European Commission

Agriculture and rural development

The EU bovine sector and grass-based ruminant livestock farms

Sustainability, diversity and territorial evidence

JULY 2026

Analytical Brief N°17

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Graphs, Maps, Table

Introduction

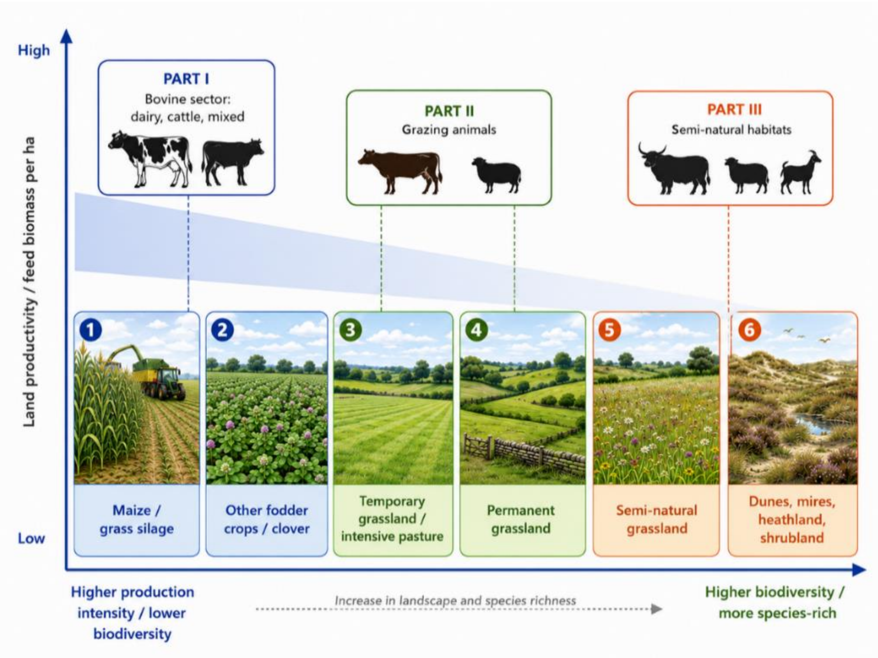
This analytical brief[1] provides an evidence-based background to the EU Livestock Strategy and the Commission proposal for the CAP 2028-2034, complementing the statistical analysis presented in the Staff Working Document accompanying the Strategy. The brief focuses on the bovine sector and ruminant grass-based farms.

It also builds on key strategic items from the Vision for agriculture and food, such as the reference to better targeting of income support. Some of the analysis presented are complementary to our earlier analytical briefs on young farmers, better targeting of income support, grassland and livestock dynamics, women in farming[2] that provide more targeted information.,

The brief is structured in three parts. The first part analyses the bovine sector, focusing on specialist dairy, specialist beef cattle and mixed crops-livestock farms[3], profiling its structural shifts, cost dynamics and feed management strategies from a competitiveness perspective. The second part expands on all ruminant and grassland farms (including sheep and goat), characterised by their stocking density relative to the grazable area as a proxy for intensity, using Farm Sustainability Data Network (FSDN) data, reading income, feed autonomy, dependence to public support and territorial trends. The third part, based on an input by the European Environmental Agency (EEA) examines semi-natural habitats and ecological need for extensive grazing, where it is critical for land management purposes.

The analytical thread connecting all three parts is the concept that livestock farming systems lie on a gradient from high-biomass intensive production to low-biomass, species-rich extensive grazing, as defined by the EEA (*Graph 1*). Considering that the Strategy highlights the diversity of the sector, the brief provides evidence showing that intensive and extensive systems differ on their environmental footprint, income base, reliance on public support, territorial rooting and role in nature conservation. A policy that treats them uniformly, whether by imposing blanket reductions in livestock numbers or by targeting support on productivity alone, risks undermining the economic and environmental value at both ends of the spectrum.

Graph 1 – Representation of land uses and livestock species in relation to land productivity and the brief structure



Source: EEA and DG AGRI own elaboration

[1] This brief is as well available as an interactive Story Map: https://agridata.ec.europa.eu/extensions/Geoportal/storymap-grazing-livestock.html
[2] Analytical briefs - Agriculture and rural development - European Commission
[3] Farm types follow the FSDN Type of Farming (TF14) classification included in FSDN guidance documents: "Specialist dairying" (45), "Specialist cattle" (49), "Mixed crops and livestock" (80), "Sheep, goats and other grazing livestock" (48) and "Mixed livestock, mainly grazing livestock" (73). The description for farms specialised in beef is "Specialist cattle" and includes "Specialist cattle – rearing and fattening" and "Cattle – dairying, rearing and fattening combined". in this brief we used the description "beef cattle" farms for clarity.

Highlights

The EU bovine herd is further specialising and concentrating. Dairy cows represent roughly two thirds of the cow herd and tend to concentrate into a few specialised north-western regions, while areas in eastern and southern Europe tend to specialise towards beef cattle based on different drivers. These trends have resulted in an overall reduction of the bovine herd to about 72 million head, with an 11% decrease in dairy cows and 7% in cattle beef since 2010. At the same time, milk production has increased (+20% comparing 2025 to 2010) and beef production has decreased by 10.9%, with a 16.9% reduction of animals slaughtered.

Income depends primarily on dimension scale and farm specialisation, not on livestock stocking density. Herd size explains far more of the variation in income than farm area and stocking density, with no significant differences across Member States. Extensification therefore carries no general income decrease for cattle and sheep systems; the income gap usually blamed on low density is a gap in scale and specialisation.

Each livestock system specialisation expresses its own strengths, especially in terms of intensive/extensive farms. Intensive systems lead on better income, scale and generational renewal, but score lowest on grassland share, feed self-sufficiency and land-based feeding. Extensive systems show the reverse: lower income and the higher reliance on direct payments but have the strongest land and feed-autonomy profile.

Feed self-sufficiency is the mirror image of intensity. Bovine farms grow on average about 40% of their grazing feed, ranging from near zero in the intensive dairy belt of the Netherlands, Belgium and western Germany to over 80% in central, eastern and Alpine regions. A similar gradient runs across all grazing ruminants, from about 58% in extensive farms down to 43% in the most intensive.

Extensive grazing delivers public goods. Such systems represent only about 10 to 15% of EU ruminant production, yet roughly one third of the habitats protected under the Habitats Directive, some 35 million hectares, depend on continued grazing. Where grazing stops, these habitats are lost to scrub and wildfire.

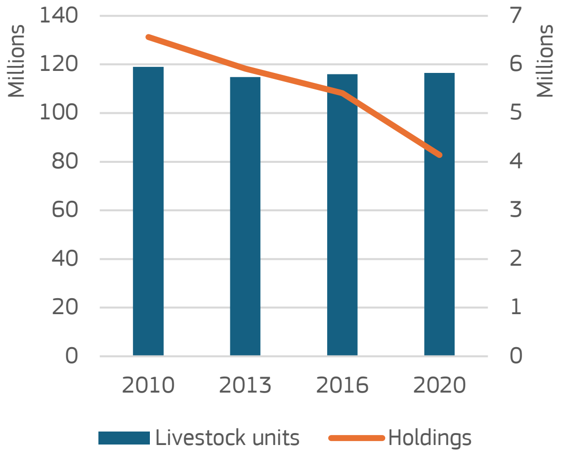
The stocking density should be balanced, taking in account that dependency on grazing is spatially uneven due to the territorial context and specialisation. In some regions the concern is excess livestock density and its environmental pressures; in others it is abandonment and the loss of the grazing that keeps habitats open.

The evidence points to the diversity of the livestock sector, leading to the need for differentiated, not uniform, policy. Policy support should be better targeted from one side to support intensive systems in reducing their footprint while supporting the viability of extensive systems.

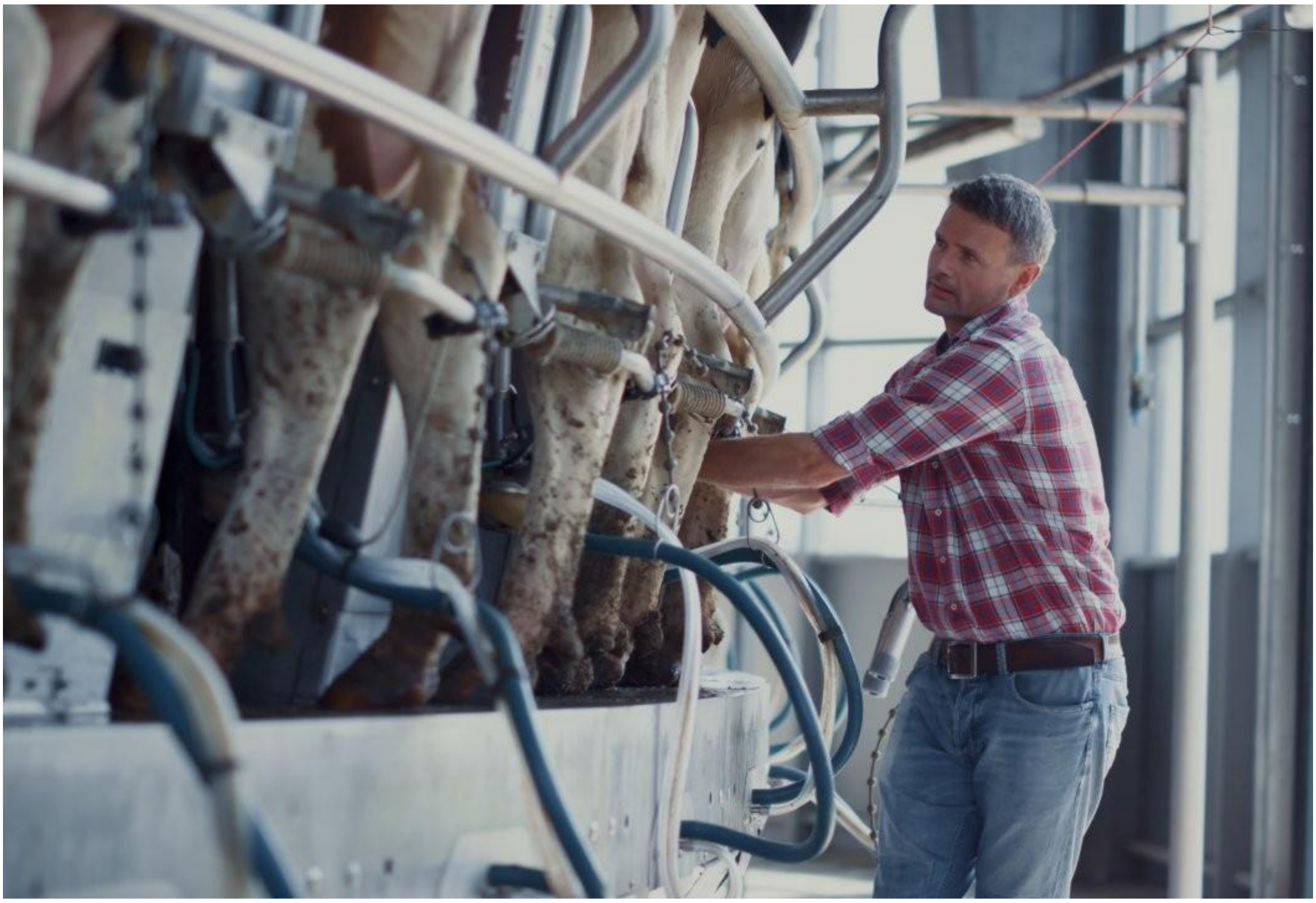
The context: livestock population and farming

In 2025, the European Union had a livestock population of 132 million pigs, 72 million bovine animals, 54 million sheep and 10 million goats, and around 1.7 billion poultry birds (4). This livestock is managed by 4.1 million farms, representing 41% of all EU farms and a very relevant proportion of the agricultural sector(5). In more detail, 21.6% of farms with livestock are classified as livestock specialists while 19.3% as mixed farming thus combining crops and livestock activity. The majority of farms are small, with 41% having less than 2 hectares and around 60% having fewer than 5 livestock units (LSU). Between 2010 and 2020, the number of livestock farms decreased significantly, continuing a long-standing downward trend and at higher level than crop-related farm types (***Graph 2***). On the other side, the agricultural areas managed by these farms was almost stable[6].

Graph 2 – **Livestock population and number of holdings with livestock in EU**



Source: Eurostat (*ef_m_farmleg* and *ef_lsk_main*), 12/06/26.



[4] Eurostat: Livestock populations (*apro_mt_lscatl*, *apro_mt_lsgoat*, *apro_mt_lssheep*, *apro_mt_lspig*, *agr_r_animal*), (*ef_lsk_poultry*).

[5] Eurostat: Farm structure (*ef_lsk_main*).

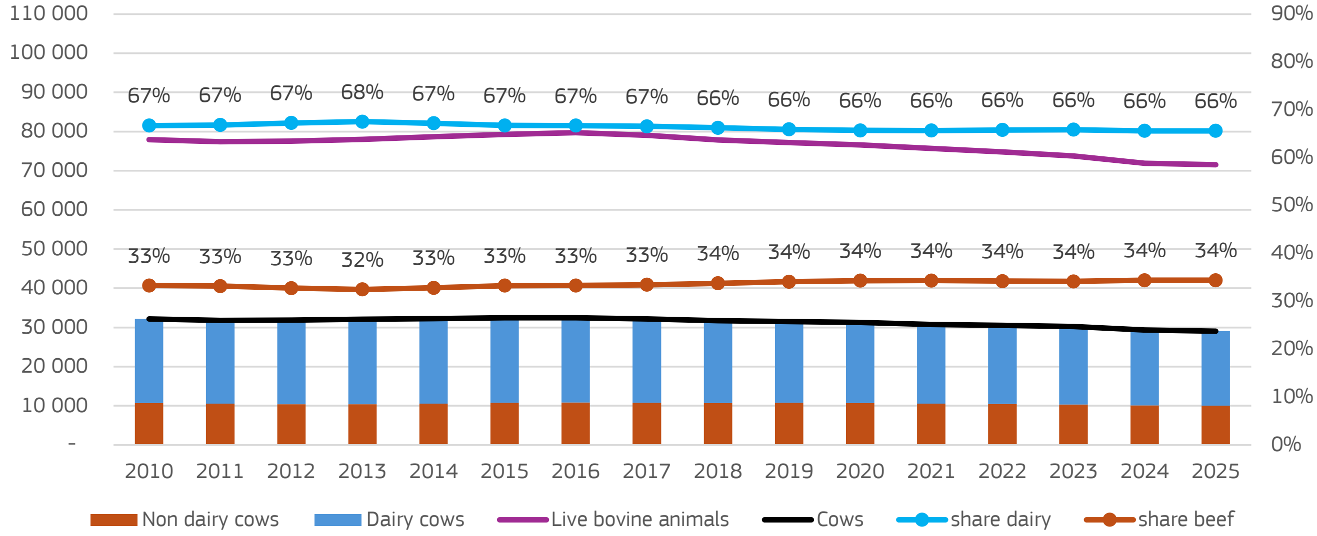
[6] *Report: EU agricultural outlook 2024-2035*

Part I: The bovine sector

The bovine sector is the natural starting point for our analysis: it dominates EU ruminant output and emissions and sits at the more productive end of the gradient that runs through this brief. This first part of the brief profiles its structure, economics, costs and feed base, focusing on specialist milk, specialist beef cattle and mixed crops-livestock farms. It already reveals the divide that shapes the rest of the analysis, between intensive, grass-rich dairy and extensive, land-based cattle.

In 2025, the total EU bovine population stood at 72 million heads, marking an overall 8% decrease since 2010. Of these, 41% were cows, and especially dairy cows accounted for two-thirds of the total cow population complemented by 34% of non-dairy cows (for beef production), a proportion that has remained stable over the past fifteen years. Compared to 2010, the number of dairy cows fell by 11%, compared with a 7% decrease in beef cows (*Graph 3*).

Graph 3 – Number of animals in the bovine sector and share of dairy – non-dairy cows in EU. 2010-2025



Source: Eurostat (*apro_mt_lscatl*), 12/06/26.

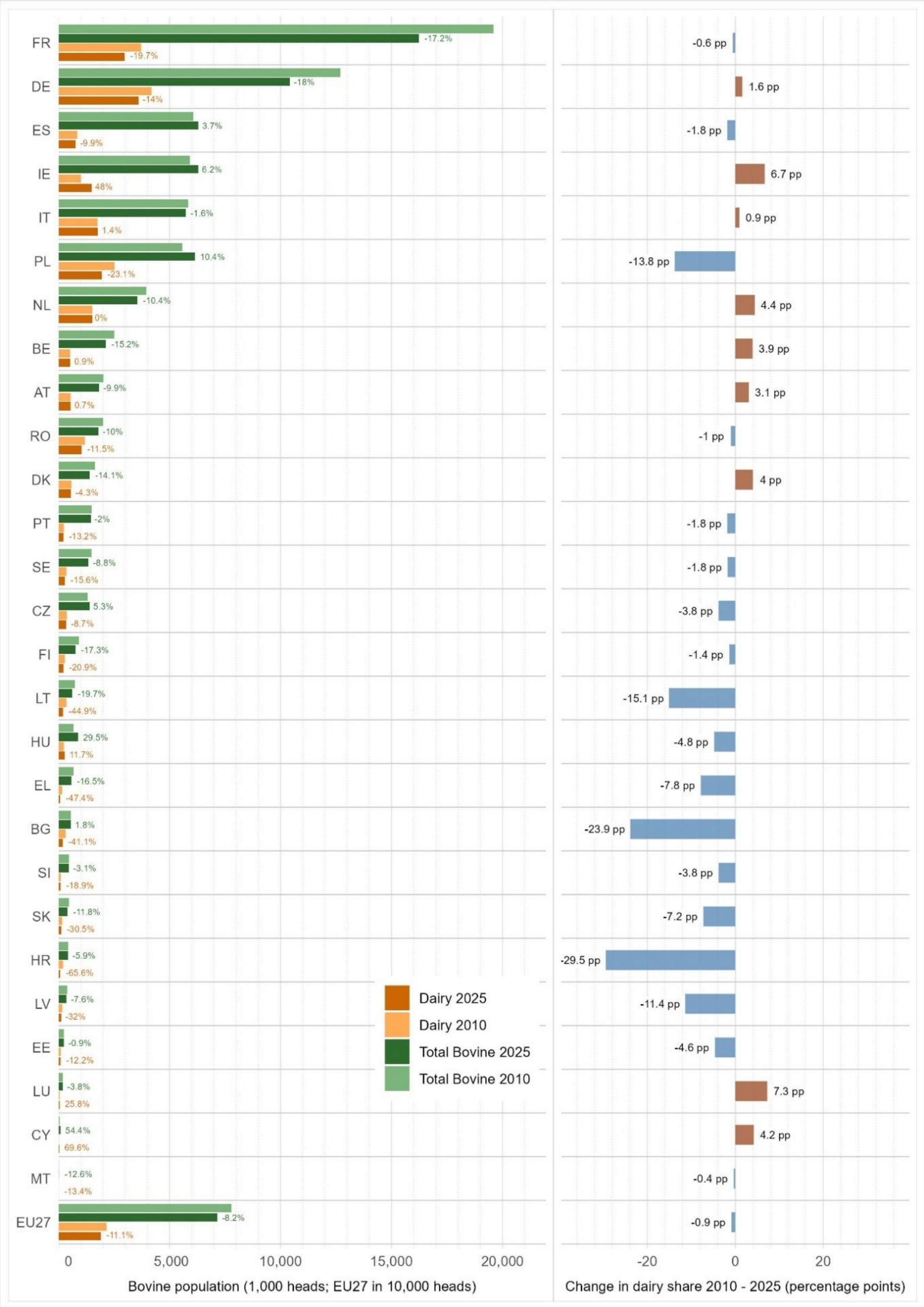
The number of dairy cows is decreasing faster than the bovine herd, and with different trends at territorial level. At first sight the structure looks stable, since the dairy share of the bovine herd has shifted by less than one percentage point at EU level, but this aggregate masks sharply diverging national trajectories (*Graph 4*). The dairy share rose most in the established dairy regions: Luxembourg (+7.3 percentage points - pp), Ireland (+6.7 pp), the Netherlands (+4.4 pp), Denmark (+4.0 pp), Belgium (+3.9 pp) and Austria (+3.1 pp). Ireland is the clearest case of expansion, its dairy cow numbers growing by 48% after the end of milk quotas in 2015, on a bovine herd that itself grew by 6%. At the opposite end, the dairy share fell steeply in Croatia (-29.5 pp), Bulgaria (-23.9 pp), Lithuania (-15.1 pp), Poland (-13.8 pp) and Latvia (-11.4 pp). Poland followed a different trend than Ireland: while its total bovine herd also grew (+10%), this increase was associated to suckler and beef cattle, and the number of dairy cows declined. In parallel, milk yields increased remarkably, hinting to productivity gains due to further specialisation and structural change.

Dairy is gaining in productivity and concentrating geographically. Milk yield increased by 28% from 2010 to 2024, rising to more than 8 100 kg per cow[7].

Across much of the east and south-east countries, dairy cows are being given up faster than beef animals, whether through farm exit or a shift towards beef cattle systems.

[7] Eurostat (***apro_mk_farm***) and (***apro_mt_lscatl***), 26/06/26

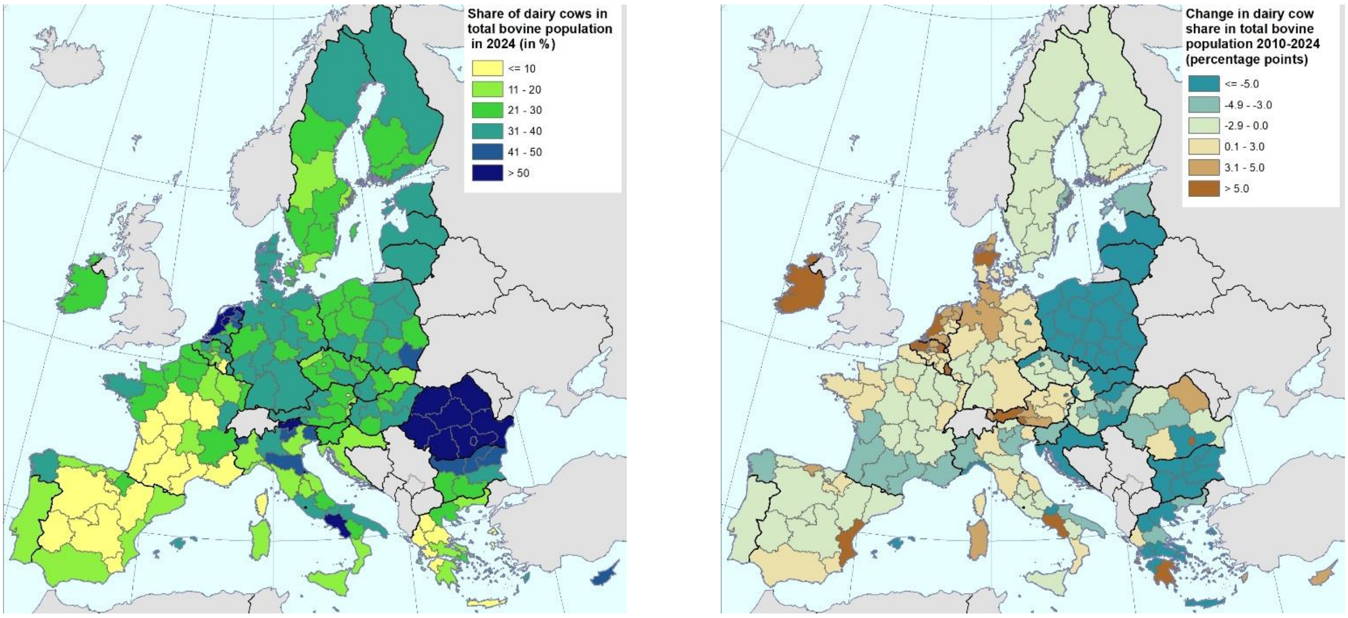
Graph 4 – Total bovine (green) and dairy cow (orange) populations by Member State and EU27, 2010 and 2025; figures beside the 2025 bars show the percentage change 2010 to 2025 in total bovine and in dairy cows. Right panel: change in the dairy-cow share of the bovine herd, 2010 to 2025, in percentage points



Source: Eurostat (*apro_mt_lscatl*), JRC analysis.

The regional picture confirms and sharpens this divergence (*Map 1*). In 2024 the dairy-cow share of the bovine herd was highest in a band running through Belgium, parts of central Europe, Romania and southern Italy, and lowest across Iberia, much of France and Greece, where suckler beef and other grazing systems dominate the cattle population. The change panel shows where the proportion between the two systems is changing: dairy specialisation is deepening in a compact north-western core, namely Ireland, the Netherlands, Belgium, northern Germany, Denmark, Austria and the Po valley, driven by a combination of high milk yields and efficient farm structures, established dairy processors/cooperatives for the collection and processing capacity, and forage availability due to relatively cool and humid climatic conditions. On the other hand, dairy specialisation is receding across most of eastern and south-eastern Europe, including Poland, the Baltic states, Bulgaria, Greece and Croatia, Milk production is thus being pulled into fewer, more intensive and more specialised regions, the same ones that stand out for high incomes and low feed self-sufficiency. **The cattle herd of the periphery, meanwhile, is shifting towards suckler systems or contracting** outright, which is driving the structural backdrop to the intensity gradient examined in Part II of the Brief and to the risk of grazing abandonment presented in Part III. The shift to beef-oriented systems is happening in regions with higher availability of land and lower land and labour costs in extensive systems, where there are limited alternative land uses, and in the case of Poland also through better EU market integration and investment in processing capacity, exporting to other parts of the EU.

Map 1 A and B – **Dairy-cow share of the bovine herd by region (mainly NUTS2): level in 2024 (left) and change 2010 to 2024, in percentage points (right)**



Source: Eurostat (*agr_r_animal*), JRC analysis.

Competitiveness

The following part of the Brief focusses on market-oriented farms, using data from the Farm Sustainability Data Network (FSDN)[8]. This survey collects data annually from a sample of more than 75 000 farms, representing approximately 3.5 million market-oriented farms in the EU. The data collected are used to assess the performance and challenges faced by farmers and EU agriculture and to advise policymakers.

The analysis presents annual average results from 2019 to 2023. During that period, market-oriented farms had on average 54 million cows per year. Most of the bovines were in specialist milk farms (49%), specialist beef cattle (32%) and in mixed crops and livestock farms (11%), which are the focus of our analysis, with these three types of farming cover more than 90% of cows.

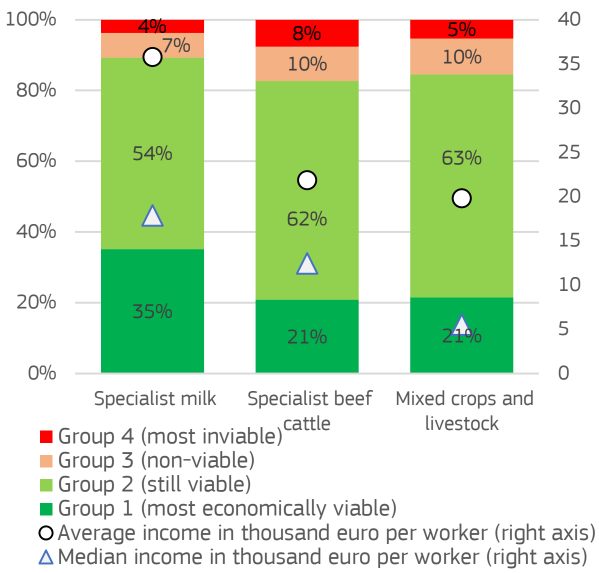
Specialist milk farms are the most profitable of the three, with an average annual income per worker[9] of

[8] Data for Malta are currently unavailable for 2022 and 2023. Data for 2021, 2022 and 2023 for Romania remain preliminary.

[9] Income per workers is expressed in farm net value added (FNVA), which is equal to gross farm income minus depreciation costs. It is used to remunerate the fixed

EUR 35 800, which is 24% higher than the average of the whole EU agricultural sector. Specialist beef cattle farms have on average EUR 21 900 whereas mixed crops and livestock farms have the lowest level of the three, at EUR 19 800 (*Graph 5*). Median income per worker shows a smaller gap but confirms the ranking: specialist milk farms have the highest level (EUR 17 900), followed by specialist beef cattle farms (EUR 12 500) and mixed crops and livestock farms (EUR 5 600). Differences in income levels can be linked to structural differences, notably in terms of physical size and herd size, influencing economies of scale. Specialist milk farms have on average 50 hectares and 71 livestock units while specialist beef cattle farms have 58 hectares and 58 livestock units. Mixed crops and livestock farms are smaller, averaging 41 hectares and 26 livestock units. The difference is even more pronounced when considering the median, indicating that mixed crop and livestock farms are proportionally smaller than the other two farm types.

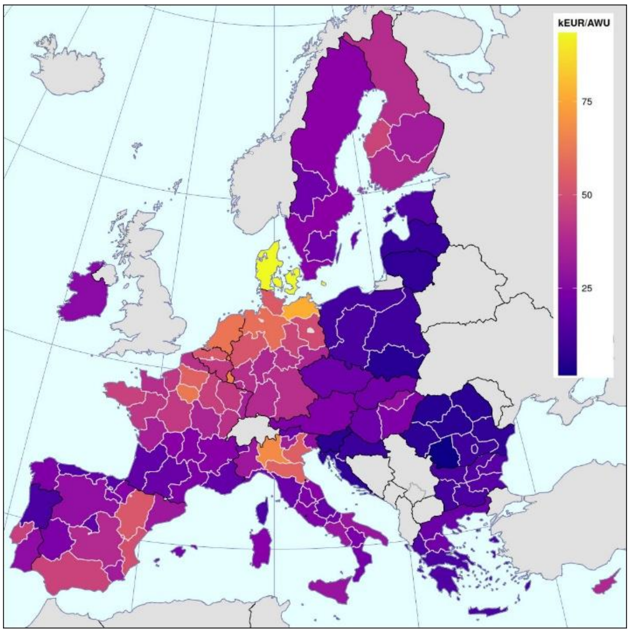
Graph 5 – Proportion of farms by viability group and average income per worker (thousand EUR/AWU) by type of farming in EU in 2019-2023



Source: FSDN.

At territorial level, farm income in bovine systems shows a pronounced north-west to south-east gradient (*Map 2*). The highest values are concentrated in a compact north-western core: Denmark records by far the strongest result, at about EUR 93 000 of farm net value added per worker, followed by the southern Netherlands, north-western Germany, northern Italy and parts of western France. Income then falls sharply towards the east and south, with most regions in Poland, the Baltics, Romania, Bulgaria and Greece below EUR 15 000 per worker, well under the EU bovine median of about EUR 27 000. **This geography mirrors differences in herd size, productivity, dairy specialisation and market integration rather than stocking density alone, and it tracks the broader pattern of EU farm incomes.**

Map 2 – Farm net value added per annual work unit (FNVA/AWU) of bovine farms, by FSDN region, average 2019-2023



Source: FSDN.

Not only are the specialist milk farms the most profitable of the three, but they also have a better profile in terms of economic viability. For this analysis, economic viability is defined as a farm's capacity to generate sufficient income to sustain operations and cover costs, including imputed costs of own labour, land, and capital.

Farms are categorised into four groups based on their net income relative to costs:

- Group 1 (most economically viable): farms able to cover all costs (including imputed costs[10]), save, and invest.
- Group 2 (still viable): farms with positive income but not able to cover their imputed costs. 2
- Group 3 (non-viable): farms experiencing losses but could have positive income by delaying depreciation.
- Group 4 (most inviable): farms experiencing losses with no possibility of positive income even with delayed depreciation.

Specialist milk farms are the most profitable of the three, and they also have a better profile in terms of economic viability, being able to cover all their costs (including the imputed costs of own factors) in 35% of cases, versus 21% for the other two types of farming (*Graph 5*).

factors of production (labour, land and capital), whether they be external or family factors. As a result, agricultural holdings can be compared regardless of whether family or non-family factors of production used.

[10] Imputed costs refer to own labour, land and capital and are estimated based on average costs for paid production factors, observed in FSDN in similar farms.

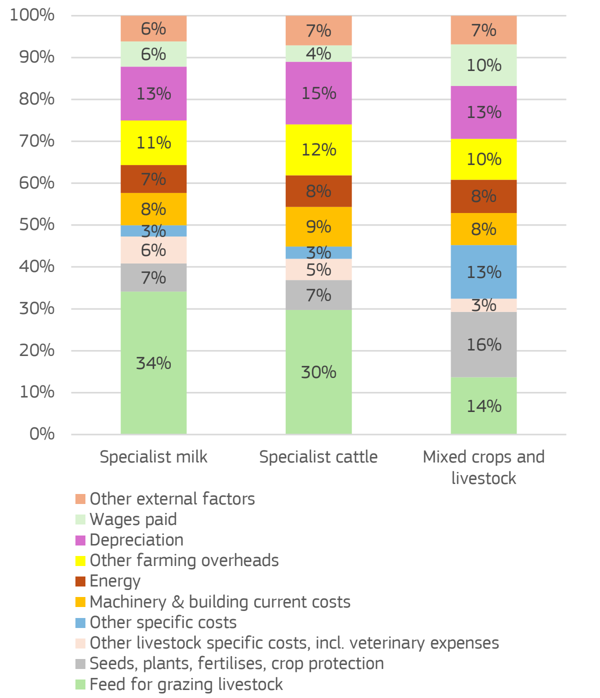
Feed represents the primary cost for the three types of farming, though its share varies significantly: 34% for specialist milk, 30% for specialist beef cattle and just 14% for mixed crops and livestock farms. The lower proportion in mixed farms reflects their integrated production model, as they typically combine animal husbandry with feed production (***Graph 6***). Consequently, these farms allocate a higher share of costs to seeds, fertilisers and crop protection products.

The second-largest category of specific costs is 'other livestock specific costs, incl. veterinary expenses' (6%, 5% and 3% respectively in the three types of farming).

When examining overhead costs, 'machinery and buildings' emerge as the most significant, with a relatively uniform share across all three types of farming, ranging from 7 to 9% each. Depreciation follows feed as the second-highest cost category, representing 13% of total costs in specialist milk and mixed farms and 15% in specialist beef cattle farms.

A notable difference appears in labour costs: the share of wages is almost double in mixed crops and livestock. This disparity arises because specialist systems rely more heavily on family or unpaid labour, whereas mixed farms employ proportionally more paid workers.

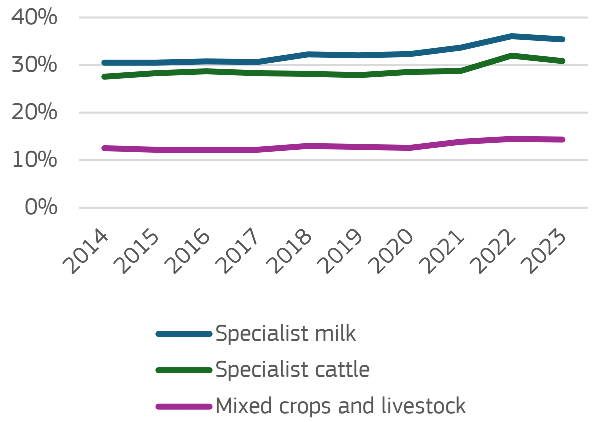
Graph 6 – Share of costs by type of farming in EU27 in 2019-2023



Source: FSDN.

Feed is typically the main cost for all livestock farms, including both self-produced and purchased feed. In 2022, the year of Russia's full-scale attack on Ukraine, a major feed producer, a subsequent spike of feed prices was observed worldwide. this translated into a higher proportion of feed costs in total costs, in particular for specialist milk and specialist beef cattle farms (***Graph 7***).

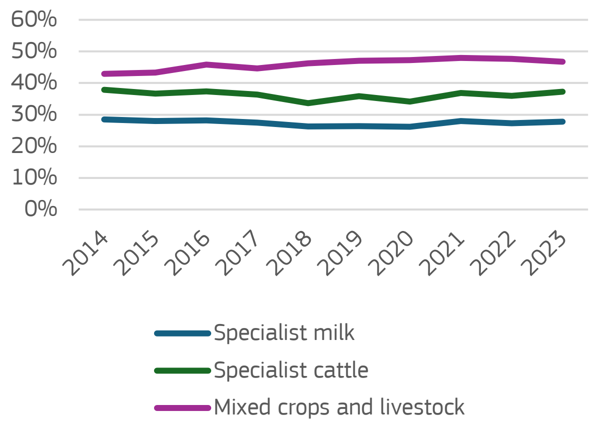
Graph 7 – Share of feed costs in total costs, in EU



Source: FSDN.

Livestock farms mostly rely on livestock feed produced outside of their own farms. Indicative figures[11] on the proportion of own-produced feed to the total cost for feed used on farms show that specialist milk have the lowest feed self-sufficiency rate (28% in 2023), followed by specialist beef cattle (37%). Thanks to their diversified business model, mixed farms have a 47% feed self-sufficiency rate (***Graph 8***).

Graph 8 – Feed self-sufficiency (share of own-produced feed in total feed cost), in EU

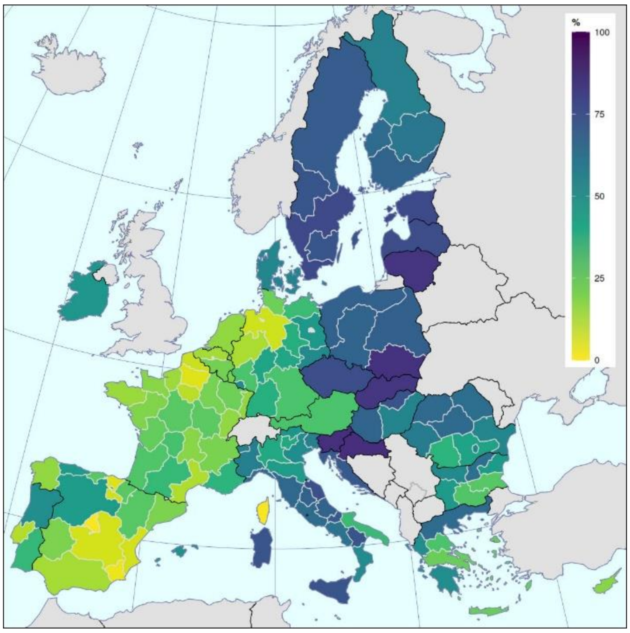


Source: FSDN.

Across FSDN regions, the share of grazing-livestock feed that is grown on the farm rather than purchased, varies widely across the EU, from near zero to about 87%, with a regional median of 40% (***Map 3***).

[11] *FSDN public database*: variables (SE310) Feed for grazing livestock (€/farm), (SE315) Feed for grazing livestock home-grown (€/farm), (SE320) Feed for pigs & poultry (€/farm) and (SE325) Feed for pigs & poultry home-grown (€/farm). Note that valuation of own-produced (home-grown) and used feed at farms is difficult, so these could be underestimated. Nevertheless, evolution of these variables should be informative of the trends.

Map 3 – Feed self-sufficiency of bovine farms, home-grown share of grazing-livestock feed cost, by FSDN region, average 2019-2023



Source: FSDN.

It is lowest in the intensive livestock belt of the Netherlands, Belgium and parts of western Germany, where herds rely heavily on bought-in feed, and in pockets of southern Spain and Corsica. It is highest in central, eastern and Alpine regions, including the Baltics, Poland, Czechia, Hungary, Austria and Slovenia, as well as the Italian islands, where bovine systems are more forage and grass-based. The pattern is broadly the inverse of stocking intensity, and it foreshadows the land-use and local-feed-footprint analysis developed in Part II of the Brief: the more intensive the system, the less of its feed it produces itself.

Animal housing

In the bovine sector, outdoor access is the dominant production system. At EU level, approximately 78.8% of bovines (around 57.6 million heads) (IFS 2020: *ef_ah_bovt*) have access to outdoor areas, and a similar proportion is observed at the level of holdings (around 77%). This indicates a close alignment between farm practices and animal distribution, with extensive or semi-extensive systems remaining structurally significant across the sector. Differences between production types are relatively limited: in specialist dairying, around 78.6% of animals and 79.7% of holdings have outdoor access, while in specialist cattle rearing and fattening, the share is slightly lower in terms of animals (78.1%) but higher in terms of holdings (83.0%), suggesting smaller herd sizes in more extensive systems.

Despite this overall pattern, significant heterogeneity exists across Member States, particularly in terms of grazing duration. On average, cattle spend around three months outdoors in the EU, but this ranges from one to two months in several Central and Southern countries (e.g. Croatia, Romania, Italy) to four to five months in countries such as France, Belgium, Ireland, Greece and Spain. In some cases, outdoor access is nearly universal (e.g. Ireland, France, Sweden), while in others a substantial share of animals remains confined (e.g. Germany, Poland, Italy). This highlights that access alone does not fully capture production practices, and that the duration and intensity of grazing are key dimensions of system differentiation.

Indoor housing systems for cattle further illustrate structural diversity. Loose or cubicle housing dominates in terms of animals, accounting for around 83% of cattle, while tie-stall systems still represent about 26% and other systems around 15%. However, the distribution across holdings is more balanced: approximately 55% of farms use loose housing, while tie-stall systems remain present on around 54% of holdings. This indicates that tie-stall systems, although declining in importance in terms of animal numbers, remain widespread among smaller and more traditional farms. Country differences are pronounced, with loose housing dominating in countries such as France, Germany, Ireland and the Netherlands, while tie-stall systems remain common in countries such as Poland, Romania, Latvia and Lithuania.

Several conclusions emerge from this analysis. Structural consolidation is continuing, with fewer and larger farms accounting for a growing share of output and herd size remaining the dominant driver of income. Income diverges sharply by production orientation, with dairy farms generating substantially higher returns per worker than beef cattle farms. The sector's environmental footprint is geographically concentrated in regions combining high stocking densities with intensive feeding and limited land. And across beef cattle systems in particular, market income alone is insufficient to sustain farm viability without CAP support. These features set the context for Part II, which broadens the lens to the full range of grass-based ruminant farms.

Part II: Characterising EU ruminant livestock farms, a multi-dimensional analysis using FSDN data

This second part of the brief broadens the lens from the bovine sector to all grazing ruminants, including sheep and goats, and characterises these farms using FSDN microdata for 2019-2023. The main indicator is the stocking intensity of ruminants on the farm's grassland base, that is ruminant livestock units per hectare of grazable area (temporary and permanent grassland).

This ratio is a measure of the extent the animals in a farm are related to the land available to feed them, and so works as a proxy for two things at once: the pressure that livestock place on the grassland, and the extent to which a farm's feed is grown locally rather than purchased or imported.

It is worth being explicit about what the indicator does not show. FSDN does not record whether animals are grazed outdoors or housed and fed with cut forage, so a low stocking intensity should be read as low land-use pressure and a more land-based feed system, not as proof of grazing.

Read through this lens, the sector reveals a paradox that runs across the whole analysis. The extensive, low-intensity systems that place the least pressure on land and grow most of their own feed are also, in general, the least profitable and the most dependent on public support, and their numbers have fallen sharply in recent decades[12]. The intensive systems that generate the highest incomes are concentrated in a few regions, notably around major rivers and seaports that facilitate both the import of protein feed and the export or disposal of excess manure, and carry the largest environmental footprint.

Locating where Europe's ruminant farms sit along this gradient, from the intensive end that overlaps the bovine systems of Part I to the extensive end that anchors the semi-natural grazing of Part III, is the purpose of this part of the Brief.

The analysis covers the farm types associated with grass-based ruminants[13]. Stocking intensity is measured as ruminant livestock units per hectare of grazable area, which is in turn defined as permanent plus temporary grassland excluding other fodder crops. This indicator reflects the grazing pressure placed on grassland and aligns with the stocking-density concept used in agri-environment schemes. Four classes are used: extensive (below 1.0 LU/ha), intermediate (1.0 to 1.4), intensive (1.4 to 4) and very intensive (above 4). The 1.0 and 1.4 LU/ha thresholds correspond to reference values used in several Member State schemes and in EU biodiversity assessments.

After excluding farms with no recorded grassland, the analytical sample represents on average about 1.0 million grass-based livestock farms per year.[14].

Distribution and structural profile

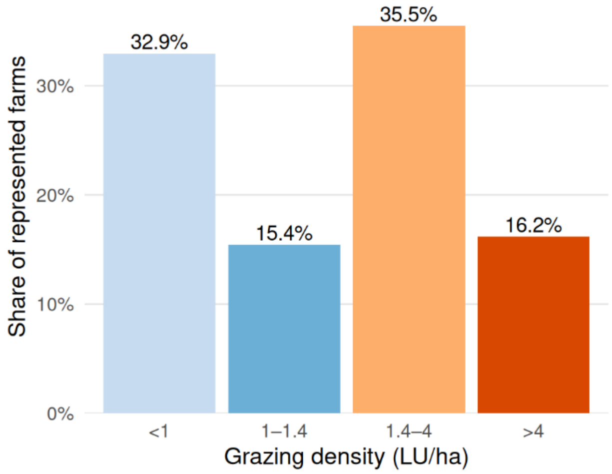
Half of EU ruminant farms graze at low intensity. Of the roughly 1.0 million grass-based ruminants' livestock farms per year with valid stocking-density data, about 33% are in the extensive class, 15% in the intermediate, 36% in the intensive and 16% in the very intensive class (***Graph 9***). Farms above 1.4 LU/ha thus represent a majority (around 52%), but this masks an internal split: the intensive class (1.4 to 4 LU/ha) is the largest single group, while the very intensive class (above 4 LU/ha) is about one farm in six and corresponds mostly to high-output dairy and mixed systems where housed or partly housed animals are the norm. The median ruminant density is about 1.8 LU/ha, which places the median farm within the intensive class. The distribution is strongly right-skewed: a small number of high-output dairy operations in the Netherlands, Denmark and Belgium, where most feed is housed and grassland is only a fraction of the land base, pull any average far above the median. The median is therefore the appropriate summary of the typical farm and is used throughout this part.

[12] *Analytical Brief N° 13: Grassland and livestock dynamics*

[13] The 2019-2023 dataset covers 145,681 farm-year observations and approximately 5.9 million represented farms after applying survey weights. Farm types follow the FSDN Type of Farming (TF14) classification included in *FSDN guidance documents*: specialist dairying (TF45), specialist cattle rearing and fattening (TF46), cattle dairying combined with rearing and fattening (TF47), sheep, goats and other grazing livestock (TF48), mixed livestock mainly grazing (TF73), and mixed crops-livestock (TF83 - Field crops – grazing livestock combined and TF84 - Various crops and livestock combined).

[14] Annual weighted estimates were computed for each year separately and then averaged across the five reference years to mitigate the influence of any single-year shock, including the market volatility associated with the 2021-2022 energy and input cost crisis. All monetary values are expressed in current euros as recorded in the FSDN, without deflation, to retain comparability with other FSDN publications.

Graph 9 – Distribution of grazing livestock farms by stocking density class, market-oriented farms, EU, average 2019–2023, % of represented farms

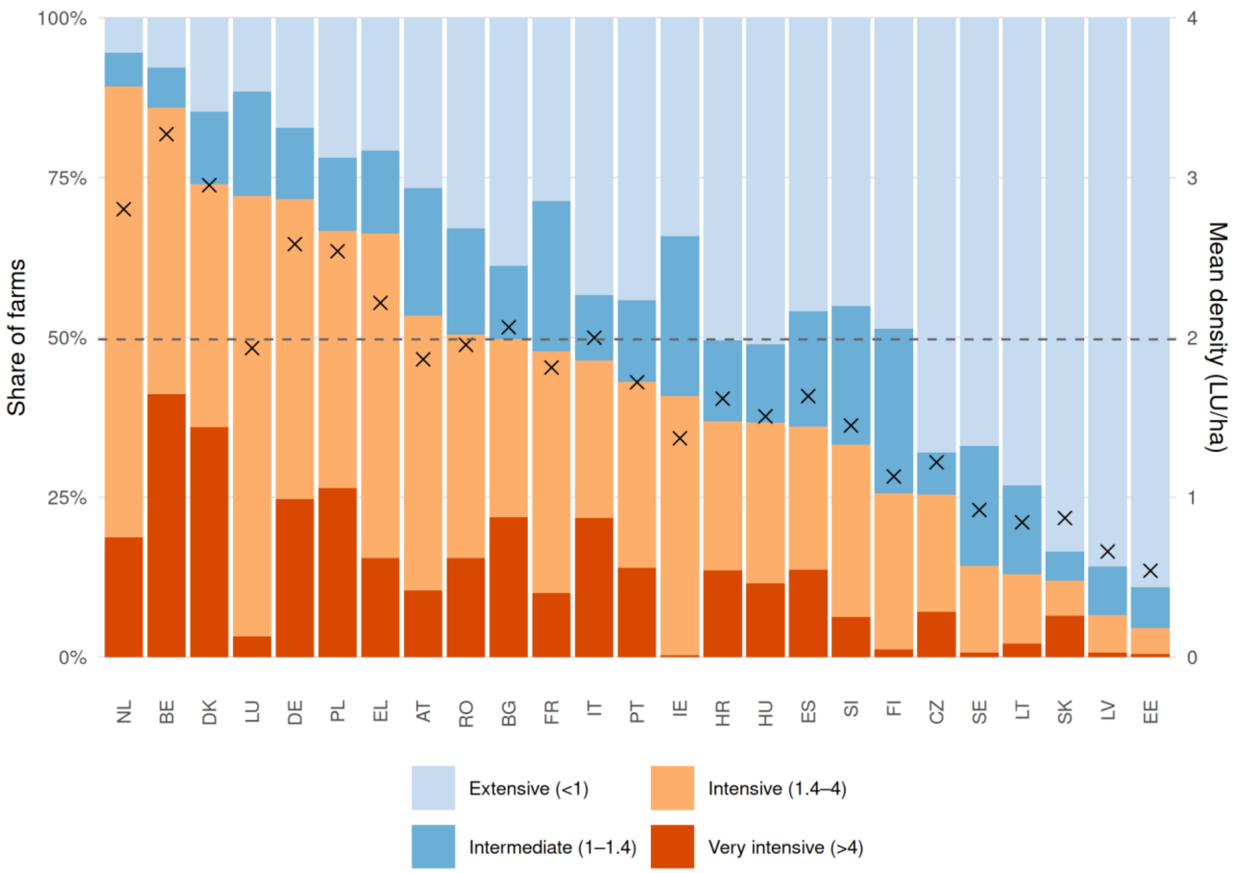


Source: FSDN, DG AGRI, own calculations, weighted estimates.

Intensity levels map onto geography: the north-west is intensive, the east and south extensive. Country-level heterogeneity is pronounced. The Netherlands, Belgium, and Denmark are dominated by intensive and very intensive farming, with 89%, 86%, and 74% of grazing livestock farms respectively operating above 1.4 LU/ha (*Graph 10*). At the other extreme, Estonia (89% extensive), Latvia (86%), Lithuania (73%), Slovakia (83%), and Sweden (67%) have large majorities of farms in the extensive class. France, Ireland, and Germany occupy intermediate positions, with farms above 1.4 LU/ha representing 48%, 41%, and 72% of the national sample respectively. Romania and Spain have mixed profiles, with farms above 1.4 LU/ha outnumbering extensive, in both cases despite large areas of low-intensity pasture. This country variation reflects underlying differences in agroclimatic conditions, farm structure, and historical policy choices rather than purely short-term economic incentives.

Across Member States, average herd size alone accounts for 79% of the variation in average farm income per worker, confirming that differences in economic scale between countries explain the income landscape far more than stocking density does.

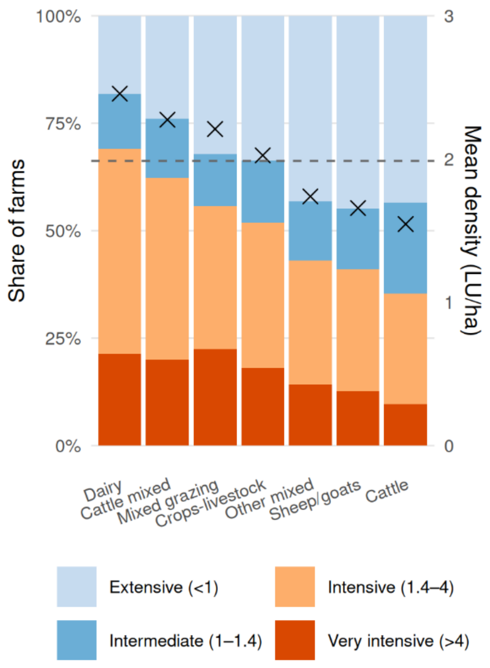
Graph 10 – Share of grazing livestock farms by stocking density class and country, with mean density overlay, market-oriented farms, EU, average 2019–2023, % of farms; LU/ha



Source: FSDN, DG AGRI, own calculations, weighted estimates, average 2019–2023.

Dairy drives intensity; cattle and sheep anchor the extensive end. The composition of density classes differs sharply across farming systems (*Graph 11*). Specialist dairy farms (TF45) are the most intensively managed: approximately 69% operate in the intensive or very intensive class combined, with only 18% in the extensive class. This reflects the high capital and feed requirements of high-yielding dairy systems, as well as the prevalence of housed or partially housed systems in high-density dairy regions. Specialist beef cattle rearing and fattening farms (TF46) have a more balanced profile: 43% are extensive, 21% intermediate, 26% intensive, and 10% very intensive. For sheep, goats and other grazing livestock (TF48), the split is 45% extensive, 14% intermediate, 28% intensive, and 13% very intensive; the non-negligible very intensive share reflects two distinct situations: Mediterranean sheep operations with supplementary feeding where grazable area is recorded narrowly, and intensive in-housed goat dairy systems such as those in the Netherlands, which is among the EU's largest goat milk producers. Mixed crops-livestock farms (TF83) are the largest group by farm count and show a predominantly intensive profile, reflecting the capacity to use on-farm feed crops to sustain higher stocking densities. This matters for policy: aggregate EU figures suggest a sector evenly split between extensive and intensive, but within each density class the mix of farm types is very different. Extensive farms are dominated by beef cattle and sheep systems in less-favoured areas; intensive farms are dominated by dairy and mixed crop-livestock operations with access to on-farm feed. A policy instrument calibrated on density alone will therefore reach very different farm populations depending on where the threshold is set.

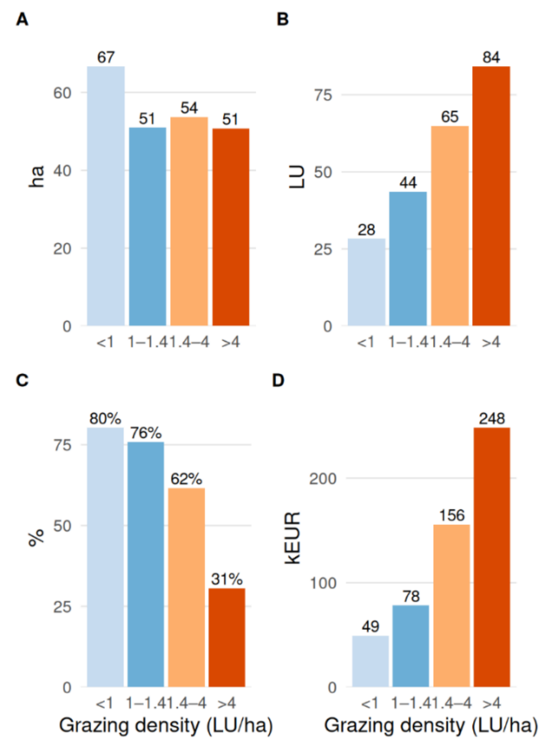
Graph 11 – Share of grazing livestock farms by density class and farm type, with mean density overlay, market-oriented farms, EU, average 2019–2023, % of farms; LU/ha



Source: FSDN, DG AGRI, own calculations, weighted estimates.

Extensive farms are smaller, more land-rich and more self-sufficient. The structural profile of farms in each density class reflects distinct production systems rather than a single intensive-to-extensive continuum (*Graph 12*). Extensive farms are the largest by land area: their mean utilised agricultural area (UAA) is 66.7 hectares, of which 54.6 hectares are grazable, representing 80% of UAA. Intermediate farms have a mean UAA of 50.9 hectares and a grazable area of 36.8 hectares (76% of UAA). Intensive farms have a mean UAA of 53.7 hectares and a grazable area of 29.2 hectares (62% of UAA). Very intensive farms have a mean UAA of 50.8 hectares but only 10.9 hectares of grazable area (31% of UAA), confirming that at very high densities, grassland represents only a fraction of the actual land base and the production system is predominantly indoor. Herd size follows the opposite pattern: the mean ruminant livestock unit holding is 28 LU for extensive farms, 44 LU for intermediate farms, 65 LU for intensive farms, and 84 LU for very intensive farms. Total farm output increases accordingly from EUR 49 000 in the extensive class to EUR 78 000, EUR 156 000, and EUR 248 000 in the very intensive class. In other words, the most intensive farms produce five times more output per farm than the most extensive ones, while using less than half the land area. This concentration of output on a smaller land base is what drives both the income advantage and the environmental footprint of intensive systems.

Graph 12 – Structural profile of grazing livestock farms by stocking density class (A) UAA, B) herd size, c) grazable area share, D) total output), market-oriented farms, EU, average 2019–2023, ha / LU / % / EUR

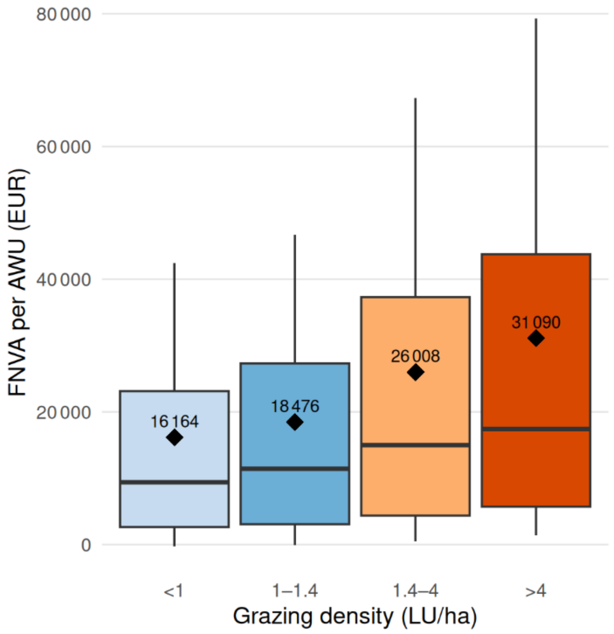


Source: FSDN, DG AGRI, own calculations, weighted estimates.

Economic performance

The income gradient is real but masked by large within-class variation. Part I of the Brief covered income in the bovine sector; this part goes further, adding the other ruminants and reading income across all of grass-based ruminant farms through the lens of stocking density. The mean farm net value added (FNVA) per annual work unit (AWU) in grazing farms rises from EUR 16 152 for extensive farms to EUR 18 519 for intermediate farms, EUR 26 036 for intensive farms, and EUR 31 060 for very intensive farms (*Graph 13*). Farm net income (FNI) per AWU - which deducts external factor costs including paid rent and interest - follows the same pattern: EUR 12 956 (extensive), EUR 14 558 (intermediate), EUR 20 178 (intensive), and EUR 24 226 (very intensive). Both distributions are characterised by large within-class dispersion: the interquartile range for FNVA/AWU in each class spans tens of thousands of euros, reflecting the heterogeneity of farm types, Member State contexts, and management practices captured within each intensity group. The income gradient from extensive to very intensive is therefore a mean effect that masks very different situations for individual farms, including extensive farms with incomes well above the mean of intensive class and intensive farms with negative market income.

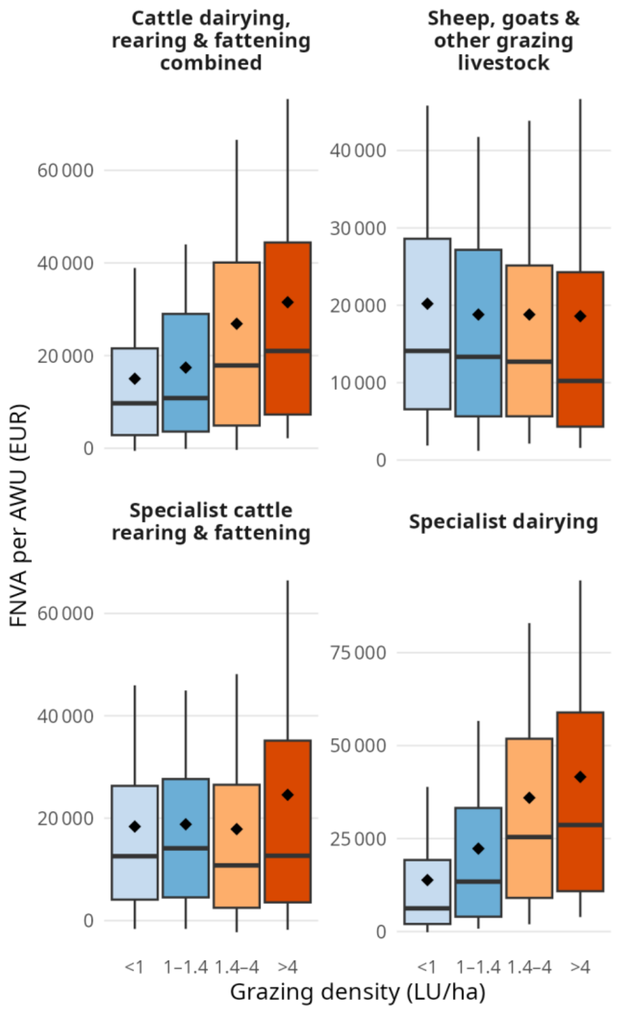
Graph 13 – Farm income (FNVA per AWU) by stocking density class, market-oriented farms, EU, average 2019–2023, EU



Source: FSDN, DG AGRI, own calculations, weighted estimates.

Dairy accounts for the income premium attributed to high intensity. The aggregate income gradient dissolves substantially when disaggregated by farm type (*Graph 14*). Specialist dairying shows the steepest positive gradient: mean FNVA/AWU rises from EUR 13 853 for extensive dairy farms to EUR 22 309 for intermediate dairy, EUR 35 975 for intensive dairy, and EUR 41 588 for very intensive dairy. Specialist cattle rearing and fattening (TF46) shows an almost flat gradient with a non-linear pattern: EUR 18 371 (extensive), EUR 18 809 (intermediate), EUR 17 867 (intensive), and EUR 24 564 (very intensive). The income for intensive cattle farms is actually lower than for extensive cattle farms - the reverse of the aggregate picture - with the very intensive cell elevated by a small number of large-scale specialised operations. Sheep, goats and other grazing livestock (TF48) show a broadly flat pattern: EUR 20 203 (extensive), EUR 18 808 (intermediate), EUR 18 809 (intensive), and EUR 18 596 (very intensive). The aggregate income gradient from extensive to very intensive is therefore driven predominantly by the dairy system, not by grazing intensity as such.

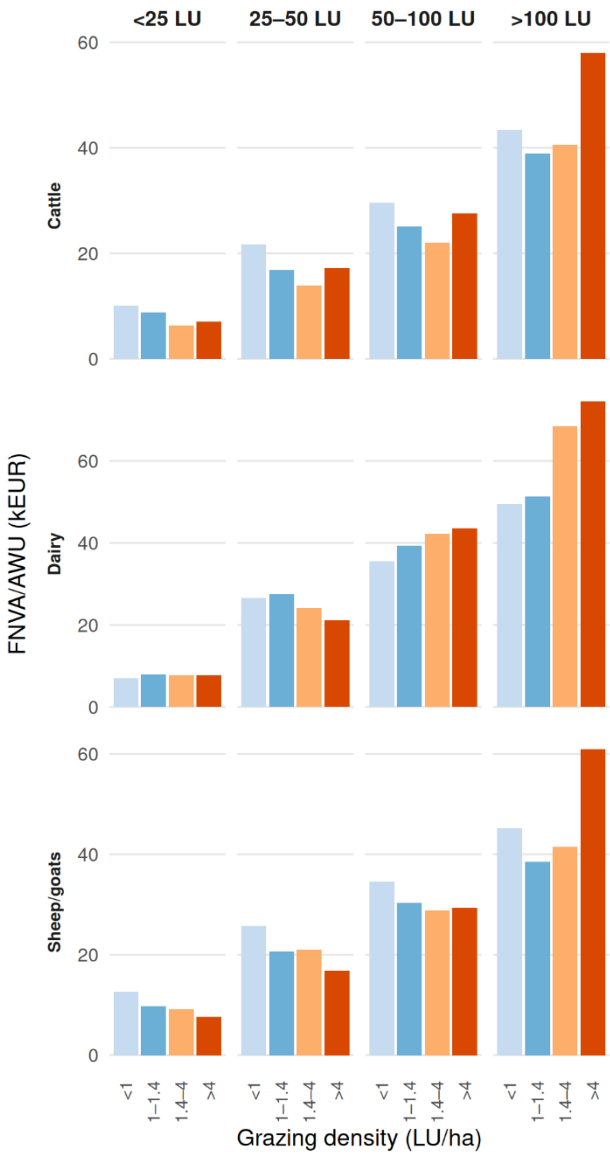
Graph 14 – Farm income (FNVA per AWU) by farm type and stocking density class, market-oriented farms, EU, average 2019–2023, EUR (different scales)



Source: FSDN, DG AGRI, own calculations, weighted estimates.

What drives income: herd size and farm type, not density. The aggregate income gradient is real, but it is not caused by stocking density. A simple statistical comparison illustrates this clearly. Stocking density on its own accounts for under 1% of the variation in income per worker across farms, against about 19% for herd size and about 6% for farm area. Farm type and Member State matter more still: once all three are taken into account, stocking density adds almost nothing to the explanation. Stocking density on its own accounts for under 1% of the variation, against about 19% for herd size and about 6% for farm area; once herd size, farm type and country are taken into account, density adds almost nothing[15].

Graph 15 – Farm income (FNVA/AWU) by farm type and herd size class, market-oriented farms, EU, average 2019–2023, kEUR



Source: FSDN, DG AGRI, own calculations, weighted estimates.

Disaggregating by farm type and herd size confirms this (*Graph 15*). The positive income-density gradient is concentrated almost entirely in the large-herd dairy cell: among dairy farms above 100 LU, mean income per worker rises from about EUR 49 500 in the extensive class to EUR 74 600 in the very intensive class. Among cattle and sheep farms the gradient disappears or reverses, with medium-herd extensive cattle farms (25 to 50 LU) out-earning their intensive counterparts and smaller intensive sheep herds underperforming extensive ones. The aggregate density-income link is therefore driven by large-herd dairy, which also happens to be the most common farm in the intensive and very intensive classes.

This is why extensification, on its own, carries no general income penalty for cattle and sheep systems: the income gap usually attributed to low density is, in reality, a gap in scale and farm type.

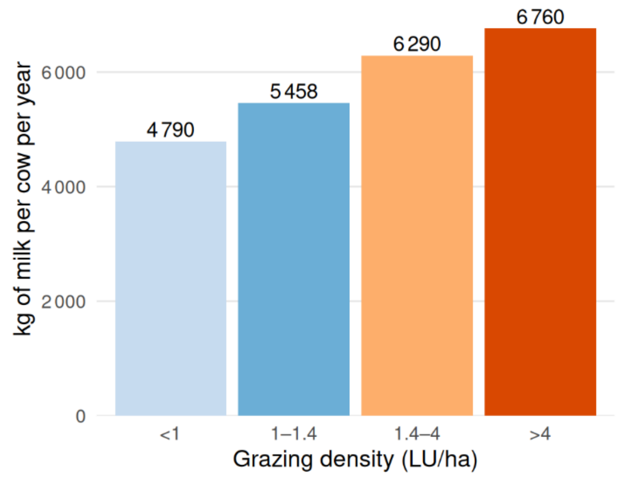
The underlying logic runs from scale to intensity, not the other way round. As farms grow, intensification tends to follow naturally: with a fixed land base, adding animals raises stocking density, and larger herds generate economies of scale that lift income per worker regardless of how intensively the land is used. This is most visible in dairy, where yield per cow also rises with intensity, and less pronounced in beef cattle and sheep systems where output per animal is broadly flat across density classes. A cattle farm of 80 livestock units grazing at 2.0 LU/ha and one of 80 units grazing at 0.8 LU/ha earn broadly the same once herd size is held constant -- it is the herd size, not the density, that drives the income difference.

Why dairy benefits from higher intensity but beef cattle does not. The asymmetry between dairy and beef cattle systems reflects a fundamental difference in output scalability (*Graph 16*). For dairy farms, milk yield per cow increases with stocking density: mean milk yield rises from 4 790 kg per cow per year for extensive dairy to 5 458 kg for intermediate, 6 290 kg for intensive, and 6 756 kg for very intensive farms. This yield response means that intensive dairy farms produce substantially more output per farm: mean total dairy output rises from EUR 66 618 at extensive densities to EUR 125 117 at intermediate, EUR 225 016 at intensive, and EUR 335 142 at very intensive, even as output per livestock unit declines slightly (EUR 2 770 for extensive vs EUR 2 475 for intensive). The overall farm income benefit at high density therefore comes from scale, not from greater efficiency per animal. For beef cattle farms, the economics per livestock unit are structurally flat: output per ruminant LU ranges narrowly across density classes, and income per LU shows no consistent upward gradient with intensity. The key point is that what matters is the number of animals, not how densely they are stocked relative to land. A beef cattle farm that reduces its

[15] Weighted regressions of farm net value added per work unit on single predictors give an R^2 of about 0.001 for stocking density (LU/ha grazable; statistically significant but trivially small), 0.057 for utilised agricultural area, and 0.190 for herd size (ruminant LU, the largest single predictor). Combining density, herd size and area give an R^2 of about 0.199, with density contributing marginally. Adding farm-type and Member State fixed effects raises the explained variation to about 0.315, and the density coefficient becomes statistically indistinguishable from zero once herd size is included.

grazable area while keeping its herd constant will show a higher stocking density on paper but will not earn more; conversely, a farm that grows its herd while expanding its land base at the same rate will raise its income without any change in density.

Graph 16 – Milk yield per dairy cow by stocking density class, specialist dairy farms, EU, average 2019–2023, kg of milk per cow per year



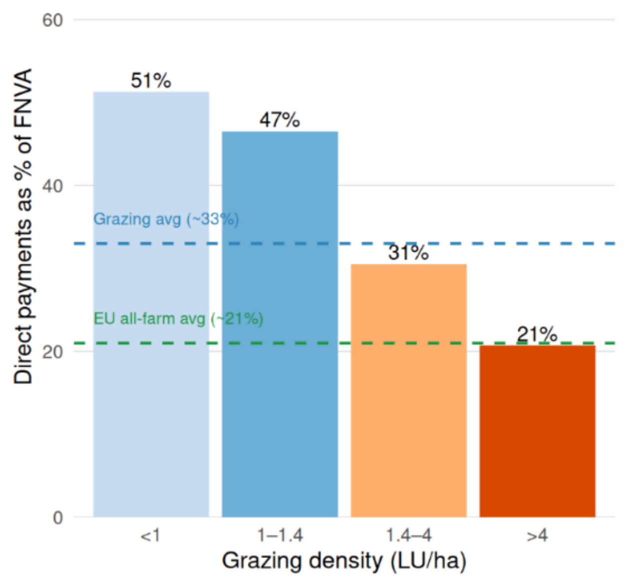
Source: FSDN, DG AGRI, own calculations, weighted estimates.

CAP support profile

Extensive farms depend on CAP for over half their farm net value added. Direct payments represent on average 33% of farm net value added across EU grazing livestock farms over 2019-2023, well above the 21% recorded for the EU farm population as a whole[16]. Dependence falls steadily as stocking intensity rises: from 51% of FNVA in extensive farms (below 1 LU/ha) and 47% in the intermediate class, to 31% in intensive farms (1.4 to 4 LU/ha) and 21% in the very intensive class (above 4 LU/ha) (*Graph 17*). The lower the stocking density, the more a farm's income depends on public support, consistent with the weaker market returns of extensive systems.

ANC and agri-environment payments concentrate in the extensive classes. Decoupled payments (Basic Payment Scheme and Sustainable Farming Instrument predecessors) represent the largest single component of total support across all density classes: EUR 11 427 for extensive farms, EUR 11 174 for intermediate, EUR 13 125 for intensive, and EUR 13 158 for very intensive (*Graph 18*). That extensive farms receive slightly less in absolute decoupled payments than intensive ones may seem counterintuitive, since extensive farms have more land on average. It reflects the fact that intensive farms, though more compact per hectare, are on average larger in economic size and eligible area than extensive farms once the full sample is considered, a further illustration that herd size and farm scale, not density, are the dominant structural axis of this sector. This is also why comparisons of total support or total income per farm across density classes should be read alongside the per-worker and per-hectare figures: averaging across structurally different farm sizes can obscure more than it reveals.

Graph 17 – Direct payments as share of FNVA by stocking density class, market-oriented farms, EU, average 2019–2023, %

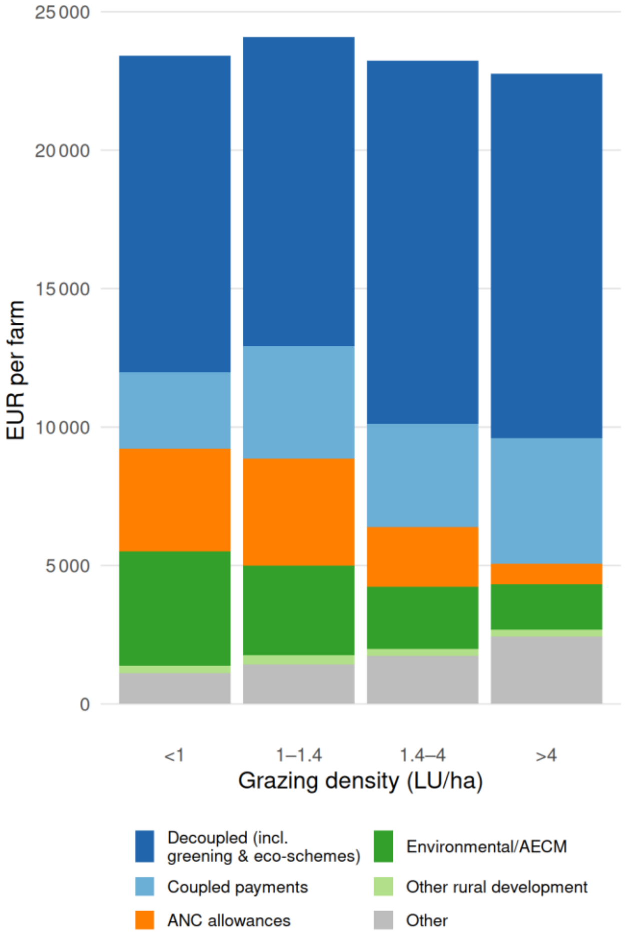


Source: FSDN, DG AGRI, own calculations, weighted estimates, average 2019–2023.

Agri-environment and climate measures (AECM) ANC payments provide targeted compensation, particularly for extensive farms: EUR 4 120 in AECM payments and EUR 3 712 in ANC payments for extensive farms, compared with EUR 1 630 and EUR 751 for very intensive farms. AECM payments compensate for costs incurred and income foregone in meeting environmental commitments, while ANC payments serve as an income support tool complementing direct payments in areas where natural constraints limit productive potential. Coupled support is smaller in absolute terms but more pronounced for intensive and very intensive farms: EUR 2 771 for extensive, EUR 4 045 for intermediate, EUR 3 714 for intensive, and EUR 4 529 for very intensive. The combined picture is one in which the current subsidy architecture - dominated by area-based decoupled payments - provides a relatively undifferentiated support floor, with targeted ANC and AECM components providing modest differentiation toward extensive and mountain farming.

[16] *FSDN public database*: variables (SE606) direct payments and (SE415) farm net added value.

Graph 18 – CAP subsidy composition by stocking density class, market-oriented farms, EU, average 2019–2023, EUR per farm

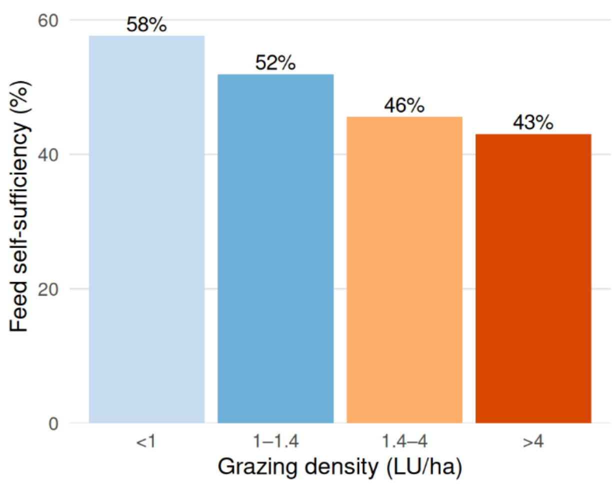


Source: FSDN, DG AGRI, own calculations, weighted estimates, average 2019–2023.

Resource base and feed

Self-sufficiency halves between the most extensive and most intensive class. As in Part I for bovine farms, feed self-sufficiency is examined here, now widened to all grazing ruminants and broken down by stocking-density class. Feed self-sufficiency, measured as the ratio of home-grown feed to total feed costs[17] , declines consistently with stocking intensity. The weighted mean self-sufficiency ratio is 57.6% for extensive farms, 51.9% for intermediate farms, 45.6% for intensive farms, and 43.1% for very intensive farms (***Graph 19***). The inverse relationship is expected: as farms push beyond the carrying capacity of their own grassland, they must source additional energy and protein from external suppliers. For intensive and very intensive farms, more than half of feed value is purchased, which increases exposure to commodity price volatility, as observed during the 2021-2022 input cost shock and more recent conflict-related disruptions. Whether purchased feed raises overall costs relative to own production depends on the system: in high-yielding dairy, bought-in concentrates can be cost-competitive with on-farm production per unit of output, but the exposure to external price shocks remains a structural vulnerability regardless of the average cost level. A less obvious implication is that purchased feed in EU livestock systems has a high probability of containing soy from non-EU origins, introducing supply chain risks, embodied deforestation and net nitrogen accumulation in EU ecosystems, pressures that are invisible in farm-level accounting. Ireland provides a notable illustration of the opposite case: Irish grazing livestock farms report a mean grazable-area share of 97.6% of UAA (compared with an EU mean of 56.6%) and a national mean self-sufficiency ratio of 44.0%, which is below the EU average of 49.9% despite the country's predominantly grass-based system, reflecting the high livestock densities, supplementary concentrate feeding and intensive grassland fertilisation characteristic of Irish dairy, all of which carry consequences for local ecosystems.

Graph 19 – Feed self-sufficiency ratio by stocking density class, market-oriented farms, EU, average 2019–2023, %



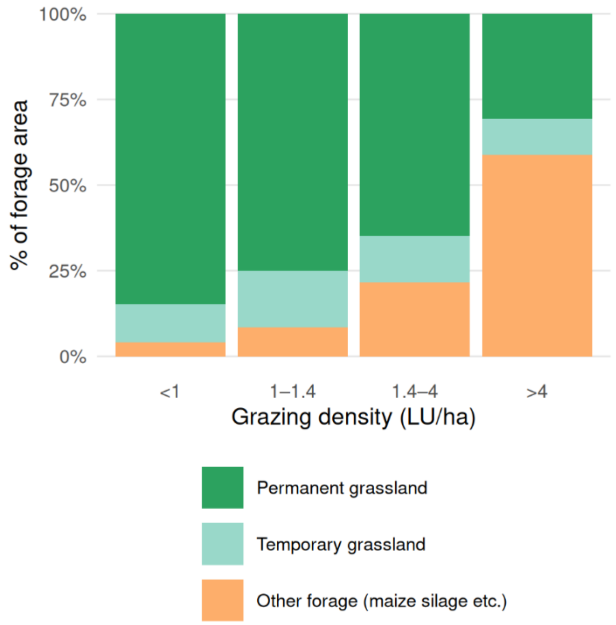
Source: FSDN, DG AGRI, own calculations, weighted estimates.

Permanent grassland dominates the forage base in extensive systems. The composition of the forage base shifts substantially across density classes (***Graph 20***). Permanent grassland accounts for 89.4% of forage area for extensive farms, 83.2% for intermediate farms, 74.5% for intensive farms, and only 43.8% for very intensive farms. The share of other forage crops - primarily maize silage and arable fodder - in the forage base is 5.4% for extensive, 7.6% for intermediate, 17.2% for intensive, and 47.3% for very intensive farms. Temporary grass lies between, at 13.1%, 12.8%, 11.9%, and 10.3% respectively. The grass-to-maize continuum visible in these figures corresponds to a known intensification pathway in north-western Europe: as dairy herds grow and outdoor grazing becomes increasingly

[17] *FSDN public database*: variables (SE315/SE310) home-grown feed to total feed costs.

difficult to manage at high densities, farms progressively replace permanent pasture with silage maize, increasing the total digestible energy available per hectare at the cost of grassland biodiversity and soil organic matter. The very intensive class average, where maize and other non-grass forages account for nearly half of forage area, is a particularly stark indicator of this substitution. The intensive class average conceals considerable country variation in this forage substitution: German and Dutch intensive farms have much higher maize shares than Irish or French intensive farms, a pattern that corresponds to well-documented nitrate concentration pressures in those territories, driven by the combination of high stocking densities and maize-based feeding systems.

Graph 20 – Forage area composition by stocking density class, market-oriented farms, EU, average 2019–2023, % of forage area

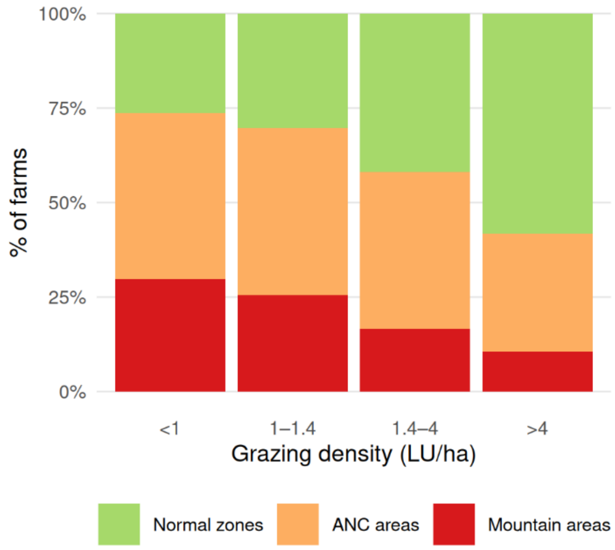


Source: FSDN, DG AGRI, own calculations, weighted estimates.

Territorial and social profile

Extensive farms are concentrated where the land leaves few alternatives. Extensive farming is markedly more concentrated in areas facing natural constraints. Among extensive farms, 30% are in mountain areas and 44% are in other areas subject to natural constraints (ANC areas), giving a total ANC share of approximately 74%. For intermediate farms the total ANC share is 70%, for intensive farms it falls to 58%, and for very intensive farms it is only 42% (***Graph 21***). The progressive decline in ANC concentration as intensity rises reinforces two observations. First, extensification in much of Europe is not a voluntary management choice but a structural feature of the agroclimatic landscape - farms in mountain and high-altitude areas cannot meaningfully intensify without additional infrastructure investment that the land base cannot support. Second, the viability of extensive farms in ANC areas depends on the combined effect of direct payments, ANC compensatory allowances, and agri-environment premiums, which together represent a larger share of farm income in these territories than elsewhere. The mean ANC payment for extensive mountain farms is EUR 7 729 per farm, compared with EUR 3 712 for extensive farms on average. Mountain and ANC settings also face growing challenges from the return of large carnivores, which increases predation pressure on extensive herds and adds to the difficulties of maintaining livestock farming in these territories; CAP agri-environment measures and specific compensation schemes provide partial responses but do not fully offset the constraint.

Graph 21 – Share of grazing livestock farms in areas with natural constraints (ANC) by stocking density class, market-oriented farms, EU, average 2019–2023, % of farms



Source: FSDN, DG AGRI, own calculations, weighted estimates.

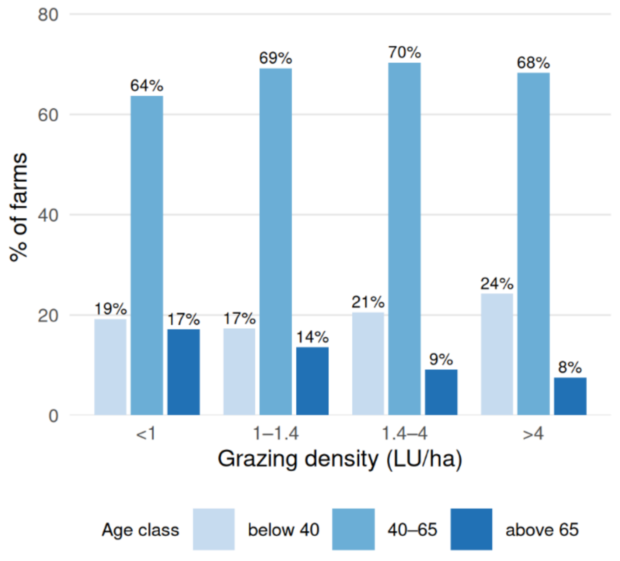
Generational renewal is weakest at the extensive end of the spectrum. The age profile of farm managers differs systematically across density classes (***Graph 22***). Managers above 65 years old represent 17.1% of extensive farm managers, 13.6% of intermediate, 9.1% of intensive, and 7.5% of very intensive farms. Younger managers (below 40) are more prevalent in the intensive and very intensive classes (20.6% and 24.2%) than in the extensive class (19.2%), suggesting some selection: younger entrants may preferentially adopt intensive dairy models with higher expected earnings, particularly in very intensive systems. The concentration of older managers in extensive farming systems raises a medium-term concern about succession and farm continuity, particularly for extensive cattle and sheep farms in less-favoured regions where land values and profitability may not justify the investment associated with an intergenerational transfer. According to the Study on the Working Conditions of Farm Employees in the EU

Agriculture Sector[18], the livestock sector presents unique occupational risks due to the nature of its tasks and working environments, with significant implications for workers' health and safety. Effective implementation of relevant occupational safety and health (OSH) legislation is therefore essential to protect farm workers, including family workers, while ensuring that gender-specific needs and differences are adequately taken into account. The Common Agricultural Policy (CAP) makes full use of social conditionality as a tool to promote compliance with EU OSH legislation, thereby contributing to improved working conditions and supporting sustainable livestock production.

Skills development is another key social dimension. Farmers are increasingly undertaking training in areas such as animal welfare, environmental practices, occupational health and safety, digital technologies, and business management to strengthen their resilience, safeguard their well-being, and adapt to evolving policy requirements and market conditions. In this context, advisory services and rural development policies play a crucial role in facilitating access to knowledge, innovation, and capacity-building opportunities. Pastoral schools, several of which have been supported through the LIFE programme or regional funding, represent a promising model for combining skills transmission with generational renewal in extensive and mountain livestock systems, particularly in southern Europe.

The share of farms with organic certification is inversely related to intensity - 19.7% of extensive farms carry an organic label compared with 8.9% of intensive and 4.8% of very intensive farms - suggesting that extensification pathways can attract younger entrants through differentiated value chains, though the data do not permit causal inference on this point. It should be noted that organic certification in extensive systems faces a structural difficulty: any externally sourced feed must also be certified organic, which creates practical barriers for farmers who rely partly on purchased inputs to supplement low-intensity grazing, and may mean that the organic share among extensive farms understates the prevalence of low-input management practices.

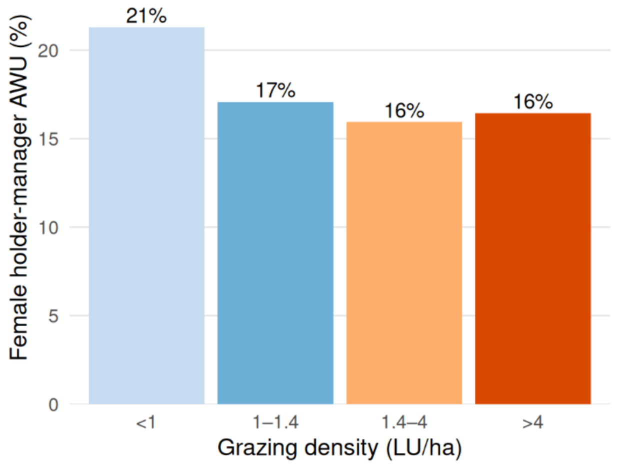
Graph 22 – Age profile of farm managers by stocking density class, market-oriented farms, EU, average 2019–2023, % of farms



Source: FSDN, DG AGRI, own calculations, weighted estimates.

Women manage a higher share of the most extensive farms. Female sole managers are more prevalent in the extensive class: they account for 20.2% of extensive farm managers, 15.8% of intermediate, 14.2% of intensive, and 14.7% of very intensive farm managers (*Graph 23*).

Graph 23 – Female holder-manager AWU share by stocking density class, market-oriented farms, EU, average 2019–2023, %



Source: FSDN, DG AGRI, own calculations, weighted estimates.

This pattern is consistent with broader FSDN observations that female farm managers tend to be associated with smaller, lower-income operations, often in less-favoured areas. The income gap is substantial: female managers in the extensive class earn a mean FNVA/AWU of

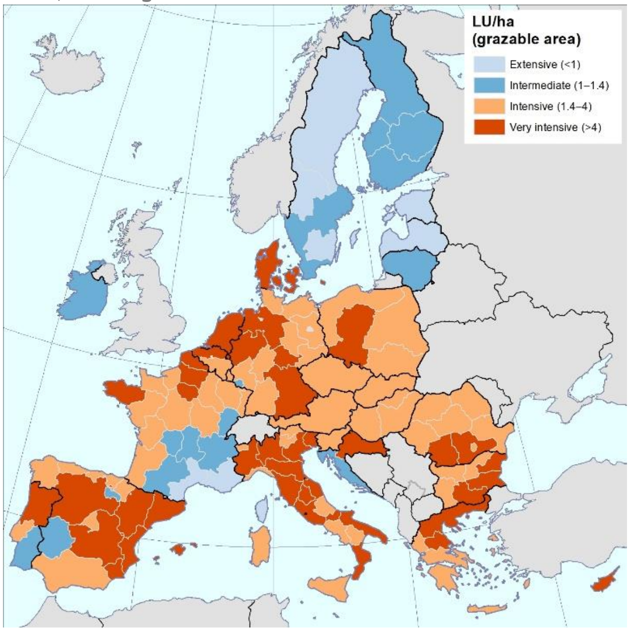
[18] Study on working conditions of farm employees in the EU agricultural sector - Publications Office of the EU

EUR 11 167 compared with EUR 17 112 for male managers in the same class. Mixed-gender holdings (where multiple managers of different genders are recorded) represent a small share across all classes (2% to 4%). Family farms account for approximately 87% of extensive, 83% of intermediate, and 81% of intensive grazing livestock farms, with no large structural break across classes. Corporate and company-form farms are a small minority but represent a disproportionate share of the very large intensive operations in certain Member States.

Regional and country patterns

High intensity clusters in the north-west; low intensity covers much of the EU. The regional distribution of stocking density, income, and farm structure reveals a strong north-south and east-west gradient (*Map 4*). FSDN regions in north-western Europe - notably the Netherlands, Flanders, Brittany, and the Jutland peninsula - show the highest mean stocking densities on grazable area, reflecting intensive dairy and combined cattle-dairy systems. Mediterranean regions in Spain, Italy, and Greece show bimodal patterns: coastal industrial dairy regions with high densities alongside extensive inland pastoral areas. Eastern European regions in the Baltic states, Romania, and the Balkans are predominantly in the extensive class, with low income per work unit reflecting both system type and the broader economic context of these regions. The share of extensive farms within each FSDN region correlates strongly with ANC classification, confirming that territorial constraints rather than management preferences are the primary determinant of extensiveness in most regions. The relationship also runs in the other direction: these same territories depend on extensive livestock farming to maintain their landscapes and ecosystems. Grasslands in mountain and ANC areas that lose grazing pressure rapidly shift to scrub and forest, with consequences for biodiversity, wildfire risk and the cultural landscapes that underpin rural tourism and local identities. Extensive grazing in these regions is therefore not only a response to natural constraints but a land management necessity, a point developed further in Part III and documented in Analytical Brief N.13 on grassland and livestock dynamics[19].

Map 4 – Mean stocking density of grazing livestock farms by FSDN region, market-oriented farms, EU, average 2019–2023, LU/ha (grazable area)



Source: FSDN, DG AGRI, own calculations, weighted estimates.

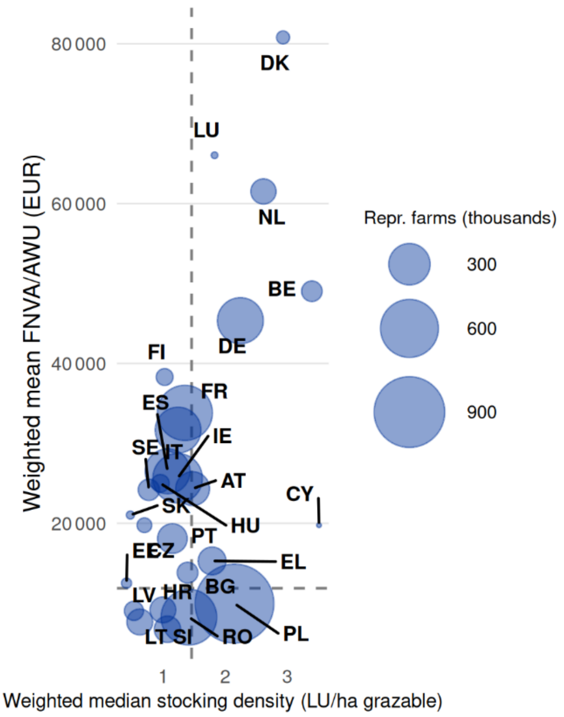
Each Member State has a distinct density-income combination. A country-level bubble chart locates each Member State by its weighted median ruminant density (horizontal axis) and weighted mean income per worker (vertical axis), with bubble size proportional to the number of represented farms and colour showing the share of farms above 1.4 LU/ha (*Graph 24*). The dashed lines mark the EU weighted medians, about 1.45 LU/ha and about EUR 11 900 per worker, dividing the chart into four quadrants. The result is one of wide structural diversity rather than a clean density-income line. A small north-western group stands well above the rest on income: Denmark at about EUR 80 800 per worker and the Netherlands at about EUR 61 500, with Luxembourg, Belgium and Germany also in the upper range and mostly coloured yellow, reflecting a high share of farms above 1.4 LU/ha. At the other end, several central and eastern countries sit below the EU median income, including Lithuania (EUR 7 657), Slovenia (EUR 6 746), Romania (EUR 8 259), Latvia (EUR 9 048) and Croatia (EUR 9 169), with Estonia (EUR 12 511) just above the line. Poland and Romania carry some of the largest bubbles, so these lower-income positions account for a large number of farms.

Crucially, higher density does not line up with higher income. Poland and Romania combine above-median density with below- or near-median income, and Cyprus sits far to the right at a high density but only middling income, while lower-density northern countries such as Finland and Hungary sit comfortably above the income median. Ireland is a further illustration: close to the EU

[19] https://agriculture.ec.europa.eu/document/download/b397715c-d526-4dd7-af26-adbdfe43af6d_en?filename=analytical-brief-13-grassland_en.pdf

median density but well above the median income (about EUR 25 600 per worker), driven by large grass-based dairy herds. Country-by-country regressions of income on stocking density confirm the impression: a statistically significant positive slope appears in only a minority of Member States, while most show no significant relationship. The aggregate income gradient is therefore not a universal feature of EU grazing livestock farming.

Graph 24 – Country weighted median ruminant density versus weighted mean FNVA/AWU; bubble size proportional to represented farms



Source: FSDN, DG AGRI, own calculations, weighted estimates.

No single system dominates on all sustainability dimensions

Extensive and intensive systems trade off differently across every dimension. The radar diagram brings the social, economic and environmental indicators together and shows that no density class performs best across the board (*Graph 25*; underlying values in *Table 1*). Each indicator is placed by its weighted mean percentile in the full ruminant population of about 132 000 sample farms, so a class's position reflects where it sits relative to all ruminant farms rather than an absolute score; the two manager indicators are shown as raw proportions.

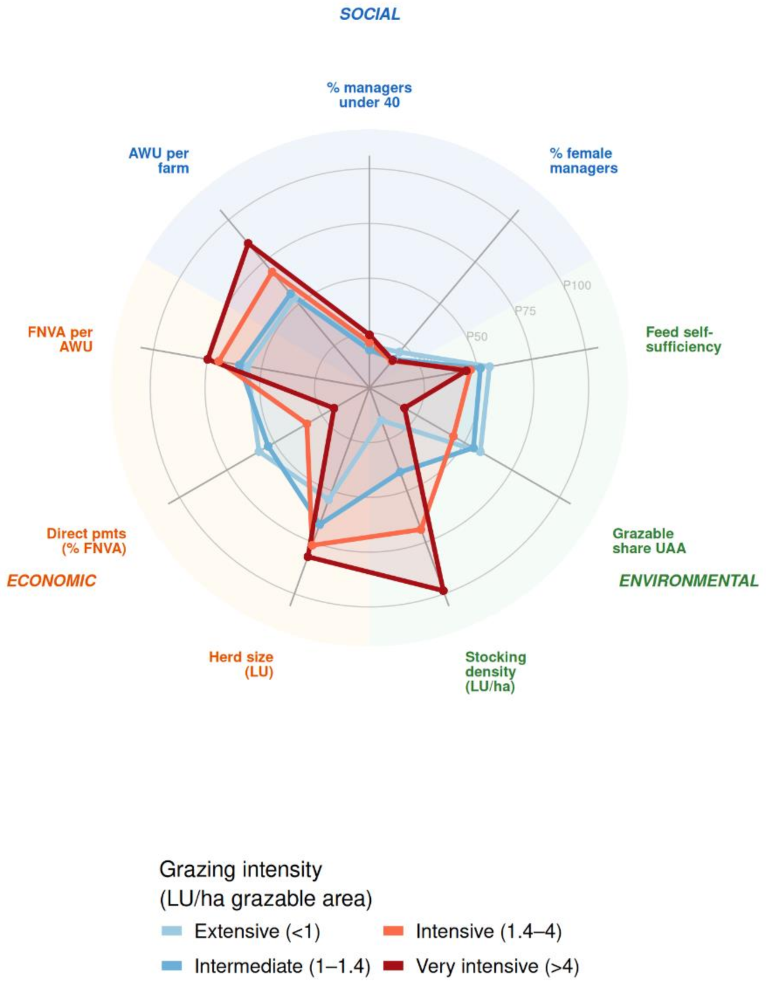
Read by dimension, the figure reveals a consistent rotation along the intensity gradient. On the economic axes, income and scale rise steadily with stocking density: farm net value added per worker climbs from about EUR 16 200 in the extensive to EUR 31 100 in the very intensive class, average herd size from 28 to 84 livestock units, and labour input from 1.4 to 2.3 work units per farm. Reliance on direct payments moves the opposite way, from 51% of value added in extensive farms to 20% in the very intensive, confirming that the highest-income systems are also the least dependent on public support. The environmental and land-use axes mirror this reversal: extensive farms devote the largest share of their land to grazable area (80% against 31% in the very intensive class) and grow most of their own feed (58% against 43% self-sufficiency), while stocking density itself rises across the classes by construction. The social picture is more mixed: extensive farms are most often managed by women (21% against 16%), whereas the youngest managers are concentrated at the intensive end (24% under 40 in the very intensive class against 19% in the extensive one).

Taken together, the diagram shows that characterising these systems by income alone would be misleading. The intensive and very intensive classes lead on income, scale and generational renewal but score lowest on grassland share, feed self-sufficiency and land-use extensivity. The extensive class shows the reverse profile: lower income per worker and the heaviest reliance on direct payments, but the strongest land-based and feed-autonomy indicators. The trade-off between economic performance and the land-use and environmental qualities of grazing systems is therefore structural, and it underpins the case for differentiated rather than uniform policy treatment of the sector.

Policy must match the diversity of systems

The analysis points to several observations with direct relevance to the evaluation and design of policy instruments targeting grazing livestock farms. Density-based measures - thresholds, requirements, or premiums linked to stocking density - are useful instruments for environmental targeting: they concern farms likely to be extensive grassland managers, farms in ANC areas, and farms with higher feed self-sufficiency. However, the analysis shows that their income impact is heavily conditioned by farm type. For cattle and sheep farms, moving from the intensive to the extensive class carries no income penalty when herd size is held constant; the income loss associated with extensification in these systems is primarily a function of herd size reduction, not density reduction per se. For dairy farms, the situation is different: extensification implies a real income cost, because intensive dairy benefits from both higher yields per cow and larger herds. Any policy instrument that incentivises dairy extensification needs to account for this income and productivity cost, alongside broader considerations around genetics, feed systems and farm viability, if it is to be effective and widely adopted. The near-uniformity of total CAP support across density classes (approximately EUR 22 750 - 24 088 per farm) suggests that the current architecture does not strongly differentiate between extensive and intensive farms in absolute terms; the differentiation is achieved largely through the ANC and AECM components, which remain a minority of total support.

Graph 25 – Multi-dimensional profile of ruminant farms by stocking-density class (population-percentile normalisation), EU, average 2019-2023. Axis position is the weighted mean ECDF percentile in the full ruminant population; the two manager indicators are shown as raw proportions.



Source: FSDN, DG AGRI own calculations, weighted estimates.

Table 1 – Indicator values by stocking-density class, raw weighted means (median for stocking density) with EU average, FSDN 2019-2023. Rows ordered as the radar axes (social, economic, environmental)

Indicator	Extensive (<1)	Intermediate (1-1.4)	Intensive (1.4-4)	Very intensive (>4)	EU average
Female managers (%)	21	17	16	16	18
Managers under 40 (%)	19	17	21	24	20
AWU per farm	1.44	1.5	1.83	2.29	1.72
FNVA per AWU (EUR)	16 164	18 476	26 008	31 090	22 425
Direct payments (% of FNVA)	51	46	30	20	32
Herd size (LU)	28	44	65	84	53
Stocking density (LU/ha, median)	0.61	1.18	2.16	6.86	1.45
Grazable-area share of UAA (%)	80	76	62	31	65
Feed self-sufficiency (%)	58	52	46	43	50

Part III: Semi-natural habitats and the ecological need for grazing

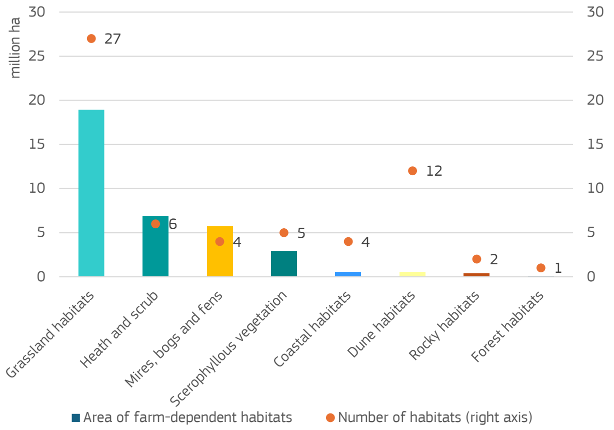
The ecological role of extensive grazing

From the intensity gradient to an ecological need. With reference to the *Graph 1*, the previous part placed Europe's ruminant farms along a gradient of stocking intensity, from intensive, largely in-housed systems to open-air grass-based production systems. This final part of the Brief turns to the extensive end of that gradient, where grazing supports livestock production but also plays an important ecological role. The environmental debate on livestock tends to focus on emissions and intensification, yet a significant share of Europe's most valued farmland habitats exists precisely because they are grazed. Removing the animals does not restore a pristine state; it leads instead to scrub encroachment, the loss of open-habitat species and a higher risk of wildfire. This is because Europe's habitats have been shaped and enriched via grazing by domestic livestock over thousands of years, and so has biodiversity.

Habitats that depend on grazing. Recent EEA work[20], combining Member State reporting under Article 17 of the Habitats Directive with expert estimates of suitable stocking densities, shows that about one third of the habitats listed in Annex I of the Directive (63 habitat types) depend on extensive grazing by cattle, sheep, goats or horses. These habitats cover roughly 35 million hectares (*Graph 26*), equivalent to about 22% of the EU's farmland area, although some part lies outside the formally recorded utilised agricultural area. They include semi-natural grasslands, heaths, scrub, wetlands and wooded pastures, and they align closely with the concept of High Nature Value (HNV) farmland, which is itself strongly oriented towards livestock systems.

A small share of production, a large share of public value. The livestock present on these farming systems represent only about 10 to 15% of total EU ruminant production, yet they deliver disproportionate benefits for biodiversity, landscape and ecosystem services, including reduced wildfire risk through the control of flammable vegetation. Their value is therefore qualitatively different from that of intensive systems: it is measured less in output than in the habitats and cultural landscapes they sustain. Treating the herd as a single block risks penalising the animals that maintain these habitats, whereas distinguish between systems of different intensity [or 'production approaches'] can support production and nature at the same time.

Graph 26 – Area of Annex I habitats dependent on extensive grazing by habitat type, EU, million ha



Source: *Conservation status of habitat types and species: datasets from Article 17, Habitats Directive 92/43/EEC reporting (2013-2018) - PUBLIC VERSION - Aug. 2020*, European Environment Agency (EEA)

Quantifying and locating grazing needs

Defining concrete grazing needs. The same work makes the notion of grazing need operational. Suitable stocking densities for maintaining these habitats range from below 0.1 to about 1.5 livestock units per hectare during the grazing season, with most habitats benefiting from densities kept below 0.5 LU/ha, well below the thresholds used to define intensive systems in the previous part. The share of a national ruminant herd needed to manage grazing-dependent Annex I habitats varies markedly, from under 5% in ten Member States to over 40% in five others. This points to a spatially uneven dependency that policy should recognise: in some regions the concern is overgrazing or excess density, while in others it is abandonment and the loss of the grazing pressure these habitats need.

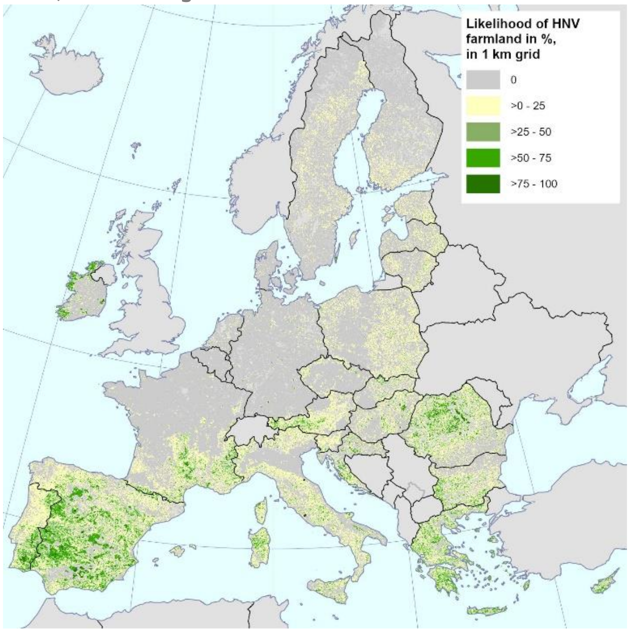
Mapping where grazing is needed. Emerging spatial datasets, including modelled EUNIS habitat distributions and the updated HNV farmland layer, offer a first basis for mapping where extensive grazing is ecologically needed. The HNV layer is built from land-cover classes refined by farming-intensity thresholds, notably nitrogen input derived from the CAPRI model, so it captures low-input, semi-natural systems well but is limited at fine resolution: features such as hedgerows and field margins fall below the grid. This approach therefore has shortcomings and can produce low HNV shares in landscapes that are locally rich in landscape features, as observed in Belgium.

In conclusion, the currently available data need to be combined with modelling approaches which yields results with substantial uncertainty, best used to indicate patterns and priorities rather than precise areas (*Map 5*).

[20] *Extensive livestock systems and nature in Europe | Publications | European Environment Agency (EEA)*

Set against the demand-side picture of where livestock density is already low, they open the way to a targeted, place-based reading of livestock policy that matches where grazing animals are ecologically needed with where they are most at risk of disappearing. Further work is under way at EEA and JRC to map the areas with highest need for extensive grazing more precisely.

Map 5 – **Likelihood of high nature value farmland in EU-27, 2018, % of 1 km grid cell**



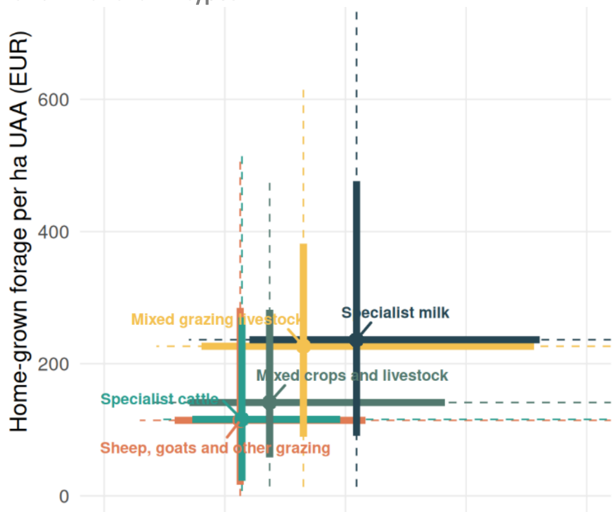
Source: EEA, based on updated JRC-EEA HNV methodology21. Data available on the EEA data hub (https://www.eea.europa.eu/en/datahub).

A single gradient, three parts

The ***Graph 1*** introduced at the start of this brief offers a conceptual framework driving the analysis. On ***Graph 27***, each farm type is placed on one gradient, with grazing intensity on the horizontal axis and the forage a farm grows on its own land, per hectare, on the vertical one. The three parts occupy different regions of this space, running from the intensive, high-biomass corner at the top right down to the extensive, low-biomass corner at the bottom left. At the top right sit the specialist dairy farms of Part I, the most intensive ruminant systems, with a median stocking density of about 2.1 livestock units per hectare and the highest home-grown forage production per hectare, around 235 EUR/ha. Even here, though, the farm grows only part of what it feeds: total forage use is roughly three times higher, so about two thirds of the feed is bought in. Intensity, high on-farm biomass and heavy reliance on purchased feed go together.

It is interesting to note that the bovine sector does not occupy a single point on this gradient but stretches across most of it. Specialist dairy sits at the intensive top right, while specialist cattle sit at the opposite, extensive end, with a median density of about 1.1 LU/ha and home-grown forage of only some 115 EUR/ha, close to sheep and goat farms. The dairy and beef halves of the cattle sector are almost mirror images: one intensive, grass-rich per hectare and feed-importing, the other extensive, low-input and land-based. Characterization of the bovine sector should separate these two aggregates considering this dominant structural fact.

Graph 27 – **Grazing intensity and home-grown forage across EU ruminant farm types**



Source: FSDN, DG AGRI, own calculations, weighted estimates.

Widening the view to all grazing ruminants, as in Part II, fills in the middle of the gradient rather than adding sharp categories. Mixed crops-livestock, mixed grazing, and sheep and goat farms spread across the lower and central band, their interquartile ranges overlapping heavily with one another and with beef cattle. There is no natural break between extensive and intensive; **the sector is a continuum**. This is why income and environmental pressure shift gradually along the gradient rather than jumping between classes, and why, as Part II showed, it is herd size and farm type, not stocking density, that mostly determines income. Reading the sector as a gradient, rather than as a set of fixed types, is the more accurate description.

The bottom-left corner, and the space beyond it that the figure cannot show, belongs to Part III. The most extensive farms in the data already cluster there, at densities around or below 1 LU/ha. But the systems that matter most for biodiversity lies further out on semi-natural grasslands, heaths and rough pastures grazed at well under 0.5 LU/ha. These do not appear on the figure because statistics on agricultural areas and farm accounts do not capture them: much of the land lies outside recorded utilised agricultural area, and the animals are too few and too dispersed to register as a distinct farm type. Their near-absence from the data is

[21] *Extensive grazing report 30-03-26 | Documentation | Biodiversity Information System for Europe*

itself part of the message. Where grazing thins to almost nothing, it stops being a question of production and becomes one of ecological necessity, which is the subject of Part III and the point at which keeping animals on the land is a public good rather than a market activity.

Read together, the three parts describe **one continuous gradient, from the intensive dairy systems that produce most of Europe's milk to the extensive grazing that maintains its most valued habitats**. The policy response should reflect the need to act differently at different points along the gradient: easing the environmental footprint at the intensive end, and keeping animals, and therefore grazing, present at the extensive end where the market alone will not, thereby finding the right balance in addressing economic, environmental and social objectives.

Concluding remarks

The specific profiles of analysis included in this brief provide information on the diversity of the livestock sector, notably on sectorial and territorial trends (including vulnerable regions) underlying bovine farms, ruminant grass-based farms and grazing effects on semi-natural habitats.

The findings provide a quantitative and qualitative basis to address better targeting for farmers in need as indicated in the Vision for agriculture and food. Another important aspect is to ensure a long-term viability for livestock farming based on different drivers such as the policy support, generational renewal, improved resilience. The categories explored in the brief are mixed and extensive farms, young farmers and female farmers, merged in a multidimensional analysis that provide a clearer view on drivers and trade-offs of the sector.

Three findings stand out.

First, the bovine sector is structured around farms specialised in the dairy sector, which holds about two thirds of the herd and concentrate most of the income; specialist cattle and mixed crops-livestock farms are numerous but hold a relatively smaller share of animals; this specialisation follows a clear north-west to south-east territorial gradient, and feed self-sufficiency is the mirror image of intensity. Studying how feed self-sufficiency develops across different farm specialisations and territories is particularly important to address the support to home-grown protein production, including for local feed production or through grassland graze.

Second, across all ruminant farms no single intensity class performs best in every dimension: the intensive and very intensive classes lead on income, scale and generational renewal, while the extensive class leads on grassland share, feed self-sufficiency and land-based feeding but earns least and depends most on direct payments. Crucially, outside dairy that also correlate with intensity, it is herd size and farm type, not stocking density, that drive income, so extensification carries no general income reduction for cattle and sheep systems.

Third, the extensive end of the intensity gradient is where livestock matters most for nature. A large share of Europe's protected farmland habitats exists because it is grazed, and these systems deliver public goods out of all proportion to their modest share of production, even as they are the most economically fragile and the most likely to disappear, if current trends continue.

The common thread is that the trade-off between economic performance and the environmental and territorial value of livestock is structural. The policy support can help to keep or bring back sustainable production in areas where livestock is the only option to keep viable rural communities and preserve the territory.

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