Factsheet
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Financing gap in the agriculture and agri-food sectors in the EU

European Commission

European Investment Bank

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Available at:

https://www.fi-compass.eu/publication/factsheet/financing-gap-eu-agricultural-and-agri-food-sectors

Glossary and definitions

Expression	Explanation
CAP	Common Agricultural Policy
CATI	Computer-Assisted Telephone Interviewing
EAFRD	European Agricultural Fund for Rural Development
GVA	Gross Value Added
PPI	Purchasing Power Parity Index
SMEs	Small and medium size enterprises
SO	Standard Output

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01 Indroduction

This factsheet presents an estimate of the financing gap for agriculture and agri-food in 24 EU Member States[1] (EU-24). The estimate refers to 2022 and updates a previous estimate published by fi-compass in 2020[2] referring to 2017 and 2018.

Since 2020, the global economic and financial context has been affected by major events such as the COVID-19 pandemic in 2020 and 2021 and the Russian invasion of Ukraine. Consequences of the latter, especially the energy crisis, have produced significant impacts on European farmers and agri-food enterprises. Many have faced substantial hurdles, including considerable increases in production costs as well as reduced revenues.

Ahead of the launch of the new Common Agricultural Policy Strategic Plans (CAP) in Member States at the beginning of 2023, the Directorate-General for Agriculture and Rural Development and the European Investment Bank decided to conduct a new analysis under fi-compass. This offers European Agricultural Fund for Rural Development (EAFRD) managing authorities and all stakeholders, first-hand information on the evolution of the financial environment in which EU farms and agri-food small- and medium-sized enterprises (SMEs) operate.

To analyse the needs of the agriculture and agri-food sectors in the EU-24 for financing and access to credit, two surveys have been carried out under fi-compass. These surveys are the basis for two reports:

- A 'Survey on financial needs and access to finance of EU agriculture enterprises', which is an analysis of the financial environment for EU farmers, based on a Computer-Assisted Telephone Interviewing survey (CATI) on a representative sample of 6 550 farmers in the EU-24 in the first half of 2023[3];
- A 'Survey on financial needs and access to finance of EU agri-food micro, small and medium sized enterprises in 2022', which analyses the financial environment for food processing SMEs, based on a CATI in the first half of 2023 on a representative sample of 2 359 agri-food SMEs in the EU-24[4].

This factsheet presents financing gap indicators for the agriculture and agri-food sectors based on the two CATI surveys. The two respective survey reports mentioned above offer a more detailed analysis of the key financial indicators of each sector.

This factsheet is structured as follows:

- Section 1 (this section) is the Introduction;
- Section 2 introduces the financing gap concept;
- Section 3 presents financing gap indicators for the agriculture sector by financial product, farm size, farm manager age, macro-sector and 'green' investment;
- Section 4 presents financing gap indicators for the agri-food sector by financial product, enterprise size and 'green' investment;
- Section 5 proposes conclusions;
- Annex I illustrates the formula used for the financing gap estimate.

1 Austria, Belgium, Bulgaria, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.
2 fi-compass (2020). Financial needs in the agriculture and agri-food sectors in the European Union.
3 Available at: https://www.fi-compass.eu/publication/factsheet/survey-financial-needs-and-access-finance-eu-agricultural-enterprises.
4 Available at: https://www.fi-compass.eu/publication/factsheet/survey-financial-needs-and-access-finance-eu-agri-food-micro-small-and-medium-sized-enterprises.

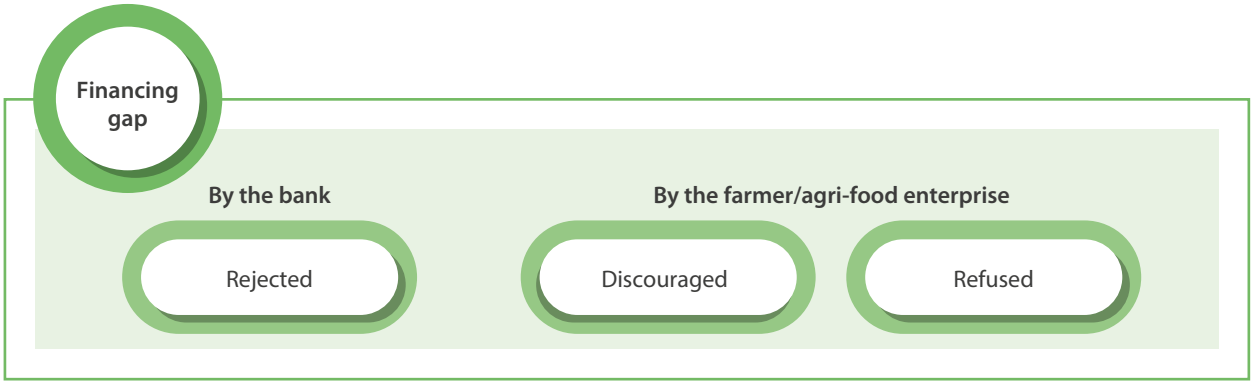
02 Financing gap definition

For this analysis, the financing gap is the *unmet credit demand due to constrained or absent access to bank financial products*[5]. In particular, **the financing gaps for agriculture and agri-food enterprises are the unmet financing demand from economically viable farms and agri-food SMEs respectively.**[6]

Unmet demand includes:

- a loan applied for but not obtained;
- financing refused by the potential borrower;
- a loan not applied for due to fear of rejection.

Figure 1.1: Components of the financing gap



Source: fi-compass, 2020.

Only unmet financing demand from viable farms or agri-food enterprises is used to calculate the gap. For this study, viable farms or agri-food enterprises are those that declared stable or growing turnover in the previous year.

The financing gap estimate for agriculture depends on the total number of farms, the share of financially viable farms reporting unmet demand for finance and the average loan size for farms (see Figure 1.2.)

Figure 1.2: Financing gap calculation method for the agriculture sector

Financing gap = Number of farms * percentage of farms that are both financially viable and have unmet demand * average loan size

The financing gap estimate for the agri-food sector depends on the total number of agri-food SMEs, the share of financially viable agri-food SMEs reporting unmet demand for finance and the average loan size for the sector (see Figure 1.3).

Figure 1.3: Financing gap calculation method for the agri-food sector

Financing gap = Number of agri-food enterprises * percentage of agri-food enterprises that are both financially viable and have unmet demand * average loan size

5 Includes short-, medium- and long-term loans and credit lines.
6 fi-compass (2020), Financial needs in the agriculture and agri-food sectors in the European Union.

03 Financing gap in the agriculture sector

This section provides an estimate of the financing gap for agriculture within the EU-24, offering a breakdown by Member State, farm size, financial product, farmer's age and macro sector.

Figure 3.1: Total agriculture financing gap, EUR million

Source: Own calculations based on fi-compass survey, 2023

In 2022, the financing gap for the EU-24 agriculture sector was EUR 62.3 billion, surpassing the 2017 figure by 33% (see Figure 3.1). This notable increase can be attributed to various factors.

In 2022, 22.7% of agricultural enterprises relied on external bank financing, far higher than in 2017 (16.6%). For financial products, in 2022 the proportion of farms seeking short-term loans increased from 5.3% to 9.4%. Likewise, the demand for medium-term loans surged from 6.2% to 13.3%, and long-term loans from 5.9% to 7.9% compared to 2017. While the rejection rate decreased notably from 14% in 2017 to 4% in 2022, the absolute number of farms facing rejection remained high due to a significant increase in loan applications during this period. Additionally, the share of loans not accepted by farmers rose from 2% to 5%, possibly due to higher interest rates.[7] Moreover, the proportion of farms refraining from applying due to fear of rejection increased from 9.7% in 2017 to 13.7% in 2022. Consequently, in 2022, the unmet demand for agriculture enterprises had increased since 2017, widening the financing gap.

Another factor is the increase in average loan size for short- and long-term financial products for small farms. For medium-sized farms, there was an increase for short- and medium-term loans and credit lines. Additionally, large farms increased their average volume for all bank products.

Changes in the adjusted farm population also increased the financing gap. Small- and medium-sized farms declined by 13% and 1%, respectively, at EU-24 level, while the number of large farms increased by 7%.

The change in the financing gap at EU-24 level can also be attributed to variations in gaps at Member State level, as illustrated in Figures 3.2 and 3.3.

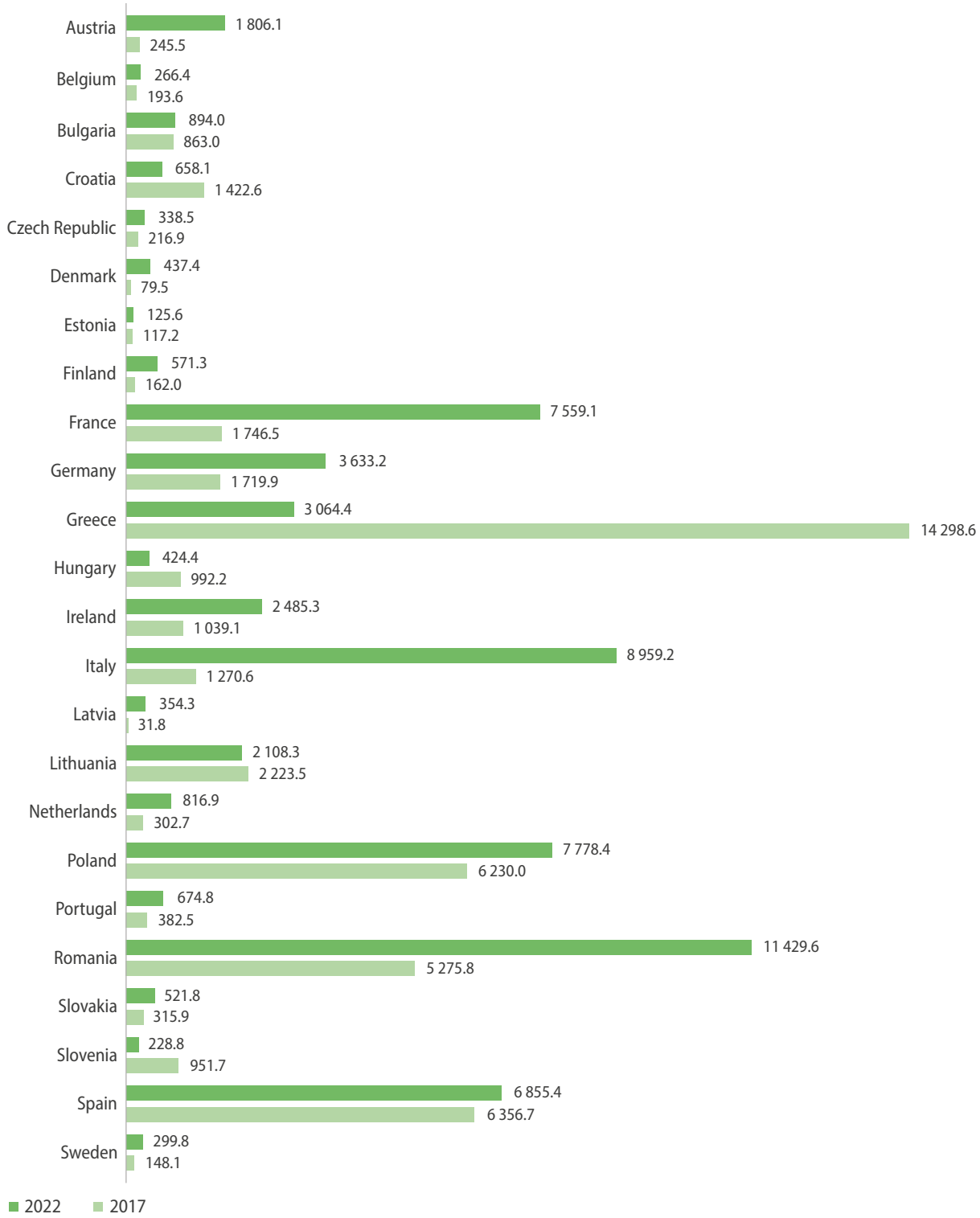
7 fi-compass (2020): Financial needs in the agriculture and agri-food sectors in the European Union; fi-compass (2023): Survey on financial needs and access to finance of EU agricultural enterprises.

In 2022, the highest financing gaps were in Romania (EUR 11.4 billion), Italy (EUR 8.9 billion), Poland (EUR 7.8 billion), France (EUR 7.5 billion) and Spain (EUR 6.8 billion). Conversely, the lowest gaps were in Estonia (EUR 125 million), Slovenia (EUR 228 million), Belgium (EUR 266 million), Sweden (EUR 299 million), Czechia (EUR 338 million) and Latvia (EUR 354 million) (see Figure 3.2).

Among Member States those that experienced the most substantial increases in their financing gaps were Latvia (elevenfold), Austria (sevenfold), Italy (sevenfold), Denmark (fivefold), and France (fourfold). These increases can be attributed to significant rises in average loan volumes across almost all banking products. Additionally, Austria, Latvia, and Italy saw increased shares of both discouraged and rejected farms. In Denmark and France, the financing gap increase was primarily due to more farms not applying for bank products out of a fear of rejection. Despite these increases on 2017, in 2022 the financing gaps in Latvia and Denmark remained lower than in most of the EU-24 Member States.

In 2022, there were notable declines in the financing gap in Greece (-78%), Slovenia (-76%), Hungary (-57%) and Croatia (-54%). However, despite these significant declines, in 2022 Greece still had a substantial gap of EUR 3 billion. The reduction in Greece's financing gap can be attributed to fewer rejected farms and fewer small farms. For Slovenia, Hungary and Croatia, the reduced gap can be credited to lower shares of rejected and discouraged farmers. In Lithuania, the decline was solely due to fewer discouraged farmers.

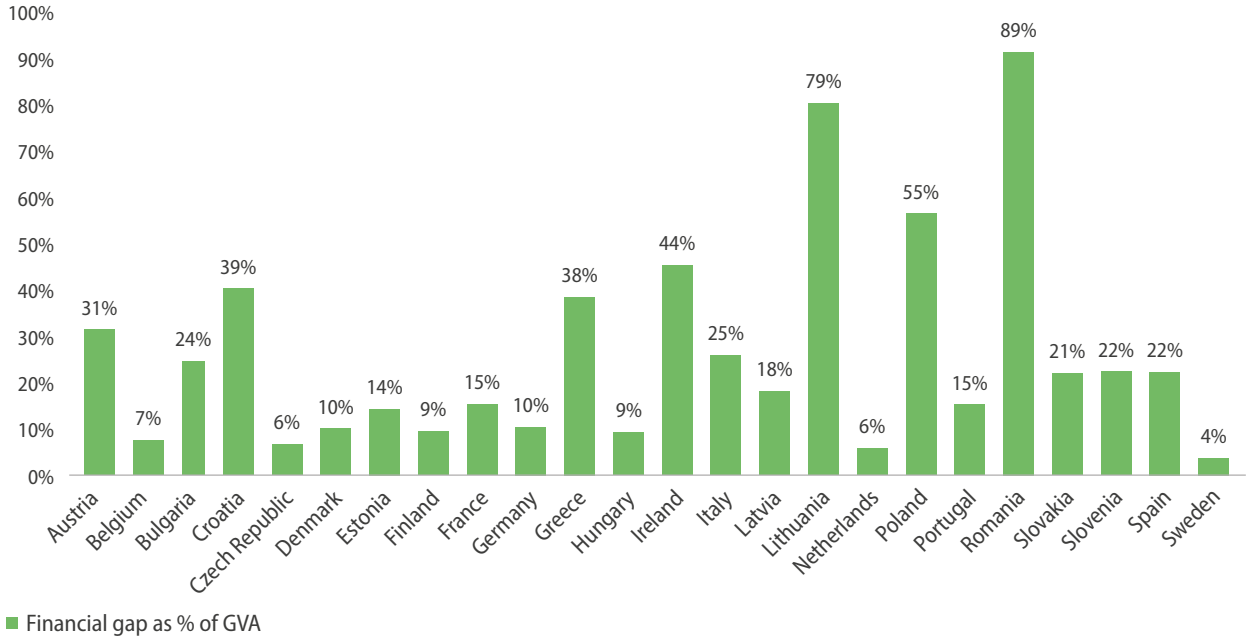
Figure 3.2: Financing gap by Member State, EUR million



Source: Own calculations based on fi-compass survey, 2023

Looking at the financing gap in relation to Gross Value Added (GVA) in agriculture sheds light on financial accessibility for agriculture across Member States. Romania stands out with the highest gap to GVA ratio (89%) (see Figure 3.3), followed by Lithuania (79%), Poland (55%), and Ireland (44%). Conversely, Sweden (4%), the Netherlands, Czech Republic (both at 6%), and Belgium (7%) had the lowest gaps (see Figure 3.3.). So, farmers in these Member States encountered fewer challenges when seeking financing.

Figure 3.3: Financing gap as a proportion of GVA



Source: Own calculations based on Eurostat[8] and fi-compass survey 2023

As in 2017, small farms encountered the most significant challenges to access finance, and long-term loans were the most elusive.

Small farms suffered EUR 38.4 billion or 61% of the agriculture financial gap in 2022. One explanation is that small farms constitute the majority, with 75% of the adjusted farm population. Nevertheless, the financing gap underscores that small farms faced greater disadvantages, in terms of loan rejections and discouragement to apply for bank products. Large farms were least likely to face difficulties in accessing finance, as their gap was estimated at EUR 9.6 billion, just 15% of the total (see Table 3.1).

Analysing the various financial products, EUR 36.3 billion or 58% of the financing gap is tied to long-term loans. This aligns longer loan maturities having higher risks. Consequently, access to long-term loans poses the most significant challenge for EU-24 farmers (see Table 3.1).

On the other hand, access to credit lines and short-term loans appears to be less difficult for EU-24 farmers. Easier access to these products could be because the average loan request is smaller, especially for credit lines. Nevertheless, both categories contribute about 12% to the total financing gap. This translates to EUR 7.7 billion for credit lines and EUR 7.4 billion for short-term loans (see Table 1).

8 Data on Gross Value Added of agriculture is available online at https://ec.europa.eu/eurostat/databrowser/view/NAMA_10_A10__custom_7589167/default/table?lang=en.

These findings underscore the critical importance of addressing the financing needs of small farms, particularly for long-term loans.

Table 3.1: Financing gap by farm size and financial product, EUR million

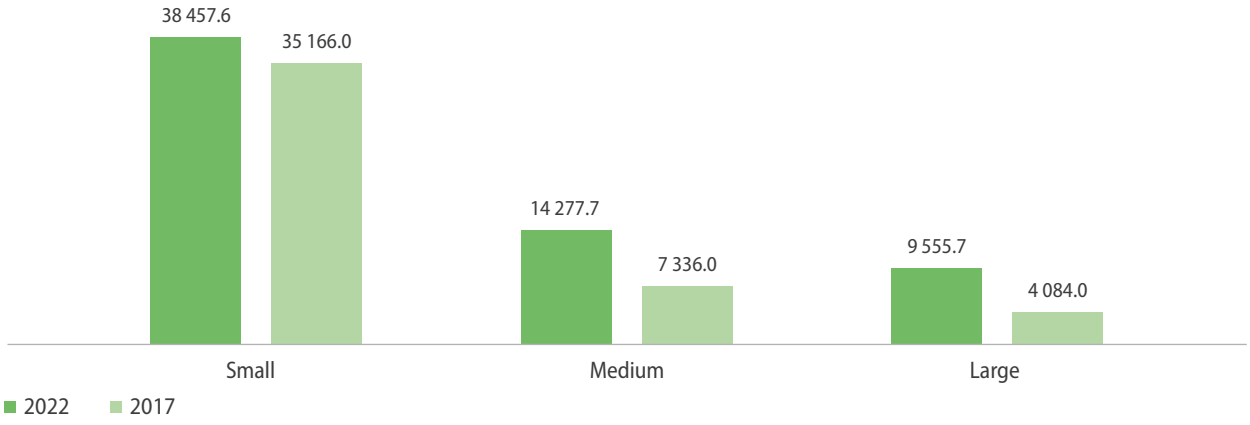
	Total	Short-term Loan	Medium-term Loans	Long-term Loans	Credit lines/bank overdraft
Small	38 457.6	3 446.5	5 089.4	25 195.1	4 726.4
Medium	14 277.7	2 115.5	3 791.6	6 766.7	1 603.9
Large	9 555.7	1 858.0	1 969.0	4 330.4	1 398.4
Total	**62 291.0**	**7 420.0**	**10 850.0**	**36 292.2**	**7 728.8**

Source: Own calculations based on fi-compass survey, 2023

In 2022, there was an increase in the financing gap across all farm sizes compared to 2017. For small farms it reached EUR 38.4 billion, surpassing 2017 by 9%. For medium-sized farms, the gap nearly doubled with a 94% increase to reach EUR 14.3 billion. Large farms also faced a substantial surge, with a remarkable 133% increase from EUR 4.1 billion in 2017 to EUR 9.6 billion in 2022 (see Figure 3.4).

These changes can be attributed to an increase in average loan size and unmet demand. This unmet demand includes more unsuccessful loan applications and more discouraged farmers. Compared to 2017, loan offers declined by small farm rose from 3% to 9%. This could be attributed to less beneficial terms and conditions, especially higher interest rates, difficulty to comply with repayment terms, increased risks, a lack of assets to be mortgaged, a lack of publicly offered or difficult to access guarantees for small farmers, higher fixed transaction costs on smaller loans and the limited bargaining power of smaller enterprises.[9]

Figure 3.4: Financing gap by farm size, EUR million

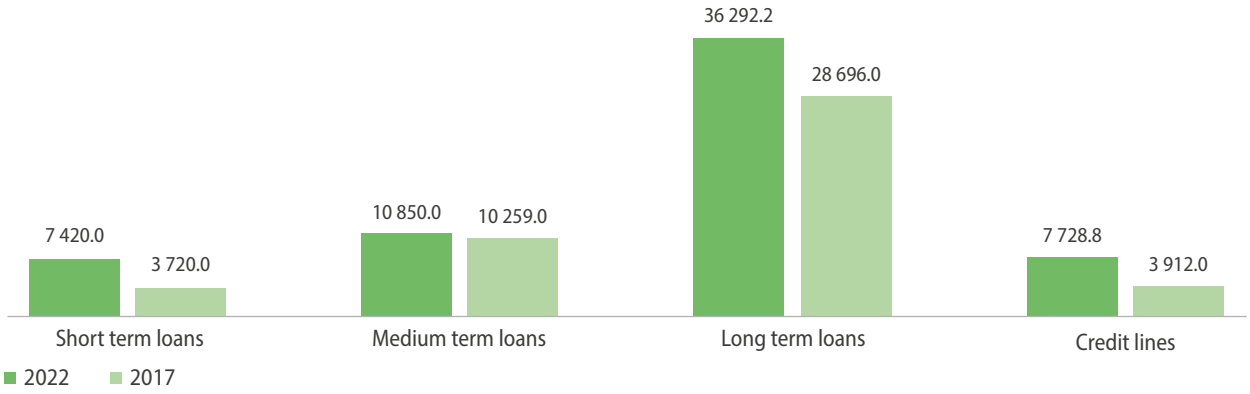


Source: Own calculations based on fi-compass survey, 2023

9 Survey on financial needs and access to finance of EU agricultural enterprises.

In 2022, the financing gap in the agriculture sector increased across all products. The most significant was for short-term loans, with a remarkable 99% rise to reach EUR 7 billion in 2022 from EUR 3.7 billion in 2017. This was closely followed by credit lines, with a 97% increase. Long-term loan financing gaps also grew, albeit at a lower rate of 26%. In contrast, the financing gap for medium-term loans grew a mere 5% compared 2017 (see Figure 3.5).

Figure 3.5: Financing gap by financial product, EUR million



Source: Own calculations based on fi-compass survey, 2023

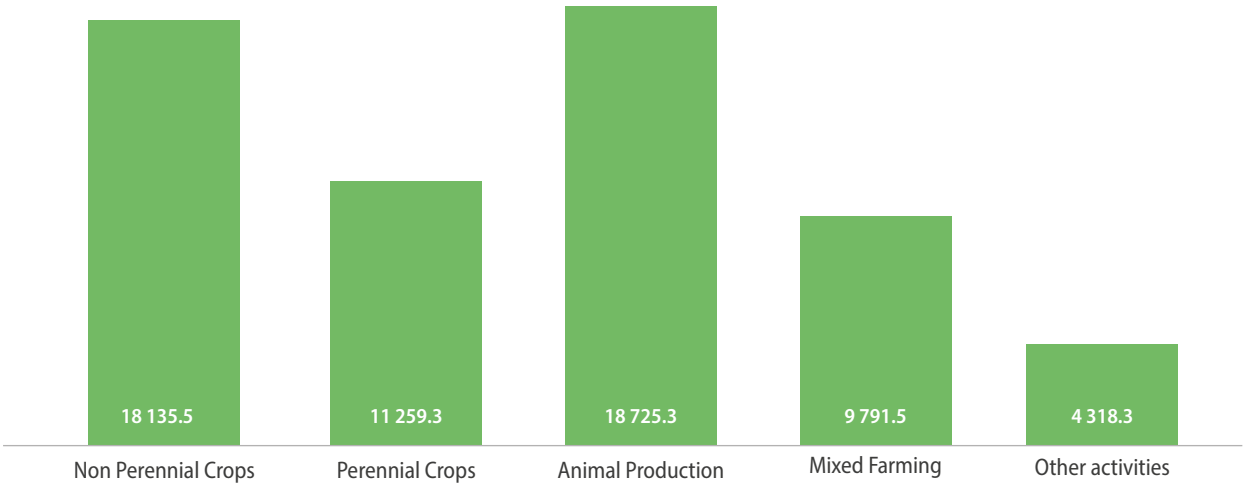
In 2022, the financing gap attributed to young farmers in the EU-24 accounted for 23% of the total gap for the agriculture sector (see Figure 3.6). In 2022, the financing gap for young farmers increased by 12% compared to 2017, reaching EUR 14.2 billion for the EU-24. This increase underscores the financial challenges faced by young farmers and their significant impact on the overall financing dynamics within the agricultural sector (see Figure 3.6).

Figure 3.6: Financial gap for young farmers, EUR million

Source: Own calculations based on fi-compass survey, 2023

In 2022, the breakdown of the financing gap by agriculture sector reveals that the largest share is attributed to animal production (30%) and non-perennial crop farms (29%). They are followed by farms specialising in perennial crops (18%), mixed farming (16%) and other agricultural activities (7%) (see Figure 3.7).

Figure 3.7: Financing gap by macro-sector, EUR million



Source: Own calculations based on fi-compass survey, 2023

In 2022, the financing gap for farmers who intended to invest for green purposes accounted for EUR 18.9 billion, or 30.4% of the total financing gap, primarily for:

- Irrigation, drought and flood protection or other investments to manage changed climate;
- Organic farming or other agro-ecological practices;
- Digital solutions or advanced machinery to optimise the use of fertilisers and crop protection products;
- Reducing energy and fuel consumption;
- Production of renewable energy such as solar panels or biogas plants.

04 Financing gap in the agri-food sector

This section analyses the estimated financial gap for EU-24 agri-food SMEs, with a breakdown by Member State, enterprise size and financial product. In 2022, the financial gap for EU-24 agri-food enterprises[10] was EUR 5.5 billion, 53% lower than the 2018 figure[11] (see Figure 4.1). This decline can be attributed to various factors.

Firstly, the gap declined significantly for small agri-food enterprises (-59%) and moderately for medium-sized agri-food enterprises (-25%).

Secondly, in 2022 the share of agri-food enterprises that applied for a bank product declined from 46% to 38%. There was a decrease in enterprises seeking short-term loans, from 17% to 11.9%. Likewise, the demand for medium-term loans declined from 22% to 17.1%, and long-term loans saw a decrease from 14% to 10.8% compared to 2018.[12]

Rejection rates decreased from 8 % in 2018 to 5.4% in 2022.[13] Additionally, the share of loans not accepted by agri-food enterprises experienced a slight decline as well, from 2% to 1.4%. While the proportion of discouraged enterprises refraining from applying due to fear of rejection increased slightly from 8% in 2018 to 8.9% in 2022, fewer agri-food enterprises did not apply due to fear of rejection than in 2018 due to fewer loan applications. Consequently, in 2022, the unmet demand of agri-food SMEs declined compared to 2018, narrowing the financing gap.

Another contributing factor to the decreased gap is the change in average loan size. There was a substantial decline for all bank products for small enterprises (employing less than 50 individuals). Volumes for long-term loans declined by 84% for medium-sized enterprises as well.

From 2018 to 2022 the financial gap in the EU-24 agri-food sector witnessed a significant decline, mostly driven by lower demand in number and size for various types of loan.

Figure 4.1: Financing gap in the agri-food sector, EUR million

Source: Own calculations based on fi-compass survey, 2023

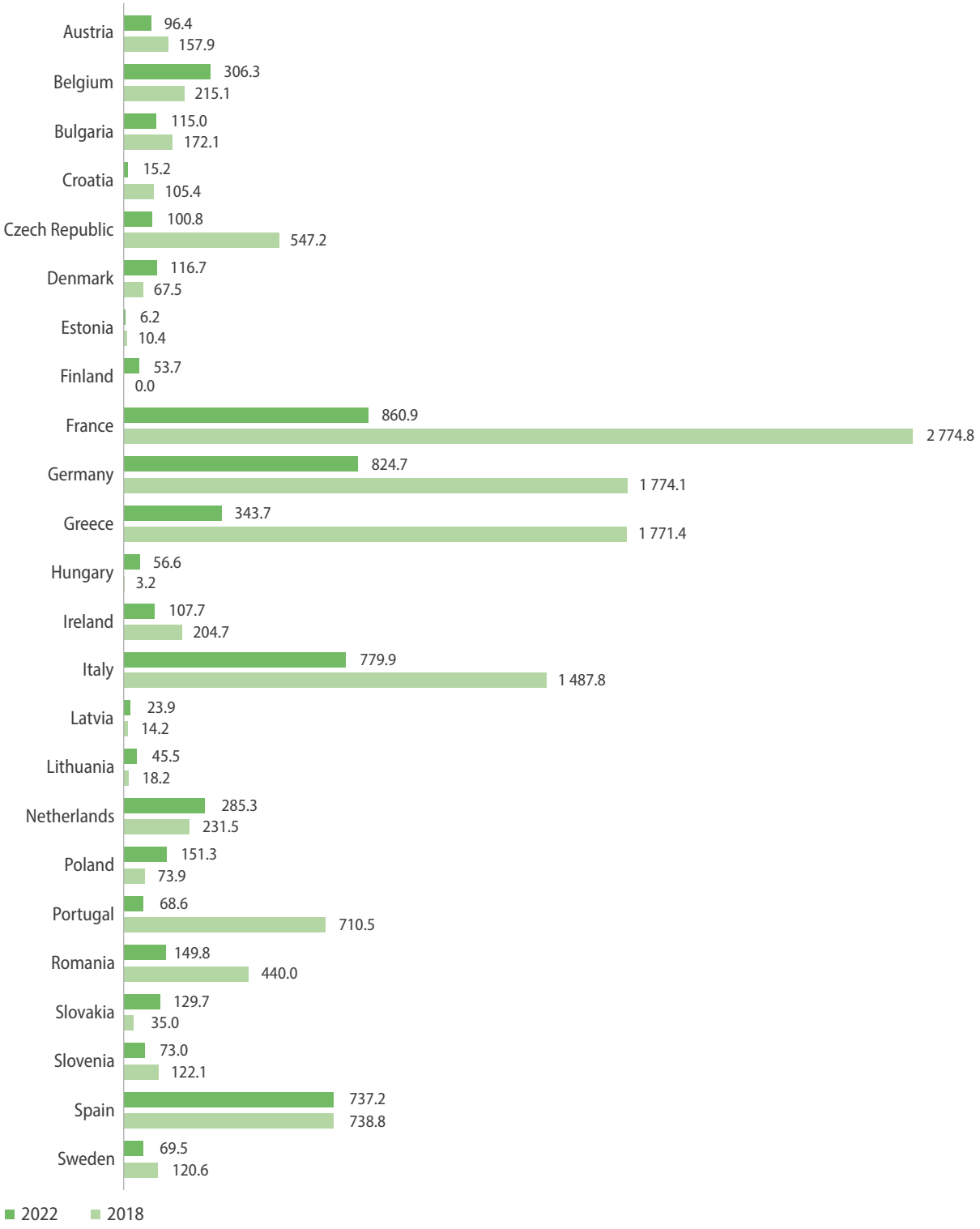
10 Only SMEs.
11 The sample covered SMEs and large enterprises with a total financing gap of 12.5 billion; however, to compare with the current survey, we removed the gap for large enterprises.
12 fi-compass survey. https://www.fi-compass.eu/sites/default/files/publications/financial_needs_agriculture_agrifood_sectors_France_0.pdf
13 fi-compass survey. https://www.fi-compass.eu/sites/default/files/publications/financial_needs_agriculture_agrifood_sectors_Italy.pdf

The change in the agri-food financing gap at the EU-24 level is a reflection of the gaps at Member State level, as illustrated in Figures 4.2. In 2022, the highest gaps were in France (EUR 860 million), Germany (EUR 824 million), Italy (EUR 779.9 million) and Spain (EUR 737 million). Conversely, the lowest gaps were in Estonia (EUR 6.2 million), Croatia (EUR 15 million), Latvia (EUR 23.9 million) and Lithuania (EUR 45.5 million) (see Figure 3.2).

The most substantial increases in financing gaps were in Hungary (seventeen-fold), Slovakia (threefold) and Lithuania (threefold). These can be attributed to higher shares of discouraged and rejected agri-food enterprises in these Member States. Despite the increases since 2018, the financing gap in these Member States is lower than those in most EU-24 countries.

In 2022, there were notable declines in the financing gap for agri-food enterprises in Portugal (-91%), Greece (-90%), Croatia (-86%), Chzech Republic (-82%) and France (-69%). The reduction can be attributed to a decreased share of rejected and discouraged agri-food enterprises. Also, small agri-food enterprises requested lower average sizes for all financial products, and there were lower average volumes for medium-sized enterprise long-term loans.

Figure 4.2: Total agri-food financing gap by Member State, EUR million



Source: Own calculations based on fi-compass survey, 2023

In 2022, EUR 4 billion or 73% of the agri-food financing gap was for small enterprises. Medium-sized enterprises were less likely to face difficulties in accessing finance and their financing gap is estimated at EUR 1.5 billion, or 27% of the total (see Table 4.1).

Analysing the various financial products, 36.5% of the gap, or EUR 2 billion, is tied to long-term loans, followed by EUR 1.4 billion for short-term loans (25%) and medium-term loans (24%) of EUR 1.3 billion. Consequently, as with the agriculture sector, access to long-term loans poses the most significant challenge for EU-24 agri-food enterprises (see Table 4.1).

Access to credit lines appears to be less difficult for the agri-food enterprises, though these still contribute EUR 770 million (14.9%) to the financing gap (see Table 4.1).

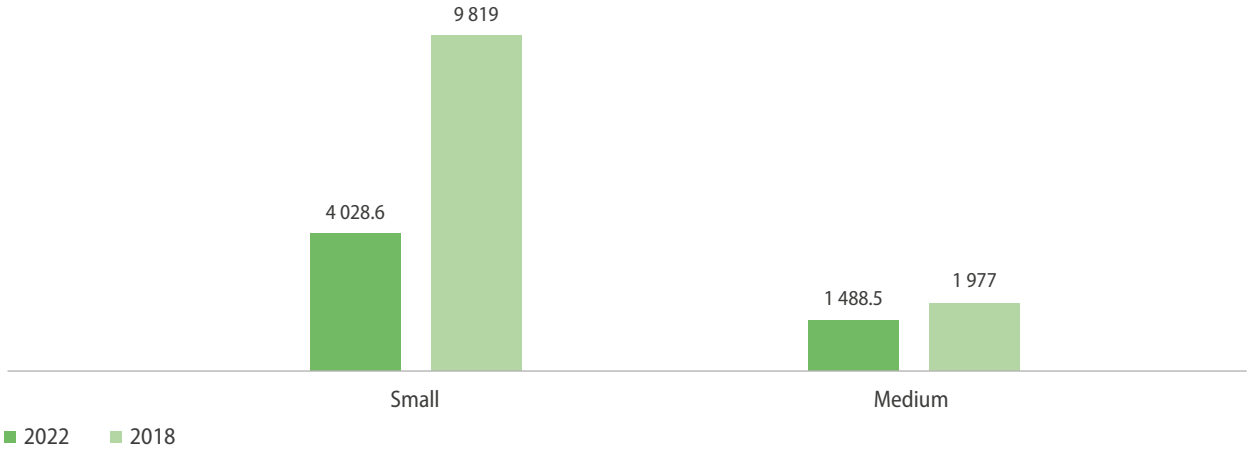
Table 4.1: Financing gap by enterprise size and financial product, EUR million

	Total	Short-term Loan	Medium-term Loans	Long-term Loans	Credit lines/bank overdraft
Small	4 028.5	805.1	908.3	1 880.4	434.7
Medium	1 488.5	586.9	432.2	134.1	335.3
Total	**5 517.0**	**1 392.0**	**1 340.5**	**2 014.5**	**770.0**

Source: Own calculations based on fi-compass survey, 2023

In 2022, the financing gap across small- and medium-sized enterprises declined compared to 2018. For small agri-food enterprises it fell 59%, reaching EUR 4 billion. For medium-sized enterprises, the decline was lower (-25%), but still a substantial EUR 1.5 billion (see Figure 4.3). These difference can be attributed to a significant decline in average loan sizes across all products for small agri-food enterprises.

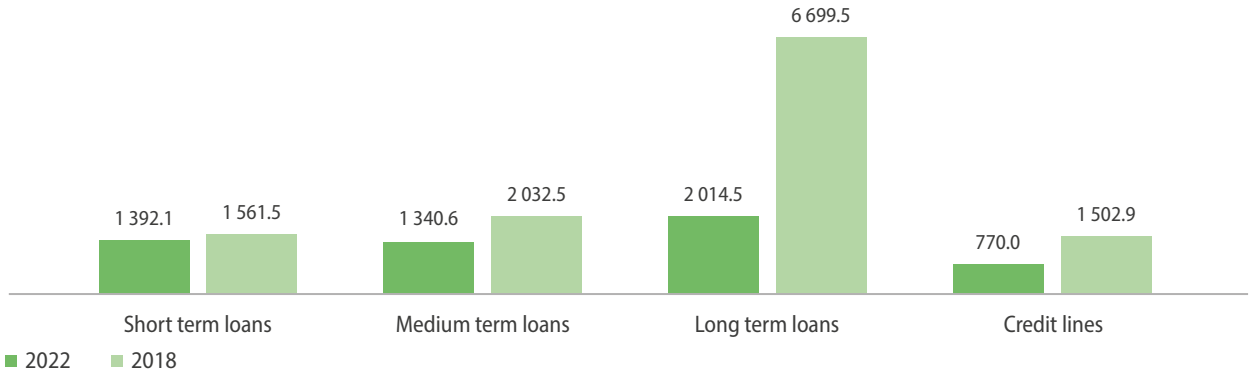
Figure 4.3: Financing gap by enterprise size, EUR million



Source: Own calculations based on fi-compass survey, 2023

In 2022, the financing gap in the agri-food sector decreased across all products. The most significant decline was for long-term loans (-70%) from EUR 6.7 billion in 2018 to EUR 2 billion in 2022, followed by credit lines with a 49% decrease. Such a significant decline of the long-term loan related gap in comparison to 2018 can be attributed to the significant decline in size of long-term loans for both small- (-66%) and medium-sized (-87%) agri-food enterprises. Medium- and short-term loan related financing gaps also decreased, albeit at a comparatively lower rate of 38% and 15%, respectively, when compared to 2018 (see Figure 4.4).

Figure 4.4: Financing gap by financial product, EUR million



Source: Own calculations based on fi-compass survey, 2023

In 2022, the financing gap for agri-food enterprises who intended to invest for green purposes accounted for EUR 1.3 billion, or 24% of the total. The activities targeted for investment were:

- Increasing energy efficiency (e.g. in buildings, production process);
- Producing renewable energy (e.g. solar, from waste or by-products);
- Improving environmental sustainability, including reducing greenhouse gas emissions (e.g. changes in the production process, sustainable packaging, input and raw material supplies, logistics and distribution);
- Adapting and increasing resilience to climate change (e.g. to extreme weather events, drought, supply shortages).

05 Conclusions

In 2022, there was a significant increase in the agriculture sector financing gap compared to 2017.

This increase reflects the sector's growing need for financial support. A key driver was an increased reliance on bank financing, with a substantial proportion of agricultural enterprises showing higher demand for short-, medium- and long-term loans. The increased number of farms seeking access to bank finance led to an increase in unmet demand, despite fewer loan rejections. In addition, the rise in the number of discouraged applicants, those refraining from applying due to a fear of rejection, contributed significantly to widening gap. Finally, an increase in average loan volumes, especially for short- and long-term loans, also played a role in the increase.

Within this dynamic context, significant variations in the gap for Member States underscored the need for tailored policy responses to address regional disparities. The continued concentration of the financing gap on small farms raises concerns about the challenges they face in accessing bank products. Young farmers in particular suffer from a substantial financing gap. These findings emphasise the urgency of implementing strategies to alleviate the financial challenges faced by small agricultural enterprises and young farmers, particularly in accessing long-term loans. A substantial portion of the gap was for green investments, underlining the sector's commitment to sustainability but also the need for policy actions to support access to finance in this area.

For agri-food enterprises, the financing gap decreased significantly. This was the result of an improved financial environment, with a lower share of loan applications rejected by banks, but also a decline in demand for various loan types, including a reduction in average loan amounts. Small enterprises, however, continued to face challenges, highlighting the need for tailored support. Member State-level variations persisted, emphasising the importance of considering regional specifics in policy formulation. The substantial gap for green investments in the agri-food sector, also highlights the need for targeted policy actions in this area.

06 References

fi-compass survey (2020). Financing needs in the agriculture and agri-food sector in the European Union, available online at:

https://www.fi-compass.eu/eafrd/fi-compass-study-financial-needs-agriculture-and-agri-food-sectors-24-eu-member-states

Data on Gross Value Added of agriculture is available online at:

https://ec.europa.eu/eurostat/databrowser/view/NAMA_10_A10__custom_7589167/default/table?lang=en.

07

Annex I – Gap Calculation Methodology

The financial gap equation aligns with the **operational definition of the financing gap** from previous fi-compass publications.[14]

Data on each component of the equation is obtained from the CATI survey under the following operational definitions:

- **Rejected** category includes unsuccessful loan and credit applications; hence, the applications that are rejected by banks and loan offers from banks that are declined by the farmers/agri-food enterprises;
- **Discouraged** category includes potential loan or credit **applications not applied for due to fear** of rejection.
- **Viable farm/agri-food enterprise** is operationalised by farms/agri-food enterprise that have a non-negative turnover growth;[15]
- **Farms/agri-food enterprises with unmet demand** are farms/agri-food enterprises whose applications for bank loans or credit lines were rejected by the bank, were declined by the borrower or who did not apply due to fear of rejection;
- **The share of viable farms/agri-food enterprises with unmet demand** is calculated as the share of the farms/agri-food enterprises that have non decreasing turnover in the previous year and are rejected or discouraged from the bank financing in total farm/agri-food enterprise population;
- **The average loan volume** (financial value) is a geometric mean of the obtained financial product (loan or credit) volume by farms/agri-food enterprises.

To calculate the financial gap, we follow the following four steps[16].

Step 1: Share of viable farms/agri-food enterprises with unmet demand for finance in total farm/agri-food enterprise population

Rejection Rate^{Viable}: This refers to the ratio of viable farms/agri-food enterprises whose application was unsuccessful (rejected by the bank or declined by the borrower) over the total population of farms/agri-food enterprises. It is calculated as follows:

$$\textbf{Rejection Rate}_j^{Viable} = \frac{\text{Number of unsuccessful viable farms/firms}}{\text{Total survey population}_j}$$

where j = short term, medium term, long term loans, credit lines.

14 fi-compass (2020), Financial needs in the agriculture and agri-food sectors in the European Union.
15 A turnover that has been stable or growing in the last year according to the survey results.
16 Each step refers to the latest surveyed year for both surveys.

Discouraged Rate^{Viable}: This refers to the ratio of viable farms/agri-food enterprises that were self-discouraged to apply for bank products because of fear of rejection over the total population. It is computed as follows:

$$\textbf{Discouraged Rate}_{j}^{Viable} = \frac{\text{Number of discouraged viable farms/firms}}{\text{Total survey population}_{j}}$$

where j = short term, medium term, long term loans, credit lines.

Unmet Demand Rate ^{Viable}: This refers to a total share of survey respondents with unmet demand for finance that is obtained by summing up the rejected and discouraged rates:

$$\textbf{Unmet Demand Rate}_{j}^{Viable} = \text{Rejection Rate}_{j} + \text{Discouraged Rate}_{j}$$

where j = short term, medium term, long term loans, credit lines.

Step 2: Number of farms/agri-food enterprises rejected or discouraged

N.of farms/agri-food enterprises with unmet demand$_{ij}^{Viable}$: in order to get the number of farms/agri-food enterprises constrained in accessing financing, the total share of viable respondents with unmet demand from the survey sample (Step 1) is multiplied by the total farm/agri-food enterprise population by size from Eurostat.[17]

We assume equal rates of rejections among small, medium, and large-sized farms[18] and small and medium agri-food enterprises[19], and disentangle the share of farms with constrains in obtaining credit by financing product.[20]

$$\textbf{N. of farms/agri-food enterprises with unmet demand}_{ij}^{Viable} = \text{Farms/agri-food enterprises population}_{i}^{21} * \text{Rejection Rate}_{j}^{Viable}$$

$$\textbf{N. of farms/agri-food discouraged}_{ij}^{Viable} = \text{Farms/agri-food enterprises population}_{i} * \text{Discouraged Rate}_{j}^{Viable}$$

$$\textbf{N. of farms in unmet demand}_{ij}^{Viable} = \text{N. of farms rejected}_{ij} + \text{N. of farms discouraged}_{ij}$$

$$\textbf{N. of agri-food enterprises in unmet demand}_{ij}^{Viable} = \text{N. of agri-food enterprises rejected}_{ij} + \text{N.of firms discouraged}_{ij}$$

where i = small, medium, large[22]
and j = short term, medium term, long term loans, credit lines.

17 For agrifood sector the entire Eurostat population is used. For agriculture, the total population from Eurostat is adjusted by removing farms having a Standard Output (SO) less than EUR 2000, between EUR2000 and EUR 3999, and between EUR 4000 and EUR 7999, depending on the Purchasing Power Parity Index (PPI) of the country. Member States are allocated in three clusters based on the SO and PPI. Accordingly, the following thresholds were applied to cluster the farms: 1) farms with SO less than EUR 2000 and PPI lower than the 33th percentile of the EU27 distributions. 2) farms with SO between EUR 2000 -EUR 4000 and PPI between the 33th and 66th percentile, 3) farms with SO between EUR 4000 – EUR 8000 and PPI above the 66th percentile.

18 Small farms have a size of 0-20 ha, medium farms have a size between 20-100 ha and large farms are the ones with more than 100 ha .

19 The small sized enterprises refer to the enterprises that employ less than 50 individuals, and medium sized enterprises refers the enterprises that employ between 50 -250 individuals. SMEs are defined according to European Commission Recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (Text with EEA relevance) (notified under document number C(2003) 1422)

20 The same assumption holds in case of agri-food enterprises. However, in case of agri-food sector, the sample includes only SMEs.

21 in case of agri-food sector. Also, in case of agri-food enterprises, we refer the same formula; however, we use agri-food enterprise population data from Eurostat instead of adjusted farm population data.

22 i = small, medium in case of agri-food sector. Also, in case of agri-food enterprises, we refer the same formula; however, we use agri-food enterprise population data from Eurostat instead of adjusted farm population data.

Step 3: Standard loan application size

Application size$_{ij}$: For each type of financial product and each farm/agri-food enterprise size category, a standard size of application is constructed, based on the EU wide geometric mean for each financing product[23] and farm/enterprise size[24]. This standard size is adjusted at country level with the Purchasing Power Parity (PPP) index.

Step 4: Financial gap across farm/agri-food enterprise size and product type

The financing gap is obtained by multiplying the standard application size (Step 3) by the total number of farms/agri-food enterprises facing constrained access to bank products as calculated in Step 2.[25]

$$\textbf{Financial gap agriculture}_{ij} = \text{Application size}_{ij} * \text{N. of farms in unmet demand}^{\text{Viable}}_{ij}$$

where i= small, medium, large
and j = short term, medium term, long term loans, credit lines.

$$\textbf{Financial gap agri-food}_{ij} = \text{Application size}_{ij} * \text{N. of farms in unmet demand}^{\text{Viable}}_{ij}$$

where i= small, medium, large
and j = short term, medium term, long term loans, credit lines.

Finally, the total gap is the sum of figures across size classes (i) and products (j).

In the context of agriculture, we analyse the financing gap by segmenting it into age and sector categories. Additionally, within both the agriculture and agri-food sectors, we assess the proportion of the financing gap allocated for green investments.

To obtain a financing gap indicator for young farmers, the number of old and young farmers within total unmet demand (rejected and discouraged farms) is obtained and multiplied by the standard loan size. Hence, the following formula is applied to calculate the financial gap for young farmers:

$$\textbf{Financial gap young farmers}_{ij} = \text{Application size}_{ij} * \text{N. of young farmers in unmet demand}^{\text{Viable}}_{ij}$$

where i= small, medium, large
and j = short term, medium term, long term loans, credit lines.

To obtain a financing gap indicator for macro sector we calculate the number of farms producing non-perennial crops, perennial crops, animal production, mixed and other activities in total unmet demand and multiply it by standard loan size. Hence, the following formula is applied to calculate the financial gap for non-perennial crops:

$$\textbf{Financial gap NPC}_{ij} = \text{Application size}_{ij} * \text{N. of NPC with unmet demand}^{\text{Viable}}_{ij}$$

where NPC is farms producing non perennial crops
i= small, medium, large
and j = short term, medium term, long term loans, credit lines.

23 short term loan, medium term loan, long term loan, credit line
24 In case of agriculture, it includes small, medium and large farms; in case of agri-food it includes SMEs.
25 Note: when the survey sample size allows, an indicative breakdown of the gap is provided for farmers age, per member state and for macro agriculture sectors.

The following formula is applied to calculate the financial gap for perennial crops:

$$\textbf{Financial gap PC}_{ij} = \text{Application size}_{ij} * \text{N. of PC with unmet demand}_{ij}^{Viable}$$

where PC is farms producing perennial crops
i= small, medium, large
and j = short term, medium term, long term loans, credit lines.

The following formula is applied to calculate the financial gap for animal production:

$$\textbf{Financial gap AP}_{ij} = \text{Application size}_{ij} * \text{N. of AP with unmet demand}_{ij}^{Viable}$$

where AP is farms producing animal production
i= small, medium, large
and j = short term, medium term, long term loans, credit lines.

The following formula is applied to calculate the financial gap for mixed farms:

$$\textbf{Financial gap MF}_{ij} = \text{Application size}_{ij} * \text{N. of MF with unmet demand}_{ij}^{Viable}$$

where MF is mixed farms
i= small, medium, large
and j = short term, medium term, long term loans, credit lines.

The following formula is applied to calculate the financial gap for farms with other activities:

$$\textbf{Financial gap OA}_{ij} = \text{Application size}_{ij} * \text{N. of OA with unmet demand}_{ij}^{Viable}$$

where OA is farms with other activities
i= small, medium, large
and j = short term, medium term, long term loans, credit lines.

Because of data constraints, we adopted an alternative approach to calculate the financing gap for green financing in the context of farms and agri-food enterprises. We determined the share of loans allocated to green initiatives within the pool of viable unsuccessful (rejected by bank or declined[26] by borrower) farms/agri-food enterprises and applied this percentage to the total financing gap in each sector.[27]

26 The total gap refers to unsuccessful and discouraged farms/agri-food enterprises. We assume that the share of potential loans would be the same if obtained by discouraged farms/agri-food enterprises.
27 Due to data limitations, we are not allowed to estimate green financing gap across farm/firm size and across financial products.

Notes

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