Where to from here for the Irish dairy industry?

The Moorepark 2025 Open Day will offer a blueprint for the dairy sector's future, with the emphasis on protecting and enhancing the fundamental advantages of our grass-based production system

Laurence Shalloo
Head of Teagasc Animal & Grassland Innovation and Research Programme

Dairy farms can become more resilient by minimising reliance on external inputs, with grazed pasture as the system's foundation due to its low cost and impact on profitability and overall sustainability. In 2023/2024, home-grown forage made up 78% of cow diets; the target is to exceed 90%.

PastureBase Ireland data shows that even in challenging years like 2023 and 2024 individual farms can grow upto 15t DM/Ha with the average at 12.4 t DM/ha, compared to the national average of 10.4 t DM/ha, back calculated from NFS data. This highlights the potential for increased pasture growth to raise carrying capacity while reducing external feeds.

Embracing the EBI, with a cow suited to grazing systems, and embracing technology will reduce labour demand and increase work/life balance. A well-optimised system, where feed supply and demand are balanced, improves profitability, lowers emissions, and enhances nutrient balance and biodiversity while providing an increasingly rewarding and satisfying work environment.

Environment

Ireland's agricultural sector faces increasing environmental pressures, particularly around greenhouse gas (GHG) emissions. Agriculture must reduce emissions by 25% by 2030 relative to 2018.

Methane dominates emissions from dairy systems in Ireland and recent developments show Ireland's pasture-based dairy and beef systems have among the lowest carbon footprints globally, with recent figures showing Irish dairy at 0.88 kg CO2e/kg FPCM.

Research and updated emission targets set for the best farmers are 0.63 kg CO2e/kg FPCM by 2030 and potentially close to 0.50 kg CO2e/kg FPCM with sequestration included. Technology adoption and farm-level changes are key to emissions reduction, as is continued investment in research to develop new solutions.

Nitrate concentrations in water are showing signs of improvement. The EPA's most recent 'Early Insights Indicator report' is showing declines in nitrate levels, albeit the south and south east are still too high.

These changes are driven by policy changes under the Nitrates Directive, increased fertiliser N costs in 2022 and 2023, and greater focus on nutrient efficiency and management at farm level. This improvement, while welcome, needs to be sustained and will be underpinned by Teagasc's Better Farming for Water campaign.

Food security

Debate is increasing around the use of human-edible food in livestock feed and its implications for global food security. Metrics such as the Edible Protein Conversion Ratio (EPCR) and Land-Use Ratio (LUR) indicate that Irish dairy systems contribute positively to human digestible protein supply.

Animal-sourced proteins offer superior digestibility and nutrient bioavailability compared to plant-based alternatives.

However, there is a need for increased focus on the diet of the dairy cow. The reality is that as the industry increases supplementary feeds in a dairy cow's diet, food security reduces, emissions increase, profitability reduces (depending on milk price and feed price ratios), while increasing the surplus nitrogen available for loss.

Technology at farm level

Dairy family farm income has significantly outperformed other enterprises since 2012, driven by increased cow numbers, land area, and grass utilisation. While productivity has improved, rising concentrate use and static pasture production and utilisation since 2022 raise concerns.

Profitability in pasture-based systems relies on maximising grass use and maintaining dairy cow fertility. Improved six-week calving rates (now 68%) reflect progress, though they are still below the 90% target.

Calls to increase milk yield per cow overlook the fact that profitability is more related to grass utilisation, input costs and the proportion of home-grown forage in the diet, rather than output. This fact applies in pasture-based settings around the world.

Dairy-beef

There is significant opportunity in our dairy beef sector, driven by increased use of sexed semen and high-value beef genetics. Sexed semen usage has risen from under 50,000 straws pre-2020 to over 350,000 in 2025, reducing male dairy calf numbers by up to 150,000.

page 10 to page 17

The Dairy-Beef Index (DBI) guides the selection of bulls with traits suitable for both dairy cows to produce calves for beef production systems.

The National Genotyping Programme and Commercial Beef Value (CBV) help identify economically efficient calves early in order to provide the beef farmer with confidence around the quality of the calves being bought.

Transformation

It's 10 years since milk quotas were abolished. The industry since then has been transformed. It has dealt with a pandemic, a war on the continent of Europe and now is dealing with the advent of tariffs and trade wars.

The industry is dealing with the challenge around generational renewal, requirements to reduce GHG emissions, uncertainty around the nitrates derogation and cost increases at farm level.

The reality is that the dairy industry has a track record of embracing technologies while dealing with and meeting challenges head on. Who would bet against the industry doing the same over the next 10 years?

Emer Kennedy says "profitability in pasture-based systems relies on maximising grass use and maintaining dairy cow fertility.

The bottom line is that we have to grow more grass

It is core to the dairy sector's competitiveness but, on average, grass output is lagging behind demand.

Michael O'Donovan
Teagasc Research Officer

Michael Egan
Teagasc Grassland Research Officer

Irish dairy farms have experienced major changes in relation to grassland over the past decade. Stocking rates have increased; nitrogen (N) fertiliser allowances and levels used have reduced; milk yields per cow have increased significantly. Also, wetter springs, and drier summers are reducing pasture production.

The consequence is increased levels of concentrate and forage supplementation while cows are at grazing. However, grazed grass/clover swards continue to be the cheapest feed source available on farms. They deliver nutrients 2.7 times cheaper that grass silage and 3.8 times cheaper than concentrate.

Data from PastureBase Ireland (PBI) shows that dry matter (DM) production on farms has not advanced in line with increased grass demand. Grass DM production has averaged 13.2t DM/ha/yr from 2014 – 2024.

There needs to be a refocus on increasing grass DM production on farms. There are many factors that influence pasture DM production, the main factors are: soil fertility, grazing management, using grass clover swards and nitrogen input.

Soil Fertility

To achieve high levels of grass growth – adequate soil fertility is essential. Phosphorus (P) and potassium (K) are very important nutrients and should be at Index 3 or 4.

However if soil pH is not optimal, the plant cannot make efficient use of applied or soil P and K. Soil pH should be higher than 6.3 and preferably closer to 6.5 (for clover establishment and fixation).

The most recent report suggests that in 2024, soils on dairy farms were significantly below the levels required for optimum pasture growth and nutrient use efficiency.

- Only 24% (about a quarter) of soils are at optimum pH, P and K
- Only 60% of soils have soil pH >6.3
- More than half (53%) of soils are only at Index 1 and 2 for P
- Just under half (47%) of soils at K levels at Index 1 and 2

Clover is widely considered as a replacement for chemical N in grassland systems; however clover will not establish, or persist, in soils with a pH below 6.3.

Grazing management targets

There are a number of key grazing management targets which must be achieved to maximise herbage production during the grazing season:

- Early February (Opening Farm Cover) >1000 kg DM/ha
- Early April (start second rotation) 600 - 650 kg DM/ha
- April to August 150 - 180 kg DM/LU
- Mid-September (Peak farm cover) 1,100 kg DM/ha
- December 1st (Closing farm cover) >750 kg DM/ha

Target Margins

These targets are not achieved on many farms. Opening farm covers

Table 1: Target blueprint to grow 15.0 t DM/ha

Growth Period	Target grass production	Current PBI Farms Performance (2013-24)	Top 100 Farms in PBI
Spring	2,000	1,810	2090
Summer	7,100	6,157	7083
Autumn	5,900	5,264	6112
Total	**15,000**	**13,232**	**15286**

Table 2: N strategy based on paddock 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	212*
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 used whenever zero chemical N application. +25kg organic N applied

were < 850 kg DM/ha on average over the past three years. This has a major influence on the level of grass growth and supplementation needed in early spring. Peak farm cover (mid-September) on farms has also been behind target at 850 kg DM/ha compared with the target of 1,100 kg DM/ha .

If farmers are to increase overall DM production (>14.5 - 15.0 t DM/ha), the above targets need to be achieved in combination with seasonal grass growth targets (See table 1).

The top 100 farms on PastureBase Ireland are reaching these goals and as a result the DM production on this cohort of farms is averaging 15.2 t DM/ha.

Mike Egan says white clover can fix up to 110kgN/ha but only if clover in the sward exceeds 20% throughout the year.

Nitrogen input

It is important that chemical N fertiliser input and paddock clover content are aligned. Individual paddock sward clover content is a key factor when implementing a strategic fertiliser program.

White clover can fix up to 100kg N/ha, but only if sufficient levels of clover in the sward (>20% - average across the year) are present.

If chemical N fertiliser is removed in the absence of adequate clover content, overall herbage production declines. Table 2 illustrates a N strategy developed based on paddock sward clover content. Nitrogen input is based on the April paddock clover content.

Paddocks which have an adequate sward clover content have their N input reduced from mid-April; chemical N is replaced by targeted soiled water usage.

To conclude, farm dry matter production needs to be refocused and increased on dairy farms. Grazing management, ensuring seasonal grazing targets are achieved; using a precision N fertiliser programme; and clover incorporation, and maintaining optimum soil fertility will help to increase overall grass/clover production.

Sex sorted semen allows dairy farmers to predetermine the sex of calves with 90% accuracy.

Breeding and reproduction

EBI is a well-established and proven strategy that leverages accumulated genetic improvements over generations, ensuring lasting benefits within the population.

Donagh Berry
Teagasc Principal Dairy & Beef Research Geneticist

Stephen Butler
Teagasc Research Officer

The economic breeding index (EBI) is for the selection of dairy parents of the next generation while the dairy-beef index (DBI) is for the selection of beef bulls for mating to dairy females.

The EBI has been validated to be robust to different production systems as well as recent and expected changes to policy (e.g., nitrate banding). In order to future proof the index, the relative weights on different traits within the EBI, like all indexes globally, are routinely reassessed as input and output prices change or as the inherent policy driving the system changes.

It is also typical to regularly update the base population of individuals; these are individuals with a mean genetic merit of zero against which all animals are compared. Two changes to the EBI will likely occur in 2025:

- the relative weights on most traits will be updated to reflect future prices and costs of production
- the base population for some traits will be updated

A change in emphasis on traits can cause some re-ranking of individual animals. A base change on the other hand will reduce the EBI of all animals by exactly the same amount; therefore, while the EBI of individual animals will change, no re-ranking will occur meaning the best animals will be exactly the same. These updates are in-line with good practice and are routine in most breeding programs.

The increased use of sex-sorted semen has facilitated greater usage of beef bulls in dairy herds. The dairy-beef index marries the desires of dairy farmers (i.e., short gestation and easy calving) with that of beef producers (i.e., efficiently produced, high value carcasses).

Ireland is unique globally in that the genetic values for calving difficulty of all beef bulls, irrespective of breed, are directly comparable with each other as well as being comparable with all dairy breed bulls.

Most dairy farmers have a threshold value for the calving difficulty genetic proof for the dairy bulls they plan to use. Exactly the same threshold can be used for beef bulls. The same principles hold for all other traits like gestation length, carcass weight and conformation. It is important if purchasing beef stock bulls to only purchase bulls with clearly presented figures and stars.

The ICBF sire advice system is a useful tool to match dairy and beef sires

to all cows; the farmer must first select the bulls to use. The dairy sire advice works on the principle of avoiding the mating of close relatives while simultaneously minimising the risk of generating progeny that are extreme in milk or fertility sub-index. A recent addition is to avoid mating of parents carrying the same lethal recessive mutations.

The overriding focus of the dairy-beef sire advice system is to minimise the likelihood of difficult calvings; secondary to this is maximising the likelihood that the resulting dairy-beef progeny will achieve the carcass specifications. However, choosing the correct beef bulls is crucial.

The role of sex-sorted semen

In seasonal calving systems, large numbers of male dairy calves are born within a short time frame, leading to market saturation and questions around the potential for beef production systems.

Sex-sorted semen allows dairy farmers to predetermine the sex of calves with approximately 90% accuracy. By targeting the best genetic merit cows with sex-sorted semen, dairy farmers can focus on producing high-value dairy female replacements, while using beef semen on the rest of the herd to improve beef traits and hence calf marketability.

The use of sex-sorted semen is not without challenges, however. Each sex-sorted semen straw contains fewer sperm cells (usually four million) compared with conventional semen straws (usually ~15 million), and the sperm cells in sex-sorted straws have been exposed to damaging steps during the sorting process. Using the findings from several research studies, advisory messages for dairy farmers to maximise success when using sex-sorted semen are summarized in Figure 1.

Field fertility performance of sexed semen in dairy herds during the 2022 breeding season was examined by the Irish Cattle Breeding Federation. The analysis compared pregnancy per AI (P/AI) with conventional semen (304,335 insemination events) versus sex-sorted semen (35,701 insemination events).

The mean P/AI was approximately similar for conventional and sex-sorted semen (63.1% vs 60.2%, respectively; relative P/AI = 95.4%; adjusted for parity, EBI and days in milk).

This indicates that acceptable fertility performance is now being achieved with sex-sorted semen on commercial dairy farms in Ireland.

An updated analysis of the 2023 breeding season performance will be reported at the Moorepark '25 Open Day.

Teagasc Moorepark farm manager JohnPaul Murphy says acceptable fertility performance is now being achieved with sex sorted semen on commercial dairy farms.

Figure 1. Extension messages for dairy farmers outlining the key strategies to maximise pregnancy success when using sex-sorted semen.

Sire and dam choice

- Bulls
  - Pick highest EBI bulls available
  - Use a large team of bulls

Dams

- Top 50% of herd based on EBI
  - Heifers
- Target live-weight and BCS 23-25
- Cycling regularly
  - Cows
- Parity 1 to 4
- >50 days in milk on day of AI
- BCS 23.00
- Cycling regularly
- No postpatrum disorders or uterine disease

When to use?

- First 3 weeks of the breeding season
- Within first 10 days if possible

Timing of AI

- 14 to 20 h after heat onset

Fixed time AI

- Costly but mitigates risk
- Facilitates targeted usage of sexed semen on MSD

Straw handling on on day of AI

- Organise sexed straws into one goblet
- Thaw 2 sexed semen straws at a time MAX
- Thaw straws 35 to 37°C for 45 seconds
- Load straws into pre-warmed AI guns, keep warm
- Deposit semen in uterine body
- Complete inseminations within 5 mins

Future-proofing incomes for the next generation

There are key opportunities within the farm gate which will sustain progress over the next decade

Padraig French
Teagasc Livestock Systems & Dairy Enterprise Leader

Conor Hogan
Teagasc Research Officer

Brendan Horan
Teagasc Research Officer

With a total estimated value of €7.4 billion in 2024, the recent performance of the sector has been achieved through a combination of increased average herd size per farm (from 75 to 96 cows per farm between 2017 and 2024) and increased productivity from improved animal breeding, grassland management and animal husbandry.

Remarkably, the increase in total sector value has been achieved while reducing reliance on chemical nitrogen (N).

At the core of this success story are over 16,000 family-owned dairy farms, producing over 8.5 billion litres of milk each year and supporting over 60,000 jobs across the rural economy.

While dairy family farm income volatility is now a significant feature, the average dairy farm income has increased by 240% since the pre-expansion period (2008-2010; €39,689 to 2022-2024; €95,689).

This is indicative of strong economic return from investment in key technology developments over this period.

While the dairy industry faces significant challenges in terms of regulation, increasing international trade uncertainties and generational renewal, the current profitability of the sector has created the opportunity for family farms to continue to innovate and develop more sustainable farming systems while future-proofing the financial livelihoods for the next generation. There are key opportunities within the farm gate which will sustain progress over the next decade.

Individual dairy farms vary considerably in terms of characteristics such as family circumstances, enter

prise mix, stage of development, soil types and farm system components. Nonetheless, all farms must plan to further develop and strengthen their farm businesses using available research innovations and technology.

Reduce feed costs and increasing feed self-sufficiency on the farm

The financial landscape for dairy production has been substantially altered during the past five years with unprecedented increases in costs.

In addition to the ongoing requirement to improve efficiency to meet climate action commitments, dairy farmers must also refocus on cost reduction to maintain margins during 2025.

To that end, high productivity pastures are the cornerstone of efficient grazing systems contributing to more than 80% of the feed requirements on dairy farms.

The medium term priority must be to increase profitability by increasing grazed pasture utilisation with high EBI cows, improving swards and matching stocking rate to grass growth potential.

Such systems can be further improved by reducing reliance on increasingly expensive supplementary feed imports, incorporating clovers within grazing swards, and further refining day-to-day operations to reduce nutrient losses.

It is hugely challenging to maintain farm productivity and profitability while reducing chemical nitrogen (N) use. It requires the successful incorporation of a substantial legume component within grazed pastures.

Further investment in productive areas

On farms where cost control is well managed and above average profitability levels are being achieved, the priority should be to invest in facilities and technology that are proven to reduce workload and further improve the efficiency of the farm operation.

Foremost among these investments should be improvements in soil fertility and pasture quality which deliver rapid and substantial returns. The next priority should to improve roadway infrastructure and acquire highly effective labour saving technologies which reduce workload and free up time.

As dairy farming consistently provides the highest return of any farming enterprise, the long term focus should be to ensure that the farm will be attractive to successors and continue to operate as a pasture based milk production unit for future generations.

Conor Hogan emphasises the need to manage input cost volatility to protect farm viability.

Taking advantage of additional growth opportunities

Farmers who aim to continue to grow a profitable business, should evaluate dairy expansion opportunities. This could be either by adding land to the existing milking platform or, where feasible, through the acquisition of an additional second grazing platform which can replicate the high levels of operational efficiency being achieved on the home farm. ,

As a group, Irish farmers are getting older. As farmers choose to exit the industry, lease and partnership agreements represent attractive opportunities for them to maintain income levels, while young entrants replacing them establish new dairy operations and grow their own dairy businesses.

Securing the farm's future

With consistently high relative returns, milk production remains the most viable use of land for the majority of dairy farmers. For farmers thinking about stepping back, early planning is critical. Pathways to family partnerships should be explored first.

If such options are not available, collaborative models, such as share farming, can enable a gradual transition; maintaining income and involvement while creating a viable entry route for a young farmer.

These arrangements can help maintain investment and productivity within the farm, and support continued involvement by the current farmer. Succession should be viewed not as an endpoint but as part of a longer-term strategy that allows the business to evolve and grow under new leadership.

The skills that will shape future success

To realise these opportunities, the next phase of development must be underpinned by key skills and robust planning. Financial benchmarking and sound business planning will be essential to guide smart investments and navigate through volatility.

Equally, people management and leadership, including how work is organised and how people are supported, will determine the attractiveness of farms as workplaces. Finally, developing strong networks through active participation in discussion groups will play a central role in knowledge-sharing and furthering growth. It is these core skills that will underpin the next phase of growth and innovation within the sector, allowing farmers to get continued value from their efforts, investments, and growth to-date.