



# The Romanian Swine Market in the EU Context

Silviu STANCIU\*

## ARTICLE INFO

### Article history:

Accepted October 2014

Available online December 2014

### JEL Classification

M21, L11

### Keywords:

Domestic market, Food crises,

Nutritional facts, Pork

## ABSTRACT

Pork is a traditional food product for Romania, representing more than half of the annual meat consumption per capita. Swine farming is an activity mainly at full time households, ensuring subsistence, representing a source for commercial exchanges, ensuring workforce stability in the rural areas. The Romanian pork production has presented a slightly fluctuating evolution in recent years. The paper proposes a review of the domestic production, consumption, origin and price of swine sold in the Romanian market. The community competitive conditions, the export limitation and food crisis (horse meat scandal, spoiled meat scandal, swine fever or swine flu) affected domestic production and exports. Data used in this paper represent statistical information provided by specialized national, European or global institutions, information presented in the media, journals, food industry treatises/dissertations or official information submitted by the Ministry of Agriculture.

© 2014 EAI. All rights reserved.

## 1. Introduction

Meat represents an important food product for human nutrition due to the significant intake of proteins, minerals, vitamins and specific micronutrients, which ensure the necessary balance for human metabolism. The high technological meat potential helps in increasing shelf life and in obtaining high nutritional value products, which are easily digestible by consumers and are profitable for processors. Obtaining the necessary meat quantities for the world population involves the selection of some fast growth cycle breeds, which are suitable for intensive growth systems. As compared to other domestic animals that are raised for red meat production, the swine present a short development cycle, high prolificacy, an omnivorous diet and a better fodder capitalization efficiency than ruminants. The superior slaughter efficiency as compared to other domestic species, the sensory characteristics and the meat's high energy value imposed this species in meat consumer preferences. Although lately there has been a great advance in poultry production, pork still occupies the first places in world meat consumption and production, the intensive swine breeding being one of the most profitable branches in the livestock sector. In Romania, swine are traditionally raised for meat and fat in households, ensuring the nutrition of the population and an income source by the exploitation of animals.

## 2. Literature review

There is a range of scientific publications about pork consumption production at a global or regional level and about the influence of its consumption on consumer health. Kanerva (2013) carried out a study about meat consumption for 8 European states, highlighting the relationships that exist between the standard of living, urbanisation, cost factors, industrialisation and health issues and pork consumption. The influence that pork consumption on consumer health is dealt with by Nanji and French (1985), Jiménez-Colmenero, Carballo and Cofrades (2001), Delgado et al. (2001), Walkera et al. (2007). The implications of quality systems on West European pork production systems are assessed by Kanis, Groen and De Greef (2003). Galloway et al. (2007) use modern methods in the pork production natural factor influence analysis. The identification of decision factors in pork purchase process by European consumers is performed by Ngapo et al. (2003) and Verbecke et al. (2010), respectively. In Romania, research regarding swine number dynamics and meat production obtained in slaughterhouses in the context of European fund accessing, including swine production chain vertical integration in agricultural cooperatives was conducted by de Luca, Cionga and Giurcă (2012). Istudor et al. (2002), Parjol (2006) use mathematical methods in order to optimize pork profit. Istudor et al. (2008) analyse pork distribution and production along the principles of traceability.

## 3. Materials and methods

While conducting the research in order to write this paper, different sources were consulted: journals, treatises from the nutrition or food technology domain, scientific papers published by specialised

\* The Bucharest University of Economic Studies, Dunarea de Jos University of Galati, Romania. E-mail address: [ssstanciu@ugal.ro](mailto:ssstanciu@ugal.ro) (S. Stanciu)

organisations. For legal information, there have been used official bulletins made by Romania's government and by different government organisations (ANSVSA). Statistical data was taken from national (Tempo Online – INS), community (Eurostat Database – The European Commission) or international (Faostat - FAO/ONU) statistical databases. Scientific information was selected from official communiqués or the economic media. The data collected was adequately ordered and processed, using statistical methods, it has been properly graphically represented and interpreted. The research was rendered difficult by the limited availability and the lack of information update in public documents.

#### 4. Pork consumption and production in the international context

According to the National Institute of Statistics (2014), food product annual average consumption per inhabitant in physical units represents “the quantity from a product or group of food products (primary or processed) consumed by an inhabitant in the reference period, regardless of the source of supply (wholesale, retail, restaurants, canteens, cafeterias, institutional households etc.) or of the place of consumption (individual households, restaurants, canteens, cafeterias, institutional households etc.)” The average consumption per inhabitant constitutes an economic indicator for food consumption, being relevant for the population standard of living and the economic development stage of a country (Murgescu, 2010). Meat consumption value for large demographic concentrations is relevant only if it is correlated with the number of inhabitants.

The data presented in table 1 illustrate production, transaction and consumption dynamics of the main types of meat worldwide. Pork occupies the most important position in global meat production in 2012, with a weight of about 37%, being followed by poultry (35.2%), cattle and buffalo (22.2%), sheep and goat, respectively, with a percentage of 4.6%. In small quantities, in some areas there are some other types of meat that are traditionally consumed: camels, yaks, horses, ostriches, game animals, some exotic or wild animals. In commercial terms, chicken meat is the most traded product, pork occupying the third place, after beef. The significant reduction in meat consumption in poor areas of the world, mainly out of economic reasons, have a major influence on the global consumption indicator. The FAO statistics (2014) present a slight decrease in average meat consumption, of about 0.1 kg./inhabitant in 2013, although at the level of economically developed countries there is a moderate increase of about 0.3 kg./inhabitant (table 1). China represents the area with the area with the greatest percentage in meat world consumption with 42% in 2012 and 43% in 2013. The second position in the world's greatest meat consumers was occupied in 2013 by the European Economic Community, with a percentage of 22% of the entire consumption (Larsen, 2012). For the period 2014 – 2023, European forecasts regarding meat consumption are optimistic. Thus, after the significant decrease which became manifest in the period 2007 – 2014, because of the economic crisis and of the limited offer, a moderate raise of up to 31.8 kg./inhabitant is forecast until 2023.

According to the USDA report (2014), the increase in pork demand on the Chinese market, as long as the number of breeding animals from this country decreased, will lead to an increase in global exports of about 4% in 2015. The European embargo, trade interdictions and the restrictions imposed because of animal epidemics will decrease imports on the Russian Federation market. Pork production in the USA will raise with about 5% in 2015, reaching 10.9 million tons and about 2.5 million tons exports, especially due to the increase in demand in Mexico and in the Asian markets. The number of animals bred for meat has been constantly raising in the last years, correlated with the demand existant on the world's meat market (Fig. 1). As compared to 1990, the biggest increase was recorded in the number of poultry, which doubled in the analysed period (104.5%). Moderate increases were recorded in the number of sheep and goats (20.6%), cattle (16.5%) and swine (13.8%), respectively. (fig.1)

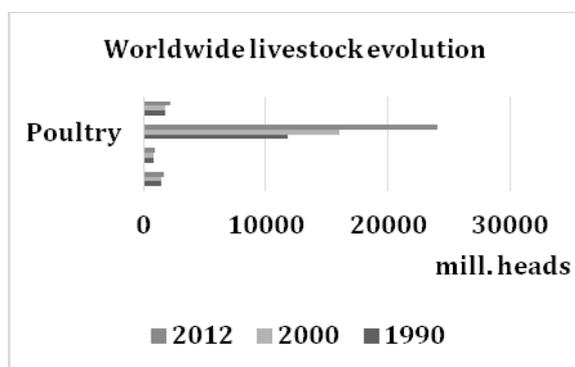


Fig 1. Meat domestic animal number, global evolution (FAO, 2014b)

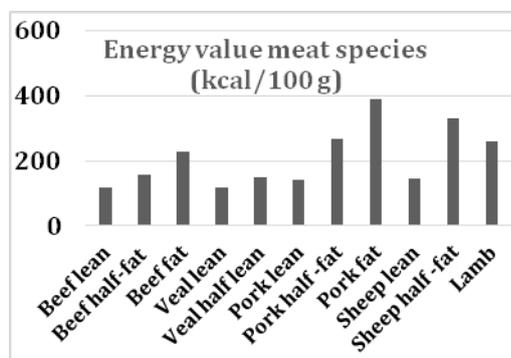


Fig. 2. Energy value for beef, sheep, swine (Graur, 2006; USDA, 2014)

## 5.1 Pork production in Europe

The European area, mainly represented by the countries of the European Union, is the second biggest meat producer after China, covering about 16% of global production. According to the EC (2014), meat community production will record a moderate decrease in beef, from 7.8 million tons in 2013 to 23.4 million tons in 2023 (a moderate increase due to environment constraints from some producing countries) and a positive trend for poultry production, which will reach 13.6 million tons in 2023, with an increase of approximately 30% as compared to 13 million tons reached in 2013. Although 2013 recorded the lowest European meat consumption in the last 11 years (64.7 kg./inhabitant), the EC specialists forecast (2013) an increase of up to 66.1 kg./inhabitant in 2023, which is practically a comeback in 2011 (fig 3). According to the report Prospects for Agricultural Markets and Income in the EU 2013-2023 (2013), there still exists a gap of about 10 kg./inhabitant between meat consumption in Western countries and the countries that have just joined the EU (fig.4), which became manifest especially because of the different beef consumption in the two regions (12 kg. in EU – 15, as compared to 4 kg. in the countries that have just joined the EU – N13). This difference will probably be diminished in the next years, taking into consideration the significant increase in chicken meat consumption. Chicken meat represents the most dynamic sector in the community area, its production and consumption evolution being explained by the increase in demand, its perception as a diet food, the improved quality and the relatively small price as compared to other types of meat (Stanciu, 2014). Pork is on the first place in the European consumer ranking regarding preferences in terms of types of meat, tendency which will be maintained in the next 10 years (Agrobroker, 2014). In the following period a community consumption reduction is estimated regarding beef and sheep meat (USDA, 2014), which is illustrated in figure 2.

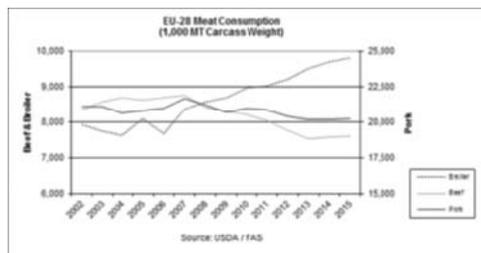


Fig. 3 European meat consumption (tons) (USDA, 2014)

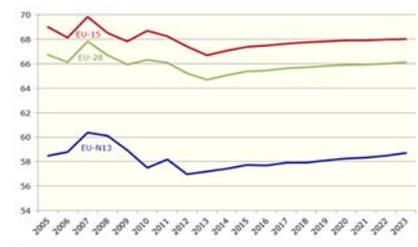


Fig. 4 Total meat consumption in retail weight (kg per capita) (EC, 2013)

Although European forecasts foresee an increase in chicken meat consumption, pork will remain European consumers' favourite in the next few years (fig. 5).

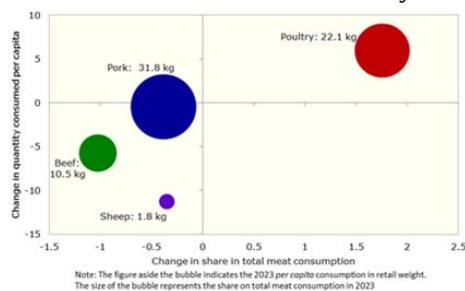


Fig. 5 EU meat consumption in 2023 as compared to 2010-12 average (%) (EC, 2014)

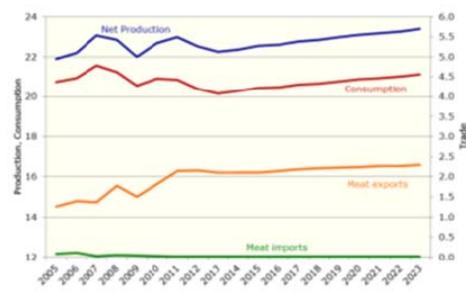


Fig. 6 EU pork market development (million tons) (EC, 2014)

According to the USDA report (EU-28 Livestock and Products Semi-annual 2014), the European swine number will continue its decrease, with an annual decrease of 1.5% per year (16 million heads in the last 7 years), higher in the case of breeding animals (19% - 3 million heads in the last 7 years). The decrease in the number of swine is more obvious at the countries that have just joined the EU because of the restructuring processes carried out by the most important producers, of the increase in productivity, of the high food costs, of the sector's low profitability as compared to the poultry one or of the new regulations regarding animal protection.

Pork European exports will continue to raise in the period 2012 – 2023, especially due to the demand manifest on Asian markets (fig. 7), with an average annual rate of 1%, much smaller than the annual increase recorded in the decade 2001 – 2011. Political differences with the Russian Federation and the conflict in Ukraine reduced European exports in those areas, which were previous to the crisis important partners for community producers (fig. 7). The relatively high prices for cereals/fodder led to a rise in the price of pork in 2012 and in the first part of 2013, existing a slight moderation in the increase in the second half of 2013 (fig.

8). According to forecasts, it is possible that the price of pork produced in Europe, which is highly influenced by the price of cereals, follow worldwide forecast evolutions, reaching 2100 euros/ton in 2023 (fig. 8).

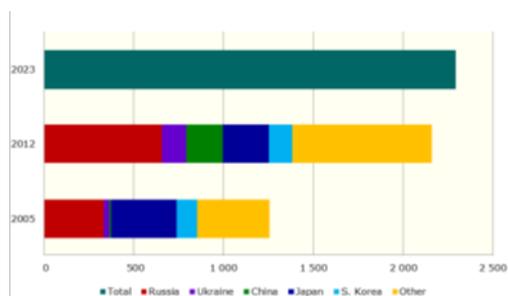


Fig. 7 EU pig meat export developments ('000 tons) (EC, 2014)



Fig. 8 Forecast price and possible price paths for EU pork (EUR/tonne) (EC, 2014)

## 6. Pork production and consumption in Romania

Swine breeding represents a traditional activity in Romania because pork is an important food product for the local population nutrition. In Romania, swine ensure over 50% out of the total meat consumption. For local producers pork is a source for trade exchanges, ensuring the food and the workforce in rural areas. Pork consumption increased significantly during the Ottoman rule, exceeding sheep meat consumption, taking into consideration religious restrictions on meat consumption imposed by Islamic concepts. During the communist period, Romania had 15 million pigs, enough to ensure domestic consumption and to obtain important export benefits. Beginning with 1990, the number of pigs permanently decreased on the Romanian territory, reaching approximately 4.5 million heads in 2014 (fig. 8, table 2). Domestic consumption, estimated at about 11 million swine per year, is 70% covered from imports. Low cereal production, the economic crisis, subsidy removal in 2010, community interdictions on Romanian pork exports (imposed in 2013 because of the swine flu), the big livestock farm disappearance, farmland division and rudimentary animal breeding, the food sector recent critical situations led to local production reduction and external partner dependence, mainly community partners. Romania exports agricultural raw materials and imports swine carcasses or pork products, causing an important deficit in the balance of trade. Fresh pork import in 2010 is almost equivalent in point of value to the whole corn quantity exported in the same year (INS, 2014). At present, pork production is mainly extensively achieved, in households, the accent being laid on consumption and subsistence. Agricultural exploitation analysis, carried out by Luca, Cionga and Giurcă (2012), relying on the Agricultural Census in 2010, highlights the fact that 80% of local farms raise one-two heads, 17.9% raise three-nine heads and only 413 farms raise more than 100 swine. Almost 40% of the national number of swine are raised in the 187 professional certified farms with only 400 heads.

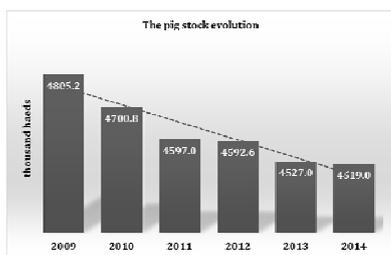


Fig. 8 Local swine number evolution

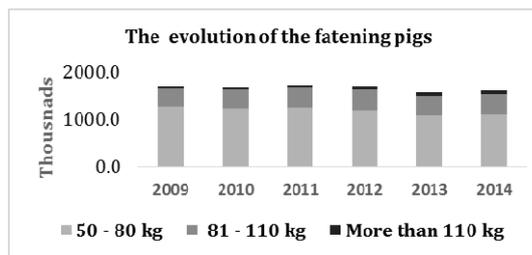


Fig. 9 Fattening swine number evolution

As compared to Germany (18.4%), France (9.6%) or Poland (7.2%), the Romanian swine market represents only 2.9% of the total production at community level, although, as natural potential, it has twice as many farmland per inhabitant as compared to the European average. Swine number reduction is reflected in the decrease in the number of fattening animals (fig. 9), activity which is mainly unfolded in specialised farms, while also reducing average slaughter weight (fig. 10). With a density of swine population of approximately 59 animals/100 ha., Romania recorded a decrease of about 10% of this indicator (fig. 11). The rapid decrease in the number of breeding animals (sows and boars) (fig. 9, fig. 13) jeopardizes the local sector existence, as consumption became totally dependent on imports.

Animal slaughter is performed traditionally in households, mainly for religious holidays. In order to avoid the transmission of diseases (trichinosis, swine fever etc.) and obey community legislation regarding animal treatment, there were established a series of procedures and restrictions referring to the method of slaughter and consumption. A short-term assessment of the sector on the basis of the data provided by INS (2014) during the period March 2013 – February 2014 shows that the total number of slaughtered swine

increased with 27.2%. For the same period, swine slaughter in specialised industrial units increased by 1.7%, and their carcasse weight decreased with 1.5%. The great majority of slaughter of animals coming from intensive breeding farms is performed in an industrial system, in modern units, which obey the regulations regarding animal welfare, in accordance with the ANSVSA (2009) regulations. The return for animal slaughter is superior in the case of swine, as compared to other butcher animals' meat or poultry (table 5, table 6). Thus, the industrial return obtained for swine slaughter is 60 – 80%, almost double as compared to the cattle and sheep (table 5).

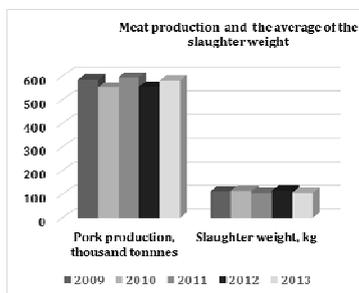


Fig 10. Pork production and slaughter average weight evolution

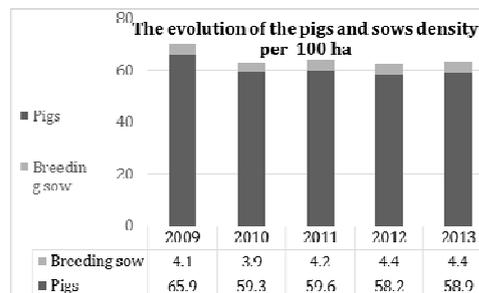


Fig. 11 Swine population average density evolution for 100 ha

Swine capitalisation is complex, the great majority of slaughterhouse by products being edible, as compared to other butcher animals or poultry (table 6). Losses due to seizures are insignificant, representing only 10% as compared to cattle or 15% as compared to sheep.

Pork is highly appreciated by consumers for its special sensory features (taste, tenderness and succulence), for its high nutritional value (due to the high quality proteins and to the mineral components – table 7) and for its important energy value (fig. 2). Pork consumption/inhabitant is directly connected with product availability and the consumer purchasing power. The Romanian consumer purchases approximately 60 – 65 kg. of meat and meat products annually, down with 25% as compared to 2009, much under the European average (Dusleag, 2014). Out of the consumed quantity, pork represents approximately 50%, chicken meat approximately 25 – 30%, and beef almost 18 – 20%. Sheep and goat meat consumption is insignificant. Pork consumption evolution is a descending one, a decrease of approximately 3% being recorded every 5 years (fig. 12). The reasons for consumption reduction are mainly economic ones, if we take into consideration purchasing power reduction, poverty and strong competition from the part of chicken meat, which is significantly cheaper. The concerns for a healthier diet, food crises (the swine flu, the dioxin-contaminated pork scandal, the beef substituted with horse meat scandal) are other factors which led to consumption reduction (Stanciu et al., 2013).

Although pork is perceived as a high fat food, a comparative analysis of the main components of pork, beef or sheep meat (table 7) indicates an identical cholesterol level of the beef and pork muscular tissue (60 mg/100g) and 10% lower than sheep meat muscular tissue. Protein intake, the main nutritional motivation of meat consumption, is close to the three types of meat/analysed muscular tissue, fluctuating around 20%. The fat content from lean pork is only 1g/100 g. higher than lean beef and with only 0.5g as compared to sheep meat. Significant differences among the 3 types of analysed red meat, from a composition point of view, appear only for 1<sup>st</sup> or 2<sup>nd</sup> quality, for which fat meat content is superior, although it presents a similar protein content. Pork energy value is the highest within the three analysed types, its consumption bringing a significant calorie intake to the human body (fig. 2). For lean pork, energy value is almost equal to lean sheep and it is close to the semi-fat beef. Therefore, from a nutritional and energy point of view, pork is a valuable food product, with some more valuable features than beef or sheep meat. Nevertheless, pork consumption must be carefully analysed, trying to avoid inferior quality categories, rich in fat, especially in case of health problems or special diets. The method of cooking is also an important factor, which can affect consumer's health more than pork composition. Own consumption, a characteristic element for fresh meat in Romania, is due to the high percentage of rural population, to traditions, to the low economic level and to breeding animals in own households. Transilvania is characterised by a high own consumption of pork, this fact being mainly due to traditions in making and consuming meat products. Own fresh meat consumption cannot be quantified and this represents a drawback. In many cases, this may favour tax evasion, carried out by unauthorised small merchants (Georgescu, 2009).

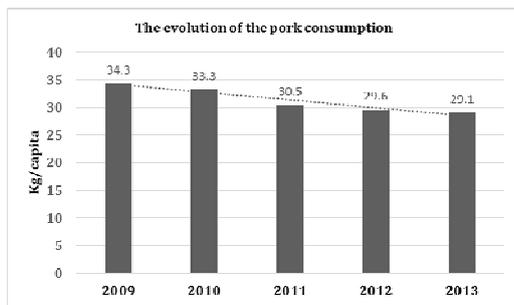


Fig.12 The evolution of pork consumption in Romania

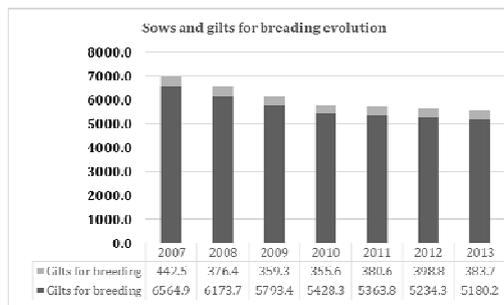


Fig.13 Breeding sow number evolution

Another trend, specific to the Romanian consumer, is the purchase of important quantities of fresh meat, trend which is favoured by the ongoing promotions in supermarkets and hypermarkets, which is frozen and subsequently consumed (Georgescu, 2009). The reconsideration of some pig breeds, whose meat is low in cholesterol (such as the Mangalitzza or the Vietnamese pig) and obtaining some meat products which have low fat content represent trends that must be analysed and capitalized by producers (Tudor, 1997).

## 5. Conclusions

The article carried out an analysis on pork national market in a community and international context, by highlighting the already existing trends in swine production and consumption. The comparative assessment of the energy and compositional features of pork, beef and sheep meat emphasized pork quality, scientifically justifying a rational food consumption, without any nutrition risks for the consumer. Identifying some breeds of pigs with a compositionally-different meat (such as Mangalitzza or the Vietnamese pig) or the use of some new cooking methods can lead to some diet food products. The economic and technical analysis of the slaughter process highlighted the superior efficiency for swine, as compared to cattle, sheep or goats. The Romanian consumer's preference for pork, which is manifest both at the level of consumption and at the existent local market demand, the available agricultural potential, the experience in swine breeding and tradition are all factors which can lead to re-launching domestic production in the terms of some support from the authorities.

## Acknowledgements

This paper was co-financed from the European Social Fund through Sectorial Operational Programme Human Resources Development 2007-2013, project POSDRU number /159/1.5/S/138907 "Excellence in scientific interdisciplinary research, doctoral and postdoctoral school, in the economic, social and medical fields-EXCELIS", coordinator The Bucharest University of Economic Studies.

## References

1. Agrobroker, (2014), *Consumul de carne din Uniunea Europeana va creste incet in urmatorul deceniu*, retrieved from <http://www.agrobroker.ro>;
2. Autoritatea Națională Sanitar Veterinară și pentru Siguranța Alimentelor- ANSVSA. (2009), *Bunastarea animalelor*, retrieved from <http://www.ansvsa.ro/?pag=40>;
3. Banu, C. coord.(2009), *Manualul inginerului de industria alimentară*, Editura ASAB, Bucuresti;
4. Delgado, C., Rosegrant, M., Steinfeld, H.,; Ehui, S.,; Courbois, C., (2001), *Livestock to 2020: the next food revolution*, *Outlook on Agriculture*, 30 (1), pp. 27-29, DOI: <http://dx.doi.org/10.5367/00000001101293427>;
5. Dusleag, O. (2014), *Romanii si-au redus consumul de carne cu 25% in ultimii 5 ani*, *Wall Street Journal* (25.08.2014), retrieved from <http://www.wall-street.ro/articol/Companii/169668/romanii-si-au-redus-consumul-de-carne-cu-25-in-ultimii-5ani.html#ixzz3OUTR> ;
6. European Comission, (2013), *Prospects for Agricultural Markets and Income in the EU 2013-2023*, retrieved from [http://ec.europa.eu/agriculture/markets-and-prices/medium-term-outlook/2013/fullrep\\_en.pdf](http://ec.europa.eu/agriculture/markets-and-prices/medium-term-outlook/2013/fullrep_en.pdf);
7. FAO (2014a), *Meat & Meat Products Report, Animal Production and Health*, retrieved from [http://www.fao.org/ag/againfo/themes/en/meat/backgr\\_sources.html](http://www.fao.org/ag/againfo/themes/en/meat/backgr_sources.html) ;
8. FAO, (2014b), *Food Outlook - Blannual report on global food markets*, retrieved from [www.fao.org/3/a-i4136e.pdf](http://www.fao.org/3/a-i4136e.pdf);
9. Galloway, J., Burke, M., Bradford, E., Naylor, R., Falcon, W., Chapagain, A., Gaskell, J., McCullough, E., Mooney, H., Oleson, K., Steinfeld, H., Wassenaar, T., Smil, V. (2007), *International Trade in Meat: The Tip of the Pork Chop*, *AMBIO*, 36(8), pp. 622-629, DOI: [http://dx.doi.org/10.1579/0044-7447\(2007\)36\[622:ITIMTT\]2.0.CO](http://dx.doi.org/10.1579/0044-7447(2007)36[622:ITIMTT]2.0.CO);
10. Georgescu, O., (2009), *Carne proaspata: scad autoconsumul si importurile*, *Revista Progresiv* (09.2009), retrieved from [http://archive.magazinulprogresiv.ro/articol/676/Carne\\_proaspata\\_scad\\_autoconsumulsi\\_importurile.html](http://archive.magazinulprogresiv.ro/articol/676/Carne_proaspata_scad_autoconsumulsi_importurile.html);
11. Institutul National de Statistică INS., (2014), *Baza de date TEMPO - serii de timp*, retrieved from <http://statistici.insse.ro/shop/?page=tempo1&lang=ro>;
12. Istudor, N, Anica-Popa, L., ANICA-POPA, I. (2008) *Traceability systems in growing pig industry*, *Multifunctional agriculture and rural development (III)* pp. 385-389;
13. Istudor, N., Manole, V., Ion, R.A., Pirjol, T., (2004), *Mathematical model for optimizing the profit of the pork meat chain*, *Journal of Applied Quantitative Methods*, 2(4), pp. 507-516;
14. Jiménez-Colmenero, F., Carballo, J., Cofrades, S., (2001), *Healthier meat and meat products: their role as functional foods*, *Meat Science*, 59 (1) pp. 5-13;

15. Kanerva, M. (2013), *Meat consumption in Europe. Issues, trends and debates*, retrieved from [https://www.academia.edu/2486553 / Meat consumption\\_in\\_Europe\\_Issues\\_trends\\_and\\_debates](https://www.academia.edu/2486553/Meat_consumption_in_Europe_Issues_trends_and_debates) ;
16. Kanis, E., Groen, A., De Greef, K. (2003), *Societal Concerns about Pork and Pork Production and Their Relationships to the Production System*, *Journal of Agricultural and Environmental Ethics*, 16 (2), pp. 137-162;
17. Luca, L, Cionga C, Giurcă D. (2012), *Consolidarea exploatațiilor agricole*, Editura Economică, București
18. Murgescu, B. (2010), *România și Europa. Acumularea decalajelor economice (1500-2010)*, Editura Polirom, București;
19. Nanzi, A, French, S. (1985), *Relationship between pork consumption and cirrhosis*, *The Lancet*, 325 (8430) pp. 681-683, doi:10.1016/S0140-6736(85)91338-8;
20. Ngapo, T.M., Dransfield, E., Martin, J. F., Magnusson, M., Bredahl, L., Nute, G.R. (2003), *Consumer perceptions: pork and pig production. Insights from France, England, Sweden and Denmark*, *Meat Science*, 66 (1) pp. 125-134;
21. Pirjol, T., (2006), *Eficiența economică pe filiera carni de porc – abordare microeconomică*, Paper presented at the International Conference "Complex Development of Rural Area" organised by ASE București, retrieved from ,
22. Stanciu, S. (2014), *Romanian poultry meat sector analysis*, *Food, Technologies & Health – 2014*, (1)pp. 222-228,;
23. Stanciu, S, Stanciuc, N., Dumitrascu, L., Nistor, C. (2013), *THE effects of horse meat scandal on romanian meat market*, *SEA - Practical Application of Science*,(1, pp:174-181;
24. Tudor, E. (1997), *Cercetări privind diversificarea unor tehnologii de prelucrare a cărnii de porc*, Teză de doctorat, USAMV București;
25. USDA, (2014), *EU-28 Livestock and Products Semi-annual 2014*, USDA GAIN: Livestock and Products, retrieved from <http://www.thepigsite.com/reports/?id=1664&country=EU> ;
26. Verbeke, W., Pérez-Cueto, F., de Barcellos, M., Krystallis, A., Grunert, K. (2010), *Meat Science*, 84 (2), pp. 284-292;
27. Walker, P., Rhubarb-Berg, P., McKenzie, S., Kelling, K, Lawrence, R. (2005), *Public health implications of meat production and consumption*, *Public Health Nutrition*, 8 ( 04 ), pp:348-356;

## Appendix

Table 1. World meat market - statistical data

	2012	2013*	2014**	Change 2014 over 2013 (%)
Meat Production (million tonnes)	304.2	308.5	311.8	1.1
Bovine meat (million tonnes)	67.0	67.7	68.0	0.5
Poultry meat (million tonnes)	105.4	107.0	108.7	1.6
Pig meat (million tonnes)	112.4	114.3	115.5	1.1
Ovine meat (million tonnes)	13.7	13.9	14.0	0.5
Trade (million tonnes)	29.7	30.9	31.3	1.4
Bovine meat (million tonnes)	8.0	9.1	9.4	3.5
Poultry meat (million tonnes)	13.0	13.2	13.5	2.4
Pig meat (million tonnes)	7.5	7.4	7.2	-2.1
Ovine meat (million tonnes)	0.8	1.0	1.0	-3.7
World meat consumption per capita (kg/year)	42.9	42.9	42.9	-0.1
Meat consumption per capita (kg/year) - developed area	76.2	75.9	76.1	0.3
Meat consumption per capita (kg/year) - developing area	33.5	33.7	33.7	0.0
FAO Meat Price Index (2002-2004=100) ***	182	184	184	-1.0%

(Source FAO World Food Outlook, 2014 a) \*estimated data \*\*forecast \*\*\* Jan-Apr 2014 over Jan-Apr 2013

Table 2. Pork and herds dynamics (2009-2013)\*

	UM	2009	2010	2011	2012	2013	2014*
Pig - total	Thousands of heads	4805.2	4700.8	4597.0	4592.6	4527.0	4519.0
Piglets less than 20 kg	Thousands of heads	936.9	911.4	841.5	839.0	867.7	868.5
Piglets between 20 and 49 kg	Thousands of heads	1794.4	1744.4	1672.8	1703.4	1718.4	1688.0
Pigs for fattening - total	Thousands of heads	1695.3	1671.6	1721.0	1680.1	1576.6	1611.9
50 - 80 kg	Thousands of heads	1270.7	1233.4	1253.7	1194.5	1081.6	1101.7
81 - 110 kg	Thousands of heads	385.1	398.7	411.1	425.1	412.9	427.1
More than 110 kg	Thousands of heads	39.5	39.5	56.2	60.5	82.2	83.0
Breeding Pigs over 50 kg - total	Thousands of heads	378.7	373.3	361.8	370.1	364.2	350.7
Pig breeding	Thousands of heads	11.8	13.0	11.4	9.8	9.7	7.1
Breeding sows - total	Thousands of heads	366.9	360.3	350.4	360.3	354.5	343.6
Sows	Thousands of heads	195.4	196.9	197.6	215.2	210.8	206.1
Of which: sows at first mating	Thousands of heads	39.9	40.6	45.5	50.9	53.0	50.4
Sows unmounted	Thousands of heads	171.5	163.4	152.7	145.1	143.7	137.5
Of which: gilts unmounted	Thousands of heads	58.5	63.6	56.0	54.0	54.6	55.0
Total livestock meat production	Thousands tonnes	585	553	595	555	582	**
Average weight at slaughter	kg/ capita	113	115	107	116	107	**

(Sources MADR, 2014; INS, 2014) \* Available from 1 May each year \*\* not available

Table 3 Dynamics of swine herds (2001-2013)\*

	UM	2007	2008	2009	2010	2011	2012	2013
Pigs	Thousands of heads	6565	6174	5793	5428	5364	5234	5180
Breeding sows	Thousands of heads	442,5	376,4	359,3	355,6	380,6	398,7	383,7
Gilts	Thousands of heads	97,3	83,7	69,5	54	55,1	58,7	69,5

(Source MADR, 2014; INS, 2014) \* Available in late rated

Table 4. The structure of pig farms by farm size (2010)

	Number of holdings	% of total	Livestock	% of total
1 - 2 heads	1.319.834	80,0	1.735.718	32,2
3 - 9 heads	295.722	17,9	1.227.163	22,8
10 - 49 heads	32.767	1,98	508.391	9,4
50 - 99 heads	742	0,04	46.488	0,9
100 - 199 heads	172	0,010	21.556	0,4
200 - 399 heads	54	0,003	14.993	0,3
400 - 999 heads	39	0,002	26.020	0,5
peste 1000 heads	148	0,01	1.807.111	33,5
Total holdings	1.649.478	100,00	5.387.440	100,00

(Luca, Gionga și Giurcă, 2012)

Table 5 Technological yields butchers slaughter (cattle, pigs, sheep) (Banu, 2009)

Species	Quality classes	Yield (%)		Fat adherent (%)
Cattle	A I	51,5		0,5
	B II	47,5		
	C III	43,0		
Young cattle fattening in semi-intensive system / individual households ( 341-400 kg live weight )	A I	51,5		-
	B II	49,0		0,7
	C III	43,0		0,5
Calves ( cattle , buffaloes )	A I	51,5		-
	B II	47,0		-
Sheep and goats	A I	41,5 <sup>1</sup>	42,5 <sup>2</sup>	-
	B II	39,0 <sup>1</sup>	40,0 <sup>2</sup>	0,8
	C III	37,0 <sup>1</sup>	38,0 <sup>2</sup>	0,3
Lambs, over 30 kg live ( without head, feet , organs)	AI	43,0 <sup>1</sup>	43,5 <sup>2</sup>	-
Youth sheep fattening 20 to 30 kg ( without head, feet , organs)	A I	43,0 <sup>1</sup>	43,0 <sup>2</sup>	-
Reformed lambs	A I	50,0 <sup>1</sup>	50,0 <sup>2</sup>	-
Pig	over 130 kg live	76,5 <sup>3</sup>	80,5 <sup>4</sup>	-
	120-130 kg live	76,2 <sup>3</sup>	80,0 <sup>4</sup>	
	111-120 kg live	76,0 <sup>3</sup>	79,0 <sup>4</sup>	
	101-120 kg live	74,0 <sup>3</sup>	78,0 <sup>4</sup>	
	91-100 kg live	72,5 <sup>3</sup>	76,5 <sup>4</sup>	
	81-90 kg live	69,0 <sup>3</sup>	76,5 <sup>4</sup>	
	61-80 kg live	68,0 <sup>3</sup>	70,0 <sup>4</sup>	
	31-60 kg live	-	68,0 <sup>4</sup>	
30 kg live	-	65,0 <sup>4</sup>		

<sup>1</sup>sheep wool <sup>2</sup>sheep without wool <sup>3</sup>skinned pigs <sup>4</sup>scalded swine

Table 6. Slaughterhouse by-products indices of recovery key (Banu, 2009)

By-product	Species		
	Cattle	Pig	Sheep
Head	2,3-2,83 (%)	5,7-5,6 (%)	3,0-4 (%)
Brain	0,1-0,11 (%)	0,06-0,65 (%)	-
Tongue (fără slung)	0,28-0,29 (%)	0,2-0,23 (%)	-
Liver	1,19 (%)	1,2-1,7 (%)	1,4-1,6 (%)
Heart	0,30 (%)	0,23 (%)	0,35 (%)
Kidney	0,19 (%)	0,20 (%)	0,2-0,65 (%)
Spleen	0,17 (%)	0,13 (%)	0,2 (%)
Skin	6,30-6,88 (%)	4,15-4,5 (%)	1 buc/head
Blood	3 (%)	3 (%)	1 (%)
Thin guts	35m/ adult bovine; 21m /veal	15,5 m/head	22m /head
Pancreas	110g/head	60g/cap	30g/head
Lungs	0,8-1,7 (%)	0,6-0,85 (%)	0,9 (%)
Confiscation liver / liver harvested	From 40 %	4-5,4%	50% liver and heart 10 % kidney

Table 7 Comparative analysis of the main components of meat sheep, cattle, pigs (Banu, 2009)

Meat of species		Water (%)	Protein (%)	Essential amino acids (mg/100g)	Non Essential amino acids (mg/100g)	Lipids (g/100g)	Cholesterol (mg/100g)	Ash (%)
Beef	Muscular tissue	74,8	21,6	8093	1296	2,5	60	1
	A I	66,4	18,6	7137	11292	14,0	70	
	B II	70,6	20,0	7696	12240	8,30	60	
Sheep	Muscular tissue	75,0	21,0	8917	12027	3,0	66	0,9
	A I	67,2	15,6	5778	9682	16,3	70	
	B II	69,7	19,8	7566	12092	9,60	70	
Pork	Muscular tissue	74,6	20,4	7801	11637	3,5	60	0,9
	A I	54,2	17,0	6811	10116	33,30	70	
	B II	51,2	14,3	5619	8602	-	-	