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CHALLENGES IN THE MILK MARKET (INVESTMENTS, DISRUPTIONS, LOGISTICS, COMPETITIVENESS, PRICES, AND POLICY)

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13

PERSPECTIVES FOR THE DEVELOPMENT OF ORGANIC DAIRY FARMS IN POLAND

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13.1. Introduction

Enhancing environmental and food security requires a shift in agricultural production systems towards sustainable agriculture which ensures more efficient use of natural resources (Huhtanen 2010). Organic farming is an agricultural production system that respects the principles of sustainable management to the greatest extent (Cooper et al. 2010; Jespersen et al. 2017).

This system combines the most environmentally beneficial practices, a high degree of biodiversity, conservation of natural resources and high animal welfare standards. Animals kept under the organic farming system must be fed with organic fodder, preferably from the same farm, and provided with sufficient space and access to outdoor areas (Meemken and Qaim 2018). The International Federation of Organic Agriculture Movements (IFOAM) defines organic farming as a set of

specific farming concepts, in line with soil, plant and animal requirements, the overall objective of which is to produce high-quality food, while maintaining the biological balance of the environment as far as possible. The basic principles of organic farming as defined by IFOAM include, among others: closed-loop management in order to maintain long-term soil fertility, preservation of animal welfare and provision of living conditions for the animals compatible with their physiological needs and humane principles (Arbenz et al 2016).

Globally, organic farming legislation is evolving, influenced by the expectations of organic sector participants and by developments in knowledge and innovation that increase the applicability of acceptable methods and measures in the sector. The European Union has created a broad legal framework for a growing number of agricultural producers and a financial support system for organic farming. On the one hand, the introduced regulations on organic farming have contributed to its institutionalisation and increased transparency in the organic food market, while the system of financial support for organic farming has fostered an increased interest among farmers in this production system.

The level of development of organic agriculture varies spatially. The continents with the largest share of the world's areas under organic maintenance are: Australia, Europe and South America (Runowski 2009). The size and importance of organic milk production is also spatially varied. Europe and North America are in the lead. The main producers of organic milk in Europe are: Germany, Austria, Great Britain, France and Denmark.

Cow's milk production is one of the most important branches of agricultural production in the world. The dairy sector also plays an important role in the economy of the European Union, and in the EU member states there is a strong emphasis on the quality of the raw material and on animal welfare, i.e. keeping animals in a way which ensures appropriate living conditions (Bórawski et al. 2020; Babuchowska 2020). The main problem of cattle farming is the negative impact of this branch of production on the environment, as indicated by many researchers, which is particularly high on farms with a high level of production intensity (Soltanali et al. 2015; Gulseven and Wohlgenant 2017; Bórawski et al 2020). At the same time, the level of public awareness of the negative

effects of agricultural intensification on health, quality of life and the environment is growing. As a consequence of the changes, both the interest of farmers in the organic production system (Brodzińska 2010) and the interest of consumers in organic food are increasing (Łuczka-Bakuła 2005).

13.2. Research objective and methods

The aim of the research is to diagnose the nature and direction of changes in organic dairy farming system in a global, European and national context and to understand their economic and social determinants. The nature of these changes is not unambiguous and the development of organic farming, especially in EU member states, including dairy farming, is largely determined by the subsidy system for organic farming. This was analysed in detail on the example of Poland.

The analyses used source data mainly from studies of foreign institutions on organic farming, such as the Research Institute of Organic Agriculture (FiBL), published in The World of Organic Agriculture – Statistics & Emerging Trends, and the International Federation of Organic Agricultural Movements (IFOAM). Both institutions are the primary source of statistics on organic farming worldwide. The latest data published in 2020 includes information on organic agriculture from 2018. The analyses on organic farming in Poland were based on data from the Commercial Quality Inspection of Agricultural and Food Products (IJHARS), as well as the Ministry of Agriculture and Rural Development (MARD), the Agency for Restructuring and Modernisation of Agriculture (ARMA).

13.3. Organic milk production in a global and European framework

According to the latest OECD-FAO projections, world milk production will grow at an average annual rate of 1.6% between 2020 and 2029, reaching 997 million tonnes in 2029. In 2029, it is estimated that Asian countries, particularly India and Pakistan, will produce more than 30% of the world's milk volume. In contrast, the highest productivity is

achieved by cows in North America, where the share of the production model based on pasture feeding is small and the mode of production in specialised farms is focused on high yields. The dairy cow population in both the United States and Canada is expected to remain similar to current levels over the next ten years, with production growth based on further productivity gains. In New Zealand, by contrast, the production system is mainly grazing-based, thus land availability and increasing environmental requirements will be the limiting factors for further growth in milk production. Strong growth in milk production can also be expected in Africa, mainly due to an increase in the size of low-yielding herds. According to OECD-FAO analysts, milk production in the world's second largest milk producer after India, the European Union, will grow at a lower rate than the world average. Moreover, it is in the EU that the share of organic milk production is expected to increase.

In 2018, there were 2 796.4 thousand organic farms worldwide, with the highest number of organic farms in Asia and Africa. In contrast, the highest annual growth rate was recorded in EU countries (by 7.14%), while a significant decrease in the number of organic farms in 2018 compared to 2017 was recorded in South America (Table 1).

Table 1. Number of organic producers by continent in 2018

Continent	2017	2018	Dynamics
Europe (incl. EU)	397 146,00	418 610,00	105,40%
	305 394,00	327 222,00	107,14%
Africa	806 877,00	788 858,00	97,76%
Asia	1 231 159,00	1 317 023,00	106,97%
South America	460 443,00	227 608,97	49,43%
North America	22 966,00	23 957,00	104,31%
Australia and Oceania	26 750,00	20 859,00	77,98%
World	2 944 909,00	2 796 404,97	94,96%

Source: own study based on data from FiBL

Among the 28 EU member states, the highest number of organic farms in 2018 was recorded in Italy (69 317 farms), followed by France (41 632 farms) and Spain (39 505). On the other hand, the highest average UAA on organic farms was recorded in Slovakia (430.49 ha), the

UK (129.06 ha) and Czech Republic (117.13 ha). The average organic farm size in the EU is 42.14 ha, while the smallest average area of organic farms are in Malta (2.48 ha), Cyprus (4.82 ha) and Slovenia (12.80 ha) (Table 2).

Organic cow's milk production in the EU in 2018 totalled 5 761 thousand tonnes. This production was mainly concentrated in Germany – 1 117 thousand tonnes (19.4% of EU production), France – 909 thousand tonnes (15.8% of EU production), Denmark – 685 thousand tonnes (11.9% of EU production) and Austria 635 thousand tonnes (11.0% of EU production) (Table 2).

Table 2. Number of producers, organic agricultural area, average organic farm area and amount of cow's milk produced in EU countries in 2018

EU country	Number of producers	Area in thous. ha	Average area per producer	Volume of organic cow's milk in tonnes
Austria	25795	637,8	24,73	635751
Belgium	2264	89,0	39,32	120077
Bulgaria	6471	162,3	25,09	5280
Croatia	4374	103,2	23,59	3094
Cyprus	1249	6,0	4,82	3706
Czech Republic	4601	538,9	117,13	33433
Denmark	3637	256,7	70,58	635751
Estonia	1948	2060,6	106,05	7386
Finland	5129	297,4	57,99	71028
France	41632	2035,0	48,88	909336
Germany	31713	1521,3	47,97	1117821
Greece	29594	492,6	16,65	75722
Hungary	3929	209,4	53,29	4721
Ireland	1725	118,7	68,81	17791
Italy	69317	1958,0	28,25	448184
Latvia	4178	280,4	67,11	94327
Lithuania	2476	239,7	96,81	68133
Luxembourg	103	5,8	56,14	3772
Malta	19	0,05	2,48	0
Netherlands	1696	57,9	34,14	293681
Poland	19224	484,7	25,21	26773
Portugal	5213	213,1	40,88	
Romania	7908	326,3	41,26	28062
Slovakia	439	188,9	430,49	25998
Slovenia	3738	47,8	12,80	7187
Spain	39505	2246,5	56,87	42006
Switzerland	5801	608,8	104,94	464970
UK	3544	457,4	129,06	564
Sum	**327 222**	**13 790,4**	**42,14**	**5144554**

Source: own study based on EUROSTAT data

13.4. Organic cow's milk production in Poland

The dynamic development of organic farming in Poland, especially after agriculture was covered by financial support under the CAP, has significantly increased the interest in organic production methods and organic processing. According to data from the Commercial Quality Inspection of Agricultural and Food Products (IJHARS), in 2018 the number of organic farms with a certificate or in the process of obtaining a certificate amounted to 19,207, compared to only 3,705 farms in 2004 (IJHARS 2007-2018). However, it is important to note that the highest number of organic farms in Poland (27 093) was in 2013. Since 2014, however, the number of organic farms has been decreasing, even though Poland is considered a country with friendly conditions for organic production due to its environmental conditions. Organic farming is one of the branches of agriculture in which we can successfully compete with other countries and produce high quality food. This is supported by the relatively clean environment, uncontaminated soils and the structure of agriculture (Szymona 2012).

Analysing the number of registered organic cattle farmers in Poland, a downward trend can be observed between 2010 and 2018. In 2010, the number of organic cattle producers was 4 187, while in the following years a downward trend was observed, the exception being 2012 with a slight year-on-year increase. In 2018, there were 1 305 organic cattle farms, representing only 31.2% of the holdings with organic herds in year 2010 (Figure 1).

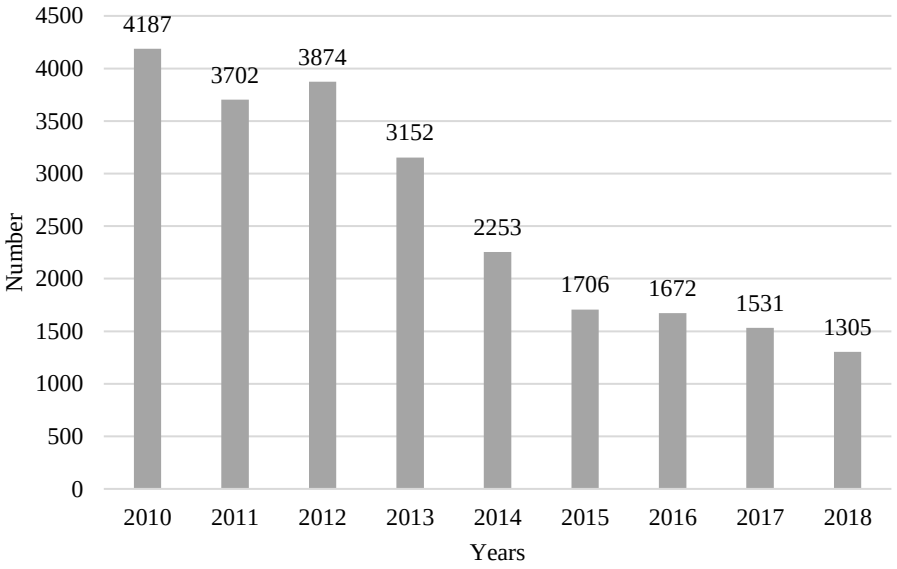

Figure 1. Organic cattle farms in Poland 2010-2018
Source: own study based on IJHARS data.

The analysis of changes in the stock of cattle kept in the organic farming system according to the direction of use, in the case of dairy cows, shows a general downward trend since 2010, while in the case of beef cattle this the same trend started in 2012. It is also worth highlighting the predominance of beef cattle over dairy cows between 2011 and 2013. On the other hand, in the new RDP 2014-2020 programming period, with a general downward trend, a clear predominance in the population of dairy cows over beef cattle kept under the organic farming system is evident. With the dairy cow herd in 2018 accounting for only 46.6%of the 2010 herd (Figure 2).

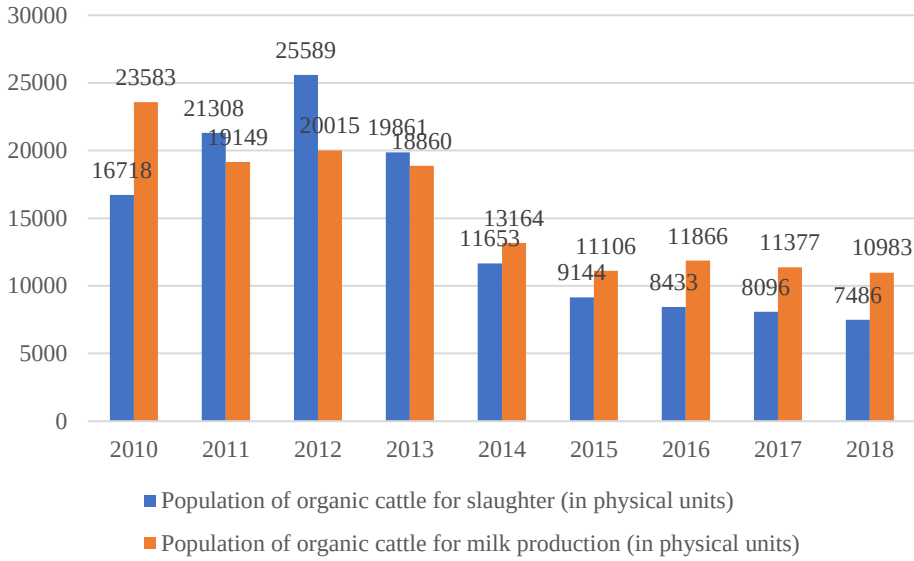

Figure 2. Population of organic cattle in Poland, 2010-2018, for slaughter and for milk production (in physical units)
Source: own study based IJHARS data

Analysing the population of dairy cows kept under organic farming system in individual voivodeships in 2018, it can be seen that the highest number of dairy cows in this system was kept in the voivodeships of małopolskie (2 002), zachodniopomorskie (1 800), podkarpackie (1 332), pomorskie (1 106) and mazowieckie (1 047) (Table 3).

Table 3. Dairy cow population and quantity of milk produced (hectolitres) by voivodeship in 2018

Voivodeship	Dairy cow population (physical units)	Volume of organic milk collected (hectolitres)	Average volume of organic milk marketed per cow (litres)	Estimated volume of organic milk sales %
małopolskie	2002	51643,23	2579,6	44,9
podkarpackie	1332	38193,20	2867,4	49,9
mazowieckie	1047	29759,00	2842,3	49,5
warmińsko-mazurskie	871	22342,0	2565,1	44,6
świętokrzyskie	516	12754,00	2471,7	43,0
podlaskie	597	18530,83	3104,0	54,0
zachodnio-pomorskie	1800	40630,00	2257,2	39,3
dolnośląskie	607	8592,31	1415,5	24,6
pomorskie	1106	16853,6	1523,8	26,5
lubelskie	248	2610,0	1052,4	18,3
lubuskie	303	170,00	56,1	1,0
kujawsko-pomorskie	239	8560,00	3581,6	62,3
wielkopolskie	149	205,00	137,6	2,4
śląskie	45	445,00	988,9	17,2
łódzkie	73	1793,00	2456,2	42,7
opolskie	48	0,00	0,0	0,0

Source: own study based IJHARS data

In Poland, a total of 253,000 hectolitres of milk were obtained from dairy cows kept under organic farming system in 2018. The available data shows that the highest milk production was recorded in the voivodeships with the largest dairy cow population, namely małopolskie with 51.6 thousand hectolitres, zachodniopomorskie with 40.6 thousand hectolitres, podkarpackie with 38.1 thousand hectolitres and mazowieckie with 29.8 thousand hectolitres. In 2018, the average annual milk yield per 1 cow was 5 747 litres and therefore, assuming the yield of dairy cows at this level, the sales volume of milk, obtained from cows kept under organic farming system, was estimated as an organic product. The calculations show that in three voivodeships, opolskie, lubuskie and wielkopolskie, milk obtained from cows kept under the organic farming system was almost entirely marketed as milk from conventional production. In four voivodeships the share of milk sold as organic was only 10-

30% of the total milk from cows kept under the organic farming system, in seven voivodeships it was 30-50% and only in two voivodeships (podlaskie and kujawsko-pomorskie) it exceeded 50% (Figure 3).

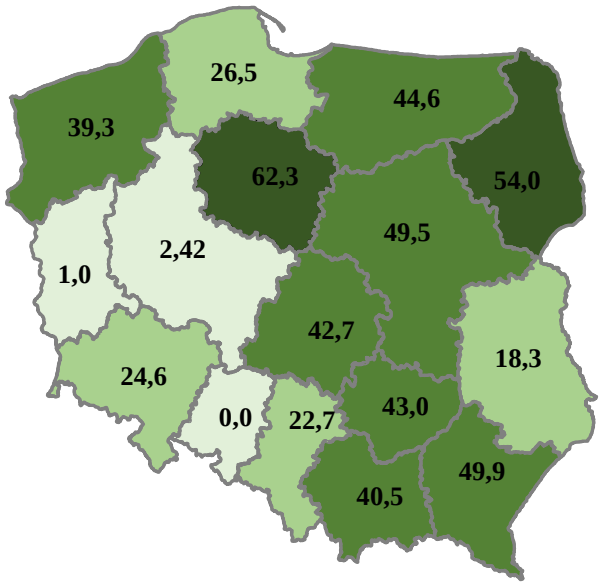

Figure 3. Level of organic milk production and sales by voivodeships (% of sales)
Source: own study based on IJHARS data

It is also worth pointing out that in recent years the production of organic cow's milk in Poland has remained stable at around 250 thousand hectolitres. In the years 2010-2012 the production was between 376 and 395 thousand hectolitres, thus this is a significant decrease in the volume of organic milk production.

The situation was similar in the number of organic milk processors. In 2009-2010, 4-5 entities were involved in milk processing, in 2012 their number increased to 17, and in 2014, 6 processors were active in this field, which together produced a total of only 1 093 tonnes of milk products and cheese (IJHARS 2008-2014). According to IJHARS these trends are a consequence of difficulties in selling organic products by agricultural producers to processors and result in them being marketed

as non-organic food. Therefore the most important barrier to development is the sale of milk and putting it into organic rather than conventional marketing. In turn, organic processors do not obtain enough quantities of raw materials for processing and thus significantly reduce their production volume or abandon it altogether. Although the environmental conditions for organic dairy farming do not essentially differ from those of conventional farming, the more expensive and more difficult organic production under domestic conditions still faces the barrier of low profitability.

13.5. Economic efficiency of organic dairy farming

The development of organic milk production is closely linked to its profitability, as well as its competitiveness in relation to other production systems. On the one hand, profitability depends on the costs incurred in production, while on the other hand, it is determined by the income obtained from the sale of raw materials or organic products. Organic livestock production reduces the scale of sales and the monetary value of commodity production, because its productivity is lower, which generates higher unit production costs (Runowski 2007; Malaga-Tobola 2011).

Milk production according to organic principles, just like conventional production, to be economically efficient, must consist of minimising production costs and maximising revenue. There are many factors determining the economic efficiency of milk production. The most important of these include milk yield per cow and milk price. Agricultural producers, who obtain milk by organic methods, expect higher prices. It is worth noting that the prices of raw materials and organic products in the world are up to 85% higher than the prices of conventional milk. In Germany, Belgium, the Czech Republic and Poland the price per kg of organic milk is about 12.5 eurocents or 36% higher than the price of conventional milk. The comparison in figure 4 shows that the price ratio of organic to conventional milk is higher from about 22% (Austria) to 46% (Belgium). In Poland, therefore, it is not the price of organic milk that limits the development of this line of production but, as already mentioned, the limited possibilities for its sale.

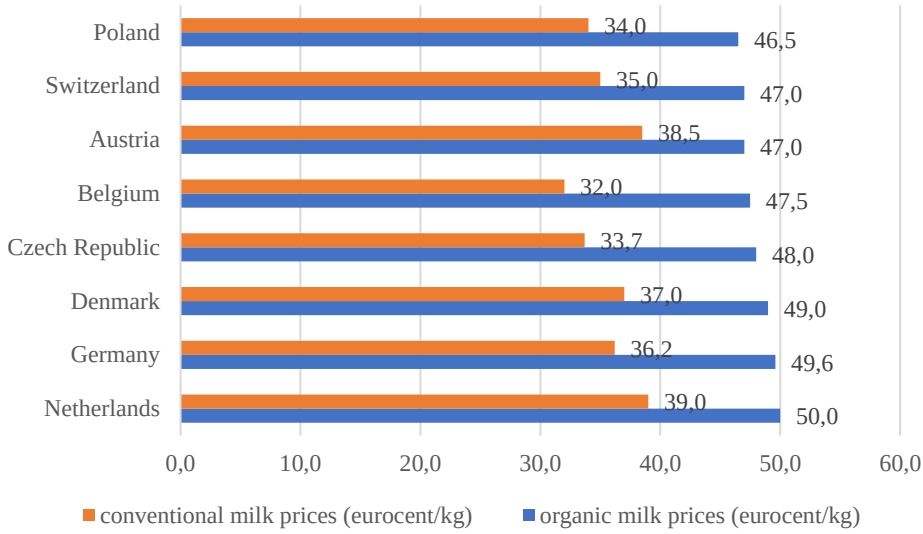

Figure 4. Comparison of organic and conventional milk prices in selected EU countries

Source: own study based on Puppel et al, 2018, p. 4.

Another determinant of the economic efficiency of organic milk production is the scale of production, which depends primarily on the number of cows in the herd, because as the scale increases, the production costs decrease. An important constraint on the increase in the scale of organic milk production is the size of the possessed fodder base, because organic cattle farming mainly involves the use of fodder from the farm (Jankowska-Huflejt and Prokopowicz 2011). The high proportion of permanent grassland on the farm determines the potential for development of this line of production and provides an opportunity to reduce feed costs.

An important influence on the economic efficiency of organic dairy farming is the appropriate choice of breed. On these farms, milk production should not be carried out using high-production breeds of cattle with high nutritional requirements, but breeds that guarantee better adaptation of animals to local environmental conditions. Native breeds are characterised by better adaptation to less favourable environmental conditions, better utilisation of lower quality fodder as well as higher

fertility. Improved animal health is particularly important in organic farming, as there are restrictions on the use of drugs. Therefore, higher cow health means lower herd failure rates and therefore lower herd renovation costs, which translate into a positive economic effect.

The results of analyses conducted on the basis of FADN data indicate that organic milk production is profitable, as 1 PLN of the incurred inputs generated an income of 1.45 PLN. In contrast, in the case of grassland animals, a loss was recorded (Juchniewicz and Nachtman 2020). It is also worth noting that it was the organic farms keeping dairy cows that obtained the highest average economic size (32162.0 euro), but also in these farms the highest own labour input was recorded.

Table 4. Selected production data by type of undertaken organic agricultural production

Specification	Units	Field crops	Permanent crops	Dairy cows	Herbivore animals	Mixed
Economic size	euro	18472,8	21190,6	**32162,0**	19207,9	14812,3
Total labour input	AWU	1,983	2,203	1,932	1,544	1,491
Own labour input	hours	3 146	2 456	**4 336**	3 519	3 168

AWU- paid labour input, expressed in full-time equivalents (annual work unit)
Source: own study based on Standard Results 2018…2020

There is a widespread belief that cows kept under organic farming system are not able to compete with conventionally managed dairy farmers due to the small scale of production and the requirements on fodder quality (Borecka and Szumiec 2013; Walczak and Szewczyk 2013; Komorowska 2016). And although the system of subsidies for organic production can be as high as 1500-1882 PLN (orchard crops), subsidies for permanent grassland are only 535 PLN, and for fodder crops on arable land they are 658-926 PLN. This support certainly improves the economic efficiency of milk production in the organic system, but it certainly does not determine it, because it is a very labour-intensive direction of production.

13.6. Summary

Milk production under organic farming system can provide an opportunity to improve the income situation of some farms, especially those producing on a smaller scale but with a large area of grassland. Studies have shown that support in the form of subsidies for organic farming is important and the main barrier to the development of organic dairy farming is the limited possibilities to sell milk as a certified product, i.e. at a higher price than milk from conventional production. The estimated production of organic milk sold as milk from conventional production varies from about 48% in kujawsko-pomorskie voivodeship to almost 100% in opolskie, lubuskie and wielkopolskie voivodeships. The lack of possibility to sell milk as a certified product significantly limits the development possibilities of organic dairy farms.

The lower competitiveness of organic farms compared to conventional farms results from the smaller scale of production and the lower milk yield per cow. Therefore, it can be improved both by concentrating production and increasing the unit milk yield of cows and by consolidating organic dairy farms to obtain a larger batch of uniform product (raw material) and a higher price for the milk sold.

In conclusion, organic cow's milk production is limited by the lack of an integrator, which could be either dairies already in operation once their organic milk processing lines are in place or groups of organic milk producers. Linking organic milk producers to processing and distribution will create a sustainable basis for the development of this line of production. The example of Poland shows that a system of subsidising organic farming without a link to the market does not support the sustainability of organic farms.

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