

Meat-processing industry of Ukraine in global food system

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The purpose. To summarize the main trends in the development of meat-processing industry of Ukraine and to justify its contribution into global food system. **Methods.** System generalization, analysis and synthesis, computational and analytical, comparison, graphic. **Results.** Main trends in the development of meat-processing industry of Ukraine are revealed and its contribution into global food system is justified. Indicators of availability and sufficiency of meat products for consumption are compared, and meat market balance indicators in Ukraine and in the world are considered. Main problems preventing development of meat-processing industry in Ukraine are determined and directions for their solution are put forward. **Conclusions.** It is necessary to oblige businessmen or tenant farmers growing grain crops to keep the optimal number of livestock (depending on productivity of lands). Calculations show that the minimum possible load for every 100 hectares of farmlands is 55 animals.

Key words: food system, meat processing industry, globalization, consumption of animal products, export, import, value added.

<https://doi.org/10.31073/agrovisnyk201805-01>

Relevance of research. Within today's world practice of studying multi-sectoral chains of production and consumption of foods, the "food system" concept is used, the said concept has not yet received wide application in Ukraine as well as its legislative consolidation. However, scholars who have studied this question mainly share the opinion, that the food system integrates all the processes associated with cultivation, collection, processing, packaging, transportation, marketing, consumption and utilization of food products and packages for increasing their ecological, economic, social efficiency. Ramified connections of this system unite the aggregate of institutional, legal, economic, financial and credit levers and factors contributing to rise in volumes of food production and to providing food security, effective use of natural and productive resources, training of personnel, innovative development, formation of a consumption culture and ideas about healthy nutrition, environmental protection, safety and quality of foods [1, 2].

Any food system is able to produce foods necessary for the full, balanced nutrition, health promotion and an increase in the life expectancy of the population. At the same time, certain types of industrial activity are specified within the system, the results of the said activity determining the level of food security in the country. In this sense, an important component of the production block of the food system is the meat processing industry, which currently has problems that worsen the state of food security.

Analysis of recent research and publications. Research devoted to the developments of different sectors of food system is reflected in the works of foreign scholars e.g. researchers of Cornell University (Ithaca, NY, U.S.A.) [4] and of Swiss Federal Institute of Technology (Zurich) [5]. This direction of research is represented in works of contemporary Ukrainian scholars Ia. Gadzalo, M. Sychevskiy, L. Deyneko, G. Kaletnik, O. Kovalenko [1-3; 7]. Such scholars as V. Andriychuk, V. Boyko, P. Borshchevskiy, T. Zinchuk, M. Kropivko, Yu. Lupenko, Yu. Luzan, M. Malik, V. Mesel-

Veseliak, T. Mostenska, P. Sabluk, M. Khvesyk, O. Shpychak etc. Have also profoundly contributed to the research of food markets

The purpose of the research is summarizing principal trends of development of meat processing industry of Ukraine and substantiating the contribute of the industry into global food system.

Results of the research. The rational development of productive-distributive chains in food system makes it possible to incline incomes and to raise economic profitability due to rise in efficiency, added value, sales, profit, job creation. Industrial manufacturing of meat products follows the breeding of agricultural animals in the added value chain embracing such processes as: slaughter, primary and secondary processing and manufacturing wide range of meat products.

According to the data of "Ukrainian Meat" association, 152 enterprises represented meat processing industry of Ukraine in 1990 these of the capacity from 50 to 250 tons of meat per shift in 25 regional centers and of the capacity from 15 to 50 tons of meat per shift in each of district centers. Currently about 40 middle range capacity (from 15 to 50 tons of meat per shift) enterprises and above one thousand of small range enterprises and shops manufacturing from 100 kg to 2 tons of meat products per shift function in Ukraine. Thus the production facilities have declined almost twice since 1990.

Currently the sufficient deficiency of raw materials caused by a slump of animal population in Ukraine is the principal problem of the branch. From 1990 to 2017 the population of agricultural animals has sufficiently declined: cattle more than 6 times, down to 3628.4 '000 of livestock, incl. milking cows more than 4.4 times down to 2063.9 '000 of livestock; pigs population more than 3.2 times down to 6120.4 '000 of livestock; poultry more than 1.2 times down to 205102.9 '000.

It is worth noting, that the density of cattle population per 100 hectares of agricultural lands has declined almost 6 times from 57 livestock in 1990 (incl. 22 cows) down to 10 livestock in 2017 (incl. 6 cows).

The decline in the population of agricultural animals has been caused by systematic variations, incl. those in agroindustrial complex, when large scale and specialized facilities for cattle and pigs rearing were demolished. Rearing of pigs in special facilities belonging to meat plants has also been suspended. Simultaneously the quality of livestock rearing has worsened, the weights of animals have been declining consistently. Thus, slaughter weight of a cattle livestock was 214 kg in 1990 and 166 kg in 2016, of a pig – 92 kg in 1990 and 87 kg in 2016.

Decline in livestock population and in the quality of rearing caused the deficit of raw materials for the food enterprises and, accordingly, to the decline in production output. According to the data of State Statistical Service of Ukraine, the meat production in slaughter weight was almost two times less in 2016 than in 1990, namely only 2323.6 '000 MT, incl. 375.6 '000 MT of beef and veal; 747.6 '000 MT of pork; 1166.8 '000 MT of poultry. The structure of meats production has also changed in favor of poultry meat.

For the past five years the structural changes took place in the dynamics of the principal economic indexes of the branch (fig. 1). The share of the added value of meat processing industry in the structure of food industry has decreased. Notwithstanding some rise in the added value (from 1162.1 to 1410.2 Mio UAH), its share in the whole structure of food industry has declined from 12.1 до 9.9%.

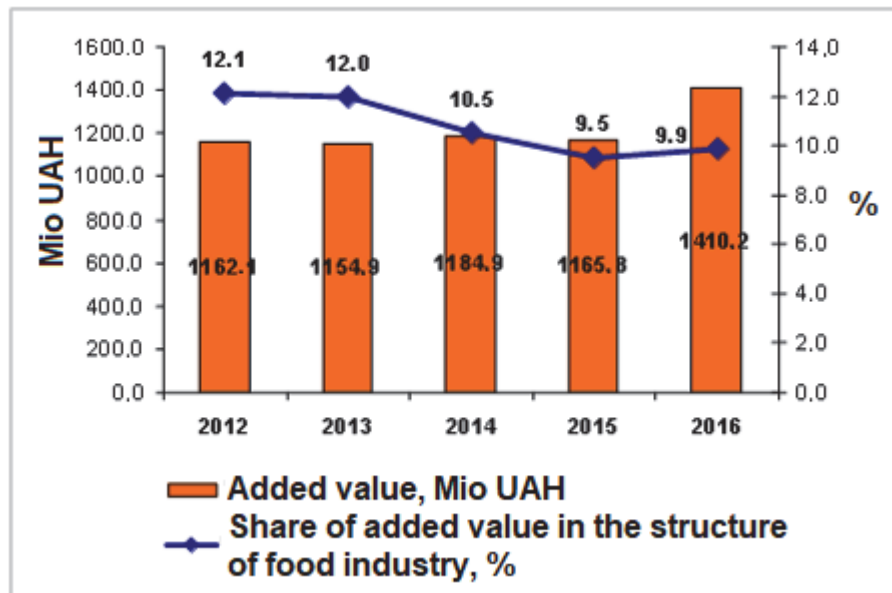


Fig. 1. Comparison of added value dynamics in meat processing industry and its share in the structure of food industry, Mio UAH / %

Source: developed basing on the data of State Statistical Service of Ukraine

In 2016 the share of meats and meat products was 13.2% of overall sales of the products of food industry this being inferior to the shares of fat-and-oil branch (23%) and beverages manufacturing (14.6%) within the costs structure.

It is worth noting, that in food structure of Ukraine the residents' actual consume of meat products has been lagging behind the ratio recommended (80 kg/person/year) for a long period of time – namely by more than 35% within past five years. In 2017 the average meat consumption was 52 kg per capita, the share of beef being 14%, of pork – 34% and of poultry – 52%. In contrast to Ukraine, an average EU resident consumes 98 kg of meat per year, an average US resident – 120 kg of meat per year [8].

Within the period of 2015 – 2017 an average resident of Ukraine consumed 90 g of proteins daily. This is one of the lowest ratios among EU states being also by 43% lower than that of US, where the residents' consumption of protein is, correspondingly, 128 g daily and 161 g daily[8]. At the same time, the proteins of animal origin amount to 35 g daily within the Ukrainians' overall consume of proteins, this being twice lower than the ratio recommended. According to the recent Order of Ministry of Healthcare of Ukraine on the norms of human physiological needs for the principal food substances and energy (№ 1073, 03 September 2017), being in forth since December 2017, more than 65% of protein in human diet (depending on the age) shall be of animal origin. For example, 147 g daily consumption of protein is sufficient for the diet of males aging from 30 to 40 when these are not heavy manual workers, 100 g of the said amount being of animal origin (meat, fish, eggs) and 47 g – of plant origin (cereals, legumes etc.). The actual Ukrainians' consume of animal proteins is significantly less than that of the residents of the advanced states: by 38% less than in the European countries (in average) and by 49% less than in USA (fig. 2).

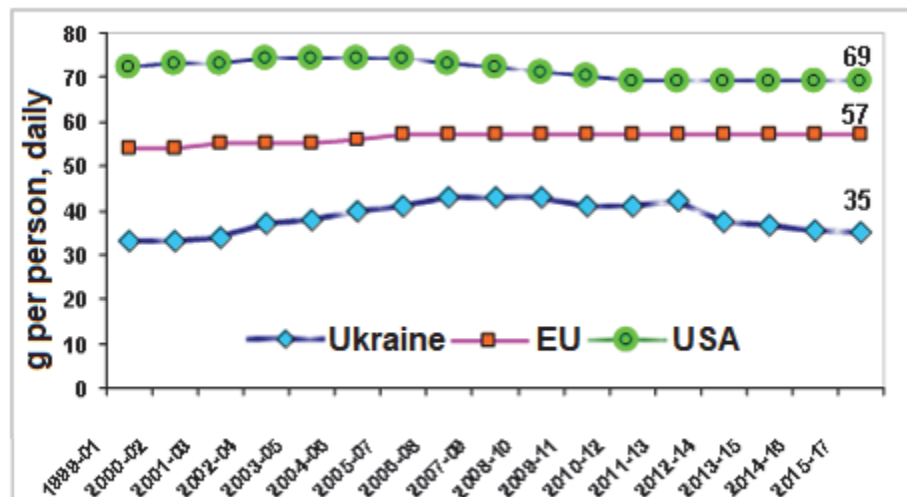


Fig. 2. Average consumption of animal proteins in Ukraine, EU and USA

(average value of 3 years, g / person / day)

Source: developed basing on "Food security indicators" // Available at:

<http://www.fao.org/economic/ess/ess-fs/ess-fadata/en/>

In Ukraine economic availability of the principal food products is limited with customers' affordability. The biggest share of the food spends of households belongs to meat products (22%, 2016-2017). The decline in the residents' actual incomes followed by progressing inflation worsens the situation. If the average cost of a monthly food multipack was 19,5% of the overall money spends in 1990, then in 2017 average food spends amounted to 57,5%.

The contribution of meat processing industry of Ukraine into the global food system is featured by indexes of the demand and supply balance these adduced in the Table.

Indexes of the demand and supply balance of meat products in Ukraine and their contribution into the global food system

	2016			2017			2018 (prognosticated)		
	The World	Ukraine	% of the World	The World	Ukraine	% of the World	The World	Ukraine	% of the World
Production, Mio MT									
All meats, incl.:	321.0	2.32	0.72	322.4	2.33	0.72	326.8	2.35	0.72
- beef and veal	60.44	0.37	0.60	61.37	0.36	0.58	62.55	0.35	0.56
- pork	109.97	0.76	0.69	111.03	0.73	0.66	113.07	0.71	0.63
- chicken	89.10	1.17	1.31	90.18	1.21	1.34	91.28	1.26	1.38
Overall consumption of households, Mio MT									
All meats, incl.:	255.75	2.19	0.86	258.09	2.20	0.85	262.23	2.22	0.85
- beef and veal	58.71	0.33	0.56	59.36	0.31	0.52	60.55	0.31	0.52
- pork	109.67	0.82	0.75	110.59	0.81	0.73	112,58	0.81	0.72
- chicken	87.37	1.01	1.16	88.14	1.05	1.19	89.09	1.06	1.19
Exportation, Mio MT									
All meats, incl.:	28.43	0.302	1.06	29.14	0.351	1.20	29.98	0.35	1.17
- beef and veal	9.42	0.048	0.51	9.791	0.06	0.62	10.06	0.050	0.50
- pork	8.32	0.009	0.11	8.271	0.01	0.13	8.48	0.005	0.06
- chicken	10.69	0.24	2.25	11.079	0.27	2.45	11.44	0.29	2.53

Importation, Mio MT									
All meats,	24.6	0.18	0.74	24.68	0.23	0.94	25.31	0.23	0.91
incl.:									
- beef and veal	7.69	0.01	0.18	7.75	0.01	0.18	7.99	0.02	0.19
- pork	7.97	0.08	0.98	7.88	0.09	1.18	8.05	0.11	1.37
- chicken	8.94	0.09	0.96	9.05	0.12	1.34	9.27	0.11	1.19

Source: developed according to data of State Statistical Service of Ukraine and The World Bank

The share of Ukraine's meat processing industry in the structure of the global manufacturing of meat products retained at the level of 0.72% for past two years. At the same time, the share of Ukraine in structure of the global production of chicken meat consistently was 1.3%. According to The World Bank forecast, the said share might increase at least by 0.04% in 2018.

The balance structure of the overall consumption of meats by households in the food system of Ukraine sufficiently differs from the average values of the World. In 2017 the proportion (in %) of the typical meats consumed was: the World 23/43/34; Ukraine 14/37/48. Thus, pork prevailed (43%) in the global consumption fund, while chicken meat – in the consumption fund of Ukraine (48%).

The proportions of the trade of meat products in the global food system is quite different. In exportation of the physical quantities of products, chicken meat takes the first place in the World, beef – the second place, pork – the third place. The physical export quantities of beef and pork did not almost change for the period of 2016 – 2017, while the quantity of chicken meat export increased by 3,7%. The said rise was in some way influenced by Ukraine its exportation of poultry meat being by 3% bigger for the period specified. It is worth noting, that Ukraine's share in the global quantities of chicken meat export is about 2,5%, this share is evident to rise in the future.

There were significant expectations of the incline of meats and meat products exportation when The Ukraine–European Union Association Agreement became operative short time ago. In the frames of the Agreement regime of mutual quotas for toll-free exportation of meats and meat products is in forth. It is deplorably, but the said quotas do not correspond to the export potentials of Ukraine neither for nomenclature nor for quantities. Since 2016 the quotas for beef and veal export to the EU amounted to 12 '000 MT, pork – to 40 '000 MT and poultry meat – 36 '000 MT, but the first and the second quotas were not used. At the same time, the use of export quotas for the supplies of meat and edible offal of poultry amounted to 43% in 2016, and the said quota was completely used during the first half of 2017.

It is worth noting, that among the Ukrainian enterprises allowed to export food products to the EU (their actual number amounting to 98) are only 6 manufacturers of poultry meat and 2 manufacturers of poultry meat products [9]. An actual problem has still been standardization, certification and implementation of HACCP systems. The rate of harmonization of national and inter-state standards (GOST) being in forth in Ukraine and concerning meats, meat products and other animal products amounts to 10,8% only (as for the end of 2017 only 27 of 251 standards in forth were the harmonized international standards). In September 2017 HACCP systems became obligatory for the group of enterprises manufacturing food products with the untreated ingredients of animal origin. These are milk processing plants, slaughterhouses and meat processing enterprises, since 20 September, 2019 the said procedures are to be implemented at all the small scale enterprises.

Notwithstanding certain positive results of the meat products manufacturers in the foreign market, the market in Ukraine is unduly open to the similar products manufactured abroad. Generally, Ukraine is not a big importer of meats to have sufficiently reduced purchases since 2013. The beef import has fallen almost to the zero notch because of low in-land demand stipulated by high prices. At the same time, in recent years from 90 to 120 '000 MT of pork and poultry meat are imported. When the rise in pork import can be explained by the unfavorable epizootic situation in the country,

and, accordingly, by its deficit in the in-land market, the incline in import purchases of chicken meat (by 40% in 2017 compared to the previous year) makes, from the first sight, rather a strange situation, as Ukraine is an important producer of poultry meat included in TOP-10 of the World's largest exporters of the product. The meat market experts' explanation of the situation is, that cheap raw materials for the meat processing industry are imported, namely mechanically separated meat and poultry offal. Average price of poultry "meat" imported in 2016 was 0.4 USD for 1 kg or 12 UAH/kg VAT included. Contrariwise, chicken meat of higher quality is exported from the country, incl. filet its price exceeding 1.0 USD for 1 kg [10].

Among the important problems preventing from the developments of meat processing industry, as well as of the whole food system, such shall be mentioned: low business interest for the profound renovation of the production facilities because of high investments risks; problems of exchange control; the low level of the use of state-private partnership mechanism in the implementation of infrastructural and innovative projects; leaving of highly qualified specialists abroad characteristic for all the activity domains and, furthermore, deficiency of any distinct model of state support of innovations developments. Therewith, the level of involvement of the Ukrainian enterprises into the international added value chains is low because of over-regulation of business activities [9].

Conclusions.

1. The research fulfilled shows that in future production and consumption of meats will incline in the global dimension, and the escalating competition of different meat products and their export will create a variety of chances for the producers of raw meats and meat processors. International experts associate the increase in production and exportation of meats mainly with Brazil, China and USA. At the same time, notwithstanding the trade trends indicating a grow in the demand for meat products, the problems of consumers' access to those products, expansion of animal diseases (avian flu, African swine fever) and political disturbances may decline the international trade and become the reasons of the uncertainty for the future period.

2. Notwithstanding the HACCP principles being codified by the Ukrainian Laws, meat products manufacturers' success significantly depends upon the activation of efforts towards harmonization of national legislation in the field of food products and veterinary with the European patterns. However, the said work shall come with the modernization of the manufacturing of meat products this will be basing at rational use of raw materials of various quality, implementing of modern scientific methods of their processing together with enhancing of their functional and technological characteristics.

The evidence from practice shows, that accreditation of the Ukrainian meat products manufacturers for complying with the EU demands is a labor intensive procedure. Rapid fulfillment of all the necessary procedures is beyond the capabilities even of the enterprises being advanced technically and sanitary. Still, the said difficulties are not the reason to abandon the attempts to seek for a proper sales niche in the abundant and demanding market of the EU. The world market environment having been already formed, production of poultry meat is a promising direction as for Ukraine. Due to the rearing costs and slaughter/primary processing spends which are significantly lower than those in the EU, the poultry meat produced in Ukraine take vantage competitive positions in the EU market being not inferior to the similar products originating from other countries.

3. The revival of cattle population in the food system of Ukraine will make the renewal of the activity of self-sustainable rearing complexes possible these using intensive rearing based on scientific knowledge and being supplied with advanced machinery and with the feeds of vitamin- and minerals-balanced content. The significant reserve for the grow in beef production, together with intensifying of the breeding and rearing of dairy and crossbred animals, is the development of the specialized branch of meat cattle breeding.

Besides, it is expedient to oblige the entrepreneurs who, being owners and tenants of agricultural lands, cultivate grain crops to rear optimally possible cattle population (depending upon the productivity of soils). Calculations show that 55 cattle per 100 hectare of agricultural lands is the minimal possible load. The said density will make organic production specialized in crop growing, without any losses for cattle breeding. The minimal number of the agricultural animals per 1 hectare of agricultural lands is regulated by the Resolution of Cabinet of Ministers of Ukraine № 241 of 30 March 2016. This will have a certain impact on the processes of revival of the branch and preservation of the fertility of the Ukrainian chernozem soils.

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