

**ECONOMICAL ASPECTS OF MILK PROCESSING  
INDUSTRY UNDER CONDITIONS OF DISPERSED  
AGRICULTURE – STUDY OF A CHOSEN REGION  
IN POLAND**

Ladislav Mura

J. Selye University, Komarno

**Abstract.** Low costs of raw material production in comparison with milk production costs in the EU-25 countries are strengths of the Małopolska dairy sector. Low costs of milk production result primarily from the extensive character of production on a majority of dairy farms, dispersion and outdated technologies, lower hygiene and veterinary standards and low remuneration for work in agriculture forced by high unemployment rate and lack of any other sources of income. Simultaneously the same factors are basic causes of low profitability of milk production and lack of funds for its modernization, thus being the main weaknesses of the Małopolska dairy sector. Small farms prevail among milk producers, which makes the structure of milk suppliers for processing greatly dispersed over the whole region. The dispersion most unfavourably affects raw milk quality and competitiveness of final dairy products.

**Key words:** economical aspects, milk processing, dispersed agriculture, region of Małopolska

**INTRODUCTION**

Dairy cattle breeding is one of basic branches of agricultural production in Poland, which together with cattle and calves for slaughter makes up 26% of final output of Polish agriculture. Value of annual milk production in Poland in 2008-2010 was between 2.1 and 2.5 mln EUR which constituted c.a. 17% of global output and 20% of

market output of agriculture in Poland. Every fourth zloty earned by farmers for sold products came from dairy cattle breeding, which is maintained on almost 1 mln farms, but only 380 thousand of these sell raw products to dairy industry. Various estimates show that between 30 and 35% of rural labour resources in Poland are involved in milk production and for about 900 thousand families milk provides an important source of income and food. On the other hand, prices of dairy products significantly affect the living standards of Polish consumers who in the first years of the 21<sup>st</sup> century spent on food between 28% (own-account households) and almost 41% (households earning their living from non-profit sources) of family budgets [Ad hoc tables... 2011].

Structure of cow population in Poland is unfavourable. About 70% of milk suppliers have only one or two cows, about 25% of suppliers own farms with 3-5 cows, whereas about 5% possess between 6 and 10 cows. Only about 0.5 of Polish farmers keep more than 10 cows. A declining tendency in cow population has been inhibited over the last years. However, changes in cow population show considerable territorial diversification. The biggest herds are kept in the north-eastern, northern and central macroregions, i.e. in the areas with largest market output of milk. These macroregions also have the most numerous dairy plants which achieve the best production and economic results in Poland.

One of drawbacks in development of Polish dairy sector is high seasonality of milk production. For this reason dairies do not fully utilise their productive potential which results in growing production costs, whereas competitiveness of Polish dairy products weakens both on domestic and European markets.

Another structural problem which dairy sector faces is too great number of economic entities processing milk, since many of them are too weak to compete successfully with large enterprises operating in the European Union [Statistical... 2009, Megyesiová and Hudák 2011] In the process of modernising and consolidating the whole dairy sector, small and medium enterprises with outdated equipment and no raw material base are liquidated, whereas the other should continue modernisation investments adjusting their market offer to changing consumer preferences. In closer and further perspective, dairy industry will have to manufacture novel, highly processed dairy products with required quality parameters and at competitive prices. Dairies, both co-operatives and capital companies achieve better results owing to closer collaboration with milk producers aiming at improvement of raw material quality and modernising raw material base. Also dairy sector in the Małopolska region faces these challenges [Cieślak 2008].

## **MATERIAL AND METHODS**

The paper is an attempted analysis of information concerning the state of milk production and processing in the Małopolska region. The analysis provides an identification of raw milk production level and production volume in the existing dairy plants. Basic materials used for the analysis include information obtained from the Regional Unit of Agricultural Market Agency in Krakow, Provincial Veterinary Inspectorate and Eurostat. Numerical data cover the reference period from 1 April 2009 to 31 March 2010 and provide a basis for the presented analysis. Literature data concerning the problems of dairy sector adjustments to the European Union market requirements have also

been used in the paper. Meeting requirements of competitiveness poses for milk producers and processors a necessity to make quick decisions in the area of consolidation and concentration of production in the Małopolska dairy sector. The basic method applied in the work has been one involving data collection in tables and figures with added comments of results.

## RESULTS AND DISCUSSION

Milk production in the chosen region, like in the whole country is distributed irregularly. The volume of milk production is determined by many factors, among which the most important are:

- soil and climatic conditions,
- agrarian structure affecting farm area of holdings keeping dairy cows,
- technical equipment of farms necessary for production of fodder for cows and equipment necessary to obtain milk with high quality parameters,
- professional qualifications of milk producers.

In 2009 cattle was kept on 117.9 thousand farms in Małopolska, which constituted 31.5% of the total number of farms, 110.0 thousand farms, i.e. 93.3% of cattle keeping farms had cows (29.4% of the total number in the region). Somewhat simplifying, it may be assumed that in 2009 every third farm in Małopolska kept cattle. Low concentration of cows and milk production has been reflected in the number of cows kept in the region and the scale of their breeding on farms in various area groups (Table 1).

In 2009 cows were kept on 10.9 thousand private farms, i.e. 29.4% of their total number. In farm area group under 1 ha of arable lands, only 3.9% kept cows. In the 1-2 ha area group 26.6% kept cows. Among medium sized farms, with arable area between 2 and 5 ha cows were kept on every second farm (58.3%). The farms with 5-10 ha of arable area which kept cows made up 76.3%. The highest percentage of farms the region keeping cows – 77.9% was registered in the group of between 10 and 15 ha of arable area. Cows were kept by 65.3% of farms with medium areas exceeding 15 ha arable lands [Cieślak 2008].

Considering simultaneously private farm size and scale on which they keep cows, a vast majority (93.57%) of the smallest farms with area less than 1 ha had only one cow. Also among farms with area of 1-2 ha, the greatest number (86.14%) kept only a single cow. A similar situation was registered for farms with 3-5 ha and 5-10 ha area where respectively 62.54% and 35.37% possessed only one cow. In the 10-15ha area group the greatest percentage (24.94%) kept 3-4 cows, whereas in the area group above 15 ha of arable area the highest percentage (21.90%) kept between 5 and 9 heads (Table 2).

Global milk output in 2009 in the Małopolska region was c.a. 725 mln litres and was almost totally obtained from cows kept in the private sector. In the Nowy Sącz sub-region 425 mln l of milk was produced, which constituted almost 60% of the global milk output in the region. The biggest quantities of milk were produced in the nowotarski county 107 mln l, i.e. almost 15% of the regional production, in nowosądecki county 90 mln l (12%), in limanowski county 67 mln l (9%) and in gorlicki county 52 mln l (7%). Krakowsko-tarnowski sub-region registered production on the level approaching 300 mln l, which makes up 40% of milk production in the region. In this sub-region the

Table 1. Number of farms according to scale on which cows are kept and arable area groups in the region of Małopolska in 2009

Tabela 1. Liczba gospodarstw rolnych według liczby hodowanych krów oraz grup obszarowych użytków rolnych

Arable area groups Grupy według powierzchni uprawnej	Total Ogółem	Farms keeping cows (heads) Gospodarstwa rolne hodujące krowy (ilość)							Farms without cows Gospodarstwa rolne nie hodujące krów
		total ogółem	1	2	3-4	5-9	10-19	≥ 20	
Total Ogółem	373 726	109 970	69 313	27 709	9 817	2 707	351	73	263 756
< 1 ha	156 835	6 070	5 680	360	29	–	–	–	150 768
1-2 ha	88 397	23 531	20 269	2 905	330	25	–	–	64 866
2-3 ha	48 462	24 264	17 716	5 545	927	73	3	–	24 198
3-5 ha	48 717	32 418	17 733	10 955	3 333	381	14	–	16 299
5-7 ha	17 388	13 145	5 089	4 771	1 579	670	35	–	4 243
7-10 ha	8 598	6 679	1 922	2 198	1 707	782	69	–	1 919
10-15 ha	3 561	2 767	669	459	690	534	106	9	794
15-20 ha	865	615	126	120	140	160	63	6	250
20-30 ha	467	305	66	67	56	63	38	15	162
30-50 ha	210	118	31	19	22	17	16	13	92
> 50 ha	226	58	12	20	4	–	5	26	168

Source: own processing on the data of Eurostat.

Źródło: opracowanie własne na podstawie danych z Eurostatu.

largest quantities of mln were produced in tarnowski county, c.a. 67 mln l (9%). The city of Krakow sub-region, which produced almost 4 mln l made up only 0.5% in the regional scale. Details of milk production have been presented in Table 3.

The five counties of the Małopolska region mentioned above, the four of which are situated in nowosądecki sub-region, in the analysed year produced 384 mln l of milk, which makes up 53% of global milk output in the region (Fig. 1).

Counties with highest milk output are localised in the southern part of the Małopolska region. Therefore it may be assumed that a natural concentration of milk production is happening because these counties are characterized by a relatively high percentage of grasslands providing natural forage reserves for cattle production which is a dominant trend in animal production.

In the analysed year milk was purchased and processed by 25 economic entities operating in the Małopolska region. Co-operatives represented by 16 dairy plants were a prevailing form. The other were private enterprises, usually partnerships. Dairy firms

Table 2. Cow population on farms according to scale on which they are kept and arable area groups in the Małopolska region in 2009

Tabela 2. Pogłowie krów w gospodarstwach w zależności od liczebności oraz grupy obszarowych użytków rolnych na terenie województwa małopolskiego

Arable area groups Grupy gospodarstw rolnych	Farms keeping cows (heads) Gospodarstwa rolne hodujące krowy (ilość)						
	total ogółem	1	2	3-4	5-9	10-19	≥ 20
Total Ogółem	181 375	69 313	55 418	32 225	16 177	4 173	4 069
< 1 ha	6 495	5 680	720	90	5	–	–
1-2 ha	27 293	20 269	5 810	1 056	138	20	–
2-3 ha	32 190	17 716	11 090	2 944	405	35	–
3-5 ha	52 809	17 733	21 910	10 791	2 149	171	55
5-7 ha	27 381	5 089	9 542	8 496	3 851	383	20
7-10 ha	17 574	1 922	4 396	5 711	4 753	770	22
10-15 ha	9 349	669	1 518	2 369	3 321	1 282	190
15-20 ha	2 796	126	240	490	1 017	771	152
20-30 ha	1 629	66	134	189	419	481	340
30-50 ha	845	31	38	76	112	197	391
> 50 ha	3 014	12	20	13	7	63	2 899

Source: own processing on the data of Eurostat.

Źródło: opracowanie własne na podstawie danych z Eurostatu.

Table 3. Cow population and milk production in individual counties of the Małopolska region

Tabela 3. Pogłowie krów i produkcja mleka w poszczególnych powiatach województwa małopolskiego

Specification Wykaz	Cow population Pogłowie krów	Milk production Produkcja mleka (t)
1	2	3
Region total Województwo ogółem	181 375	725 500 000
Krakowsko-tarnowski sub-region Subregion krakowsko-tarnowski	74 058	296 232 000
Bocheński county Powiat bocheński	7 662	30 648 000
Brzeski county Powiat brzeski	8 056	32 224 000

Table 3 – cont. / Tabela 3 – cd.

1	2	3
Chrzanowski county Powiat chrzanowski	519	2 076 000
Dąbrowski county Powiat dąbrowski	5 927	23 708 000
Krakowski county Powiat krakowski	9 906	39 624 000
Miechowski county Powiat miechowski	9 113	36 452 000
Olkuski county Powiat olkuski	5 137	20 548 000
Oświęcimski county Powiat oświęcimski	2 489	9 956 000
Proszowicki county Powiat proszowicki	4 763	19 052 000
Tarnowski county Powiat tarnowski	16 731	66 924 000
Wielicki county Powiat wielicki	3 339	13 356 000
City of Tarnów Tarnów	416	1 664 000
Nowosądecki sub-region Podregion nowosądecki	106 358	425 432 000
Gorlicki county Powiat gorlicki	12 995	51 980 000
Limanowski county Powiat limanowski	16 835	67 340 000
Myślenicki county Powiat myślenicki	8 151	32 604 000
Nowosądecki county Powiat nowosądecki	22 519	90 076 000
Nowotarski county Powiat nowotarski	26 914	107 656 000
Suski county Powiat suski	6 006	24 024 000
Tatrzański county Powiat tatrzański	7 128	28 512 000
Wadowicki county Powiat wadowicki	5 215	20 860 000
City of Nowy Sącz Nowy Sącz	595	2 380 000
City of Kraków sub-region Miasto Kraków i podregion krakowski	959	3 836 000

Source: own processing on the data of Eurostat.

Źródło: opracowanie własne na podstawie danych z Eurostatu.

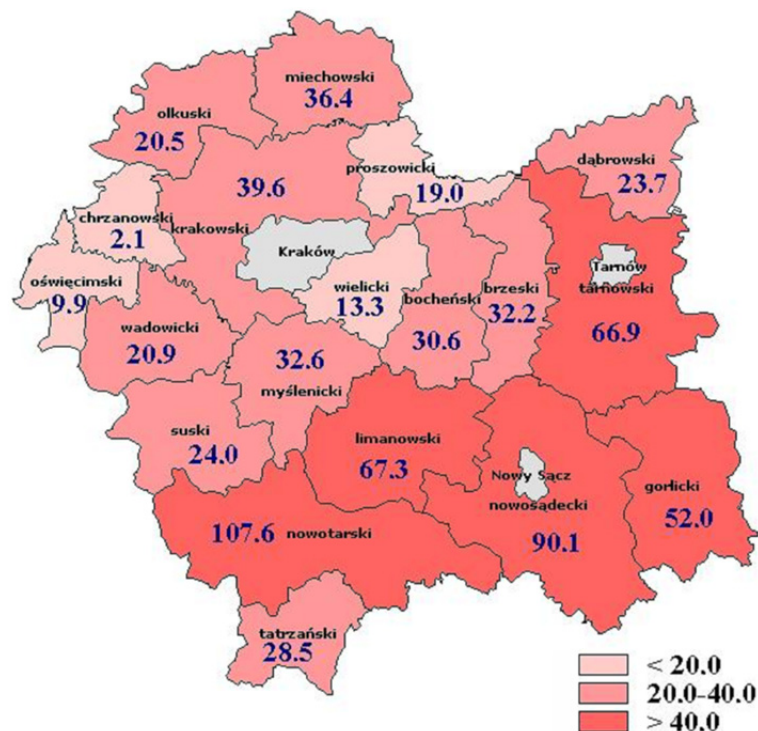


Fig. 1. Milk production in individual counties of the Małopolska region in 2009 (mln l)

Source: [www.agroinfo.org.pl](http://www.agroinfo.org.pl)

Rys. 1. Produkcja mleka w poszczególnych powiatach województwa małopolskiego w 2009 roku (mln l)

Źródło: [www.agroinfo.org.pl](http://www.agroinfo.org.pl).

in the region may be counted to small and medium sized enterprises, according to the volume of raw milk processed annually. The firms, which in the analysed year processed the largest amounts of milk, c.a. 140 mln l were dairy co-operatives and these reached almost 85% share in milk purchases and processing in the region (Table 4).

Quality of milk purchased in the analysed year in the Małopolska region differed negatively from milk quality parameters for the whole country and this fact is strictly connected with such high dispersion of production.

Dairy plants operating in the Małopolska region acquire milk primarily from their own local raw material bases and only small quantities of raw milk are purchased in the adjoining provinces. Small farms with area no larger than 5 ha, maintaining multidirectional production and keeping on an average one or two cows, predominate among milk suppliers. The structure of milk producers in the Małopolska region reveals a definitely dispersed character and the milk supplies for dairy plants are concentrated only to small degree. Dispersion in milk production most unfavourably affects the purchased milk quality level. Concerning milk processing in the analysed year, the adjustment to the EU

Table 4. Purchasing entities and quantities of milk processed in the Małopolska region  
Tabela 4. Jednostki kupujące i ilość mleka przetwarzanego w województwie małopolskim

Purchasing entity (no.) Jednostka nabywająca (numer)	Number of suppliers Liczba dostawców	Litres Litry	Average amount of milk from single supplier Średnia ilość mleka od dostawcy
1 (s)	732	3 643 314	4 977
2 (s)	248	4 176 658	16 841
3 (s)	1 046	3 295 035	3 150
4 (s)	602	2 032 731	3 377
5 (s)	568	3 152 405	5 550
6	292	2 109 205	7 223
7 (s)	3 997	29 728 946	7 438
8 (s)	1 037	8 420 949	8 120
9	195	1 328 006	6 810
10 (s)	2 771	12 746 034	4 600
11	692	5 976 777	8 637
12 (s)	467	3 656 462	7 830
13	343	1 302 324	3 797
14 (s)	211	597 670	2 833
15 (s)	1 186	11 506 810	9 702
16 (s)	665	4 937 966	7 426
17	400	1 466 452	3 666
18 (s)	2 606	18 907 984	7 256
19 (s)	3 288	17 483 135	5 317
20	100	372 340	3 723
21	150	413 000	2 753
22 (s)	1 838	12 010 631	6 535
23	627	3 697 564	5 897
24	1 655	8 144 669	4 921
25 (s)	526	4 018 131	7 639
Total – Ogółem	26 242	165 125 198	6 292

(s) – dairy co-operatives.

Source: own processing on the numerical data of Regional Office of Agricultural Market Agency in Kraków and Eurostat.

(s) – spółdzielnie mleczarskie.

Źródło: opracowanie własne na podstawie danych liczbowych z Wojewódzkiego Biura Agencji Rynku Rolnego w Krakowie oraz Eurostatu.



market requirements was best reflected by the fact that none of the enterprises met requirements for category A. One of the ways to ensure better competitiveness for the enterprises in the region is consolidation of small units into larger entities with narrow specialisation [Megyesiová 2005, Šúbertová 2010].

## CONCLUSIONS

Unwillingness of some of the dairy plant managing bodies to cooperate and form capital partnerships and inability to realize the benefits resulting from such collaboration are reasons for poorly developed own dairy product sale networks. A weak financial condition of firms, lack of integration and difficult access to capital it may lead to insufficient development of linkages among successive links of marketing chain.

## REFERENCES

- Ad hoc tables from the farm structure survey. 2011. Eurostat. [http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/ad\\_hoc\\_tables\\_farm\\_structure\\_survey](http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/ad_hoc_tables_farm_structure_survey) [access: 10.09.2011].
- Agencja Rynku Rolnego. 2010. Oddział Terenowy. Kraków. [http://www.arr.gov.pl/index.php?option=com\\_content&view=article&id=62&Itemid=258](http://www.arr.gov.pl/index.php?option=com_content&view=article&id=62&Itemid=258) [access: 8.09.2011].
- Cieślak J., 2008. Sytuacja przemysłu mleczarskiego w województwie małopolskim w procesie integracji z UE. Pr. Nauk. AE Wroc.
- Megyesiová S., 2005. Klasifikácia krajín na základe zvolených kritérií. Forum Statisticum Slovacum 5, 1, 126-133.
- Megyesiová S., Hudák M., 2011. Komparácia vybraných krajov Slovenska prostredníctvom ukazovateľov priemyslu. In: Marketing a marketingová komunikácia (vybrané aspekty, pohľady a trendy): recenzovaný vedecký zborník. Fakulta manažmentu, Prešovská univerzita, Prešov, 176-184.
- Statistical Office in Krakow. 2009. Bulletins of SO in Krakow. [http://www.stat.gov.pl/krak/22\\_ENG\\_HTML.htm](http://www.stat.gov.pl/krak/22_ENG_HTML.htm) [access: 22.09.2011].
- Šúbertová E., 2010. The structural changes and results of agricultural companies in the Slovak republic. Megatrend Rev. 7, 2, 53-62.

## EKONOMICZNE ASPEKTY FUNKCJONOWANIA PRZEMYSŁU MLECZARSKIEGO W WARUNKACH ROLNICTWA ROZPROSZONEGO – BADANIA PRZEPROWADZONE W WYBRANYM WOJEWÓDZTWIE

**Streszczenie.** Niskie koszty przetwarzania mleka, w porównaniu z kosztami produkcji w 25 krajach UE, stanowią siłę małopolskiego przemysłu mleczarskiego. Niskie koszty produkcji wynikają, po pierwsze, z ekstensywnego charakteru tej produkcji w większości gospodarstw mlecznych, rozproszenia i przestarzałych technologii, niższego poziomu higieny i standardów weterynaryjnych, niższego wynagrodzenia za pracę w rolnictwie, co z kolei jest wynikiem wysokiej stopy bezrobocia w sektorze i braku innych źródeł dochodu. Te same czynniki są podstawowymi przyczynami niskiej opłacalności produkcji mleka i braku funduszy na jej modernizację, i stanowią, w związku z tym, główną słabość

małopolskiego sektora mleczarskiego. Wśród producentów przeważają małe gospodarstwa, co powoduje, że struktura dostawców mleka dla celów przetwórstwa jest znacznie rozproszona po całym województwie. Rozproszenie to w sposób niekorzystny wpływa na jakość surowca i konkurencyjność produktów końcowych.

**Słowa kluczowe:** aspekty ekonomiczne, przetwarzanie mleka, rozproszone rolnictwo, województwo małopolskie

*Accepted for print – Zaakceptowano do druku: 15.12.2011*

*For citation – Do cytowania: Mura L., 2012. Economical aspects of milk processing industry under conditions of dispersed agriculture – study of chosen region in Poland. J. Agribus. Rural Dev. 1(23), 61-70.*