Fact sheet on animal husbandry in Germany: Dairy cows

Suggested Citation
Tergast H, Hansen H, Weber E-C, Raschel A (2024) Fact sheet on animal husbandry in Germany: Dairy cows. Braunschweig: Thünen Institute of Farm Economics, 19 p

Hauke Tergast
Heiko Hansen
Eva-Charlotte Weber
Anna Raschel
Thünen-Institut für Betriebswirtschaft

Johann Heinrich von Thünen-Institut
Bundesforschungsinstitut für Ländliche Räume, Wald und Fischerei
Bundesallee 63
38116 Braunschweig

Tel.: 0531 2570 1429
Fax: 0531 596 5199
E-Mail: hauke.tergast@thuenen.de

Braunschweig, 01.04.2025

Structure

1 Supply balance and trade 3

2 Stocks and farm structures 6

2.1 Stocks and their development 6

2.2 Farm structures and their development 7

3 Husbandry methods, production systems und performance parameters 11

4 Profitability of milk production 14

4.1 Germany 14

4.2 European Union 16

5 Bibliography 19

List of figures

Figure 1:	Development of milk production from 2002 – 2023 (in million tonnes)	3
Figure 2:	Import, export and foreign trade balance for milk and dairy products in Germany 2003 – 2023 (in million euros)	4
Figure 3:	Top 5 export destinations for German milk and dairy products 2003 – 2023 (in million euros)	4
Figure 4:	Top 5 countries of origin for milk and dairy products imported to Germany 2003 – 2023 (in million euros)	5
Figure 5:	Developements in the dairy sector in Germany	6
Figure 6:	Number of dairy farms and dairy cows by federal states 2024 (May)	7
Figure 7 and 8:	Regional distribution of milk production 2023 and proportion of grassland 2020	8
Figure 9:	Change in milk production in kg/ha UAA between 2010 and 2023	8
Figure 10:	Average herd sizes in the federal states (cows per farm) 2024 (May)	9
Figure 11:	Farm size classes in Germany in 2024 (May), farms or 100 dairy cows	10
Figure 12:	Husbandry methods in milk production in Germany in 2020	11
Figure 13:	Pasture grazing of dairy cows in the individual federal states in 2020	12
Figure 14:	Typical production process in conventional dairy farming	12
Figure 15:	Proportion of dairy and dual-purpose breeds in the dairy cow herd in the federal states in 2024	13
Figure 16:	Distribution of full costs per kilogram of milk produced in Germany (average for the business years 2020/21 to 2022/23)	14
Figure 17:	Development of the average income per worker of specialized dairy farms in Germany	15
Figure 18:	Income per worker in specialized dairy farms in business year 2021/22 compared by federal states	15
Figure 19:	Size and intensity of specialized dairy farms in the ten largest milk-producing EU Member States	16
Figure 20:	Farm income of specialized dairy farms in the ten largest milk-producing EU Member States	18

1 Supply balance and trade

- In 2023, 32.6 million tonnes of milk were produced **(Figure 1)**. Germany is thus the largest cow´s milk producer in the EU.
- Until 2015 the quantity of milk was regulated by the milk quota. Although the milk quota was abolished, the quantity of milk has since stabilized at a level of around 33 million tonnes per year.

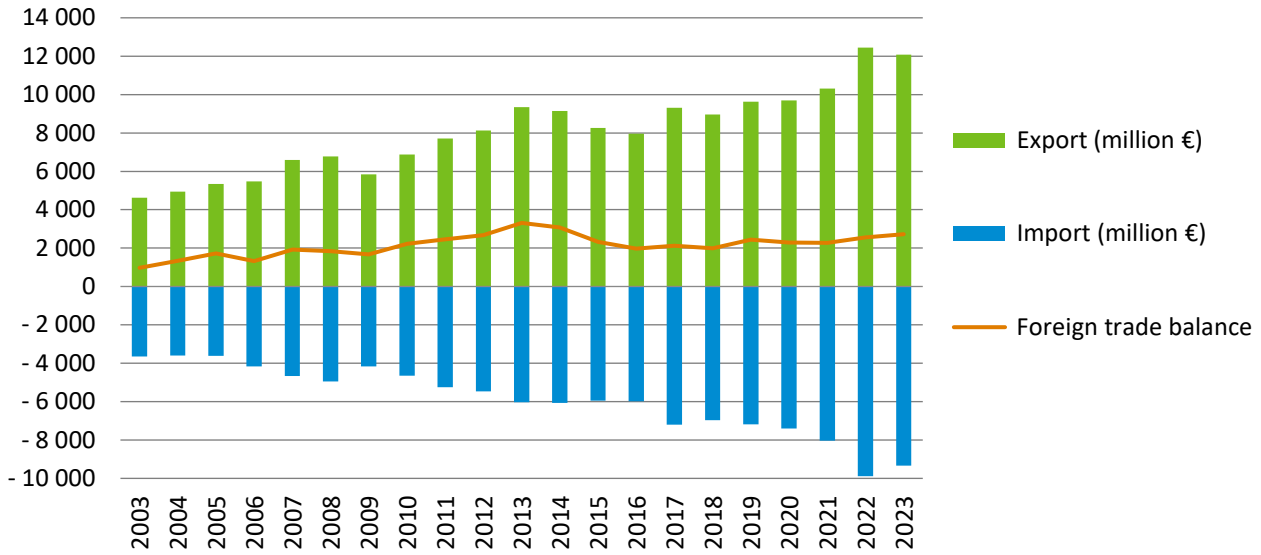
Figure 1: Development of milk production from 2002 – 2023 (in million tonnes)

Source: BLE, various years; own illustration.

- Foreign trade in milk and dairy products is of particular importance for the German milk production: About halve of the milk produced in Germany is exported abroad.
- In total, exports in 2023 amounted to a value of approx. 12.1 billion euros[1] **(Figure 2)**.
- At the same time, milk and dairy products are imported to the value of 9.3 billion euros.
- Thus, Germany is a net exporter of milk and dairy products.

[1] In contrast to the other fact sheets on livestock farming in Germany, the following section analyses imports and exports in terms of value (millions of euros) rather than volume. This is due to the fact that not only milk, but mainly all dairy products (see also table 1) are traded. However, it should be noted that fluctuations between years may also be partly due to exchange rate fluctuations.

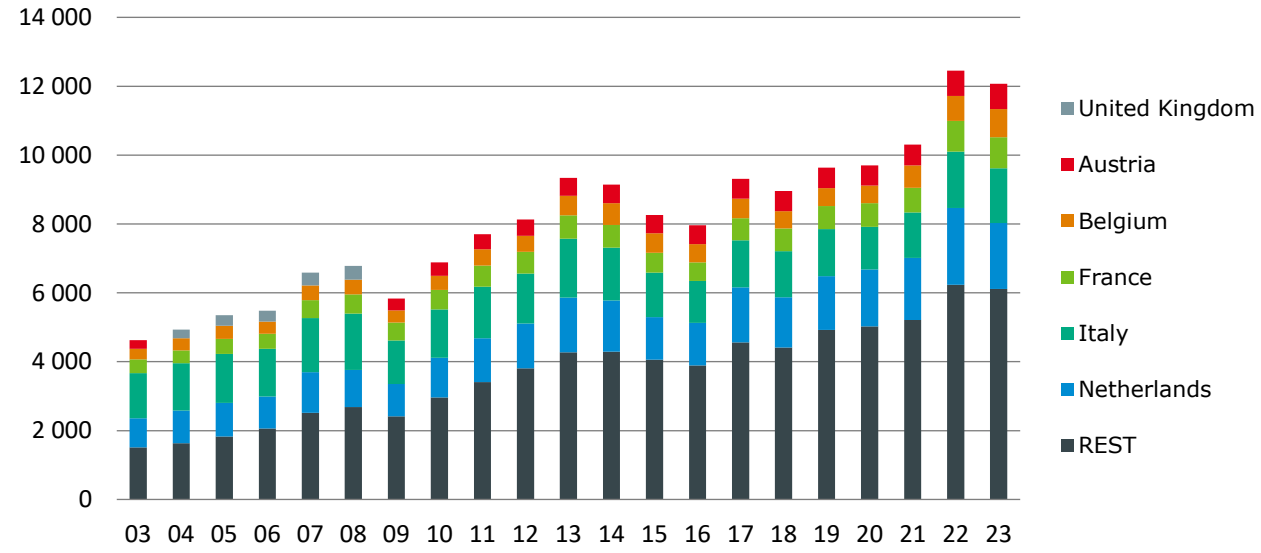
Figure 2: Import, export and foreign trade balance for milk and dairy products in Germany 2003 – 2023 (in million euros)



Source: UN COMTRADE, 2024; own illustration and calculation.

- Most of the exports go to other EU member states. The most important export destinations are the Netherlands with 16 percent and Italy with 13 percent of the export value, followed by France in 3rd place in the top 5 export destinations **(Figure 3)**.
- The "rest" (= not the top 5 countries) takes a share of about 51 percent. This means that the exports can be classified relatively diversified. Furthermore, it can be observed that exports to the remaining countries have increased since 2003.

Figure 3: Top 5 export destinations for German milk and dairy products 2003 – 2023 (in million euros)

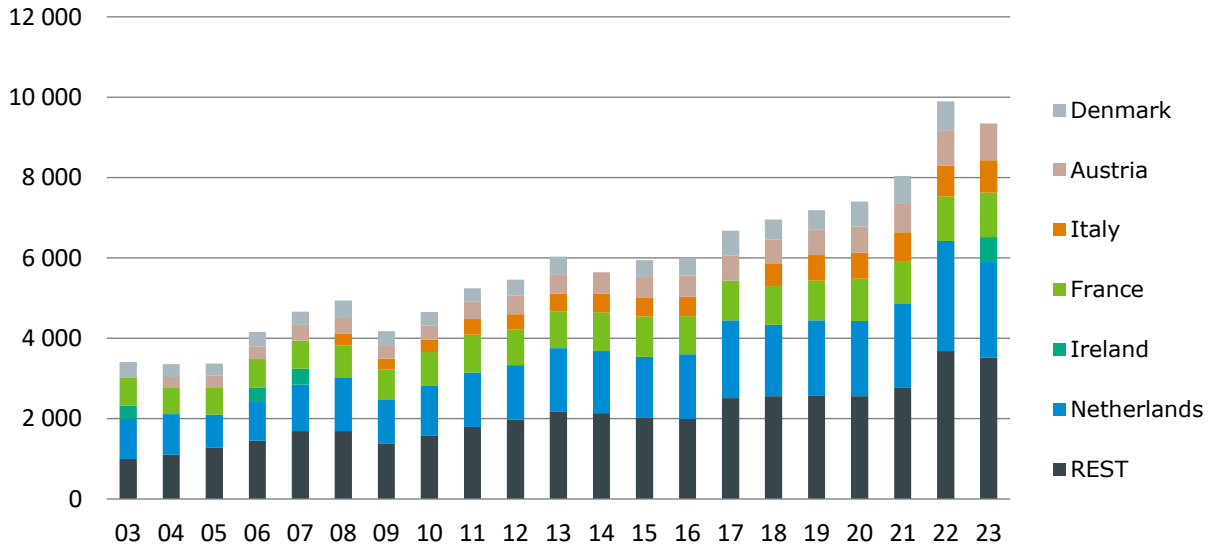


Note: Top 5 in each single depicted year. As these can change, more than five countries are listed in the legend.

Source: UN COMTRADE, 2024; own illustration and calculation.

- Germany mainly imports milk and dairy products from the Netherlands (25 percent of the import value), France (12 percent), Austria (10 Percent) and Italy (9 percent) **(Figure 4).**
- About 38 percent of the total imports are from other countries ("rest"). Thus, also the imports are relatively diversified.

Figure 4: Top 5 countries of origin for milk and dairy products imported to Germany 2003 – 2023 (in million euros)



Note: Top 5 in each single depicted year. As these can change, more than five countries are listed in the legend.

Source: UN COMTRADE, 2024; own illustration and calculation.

- **Table 1** shows that the self-sufficiency rate for many milk and dairy products in Germany is above 100 percent.

Table 1: Self-sufficiency rate for milk and dairy products 2022 in Germany (provisional)

Milk and milk products	Self-sufficiency rate in percent
Fresh milk products	114
Cream products	124
Condensed milk products	1.078
Whole milk powder	131
Skimmed milk powder	282
Cheese	132
Butter	102

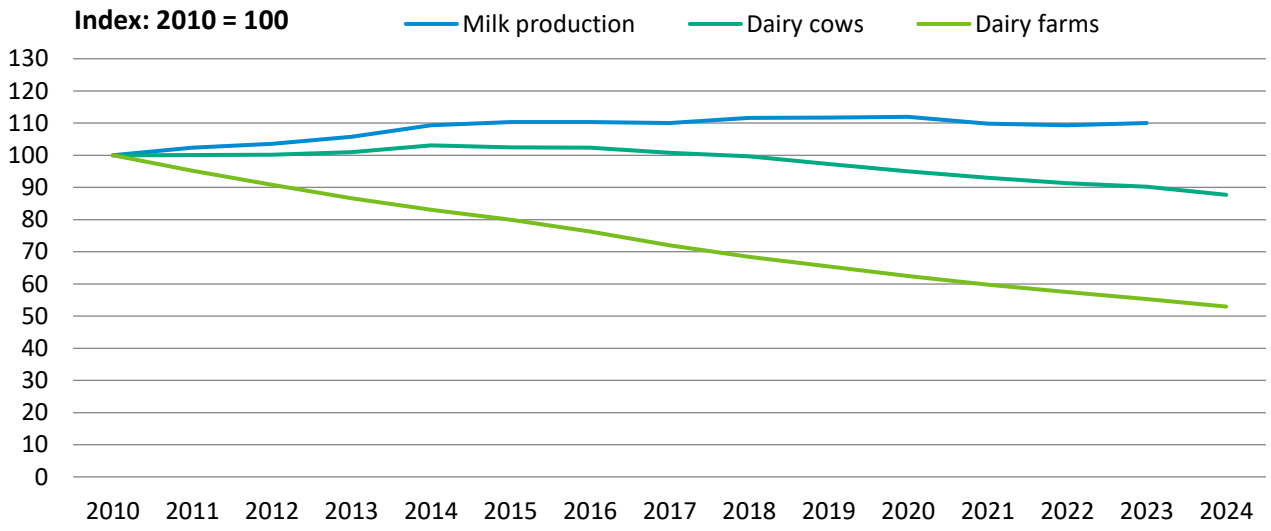
Source: BLE, 2024a; own illustration.

2 Stocks and farm structures

2.1 Stocks and their development

- On the reporting date of the livestock counting, 3rd May 2024, 3.67 million dairy cows were held on about 49 500 farms.
- During the EU milk quota regime (1984 to 2015), increasing milk yields have led to a decreasing number of cows. After abolition of the milk quota, stocks remained relatively stable at times. Between 2012 and 2014, cow numbers even rose slightly again. Though since 2015 the stocks are dropping steadily **(Figure 5)**.
- As the milk yield per dairy cow increased over the same period, the milk yield in Germany remained relatively constant.
- In opposition to milk production, the number of dairy farms declined continuously in the considered period. Compared to 2010, in 2024 only 53 percent of the dairy farms were still existing.
- However, about every fourth farm is holding dairy cows. So, the milk production is the most important production branch in Germany. Usually, the milk production achieves the highest single contribution to the production value in the agricultural sector, with about 19 percent (BLE AND BMEL, 2024).

Figure 5: Developements in the dairy sector in Germany since 2010



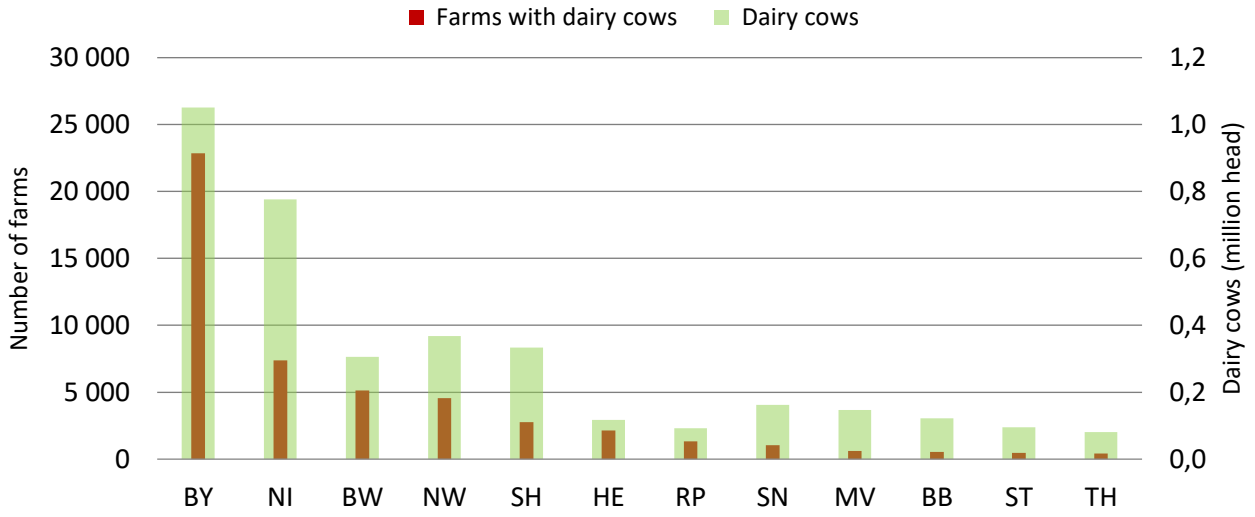
Note: Data for milk production in 2024 will only be available in 2025. The number of dairy cows and dairy farms corresponds to the cut-off date of the livestock census (3rd May 2024)

Source: BLE, various years; STATISTISCHES BUNDESAMT, 2024; own illustration and calculation.

2.2 Farm structures and their development

- The number of dairy farms varies considerably between the federal states. Almost half of all dairy farms in Germany are located in Bavaria (**Figure 6)**.
- About 50 percent of Germany´s dairy cows are kept in Lower Saxony and Bavaria.

Figure 6: Number of dairy farms and dairy cows by federal states 2024 (May)

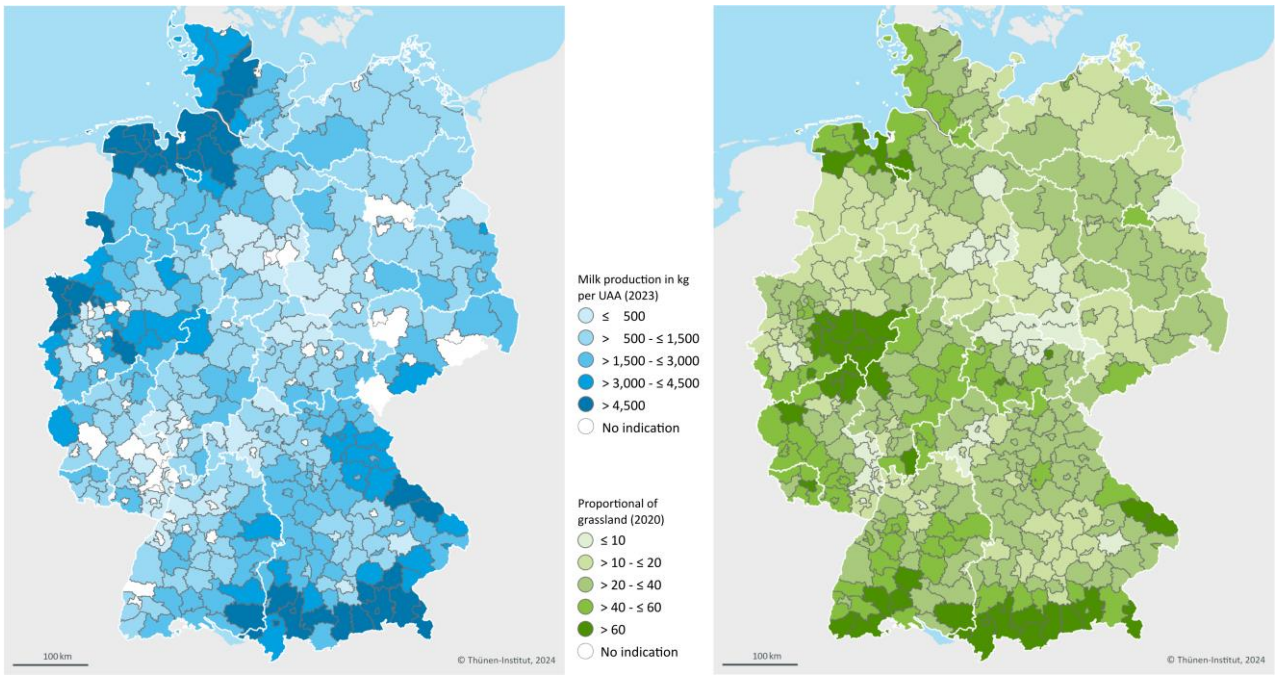


Note: Abbreviation for the federal states: BY = Bavaria, NI = Lower Saxony, BW = Baden-Wurttemberg, NW = North Rhine-Westphalia, SH = Schleswig-Holstein, HE = Hesse, RP = Rhineland-Palatinate, SN = Saxony, MV = Mecklenburg-West Pomerania, BB = Brandenburg, ST = Saxony-Anhalt, TH = Thuringia

Source: STATISTISCHES BUNDESAMT, 2024; own illustration.

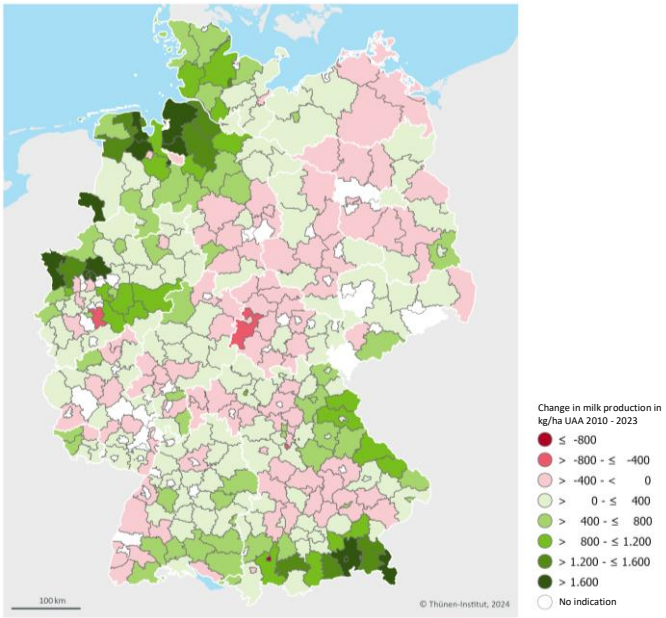
- **Figure 7** shows the regional distribution of milk production per hectare. **Figure 8** shows the distribution of grassland in Germany. A large proportion of the milk is produced on locations with a high proportion of grassland.
- Milk production on grassland sites is particularly advantageous, as the grass serves as a valuable feed basis for the dairy cows (as ruminants). At the same time, there rarely is a cost-covering alternative opportunity for grassland use.
- Especially in recent years, milk production on grassland sites has intensified. **Figure 9** shows this development between 2010 and 2023 at district level in kg of milk produced per hectare of utilized agricultural area (UAA).
- Especially in Northwest Lower Saxony and Schleswig-Holstein, milk production has increased considerably.

Figure 7 and 8: Regional distribution of milk production 2023 and proportion of grassland 2020



Source: BLE, 2024b; THÜNEN AGRARATLAS, 2022; own illustration and calculation.

Figure 9: Change in milk production in kg/ha UAA between 2010 and 2023



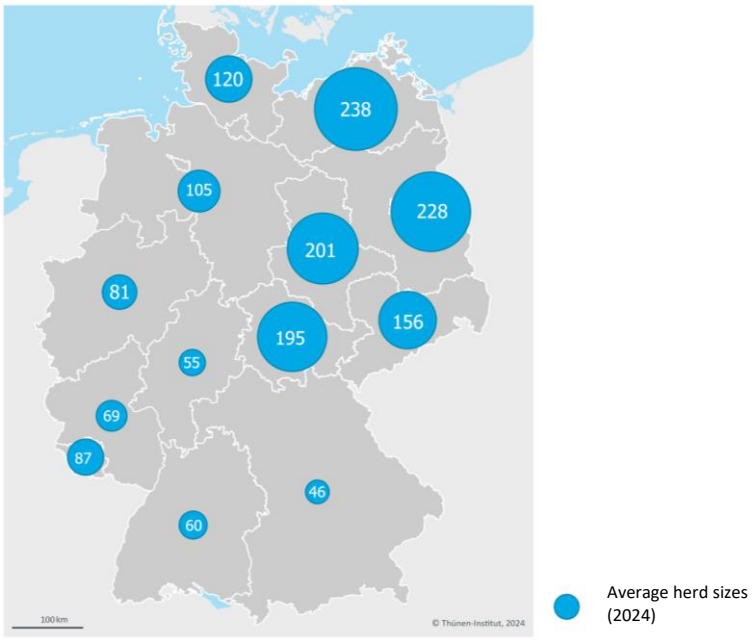
Note: Due to changes in the district status in the course of the district reform in Mecklenburg-West Pomerania, the districts of Mecklenburgische Seenplatte and Vorpommern-Greifswald were temporarily combined to continue the time series.

Source: BLE, 2011, 2024b; THÜNEN AGRARATLAS, 2022; own illustration and calculation.

- The number of cows kept per farm varies greatly in Germany. The range is from less than 10 to more than 1 000 cows per farm. On average, there were 74 cows per dairy farm in May 2024.
- **Figure 10** shows the average herd size of dairy herds in the individual federal states.

- Particularly large herds are located in the “new” federal states (Brandenburg, Mecklenburg-West Pomerania, Saxony, Saxony-Anhalt, Thuringia). For historical reasons, the average herd size is 197 cows per farm there, whereas in the “old” federal states on average 66 dairy cows are kept per farm.
- In a nationwide comparison, Bavarian dairy farms are the smallest (46 cows per farm). On small dairy farms, non-agricultural income is often included.

Figure 10: Average herd sizes in the federal states (cows per farm) 2024 (May)



Note: The city states were assigned to the surrounding federal states for the calculation: Berlin to Brandenburg, Bremen to Lower Saxony and Hamburg to Schleswig-Holstein.

Source: Statistisches Bundesamt, 2024; own illustration and calculation.

- **Table 2** shows that the average stock size increased in all federal states between 2010 and 2024.

Table 2: Absolute and relative change in herd size in the different federal states between 2010 and 2024 (May)

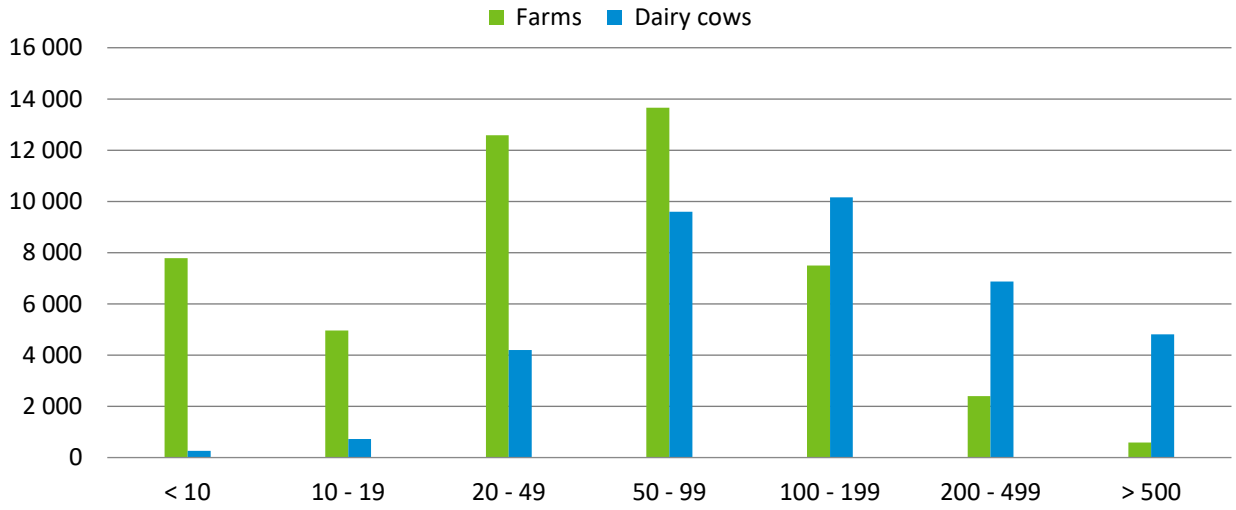
	NI	NW	SH	BW	BY	HE	RP	MV	ST	BB	TH	SN
relative change in herd size in %	+87	+77	+75	+85	+57	+52	+50	+36	+20	+14	+33	+30
absolute cahneg in herd size (cows)	+49	+35	+51	+27	+17	+19	+23	+63	+34	+28	+48	+36

Note: Abbreviation for the federal states: BY = Bavaria, NI = Lower Saxony, BW = Baden-Wurttemberg, NW = North Rhine-Westphalia, SH = Schleswig-Holstein, HE = Hesse, RP = Rhineland-Palatinate, SN = Saxony, MV = Mecklenburg-West Pomerania, BB = Brandenburg, ST = Saxony-Anhalt, TH = Thuringia

Source: Statistisches Bundesamt, 2024; own illustration and calculation.

- **Figure 11** shows, that most farms are in the herd size class of 50 – 99 dairy cows. Most dairy cows are kept in herd sizes between 100 and 199 dairy cows.
- 21 percent of farms have herds of more than 100 dairy cows and 60 percent of the dairy cows are in this class.
- 6 percent of farms keep more than 200 dairy cows, but a total of 32 percent of the dairy cows are kept in herds with more than 200 dairy cows.

Figure 11: Farm size classes in Germany in 2024 (May), farms or 100 dairy cows

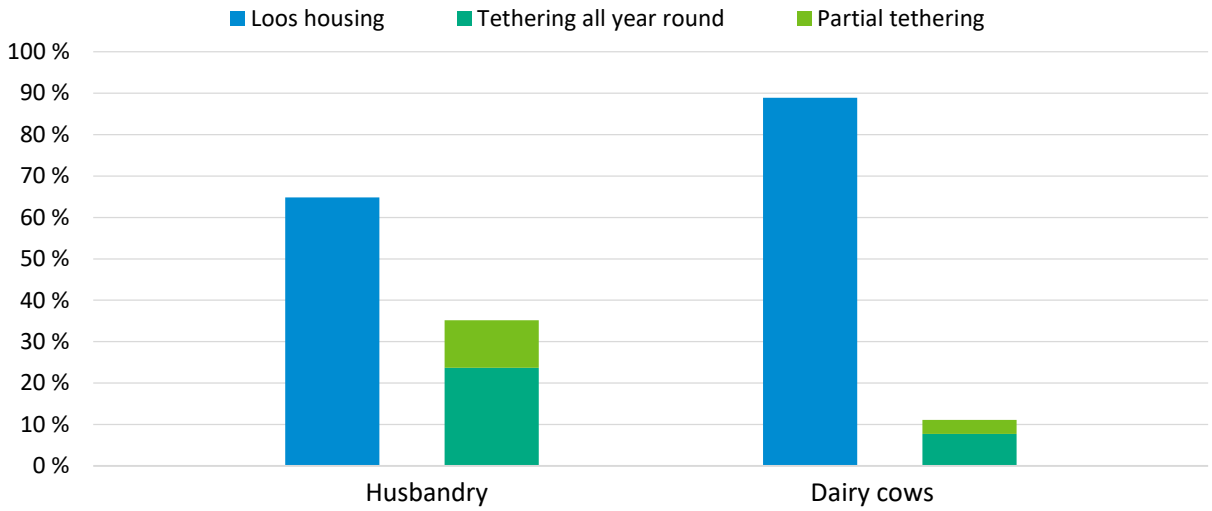


Source: STATISTISCHES BUNDESAMT, 2024; own illustration.

3 Husbandry methods, production systems und performance parameters

- **Figure 12** illustrates, that in 2020 the loose housing was the dominant type of housing on dairy farms in Germany. 65 percent of the dairy farms kept their dairy cows in a loose housing system. 35 percent kept their dairy cows tethered, the majority all year round.
- Most dairy cows (89 percent) were kept in loose housing. The farms practicing tethering are therefore on average relatively small farms. 65 percent of dairy cows in tethered housing were in Bavaria. There, 42 percent of the farms practiced tethered housing.

Figure 12: Husbandry methods in milk production in Germany in 2020

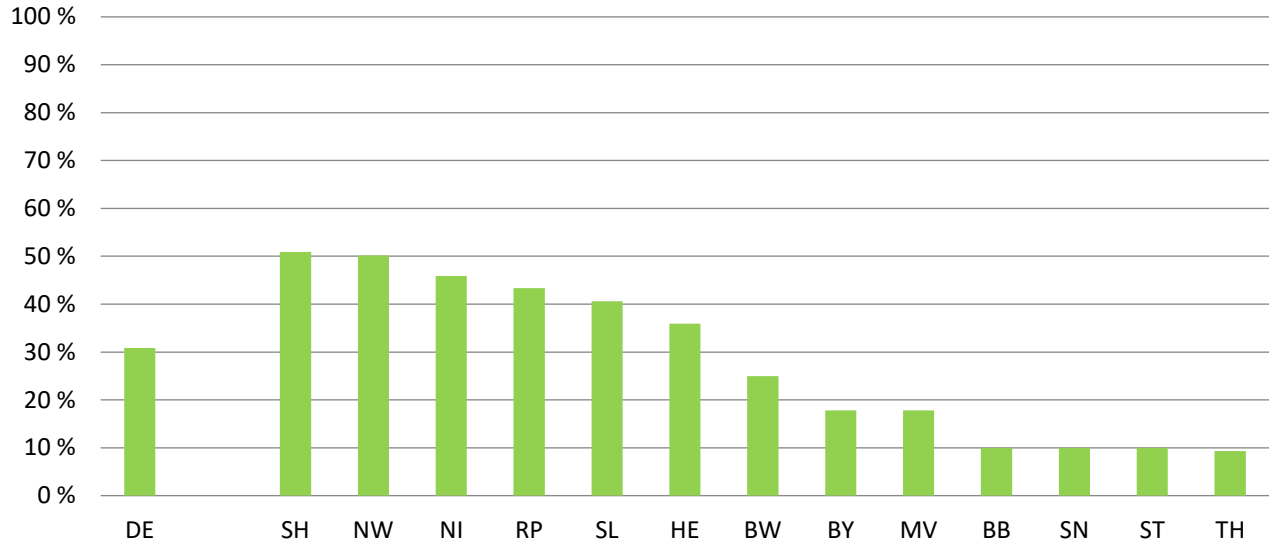


Note: The husbandry methods are only surveyed every 10 years. The last survey was conducted in 2020 as part of the agricultural census.

Source: TERGAST ET ALL., 2023; own illustration.

- The proportion of dairy cows grazing on pasture was 31 percent in Germany in 2020 **(Figure 13)**.
- In herds of 50 to 99 dairy cows, 39 percent of the cows grazed on pasture, in herds with more than 100 cows it was 24 percent.
- Pasture grazing is particularly widespread in North Rhine-Westphalia, Schleswig-Holstein and Bremen. In these federal states, more than half of the dairy cows had access to pasture in the summer in 2020. In Lower Saxony it was 46 percent.

Figure 13: Pasture grazing of dairy cows in the individual federal states in 2020



Note: Abbreviation for the federal states: DE = Germany, BY = Bavaria, NI = Lower Saxony, BW = Baden-Wurttemberg, NW = North Rhine-Westphalia, SH = Schleswig-Holstein, HE = Hesse, RP = Rhineland-Palatinate, SN = Saxony, MV = Mecklenburg-West Pomerania, BB = Brandenburg, ST = Saxony-Anhalt, TH = Thuringia, SL = Saarland

Source: Statistisches Bundesamt, 2021; own illustration.

Figure 14: Typical production process in conventional dairy farming

Day 1: In order to be able to give milk at all, the cows must first have a calf. For calving, the cows are usually kept in a separate calving pen.

Until week 8, it´s allowed to keep calves alone. Calves are mainly kept in calf pens or calf igloos with an outlet. Commonly, cow calves remain on the farm as their own offspring. The male calves are usually sold after four weeks to fattening farms.

From week 8 at the latest, the calf must be kept in a group with other young animals (TierSchNutztV §9). Common types of housing are straw stables and free stall barns. For older young animals, grazing is also common in the summer months.

From the age of 15 month, the young cattles are inseminated, often artificially. Calving takes place 285 days later on average. The goal of many farmers is to reach a first calving age of 24 month.

After calving, the first lactating cow is integrated into the dairy herd and milked two to three times a day. Most dairy cows are kept in free stall barns. 31 percent of dairy cows graze on pasture in the summer months. Approximately 60 days after calving, the cow can be inseminated again.

6 to 8 weeks before calving, the pregnant cow is dried off (no longer milked) and kept in a group separate from the lactating cows. In the summer months many farms put the dry cows on pasture.

Source: own illustration, pictures: Lassen and Lindena.

- **Figure 14** shows a typical production process in conventional dairy farming. The associated production and performance indicators reflect a medium level of performance by Holstein Black and White **(Table 3)**.

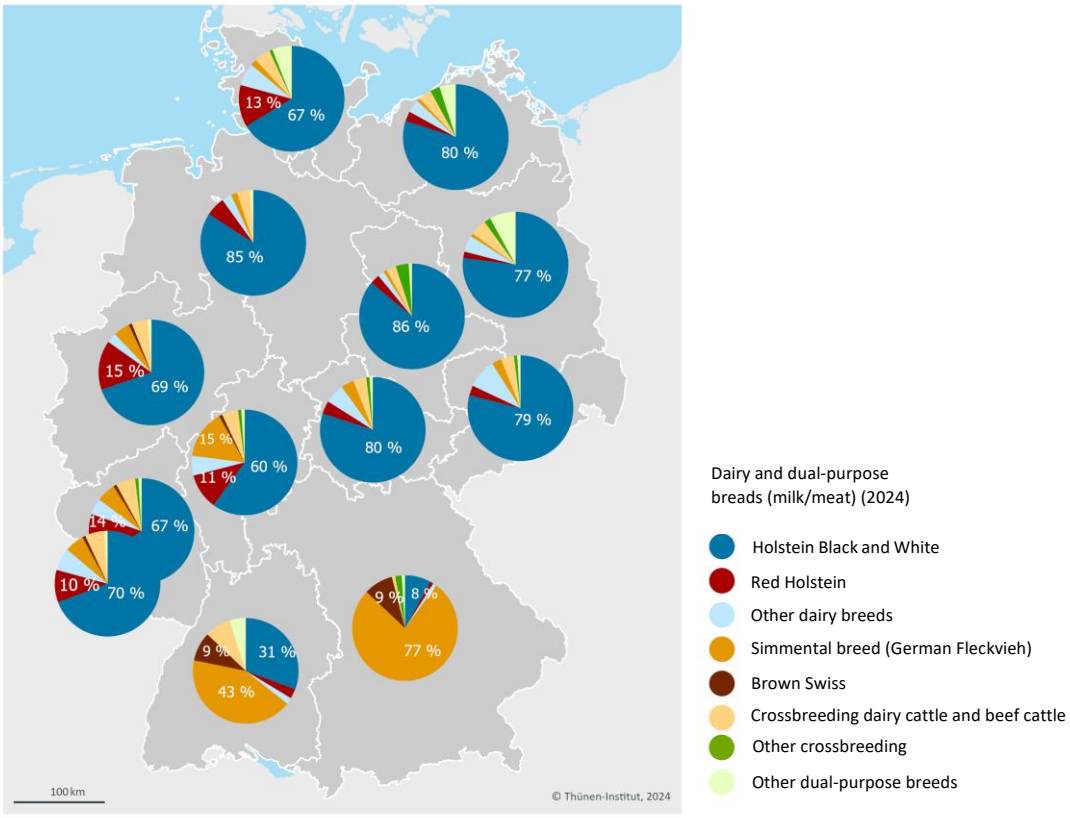
Table 3: Production and performance indicators in dairy farming

Milk yield (kg)	8 500	Calf losses (%)	5
Fat content (%)	4,10	First calving age (month)	28,8
Protein content (%)	3,40	Number of lactations	3
Coarse forage output (kg ECM)	4 000	Remontage (%)	33
Mid-calvin period (days)	417	Cow losses (%)	1

Source: KTBL, 2022; own illustration.

- In Germany, very different breeds are kept for milk production **(Figure 15)**. There are breeds, that are primarily bred for high milk yield, while other breeds are bred as “dual-purpose breeds”. They usually have a lower milk yield, but a higher meat yield.
- The classic dairy breed is the Holstein-Friesian cattle: Holstein Black and White or Red Holstein. 59 percent of all cows kept for milk production in Germany belong to this breed. Typical dual-purpose breeds are Simmental breed (German Fleckvieh) or Brown Swiss. They are mainly used for milk production in the more southern regions of Germany and account for about 31 percent of the dairy cows.

Figure 15: Proportion of dairy and dual-purpose breeds in the dairy cow herd in the federal states in 2024



Note: The city states were assigned to the surrounding federal states for the calculation: Berlin to Brandenburg, Bremen to Lower Saxony and Hamburg to Schleswig-Holstein.

Source: Statistisches Bundesamt, 2024; own illustration and calculation.

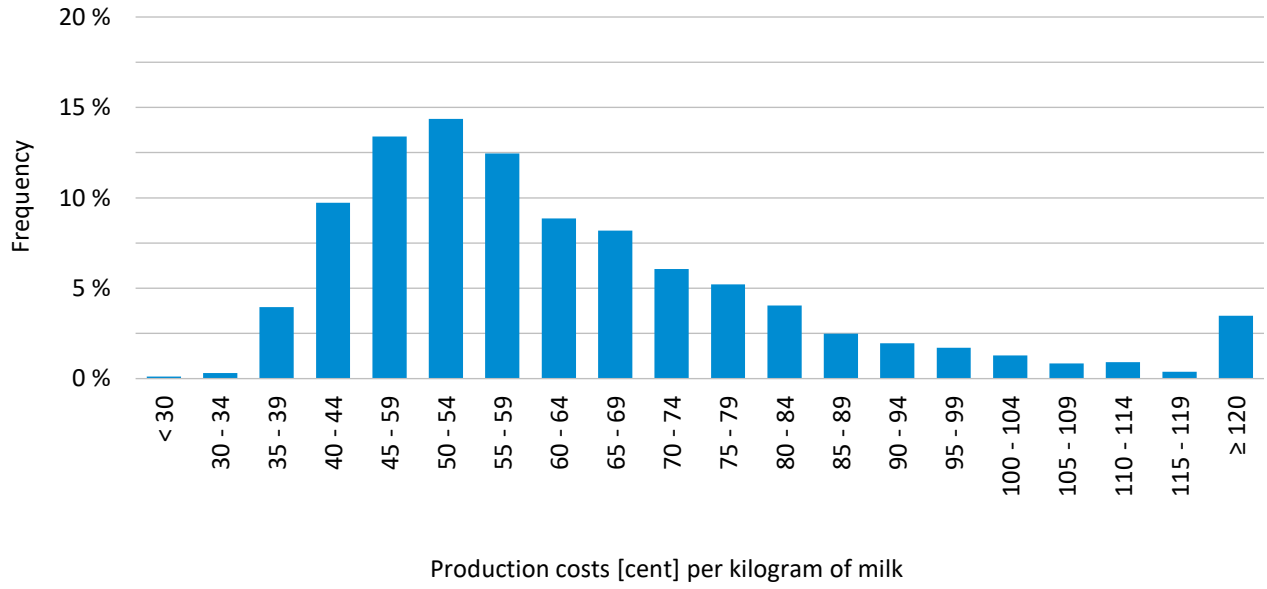
4 Profitability of milk production

- The databases used to analyse the profitability of milk production are the BMEL Test Farm Network for Agriculture and the European Commission's Farm Accountancy Data Network (FADN), which comprise the accounts of representatively selected farms.

4.1 Germany

- With regard to milk production costs, there are considerable differences between the dairy farms analysed. Around three quarters of the dairy farms have full costs of 40 to 70 cents per kilogram of milk. Slightly more than half of the farms have full costs of between 40 and 60 cents per kilogram of milk. Most frequently - at 15% of the analysed farms - the full costs are between 50 and 54 cents per kilogram of milk (**Figure 16**).

Figure 16: Distribution of full costs per kilogram of milk produced in Germany (average for the business years 2020/21 to 2022/23)



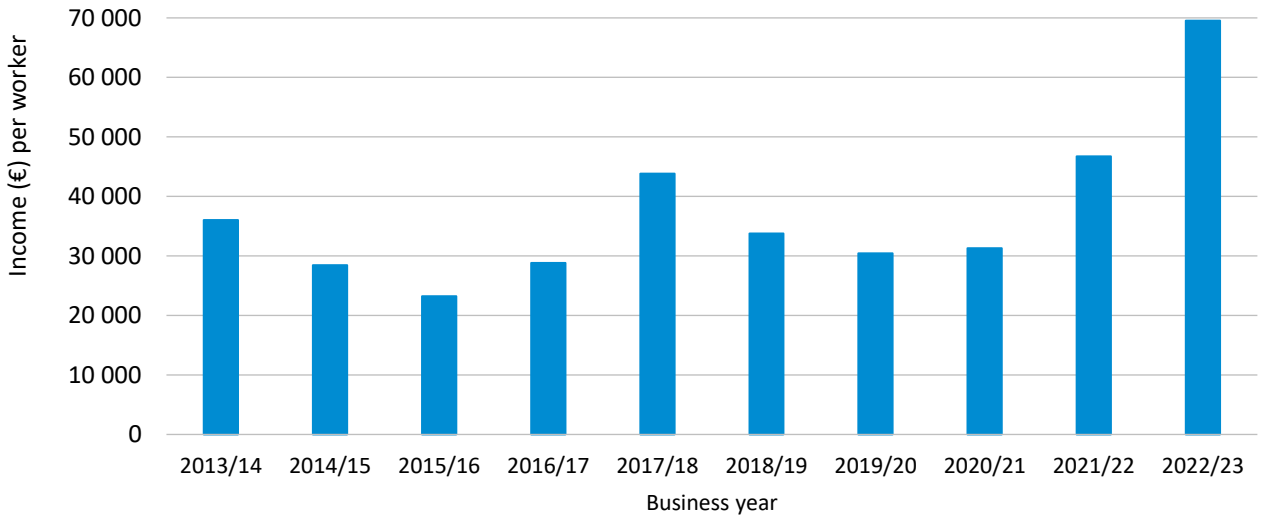
Note: The accounting data of "highly specialized dairy farms" were analysed. These are farms, whose revenues from milk sales and by-products account for more than 95 % of farm revenues from animal and plant production.

Source: Own illustration and calculations based on accounting data from the Test Farming Network.

- Over time, there have been large fluctuations in income per worker: In the last ten business years[2] (2013/14 to 2022/23), specialized dairy farms achieved the lowest income in the business year 2015/16 (on average 23,000 euros per worker). By far the highest income was achieved in the most recent business year 2022/23 (an average of 70,000 euros per worker) and thus significantly exceeds the previous peak year 2021/22 **(Figure 17)**.
- The income per worker also differs between the federal states. The highest average income per worker in the business year 2022/23 was around 105,000 euros in Lower Saxony and the lowest around 48,000 euros in Thuringia **(Figure 18)**.

[2] In the German agriculture, a business year generally refers to the period from 1 July to 30 June. Dairy farms, in which forage production plays a major role, can set the business year to the period from 1 May to 30 April.

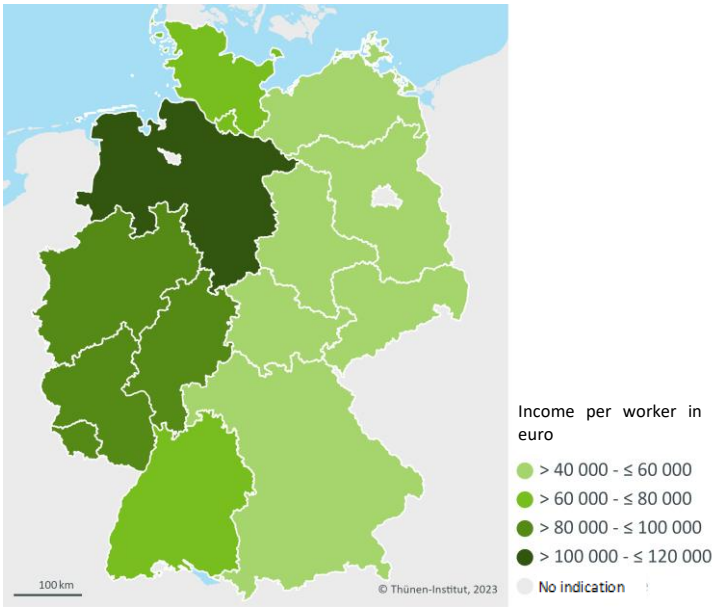
Figure 17: Development of the average income per worker of specialized dairy farms in Germany



Note: The database is the Farm Accountancy Data Network (FADN). "Specialized dairy farms" according to the classification system of the European Union were analysed. These are farms where milk production accounts for more than 75 % of the standard output (standardised monetary value of a farm's gross agricultural production). In order to make the income of farms with different legal forms comparable, the key figure "profit plus personnel expenses per worker" was used.

Source. EUROPEAN COMMISSION, 2024; own illustration and calculation.

Figure 18: Income per worker in specialized dairy farms in business year 2022/23 compared by federal states



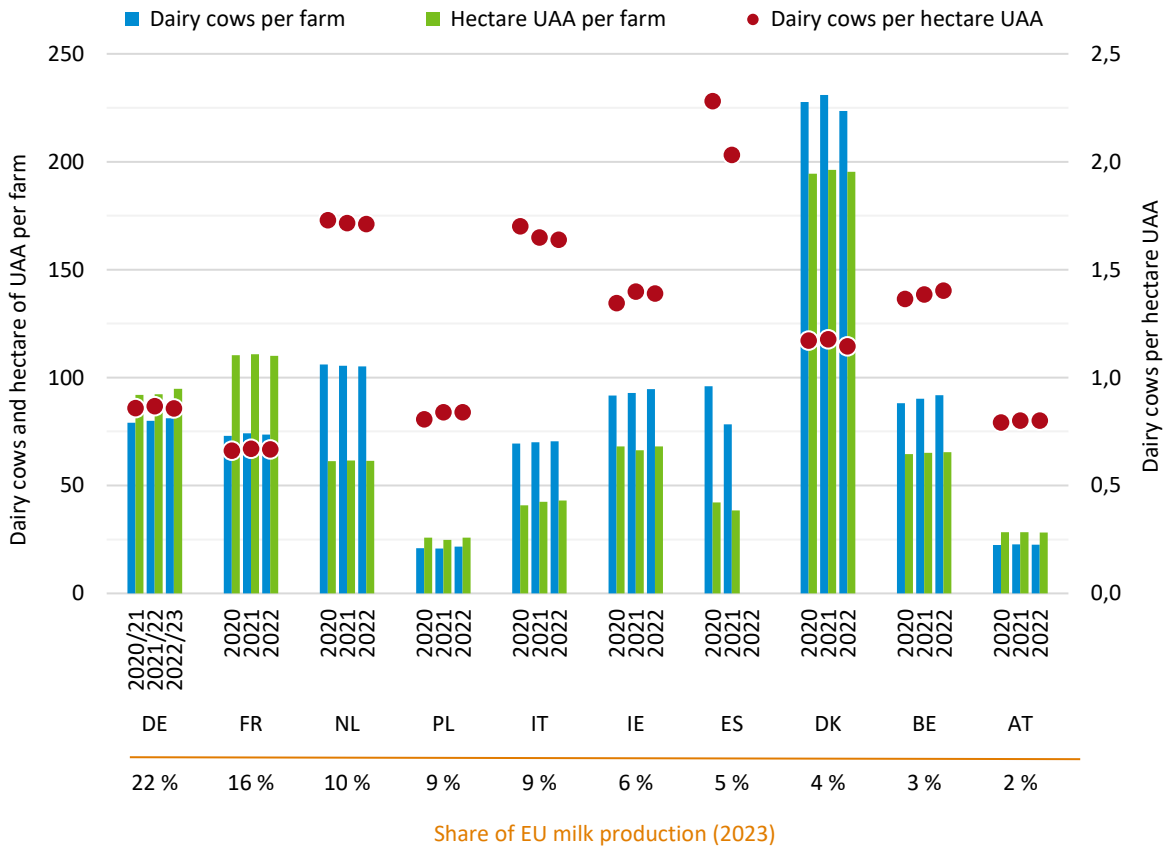
Note: The database is the Farm Accountancy Data Network (FADN). The data for the business year 2022/23 are provisional for Germany. "Specialized dairy farms" according to the classification system of the European Union were examined. These are farms where milk production accounts for more than 75 % of the standard output (standardised monetary value of a farm's gross agricultural production). In order to make the income of farms with different legal forms comparable, the key figure "profit plus personnel expenses per worker" was used.

Source: EUROPEAN COMMISSION, 2024; own illustration and calculation.

4.2 European Union

- Germany is the largest milk producer in the European Union. In 2022, Germany produced around a fifth of the milk produced across the EU (22 %), followed by France, which produced 16 %, and the Netherlands, Italy and Poland, which each produced around 10 % **(Figure 19, bottom row)**.
- The specialized dairy farms in Germany had a mean herd size of 80 dairy cows in the 2021/22 business year **(Figure 19, blue bar)**. According to the European Union's classification system, they include farms where milk production accounts for more than 75 % of the standard output (standardized monetary value of a farm's gross agricultural production). This classification results in a slightly higher average herd size than that in chapter "2.2 Farm structures and their development", which is based on the average of all dairy farms.
- Of the ten largest milk-producing EU Member States, Denmark has by far the largest farms with about 224 dairy cows. Also, the mean herd size in the Netherland (105), Belgium (90) and Ireland (90) was higher than the mean herd size in Germany. The smallest mean herd size of the countries considered was on the specialized dairy farms in Poland and Austria. These were 22 dairy cows (PL) and 23 dairy cows (AT) **(Figure 19, blue bar)**.

Figure 19: Size and intensity of specialized dairy farms in the ten largest milk-producing EU Member States

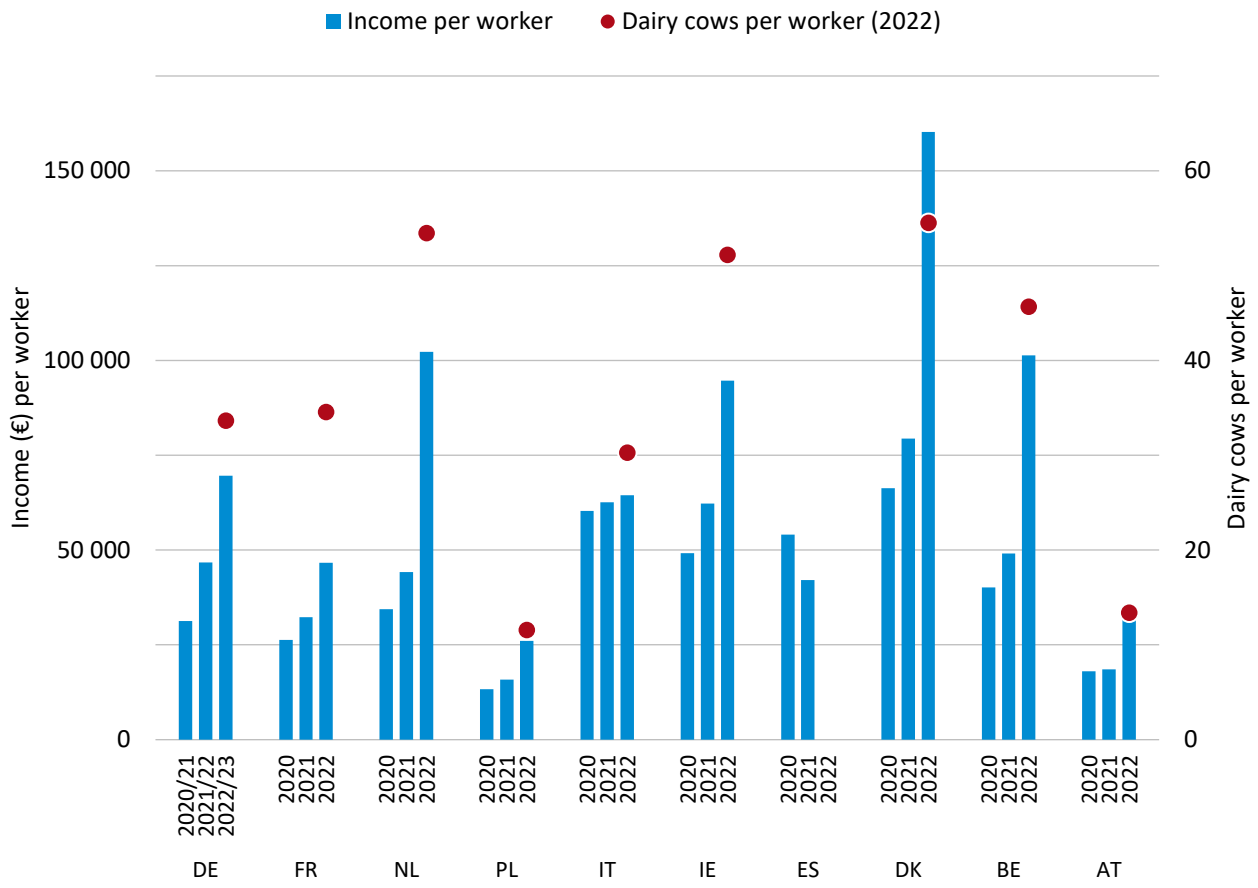


Note: The data basis for the results is the Farm Accountancy Data Network (FADN). The data for the 2022/23 business year are provisional for Germany. The data for Spain for 2022 was not yet available when the fact sheet was published. UAA = Utilized agricultural area.

Source: European Commission, 2024; Eurostat, 2024; own illustration and calculation.

- The average area of specialized dairy farms is closely related to herd size and ranged from 26 hectares of UAA in Poland to around 195 hectares in Denmark in the years studied. In Germany, it was around 95 hectares **(Figure 19, green bars)**.
- The average stocking density per hectare UAA in the EU Member States considered ranged from 0.7 dairy cows per hectare in France to 2 dairy cows per hectare in Spain. In Germany, specialized dairy farms had an average of 0.9 dairy cows per hectare of UAA. Compared to the other countries surveyed, this value seems rather low. Only in France, Poland and Austria the stocking density of specialized dairy farms was lower **(Figure 19, red dots)**.
- Income per worker differs greatly between the EU countries surveyed. In 2022, the range was from about 26,000 euros per worker in Poland to around 160,000 euros in Denmark. In Germany, income per worker was around 70,000 euros in the 2022/23 business year **(Figure 20, blue bars)**.
- As already shown for Germany **(Figure 17)**, income per worker in 2022 has increased significantly in the EU Member States examined compared to 2021, except Italy. This increase is particularly pronounced in the Netherlands, Belgium and Denmark, where the income per worker has more than doubled **(Figure 20, blue bar)**.
- The average number of dairy cows per worker also differs between the EU Member States considered. The range in 2022 was from about 12 dairy cows per worker in Poland to about 55 dairy cows per worker in Denmark. In Germany, the value was at about 34 dairy cows. **(Figure 20, bottom row).**

Figure 20: Farm income and production intensity of specialized dairy farms in the ten largest milk-producing EU Member States



Note: The database is the Farm Accountancy Data Network (FADN). In order to make the income in farms with different legal forms comparable, the key figure "profit plus personnel expenses per employee" was used. The data for the 2022/23 business year are provisional for Germany. The data for Spain for 2022 was not yet available when the fact sheet was published.

Source: EUROPEAN COMMISSION, 2024; own illustration and calculation.

5 Bibliography

BLE (versch. Jgg.): Milcherzeugung und -verwendung nach Monaten in Deutschland. Bonn.

BLE (2011): Milcherzeugung und -verwertung nach Kreisen in Deutschland im Jahr 2010. Bonn.

BLE (2024a): Bericht zur Markt- und Versorgungslage mit Milch und Milcherzeugnissen. Bonn.

BLE (2024b): Milcherzeugung und -verwertung nach Kreisen in Deutschland im Jahr 2023. Bonn.

BLE und BMEL (2024): Produktionswerte des Bereichs Landwirtschaft. Bonn.

EUROPÄISCHE KOMMISSION (2024): Öffentliche Datenbank des INBL (Informationsnetz landwirtschaftlicher Buchführung). In: https://agridata.ec.europa.eu/extensions/FADNPublicDatabase/FADNPublicDatabase.html. Abruf: 5.11.2024.

EUROSTAT (2024): Milchaufnahme (alle Milcharten) und Gewinnung von Milcherzeugnissen - jährliche Daten. Abruf: 5.11.2024.

KTBL (Hrsg.) (2022): Betriebsplanung Landwirtschaft 2022/23. Daten für die Betriebsplanung in der Landwirtschaft. Darmstadt.

STATISTISCHES BUNDESAMT (2021): Land- und Forstwirtschaft, Fischerei. Stallhaltung, Weidehaltung. Landwirtschaftszählung. Wiesbaden.

STATISTISCHES BUNDESAMT (2024): Viehbestanderhebung Rinder. GENESIS-Online Abruf. Wiesbaden.

TERGAST, H. T., S. NEUENFELDT und A. BERGSCHMIDT (2023): Zum Umfang der Anbindehaltung in der Rinderhaltung. Sonderbeilage Bund + Länder. In: Agrar-Europe 64 (30): 1–3.

THÜNEN AGRARATLAS (2022): Landwirtschaftliche Nutzung Version 2022. Methodik: Gocht & Röder (2014). Using a Bayesian estimator to combine information from a cluster analysis and remote sensing data to estimate high-resolution data for agricultural production in Germany. Int. J. Geogr. Inf. Sci. (2014), 10.1080/13658816.2014.897348. Daten: Stat. Ämter der Länder, Kreisdaten der Landwirtschaftszählung 2020 (eigene Berechnungen); FDZ der Stat. Ämter des Bundes und der Länder, Landwirtschaftszählung 2010/2020 und AFiD-Panel Agrarstruktur 1999, 2003, 2007, 2016 (eigenen Berechnung: Kreisdaten 1999-2020. Clusterschätzer); © GeoBasis-DE/BKG (2020).

UN COMTRADE (2024): DESA/UNSD, United Nations Comtrade Database. In: https://comtrade.un.org/.