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## TRANSFORMATIONS TAKING PLACE IN THE DAIRY SECTOR IN POLAND IN THE YEARS 1995–2020<sup>®</sup>

### Przekształcenia zachodzące w sektorze mleczarskim w Polsce w latach 1995–2020<sup>®</sup>

*The Polish dairy sector is subject to constant adjustment processes due to significant political events that took place in 1989–2020. The first was the systemic transformation, the consequences of which are visible in the entire Polish economy, the second was the accession to the European Union, and the third was the abolition of production quotas in 2015 and the Covid-19 pandemic lasting from March 2020. In the preparation of the article, literature on the subject was used, reports published by the Central Statistical Office in statistical yearbooks of agriculture and industry, as well as reports published by the Institute of Agricultural and Food Economics (IERiGŻ-PIB) in Warsaw, which were used to describe the causes and effects of phenomena occurring in the dairy sector in Poland in the years 1995-2020. The article uses simple descriptive and cause-effect methods. Based on the conducted analyzes, it was found that the integration with the EU resulted in the rebuilding of the institutional environment for agri-food producers and processors. Among all agricultural markets, the most dynamic changes took place in the dairy sector. It was related to extensive intervention mechanisms on the milk market in the EU, which limiting production and applying a wide range of subsidies for farmers.*

**Key words:** dairy sector, market analysis, production concentration, processing concentration, effects of Covid-19, forecast.

*Polski sektor mleczarski podlega ciągłym procesom dostosowawczym ze względu na istotne wydarzenia polityczne, które miały miejsce w latach 1989–2020. Pierwszym z nich była transformacja ustrojowa, której konsekwencje są widoczne w całej polskiej gospodarce, drugim akcesja do Unii Europejskiej, zaś trzecim zniesienie kwotowania produkcji w 2015 roku oraz pandemia Covid-19 trwająca od marca 2020 roku. W opracowaniu artykułu wykorzystano literaturę przedmiotu, raporty publikowane przez GUS w rocznikach statystycznych rolnictwa i przemysłu, a także raporty publikowane przez Instytut Ekonomiki Rolnictwa i Gospodarki Żywnościowej (IERiGŻ-PIB) w Warszawie, które posłużyły do opisanie przyczyn i skutków zjawisk zachodzących w sektorze mleczarskim w Polsce w latach 1995-2020. W artykule zastosowano proste metody opisowe i przyczynowo-skutkowe. Na podstawie przeprowadzonych analiz stwierdzono, że integracja z UE spowodowała przebudowanie otoczenia instytucjonalnego dla producentów i przetwórców rolno-żywnościowych. Spośród wszystkich rynków rolnych najbardziej dynamiczne zmiany zachodziły w sektorze mleczarskim, było to związane z rozbudowanymi mechanizmami interwencyjnymi na rynku mleka w UE, przejawiającymi się m.in. limitowaniem produkcji oraz stosowaniem szerokiego wachlarza dopłat dla rolników.*

**Słowa kluczowe:** sektor mleczarski, analiza rynku, koncentracja produkcji, koncentracja przetwórstwa, skutki Covid-19, prognoza.

## INTRODUCTION

In Poland, both agriculture and the food industry have been subject to constant adjustment processes since 1990, which are related to political events. In the 90s of the twentieth century, it was a systemic transformation that caused a number of effects in the entire Polish economy, including the dairy sector, and the second - accession to the European Union (EU) [2, 16].

Over the last 30 years, the Polish dairy sector has undergone significant transformations, being one of the key sectors of the food industry. This sector was subject to great

pressure from structural changes after 1990. The economic transformation of the 90s was of significant importance for the Polish dairy industry, due to such activities as: abolition of subsidies, introduction of a free market, changing the current orientation of the industry from production to demand, and meeting consumer expectations, which not only threatened the development opportunities of the industry, but also caused foundations of the economic existence of many of its entities. Other reasons for the deep crisis that the dairy sector struggled with in 1990–1995 were significant imports of cheap and attractive dairy products, a decline in the use of obsolete production capacities and difficulties in reorienting

production to meet market demand [20]. The crisis in milk processing was accompanied by a collapse in the level of its production on farms, caused by a very high fragmentation and a rapid deterioration of the economic conditions of production [20].

From May 1, 2004, the history of the Polish dairy industry was created together with other countries of the common market. After European integration, the milk market was covered by a more extensive regulatory system, including milk quotas, mechanisms influencing the maintenance of market equilibrium, intervention prices, mechanisms supporting the increase in demand in the internal market, regulations concerning foreign trade [22, 26]. After accession to the EU, there was a need to adjust the Polish dairy industry to the requirements of the EU Member States [7]. The development of the milk and dairy products market is of great importance to the development of exports with a simultaneous reduction of imports [14]. The adaptation of enterprises to contemporary economic processes is inextricably linked with their activity in initiating and improving activities that may increase their ability to compete. Poland's integration with the European Union meant the necessity to significantly rebuild the institutional environment for agri-food producers and processors. Among all agricultural markets, the most dynamic changes took place in the dairy sector. It was mainly related to extensive intervention mechanisms on the milk market in the EU, manifested, inter alia, in limiting production and applying a wide range of subsidies for farmers [2, 14]. In the EU, milk quota was introduced in the mid-1980s, and in Poland this mechanism began to function on April 1, 2004. In 2015, milk quotas were abolished, which initially raised objections and concerns from many circles, pointing to the destabilization of milk prices [2]. According to BGŻ BNP Paribas experts, the abolition of milk quotas favors the development of milk production, especially in north-eastern Poland. From April 2017 to March 2018, according to GUS data [2021], almost 11.3 billion liters of milk were purchased in Poland, i.e. 10.9% more than in the last year of the quotas (from April 2014 to March 2015.) [9, 34].

The dairy sector is one of the important sectors of the Polish food economy, which is responsible for generating the production value of the entire industry at the level of about 2.5%, and the production value of the food industry at the level of 15% [26]. Based on the data contained in the EUROSTAT database [3], it was shown that Poland is a key milk producer in the EU, with an 8.3% share in global production. Poland ranks fourth in terms of the volume of milk production among the EU countries, second only to Germany, France and Great Britain [3]. Milk and dairy products are among the key products that are important in the diet of people due to their nutritional, dietary and economic values. The dairy sector is the subject of research by many agricultural economists, including: Nieżurawski [18], Smoleński [29] and others, Sznajder [31], Seremek-Bulge [28], Parzonko [21], Malak-Rawlikowska [15].

According to Falkowski and Kostrowicki [4], in Poland (especially in the central and north-eastern region) there are favorable natural conditions for cattle breeding and production, due to the large share of meadows and pastures, which contributes to the development of production in accordance

with the traditional grazing of animals, less susceptible to fluctuations in the supply and prices of fodder plants (as opposed to the alcove system). In addition, it creates traditional dairy products with high added value much more often than in industrial production, and contributes to the sustainable development of rural areas through the employment structure [13]. On the other hand, cattle breeding in Poland is limited by the low water resources and relatively low rainfall affecting fodder plants [21, 26].

An important direction of changes in the dairy industry is the progressive concentration of milk production and processing. Processing plants should be a particularly important link of concentration, as they are less efficient compared to their Western competitors. [23, 26]. Without accelerating the concentration in cattle breeding and further consolidation in processing, it will be difficult for the Polish dairy to maintain the competitiveness of its products in the conditions of trade liberalization and the departure of the European Union from subsidizing exports. Concentration in cattle breeding is also necessary due to the growing income challenges of farmers, for whom the possibilities of price increases are exhausted (due to the specificity of flexibility in food markets) [5, 17]. The fastest concentration takes place in regions with high commodity production, natural and economic conditions most favorable to milk production [8]. This applies mainly to the Mazowieckie, Podlaskie and Wielkopolskie voivodships, which have the highest number of cows [19].

**The aim of the research was to identify the most important changes that took place in the Polish dairy sector in three research periods: period I covering the years 1995–2003, i.e. during the transformations taking place in connection with the political transformation and preparatory activities related to the intention to join the EU; The second period covering the years 2004–2012, i.e. the time after Poland's accession to the EU, taking into account changes related to the adjustment of the dairy sector to EU requirements; The third period covering the years 2013–2020, i.e. the time associated with the lifting of regulations on the milk market, as well as changes related to the Covid-19 pandemic. Due to the important role of the dairy sector in Poland, it was chosen deliberately.**

## METHODS AND MATERIALS

The research included data for the years 1995–2020. The time period was selected so that there would be a comparable number of periods both before and after the accession to the EU, as well as the lifting of regulations on the milk market. The work uses material from reports published by the Central Statistical Office in statistical yearbooks of agriculture and industry and from reports published by the Institute of Agricultural and Food Economics (IERiGŻ-PIB) in Warsaw [11]. The research material also included the literature on the subject, which contributed to the description of the causes and effects of the phenomena occurring in the dairy sector in Poland in the years 1995–2020. In order to show changes in the sector, the following issues were examined: the state of the cows population, milk production, milk purchase, milk yield, milk distribution, economic and financial results of enterprises dealing with milk processing and cheese production, and consumption of milk and its products. As part of the study, the

following research problem was identified: Changes taking place in the Polish dairy sector in 1995–2020 related mainly to: the political transformation (1995–2003), accession to the EU (2004–2012), the abolition of milk quotas and the occurrence of the Covid pandemic 19 (2012–2020) had a significant impact on changes in the production, processing and consumption of milk in Poland. The descriptive and cause-effect methods were used to present the research results.

## RESULTS AND DISCUSSION

In the 1990s, the economy in Poland changed from centrally planned to free market, which led to a number of changes also in the dairy sector. Activities related to the political transformation resulted in, inter alia, the elimination of state-owned herds on farms, the conversion of dairy cooperatives and the reduction of domestic demand for milk, ripened cheese and butter [14]. The changes taking place in the Polish economy and the dairy sector also contributed to a decrease in the amount of milk supplied for processing, which meant that dairy enterprises could not fully use their processing capacity, which consequently led to a deterioration of their financial situation. Due to the complicated situation on the food market, the Ministry of Agriculture and Food Economy has developed a “Program for the restructuring and modernization of the dairy industry” focusing on:

- achieving long-term profitability of milk production and processing, while maintaining moderate prices and guaranteed product quality,
- modernization of the dairy industry using modern infrastructure, conducting promotional activities and increasing the level of milk processing,
- stabilization of the dairy market with the help of an increase in domestic demand and supply and the creation of opportunities for exporting dairy products,
- increasing the competitive ability of the dispersed capital in order to optimize the use of production factors and resources, adjusting offers to market needs [14].

In order to improve the flow of current assets, most milk processors have set up their own chain of stores. The process of concentration of processing was carried out by extending the existing plants. The reduction of the production scale resulted in the deterioration of the financial situation of many plants and layoffs of employees. There were many small plants on the market that did not cooperate with other dairies. The result is competition between them, especially on the local market. Accelerating the concentration of milk production is the most important condition for meeting competition and taking advantage of the possibilities of the Polish dairy industry in the enlarged Union. Concentration of production continues to be the most important factor in reducing costs and improving the profitability of milk production and processing [14].

## CHANGES IN MILK PRODUCTION IN POLAND IN 1995–2020

Domestic production determines the supply of milk in Poland [2]. The quota of milk produced in Poland from 1995 to 2020 reached the value of 11–13 billion liters per year. In the period before Poland’s accession to the EU (1995–2003),

the average annual volume of milk production in Poland was 11,631 million liters, and after the integration (2004–2012) it increased to 11,873 million liters, and after the removal of regulations on the milk market, production increased to 13 281 million l (Table 1).

**Table 1. Average annual volumes of selected data on milk production in Poland in the period before and after accession to the EU (1995–2003) and after (2004–2012) and (2013–2020)**

**Tabela 1. Średnioroczne wielkości wybranych danych dotyczących produkcji mleka w Polsce w okresie przed akcesją do UE (1995–2003) i po niej (2004–2012) oraz (2013–2020)**

	1995–2003	2004–2012	2013–2020 (2019*, 2020**)
<b>Production [mln l]</b>	11 631	11 873	13 281
<b>Purchase [mln l]</b>	6 785	8 684	11 075
<b>Cow population [thous. Pcs.]</b>	3 262	2 729	2 394
<b>Milk yield [l/pcs]</b>	3 569	4 381	5 985

\* Estimate of IAFE-NRI for 2019

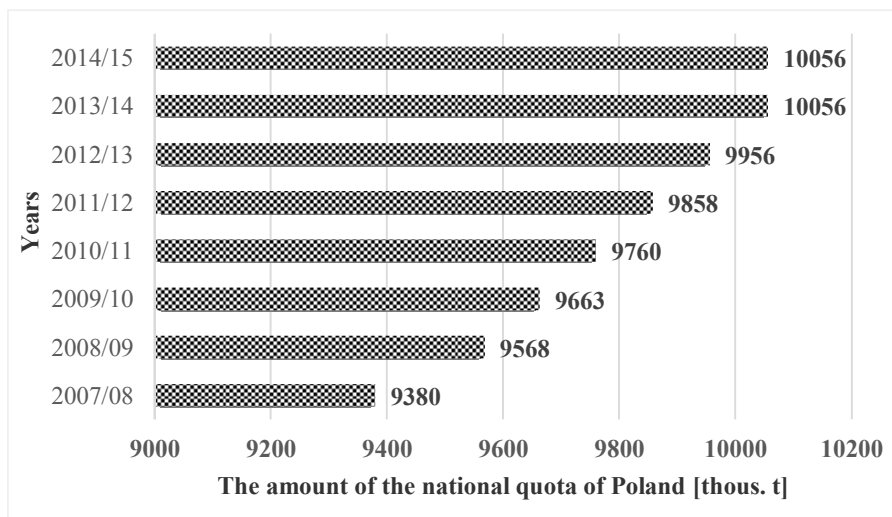
\*\* IERiGŻ-PIB forecast for 2020

**Source:** Own study based on [27]

**Źródło:** Opracowanie własne na podstawie [27]

Intervention mechanisms of the Common Agricultural Policy (CAP), i.e. milk production quotation, as well as intervention prices for dairy products, or instruments stimulating internal demand (e.g. subsidizing milk fat in processing and consumption) and direct subsidies, compensating milk producers for lowering income due to price reductions, they are of key importance for the functioning of the milk market [2, 14]. In the years 2002–2011, over PLN 113 billion was allocated to the agri-food sector and rural areas under financial aid programs [2, 33]. In the dairy sector, one of the CAP regulation mechanisms aimed at limiting milk production was the quota system introduced in Poland in 2004, which indicated what amount of milk a given EU country could market in a quota year without bearing any financial consequences [25]. Based on the IERiGŻ (2008) report: Multiannual Programs 2005–2009, it was found that the national milk quota was increasing from 2004 to 2015, which was related to the activation of restructuring provisions by the European Commission (Fig. 1) [24]. The national milk quota in the quota years 2014/2015 amounted to PLN 10,056 thousand tonnes and was compared to the quota year 2004/2005 by 676 thous. tons higher (Fig. 1). The purpose of the production quotation was to reduce the growing production surpluses and to stabilize the prices of dairy products. This system was to contribute to reducing the costs associated with the need to conduct extensive market intervention and the costs associated with the storage and management of the emerging stocks. In addition, the reduction in milk production was expected to increase milk prices and thus support producers’ income [25]. On the other hand, the disadvantages of the milk quota system were the risk of paying penalties for exceeding milk production by the largest producers, which in consequence meant that producers who, as a result of the investments made, increased the efficiency of cows,





**Fig. 1. The amount of the national quota of Poland [thous. t].**

**Rys. 1. Wielkość kwoty narodowej Polski [tys. t].**

**Source:** Own study based on [27]

**Źródło:** Opracowanie własne na podstawie [27]

were most exposed to exceeding the limits granted to them. Another drawback of the quota system was that it helped small producers stay in the market. The limits bind small producers with collection points and processing plants and postpone the date of these producers' decisions about choosing other forms of earning money. In addition, the quota system created additional costs for processors and the quota administration. A number of disadvantages of the milk production quota system, as well as the progressive regionalization and concentration of production, and the reduction of the number of milk producers led the European Commission to decide to abolish milk quotas in 2015. According to the European Commission, the abolition of milk quotas will lead to an increase in milk production by about 5–6% and a decrease in its price [25].

Milk production is determined by two main factors: the herd of dairy cows and their productivity. The remaining determinants (eg weather conditions, economic situation) have an indirect impact on production [32]. The shaping of the volume of milk produced in Poland was a consequence of changes in the number of herds and their milk yield. The number of cows in Poland (according to the June data from IAFE) has significantly decreased in the entire period under study, i.e. from 3,579,000 units in 1995 to 2,190 thousand pcs. in 2020 [27], which is caused by the decreasing number of farms keeping cows (in 1996–2008 the number of milk producers decreased from 1.31 million to 0.55 million). In Poland, this phenomenon was accompanied by a slow process of concentration, with a clear fragmentation of production compared to the EU [2, 10]. In the period before the accession to the EU (1995–2003), the annual average number of cows amounted to 3,262 thousand, while after it (2004–2012) it decreased to 2,729 thous. pcs. and in the period (2013–2020), taking into account the period after the abolition of milk quotas, it decreased to 2,394 thous. pcs (Table 1). On the other hand, the milk yield of cows in the whole period studied increased from 3136 l / head. in 1995 up to 5850 l / unit in 2020 (increase by 53%) [27]. The dynamic improvement of

milk production efficiency was caused by technological progress in production, but the factor limiting the improvement of milk yield of cows is the fragmentation of raw milk production, as genetic progress in small herds is small [2, 25]. In the years 1995–2003, the average annual milk yield was 3569 l / animal, while in 2013–2020 it increased to 5985 l / animal. (Table 1).

In the Polish dairy industry, the commodity production of raw milk is systematically increasing, as distribution is increasingly carried out through market channels. The dairy industry plays a decisive role in this respect, as it dynamically increases the purchase and processing of milk. At the same time, the direct sale of milk and milk products from farms is decreasing, as the number of small entities keeping cows is decreasing. The use of milk on farms includes consumption (self-supply) and fodder purposes. The dairy industry shows

a great demand for the raw material [25]. In the distribution of domestic milk production from 1995 to 2020, a decrease in the use of milk on the farm, both for fodder and consumption purposes, can be observed (Table 2). Before Poland's accession to the EU, the average annual consumption of milk was 3266 million liters, of which 671 million liters were allocated to fodder, and 2583 million liters to consumption. (Table 2). However, after the accession to the EU and the abolition of milk quotas, a decrease in milk consumption by 1,426 million l was observed (Table 2). The reduction of milk consumption on the farm after the integration with the EU was influenced by the progressive disappearance of small milk production farms from the market, which faced high requirements in terms of milk production standards, animal welfare and formal procedures in connection with participation in the quota process [2, 12]. Due to the decrease in milk consumption on farms, its sale increased significantly. In 1995–2003 it amounted to an average of 8364 million liters, and in the period after accession (2004–2012) it increased by 12% to the level of 9373 million liters, while in the period 2013–2020 it increased by 22% to the level of 11,426 million liters (tab. 2). In the same period, the average annual sales of raw material for the dairy industry increased even more (by 66%). On the other hand, direct sales of milk to small processors decreased significantly (by 78%) (Table 2).

## CHANGES IN MILK PROCESSING IN 1995–2020

In the dairy sector, there is a desirable industrialization trend in milk processing. The share of domestic milk processing is decreasing [25]. The economic and financial situation of the Polish dairy industry from 1995 to 2020 has significantly improved, despite the systemic transformation, adjustment measures related to the accession to the EU, the abolition of milk quotas, as well as the recession in the national economy caused by the COVID-19 pandemic and the introduction in March 2020 state of epidemiological emergency. The number

**Table 2. Average annual disposals of national milk production in Poland in the period before and after accession to the EU**

**Tabela 2. Średnioroczne rozdysponowanie krajowej produkcji mleka w Polsce w okresie przed akcesją do UE oraz po niej**

Years	Consumption on the farm [mln l]			Purchase/commodity production [mln l]				Total expenditures
	for feed	for consumption	Total	for the dairy industry	to the other processors	Other Purchase	total	
1995–2003	671	2 583	3 266	6 667	124	1574	8 364	11 631
2004–2012	536	1 956	2 491	8 579	105	698	9 373	11 873
2013–2020	566	1 274	1 840	11 041	34	351	11 426	13 266
Change [%]	-16	-51	-44	66	-73	-78	37	14

Source: Own study based on [27]

Źródło: Opracowanie własne na podstawie [27]

**Table 3. Economic and financial results of milk processing and cheese production**

**Tabela 3. Wyniki ekonomiczno-finansowe przetwórstwa mleka i produkcji serów**

Description	1995	2004	2010	2015	2018	2019
1. Number of dairies	336	265	205	177	163	156
2. Number of employed persons (thousand people)	56,30	42,20	34,90	32,24	32,89	32,94
3. Sales value (PLN million)	13,6	61,1	23,1	26,92	33,17	34,74
4. Gross profit for dairies (PLN million)	-	404	629	451,0	526,4	621,1
5. Profitability ratios (in% of revenues):						
- Gross profit			2,68	1,66	1,57	1,77
- Net profit	0,38	2,91	2,21	1,31	1,28	1,36
- capital accumulation	-0,29	2,31	4,86	3,57	3,23	3,27
-operating surplus	3,5	-	5,97	4,27	3,84	4,01
6. Financial costs in% of revenues	-	-	0,64	0,35	0,32	0,33
7. Current financial liquidity	1,41	1,32	1,51	1,41	1,62	1,59
8. Investment rate	-	-	1,34	1,35	1,35	1,45
9. Share of profitable companies (%):						
- in the total number of companies	-	-	80,5	70,6	68,7	68,1
- in the revenues of the sector			93,2	84,5	85,5	90,8
10. Share of direct export in sales value (%)	-	-	10,6	15,2	16,7	18,4
11. The share of dairy in the sales value of the food industry (%)	-	-	13,7	12,3	12,6	12,3

\* Data refer to enterprises employing 10 or more people;

Source: Own study based on IAFE-PIB calculations based on unpublished data of the Central Statistical Office

Źródło: Opracowanie własne w oparciu o obliczenia IERiGŻ-PIB na podstawie niepublikowanych danych GUS

of dairy industry entities is systematically decreasing. At the same time, milk processing is concentrated [25]. Currently, there are about 156 entities operating in Poland, in 2004 there were 265 of them, and in 1995 – 336 (Table 3). Along with the decrease in the number of dairy enterprises, there was a decrease in the number of employees in the dairy industry by 23.36 thousand people (41%) (Table 3). From 2004 to 2019, a decrease in the value of sales by PLN 26.36 million was observed (Table 3), while the gross profit of the dairy industry since the accession to the EU has increased by PLN 217.1 million, reaching the level of PLN 621.1 million in 2019 (Table 3). The share of profitable companies in the sales revenues of the dairy industry has a growing tendency since 2015 has increased from 84.5% to 90.8% in 2019 (Table 3) The dairy industry is characterized by safe financial liquidity,

which in 2019 amounted to 1.67 and is able to settle current liabilities, in particular, it concerns raw material costs.

The Polish dairy industry continues its restructuring and modernization processes. The improvement in the financial situation contributed to the increase in the investment activity of enterprises. In the first half of 2020, capital expenditure amounted to PLN 359.2 million. The value of investment outlays was 18% higher than the value of depreciation write-offs, which means that enterprises systematically increase the value of fixed capital. The investment structure is dominated by expenditure on machinery and equipment (88.3%), but expenditure on buildings (14.8%) and means of transport (4.5%) also had a significant share. Investments also concerned the storage and logistics base, as well as energy installations and water and sewage management in order

to reduce costs related to environmental protection [27]. A significant investment boom was observed in the years 2002–2006, which was related to the adjustment processes taking place in dairy enterprises. The entities took actions necessary to meet the sanitary and veterinary requirements required to operate on the European market. In 2002–2006, PLN 3.5 billion was invested in dairy companies employing over 9 people. The largest expenditure was incurred in the year of Poland's accession to the EU. The investments made allowed a significant number of enterprises to start operating on the international market. Most dairies made investments related to the modernization of the milk collection system from the producer and improved the transport of milk to the dairy plants. The share of milk collected by dairies directly from agricultural producers increased. These activities significantly contributed to the improvement of the quality of milk produced [25]. One of the sources of financing investments in the dairy sector was the SAPARD program, launched before Poland's accession to the EU. In the years 2002–2006, more than 60% of the SAPARD funds allocated to support the dairy industry were invested in three voivodships: Mazowieckie, Podlaskie and Wielkopolskie. The value of average investments was the highest in the province Podlaskie (PLN 56.6 million) and Mazowieckie (PLN 30.5 million), where the strongest enterprises operated [25].

## CHANGES IN MILK CONSUMPTION IN 1995–2020

The range of products manufactured by the food industry has changed since 1995. The range of manufactured products is adapted to the changing market situation. After Poland's accession to the EU, in the conditions of expanded export opportunities, dairy enterprises significantly increased the production of cheese, drinking milk, milk drinks and powdered milk (Fig. 2). The upward trend in cheese production continues, but the growth dynamics is much slower. Production is adjusted to the anticipated demand. The range of manufactured products must be constantly changing in order to meet the needs of consumers [25].

According to the Central Statistical Office (GUS) data, in 2019 the balance consumption of milk, including milk intended for milk products, without milk processed into butter, amounted to 228 l per capita and was 3.2% higher than in the previous year. The increase in consumption took place in the conditions of a relatively good economic situation on the international market and a real cheapening of dairy products in relation to food in general, including in particular meat and its products and fish [27]. The GUS household budget research shows that in 2019 the downward trend in the consumption of potable milk continued. The decrease in consumption was 2.4% compared to 2018. In 2019, the balance consumption of butter in Poland was 5.0 kg per capita and was 6.4% higher than in 2018. The consumption of butter reached the highest level since 1992. The main reason for the increase in consumption was the improvement in the income situation of households, the decrease in retail prices by an average of 4.5% and the change in the consumption model. Domestic consumers increasingly appreciate the taste and health benefits of butter [27].

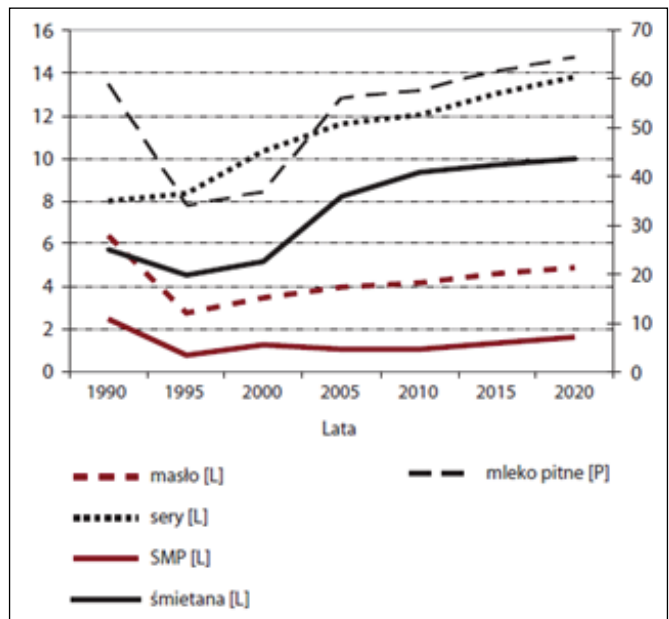


Fig. 2. Consumption of milk and dairy products [kg / person] in Poland in 1990–2005 and forecast until 2020 (L – left axis, P – right axis).

Rys. 2. Spożycie mleka i produktów mleczarskich [kg/osobę] w Polsce w latach 1990–2005 oraz prognoza do 2020 roku (L – lewa oś, P – prawa oś).

Source: [1]

Źródło: [1]

## IMPACT OF THE COVID-19 PANDEMIC ON THE DAIRY SECTOR IN POLAND AND THE RELATED FORECAST FOR 2021

As of March 2020, the entire world has been struggling with the Covid-19 pandemic. Humanity is concerned about the immediate and long-term health effects that Covid-19 could cause. Despite the fact that human health and life are perceived as the highest commodities, the economic consequences of the Covid-19 pandemic also deserve attention [30]. Reliable assessment of these effects, inter alia, for the food industry, including the dairy sector, is currently not fully possible, which is related to the advancement of the pandemic, the scale and directions of its spread, and insufficient knowledge about the value and scope of food market support from both the state and EU institutions. Food producers were less affected by the effects of the Covid-19 pandemic than other branches of industrial processing, as the products produced in this sector are basic products, and therefore have lower income elasticity of demand. Market observations and reports from economic practice confirm that the food industry, including the dairy sector, is doing well during the pandemic. Producers of food products and beverages take a number of steps to ensure food production, along with reducing the obstacles associated with the Covid-19 virus on work efficiency. Processors faced the challenges of reorganizing work, adapting to new legal norms and the additional costs associated with it, in other words minimizing risk, while maintaining business stability in the long term [30]. According to the authors of the report



entitled: *Food Foresight: The impact of COVID-19 on the food sector in Central and Eastern Europe developed by EIT Food at the request of the European Commission* [2020], changes in purchasing habits and the emergence of new consumer trends are changing the structure of demand for food to which they will be food producers forced to adapt. Nowadays, after a period of buying in stock, consumers have entered the phase of purchasing less frequently but in larger quantities. Ecological, traditional and branded products are popular because their health and nutritional values are appreciated to a greater extent. For food safety, packaging is also important - products that are hermetically sealed by the manufacturer and products in collective packaging gain. A chance for the development and production growth of food companies is not only to adjust the structure of supply to the changing structure of domestic demand, but also to acquire and recognize new markets where food shortages have been revealed [6, 30].

The impact of the COVID-19 pandemic may be more or less noticeable and varied depending on the specificity of production and the operating conditions of individual sectors of the food industry. According to Szczepaniak et al. [2020] the possible impact of the Covid-19 pandemic on the dairy sector in Poland in a short period of time may manifest itself, inter alia, in turbulences in the export of milk and its products, egg powdered milk, which cannot always be absorbed by the domestic market; problems with the export of dairy products may increase their supply to the internal market and, as a result, lead to a drop in prices and a temporary reduction in companies' revenues [30]. On the other hand, in the long term, the Covid-19 pandemic in the dairy sector may result in problems with the export of milk and its products, which will result in an increase in their supply to the domestic market and, consequently, cause a drop in prices and a long-term reduction in companies' revenues. Another effect for the dairy sector in the long-term perspective, due to the high connection of the Polish dairy sector with the world market, is a possible decline in the revenues of dairy companies if the prices of milk and its products fell on world markets [30].

According to experts of the Institute of Agricultural and Food Economics, in 2021 the upward trend in balance milk consumption will be halted, which will be a consequence of the Covid-19 pandemic lasting from March 2020, which results in a recession in the national economy, deterioration of the labor market situation, decrease in consumer income and restrictions in the movement of the population. As a consequence, households will reduce their expenses on food, including milk and milk products [35]. According to Śmigielska (2020), in 2021 the milk market in Poland will be affected by the economic recession, and the dairy sector will continue its restructuring processes. Experts forecast that in 2021 the total number of cows will decrease by 1.5% to 2,450,000. heads, and dairy cows by 1.6% to 2,190 thousand. pcs. The average yield of dairy cows will increase to 6540 l per animal. and will compensate for the drop in the stock, which will contribute to the increase in milk production by 0.6% to the level of 14.5 billion liters. Raw material supplies to processing plants will increase by 2.6% and will amount to 12.5 billion liters [32, 35]. The pandemic will not disrupt international trade. Exports of dairy products in milk equivalent will increase to 5.1 million tons, and imports to 2.2 million

tons. In terms of value, exports will increase to the level of EUR 2.5 billion. Export will be necessary with the growing milk production and the decline in consumption in Poland. In 2021, the consumption of milk and its products should be at the level of 226 l / person, and of butter – 4.7 kg / person. Next year, the prices of the raw material will mainly depend on the economic situation on the world market. In a situation where the economic recession caused by the pandemic will not last too long, milk prices in Poland should remain at the level of PLN 1.35 / l. However, if the recession continues for an extended period of time, export problems may arise. The increase in production will contribute to the excess supply, which will cause prices to fall to the level of 1.30 – 1.33 PLN / l [32, 35].

## SUMMARY

Based on the review of the literature on the subject and the conducted research analyzes in the field of determining the significance of changes taking place in the Polish dairy sector in 1995–2020 in the field of production, processing and consumption of milk in Poland, it was found that:

- In 1995–2020, significant progress was achieved in increasing cow milk yield, increasing production concentration and improving the quality of raw milk production. The improvement of cows' milk yield was achieved through the use of modern cow feeding techniques and breeding methods.
- Integration with the European Union and the introduction of the Common Agricultural Policy stimulated the restructuring of the dairy sector. Restructuring activities were forced by the need to comply with high sanitary and veterinary production standards. Moreover, a significant improvement in the profitability of milk production after the accession resulted in an increased interest in cattle breeding and facilitated the restructuring of farms producing milk.
- In 2004–2015, the volume of milk production was limited by its limitation. The introduced system of limiting milk production did not allow for its increase. This system administratively determines the sales volume and makes it difficult to adapt smoothly to the changing market.
- In milk processing in Poland, the production concentration process took place. The number of dairy industry entities is systematically decreasing. Plants that did not comply with EU requirements had to be closed, others merged or were taken over.
- The Covid-19 pandemic announced by the World Health Organization in March 2020 has a significant impact on changes in the consumption of milk and dairy products. The Covid-19 pandemic has changed consumer attitudes regarding food consumption. Enterprises in the dairy sector have undertaken a number of measures to adapt to functioning in the conditions of a pandemic, which was fostered by the launch of various protective measures by the state. In the long run, dairy companies themselves will have to take care of planning and risk management strategies, investments in digitization and automation, and the integration of production management systems with distribution systems. These activities will help to ensure

the continuity of supply chains in various crisis situations. An appropriate economic policy and the involvement of entrepreneurs may allow the current level of development of the Polish dairy sector to be maintained.

## PODSUMOWANIE

W oparciu o przegląd literatury przedmiotu oraz przeprowadzone analizy badawcze dotyczące określenia znaczenia zmian zachodzących w polskim sektorze mleczarskim w latach 1995–2020 w zakresie produkcji, przetwórstwa oraz spożycia mleka w Polsce stwierdzono, że:

- W latach 1995–2020 osiągnięto znaczny postęp w zakresie zwiększenia mleczności krów, zwiększenia koncentracji produkcji i poprawy jakości produkcji mleka surowego. Poprawę mleczności krów osiągnięto w wyniku stosowania nowoczesnych technik żywienia krów i metod hodowlanych.
- Integracja z Unią Europejską i wprowadzenie Wspólnej Polityki Rolnej stymulowało restrukturyzację sektora mleczarskiego. Działania restrukturyzacyjne były wymuszane przez konieczność przestrzegania wysokich standardów sanitarnych i weterynaryjnych produkcji. Znaczna poprawa opłacalności produkcji mleka po akcesji spowodowała ponadto wzrost zainteresowania chowem bydła i ułatwiała restrukturyzację gospodarstw produkujących mleko.

- W latach 2004–2015 wielkość produkcji mleka była ograniczona przez jej limitowanie. Wprowadzony system limitowania produkcji mleka nie pozwalał na jej zwiększenie. System ten, w sposób administracyjny określa wielkość sprzedaży i utrudnia płynne dostosowanie się do zmieniającego się rynku.
- W przetwórstwie mleka w Polsce nastąpił proces koncentracji produkcji. Liczba podmiotów przemysłu mleczarskiego systematycznie maleje. Zakłady, które nie dostosowały się do wymagań unijnych musiały zostać zamknięte, inne połączyły się lub zostały przejęte.
- Na zmiany w konsumpcji mleka i artykułów mleczarskich istotne znaczenie ma pandemia Covid-19 ogłoszona przez Światową Organizację Zdrowia w marcu 2020 roku. Pandemia Covid-19 przyczyniła się do zmian postaw konsumenckich w zakresie spożywania żywności. Przedsiębiorstwa sektora mleczarskiego podjęły szereg działań dostosowawczych do funkcjonowania w warunkach pandemii, czemu sprzyjało uruchomienie przez państwo różnego rodzaju środków osłonowych. W dłuższej perspektywie przedsiębiorstwa mleczarskie same będą zmuszone zadbać o strategię planowania i zarządzania ryzykiem, inwestycje w cyfryzację i automatyzację oraz integrację systemów zarządzania produkcją z systemami dystrybucyjnymi. Działania te będą sprzyjać zapewnieniu ciągłości łańcuchów dostaw w różnych sytuacjach kryzysowych. Odpowiednia polityka gospodarcza i zaangażowanie przedsiębiorców pozwolą utrzymać dotychczasowy poziom rozwoju polskiego sektora mleczarskiego.

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