National DAIRY CONFERENCE 2026

'DEVELOPING RESILIENT DAIRY FARMING SYSTEMS'



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Agriculture and Food Development Authority

Conference Programme

9.35am **Welcome**

Teagasc Chairman, Liam Herlihy

9.50am **Session 1: Dairy farm resilience – are we moving in the right direction?**

Chaired by Grainne Hurley, Regional Manager, Cork West

Supporting farm resilience, a Milk Processors perspective

Michael Harte, CEO, Dairygold Co-Operative

Farm KPI's that drive resilience for the long term

Laurence Shalloo, Teagasc Moorepark

Update on international dairy market trends

John Lancaster, StoneX

10.50am **Tea/Coffee break**

11.20am **Session 2: Farming in challenging years, building contingency into our systems**

Chaired by Deirdre Hennessy, University College Cork

Climate effects on long term trends in grass growth

Options for filling summer feed deficits – cost and implications

Do we need to adjust system KPI's?

Priority investments in farm infrastructure

Panel Speakers: *Mark Treacy, Teagasc, Dairy Specialist*
John McAuliffe, dairy farmer, Cork
Matt Pilkington, dairy farmer, UK

12.40pm **Lunch**

2.00pm **Afternoon Workshops**

All workshops are repeated 3 times during the afternoon at 2.00pm, 2.45pm and 3.30pm.

Workshop 1 ***EBI: Proven technology breeding the cow of the future***

Speakers: Stuart Childs, Teagasc, Kevin Downing & Margaret Kelleher ICBF

Workshop 2 ***Best practice in farmyard design***

Speakers: Patrick Gowing, Seamus Nolan & John Moriarty, Teagasc

Workshop 3 ***Troubleshooting dry cow nutrition for a better calving season***

Speakers: Aisling Claffey, Teagasc, Maresa Sheehan & Denise Murphy, DAFM RVL & Fachtna Collins, Cork farmer

Workshop 4 ***Is 14 tonnes DM grass grown still a realistic target?***

Speakers: Michael O'Donovan & Nikki Kennedy, Teagasc

Workshop 5 ***Matching people and rostering to farm workload, getting the balance right***

Speakers: Martina Gormley & Liz Duffy, Teagasc

Workshop 6 ***Using key financial metrics to improve farm profits***

Speakers: James Dunne & Adrian O'Callaghan, Teagasc & David O'Leary, Cork farmer

National Dairy Conference 2026

Developing Resilient Dairy Farming Systems

Radisson Blu, Little Island Cork

Wednesday 25th November, 2026

Teagasc

Agriculture and Food Development Authority

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Welcome from Teagasc Cork East Advisory Region

Majella Moloney
Regional Manager, Teagasc Cork East Advisory Region



On behalf of the Teagasc Cork East Region, together with my staff, I am happy to welcome attendees to the 2026 National Dairy Conference. "Developing Resilient Dairy Farming Systems" is the theme for this year's event. Cork remains the undisputed dairy capital of Ireland. With over 394,000 dairy cows across approximately 4,200 farms, this accounts for nearly a quarter of the national dairy herd. This scale reinforces the county's long- standing role as one of Irelands leading dairy producing regions.

Teagasc very much appreciates our collaboration with the dairy co-ops in the county. Our Joint programmes with these industry partners, enables us to extend world class Teagasc Dairy research and advisory onto our dairy farms. Following a demanding year marked by challenges in grass growth and market volatility, this conference brings togethers researchers, industry experts and innovative farmers to explore practical strategies for building financial, environmental, and operational resilience. From optimising grass utilisation and herd genetics to managing labour and market shifts, our goal is to equip you with actionable insights for 2027 and beyond.

The main conference in the morning, complemented by the after-lunch workshops can assist dairy farmers in creating a robust enterprise, which will be well placed to withstand the undoubted challenges of the years to come. Finally, we are very pleased to be this year's host and that this year's conference provides you with a learning opportunity to help you prepare for the future.

Welcome from Teagasc Dairy KT Department

Joe Patton
Head of Dairy Knowledge Transfer, Teagasc



On behalf of the Teagasc Dairy team, I would like to welcome you to this year's National Dairy Conference. Our theme "Developing Resilient Dairy Farming Systems", is appropriate given the challenging year just gone due to lower milk price, cost pressures and mid-season drought in many areas. This followed a very good year in 2025 when favourable pasture growth and milk markets combined to return strong profits and helped to build feed and cash reserves on farm.

Such variation over a relatively short time frame underlines the need to maintain very resilient models of production. As we have seen, market conditions will fluctuate faster than any farming system can adjust so the challenge is to find the key technical and financial practices that can deliver consistency across a range of circumstances. These will be covered in detail today.

On a positive note, this year saw continued progress on uptake of technologies on dairy farms. We have seen for example a continued shift to sexed semen and greater use of high dairy beef merit AI bulls. This adds to early-season revenue on dairy farms and addresses a key sustainability issue for the sector. Renewed focus on the EBI itself is needed- its benefits to dairy farm profit will be explored today. In addition, the number of farms measuring grass and completing feed budgets through PastureBase is growing which gives very valuable information both for real-time management and longer-term planning decisions. We will discuss how farmers can get more value from their data.

Long-term challenges for the sector need to be addressed, in particular on how high performing dairy systems can incorporate best-practice water quality and environmental measures into their routine management. This must be achieved while maintaining progress on farm profitability. Good engagement is occurring through joint industry initiatives such as the Better Farming for Water Campaign. Implementation of mitigation is underway; progress can be accelerated in the coming year. We welcome the perspective of Michael Harte, CEO Dairygold, on how industry is supporting efforts in this space.

Our conference today will take a forward look at these key issues in detail. Attendees will hear from a mix of researchers, advisers and leading farmers. The workshops have an informal style to allow for plenty of questions, debate and discussion. We encourage you to take full part. New science is always of interest, but nothing beats hearing the experience of farmers who have been putting ideas and technologies into practice. Teagasc are delighted to have Cork farmers John McAuliffe, Fachtna Collins & David O'Leary presenting at the conference. We also welcome Matt Pilkington, who farms across Warwickshire/ Northamptonshire in the UK. Their input and insight will be a highlight of the day and we sincerely thank them for their participation.

9.50am Session 1: Dairy farm resilience – are we moving in the right direction?

Moderator



Grainne Hurley
Regional Manager, Cork West

Session 1 Speakers

Michael Harte



CEO, Dairygold Co-Operative

Michael is Chief Executive of Dairygold, one of Ireland's largest Dairy Co-Operatives, consisting of Dairy, Nutritionals and Agri Businesses. Headquartered in Mitchelstown, County Cork, the Co-Operative employs 1,200 people and generates c. €1.5 billion in turnover per annum. Dairygold is a significant driver of rural economic activity across the Munster region, processing over 1.4 billion litres of milk annually and purchasing more than 106,000 tonnes of grain on behalf of over 3,000 farm families. A Fellow Chartered Management Accountant, Michael joined Dairygold more than 35 years ago and served as Chief Financial Officer from 2006 until his appointment as Chief Executive in July 2024. Michael is responsible for driving the strategic direction of the business, including delivering strong financial performance and maximising Shareholder Members' incomes.

Laurance Shalloo



Head of Animal & Grassland Research & Innovation Programme, Teagasc, Moorepark

Prof. Laurence Shalloo, Teagasc Senior Principal Research Officer, is Head of the Animal & Grassland Research and Innovation Programme (AGRIP) at Moorepark, Fermoy, Co. Cork. Laurence is Deputy Director of the SFI/DAFM-funded VistaMilk Research Centre and is an Adjunct Professor at UCC and UCD. Under his leadership, the AGRIP is focused on increasing the economic, environmental and social sustainability of Ireland's animal-based agriculture sector. The guiding principle of the dairy programme sits around maximising the proportion and performance from pasture while reducing input costs and increasing resilience of the systems operated at farm level. A key focus is to develop the most appropriate genetics for the systems operated in Ireland, and increasingly there has been extensive work underway to address environmental and social issues within the sector. Laurence's own research programme has focused on livestock systems modelling at the farm and processor level, in order to develop innovative pathways to drive overall sector sustainability.

John Lancaster



Head of EMEA Dairy & Consulting, StoneX

John Lancaster is Head of EMEA Dairy & Food Consulting at StoneX Financial Europe, based in Dublin. He works across the full dairy supply chain, engaging with producers, processors, traders, and end-users across Europe and internationally. John helps clients identify, quantify, and understand their commercial price risk exposure, translating physical market dynamics and structural risks into effective pricing and hedging strategies. He is actively involved in market-development initiatives and the evolution of dairy risk management products and services.

Dairy farm costs and competitiveness – change over time?

Laurence Shalloo[1], Sean Crowley[1] Fiona Thorne[3], and Benjamin Marmount[1,2]

[1]Teagasc, Animal & Grassland Research and Innovation Centre, Moorepark, Fermoy, Co. Cork; [2]DairyNZ, 605 Ruakura Rd RD6, Newstead, Hamilton, New Zealand; [3]Teagasc, Rural Economy and Development Programme, Ashtown, Dublin 15

Summary

- The cost competitiveness of the Irish dairy industry has declined in recent years relative to other key benchmark countries. Costs of production were stable over the period 2012 to 2020 in the absence of input price inflation. Costs of milk production were 41% higher in 2025 when compared to 2020.
- Total factor productivity has increased since the relaxation of milk quotas driven by aggregate output growing relatively faster than aggregate input over the period 2010 to 2025.
- Increases in pasture and concentrate cost account for 70% of the direct cost increases, while energy and fuel, depreciation, hired labour and land rental accounts for 72% of the overhead cost increases between 2020 and 2025
- Costs per kg MS were most associated with year, concentrate proportion, milk solids yield per cow, milk protein concentration and herd size over the period 2015 to 2025
- Net profit per hectare was most associated with year, concentrate proportion, pasture utilised, dairy forage area, milk solids yield per cow and grazing season length over the period 2015 to 2025
- Pasture utilisation was positively associated with increased total factor productivity over the period 2010 to 2025. Farmers that operated under a derogation had higher total factor productivity when milk quotas were removed and had higher increases in total factor productivity since milk quotas were removed.

Introduction

The Irish dairy industry has undergone a remarkable transformation since the removal of EU milk quotas in 2015. Since preparation for their removal began during the 2007 - 2009 period, and up to 2025, milk solids output increased by over 99%. This increased output has been achieved through increased cow numbers, increased milk yield per cow, increased fat and protein percentages, increased stocking rates and additional land entering dairy production. While it is clear that the dairy industry still has great potential to both grow and improve efficiency, it is important farmers remain focused on their systems of production to create a resilient and profitable long-term business. As grass silage and concentrate costs are dramatically more expensive, respectively, than grazed grass, focusing on maximising the proportion of grazed grass in the diet of the dairy cow has resulted in more profitable dairy systems. However, since 2020, production costs have increased due to external factors such as the Covid pandemic and the Ukraine war, compounded by increased levels of purchased concentrate feed use at farm level and reductions in pasture utilisation. The industry must navigate challenging conditions brought about by changing environmental policies, system creep, variable pasture production, increased reliance on concentrate supplementation, an economy operating at full employment with a high-cost base, and increased inflation all amid ongoing uncertainty in policy and trade conditions.

This paper describes cost changes over time at farm level, and the key relationships that should be prioritised to control costs and maximise profitability. It then describes the levels of Total Factor Productivity in the dairy industry over the past 15 years and discusses some of the factors affecting total factor productivity and finishes with an evaluation of the international cost competitiveness of the dairy industry when compared to the US and New Zealand.

1. Cost of production change over time

Over the past number of years, there has been significant change in costs of production at farm level when expressed in costs per kg of milk solids (€/kg MS; Figure 1). In contrast to relatively stable costs per kg MS between 2012 and 2020, there has been a dramatic increase in costs since 2020 driven mainly by factors outside the farm gate but also associated with changes within the farm gate. The increase in costs in 2022 was largely driven by the geopolitical situation in Ukraine and was associated with input price inflation rather than on system change or system creep. Since 2022 however, there has been a significant retrenchment in input prices, yet this has not been directly associated with a reduction in costs at farm level.

The sticky nature of the costs of production reflected two difficult weather years in 2023 and 2024. While 2025 was a strong year for pasture production, costs did not drop dramatically. NFS data shows that costs of production have reduced since 2023 albeit slowly.

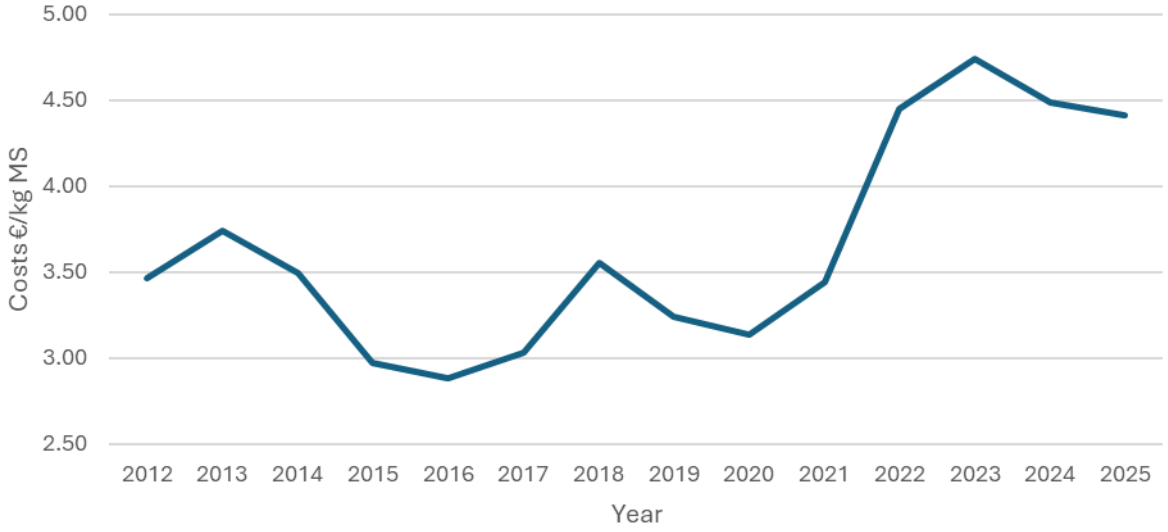


Figure 1. *Change in costs of production on Irish dairy farms between 2012 - 2025 (Teagasc NFS)*

The reality of this level of cost increase is that dairy farm incomes would be under significant pressure, if not associated with dramatic increases in milk price over the period from 2021 to 2025. The milk price increase observed in 2022 and again at the later part of 2024 and into 2025 has reduced some of the exposure of some dairy businesses to the dramatic cost increases (Figure 1). There is an urgent need to refocus on costs of production to reduce the exposure of dairy farms in light of increasingly volatile milk prices. In 2023 milk prices dropped dramatically relative to 2022 but were still high relative to historic prices and family farm income was under €50,000 (the only year since 2012 in which the family farm income was below €60,000) and this created significant income and cash-flow pressures on dairy farms. The impact was cushioned by the high income observed in 2022 (circa €150,000). Similarly, incomes achieved in 2025 have created a significant cushion for many farmers in 2026.

Analysis of NFS data (Figure 2 and figure 3) has shown that when milk prices drop (Figure 2 2023) costs of milk production (€/kg MS) explain a much higher proportion of the net profit per hectare than when milk price is higher. When 2024 is compared to 2023 a much higher proportion of the net profit per hectare can be explained by costs per kg of milk solids when milk price is lower. Taking figure 2 and figure 3 together it is clear that a strong focus on costs irrespective of milk price protects the business against fluctuations in milk prices. Just under 69% of the variation in net profit per hectare was explained by costs of production in 2023 while the corresponding figure in 2024 was 44%.

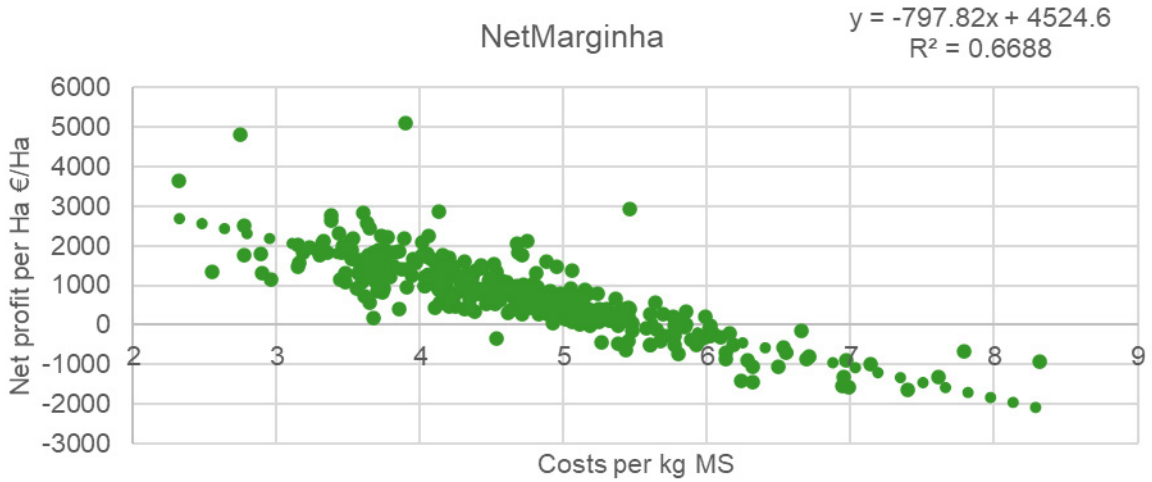


Figure 2. *Relationship between costs of production (€/kgMS) and net profit per hectare in 2023*

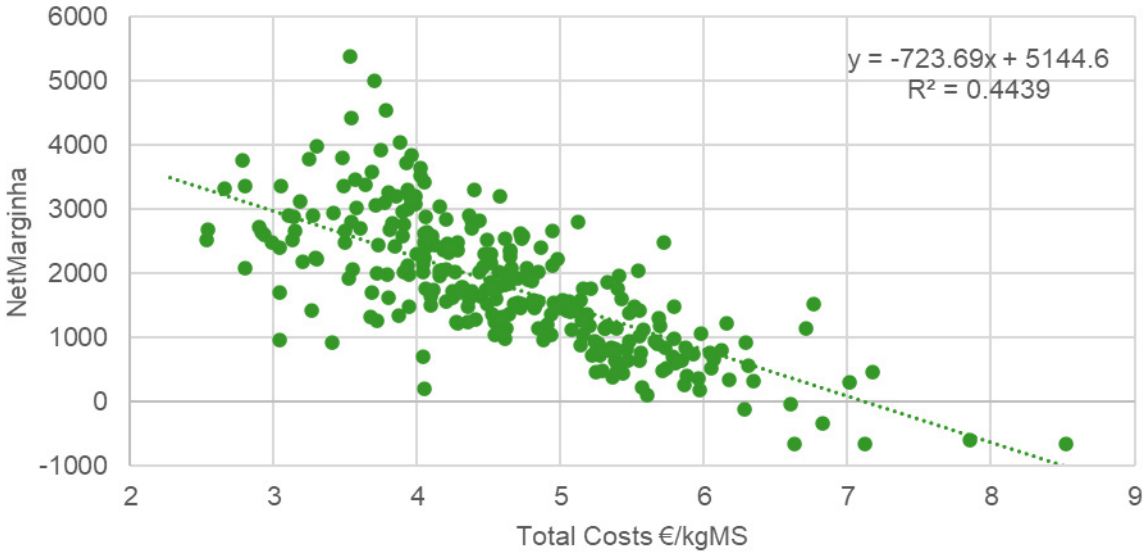


Figure 3. *Relationship between costs of production (€/kgMS) and net profit per hectare in 2024*

Factors associated with cost change over time

Table 1 shows the overall summary financial figures for dairy farms over the period 2020 to 2025 (€/kg MS). Between 2020 and 2025, variable costs increased by 41% and fixed costs have increased by 40%. Total costs have increased by 41% from €3.13 to €4.41 during the same period.

Table 1. Gross Output, direct costs, gross margin, fixed costs and net margin per kg milk solids for the years 2020 to 2025.

	2020	2021	2022	2023	2024	2025
Gross Output	4.62	5.26	7.83	5.63	6.51	7.31
Direct Costs	1.79	1.90	2.57	2.74	2.62	2.53
Gross Margin	2.83	3.35	5.26	2.89	3.89	4.78
Overhead Costs	1.34	1.54	2.09	1.97	1.87	1.88
Total Costs	3.13	3.44	4.66	4.71	4.49	4.41
Net Margin	1.48	1.81	3.17	0.92	2.20	2.90
Net Margin as a % of Gross Output	32	34	40	16	34	40

Source: Calculations based on the NFS

Table 2 shows the breakdown in cost changes between 2020 and 2025. Pasture and forage costs increased by €0.22 per kg MS while concentrate costs increased by €0.30 per kg MS. The concentrate cost and pasture and forage cost increase reflect a 41% and 37% increase between 2020 and 2025. In terms of overhead costs, energy and fuel increased by €0.11 per kg MS, hired labour by €0.07 per kg MS, land rental by €0.07 per kg MS, machinery depreciation by €0.06 per kg MS and building depreciation by €0.08 per kg of MS.

From the NFS data, of the total increased costs at farm level, increased pasture and forage costs accounted for 17% of the total increase compared to 23% for concentrate costs. In terms of fixed costs, energy and fuel accounted for 9% of the total increase, compared to 5% for hired labour, 5% for land rental, 5% for machinery depreciation and 6% for building depreciation. Pasture and forage costs, concentrate costs, energy and fuel, hired labour, rent, machinery depreciation and building depreciation accounted for 71% of the total cost increases.

Table 2. Breakdown of costs over the period 2020 to 2025 (NFS, €/kg milk solids).

	2020	2021	2022	2023	2024	2025
Direct costs						
Pasture and forage	0.59	0.57	0.85	0.89	0.83	0.81
Concentrate	0.73	0.82	1.13	1.17	1.11	1.03
Overhead costs						
Energy and fuel	0.26	0.30	0.40	0.39	0.38	0.37
Hired labour	0.08	0.09	0.13	0.13	0.13	0.15
Land rental	0.14	0.14	0.17	0.16	0.19	0.21
Machinery depreciation	0.21	0.26	0.40	0.41	0.33	0.27
Building depreciation	0.15	0.22	0.35	0.26	0.20	0.23

Source: Calculations based on the NFS

Similar to the actual costs observed, the agricultural input price index shows little change over the period 2012 to 2020 with similar cost increases to figure 1 and table 1 between 2020 and 2025. There was a dramatic increase in input cost inflation from 2020 to 2022 (circa. 50% increase) however, since 2022, the agricultural input price index has declined substantially (Figure 4). The index is showing an increase of approximately 27% relative to 2020 in 2025, however when costs are analysed, the corresponding actual increase in costs at farm level was 41%. Understanding the difference and the reasons for the increase beyond the input price inflation is key to making changes at farm level to arrest some of the increases observed. Lower cost farms had lower cost increases when compared to average or higher cost farms.

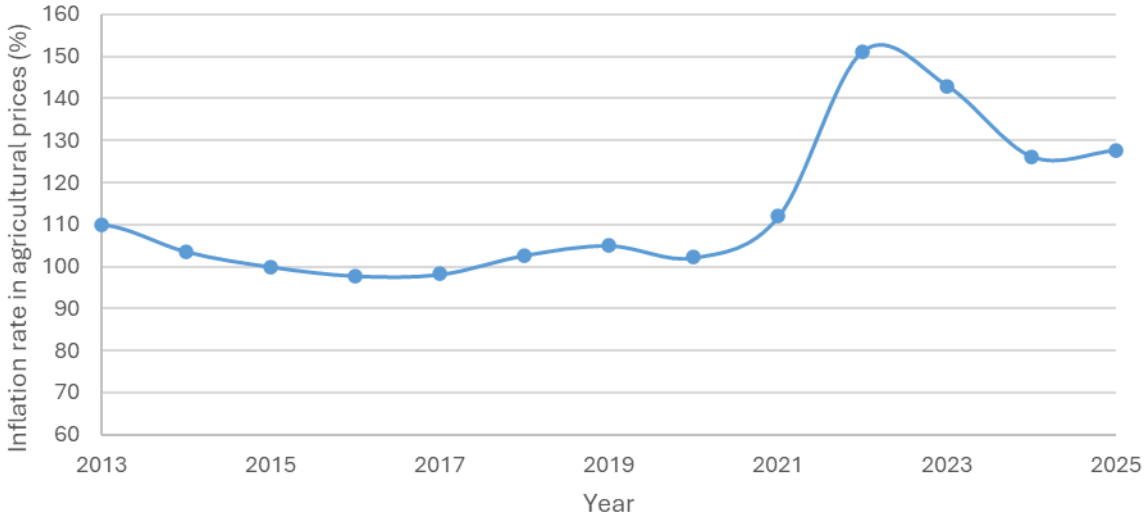


Figure 4. *Agricultural input price index between 2014 and 2025 (CSO, various years)*

2. Factors associated with profitability change on dairy farms

Given the changes in both costs and output prices in recent years, it is essential to re-establish the key factors associated with costs of production and profitability in dairy production systems. Data from the NFS was used over the period 2015 to 2025 to reestablish the factors affecting costs and margins per kg of milk solids and per hectare.

Over the period 2015 to 2025 stocking rate increase from 1.96 livestock units (LU) per hectare (Ha) (LU/Ha) in 2015 to 2.11 LU/Ha in 2021 and back down to 2.02 LU/Ha in 2025(table 3). Concentrate feed per cow increased from 938 kg per cow in 2015 to 1,349 kg per cow in 2025. Cow numbers on farm increased from 66 cows in 2015 to just under 100 cows in 2025. The proportion of the diet offered to animals as concentrates as increased from 17% in 2015 to 24% in 2018 followed by a decline to 20% and a steady increase since 2021 to between 22 and 23%. Pasture utilised per hectare increased from 7.4t DM/Ha in 2015 to 8.3t in 2021 and back down to 7.7t DM/Ha in 2025. Milk solids have increased from 402kg per cow in 2015 to just under 450kg in 2021 and 2022, declined to 430kg/cow in 2024 and reached 460kg/cow in 2025.

Table 3. Physical performance changes on dairy farms in Ireland over the period 2015 to 2024

Year	Stocking rate (LU^2/ha)	Con. Per cow (Kg/LU)	Proportion of concentrate	Pasture utilised (kg of DM/ha per year)	Ms (kg fat and protein) per cow
2015	1.96	938	0.17	7,417	402
2016	2.00	956	0.17	7,535	399
2017	2.02	1,058	0.18	7,605	407
2018	2.02	1,393	0.24	7,314	411
2019	2.07	1,158	0.20	7,887	428
2020	2.03	1,159	0.19	7,846	437
2021	2.10	1,149	0.19	8,306	447
2022	2.11	1,240	0.21	8,184	446
2023	2.11	1,230	0.21	7,936	427
2024	2.04	1,363	0.23	7,512	430
2025	2.02	1,359	0.22	7,727	460

Source: Calculations based on the NFS

The analysis shows that there is a significant effect (Table 4) of stocking rate, MS yield per cow, concentrate feeding level on pasture utilisation on Irish dairy farms. As stocking rate and MS yield per cow increase, pasture utilisation increases. In contrast, as concentrate feeding levels per cow increase, pasture utilisation reduces.

Table 4. Regression coefficient for factors associated with pasture utilised per hectare (kg DM/ha) on Irish dairy farms (based on NFS from 2015 to 2025).

Pasture Use (kg of DM/ha per year)	Estimate	P value
Stocking rate (LU/Ha)	3,698	<.0001
Milk solids yield per cow (kg)	8.1	<.0001
Concentrate (kg /cow)	-0.91	<.0001

Source: Calculations based on the NFS

Table 5 shows the key drivers of costs of production per kg MS and per hectare. The factors associated with costs per ha were year, stocking rate, concentrate proportion, milk solids yield per cow, milk protein percentage and herd size, while the factors affecting costs per kg MS were year, soil group, proportion of pasture in the diet of a dairy cow and MS per cow

Table 5. Regression coefficients and the associated P- values for factors associated with production costs (cents/litre, €/ha and € kg/MS) on Irish farms (NFS, 2015 to 2025).

Variable	Change in variable	Estimate (SE)	P-value
Total costs (€/ha)			
Year		165 (4)	<0.001
Stocking rate	+1 LU/ha	1,384 (24)	<0.001
Concentrate fed per cow	+1 t/cow	662 (26)	<0.001
Milk solids yield per cow	+50 kg MS/cow	198 (8)	<0.001
Milk protein	+1 percentage point	–746 (89)	<0.001
Herd size	+10 cows	20.7 (2.2)	<0.001
Total costs (€/kg MS)			
Year		0.190 (0.004)	<0.001
Concentrate fed per cow	+1 t/cow	0.66 (0.05)	<0.001
Milk solids yield per cow	+50 kg MS/cow	–0.203 (0.009)	<0.001
Milk protein	+1 percentage point	–0.99 (0.09)	<0.001
Herd size	+10 cows	0.013 (0.002)	<0.001

Source: Calculations based on the NFS

Table 6 shows the drivers of net profit per kg MS and per hectare, over the period 2015 to 2025. The factors significantly associated with net margin per hectare were year, concentrate proportion, pasture utilised, dairy forage area, milk solids yield per cow and grazing season length. Year, concentrate proportion, dairy forage area, milk solids yield per cow and grazing season length were associated with net profit per kg milk solids.

Table 6. Regression coefficients and associated P- values on factors associated with net profit per hectare and per kg of milk solid (based on NFS, 2015 to 2025).

Variable	Change in variable	Estimate (SE)	P-value
Net profit (€/ha)			
Year		123 (5)	<0.001
Concentrate proportion	+10 percentage points	–309 (27)	<0.001
Pasture utilised	+1 t DM/ha	221 (8)	<0.001
Dairy forage area	+10 ha	–29 (6)	<0.001
Milk solids yield per cow	+50 kg MS/cow	234 (11)	<0.001
Grazing season length	+1 day	1.43 (0.45)	0.002
Net profit (€/kg MS)			
Year		0.13 (0.005)	<0.001
Concentrate proportion	+10 percentage points	–0.51 (0.03)	<0.001
Dairy forage area	+10 ha	–0.028 (0.007)	<0.001
Milk solids yield per cow	+50 kg MS/cow	0.175 (0.011)	<0.001
Grazing season length	+1 day	0.0013 (0.0005)	0.008

Source: Calculations based on the NFS

3. Productivity Analysis

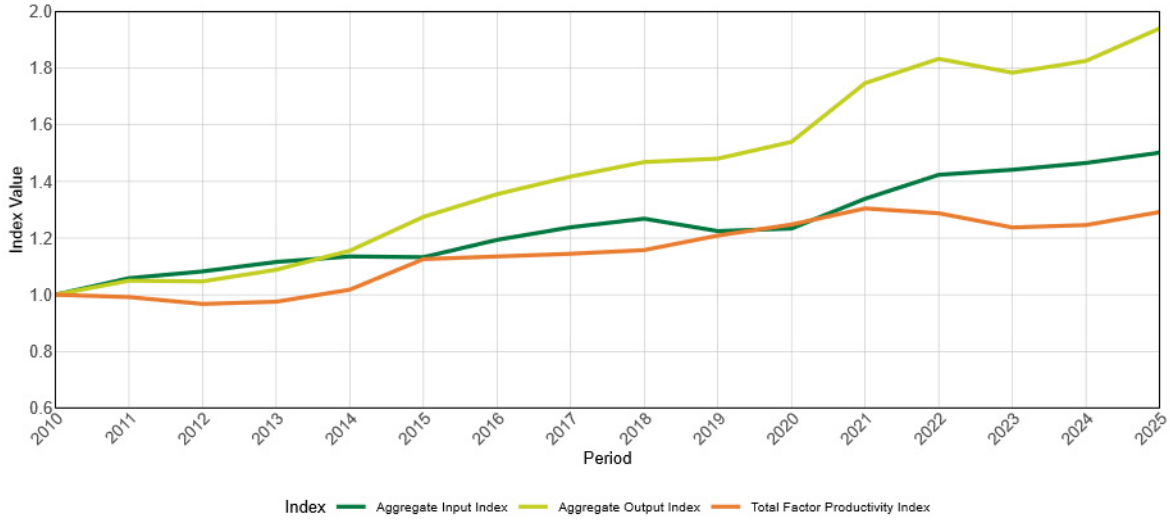
Total Factor Productivity

Productivity analysis generates a ratio of output to input. In economics it can be used to describe the way in which firms, sectors and economies produce outputs from inputs. In the context of dairy farming two levels of analysis are possible, the farm level and the sector level. At both levels productivity can refer to a myriad of measures, but most commonly milk solids per cow or milk solids per hectare are examined. These measures fall into a category of productivity measures called partial productivity measures.

While partial productivity measures are commonplace they can lead to incomplete comparisons, and thus conclusions. Consider three simple farms where each farm uses a unique combination of cows, land

and labour to produce a given level of milk solids. The farm that has the highest milk solids might claim to be the most productive. However, farmers that have a lower overall milk solids yield may actually have higher productivity. One farmer might have higher milk solids per hectare, one farmer might have higher milk solids per cow and one per labour unit. In order to combine all of these inputs used during the production process which have heterogenous units such as heads of cattle, hectares of land and number of workers into a single measure we create an index. This holistic measure of input is called an aggregate input index and the same aggregation occurs for outputs, creating an aggregate output index to combine milk, livestock and crop sales. These aggregate indices are compiled using a category of index referred as a proper index which are a group of indices that satisfy desirable properties according to measurement theory. In this analysis we have used the Lowe index, which uses the prices of outputs or inputs to weight the quantities into an aggregate. This specific type of index has been used to measure the total factor productivity of the dairy sectors in Australia, New Zealand and the United States.

After determining aggregate output and aggregate input we are then able to calculate total factor productivity, and when compared to a given reference – in this case the first farm in 2010 – we can present changes in these figures using indices as shown in figure 5. This plot demonstrates that while both aggregate output and input increased over the 16 years studied, aggregate output increased relatively faster than aggregate input. Consequently, the total factor productivity index increased by approximately 1.9% per annum. There was significant pent-up capacity in the dairy industry as a result of milk quotas and therefore the relaxation of milk quotas has resulted in significant productivity growth in the post quota period.



Source: Calculations based on the NFS

Figure 5. *Irish dairy aggregate output index, aggregate input index and total factor productivity index*

Beyond total factor productivity, economists operating in this field have also been able to express the role of changing prices (both input and output) in the form of terms of trade and profitability via gains in total factor productivity. The terms of trade index calculated relates the prices farmers receive for their agricultural outputs to the prices they pay for farm inputs and profitability index shown in Figure 6 outlines revenue relative to costs change over time. By presenting the terms of trade, profitability and total factor productivity indices together we can see productivity can mitigate the effects of changing prices on farm profitability (Figure 6).

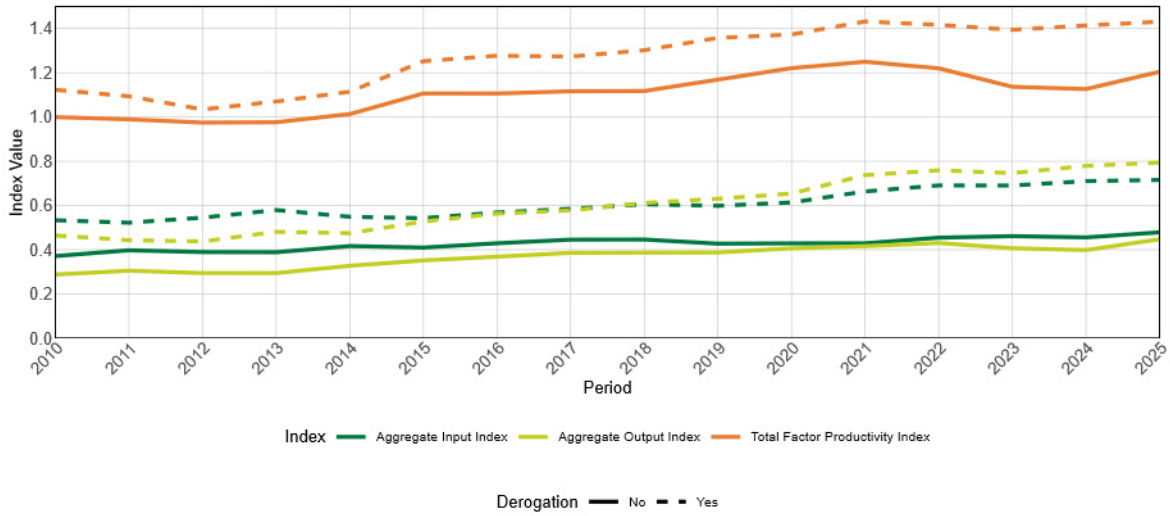


Source: Calculations based on the NFS

Figure 6. *Irish dairy terms of trade, profitability and total factor productivity indices*

The most notable feature of figure 6 is that the gap between the profitability and terms of trade indices, suggesting that gains in total factor productivity have contributed to improved profitability of Irish dairy farmers in the face of changing prices.

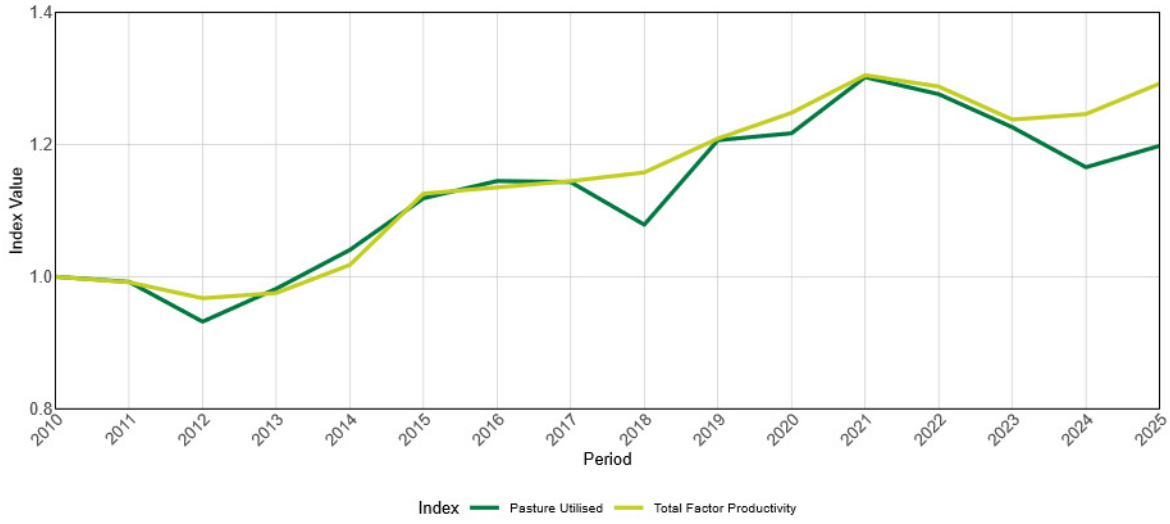
The total factor productivity of farms operating under a nitrates derogation relative to those that are not operating with a nitrates derogation is shown in figure 7. This plot shows unsurprisingly that both aggregate output and aggregate input for farms under the nitrates derogation are higher than not in a nitrate derogation. Nitrates derogation farms are simultaneously producing and consuming more in the production process. Figure 7 shows that farms operating under a nitrates derogation start with a relatively higher productivity and that over the course of the analysis the gap compared to those farms not in a derogation widens.



Source: Calculations based on the NFS

Figure 7. *Irish dairy total factor productivity index, aggregate output index and aggregate input index split out by derogation status with farms not under derogation as the reference.*

The relationship between pasture utilised and total factor productivity is shown in figure 8. These results demonstrate that over the long run pasture utilised has moved in tandem with total factor productivity, reinforcing that pasture utilised is central to Irish dairy farming which has been described in a different way earlier in this paper.



Source: Calculations based on the NFS

Figure 8. *Irish dairy total factor productivity index and back-calculated annual average pasture utilised.*

4. International Competitiveness

In the previous sections we have seen what drives profitability on Irish dairy farms, and how the productivity of the sector has been progressing. Taken together we see that that there are decisions farmers can take within a season to drive profitability, but also in the long run gains in productivity contribute to profitability by either mitigating or magnifying the impacts of changes in input and output prices. While profitability is one of the main concerns for an individual farmer the role of productivity and cost competitiveness transcends the border given the global nature of dairy markets but is easily forgotten in short run pursuit of profits. It is therefore extremely important that the industry continues to look at long run competitiveness as well as annual profitability. Strategically there will be a bigger gain in the long term with a continued focus on the key drivers of total factor productivity.

For some countries with protected dairy sectors (limited imports and or exports) competitiveness only matters to the extent that they are profitable. In Ireland, especially in the post-quota environment where export is central, cost control is more important than ever. The extent of the exposure to international markets is demonstrated by the share of production consumed domestically relative to that exported. For example, in countries like Ireland and New Zealand where over 90% of the production is exported, international cost competitiveness is extremely important. While other countries where milk supply and consumption is in balance, there is different market drivers.

Absolute production doesn't necessarily dictate a countries position as a global milk player given that some countries produce a lot but export a smaller proportion such as the United States (US) which in 2025 produced 105 million tonnes (mt) of milk of which it exported 18%. In the same year Ireland produced 9mt of milk, exporting roughly 94% meaning that the exports from the United States were approximately twice that of Ireland. The low proportion of production consumed domestically means that both Ireland and NZ must be able to compete on cost in the global markets for their sectors to ensure long term competitiveness. Historically this has been the case in Ireland and NZ, with cost of production advantages compared to the US being enjoyed largely due to the pasture-based nature of the sectors where home grown feeds resulted in lower total feed costs.

However, figure 9 shows that the metric used for international comparisons (operating costs less livestock & other revenue) in the US have declined in recent years, whilst costs have remained elevated in other regions internationally, including Ireland. The change requires further discussion and interrogation, but it should be noted that it includes changes in cost structures, system changes, input price changes as well as changes in currency exchange rates. It is estimated that at least 10% of the change in the cost comparison is down to currency movements between the euro and the US dollar for Ireland and that figure is closer to 20% for New Zealand in the opposite direction. The other key change that has occurred in the past two years is the value of non-milk revenue. While there has been a welcome increase in Ireland, the increase in non-milk revenue in the US has been much higher. While this impact is less in New Zealand there has been lag in exposure to cost increases that are now having a significant impact in the costs of production at farm level.



Source: Red Sky Agriculture 2026

Figure 9. *Cost of production (operating costs, less livestock revenue, less other income divided by production) of selected countries over time*

It is clear that if Ireland is going to continue competing in global dairy markets on a costs-of -production basis as a pasture-based producer it must control its cost of production.

Looking at international competitiveness another key strategy centres on product differentiation. Ireland's pasture fed standard is a key tool to use to provide tangible reliable information to the market on the grass-based credentials of the dairy industry. Any movement to weaken that standard will not alone have consequences for costs of production but may also have implications around market access and price.

Conclusion

Ireland's competitive analysis centres on maximising pasture production and utilisation. At farm level there is now a need to relook at strategies to increase both to ensure long term overall sustainability. This paper has focussed on financial performance of dairy farms; similar analysis has looked at the environmental performance with a similar conclusion. There is good alignment of objectives across these metrics.

11.20am Session 2: Farming in challenging years – building contingency into our systems

Moderator



Dr. Deridre Hennessy
Lecturer in Sustainable Agriculture (Grassland) UCC

Session 2 Speakers

John McAuliffe
Dairy farmer, Kiskeam, Cork



John McAuliffe farms 80 cows on a 33ha milking platform in Kiskeam, Co. Cork, an area characterised by high rainfall and heavier soils. His farming system places a strong emphasis on maximising grass utilisation, breeding a high-EBI herd and producing milk with high solids while keeping inputs to a minimum. The herd delivered 471 kgs of milk solids in 2025 with 4.35% fat and 3.82% protein. John returned home in 2022, forming a registered farm partnership with his parents, he took over responsibility for grass allocation and milking. This partnership now continues with his father Flor and is moving to succession. The farm focusses on compact calving and getting cows out to grass as soon as possible in the spring, while also ensuring enough silage is made for a long winter. Flor and John are members of the Teagasc NJ Western Duhallow dairy discussion group while John also attends a new young farmer workshop run by the Teagasc/Kinisla Joint programme.

John is passionate about maintaining a good work-life balance and ensuring he has time to enjoy life off the farm. With milking finished by 5pm each evening, he makes time to play football with his local club, Kiskeam. He also works part-time as a Strength and Conditioning Coach with Kiskeam GAA and as a fitness instructor in the local gym. These roles allow him to stay involved in the local community while providing a valuable social outlet outside of farming.

Matt Pilkington
Dairy farmer, UK



Matt Pilkington is part of a progressive, family-run dairy farming business managing 1500 cows across 4 farms plus a youngstock rearing unit in Warwickshire and Northamptonshire, UK. Alongside Caroline, Hilary and Mark, Matt has transformed four previously underperforming farms into modern, pasture-based dairy units now producing 9.2 million litres of milk annually. All farms operate block calving systems, with three spring herds plus one autumn herd to manage milk contract obligations.

The overall focus is to maximise conversion of home-grown grass into milk solids while achieving high standards of animal welfare and environmental sustainability. With experience across a range of farming business arrangements, the Pilkington family places real emphasis on a simple and repeatable approach to dairy farm development and management. Mid-season droughts and milk market trends create year-to-year variability, and we look forward to hearing Matt's strategic approach to dealing with these challenges.

Mark Treacy, Teagasc
Dairy Specialist, Clonakilty, Cork



Mark is a Teagasc dairy specialist based in the Clonakilty advisory office. He qualified from UCD with an honours B.Agr.Sc (Animal and Crop Production) in 2003 and subsequently completed a Masters (M.Phil) through Queens University Belfast and Teagasc Moorepark, where he looked at nutrient management practices on intensive Irish dairy farms. Previously, Mark has held a number of positions in Teagasc, including working as a dairy advisor for 10 years in the Cork West region, a college lecturer in Clonakilty Agricultural College, and a technologist on the Agricultural Catchments Programme.

Farming in challenging years – building contingency into our systems

Mark Treacy[1], Elodie Ruelle[2] and Peter Doyle[3]

[1]Teagasc, Clonakilty Agricultural College, Co. Cork; [2]Teagasc, Animal & Grassland Research and Innovation Centre, Moorepark, Fermoy, Co. Cork; [3]Teagasc, Grange Research Centre, Dunsany, Co. Meath.

Summary

- Changing weather patterns inevitably mean changes to pasture production curves over time. Measuring pasture growth across years helps identify mitigation steps
- While pasture growth may increase on average over time, some regions of the country are predicted to experience mid-season drought while others will have more challenging grazing conditions early and late in the grazing season.
- A reserve of high-quality forage (>400kg DM per cow) over and above normal requirement is a simple first step in building contingency
- Careful consideration should be given to the cost and utility of potential contingency measures including feed sources, stocking rate, median calving date, infrastructure etc. Prioritise simple and repeatable options over novelty and risk.

Introduction

It may sound obvious, but no two years are the same. Variability is an integral part of farming and is difficult to avoid, but it does pose challenges in our dairy systems. We are all aware of the variations experienced at farm level such as fluctuations in output and input prices, and differences in ground conditions and grass growth caused by weather changes. There is little we can do to prevent these fluctuations, and therefore we must increasingly look at ways in which we can build resilience into our systems to allow us to successfully deal with these challenges when they occur.

Changes in climate - effects on annual grass growth patterns

Increases in global temperatures are already driving changes in our weather patterns, with rainfall pattern changes predicted to increase levels of winter rainfall and cause more frequent occurrences of dry summer periods. This will lead to changes in both annual and seasonal growth patterns of grass in Ireland.

Modelling carried out as part of the Agri Adapt Project shows an increase in global temperatures of 1.5°C temperature would increase annual grass production by about 3.5%, while a 3.0° C temperature rise would increase grass production by close to 5%. While increases in annual grass production sound positive, the impacts of changes in seasonal grass patterns also need to be considered.

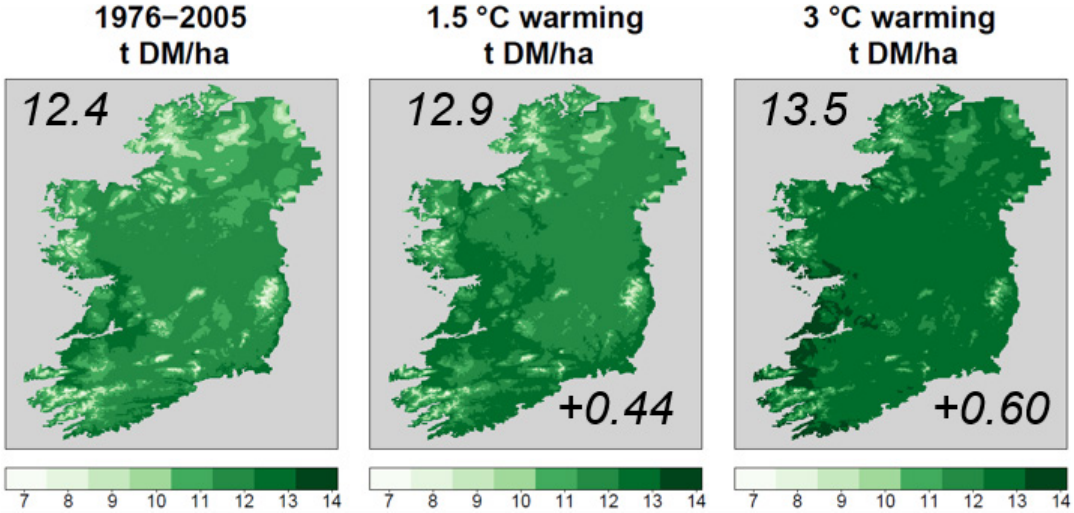


Figure 1. *Predicted changes in annual grass production (t DM/ha) resulting from increases in average global temperatures*

Predicted changes in monthly grass production resulting from rises in average global temperatures are shown in Figures 2 and 3. While overall grass production is projected to increase, it is clear that much of this increased growth will occur over winter, with a decline in summer grass production predicted for the majority of the country. This effect will be largest in traditionally drier areas of the country such as the midlands and South-East. Furthermore, modelling also indicates that year to year variation in summer grass production is likely to increase.

While models show increased production potential due to changes in climate, it is important to note that at farm level data from Pasturebase Ireland shows a decrease in annual grass production when the average annual production between 2021 to 2025 (12.36 t DM/ha) is compared to average annual production for the previous 5-year period, 2016 to 2020 (13.34 t DM/ha). Farm management practice has a large influence on grass production and the effects of changes in nitrogen fertiliser application rates, soil fertility and reseeding also need to be considered when looking at the appropriate stocking rate of individual farms in the future.

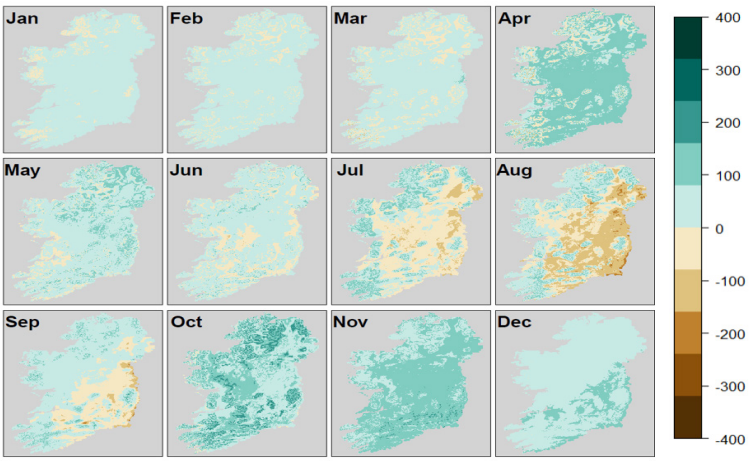


Figure 2. *Predicted changes in monthly grass production (kg DM/ha) resulting from a 1.5°C increase in average global temperatures*

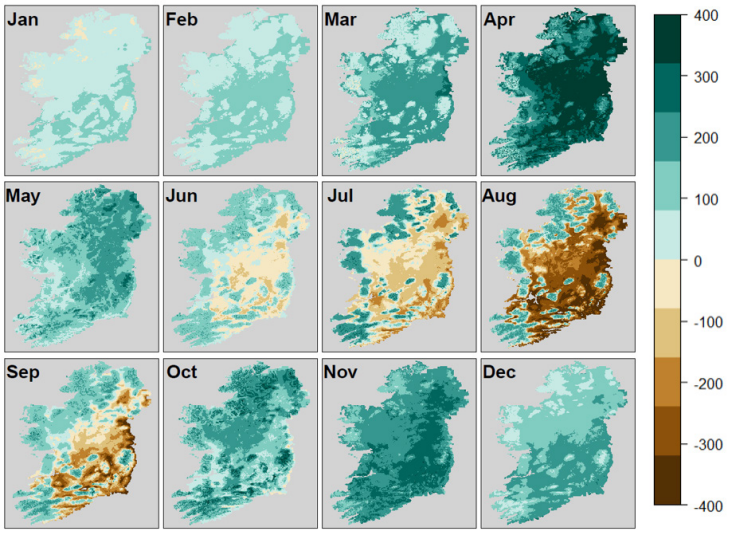


Figure 3. *Predicted changes in monthly grass production (kg DM/ha) resulting from a 3°C increase in average global temperatures*

Feed Reserves – quantities and options

Considering the level of variation now occurring in mid-season pasture production, it is recommended that farms should carry a reserve of 400 to 500 kg DM of high-quality forage. Similar reserves will also be required for less drought prone farms as these are more likely to suffer from trafficability challenges in spring.

In practical terms, the feed reserve needed on many farms is equivalent of just over 2 silage bales per cow, or about 35 days' feeding for a mature cow. It is important to note that this reserve is additional to normal annual silage requirements i.e. in an average pasture-growing year, the reserve will sit unused and will roll into the subsequent year. In terms of quality, forage reserves should be equal or greater in feed value to 75 DMD grass silage, so that it can fed to replace grazed pasture with minimum increase in concentrate feed. For farms stocked >2.5 cows per ha on the grazing platform, at least 40% of normal feed reserve requirement should also be at this level of quality. For example, a typical dairy farm stock stocked at 2.5 to 3.0 cows per ha on the milking platform on a dry soil type, will need at least 1tDM of high quality silage, plus a standard 0.6 to 0.7tDM of dry cow feed on hand.

Where not currently in place, putting such a reserve in place will cost approximately €130 per cow, however once established the cost of maintaining this reserve is expected to be substantially lower as

it is unlikely that the reserve will be fully used in most years. It also adds to inventory value of the farm from a profitability perspective.

Costing feed reserve options

Table 1 outlines the estimated production costs of a range of commonly used feeds. Grazed grass/clover swards are the cheapest feed source available and therefore where their availability is limited it is inevitable that the cost of feeding the herd will increase. Zero grazed grass or red clover, where available from out blocks, may be an option for filling short term feed deficits. However, it is of limited use during prolonged dry periods as its supply will also be affected by the low growth conditions and may also be impractical during periods of challenging grazing conditions as field conditions will likely also be unsuitable for the operation of farm machinery.

The variation in costs of various options such as silages is relatively small and therefore much of the decision-making surrounding which is the best option on a farm will come down to practicalities and farm location. On dedicated silage out-blocks, a combination of maize silage and red clover crops could be considered as these crops will benefit from being rotated between sites and are less drought prone options than grass silage. Grass silage, while more drought prone, offers the flexibility of being able to cut the crop at various stages depending on the quality of silage required, and offers the added benefit of potentially being available for zero grazing or grazing with youngstock. Overall, high-quality grass silage (75+ DMD) will be the most attractive option on the majority of farms due to its ease of feed out, the ability to store for multiple years if unused, flexibility in diets and a reduced requirement for additional protein in the diet when compared with alternative feeds such as maize silage.

Where alternative grazing crops such as stubble turnips are being considered on the milking platform, careful consideration is required on how the availability of grazing grass for the herd will be impacted. These crops are unlikely to result in an increase in overall dry matter production on the platform and will result in the need to operate at a higher stocking rate on the remaining grassland area while the summer crop is growing. On a dry matter basis these crops are similarly expensive relative to silage options, however the cost difference is reduced when compared on a UFL basis, and when feed-out costs are included. To provide the required level of feed reserve, 0.1 ha of these grazing summer crops would be required per cow. For a herd operating with a milking platform stocking rate of 3 cows/ha, removal of the required area for a summer grazing crop would result in an increase in grassland stocking rate to 4.34 cows/ha while the area was unavailable for grazing, both while the crop is growing and while the area is returned to grass after being grazed. A growth rate of 73 kgDM/day would be required to sustain such a stocking rate with a grass allocation of 17 kgDM/cow/day. Where summer grazing fodder crops are grown on the milking platform they are of little benefit in years where summer growth is unaffected by moisture deficits but will increase overall feed costs.

Table 1. Feed Assumptions and Cost of Production of Feeds (Peter Doyle, Teagasc)

	Grazed grass	Grass+ white clover	Multi-species	Zero-grazing grass all year[1]	First + second cut pit silage[2]	First + second cut bale silage[2]	3-cut grass silage (pit)	3-cut red clover silage (pit)[3]	Maize silage (open)[4]	Maize silage (closed)	Fodder beet[4]	Winter whole crop wheat	Grazed Kale	Stubble Turnips	Dairy nut @ €370/t	Purchased rolled barley @ €290/t
Feed Assumptions																
DM yield (t/ha)	13	13	13	13	6 + 4.7	6 + 4.7	6+4.7 +3.3	5.6 + 4.0 + 3.5	13	16	15	12.5	6	3.5	.	.
DM (%)	17.4	17.4	16.4	17.4	21.7	32.4		30	30	30	19	37.5	16.2	75	86	.
UFL/kg DM	1.03	1.02	1.02	1.03	0.82	0.82	0.81	0.81	0.8	0.8	1.12	0.77	1.05	1.10	1.08	.
DM digestibility (%)	82	81	81	82	73	73	73	73	70	70	86	69			.	.
Inorganic fertiliser N kg/ha[5]	225	100	100	225	87 + 69	87 + 69	87 + 69 + 70		112	112	114	184	0	40	.	.
Total fertiliser N kg/ha	250	125	125	250	115 + 82	115 + 82	115 + 82 + 70	0	145	145	145	200	0	40	.	.
Feed costs October 2026																
Total costs/ha (incl. land charge) (€)[6]	1455	1262	1298	2977	2496	3105	3483	3194	3439	4190	4069	3337	1538	1352		
Total costs/ha (excl. land charge) (€)	714	521	557	2236	1996	2605	2842	2550	2698	3449	3328	2596	1167	982		
Total costs/t DM grown (incl. land charge) (€)[6]	112	97	100	229	233	290	249	226	269	266	271	271	256	386		
Total costs/t DM grown (excl. land charge) (€)	55	40	43	172	186	243	203	181	211	219	222	211	195	281		
Total costs/t DM utilised (incl. land charge) (€)[6]	140	121	125	286	300	341	318	299	309	306	336	315	320	515	449	352
Total costs/t DM utilised (exc. land charge) (€)	69	50	54	215	240	286	259	239	242	252	275	245	243	374	449	352
Relative cost to grazed grass per energy utilised (UFL) including land charge[6]	1.0	0.9	0.9	2.0	2.7	3.1	2.9	2.7	2.8	2.8	2.2	3.0	2.2	3.4	3.1	2.2
Relative cost to grazed grass per energy utilised (UFL) excluding land charge	1.0	0.7	0.8	3.1	4.4	5.3	4.8	4.4	4.5	4.7	3.7	4.8	3.5	5.1	6.2	4.6
Cost per 1000 UFL (inc land charge) (€)	136	119	122	278	365	421	389	366	385	381	300	409	305	468	416	304
Cost per 1000 UFL (exc land charge) (€)	67	49	52	209	292	353	318	292	302	313	246	318	232	340	416	304

[1]*Zero-grazing does not include the cost of handling extra slurry vs. grazing*
[2]*First- and second-cut silage were assumed to be cut on 29 May and 17 July, respectively*
[3]*Slurry + the cost 0-7-30 for the remainder of K requirements, does not include grazings in the back end of the year. 6 year persistence*
[4]*The extra cost of feed protein supplementation required for maize and fodder beet is not included*
[5]*Remainder of nitrogen requirement was fulfilled via slurry (organic N) application.*
[6]*Land charge of (€741/ha) €300/acre*
All feed costs include VAT
Protected urea = €740/t; 0-7-30 €540/t, 18-6-12 = €600/t

Herd and grazing management decisions

Grass clover swards are the cheapest available feed source, and every effort must be made to maximise their use in our dairy cow diets, with increasing pasture utilised shown to be worth an additional €221 per tonne of pasture utilised per hectare. Regular grass measurement allows for both long-term and short-term informed management decisions to be made, however its uptake is still relatively low in Ireland. Management tools such as spring and autumn rotation planners, grass budgets and winter fodder budgets within Pasturebase Ireland are a valuable resource and should be used to aid decision making.

The correct stocking rate for a milking platform, and indeed a whole farm, is largely governed by the quantity of grass which can be produced from it and will vary between farms. It is important to establish what the 5-year average grass production is and to use in the calculation of target stocking rate. Consideration needs to be given to both the overall tonnage which can be produced, as well as weekly growth rates. Excessive stocking rates will lead to a requirement for increased levels of supplementary feeding, increasing the cost of production.

Table 2. Supplementary feeding rates (kg DM per cow) required at varying milking platform stocking rates and daily growth rates

		Milking Platform Stocking Rate (cows/ha)							
		2.75	**3**	**3.25**	**3.5**	**3.75**	**4**	**4.25**	**4.5**
Growth Rate (kg DM/ha/day)	**50**	0.8	2.3	3.6	4.7	5.7	6.5	7.2	7.9
	55	0	0.7	2.1	3.3	4.3	5.3	6.1	6.8
	60	0	0	0.5	1.9	3.0	4.0	4.9	5.7
	65	0	0	0	0.4	1.7	2.8	3.7	4.6
	70	0	0	0	0	0.3	1.5	2.5	3.4
	75	0	0	0	0	0	0.3	1.4	2.3
	80	0	0	0	0	0	0	0.2	1.2
	85	0	0	0	0	0	0	0	0.1

For farms operating on heavy soils in particular, a further strategic response to changing weather patterns and soil trafficability may be to adjust planned start of calving date (PSC). While the principle of matching calving date to pasture growth and availability holds across all farms, in practice this may mean altering PSC, for example for 10-14 days, to better align pasture availability with demand. As herd fertility and 6-wk calving rates continue to improve, herd managers have better capacity to align grass supply with early lactation herd demand without suffering the penalty of excess numbers calving into late April. Previous work conducted both in Curtin's Farm (Cork) and Ballyhaise Farm (Cavan), showed minimal penalty to annual milk solids productivity but a reduced reliance on silage and concentrate in early lactation. Instead, supplement feeding was shifted to some extent to the late lactation period where feeding management tended to be more straightforward. Decisions on changing calving date should not be made lightly however and require a comprehensive analysis of the individual farm's soil type, spring pasture growth pattern, and herd feed demand.

Farm Infrastructure investments to increase resilience

Strategic investment in farm infrastructure is a key tool for reducing the impacts of weather events on dairy farms. Predicted increases in winter rainfall will likely make spring grazing more challenging, particularly in higher rainfall areas. Analysis by Elodie Ruelle in Teagasc Moorepark shows changes in weather patterns have so far caused little change in the possible first turnout dates in areas such as Moorepark and Oakpark, however, the average date when ground conditions were suitable for turnout in areas such as Ballyhaise has moved 12 days later when weather data for the periods 2005-2014 and 2016-2025 were compared. Year to year variation in suitable turnout dates in higher rainfall areas has also substantially increased. As global temperatures rise, these effects are likely to continue to increase and will also begin to impact more on drier farms as well. The adequacy of grazing infrastructure should be examined on every farm, with investment required on many. Investment in such facilities has a good payback as increasing spring grazing is estimated to return around €3.30 per cow per additional day at grass. While some of these investments may be substantial, such as the provision of additional roadways, spur roadways, and additional water troughs, many others can be quickly achieved with relatively small investments such as the provision of additional access points to paddocks, automatic paddock gap opening systems, and a good supply of temporary fence posts and reels.

Much investment has been, and continues to be, made in additional slurry storage. While much of this investment has been driven by changes in regulatory requirements, it is prudent that all farms assess their storage facilities not only from a regulatory perspective, but also from a practical perspective. The

actual location of storage facilities within a farm can a have a large effect on labour efficiency. Having storage located where it is required rather than having to transfer slurry between storage facilities has a substantial time saving at a time of year when there often doesn't seem to be enough hours in the day. When constructing new facilities careful planning is required to ensure the facilities are located where they will be of most practical benefit. Consideration should also be given to including additional storage capacity to future proof the farm and reduce the chances of having to spread slurry in sub optimal conditions. Return on investment in these facilities will come from increased labour efficiency and a higher recovery of nutrients from the slurry collected. For a 100-cow herd spreading slurry in optimal conditions can result in a difference of over €3,000 in the value of nutrients recovered from the slurry collected over an 18-week period.

Adequate feed space is an important consideration for the future. Many of the current facilities available on farm are designed with adequate feed space for feeding stock over the winter period with unrestricted ad lib access to feed. However, where feed space is required for supplementary feeding during periods of challenging grazing conditions or restricted grass availability sufficient space for the entire herd to feed at once is required with an allowance of 650mm of feed space per cow recommended. Solutions such as splitting the herd into groups and feeding at different times, or the provision of additional feed space using temporary feeders may suffice in the short term, however they are likely to substantially increase workload and are unlikely to be a suitable long-term solution. Where additional slurry storage is being constructed on farm, consideration should be given to how additional feed space could be integrated into the project.

As previously outlined, a reserve of high-quality feed is essential on all farms. Therefore, having adequate fodder storage space is critical. Investment in such facilities has been relatively low in recent years, despite substantial increases in herd size on many farms. From a practical viewpoint, separate storage facilities are required to allow for the segregation of silages of differing qualities to ensure access is always available to the most appropriate feed.

Workshop 1: Proven technology breeding the cow of the future

Workshop 1 Speakers

Dr. Stuart Childs

Dairy Specialist, Teagasc



Stuart is a Teagasc dairy specialist based in Teagasc Moorepark. He qualified from UCD with a BAgrSc (Animal Science) and completed a PhD in Animal Science investigating the role of fatty acid nutrition on fertility in cattle. Stuart worked for 10 years as a dairy advisor in the Kilmallock, Mallow and Moorepark areas. Stuart's key focus areas are that of animal breeding and animal health.

Kevin Downing

Service Development Manager, ICBF



Kevin is the Service Development Manager with ICBF and is responsible for managing relationships with many of ICBF's key third-party partners, including milk and meat processors, Teagasc and Gene Ireland partners. Since joining ICBF in 2021, he has worked on the development and delivery of services across the Irish cattle industry, with a particular focus on industry collaboration, data exchange and supporting ICBF's breeding programmes.

Margaret Kelleher

Genetics Operations Manager, ICBF



Margaret is the Genetics Operations Manager with ICBF, leading the team responsible for delivering national and international genetic evaluations and services to the industry. She has worked with ICBF since 2015, following the completion of her PhD in Animal Breeding and Genetics, where she developed the Cow's Own Worth (COW) index. Her work spans genetic evaluations, genomics and breeding programmes across the Irish cattle industry.

EBI: Proven technology breeding the cow of the future

Stuart Childs[1], Kevin Downing[2], Dan O'Riordan[2] and Margaret Kelleher[2]
[1]*Teagasc Dairy Knowledge Transfer, Moorepark, Fermoy, Co. Cork.*
[2]*ICBF, Link Road, Ballincollig, Co. Cork.*

Summary

- Higher EBI delivers higher profit. Every €1 increase in EBI is worth approximately €2 in profit, with the relationship holding across different production systems.
- EBI drives milk solids through more than yield alone. Better fertility, survival, health and calving performance increase days in milk, herd maturity and ultimately saleable lifetime output.
- EBI balances dairy and beef value. The Maintenance and Beef sub-indices account for both the energy cost of cow size and its potential beef return.
- DNA-based registration strengthens EBI. Verified parentage and genomic information improve data quality and deliver more reliable evaluations earlier in life.
- Balanced genetics build resilience. Future cows must cope with less predictable seasons, helping reduce exposure when grass growth and grazing conditions differ from expectations.

Introduction

Introduced in 2001, the Economic Breeding Index (EBI) has transformed dairy cattle breeding in Ireland by providing farmers with a scientific and economically focused method of selecting the best animals for the next generation. Rather than concentrating on individual production characteristics, the EBI combines genetic information from multiple traits into a single monetary value, allowing farmers to identify animals with the greatest potential to improve overall farm profitability.

After more than 25 years of development and implementation, the EBI has established itself as a proven breeding technology. However, an important question remains: can EBI deliver the dairy cow for the dairy systems of the future?

What is the EBI?

The EBI is a genetic selection tool designed to identify the most profitable bulls and cows for breeding dairy herd replacements. It combines estimated genetic merit for a range of economically important characteristics into one overall figure, expressed in a euro value.

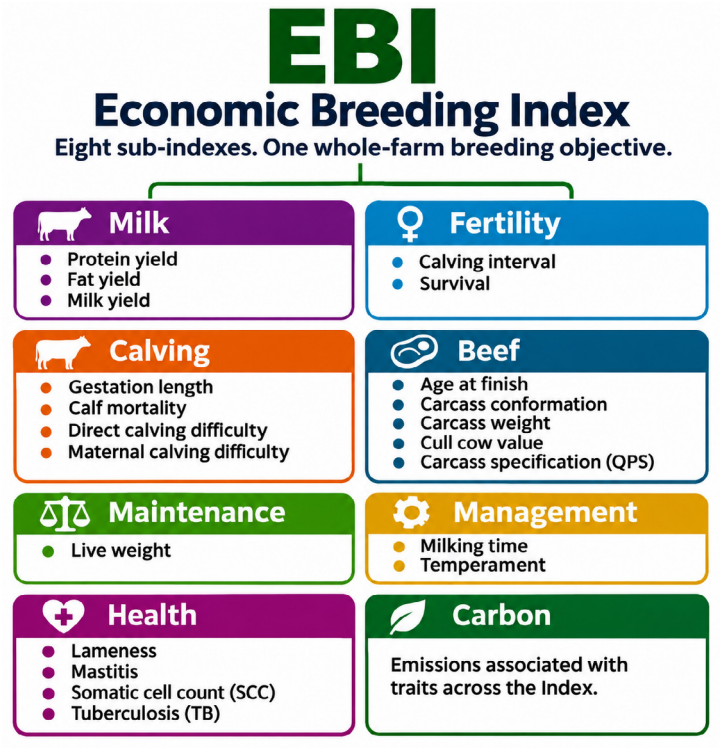


Figure 1. *The Economic Breeding Index (EBI) sub-indices*

EBI works. The evidence is in profit and performance

A major strength of the EBI is that it is supported by both extensive research and practical evidence from commercial dairy farms. Over the past 25 years, average herd EBI has increased by approximately

€191, with the cumulative value of this genetic improvement to the Irish dairy industry estimated at €5.5 billion.

At farm level, the relationship is clear: each €1 increase in herd EBI is associated with approximately €1.96 additional net profit per cow.

Higher-EBI herds also perform better across the traits that drive profitability. In 2025, the top 20% of manufacturing herds for EBI produced more milk solids, had better fertility and udder health, and had lower emissions intensity than the herd average.

Table 1. Relationship between EBI and dairy herd performance in Irish manufacturing herds (2025)

Top 20% EBI advantage over herd average	2025 result
Milk solids	+52 kg/cow
Six-week calving rate	+12 percentage points
Calving interval	13 days shorter
SCC	39,000 cells/ml lower
Emissions intensity	0.09 kg CO_2e/kg FPCM lower

Source: ICBF, 2025 Key Performance Indicators in Manufacturing Dairy Herds.

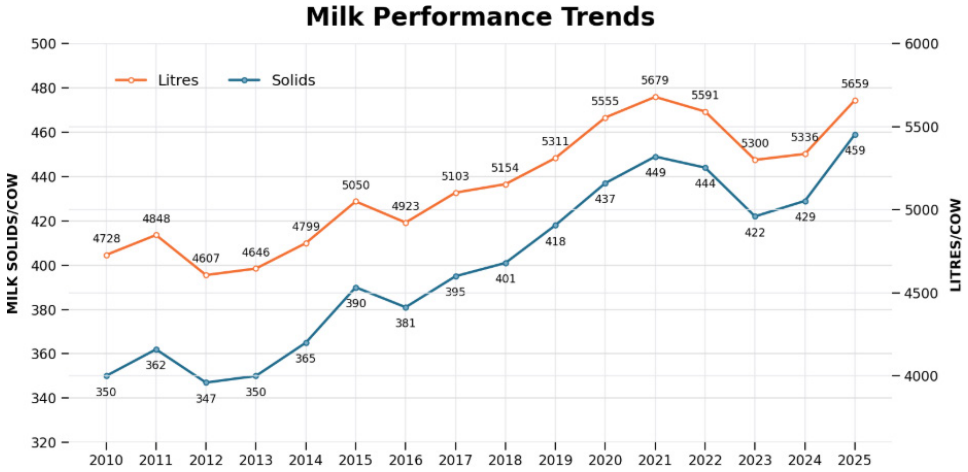


Figure 2. *Milk litres and milk solids (kg) per cow from 2010 to 2025 (Source: ICBF, 2026)*

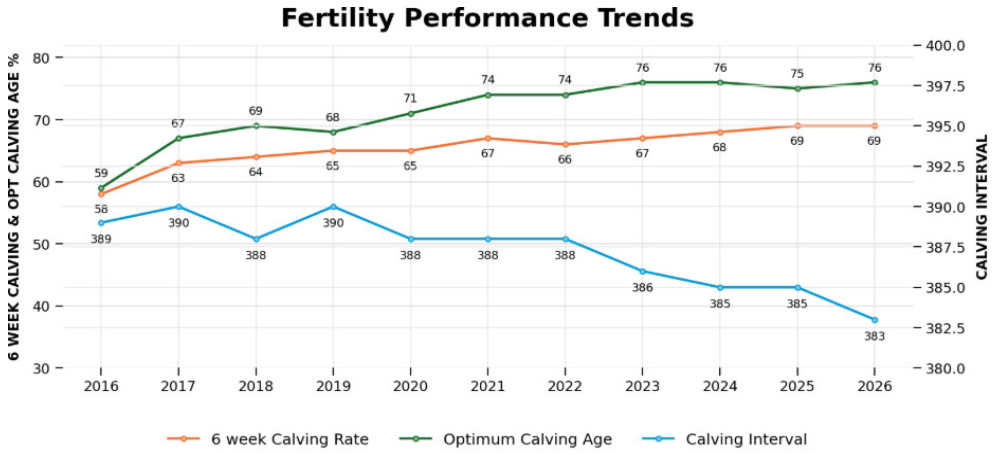


Figure 3. *Trends in six-week calving rate, optimum calving age and calving interval. (Source: ICBF, 2026)*

More milk solids, without losing sight of the whole cow

EBI increases milk solids through several routes. Direct improvement in fat and protein yield and concentration remains important, but better fertility means more days in milk, better survival allows more cows to reach mature production, and improved health and calving performance increase saleable milk while reducing intervention costs.

Because these traits work together to determine overall performance and profitability, they cannot be considered in isolation. Selecting only for milk can create costs elsewhere through poorer fertility, reduced survival, poorer health or higher maintenance requirements. EBI assigns an economic value to each and combines them into one overall measure, ensuring that gains in production are balanced against their impact on fertility, survival, health and maintenance costs. Two bulls can have the same overall EBI but arrive at it through different combinations of strengths and weaknesses. The overall EBI identifies economically attractive animals, while the sub-indexes allow farmers to fine-tune selection to the needs of their own herd.

Farmer chooses the system: EBI captures what the cow costs and what she delivers

Cow size creates both costs and returns. The Maintenance and Beef sub-indexes therefore account for both the input costs and potential outputs delivered.

MAINTENANCE: THE COST SIDE	BEEF: THE VALUE SIDE
A larger heifer requires more energy to reach mature size, and a larger cow requires more energy simply to maintain herself each year. When milk, fertility, health and other functions are held constant, that additional energy is an economic cost.	Size can also create value. A larger cow may produce progeny with greater beef merit and can have a higher value herself when she leaves the dairy herd. The Beef sub-index captures this contribution to the dairy enterprise.

Read together, the objective is clear: EBI is not trying to breed the smallest cow, nor is it rewarding size for its own sake. It is seeking the economically optimum cow when the cost of rearing and maintaining her and the beef value from her and her progeny are considered together. Sexed semen and use of better-quality beef bulls (i.e. high DBI beef bulls) negate some of the impact of poor beef characteristics of the dairy dams.

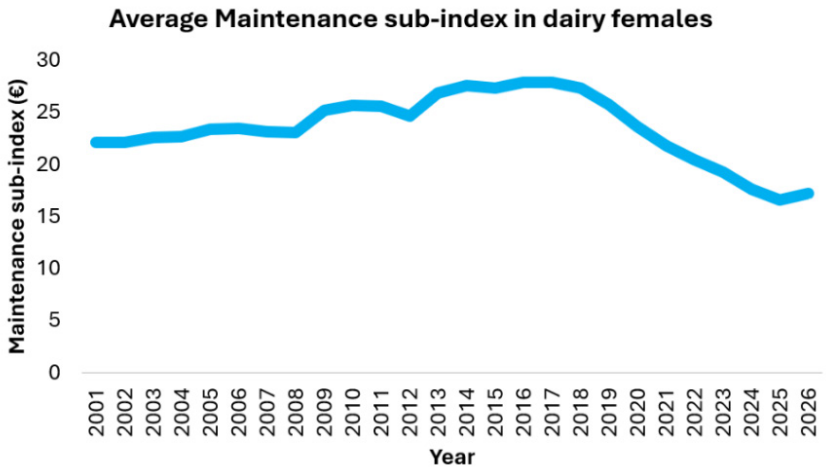


Figure 4. *Average Maintenance sub-index in dairy females, 2001–2026. (Source: ICBF, 2026)*

EBI does not ask whether a bigger or smaller cow is better. It asks which cow leaves more profit behind when all her costs and outputs are counted.

DNA-based registration and connected national data strengthen EBI

Ireland's breeding programme is supported by a connected national data infrastructure. Animal identity, pedigree, genotypes, milk recording, fertility, calving, health, movements, slaughter and carcass information can be linked across the life of an animal and across the dairy and beef sectors. This allows the economic consequences of breeding decisions to be followed well beyond the milking herd.

DNA-based calf registration strengthens that system further. Through the National Genotyping Programme, parentage can be verified before registration and passport issue. This prevents incorrect sire or dam information from becoming embedded in the national database and gives greater confidence that records are assigned to the correct animal and family. The genotype can then be combined with pedigree and performance information in genomic evaluations, providing a more reliable EBI earlier in life.

The practical impact is significant. Farmers can identify superior replacement females sooner, breeding programmes can screen more young animals, and parentage corrections can flow into routine weekly genomic evaluations. DNA-based registration is therefore more than an identification tool: it improves data quality at source and strengthens the accuracy, timeliness and usefulness of EBI.

EBI is breeding a cow for a less predictable grass-growing season

The cow selected today will enter a different operating environment. Weather has always influenced grass supply, but farmers are increasingly managing sharper contrasts across the year: wet springs that delay turnout and reduce utilisation, dry summer periods that restrict growth, and milder but wetter autumns and winters that may extend biological growth while limiting grazing access because of soil conditions. The timing of grass growth can become less predictable even where annual production remains strong.

This places greater value on fertility, survival, health, moderate maintenance requirements and the ability to recover from short-term nutritional or environmental pressure. A compact-calving, fertile cow

can make better use of early-season grass when conditions allow. A healthy, long-lived cow reduces the replacement burden when feed is challenged. A cow with an appropriate maintenance requirement leaves more available feed for productive output. EBI cannot predict the weather, but balanced genetic improvement can breed a herd that is less exposed when the season does not follow the expected curve.

Genetic gain is cumulative and permanent. Bulls selected now will have daughters entering the herd several years from now, and those daughters may remain there well into the 2030s. EBI is therefore breeding the next decade's cow, not merely next year's heifer.

What should farmers do?

- Use overall EBI to drive balanced genetic gain. Do not let a single trait dominate the entire breeding programme.
- Use the sub-indexes to address herd priorities. Protect what is working and put added emphasis on genuine weaknesses.
- Think in lifetime milk solids. Fertility, survival, health and calving performance all influence the amount ultimately sold.
- Read Maintenance and Beef together. Cow size carries both a lifetime energy cost and a potential beef return.
- Use DNA information and keep recording. Verified parentage, genotyping, milk recording and health data strengthen evaluations for every herd.
- Match genetics with management. EBI identifies potential; grassland, nutrition, health and reproductive management determine how much is realised.

Conclusion

EBI has moved Irish dairy breeding beyond the pursuit of one trait or one type of cow. It is a proven, balanced and adaptable breeding objective that works across dairy systems because it counts the major sources of income and cost associated with the animal. The farmer chooses the system. EBI helps provide the genetics to make that system more profitable, efficient and resilient.

The cow of the future will not simply be the animal with the highest EBI. She will be an animal who has the genetic potential to produce high value, high solids milk from a predominantly grass based diet, will go in calf efficiently, while remaining healthy and productive for multiple lactations, and maintaining a low environmental footprint.

The unique incorporation of both the Maintenance and Beef sub-indices shows the whole-enterprise thinking of EBI in practice. Its value is strengthened further by DNA-based registration and Ireland's ability to connect genomic, performance and lifetime animal data. These foundations allow EBI to continue breeding cows that deliver more saleable milk solids, remain productive for longer and cope with increasingly variable grass-growth and grazing conditions.

The EBI is not just a tool for selecting the next generation of dairy cows; it is a proven technology shaping the future of profitable, efficient and sustainable dairy farming.

Workshop 2: Best practice in farmyard design

Workshop 2 Speakers

Patrick Gowing

Dairy Specialist, Teagasc Portlaoise, Co. Laois



Patrick qualified from UCD in 2002 with a B.Agr.Sci. He started his career with Teagasc as a dairy advisor in Sligo/Leitrim for 3 years before working in the same role in Westmeath for 5 years. In 2015 Patrick was selected to lead the new Teagasc dairy expansion service which was set up to help expanding farmers and new entrants post quota. In that time Patrick completed over 1,000 farm business plans to help farmers in their expansion journey. In 2021 Patrick joined the dairy Kt team as a dairy specialist focusing on the areas of farm finance, farm infrastructure and AMS.

Séamus Nolan

Scheme Support Unit Specialist, Teagasc, Castlerea, Co. Roscommon



Séamus Nolan is a Schemes Support Specialist providing back up to Teagasc advisors in relation to DAFM schemes and compliance with a main focus on TAMS and Nitrates / Derogation requirements. Prior to his current role Séamus worked as a Dairy Advisor providing technical advice and scheme support to Dairy farmers with over 25 years' experience in that area.

John Moriarty

Dairy Advisor, Teagasc, Midleton, Co. Cork.



John qualified from UCD in 2012 with a B.Agr.Sci. He worked in the pig industry for four years before returning to UCD to complete M.Agr.Sc in knowledge transfer. He started his career in Teagasc co-ordinating two EU horizon 2020 projects before working as a scheme's advisor and dairy advisor in Teagasc Fermoy. Since 2023 he has worked as a dairy advisor in the Teagasc Midleton Office working with dairy farmers in the south and east Cork areas.

Best Practice in Farmyard Design and TAMS

John Moriarty[1], Seamus Nolan[2], Patrick Gowing[3] and Padraig O'Connor[4]

[1]Teagasc, Advisory, Midleton, Cork; [2]Teagasc Advisory, Castlerea, Roscommon; [3]Teagasc, Portlaoise, Laois; [4]Teagasc, Grange Research Centre, Dunsany, Co. Meath

Summary

- Average herd size is no longer growing but there is still investment required at farm level
- Costs of developing infrastructure in your farm have increased dramatically
- Slurry capacity regulations are increasing from 0.33m3/cow/week to 0.4m3/cow/week in October 2028.
- 50% of farmers surveyed do not have sufficient slurry storage when new regulations are taken into consideration.
- Use Teagasc guidelines to help design any future investment.
- Nutrient Storage Scheme was added to TAMS to help farmers with increasing slurry capacity with a grant rate of 60%

Introduction

Since 2015 we have seen significant expansion in cow numbers but over the last 2-3 years the national herd has stabilized and is no longer growing at the same pace. However, there is still significant investment required on farms to bring the facilities up to match the herd size currently on farms. Also, in this same period we have seen significant inflation in the cost of investment in farmyards. This makes it all the more important that any future farm investments are planned and designed using best practice guidelines to ensure you are future proofing your farm and getting the best return from your investment.

Housing Investment Costs (ex VAT, guideline figures)

Item	Quantity	Cost (€)	Total/cow (€)
Cubicles	1	2,310	2,310
Slurry (m^3)	7.26	165	1,200
Silage Pit	1	500	500
Calving pens	0.02	5,000	100
Calf Housing	0.33	1,200	396
Total/cow			4,506

Milking Parlour Investment Costs (ex VAT, guideline figures)

Item	Quantity	Cost (€)	Total/cow (€)
Shed	1/8	10,000	1,250
Plant	1/8	10,000	1,250
ESB	500	5,500	69
Bulk tank	60	3	180
Total/cow			**2,749**

On farm Investment Needs

John Moriarty from Teagasc Cork East, recently completed a survey of discussion group members in the cork area to establish their future development needs.

The average herd size of the farms surveyed was 163 cows currently with plans to increase by 13 cows by 2030.

The survey was split into 3 main areas, milking facilities, housing, slurry capacity and calving/calf sheds.

On the milking facilities the average number of rows per milking was 10 rows with a range of 7-14 rows on farm. When asked 35% of the farmers intend on investing in their milking facilities. Twenty % of the farmers intend to construct a new parlour over the next 5 years. There are insufficient holding yards on 20% of the farms where the holding yard did not have $1.5m^2$/cow currently. Over half the farmers surveyed do not have automatic drafting currently installed on their farms.

On slurry storage, 85% have enough slurry capacity for the current regulations regarding slurry storage. However, when asked if they have enough capacity when the regulations change from $0.33m^3$/cow/week to $0.4m^3$/cow/week in October 2028 only 50% of the farmers will be compliant and will need to invest in slurry capacity to be able to retain their current cow numbers. Worryingly, only 20% of the farmers who require additional slurry storage have started the process of planning permission and TAMS applications.

There was an average of 198 cubicles/farm reported in the survey.

The final area the survey focused on was calving area and calf sheds. On average the farms have enough area to hold 14% of the herd in the calving area on farm based on 8m^2/cow floor area available. However, 60% of the farms were under 15% available and will require additional investment. The target is to have a calving area that can cater for 10% of your herd with 15% deemed to be best practice.

On calf sheds 25% of the farmers don't have enough space in their calf sheds to allow for all calves at 2m^2/calf and require further investment. On the feeding systems 40% of the farms use an automatic calf feeder to feed their calves.

Based on the results of the survey, there is still significant investment required on farms and this will have to be planned properly to future proof the farm.

Farmyard layout – Guidelines

"Good design fixes all problems"

Most of our farmyards have developed over time with a new feature added typically every other year often without consideration for the overall flow and design of the yard.

Now is the time to step back and have a hard look at your yard as there are many aspects we have to take into consideration but if we can design it right it will minimise soiled water issues, reduce labour and improve lameness in the herd.

Your farmyard should always be designed with a larger herd in mind. It does not cost anything to leave space behind a shed for potential future development even if the herd never grows.

Based on this, Teagasc have developed some design principles you should consider when planning your yard.

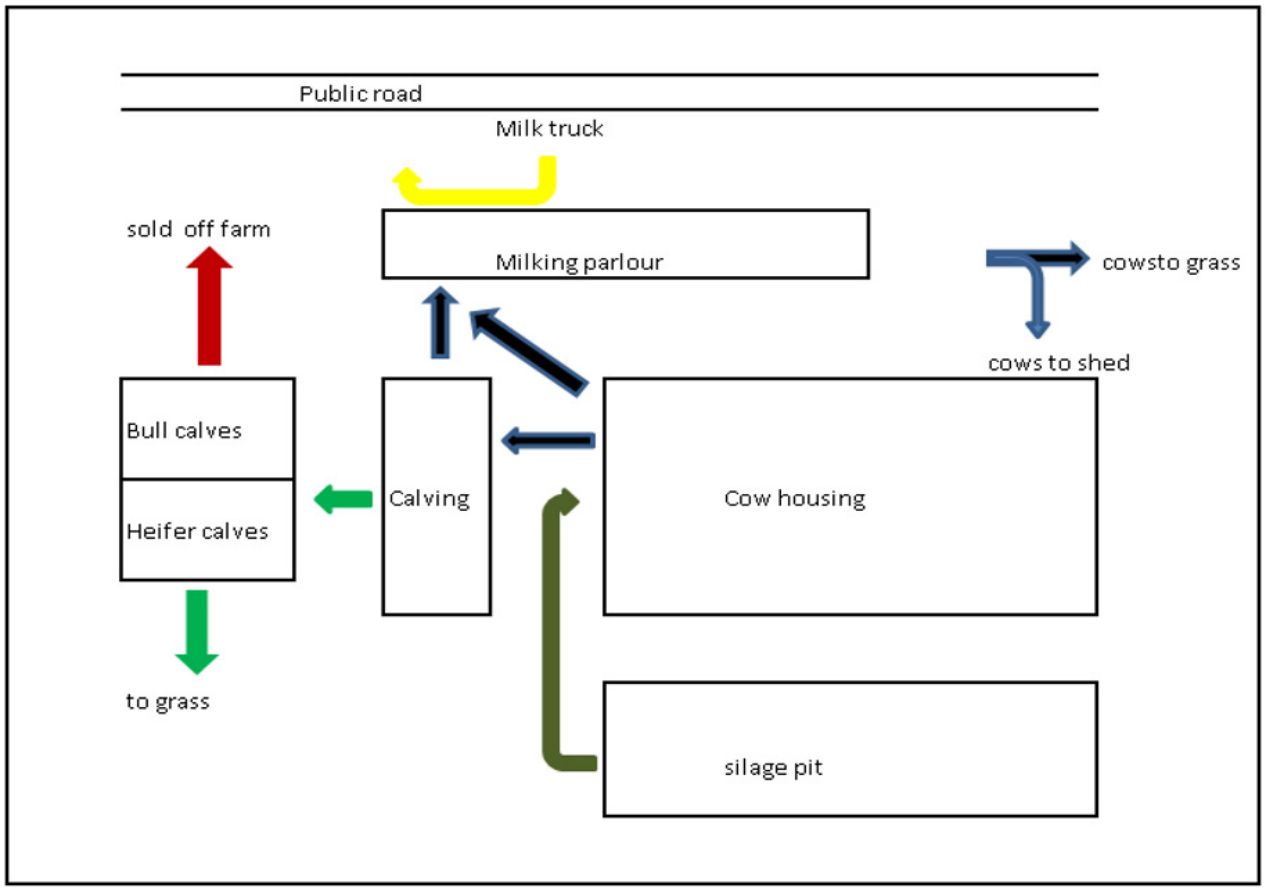
Design Principles for designing a farmyard:

- 3 Main movements on a dairy farm
  - » Milk lorry
  - » Cow movement
  - » Machinery
- They should not cross over – allow each to operate individually
- Allow for future expansion. Develop the farm in streets rather than courtyards
- Locate silage and other feed storage facilities close to the feeding area.
- Do not locate silage pits or drystock housing between cow wintering unit and milking shed.
- Locate the exit from the main housing in close proximity to the holding yard entry (5-10m) to reduce movements across open yards.
- Separation of soiled water, clean water and slurry.
- Calving boxes associated with cubicle shed and close proximity to the milking parlour
- Minimize turns from paddock to holding yard entry. Plan for 3 turns maximum and use bends rather than 90 degree turns on farm roadways
- Face open sided sheds towards sheltered side as 70% of wind/rain comes from South-West.
- Locate cattle crush and holding pen adjacent to the milking parlour and winter accommodation.
- Have an appropriately sized handling facility with good animal access.
- Allow for expansion of milking facilities, winter accommodation and slurry storage
- Divert surface runoff from higher ground and divert roof water to clean drains

To access plans and ideas of well-designed sheds please click the following link:

https://teagasc.ie/rural-economy/farm-management/farm-buildings/virtual-farmyard-tours/

This will bring you to a series of virtual tours show casing best practice in all aspects of farmyard design



TAMS 3 – Nutrient storage

The Targeted Agricultural Modernisation Scheme (TAMS) was first launched in 2010 with an initial focus mainly on Animal housing, Silage bases, Dairy equipment and facilities as well as LESS equipment and certain items relating to farm safety. Since its initial inception TAMS has been updated and extended covering successive Rural Development Programmes with the latest TAMS 3 launched in 2023 spanning twelve schemes covering a broad spectrum on farm investments mainly focussed on Water quality, Farm safety and Animal welfare. The standard grant rate allowed is 40% while Young trained farmers, organics and Women farmers can avail of an enhanced rate of 60%. All applicants are eligible for a 60% grant on certain investments relating to Solar and LESS equipment as well as Farm safety and Nutrient storage.

The Nutrient Storage Scheme was the latest addition to the TAMS 3 portfolio. It provides 60% grant rate to all successful applicants regardless of age or gender. Nutrient storage investments are prioritised under TAMS 3 as they play a vital role in Irelands quest to improve water quality. The following points should be noted in relation to this scheme

- Independent TAMS ceiling of €90,000 for individuals, companies and joint ventures and €160,000 ceiling for Registered farm partnerships all at 60% rate.
- Eligible investments include mass concrete tanks and approved tank covers, manure pits, Circular and Geo-membraned lined stores
- Full planning / Planning exemption must be granted prior to application
- Applicants must be nitrates compliant for the most recent completed winter
- Nutrient storage investments are prioritised under Ranking and selection and attract an additional 40 points which should almost guarantee progression to final stages of approval.
- Approvals last for 12 months but applicants can apply for a 6-month extension subject to certain conditions
- All investments must be up to the relevant specification, and it is important that any contractor employed is familiar with same.
- If you apply as a Registered farm partnership, the partnership must remain in place for 5 years post payment of claim otherwise there may be a liability to clawback of claims over the €90,000 individual ceiling.

As with all investments it is important to shop around to obtain best value and maximise TAMS grant return especially in relation to concrete and contractor prices. Grant spec concrete must be specified with the supplier when ordering same otherwise certification may not be forthcoming.

Conclusions

There is still investment required on Irish farms to "catch up" with the increased herd size. The cost of investment in farmyard infrastructure has increased dramatically over the last number of years. Careful planning and consideration are required to make sure you are designing your farm correctly and future proofing your farm. Start the process early as it takes significant time to move from the design phase, planning, TAMS application and finance approval before you can commence building.

Workshop 3: Troubleshooting dry cow nutrition for a better calving season

Workshop 3 Speakers

Dr. Aisling Claffey

Teagasc Grange Research Centre, Dunsany, Meath



Aisling joined Teagasc as the Ruminant Nutrition Specialist in 2024. She completed a PhD in Teagasc Moorepark, in collaboration with UCD, on autumn and spring grazing management, and pasture allowance in early lactation dairy cows. Prior to this role, Aisling spent five years working in industry as a dairy specialist, with a particular focus on nutrition.

Fachtna Collins

Carhuvouler, Clonakilty, Co. Cork



Fachtna, Joan and Michael Collins, farm in partnership in Clonakilty, Co. Cork, running a 109 cow Dairy herd with 24 in calf heifers and 24 replacement heifer calves, supplying Lisavaird co-op which is part of the Carbery group. Fachtna and Michael supplied 509 kgs MS/Cow in 2025 on 1.1 t/concentrate/cow. All calves are reared on whole milk. The spring calving Fresian Holstein herd has an EBI of 185, calving interval of 366 days and 81% calved in 6 weeks. Total area farmed is 70ha, with a 28ha milking platform and 2 outside blocks, with 2.5 ha of maize purchased from a local contractor. The Collins' also run a calf to beef system, rearing 60 angus bullocks and heifers, with the heifers carried to slaughter and bullocks sold after the first winter. Seventy-five % of these stock are high CBV AA A.I with the remaining 25% from AA stock bull. Calving starts in mid-January; with the beef enterprise aiming to have all beef stock slaughtered by the second week of December. Fachtna and Michael are taking part in the Carbery/Teagasc monitor farm programme. Grass utilization is a high priority for the Collins family; an underpass has been installed with several years and good access to paddocks has been established to mind wetter ground and enable early turn out. Michael plays football and hurling with his local club St Oliver Plunketts and will be playing a Junior B county semi-final in the next week or two

Maresa Sheehan

Department of Agriculture, Food & Marine, Kilkenny.



Maresa Sheehan worked for eight years in large animal practice, she now works in Kilkenny Regional Veterinary Laboratory as a Senior Research Officer where she provides a postmortem/diagnostic service to farmers through their vets. Research interests include parasitology, herd health and disease surveillance. She is a Fellow of the Royal College of Pathologists.

Dr. Denise Murphy

Department of Agriculture, Food & Marine, Athlone.



Dr. Denise Murphy – Department of Agriculture, Food & the Marine. Denise is a veterinary Research Officer in Athlone Regional Veterinary Laboratory, where her role includes the post-mortem examination of farmed animals and on-farm animal disease investigation. She qualified as a vet from UCD in 1997 and was awarded a PhD for research on tuberculosis in badgers in 2009. She is the current lead of the Wildlife Group within DAFM laboratories.

Troubleshooting dry cow nutrition for a better calving season

Aisling Claffey[1], Denise Murphy[2] & Maresa Sheehan[3]

[1]Teagasc, Animal and Grassland Research and Innovation Centre, Grange; [2]DAFM Regional Vet Laboratory, Athlone; [3]DAFM Regional Vet Laboratory, Kilkenny

Summary

- Ensure adequate Magnesium is offered to cows daily (~ 30 g supplemental Mg/cow/day)
- Choose an appropriate pre-calver mineral and supplement for 8 weeks pre-calving
- Mitigate further risks by identifying high risk forage and avoid feeding to cows 2-3 weeks pre-calving
- Ensure cows are in optimal body condition score at calving (3.0-3.50)

Introduction

In a recent transition cow health and management survey of Irish dairy farms (L. Horan *et al.*, 2025), 23 % of farms reported clinical incidences of milk fever in over 4 % of the herd and 26 % of herds reported up to 3 % incidences of displaced abomasum, with a target of ≤ 1 % of the herd for both disorders. Hypocalcaemia is often referred to as a 'gateway' disorder.

Over two-thirds of farms had excessive cases of milk fever in their herd. In addition to the primary clinical presentation of milk fever, a large cohort of cows within the herd will be sub-clinical. This cohort of animals are at a much higher risk of subsequent health and metabolic disorders in early lactation.

Calcium (Ca) plays an important role in muscle contractions and a functioning immune system. A rapid onset in demand for Ca in the mammary gland occurs at the point of calving. This lowers blood Ca levels. Maintaining optimum Ca status is supported by the release of Parathyroid hormone (PTH) to stimulate bone mobilisation of Ca stores, reduce Ca losses from urine, and activate the production of calcitriol (a Vitamin D hormone that increases Ca absorption in the intestines).

Clinical signs of hypocalcaemia/low blood calcium

The Dept. of Agriculture, Food and the Marine Regional Veterinary Laboratories (RVL) provide post-mortem (PM) and diagnostic testing services to farmers via their local veterinary practice. Stillborn calves submitted for PM examination are routinely examined for both infectious and non-infectious causes. Investigations into some of these cases reveal a wider herd level issue of sub-clinical and clinical hypocalcaemia.

Impaired muscular function, due to low blood Ca, can reduce uterine contractions and prolong calving. This can result in weak, acidotic calves, that are less inclined to suck or stand, and in some cases can result in still births. For many farmers, this may raise the question of Iodine deficiency, but the reality is the typical inclusions of Iodine in pre-calver minerals (500mg/kg) far exceeds the requirements of the late-gestation dairy cow. In addition, there are limited compounds that impair Iodine absorption (an exception being goitrogens that are present in brassica crops). Reduced uterine contractions can increase the risk of retained placentas and delay uterine involution.



Figure 1. *Prolonged calving resulting in meconium-stained calf. Prolonged calving can be caused by subclinical hypocalcaemia (Credit: Teagasc)*

Other outcomes of this impaired muscle function are reduced rumen contractions, leading to supressed dry matter intake (DMI) and a negative energy balance. This will impact on early lactation milk production but can also increase the risk for metabolic disorders (ketosis, fatty liver) and displaced abomasum. It may also impair closure of the teat sphincters, leaving the mammary gland more exposed to environmental bacteria and mastitis. Calcium also has an important role in the immune system. Immune suppression may give rise to increased risk of mastitis and metritis (following slow/hard calving, retained placenta, delayed uterine involution).

Hypocalcaemia/Low Blood Calcium

The dietary supply of Magnesium (Mg) and Mg absorption have a major influence on the cow's Ca blood calcium status via effects on PTH secretion and tissue responsivity to PTH. Achieving 0.4 % Mg in the diet consumed by the dry cow (~ 48 g Mg for a cow eating 12 kg DM grass silage) is essential to optimise Ca mobilisation and prevent hypocalcaemia. Typically, silage supplies 14-20g Mg/cow/day, the remainder must be supplemented daily (~ 30 g Mg). The quantity supplied in the pre-calver mineral, and/or other supplementary sources (see Table 1), and the quality and consistency of on-farm practices around daily supply of minerals to the dry cows will have a large impact on Mg intake.

Table 1. Magnesium supply from a pre-calver mineral offered at 100 g/cow/day depending on Mg inclusion and options to boost supplemental Mg to cows in the final 2-3 weeks pre-calving

	Mg content	Offered (g/cow/day)	Supply of Mg (g/cow/day)
Pre-calver mineral	18-30 % Mg	100 g	18-30 g
		Offered g/cow/day (to boost Mg supplementation)	
CalMag	56 % Mg	20 g	11 g
Sweet. CalMag	33 % Mg	30 g	10 g
Mg Cl flakes*	12 % Mg	100 g	12 g

Other factors that affect calcium homeostasis

Other mineral related factors that increase the risk of hypocalcaemia are

- Excess dietary K (aim for < 2.0 % K in forage);
- High DCAD (aim for + 0 to 100 mEq/kg DM, ideally less than + 200 mEq/kg DM);
- Excess dietary P (maintain diet at 0.3 % P of DM); and
- Insufficient Vitamin D supplementation (22000 IU/cow/day required)

The K concentration of the forage is a key driver of positively elevated DCAD in most grass silages and therefore, mineral analysis of the forage available within the yard will identify high risk silages as individual crops can test up to 5 % K (mean 2.14 % K of DM).



Figure 2a. *Grass silage sample with elevated K concentration (2.83 % K) and DCAD (CAB; 410 mEq/kg), increasing the risk of hypocalcaemia within the herd*

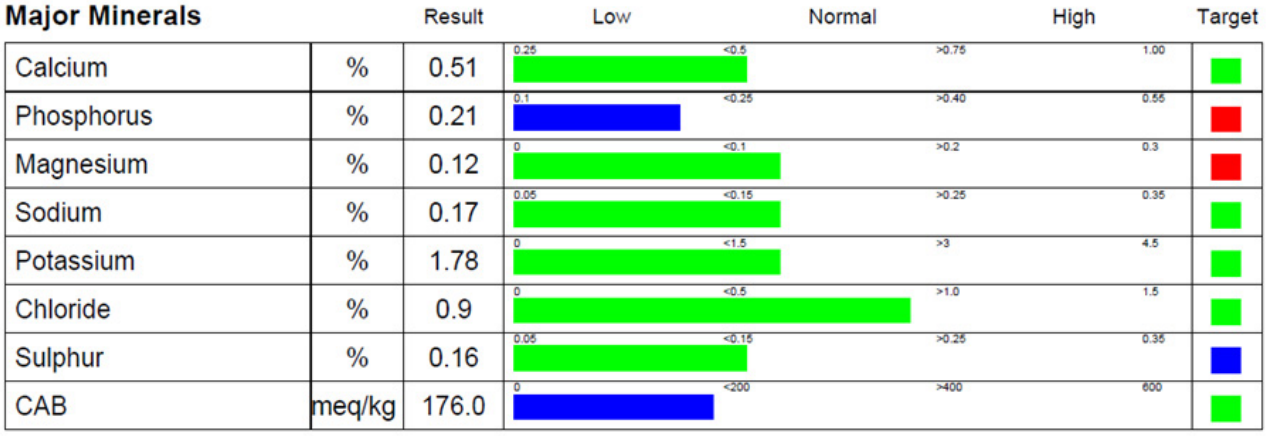


Figure 2b. *Grass silage sample with moderate K concentration (1.78 % K) and DCAD (CAB; 176 mEq/kg), which is more appropriate for feeding to cows 2-3 weeks pre-calving*

Table 2 below encompasses an example grass silage mineral analysis, the quantity of each mineral component supplied at an assumed DMI of 12 kg DM/cow and pre-calver mineral offered at 100g/cow/day. It compares the dietary supply and cow requirement for each mineral on both a quantity (g or mg)/cow/day and on a DM basis. Adequate supplies are highlighted in green while below optimal (e.g. Mg) or potential antagonisms (K, DCAD, Iron and Molybdenum) are highlighted in yellow.

Offer pre-calver mineral for 8 weeks pre-calving to support foetal development and to meet the demands on the cow for colostrum production and transition to lactation. It is important to note that micro-minerals are typically included in the pre-calver mineral at the max. permittable level under EU regulation EC No 1831/2003. In commercially available products Mg availability can range from 18-30 %, and vitamin levels, which are typically lost during the fermentation process, may be inadequate so cognisance should be paid to these.

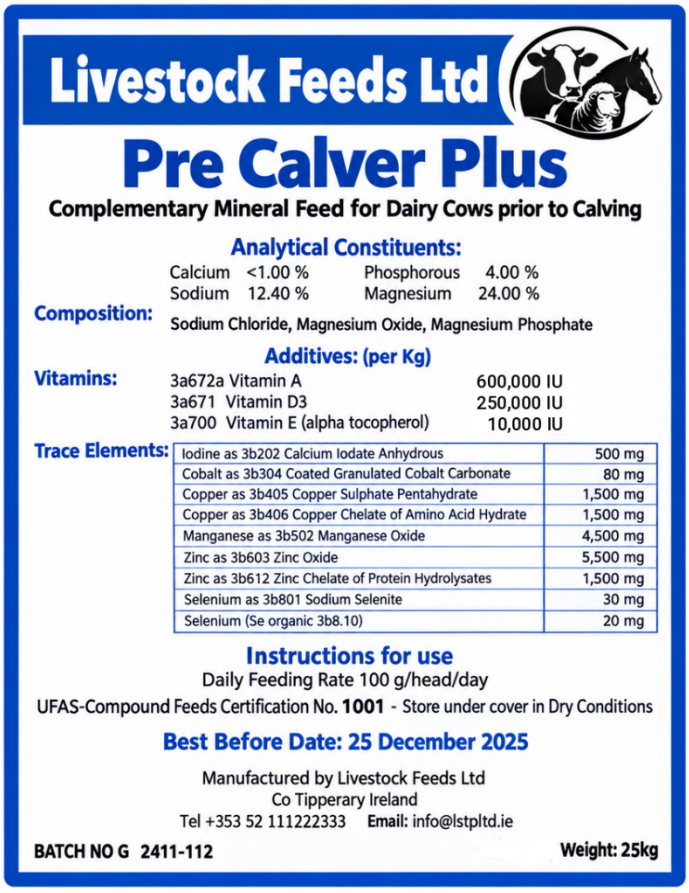


Figure 4. *Example pre-calver mineral label used to calculate total dietary supply in table 2.*

Vitamin D has an important role to play in Ca homeostasis (calcitriol production) and immune function. The cow has limited stores of it, similar to Mg, so daily supplementation is critical (c~ 22000 IU/cow/day).

Vitamin A is critical for bone and organ development in the growing foetus, in addition to immune function and vitamin E requirements increase rapidly in the final weeks pre-calving due to its role in colostrum production and its works in conjunction with selenium to improve cow health outcomes, particularly in relation to SCC and mastitis. Vitamin A and E can be stored in adipose tissue and liver to help support shortfalls during this period.

It is important not to overlook the importance of having cows in an optimal BCS (3.25) at calving also, with a herd level range of 3.0-3.5. Care should be taken to monitor BCS of individual cows again at dry-off and respond appropriately to thin (≤ 2.75) or over conditioned cows (≥ 3.5) during this period

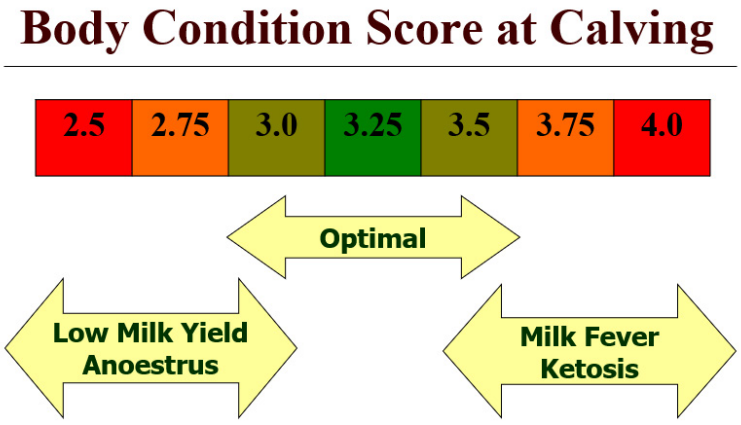


Figure 5. *Body condition score at calving and associated health risks*

Conclusion

The knock-on effects of clinical and sub-clinical hypocalcaemia can be far reaching; reduced DMI, impaired milk production, increased BCS loss and higher risk for metabolic disorders and infections, all of which may contribute to suboptimal fertility outcomes. Mitigate these risks by identifying high K/high DCAD forages and do not offer these to cows that are 2-3 weeks from calving, ensure you are consistently achieving at least 30 g of Mg supplementation daily and supply a good quality pre-calver mineral for the

final eight weeks of gestation to meet the demands on the cow during this period of rapid foetal growth. Finally, excess body condition score at calving is an important but often-overlooked factor in milk fever prevention- manage energy intake through dry period with the aim of calving cows at target BCS

Table 2. Comparison of the dietary supply and cow requirement for each mineral, on both a quantity (g or mg)/cow/day and on a DM basis, assuming a DMI of 12 kg DM/cow of grass silage and pre-calver mineral offered at 100 g/cow/day

Macro-mineral (% of DM)	Magnesium	Calcium	Phosphorus	Sulphur	Sodium	Chloride	Potassium	DCAD (mEq)
Grass Silage* (% of DM)	0.17%	0.61%	0.28%	0.21%	0.12%	0.86%	1.99%	189
Total g supplied @ 12 kg DMI silage	20.4	73.2	33.6	25.2	14.4	103.2	238.8	2268
Total g supplied/100g mineral as fed	24	1	4	-	12	-	-	52
Total dietary supply (g/cow/day)	44.4	74.2	37.6	25.2	27.4	103.2	238.8	
Total Supplied % of DM	0.37%	0.62%	0.31%	0.21%	0.23%	0.86%	1.99%	193
Requirement (% of DM)	0.40%	0.40%	0.20%	0.20%	0.17%	0.14%	0.70%	<100
Req. g/ cow/ day @ 12 kg DMI/ cow/day	48	48	24	24	20.4	16.8	85	
Balance								
Micro (mg of DM)	**Cobalt**	**Copper**	**Selenium**	**Iodine**	**Manganese**	**Zinc**	**Molybdenum**	**Iron**
Grass Silage* (mg of DM)	0.16	7.3	0.07	0.25	106	31	1.4	435
Total mg supplied @ 12 kg DMI silage	1.92	87.6	0.84	3	1272	372	16.8	5220
Total mg supplied mineral/ 100g as fed	8	300	5	50	450	700	-	-
Total dietary supply (mg/ cow/day)	9.92	387.6	5.84	53	1722	1072	16.8	5220
Total Supplied (mg of DM)	0.83 mg	32.3 mg	0.49 mg	4.4 mg	226 mg	89 mg	1.4 mg	435 mg
Requirement (mg of DM)	0.20 mg	19 mg	0.3 mg	0.55 mg	40 mg	30 mg	-	15 mg
Req. mg/ cow/ day @ 12 kg DMI/ cow/day	2.4	228	3.6	6.6	480	360	-	180
Balance								

**Grass silage macro-mineral analysis supplied in row 2 and micro-mineral analysis supplied in row*

Workshop 4: Is 14 tonnes DM grass grown still a realistic target?

Workshop 4 Speakers

Prof. Michael O'Donovan

Teagasc Animal & Grassland Research & Innovation Centre, Moorepark, Cork



Prof. Michael O Donovan is Head of Grassland Science in Teagasc, based in Moorepark. Originally from Bantry in West Cork, he completed a bachelor's degree in agriculture, followed by a Masters and PhD with UCD based in Moorepark. He has worked in grassland science research since, completing numerous funded projects and supervising many postgraduate students. He leads the work on Pasturebase Ireland and Pasture Profit Index in particular and carries out extensive outreach work with groups and advisers. He has worked on many collaborative internal and cross-country projects, most notably with INRAe in France. He has recently co-ordinated a 14-country consortium for the new EU Horizon GrassWise project.

Nikki Kennedy

Grass10, Teagasc Grange Research Centre, Meath



Nikki Kennedy joined Teagasc in 2025 as a Grass10 programme advisor. Nikki holds a degree in Agriculture from Lincoln University, New Zealand and during her time studied at UCD. Currently farming and with a strong, practical on-farm background, Nikki's focus is helping farmers grow and utilise more grass on their farms through a practical farm-based approach.

Increasing grass dry matter performance in Irish dairy farms

Michael O'Donovan[1] and Caitlin Looney[1]
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Summary

- Annual pasture dry matter (DM) production averages 13.1 t DM/ha on PastureBase Ireland farms from 2014-2026, however there is a large variation between farms
- Soil pH is improving on dairy farms, but soil fertility is suboptimal on 76% of soil samples tested
- Prevision nitrogen management with grass/clover swards is a critical component of grazing management
- Pasture management needs to be used in combination with other decision supports tools. PastureBase Ireland provides several grazing management tools to improve grazing management decisions

Introduction

Irish grassland dairy farms have experienced significant transformation over the past decade. Stocking rates have increased, and chemical nitrogen (N) fertiliser use has decreased, but farms face new challenges. When long term meteorological data from the period 1991 to 2020 was compared with the period 1961 to 1990, Ireland's climate has become 0.7 ˚C warmer and 7% wetter (Flattery, 2024). Prolonged periods of moisture deficit (June-August) reduce peak grass growth, this was clearly experienced in 2026. The main challenge facing dairy farmers today is to increase grass growth and grass utilisation. While grass growth varies daily depending on the prevailing weather conditions, the grassland industry has made major technological improvements in recent years to assist grassland management decision making. Growing grass at a consistent level ensures that the farm is less dependent on imported feed (concentrate and purchased silage) to sustain the farm stocking rate. The Climate Action Plan 2023 set a national maximum limit for chemical N use of 300,000 tonnes (t) by 2030; 282,000t were used in 2023, 310,000t in 2024, 349,293t in 2025, indications are that N usage has reduced by 8% in 2026. Successful grazing management is the 'sum of all the parts'; when one of the key components is not in place, grassland performance declines. This paper explores the options available to improve current grazing management practises and discusses the strategies to increase farm herbage growth capacity.

Grazing management performance on PastureBase Ireland farms

Grazing management and grass DM production data from 263 farms recording >35 covers on PBI annually over a 12-year period (2014 – 2026) are summarized in Table 1. Annual pasture growth averaged 13.1 t DM/ha during that period, with 7% variation in DM production (+/- 907 kg DM/ha) between years. Spring pasture DM production had greater variation compared with summer and autumn (Table 1). On average, over the 12 years, spring (Jan – April) pasture DM production was 1.8 (+/- 0.3) t DM/ha, summer (May – July) DM production was 6.2 (+/- 0.5) t DM/ha, and autumn (Aug – Dec) DM production was 5.3 (+/- 0.3) t DM/ha. The average number of days at grass ranged from 274 to 296 days between years, with an overall mean of 285 grazing days. Mean pre-grazing herbage mass declined from 1,611 kg DM/ha in 2014 to 1,474 kg DM/ha in 2023, which is in line with recommendations (O'Donovan *et al.*, 2022) and was associated with an increase in the number of defoliation events per year (7.1 to 8.1).

Table 1. Seasonal and annual DM production (tonnes DM/ha) from (2014-2026) on a sample of PBI farms (n = 160)

Year	Spring	Summer	Autumn	Annual	No. of Grazing and Silage Events
2014	1.6	6.4	5.1	13.1	7.1
2015	1.7	6.4	5.5	13.6	7.5
2016	1.4	6.6	5.6	13.6	7.9
2017	2.2	6.5	5.6	14.3	7.9
2018	1.3	5.0	4.9	11.2	6.7
2019	2.1	6.6	5.2	13.9	7.9
2020	2.0	6.4	5.5	13.8	8.0
2021	2.1	6.1	5.7	14.0	8.4
2022	1.9	6.0	4.6	12.5	8.2
2023	1.9	6.0	5.3	13.2	8.1
2024	1.7	5.6	4.9	12.3	8.1
2025	2.0	6.1	5.1	13.2	8.0
2026	1.9	5.9	4.2	12.0	7.7

Grazing management improvements

Stocking rates have increased over the 11-year period; the average stocking rate on the milking platform has increased from 2.8 livestock units (LU)/ha in 2014 to 3.0 LU/ha in 2025/6. The level of pasture allocation to the herd has remained constant, at 3.7 t DM/cow. Supplementation of cows with both conserved forage and concentrate increased over the 13-year period. The increase in supplementation during the grazing period is due to reductions in cumulative herbage production (particularly during the last three years), increased stocking rates, and a significant decline in chemical N input, which has resulted in input swapping on many farms in the last number of years (i.e., swapping chemical N fertiliser input for concentrate input).

The weekly pasture growth rate in 2026, the 5-year average weekly pasture growth rate (2019-2026) and the average PBI farm grass demand over the same period are illustrated in Figure 1. Daily pasture demand was approximately 40 kg DM/ha per day. The mid-season period (1st May – 1st September) had the highest daily pasture demand of approximately 59 kg DM/ha per day, and average pasture growth rate was 60 kg DM/ha over the same period. The year-to-year variation in daily pasture growth rate has increased in recent years, largely due to prolonged periods of either rainfall surplus or deficit, directly contributing to the significant increase in supplementary feeding levels in Irish dairy systems. In recent years, there has been a strong focus on spring grazing management; the date that the first rotation began advanced from Feb 21st to Feb 5th (2014 – 2026). The second rotation is also starting earlier (April 8th vs April 2nd). These changes have resulted in an increase in grass demand earlier in the season, but spring grass growths rates have not increased in tandem with this increase in demand. This shortfall in spring grass supply has been replaced with increased concentrate and silage supplementation in early lactation (Table 2).

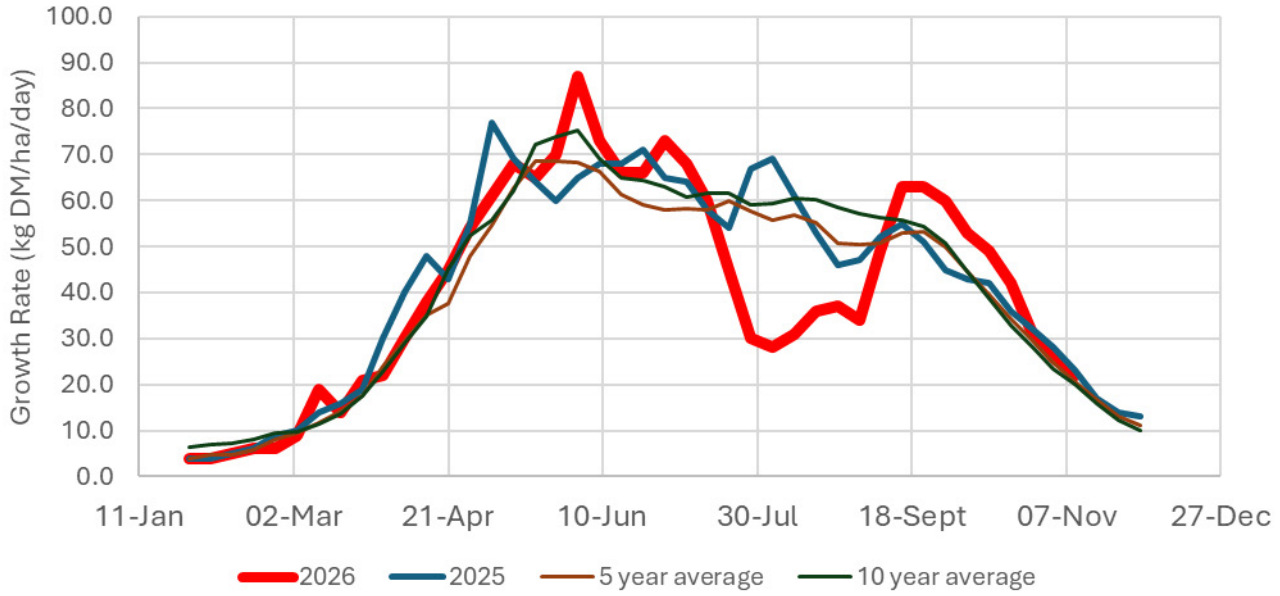


Figure 1. *Weekly grass demand and grass growth on Pasturebase Ireland dairy farms (2013- 2026)*

Farm Cover grassland targets

Across the grazing season, key farm cover targets should be achieved to maximise overall herbage production. The key targets across the year are:

- >1000 kg DM/ha average farm cover in early February (opening farm cover)
- 600 - 650 kg DM/ha average farm cover in early April (start second rotation)
- 160 - 200 kg DM/LU during mid-season (April to August)
- 1100 kg DM/ha average farm cover in mid-September (peak farm cover)
- >750 kg DM/ha average farm cover on December 1st (closing farm cover)

Spring management

Spring can be a time of low pasture availability due to low growth rates, especially if closing farm cover is behind target. Ensuring the availability of sufficient herbage for grazing in early spring requires appropriate closing grazing management in autumn, spring N fertiliser application (timing and quantity) and using spring grass budgeting. The objective is to budget the grass allocation until the start of the second grazing rotation in early April and maximise the proportion of grazed grass in the cow's diet. Recent research has indicated that herd average dry matter intake at calving is 13.2 kg DM/day, increasing by 0.8 kg per week

for the first 4 weeks, and 0.3 kg per week until a peak is reached in week 10 of lactation. Ensuring cows are fully fed during this period is crucial.

Opening farm cover (OFC) in February is a key management factor during the first rotation. For farms with a high spring grass demand (influenced by turnout date, stocking rate and calving pattern) a target OFC >1000 kg DM/ha is required to ensure high performance from grazed grass and minimize the requirement for supplementation. Spring demand on most dairy farms has markedly increased in recent years, with an earlier mean calving date, more compact 6-week calving rate and increased stocking rates. However, OFC on PBI farms over the same period (2013-2026) has not been sufficient to satisfy the increased demand on farms. The average OFC for the previous 11 years was 880 kg DM/ha (range 680 – 1004 kg DM/ha). Hence, OFC on most farms was below the target of 1000 kg DM/ha, resulting in a feed supply shortfall on these farms.

Table 2. The overall and seasonal grass demand and concentrate and forage input over the grazing season from 2014 to 2025

Year	Overall annual pasture demand (kg DM/ha/day)	Spring pasture demand (kg DM/ha/day)	Summer pasture demand (kg DM/ha/day)	Autumn pasture demand (kg DM/ha/day	Overall annual concentrate offered/cow	Conserved forage offered/ cow per year
2014	41	23	60	39	400	261
2015	43	27	63	41	464	262
2016	43	22	65	41	587	325
2017	45	30	64	43	622	315
2018	35	19	51	39	1,122	566
2019	43	27	60	43	750	356
2020	42	27	58	41	799	519
2021	42	27	59	42	857	474
2022	39	26	58	36	1,009	599
2023	42	25	56	42	892	538
2024	41	25	59	40	1066	587
2025	42	28	56	42	934	423
2026	40	27	57	35	866	1406*

**PBI data to 11/11/2026*

Mid-Season Management

The objective during the main grazing season is to maintain high animal performance from an all-grass diet, while at the same time maintaining high pasture quality. In general, from late April onwards, grass supply exceeds demand, and pre-grazing herbage mass should be maintained at 1,300 to 1,600 kg DM/ha, with a grazing residual of 50 kg DM/ha (4 cm post-grazing height). Excellent pasture quality is required to maximize animal performance from pasture in summer. From mid-April to mid-August, farm cover should be maintained at between 160 to 200 kg DM/cow with a rotation length of 18-21 days. During this period, aim to achieve six grazing rotations and utilize 7.1 t DM/ha. Paddocks with surplus grass should be removed as they are identified (i.e., baled silage) to maintain grass quality while keeping them within the grazing rotation. In periods of high growth rates, however, paddocks identified as surplus can be held for an additional period to increase silage yield and to better match growth rates and herd feed demand. Maintaining excellent herbage quality throughout mid-season is necessary to maximise animal performance from pasture. During mid-season when grass growth exceeds herd demand, the N fertiliser application strategy needs to be carefully managed, ensuring that N fertiliser is applied in line with clover content. Additionally, there has been a gradual increase in summer stocking rates, increasing the herd demand for grass supply and the requirement for high pasture growth rates. It is vital that mid-season demand is appropriate for an individual farm's capacity to grow grass to ensure adequate high-quality grass supply.

Autumn Management

Typically, the grazing rotation length is extended from mid-August (+ 2 days/week) to allow large quantities of herbage to build up before the expected decline in grass growth, allowing the grazing season to be extended into late November. In some years, it may be necessary to supplement with grass silage in late August for a short period to increase overall average farm cover. Peak farm cover should be achieved in mid-September (~1,100 kg DM/ha). Data from PBI farms indicates that peak cover in mid-September is 850 kg DM/ha (range 590 to 956kg DM/ha), which is 250 kg DM/ha less than the target. The large gap between the target peak cover and actual peak cover achieved on farms increases the requirement for supplementation.

Table 3. Target blueprint to grow 15 t DM/ha

Growth Period	Target grass production	Current PBI Farms Performance (2013 -2025)	Top 100 farms in PBI (2013 – 2025) *
	Tonnes DM/ha		
Spring (01/1 – 30/4)	2.0	1.8	2.1 (2.2)
Summer (01/5 – 10/8)	7.1	6.2	7.1 (6.8)
Autumn (11/8 – 31-12)	5.9	5.0	6.1 (5.9)
Total	15.0	13.1	15.3 (14.8)

**Figures in brackets are the average values from 2020 to 2025*

Achieving the target peak cover (1,100 kg DM/ha) will reduce supplementation requirement for the remainder of the grazing season and has an important effect on achieving closing farm cover targets. Autumn closing date is the main management factor influencing the supply of grass in early spring. To ensure that adequate quantities of grass are available at the start of the first rotation (early February), an average closing farm cover (1st December) of between 650-750 kg DM/ha is required and is dependent on individual farm demand (stocking rate).

Table 4. Farm cover targets across the grazing season

Date	Average farm cover (kg DM/ha)	Cover (kg DM/LU)	Rotation Length (days)
01-Feb (opening farm cover)	>1000	330	60
01-Mar	750	250	40
05-Apr	600	200	25
May, June, July	510	170	18-24
Mid-August	750	250	25
01-Sep	990	330	30
15-Sep	1100	370	35
01-Oct	950	380	40
01-Nov	65% closed		
01-Dec (closing farm cover)	>700		

Fertiliser management

It is important to maintain adequate soil fertility (soil pH > 6.3 and index 3 and 4 for phosphorous (P) and potassium (K)) to ensure sward productivity. When soil fertility is optimal, N efficiency can be increased by up to 20%, highlighting the significant environmental and economic benefit of improving soil fertility. Although farmers have made significant reductions in the quantity of chemical N applied, the quantities of P and K also declined by 33%, and lime usage declined by 40% in 2023, compared with 2022. The most recent soil fertility report for dairy soils in 2025 highlighted several shortcomings in national soil fertility:

- 24% of soils had optimum pH, P and K
- 60% of soils had soil pH > 6.3
- 47% of soils were index 3 or 4 for P
- 53% of soils were index 3 or 4 for K

White clover can fix atmospheric N into a plant usable form of N by a process called biological N fixation (BNF). This can be used to replace chemical N during the main grazing season. It is important to note that optimal soil fertility is essential for white clover establishment and persistence. Targeted use of chemical N fertiliser is necessary to optimise grass growth and maximise BNF from white clover. White clover can fix up to 100 kg N/ha through BNF, but the supply of N from BNF is not consistent throughout the grazing season and is influenced by the white clover content in the sward and prevailing weather conditions. A soil temperature of ≥ 10 °C is required for sustained high levels of BNF. Generally, these conditions first occur in late-April to mid-May, and this means that BNF is low in early spring and increases to a peak in July- September. A strategic N application plan based on paddock sward white clover content in April is outlined in Table 5, reducing chemical N application allows white clover content to increase, maximising BNF.

Table 5. Chemical N usage based on April sward clover content

April Clover content (%)	Mid-Feb	Mid-Mar	Mid-April	Mid-May (2 rot)	Mid-June (2 rot)	Mid-July (2 rot)	Mid-Aug	Mid-Sept	Total
Chemical Fertiliser (kg N/ha)									
Grass sward	24	36	20	32	28	28	21	23	214*
5%	20	35	20	20	20	20	20	20	175
10%	20	35	20	15	15	10	15	20	150
15%	20	35	20	15	10	SW	10	20	130
20%	20	35	20	15	SW	SW	SW	15	105

**Chemical N fertiliser can be increased to 230 kg N/ha in paddocks with no clover, as long as whole farm N does not exceed 212 kg N/ha*
Soiled water (SW) used whenever zero chemical N application indicated; equivalent to 25 kg organic N applied

Perennial Ryegrass and Clover varieties

Breeding continues to deliver improved grass varieties. New varieties emerging in the 2025 Irish recommended list had an average Pasture Profit Index of €265, an increase of €55 relative the average Pasture Profit Index in 2015. The on-farm evaluation of grass varieties over a 7-year period has indicated large annual differences in DM production between varieties, but also that the DM production profile is consistent for varieties exposed to good grazing management and adequate soil fertility. The primary reasons identified for reseeding swards on many farms are to correct the paddocks with poor graze out, overburden of weed species or improve the seasonal performance of a paddock. Reseeding is a substantial investment cost (> €1100/ha when full costs are used). A reseeded sward can achieve 15% greater DM production compared with the mean of the farm during the first two full production years. Similar to the differences observed between perennial ryegrass varieties, recent research has highlighted large differences in agronomic performance between the top and bottom performing white clover varieties. To maximise the agronomic performance of newly sown reseeds, prioritise selection of high performing perennial ryegrass and white clover varieties from the Pasture Profit Index.

Summary

To ensure the sustainability and productivity of pasture-based systems, increasing herbage production to support the farm stocking rates must be a key objective in the years ahead. Despite stable total annual levels of herbage production during the past decade (averaging 13.1 t DM/ha), significant variability in grass growth has occurred between years, particularly during spring and summer. Several key aspects of grazing management have improved: more grazing days, a greater number of grazing events and a reduction in pre-grazing herbage mass. At the same time, however, concentrate and conserved forage inputs have increased, highlighting a reliance on external feed sources. The future of grassland systems will depend on the ability to increase herbage production within the constraints of reducing chemical N fertiliser inputs. Using available technologies and achieving grazing management targets will be critical to meeting these challenges.

References

Flattery, P. 2024. How weather patterns are changing, what are we adapting to? Pages 8-12 in Proc. Climate Adaptation Conference. Teagasc, Teagasc, Animal & Grassland Research and Innovation Centre, Moorepark, Fermoy, Co. Cork.

O'Donovan, M. Dillon, P. Conaghan, P. Hennessy, D. Irish Grassland Research — main achievements and advancements in the past 60 yrs and where to progress to next. (2022). Irish Journal of Agricultural and Food Research, 10.15212/ijafr-2020-0152

Workshop 5: Matching people and rostering to farm workload, getting the balance right

Workshop 5 Speakers

Martina Gormley

Teagasc Dairy Specialist, Athenry, Galway



Martina Gormley, from Galway, competed a UCD Agricultural Science degree in 2008 and Walsh Fellowship Masters with UCD and Teagasc in 2013. Martina started out working with ICBF, and from this transitioned to working on the Teagasc/Lakeland joint programme. She has also worked on the Teagasc/Aurivo programme and has been working as a Teagasc Dairy Specialist for the last 8 years. Within this role Martina Specialises in labour efficiency. Martina has a keen interest in working with dairy farmers to become more efficient with workload practices and working with people.

Liz Duffy

Teagasc Dairy, Climate & Sustainability Advisor, Midleton, Cork



Liz Duffy, a Co. Dublin native and UCD Agricultural Science graduate, completed a PhD at University College Cork before joining Teagasc in 2001. Liz has held various roles within Teagasc, initially as a REPS planner in the Fermoy Advisory Office in Moorepark. Following this Liz transitioned to a position as Discussion Group facilitator on the Teagasc/Dairygold joint programme and then as a dairy advisor in Fermoy and Midleton, Co. Cork. Currently Liz has a dual role of Dairy Advisor and a Climate & Sustainability role. Liz is focussed on assisting clients navigate their farm business through the evolving regulatory changes, driving technical efficiency and work-life balance with a major focus on all aspects of environmental & economic sustainability

Matching people and rostering to farm workload, getting the balance right.

Martina Gormley[1] & Liz Duffy[2]

[1]Teagasc, Animal & Grassland Research and Innovation Centre, Athenry Co. Galway; [2]Teagasc, Knockgriffin, Midleton, Co. Cork

Summary

- Dairy farmers are well-positioned to offer highly competitive and attractive employment packages and many are doing so very successfully on a consistent basis.
- Word-of-mouth is the single most commonly used method of recruiting locally, however multiple methods may need to be used to maximise access to available labour.
- There are numerous benefits to having a staff roster, yet very few dairy farmers have a written/physical work roster in place.
- One of the main benefits of a roster is ensuring people are not over-worked and stressed, benefitting staff productivity and retention
- Rosters can and do change over time but fundamentally having the correct number of good employees is essential for the success of any staff roster.

Introduction

The issue of burnout, and challenges of attracting and retaining employees, have become increasingly prominent in Irish agriculture. Farm structure in Ireland has seen a dramatic change in recent years. Recent data indicates that almost half of farm families do not have an identified successor. The traditional owner-operator plus additional family help model, that previously could manage an average herd size, is increasingly becoming incapable of coping with the new realities of herd size. The sustainability of dairy farming increasingly relies on farms being able to provide employment opportunities where pay and conditions of work are at least as attractive as alternative careers.

Previous studies with dairy farm employees have found that hours worked on dairy farms can make employment unattractive. Evening finish time was cited as the most critical issue for employees. The majority of Irish dairy farmers are calving in Spring and aim for at least 80% calved in the first 6 weeks. Spring has been identified as accounting for 35% of the overall workload. This can bring its own challenges in terms of matching staff to the roster throughout the year. Alongside this, Irish farms are competing with industries that typically offer a 5-6pm finish time and flexible working arrangements. Therefore, more farmers are trying to ensure employees, insofar as feasible, have structured working days for most of the year. Employment law must be adhered to in terms of rest breaks and overall working hours per week. See (https://www.workplacerelations.ie/).

Rostering is not a new concept however in most dairy farms, except for some of the larger and multi-site units, there is no physical roster in place. The roster is verbal, with usually fixed hours for full-time employees. This brings its own challenges, namely are there enough people at key time, who covers leave and sick leave etc. For some farmers the initial challenge is 'where will I find employees?', and then the rostering challenge will follow. Perhaps instead, the starting point should be 'can I offer an attractive job and what does that look like on a roster?'. Over time this shift in approach can lead to better hiring outcomes and a more effective work plan for the whole farm.

What makes employment attractive

Research and experience tell us that people seeking employment want the following as core factors; Flexible working hours, fair pay, relevant training, good communication, responsibility, respect and good working conditions. These are common to all employees and the best quality employees will expect them. Higher-level expectations such as opportunities for career progression will vary more depending on the person and are very important to some depending on their circumstances, however the core factors must be in place as a starting point in all cases.

There is no question that dairy farmers can offer flexible working hours as these farms are operating 365 days per year with a variety of tasks. Mindset and tradition can often be the barrier around hours of work. However, change is happening and we can now see farmers offering most or all of the above. After careful consideration to what the farm and farmer can offer, thought must be put into platforms for finding people.

Finding employees

Based on a recent study conducted with Teagasc dairy discussion groups, Figure 1. presents the variety of methods used by the farmers to recruit employees. Some farmers used more than one method, and word of mouth was the most used method. Word of mouth remains the most used method of recruitment.

Peer recommendations and word-of-mouth recruitment rely entirely on the dairy farmers reputation as a quality employer.

In the future, dairy farmers will need to reach a larger and more diverse talent pool such as urban dwellers looking for a career change, as well as overseas workers seeking employment or experience in Ireland. To search for these less traditional farm employees, a variety of innovative recruitment methods will be required. We see this already on farms that have a tradition of hiring multiple employees, where for example a mix of agency staff, local people and work experience students are combined into a diverse workforce on the farm. By using a variety of recruitment methods, farmers are ensuring their jobs are advertised to a wide network of people.

Figure 1. Variety of methods used by farmers surveyed to recruit employees

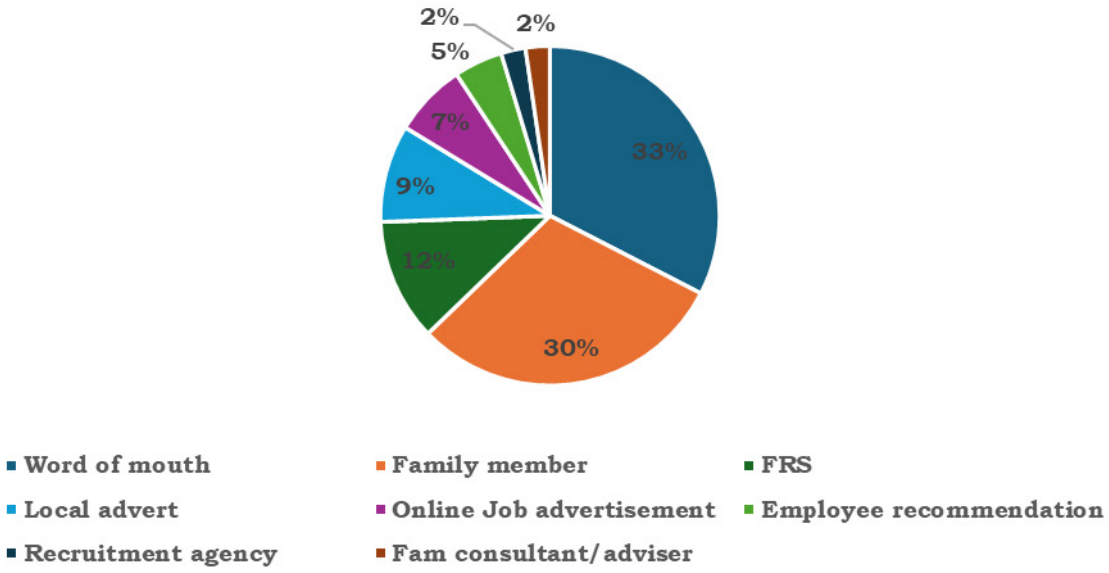


Figure 1. *Recruitment methods utilised by farmers.*

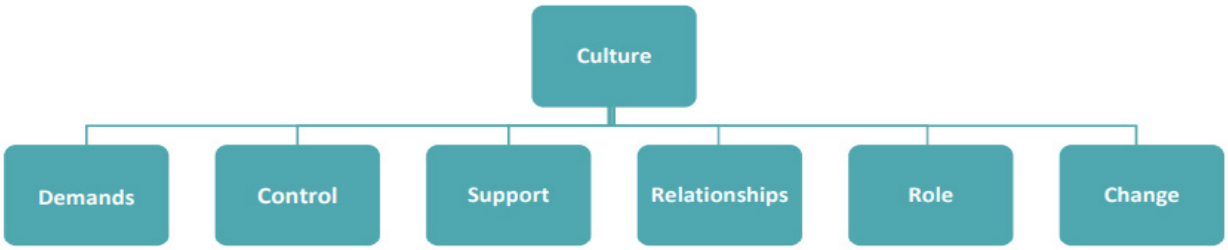
Identifying and managing work related stress through better rostering

HSE policy on presentation and management of work-related stress has characterised the indicators of work-related stress as including the following:

- Staff attitude & behaviour- loss of motivation
- Staff turnover- increased turnover
- Sickness absence – frequent short periods of absence
- Presenteeism- coming into work when unwell
- Relationships at work-tension between colleagues
- Work performance – reduced output

There are multiple signs and symptoms of work-related stress and more information can be accessed here: https://www2.healthservice.hse.ie/files/190/.

The HSE has also identified six key areas for assessing potential sources of work-related stress. These are known as the 'Management Standards'. They cover the primary sources of work-related stress and can be used to measure performance in these areas. The key areas are:



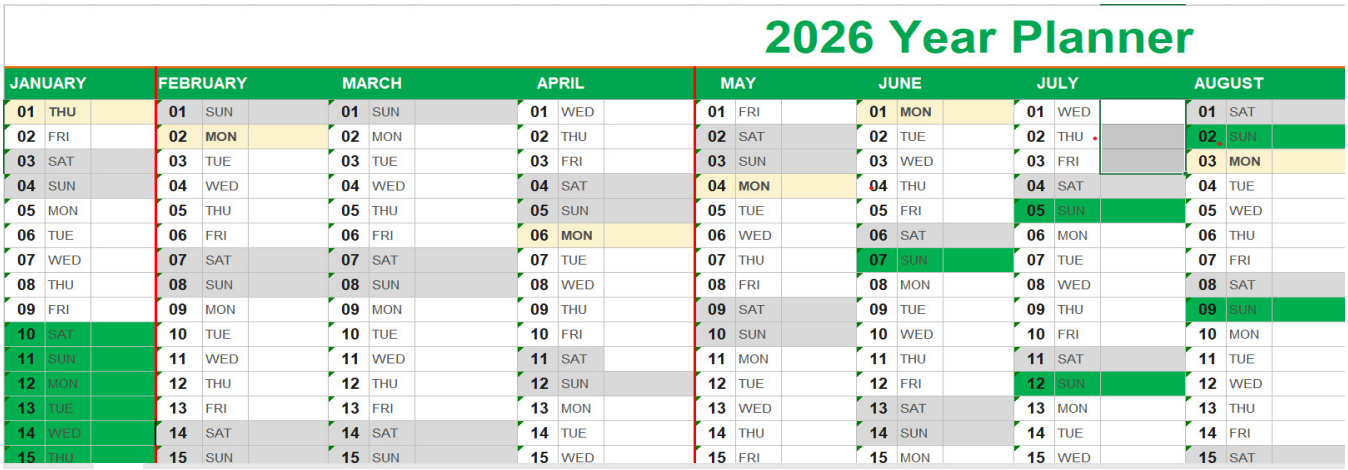
Demands include important issues such as total workload, daily/weekly work patterns and the work environment.

Rostering

Rostering is a tool that can help with the demands above as they can:

- Eliminating over and under staffing
- Ensuring legal obligations are adhered to with hours work and leave
- Reducing workplace accidents
- Reducing burnout
- Reducing staff turnover
- Preventing conflict
- Enhancing communication

Unfortunately, on many dairy farms physical written rostering is still not commonly practiced.



2026 Year Planner

JANUARY		FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY		AUGUST	
01	THU	01	SUN	01	SUN	01	WED	01	FRI	01	MON	01	WED	01	SAT
02	FRI	02	MON	02	MON	02	THU	02	SAT	02	TUE	02	THU	02	SUN
03	SAT	03	TUE	03	TUE	03	FRI	03	SUN	03	WED	03	FRI	03	MON
04	SUN	04	WED	04	WED	04	SAT	04	MON	04	THU	04	SAT	04	TUE
05	MON	05	THU	05	THU	05	SUN	05	TUE	05	FRI	05	SUN	05	WED
06	TUE	06	FRI	06	FRI	06	MON	06	WED	06	SAT	06	MON	06	THU
07	WED	07	SAT	07	SAT	07	TUE	07	THU	07	SUN	07	TUE	07	FRI
08	THU	08	SUN	08	SUN	08	WED	08	FRI	08	MON	08	WED	08	SAT
09	FRI	09	MON	09	MON	09	THU	09	SAT	09	TUE	09	THU	09	SUN
10	SAT	10	TUE	10	TUE	10	FRI	10	SUN	10	WED	10	FRI	10	MON
11	SUN	11	WED	11	WED	11	SAT	11	MON	11	THU	11	SAT	11	TUE
12	MON	12	THU	12	THU	12	SUN	12	TUE	12	FRI	12	SUN	12	WED
13	TUE	13	FRI	13	FRI	13	MON	13	WED	13	SAT	13	MON	13	THU
14	WED	14	SAT	14	SAT	14	TUE	14	THU	14	SUN	14	TUE	14	FRI
15	THU	15	SUN	15	SUN	15	WED	15	FRI	15	MON	15	WED	15	SAT

Considerations when rostering

The average age of dairy farmers is increasing with the average age now 54 and consequently more are saying they are not able to do the work they used to do. Therefore, this adds to the benefits of having scheduled, fixed staff employed, giving the opportunity to plan the workload accordingly.

In-terms of the number of hours or people that a farmer will need, it depends to a large extent on the system and facilities in place. For example, some farmers calve cows in two seasons, some are aiming for very high output system where cow care can be more demanding, some have invested in facilities which improve work efficiency around the yard while others have not. It will also depend on how much work is outsourced to the contractor or others. On average a good guide is that for the average herd size of 100 cows, the farmer providing full-time labour input with 800+ hours part-time help can work well, while for larger herds 1 person per 100 cows plus some part time help to cover additional work in spring and leave throughout the year is adequate.

Regardless of how many people you need or if they are all part-time or full time or mixed, fixed hours are essential. This has been an issue in the past with some farmers only looking for someone for the busy spring period or when they go on holidays. Variable, non-fixed hours undermine scheduling reliability, as staff may prioritize outside commitments and remain unavailable for short-notice shifts. Poor planning can also damage your reputation as an employer, making you appear unorganized and disrespectful of your team's personal time.

Farmers managing the average herd size need to be mindful when planning part-time help. For example, if the farmer is working Monday to Friday on their own and have help scheduled for Saturdays, they could decide to plan for additional work due to having another person. The challenge here is that the farmer has worked hard all week and now has a packed Saturday planned on top of this. Some farmers have decided to get in a relief milker one or two evenings during the week to ease the workload for themselves. Farmers must be mindful that they are a key part of the roster and in turn must also look after themselves and not over commit themselves.

Another consideration is to balance workload across the seasons. Farmers with part-time help can have the challenge when employees are in school/college during spring when they have them for the weekend and during the summer they also have them during the week. Farmers in some cases would like to have more help in spring but decide to make the most of summer and take more time off then.

Farmers with full-time help can have a challenge when it comes to weekend rostering. Full-time people can typically prefer working Monday to Friday. What farmers are doing here is completing all major tasks

from Monday to Friday. As a result, weekend duties are strictly limited to milking and routine youngstock management, allowing for an optimized schedule where team members rotate onto weekend shifts only once every three weeks.

Rostering annual leave is a major benefit when working with employees. Farmers can guide employees in terms of ideal time to take leave and farmers can firstly roster their own leave. When leave must be noted on the roster and it operates as a first come basis employees get more efficient around booking leave. Sick leave is far more challenging when there is only one employee and also when understaffed. This leaves the farmer under a lot of pressure. On the back of this some farmers have decided that it is best to have 2 people or more working on the farm be it part or full time.

Key considerations for the management of night-time calving centres around farms operating with family and multiple employees tending to roster nighttime calvings so that whoever is on at night starts later in the following day and is not rostered on every night. For some farmers with part time help they have invested in additional calving facilities and have a bigger number of close-up cows on straw and on the back of this have the routine of doing a final check and if nothing is happening, they go to bed and are back out early in the morning. These farmers say it is too much to have broken sleep at night and work all the following day. Other farmers have advertised and hired a night-time calver for 6 weeks and where used is working successfully.

Practical Implications

Before we can think of rostering, the WRC employer obligations and the fundamentals around attracting people to work on your farm need to be seriously considered. Work-related stress is a real issue for both employees and employers and needs to be factored into labour management decisions. As a survey farmer noted '*in the long run it costs more being a little bit under-staffed than being a little bit over-staffed*'. Rostering is a fantastic aid to matching workload and staff. It is not a difficult task and the visualisation of it helps to determine what is required on any given day. There are many considerations when rostering. The advice is to make a positive start and then all can be tweaked along the way to help achieve your farm objectives.

Workshop 6: Using key financial metrics to improve farm profit

Workshop 6 Speakers



James Dunne

Dairy Specialist, Teagasc, Ballyhaise, Co. Cavan

James graduated in 2013 from UCD with an Honours B.Ag.Sci.(Animal and Crop Production). James subsequently went on to complete a Masters in Agricultural Innovation Support through the Teagasc Walsh fellowship programme in collaboration with UCD. He worked as a business and technology dairy advisor in Ballyhaise for 5 years from 2016-2020. In 2020 James joined the Teagasc Dairy KT team as a dairy specialist with a focus on the physical and financial performance of commercial dairy production systems, including issues pertaining to sustainable dairy systems,



Adrian O'Callaghan

Dairy Enterprise Advisor, Teagasc, Mallow, Co. Cork

Adrian graduated in 1996 from UCD with Hons B Ag.Sc and subsequently completed a Higher Diploma in Farm Financial Management in 2006 with WIT. He has been a Dairy Advisor in the Mallow office since 2006 and worked on the Teagasc/Dairygold Joint Programme from 2014 to 2018 as the Demo Farm Advisor. He is currently working with 120 Dairy Clients and 5 Dairy Discussion Groups in the Cork East Region.



David O'Leary

Dairy Farmers, Minane Bridge, Co. Cork

David and Marianne farm in Minane Bridge, Co. Cork. They milk 160 cows on a milking platform of 45Ha with an additional 55 ha for silage and replacements. 569Kg MS/Cow was supplied to Clona Dairies in 2025. David is a member of two Discussion Groups, 3C South of Lee and Progression Group. He has been completing E Profit Monitor since 2011.and it is used to benchmark his farming business against discussion group members while making informed management decisions for the home farm.

Using key financial metrics to improve farm profit

James Dunne[1] Teagasc Dairy Systems Specialist & Adrian O'Callaghan[2] Teagasc Dairy Enterprise Advisor

[1]Teagasc Ballyhaise College, Co. Cavan; Teagasc, Animal & Grassland Research and Innovation Centre, Moorepark, Fermoy, Co. Cork; [2]Mallow Advisory Office, Teagasc, Sandfield, Mallow, Co. Cork,
Farmer: David O'Leary, Cork, 3C South of Lee Discussion Group

Summary

- Benchmarking farm physical and financial performance through the Teagasc Profit Monitor will help identify factors driving profit and where management improvements can be made.
- Industry discussion and debate in the absence of evidence-based commercial farm data can distract from what consistently delivers at farm level- cost control and home-grown forage utilised.
- In the 2025 Profit Monitor analysis, each additional 1 cent/litre in production costs was associated with approximately €124/ha lower margin.
- Each additional tonne of grass dry matter utilised per hectare was associated with approximately €314/ha higher margin.

Introduction

Variations in dairy farm profit are determined not just by the value of what a dairy farm generates (gross output/turnover), but also by total variable and fixed costs of production. A discussion around farm output alone, without considering the cost implications of how that output is achieved, tells us very little about the underlying financial performance of a farming business. Two farms producing similar levels of milk solids per cow for example, can generate very different financial returns. It is therefore essential to assess farm performance based on the key physical and financial metrics that relate to long-term farm profitability, rather than relying on readily available performance data that is less predictive of financial outcomes. This paper focuses on two such practical opportunities: controlling costs and utilising more home-grown grass.

The importance of benchmarking the farm business

Benchmarking enables an individual farmer to compare financial and physical performance, identify business strengths and weaknesses, and set realistic targets relative to their farming peers. For example, is purchased concentrate cost on the farm high considering stocking rate and milk solids? Is machinery running cost too high etc.? Completing an annual Teagasc Profit Monitor provides the foundation and permits investigation of the reasons behind variations in performance. In addition, analysis of physical and financial data in tandem across many farms and numerous years can help farmers and groups to better understand which metrics to prioritize - this where real value can be gained from benchmarking.

Key Performance Indicators - where to focus?

With so much discussion about what is the right or wrong option for a farming enterprise, it is easy to lose sight of the measures that really influence profit. Conversations about key performance indicators (KPIs) can become clouded by individual preferences and opinions rather than evidence. Farmers may also identify strongly with a particular production "system", but the underlying drivers of profit do not change with the label attached to a farm.

There is an enormous range of KPIs available to dairy farmers, making it easy to become overly focused on individual measures that may have little relationship with overall farm profitability. The challenge is to distinguish between figures that are interesting and those that genuinely influence financial performance. Table 1 highlights the considerable variation in physical and financial KPIs across Irish dairy farms. Top and bottom 10% categories are calculated independently for each KPI. However, achieving a high ranking for any individual KPI does not necessarily translate into higher farm margins.

Table 1. Benchmarking of key dairy farm performance indicators – 2025 Teagasc Profit Monitor.

KPI	Average	Top 10%	Bottom 10%
EBI	221	255	156
Milk solids cow	470	566	376
Milk fat %	4.51	5.01	4.12
Milk protein %	3.66	3.90	3.42
Grass utilised dm/ha	9.18	12.81	5.96
Concentrate kg cow	1,169	676	1830
Concentrate per kg MS	2.48	1.54	3.71
Common cost per litre*	26.73	19.99	36.07

**Note: Common costs include variable costs and common fixed costs, but exclude land rental, hired labour and interest. They are therefore not the same as total production costs. Using common costs allows a more consistent comparison of operating efficiency between farms.*

When Teagasc Profit Monitor data is analysed to assess the impact of individual KPI's impact on farm profit it points to two practical measures that matter across Irish dairy farms: controlling costs and increasing the amount of home-grown forage utilised. The following sections examine how each relates to margin and what farmers can do about it.

Cost control

The first measure is costs per litre. The 2025 Teagasc Profit Monitor data shows that farms with lower common costs achieve higher margins per hectare.

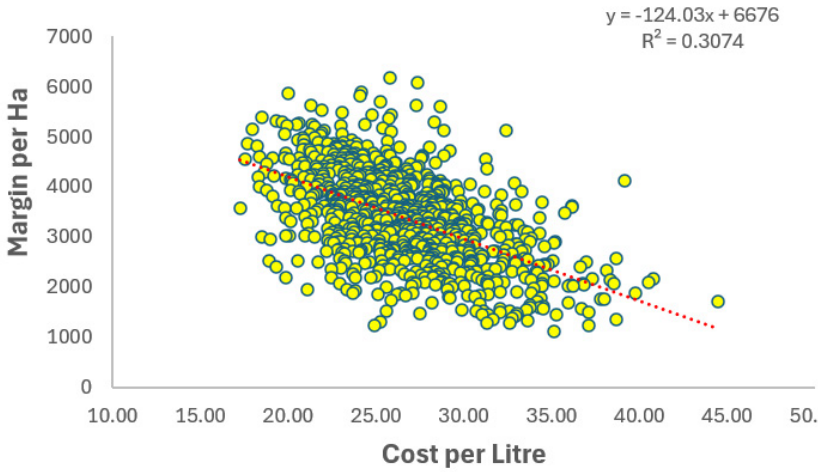


Figure 1. *Relationship between common costs (cent/litre) and common margin (€/ha), Teagasc Profit Monitor 2025.*

The analysis shows that each 1 cent/litre increase in common costs is associated with a reduction in common margin by €124 per hectare. Common costs include variable costs and common fixed costs, but exclude land rental, hired labour and interest. For a typical 50-hectare dairy farm, this represents approximately €6,200 annually per 1cpl in costs. Therefore, seemingly small differences in individual production costs can aggregate into significant effects on overall farm profitability. Cost control does not mean cutting essential expenditure on soil fertility, breeding, animal health or infrastructure.

The objective is not solely to simply spend less, but to ensure that every euro spent delivers productive value to the business. Farmers should as a starting point know their total cost of production, a detailed breakdown of the associated costs with running the business can then identify the areas where action is required. Completing an eProfit Monitor alongside the Teagasc Dairy Bill of Quantities helps farmers review both the price and quantity of inputs used.

Forage utilised

The second measure is grass utilised per hectare. It estimates the quantity of home-produced forage consumed by the herd and reflects grass growth, grazing management, stocking rate and feed decisions. Increasing grass utilised can reduce reliance on purchased feed, helping to improve margin.

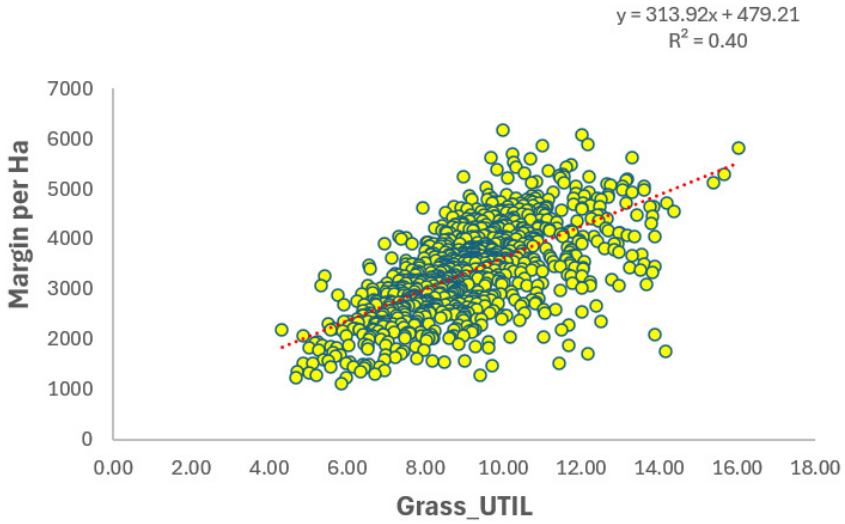


Figure 2. *Relationship between grass utilised (t DM/ha) and margin (€/ha), Teagasc Profit Monitor 2025.*

The 2025 Teagasc Profit Monitor analysis shows that farms utilising more grass per hectare generally achieve higher common margins. Each additional ton of grass dry matter utilised per hectare is associated

with approximately €314 higher margin per hectare. For a 50-hectare dairy farm, this represents approximately €15,700 annually.

The practical message is to maximise the quantity of home-grown grass consumed by the herd. Good grazing management, soil fertility, grass measurement and matching stocking rate to grass-growing potential are central to achieving this. The focus should be on producing milk solids efficiently from home-grown forage rather than relying on additional purchased feed to drive output.

Using benchmarking to make strategic farm decisions- case study

David O'Leary farms in Cork and is a member of the 3C South of Lee Discussion Group. David has completed a Teagasc Profit Monitor every year since 2011, benchmarking the business against discussion group peers and tracking trends over time. The results help him to plan changes and implement management decisions with confidence.

In 2025, the 89-hectare dairy enterprise milked an average of 152 cows and produced 582 kg milk solids per cow. Strong milk composition—4.84% fat and 3.94% protein—is a particular strength. The farm recorded comparable costs of 29.86 cent/litre (€1,920/cow). Comparing individual costs with discussion group results and the Teagasc Dairy Bill of Quantities can show where spending is competitive and where savings may be possible.

A key focus of the O'Leary farm is achieving high levels of home-grown forage utilisation as a primary driver of efficient milk production. Through his annual Profit Monitor analysis, David identified one particular area requiring attention: purchased concentrate accounted for approximately 36% of total variable costs in 2025.

With grass utilised estimated at 8.5 tonnes DM/ha and concentrate feeding averaging 1,612 kg per cow, a target was set to increase grass utilised by half a ton DM/ha, with the aim of reducing purchased feed requirements and improving efficiency further.

Achieving this target across the 89-hectares of grassland would provide an additional 44.5 tonnes of grass dry matter annually. If this fully replaced purchased concentrate, feed usage could potentially reduce by approximately 340 kg per cow. At the farm's actual 2025 concentrate price of €322/t, this represents a potential annual saving of €16,700, reducing comparable costs from 29.86 to approximately 28.15 cent/litre, assuming milk production is maintained and no additional costs arise.

This example demonstrates how annual benchmarking can identify both the strengths of a farming business and specific areas requiring attention, allowing farmers to set measurable targets and make informed decisions to improve profitability.

Conclusion

Make no mistake, despite the many opinions and assumptions within the industry that are often unsupported by evidence, the data consistently demonstrates that controlling production costs and increasing grass utilised are two key drivers of higher margins on Irish dairy farms, year on year.

The challenge for farmers is to look beyond output alone and focus on the financial efficiency of their business. Annual Profit Monitor analysis provides the evidence needed to understand what is working well, identify areas requiring attention and make informed management decisions.

Ultimately, the message is simple: measure performance, challenge assumptions and focus on the factors proven to drive profit. The objective is not simply to produce more, but to generate consistently stronger financial returns from the resources available.


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