

FOOD CONSUMPTION TRENDS IN ROMANIA – DIETARY DIVERSITY APPROACHES

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Abstract

Dietary diversity is an important characteristic of the diet quality, showing the nutrient adequacy and playing a significant role in nutrition security, health status and wellbeing of people. Numerous studies point out the food consumption, in the context in which highly processed low-cost foods and sugar based beverages are increasingly common. We start our research from the premise that the consumption of these categories of food increased in the last decades in Romania, slowing down the assurance of nutrition security and a diverse and healthy diet. The objective of this paper is to identify the food consumption trends for those products considered to ensure dietary diversity. The results show that the consumption of food considered to ensure the dietary diversity slightly increased over the last two decades and the consumption of sugar based food and beverages significantly increased in the same period. The relevance of the study lies in its capacity to draw conclusions upon people diet in Romania, the results serving as assumptions for future quantitative research of dietary diversity.

Keywords: *dietary diversity, food consumption, nutrient adequacy, nutrition security.*

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Introduction

Health is a concern of all people. Its determinants are very complex, among them, food is important because it brings nutrients that human body needs for an active and healthy life. Eating well contributes to reduce the risk of physical health issues, such as heart disease and diabetes. Moreover, it helps with sleeping patterns, energy levels, and wellbeing. These could be achieved through dietary diversity that improve micronutrient intake and contribute to sustainable, healthy diets.

Dietary diversity refers to nutrient adequacy, meaning the coverage of basic needs in terms of macro and micro nutrients, and to diet variety or balance (FAO, 2010). These are the two components of the diet quality. It is therefore necessary to study food consumption to conclude over the quality of the diets and, moreover, the health status of people.

Studies show that highly processed low-cost foods and nutrient poor, such as crisps, snacks, chips and others, and sugar based beverages are increasingly common (FAO&WHO, 2019). Consuming such poor nutrient food products leads to unhealthy diets which determine, furthermore, overweight, obesity, cancer, diabetes and cardiovascular diseases (Askari et al., 2020). Moreover, other studies show that pre-existing conditions such as type hypertension, diabetes, and obesity grow the severity of complications associated with coronavirus illness (COVID-19) (Katzmarzyk et al., 2020). Therefore, the consumption of unhealthy foods needs to be studied, to observe its trends over the years in Romania.

This piece of research answers the question what are the trends in food consumption in Romania, starting from the hypothesis that the consumption of unhealthy products, such as sugar based beverages and highly processed nutrient poor low-cost foods, increased over the last decades (H1) and the consumption of the products that ensure the dietary diversity slightly increased (H2). We based our assumptions on the results of other authors' studies, showing the same trends (Baker et al., 2020; Baker and Friel, 2016; Ion and Popescu, 2011; Monteiro et al., 2018; Popescu and Ion, 2017). The objective of the paper is to illustrate an image of people diet in Romania, trying to identify how diverse it is. In order to achieve this goal, the statistical data reflecting the food consumption of certain groups of products and analyzed.

The paper is structured in five parts, as follows. After the introduction, the second part contains the literature review and bibliometric analysis. The third one presents the data and the methodology, so as the fourth one discusses the results. Final conclusions are drawn in the fifth part.

1. Literature review

Worldwide, the topic of dietary diversity is present in articles, reports, debates, because its importance in ensuring nutritional security and maintaining a good health status of individuals. The interrogation of the Web of Science database on the subject of dietary diversity reported 9,692 publications, in the period 1991-2021. Their dynamics can be seen in figure no. 1. Their number sharply increased starting with 2017, reaching a peak of 92 papers in 2020. Among the 9,692 publications, almost 2,000 papers have been published in the field of nutrition dietetics, almost 1,000 in food science technology, 893 in ecology, 745 in microbiology, 711 in multidisciplinary sciences. Other articles have been written in the fields of public environmental health, zoology, biochemistry, molecular biology, agricultural dairy, animal science etc.

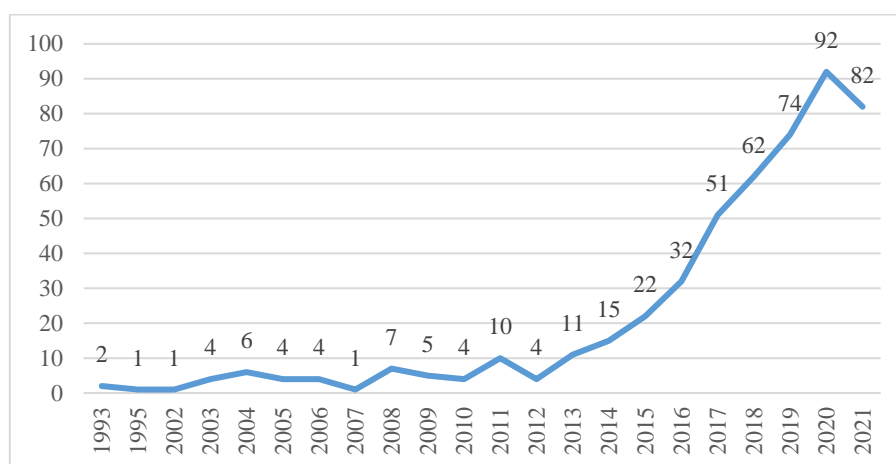


Figure 1. Dynamics of publications on dietary diversity, 1990-2021

Sources: edited by the authors based on WoS data

Using the VOS viewer program, the analysis of the results of the Web of Science database inquiry on dietary diversity continued with the identification of the connections between the terms with which this topic was associated in written papers, resulting in the map in Figure 2. Thus, five different clusters have been identified. There are numerous topics related to

dietary diversity, the strongest relationships have been identified with health, nutrition, quality, nutrition status, variety, children, women, food security, obesity, adequacy, consumption, food variety, risk, nutrient adequacy, growth, diversity, patterns, indicators, agriculture, young children, dietary diversity score, income, mortality, malnutrition, Bangladesh, food, Ethiopia, score, impact, metabolic syndrome, biodiversity, food insecurity, Africa, nutrition transition, interventions, adolescent etc.

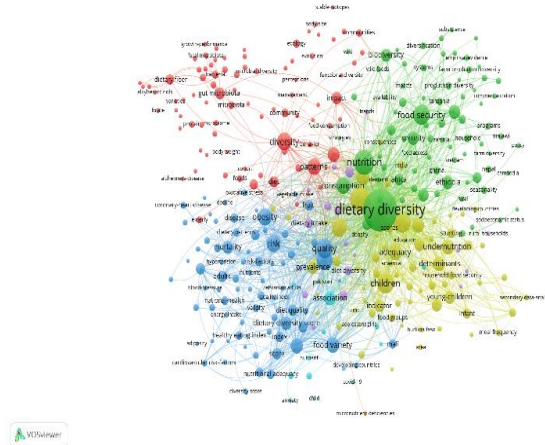


Figure 2. Links between dietary diversity and other related notions (clusters by topic)
Source: edited by the authors using VOS viewer

The research goes deep in analyzing the authors’ interests in specific topics related to dietary diversity along the years (Figure 3). While in the period 2014-2016 the preferred topics related to dietary diversity were diet quality, food variety, nutritional adequacy, mortality, risk factors, dietary patterns, in the period 2016-2018 the most papers were focused on nutrition, consumption, children, undernutrition, determinants, young children, infant, household food security. In the last couple of years, authors research dietary diversity in relation to food security, biodiversity, food access, developing countries, rural etc.

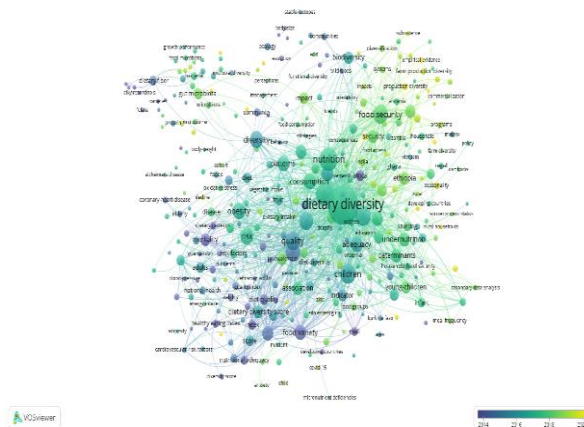


Figure 3. Links between dietary diversity and other related notions (clusters by year)
Source: edited by the authors using VOS viewer

Out of the publications reported after inquiring the Web of Science database, 12 articles refer to Europe, most of them published in WoS category Nutrition and Dietetics. Another 163 papers were written on the topic of food consumption. Thus, Sangeetha (et al., 2017) identified the food consumption pattern in one Indian region, discussing the diet diversity as well. Schwei (et al., 2017) concluded that, in order to enhance health, interventions that improve dietary diversity and the consumption of vitamin A are important areas of focus for health leaders in one region of Ethiopia. Parrapurathu (et al., 2015) showed that the level of diversity in household diets is an indirect measure of diet quality. Moreover, the level of dietary diversity is the extent to which nutritional needs of households are being met. They also found a positive relationship between dietary diversity and three of the food security pillars: availability, access and utilization. Kenedy (et al., 2010) conducted a comparative study in three African countries, in order to provide an overview of the both household dietary diversity score and food consumption score. These two indicators are used for food security assessment and surveillance. Alexandri and Kevorchian (2015) conducted a study for identifying the economic and socio-demographic factors influencing food consumption diversity in Romanian households, showing positive correlations between diversity and household incomes. Moreover, the authors argued that food diversity is higher in the case of urban households as compared to rural ones. Bearing in mind the results of the previous research, the paper aims to identify the trends of food consumption in Romania, for those categories of products mentioned in FAO reports and methodologies, considered to ensure nutrient adequacy and dietary diversity.

2. Materials and methods

The indicator used by FAO to measure the dietary diversity is Minimum Dietary Diversity (MDD), measured mostly for women. Women are envisaged because they are often nutritionally vulnerable due to the physiological demands that pregnancy and lactation require (Black et al., 2013). Specialists (Branca et al., 2015) demonstrated that requirements for nutrients are higher in the case of pregnant and lactating women than in the case of adult men. Moreover, insufficient micronutrient intakes before and during pregnancy and lactation affect both women and the development of their babies.

Minimum Dietary Diversity for Women is a dichotomous indicator showing whether or not women between fifteen and forty-nine years of age have consumed at least five out of ten defined food groups the previous day (FAO, 2021). The indicator reflects the quality of the diet, therefore it focuses on micronutrient adequacy, summarizing eleven micronutrients: vitamin A, vitamin B-6, folate, vitamin B-12, vitamin C, thiamine (B1), riboflavin (B2), niacin (B3), calcium, iron and zinc. The ten groups of food products considered for assuring micronutrient adequacy are:

1. grains, white roots and tubers;
2. pulses (beans, peas and lentils);
3. nuts and seeds;
4. milk and dairies;
5. poultry meat and fish;
6. eggs;
7. dark green leafy vegetables (spinach, broccoli);
8. other vitamin A-rich fruits and vegetables (carrots, papaya, mango);
9. other vegetables (cabbage, cauliflower, beets, celery, cucumbers, eggplant, zucchini, radish, tomatoes, mushroom);
10. other fruits (apple, avocado, banana, berries, pineapple, orange, watermelon).

Furthermore, the research continues to study the consumption of unhealthy food. The reason behind this approach is that unhealthy food is related to non-communicable diseases, nutrition transition and multiple burden of malnutrition, such as obesity. The groups of unhealthy foods are:

1. fried and salty foods (snacks, instant noodles, doughnuts, fast food);
2. sweet foods (biscuits, chocolates, candies, cakes, cookies, ice cream);
3. sweet beverages.

This piece of research refers to the average consumption of the groups of products listed before, without excluding men. The data have been retrieved from the National Institute of Statistics of Romania databases and FAOSTAT databases.

3. Results and discussions

In order to identify consumption trends in Romania, and in conjunction with the methodology presented, the consumption of all products identified in international databases (FAOStat) have been analyzed, in order to compile the model for measuring food diversity in terms of MDD indicator. Thus, after being extracted from international and national databases, the main foods consumed were centralized according to food groups and food items.

The first group of products, grains, white roots and tubers, is structured into two subdivisions, namely A. Food made from grains and B. White roots and tubers plantations.

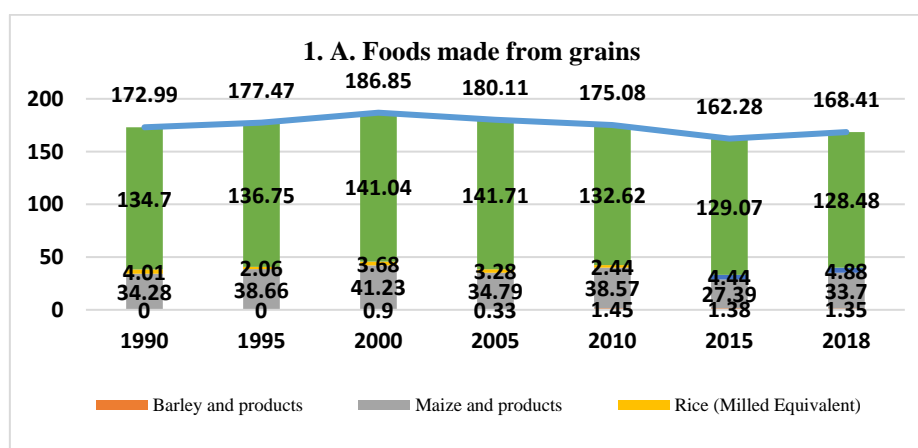


Figure 4. Consumption dynamics for group 1-Grains, white roots and tubers, subdivision A-Food made from grains (kg/person)

Source: edited by the authors using FAO Stat and NIS databases

Regarding the first subdivision, it can be observed that between 1990 and 2018, the total consumption ranged between 162 kilograms per year per inhabitant and 187 kg / inhabitant. But for this long period the average consumption was 175 kg / inhabitant being somewhat constant. Among the elements that constitute this subdivision, the wheat product with the highest weight is observed, with an average consumption of 135 kg, being slightly decreasing, with a change rate of -0.8% per year. Corn ranks second in terms of share in consumption, averaging 35 kg per year and decreasing each year by 0.3 percent. Lastly, rice consumption varies somewhere around the average of 4 kg / inhabitant, with the highest variation of 26.6 percent.

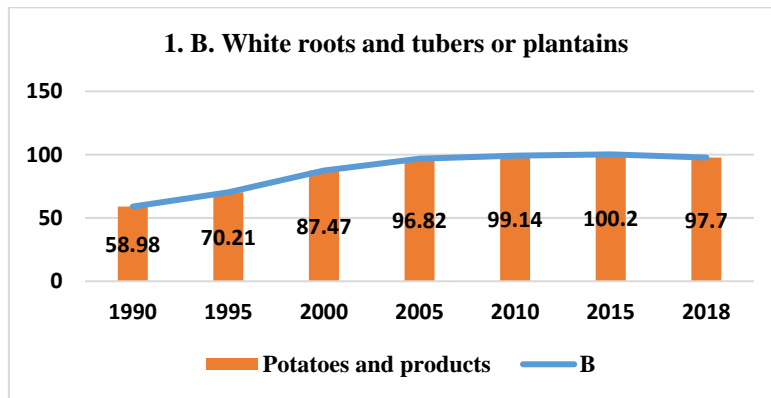


Figure 5. Consumption dynamics for group 1-Grains, white roots and tubers, subdivision B-White roots and tubers or plantains (kg/person)
Source: edited by the authors using FAO Stat and NIS databases

Regarding the second subdivision of the first group, only the consumption of potatoes was registered here, this having an increasing trend in the analyzed period varying between 59 kg per year per inhabitant and 100 kg per year per inhabitant. On average, every five years the average growth rate for potato consumption was 8.8 percent and a variation of 18.7 percent. On average, in the 28 years under analysis, the consumption of potatoes was 87 kg / inhabitant.

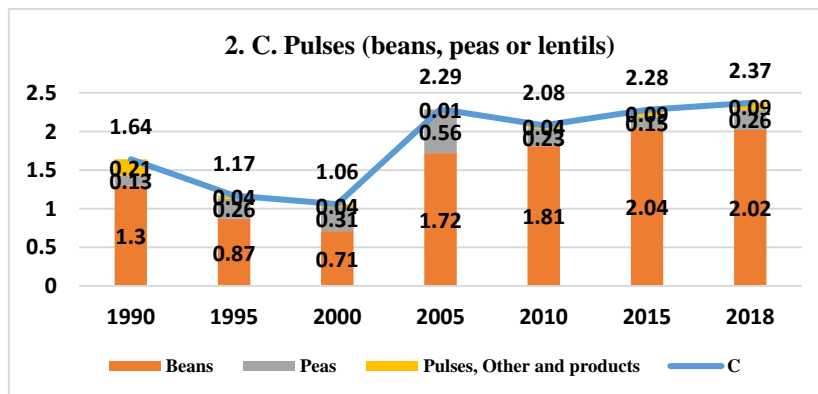


Figure 6. Consumption dynamics for the 2-Pulses group (beans, peas and lentils) (kg/person)
Source: edited by the authors using FAO Stat and NIS databases

With regard to the second food group, there is an increasing trend over the last 28 years, with consumption fluctuations for this group between 1.1 kg and 2.4 kg, with an average consumption of 1.8 kg. In 2005, there is a significant increase for this group given that the main product of this group, namely beans, has a significant increase in consumption from 0.71 kg to 1.72 kilograms per capita. On average, the consumption of beans registered a value of 1.5 kg / inhabitant and a growth rate in the five years of 7.6 percent. Regarding the consumption of peas, another product in this group, there is an increase from 0.1 kg /

inhabitant to 0.6 kg / inhabitant, on average every five years there was an increase of 12.2 percent.

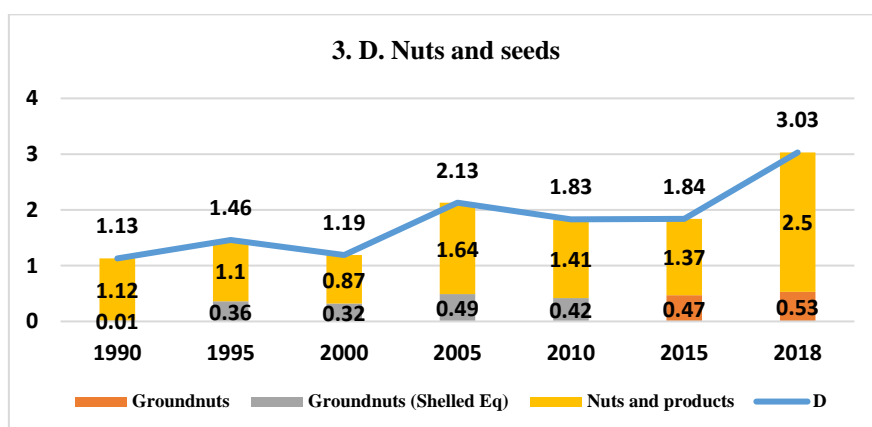


Figure 7. Consumption dynamics for group 3- Nuts and seeds (kg/person)

Source: edited by the authors using FAO Stat and NIS databases

The third group of products related to nuts and seeds registers an increasing trend of consumption from 1.1 kg / inhabitant to 3 kg per inhabitant, on average being 1.8 kg, and the five-year rate being 18 percent. The walnut product contributes the most to this category, with an average consumption of 1.4 kg and a growth rate of 14 percent for every five years.

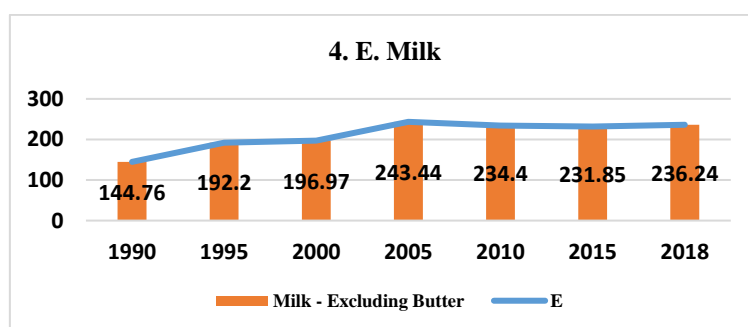


Figure 8. Consumption dynamics for the 4-Dairy group, E-Milk subdivision (kg/person)

Source: edited by the authors using FAO Stat and NIS databases

The fourth group on dairy products is divided into two subgroups, the first being on milk. There is an increasing trend in milk consumption from 145 kg per capita to 243 kg per capita, with an average consumption of 211 kg per capita. The five-year growth rate was 8.5 percent.

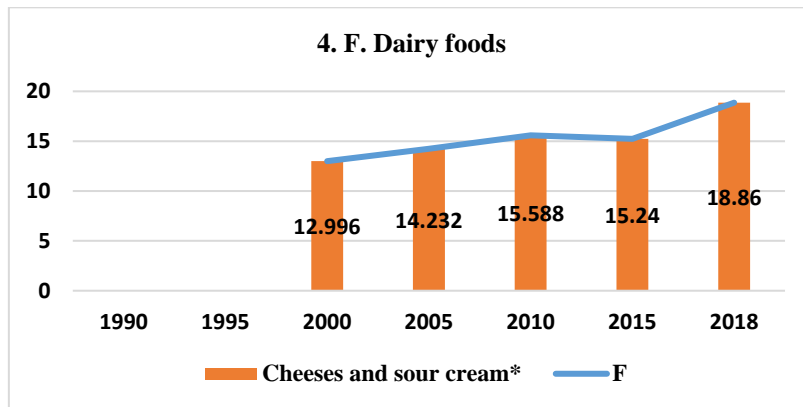


Figure 9. Consumption dynamics for the 4-Dairy group, F-Dairy foods subdivision (kg/person)

Source: edited by the authors using FAO Stat and NIS databases

Regarding the second sub-group, respectively dairy products, it should be mentioned that the data were available in the period 2000 - 2018, noting also an increasing trend of consumption, increasing from 13 kg per year to 18.9 kg per year, on average being 15.4 kg. The five-year growth rate is 9.8 percent.

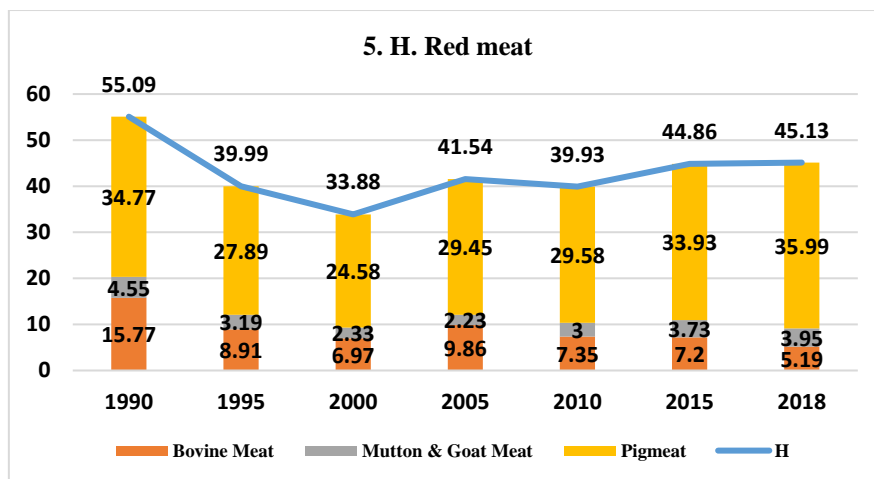


Figure 10. Consumption dynamics for group 5-Poultry meat and fish, subdivision H-Red meat (kg/person)

Source: edited by the authors using FAO Stat and NIS databases

As far as red meat is concerned, there is a decrease in consumption, starting from the value of 55 kg / person, reaching a value of 45 kg per person, on average being 43 kg per person, and the five-year rate of change being - 3.3 percent. The highest intake for this category is pork with an average consumption of 30.9 kg and a slight five-year increase of 0.6 percent, followed by beef with an average consumption of 8.8 kg, but with a very significant decrease of 17 percent every five years and the meat of sheep and goats with an average of three of 3 kg / inhabitant and a five-year decrease of 2.3 percent.

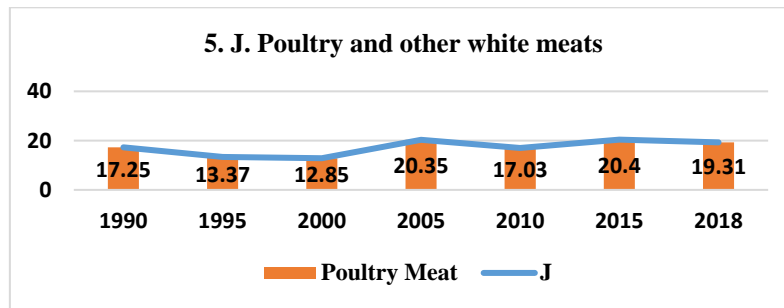


Figure 11. Consumption dynamics for group 5-Poultry meat and fish, subdivision J- Poultry and other white meats (kg/person)

Source: edited by the authors using FAO Stat and NIS databases

Regarding chicken, it can be seen that the trend of this indicator is slightly upward, quite oscillating, however, in the analyzed period the consumption being between 13 kg and 20 kg on average being 17.2 kg / inhabitant, and the five-year growth rate being only 1.9 percent.

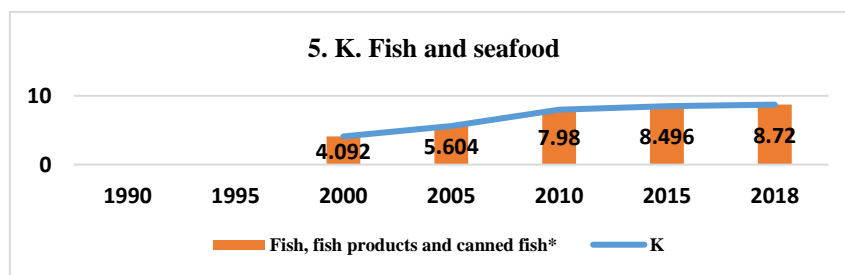


Figure 12. Consumption dynamics for group 5-Poultry meat and fish, subdivision K- Fish and seafood (kg/person)

Source: edited by the authors using FAO Stat and NIS databases

Regarding the subdivision of fish and seafood, data are recorded regarding the quantity of fish and fish products for the period 2000-2018, the consumption being an increasing one, on average every five years increasing by 20 percent. The average consumption for this category ranged between 4.1 and 8.7 kg / inhabitant on average being 7 kg / inhabitant.

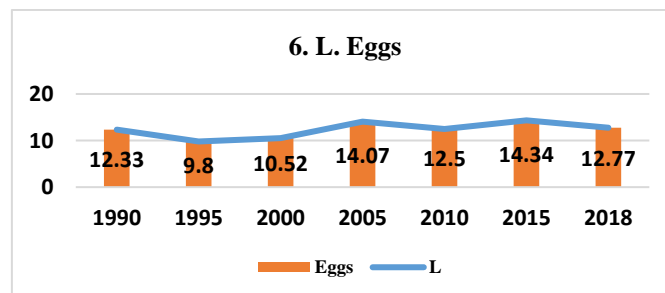


Figure 13. Consumption dynamics for the 6-Eggs group (kg/person)

Source: edited by the authors using FAO Stat and NIS databases

For the sixth group, respectively, egg products, the following levels of consumption were recorded, respectively 9.8 kg of eggs / person, increasing to a maximum period of 14.3 kg / person on average, this consumption being 12.3 kg, and the growth rate of only 0.6 we can consider that this consumption of eggs is among the most constant consumptions recorded for the analyzed groups.

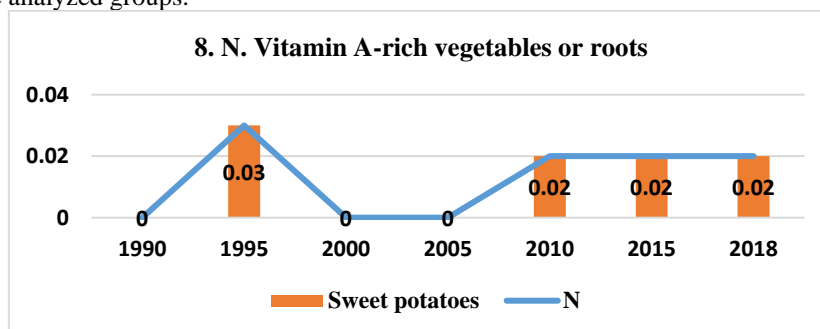


Figure 14. Consumption dynamics for group 8- other vitamin A-rich fruits and vegetables, subdivision N- Vitamin A-rich vegetables or roots (kg/person)

Source: edited by the authors using FAO Stat and NIS databases

For the eighth category or group of products relating to vegetables and fruits rich in vitamin A for the first subdivision, namely vegetables, data are observed relating only to the consumption of sweet potatoes. These data have been updated more in the last period of time being somewhat a constant consumption of only 0.02 kg per capita in our country.

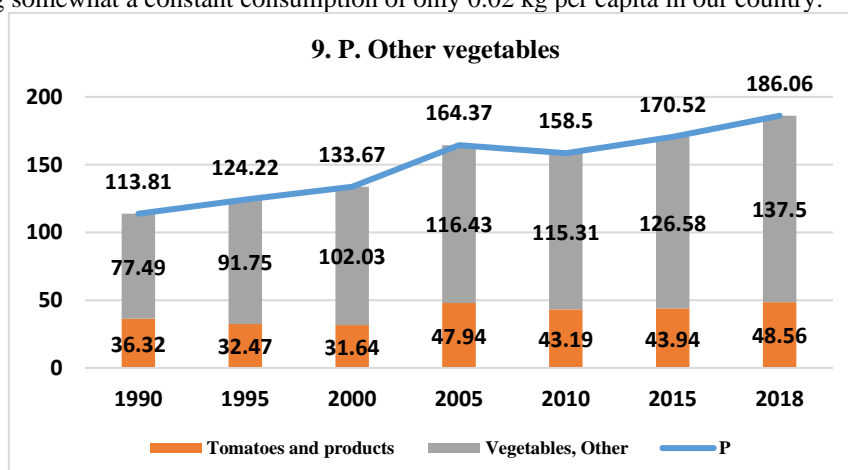


Figure 15. Consumption dynamics for the 9-Other vegetables group (kg/person)

Source: edited by the authors using FAO Stat and NIS databases

For the ninth group of products, respectively other vegetables, the consumption of tomatoes has been included, ranging between 31 kg per year to 48 kg per year, on average being 40.6 kg per year with a five-year growth rate of 5 percent. Although tomatoes have an important share in the total of this category, the most important share has “other vegetables”, this element registering consumption between 77 kilograms and 138 kg, the average being 110 kg / person and the growth rate being 10 percent.

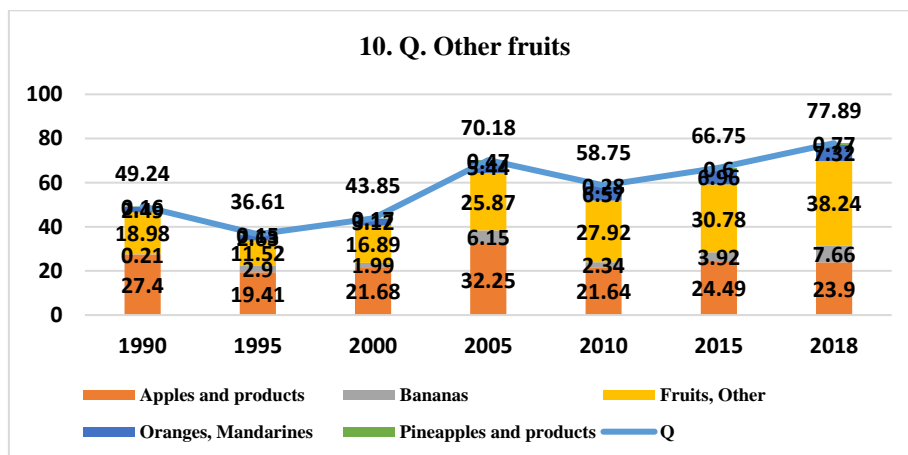


Figure 16. Consumption dynamics for the 10-Other fruits group (kg/person)

Source: edited by the authors using FAO Stat and NIS databases

For the last group, respectively "other fruits" there is a significant increase in consumption from 50 kg per capita to 78 kg / person on average being 57.6 kg per person, and the average five-year growth rate is 7.9 per one hundred. Studying the products, a somewhat equal share is observed between apples and other fruits, on average the consumption for these two products being 24.4 kg / person and 24.3 kg / person. Apples show a decreasing rate of change, and the other fruit category has a growth rate of 12 percent. On average, oranges and mandarins' consumption is 4.9 kg / inhabitant and pineapple 0.4 kg / inhabitant. It is no coincidence that we left the banana product at the end, it records the highest increase of all products, from 0.2 kg / inhabitant in 1990, when not so many bananas were present on the market, to a level of 7.7 kg. / inhabitant in 2018, on average for the entire period the consumption being 3.6 kg, and the five-year growth rate being 82 percent.

Next, the analysis of the consumption of unhealthy products was proposed, and from the three groups mentioned in the material and method section. Data regarding consumption were identified for two groups, respectively sweets and soft drinks.



Figure 17. Consumption dynamics for the Sweet foods group (kg/person)

Source: edited by the authors using FAO Stat and NIS databases

Regarding the consumption for sweet foods, it can be observed that it is somewhat constant in the period 2005 - 2018, oscillating between 2.3 kg and 2.8 kg per year per person, on average this consumption being 2.5 kg / inhabitant, with a five-year growth rate of 1.5 percent and a variation in the analyzed period of 8.9 percent.

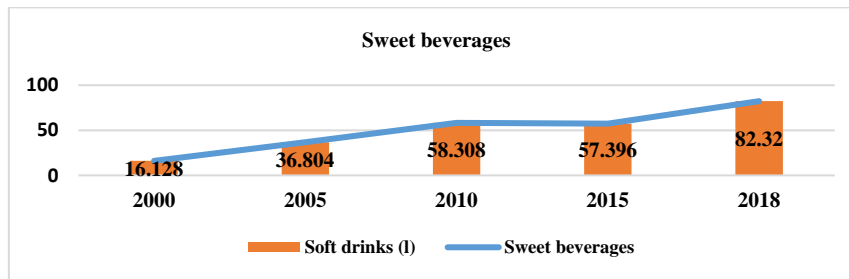


Figure 18. Consumption dynamics for the Sweet beverages group (liter/person)

Source: edited by the authors using FAO Stat and NIS databases

Regarding the sweet soft drinks, a constant increase can be observed in the period 2000 - 2018 starting from 16 l / person / year to 82 l / person / year which means a very high increase of 5.1 times. The average consumption over the entire period was 50 l / inhabitant and the five-year growth rate being 50 percent, so it can be considered that lately the population in Romania has started to consume more and more this type of product. A limit of the research should be mentioned. The consumption of water has been included in the beverages category, and this could be an explanation for the significant growth of the consumption of this category. Therefore, the authors cannot appreciate to what extent the increase in beverage consumption is caused by a real growth in consumption or by methodology.

Conclusions

The research analyzed the food consumption in Romania, for the products considered by specialists that ensure dietary diversity. The results show that the consumption increased for some groups, such as white roots and tubers, pulses, nuts and seeds, milk and dairies, fish and sea food, other vegetable and fruits, and decreased for other: foods made from grain and meat. As regards the consumption of sweet foods and sweet beverages, an increasing trend can be noticed for both categories. Thus, the hypothesis assumed at the beginning of the research that the consumption of unhealthy products, such as sugar based beverages and highly processed nutrient poor low-cost foods, increased over the last decades (H1) is validated. The hypothesis that the consumption of the products that ensure the dietary diversity slightly increased (H2) is also, validated.

We may argue that, on average, the diet in Romania is diverse enough to assure nutrition security. In order to have a better understanding of dietary diversity of people grouped by gender, age, occupation, education etc. and having the image of food consumption trends in Romania, based on secondary data, future research should focus on gathering and analyzing primary data from a representative sample of people, for better understanding the consumers' food choices and identifying the drivers of achieving diet diversity.

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