

## Optimization of Meat Consumption in Georgia in the Context of Worldwide Trends

Paata Koghuashvili\* and Badri Ramishvili\*\*

\*Department of Business Administration, Georgian Technical University, Tbilisi, Georgia

\*\*Faculty of Economics and Business, Ivane Javakishvili Tbilisi State University, Tbilisi, Georgia

(Presented by Academy Member Vladimer Papava)

According to international practice the meat consumption rate is one of the most important human welfare indicators. In Georgia, according to the latest data, this figure is 38 kilograms per capita annually representing 58.5% of a standard level. Therefore, the most important problem of Georgia's agriculture and economy in general is to rise the indicator to the physiological standard of nutrition or to 65kg. However, by increasing meat consumption rate it is impossible to meet this challenge, moreover, it will not be possible unless consumption is based on important aspects such as opportunities for local meat production, the established food culture and healthy eating standards. In order to solve the problem, the paper analyzes the experience of the world most developed countries, on the basis of which, the authors suggest an optimal meat consumption pattern for an average person in Georgia according to type of meat as follows: 50% accounts for poultry, 24% – for pork, 20% – for cattle meat, and the remaining 6% should be accounted for ovine, goat and rabbit meat. © 2020 Bull. Georg. Natl. Acad. Sci.

Meat consumption, poultry meat, beef; pork, ovine meat, physiological standards of nutrition

Rapid growth of meat production and consumption in recent decades is driven by astonishing improvements in economic and social situation of most countries of the world. For example, in 1961, one inhabitant of the world consumed in average about 20kg of meat, and 36kg by 2018. Over the same period, the GDP per capita increased for about 4 times. This link between social wealth and meat consumption, in turn, is due to the fact that animal products, especially meat and meat products have high value, and can be affordable mostly for the financially established population. However, if we undertake a planetary analysis of meat con-

sumption, we see that there are several exceptions in this respect, due to the local alimentary culture, ethno-religious issues, specific conditions of meat production and other factors: the so-called lacto-vegetarian and lacto-ovo-vegetarian diets excluding meat consumption. Recently, there has also been an increase in the number of vegetarians and vegans.

World economy of the 2020 faced completely a new problem due to spread of coronavirus. The term “coronomic crisis” appeared, which underlines the importance of events [1]. At the moment it is clear that global economy undertakes

some impediments. The isolation and deglobalisation brings negative results to the world economy and it is essential to diversify supply and value chains [2]. It is evident that current situation will affect the humankind for a long time. Although the most important in the nearest future is the health of humans and then physiological sustainability. This depends on healthy, balanced feeding. Despite the fact, in the expense of which – local production or import strategy – Georgia will choose to meet meat demands in the country. In both cases it will be essential to define optimal consumption of volumes and structure of meat, to which this work is dedicated.

According to the physiological standards of nutrition established in the former Soviet Union, the average person requires about 65-73 kg of meat and its by-products per year. These standards were based on the well-justified medical research. Some fluctuations in the standard were due to several reasons, most of which were associated with climatic conditions in the region and the employment profile of the population. For Georgia, located in the south of empire and covered the main part of subtropical area, the low value of this standard was considered acceptable because fruits and vegetables were more affordable products for the local population. It should also be noted that the vast majority of the population of Georgia, taking into account the employment profile and conditions, did not need a special diet that includes the prevalence of animal products, especially fats, in the diet of the population of the industrial centers in the North of the Soviet Union. Therefore, the average annual consumption of meat and its by-products for the average resident of Georgia was about 65 kg. We believe that using these data as a common guideline would be appropriate for our further research.

One problem is to achieve it physiological standard of nutrition, while the other is to achieve this in an optimal way, meaning to meet the demand by local production. This would, among other

things, allow Georgia to retain its population, especially in rural areas, especially in the mountain countryside. After all, meat production is one of the most labor-intensive industries, and its development will contribute to growth in the capacity of Georgian rural area, and this will raise this rate to the optimal 300-330 thousand of employees [3].

The specific conditions of meat production have a great influence on the populations' dietary habits in countries with similar resources. These are primarily extensive pastures or the other type of a stable food base, fertile agricultural land, good climatic conditions, water resources and a large area. When we face these factors, the first thing that is developing is cheap cattle breeding, however, it is clear that the opportunities for other types of animal or poultry meat production are also increasing. We can point to seven countries on earth, where the above listed basic production conditions exist. These are: the United States, Argentina, Australia, Brazil, Canada, Chile and New Zealand, that it is in those countries that meat consumption per capita is highest. The only exceptions in this regard are the European Union and Israel, which we will discuss next.

The people in seven countries listed above took the liberty of having the right to eat large quantities of meat, and specifically cattle meat, which is considered particularly expensive, accounts for a significant proportion in meat consumption patterns. The expensiveness is due to the quantity of food intake. These seven states themselves can be parted into two groups. The first group will consist of the United States, Australia, New Zealand and Canada, where along with favorable framework conditions of meat production, the level of economic development is high as well. The second group of countries will consist of Argentina, Brazil and Chile. In terms of the GDP per capita, these countries can be considered the moderately advanced countries, but owing to favorable conditions of cattle breeding, production of cheap

meat allows their people to consume this product at a high level.

High rates of meat consumption in the EU and Israel are provided by the highly developed agriculture and the healthy economic environment. Of particular note is Israel, where, for religious reasons, pork is not consumed at all, and it is replaced by poultry meat.

The examples of Norway and Japan are also interesting. These countries are among the world leaders in terms of economic development, but the rate of meat consumption is quite low there. In our view, the main reason for this is a high proportion of fish and seafood in the diet of their inhabitants. This is especially true for Japan.

Switzerland is an exemplary country for Georgia in terms of an economic development model, especially of agricultural development model. In terms of the GDP per capita, it is one of the world leaders, however in 2018, meat consumption was below the physiological standards of nutrition (we are primarily guided by data provided by the Organization for Economic Cooperation and Development, although there are also other various information sources). This could be explained by the increase in the number of followers of healthy nutrition. This view is also supported by the fact that since the mid-1970s, when the per capita meat consumption was more than 75kg [4], this figure has been declining steadily.

Table shows the data for 2018 on meat consumption pattern, as well as the deviation from the physiological standards of nutrition, which we calculate as the difference between the upper and lower limits of the physiological standards of nutrition and the meat consumption rate existing in a particular country. For example, data on countries, where the per capita consumption rate is lower than 65kg, will be presented in the corresponding column of Table marked „-“, while data on countries with the per capita consumption rate more than 73kg are marked „+“, and the

figures ranging between 65 kg and 73 kg we treat as being within the normal range, and they are marked „=“. As we can see, averaged data of the European Union and Canada are within the normal range. The per capita meat consumption rate in seven countries presented in Table is above normal, while in eighteen countries, the equivalent figure is below the standard, at a time when the tables considered in this paper present data of countries members of the Organization for Economic Cooperation and Development and Georgia. It is obvious that the situation in the rest of the world would be even worse.

In meat consumption patterns, we have discussed the consumption rates of poultry, pork, cattle and ovine meats, although goat meat may also be included in the latter. This is the case in Georgia, for example. In some countries, the consumption of other types of meat may also be of some significance (for example, in China, given the country's highly varied cuisine), but globally, in quantitative terms, it should not be substantial, so it is not usually accounted.

Until recently, pork was dominant in meat consumption pattern in the world, in the diet of the major consumers such as China and the European Union, and pork still is the highest percentage in the diet, although there has been a recent increase in poultry consumption, which is due to several factors. First, it should be noted that poultry meat is the most inexpensive, as compared to production of other meat products, the cost of feeding stuffs is several times lower. However, owing to its biological characteristics, poultry is considered to be a fast-growing sector. For example, “in 50 days after hatching, the weight of broiler chicken and duck multiplies by 40 times, the weight of egg-laying hens - by 13.5 times, and the weight of turkey multiplies by 15.6 times. Meanwhile, the live weight of a piglet of the same age increases 12.3 times, while the live weight of veal increases only 1.97 times” [5]. Trends in healthy nutrition observed in developed countries contribute to an

increase in poultry meat consumption. It is a well-known fact that poultry meat is rich in animal proteins and low in cholesterol as compared to other types of meat.

From a socio-economic point of view, great importance is attached to achieving an appropriate level of the physiological standards of nutrition in meat consumption in Georgia, which we determined at a level of 65 kg. At the same time, it is also necessary to identify meat consumption pattern, which should be based mostly on local production opportunities, the established food culture and the principles of healthy eating.

By 2018, an average annual meat and meat products consumption per capita was 38 kg in Georgia, and structurally this volume was divided by type as follows: 47.4% accounted for poultry, 28.9% - for pork, 21.1% - for beef, and 2.5% accounted for ovine and goat meat. In our view, these proportions, which have been established as a result of the impact of market forces, are not going to change significantly, although some adjustments are desirable. In addition, if we also take into account that meat consumption per capita in Georgia should increase by 27 kilograms, these adjustments can be made smoothly.

**Table. Meat consumption pattern and the deviation from the physiological standards of nutrition**

Countries	Poultry meat, %	Pork meat %	Beef and veal %	Sheep meat %	+,- (Kg)
USA	50.0	23.1	26.3	0.6	+26.3
Argentina	42.5	12.0	44.4	1.1	+16.9
Australia	47.8	23.7	20.4	8.1	+19.2
Switzerland	27.9	43.5	25.9	2.7	-13.7
New Zealand	52.6	25.9	15.9	6.1	+1.9
Norway	30.9	36.3	24.6	8.2	-9.4
Israel	74.6	-	23.6	1.8	+22
Brazil	51.6	15.9	31.7	0.8	+4.2
Chile	48.9	25.5	25.1	0.5	+1.6
Russia	50.0	31.2	16.6	2.2	-2.2
Kazakhstan	31.6	10.3	40.7	17.3	-17.6
Ukraine	54.2	32.1	12.9	0.8	-26.1
Canada	49.1	23.3	26.1	1.5	=
Paraguay	12.9	52.6	33.3	1.2	-23.9
United Kingdom	45.6	28.5	19.2	6.7	-4
Mexico	55.7	26.1	17.2	1.0	-13.3
Turkey	60.1	-	26.5	13.4	-32.9
Iran	70.6	-	16.6	12.8	-32.4
Japan	41.5	39.8	18.2	0.5	-24.3
China	23.7	62.2	7.8	6.3	-16.1
Indonesia	69.1	9.1	18.2	3.6	-54
Malaysia	88.2	9.8	-	2.0	-9.8
Vietnam	25.5	56.5	17.7	0.3	-12.4
Nigeria	17.6	21.6	25.5	35.3	-59.9
India	66.7	5.5	13.9	13.9	-61.4
European Union	33.1	49.8	15.1	2.0	=
Georgia	47.4	28.9	21.1	2.5	-27
World	40.9	35.4	18.4	5.3	-30.3

Table prepared based on data provided in: World Bank data - URL <https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?view=chart>, Meat consumption. OECD data. - URL: <https://data.oecd.org/agroutput/meat-consumption.htm>, National Statistics Office of Georgia (Geostat) - URL: <https://www.geostat.ge/>

In our view, the rate of poultry meat consumption in Georgia should be at least at a level of 50%, which, according to the physiological standards of nutrition, is equivalent to 32.5kg in absolute numbers. The poultry industry must be diversified, and special attention should be attached to promoting the local production and consumption of turkey meat. Consumption of ovine and goat meat should be significantly increased, especially the latter, as goat is a traditional farm animal for western Georgia. To this category the rabbit meat should also be added and the total consumption rate of ovine, goat and rabbit meat should be increased substantially, and meat rationing should make at least 6%, or about 4kg. There are no large reserves for the growth of beef consumption in Georgia, so at best, it will remain at a level of about 20%, which, according to the physiological standards of nutrition, is equivalent to 13kg. The remaining 15.5kg, or about 24%, will be attributed to pork, which will always remain an important part of the meat rationing due to Georgian dietary habits.

Particular importance is attached to achieving an appropriate level of the physiological standards

of nutrition in meat consumption in Georgia (by our calculations – 65 kg). The proportions that have been established as a result of the impact of market forces on the consumption of different types of meat should not change significantly, although some adjustments are possible. In addition, it should also be taken into account that meat consumption per capita in Georgia should increase by 27 kilograms that allows to make these adjustments smoothly.

The poultry industry must be diversified, and special attention should be attached to promoting the local production and consumption of turkey meat. Consumption of ovine and goat meat should be increased significantly.

An important basis of meat consumption pattern presented in the paper is that it should be covered by local production. We should also remember that meat is a valuable product, and development of its local production will increase the productivity, net rent and, consequently, the price [6] of Georgian land, and this will allow it, as an important asset of agricultural production, to become fully involved in economic activities.

*ეკონომიკა*

## საქართველოში ხორცის მოხმარების ოპტიმიზაცია მსოფლიოში არსებული ტენდენციების ფონზე

### პ. კოლუაშვილი\* და ბ. რამიშვილი\*\*

\*საქართველოს ტექნიკური უნივერსიტეტი, ბიზნესის ადმინისტრირების დეპარტამენტი, თბილისი, საქართველო

\*\*ივანე ჯავახიშვილის სახ. თბილისის სახელმწიფო უნივერსიტეტი, ეკონომიკისა და ბიზნესის ფაკულტეტი, თბილისი, საქართველო

(წარმოდგენილია აკადემიის წევრის ვ. პაპავას მიერ)

მსოფლიო ეკონომიკას 2020 წელს სრულიად ახალი პრობლემა წარმოექმნა კორონა ვირუსის გავრცელების გამო. შექმნილი ვითარება მრავალი მიმართულებით მოახდენს გავლენას კაცობრიობაზე, თუმცა ყველაზე მნიშვნელოვანი უახლოეს პერიოდში ადამიანის ჯანმრთელობა და ფიზიოლოგიური მდგრადობა იქნება, ეს კი, დიდწილადაა დამოკიდებული ჯანსაღ, დაბალანსებულ კვებაზე. საერთაშორისო პრაქტიკიდან გამომდინარე, ხორცის მოხმარება კეთილდღეობის ერთ-ერთ მნიშვნელოვან მაჩვენებლად ითვლება. თუმცა, სამწუხაროდ, საქართველოში ეს მაჩვენებელი უკანასკნელი მონაცემების თანახმად მოსახლეობის ერთ სულზე 38 კილოგრამს შეადგენს წელიწადში, რაც ნორმის მხოლოდ 58.5%-ია. შესაბამისად, საქართველოს სოფლის მეურნეობის და მთლიანად ეკონომიკის უმნიშვნელოვანესი პრობლემა ამ მაჩვენებლის კვების ფიზიოლოგიურ ნორმამდე, 65 კგ-მდე, აყვანა. მაგრამ, პრობლემის დასაძლევად ხორცის მოხმარების მექანიკური ზრდა არ კმარა, უფრო მეტიც, ეს ვერ მოხერხდება თუ მოხმარება არ დაეყრდნობა ისეთ მნიშვნელოვან ასპექტებს როგორცაა ხორცის ადგილობრივი წარმოების შესაძლებლობები, კვების დამკვიდრებული კულტურა და ჯანსაღი კვების სტანდარტები. ყოველივე ეს კი, ხორცის მოხმარების ოპტიმალური სტრუქტურის დადგენით უნდა გადაწყდეს. სტატიაში ამ პრობლემის გადასაწყვეტად გაანალიზებულია მსოფლიოს მოწინავე ქვეყნების გამოცდილება, რის საფუძველზეც ავტორები საქართველოს საშუალო მოქალაქისთვის ხორცის მოხმარების ოპტიმალურ სტრუქტურას იძლევიან, რაც პროცენტულად შემდეგნაირად გამოისახება: მოხმარების 50% უნდა მოდიოდეს ფრინველის ხორცზე, 24% ღორის ხორცზე, 20% მსხვილფეხა რქოსანი პირუტყვის ხორცზე, ხოლო დანარჩენი 6% კი ცხვრის, თხისა და ბოცვრის ხორცზე.

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