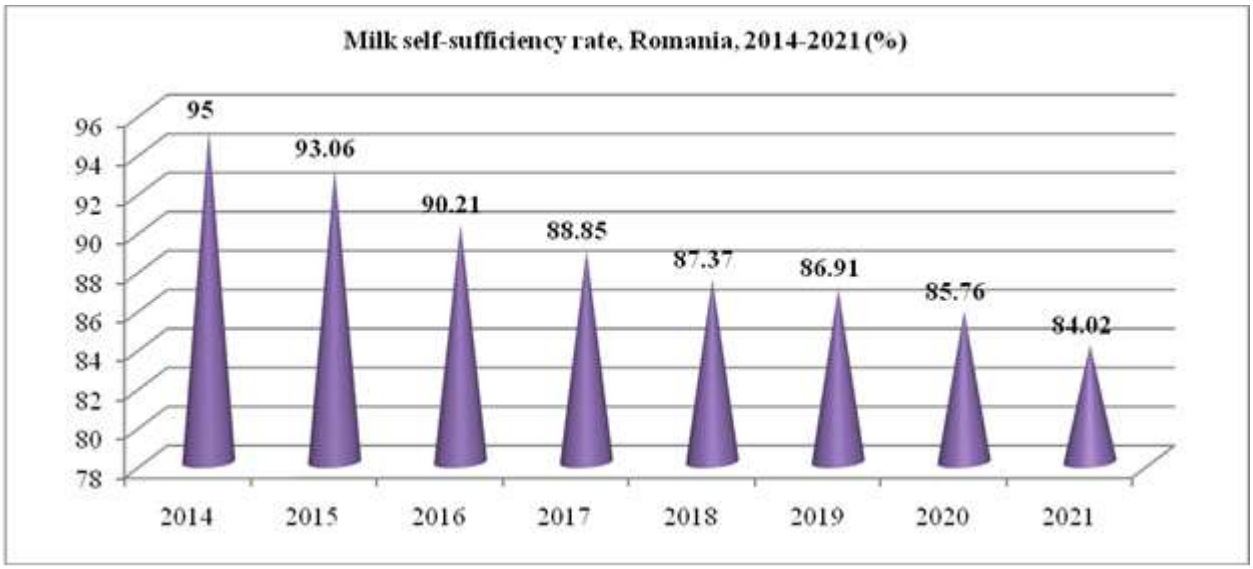

Fig. 11. Dynamics of milk self-sufficiency rate in Romania, 2014-2021 (%)
Source: Own design and calculation based on the data from NIS, 2023 [8].

CONCLUSIONS

The analysis allowed to draw the main conclusions on how milk balance reflects milk crisis in Romania.

First of all, utilizable internal milk production was in a continuous decline, from 57,055 thousand hl in 2014 to 51,750 thousand hl in 2021, recording a loss by 9.3%

Availabilities for human consumption remained relatively stable, in 2021 accounting for 48,881 thousand hl, being by only 0.53% higher.

The weight of availability of milk for human consumption in utilizable internal milk production increased from 85.21 % in the year 2014 to 94.45% in the year 2021.

Milk import registered an upward reaching 12,988 thousand hl in 2021, being 2.58 times higher than in 2014

As a consequence, the share of import in availability for human consumption increased by +16.28 percentage points, accounting for 26.57% in 2021 versus 2014, when it accounted for 10.29%.

Milk export registered an ascending trend from 2,004 thousand hl in 2014 to 3,152 thousand hl in 2021 (+ 57.28%). As a result, the share of export in utilizable production (UIP) went up from 3.51% in 2014 to 6.09% in 2021,

Export/import ratio declined from 0.40 in 2014 to 0.24 in 2021, reflecting that imports exceeds exports, which led to a negative milk trade balance.

Milk consumption per capita reached 255.6 kg in 2021, being by 4.66% higher than in 2014 when it was 244.2 kg.

The average daily milk consumption increased by 4.67% from 689.1 g in 2014 to 721.3 g in 2021.

The self-sufficiency rate decreased from 95% in the year 2014 to 84.02 % in the year 2021, because of the descending trend of utilized internal production.

In consequence this analysis led to the following recommendations:

-More subsidies for sustaining dairy farming are compulsory to diminish the decline in the number of dairy cows, milk production and

milk delivery on the internal market and to reduce imports.

-Processors have to offer a similar price with the one they provide in other EU countries, it is about Euro 0.5 per milk kilogram compared to Euro 0.2 - 0.3 they offer in Romania.

-Imports have to be reduced not to discourage Romanian farmers, who have to deliver their milk to dairies.

-Milk export have to be encouraged but after assuring the market requirements by internal production.

In this way, both self-sufficiency rate could be improved and also the efficiency in milk trade could grow.

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