Outlook 2024

Situation and Outlook for Irish Agriculture

Nov 28th 2023

Agricultural Economics and Farm Surveys Department
Teagasc

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Outlook 2024
Economic Prospects for Agriculture

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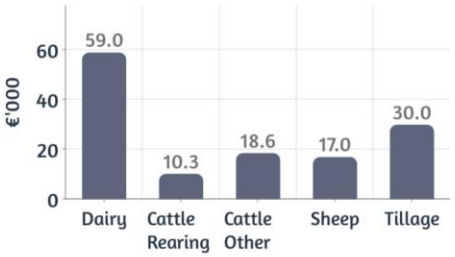
Summary Review of 2023

Global Economy

- Inflationary pressures
- Geopolitical concerns
- Slow down in global growth

Average Family Farm Income Estimates 2023



Margins (relative to 2022)

- Dairy: down substantially, due to lower milk prices
- Beef: up on cattle rearing, stable on cattle finishing
- Sheep: up, due to input cost savings
- Tillage: down substantially, due to lower harvest prices and yields
- Pigs: up substantially, due to higher output prices

Support Payments

- Broadly in line with 2022
- Some additional Tillage measures

Average NFS Farm Income 2023e vs 2022

Input Costs

Some cost savings - fertiliser & fuel

Price increases for feed & electricity

Fertiliser Prices

Down 20% for grassland vs 2022

Down 15% for tillage vs 2022

Feed Prices

up 2% relative to 2022

Oil Prices

Down relative to 2022, averaging US$84 in 2023 (down 19% in euro terms)

Average Annual Exchange Rate in 2023e

$ 1.08 / Euro

£ 0.87 / Euro

Eurozone inflation

Remained high in 2023

Irish Unemployment

<4% in 2023

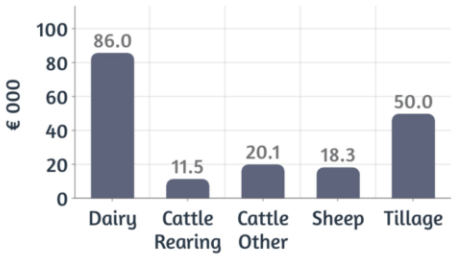
Weather Conditions

Improved on 2022 but challenging at times

Summary of Prospects for 2024

Global Economy
- Much uncertainty currently
- Poor growth prospects
- Inflationary pressures remain

Average Family Farm Income Forecast 2024



Margins in 2024 (relative to 2023)

- **Dairy:** improved margins, due to higher milk prices
- **Beef:** up for cattle rearing and finishing, input cost savings
- **Sheep:** up slightly, input cost savings
- **Tillage:** up substantially, due to higher harvest prices and yields
- **Pigs:** down appreciably, due to lower pig prices

- **Support Payments**
- Broadly in line with 2023
- Scheme participation dependent

Average NFS Farm Income 2024f vs 2023e

Input Costs
Reductions in aggregate

Fertiliser Prices
Down significantly for both grassland and tillage

Feed Prices
Down slightly on the 2023 level

Oil Prices
Expected to be down slightly in 2024 (average US$80)

Average Annual Exchange Rate
$ 1.11/ Euro
£ 0.87/ Euro

Eurozone inflation
To slow compared to the 2023 level

Irish Unemployment
to remain stable ~4%

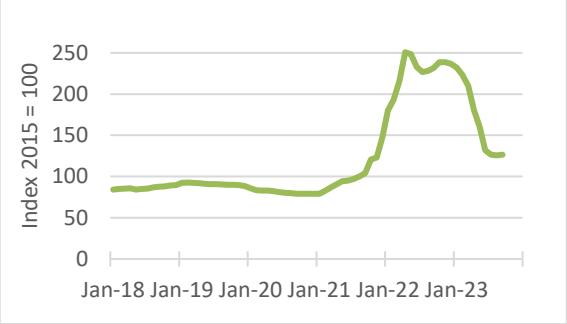
Weather conditions
Normal weather assumed

Overall Sector: Summary Review of 2023

Output Value	Input Spend	Support Payments	Income
↓ Down	↓ Down	→ Stable	↓ Down

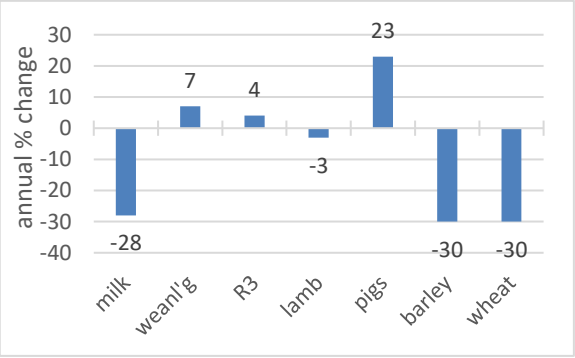
- Weather conditions in 2023 were atypical with an unusually dry H1 followed by a particularly wet H2. This created challenging production conditions at times for grassland and tillage.
- Driven by the consequences of the illegal invasion of Ukraine and other inflationary pressures, total production costs remained high in 2023. Fertiliser use continued to fall.
- Averaged over the year, there was a 28 percent decrease in milk prices in 2023, with VAT inclusive prices averaging just over 43 cent per litre (actual fat and protein). Irish milk production is estimated to have declined slightly in 2023.
- Production costs remained elevated in 2023. The decline in the milk price exacerbated the issue on dairy farms in 2023. The average dairy net margin declined by 71 percent, to an estimated 7.05 cent per litre.
- Prices for finished cattle increased by 4 percent in 2023. Weanling prices increased by 7 percent, while prices of store cattle increased by 5 percent relative to the 2022 level.
- The average gross margin on the cattle finishing enterprise decreased by 1 percent in 2023. The average gross margin on the single suckling enterprise increased by 15 percent in 2023.
- The average net margin on the cattle finishing enterprise decreased slightly to €49 per hectare in 2023. The average net margin on the single suckling enterprise increased to a break-even position in 2023.
- Declines in the costs of production for the sheep sector were sufficient to outpace the slightly lower marketed output values in 2023. This resulted in higher margins on the average mid-season lowland lamb enterprise. Total direct costs of production were down 10 percent on average.
- The gross margin for Irish mid-season lowland lamb producers in 2023 is estimated to have increased by 5 percent. The margins were boosted by the receipt of payments from the Sheep Improvement Scheme
- In 2023 Irish cereal yields for most major crops were below 2022 levels, with the magnitude of change varying by crop. Cereal prices at harvest in Ireland in 2023 were down significantly on the 2022 level, due to increased production levels in the EU market.
- Direct costs for cereal production decreased in 2023, due mainly to a fall in fuel and fertiliser prices. Whilst direct costs were lower in 2023, the substantial decrease in gross output led to a substantial decrease in cereal margins in 2023.
- Pig prices improved significantly in 2023 to reach an average of 224 cent per kg, a 23 percent increase on the 2022 level. On average pig production costs were stable in 2023, following the large increase in 2022. Irish pig production fell 9 percent, as the breeding herd contracted in 2022.
- The key pig production profitability measure, margin over feed, improved significantly reaching 69c per kg dwt in 2023, bringing Irish pig farms back into profitability.

Figure E1: Monthly Price Index of Fertiliser in Ireland from 2018 to 2023



Source: CSO (various years)

Figure E2: Change in Output Prices 2023 vs 2022



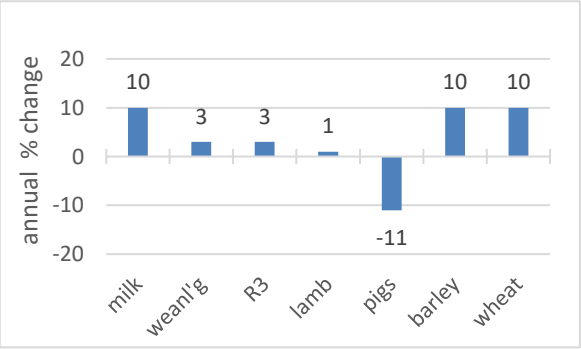
Source: Authors' estimates

Overall Sector: Outlook for 2024

Output Value	Input Spend	Support Payments	Income
↑ Up	↓ Down	→ Stable	↑ Up

- The outlook for Irish agriculture in 2024 is conditional on a normal weather assumption.
- The cost inflation of 2022 and limited cost reductions in 2023 will leave overall production costs at a high level coming into 2024.
- Fertiliser prices are forecast to fall significantly in 2024. Limited change in usage levels is anticipated.
- For 2024 as a whole, feed prices are forecast to remain very similar to the 2023 level.
- Fuel prices are forecast to fall by 4 percent in 2023.
- The outlook for the global dairy market is somewhat uncertain for 2024, but on average Irish milk prices are projected to improve by about 10 percent compared to 2023.
- An average Irish milk price of about 47 cent per litre (actual constituents vat incl.) is forecast. Despite some input costs reductions, across fertiliser and energy in particular, production expenditure will remain high. A net margin of 12.4 cent per litre is forecast for 2024.
- Against this backdrop, Irish milk production is forecast to remain relatively stable in 2024.
- In 2024 the average dairy net margin is forecast to improve by over 70 percent compared to 2023, to 12.4 cent per litre.
- Young cattle prices and finished cattle prices are forecast to be three percent higher in 2024 relative to 2023.
- The average gross margin on the cattle finishing enterprise is forecast to increase by 7 percent to €779 per hectare in 2024.
- The average gross margin on the single suckling enterprise is forecast to increase by 8 percent to €719 per hectare in 2024.
- While a modest increase in lamb prices is forecast for 2024, this coupled with a slight easing in costs, will result in higher margins on sheep farms.
- Sheep gross margins are forecast to increase by about 9 percent on average, to €982 per hectare.
- Payments to farmers participating in the Sheep Improvement Scheme will continue to boost the value of gross output and margins per hectare on sheep farms in 2024.
- EU winter cereal planted area figures for the 2024 harvest are forecast to be lower than the area planted in the 2023 harvest year. Irish cereal prices at harvest in 2024 will be highly dependent on supply and demand conditions globally. Based on current futures trading prices, Irish cereal prices are forecast to increase slightly relative to harvest 2023.
- Overall, costs on cereal farms look set to decrease again in 2024. With a normal yield forecast and an increase in prices, margins for all crops in 2024 will increase on the 2023 levels.
- In 2024, the Irish pig price is forecast to fall by 11 percent to 200c per kg.
- The annualised composite pig feed price is forecast to fall by 11 percent in 2024 relative to 2023.
- This represents a decrease in the cost of feed per kg dwt., which is forecast to be 139 cent in 2024 compared with 155 cent in 2023.
- With Irish pig production set to remain stable in 2024, the Irish pig sector will experience a reduction in margins, with a moderate level of profitability.

Figure E3: Forecast Change in Output Prices 2024 vs 2023



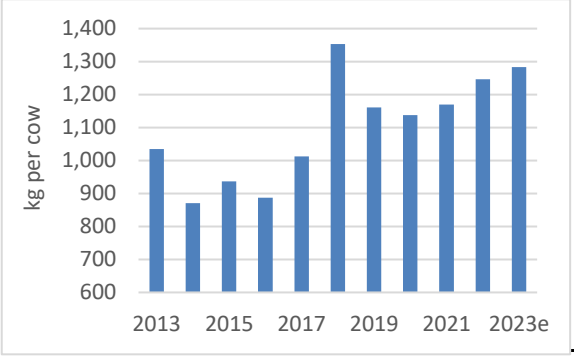
Source: Authors' forecasts

Dairy: Review of 2023

Output Value	Input Spend	Income
Down	Stable	Down

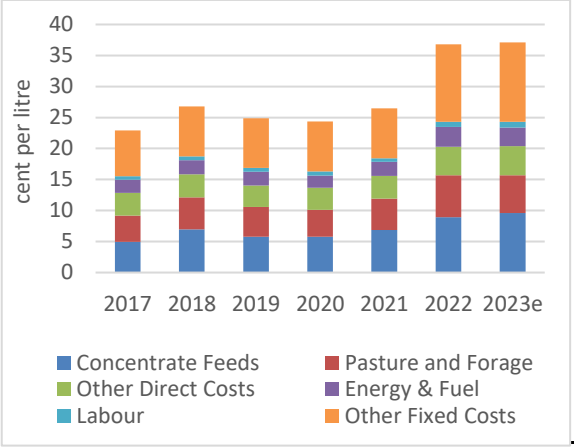
- The dairy sector experienced a sharp decline in the value of output in 2023, while production costs remained very high.
- Global milk production increased in 2023, following a decline in 2022. International import demand for dairy products was muted.
- Butter and SMP prices in particular fell sharply and given their importance in the Irish dairy product mix, Irish milk prices fell well below the EU average in 2023.
- The annual average Irish milk price for 2023 is estimated to have declined by 28 percent to 43.2 cent per litre (actual constituents vat incl) from a record high level in 2022.
- In aggregate, Irish milk production declined slightly in 2023 (down 1 percent) with generally favourable grass growth observed through some of the peak milk production months, despite particularly dry conditions early in the summer.
- Dairy cow numbers increased by 1.2 percent to 1.647m in June 2023, compared to June 2022.
- On a per cow basis, dairy feed usage is estimated to have increased by 3 percent in 2022 to about 1,283 kg.
- Due to an increase in concentrate feed prices and usage, feed expenditure increased in 2023 by 5 and 7 percent on a per hectare and per litre basis respectively relative to June 2022.
- Fertiliser prices fell somewhat in 2023, but remained high. Fertiliser usage continued to decline. As a result, pasture and forage costs fell on average by about 11 percent year-on-year.
- Despite reductions in some input cost items in 2023, it is estimated that total production costs did not come down relative to 2022. Total costs in 2023 are estimated to be approximately 37.1 cent per litre.
- The strong decline in milk prices, in a high cost environment, resulted in an estimated net margin of 7.05 cent per litre in 2023. This represents a 71 percent decrease on 2022.
- With a reduction in milk prices and production per hectare down slightly in 2023, it is estimated that the net margin per hectare declined by approx. 71 percent to a national average of €859.

Figure E4: Irish Dairy Cow feed use 2013 to 2023e



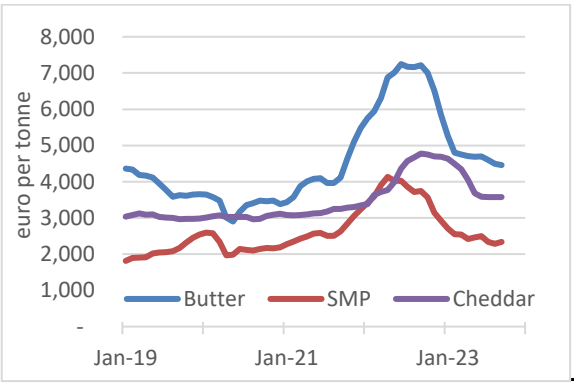
Source: Authors' estimates derived from DAFM and CSO data.
Note: e = estimate.

Figure E5: Average Total Milk Production Costs (cent per litre) in Ireland: 2017 to 2023e



Source: Teagasc National Farm Survey and Authors' Estimate.

Figure E6: Monthly European Dairy Product Prices Jan 2019 to Sept 2023



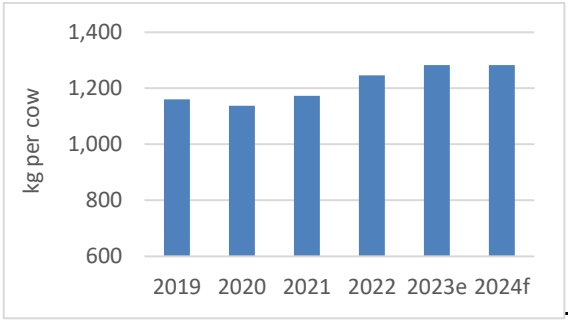
Source: MMO

Dairy: Outlook for 2024

Output Value	Input Spend	Income
Up	Down	Up

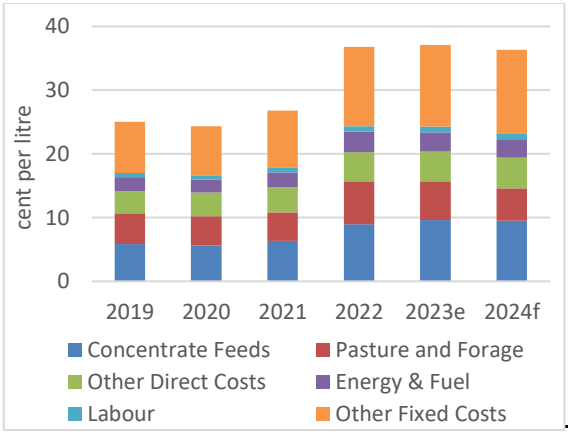
- The dairy market outlook for 2024 is more positive, with further adjustments in supply and demand expected to bring some improvement in international dairy commodity prices.
- However, weak global economic growth may hinder a stronger dairy market recovery.
- The annual average Irish milk price in 2024 is forecast to improve by approximately 10 percent. This would represent an annual average milk price of approximately 47.5 cent per litre (actual fat and protein VAT inclusive).
- Some further easing in production costs is expected across some cost items e.g. fertiliser and fuel.
- Assuming normal weather conditions in 2024, feed use per head on Irish dairy farms is expected to remain stable. Feed prices are also expected to remain relatively unchanged (down 1 percent).
- Despite global uncertainty, oil prices are expected to fall further in 2024, with fuel prices forecast to decrease by 4 percent, on average.
- The outworking of the recent changes in nitrate regulations is likely to be complex and have some influence on national production. No increase in milk production is assumed in this forecast for 2024, with a stable dairy cow population and stable milk yields.
- With output value per hectare expected to increase by 10 percent in 2024, and allowing for a slight fall in costs, improved margins are anticipated. The forecast average net margin per hectare in 2024 is €1,477, an increase of 73 percent relative to the low returns of 2023.
- On a per litre basis, the average net margin is forecast to increase by 73 percent in 2024 relative to the 2023 level, to an average of 12.2 cent per litre.
- Overall, a return to more normal income levels is envisaged on Irish dairy farms in 2024. Although production costs look set to remain elevated, an improvement in farm milk prices will boost output value.

Figure E7: Irish Dairy Cow feed use: 2019 to 2024



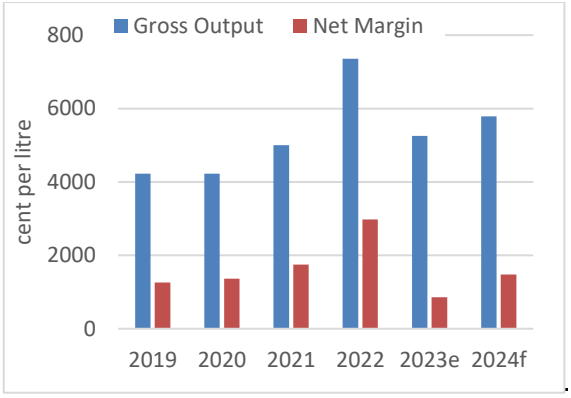
Source: Authors' estimates derived from DAFM and CSO data.
Note: e = estimate. f= forecast

Figure E8: Average Total Milk Production Costs (cent per litre) in Ireland: 2019 to 2024



Source: Teagasc National Farm Survey, Authors' Estimate for 2023 and Authors' Forecast for 2024.

Figure E9: Dairy Gross Output and Net Margin 2019 to 2024



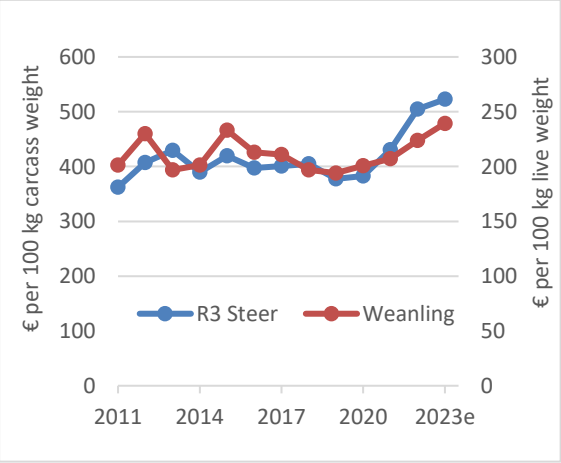
Source: Teagasc National Farm Survey, Authors' Estimates for 2023 and Authors' Forecast for 2024

Cattle: Review of 2023

Output Value	Input Spend	Income
Down	Down	Mixed

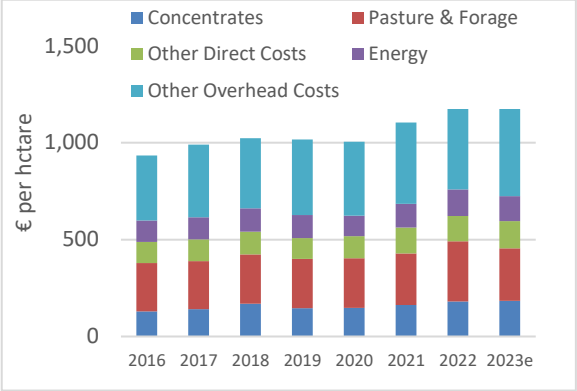
- In 2023, average prices for prime finished cattle were 3.5 percent higher than the average levels in 2022.
- In 2023, prices for younger cattle were 5 to 7 percent higher relative to 2022, leading to an increase in output value on Single Suckling enterprises.
- The output value on the average Cattle Finishing enterprise decreased in 2023, as a result of lower volumes of beef production.
- The Suckler Cow Efficiency Programme (SCEP) and National Beef Welfare Scheme (NBWS) schemes contribute positively to gross output on Single Suckling farms.
- Decreases in fertiliser prices have contributed towards lower direct input expenditures on cattle enterprises.
- In 2023, the average gross margin per hectare earned on Single Suckling enterprises is estimated to be €666 per hectare, a 15 percent increase on the 2022 level.
- In 2023, the average gross margin per hectare earned on Cattle Finishing enterprises is estimated to be €729 per hectare, a 1 percent decrease on the 2022 level.

Figure E10: Finished Cattle and Young Cattle Prices



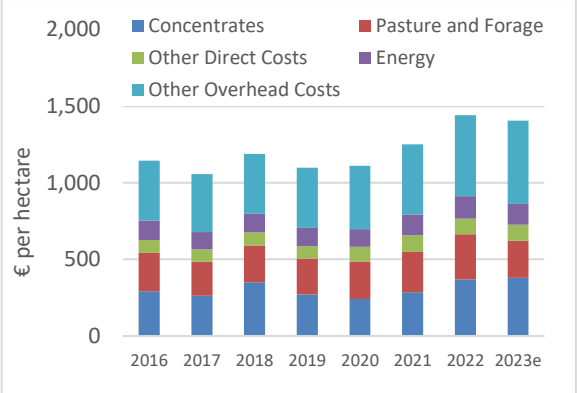
Source: 2009-2022 DG Agri, CSO, 2023 Authors' estimate

Figure E11: Costs of Production Single Suckling (SS)



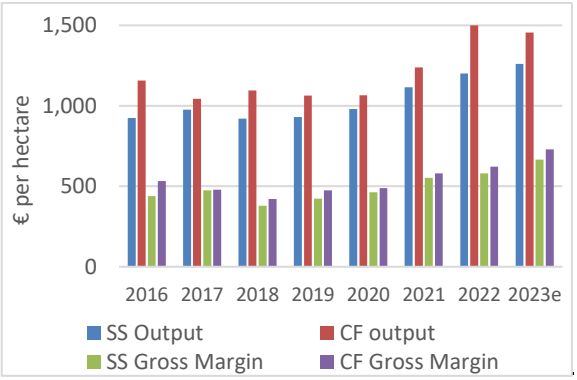
Source: 2016-2022 Teagasc NFS, 2023 Authors' Estimate

Figure E12: Costs of Production Cattle Finishing (CF)



Source: 2016-2022 Teagasc NFS, 2023 Authors' Estimate

Figure E13: Output and Gross Margin



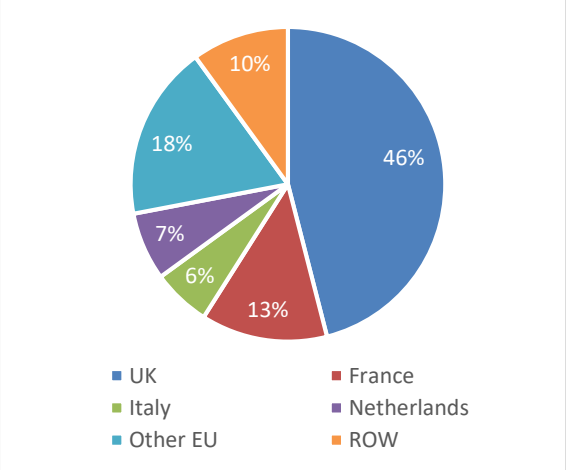
Source: 2016-2022 Teagasc NFS, 2023 Authors' Estimate

Cattle: Outlook for 2024

Output Value	Input Spend	Income
↑ Up	↓ Down	↑ Up

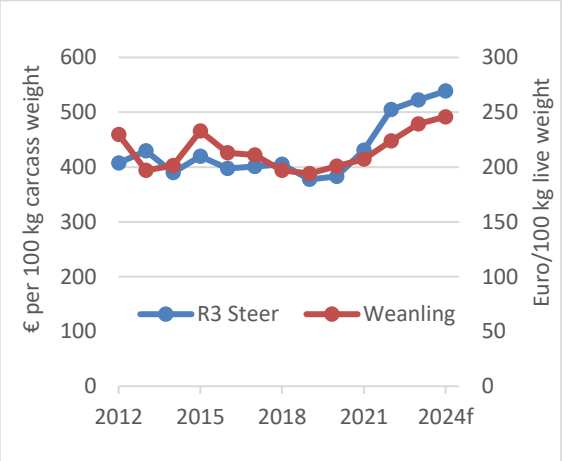
- EU beef supply is forecast to decline in 2024.
- UK beef supply is forecast to be unchanged in 2024.
- Average Irish finished cattle prices in 2024 are forecast to be 3 percent higher relative to 2023.
- Average Irish young cattle prices in 2024 are forecast to be 3 percent higher relative to 2023.
- Input expenditure in 2024 is forecast to decrease on 2023 levels due to lower fertiliser prices.
- Direct costs of production on Single Suckling enterprises are forecast to decrease by approximately 5 percent in 2024.
- Direct costs of production on Cattle Finishing enterprises are forecast to decrease by approximately 9 percent in 2024.
- In 2024, the average gross margin per hectare on Single Suckling enterprises is forecast to increase by 8 percent to €719 per hectare.
- In 2024, the average gross margin per hectare on Cattle Finishing enterprises is forecast to increase by 7 percent to approximately €779 per hectare.
- The Suckler Carbon Efficiency Programme, the ACRES programme and other policy supports will continue to contribute to farm income on cattle farms in 2024.

Figure E14: Irish Beef Exports by Volume in 2023



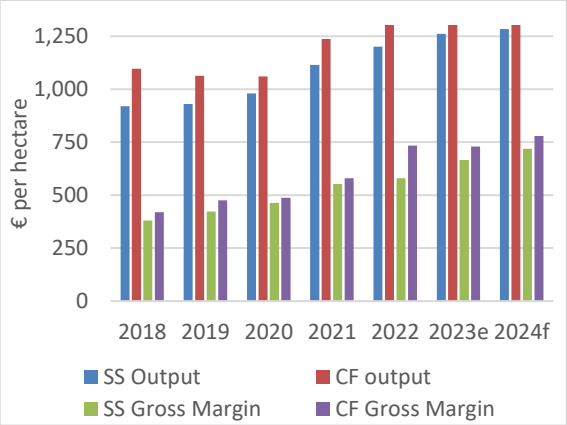
Source: Eurostat COMEXT (year through August)

Figure E15: Cattle prices with forecast for 2024



Source: Authors' forecast

Figure E16: Single Suckling (SS) and Cattle Finishing (CF) Output and Gross Margin



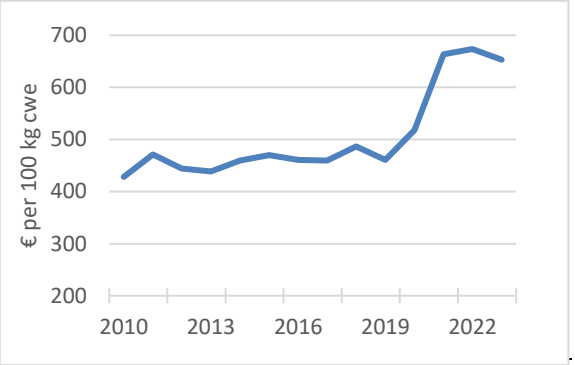
Source: 2018 to 2022 Teagasc NFS, 2023 Authors' estimate, 2024 Authors' forecast

Sheep: Review of 2023

Output Value	Input Spend	Income
↓ Down	↓ Down	↑ Up

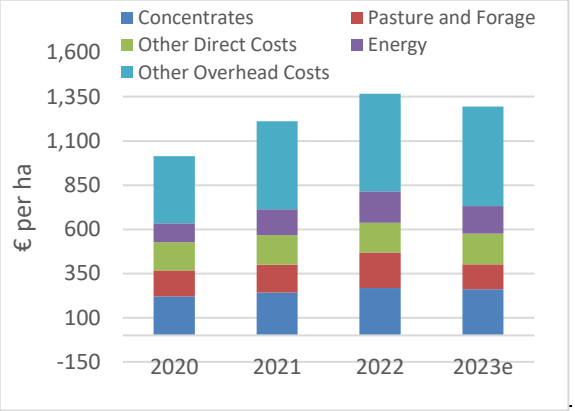
- EU sheep meat production in 2022 is estimated to grow by just over 1 per cent.
- With high prices, EU sheep meat exports have declined by 3% (Jan-Aug period) in 2023. Continued high EU prices and tight EU domestic supply are expected to continue.
- The high EU domestic prices are favouring more imports from both NZ and the UK, estimated to increase by 15 percent in 2023.
- Prices on the European lamb market in 2023 are higher than in 2022 and are well ahead of 5 year average price levels. Prices for heavy lamb, at the time of going to press are, on average 8 percent higher than in 2022.
- It is expected that the average lamb price in Ireland for 2023 for the year as a whole will be lower than in 2022. The year on year price change is estimated at 3 percent.
- Total direct costs of production for Irish mid-season lowland lamb enterprises are estimated to have decreased in 2023, down by almost 10 percent in 2023.
- Overhead costs of production are estimated to have decreased by 2 percent.
- Gross margins per hectare for Irish mid-season lowland lamb producers are estimated to have increased in 2023 by 5 percent, owing to lower costs of production in 2023, which decreased 5 percent on average.
- The receipt of Sheep Improvement Scheme, under CAP Pillar II, boosted margins on sheep farms in 2023.
- In 2023 the average gross margin on mid-season lowland enterprises is estimated to be €905 per hectare.

Figure E17: Irish Lamb price 2010 – 2022 with estimate for 2023



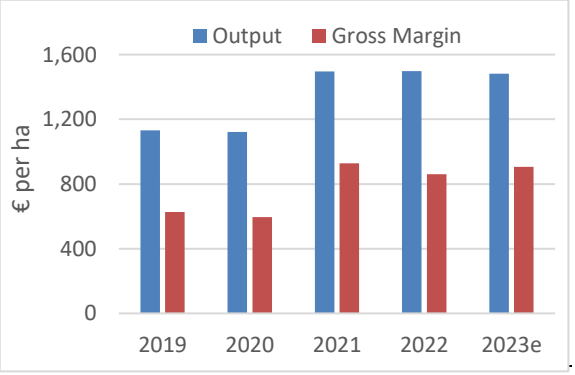
Source: European Commission DG AGRI and author estimate 23

Figure E18: Average Sheep production costs 2020 - 2022 and estimate for 2023



Source: Teagasc NFS 2020 - 2022, Authors' Estimate for 2023

Figure E19: Average Sheep output 2019-2022 & margin estimate for 2023



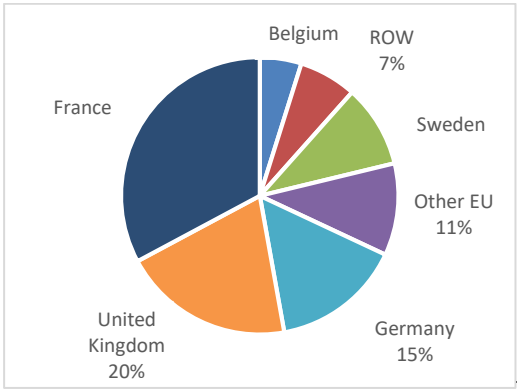
Source: Teagasc NFS 2019-2022, 2023 Authors' Estimate

Sheep: Outlook for 2024

Output Value	Input Spend	Income
Up	Down	Up

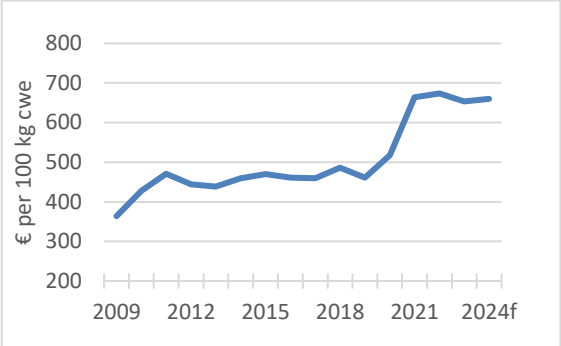
- The outlook for Irish and EU lamb prices for 2023 is positive. Continued high EU prices and tight EU domestic supply are expected to continue.
- Global sheep meat prices are forecast to remain high, similar to 2023 price levels. Export opportunities for Irish sheep meat will continue to support Irish prices in 2024.
- Sheep feed expenditure is forecast to decrease marginally, by circa 1 percent. Concentrate prices are forecast to decrease by 1 percent, with feed use forecast to remain stable.
- Fertiliser prices are forecast to decline on 2023 price levels. With fertiliser usage remaining as per 2023, pasture and forage costs in 2024 are expected to decline by almost a third.
- With lower costs of production continuing into 2024 year and a modestly positive lamb price outlook, gross margins for mid-season lowland lamb enterprises in 2024 are expected to increase by 9 percent.
- The recently announced additional payments and measures forthcoming under the proposed 'improved' Sheep Improvement Scheme, under CAP Pillar II, will provide a further boost at the individual farm level in 2024 and support margins for lowland lamb producers.
- In 2024, the average gross margin per hectare earned by Irish mid-season lowland lamb enterprises is forecast to increase to €982.

Figure E20: Irish Sheep and Lamb Meat Exports (Volume) by Destination in 2023



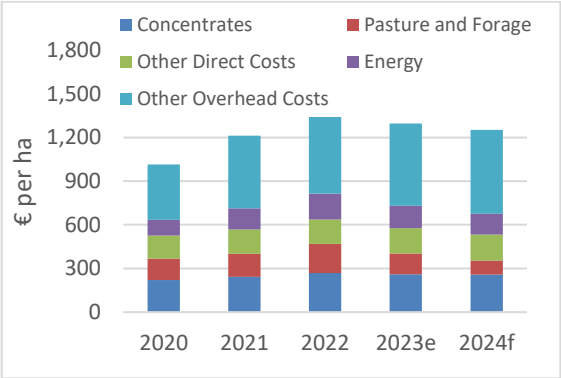
Source: Eurostat COMEXT (Volume, year to end August 2023)

Figure E21: Irish Lamb price forecast for 2024



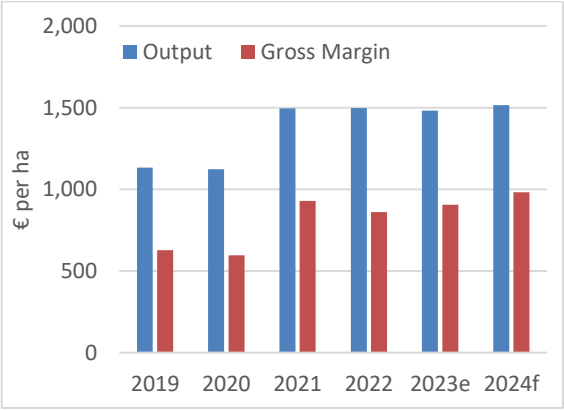
Source: DG Agri 2009-2022; Authors' Estimate 2023; Authors' forecast 2024

Figure E22: Sheep production costs forecast 2024



Source: Teagasc NFS 2020-2021, Authors' Estimate 2023, Authors' Forecast 2024

Figure E23: Average Sheep output & margins with forecast for 2024



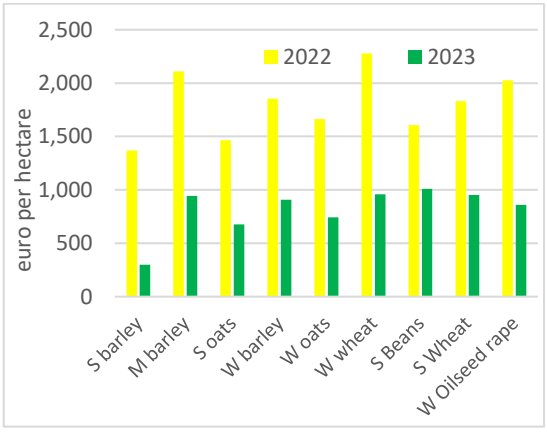
Source: Teagasc NFS 2018-2022, Authors' Estimate 20234, Authors' Forecast 2024

Cereals: Review of 2023

Output Value	Input Spend	Net Margin per ha
Down	Down	Down

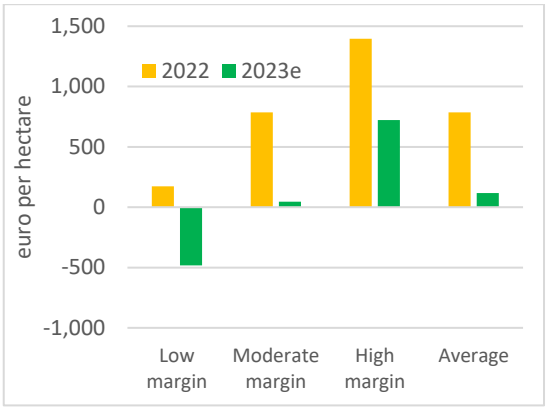
- Despite a decrease in global soft wheat and barley production in 2023/24, the increase in maize production internationally was enough to slightly increase overall production on the international cereals balance sheet.
- These supply factors, coupled with a relatively flat demand situation led to a significant decrease in cereal prices at harvest 2023, with on account Irish harvest prices decreasing by over 30 percent.
- There was also a decrease in yields of the main cereal crops in Ireland in 2023. Irish spring barley yields decreased by 21 percent on a per hectare basis, while winter wheat yields decreased by 14 percent per hectare, compared to 2022.
- Direct costs of production on Irish cereal farms decreased in 2023 compared to 2022. The largest decreases were for fertiliser and fuel related costs at 15 percent and 18 percent respectively.
- On average direct costs of production decreased by 5 percent in 2023 on a per crop basis. Overhead costs allocated to cereal enterprises on tillage farms also decreased in 2023.
- The net effect of the change in output value and input costs was a significant decrease in the average gross margin for cereal crops in 2023. The gross margin per hectare for spring barley, winter barley and winter wheat decreased by €1,070, €945 and €1,320 respectively.
- There remains a wide variation in terms of the economic performance of individual cereal farms nationally. It is estimated that the average cereal enterprise on specialist tillage farms has returned a positive market based net margin in 2023.
- But there is a range around this average figure, with the bottom one third of farms earning a negative market based net margin of approximately minus €480, while the top one third of farms earned approximately €725 per hectare.
- Overall, there was a €670 per hectare decrease in the average market based net margin in 2023, relative to 2022. This can be attributed to significant decreases in cereal price and yields which more than outweighed any decrease in direct and overhead costs.

Figure E24: Gross Margin for Main Cereal Crops



Source: Teagasc, National Farm Survey Data & Author's estimate for 2023

Figure E25: Cereal Enterprise Net Margin on Specialist Tillage Farms



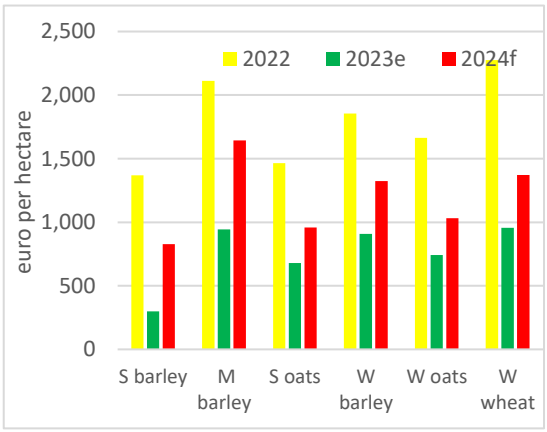
Source: Teagasc, National Farm Survey Data & Author's estimates for 2023

Cereals: Outlook for 2024

Output Value	Input Spend	Net Margin per ha
Up	Down	Up

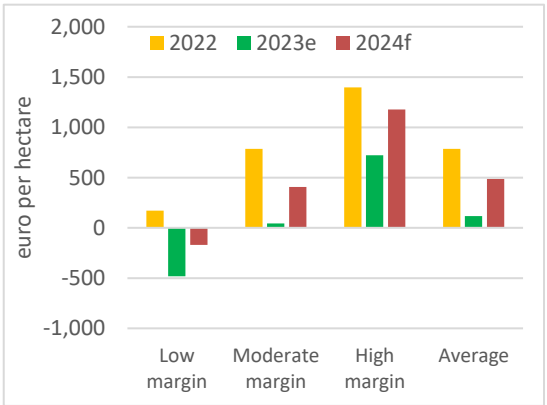
- EU grain production increased in 2023. In terms of market supply and demand, there is a lot of uncertainty at present, as stocks to use ratios are variable across wheat, barley and maize.
- Current (November 2023) futures markets indicate that 2024 harvest prices will be slightly higher than those that prevailed at harvest 2023, by over 10 percent.
- This upward movement in prices can be explained by an expected reversion to trend yields in the EU for 2024 and a forecast for a lower ending stock position after the 2024 harvest.
- A return to 5 year trend yields in Ireland in 2024 would mean a yield increase for most cereal crops.
- Direct costs of production on cereal farms are expected to decrease again in 2024, with key inputs such as fertiliser, seed and fuel expected to decrease.
- Whilst fuel related costs are expected to decrease in 2024, by about 9 percent on tillage farms, other overhead costs are expected to increase further in 2024, by about 2 percent compared to 2023.
- The net effect of the forecast changes in output value and input expenditure mean that 2024 gross margins for cereals are forecast to increase over 2023 levels.
- The average gross margin for spring barley in 2024 is forecast to increase by approximately €530 per hectare compared to 2023. The average winter barley and winter wheat gross margins are forecast to increase by about €415 per hectare in 2024.
- The cereal enterprise market based net margin on specialist tillage farms in 2024 is forecast to increase on the 2023 level. It is forecast that the average specialist tillage farm will return approximately €485 market based net margin in 2024.
- It is forecast that approximately 25 percent of specialist tillage farmers will return a negative market based net margin in 2024.

Figure E26: Gross Margin for Main Cereal Crops (2023 estimate & 2024 forecast)



Source: Teagasc, National Farm Survey Data & Author's estimate for 2023 & forecast for 2024

Figure E27: Cereal Enterprise Net Margin on Specialist Tillage Farms, 2023 forecast



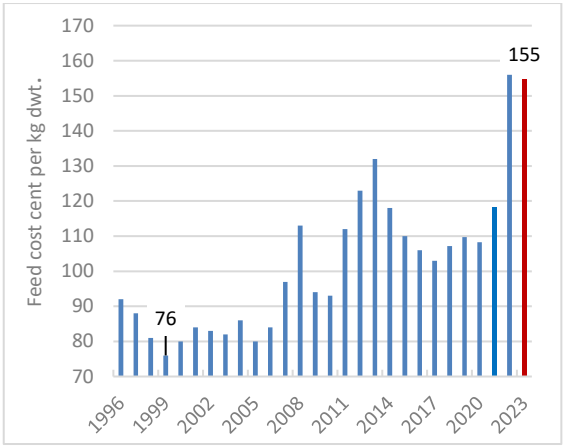
Source: Teagasc, National Farm Survey Data & Author's estimate for 2023 & forecast for 2024

Pigs: Review of 2023

Output Value	Input Spend	Income
Up	Up	Up

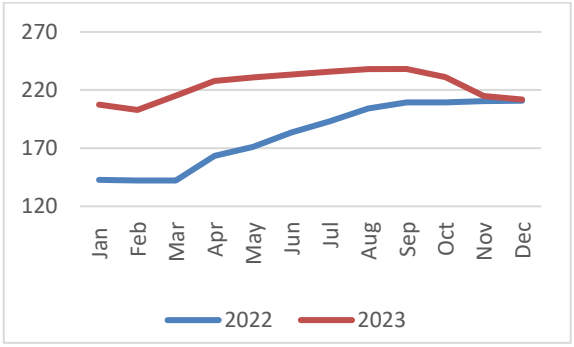
- The composite feed price per tonne entered 2023 on a historic high level (€480/tonne) arising from the feed ingredient prices increasing rapidly with the invasion of Ukraine.
- The annual average feed cost in 2023 is estimated to be 155 cent per kg dwt. This is virtually unchanged from the 2022 figure (156 cent) but higher than the 5 year average (129 cent).
- At 224 cent per kg, the 2023 Irish pig price was significantly higher than the 182 cent per kg average for 2022. This increase is primarily attributable to input cost inflation following the invasion of Ukraine and a tightening of the EU pig supply.
- The estimated 2023 average pig price of 224 cent per kg is significantly higher than the five year average (2019-2023) of 181 cent per kg.
- The 2023 'Margin Over Feed' (MOF) per kg is estimated to be 69 cent per kg dwt. This is significantly higher (+167 percent) than the 26 cent in 2022, which was the lowest in 40 years.
- The volume of Irish pigs slaughtered decreased to 3.48m in 2023, which was a decrease of 360,000 pigs (-9.3 percent) on the 2022 level and similar to the 2014 level. In 2023, of the 3.84m pigs of ROI origin that were slaughtered, 0.353m were slaughtered in Northern Ireland, a decline of 41,000 pigs on the 2022 level.
- In 2023, pig slaughter volumes in the principal European pig producing countries decreased by 8 percent when compared to 2022. The countries with the largest decrease were Denmark (-19 percent) Germany (-6 percent), Spain (-6 percent) and France (-5 percent).
- Exports of Irish pigmeat declined by 17 percent (Jan to Sept.) when compared to 2022. The largest decline was in exports to China which decreased in volume by 7 percent. EU pigmeat exports to China also fell in volume terms in 2023 when compared to 2022 (690,000 versus 788,000 tonnes)

Figure E28: Irish Compound Pig Feed Price 2013 to 2023



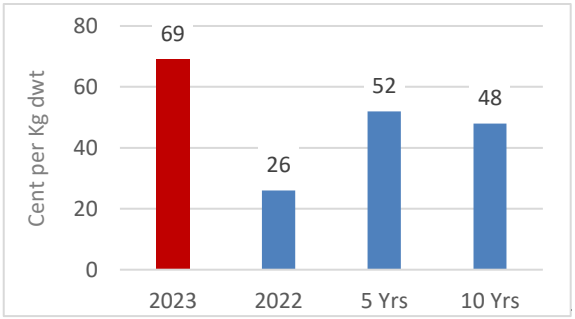
Source: Teagasc Pig Development Department, estimate for 2023

Figure E29: Monthly Irish Pig Prices 2022 – 2023



Source: Teagasc Pig Development Department, estimate for 2023

Figure E30: Margin Over Feed: Historical Comparison with 2023



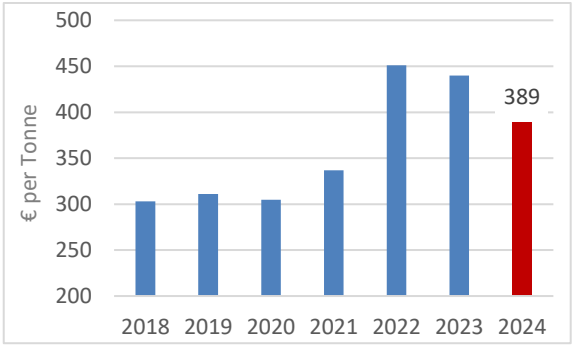
Source: Teagasc Pig Development Department, estimate for 2023

Pigs: Outlook for 2024

Output Value	Input Spend	Income
↓ Down	↓ Down	↓ Down marginally

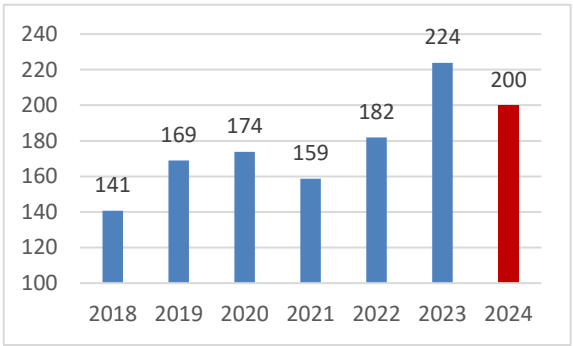
- The November 2023 composite pig feed price of €399 per tonne will be maintained into early 2024.
- In Q2 and Q3 of 2024, pig feed costs are forecast to marginally decrease, with expectations of good harvest yields in the northern hemisphere and further transition to contract milling/forward buying.
- Forecasts for the 2024 South American (SA) soyabean harvest suggest it will reach 163 mt. However current drought conditions in some parts of Brazil may lead to a lower harvest.
- The annualised composite pig feed price is forecast to decrease by 11 percent in 2024 relative to 2023. This represents a decrease to 139 cent per kg in 2024 when compared to 155 cent per kg in 2023.
- In 2023 the size of the EU sow herd is likely to continue to stabilise in the main pig producing countries, with the exception of Spain. The Spanish sow herd is expected to continue its long term growth, albeit at a lower level than previously (+1 percent).
- In 2024, the size of the Irish sow herd is expected to stabilise/marginally increase after a significant reduction in 2022-2023, but the tight supply volume of Irish pigs is expected to continue.
- The volume of EU exports of pigmeat to China will have an important influence on the EU and Irish pig price in 2024. It is expected that China's imports from the EU will remain weak due to the meat supply created from on-going sow herd culling in China.
- African Swine Fever (ASF) will continue to feature in 2024 with further cases in Eastern Europe and Western Europe countries continuing heightened biosecurity pre-cautions
- In 2024, the Irish pig price is forecast to be 200 cent per kg, but this forecast is highly influenced by ASF developments, EU pig supply volumes and Chinese import demand.
- Following high losses in 2021-2022 and a return to profitability in 2023, the Irish pig sector is expected to continue to deliver moderate levels of profitability in 2024.

Figure E31: Historical Compound Pig Feed Price and forecast for 2024



Source: Teagasc Pig Development Department estimate for 2023 & forecast for 2024

Figure E32: Historical Irish pig prices and forecast for 2024



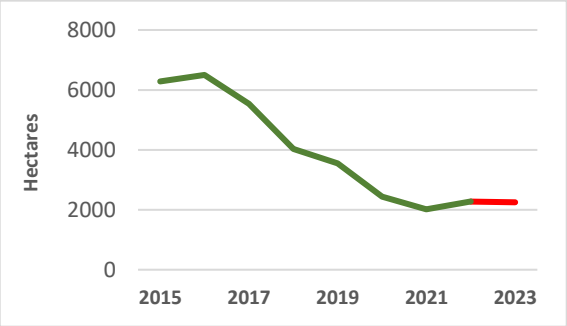
Source: Teagasc Pig Development Department est. 2023 & forecast for 2024

Forestry Sector: Review of 2023

Afforestation levels	Actual Timber demand	Timber prices
Forecast below 2022 levels	Variable due to national and international economic uncertainties / consumer confidence	Tracking timber demand and competitiveness

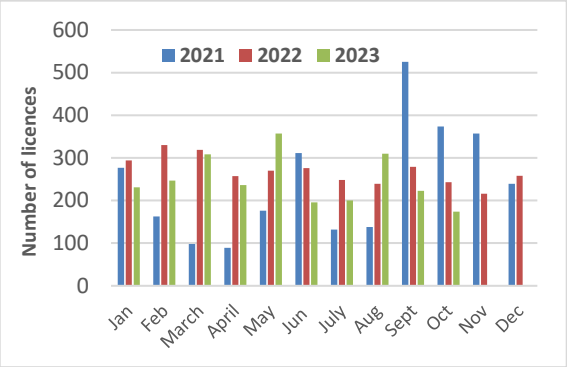
- The projected planting level for 2023 is just over 2,000 ha, which is below 2022 levels.
- The forestry licencing backlog reduced from a reported 6,000 in August 2021 to 1,988 by January 2023, with further improvements reported during 2023. DAFM attributed the improved licencing outputs to implementation of measures recommended under Project Woodland.
- The total number of felling licences issued to Week 3, November, 2023 was 2,626, compared to a total of 3,293 for the full year in 2022.
- Almost 70 km of private grant aided forest roads were completed in 2022. The year to date completion figure up to Week 3, November 2023 is 65 km.
- Timber markets remained challenging during 2023, reflecting the demand/supply situation.
- Exports of all forestry and wood based products totalled €784 million in 2022, representing 1.54 million tonnes of product.
- The United Kingdom remains our largest export market, accounting for over 80 percent of forestry and wood-based product exports by value.
- The total volume of roundwood input purchases by industry in 2022 was reported as 3.1 million m3, a decrease of 3 percent from 2021. Twenty eight percent of purchases were from privately owned forests, a decrease of 8 percent from 2021 levels.
- Dwelling completions in Ireland for 2023 are forecast to exceed the target of 29,000 units.
- Approximately half of Ireland's forest estate is certified as sustainably managed by international non-governmental organisations. Currently there are 15,680 ha of privately-owned forests certified, representing 5.7 percent of the private estate.

Figure E34: Annual planting 2015 to 2022, with projection for 2023



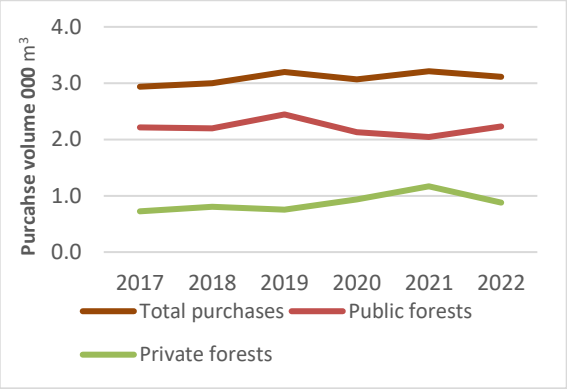
Source: DAFM (2023)

Figure E35: Monthly Felling Licences issued 2021 to (October) 2023



Source: DAFM, Forestry Section Monthly Reports (2021/22/23) and Forestry Dashboard

Figure E36: Roundwood Purchases ('000m^3) from public and privately owned forests 2022



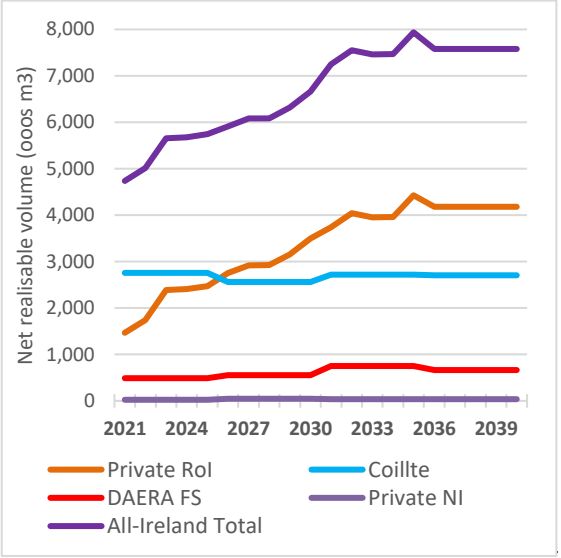
Source: CSO 2023

Forestry Sector: Outlook for 2024

Afforestation levels	Timber demand	Timber prices
Up	Anticipated stable or modest demand increases	Linked to demand / supply issues

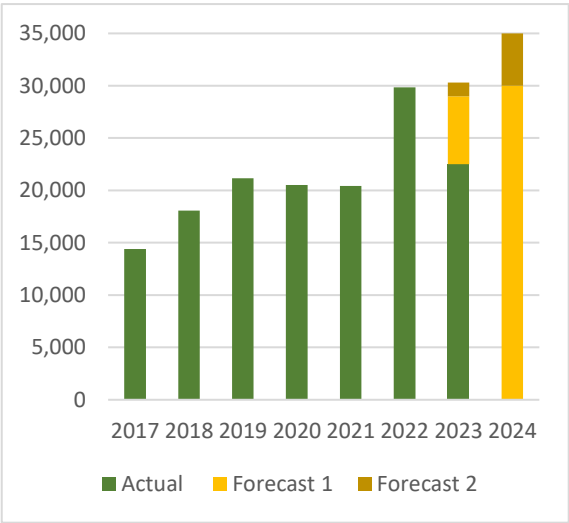
- The Government budget allocation for forestry measures in 2024 is €110 million. This allocation reflects funding to establish 8,000 ha of new forests, an ambitious target set out in the Food Vision 2030 Strategy and Climate Action Plan 2023.
- Increasing planting rates towards target levels remains a priority. New forest creation opportunities within the new Forestry Programme 2023-2027 will need to be combined with provision of strong support to farmers and landowners in re-engaging with forestry and building confidence regarding its many benefits.
- Forecasts indicate that the net realisable timber volume (NRV) from private sector forestry in Ireland will increase from 2.38 million m3 in 2023 to 2.4 million m3 in 2024.
- The export-oriented sawmilling sector will continue to compete in a challenging market environment, but has significant potential to enhance its market position with a sufficient level of timber mobilisation.
- The level of Irish house completions for 2024 is estimated to reach between 30,000 and 35,000 units.
- Continued sustainable management of forests, including timely thinning operations as appropriate, will help optimise forest productivity, whilst also facilitating ongoing mobilisation of the timber resource.
- A focus on the rapid expansion of forest certification in the private forest sector is also necessary to ensure the sector is well positioned to meet future timber market requirements.

Figure E37: Forecast of Total Net Realisable Volume Production by ownership category to 2040 (≥ 7cm top diameter)



Source: All-Ireland Roundwood Production Forecast 2021-2040 (COFORD, 2021)

Figure E38: Housing Completions in Ireland (actual and forecast) 2016-2023



Sources: CSO, McQuinn *et al.*, 2023, O'Leary 2023

Irish Dairy Farming Factsheet 2022
Average Performance

Milk Sales per ha
11,587 litres (down 2%)

Days at Grass
236 days (down 4 days)

Milk Production per cow
5,716 litres (down 1%)

Stocking Rate
2.10 lu/ha (unchanged)

Milk price actual fat/protein
59.88 cent per litre (up 49%)

Dairy Enterprise* area
44.3 ha (unchanged)

Average Dairy Herd Size
93 dairy cows (up 1%)

Milk Fat Content
average 4.26% (up 0.04 points)

Concentrates Fed/Dairy Cow
average 1,246 kg (up 6%)

Milk Protein Content
average 3.53% (down 0.01 point)

Concentrates fed/litre of milk
average 0.22 kg (up 7%)

Milk Solids per Cow
average 441 kg (down 2%)

Nitrogen per ha of grassland
160 kg (down 7%)

Basic Payment Scheme
per farm € 17,576 (up 2%)

Total Production Costs
36.79 cent per litre (up 37%)
€4,379 per hectare (up 35%)

Somatic Cell Count
173,000 cells/ml (up 4%)

Gross Margin Dairy Enterprise
41.07 cent per litre (up 57%)
€4,925 per hectare (up 54%)

Net Margin Dairy Enterprise
24.54 cent per litre (up 74%)
€2,975 per hectare (up 71%)

Source: Teagasc National Farm Survey 2022 (Final Results)
Note: Percentage changes are relative to 2021
*Dairy Enterprise area refers to area for dairy cows only

Irish Dairy Farming in 2023

Falling dairy prices
Modest growth in global milk production

Irish Milk Production
Down marginally on 2022

Irish Milk Price
Down 44% on the 2022 level

Weather Conditions
Generally benign, despite some periodic challenges

Grass Availability
Normal for the year as a whole

Fertiliser Prices down 20%
Fertiliser Use down 5%

Feed Prices up 2% in 2023
Feed Use up 3% per head

Other Direct Costs per litre
up 3% on the 2022 level

Fuel Prices (Farm Diesel)
down 18% on the 2022 level

Total Costs per litre of milk
unchanged on the 2022 level

Net Margin for Dairy Enterprise
down 71% per litre on 2022

Source: Teagasc Estimates for 2023 and Forecasts for 2024

Irish Dairy Farming in 2024

Some demand recovery
Improved commodity prices

Irish Milk Production
forecast no change on 2023

Irish Milk price
Up 10% on the 2023 level

Weather Conditions
Normal weather assumed

Grass Availability
normal conditions

Fertiliser Prices down 35%
Fertiliser Use unchanged

Feed Prices stable (down 1%)
Feed Use unchanged per head

Other Direct Costs per litre
up 2% on the 2023 level

Fuel prices (Farm Diesel)
down 9% on the 2023 level

Total Costs per litre of milk
down 2% on the 2023 level

Net Margin for Dairy Enterprise
up 72% per litre on the 2023 level

Note: percentage changes are relative to previous year

Review of Dairy Farming in 2023 and Outlook for 2024

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1. Introduction

This paper looks back on dairy farm performance in 2022, reviews the outcomes for 2023 and looks ahead to the prospects for 2024. Data from the Teagasc National Farm Survey (NFS) are used in our review of 2022. The milk price and key input cost estimates for 2023 are used to produce an overall estimate of dairy enterprise margins for 2023. Finally, in the closing sections of the paper, the forecast for milk price, production costs and dairy farm margins in 2024 are presented.

Dairy farm income increased substantially in 2022, following a number of years of growth. Despite a continued increase in production costs, milk price also rose sharply, which helped to alleviate rising cost pressures. There was little change in overall milk production in 2022, partly due to high fertiliser and feed prices, and also a dry summer which impeded grass growth. On average, there was a 50 percent increase in Family Farm Income (FFI) in 2022 to €148,598, as recorded through the Teagasc NFS.

Production costs increased significantly across the board on the average Dairy farm enterprise in 2022. On a cent per litre basis, average direct costs increased by 37 percent, due mainly to elevated feed and energy costs. Fixed costs also increased by the same magnitude, primarily due to depreciation.

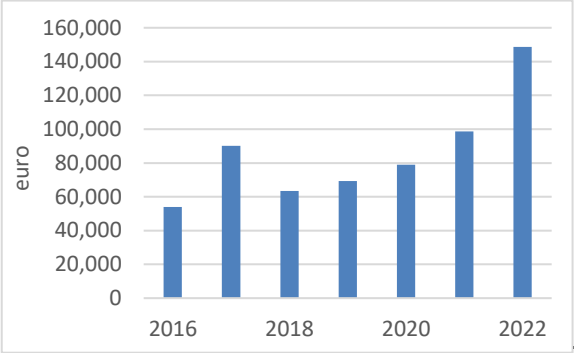
On average, purchased concentrate expenditure increased by 41 percent per litre of milk. Average feed volumes per cow have generally been trending upwards since the abolition of EU milk quota. However, feed use on individual farms, are influenced by factors such as location, land type and stocking rate. In 2022, the average feed volume per dairy cow increased to 1,246kg.

Pasture and forage costs on dairy farms also increased slightly in 2022, up 49 percent per litre, on average. There was a general increase year-on-year in other direct costs such as contracting charges and veterinary expenses. Expenditure relating to hired labour also increased in 2022. Expenditure on energy continued to increase in 2022, due to rising fuel and electricity prices.

2. Review of the Economic Performance of Dairy Farms in 2022

Results from the Teagasc NFS 2022 for Dairy farms are summarised here. Figure 1 presents the average FFI on *Specialist Dairy* farms over the years 2016 to 2022. The chart shows that there has been steady growth in average dairy farm income in recent years, with a substantial increase in 2022.

Figure 1: Average Income on Irish Specialist Dairy Farms 2016 to 2022



Source: Teagasc National Farm Survey (various years).

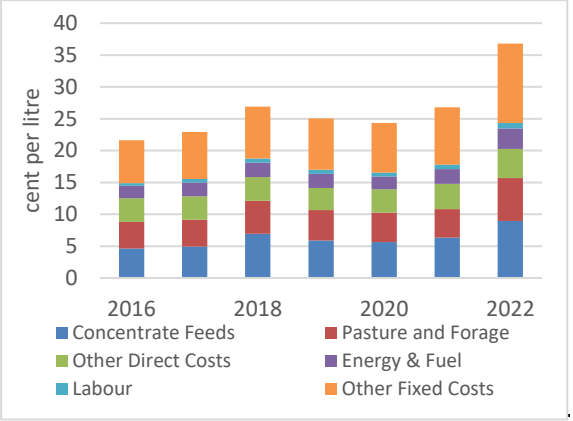
To further explore the economic performance of dairy farms in 2022, we next look at how margins have changed over the course of the past few years. Table A1 (see appendix) presents the average gross output, gross margin and net margin per litre of milk produced in 2021 and 2022. Farms producing mainly liquid milk are excluded from the sample, as are herds of 10 cows or less.

The gross output measure includes the value of milk and calf sales minus replacement costs. The data indicate that gross output per litre increased by 50 percent in 2022 relative to 2021, due to the strong milk price. On average, on a cent per litre basis, concentrate feed related costs increased by 41 percent. Total direct costs (per litre) increased by 37 percent year-on-year. The average Dairy gross margin in 2022 increased by 57 percent to 41 cent per litre. Due to increased expenditure on fixed costs relating to buildings and machinery, an increase in total costs of 37 percent was reported year-on-year. Overall, there was a 74 percent increase in average net margin in 2022, to 24.5 cent per litre.

Table A2 (in the appendix) presents gross output, total costs and net margin per hectare of forage area allocated to the Dairy enterprise for 2021 and 2022. In 2022, milk production per hectare declined marginally (-1.3 percent). Net margin, on a per hectare basis, increased by 70 percent for the average Dairy enterprise in 2022, due mainly to milk price growth, and increased production, in spite of the rise in production costs.

The cost and margin data in Table A3 (in the appendix) allow us to examine the variability in economic performance across dairy farms in 2022. Farms are classified on the basis of gross margin per hectare: the best performing one-third of farms (Top), the middle one-third (Middle) and the least best performing one-third (Bottom). On a per litre basis, total production costs for the Bottom group (38.9 cent) were 13 percent higher than for the Top group (34.5 cent). The net margin for the Bottom group (20.9 cent) is approximately 74 percent of that of the Top group (28.1 cent). Figure 2 indicates that total milk production costs increased by 37 percent on average in 2022 to 36.8 cent per litre.

Figure 2: Total Milk Production Costs (cent per litre) in Ireland: 2016 to 2022



Source: Teagasc National Farm Survey Data.

3. Review of 2023 Estimated Performance

This section of the paper presents a review of Irish dairying in 2023. Actual Teagasc NFS results for 2023 will not be available until the middle of 2024. Therefore, it is necessary to estimate the price and volume of inputs and outputs in 2023, in order to estimate the outcome for margins in 2023. The following section of the paper first addresses production cost estimates for 2023, looking at both input prices and input usage volumes. A cost assessment based on the average dairy farm nationally is then given. Finally, the development of dairy product markets in 2023, in terms of both price and volume changes, is discussed.

3.1 Estimated Input Usage and Price 2023

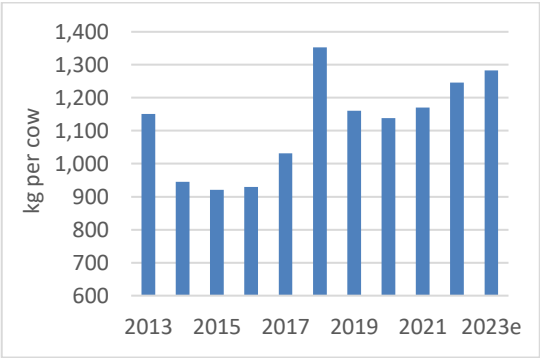
It is not yet possible to offer a comprehensive assessment of the precise changes in production costs for every farm in 2023. It is assumed that there was a 1 percent drop in the volume of milk production on the average dairy farm in 2023.

3.1.1 Feedstuff – usage and price 2023

Purchased feed (concentrates) is an important element of dairy production costs in Ireland, typically accounting for about 25 percent of total production costs in recent years.

Although official aggregate feed sales data for the full year are not yet available, the trend in dairy feed use in 2023 is up slightly on the 2022 level. Department of Agriculture, Food and the Marine (DAFM) feed sales data for dairy farms for Q1 and Q2 of 2023 were respectively up 5 and 10 percent on the same periods in 2022. Data for Q3 2023 indicate a decrease of 7 percent relative to the same period in 2022. Overall, dairy feed sales were 3 percent higher in the first 9 months of 2023. The Irish dairy cow population is estimated to have increased by just under 1 percent in 2023. The average milk yield per cow in 2023 is estimated to have fallen by 2 percent on the 2022 level. Figure 3 shows the average volume of compound feed use per cow in recent years, including an estimate for 2023.

Figure 3: Compound Feed Purchases per Dairy Cow in Ireland: National Average for 2013 to 2023



Source: Author estimates derived from DAFM and CSO data.
Note: e = estimate.

These data are derived from DAFM figures on feed sales to the end of Q3 and estimates for Q4 2023 by the authors, along with Central Statistics Office (CSO) data on animal numbers. For the average dairy farm, with a 1 percent decline in milk production in 2023, feed use per cow, is estimated at approximately

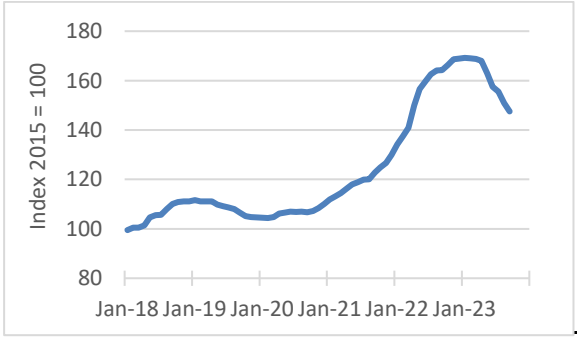
1,283 kg, a 3 percent increase in volume terms relative to 2022.

The feed price in any given year is a combination of supply and demand factors for the current production year, and the year previous. In 2023, the feed price story is made up of what happened in feed grain markets in the 2022 and 2023 production years. For the first half of 2023 there was a continued easing of feed price levels, which were very high during 2022 due in large part to the uncertainty associated with supply due to the situation in Ukraine. Despite significant upward movement in Irish farm gate harvest prices in 2022, the clarity in the supply of grains on the international market at the beginning of 2023 resulted in downward movement in feed prices during H1 2023.

During H2 2023, it became evident that wheat and barley production on the international balance sheet was down for the 2023 production year, as was total demand for these products. However, there was also an increase in production and demand for maize on the international balance sheet. The ending position for maize contributed to an estimated increase in ending stocks and an increase in the ending stocks to use ratio for maize internationally. The estimated production and ending stocks position resulted in a decrease in harvest prices for cereals in 2023, compared to 2022 harvest prices. This decrease in harvest prices for 2023, contributed to further feed price deflation as 2023 progressed.

Figure 4 shows an index of monthly Irish cattle feed prices from 2018 to 2023. While the price of feed has been declining in recent months, it has done so from a very high level. For 2023, on an annual basis, feed prices are estimated to be about 2 percent higher than in 2022.

Figure 4: Monthly Price Index of Cattle Meal in Ireland 2018 to 2023



Source: Central Statistics Office (Various Years).

On a per litre basis, the expenditure on feed is estimated to have increased by about 7 percent in 2023 compared to the 2022 level. Feed costs, measured on a per hectare basis, are estimated to have increased by 5 percent on the average farm, experiencing a 1 percent drop in milk production in 2023.

3.1.2 Fertiliser – usage and price 2023

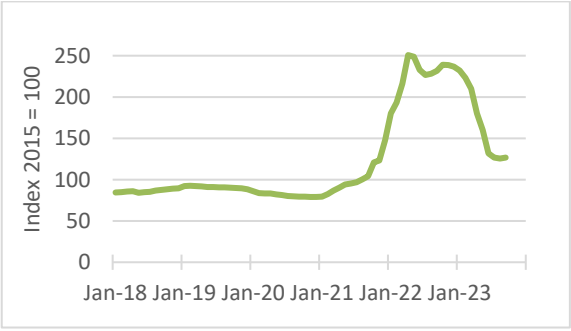
Pasture and forage costs typically comprise about 20 percent of total production costs on Dairy farms. This cost item is made up of fertiliser purchases and contracting charges. Figure 5 charts the Irish monthly index of farm level fertiliser prices from 2017 through to 2023.

The invasion of Ukraine pushed fertiliser prices to an extremely high level in 2022. While fertiliser prices have fallen over the course of 2023, the price drop did not occur until after the main window for fertiliser application. This limited the benefit which lower fertiliser prices had on dairy farm production costs in 2023. Taking account of the seasonality in purchasing, a 20 percent drop in fertiliser prices in 2023 is estimated relative to 2022.

Fertiliser use on dairy farms fell in 2022, largely on account of the very high price level, but also because of the increasing emphasis on lower fertiliser usage for environmental reasons. While full year figures for fertiliser sales have yet to be published it is estimated that total fertiliser use in Ireland fell again in 2023.

DAFM sales figures for 2023, were unavailable at the time publication. In Figure 6, an estimate of full year sales, in volume terms is provided, showing an 18 percent decrease in the national level of nitrogen (N) sales, a 9 percent decrease in phosphorus (P) sales and a 8 percent decrease in potassium (K) sales relative to 2022. The precise decrease in sales on dairy farms cannot yet be determined, but is likely to be about 5 percent.

Figure 5: Monthly Price Index of Fertiliser in Ireland for 2018 to 2023

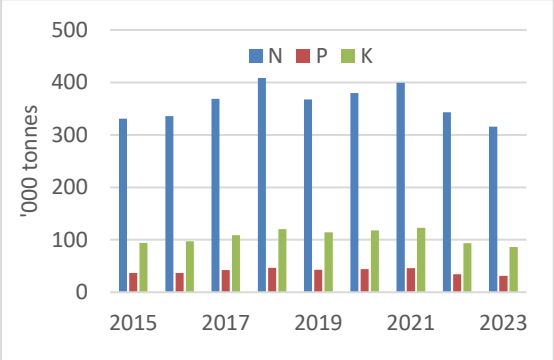


Source: Central Statistics Office (Various Years).

Overall, taking account of the decreased level of fertiliser sales and the 20 percent drop in price, fertiliser expenditure per hectare on the average

dairy farm in 2023 is estimated to have fallen by approx. 24 percent compared to 2022, with the precise figure depending on any drop in usage that has occurred, and the timing of fertiliser purchases.

Figure 6: Irish Fertiliser Sales by Compounders 2015 to 2023e (Oct-Sept)



Source: DAFM (various years)

3.1.3 Contractor Costs - usage and price 2023

Contractor costs comprise the remainder of the pasture and forage cost element. It is estimated that contracting charges have increased in 2023 (up 3 percent) in line with general cost inflation.

3.1.4 Pasture and Forage – usage and price 2023

With the reduced spending on fertiliser in 2023 expenditure on pasture and forage is estimated to have fallen by about 9 percent on a per hectare and 10 percent on a per litre basis on farms where milk production has fallen by 1 percent in 2023, despite a slight increase in contracting charges.

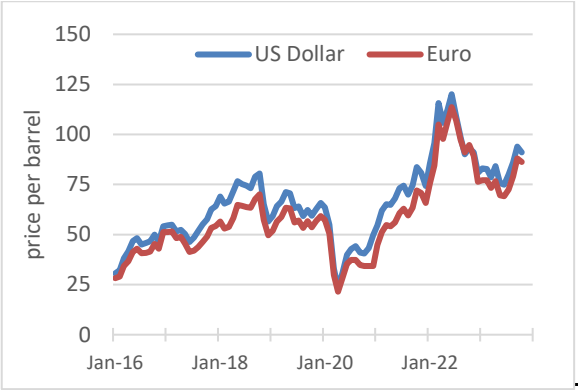
3.1.5 Electricity and Fuel – usage and price 2023

Energy (electricity and fuel) is a relatively less important farm input compared to feed and fertiliser, comprising less than 10 percent of total costs on dairy farms, on average.

Crude Oil and Fuel Prices:
The global energy market continued to experience volatility in 2023, reflecting geopolitical and other supply related concerns. Brent crude oil prices began 2023 at US$83 per barrel (pb). Monthly prices fell as low as US$75 in June, but rose again to over US$90 in Q4.

Crude oil prices are presented in Figure 7. The annual average Brent price for 2023 is expected to be about US $83 pb, which represents a 16 percent decline on the average oil price in 2022 of close to US $100 pb.

Figure 7: Monthly Average Brent Crude oil prices in Euro and US dollar from 2016 to 2023



Source: St Louis Fed

In 2023 the euro appreciated marginally in value relative to the US dollar. The euro was valued at US$1.07 in January 2023. It rose to US$1.10 by July, before slipping back to about US$1.05 by October. The average value in 2023 should be about US$1.07, compared with US$1.05 in 2022.

The slight appreciation of the euro accentuated the fall in crude oil prices when expressed in euro terms. Hence, the estimated average crude oil price for 2022 was about €77 pb, a decrease in euro terms of about 18 percent on the 2022 value of €95 pb. Overall, farm level fuel costs in Ireland fell in 2023, with marked (duty free) fuel prices approximately 18 percent lower in 2023 relative to the average level in 2022. Duty paid fuel prices decreased by about 15 percent.

Electricity Prices: The escalation in fossil fuel prices in 2022 led to a sharp rise in electricity prices. Despite the fall in fossil fuel prices in 2023, downward movement in electricity prices has been slow to emerge. Hence, annual electricity prices in 2023 are estimated to be 27 percent above their 2022 level.

Fuel and Electricity Volumes: Demand by farmers for fuel and electricity tends to be relatively inelastic with respect to price.

Given that milk production is estimated to have fallen only very slightly nationally, this suggests that the volume of electricity and fuel use is not likely to have changed in 2023. With lower prices for fuel and higher prices for electricity, the overall expenditure on both electricity and fuel is estimated to be down about 7 percent on a per hectare or per litre basis in 2023.

3.1.6 Other Direct and Fixed Costs–usage and price 2023

It is estimated that there was a 3 percent increase in agricultural wages in Ireland in 2023. It is assumed that the quantity of hired labour used on farms is likely to have been unchanged, given that there was little change in milk production.

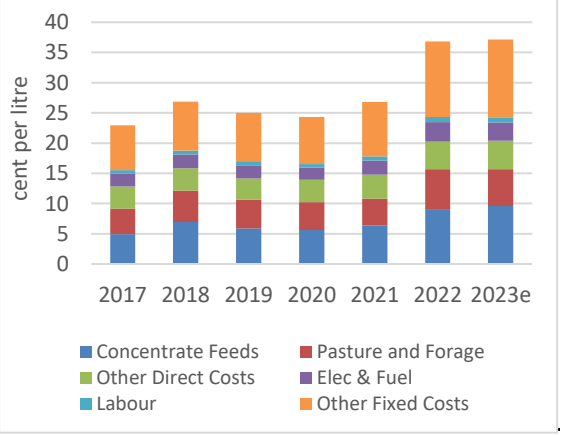
The price of other input cost items increased by 2 percent in 2023. It is assumed that usage volume of these input items remained unchanged.

The assessment of fixed costs in the Teagasc NFS is quite complex and definitive information on how fixed costs have changed in 2023 will not be available until the Teagasc NFS results for 2023 are published in 2024. Factoring in the sharp fall in milk price in 2023 and unchanged milk production, the value of milk output will has decreased. Hence the share of fixed costs allocated to the Dairy enterprise on dairy farms is estimated to have fallen in 2023. More generally, the rate of increase in capital items has eased relative to 2023. Overall, this means that the anticipated change in fixed costs in 2023 should be modest.

3.1.7 Estimate of Total Input expenditure for 2023

With a little over 1 percent increase in dairy cow numbers, and a 1 percent drop in milk production in 2023, it follows that milk yield per cow has dropped by about 2 percent in 2023. The assessment of production costs for the average dairy farm is considered here on the basis that the farm experienced a 1 percent drop in milk production in 2023. Figure 8 charts the average total cost of production and its subcomponents from 2017 to 2022 and the associated estimate for 2023.

Figure 8: Total Cost of Milk Production in Ireland from 2017 to 2023e



Source: Teagasc National Farm Survey Data and Authors' estimate. Note: e = estimate.

The fall in production costs in 2019 and 2020 has been followed by an increase in 2021, a dramatic increase in 2022 and a stabilisation in production costs in 2023.

It is estimated that the average total cost of milk production in Ireland in 2023 was 37.1 cent per litre, on a par with 2022. But this is considerably higher than the average of 26.8 cent per litre in 2021. This represents an increase of 38 percent over the last two years.

3.2 Review of Dairy Market in 2023

In aggregate, modest milk production growth has been observed across the main dairy export regions in 2023 relative to 2022. This is in spite of falling dairy prices, in the face of muted international dairy product import demand in 2023.

European dairy commodity prices increased in Q1 and Q2 in 2022 and stabilised at record levels in Q3. For 2022 as a whole, dairy product prices were up considerably relative to the 2021 price levels. However, European butter prices began to decline from a price of over €7,000 per tonne in Q3 of 2022. The decline continued in Q4 of 2022 and accelerated in Q1 of 2023. By Q2 of 2023 European butter prices had dropped below €5,000 per tonne and the decline continued in Q3 2023, bringing butter prices down to about €4,500 by the end of Q3. There has been an uptick in prices in Q4 of 2023, the price increasing to over €4,700. For 2023 as a whole, European butter prices are likely to be down 28 percent on the 2022 level.

European SMP prices also fell sharply in Q3 and Q4 of 2022 and the decline accelerated in Q1 of 2023 taking prices from a high of over, €4,000 per tonne in 2022 to about €2,600 in Q1 of 2023. Further price reductions occurred in Q2 and Q3 of 2023 taking SMP prices to €2,300, the lowest level since early 2021. The SMP price has risen to over €2,500 in Q4 2023. For the year 2023 as a whole, European SMP prices are likely to be down 32 percent on the 2022 level.

European Cheese prices normally move over a narrower price range than Butter and SMP, but prices did weaken considerably, particularly in Q3 of 2023. Cheddar fell to just over €3,500 per tonne in Q3 and Q4 of 2023, over €1,000 per tonne lower than a year previously. For the year 2023 as a whole, European Cheddar prices are likely to be down 10 percent on the 2022 level.

In the EU, there has been little milk production growth in 2023. EU milk production is likely to increase by about 0.7 percent overall. This

represents an increase in EU milk production of about 1.0 mt relative to the 2022 level, which more or less offsets the decline in EU milk production that occurred in 2022.

Growth in milk production in New Zealand (NZ) has ceased in recent years, as its dairy sector increasingly refocuses on enhancing value rather than volume in its dairy products. In the 2022/23 season NZ milk production fell by 5 percent. However, a strong back end to the NZ milk production season (early Q2 2023) prevented a larger decline. The early months of the 2023/2024 season were dominated by high costs, low milk prices and adverse weather conditions. However, aided by the strong ending to the 2022/23 season, it is estimated that NZ milk production in the 2023 calendar year will be up 2 percent (0.3 mt).

US milk production in 2023 had been running ahead of 2022 levels until Q3 of 2023 when production started to ease back. With a slight increase in US dairy cow numbers in 2023, but with no change in milk yields, US milk production should be up by 0.3 percent (0.3mt) in 2023.

Overall, for the calendar year 2023 Australian milk production should be more or less on a par with 2022. Similarly, in Argentina milk production for the calendar year 2023 is likely to be on a par with the 2022 level.

Overall, milk production across the major dairy export nations in 2023 should be up by over 1.5 mt, more or less reversing the decline in milk production observed across these regions in 2022.

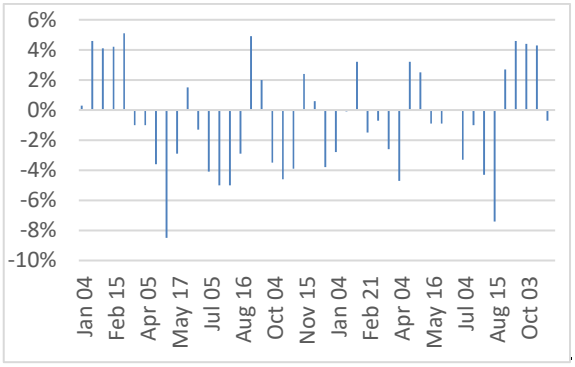
China's milk production has continued the strong growth observed in recent years and is likely to increase by 5% (1.0mt) in 2023. This brings the total increase in China's milk production over the last 6 years to 33% (10.30 mt).

Reports suggest that there are considerable stocks of dairy products on hand in China. With strong growth in its domestic dairy production and the stocks of dairy product available, it is not surprising that Chinese dairy import demand weakened considerable in 2022 and has shown no real sign of recovery in 2023. By July of 2023 WMP imports into China were running 40 percent below the previous year, while imports of SMP were up about 20 percent in the same period. Imports of whey powder also increased by about 25 percent over the first half of 2023. However, imports levels in 2023 are well behind the level reported two years ago.

Total EU exports of SMP to third countries were up 22 percent in the period January to August 2023, relative to the same period in 2022. An increase in EU butter exports has also been experienced in 2023. For the period January to July, EU butter exports to third countries increased by 10 percent on the same period in 2022. EU exports of cheese to third countries has shown little change in 2023 compared with 2022.

Figure 9 shows price movements in the influential New Zealand Global Dairy Trade (GDT) Auction Index over the course of the past two years. Successive negative price movements occurred in Q1, Q2 and much of Q3 in 2023. However, in Q4 of 2023 some positive price movements have been observed.

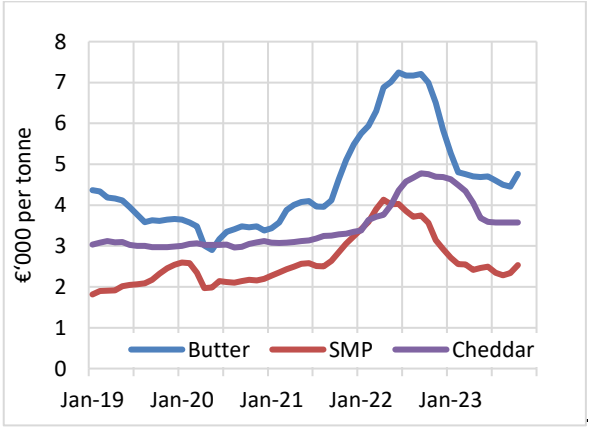
Figure 9: Monthly GDT Auction Index Price movements in 2022 and 2023



Source: GDT Auction 2023.

European wholesale dairy product prices are shown in Figure 10. In 2023 prices for butter, cheddar and powders have trended strongly downwards from admittedly very high levels in 2022. Prices have stabilised in Q4 of 2023 with some signs of an uptick in prices as of November 2023.

Figure 10: European Dairy Product Prices 2019-23

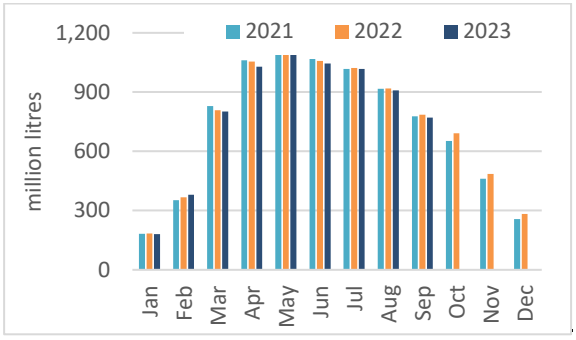


Source: MMO 2023.

3.3 Estimated Output Values 2023

Irish milk production fell by about 1 percent in 2023. Monthly milk deliveries are shown in Figure 11.

Figure 11: Monthly Irish Milk Deliveries 2021 to 2023



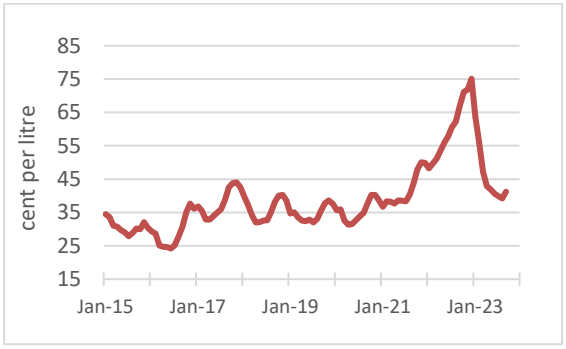
Source: CSO, 2023.

While there has been a further slight increase in dairy cow numbers in 2023, this has been offset by lower milk yields.

Irish dairy cow numbers, as recorded in June 2023 increased to 1.647 million, compared with 1.627 million in June 2023, an increase of 1.2 percent (CSO, 2022). In the year to September 2023, milk production was down by 1.0 percent (CSO, 2023).

Figure 12 presents monthly Irish milk prices recorded by the CSO from January 2015 through to September 2023. In Ireland the average 2023 manufacturing milk price is estimated to be down about 28 percent on the 2022 level. Some farmers will have milk in fixed price contracts and therefore may not obtain the spot prices quoted.

Figure 12: Irish Farm Gate Milk Prices Actual fat (vat incl.) Jan 2015 – Sept 2023



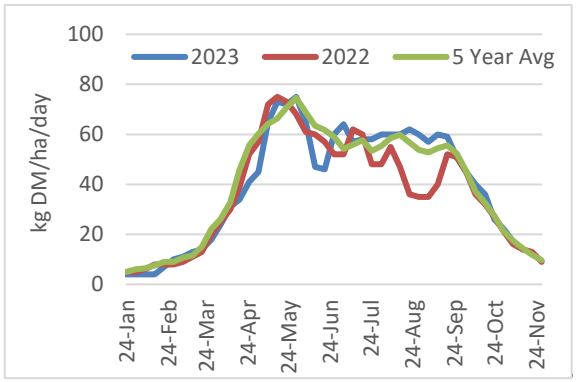
Source: CSO. Note: Actual fat (vat inclusive).

In 2023, Irish farm gate milk prices fell as the year progressed, reflecting the fall in dairy commodity prices. The annual average national milk price (CSO definition) is estimated to be approximately 43 cent per litre (vat inclusive) in 2023 on an actual fat and protein basis (estimated to be 4.34 percent fat and 3.44 percent protein).

The general downward trend in milk price is driven by slower demand growth internationally alongside an continuing increase in supply. This has resulted in a continued decline in key international dairy product prices.

Figure 13 illustrates the evolution in national grass growth in 2023 compared to 2022, as measured by the PastureBase Ireland system. Grass growth over H1 of 2023 was below the 5 year average due to unusually dry conditions in early summer. There followed generally higher than average rainfall later in the summer. However, overall grass growth conditions in 2023 were better than 2022 over the course of the peak milk production season, with higher than average growth in August and September. However, conditions for silage production were challenging in some regions, with wet weather in early autumn also posing difficulties for grazing ground.

Figure 13: National Grass Growth 2022 & 2023



Source: Pasturebase Ireland.

3.4 Review of Dairy Enterprise Net Margins in 2023

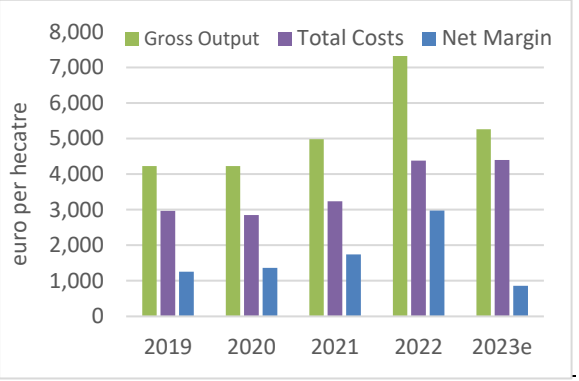
The review of milk prices showed that the average milk price for 2023 was down approximately 28 percent on the 2022 level. The review of input costs concluded that for the average farm, experiencing a slight decline in milk production, total production costs on a per litre basis are estimated to have remained high in 2023, unchanged from the 2022 level.

The margin per hectare is first described before examining margin on a per litre basis. Figure 14 presents the estimated average gross output, production costs and net margin per hectare for 2023 in comparison to recent years, on the basis of a slight decline in milk production in 2023.

For 2023 the net margin for milk production is estimated to have averaged €859 per hectare. This means that the average net margin in 2023 has declined by over €2,100 per hectare relative to 2022.

This represents a decrease of 71 percent year-on-year.

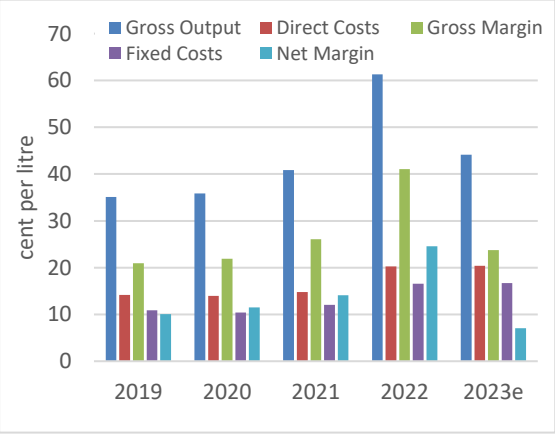
Figure 14: Average Gross Output, Costs & Margins per hectare for Irish Milk Production in 2019-2022 & estimate for 2023



Source: Teagasc National Farm Survey Data and Authors' estimates. Note: e = estimate.

Estimated average gross output per litre in 2023 is shown in Figure 15, on the basis of a slight decline in milk production in the year. Average gross output per litre is estimated to be 44.2 cent per litre in 2023, representing a 28 percent decline on 2022. Total costs are estimated to have remained stable at 37.1 cent. This will result in a dramatic decline in net margin of 71 percent to 7.1 cent on the 2022 level.

Figure 15: Average Gross Output, Costs & Margins per litre for Irish milk production in 2019-2022 and estimates for 2023



Source: Teagasc National Farm Survey Data and Authors' estimates. Note: e = estimate.

See Table A5 (in the appendix) for estimates of output, costs and margins on a per litre basis for a farm that has reduced milk production by 1 percent in 2023.

4. Dairy Outlook for 2024

For the purposes of this analysis, no increase in Irish milk production in 2024 is forecast, with no change in the dairy enterprise's land base. Production costs are forecast to drop slightly from the extremely high levels of 2022 and 2023.

4.1 Outlook for Input Expenditure 2024

In this analysis of likely changes in production costs in 2024, for simplicity it is assumed that the average farm produces the same milk volume in 2024 as it did in 2023. This is in line with the forecast stable volume of Irish national milk production in 2024.

4.1.1 Feed - usage and price 2024

Irish animal feed prices are driven by a combination of Irish cereal harvest prices (for the previous year and current year) and the prices of imported feed. Irish cereal prices at harvest 2023 were down by over 30 percent on the 2022 level. In 2023, despite a decrease in European wheat and barley production volumes, an increase in the production of maize on the European balance sheet in 2023/24 compared to 2022/23 (by about 8.6 Mt), coupled with reduced uncertainty of supply from the Black Sea region compared to 2023, resulted in a significant downward movement in Irish farm gate harvest prices compared to 2022.

Feed prices in 2024 will depend in part on cereal prices for harvest 2024, but equally so the harvest prices paid in 2023 will impact feed prices in 2024. On a monthly basis there has been downward movement in feed prices over the course of 2023, with prices in early 2024 set to be lower than at the outset of 2023. Cereal prices at harvest 2024 are forecast to increase on 2023 harvest prices. Averaging across the full year, feed prices are forecast to be a tale of two halves, with a relatively stable story for average feed prices in 2024, compared to 2023, with feed prices to decrease by a mere 1 percent in 2024 relative to the average price for 2023.

The volume of dairy feed used in Ireland increased slightly in 2023 on a per head basis. With the assumption of normal weather in Ireland in 2024, and with no increase in milk production forecast, feed volume requirements per head for grassland enterprises would be expected to remain largely unchanged in 2024. With feed use stable on Irish farms and with a 1 percent drop in feed prices, this will result in a 1 percent drop in feed expenditure on a per litre basis in 2023.

4.1.2 Fertiliser & Contracting Costs– usage and price 2024

Fertiliser prices began to ease back from record levels in Q1 of 2023 and the decline continued as the year progressed. Fertiliser prices are now at a lower level than in 2022 and it is anticipated that these lower prices should persist into 2024. For 2024 as a whole fertiliser prices are forecast to be 35 percent lower than the average in 2023. Fertiliser usage in 2024 is forecast to remain unchanged on the 2023 level. Agricultural contracting charges are forecast to increase slightly in 2024 (up 3 percent). Overall, this will lead to a reduction of 16 percent in average pasture and forage costs.

4.1.3 Electricity and Fuel – usage and price 2024

As of November 2023, prospects for the US$/euro exchange rate in 2024 are contingent on lower US inflation and economic growth and lower US interest rates. This would cause the US$ to weaken slightly against the euro to average around US$1.11 in 2024. An analysis of futures prices indicates that Brent crude oil could average US$80 in 2024. This would represent a decrease of about 4 percent on the 2023 level.

At a US$/euro exchange rate of $1.11, the forecast annual Brent crude oil price for 2024 would be €71 pb, which would leave the annual average Brent crude oil price down 7 percent in euro terms in 2024 relative to the average for 2023. With a further carbon tax increase planned for 2024, farm fuel prices are forecast to decline by 7 percent on average. Electricity prices are forecast to decrease by 10 percent in 2024. This would mean expenditure per hectare on electricity and fuel in 2024 would be down 8 percent.

4.1.4 Other Direct and Fixed Costs – usage and price 2024

Projections relating to the macroeconomy in 2024 are conditioned by some uncertainty relating to global growth prospects. Internationally, economic growth rates are expected to be modest in 2024, with a risk that some economies could move into recession. General inflation is expected to be lower in 2024, approaching levels that are considered more sustainable over the longer term.

An increase in wage rates in 2024 of 3 percent is forecast. The increase in general inflation affecting other direct costs in 2024 is forecast to be 2 percent on a per hectare basis.

At an overall farm level, fixed costs on dairy farms are forecast to increase by 3 percent, on average in 2024.

4.1.5 Estimate of Total Input expenditure for 2024

Overall, direct costs per hectare are forecast to fall by 5 percent in 2024, with a similar percentage reduction on a per litre basis. Fixed costs are forecast to increase by 1 percent on a per hectare basis. Overall, total production costs per hectare are forecast to fall by 2 percent per hectare in 2024.

4.2 The Outlook for Dairy Markets in 2024

The slowdown in milk production growth in 2022, in the face of higher input prices and some adverse weather conditions in key production regions, meant that the dairy market was out of balance at the outset of 2023. The world dairy market in 2023 was then characterised by falling dairy commodity prices, albeit from the quite high levels reached in 2022.

Production growth in 2023 in key production regions were stronger but international demand was weaker. China experienced further strong production growth and along with ample stocks, this resulted in subdued dairy import activity.

The dairy market situation in 2024 is likely to be characterised by further adjustments in supply and demand, which should lead to some improvement in dairy commodity prices and in turn farm milk prices. However, the increase in dairy commodity and milk prices is unlikely to be substantial, as Chinese import demand is not expected to recover in 2024. Weak global economic growth is another factor which could hinder a stronger dairy market recovery.

Movement in the GDT auction are usually indicative of short-term developments in global dairy commodity prices and in farm milk prices. The GDT auction has begun to report some positive price movements recently auctions, indicating that higher milk prices are in prospect entering 2024.

In spite of lower margins, EU milk production increased in 2023, offsetting the reduction observed in 2022. For 2024, assuming more favourable production conditions, a slight further increase in EU milk production is possible, perhaps about 0.4 percent (0.6 mt). However, the EU dairy sector is increasingly coming under pressure, due to a range of EU and Member State level environmental policies. Much will depend on the evolution of production costs, which are in part linked to how the energy market will evolve.

The US dairy market remains a bit more insulated from global dairy prices developments than other major export regions. Latest forecasts suggest a further 1.2 percent (1.3 mt) increase in US milk production in 2024. This increase would reflect a combination of increased milk yields and marginally lower cow numbers (USDA, 2023).

There has been a relatively poor start to the 2023/24 milk production season in New Zealand. Unfavourable weather conditions could continue to create production difficulties. However, profitability should improve as milk prices rise and cost pressures ease slightly. As a result, it is likely that New Zealand milk production could increase by about 1 percent (0.2 mt) in 2024.

The Irish milk price fell considerably more than milk prices in much of the rest of the EU in 2023. From a position close to the top of the EU milk price league in 2022, Irish milk prices fell to well below the EU average in 2023. The extent of the recovery in Irish milk prices in 2024, will depend on the strength of international dairy prices and also the timing of the recovery in those prices. Given the seasonal nature of Irish dairy production, the sooner an increase in dairy commodity prices is observed, the greater the benefit this will have for the annual average Irish milk price in 2024.

It is forecast that the annual average Irish milk price in 2024 will be up 10 percent on the 2023 level, giving an annual average milk price (actual fat and protein vat inclusive) of about 47.5 cent per litre in 2024 (VAT inclusive actual fat and protein basis), equivalent to a base price of about 43 cent per litre. While this would still represent a high milk price in historical terms, production costs will remain high, which will mean that dairy margins will be adequate rather than extraordinary.

4.3 The Outlook for Milk Production in 2024

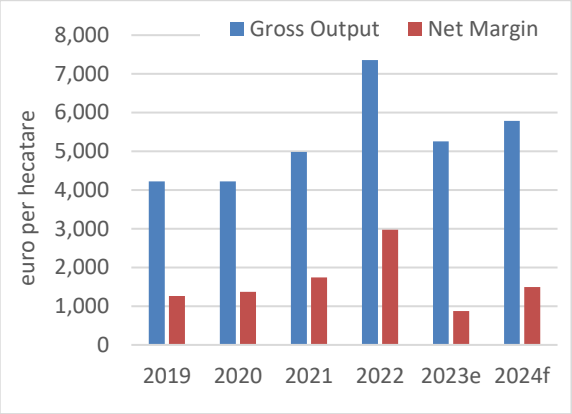
Irish milk production fell slightly in 2023, as higher cow numbers were offset by lower yields. The milk price outlook for 2024 is more favourable than the outcome for 2023. However, cost pressures will continue to be substantial. No increase in milk production is forecast for 2024, with a stable dairy cow population and stable milk yields.

4.4 The Outlook for Dairy Enterprise Net Margins in 2024

This section considers the impact of changes in milk prices and production costs on gross and net margins on dairy farms in 2024. Minor price decreases for feed and energy are forecast for 2024, with a more substantial fall in fertiliser prices likely. No change in milk output per hectare is assumed for 2024.

In 2024, profitability per hectare, as measured by net margin on the average dairy farm, is forecast to increase by 72 percent. Average net margin per hectare is estimated to be €859 for 2023, but is forecast to rise to €1,477 in 2024, as illustrated in Figure 16.

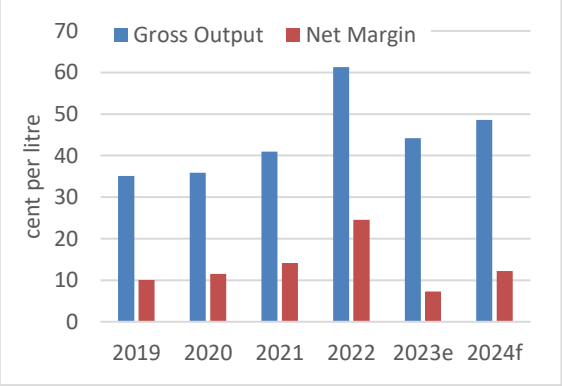
Figure 16: Average Gross Output and Net Margin per hectare for 2019 to 2023e with forecast for 2024



Source: Teagasc National Farm Survey Data and Authors' estimates. Note: e = estimate f= forecast.

Figure 17 presents a margin forecast on a per litre basis for the average dairy farm, based on a stable level of milk production in 2024.

Figure 17: Average Gross Output and Net Margin per litre in Ireland 2019 to 2023e, with forecast for 2024



Source: National Farm Survey Data (Various Years) and Authors' estimates. Note: e = estimate f = forecast.

Given the forecast increase of 10 percent in the average milk price in 2024, and with production costs remaining high (down just 2 percent in 2024), this would mean that gross and net margins are forecast to increase in 2024. Net margin per litre is forecast to increase by 73 percent in 2024, to an average of 12.2 cent per litre.

5. Concluding Comments

Production costs increased sharply in 2022 and remained elevated in 2023. A sharp reduction in milk prices occurred in 2023.

There was a major reduction in net margin per hectare and per litre of milk produced in 2023. On average, it is estimated that dairy enterprise net margin per hectare fell by 72 percent in 2023 to €859.

In 2024 the annual average milk price is forecast to increase by 10 percent relative to the 2023 level. On the assumption that normal weather is experienced in 2024, production costs will remain very high, but should be down marginally on the 2023 level.

It is forecast that total production costs will fall by 2 percent to reach 36.3 cent per litre. The average net margin per hectare and per litre in 2024 are likely to be up 73 percent on the 2023 level at €1,477 per hectare and 12.2 cent per litre.

Dairy farms will continue to operate in a high cost environment in 2024. An improved milk price will mean that margins return to a more sustainable level in 2024.

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Table A1: Average Gross and Net Margin of Milk Produced in 2021 and 2022

	2021	2022	% Change
	cent/litre		
Total Gross Output	**40.92**	**61.33**	**49.9%**
Concentrate Costs	6.36	8.95	40.7%
Pasture and Forage Costs	4.53	6.73	48.5%
Other Direct Costs	3.91	4.58	17.0%
Total Direct Costs	14.81	20.26	36.8%
Gross Margin	**26.12**	**41.07**	**57.2%**
Electricity and Fuel	2.33	3.22	38.2%
Labour	0.69	0.85	23.5%
Other Fixed Costs	8.99	12.47	38.7%
Total Fixed Costs	12.00	16.53	37.8%
Total Costs	26.80	36.79	37.3%
Net Margin	**14.12**	**24.54**	**73.7%**

Source: Teagasc National Farm Survey Data

Table A2: Average Net Margin per hectare* in 2021 and 2022

		2021	2022	% Change
Milk Produced	litres/ha	12,164	12,007	-1.3%
Total Gross Output	€/ha	4,982	7,353	+47.6%
Total Costs	€/ha	3,237	4,379	35.3%
Net Margin	€/ha	1,745	2,975	70.4%

* Hectare of forage area allocated to the dairy enterprise
Source: Teagasc National Farm Survey Data

Table A3: Output, costs and margin (cent per litre) for Top, Middle and Bottom one-third of farms in 2022

	Top	Middle	Bottom
	cent per litre		
Gross Output	62.62	61.56	59.83
Concentrate Feeds	8.76	9.00	9.09
Pasture & Forage	6.02	6.52	7.62
Other Direct Costs	4.39	4.49	4.86
Electricity & Fuel	2.76	3.14	3.73
Labour	0.97	0.83	0.76
Other Fixed Costs	11.63	12.90	12.85
Total Costs	34.53	36.88	38.90
Net Margin	28.09	24.69	20.92

Source: Teagasc National Farm Survey Data

Table A4: Output and profit per hectare for Top, Middle and Bottom one third of farms in 2022

		Top	Middle	Bottom
Stocking rate	cows/ha	2.45	2.10	1.76
Milk produced	litres per ha	15,376	12,085	8,643
Concentrates fed per cow	kg	1,371	1,286	1,084
Concentrates fed per litre of milk produced	kg	0.21	0.22	0.22
Gross output	€ per ha	9,588	7,396	5,131
Direct Costs	€ per ha	2,984	2,462	1,853
Gross Margin	€ per ha	6,603	4,934	3,277

Source: Teagasc National Farm Survey Data

Table A5: Average Gross and Net Margin per litre of Milk Produced 2021-2024f

	2021	2022	2023e	2024f
	cent per litre			
Total Gross Output	**40.92**	**61.33**	**44.16**	**48.57**
Concentrate Costs	6.36	8.95	9.61	9.51
Pasture and Forage Costs	4.53	6.73	6.07	5.10
Other Direct Costs	3.91	4.58	4.72	4.81
Total Direct Costs	14.81	20.26	20.39	19.42
Gross Margin	**26.12**	**41.07**	23.76	**29.15**
Electricity and Fuel	2.33	3.22	3.00	2.78
Hired Labour	0.69	0.85	0.89	0.93
Other Fixed Costs	8.99	12.47	12.82	13.21
Total Fixed Costs	12.00	16.53	16.72	16.91
Total Costs	26.80	36.79	37.11	36.33
Net Margin	**14.12**	**24.54**	**7.05**	**12.24**

Source: Teagasc National Farm Survey Data. Figures for 2023 are estimates, Figures for 2024 are forecasts.

Cattle Farming in 2022
Average performance

Irish Cattle Slaughter
1.911 million head (up 6.6%)

Live Exports
286,265 head (up 15.8%)

Irish Suckler Cow Numbers
0.86 million (down 3.1%)

Weanling purchase price
average €844/head (up 11.0%)

Male Store purchase price
average €1,141/head (up 13.9%)

Female Store purchase price
average €953/head (up 8.5%)

Male Finished Animals Price
average €1,827 per head (up 17.1%)

Female Finished Animals Price
average €1,580 per head (up 18.7%)

Gross Margin
(Single Suckling)
average €580 per hectare (up 5.4%)

Gross Margin
(Cattle Finishing)
average €735 per hectare (up 27.7%)

Stocking Rate (Calf to Weanling)
average of 1.20 lu/ha (up 4.3%)

Stocking Rate (Calf to Store)
average of 1.57 lu/ha (down 10.8%)

Stocking Rate (Calf to Finishing)
average of 1.58 lu/ha (up 1.1%)

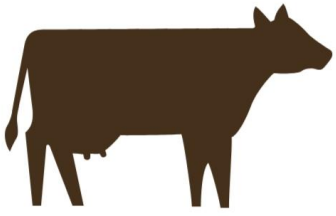
Stocking Rate (Cattle Finishing)
average of 1.32 lu/ha (down 4.7%)

Concentrate Fed/LU
(Cattle Finishers)
average 643 kg (up 1.0%)

Slaughter Weight/Head
average 325.1 kg (down 2.0%)

Total Production Costs
(Single Suckling)
average €1,104 per hectare (up 16.2%)

Total Production Costs
(Cattle Finishing)
average €1,440 per hectare (up 17.7%)



Source: Teagasc National Farm Survey, Central Statistics Office and Dept. of Agriculture, Food and the Marine

Irish Cattle Farming in 2023

R3 Steer price
3.5% on the 2022 level

Weanling and Store prices
7% and 5% respectively

higher/lower beef calf prices
no change on the 2022 level

Weather Conditions
Normal despite some periodic challenges

Grass Availability
Normal for the year as a whole

Fertiliser Prices
20% on the 2022 level
Fertiliser Use
15% on the 2022 level

Feed Prices 2% on 2022
Feed use 1% on 2022

Other Direct Costs
5% on the 2022 level

Fuel prices
16% on the 2022 level

Total Input Costs (Suckler)
1.5% on the 2022 level
Total Input Costs (Finisher)
2.5% on the 2022 level

Gross Margin (Suckler)
15% on the 2022 level
Gross Margin (Finisher)
1% on the 2022 level

Irish Cattle Farming in 2024

R3 Steer prices
3% on the 2023 level

Weanling and Store prices
3% on the 2023 level

Lower/higher beef calf prices
5% on the 2023 level

Weather Conditions
Normal weather assumed

Grass Availability
normal conditions

Fertiliser Prices
35% on the 2023 level
Fertiliser Use
no change on the 2023 level

Feed Prices 1% on 2023
Feed use 2% on 2023

Other Direct Costs
2% on the 2023 level

Fuel prices
6% on 2023 level

Total Input Costs (Suckler)
2% on the 2023 level
Total Input Costs (Finisher)
4% on the 2023 level

Gross Margin (Suckler)
8% on the 2023 level
Gross Margin (Finisher)
7% on the 2023 level

Source: Teagasc Estimates for 2023 and Forecasts for 2024

Review of Cattle Farming in 2023 and Outlook for 2024

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1. Introduction

This paper presents estimates for the returns from cattle production in 2023. The paper contains a review of the economic performance of Irish cattle farms in 2022 based on data provided by the Teagasc National Farm Survey 2022 (Dillon et al. 2023). The paper also includes forecasts for the economic situation on Irish cattle farms in 2024.

Finished cattle prices increased in the first quarter of 2023. Average R3 steer prices were above €5.30 per kg (including VAT) during the first half of 2023. However, beef prices began to decline in June and were below 2022 levels until November when prices began to increase moderately. In 2023, the annual average steer and heifer prices were 3.5 percent higher relative to 2022. Prices for store animals and weanlings increased by approximately 5 percent and 7 percent respectively.

In 2023, the volume of prime cattle slaughtered decreased by 3.5 percent relative to 2022. This includes a 10 percent decline in young bull beef production. The average weight of finished prime cattle decreased by 1 percent relative to 2022 thereby leading to a 4.5 percent decrease in prime beef production. Overall, total national beef production decreased by 4 percent in 2023. The total volume of beef production is therefore significantly lower in 2023 relative to 2022.

Input prices remained high in 2023 after extraordinary increases in 2022. Concentrate feed prices began to decline during the summer months but remained above the price levels observed in early 2022. Fertiliser prices declined strongly in Q2 2023 and this supported a reduction in input costs for those farmers who purchased during this quarter. In terms of other expenditures, electricity prices were significantly higher in 2023 relative to 2022 while motor fuel prices decreased.

Grass-growing conditions varied during 2023. Grass growth rates performed reasonably well in the spring. A particularly dry June contributed to lower grass growth rates. However, grass growth rates recovered in the remaining summer months. High rainfall levels affected grass conditions in the autumn with a negative impact in much of the country. Grass-growing–conditions influenced the demand for concentrate feed in the last quarter with an estimated 1 percent increase in the quantity of concentrates used on the average Cattle finishing enterprise.

The average gross margin on Single Suckling farms is estimated to have increased by 15 percent in 2023 to an estimated €666 per hectare. It is estimated that overhead costs increased by 1 percent on a per hectare basis. The average Single Suckling enterprise is estimated to have a break-even net margin per hectare in 2023.

The gross margin per hectare on the average Cattle Finishing enterprise is estimated to be similar to 2022 with just a 1 percent decrease leading to an estimate of €729 per hectare. On average, Cattle Finishing farms are estimated to have earned positive net margins in 2023. The average Cattle Finishing enterprise net margin is estimated to be €49 per hectare in 2023. This is lower than the average net margin of €60 per hectare reported in 2022.

Margins earned on cattle farms in Ireland are influenced by beef supply and demand. The quantity of beef consumed in the EU is estimated to be slightly lower in 2023 (European Commission 2023a). Total EU beef supplies are estimated to have declined in 2023 but with significant variability between member states. Beef supply declined in Italy and Spain but increased in the Netherlands and Belgium and remained stable in France and Germany (European Commission 2023b). Livestock population statistics point to further declines in EU beef production over the short and medium term (Eurostat 2023).

In 2023, beef retail consumption in the UK has declined slightly in volume terms. However, rising consumer prices mean that the total consumption value is higher in 2023 relative to 2022 (AHDB 2023c). UK beef production is slightly lower in 2023 relative to 2022 due to declines in slaughter weight (AHDB 2023d). In 2023, UK consumer prices for sirloin/rump steak continued to increase and have reached record levels in sterling terms (Office for

National Statistics 2023a). This is a positive development for the beef sector in Ireland given the importance of exports to the UK.

At a global level, there continues to be an important shift in the demand for beef. In 2023, the domestic consumption of beef and veal is estimated to have increased by 4 percent in China, with smaller changes in other parts of the world. Global consumption of beef and veal is approximately 1 percent higher in 2023 relative to 2022 (USDA, 2023).

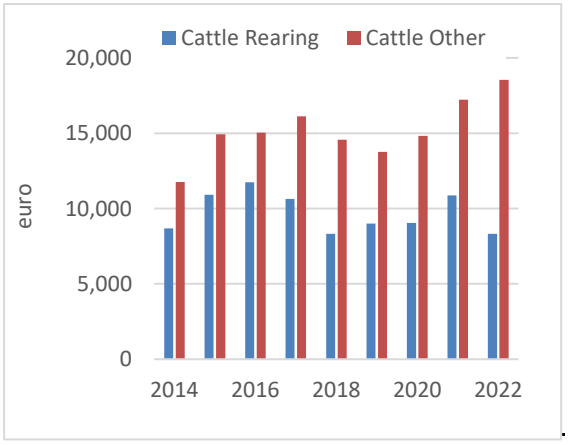
Global beef consumption in 2024 is expected to be 1 percent lower relative to 2023. Beef production in China is expected to increase by 2.5 percent but declines are forecast elsewhere and particularly in the United States where a 6 percent reduction is forecast (USDA, 2023).

Unless stated otherwise, all figures referred to in this paper are in nominal terms and all enterprise output and profit estimates exclude the value of decoupled income support payments and are expressed per hectare.

2. Review of the Economic Performance of Beef Farms in 2022

The trends in average family farm income (FFI) for the two types of cattle farm systems identified in the Teagasc NFS over the period 2014 to 2022 are shown in Figure 1. In 2022, the average FFI on Teagasc NFS *Cattle Other* farms increased by 8 percent compared with 2021 levels while the average FFI on Teagasc NFS *Cattle Rearing* farms decreased by 23 percent compared to 2021.

Figure 1: Average Family Farm Income on Cattle Rearing and Cattle Other Farm Systems: 2014 to 2022



Source: 2022 Teagasc National Farm Survey (2023)

2.1 Irish Beef Enterprise Performance in 2022

This section discusses the output and cost structure of Single Suckling and Cattle Finishing enterprises in Ireland.

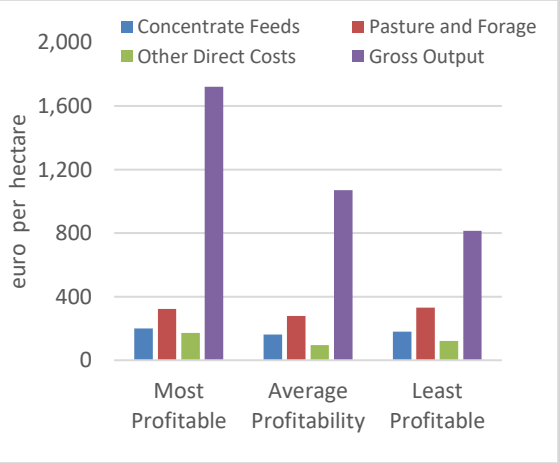
In this year's enterprise analysis, we continue to present results based on the two way categorisation of Irish cattle enterprises: Single Suckling and Cattle Finishing enterprises first used in Breen and Hanrahan (2012) and as in the Teagasc NFS cattle enterprise fact sheets (Teagasc, 2023a and 2023b).

Single Suckling enterprises in the analysis that follows are enterprises with more than 10 cows, while the Cattle Finishing enterprises analysed are those with more than 10 livestock units where more than 70 percent of the animals sold off the farm were sold for slaughter. In total, these two enterprises were present on more than 37,000 farms nationally.

Farms with these enterprises have been ranked on the basis of gross margin earned per hectare and each farm enterprise group has been broken into three equally sized sub-groups, which we have termed farms that are least profitable, those that have average profitability and those that are most profitable.

Single Suckling: In 2022, the average direct costs of production per hectare for Single Suckling enterprises varied from €534 on the middle-third of profitable farms to €695 on the top one-third of profitable farms (see Figure 2).

Figure 2: Variation in Total Production Costs and Gross Output on Single Suckling enterprises in 2022



Source: 2022 Teagasc National Farm Survey (2023)

The cost of concentrate feed, along with the cost of pasture and winter forage typically accounts for

approximately 80 percent of the direct costs of production on these farms. The average expenditure on concentrate feed varied from €161 per hectare on the middle third of farms to €200 per hectare on the most profitable farms.

There was considerably more variability in the average gross output per hectare between the least profitable and most profitable farms. The most profitable one-third of Single Suckling enterprises earned an average gross output of €1,722 per hectare, compared with an average gross output of €814 per hectare on the least profitable one third of Single Suckling enterprises. This variability in average gross output is largely due to higher average stocking rates on the more profitable farms. In 2022, the most profitable Single Suckling enterprises had an average stocking rate of 1.73 livestock units (LU) per hectare compared with 1.13 LU per hectare on those Single Suckling enterprises with the lowest levels of profitability.

The capacity of farms to operate at high stocking rates is in part determined by the quality of the land farmed. In 2022, 59 percent of the most profitable Single Suckling enterprises farmed very good soils, whereas the proportion of the least profitable Single Suckling farms on very good soils was considerably lower at 25 percent.

The most profitable one-third of Single Suckling enterprises in 2022 had an average gross output per hectare that was over double the average output per hectare on the least profitable one-third of enterprises. However, the average direct costs per hectare were only 10 percent higher for the most profitable group.

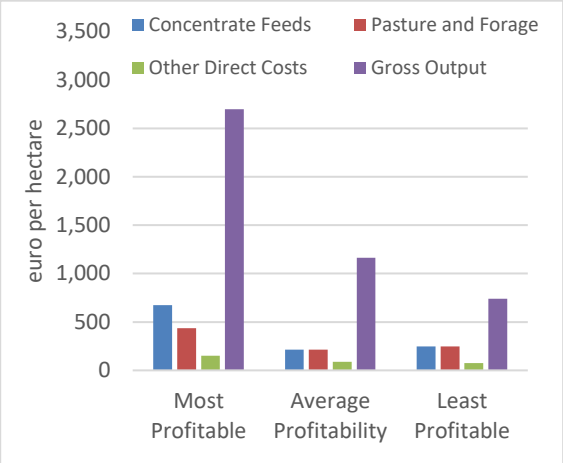
Cattle Finishing: The second cattle enterprise category analysed is the Cattle Finishing enterprise. The enterprises analysed were again ranked on the basis of gross margin per hectare and assigned to three equally sized groups in terms of profitability termed *least, average* and *most profitable*.

Average direct costs of production per hectare were highest on the most profitable farms and lowest on those farms in the middle third of profitability (see Figure 3). Total expenditure on concentrate feed is substantially higher on Cattle Finishing enterprises than on Single Suckling enterprises. The most profitable one-third of Cattle Finishing enterprises had a gross output of €2,698 per hectare compared with €739 per hectare on the least profitable Cattle Finishing enterprises.

Relative to the Single Suckling enterprise, there is a larger degree of heterogeneity in gross output per hectare across the Cattle Finishing enterprises analysed. This diversity reflects the differing levels of production intensity on these farms. The average stocking rate on the least profitable Cattle Finishing enterprises was 0.93 LU per hectare, while the average stocking rate on the most profitable one-third of Cattle Finishing enterprises was 1.85 LU per hectare.

In general, more profitable Cattle Finishing enterprises were on farms with better soils, 67 percent of the most profitable Cattle Finishing enterprises farmed very good soils compared to 48 percent of the least profitable farms.

Figure 3: Variation in Total Production Costs and Gross Output on Cattle Finishing Enterprises in 2022



Source: 2022 Teagasc National Farm Survey (2023)

The results presented in Figure 2 and Figure 3 highlight the differences in costs per hectare on Single Suckling and Cattle Finishing enterprises. However, it is important to recall that there is even greater variation in gross output across different farm enterprises. While higher levels of gross output per hectare are in general associated with higher levels of direct costs of production and farming on better than average soils, the difference in technical performance and productivity between the top one-third and bottom one-third of Cattle Finishing enterprises remains striking.

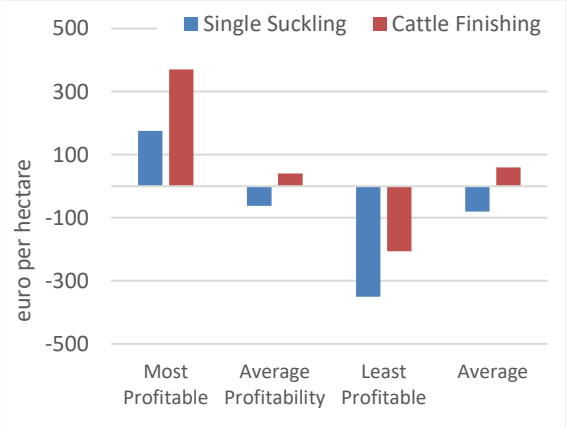
Average overhead costs per hectare on the Cattle Finishing and Single Sucking enterprises were €675 and €660 per hectare respectively (see Appendix Table A1 and Table A2 at the end of this paper). On a whole farm basis, the total overhead expenditures tend to be higher on Cattle Finishing enterprises due to their relatively larger farm size.

On Single Suckling farms, the net margins declined in 2022 relative to 2021. In 2022, the improvement

in the performance of Cattle Finishing enterprises can largely be attributed to rising finished cattle prices. On average, Cattle Finishing enterprises in 2022 earned a better net margin per hectare relative to the average Single Suckling enterprise. The average net margin is reported as positive for the Cattle Finishing enterprise in 2022 (+€60 per hectare) but is reported as negative for the average Single Suckling enterprise (-€80 per hectare).

Figure 4 shows the net margins earned on the two cattle enterprises analysed. Figure 4 illustrates that in 2022 only the most profitable one-third of Single Suckling enterprises earned positive net margins and that the level of these margins was relatively low. In the case of Cattle Finishing enterprises, the top and middle third of profitability earned positive net margins.

Figure 4: Cattle Enterprise Net Margins per hectare in 2022



Source: 2022 Teagasc National Farm Survey (2023)

3. Estimated Performance of Irish Cattle Farms in 2023

This section of the paper presents a review of the economic performance of Irish cattle enterprises in 2023. A discussion of the estimated changes in input usage and input costs in 2023 is first presented and this is followed by a discussion of estimated changes in output value. Estimates of margins earned by Single Suckling and Cattle Finishing enterprises in 2023 are then presented.

Estimates for 2023 margins are based on relatively small changes in the intensity of production per hectare on the average cattle finishing farm. The impact of changes in the intensity of production on individual enterprises would be expected to vary from farm to farm. In some cases, a change in intensity may increase profitability, in others it could give rise to lower margins. In 2023, aggregate production of beef decreased in Ireland. Suckler cow inventories declined in 2023 relative to 2022 (DAFM 2023c).

3.1 Estimated Input Usage and Price 2023

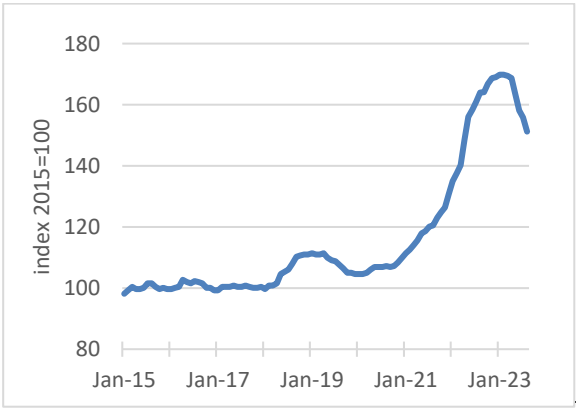
3.1.1 Feedstuffs

Purchased feed is an important element of the direct costs of beef production in Ireland. Typically, this cost item accounts for approximately 30 percent of total direct costs on Single Suckling enterprises and 45 percent of direct costs on Cattle Finishing enterprises.

Less favourable grass growing conditions in Autumn 2023 contributed to higher volumes of concentrate feed purchases by cattle finishing farms. This emerged despite the continued high prices for concentrate feed. Overall, it is estimated that feed use increased by 1 percent per hectare on cattle finishing enterprises in 2023 relative to 2022. It is estimated that no change occurred on cattle rearing enterprises.

Figure 5 presents the CSO monthly price index for cattle feed stuffs for the period January 2015 to August 2023. In August 2023, cattle feed prices were 8 percent lower relative to the prices reported in August 2022. However, feed prices have been slow to decline from their peak in Q1 2023. As a result, we estimate that average cattle feed prices are 2 per cent higher in 2023 relative to 2022. This estimate accounts for the final quarter of the year.

Figure 5: Monthly Price Index of Cattle Meal in Ireland 2015 to 2023



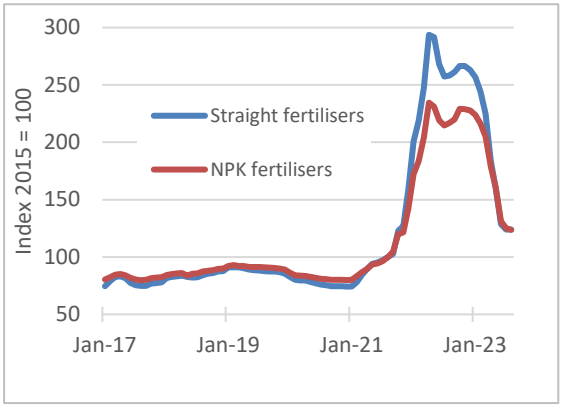
Source: CSO (2023)

We estimate that expenditure on concentrates by cattle finishing farms in 2023 increased by 3 percent relative to 2022. We estimate that expenditure on concentrates by cattle rearing farms in 2023 increased by 2 percent relative to 2022.

3.1.2 Fertiliser in 2023

Figure 6 presents monthly data on fertiliser prices since 2017. Fertiliser prices increased dramatically in early 2022 but eventually began to decline in Q2 2023. The decrease in Irish fertiliser prices contributes to lower overall fertiliser expenditure on Irish cattle farms in 2023.

Figure 6: Monthly Price Index of Fertiliser in Ireland from 2017 to 2023



Source: CSO (2023)

3.1.3 Electricity and Fuel in 2023

Fuel expenditure on Irish cattle farms is estimated to have decreased by approximately 15 percent in 2023 relative to the 2022 level. The decrease in global oil prices in early 2023 influenced the decline in domestic motor fuel prices. The demand for motor fuel in agriculture is relatively inelastic and total expenditure is estimated to have decreased as a result of the price decline.

We estimate no change in contracting charges for 2023 compared to 2022. Overall expenditure on pasture and forage by cattle farmers in 2023 is estimated to have been lower than in 2022 and this decline is entirely attributed to reductions in fertiliser expenditure. Electricity prices are estimated to have been 28 per cent higher in 2023 relative to 2022.

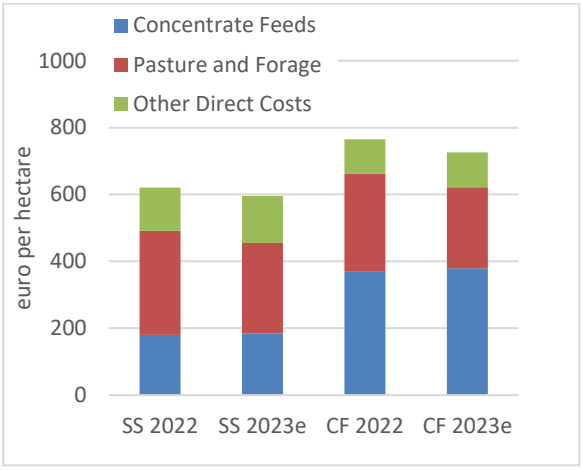
3.1.4 All Other Direct and Overhead Costs– usage and price 2023

Hourly wages in Ireland are estimated to have increased by 5 percent in 2023; however, given the low usage of hired labour on Irish cattle farms, this development does not have a major impact on costs of production. Increased veterinary costs and costs associated with Infectious Bovine Rhinotracheitis (IBR) testing contribute towards an estimated 6 percent increase in other direct costs for the average cattle rearing farm in 2023. Other direct costs increase by approximately 4 percent on cattle other farms.

3.1.5 Estimate of Total Direct Costs for 2023

Figure 7 compares the average direct costs of production for the Single Suckling and Cattle Finishing enterprises in 2022 with the estimated direct costs for 2023.

Figure 7: 2022 Direct Costs and Estimated 2023 Direct Costs for Single Suckling (SS) and Cattle Finishing (CF) Enterprises



Source: Teagasc National Farm Survey (2023) and Author's Estimates

On average, total direct costs decreased by 4 percent in 2023 on Single Suckling farms and declined by 5 percent on Cattle Finishing farms. These declines are mainly due to reduced expenditure on fertiliser. This is particularly the case on Cattle Finishing farms where fertiliser use tends to be higher than on Single Suckling farms. In the case of Single Suckling farms, there are some additional other direct costs associated with IBR testing for those farms participating in the National Beef Welfare Scheme (NBWS) scheme.

The slight increase in feed use on Cattle Finishing farms means that feed expenditure increases on this enterprise to a greater extent than on Single Suckling farms. The slightly higher feed prices (2 percent) mean that concentrate feed expenditure is higher on both enterprises.

In 2023, there are limited changes in total overhead costs. Lower fuel costs in 2023 were offset by some price increases in other overheads. The overall costs of production in 2023 are estimated to have

increased by 1 percent on both Single Suckling and Cattle Finishing farms.

3.2 Estimated Output Values 2023

The value of gross output on Single Suckling enterprises is estimated to have increased in 2023, with higher average prices for weanlings and store cattle observed throughout most of the year including the important autumn months.

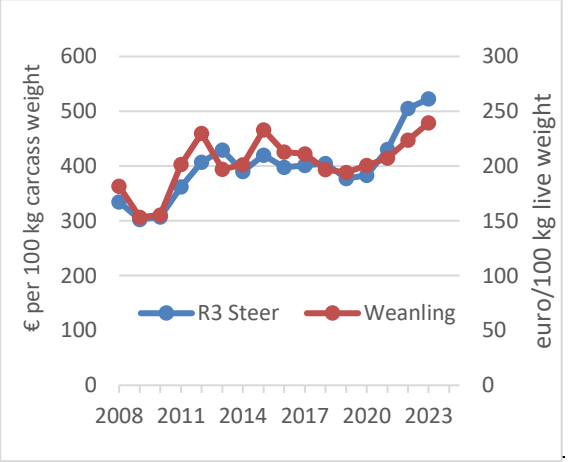
In our estimates for 2023, we have incorporated the payments made to cattle farmers under the new Suckler Carbon Efficiency Programme (SCEP) and the new National Beef Welfare Scheme (NBWS). The payments under these schemes are contingent on farmers undertaking specified measures. These schemes are discussed in some detail in two Teagasc Beef Edge podcasts (Egan 2023a; Egan 2023b).

These two schemes contribute to our estimates of gross output value in 2023. We estimate no change in coupled payments in 2023 relative to 2022 for the average Single Suckling enterprise. This estimate represents the average situation for all cattle rearing farmers. However, some cattle farmers with suckler cows are not participating in these schemes and receive no payments on a per hectare basis. Some farmers may be participating in one of these schemes. For recipients of these schemes, the actual payments per hectare are therefore significantly larger than the average estimates suggests.

The average gross output is estimated to be higher than the levels observed in 2022. In 2023, the value of output per hectare on Single Suckling farms is estimated to be €1,261 (an increase of 5 percent on the level in 2022). On both cattle rearing farms and cattle finishing farms, the changes in Gross Output are due to changes in output prices and changes in the volumes of production. Figure 8 presents average R3 steer and weanling prices for the period 2007 to 2022 and an estimate for 2023. The weanling price refers to the value of bullocks in the 300-349 kg weight bracket.

The estimated annual average R3 base steer price for 2023 of around €520/100kg (including VAT) represents a 3.5 percent increase on the price level in 2022. All of the increase in the average annual price is due to developments in the first quarter of 2023. The sharp increase in input costs for winter finishing was one of the main factors influencing the increase in beef prices during this time. The estimated average weanling price (300-349kg) is estimated to be approximately 7 percent higher in 2023 relative to 2022. The increase in weanling prices could be attributed to some optimism about economic returns in the short-term as a result of expected declines in key input prices.

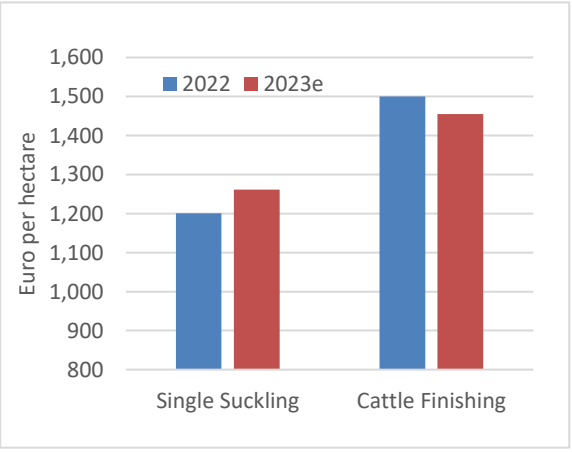
Figure 8: Finished and Live Cattle Prices in Ireland 2008 to 2023



Source: DG Agri. and CSO; * Author's estimate 2023.

Overall, the average value of gross output on Cattle Finishing enterprises is estimated to be lower in 2023 relative to 2022. The market value of output is influenced by the price of cattle sold and cattle purchased. For 2023 as a whole, the gap between finished cattle prices and weanling prices declined. The volume of Gross Output on cattle finishing farms decreased by approximately 4 per cent in 2023 relative to 2022. In 2023, the average value of output per hectare on Cattle Finishing farms is estimated to be €1,455 (a decrease of 3 percent on the level in 2022).

Figure 9: 2022 Gross Output for Single Suckling (SS) and Cattle Finishing (CF) Enterprises and Estimate for 2023



Source: 2022 National Farm Survey (2023) and Author's Estimates 2023

In 2023, the average Gross output per hectare was higher on Cattle Finishing enterprises than for Single Suckling enterprises. This largely reflects the higher stocking density per hectare on these farms.

There is a large degree of variation in the value of gross output per hectare between the least profitable, those with average profitability and most profitable groups of Cattle Finishing enterprises. Table A2 shows that the most profitable Cattle Finishing enterprises in 2023 are estimated to have produced an average level of gross output per hectare (€2,616 per hectare) that was 265 percent higher than the average value of output per hectare on the least profitable group of Cattle Finishing enterprises (€717 per hectare).

3.3 Beef Enterprise Margin Estimates for 2023

As shown in Figure 7, the estimated expenditure on concentrate feed by finished cattle enterprises increased slightly in 2023. On both the Single Suckling and Cattle Finishing enterprises, expenditure on pasture and forage decreased significantly in 2023. Total direct costs on both enterprises are estimated to have decreased in 2023.

On Single Suckling enterprises in 2023, the margins are higher relative to 2022. Single Suckling enterprises in 2023, are on average estimated to have a break-even net margin per hectare. On average, the farmers not participating in either the SCEP or NBWS schemes are likely to have earned negative net margins in 2023.

For the average Cattle Finishing enterprise, net margins on a per hectare basis are estimated to have decreased in 2023. Cattle Finishing enterprises are estimated to have earned a positive net margin of €49 per hectare. This decline can be attributed to the decline in the volume of beef production and the finding that cattle finishers paid significantly higher prices for weanlings in 2023 relative to 2022.

Table A1 and Table A2 decompose the Single Suckling and Cattle Finishing population into 3 groups of equal number on the basis of profitability (gross margin per hectare) and presents estimates of gross output, direct costs, gross margin and net margin for 2023.

For both the Cattle Finishing and Single Suckling enterprises, the top one-third of farmers earned positive net margins in excess of €200 per hectare. The average net margin is slightly positive for the middle-third of farmers in these two enterprises. For both enterprises, the bottom one-third of farmers are estimated to have experienced negative net margins in 2023.

4. Outlook for 2024

In this section, we forecast the expenditure for various input items and the beef price that is most likely to prevail in 2024. We provide a forecast of the incomes from the production of cattle in 2024.

4.1 The Outlook for Input Expenditure

4.1.1 Feedstuffs in 2024

Global cereal and oilseed futures market prices point to some decreases in feed prices in 2024. Cattle feed prices are forecast to be 1 percent lower in 2024. A 4 percent reduction in feed volume on Cattle finishing enterprises is forecast for 2024. Our forecast is for an average 5 percent decrease in overall feed expenditure on Cattle Finishing enterprises and a 2 percent decrease on Single Suckling enterprises during 2024.

4.1.2 Fertiliser in 2024

Given the developments in global supply and demand, the outlook for international fertiliser prices in 2024 is for the price of fertilisers to be lower relative to the exceptionally high levels of 2023. In our 2024 forecast, we forecast that total expenditure on pasture and forage by Irish cattle farmers will be lower relative to the 2023 level.

4.1.3 Electricity and Fuel in 2024

Fuel costs in 2024 will depend mainly on the evolution of crude oil prices. Current futures prices suggest that crude oil prices will decrease in 2024 relative to 2023 prices. Our forecast is that fuel prices in 2024 will be 6 percent lower than in 2023.

4.1.4 Other Direct and Fixed Costs in 2024

The cost of labour is forecast to increase by 3 percent in 2024. However, on the average Irish cattle enterprise hired labour costs are very small and inflation in labour costs is not expected to have a major impact on overall costs of production. General inflation is likely to be lower relative to 2022 and 2023. We therefore forecast an increase in other direct costs of 2 percent. Other overhead (fixed) costs are forecast to be 3 percent higher in 2024.

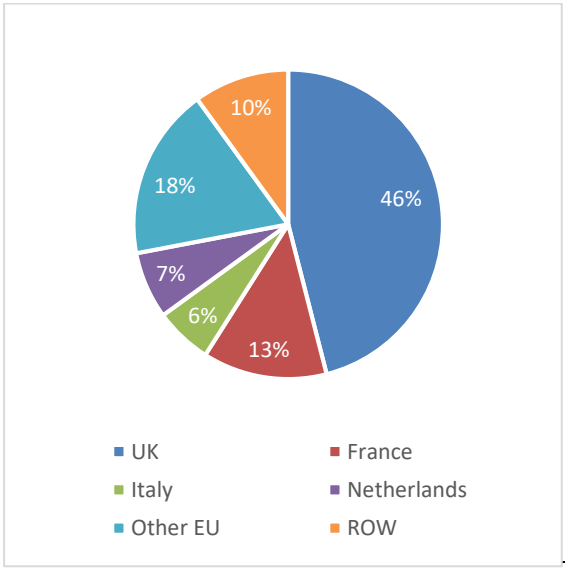
4.2 The Outlook for Cattle and Beef Markets 2024

Ireland exports close to 90 percent of its beef production (CSO 2023b). Conditions in markets to which Irish beef and cattle are exported largely determine Irish cattle prices; though supply developments in Ireland can cause Irish cattle prices to deviate from export market prices over the short run.

Figure 10 illustrates the destinations of Irish beef exports in 2023 (year to the end of August). The UK is the most important export destination for Irish beef with a current export share of 46 per cent.

The importance of the EU in Ireland's beef exports is evident. France is the EU member state with the highest export share for beef at 13 percent. However, it is evident from various DAFM meat market reports that the value of beef exports to France declined in the first 8 months of 2023 relative to the equivalent period in 2022 (DAFM 2022; DAFM 2023b). Exports to the Netherlands and Italy remain important with export shares of 7 percent and 6 percent respectively. The share of exports to the rest of the world (ROW) remains significant at 10 percent. It appears that in the first eight months of 2023, a decrease in exports to France is offset by an increase in exports to the UK although the total volume of exports has decreased slightly (Eurostat COMEXT 2023).

Figure 10: Estimate of Irish Beef Export Markets by Volume in 2023



Source: Eurostat COMEXT, January to August (2023)

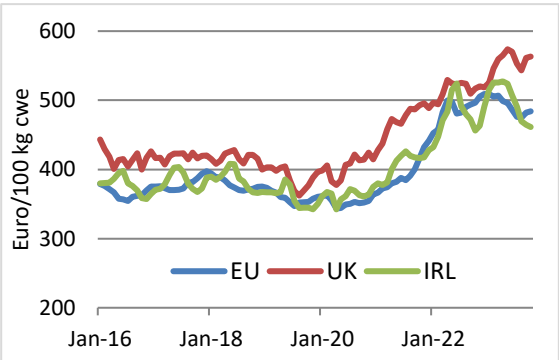
In recent years, there has been a notable increase in the volume of exports to EU markets including France. However, there remains strong competition for access to these markets. Ireland is one of the main exporters of beef to France but faces some competition from the beef sectors in Germany, Netherlands and Belgium (Agreste 2023, p.6). In addition, both consumption and overall imports of beef have declined in France during 2023 (L'institut de l'élevage, 2023)

The European Commission reports that the consumption of beef is declining in the EU (European Commission 2023b). The extent of the decline during 2022 and 2023 may be influenced by the rapid increase in inflation including food and meat price inflation. In France, beef prices increased by 5 per cent in 2023 after increases of about 10 percent in 2022 (INSEE France 2023a, 2023b). In Germany and the Netherlands, beef and veal prices have been stable in 2023 after substantial increases in 2022 (Federal Statistics Office Germany 2023; Statistics Netherlands 2023). Consumer beef prices in Italy are about 5 per cent higher than in 2022 (ISTAT 2023).

In the UK, the rise in consumer prices continued in 2023. According to the Office for National Statistics, average consumer prices for steak and mince increased in 2023 (ONS 2022a; ONS 2022b).

Figure 11 shows a comparison of beef prices in Ireland with the EU and UK. Figure 11 shows that beef prices in the UK continued to increase during 2023. The AHDB reports more detailed statistics according to UK region (AHDB 2023b).

Figure 11: Monthly EU, UK and Irish Finished Cattle Prices 2016 to 2023 (Excl. VAT)



Source: DG Agriculture and Rural Development, AHDB and ECB. Ireland and UK Steer R3, EU27 Young Bull R3.

It is clear from Figure 11 that UK steer prices have tended to exceed Irish steer prices for most of the period. The preference among UK consumers for beef sourced in Britain provides one explanation for

this long-run pattern. However, the gap between UK and Irish prices (October 2023) significantly exceeds the long run average of approximately 10 percent. Given the extent of interdependence between the UK and the beef sector in Ireland, we may therefore anticipate some partial convergence in beef prices over the coming months.

In the short run, the outlook for prime beef supplies in Ireland are determined by the current inventories of animals aged 1-2 years. Data from the Department of Agriculture, Food and the Marine (DAFM) AIMS database provide insights into developments in these inventories. Inventories for animals aged 12-24 months of age are significantly lower relative to the levels observed 12 months previously. Overall, we forecast a 4 percent decrease in prime beef production for 2024.

In the rest of the EU, supplies of cattle for slaughter in 2023 are likely to be lower than 2022. Overall EU production of beef in 2024 is forecast to be approximately 1.0 percent lower in 2023 (European Commission 2023c).

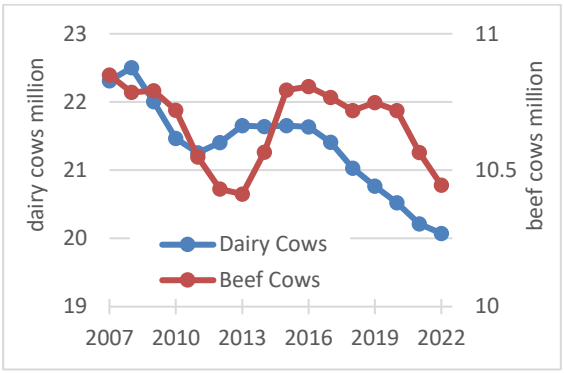
In the UK, the inventories for animals aged 12-24 months of age appear similar in June 2023 relative to June 2022 (DEFRA 2023b). This points to no major changes in UK beef production during 2024. In the UK, there are notable declines in the size of the breeding herd and particularly for non-dairy cows. This points to some contraction in UK beef production in the medium-term (beyond 2024).

In the medium term, inventories of breeding animals are the key determinant of future beef supply. Figure 12 illustrates the recent trends in dairy and beef cow inventories in the EU (readers should note the different scales on the left and right axes). In anticipation of the abolition of EU milk quota in April 2015, the numbers of dairy cows in the EU increased, however low levels of profitability in many member states subsequently reversed this trend.

Dairy cows account for approximately two-thirds of the stock of cows in the EU. Under the CAP, many Member States have coupled direct payments related to both numbers of dairy and suckler cows and these policy measures will tend to mitigate some of the impact of on-going low levels of profitability on cow numbers. Beef cow numbers declined in 2022 in most EU member states including Ireland, France and Spain.

Our forecast is for a 3 percent increase in the annual average finished cattle price in 2024 relative to the annual average in 2023. This equates to a price of approximately €535/100kg (including VAT) for the average R3 steer.

Figure 12: EU27 Cow Numbers 2007 - 2022



Source: Own elaboration based on Eurostat (2023)

Our forecast is for a 3 percent increase in the annual average finished cattle price in 2024 relative to the annual average in 2023. This equates to a price of approximately €535/100kg (including VAT) for the average R3 steer.

In 2024, a decrease in some input prices is expected to impact positively on Cattle Finishing enterprises. A rising demand for the purchase of younger cattle can emerge due to the expected contraction over the medium-term in beef production in the EU and the UK. A slight improvement in margins earned on the Cattle Finishing enterprise will further support this demand. Our forecast is that prices for weanling and store cattle will increase by 3 percent in 2024 relative to the 2023 levels. Gross output for the average Single Suckling enterprise is therefore forecast to be higher relative to the estimated 2023 levels.

4.2.1 Outlook for Beef Enterprise Net Margins in 2024

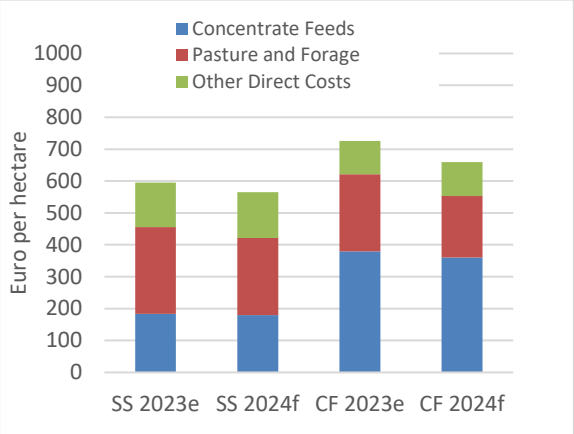
In 2024, the evolution of the net margin on cattle farm enterprises will be influenced by cattle sales, cattle purchases and input expenditures.

Figure 13 compares the estimated and forecast average direct costs per hectare in 2023 and 2024 for the Single Suckling and Cattle Finishing enterprises. On both enterprises, the level of expenditure on pasture and forage is expected to be lower in 2024 relative to 2023. This is mainly due to the forecast of a reduction in the price of fertiliser.

Concentrate feed prices are forecast to decrease by 1 percent with some decreases in the quantity of concentrate feed usage on Cattle Finishing farms. As a result, expenditure on concentrate feed is forecast to be 5 percent lower on Cattle Finishing

enterprises and 2 percent lower on Single Suckling enterprises in 2024. On a per hectare basis, the direct costs are forecast to decrease by 5 percent on the average Single Suckling enterprise and by 9 percent on the average Cattle Finishing enterprise.

Figure 13: Estimated Direct Costs for 2023 and Forecast Direct Costs for 2024

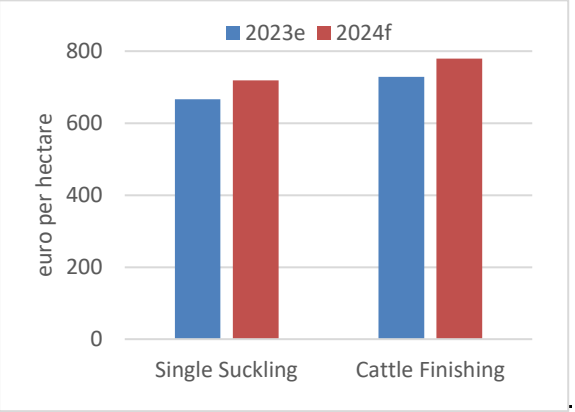


Source: Author's Estimates 2023 and Forecasts 2024

Figure 14 shows the estimated gross margin on both cattle enterprises in 2023 and the forecasted gross margins for 2024. For 2024, the gross margin for the average Single Suckling enterprise is forecast to increase by approximately 8 percent. On a per hectare basis, the gross margin for the average Cattle Finishing enterprise is forecast to increase by approximately 7 percent in 2024.

Net margins on average Cattle Finishing farms are forecast to be higher in 2024 relative to 2023 with a forecast average net margin of €100 per hectare. Net margins for the Single Suckling enterprise are forecast to improve in 2024 relative to 2023. A positive net margin per hectare of €51 is forecast for 2024.

Figure 14: 2023 Gross Margin for Single Suckling (SS) and Cattle Finishing (CF) Enterprises and Forecasts for 2024



Source: Author's Estimates for 2023 and Forecasts for 2024

5. Concluding Comments

In 2023, there were mixed outcomes in relation to the economics of cattle farming in Ireland. Finished cattle prices increased steadily in January and February but declined significantly during the summer and autumn period with moderate improvements in November. Input prices have been slow to decline for key inputs including feed and fertiliser. Young cattle prices performed well during the autumn and this pointed to some optimism among cattle finishers about economic returns over the short-term.

In 2023, the decline in prime beef production is one of the most important statistics emerging from the beef sector in Ireland. On a per hectare basis, gross and net margins for cattle finishing enterprises are estimated to be lower in 2023 relative to 2022. However, this is mainly attributed to the decline in beef production rather than being due to price dynamics. Total prime beef production is estimated to be 4.5 percent lower in 2023 relative to 2022.

In 2023, margins have improved on cattle rearing farms due to an increase in young cattle prices and some declines in input prices. On the cattle rearing enterprise, there is a recovery from particularly low incomes in 2022.

The support of the Fodder Scheme continued to have an important impact on farm incomes in 2023. The NBWS scheme and particularly the SCEP scheme supported gross output and gross margins on many Single Suckling farms. The participation in these schemes may have helped prevent a decline in income on many cattle farms.

The declines in the breeding cattle herd in the UK, France and Germany means that the prospects for the beef sector in Ireland are improving for the medium-term. A medium-term contraction in UK and EU beef supply can support the price of younger cattle in 2024. Margins on the cattle rearing enterprise are forecast to improve in 2024 with some of this forecast improvement due to expected declines in input prices.

Our forecast for 2024 is for a 3 percent increase in Irish finished cattle prices and a 3 percent increase for young cattle prices. A significant decline in input costs can contribute to improved profitability on cattle farms in Ireland and particularly on cattle finishing farms. However, a further decline in the volume of beef production is forecast in 2024. This means that total beef output value is forecast to be 1 percent lower in 2024.

The levels of profit forecast for both Cattle enterprises in 2024 are slightly above the averages observed over the period 2015-2023. The profitability of the average Single Suckling and Cattle Finishing enterprise, when decoupled direct payments are excluded, has for most of the recent past been negative. While the top one-third of both Single Suckling and Cattle Finishing enterprises often earn positive net margins, most enterprises have failed to consistently cover their costs of production with the value of output sold. This on-going lack of profitability reflects the structure of the industry and its high costs.

There is a continued challenge facing the wider Irish beef industry in developing new markets for Irish beef that will reduce the dependence of the industry on the UK market that has traditionally been Ireland's second "home" market. Consumer prices for beef in the UK continued to increase in 2023 but there is a preference among UK consumers for beef sourced in Britain.

In recent years, the rising consumer prices for beef in key EU export destinations have offered opportunities in terms of exports and particularly with the continued decline in beef production at the EU level. Our analysis of trade data indicates that the EU export share declined slightly in 2023 after increases in recent years. A resurgence in the EU export share can contribute to the future viability of the beef sector in Ireland. However, it remains crucial that the sector continues to be competitive in these EU markets.

The forecast decline in domestic beef production may have some influence on beef prices in Ireland during 2024. However, the main concerns will relate to beef supply and demand in key export destinations and beef markets globally. After a difficult second half to 2023, the prospects for the beef sector appear more positive entering 2024. The general outlook for 2024 is for moderate improvements in the profitability of beef production in Ireland.

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Table A1: 2022 and Estimated 2023 Financial Performance per hectare: Single Suckling Enterprise

	Most Profitable	Average Profitability	Least Profitable	Average
		euro per hectare		
Gross Output 2022	1,722	1,070	814	1,201
Direct Costs 2022	695	534	633	621
Concentrate Costs	200	161	180	180
Pasture and Forage Costs	323	278	332	311
Other Direct Costs	172	95	121	129
Gross Margin 2022	1,027	536	181	580
Overhead Costs 2022	852	599	531	660
Net Margin 2022	176	-63	-350	-80
Gross Output 2023	1,806	1,122	854	1,261
Direct Costs 2023	672	510	604	595
Concentrate Costs	204	164	183	184
Pasture and Forage Costs	281	243	290	271
Other Direct Costs	187	103	130	140
Gross Margin 2023	1,134	612	251	666
Overhead Costs 2023	859	604	536	666
Net Margin 2023	275	8	-285	0

Source: Teagasc National Farm Survey Single Suckling Enterprise Fact Sheet 2022 (Teagasc NFS, 2023a) and Authors' Estimates 2023

Table A2: 2022 and Estimated 2023 Financial Performance per hectare: Cattle Finishing Enterprise

	Most Profitable	Average Profitability	Least Profitable	Average
		euro per hectare		
Gross Output 2022	2,698	1,163	739	1,500
Direct Costs 2022	1,258	514	567	765
Concentrate Costs	672	214	246	368
Pasture and Forage Costs	436	213	247	295
Other Direct Costs	150	87	74	102
Gross Margin 2022	1,440	648	172	735
Overhead Costs 2022	1070	608	379	675
Net Margin 2022	370	40	-207	60
Gross Output 2023	2,616	1,127	717	1,455
Direct Costs 2023	1,203	484	532	726
Concentrate Costs	692	220	253	380
Pasture and Forage Costs	358	175	203	242
Other Direct Costs	153	89	75	104
Gross Margin 2023	1,413	643	185	729
Overhead Costs 2023	1079	613	382	680
Net Margin 2023	335	30	-197	49

Source: Teagasc National Farm Survey Cattle Finishing Enterprise Fact Sheet 2022 (Teagasc NFS, 2023a) and Authors' Estimates 2023

Table A3: Forecast 2024 Single Suckling Enterprise Financial Performance per hectare

	Average
	euro per hectare
Gross Output 2024	1,284
Direct Costs 2024	180
Concentrate Costs	242
Pasture and Forage Costs	143
Other Direct Costs	565
Gross Margin 2024	719
Overhead Costs 2024	548
Net Margin 2024	51

Source: Authors' forecasts for 2024

Table A4: Forecast 2024 Cattle Finishing Enterprise Financial Performance per hectare

	Average
	euro per hectare
Gross Output 2024	1,439
Direct Costs 2024	361
Concentrate Costs	193
Pasture and Forage Costs	106
Other Direct Costs	660
Gross Margin 2024	779
Overhead Costs 2024	679
Net Margin 2024	100

Source: Authors' forecasts for 2024

Mid Season Lowland Lamb Factsheet
Average Performance 2022

Irish Sheep Slaughter
3.197 million head (up 7.6%)

Irish Lamb Slaughter
2.74 million head (up 5.9%)

Sheep Meat Exports
75,000 tonnes cwe (up 10%)

Irish Breeding Sheep
3.05 million (up 5%)

Lamb price
€674/100kg (up 1.5%)

Lamb Carcass kg per ha
down 3% on 2021 level

Total Production Costs
(Mid Season Lowland)
€191 per ewe (up 16%)
€1,367 per ha (up 13%)

Gross Margin
(Mid Season Lowland)
€861 per hectare (down 7%)

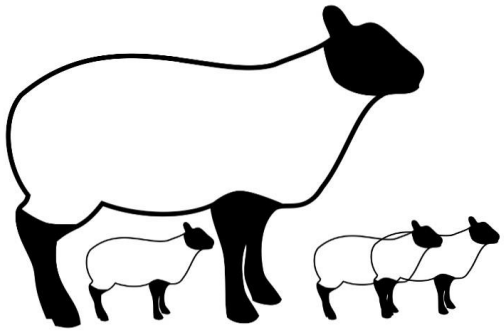
Net Margin
(Mid Season Lowland)
€131 per hectare (down 54%)

Stocking Rate
(Mid Season Lowland)
7.23 ewes/ha (down 3%)

Weaning Rate
(Mid Season Lowland)
1.36 lambs/ewe (down 2%)

Lamb Mortality
(Mid Season Lowland)
6% (unchanged)

Lambs Weaned/ ha
(Mid Season Lowland)
10.10 lambs/ha (down 3%)



Source: Teagasc National Farm Survey 2022 and Central Statistics Office
Note: Percentage changes are relative to 2021

Irish Sheep Farming in 2023

Marginally higher EU lamb prices

Lamb/Sheep Slaughter
up 1%

Lamb Prices
down 3%

Weather Conditions
normal

Grass Availability
normal

Fertiliser Prices
down 20% on the 2022 level
Fertiliser Use
down 15% on the 2022 level

Feed Prices up 2% on 2022
Feed use down 5% on 2022

Other Direct Costs
up 3% on 2022

Fuel prices (Farm Diesel)
down 18% the 2022 level

Total Direct Costs
down 10% on the 2022 level

Gross Margin per ha
(Mid Season Lowland Lamb)
€905 (up 5% on 2022)

Source: Teagasc Estimates for 2023 and Forecasts for 2024

Irish Sheep Farming in 2024

Little movement in EU lamb prices

Lamb/Sheep Slaughter
lown 3% on 2023

Lamb prices
up 1% on 2023

Weather Conditions
normal weather assumed

Grass Availability
assumed normal

Fertiliser Prices
down 35% on the 2023 level
Fertiliser Use
unchanged on the 2023 level

Feed Prices down 1% on 2023
Feed use unchanged on 2023

Other Direct Costs
up 2% on the 2023 level

Fuel prices (Farm Diesel)
down 10% on the 2023 level

Total Direct Costs
down 8% on the 2023 level

Gross Margin per ha
(Mid Season Lowland Lamb)
€982 (up 9% on the 2023 level)

Review of Sheep Farming in 2023 and Outlook for 2024

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1. Introduction

For this paper, data from farms in the Teagasc National Farm Survey (NFS), which have a mid-season lowland lamb enterprise, are used together with data from the Central Statistics Office (CSO), European Commission DG Agri and Eurostat to analyse the financial performance of Irish sheep farms. Estimates of enterprise margins for 2023 are based on 2022 Teagasc NFS data and on CSO price indices for the year to date (CSO, 2023a) and preliminary CSO estimates for 2023 (CSO, 2023b). Forecasts for sheep enterprise margins for 2024 are based on our estimates of margins for 2023, and our forecasts of input and output price and volume changes in 2024.

We begin the paper with a brief review of the outturn for Family Farm Income (FFI) for the Teagasc NFS mainly sheep farms in 2022. A detailed assessment of the 2022 mid-season lowland lamb enterprise margins is then presented in section 3. This is followed by an overview of the current short term outlook for European and Irish sheep markets in section 4. Estimates and forecasts of margins for the mid-season lowland lamb enterprise for 2023 and 2024 are then presented in sections 5 and 6. The mid-season lowland lamb enterprise is the predominant lowland sheep system in Ireland. In our analysis we have limited the sample analysed to those enterprises with more than 20 breeding ewes.

In our analysis of enterprise margins for 2024 we have included payments per breeding ewe for sheep welfare measures completed under the Sheep Improvement Scheme (SIS), funded under Ireland's CAP Strategic Plan (DAFM, 2022). The SIS initially ran from 1 February 2023 to 31 December 2023. From 2024, the scheme year will coincide with the calendar year, 1st January to 31st December 2024. The reference number of ewes on participating farms will be based on the number of breeding ewes declared on sheep census returns (historical census data) over the period 2016 to 2021. –Where three or more census returns have been submitted over this period, the reference number for the SIS will be the average of the three years with the highest number of breeding ewes declared. With regard to farmers who have only two years census returned over this period, the reference number will be based on the average of the number of breeding ewes declared over those two years and likewise if only one census returned in this period, the number will be based on that census return. The previous census returns will also determine your flock type (lowland or hill). As in previous years, there will also be a provision for new entrants to sheep farming to apply and to join the Sheep Improvement Scheme.

We have assumed that the SIS payment will be paid on a per ewe basis, at a rate of €12 per ewe for 2024 year. At an average stocking rate of approximately 7 ewes per hectare, this is equivalent to €84 per hectare. However, based on average actual payments per hectare under the Sheep Welfare Scheme over the past number of years a lower estimate of €60 per hectare is applied. The Budget 2024 announcement, October 2023, contained a further important measure to support the sheep farming sector in 2024 year. This is expected to bring the payment per ewe under SIS from €12/ewe in 2023 to €20/ewe in 2024. However as of yet, it is unclear what actions sheep farmers will actually have to take, above the welfare and health actions as undertaken in the current SIS to avail of this additional €8/ewe of funding. The actual costs of participating in these actions and other details are not available at the time of going to press, but in our forecasts for 2024 year we have factored this additional €8 per ewe differential into our calculations, based on lower average stocking and payment rates to calculate payments per hectare over and beyond the 2023 year SIS payments. These payments, relating to the SIS and the 'improved SIS' for both 2023 and 2024, are incorporated in estimates of enterprise output for 2023 and forecasts for 2024 as the SIS payment is linked to production (ewe numbers).

2. Review of the Economic Performance of Sheep Farms in 2022

FFI on those farms classified by the Teagasc NFS as *Mainly Sheep* farms, representing 13,979 Sheep farms nationally, declined by 21 percent in 2022, to an average of €16,324. Sheep farms account for 16 percent of the total farm population represented

and 6 percent of farm income (€228m) in 2022. The average FFI earned on these farms for the period 2016 through 2022 is shown in Figure 1.

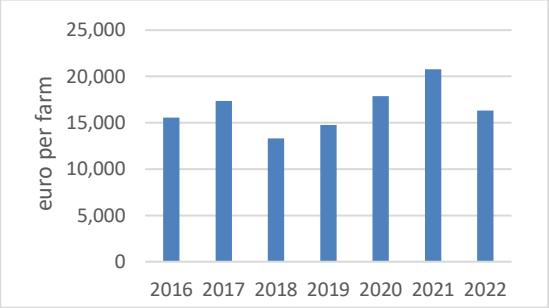
Sheep farm incomes have been on an upward trajectory for several years, following an increase of 21 percent in 2020 year and a further 16 percent increase in 2021 year, with FFI in 2021 setting a new record for sheep farm incomes. However, in 2022, although output values remained relatively high, increased costs (up 14 percent) squeezed margins and led to a sharp decline in average FFI. While Sheep farms saw the value of output increase, the rise in production costs left incomes in 2022 on these farms lower with the high rate of general inflation in Ireland over the last two years eroding the real value of income. In 2022, 51 percent of Sheep farms recorded an average FFI of €10,000 or less, up from 42 percent in 2021.

Sheep farms in Ireland continue to be typically characterised by lower profitability and relatively smaller holdings. The Utilised Agricultural Area (UAA) remained unchanged, at 45 hectares on average in 2022. The average FFI per hectare in 2022 was €362, down substantially (€100) compared to 2021, due mainly to elevated input costs. In 2022, gross output increased marginally by 2 percent to €62,505 driven by lamb prices remaining strong, due to continuation of better market conditions and increased opportunities for Irish lamb exports. However, higher prices for farm inputs in 2022 were not offset by lamb and ewe prices, leading to an overall decline in Sheep FFI. Financial assistance through the SIS (and its predecessor, the SWS) has been significant in recent years, as have cattle related scheme payments (many sheep farms have a secondary cattle enterprise).

As expected, in line with the lower FFI year in comparison to 2021, there was a 4 percentage point decrease in the proportion of specialised sheep farms earning above €50,000, with just 6 percent of farms in 2022 earning FFI €50,000 or more. However, at the other end of the income distribution, the proportion of sheep farms earning a FFI less than €5,000 increased by 10 percentage points in 2022, to 46 percent. A further 15 percent reported an income of between €5,000 and €10,000 in 2022, slightly up compared to the previous year. The proportion of farms earning on average between €10,000 and €20,000 declined by 3 percentage points to 21 percent, with the proportion earning between €20,000 and €50,000 declining by 3 percentage points to 23 percent.

In line with other systems, there was a sharp increase in production costs on Sheep farms in 2022. Direct costs on Irish sheep farms increased by 9 percent, averaging €22,960, while overhead costs rose by 20 percent to €23,221. The largest component, of direct costs, was expenditure on concentrate feed, which increased by 13 percent to €8,503 in 2022, following a 15 percent increase in 2021 year, while expenditure on purchased bulky feed also increased, to €1,695 on average. Fertiliser expenditure on the average Sheep farm increased by 39 percent year on year to €4,423 following an increase of one fifth in 2021 year. Nitrogen use on Sheep farms declined 40 percent, the largest reduction across the drystock systems.

Figure 1: Average Income on Mainly Sheep Farms in Ireland: 2016 to 2022



Source: Teagasc National Farm Survey (various years)

Expenditure on contracting increased by 18 percent to €3,100, with expenditure on veterinary and livestock costs down 8 percent to €3,276. Other direct costs increased by 5 percent to €1,859 on average in 2022.

On the average Sheep farm in 2022, investment expenditure totalled €8,774. There were also increased debt levels on Sheep farms, on average debt on sheep farms rose to €36,706. Across all farm systems, 62 percent of farms have no farm business related debt. However, this figure varies considerably by farm type, with 3 out of 10 Sheep farms having outstanding farm debt in 2022. The debt to income ratio on Sheep farms in 2022 was 1.58.

The mixed nature of most Irish sheep farms means that developments affecting non-sheep enterprise profitability can significantly influence the income performance of sheep farms. It is important to note that farms classified as *Mainly Sheep* include both specialist sheep and also a sub category of farms on which sheep and cattle are combined. Of the total livestock gross output on these mainly sheep farms for 2022, just over 40 percent pertains to gross output from the various cattle enterprises. This

proportion is up 10 percentage points on 2021 but still slightly down on earlier years, where typically almost one half was attributable to the cattle enterprise activities. *Mainly Sheep* farms have been steadily increasing their sheep output. *Mainly Sheep* farm gross output is also inclusive of direct payments to farmers under the various CAP Pillar I and Pillar II schemes.

Direct payments to *Mainly Sheep* farms remained relatively stable year-on-year at €18,947 in 2022 year on average (€18,768 in 2021). Payments through GLAS and the Areas of Natural Constraint (ANC) remained important to the average sheep farm in 2022, with a small reduction in participation in schemes such as GLAS. Typically, for farmers participating in the SIS the scheme remained most important, with sheep farms in Teagasc NFS receiving an average payment of about €1,300 in 2022. The Fodder Support Scheme was also important for sheep farms in 2022, resulting in an average payment of just over €900. Focusing on the composition of average direct payments, the Basic Payment accounted for 60 percent of all payments received on the average Sheep farm in 2022.

Overall, reliance on direct payments was comparatively higher in 2022, with the ratio of direct payments to FFI worsening significantly on Sheep farms. Following the sharp decline in FFI year on year, the average ratio was 116 percent, indicating that the average Sheep farm used more than €2,600 of the direct payments received over the course of the year to cover the farm operating loss.

In the remainder of this paper, we focus exclusively on the mid-season lamb enterprise as the unit of analysis. This allows us to isolate the impact of developments in sheep output prices and related costs of production on the profitability of Irish sheep production. All enterprise margins are exclusive of direct payments that are decoupled from production. However, enterprise margins for mid-season lowland lamb do include coupled payments related to sheep production. In 2023 and 2024, payments to farmers participating in the Sheep Improvement Schemes (SIS) will boost the value of gross output and margins per hectare.

3. Sheep Margins in 2022

Changes in the value of output, costs and gross margin per hectare for the mid-season lowland lamb enterprise in 2022 are shown in Table A1 of the Appendix to this paper. For 2022, the value of gross output for mid-season lamb enterprises remained relatively on par with 2021. The volume of carcass output per hectare declined by circa 3 percent in 2022. In 2022 the stocking rate of ewes per hectare also declined, by 3 percent. When combined with a decline of circa 2 percent in weaning rate per ewe, the overall estimated lamb carcass per ha therefore decreased by 3 percent.

In 2022, total direct costs per hectare on the average mid-season lamb enterprise increased by 12 percent. Pasture and forage costs increased by the highest magnitude, increasing 27 percent relative to 2021, while expenditure on concentrate feed increased by 11 percent.

Gross margins in 2022 declined by 7 percent relative to 2021, mainly due to growth in direct input costs. Gross output value per hectare remained relatively on par with 2021, with sustained higher prices but with some declines in physical output per hectare augmented by a 6 percent decrease in coupled payments per hectare in 2022.

Historically, there has been a wide range in the profitability of sheep farms operating the mid-season lamb system. In part, this range in profitability is reflective of differing agronomic conditions such as soil quality which limit the capacity of some farms to increase their intensity of production.

For comparison purposes, in Table A2, the mid-season lowland lamb enterprises are ranked on the basis of gross margin per hectare, and assigned to three equally sized groups which we have termed least profitable, average and most profitable. The average levels of output, direct costs and gross and net margin per hectare, as well as indicators of technical performance across these three groups, can then be compared.

The most profitable one third of mid-season lamb enterprises earned an average gross margin per hectare of €1,509 per hectare in 2022, while farms in the bottom group earned an average gross margin of only €270 per hectare. Top producers earned, on average, 5.5 times more per hectare than their counterparts in the bottom group, which is equivalent to the differences as identified in previous years' analysis.

The large difference between the value of output per hectare across the three groups of farms is due to differences in their weaning and stocking rates. Higher levels of technical performance are reflected in an average carcass output per hectare of circa 290 kg on the most profitable mid-season lamb

enterprises, versus 120 kg on the least profitable enterprises.

These very large differences in gross margin earned per hectare reflect a large variation in the intensity of production across the farm population, but also differences in direct costs per hectare (see Table A2 in the Appendix). Total direct costs per hectare are highest for the group with the highest level of profitability, 30 percent higher on average (€765 versus €527), which is more of a differential than reported in 2021 and in earlier years analysis. The total direct costs incurred on top groupings of farms are 24 percent higher for 2022 versus 2021 year (€765 versus €615), while the bottom grouping direct costs are almost on par year on year (€527 versus €534). However total direct costs incurred on the middle group of farms increased by 12 percent to €623 in 2022.

When direct costs of production per kg of lamb carcass produced are compared, the impact production intensity per hectare is apparent. Direct costs of production per kg of lamb carcass produced on the least profitable farms are over 60 percent higher than on the most profitable farms.

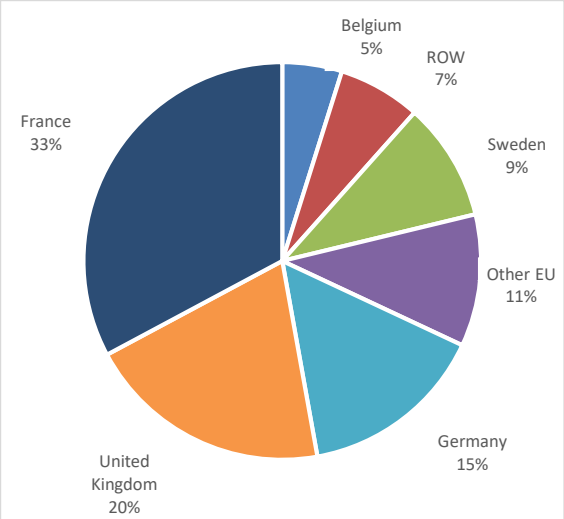
With a decline of 7 percent in gross margin earned in 2022, the average net margin for the mid-season lamb enterprise decreased to €131 per hectare. This represents a 54 percent decline on the net margin earned in 2021, declining from €284 to €131 per hectare. As the data in Table A2 indicate, the large variation in gross margin earned per hectare is also reflected in a variation in net margins earned. The most profitable mid-season lowland—lamb enterprises, on average, earned a net margin of €404 per hectare while the least profitable lowland lamb enterprises had on average a negative net margin (i.e. a loss) of €220 per hectare.

4. Sheep Meat Markets: Review of 2023 and Outlook for 2024

The vast majority of Irish sheep meat production is destined for foreign markets with 75,000 tonnes (cwe) of sheep meat exported in 2022, an increase of 10 percent on the previous year (CSO, 2023d). The reliance on export markets means that understanding the outlook for lamb price developments on Ireland's export markets is critical in assessing the prices that Irish sheep farmers are likely to receive.

Solid fundamentals continue to support demand for Irish sheep and lamb meat exports. France remains the most important sheep meat export destination in 2023, with exports to that market accounting for the largest share as in previous years, at 33 percent. On a year to date basis (to end of September), total sheep meat exports were up by 6 percent, following a 15 percent increase over the same period last year, with exports to most of the highest export proportion destinations increasing slightly. Irish sheep meat export destinations in 2023 are illustrated in Figure 2.

Figure 2: Irish Sheep meat Exports (CWE) by Destination – 2023



Source: Eurostat COMEXT database, year to September 2023

(ROW = Rest of World)

Ireland's rate of self-sufficiency in sheep meat increased by 36 percent to 397 per cent in 2022, which compares to a self-sufficiency rate of 262 percent across total meat.

For 2023 year, in the period Jan-August 2023, EU sheep/goat slaughterings were down 5.5 percent year-on-year. Slaughterings in the EU as a whole have declined (but large difference exist across different EU countries in this regard). EU heavy lamb prices have remained at high levels, following on from a high price year in 2022, but the substantial reduction of the flock over recent years limits the possibility for production increases in certain EU countries, despite the favourable prices that exist.

Overall, the expectation is that a slowdown in slaughterings in the second half of 2023 will result in a small production decrease of circa less than 2 per cent (-1.8%), followed by a somewhat lower forecasted decline for 2024 year of circa 1 percent.

As with other red meat types, being the most expensive type of meat, EU consumption of sheep meat is expected to suffer from inflationary pressures. However in comparison to other red

meats, its positioning within consumer baskets for cultural and religious festivals gives it a distinct advantage. The expectation is that the EU per capita consumption will remain relatively stable.

Following price declines at the beginning of 2023, prices recovered in the run up to and during the earlier Easter period (which was just a week earlier than in 2022 year) but fell short of reaching the sustained record price levels experienced in this period during 2022. Prices reached their highest level at end of Q2, at which point they began to decline but closely tracked 2022 price levels. At time of going to press, 2023 EU prices are almost 3 percent ahead of 2022 price levels at this time last year, with the continuing high price level driven mainly by the low rates of growth in domestic supply and the sustained demand level in the EU.

Despite the high prices for sheep meat that prevail, EU demand for lamb has been sustained. The high EU domestic prices are favouring more imports from both New Zealand and the UK, estimated to increase by 15 percent in 2023. Historically low EU sheep flocks are estimated to push slaughtering down by almost 2 percent in 2023. Owing to high costs of production, this has impacted on increasing prices for other meats also. High prices in the EU are forecast to prevail for remainder of 2023, due to stable demand coupled with the limited capacity to increase production in the EU (after years of declining sheep numbers).

Following a decline in EU imports of sheep meat in 2021, due to lower shipments from the UK and New Zealand, overall EU imports of sheep meat increased through the first half of 2022. This continued into 2023 year, and up to July 2023 EU imports of sheep and goat are up 12 percent on same period in 2022. The UK remains the largest import origin country (tonnes cwe), where imports were up 15 percent to end July, and at that point in year, the UK comprising almost 50 percent of the total tonnes imported.

With high prices, EU sheep meat exports have declined. In latest data available for 2023, up to July 2023, EU sheep meat exports are down 6 percent in comparison to same period in 2022. Continued high EU prices and tight EU domestic supply are expected to continue, and no recovery in exports is forecast for 2024.

In 2022, Ireland ranked 5th in the EU in terms of sheep production, comprising 9 percent of total heads slaughtered. Spain was the largest producer of sheep meat in Europe with a share of 26 percent.

Production of sheep meat in the UK is set to increase in 2023 (AHDB, UK Sheep Outlook, June 2023). For 2023 lamb production is forecast to increase by approximately 2% year-on-year, driven by higher carry-over and a broadly stable lamb crop. Consumption is expected to weaken, linked to recessionary pressures in the UK.

As many UK farms lack clarity around government agriculture policy and what any proposed changes to same will mean to their businesses, this is expected to hinder confidence and productivity, particularly in more extensive systems. Some industry reports suggest that increasing availability of land (e.g. inclusion of sheep in arable rotations on more frequent basis) may drive flock expansion, and thus supporting numbers. However, general pressures from input costs and policy uncertainty are expected to outweigh this for the overall breeding flock, so that growth of circa 0.5% is anticipated in the UK breeding flock by 1 December 2023. (AHDB, UK Sheep Outlook, June 2023)

Imports are important in balancing demand in the UK, both in terms of meat cuts that are preferred by UK consumers and the timing of supply. For 2023, factoring in lower trade in the first quarter, UK lamb imports are forecast to ease by nearly 20% year-on-year, driven by weaker domestic demand. Market dynamics on the continent are looking favourable for UK exports in 2023. Declining production in some key EU markets and the diversion of southern hemisphere product into China are contributing to supply tightness. Coupled with higher production in the UK (exports are more closely related to production levels), and weaker domestic demand, It is expected that UK sheep meat exports will rise in 2023 year versus 2022.

Both New Zealand and Australia have been increasing their focus on China as a more attractive market. The UK-Australia and UK-New Zealand FTAs came into force at the end of May 2023, which opens the door to more exports of red meat from Australia and New Zealand to the UK. However, AHDB modelling suggests UK imports will not dramatically increase because of these agreements. (AHDB, 2023b) This is owing to fact that Australia and New Zealand already have access to lucrative markets in Asia. Therefore, they are unlikely to divert product from these markets to the UK, despite having tariff-free access. However, if circumstances change in the longer term, then there will be the potential for more product to be shipped to the UK.

At a global level Australia and New Zealand (NZ) continue to maintain their dominance in 2023 as the largest exporters of sheep and goat products. Australia has been very competitive for sheep meat exports in 2022-23, with a significant increase in export volumes. This is due to multiple years of favourable weather conditions and flock rebuilding efforts with Australia undergoing multi-year rebuilding of its national flock, to a level not seen since 2007 (78.75 million head). The main driver for reduced demand for NZ exports was owing to further liberalisation of Australia's access to China.

With global shipping costs expected to remain at relatively high levels, the competitiveness of Australian and NZ lamb on the European markets will remain suppressed. Despite volumes of exports to China starting to decline Asia remains the key market for both New Zealand and Australia.

Demand for New Zealand lamb remains strong, with exports more positive for 2023-24 compared to earlier years (Beef & Lamb NZ (2023a)). Total NZ export receipts for sheep meat are forecast to be up almost 5 percent on 2022-23, with the weaker NZD value impacting on average export values. The forecast for a direction of the NZD is mixed, stronger against the USD than it was in 2022-23 but weaker against European currencies.

In 2022-23 farm gate prices for lamb and mutton decreased, with lamb prices down an estimated 13 percent. Uncertainty around government policy decisions and their impact on the sheep industry continued to influence farmer decisions. In 2022-23 declining lamb and sheep farm gate prices were the main–driver behind reduced profitability. NZ Beef and Lamb forecast that market prices for lamb and mutton will be similar to the levels achieved in 2022-23. However, farm expenditure continues to climb, driven by inflation and high interest rates, reducing profit margins significantly. The EU-NZ FTA provides for little additional access for NZ meat to the EU market.

Australia produces 5 percent of the world's sheep meat, but accounts for 36 percent of exports (MLA) and is the largest supplier in the global market. With the long-term outlook for global sheep meat consumption strong this puts Australia in a most favourable position, with economic development, growing populations and household income growth providing the momentum for meat consumption.

According to the latest Sheep Industry Projections update from Meat & Livestock Australia (MLA), the Australian sheep meat industry is set for another exceptional year in 2023, driven by "optimal breeding conditions nationwide, a genetically superior flock, improved lambing percentages and medium-term industry confidence at the farm gate level". In Australia, the value of sheep meat production is forecast to increase sharply in 2023, mainly as a result of strong improvement in numbers which will deliver strong volumes of finished-weight stock to market.

The value of Australian sheep meat exports in the period 2023–24 is forecast by ABARES to fall by 16 percent, due to declining lamb and mutton prices. Though prices are expected to decline relative to the record levels observed in 2021–22, export prices will continue to be supported by continuing strong demand from in particular the United States and China.

China (incl. Hong Kong) continued in 2023 to be the largest importer of sheep meat globally. Chinese demand for all red meat has been buoyant, however, economic uncertainly and slowing Chinese economic growth rates continues to weigh on prospects, but demand for imported meat continues to be supported by income growth in the medium to long term.

China is a difficult market to forecast, especially with tighter government controls on reporting. Economic activity in China has been unpredictable and this is expected to continue into 2024 year. However the IMF forecasts that the Chinese economy will grow over 5 percent in 2023 and a further 4.5 percent in 2024. While 90 percent of China's sheep meat consumption is domestically produced, and while government has ambitions of achieving self-sufficiency, scarcity of both land and water will be limiting factors in achieving this objective. Hence, Chinese demand for imported sheep meat is expected to remain strong in 2024.

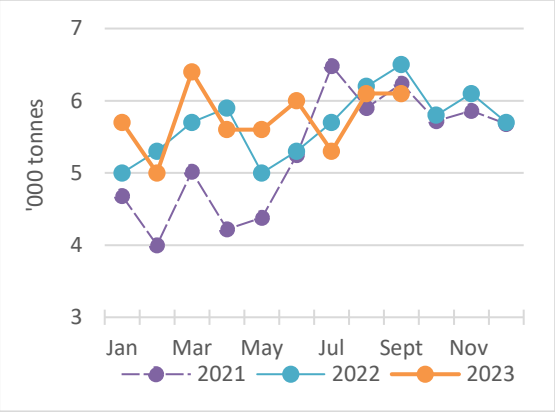
The number of sheep slaughtered in Ireland during the period January to end September decreased by 0.5 percent when compared with the corresponding period in 2022.

Monthly CSO sheep and lamb slaughter data for 2021, 2022 and 2023 are shown in Figure 3. These data are consistent with those reported by DAFM (2023b), with throughput in 2023 for the year to the end of September circa 2 percent higher than in 2022.

The June 2023 provisional Crops and Livestock Survey results (CSO, 2023) show that when compared to June 2022, sheep numbers increased by 0.3 percent to almost 5.984 million. Breeding sheep decreased by 2.8 percent while other sheep

increased by 3.5 percent. This indicates that that breeding inventories at the end of 2023 will be slightly below those reported for 2022. With lower ending ewe numbers forecast for 2023, lamb production in 2024 in Ireland is forecast to decline in 2024 by circa 2 percent.

Figure 3: Monthly sheep and lamb slaughterings 2021 - 2023 ('000 tonnes)



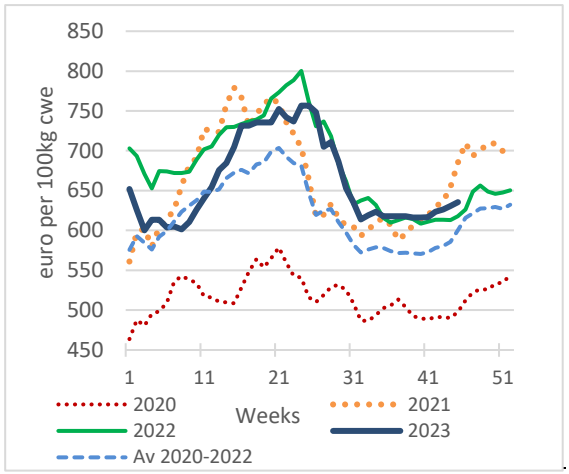
Source: CSO Statbank, September 2023

5. Estimated Sheep Gross Margins 2023

To obtain an estimate of farm profitability for 2023, it is necessary to estimate the volume and price of inputs likely to have been used in producing lambs, as well as the volume and value of the lamb produced. In our estimates for 2023 (and forecasts for 2024) we have assumed that the volume of spring lamb produced per hectare nationally remains unchanged and this is reflected in assumed stability in weaning rates and stocking rates in 2023 and 2024 relative to those observed in 2022. It is assumed that in 2023 the Sheep Improvement Scheme will add approximately €60 per hectare to the value of gross output on the average mid-season lamb enterprise in 2023. In 2024 an additional €8/ewe of funding will be available under additional supports as announced in Budget 2024. This is expected to add a further additional payment of approximately €50 per hectare. Note that we have assumed that there are no additional costs to SIS participation over and above those associated with participation in the SWS.

Irish lamb prices for 2023 began strongly in a historical context. In Q1 2023 prices were circa 6 percent behind the same period in 2022 (Figure 4). However by Q2, prices on average were circa 2.5 percent ahead of 2022 price levels.

Figure 4: Weekly Irish Lamb Price, 2020 – 2023, Average 2020-2022



Source: European Commission DG Agri

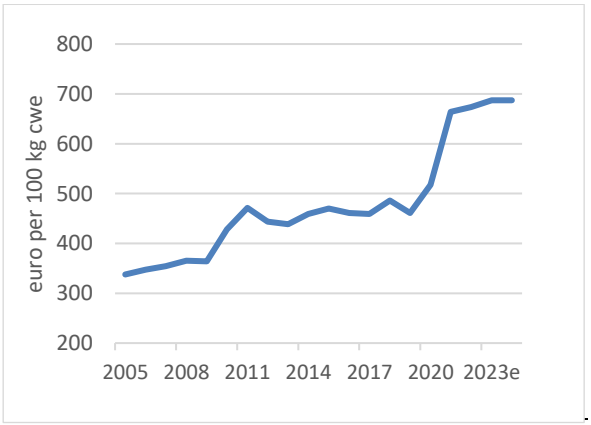
As of the end of September 2023, prices continued to remain over 2 percent higher than in 2022. As is evident from Figure 4, the 2023 lamb prices when compared to the previous three year average prices, 2020-2022 (dotted blue line in graph) still remain relatively high and well ahead of 2020 year and earlier year lamb prices.

This higher Irish price reflects higher prices in the EU for heavy lamb, which are expected to persist over the remainder of 2023. At the time of going to press, EU average heavy lamb prices are on average 8 percent higher than in 2022.

Our estimate is that Irish lamb prices in 2023 will be on average close to 3 percent lower than in 2022. With aggregate meat output across the sector up 1 percent Our estimate is that output value per hectare in 2023 will be 2% lower than in 2022.

The main direct costs of production for Irish sheep farms are purchased feed, pasture and forage costs.

Figure 5: Irish Lamb Price, 2005 to 2023e, 2024f



Source: European Commission DG AGRI and author estimate 2023, forecast 2024

Purchased concentrate feed accounts for 40 percent of total direct input expenditure on the average mid-season lowland lamb system. Over the course of 2023, feed usage on sheep farms is down by circa 5 percent on average on the 2022 year and this coupled with an estimated increase in concentrate feed prices, of approximately 2 percent, means that concentrate feed costs in 2023 will be circa 3 percent lower than in 2022 on sheep farms. Overall concentrate costs are estimated to decline by 3 percent in 2023 on the average mid-season lowland lamb enterprise due to reductions in volume used more than offsetting the slightly higher prices.

Pasture and forage costs typically account for 30 percent of total direct costs on the mid-season lowland lamb system. Fertiliser prices are estimated to have decreased by 20 percent in 2023. Fertiliser costs on sheep farms in 2023 will be dramatically lower than 2022 levels. In our estimates for 2023, we have assumed that coupled with the large forecast decrease in fertiliser prices that the volumes used by mid-season lowland enterprises in 2023 will have also declined by circa 15 percent. Overall expenditure on pasture and forage is estimated to have declined by almost one third (circa 29 percent) when compared to 2022.

In 2023, total direct costs of production on the mid-season lowland lamb enterprise are estimated to have decreased by just almost 10 percent on 2022 levels. Fuel and electricity are the main items contributing to overhead cost changes in 2023. Prices of electricity in particular are estimated to have increased by 28 percent, while fuel prices are estimated to have declined by between 15 and 18 percent depending on fuel type. Usage of these inputs on mid-season lowland sheep farms is estimated to remain on par with 2022 levels. Overall, overhead costs on the mid-season lamb enterprise are estimated to have decreased, by circa 5 percent relative to 2022.

Declines in the costs of production in 2023 have outpaced the negative growth in the value of marketed output, this coupled with receipt of additional payments from the Sheep Improvement Scheme in 2023, mean that we estimate that margins on the average mid-season lowland lamb enterprise will be higher in 2023 when compared to 2022.

The average gross margin earned in 2023 is estimated to have increased by just over 5 percent to €905 per hectare (see Table A3 in the Appendix). The receipt of payments from participation in the Sheep Improvement Scheme boosted the estimated gross output earned from the mid-season lowland lamb enterprise in 2023 and was just about sufficient to cover some of the input cost increases. In the absence of this coupled payment the estimated gross margins would have actually increased by circa 4 percent.

Overall, decreases in overhead costs in 2023 mean that the enterprise net margin on the mid-season lowland lamb enterprise is also estimated to have increased strongly, with the net margin level in 2023 over 42 percent higher than that earned in 2022. The estimated average net margin per hectare on mid-season lowland sheep farms in 2023 is €186 per hectare.

6. Outlook for the Sheep Enterprise Gross Margin in 2024

In 2024, Irish lamb prices are forecast to increase modestly on already record high price levels received in the preceding years, as high prices continue to prevail in EU and supplies remain tight. It is forecast that average prices will remain somewhat higher than five year average years' price levels. For 2024, prices are forecast to increase by circa 1%. Continental EU markets account for the majority of Irish lamb and although economic disruptions continue to impact consumer demand, tight global markets for sheep meat and export demand for Irish sheep are forecast to support Irish lamb at close to current price levels.

The outlook for input expenditure in 2024, from the perspective of Irish sheep farmers, is also more positive than in 2023. Prices of the majority of the key inputs to sheep production are forecast to either remain relatively constant or decline slightly, with electricity, fertiliser and concentrate feed prices just some of the inputs forecast to decrease in 2024 year. Input volumes used in 2024 are forecast to remain unchanged (on a per hectare basis). Total costs on Irish sheep farms are forecast to decrease by 3 per cent in 2024. Direct costs of production are forecast to decrease by circa 8 percent while overhead costs of production are forecast to remain relatively unchanged, relative to 2023.

Concentrate feed prices are forecast to decrease modestly in 2024, by circa 1 percent. The volume of feed use is forecast to remain comparable with 2023 levels, a year in which volume used also decreased by circa 5 percent. Concentrate feed is required to meet the earlier additional Easter demand expected in 2024, a year in which Easter is

celebrated slightly earlier in the month of March, rather than in April as in 2023 year. Overall expenditure on concentrates in 2024 is forecast to decrease by 1 percent.

The price of fertiliser is forecast to decline further in 2024, following price declines in 2023 year, reversing some of the substantial increases experienced in earlier year. Electricity and fuel prices are also forecast to decline while other overhead costs remain relatively stable or increase moderately by circa 2 percent. Overall, pasture and forage costs on Irish lowland mid-season lamb enterprises are forecast to decline in 2024, by almost one third.

Table A3 (in the Appendix) summarises our forecasts of output, costs and margins for the mid-season lamb enterprise for 2024. Our modestly positive outlook for lamb prices in 2024, coupled with a forecast decline in sheep output per hectare, with a forecast decline in direct costs of production leads to our forecast of a higher gross margin in 2024 than in 2023. Factoring in the additional payments forthcoming under the proposed 'improved' SIS scheme for 2024 year further increases the gross margin forecast for 2024.

Our forecast for the 2024 gross margin per hectare for the mid-season lamb system is €982 per hectare, a 9 percent increase on our 2023 estimate. In 2024, as in 2023, margins earned on the mid-season lowland lamb enterprise will continue to be boosted by the receipt of payments from CAP Pillar II schemes (particularly the new Sheep Improvement Scheme).

Total overhead costs for the average mid-season lamb enterprise are forecast to remain relatively stable in 2024. In 2024 the forecast decline in overhead costs levels further augments the forecast decrease in direct costs. With a small increase in output value forecast for 2024, mainly as a result of additional SIS payments, net margin per hectare for the average sheep enterprise is expected to increase in 2024 to €263 per hectare. A 42 percent increase on the 2023 net margin of €186 per hectare.

7. Concluding Comments

The average gross margin earned by mid-season lamb producers in 2023 is estimated to have increased compared to that earned in 2022.

Lower lamb prices resulted in lower gross output values. However, the lower output value per hectare in 2023 was offset by lower input prices which were sufficient to leave the estimated gross margins 5 percent higher than the levels earned in 2022. Direct payment receipts associated with participation in the Sheep Improvement Scheme provided a financial boost at the individual farm level in 2023 and added to the margin on sheep farms.

Our forecast is that in 2024 Irish lamb prices will be modestly higher, circa 1 percent above 2023 price levels. Output volume is forecast to decline by circa 3 percent, as breeding stocks are forecast to continue to decline.

Gross margins earned by the average mid-season lamb enterprise forecast for 2024 is €982 per hectare, an almost 9 percent increase on the estimated gross margin for 2023. Average net margins are forecast to increase, with the average mid-season lamb enterprise forecast to earn a net margin of €263 per hectare in 2024.

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Table A1: Average Mid-Season Lamb Output, Direct Costs, Gross Margin and Technical Performance

	2022	2023e
	€ per ha	
Gross output	1498	1,481
Coupled Payments (Sheep Grassland/Sheep Welfare)	47	60
Direct Costs	637	576
Concentrates	268	260
Pasture and Forage costs	200	142
Other direct costs	169	174
Gross Margin	861	905
Overhead Costs	730	719
Net Margin	131	186
Ewes per ha	7.23	7.20
Lambs per ewe	1.36	1.36
Lamb Carcass (kg) per ha	202	195

Source: Teagasc National Farm Survey and Authors' estimates for 2023
Note: In calculating the volume of lamb carcass output per hectare an average carcass weight of 20 kg has been used (Hanrahan, 2006)

Table A2: Mid-Season Lamb Output, Costs, Margins and Technical Performance in 2022 by gross margin grouping

	Most Profitable	Average Profitability	Least Profitable
		€ per ha	
Gross Output	2,273	1,444	797
Direct Costs			
Concentrates	328	251	227
Pasture and Forage	241	202	159
Other Direct Costs	196	170	141
Gross Margin	1,509	821	270
Net Margin	404	219	--220
Ewe per ha	9.51	7.33	4.92
Lambs per ewe	1.56	1.30	1.23
Lamb carcass (kg) per ha	297	191	121
Dir. costs € per kg carcass	2.58	3.26	4.35

Source: Teagasc National Farm Survey
Note: In calculating the volume of lamb carcass output per hectare an average carcass weight of 20 kg has been used (Hanrahan, 2006).

Table A3: Average Mid-Season Lamb Enterprise Costs, Output, Gross and Net Margin, 2022 – 2024f

	2022	2023e	2024f
		€ per ha	
Total Direct Costs	637	576	532
Concentrates	268	260	257
Pasture and Forage	200	142	97
Other Direct Costs	169	174	178
Gross Output	1,498	1,468	1,514
Of which: Sheep Grassland /Sheep Welfare Payment	47	60	110
Gross Margin	861	905	982
Overhead Costs	730	719	719
Net Margin	131	186	263

Source: Teagasc National Farm Survey. e Estimate, f Forecast

Table B1: Average Hill Sheep Output, Direct Costs, Gross Margin and Technical Performance, 2021 - 2022

	2021	2022
	€ per ewe	
Gross output	123	104
of which Sheep welfare per ewe	7	9
Total Direct Costs	61	64
Gross Margin	62	40
Overhead Costs	58	76
Net Margin	-4	-36
Ewes per ha	5.3	4.5
Lambs per ewe	1.1	1.0
Lamb Carcass (kg) per ha	117	90

Source: Teagasc National Farm Survey

Note: This analysis summarises results for farms with a hill sheep enterprise and only Hill sheep farms with more than 20 ewes are included in the analysis. For 2021 and 2022 year, the data relate to 22 and 24 farms respectively, and is nationally representative of just under 2,670 farms in 2022 year.

Irish Cereal Enterprise 2022
Average Performance

Irish Cereal Production
2.55 million tonnes (up 4%)

Irish Cereal Area
285,700 ha (up 4%)

Irish Barley Area
190.300 ha (up 3%)

Irish Wheat Area
67,200 ha (up 8%)

Spring Barley price
average €325 per tonne (up 40%)

Winter Wheat price
average €333 per tonne (up 43%)

Spring Barley Yield per ha
average 7.1 tonnes (down 1%)

Winter Wheat Yield per ha
average 9.8 tonnes (down 6%)

Total Production Cost per ha
Spring Barley
average €2,025 (up 44%)

Total Production Cost per ha
Winter Wheat
average €2,331 (up 22%)

Net Margin for Spring Barley
average €459 per ha (up 3%)

Net Margin for Winter Wheat
average €1193 per ha (up 61%)

Target Yield for Spring Barley
7.2 tonnes per hectare
achieved on 53% of farm

Target Yields for Winter Wheat
10.3 tonnes per hectare
achieved on 43% of farms

Net Margin Target Spring Barley
€150 per hectare
achieved on 68% of farms

Net Margin Target Winter Wheat
€450 per hectare
achieved on 90% of farms

Source: Teagasc National Farm Survey and Central Statistics Office

Irish Cereal Farming in 2023

Increased EU Cereal Production
Maize ending stocks/use ratio lower

Irish Cereal Yields
Down 14% for winter wheat
and down 21% for spring barley

Barley and Wheat prices
Down over 30% on 2022 level

Weather Conditions
favorable for sowing and harvest

Fertiliser Prices
Down 15% on the 2022 level
Fertiliser Use
Down slightly on whole farm

Seed Prices
Up 30% on 2022

Other Direct Costs
Up 2% on 2022

Fuel prices
Green diesel down 18% on 2022

Total Direct Costs
Down 5% on 2022

Gross Margin
Spring Barley
Down €1070 per ha on 2022
Winter Wheat
Down €1320 per ha on 2022

Net Margin
Average Cereal Enterprise
€115 per ha (down €670 per ha)

Source: Teagasc Estimates for 2023 and Forecasts for 2024

Irish Cereal Farming in 2024

Decrease EU Cereal Production
assuming trend yields

Irish Cereal Yields
Increase in individual yields
assuming trend yields

Cereal prices
Up 10% on 2023 harvest price

Weather Conditions
Normal weather assumed

Fertiliser Prices
Down 35% on the 2023 level
Fertiliser Use
Little on a whole farm level

Seed Prices
Down 15% on 2023

Other Direct Costs
Up 2% on 2023

Fuel prices
Green diesel down 9% on 2023

Total Direct Costs
Input costs 16% on 2023

Gross Margin
Spring Barley
Up €530 per ha on 2023
Winter Wheat
Up €415 per ha on 2023

Net Margin
Average Cereal Enterprise
€486 per ha (up €370)

Review of Tillage Farming in 2023 and Outlook for 2024

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1. Introduction

Harvest prices in the cereals sector in 2023 were considerably lower than those achieved in 2022. Average moisture levels were also higher in 2023 which had a negative impact on average prices paid by per tonne, due to unfavourable weather at harvest. Furthermore, yields for the major Irish cereal crops were also lower than those achieved at harvest 2022. Taken together these developments resulted in significantly lower gross output values on a per hectare basis in 2023 relative to 2022. However, there was some reprieve in direct costs of production in 2023, associated with a decrease in fuel and fertiliser costs in particular.

The downward movement in cereal prices at harvest 2023 was influenced by ample global harvests on the one hand and demand undermined by inflation on the other.

The international balance sheet for 2023/24 is projected to have relatively high ending stocks in the main export regions internationally.

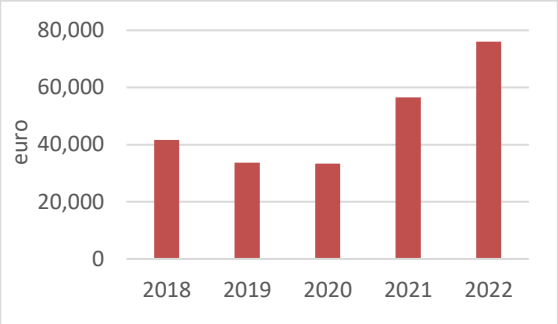
This paper will consider whether the price increases of the 2023 harvest can be considered atypical or whether prices will continue at these levels into the 2024 harvest. The paper uses Irish Teagasc National Farm Survey (NFS) data to conduct a review of the financial performance of tillage farms in 2022. Following this, prices and costs are estimated for 2023 and these are used to produce an estimate of net margin for the 2023 harvest year. In the concluding sections of the paper, forecasts for 2024 are presented.

2. Review of the Economic Performance of Tillage Farms in 2022

Approximately 6,200 specialist tillage farms were represented by the Teagasc NFS in 2022. Income on tillage farms increased by 34 percent year-on-year.

Gross output on a whole farm basis increased by 32 percent. Direct costs and overhead costs decreased on a whole farm basis, by 39 percent and 24 percent respectively. Overall, total costs on a whole farm basis increased by 31 percent on average. These changes resulted in an average Family Farm Income (FFI) in 2022 of €76,013, which is equivalent to an 88 percent increase on the five year average FFI on tillage farms.

Figure 1: Average Income on Irish Specialist Tillage Farms 2018 to 2022



Source: Teagasc, National Farm Survey (various years).

To understand the economic performance of tillage farms in 2022, we begin with a review of the cost and return structure of the main cereal crops using NFS data. Figure 2 disaggregates the direct costs of production for the principal cereal crops grown on Irish farms in 2022.

Figure 2: Composition of Direct Costs for Cereal Crops, 2022

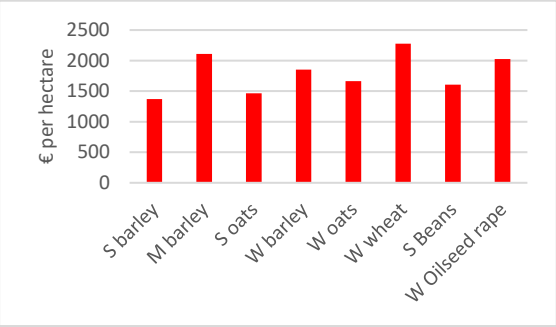
Source: Teagasc, National Farm Survey.

Figure 2 shows that in general, direct costs are higher for winter sown crops compared to spring sown crops, due to the higher fertiliser and crop protection costs incurred in growing winter crops. However, given that yields are generally higher in winter sown crops, the more appropriate comparative economic indicator is gross margin per hectare, as shown in Figure 3.

Figure 3 shows that the average gross margin per hectare for all winter crops is higher than the gross margin for equivalent spring sown crops. Winter wheat recorded the highest gross margin and spring barley the lowest margin of all cereal crops examined in 2022 (see Table A1 in the appendix to this paper for further details). The gross margin per hectare for the two main cereal crops, spring barley and winter wheat increased in 2022 relative to 2021, by approximately €250 and €600 per hectare respectively.

While gross margin estimates are useful for comparative purposes, it is also worthwhile to examine the shift in net margin over time. However, for cereal crops it is particularly difficult to allocate overhead costs and straw output to individual crops using NFS data.

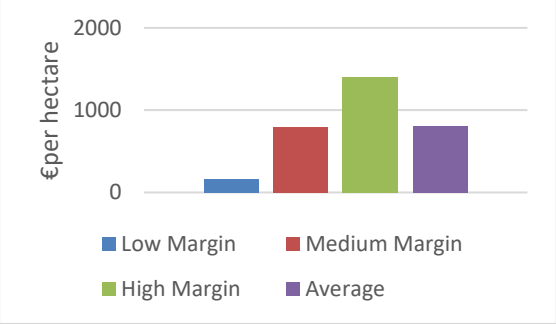
Figure 3: Gross Margins per hectare for Cereal Crops, 2022



Source: Teagasc, National Farm Survey Data.

For this reason, the analysis looks at the net margin of the cereal enterprise of the entire NFS specialist tillage farming population and this is shown in Figure 4.

Figure 4: Cereal Enterprise on Specialist Tillage System Farms: Net Margin Distributions, 2022



Source: Teagasc, National Farm Survey Data.

To examine the variation in net margins earned by tillage farms, the sample was divided in to three groups. Farms were classified on the basis of net margin per hectare; the best performing one-third of farms labelled high margin, the middle one-third labelled moderate margin and the poorest performing one-third labelled as low margin. The variation in margins across Irish tillage farms is readily apparent from Figure 4. The net margin per hectare for the cereal enterprise on high margin farms in 2022 was €1,400 compared to €785 on moderate margin farms and €170 on low margin farms. It is important to remember that these margins include production output only; hence by definition the Basic Payment Scheme (BPS), which is decoupled from production, is not included in these figures.

3. Estimate of 2023 Performance

This section of the paper presents a review of the cereal sector in 2023. To provide an estimate of enterprise margins for the current year, it is necessary to estimate the volume and price of inputs that are likely to have been used as well as the volume and value of outputs produced in 2023. The ensuing sections of the paper discuss first, the movements in input prices and usage and second, the cereal market conditions, harvest yields, and production in 2023.

3.1 Estimated Input Usage and Price 2023

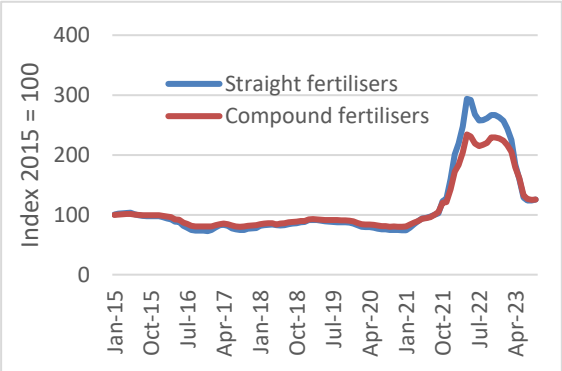
3.1.1 Fertiliser – Usage and Price 2023

In the early half of the noughties, fertiliser costs typically comprised about 25 percent of direct costs and just over 10 percent of total costs on tillage farms. However, fertiliser types commonly used on tillage farms have increased substantially in price since 2006. Expenditure on fertilisers now represents a larger proportion of costs on tillage farms than previously. In 2022, fertiliser costs represented 42 percent of direct costs on tillage farms and approximately 22 percent of total costs. In particular, the price of natural gas is a key determinant of fertiliser price. Short run changes in the demand for natural gas (and fertiliser), coupled with relatively fixed production capacity has the potential to impact fertiliser prices to a large extent.

Following the significant peak in fertiliser prices in 2008 and 2009, the pressure on fertiliser prices has been mixed in more recent years. However, the COVID-19 pandemic and the illegal invasion of Ukraine has significantly altered the balance in demand and supply for natural gas which has had a very significant impact on fertiliser prices. Following a sharp decline in fertiliser prices in 2020, a step increase in fertiliser prices occurred during the

course of 2021 and again in 2022. Whilst there was some welcome reprieve in fertiliser prices during the course of 2023, much of the price decreases happened in the second half of the year, but much of the demand for fertiliser on tillage farms occurs in Q1 and Q2. On a calendar year basis, it is estimated that fertiliser prices for N based products are down 37 percent, and down about 13 percent for P and K compounds, in 2023 compared to 2022. However, seasonality of purchase is very important, especially in the context of tillage crops, and when seasonality of purchase is factored into the calculation, it is estimated that N based products on cereal farms were down about 20 percent and NPK compounds were down by 10 percent in 2023 compared to 2022 for winter and spring cereal crops.

Figure 5: Irish Farm Gate Price Index of Fertilisers 2015 to 2023



Source: Central Statistics Office data for 2015 to 2023.

On the usage side, DAFM figures indicate that fertiliser purchases in the 2023 fertiliser year (October 2022/September 2023) were down by about 18 percent, on those recorded for the previous year. Given that DAFM data on fertiliser purchases refers to all purchases for grassland and cropland it was necessary to consult with farm advisors and industry sources to evaluate the magnitude of change in fertiliser usage levels for Irish crop farms in 2023. Reports from a number of sources indicate that there is much more limited opportunity for nutrient reductions on crop farms compared to grassland farms, in response to rising fertiliser prices, with individual crops having specific nutrient requirements to achieve target yields. Notwithstanding that, it is estimated that there was some further substitution away from chemical fertiliser in favour of animal manures to fulfil crop nutrient requirements in 2023, prompted by the continued high price of fertiliser prevailing in 2023. Overall expenditure on chemical based fertiliser in 2023 is estimated to have decreased by about 20 percent on a whole farm basis, taking a reduction in cereal area and a reduction in synthetic fertiliser usage into account.

3.1.2 Seed – Usage and Price 2023

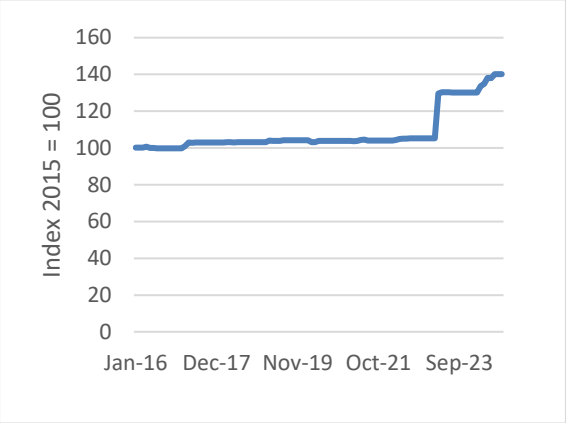
Expenditure on purchased seed on crop farms comprises between 10 and 19 percent of direct costs of production, with seed representing a higher proportion of direct costs in protein crops, such as Spring beans, where fertiliser costs represent a lower proportion of direct costs. In terms of the composition of total costs, seed represented about 5 percent of total costs in 2022. In 2023, cereal farmers experienced an increase in seed costs relative to the previous year given that cereal prices at harvest increased in 2022 relative to 2021, this price increase has transmitted to seed prices, with blue label seed costing around €760 per tonne, which was about 30 percent higher than 2022 seed prices.

3.1.3 Crop protection – Usage and Price 2023

The expenditure on crop protection by specialist tillage farms in 2022 accounted for 17 percent of direct costs and 9 percent of total costs. However, the contribution of crop protection to the composition of costs can vary significantly depending on the crop; the percentage spent on crop protection for winter crops is higher than that for spring crops. For example, for the winter wheat crop in 2022, crop protection costs accounted for 25 percent of direct costs, as compared to 19 percent for spring barley.

Compared to other significant costs on tillage farms, the increase in the prices of crop protection products listed by the CSO has been limited over the recent past, until the trend break which has appeared in the data in February 2022. Figure 6 shows that the increase in the price of crop protection products from 2014 to 2021 was approximately 5 percent and that from February 2022 there has been a very significant increase in crop protection products. The annual average increase in crop protection products in 2022 was 20 percent and in 2023 is 9 percent, which indicates a significant further increase in prices compared to 2022 and the trend previous to 2022. This increase in prices is attributed to inflation in the energy market, which is important for the manufacture of products and also supply and demand issues associated with post pandemic supply shortages globally.

Figure 6: Price Index of Plant Protection products in Ireland 2016- 2023



Source: Central Statistics Office and Author's own estimates.

3.1.4 Electricity and Fuel – Usage and Price 2023

Energy and fuel are important inputs in crop production. Given that a number of direct and overhead costs are directly influenced by energy and fuel prices, the trend in energy prices is of significance for tillage farmers. In this analysis it is assumed that hired machinery/contracting and transport costs, which are components of direct costs, and fuel and lubricants which are components of overhead costs, are directly influenced by energy inflation. These cost items represented approximately 16 percent of total costs on tillage farms in 2022.

Based on the CSO estimates presented in Figure 7, the farm level price of fuel has increased by 44 percent between 2021 and 2022 (the last full year for which data is available).

Figure 7: Price Index of Fuel products in Ireland 2016 – 2023

Source: Central Statistics Office and Author's own estimates.

Subsequently, as a result of a decrease in Brent crude oil prices due to the demand returning to more normal levels following the COVID-19 induced demand shock, coupled with gas prices decreases associated with supply issues receding following the war in Ukraine, green diesel fuel prices on Irish tillage farms decreased by about 15 percent in 2023 relative to 2022.

Demand for these input items tends to be relatively inelastic with respect to price and therefore it is assumed that usage in 2023 will have been similar to the 2022 level. Overall expenditure on fuel related items is likely to be 15 percent lower in 2023 relative to 2022.

3.1.5 All other direct and overhead costs – Usage and Price 2023

Based on CSO estimates for the first nine months of 2023 compared to the same time period in 2022, it is estimated that 'other direct costs' have increased on an annual basis by about 2 percent.

The average cost of land rental in 2022 on specialist tillage farms represented 7 percent of total costs. Given that farm gate cereal margins increased significantly in 2022, there could be some basis for assuming a slight increase in land rental prices in 2023. Furthermore, significant increases in dairy farm incomes in 2022 may have further contributed to an increase in land rental prices in 2023, with dairy farmers perhaps more likely to bid up the price of rented land. However, some of the aforementioned buoyancy in the market may have been negated by significant cost price inflation on other input items. Hence, it is assumed that the average land rental price per hectare increased by the average rate of inflation on other agricultural inputs, at 5 percent. The methods employed here, which reflect costs per crop hectare, do not capture changes in the volume of land rented. For 2023, on a total farm basis, the actual impact of any changes to total cereal area (rented or otherwise) will only be fully reflected in the final Teagasc NFS figures for 2023, which will be published in mid-2024.

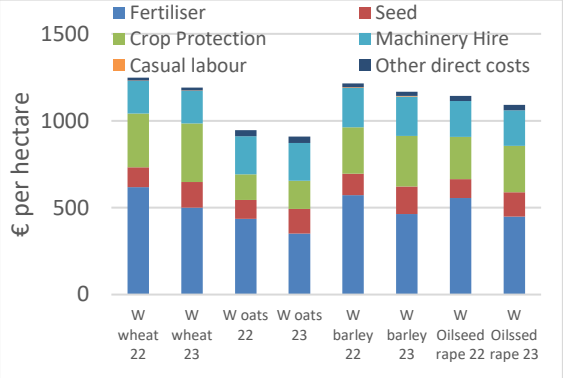
3.1.6 Estimate of Total Input expenditure for 2023

Total expenditure on all input items is estimated to have decreased in 2023 relative to 2022. The most significant decrease in expenditure on a per hectare basis occurred for fertiliser and fuel, which are estimated to have decreased by 20 percent and 15 percent respectively. Feed prices are estimated to have decreased by about 2percent (which is relevant for subsidiary enterprises on tillage farms).

Seed prices increased by about 30 percent in 2023. On average, the estimated decrease in total direct costs was approximately 5 percent in 2023 relative to the 2022 level, on a per hectare, per crop basis.

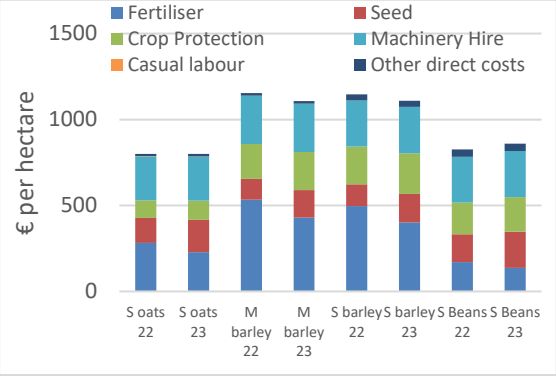
The estimates, provided on a per hectare basis for individual cereal crops, do not take into account changes in the area devoted to individual cereal crops.

Figure 8A: Direct Costs in Winter Crops in Ireland 2022 and Estimates for 2023



Source: Teagasc, National Farm Survey Data and Author's estimates for 2023.

Figure 8B: Direct Costs in Spring Crops Ireland 2022 and Estimates for 2023



Source: Teagasc, National Farm Survey Data and Author's estimates for 2023.

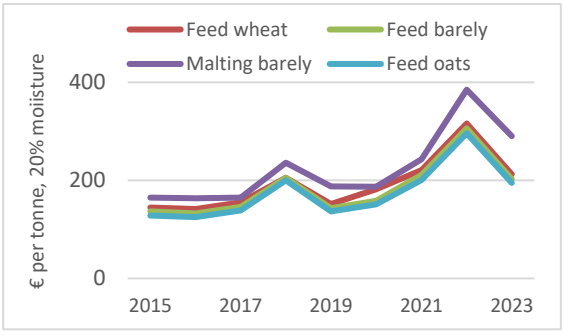
Overall, it is estimated that direct costs for the average cereal enterprise decreased by less than 10 percent (taking cereal area into account) whilst overhead costs also decreased by approximately 10 percent. A significant explanation for the decrease in overhead costs for the cereal enterprise is due to the allocation methods used on a whole farm basis, which is based on a proportion of output based methodology.

3.2 Estimated Output Values 2023

3.2.1 Price, yield, moisture levels and coupled payments in 2023

In 2023, despite a significant decrease in national cereal volumes, a decrease in the aggregate production of wheat, barley and maize on the European balance sheet in 2023/24 compared to 2022/23, resulted in a significant downward movement in Irish farm gate harvest prices compared to 2022 (Figure 9).

Figure 9: Farm Gate Cereal Prices (major crops), 2015-2023



Source: Teagasc, National Farm Survey Data and Author's estimate for 2023

While the majority of cereals in Ireland are still sold off farm at harvest time to a grain merchant on a green moisture basis, the ability of farmers to forward sell grain has introduced an additional element to the calculation of the average price received by farmers. For the past number of years the Teagasc NFS has collected data on the proportion of cereals forward sold before harvest. This research indicates that the majority of cereals are not forward sold before harvest, but are sold at harvest time, on a green moisture basis. In 2022, the NFS indicates that approximately 10 percent of total cereal production was forward sold by farmers prior to harvest.

Table 1 shows the average green yields obtained in 2022 and estimated yields for 2023. In general, the yields achieved in 2023, compared to 2022 were lower. However, readers should note that these yields are green yields and are thus not adjusted for moisture content, which were also well below the 5 year average, due to unfavourable harvest conditions.

The last variable which must be assessed in calculating cereal output value per hectare and per farm is the value of straw. Following the decrease in cereal yields, there was also a decrease in the volume of straw produced in 2023, this decrease is driven by the decrease in cereal area, poor crop

establishment and unfavourable weather conditions at harvest. It is estimated whilst the volume of straw was decreased in 2023, the price for straw was more favourable in 2023 compared to 2022. Uptake of the straw incorporation measure was also very positive in 2023. Overall, a slight increase in direct market based straw receipts value of about 10 percent is assumed for 2023.

Coupled payments on the tillage enterprise have also witnessed changes from 2022 to 2023. The protein aid payment budget increased from €3 million in 2022 to €7 million in 2023, with the per hectare payment rates increasing from approximately €290 in 2022 to €420 in 2023. There was also the late announcement of an emergency fund for tillage and horticulture producers in 2023, with an average payment of €28 per hectare for cereal and oilseed rape crops in 2023. These coupled payments are include in the calculations outlined in Figure 10 (and Figure 12) below.

Additional support payments in the Straw Incorporation Measure (SIM) and the Tillage Incentive Scheme (TIS) are also included in the cereal enterprise margins presented in Figure 13 below. The SIM budget increased from €10 million to €16 million in 2023 and the TIS continued with a budget of €10 million in 2023.

Table 1: Average Yield Levels, 2022 and 2023 Harvest

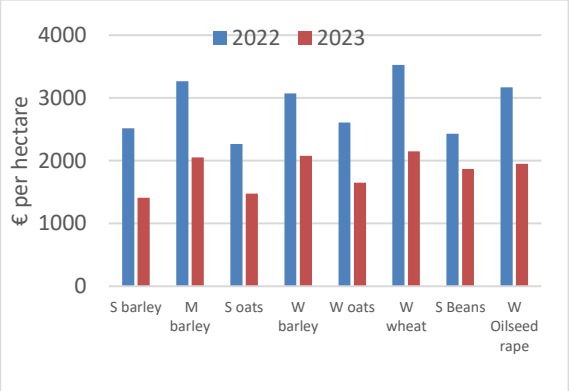
	Yield (tonne per ha.)	
	2022	2023*
Winter Wheat	11.0	9.5
Winter Barley	8.7	8.7
Winter Oats	9.2	8.3
Spring Wheat	8.0	7.6
Spring Barley	8.1	6.4
Spring Oats	7.9	7.2

Source: CSO (2022) & Teagasc Harvest report figures for 2023

3.2.2 Estimate of Total Output Value for 2023

Given the large number of variables that need to be considered in estimating output value, as outlined above, the estimated changes in crop output value between 2022 and 2023 are very crop specific.

Figure 10: Actual Gross Output per Hectare 2022 & Estimated Gross Output per Hectare 2023



Source: Teagasc, National Farm Survey Data and Author's estimates for 2023.

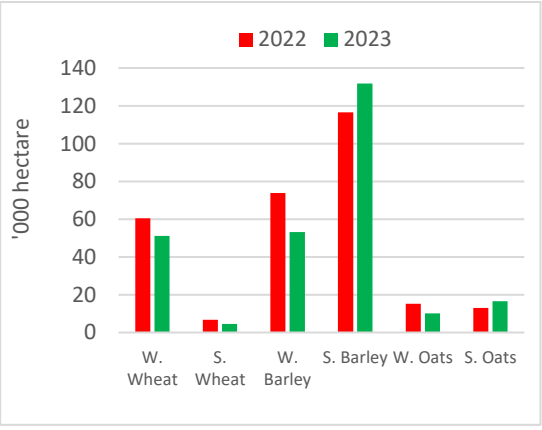
In overall terms, the general trend has been a significant decrease in output value in 2023 relative to 2022. This decrease arises due to the unfavourable cereal yields and the price of cereals paid at harvest 2023. Output value per hectare in 2023 is estimated to have decreased by on average 34 percent across the crops examined.

3.2.3 Estimate of Total Production 2023

The figures presented in section 3.2.2 provide estimates of output value per hectare. However, these estimates do not take in to consideration changes in the area devoted to cereal crops in 2023. Figure 11 shows the area estimates for 2023 based on 2023 Teagasc Harvest Report data.

Figure 11 shows that the total area devoted to cereal production decreased by 6.4 percent in the 2022/23 crop year compared to the 2021/22 crop year.

Figure 11: Change in Irish Crop Area from 2021/2022 to 2022/23 crop year in Ireland



Source: CSO and Teagasc Final Harvest Report 2023

There was also some switching between winter and spring sown crops which was weather related. When non cereal crops are taken into consideration, specifically, winter oilseed rape and spring beans, the area devoted to crops is reduced to 2.3%, due to an increase in the aforementioned areas.

Table 2 combines actual total cereal production for 2022, as reported by the CSO, with estimated total cereal production for 2023. The estimated 2023 production of wheat, barley and oats is based on 2023 yield estimates from the Teagasc harvest report. Overall, cereal production is estimated to be down by approximately 500,000 tonnes or 20 percent on 2022 levels.

Table 2: Actual & Estimated Production 2022 & 2023 ('000 Tonnes)

	2022	2023e	%Change
Wheat	683	493	-28%
Barley	1506	1240	-18%
Oats	231	194	-16%
Total	2420	1927	-20%

Source: CSO and Teagasc Final Harvest Report 2023

3.2.4 International Production Estimates for 2023

While production estimates for Irish cereals are important from a national supply, demand and balance sheet perspective, it is primarily developments in the EU and international supply and use balance for cereals that affect price developments in Ireland. For this reason, a review of EU and international ending stocks for cereals are more informative when near term price developments are concerned.

Latest estimates for EU total grain production for the 2023/24 marketing year are up on the previous year's levels (Strategie Grains, November 2023). EU total production of wheat, barley and maize were up 2 percent on the previous marketing year, with total grain production on the international balance sheet also up by 2 percent on the previous marketing year. However, it is noteworthy that there is a decrease in the stocks to use ratio for wheat and barley, and an increase in stocks to use ratios for maize on the international balance sheet. These figures must be interpreted with caution however given very different ending positions between the various export regions of the world.

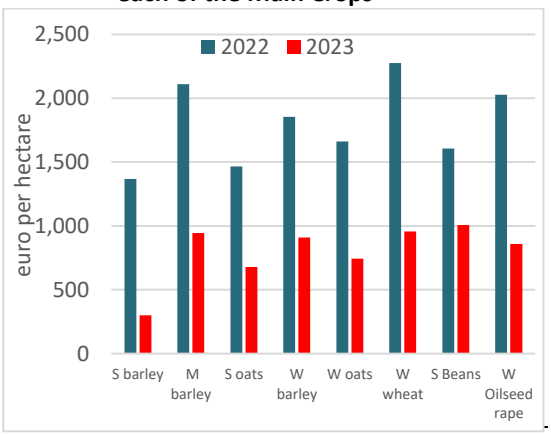
Much of the volatility in cereal prices during the 2023 calendar year have been linked to severe uncertainties regarding export potential from Ukraine and Russia, coupled with weather woes internationally impacting potential yields. It is expected that this uncertainty will continue to prevail into the 2024 calendar year, with weather conditions impacting sowing and harvest conditions internationally.

3.3 Review of Tillage Enterprise Margins in 2023

The review of cereal output value showed that the average value of output received by farmers was significantly lower in 2023 compared to 2022. The review of input costs concluded that total direct costs were slightly lower in 2023 compared to 2022, due mainly to a decrease in fertiliser and fuel expenditure. Figure 12 presents the effect of these estimates on the estimated gross margin for each of the main Irish cereal crops.

Figure 12 shows a negative story in terms of the relative change in gross margin in 2023 relative to 2022. The relative shift in yields, crop prices, straw returns and input expenditure has been negative for most cereal crops between 2022 and 2023.

Figure 12: Actual Gross Margin in 2022 & Estimated Gross Margin for 2023 for each of the Main Crops

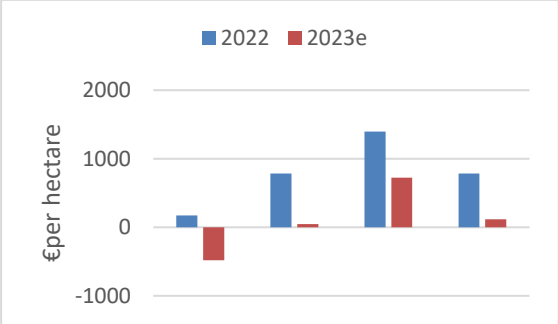


Source: Teagasc, National Farm Survey Data and Author's estimates for 2023.

In terms of the major crops, the gross margin for spring barley was down by approximately €1,070 per hectare and the winter barley gross margin is estimated to be down by nearly €945 per hectare, while the gross margin for winter wheat is estimated to be down by nearly €1.320 per hectare. It should be noted that the average gross margin figures presented above are market based gross margins and therefore exclude all decoupled payments and overhead costs, except for the inclusion of the coupled protein aid payment, for spring beans.

The estimated net margins for 2023 are presented for the average cereal enterprise on specialist tillage farms, with the NFS sample disaggregated into one-third groupings based on net margins per hectare obtained.

Figure 13: Actual Net Margin 2022 and Estimated Net Margin for 2023 for the Cereal Enterprise on Specialist Tillage Farms



Source: Teagasc, National Farm Survey Data and Author's estimates for 2023.

Figure 13 shows the cereal enterprise net margin estimates for 2023 relative to 2022, for the average specialist tillage farm, in addition to the net margins for the low, moderate and high margin groupings of tillage farms.

The estimate of net margins for the typical cereal enterprise in 2023 is significantly lower than in 2022 given downward movement in gross margins per hectare and less significant movement in overhead costs. For the best performing one-third of tillage farms, the estimated net margin for 2023 was approximately €725 per hectare compared to the average, where the net margin was approximately €115 per hectare. It is important to remember that these figures exclude decoupled direct payments. Furthermore, it is important to note that owing to the methods employed in this estimation, changes in cropping choice or area cannot be fully captured and will only be clear when the final Teagasc NFS figures become available for 2023.

4. Outlook for 2024

In this section forecasts are provided for expenditure on various input items in 2024, the likely farm gate cereal price that will prevail at harvest 2024 and the likely net margin of tillage farms in 2024.

4.1 The Outlook for Input Expenditure

4.1.1 Fertiliser – usage and price 2024

A number of factors need to be considered when forecasting price and volume changes for fertiliser on crop farms in 2024. Market report data coming from the fertiliser industry at present are suggestive of a very uncertain supply, demand and price situation for products in 2024. Market sources at the time of writing (November 2023) are indicating that the price of CAN and Urea are approximately 55 and 45 percent lower than the corresponding time last year and NPK compound products approximately 45 percent lower than for the corresponding period last year, due in a large part to factors affecting supply of fertiliser products and movement on energy costs. Taking all of these issues into account, including seasonality of purchases, it is forecast that the decrease in fertiliser price for cereal crops in 2023/24 will be 35 percent lower than for 2022/23, given that fertiliser on crop farms is purchased over the number of months from Autumn in one year through to June in the following year.

Holding all other things constant, fertiliser usage on a whole farm basis in 2024 on crop farms could be expected to decrease slightly due to lower levels of winter crop sowing due to autumn weather conditions. In addition, given the very significant decline in net margins in 2023, it is expected that at a farm level there will be further efforts to reduce fertiliser application, if at all possible. Finally, there should be some benefits evident from the straw incorporation measure on those farms that entered the scheme, which would have an effect on fertiliser demand in 2024. Overall, it can be expected that fertiliser expenditure will be about 40 percent lower per hectare for specific crops on cereal farms in 2024 relative to the 2023 level.

4.1.2 Seed – usage and price 2024

As mentioned previously, cereal farmers experienced an increase in seed costs in 2023 relative to the previous year due to cereal price increases at harvest 2022. Given that cereal prices at harvest decreased in 2023 relative to 2022, this price decrease has been transmitted to seed prices, with blue label seed costing around €660 per tonne, which is approximately 15 percent lower than 2023 seed prices.

4.1.3 Crop protection – usage and price 2024

The increase in crop protection costs in 2024 relative to 2023 is forecast to be of a smaller magnitude to the changes seen in 2023, much of which were related to energy price hikes and supply constraints post COVID. Assuming no further significant price changes on a monthly basis, from the current prices in November 2023, it is likely that price increases for plant protection products will be

about 3 percent in 2024, on an annual average basis. This 3 percent increase on a per crop basis will be slightly lower on a whole farm basis, reflecting the decrease in winter cereal planting, with a higher requirement for crop protection compared to spring sown cereal crops.

4.1.4 Electricity and Fuel – usage and price 2024

Fuel costs in 2024 will depend mainly on the evolution of crude oil prices. Current futures prices suggest that crude oil prices will decrease in 2024 relative to 2023 prices, leading to a 9 percent decrease in farm level fuel prices on tillage farms, on an annual average year basis.

4.1.5 All other direct and overhead costs 2024

All other direct costs are forecast to increase by about 2 percent in 2024, in line with projections for general inflation in 2024 and basing the forecast on an annual average basis. At this early stage in the production season anecdotal evidence on land rental prices for 2024 is mixed. However, due to the decrease in income on tillage farms in 2023, it is assumed that there will be little inflationary pressure on land rent in 2024.

4.2 The Outlook for Markets 2024

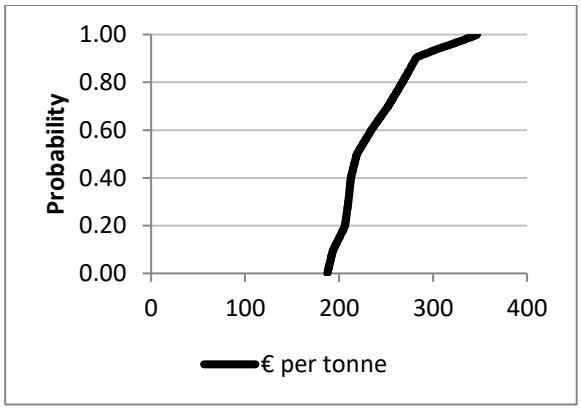
The cereals market has experienced significant volatility in recent years, and particularly so during 2022 and 2023. Planting decisions by farmers will be influenced by expected farm gate cereal prices (and margins) in 2024. A number of factors must be taken into consideration when making price forecasts for the coming harvest.

To formally evaluate the risk associated with predicting the 2024 harvest price, an econometric analysis was conducted to predict the probability that the 2024 farm gate price will be higher or lower than the 2023 price. This analysis was based on the November 2023 MATIFF futures prices for November 2024 contracts. The regression analysis examined the historic relationship between (i) predicted futures price for the following harvest, made from the previous November/December when planting decisions were being made, and (ii) the actual farm gate price paid at harvest one year hence. This regression analysis enables a forecast to be made of the 2024 Irish farm gate cereal price for wheat, taking into consideration the differences between the historic predicted values (MATIFF) and the actual outcomes.

Figure 14 outlines the probability of achieving various harvest prices in September 2024. Based on the econometric model developed, it shows that there is significant uncertainty concerning the predicted harvest price for September 2024. This predicted range is based on current (MATIFF) futures trading prices (November 2023), and the spread around the mean value is based on how right or wrong futures markets have been in recent times in predicting prices one season ahead.

Based on market reports on forward prices and the probabilities of achieving different harvest prices, the average predicted value for the farm gate wheat price is approximately €235 per tonne at 20 percent moisture, which is approximately a 10 percent decrease over harvest prices paid in 2023. However, there is a significant variance surrounding this figure. Based on a 90 percent confidence interval, it is forecast that the figure could be as low as €188 per tonne or as high as €347 per tonne (Figure 14).

Figure 14: Probability Distribution of the predicted 2024 Wheat Harvest Price

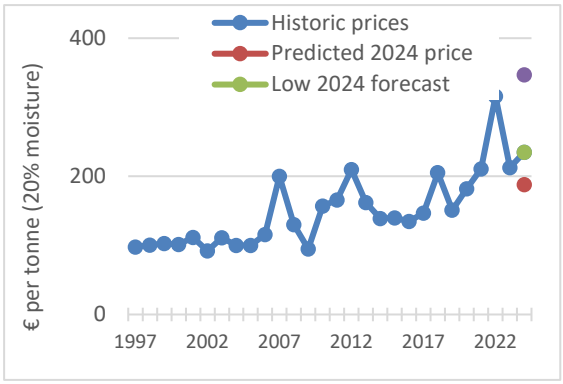


Source: Author's own estimates.

The latest edition of *Strategie Grains* (November 2023) outlines a decline in the EU area planted to winter crops for the 2024/25 marketing year compared to 2023/24.

In total, soft wheat area in the EU27 in 2024/25 is estimated to reduce to 21.5Mha compared to 21.7Mha in 2023/24. Total EU27 barley area is expected to increase slightly (10.5 Mha in 2024/25 Mha compared to 10.3 Mha in 2023/24). Total EU27 maize area is forecast to increase slightly from 8.5 Mha (2023/24) to 8.6Mha (2024/25). It is however important to note that the change in cereal area includes a switch to more spring sown crops, due to the unfavourable weather conditions, and the decline in winter sown crops. See Appendix A3 for further details on forecast changes in arable crop areas in the EU27 for 2024/2025.

Figure 15: Historic, Estimated & Forecast Farm Gate Feed Wheat Price (1997– 2024)



Source: Author's own estimates, 2024 forecast, at 90 percent confidence interval.

The latest edition of *Strategie Grains* (November 2023) points to factors other than weather-dictated developments, which have impacted a reduction in winter sown crops across much of the EU for the 2024 harvest. Other factors cited as influencing farmer's cropping decisions for the 2024 harvests include:

- The financial position of many farms in Europe which has been weakened because of the eroded farmers' margins in 2023 (i.e., sharply rising production costs coupled falling grain and oilseed prices).

- Whilst Autumn fertiliser prices are significantly lower than last year (Autumn 2023) the price level is still relatively expensive compared with prices in 2022 and 2021.

The slight increase in farm gate cereal prices at harvest 2024 which is borne out in futures trading prices at the moment, also reflects an anticipated slight decrease in carry out stock levels from the current marketing year for wheat and barley in particular. The latest reports from Rabobank international suggest that another deficit in the global market for wheat in the coming year is likely. For the wheat market there will be little relief from the Southern Hemisphere crops in the coming months, with both Argentina and Australia underperforming. El Niño could leave fields in Australia with little moisture ahead of the 2024 planting season, according to Rabobank.

Possible bullish and bearish factors which could impact on prices at harvest 2024 include:

- significant weather events,
- exchange rate movements,
- changes in demand from feed and food sources,
- supply chain and transport issues;
- input price movements and impact on demand for inputs and potential yields.

Whilst all of the aforementioned supply and demand factors are assumed to be considered in the futures trading environment at the moment, the overriding bullish factors are considered most important in determining the futures trading prices for harvest 2024. But it is still very early to forecast what might happen to these additional variables, and futures markets tend to move closely in line with first production estimates and exchange rate forecasts, with improved reliability of estimates coming in late spring of the harvest year.

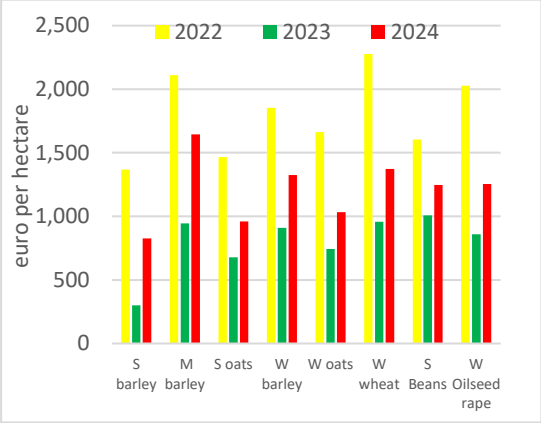
Based on the futures market forecast and the average loyalty top ups in recent years from merchants, our forecast is that farm gate cereal prices will increase by about 10 percent at harvest 2024.

4.3 The Outlook for Tillage Enterprise Margin in 2024

Direct costs are forecast to be lower in 2024 relative to 2023, due to the forecast decrease in fertiliser expenditure, seed costs and fuel. Some other direct costs of production are forecast to increase by small amounts in 2023, crop protection by 3 percent and all other direct inputs by 2 percent. Whilst some direct cost items may increase in 2024, the general trend is for a decrease in costs compared to 2023, resulting in total direct costs in 2024 which should be lower than 2023 levels, on a per hectare basis. Furthermore, output value on average is forecast to be higher than 2023 levels, due to the forecast increase in cereal yields when trend yields are assumed, coupled with an increase in cereal prices. Figure 16 presents the actual gross margin for each of the main cereal crops in 2022, and the respective estimates and forecasts for 2023 and 2024.

The net effect of input price, output price and volume movements is on average, forecast to have a positive effect on gross margins for 2024. For example, gross margins for winter wheat and winter barley are forecast to increase by approximately €415 per hectare respectively, while gross margins for spring barley are forecast to increase by approximately €530 per hectare. The overall story for the 2024 forecast is for an increase in gross margins as a result of the achievement of trend yields, an increase in cereal prices and a decrease in direct costs.

Figure 16: Actual 2022, Estimate 2023 and Forecast 2024, for Cereal Crop Gross Margins

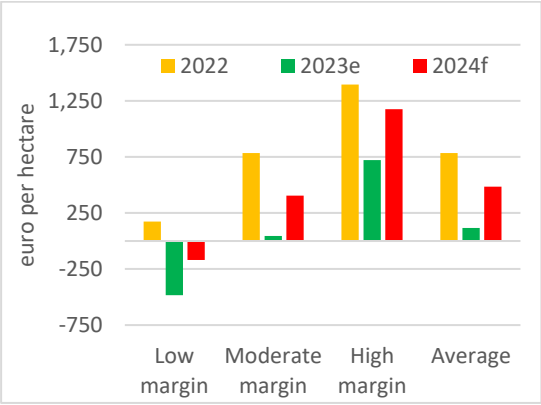


Source: Teagasc, National Farm Survey Data and Author's estimates for 2023 & forecast for 2024.

Similar to the format used to present margins in 2022 and 2023 earlier in the paper, the forecast net margins for 2024, are presented for the cereal enterprise on specialist tillage farms, as well as the population of such farms disaggregated into one-third groupings based on margins obtained. Figure 17 shows that the forecast net margins for the cereal enterprise in 2024 are higher than in 2023 and lower than those achieved in 2022.

The upward movement in margins (compared to 2023) is associated with the yield and price forecasts for 2024 and a decrease in some key direct cost items.

Figure 17: Net Margin Actual 2022, Estimate 2023 and Forecast 2024 for the Cereal Enterprise on Specialist Tillage Farms



Source: Teagasc, National Farm Survey Data and Author's estimates for 2023 & forecast for 2024.

Overall, the net margin for the average cereal enterprise in 2024 is forecast to increase by about €370 per hectare relative to 2023.

This leaves net margins for the cereal enterprise significantly less than the dairy enterprise, but ahead of sheep and beef margins.

4.4 Concluding Comments

The 2022/2023 production year saw significant downward movement in cereal gross margins and net margins for the main cereal crops. In 2023, there was a decrease in winter cereal area and yields at harvest time and a significant decrease in harvest price. There was some reprieve from lower direct costs of production, from fertiliser and fuel and higher payments from the straw incorporation measure, coupled protein payments and the emergency tillage payment. Taken together these factors yielded a significant reduction in net margins on the average cereal enterprise on specialist tillage farms.

The gross margin per hectare for spring barley, winter barley and winter wheat are estimated to be down by approximately €1,070, €1,320 and €945 per hectare respectively.

The forecast for net margins on tillage farms in 2024 is for an increase in margins, owing to a return to trend yields, a slight increase in harvest prices and a decrease in whole farm direct costs. The overall picture for cereal crops is that in general average net margins should be higher than those achieved in 2023 but remain significantly lower than the high margins received in 2022. The movement in margins forecast for 2024 will mean that cereal based net margins will be positive on approximately 75 percent of specialist tillage farms in 2024.

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Table A1: Production Costs, Output and Gross Margin for Major Cereal Crops in 2022 (€ per ha)

	Gross Output	Fertiliser	Seed	Crop protection	Machinery Hire	Other direct costs	Total direct costs	Gross Margin
S barley	2,514	497	127	218	269	35	1,146	1,368
M barley	3,265	533	122	203	281	15	1,154	2,111
S oats	2,266	282	145	103	254	14	801	1,466
W barley	3,070	573	123	267	227	24	1,216	1,855
W oats	2,608	436	108	149	219	35	946	1,663
W wheat	3,524	619	114	309	188	16	1,248	2,276
S Beans	2,432	170	162	185	267	43	826	1,605
S Wheat	2,723	383	155	154	190	9	891	1,832
W Oilseed rape	3,170	555	109	244	205	30	1,143	2,027

Source: Teagasc National Farm Survey Data (2023)

Table A2: Variation in output and margin 2022: top and bottom performing spring barley producers

	Top	Bottom	% Difference between Top and Bottom
Average crop area (hectares)	19	10	89%
Yield (tonnes per hectare)	8	7	16%
Price per tonne	334	317	6%
Gross output (€ per hectare)	2,774	2,264	22%
Fert., seed, spray (€ per hectare)	776	906	-14%
Machinery hire (€ per hectare)	208	327	-36%
Gross Margin (€ per hectare)	1,782	971	84%
Fixed Costs (€ per hectare)	830	985	-16%
Total Costs (€ per hectare)	1,822	2,278	-20%
Net Margin (€ per hectare)	951	-14	>-100%

Source: National Farm Survey Data (2023)

Table A3: Changes in arable crop areas in the EU27

	23/24 M Ha	24/25M Ha	% Change
Soft wheat	21.7	21.5	-1%
Maize	8.5	8.6	1%
Barley	10.3	10.5	2%
Total wheat, barley, maize area	40.5	40.6	0%

Source: Strategie Grains (November 2023)

Irish Pig Sector in 2022

Sow population
126,000 head
down 12.5% on 2021 level

Live Pig Exports
394,000 head
down 8% on the 2021 level

Pig Slaughter
3.84 million head
down 2.7% on the 2021 level

Feed Prices
€451 per tonne
up 34% on the 2021 level

Pig prices
€1.82 per kg
up 14% on the 2021 level

Margin over feed cost
26 cent per kg
down 37% on the 2021 level

Source: Teagasc Pig Development Unit, Central Statistics Office and Department of Agriculture, Environment and Rural Affairs Northern Ireland

Irish Pig Sector in 2023

Sow Population
134,000 head
up 5.8% on the 2022 level

Pig Slaughter
3.48 million head
down 9% on the 2022 level

Live Pig Exports
353,000 head
down 10% on the 2022 level

Pig prices
€224 per kg
up 23% on the 2022 level

Feed Prices
€440 per tonne
down 3% on the 2022 level

Margin over Feed Costs
69 cent per kg
up 167% on the 2022 level

Irish Pig Sector in 2024

Sow Population
138,000 head
up 2.9% on the 2023 level

Pig Slaughter
3.48 million head
unchanged on the 2023 level

Live Pig Exports
353,000 head
unchanged on the 2023 level

Pig Prices
€200 per kg
down 11% on the 2023 level

Feed Prices
€389 per tonne
down 12% on the 2023 level

Margin over Feed Costs
61 cent per kg
down 12% on the 2023 level

Source: Teagasc Pig Development Unit Estimates for 2032 and Forecasts for 2024

Review of Pig Sector in 2023 and Outlook for 2024

Michael McKeon

Pig Development Department, Teagasc

1. Introduction

In 2022 the Irish pig industry experienced its lowest profitability in 40 years as the invasion of Ukraine led to escalating feed ingredient and energy costs. During 2023 the sector returned to much needed profitability.

2. Review of Irish Pig Sector in 2023

The review of the sector can be broken into the input costs incurred and the income generated in 2023.

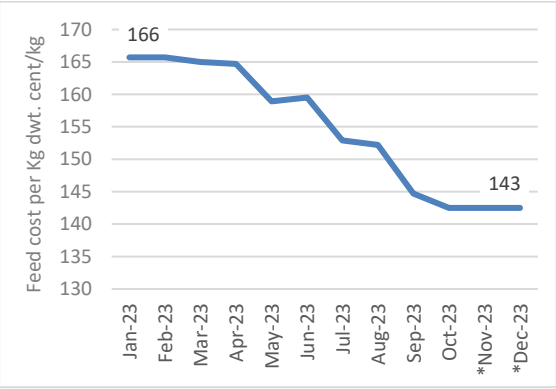
2.1 Pig Production Costs

The cost of producing pigs in Ireland can be divided into feed cost (75 percent) and non-feed costs (25 percent).

2.2 Irish Pig Feed Costs 2023

Monthly Irish composite pig feed prices are shown in Figure 1, expressed in terms of the cost per kg deadweight (dwt.). Feed prices started the year on a high plateau of 165c per kg due to continued high ingredient costs arising from the invasion of Ukraine. As the year proceeded falling ingredient prices led to an estimated feed cost of 143c/kg at year end, to give an annual average of 155c/kg. The equivalent composite feed price fell from €480 per tonne in January to €399 per tonne in December (-€81), giving an estimated annualised cost of €440 per tonne – a decrease of 3 percent (€451) when compared to 2022.

Figure 1: Monthly Irish pig feed cost 2023

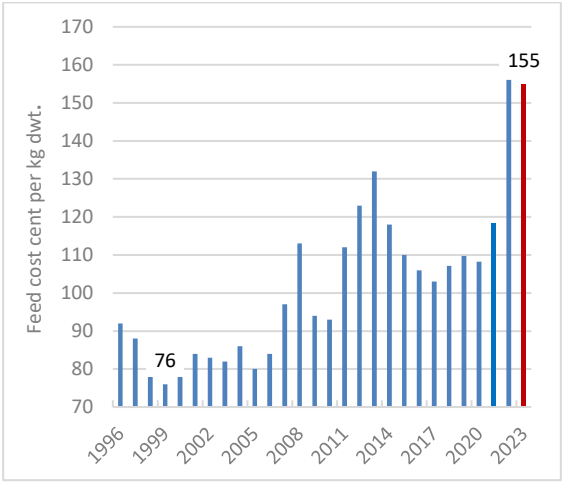


Source: Teagasc Pig Department
* estimated / forecast

When the composite feed price is examined over a longer time period, the 2023 price of €440 per tonne is second highest to 2022, over the last forty years. It is significantly higher than the 5 year (2019-2023) and 10 year average (2014-2023) of €369 and €335 per tonne respectively.

Prior to 2022 the previous highest feed cost was in 2012 at 132 cent per kg and the lowest was in 1999 at 76 cent per kg.

Figure 2: Irish pig feed cost 1996-2023



Source: Teagasc Pig Development Department

2.3 Non-feed costs in Irish Pig Production

There are currently 70,000 sows on the Teagasc Profit Monitor (PM) database from a national herd of an estimated 134,000 (52 percent of total). The non-feed costs quoted are based on the national 2022 PM data, (2023 full-year data is not yet available).

Non-feed costs (excluding building depreciation and financial costs) are itemised in Table 1. The largest increases in non-feed costs in 2022, when compared to the five year average, were for energy, transport and house rental.

The biggest reduction was for labour reflecting the tightened staffing levels on units due to the poor profitability in 2022.

Table 1: Non-Feed Costs in PM Recorded Herds

Cost Item	2022	2019-2022
	cent per kg dwt.	
Healthcare	6.1	6.1
Heat, Power, Light	9.2	4.8
Transport	2.1	1.5
AI	1.8	1.8
Manure	1.2	1.8
Labour/Management	12.9	14.5
Repairs	3	2.9
Administration	0.7	1.2
Environment	0.4	0.4
Insurance	1.5	1.4
House rental	2.6	2.0
Contract Costs	3	2.4
Water	0.7	0.5
Dead Pigs Disposal	1	0.8
Stock Depreciation	2.5	2.3
Miscellaneous	1.2	1.3
Total	44.3	43.3

Source: Teagasc PM Report 2022

2.4 Financial Costs in Irish Pig Production in 2022

These costs include interest payments and building depreciation and vary greatly from unit to unit depending on the age of the unit and the level of capital investment undertaken in the business in recent years. Financial costs based on 2022 data are itemised in Table 2.

We estimate that the cost of building depreciation and interest is significantly lower than the true level required for a healthy pig industry. This reflects the sector's reduced capital investment over a period of time, due to the low profitability of the sector at various points.

The lack of capital investment will increase costs in the short term (e.g. heating) and reduce sectoral performance efficiencies in the medium term to long term.

Table 2: Financial Costs in PM recorded herds

Cost Item	2022	2018-2022
	cent per kg dwt.	
Interest	4.6	4.4
Building Depreciation	1.4	1.4
Total	6	5.9

Source: Teagasc Pig PM Report 2022

2.5 Total Cost of Irish Pig Production in 2023

The estimated annualised cost of production in 2023 (based on 2022 non-feed costs and 2023 feed costs) was 205.3 cent per kg dwt. for pigs delivered to the slaughter plant. This is virtually unchanged from the total cost of 203.4 cent per kg dwt. for 2022.

2.6 Irish Pig Prices in 2023

The estimated average pig price in 2023 was 224 cent per kg dwt., which was a record high price. It was 23 cent per kg dwt. higher than in 2022 (182 cent per kg dwt) and 65 cent higher than 2021 (159 cent per kg dwt) and significantly higher than the five year (2019-2023) and 10 year average (2014-2024) of 181 and 167 per kg dwt respectively. The high pig price was a market response to the record high feed cost and reduced EU pig supply incurred in 2022-2023.

The monthly pig price in January 2023 was a record high at 207 cent per kg dwt. However this was still insufficient to return a profit for producers. As the year proceeded, the pig price increased due to a tightened pig supply in Ireland and across Europe.

The Irish price peaked at 238c per kg in August and September 2023 and prices in other European countries reached similar record highs with Germany peaking at €2.50 and Spain at €2.64.

In recent months a reduction in European pigmeat exports (-19 percent) has led to more pigmeat product on the European market and allied to increased pressure for lower prices from retailers, has resulted in a reduction in EU pig prices at farm level.

The market expectation is that the continued relatively tight pig supply across Europe will limit significant reductions in pig price during the first half of 2024.

Table 3: Monthly Irish Pig Price in 2023

Month	Pig Price
	cent per kg dwt.
January	207
February	203
March	215
April	228
May	231
June	233
July	236
August	238
September	238
October	231
November*	215
December*	210
Average*	224

Source: Teagasc Pig Development Department

* Estimate / forecast

2.7 Irish Pig Production Profitability 2023

The margin over feed cost (MOF) in 2022 was 26 cent per kg dwt. which was the lowest MOF in the last 40 years. The 2023 MOF was higher, at an estimated 69 cent per kg.

It is estimated that a MOF of 52c per kg is currently required to meet all current production costs, including financial repayments. The MOF on a cent per kg achieved in 2022 was significantly below this requirement.

Table 4: Margin over Feed Costs 2014-2023

Year	Pig Price (Net)	Feed Cost	Margin over Feed
	Cent per kg dwt.		
2014	167	118	49
2015	148	111	37
2016	149	106	43
2017	162	104	58
2018	140	107	33
2019	168	110	58
2020	173	108	65
2021	159	118	41
2022	182	156	26
2023*	224	155	69

Source: Teagasc Pig Development Department *Estimate

The 2023 MOF is significantly above the norm when compared to the longer term trend shown in Table 5. The 2023 MOF is between 24 percent to 35 percent higher than the 5, 10 and 15 year average respectively.

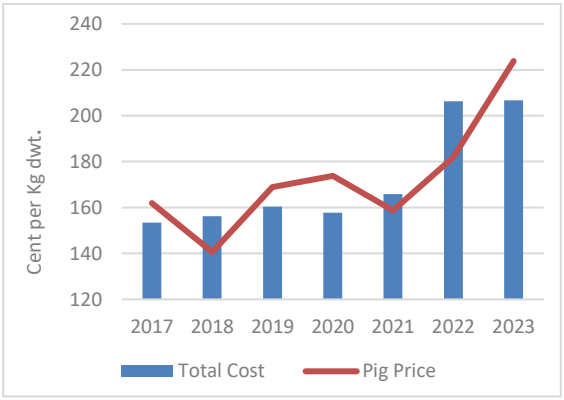
Table 5: Margin Over Feed in 2023 compared to the 5, 10, and 15 year average

	Margin Over Feed	% Diff.
	cent per kg per dwt.	
2023*	69	-
2022	26	167
5 Yr average	51	24
10 Yr average	46	33
15 Yr average	45	35

Source: Teagasc Pig Development Department *Estimate

Figure 3 illustrates the pig price received and the total production cost (feed cost plus 52 cent) since 1997.

Figure 3: Pig Price compared to estimated Total Production Cost



Source: Teagasc Pig Development Department
*Total cost 2023= Feed cost + 52c

The Irish pig sector returned to profitability in April 2023 following 21 months of continuous losses (€580,000 loss per average 600 sow unit). From May 2023 onwards the sector experienced better profitability levels. However at current forecast profitability levels, it will be 2025 before the accumulated cashflow losses from 2021-2023 are recouped.

2.8 Irish Sow and Pig Numbers in 2023

The Irish commercial sow herd census in 2021 was estimated at 145,000 and had remained very stable over the previous 10 years despite considerable financial fluctuations in the sector during this time. However, the poor profitability in 2022 resulted in approximately 11,500 sows being culled through herd destocks, and an estimated further 7,000 sows culled through temporary herd size reductions. The

current herd size is estimated at 134,200 and is expected to marginally increase further in 2024. The national herd size is unlikely to return to the 2021 level in the short term, unless producers are incentivised to expand in the coming years through high profitability.

Table 6: ROI born pigs slaughtered: 2020-2023

Year	2020	2021	2022	2023*
	Thousand head			
Breeding sows	146.9	144.8	126.6	134.2

Source: CSO

The estimated number of pig slaughterings in 2023 is illustrated in Table 7. The 2023 disposals are estimated to be 3.48 million pigs, which is 9.4 percent lower than in 2022, reflecting the reduction in the national sow herd size. This is the lowest level of pig disposals since 2014.

Table 7: ROI born pigs slaughtered: 2020-2023

Year	2020	2021	2022	2023*
	million head			
Slaughter Pigs	3.83	3.95	3.84	3.48

Source: Teagasc Pig Department ^ Includes. N.Ire. plants *Est

The quarterly disposals (Table 8) illustrates a reduction in the quarterly Year-on Year differential. However, this reflects the onset of the decline in pig supplies towards the end of 2022, rather than a sector recovery in 2023.

Table 8: ROI born^ pig disposals 2023

	Disposals (hd)	% Diff. YOY
Q1	892,630	- 10.6
Q2	857,742	- 12.8
Q3	865,174	- 6.7
Q4*	868,370	- 7.1
Total*	**3,483,916**	**- 9.3**

Source: Teagasc Pig Department ^ Includes. N.Ire. plants *Est.

The percentage of ROI born pigs being slaughtered in Northern Ireland processing plants has declined considerably since the peak in 2013. The number being exported, as a percentage of national production, has declined from 18 percent (519,000 pigs) to an estimated 10 percent (353,000 pigs) in 2023.

The percentage of total pig production being exported to Northern Ireland appears to have stabilised, as 2023 was unchanged from 2022, at 10 percent.

Table 9: Slaughter and Live Export to N. Ireland of ROI Born Pigs from 2014-2023

Year	Licensed Export Plants in Ireland	Exports to Northern Ireland	Exports as % of Total
	million head		%
2014	2.940	0.519	18
2015	3.132	0.514	16
2016	3.221	0.414	13
2017	3.295	0.433	13
2018	3.337	0.463	14
2019	3.273	0.425	12
2020	3.343	0.456	13
2021	3.523	0.429	11
2022	3.499	0.394	10
2023*	3.130	0.353	10

Source: DAFM & DARDNI *estimate

The combination of high sow prolificacy and higher sale weight had led to a significant increase in the annual volume of Irish pigmeat being produced year-on-year prior to 2022.

The output increased by 15 percent over a 5 year period from 2017-2021 (Table 10). However, since 2022 this trend has reversed, reflecting the decline in the size of the Irish national sow herd.

Table 10: Irish annual pigmeat output 2019-2023

Year	Total Pigs Slaughtered	Ave Dead weight #	Total Pigmeat Produced
	Million Head	Kg	Tonnes
2019	3.70	86.7	320,790
2020	3.83	87.7	335,891
2021	3.95	90.7	358,265
2022	3.84	90.6	348,238
2023*	3.48	90.6	315,642

Source: DAFM & DARDNI * Estimated ^ ROI born # Teagasc

The reduced volume of slaughter pig disposals in 2022 and 2023 has increased the spare kill capacity in the principal pig processing plants.

While this gives greater flexibility to the sector in the event of one of the main processing plants being temporary off-line e.g. breakdowns etc., if there is not a recovery in pig supplies in the short-to-medium term, then the efficiency of pig processor plants will be reduced.

2.9 EU Sow and Pig Numbers in 2023

The national sow herds in all major pig producing countries across the EU, decreased during 2023 with the exception of the Spain. The Spanish herd is the EU largest sow herd and has grown by 368,000 sows (+15 percent) over the last 10 years.

Other EU sow herds have continued to contract as in recent years. Germany, Denmark and France have declined by an aggregate 206,000 sows over the last 12 months.

The selected sow herds listed in Table 11 have declined by a modest 2.3 percent during the last year (June 22 vs. June 23) but have declined by a significant 9.4 percent (975,000 sows) since 2020.

Table 11: Changes in selected European sow herds

	Jun 23	Jun 22	Change
Country	Million head		%
Spain	2,756.40	2,698.98	2.1%
Germany	1,408.00	1,509.50	-6.7%
Denmark	1,133.00	1,201.00	-5.7%
Netherlands	888.90	925.61	-4.0%
France	886.66	917.04	-3.3%
Italy	637.00	602.00	5.8%
Poland	600.76	617.09	-2.6%
Belgium	357.06	372.84	-4.2%
Hungary	234.30	242.60	-3.4%
Romania	227.50	233.90	-2.7%
Austria	216.90	224.18	-3.2%
Sweden	108.04	127.26	-15.1
Total 12 MS*	9,672.00	9,454.52	-2.3

Source: Eurostat * 12 selected member states

The level of pig disposals in some of the principal pig exporting countries are shown in Table 12. The sow herd decline in Germany and the reduction of weaner pigs being imported for finishing from Denmark and the Netherlands has resulted in a significant decrease in German pig disposals (-2.1 million pigs). Since 2020 there has being an overall annual decline in German pig disposals of 6.65 million (-18 percent).

The Danish industry has also been severely affected by the low profitability and the difficulties exporting pigs to Germany for finishing and slaughter. Their current slaughter throughput (Jan-Sept. 2023) is down 19.5 percent and the *Danish October 2023 National Pig Census* estimates its finisher pig population is down 12.2 percent year-on-year. Over the last two years their finisher pig population (+50kgs) has dropped by 22 percent (700,000 pigs).

The Spanish slaughter pig numbers significantly decreased (-6.3 percent) for the first time in many years. This is due to a pig disease outbreak (PRRS.) which reduced their supply of pigs for slaughter even through their sow herd moderately increased (+2 percent) during 2023.

Table 12: Selected European & North American Pig Disposals

	2022*	2023*	Change
Country	Million head		%
Germany	32.57	30.47	-6.4
Spain	37.31	34.95	-6.3
France	15.79	15.01	-4.9
Denmark	14.51	11.69	-19.5
U.S.	103.1	104.4	1.7

Source: MPB 2023 *Jan-Sept

2.10 EU Pigmeat Exports in 2023

Ireland's pigmeat exports decreased in 2023 by an estimated 17 percent (216,149 vs 179,873 tonnes). There was a similar trend across the rest of the Europe, with EU exports declining by 19%.

Table 13: Pigmeat exports from selected countries

Country	2022*	2023*	change
	million tonnes		%
ROI^	0.22	0.18	-17
EU	3.08	2.49	-19
USA	1.49	1.68	13
Canada	0.84	0.76	-5
Total	5.41	4.98	-8.1

Source: MDP * Jan-Aug ^Jan-Sept

This decline was predominantly due to the reduction in the volume of Chinese imports.

The Irish year-on-year export volume to China declined by a modest 7 percent in 2023, but when compared to 2021 the volume and value have declined by 43 percent and 48 percent respectively.

Exports from the US and Canada have increased over the last 12 months as a consequence of their current loss-making pig-cycle which has giving them a competitive advantage through lower product costs.

Table 14: Pigmeat exports to China

Country	2022*	2023*	change
	Thousand tonnes		%
ROI^	45	42	-7
EU	788	690	-13
USA	314	348	10
Brazil	301	296	-2
Canada	98	168	72
Total	5.41	4.98	-8.1

Source: MDP * Jan-Aug ^ Jan-Sept

3. Outlook for Irish Pig Sector in 2024

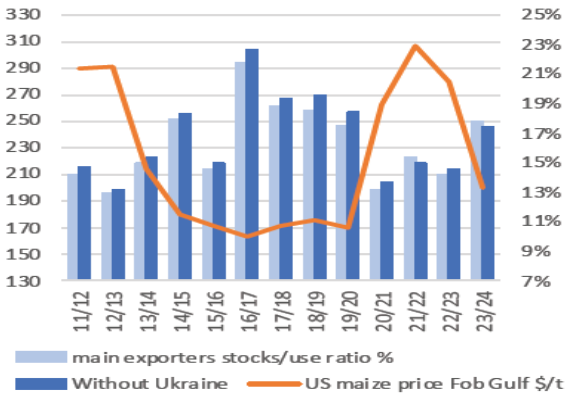
The 2024 outlook for the pig sector is predicated on the expected global pig feed and pig price market developments.

3.1 Irish Pig Feed Price Outlook in 2024

The elevated pig feed ingredient costs which resulted from te invasion of Ukraine have now dissipated. The cost per tonne of maize, barley and wheat is now lower than before the invasion.

The volume of wheat and barley being exported from Ukraine and Russia is currently putting downward pressure on global cereal prices. The high output from the recent Russian wheat harvest, along with the depreciation of its currency, is expected to result in Russia exporting 25 percent of all global wheat in the current trading year. Further downward pressure on cereal prices is due to the large global stocks of maize as a result of high output from the U.S. and Brazilian harvests. The increase in maize global stock-to-use of 25.6 (five year average 24.5 percent) is expected to continue to exert downward pressure on maize prices and allow greater scope for substitution in lieu of wheat and barley, in least-cost diet formulations.

Figure 4: Global maize stock-to–use ratio



Source: Strategie Grains

The soyabean planting season is now concluding in Brazil, the world's largest producer. The soil moisture level and planting conditions are very variable and are largely dependent on the geographical location. Some Brazilian regions are experiencing severe drought (e.g. Mato Grosso), while southern Brazil is experiencing excess rainfall. The Brazilian forecast is for a soyabean harvest of 163 mt. If this volume transpires and Argentina returns an average harvest output, then the resultant increase in global stocks will result in downward price pressure and a decline from the current high soyabean price plateaux.

Overall, the outlook for the composite pig feed price is relatively benign with price subject to little change during the first six months of 2024. The arrival of the northern hemisphere cereal and soybean harvest will result in the maintenance or a moderate decrease in some feed ingredient prices e.g. soyabean. The average cost per tonne may however decline if there is a continuation in the trend towards greater numbers of pig producers utilising compound feed, to forward-buy/ undergo contract milling agreements.

The stability of feed costs in the first half of 2024 followed by a moderate decrease in the second half, is forecast to generate an average 2024 pig feed cost of 139 cent per kg dwt. (composite feed price of €389/t). This a decrease of 11.6 percent on the 2023 level.

3.2 Pig Prices in 2024

The outlook for the Irish pig price is going to be driven by EU pigmeat supply and EU pigmeat exports.

The reduction in the EU herd of an estimated 1 million sows over the last four years, has resulted in approximately 25 to 27 million less pigs entering the supply chain on an annualised basis. This shortfall is not expected to be filled in the short-medium term as more demanding EU welfare, housing and environmental legislative standards, will make future expansion more expensive and difficult to achieve.

However, the reduction in EU pig numbers has not resulted in EU pigmeat supply being as constricted as might be expected. The reduction in pig supply since 2020 has been substantially off-set by a decline in EU pigmeat exports over his period (-982,839 tonnes). The reduction in EU export volume has resulted in the larger EU exporting countries e.g. Spain, Denmark, Netherlands, supplying greater volumes of pigmeat into the EU internal market rather than export.

The main reason for the reduction in exports is the reduced Chinese import requirement. Between 2020 to 2023 total EU exports reduced by 0.982 million tonnes, but EU exports to China over this period reduced by 1.182 million tonnes. The import reduction is due to the recovery of the Chinese herd. However, due to significant losses (est. +€50 billion) over the last 18 months the herd is in decline again. The enhanced level of culling will lead to a greater supply of pigmeat in the supply chain in the short term. However, this time it appears to be due to government policy of reducing backyard production in favour of large commercial companies, rather than pig disease (African Swine Fever).

Currently in China the top 16 companies supply 20 percent of the annual pig volume (140 million pigs), but this volume is expected to reach 25 to 27 percent of total supply within the next 5 years. The Chinese Ministry of Agriculture has stated that the current sow herd of 42.1 million is still too high and needs to be reduced further.

The Chinese Dalian pig futures market appears to support the expectation of continued ample Chinese domestic supply for 2024 and therefore a continued reduced pigmeat import requirement.

Table 15: Chinese Dalian Futures Pig Price (Yuan/kg)

Nov. 23	Jan. 24	May. 24	Jul. 24	Sept. 24
14.1	15.8	15.7	16.7	17.7

Source: Bloomberg

It is forecast that reduced EU pig supply and weak EU exports / Chinese import demand will continue to be experienced in 2024. The lower pig supply will ensure a pig price floor for the EU and Irish market, but the absence of strong exports would suggest that the pig price is unlikely to regain the peak of 2023.

Therefore the EU and Irish pig price may decrease at the start of 2024, but should recover in Q2 and rise steadily until reaching a plateau by mid-summer. In the second half of the year there will be a marginal weakening in Q3 and Q4.

3.3 Pig Sector Profitability in 2024

A pig price reduction in early 2024 indicates that the MOF for Q1 will tighten until the pig price begins to rise.

As the pig price increases in Q2, the MOF will improve. In addition, an easing of the high feed cost is expected to begin during the end of Q2 of 2024, which will produce moderate profitability in Q1 and Q2. A marginal downward trend in feed cost, allied to moderate reduction in pig prices in Q3 and Q4, will lead to a continued level of profitability in the second half of 2024.

The forecast margin-over-feed of 61 cent/kg dwt. indicates that 2024 will be profitable, but at a lower level then in 2023.

Table 16: Pig & Feed Price Forecast 2024

Year	Pig Price (Net)	Feed Cost	Margin over Feed
	cent per kg dwt.		
2023*	224	155	69
2024^	200	139	61

Source: Teagasc Pig Development Department
*Estimate
^ Forecast

4. Conclusion

The Irish pig sector was loss-making in early 2023 but returned to good profitability for the remainder of the year. The outlook for 2024 is for modest profitability, with margins improving as the year progresses to peak in mid-year, with a marginal reduction in the second half of the year.

Review and Outlook for Forestry 2024

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1. Introduction

The evolving forest sector is increasingly important to rural economies and a highly significant policy driver at national level. Fifty one percent of our forest resource is in private ownership. There are almost 24,000 individual forest owners with over 19,000 classified as farmers (DAFM, 2023). The economic contribution of the forestry sector to the economy is estimated at over €2 billion per annum (DAFM, 2022). Ireland's forest resource supports 9,400 direct and indirect jobs, the majority in rural areas (Forestry Services and Phillips, 2022). Wood products, to the value of €450 million are exported to over 50 countries.

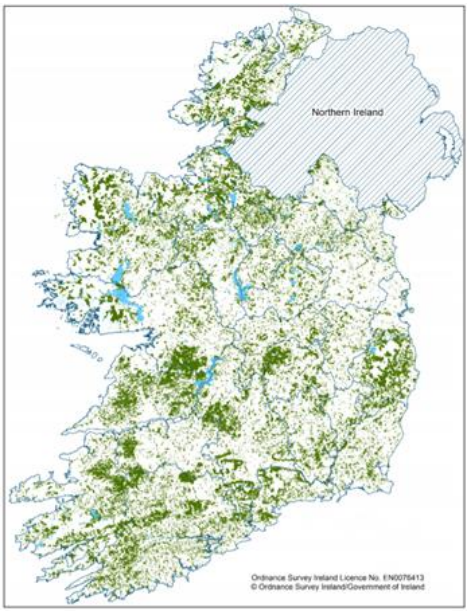
Ireland's Forest Strategy (2023-2030), published in September, 2023 has an overriding objective to urgently expand the national forest estate on both public and private land in a manner that will deliver lasting benefits for climate change, biodiversity, water quality, wood production, economic development and quality of life. This is acknowledged as a challenge of very significant proportions, which will require and whole of society and a whole of government response (DAFM, 2023a).

On September 6, 2023, Minister for Agriculture Food and the Marine, Charlie McConalogue TD, and Minister of State for Land-use and Biodiversity, Senator Pippa Hackett, welcomed the approval by the Government and opening of the Afforestation Scheme under the new Forestry Programme 2023 – 2027. The Afforestation measures within the Programme include 12 Forest Types (FTs), along with significantly increased support for forest establishment and yearly premiums up to over €1,100 per hectare for up to 20 years for farmer applicants. The Programme, including future annual premium supports, is underpinned by a Government commitment of €1.3 billion (DAFM, 2023b).

While the Forestry Programme is the main implementation mechanism for the Forest Strategy in the immediate to short term, the Forest Strategy Implementation Plan also contains a range of non-Programme actions designed to assist in the development of the forest sector. These are under consideration and development and will very much complement actions under the new Forestry Programme (DAFM, 2023c).

The fourth National Forestry Inventory (DAFM, 2022) estimated forest cover in Ireland to be 808,848 hectares (ha). This represents 11.6 percent of the total land area, excluding inland water bodies. Figure 1 is map of forest cover in 2022. Many private forests established during the 1980s and 1990s are now approaching silvicultural maturity. Supported by an appropriate level of timber mobilisation capacity, this timber resource is projected to result in a major increase in supply to the market in the coming years. This projected increase will be a driver for many associated benefits in terms of sectoral growth and wider employment potential (Teagasc 2020). The challenge is to ensure that measures contributing towards these targets equitably address the economic, environmental and social benefits that forestry can deliver.

Figure 1: Forest Cover in Ireland 2022



Sources DAFM (2022)

Forests and forest products play an important role in mitigating climate change by sequestering and storing atmospheric carbon dioxide (CO_2). Ireland's forest sink is, however, declining and is projected to become a net source of emissions for a period by 2025. This is due to a number of factors including recent low levels of afforestation, legacy emissions associated with forests planted on organics soils, a projected increase in timber harvesting levels in the private sector and a decline in growth rates associated with the age profile of the forest estate.

In line with Ireland's Climate Action Plan, an expanded and sustained afforestation programme of 8,000ha or more will improve the future sink capacity of the forest estate. Such improvement will necessitate substantially increased afforestation rates to create additional carbon sinks, particularly post 2030 (DAFM, 2023a). There is also a need for consideration of appropriate forest management measures to increase the carbon storage of existing forests. In addition, the increased use of wood products, including sawnwood and advanced engineered wood construction products also offer a sustainable alternative to high CO_2-producing construction materials and provides an opportunity to reduce the embodied emission of buildings (COFORD, 2021).

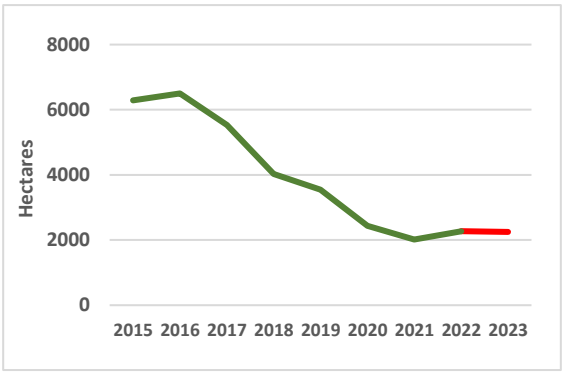
2. Forestry Financial Supports

In 2022, over €70 million in capital expenditure was invested by the Department of Agriculture, Food and the Marine (DAFM) in forestry development. Eighty eight percent of this went towards afforestation grants and premia (DAFM, 2023). The Government, in its 2024 budget, announced an allocation of €110 million to support the new National Forestry Programme 2023-2027 (DAFM, 2023d). This provides funding to establish 8,000ha of new forests from 2023 onwards, a highly challenging target set out in the Climate Action Plan 2023 (DECC, 2023).

3. Planting in 2022/2023

In 2022, DAFM made payments relating to the planting of 2,273 hectares (ha) of land, up marginally from 2,016ha in 2021 (Figure 2), but substantially below national targets. Cork had the highest afforestation area by county at 400ha, followed by Clare and Galway at 211ha and 209ha respectively. The proportion of broadleaves in new forests created during 2022 was 42 percent, just up from 41 percent in 2021 (DAFM, 2023).

Figure 2: Annual planting 2015 to 2022, with projection for 2023



Source: DAFM (2023)

Based on planting levels to date, the projected total area planted in 2023 is just over 2,000ha. This is below 2022 levels and reflective of the challenge of substantially increasing afforestation rates and progressing towards planting targets in 2024, which will be a pivotal year in this regard. Key to reaching such targets is the need to revitalise confidence among landowners in the benefits of forestry as a viable option to complement existing farm enterprises (DAFM, 2022b).

The Forestry Programme 2023-2027, which was approved and launched in September 2023, sets out 12 new Forest Type options, with associated premiums increases of between 46 and 66 percent over current levels and the extension of annual payments from 15 to 20 years for farmers.

Magner (2023) outlined that the menu of choice available to farmers who are considering planting is extensive, but maintained that the extent of take-up will not be apparent until farmers and foresters fully understand their implications. Magner went on to outline constraints to planting uptake, including environmental constraints (bird breeding habitats, peat depth and high nature value farmland), described as having capacity to slow down licence approval and restrict land availability for afforestation. The current significant agricultural demand for even marginal land was also identified as a challenge. The introduction of extremely innovative and well-funded afforestation programmes, including the Native Tree Area Scheme was a positive element for both marginal and more productive land (Magner, 2023).

3.1 The Decision to Plant

The Teagasc National Farm Survey (NFS) collects information annually on a sample of farms with a forest enterprise. The sample is statistically

weighted to represent the national farming population. Of the 85,951 farms represented by the 2022 survey (Dillon *et al.*, 2023), 8,322 farms (9.7 percent) contain forests, with an average ownership of 9.7ha per farm. Those farmers participating in the Teagasc NFS have forests spread over a range of age classes. On average, 54 percent of farms with forests received payments in 2022 with an average payment of €4,069. A summary, indicating the extent to which farms and farming systems include forests is presented in Table 1.

The 2022 Teagasc NFS data indicate that the largest populations of farms who previously chose the forestry option were those with cattle systems (cattle rearing and in particular, cattle other). Farms showing the highest average forest area per farm comprised those with cattle other, mixed livestock and sheep enterprises. Mixed farming had the highest overall representation of farms with forests (14 percent), followed by sheep and tillage enterprises (both with 12 percent) and cattle rearing (11 percent) in the survey. Seven percent of dairy farms contained a forest enterprise with an average forest area of 7.1ha (Table 1).

Table 1: Teagasc National Farm Survey 2022 - Forestry Representation on Irish Farms

System	Farm Population	Farms with forest	% with forest	Average forest area per farm (ha)
Dairy	15,319	1,017	7.0	7.12
Cattle Rearing	18,079	2,000	11.0	8.98
Cattle Other	30,148	2,606	9.0	11.28
Sheep	13,979	1,638	12.0	9.77
Tillage	6,246	748	12.0	9.33
Mixed Livestock	2,108	312	14.0	10.3
ALL	85,951	8,322	10.0	9.71

Source: Dillon *et al.* 2023

Ireland's Forest Strategy Implementation Plan (DAFM, 2023c) identified barriers to achieving the 8,000ha annual forestry target. These include competing land uses that offer higher economic reward in the short term, the permanent land use change required, difficulties in the administration of forestry licences in recent years and negative farmer perceptions of forestry. The Plan also identified the need for the Forestry Programme to raise awareness of forestry as a profitable and recognised land use and the need for incentives to plant appropriate species to ensure forest resilience.

Irwin *et al.* (2023) used the Theory of Planned Behaviour to investigate the main attitudes, influencers and intentions of Irish dairy and drystock farmers to planting trees. The results demonstrated that these farmers are mainly driven by their attitude and moral norms which in turn were shaped through the views of people they perceive as influential, such as family, advisors and other local farmers. Environmental benefit was cited as a key advantage to having trees on farms.

Ryan and O'Donoghue (2016) outlined how the conversion of land from agriculture to forest involves a multifaceted and complex decision making process. Factors relevant to this land use change decision, and still very relevant currently, consist of physical, economic and behavioural drivers. The latter incorporate the permanence of the land use change when moving from agriculture to forestry and socio-cultural attitudes towards the decision, soil quality and the opportunity cost of planting. The potential relative returns to agriculture and forestry and the timescales involved also constitute significant factors affecting the afforestation decision.

4. Financial Returns - New Forestry Programme

The Teagasc Forest Investment Valuation Estimator (FIVE) supports decision making in relation to potential land use and forestry options. FIVE software applies Discounted Cash Flow (DCF) analysis to model indicative financial returns for forestry land use options (forest creation) and management options (e.g. forest thinning). It provides financial output for decision support, particularly in relation to reviewing pre-planting options and comparing criteria such as tree species, yield classes and forest rotation lengths according to landowners' preferences and objectives.

Potential timber revenues are generated by FIVE through the selection of forest characteristics and management regimes. A range of variables are used as inputs in a typical financial analysis. These include species, site productivity, rotation length, relevant premium payments, establishment and on-going management costs, as well as potential thinning and clearfell timber volumes and revenues. Future cost and revenue streams from forestry are generated by FIVE and are discounted to present day values and presented as Net Present Values (NPVs).

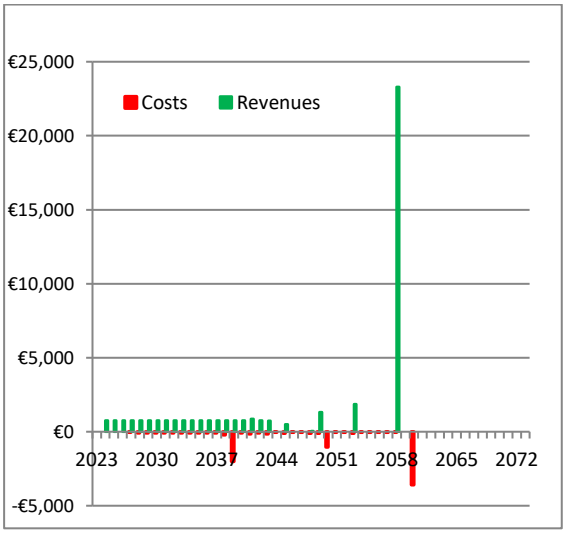
The NPV refers to the net returns to forestry over one (or more) forest rotation(s). In order to compare forestry with other farm enterprise options (at an indicative level), the FIVE tool expresses different forest crop rotations on an annual per hectare basis by generating the Annual Equivalent Value (AEV) for each forest scenario. The AEV expresses the NPV as a series of equal cash flows over the forest rotation.

Figures 3 and 4 present indicative financial returns for one hectare of Forest Type 12, comprising mixed high forest (mainly spruce, 20 percent broadleaves (FT12) and Forest Type 7 (other broadleaf forest (FT7) respectively, based on FIVE analysis. "FT" refers to the relevant forest type under the proposed new DAFM Forestry Programme, Intervention 1 (Forest Creation).

If all costs and revenues associated with forestry land use are compared with all costs and revenues associated with agricultural land use (after adjusting to present values and the one-year cycle per annum basis) then the Forestry AEV per hectare and family farm income can be considered conceptually equivalent.

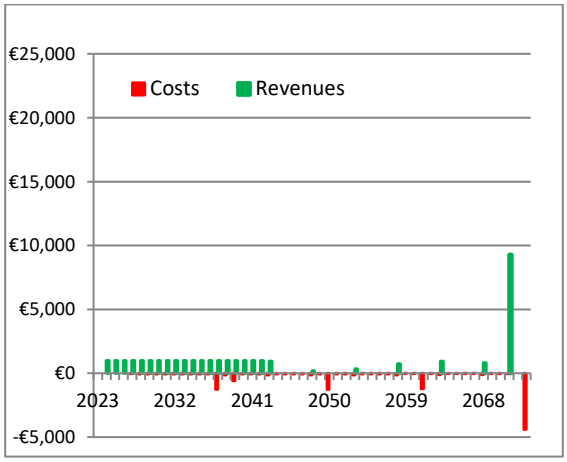
A summary of the comparative financial outputs from FIVE analysis for these two afforestation categories is presented in Table 2. The respective AEVs are €689 /ha/year for FT12 and €569/ha/year for FT7.

Figure 3: Indicative Forest Returns - One Hectare of Forest Type 12 (FT12)



Source: Teagasc, FIVE (2023)
Assumptions: Forest Type 12, mixed high forest with mainly spruce (Yield Class 24), 20 percent broadleaf species, 15 percent retain area for biodiversity enhancement, forest cycle of 35 years, discount rate 5.0 percent, 10-year average timber prices used.

Figure 4: Indicative Forest Returns - One hectare of Broadleaf Forest (FT7)



Source: Teagasc, FIVE (2023)

Assumptions: Grant and Premium Category 5 (85 percent sycamore (Yield Class 8), 15 percent retain area for biodiversity enhancement), forest cycle of 50 years, discount rate 5.0 percent, 10-year average timber prices used.

Table 2: Comparative per Hectare Financial Outputs (€) - Forest Types 12 and 7

Proposed Forest Type / Financial output	Forest Type 12	Forest Type 7
Total revenues (€)	40,233	32,687
Total costs (€)	8,980	12,550
Net Present Value (€/ha)	12,648	10,402
Annual Equivalent Value (AEV) €/ha/year	689	569

Source: Teagasc 2023

It should be borne in mind that this analysis compares observed agricultural incomes with projected future forestry income flows discounted to today's values and converted to annual equivalent. This allows an indicative rather than absolute comparison. It is evident that forestry returns based on proposed new premia levels in the Forestry Programme 2023-2027, can be very competitive when compared to many agricultural enterprises.

The analysis involving FIVE does not take into account the capacity for eligible forestry parcels to draw down the new Basic Income Support Scheme

(BISS) payment as well as the forestry premia. It also does not factor in the potential income-tax free returns and relative efficiencies in terms of labour inputs when compared to other enterprises.

FIVE cannot account for uncertainties such as potential subsidies that agricultural and forestry land will attract in the future or what new values may emerge for the services produced by agricultural and forestry land uses.

5. Licensing of Forest Operations

The final report of the Project Woodland Project Board was published in January 2023. Reducing the licencing backlog was identified as one of the key priorities. The report outlined a reduction in the backlog from an initial figure of 6,041 in August 2021 to 1,988 as of January 6,2023 with further improvements reported during 2023 (DAFM, 2023e).

While it reported very significant progress in reducing licencing backlog, it also indicated that the task of refining and optimising departmental processes, so that licences can be issued as efficiently as possible, while respecting the legal process, would inevitably be a continuing one.

In addressing the Joint Oireachtas Committee on Agriculture, food and the Marine October, 2023, Minister Pippa Hackett, outlined how DAFM was working on a licencing plan covering the remainder of 2023 and providing indicative plans for 2024.

Feedback from stakeholders across the forest sector include concerns that environmental constraints impact on licence approvals and land availability for afforestation. It highlights the importance of a continuous flow of approvals through the licensing system to support measures within the new Forestry Programme 2023-2027.

6. Timber Harvest and Supply

6.1 Felling Licence Approvals

The DAFM have responsibility for regulation and licencing of tree felling in Ireland. The Forestry Act (2014) requires applicants to provide notice of intention to fell trees and provides for a single felling licencing process.

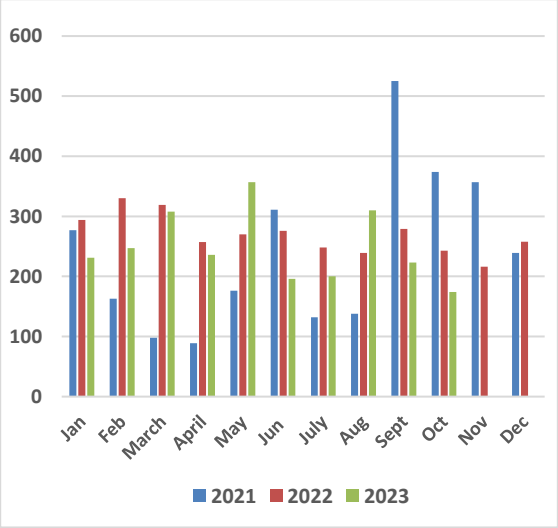
The number of felling licences issued annually is reported as a monthly sectoral figure, combining licence numbers issued for Coillte and private forest owners. The total number of felling licences issued up to Week 3 November, 2023 (Figure 5) was 2,626 (Coillte 1,301, private 1,325). In comparison, the total number of felling licences issued for 2021 and 2020 was 3,293 and 2,897 respectively.

The 2023 felling licence approvals issued (to September 2023 inclusive) represent an estimated thinning area of 6,613ha and clearfell area of 20,418ha (DAFM, 2023f and 2023g). This compares to an approved thinning area of 25,089ha and clearfell area of 23,009 ha for the full year of 2022.

When considering the above data, it should be borne in mind that applicants for felling licences may apply for multiple harvest events on the same forest plot in a felling licence application. All felling licences allow for a 10 year period to carry out thinning and/or clearfell, as stipulated under the Forestry Act 2014. Further information on the breakdown of private and Coillte licensing is contained within the DAFM weekly Forest Licensing Dashboard.

Similar to the sectoral requirement regarding afforestation licences, feedback also highlights the need to sustain progress in increasing the flow of approvals for both forest road construction and harvesting operations in 2024. These are essential elements required to maintain a well-functioning timber supply chain.

Figure 5: Monthly Felling Licences Issued 2021 to October 2023



Sources: DAFM, Forestry Section Monthly Reports (2021/21/22) and Forestry Dashboard 2023

6.2 Wood Removals from Forests / Purchases by Industry

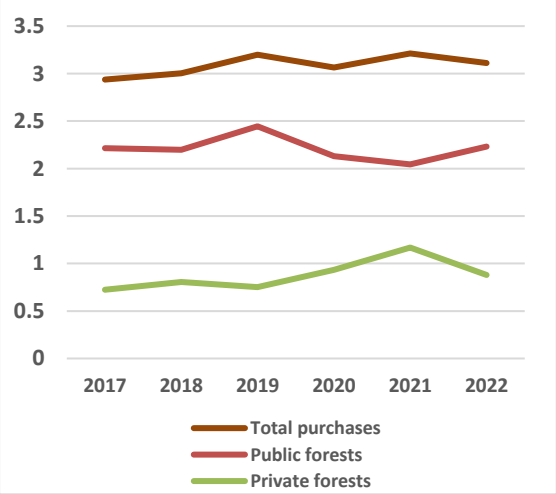
The Central Statistics Office (CSO) compiles annual returns for forestry data in Ireland since 2019. These

includes statistics on forest wood removals and wood input purchases by industry.

Roundwood removals from forests reached a reported 4.14 million cubic metres (m^3) in 2022, with a total value of €251 million. This represented a 4.4 percent decrease in volume (from 4.33 million m^3) on 2021 levels but a reported 10.6 percent increase in value. Wood removals from private forests in 2022 comprised 43 percent of total removals, compared with 48 percent in 2021 (CSO, 2023).

The total volume of roundwood input purchases by industry was reported as 3.1 million m^3 in 2022, a 3.0 percent decrease from 2021 levels. Magner (2023a) describes how this masks a decline in private timber production, as Coillte supply increased by 9 percent. He outlines how the fall in timber supply from privately-owned forests represents a dramatic departure compared with the three–year period (2019-2021) when, year on year, average increases of 24 percent in production were achieved. Magner also posited that if this trend had been maintained, 2022 private supply would have reached 1.4 million m^3. Instead, purchases of roundwood fell from 1.17 million m^3 in 2021 to 0.88 million m^3 in 2022, a decrease of over 24 percent (CSO, 2023 and Figure 6).

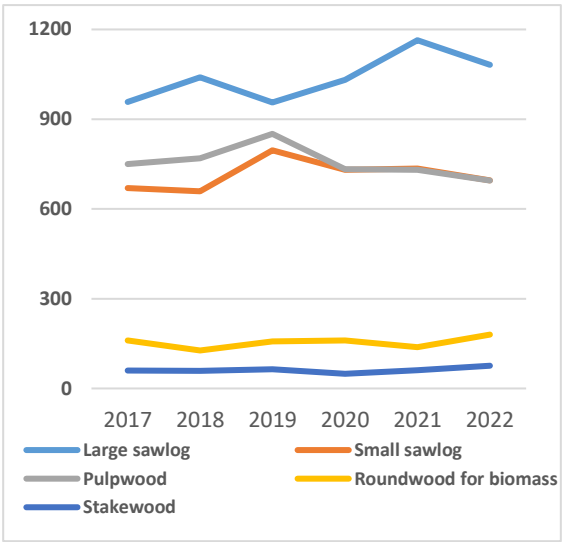
Figure 6: Roundwood Purchases by Industry 2017-2022 (millions m^3)



Source: CSO 2023

Overall, large sawlog represented the highest proportion of roundwood purchase tonnage at approximately 40 percent in 2022. Both small sawlog and pulpwood each accounted for 25 percent of purchase volumes (Figure 7). Non-roundwood products such as brash, tree stumps, woodchip and sawdust totalled 424,000 tonnes in 2022, c.10 percent of the total purchase.

Figure 7: Coniferous Roundwood Purchases by Product 2017-2022 (000s tonnes)



Source: CSO 2023

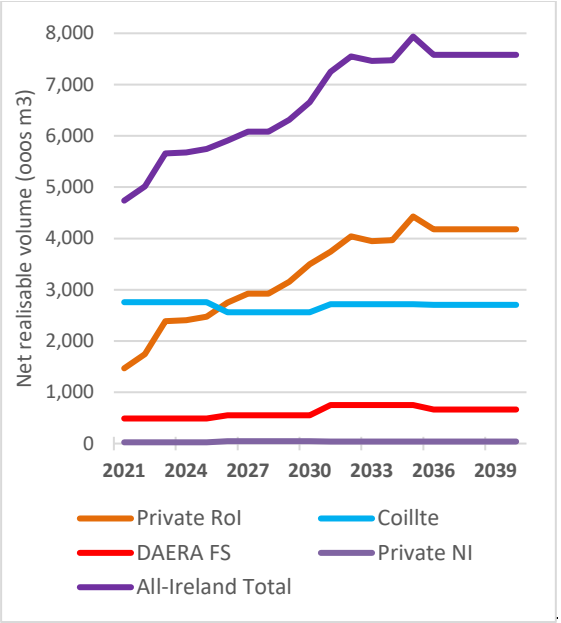
7. Realisable Future Timber Volumes

The COFORD All Ireland Roundwood Production Forecast 2021-2040 (Phillips *et al.,* 2021) includes both private and public forests. The forecast for net realisable volume (NRV) totals 133.45 million m^3 over the forecast period. The NRV increases from 4.74 million m^3 in 2021 to 7.94 million m^3 in 2035, followed by a small decrease of 0.35 million m^3 and then remains constant at circa 7.6 million m^3 up to 2040. When compared with the previous forecast over the common reporting period 2021 - 2035, the volumes are broadly similar (Figure 8).

Figure 8 also indicates that any real increase in the timber volume produced in Ireland to 2040 will necessitate a significant mobilisation of the private forest timber resource. Forecasts predict net realisable volumes from private forests to increase from 2,408m^3 in 2024 to 4,177m^3 in 2040. In contrast, the roundwood supply forecast for state-owned (Coillte) forests remains relatively stable, only varying between 2,560m^3 and 2,757m^3 over the same period.

The forecast increase in domestic demand for Irish construction timber will, if realised, provide an opportune additional outlet for increasing supply. It is likely to take significant pressure off exports in the medium term, with a range of potential benefits accruing.

Figure 8: Forecast of Total Net Realisable Volume Production by ownership category to 2040 (≥ 7cm top diameter)



Source: All-Ireland Roundwood Production Forecast 2021-2040 (COFORD, 2021)

7.1 Global Timber Supply/Demand Trends

The Global Sawlog prices Index (GSPI) fell by a reported 1.6 percent in Quarter 2 (Q2), 2023. This fall represented an almost 10 percent decline compared to Q2, 2022 when it had hit its all-time high. Although sawlog prices have moved downward in most of the 20 countries tracked by this index, a few regions, including the Nordic countries have seen rising log prices over the last year. Global Wood Markets Info (2023) reported that lower demand for wood raw materials, driven by weaker lumber markets worldwide, has been the significant factor in recent decreases in timber prices.

For example, the weak construction economy, high building interest rates, inflation and a low number of building permits impacted on the German timber trade in 2023. By the end of September, sales had declined by a reported 15 percent compared to the same period in 2022. According to the GD Holz business comparison, survey participants cited both price declines and to a greater extent, lower demand as causes (Global Wood Markets Info, 2023a). For the coming years, the wood trade sees itself in a good position with wood as a material and its product ranges, as wood construction is at the top of the agenda in Germany and elsewhere in Europe in order to effectively counteract climate change, given its CO_2 binding potential.

Sawmills in Finland and Sweden experienced different timber market developments than most other regions over the past two years. Because Finnish sawmills were cut off from Russian imports in 2022, domestic log prices increased by an estimated 10 percent in Euro-terms. The availability of logs in the Baltic Sea region tightened in 2022 and 2023, with shipments from Belarus, Russia, and Ukraine being halted by the Russian invasion of Ukraine. Swedish sawmills have increased imports of higher-cost logs from Estonia and Latvia and have also offered higher prices to domestic sawmills in 2023 (Global Wood Market Info, 2023b).

The 2023 International Softwood Conference, which took place in October 2023, heard that softwood markets have disappointed both traders and sawmillers in 2023 on the back of the slowdown emerging in the second half of 2022. Having peaked in 2021, softwood production on 2023 is expected to decline by over 8 percent in Europe, and consumption by around 11 percent compared with 2022. Production in the sector has reportedly been curtailed to accommodate weak demand (Global Wood Markets Info, 2023b).

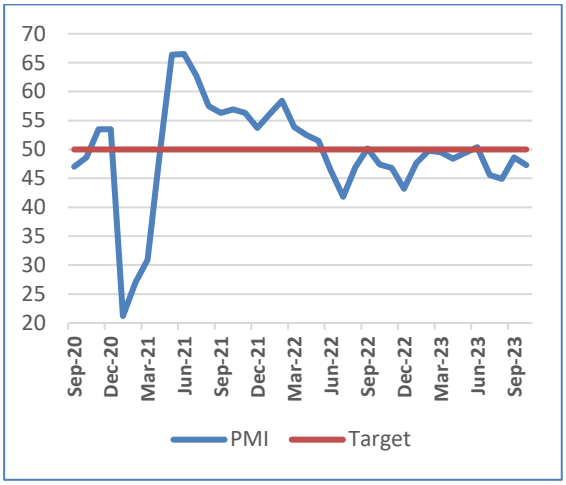
8. Timber Demand Drivers

8.1 Domestic Timber Demand

The BNP Paribas Real Estate Ireland Construction Index (PMI) is a seasonally adjusted index which tracks changes in construction activity over time. Index readings above 50 signal increased growth (Figure 9, base line in red).

The index posted a reading of 47.3 for October 2023, down from 48.6 the previous month. This signalled the fourth consecutive monthly reduction in Irish construction activity. The pace of decline was described as “solid” and faster than that seen in September, while less pronounced than contractions recorded over the summer, 2023 (Figure 9). Surveyed participants reported a general slowdown in market conditions. At the same time, new orders were reported as nearing stabilisation over the course of October and firms continued to expand their staffing levels. The rate of input cost inflation eased to a four month low (S&P Global, 2023).

Figure 9: BNP Paribas Real Estate Construction PMI Sept 2020 to October 2023



Source: 2023 S&P Global

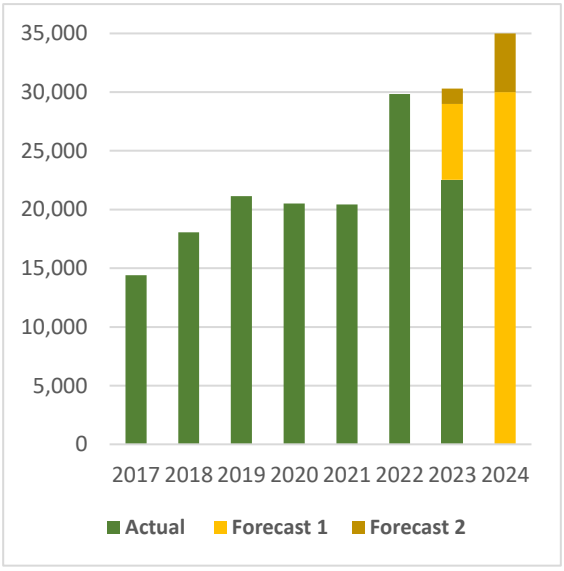
In contrast to the overall picture for the construction sector, commercial activity returned to growth in October, 2023. This eased a three month sequence of decline. Further reductions in activity on housing and civil engineering projects were reported, with housing activity seeing the sharpest fall since April, 2023 (S&P Global, 2023).

BNP Paribas Real Estate Ireland Construction PMI Report (November 2023) commentary suggested that companies maintained an optimistic outlook for 2024, amid hopes that new projects would be secured, thereby feeding through to growth in activity. However, reported sentiment dropped sharply over the month, being reported as the lowest since November 2022. There were some concerns regarding the potential impact of a weaker economic climate on activity in the sector (S&P Global, 2023).

Figure 10 shows the number of dwelling completions in the State since 2017 with forecasts for 2024. The CSO uses new connections to the electricity network as the basis for statistics on new dwelling completions, a data source that is collected nationally in a consistent manner for all dwellings. A total of 29,851 dwelling completions was reported in 2022, an increase of 45.2 percent over 2021 levels and 43.1 percent up from 2019, pre-pandemic (CSO, 2023).

Despite challenges, investment in construction showed signs of recovery in the first quarter of 2023 with 6,716 housing units completed. Completions increased again in the second quarter to 7,353 units (CSO, 2023). Commencements have continued to grow throughout 2023 on an annual basis, which indicates an increasing pipeline for future housing output (McQuinn *et al.*, 2023). There were 8,452 new dwelling completions in Q3 2023, marking an increase of 14.4 percent on the same three months of 2022 (CSO, 2023).

Figure 10: Dwelling Completions RoI (actual and forecast) 2017-2024



Source: CSO 2023, ESRI 2023. O'Leary 2023

McQuinn *et al*. (2023) suggest that while moderating building costs can likely act to support production by stabilising input prices, nonetheless, other potential headwinds to the construction sector may begin to challenge the viability of projects. A continuation of house price declines in real terms, as evidenced over the past number of months in 2023, may dampen new supply as providers question viability and sales prospects. In addition, they outline how credit to construction is becoming more expensive as interest rates rise. This is suggested to increase the cost of existing liabilities and increase the cost of production through investment and working capital channels. McQuinn *et al*. imply that both of these effects are likely to act as a drag on the growth in housing production.

However, McQuinn *et al.* (2023) postulate that increasingly active State investments and policy supports in the construction sector may counteract these effects. The construction sector is likely to be operating at or close to capacity at present given the extremely low unemployment rate and tight labour market. This is reported likely to put upward pressure on wages in the period ahead and could dampen output. Given these considerations, McQuinn *et al.* expect housing completions to reach

29,000 in 2023 and 30,000 in 2024 (Figure 10 - Forecast 1).

On the back of resilience of both recent housing completions and commencements, O'Leary *et al.* (2023) forecast that completions will grow to c. 35,000 in 2024. While there was some concern around new housing supply due to weaknesses in the private residential sector, increased government involvement is cited as having played an important role in reducing this risk and is considered an ongoing feature in 2024 and beyond (O'Leary, 2023, Figure 10 - Forecast 2)

8.2 UK and Other Markets

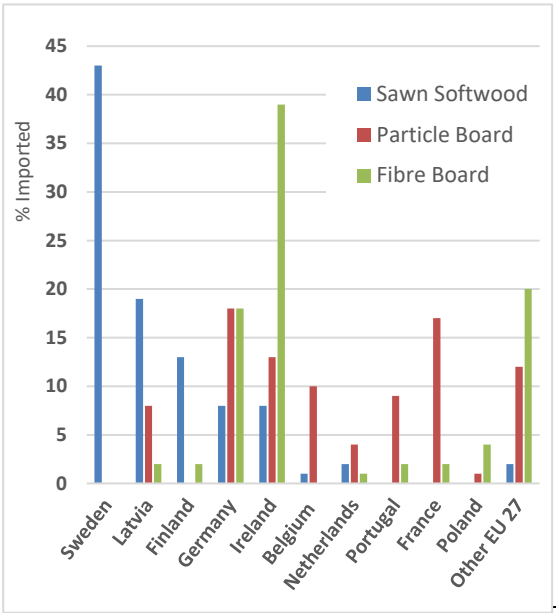
The United Kingdom (UK) is the largest single importer of timber in Europe. Wood imports to the UK in 2022 included an estimated 6.5 million m^3 of sawnwood (a 20 percent decrease from 2021) and 3.2 million m^3 of wood-based panels (15 percent decrease). Apparent consumption (timber used as wood and wood products by people and industries) was estimated at 48.3 million m^3 of wood raw material equivalent (underbark) in 2022, representing a 9 percent decrease from 2021 figures (Forestry Commission, 2023).

Overall timber import volumes into the UK in the first eight months of 2022 stood at 6.8 million m^3. This represents the lowest January to August total since 2016. A fall in softwood imports was reported as the main reason for the overall decline in imports, with softwood import volumes 25 percent lower than in 2021 and 16 percent lower that pre-pandemic volumes in August 2019 (Global Wood Market Info, 2023c).

The Forestry Commission trade statistics for 2022 reported that Ireland supplied 8 percent of the UK sawn softwood imports, reportedly up from 4 percent in 2021. Sweden, with 43 percent, Latvia, with 19 percent, Finland with 13 percent and Germany with 8 percent provided the majority of sawn softwood imports (Figure 11). Ireland supplied a reported 39 percent of the fibreboard and 13 percent of the particle board imports to the UK in 2022 (Forestry Commission, 2023).

The timber products market in the UK is subject to cyclical price fluctuations, reflecting trends in the UK economy. Issues such as timber supply uncertainly and exchange rate fluctuations also affect margins in a market which is extremely competitive at the best of times. Figure 12 presents the Euro-Sterling (€/UK£) relationship between January 2018 and September 2023.

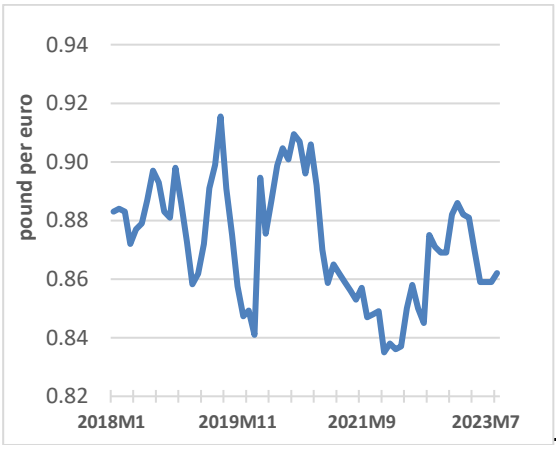
Figure 11: Country of origin of wood imports (per cent) to the UK in 2022



Source: Forestry Commission, 2023

The Euro has shown a trend of downward momentum against Sterling, from 0.886 in February to 0.859 in August 2023. A stronger Sterling can positively impact the competitiveness of Irish timber exports to the UK. The AIB summary of exchange rate forecasts places the Euro-Sterling in the 0.84-0.90 trading range during 2024.

Figure 12: Euro - Sterling Exchange Rate Jan 2018 to September 2023



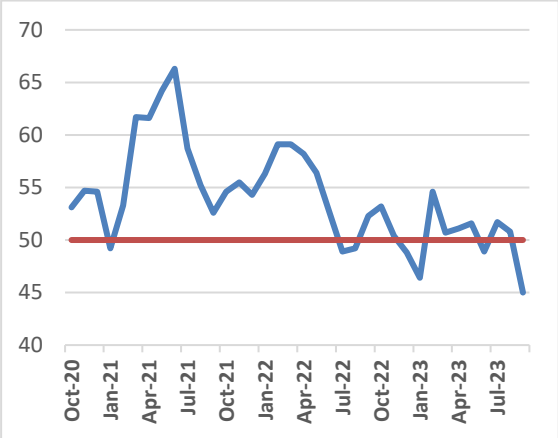
Source: European Central Bank, 2023

8.3 UK Economy

Figure 13 presents the S&P Global/CIPS Construction PMI between October 2020 and October 2023. Readings over 50 indicate growth.

February 2023 saw the strongest rate of growth in the sector since May 2022 with the reported smallest number of supplier delays since January 2020. The index for June was 48.9 score, below the 50 mark, indicating negative growth. There was a significant increase in overall construction in July (51.7) which was the highest recorded since February 2023. The index recorded a score of 45 in September, down from 50.8 in August and well below the neutral mark for the first time since June.

Figure 13: S&P Global/CIPS UK Construction PMI Oct 2020 to Oct 2023



Source: www.cips.org

All three segments of construction reportedly experienced a reduction in business activity following the steep, accelerated fall in house building. 'Shrinking order books' also reportedly slowed employment growth, with respondents significantly lowering their business activity expectations for the year ahead. The impact of high mortgage rates and low house buying demand were identified as factors flowing through the supply chain and negatively impacting the UK construction industry (www.cips.org).

Timber Development UK (TDUK) reported timber imports remaining steady in 2023 with markets recovering from the dramatic peaks and troughs over the previous few years. Though overall the 2023 level remains below 2022, the deficit in import volume continued to reduce, down to 5 percent in January to July compared to 7 percent in January to June. Import volumes in July were reported as fluctuating in a more gradual fashion with buyers importing timber at a more realistic pace compared to the previous three years (TDUK, 2023).

Going forward, a more pessimistic market picture was cited, with predicted declines in private housing and repairs, maintenance and improvements (RMI) heading into 2024. These two sectors are reported as being core drivers of timber demand, but high interest rates and sticky inflation were forecast to contribute to struggles in both sectors in autumn/winter 2023. However, TDUK also cited some room for positivity in the long-term, with timber demand predicted to increase given the urgent need to decarbonise the built environment. It also referred to the imminent release of the UK Timber in Construction Roadmap which will outline policies capable of expanding low-carbon timber construction, particularly in housing (TDUK, 2023).

According to the UK Construction Products Association (CPA) Forecasts (autumn, 2023), construction output is expected to fall overall by 6.8 percent in 2023, similar to the 7.0 percent contraction forecast in the summer of 2023. A further marginal fall of 0.3 percent is forecast in 2024, representing a revision down from 0.7 percent growth in the Summer Forecast. Both private housing and private housing RMI are forecast to be the most affected by the prevailing economic conditions of flatlining growth, stubborn inflation and interest rates suggested to remain at peak throughout (CPA, 2023).

9. Timber prices

Published timber price data has again been limited during 2023. Magner (2022) reported that Coillte prices are no longer available because of market sensitivities. The UCD Wood Price Quarterly for standing private timber sales has been impacted by lack of available price data. IFA Market reports, based on timber price surveys, have been published on a quarterly basis.

Private timber prices presented are indicative and can fluctuate according to factors such as region, forest type, harvest type, timber quality, woodlot size and access. The breakout of product assortments at clearfell will also vary significantly based on factors such as forest age, timber quality, the extent and quality of previous management interventions, including forest thinning, and decisions on timber assortments made at time of harvesting. Forest owners can greatly benefit from becoming familiar with the range of markets available and accessing a range of quotations when marketing and selling timber.

Table 3: Indicative timber assortment prices July-Sept 2023 delivered to mill gate

Product	Length (m)	Diameter (cm)	Mill Gate prices Q 3, 2023 (€/tonne) (ex VAT)
Pulp	3		41 - 47
Pallet	3.1	14+	65 - 75
Pallet	3.7	14+	74 - 85
Sawlog	4.9	18 - 20+	86 - 105

Source: Industry sources during 2023
Note: Prices are indicative mill gate (delivered in), expressed as € per tonne, and can vary according to a range of factors

Table 3 presents indicative timber assortment (mill gate) prices for the period July to September 2023. These figures were compiled by Teagasc, based on feedback from industry sources. Mill gate prices are those paid by the buyer for timber delivered to the yard/sawmill. In this scenario, the forest owner pays for the costs of harvesting and haulage to the sawmill or processing point. Indicative costs for such harvesting and extraction range from €18 to €24 per tonne for thinning and €12 to €14 per tonne for clearfell. Haulage costs (to mill gate) would be in the order of €10 to €14 per tonne, but may vary according to outlined factors.

The Irish Farmers' Association (IFA) Farm Forestry Timber Price survey comparing the periods January to March and April to June 2023 is shown in Table 4.

Table 4: IFA Farm Forestry Timber Price Surveys, Quarters 1 and 2, 2023

Product	Length (m)	Diameter (cm)	Roadside Price Q 1, 2023 (€/tonne) (ex VAT	Roadside Price Q 2, 2023 (€/tonne) (ex VAT)
Pulp	3	< 7	32-40	35-45
Stake	1.6	>8 <15	38-48	42-52
Pallet	2.5	14+	42-50	50-57
	3.1	14+	60-65	58-62
	3.4	14+	65-70	63-75
	3.7	14+	68-74	65-80
Sawlog	4.9	20+	85-95	83-96
	5.5		88-105	91-110

Source: IFA Farm Forest Timber Price Surveys 2023, Note: Prices are roadside and expressed as € per tonne

These prices, quoted as roadside (Ex VAT), were sourced from forest owners, forestry companies and sawmills. Timber markets were reported as showing a recovery from the previous period in Q1, 2023 and remaining relatively stable in Q2, with generally no significant changes in prices across timber products (www.ifa.ie).

It should also be noted that the price ranges provided are indicative rather than absolute. Prices are expressed as roadside sales (where the timber is sold to the buyer on the forest road and the harvesting contractor is paid by the forest owner) and in euro per tonne.

10. Forest Certification

Forest certification is a mechanism by which the quality of forest management is judged against a set of agreed standards and how forest monitoring, tracing and labelling of timber, wood products and non-timber forest products is carried out (Teagasc, 2021). Forest Certification incorporates two processes:

- Assessment of forests to determine if they are being managed according to agreed standards, known as Forest Management Certification
- Labelling of wood that has been harvested from a well-managed forest, known as Chain of Custody Certification

Meeting certification standards involves a chain of custody traceability and evidence of compliance with environmental and social principles. There are financial costs associated with certification, both in terms of administration and changes in management practices. Although certification may not translate into higher timber prices, it will provide better access to national and international markets, providing a competitive advantage.

With the timber supply forecast from Irish forests set to increase significantly in future years (see Section 7), the urgent requirement for certification must now be in sharp focus. As the relative overall proportions of available certified timber volume falls, the demand for further certification across private timber supply will continue to increase sharply.

A study commissioned by COFORD on private forest certification in Ireland established that only 5.7 percent of private forests in Ireland, representing an area of 15,680 ha, are certified (Forestry Services *et. al.,* 2022). In terms of market access, a survey questionnaire was completed by entities in the

processing and wood panel sectors. Lack of forest management certification was identified by 40 percent of survey respondents as an issue for them purchasing timber from the private sector within the past year. Ninety percent of respondents indicated that the lack of forest management certification will be an issue regarding purchasing timber from private forests in the future.

The certification study describes how 55.4 percent of total roundwood could be sourced from the private sector over the next 20 years. A 70 percent rule for certification claims applies, which involves a concession to certificate holders, allowing limited mixing of certified and uncertified material). Assuming this 70 percent threshold remains in place, then approximately 24.6 million m^3 will require certification in the long term (Forestry Services *et al*, 2022a).

An estimated 2.9 million m^3 of timber from private forests will need to be certified over the next 5-year period. This is estimated in the study to represent approximately 2,000 forest owners. In the absence of increased certification, timber processors will either have to import additional certified timber to meet this 70 percent threshold and/or develop markets for non-certified material (Forestry Services *et al.,* 2022). The COFORD study suggests that this could result in a decrease in timber price for uncertified timber and a scenario involving the withholding of timber by the private sector in anticipation of developing markets.

As harvesting levels in the private sector are projected to surpass those in state forestry by 2026 (see figure 8), the aforementioned study highlights the urgency of increasing the area of certified private forestry in order to help ensure future access to timber markets. It also provides a series of recommendations to help facilitate certification uptake by private forest owners.

Voluntary forest certification schemes are run by international non-governmental organisations to promote good forest practice. There are currently two certification schemes available in Ireland - the Programme for the Endorsement of Forest Certification (PEFC) and the Forest Stewardship Council (FSC) (DAFM, 2023). Voluntary forest certification links the demand for forest products to environmental and social standards to producers to show that wood or wood products come from certified forests. All major Irish sawmills are certified.

The COFORD-commissioned study concluded that a national group certification scheme is the only sustainable approach that can adequately address identified barriers. It also suggested the need for the establishment of a new legal entity, supported by a representative steering group with representation and collaboration across the forestry sector (Forestry Services *et al.*, 2022).

In this regard, work has been underway during 2023, through a stakeholder working group, to develop membership criteria and rules for an Irish Group for Forest Certification Scheme. A draft management manual is being finalised to provide information regarding the operating structure, policies and procedures for the Group Certification Scheme. It is being developed to comply with Sustainable Forest Management standards of both the Forestry Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC).

11. Renewable Energy

Bioenergy represents the largest source of renewable energy globally but only a small percentage of Ireland's total energy use. The Renewable Energy Directive is the legal framework for the development of renewable energy across all sectors of the EU economy.

The directive establishes common principles and rules to remove barriers, stimulate investments and drive cost reductions in renewable energy technologies, and empowers citizens, consumers and businesses to participate in the clean energy transformation (European Commission, 2021).

In December 2018, the recast Renewable Energy Directive 2018/2001/EU entered into force and has been legally binding since 2021. It is an important part of the *Clean Energy For All* European package, aimed at keeping the EU a global leader in renewables and, more broadly, helping the EU to meet its emissions reduction commitments under the Paris Agreement.

As part of the European Green Deal, the European Commission has committed to achieving a series of actions under the Fit for 55 Package. (European Council, 2022). It is a highly significant, cross-sectoral package detailing the binding actions, by which it is proposed the EU will reduce greenhouse gas emissions by at least 55 percent by 2030 as compared to 1990 levels. The Fit for 55 package consists of proposals to amend existing legislation as well as new initiatives in climate, energy & fuels, transport, buildings, land use and forestry.

The increased ambition under the Renewable Energy Directive to set a target of 40 percent of gross final consumption of energy being met from renewable sources by 2030 is of particular interest to Ireland (DAFM, 2022c). DAFM continues to support farmers, foresters and landowners participation in this energy transition through achieving energy use efficiencies, the deployment of renewable energy technology sources for self-consumption and in the provision of biomass feedstocks (DAFM, 2022c).

The Climate Action Plan 2023 identified the utilisation of biomass as a key fuel for decarbonisation. The Support Scheme for Renewable Heat (SSRH) is a government funded initiative designed to increase the energy generated from renewable sources in the heat sector. The second phase of the SSRH was launched in June 2019. It provides ongoing operational support/tariffs for businesses, farms and other non-domestic heat users for the ongoing use of biomass as well as anaerobic digestion systems. The scheme is designed to support up to 1,300GWh of renewable heat per year (DCCAE, 2019). The 2023 National Bioenergy Conference heard of further endeavour required to improve perception barriers to the uptake of biomass energy (Robb, 2023).

Increasing uptake levels of the SSRH can stimulate demand for small logs and wood chip. While there is a growing supply of forest-based biomass forecast to become available over the period to 2040, a key challenge in future years will be to develop and ensure a balanced approach that optimises development of Ireland's wood resource. This approach is one which best meets the needs of both the wood processing and energy sectors. This challenge comes against the backdrop of an increasing overall wood supply deficit, as described by the COFORD Wood Mobilisation and Forecasting Group (CWMFG, 2018).

To support the need to decarbonise the heat sector, Government has agreed to the introduction of a Renewable Heat Obligation (RHO) which is set to be introduced in 2024. The RHO will support an increased use of renewable energy in the heat sector and contribute to a reduction in emissions in line with Ireland's climate ambitions. As Ireland imports most of its fossil fuels, the heating sector is a significant contributor to Ireland's high energy import dependency. The RHO will also help reduce Ireland's reliance on imported fossil fuels and its energy security due to greater diversification of its energy streams (DECC, 2023a).

12. Brexit

The impact of Brexit continues to be felt through new requirements for both import controls and for export certification. In 2021, operational responsibility for import controls at Dublin Port, Dublin Airport and Rosslare Europort were transferred to DAFM's new Import Controls Operations Division. Forestry imports from Great Britain (GB) have largely been via 'roll-on roll-off' transport through Dublin Port, but there is also trade of coniferous roundwood into a number of regional ports (DAFM, pers. comm.).

The GB market is of enormous importance for the Irish forest sector. Upon leaving the EU, new phytosanitary requirements applied, including the requirement for an exporter of a controlled commodity to obtain a Phytosanitary Certificate from DAFM, which involves inspection and the issue of an official document by the Department to the exporter. In order to meet this new demand from the exporting sector, a new IT system, the Export Certification System (ECS), was developed and made available to the sector through an on-line portal. Exporters were briefed throughout on the new requirements and the mechanism for application for Phytosanitary Certificates, backed up by training. New staff were recruited by DAFM to deal with this new requirement (DAFM, pers. comm.).

As a result of the United Kingdom leaving the EU and then the Single Market at the end of the transition period, coniferous roundwood with bark originating in the United Kingdom (Great Britain) became subject to mandatory import control. Prior to 31st December 2020, roundwood from the Pest Free Area could be imported with a Plant Passport, but without official border controls and mandatory inspections. The new requirements for the importer include the need to source a Phytosanitary Certificate from the United Kingdom authorities and to provide advance notification of the import, together with the Phytosanitary Certificate to DAFM. Under the Official Controls Regulation (EU 2017/625), imports of controlled commodities can only be made through officially designated and approved places of import called Border Control Posts (BCPs) and it is at these that DAFM, through the Forestry Inspectorate, carries out Official Controls on imported goods (DAFM, 2023).

ISPM No. 15, is the FAO IPPC, International Standard for Phytosanitary Measures, Regulation of Wood Packaging Material in International Trade. ISPM 15 describes phytosanitary measures to reduce the risk

of introduction and/or spread of quarantine pests associated with wood packaging material made of raw wood, in use in international trade. In practice, wood packaging material made from unprocessed raw wood and used in supporting, protecting or carrying a commodity, must be subject to a specific phytosanitary treatment (e.g. heat treatment). In addition each individual unit of the wood packaging material must be marked on at least two sides with the officially approved ISPM No. 15 mark verifying the treatment and incorporating the country code and the registration number of the producer of the packaging.

Wood packaging material, associated with exports of goods of all kinds from Ireland to most non-EU countries around the world, is required to comply with ISPM No. 15. Since January 1st 2021, this requirement also applies to wood packaging going from Ireland to Great Britain. ISPM No. 15 thereby facilitates exports by Irish companies, which are being transported using wooden pallets, crates, loose wood dunnage etc. In Ireland there are currently 52 companies authorised to treat WPM to ISPM 15 Standard. The Forestry Inspectorate is responsible for the national implementation of ISPM No. 15.

13. Developments in the Bioeconomy

The substitution of fossil resources with sustainably produced biomass to facilitate decarbonisation and continued economic growth is central to the concept of the bioeconomy. The recently-published Bioeconomy Action Plan 2023-2025 (DECC, 2023b) identifies agriculture, food, forestry and the marine (comprising Pillar 4 of the bioeconomy) as a key sector for biomass and biomaterial generation. It includes actions which will continue to develop Bioeconomy demonstration initiatives, expand advisory support services and support the re-circulation and upcycling of biobased materials.

The Bioeconomy Action Plan also identifies that knowledge and innovation play a crucial role in helping farmers, foresters, fishers, and rural communities meet current and future challenges. To ensure that bioeconomy knowledge is shared between everyone who uses and produces it, and that people are connected, effective Agriculture Knowledge and Innovation Systems (AKIS) are needed. These actions seek to develop innovation support services focused on the deployment of biobased business models across all sectors.

14. Forests and Climate Change

Appropriate measures and actions in the forest sector provide opportunities to mitigate greenhouse gas emissions, not only through the sustainable management of existing forests and the creation of new ones, but also in the active storage of carbon in harvested wood products. In 2021, COFORD issued a series of statements informing the general public and policy makers of the critical importance of both forests and forest products in achievement of commitments with regard to climate change mitigation and adaptation.

14.1 Forests, Land Use and Climate Change Mitigation

14.1.1 Climate Action Plan

Historically, forest and harvested wood products (HWP) have been critical to offset LULUCF emissions, but this offsetting potential has been declining in recent years (EPA, 2022). The key factors associated with this transition include reduced afforestation levels, increasing harvest levels in the private sector, declining growth rates with age class legacy shifts and recent changes to the Emission Factors (EFs) from forested organic soils (EPA, 2022; Black et al., 2022, 2012; Jovani-Sancho et al., 2021).

While the growing stock is increasing in Irish forests, there is potential for the increased harvest of wood products, COFORD estimates that Irish forests have potential to increase supply of roundwood from 4M m3 per year to over 7.9 M m3 by 2035 (COFORD, 2021). The emission/removal trends excluding HWP for managed forest land (MFL) reflect a transition from a sink to a source of emissions in 2018, with consistent increases in GHG emissions (from 420 Gg in 2018 to 2,161 Gg CO2e by 2025 (FERS & DAFM, 2018). The GHG profile of all forest land is expected to be a net emission by 2025 even if current afforestation targets of 8,000 ha per year are met (Lanigan et al., 2023)

Ireland's CAP 2023 outlines the uncertainties evident in the LULUCF sector with regard to underlying data and emission factors. It also indicates that such uncertainties are being addressed through relevant research projects and over the short to medium term, further substantial revisions are forecast (DECC, 2023).

The Climate Action Plan (CAP) 2023 describes the measures and actions required under the Land Use, Land Use Change and Forestry Sector (LULUCF).

Pending the establishment of LULUCF sectoral ceilings, the 2023 Climate Action Plan committed to accelerating the taking of measures and actions to achieve enhanced emission reductions in the LULUCF sector. These included the following:

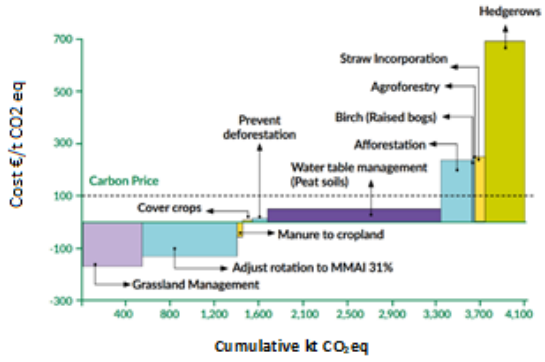
- Increasing annual forest establishment rates from 2,000 hectares (2021/2022) to 8,000 ha per annum from 2023 onwards, achieving a total of 68,000 ha by 2030.
- Developing, assessing and adopting the new Forestry Programme and Coillte's Strategic Vison
- Promoting forest management initiatives in both public and private forests to increase carbon sinks and stores

It is worth noting that although revision of the LULUCF Regulation leaves the no-debit rule and accounting methods in place for 2024-2025, from 2026 it raises the bar. Instead of no-debit, the revision sets a Union-wide target of making the LULUCF sector a net carbon sink, removing 310 Mt of CO_2 by 2030 (Hyyrynen *et al.*, 2023)

14.1.2 Teagasc MACC 2023

The Teagasc Marginal Abatement Cost Curve (MACC) provides a graph that visualises the abatement potential of greenhouse gas (GHG) mitigation measures and the relative costs associated with each of the measures included. It also helps stakeholders make informed decisions about how to allocate resources for emission reductions. It provides insights in to the cost-effectiveness of different abatement options and helps identify the least costly ways to achieve a given reduction target.

Figure 15: Marginal Abatement Cost Curve (MACC) for LULUCF in 2030 for Pathway 2 uptake Levels



Source: Lanigan *et al.*, 2023

Four distinctive MACCs have been developed. The LULUCF MACC (Figure 15) identifies the abatement potential and relative costs associated with measures that reduce emissions and enhance sinks associated with Land Use, Land Use Change and Forestry.

The LULUCF sector faces a range of challenges. Under business as usual, LULUCF emissions are projected to increase substantially to circa 10.5 million tonnes CO_2eq/yr by 2030. This projected increase in land-use emissions is due to a number of factors, including the age profile of Irish forestry and the relatively low afforestation rate over the last decade (Lanigan *et al.*, 2023). The potential contribution of forestry is describes as follows:

- By 2030, afforestation rates of 8,000 ha per annum could deliver only modest reductions of 287 ktCO_2eq per annum (Figure 15)
- Increased afforestation will, nonetheless, be required in order to obtain significant reductions in AFOLU emissions in the 2030-2050 period.
- Forest management (incentivising adjustment of the rotation age up to mean maximum annual timber volume increment (MMAI) achieved on between 21 percent and 31 percent of the current forest stock) could reduce emissions in 2030 by 394 and 890 ktCO2eq per annum for pathway 1 (21 percent forest area) and pathway 2 (31 percent forest area, Figure 15) respectively. This measure could increase timber yields. However the adjusted rotation scenario would also have other significant potential effects across the sector and its implementation should therefore be informed by a full socio-economic analysis and consultation within stakeholders involved.
- Preventing deforestation on 752 ha per annum will reduce sectoral emissions by 140 ktCO_2eq per annum for each year of the commitment period, resulting in over 1 Mt CO2 e abatement over the entire period.

It should be noted that the MACC 2023 uses the assumptions in the national inventory at the time of writing, but these are likely to change substantially as knowledge improves based on new science (Lanigan *et al.,* 2023).

14.2 Climate Change Adaption

COFORD (2021) describes the urgent need to develop adaptation measures to future-proof the outputs of goods and services from Irish forests. It recommends a range of measured and evidence-

based initiatives, supported by ongoing research, as well as frequent and careful monitoring and review. The COFORD Statement on the Impacts and Adaptation to Climate Change outlines key recommendations in areas such as, tree species/breeding/genetics, forest design, forest management, forest protection and a focus on cross-sectoral interdependencies.

14.3 Use of Wood Products

The increased use of wood products provides a pathway and opportunity to significantly reduce the embodied emissions of buildings. COFORD (2021) outlines how both sawn wood and more advanced engineered wood construction products (e.g. oriented strand board, cross laminated timber and laminated veneer lumber) offer a sustainable alternative to site-based high CO_2-producing construction materials, such as masonry, concrete and steel. This COFORD statement outlines how such high performance wood products are now deployed internationally in high-rise construction up to 24 storeys. Light timber frame is also a sustainable alternative to conventional masonry construction.

House building in Ireland is mostly low rise with timber frame accounting for only 24 percent, which is low by European standards. Analysis shows that increasing the use of timber frame construction and adopting new engineered wood technologies for high rise applications has the potential to reduce CO_2 equivalent emissions by an estimated 3.4 million tonnes by 2050 (COFORD, 2021).

The COFORD adaptation statement also highlights the importance of a whole life cycle approach to the evaluation of building emissions. This is now accepted as increasingly necessary to access the true carbon footprint of buildings and to achieve the current and future emissions reduction targets.

14.4 Carbon Farming

The European Commission defines carbon farming as "*a green business model that rewards land managers for taking up improved land management practices, resulting in the increase of carbon sequestration in living biomass, dead organic matter, and soils by enhancing carbon capture and/or reducing the release of carbon into the atmosphere, in respect of ecological principles*".

To facilitate and regulate the development of carbon farming (amongst other carbon removal methodologies), the European Commission published a Proposal in November 2022 for a Regulation on an EU certification for carbon removals (CRCF). This proposal sets out a voluntary EU-wide framework to certify carbon removals generated in Europe. It also sets out criteria to define high-quality carbon removals and the process to monitor, report and verify the authenticity of these removals with a timeline of 2030 for it to be fully operational. Negotiations and discussions on this proposal are ongoing.

Carbon farming could support GHG removals, through activities such as managing soils in a manner that increases the carbon stored (e.g., multi species swards, reduced ploughing, use of cover crops, etc), or through other land use activities such as forestry, peatland rehabilitation and hedgerow management.

As part of Ireland's commitments in the National Climate Action Plan 2023, the Department of Agriculture, Food, and the Marine (DAFM) has responsibility for the development of a national 'Carbon Farming Framework'. DAFM has recently conducted a public consultation on scoping out a Policy Framework for Carbon Farming. The objective of this public consultation is to obtain feedback from stakeholders on the scope of a Carbon Farming Framework for Ireland. Parallel to the public consultation, a multi-stakeholder working group will be established to oversee the development of a National Carbon Farming Framework. The findings of the consultation will inform their decision making on the scope of the National Carbon Farming Framework.

The European Commission proposal is being discussed by the European Parliament and the Council, in line with ordinary legislative procedure. Based on the QUALITY criteria, the Commission will develop tailored certification methodologies for the different types of carbon removal activities, supported by an expert group who will complete its work on baselines. An EU Carbon Farming Regulation is scheduled to be published in October 2024, before the end of the Commission's term. The operational phase of the process is set to commence in stages during 2025, to empower accreditation and certification bodies, establishment of a registry and other frameworks. A scheme is scheduled to be fully operational by 2030 (DAFM 2023h).

15. Forest Health

The Plant Health Regulation EU 2016/2031 and Official Controls Regulation EU 2017/625 came into

effect in December, 2019. DAFM's Forestry Inspectorate have responsibility for implementation of the forestry aspects of these Regulations through a range of relevant measures (DAFM, 2023). These include appropriate import controls, requirements for the implementation of Plant Passport systems, health surveys and contingency planning and requirements in relation to regulation of wood packaging materials in international trade.

The Plant Health Regulation sets out a list of priority pests (those pests whose potential economic, environmental or social impact is the most severe for the Union territory) for which DAFM is required to conduct mandatory annual surveys. The Regulation also sets out a comprehensive list of Union quarantine pests which must be included in a multiannual survey plan of five to seven years.

Ireland has Protected Zone status for 14 harmful organisms that are present in other EU member states but not present in Ireland. To justify Irelands Protected Zone status, the Forestry Inspectorate conducts national forest surveys and reports annually to the European Commission. For example a network of observation points, pheromone traps, bait logs and sampling points distributed around the country is used to monitor for the presence of regulated organisms and for general forest health monitoring purposes. No detection of any of these organisms was reported from surveys conducted in between 2019 and 2022 (DAFM 2023).

In December, 2022, DAFM launched the Mid-Term Report on the Plant Health and Biosecurity Strategy 2020-2025. The Plant Health and Biosecurity Strategy 2020-2025 sets out the importance of plant health and biosecurity for Ireland as well as ensuring that all stakeholders are aware of the risks to plant health, and their role and responsibilities to reduce that risk. The Strategy seeks to minimise the threat posed to plants by the potential introduction and establishment of plant pests and diseases.

The Mid-Term Report provided an assessment of progress across the 18 recommendations in the Strategy (DAFM, 2022b). A key deliverable under this strategy was the establishment of a Pest Risk Analysis Unit within DAFM. This Unit continuously monitors for emerging plant pest threats and conducts risk assessments on those pests deemed most important to Ireland.

Other actions to date include the investment in and upgrade of facilities at Border Control Posts, the expansion of plant pest surveillance capability, and a range of awareness-raising and education initiatives to support stakeholders in both meeting their legislative requirements and proactively protecting plant health.

Ireland has a comparatively good overall forest health status in that the forest resource is not subject to the range of pests and diseases that are endemic in Continental Europe and further afield. However, specific tree species remain seriously challenged by biotic pests with examples outlined below.

15.1 Ash Dieback

In June, 2023, Minister of State Senator Pippa Hackett commissioned an independent review into Ash Dieback support schemes. The review was to provide the Minister with advice and recommendations on a way forward in line with the new Forest Strategy. The Review Group met with a range of stakeholders, including forest owners affected by Ash Dieback The group also received written submissions.

The Review Group report was finalised and recently published. The report includes 13 recommendations which are available in the report including:

- A rapid and co-ordinated national response;
- The safe and comprehensive clearance and re-establishment of affected woodlands;
- Assessment of future supports for owners - to identify the broadest possible scope to resolve the situation;
- Used as a learning opportunity in the context of potential future risks for example:
    - Vigilance for possible future threats;
    - Have risk analysis and appropriate contingencies in place;
    - Looking at appropriate species and species mixes when replanting to build resilience in future forests.

Speaking at a recent Irish Agroforestry Forum's International Agroforestry conference (November 16), Minister of State Pippa Hackett indicated that an implementation plan for Ash Dieback is close to completion and the anticipation was that it would be brought to Cabinet for sign-off within weeks. The impact of Ash Dieback, not only on ash plantations, but also for confidence within the sector, was acknowledged as was the need to re-instill confidence in farmers across the country.

15.2 *Ips typographus / Ips cembrae*

The eight-toothed European spruce bark beetle was confirmed in Scotland for the first time according to a report in the Forestry Journal, dated 29th September 2023. A single case of *Ips typographus* was discovered in a trap in a Fife woodland, with no breeding populations reported (Haugh, 2023). It is believed that the *Ips* beetle arrived on the back of goods being shipped at Grangemouth, and was discovered due to Scottish Forestry's new surveillance programme to check for pests and diseases.

In response, Scottish Forestry initiated further surveys to ensure there are no other resident populations and have requested the forestry industry to remain vigilant regarding all tree pests and diseases. Since July 13, 2022, the *Ips typographus* demarcated area in the UK has been extended, placing restrictions on the felling, killing and movement of spruce in this area covering much of the South East, London, Hertfordshire and Essex.

Stakeholders within Irish forestry have recently expressed serious concerns about the potential introduction of the eight-toothed European spruce bark beetle, given the widespread damage caused to forests by the insect across Europe. Stakeholders have also highlighted the increased risks arising from the importation of logs from the pest-free designated zone in west Scotland and the need to consider appropriate controls to protect against the beetle introduction. These considerations include a proposed temporary ban on imports of timber with bark from that area.

DAFM recently described how all imports into Ireland must be compliant with the EU Plant Health Regulation and importers must be registered as professional operators. Similarly, any action taken by Ireland in response to threats from pests must be compliant with the EU Plant Health regulations and the International Plant Health Protection Convention. Importers in Ireland are prohibited from importing roundwood known to be affected by quarantine bark beetle species. DAFM indicated their continued engagements with Scottish Authorities, Northern Ireland and the European Commission to ensure that the pest free status of the island of Ireland is maintained. In addition, DAFM stated that all imports from the pest free area must be accompanied by phytosanitary certificates which are issued by the UK Government Authority, in alignment with the International Plant Protection Convention (Magner, 2023b).

The Scottish forestry authorities informed DAFM that the large larch bark beetle, *Ips cembrae*, had been detected in traps at three locations within the Pest Free Area (PFA) of Scotland during 2022 surveillance. This species is one of the six bark beetles for which Ireland has a Protected Zone and is the first recording of the beetle inside the Scottish Pest Free Area (PFA). Scottish Forestry has conducted inspections in surrounding areas and no evidence of beetle activity or the presence of a breeding population have been found. As a result of this finding, DAFM, in association with authorities of Northern Ireland, agreed that exports of larch roundwood and bark from the PFA to the Island of Ireland are suspended. Scottish Authorities have stated that they will not be issuing phytosanitary certificates for roundwood of larch from the PFA while wider surveillance is being completed.

15.3 *Phytophthora ramorum*

Since the first finding in Ireland of *P. ramorum* in Japanese larch in 2010, the Forestry Inspectorate has continued to conduct annual ground and aerial surveys of larch with the assistance of the Air Corps and Coillte. At the start of 2022 the disease had been confirmed present in Japanese larch at 56 forest locations affecting approximately 337 ha of forestry. There were four further forestry findings in Japanese larch in 2022 (DAFM, 2023).

At an EU level, the regulatory status of *P. ramorum* changed in 2022, following a review at the Standing Committee on Plant Health and other Commission Working Groups, as part of the wider revision of the Annexes to the Plant Health Regulation. EU isolates of the pathogen have been downgraded to regulated non-quarantine pest (RNQP) status. Non-EU isolates of *P. ramorum* will continue to be treated as Union quarantine pests. To date all findings in Irish forests have been EU isolates. This legislative change will impact on DAFM policy in relation to the disease (DAFM, 2023).

15.4 EU Plant Health Regulations and Import Controls

Import inspections of wood and wood products from third countries regulated under the EU Plant Health Regulation are routinely conducted to ensure compliance with entry requirements as part of the customs clearance process. In 2021, operational responsibility for import controls at Dublin Port, Dublin Airport and Rosslare Europort were transferred to DAFM's new Import Controls Operations Division (DAFM, 2023)

Imports from Great Britain began to be treated like other Third Country imports and there was an overall increase in the amount of import inspections carried out. In 2022, 795 third country consignments received a documentary check and where appropriate to the requirements, were physically inspected. Five were found to be non-compliant with the import requirements. Appropriate measures were taken where non-compliances were detected, depending on the nature of the non-compliance (DAFM, 2023).

DAFM also has a presence at Tivoli Docks, Port of Cork Company for the inspection of controlled wood and wood products coming into Ireland from third countries (mainly the USA and Canada). In 2022, 57 consignments received a documentary check and if appropriate to the requirements, were physically inspected. All were found to be compliant with the import requirements. DAFM also has an office in Waterford port and this services shipments coming into other ports as required.

16. Knowledge Transfer Group Scheme

Senator Pippa Hackett, Minister of State for Biodiversity and Land Use, re-opened the Forestry Knowledge Transfer Group (KTG) scheme in July 2023. The aim of the forestry KTG scheme is to increase awareness of sustainable forest management amongst forest owners and optimising their resource from an economic, environmental and social perspective. The Scheme incorporates topics covering options such as continuous cover forestry, agroforestry and building forest resilience (DAFM 2023i). Since the schemes inception in 2017, DAFM has funded the involvement of approximately 2,400 forest owner participants.

17. Outlook for 2024 and beyond

17.1 EU Outlook

The European Green Deal aims to set the EU on a path to green transition, with the ultimate goal of reaching climate neutrality by 2050. The EU Forest Strategy for 2030 is one of the flagship initiatives of the European Green Deal. It also builds on the EU Biodiversity Strategy for 2030. The EU Forest Strategy seeks to contribute to achieving the EU's biodiversity objectives, as well as greenhouse gas emission reduction target of at least 55 percent by 2050. It recognises the central and multifunctional role of forests, and the contribution of foresters and the entire forest-based value chain in achieving a sustainable and climate neutral economy by 2050 and preserving lively and prosperous rural areas (Ec.europa.eu, 2021).

The EU Forest Strategy seeks to develop the socio-economic functions of forests as thriving rural areas and to boost the forest-based bio-economy within sustainability boundaries. It also seeks to protect, restore and enlarge the EU's forests to combat climate change, reverse biodiversity loss and ensure resilient and multifunctional forest ecosystems.

17.2 Food Vision 2030

The Food Vision 2030 Report (Government of Ireland, 2021) sets out a strategy for the Irish agri-food sector to ensure its economic, environmental and social sustainability to 2030. Mission 1 sets out goals to achieve a climate smart, environmentally sustainable agri-food sector. In meeting these needs, the Food Vision Report highlights that the direction should be towards diverse multifunctional forests that strengthen the economic viability of rural communities, the protection of our environment and building resilient forests in the face of climate change.

17.3 Afforestation

The measures proposed in Ireland's Forest Strategy Implementation Plan (DAFM 2023c) aim to re-engage landowners, including the farming community, in afforestation, through a range of approaches:

- Introduce new sources of income for qualifying applicants to bridge the gap between the last premium payment and the availability of revenue from timber;
- Make the planting of small forests more attractive to farmers;
- Offer higher payments for forests that deliver more environmental benefits;
- Improve awareness amongst the general public regarding the benefits of forestry and make forests more accessible for recreation and amenity;
- Achieve enhanced biodiversity;
- Adopt measures to address species diversity;
- Increase the resilience of the national forest estate to the effects of climate change (climate adaptation).

There is a clear urgency to sustainably increase planting rates and make progress towards stated

planting targets in 2023 and future years. This is critical not only to Ireland's forestry sector, but also in terms of forests' vital role in climate change mitigation, rural development and renewable energy provision. The Afforestation Scheme provides a range of options for landowners considering planting and feedback from the sector highlights the clear need for a balanced planting programme that incorporates the requirements for Ireland's future timber needs within the sector.

The Native Tree Area (NTA) Scheme, launches on October 4, 2023, is outside the Afforestation Scheme, and allows for a simpler application process for native tree planting, where the 'footprint' planted is less than 1.0 ha in area and where undertaken in specific locations. The scheme facilitates the creation of new small-scale native forests which can deliver meaningful ecosystem services that can include the protection and enhancement of water quality and aquatic ecosystems in suitable locations. These forests can also provide wider biodiversity functions by protecting and expanding existing native forests. Approvals are issuing for the NTA in a matter of weeks in most cases. Since its recent launch, DAFM has received 25 applications for the Native Tree Area Scheme, with 8 approvals issued (DAFM, pers. comm., 2023)

Substantial supports within the Forestry Programme 2023-2027 will need to be combined with provision of strong support to farmers and landowners in re-engaging with forestry and reinvigorating confidence regarding its many benefits. In this regard, given the potential challenges/constrains outlined in section 3, the extent and type of planting take-up in 2024 will be pivotal for the forestry sector. A range of supportive actions and a fully co-ordinated approach by all stakeholders is also required to help initiate an upward trend in planting levels.

17.4 Sustainable Forest Management

The Forest Strategy 2023-2030 (DAFM, 2023a) outlines how all forest types can deliver benefits to the economy, environment and society. The choice of management approach will result in trade-offs between the forest types and the range of benefits they can provide. Each will have its advantages and disadvantages depending on the objectives and purpose of the forest. It will mean applying the most appropriate forest management approaches for the objectives set for a forest, whether it be even-aged forests with a commercial focus, closer-to-nature forests, semi-natural forests or agroforestry but within the overall framework of Sustainable Forest Management (DAFM, 2023).

Ireland's Forest Strategy Implementation Plan (DAFM 2023c) aims to support sustainable management through a range of approaches. Intervention 4 will support the development of privately and publicly owned forests. The primary objective is to offer forest owners a range of schemes to manage their forests sustainably and increase the delivery of ecosystem services, biodiversity, regeneration capacity and vitality.

The DAFM Forest Strategy Implementation Plan also contains a proposed Payment for Ecosystem Services (PES) Pilot Premium Structure. This proposed pilot initiative aims to promote the longer-term sustainable management of forests. It proposes that applicants, out of premium, or who never received a grant payment, would be considered for approval to select PES option(s) in accordance with the management practice selected for practices such as native woodland conservation, CCF, seed stand management, environmental enhancement, creation of public access or planting for water protection.

17.5 Mobilisation of our timber resource

To meet the needs of a future circular economy, there is increasing demand for sustainable wood products. The forest sector holds significant potential for sustainably increasing supply. Estimates indicate that the annual potential roundwood supply will increase from 4.7 million m^3 in 2021 to 7.1 million m^3 by 2035, with the increase largely driven by the private sector, with softwood timber from conifer species being the main component (DAFM, 2023).

Ongoing sustainable management of forests, including timely thinning operations, where appropriate, will help optimise forest productivity, whilst also facilitating ongoing mobilisation of the timber resource. Intervention 3 of the Forest Strategy Implementation Plan, incorporates 9 measures supporting infrastructure and technology investments. These include a Forest Road Scheme and additional support elements, investment aid for the development of the forest tree nursery sector and support for innovation and development of technology tools via a Forest Technology Challenge Grant.

As more of Ireland's private forest estate approaches maturity, it is essential that markets are developed for the increased use in hardwood as well as conifer species. This will require increased

support for research and innovation towards developing and/or stimulating new and emerging markets.

Net realisable timber production from private Irish forests is forecast to increase from 2.4 million m^3 in 2024 to over 3.49 million m^3 by the end of the decade (COFORD, 2021). The prediction that, by and large, growth in the sawmill and wood based panel demand can be met on the island of Ireland by 2025 is based on increased State investment in forestry and county roads, as well as continued and sharp focus on the reduction or elimination of other barriers to identified wood mobilisation (CWMFG, 2018). An urgent focus on the rapid expansion of forest certification in the private forest sector has been identified as essential to ensure the sector is well positioned to meet future timber market requirements (Forestry Services *et. al.*, 2022).

Timber harvest and mobilisation from first and subsequent thinnings is likely to continue to be the major component of the wood-based panel (WBP) sector and the growing wood biomass sector. It is essential that appropriate and timely thinning continues to be promoted and facilitated in private forests that are suitable for this important silvicultural practice.

The export-oriented sawmilling sector will continue to compete in a challenging market environment, with EU/UK-related developments likely to have significant impacts post 2023. Engagement with the timber processing sector indicates strong confidence in their ability to process the available timber forecast to come on the market in future years. Sustained progress in the licencing of forest roading and felling activities is also deemed essential to enable sustainable wood mobilisation and supply to domestic and export timber markets.

Engagement with timber buyers also provides insights into the continued demand for timber to meet the ongoing requirements of the processing sector. Competitive timber prices can be paid for well managed forests with good quality timber, adequate road access and felling licences in place, proximity to markets, and economically advantageous plantation size. The ongoing development of forest owner entities will continue to help facilitate and support additional thinning and harvesting capacity and timber supply.

The cascading principle for the priority uses of wood is a key driver for how we will use wood in the future. This approach is described in the EU Forest Strategy, where it proposes the use of wood according to several ordered priorities as follows:

1. Wood-based products; followed by
2. Extending their service life; then
3. Re-use;
4. Recycling;
5. Bioenergy, finally cascading down to
6. Disposal.

This approach will help to ensure that wood is used to substitute more carbon-intensive products as much as possible and deliver the highest value for carbon storage (DAFM, 2023a).

17.6 Forest Health

With increasing levels of new and emerging trade and greater mobility of larger numbers of people, the risk from the introduction of exotic pests and diseases is ever present. Forests are also vulnerable to damage from abiotic factors such as fire and wind. Changes in climatic conditions can exacerbate the risks from pests and diseases as fluctuations in temperature, rainfall and extreme weather events can potentially affect the patterns of migration and impacts of pests.

The recent first finding of *Ips typographus* in eastern Scotland is reflective of the significant risks that need to be constantly monitored along with appropriate and flexible responses as circumstances invariably change. This will be critical in terms of maintaining the integrity of our forest health status.

17.7 Promoting Timber in Construction

The new Forest Strategy places a strong emphasis on the use of timber and its important role in reducing the amounts of carbon-intensive materials used in construction. Not only is wood a sustainable, home-grown product, but it can also replace steel and concrete, reducing the carbon footprint of our buildings. Timber used in construction is an excellent way of storing and locking up carbon, and has a positive impact on our climate (DAFM, 2023j).

A new Inter-departmental and Industry Steering Group on Timber in Construction convened its first meeting in November, 2023. The mission of the Interdepartmental and Industry Steering Group on Timber in Construction is to develop a forum with Government and Industry to work collaboratively:

- To create the conditions to increase the use of timber in construction, whilst ensuring the

highest degree of building safety and property protection;
- To examine regulatory and standardisation standards challenges; and
- To maximise the use of home-grown timber in construction

17.8 UK Market

Despite challenges, Ireland's forest sector is very well positioned to capitalise on existing and future market opportunities with our contiguity to the UK, which imported 6.5 million m^3 of sawnwood and 3.2 million m^3 of wood based panels in 2022 (Forestry Commission, 2023). Maintaining a flexible, responsive and market-focused approach is central to guiding the industry through market challenges that can arise. There is also a positivity from timber processors that such challenges can be met if appropriate levels of timber mobilisation are achieved.

17.9 Forest Investment Scenarios

The trading of semi-mature forest properties and related investment packages shows continued evolution. Such packages include proposals on the forward selling of timber harvest rights. This relatively new development in the private forest sector may involve a range of investment scenarios and options for private forest owners.

A full analysis of such investment scenarios from economic, legal and taxation perspectives is pivotal to developing insights into the merits of this expanding forest investment sector. It is also critical in terms of ensuring that the considerable value underpinning productive forests can be fully realised by owners. In appropriate cases, interest in semi-mature plantations may provide options to address landowners concerns over the perceived long production cycles and reduced asset liquidity associated with forestry.

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Farm level Sustainability
Environmental Dimension 2023 Review

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1. Introduction

As depicted in Figure 1 the sustainability of a farm is based on the intersection between the economic, environmental, social and innovation dimensions of that farm. The sustainability of a farm is dependent on strength of these dimension. Failure on a single dimension can threaten the long term sustainability of a farm.

Figure 1: Dimensions of Sustainability

Other chapters have focused on the economic outlook for different farm types. This chapter looks at the sustainability of farms on the environmental dimension with specific focus on gaseous emissions. This covers the greenhouse gas (GHG) and ammonia (NH_3) emissions emitted at farm level.

Farm level emissions are estimated based on activity data multiplied by an emission factor. The 2022 Teagasc sustainability report (Buckley & Donnellan, 2023) sets this out in greater detail and reports results for 2022, as well as a number of preceding years. This sustainability analysis uses activity data from the Teagasc National Farm Survey (Teagasc, 2023) and emission factors from national inventory accounting methods for GHG (Duffy et al., 2023) and ammonia (Hyde et al., 2023). With the exception of some emission factors that relate to the dry matter intake of animals, generally speaking, emission factors tend to remain relatively static in the short to medium run until new scientific evidence emerges. Hence, GHG and NH_3 emission projections for 2023 in this chapter are based mainly on changes on farm activity levels. Farm based activity levels in 2023 are estimated with reference to the Teagasc National Farm Survey using 2022 as the base year.

The Teagasc National Farm Survey (NFS) which is part of the EU Farm Accountancy Data Network (FADN) contains a sample of 793 farms from across Ireland in 2022. The survey collects data on an annual basis on livestock numbers, cropping area, inputs and outputs, assets and liabilities, direct payments under the CAP and family farm income. This dataset is primarily collected to report on farm incomes to the EU Commission (as per EU member state requirements) but has been expanded in Ireland in recent times to report on the environmental sustainability of Irish farms.

The Teagasc NFS is based on a nationally representative random sample which is selected in conjunction with the Central Statistics Office (CSO). Each farm is assigned a weighting factor so that the results of the survey are representative of the national population of farms (a total of 85,951 farms are represented in this study for 2022). Within the Teagasc NFS, farms are classified into major farming systems according to the standardised EU typology as set down by EU Commission. Results on the GHG and ammonia emission of the four main land based farm systems in Ireland, namely, dairy, cattle, tillage and sheep are reported here.

2. Methodological approach to estimating 2023 farm level gaseous emissions

From an activity level perspective two things that can significantly influence emissions and where data is available for 2023 are animal numbers, and type and quantity of chemical N fertiliser & lime applied to land.

Animal Number Projections for 2023: The Central Statistics Office (CSO, 2023) publish bovine animal

numbers held on farms each June. Results from the CSO June 2023 survey were compared with those from 2022 and this showed a decrease in overall cattle numbers of 0.74% as seen by Table 1. However, this decrease was not uniform across the different categories of bovines. Dairy cows (+1.19%) and cattle 2years and over (+7.6%) numbers increased while other cows (-4.5%), bulls (-3.73%), Cattle 1-2 years (-1.39%) and Cattle under 1 year (-2.82%) numbers all declined.

Table 1: Changes in cattle numbers 2022 vs 2023

Animal inventories	2022 vs 2023
Total cattle	-0.74%
Dairy cows	+1.19%
Other cows	-4.50%
Bulls	-3.73%
Cattle: 2 years and over	+7.63%
Cattle: 1-2 years	-1.39%
Cattle: under 1 year	-2.82%

Source: CSO (2023)

For the ovine numbers, overall numbers are shown to have increased very marginally (+0.27%) between 2022 and 2023. Similar to bovines there are different categories of sheep which are going in opposite directions, with ewe numbers declining (-3.05%) and rams/other sheep increasing (+4.67% and +3.52 % respectively).

Table 2: Changes in sheep numbers 2022 vs 2023

Animal inventories	2022 vs 2023
Total sheep	+0.27%
Ewes	-3.05%
Rams	+4.67%
Other sheep	+3.52%

Source: CSO (2023)

These national level changes in livestock inventories (by category) are applied proportionately across farms with dairy, cattle and sheep animals within the 2022 base year to yield a 2023 estimate of farm level livestock numbers. Land area farmed is assumed to remain static.

Chemical N Projections for 2022: The second major element that could likely impact farm level emissions is the volume and type of chemical fertiliser applied on farms. Different emission factors are associated with different fertiliser types (e.g. CAN versus Urea) and a higher level of application of a given fertiliser will lead to higher levels of overall emissions. Table 3 is constructed from sales data (DAFM, 2023a). Sales data for fertiliser follows a September to October sales year. However, data for the full sales year is not yet available so estimates are based on sales data between September 2022 and June 2023. This indicates that total N (elemental) decreased by 17.3% compared to the previous year for this time period. Straight CAN and NPK compounds were the most common fertilisers purchased in volume terms and the volume of each purchased decreased by 31.5% and 10.1% respectively between 2022 & 2023. It is notable that sales of straight urea fertiliser have also declined significantly between 2022 & 2023 (-20.5%). Conversely, sales of protected urea fertiliser on the other hand remained relatively stable between 2022 and 2023 (1% reduction). Protected urea is associated with lower GHG emission (vs. CAN) and lower ammonia emission (vs. straight urea). Changes in chemical N fertiliser at farm level are assumed to be reflective of the national level trends as outlined in Table 3. However, it should be noted that there may have been a hangover of fertiliser stocks held on farm from the previous year (2022) due to farmer forward buying on foot of higher incomes.

Table 3: Total tonnes of Chemical N sold 2022-2023 up to Quarter 3

	2022*	2023*	% change
Straight CAN	84,909	58,128	-31.5%
Straight Urea	41,909	33,332	-20.5%
Protected Urea	26,032	25,766	-1.0%
NK Compounds	1,831	1,412	-22.9%
NP Compounds	1,554	983	-36.7%
NPK Compounds	114,846	103,299	-10.1%
Other N Fertilisers	3,854	4,478	16.2%
Total	274,935	227,398	-17.3%

*September to October sales year, data is from October 2022 to June 2023 (Source: DAFM 2023a)

Technology Adoption for 2022: The adoption of certain technologies can help reduce gaseous emissions at farm level. Teagasc through the publication of its GHG MACC report (Lanigan et al., 2023) and NH_3 MACC Report (Buckley et al., 2020) have highlighted technologies that are effective in reducing gaseous emissions. The use of protected urea in 2023 is covered in the aforementioned section but assumptions around the transition to the use of low emissions slurry spreading (LESS) technology are included in this analysis. Results of Buckley (2023) indicated a movement from 48% in 2021 to 59% in 2022 of aggregate slurry spread by LESS. It is assumed this transition continues in 2023 and that a similar proportional increase in aggregate slurry applied by LESS is realised in 2023.

Additionally, preliminary data that suggests lime applied decreased by circa 16% between 2022 and 2023 (DAFM, 2023b). This has implication for GHG emissions as CO_2 is released when lime is applied and this projected decline has been included in the analysis.

3. Results

It is important to appreciate that some factors influencing the various indicators presented here are partially within the control of an individual farmer (e.g. input use efficiency, technology adoption), while others factors are outside of an individual farmer's control (e.g. farm output prices, weather conditions, soil quality). Farming is influenced by weather conditions, which vary from year to year, and which therefore may affect the level of production or the level of input utilisation in a given year. Hence, drawing inference based on one year movements must be untaken with caution.

3.1 GHG Emissions

Agriculture is the largest contributor to Irish greenhouse gas emissions by sector, with 38.4% of the national emissions total in 2022 (Environmental Protection Agency, 2023). The agricultural sector is required to reduce its emissions in the context of Ireland's commitment to reduce national GHG emissions. The Climate Action and Low Carbon Development (Amendment) Act 2021 (Government of Ireland, 2021) sets down a greenhouse gas emissions reduction target of 51% by 2030 for the state and towards climate neutrality by 2050. Under the Climate Action Plan 2021, agriculture has a sectoral target of to reduce emissions by 25% by 2030 (Government of Ireland, 2022).

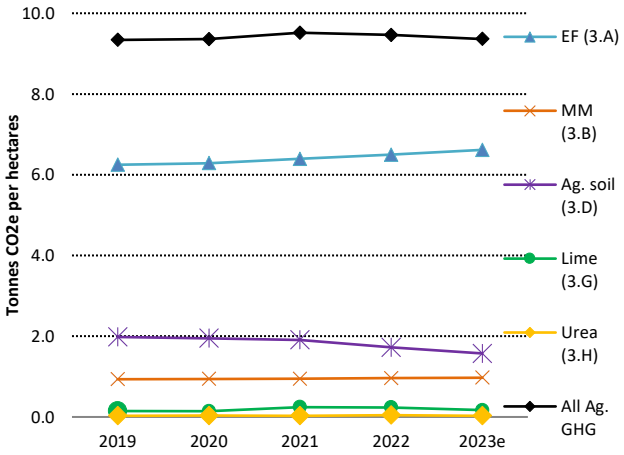
The GHG emissions indicators in this analysis are estimated following the IPCC methodology accounting conventions and Irish emission factors as employed in the 2022 National Inventory Report for Ireland (Duffy et al., 2023). The main sources of agricultural GHG emissions are methane (CH_4) emissions from enteric fermentation (EF) by ruminant livestock, CH_4 and nitrous oxide (N_2O) emissions from manure management (MM) (production and storage of livestock manures) and N_2O emissions resulting from the application of manures and chemical fertilisers to agricultural soils. Additionally, direct CO_2 emissions associated with lime and urea application are also included in this analysis but each represent minor elements. For reporting purposes, all non-carbon dioxide (CO_2) emissions are converted to CO_2 equivalents (CO_2e) using appropriate IPCC based global warming potentials (GWP100). The relevant co-efficients for CH_4 and N_2O are 28 and 265 respectively.

3.1.1 GHG on Dairy Farms

Figure 2 presents results by emission category between 2019 and 2023e. The 2023e result is an estimate for emissions in 2023 based on the projected changes in activity levels as set out in section 2.

Projections for 2023 indicate a slight decline in GHG emissions on dairy farms compared to 2022 (Figure 2). Although emissions under the Enteric Fermentation (3.A) and the Manure Management (3.B) increased due to an increase in the average dairy herd size this was offset by a reduction in chemical N usage (Category 3.D & 3.H) and liming rates (Category 3.G).

Figure 2: Dairy Farm Agricultural based GHG Emissions per hectare by emission category

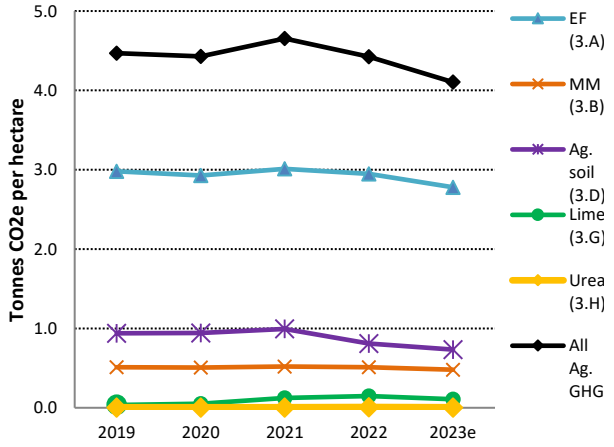


Source: Teagasc Sustainability Report and Author's estimate

3.1.2 GHG on Cattle Farms

Figure 3 presents GHG emissions results by categories on cattle farms. Projections indicate a decline in GHG emission per hectare between 2023 and 2022. This was mainly driven by reduction in livestock numbers and chemical N fertiliser usage.

Figure 3: Cattle Farm Agricultural based GHG Emissions by emission category

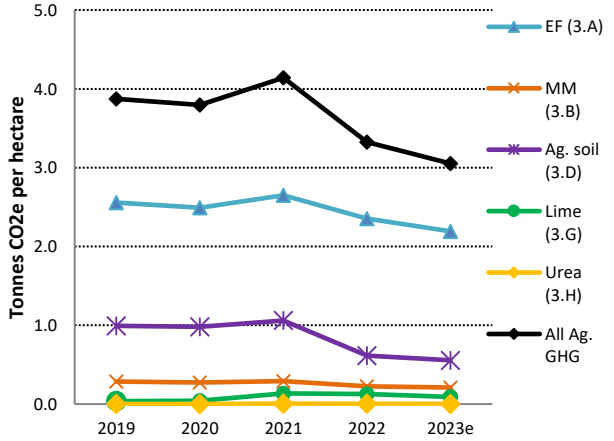


Source: Teagasc Sustainability Report and Author's estimate

3.1.3 GHG on Sheep Farms

Figure 4 reports GHG per hectare results by emissions category on sheep farms. GHG emissions on sheep farms are projected to decline in 2023 compared to 2022. Decreased emissions are indicated across all categories but like the cattle farms they were mainly driven by a reduction in livestock numbers and chemical N fertiliser usage.

Figure 4: Sheep Farm GHG Emissions by emission category - Rolling 3 year average

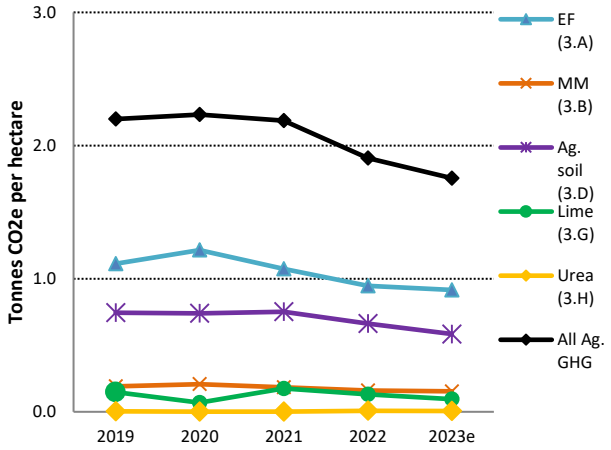


Source: Teagasc Sustainability Report and Author's estimate

3.1.4 GHG on Tillage Farms

GHG per hectare results by emission category on tillage farms are presented in Figure 5. Similar to livestock farms, emissions on tillage farms are expected to decline in 2023 versus 2022. The drivers are similar to what is projected for other systems, namely a reduction in livestock numbers and chemical N use on tillage farms. However, it should be noted that measures such as straw incorporation & switching to protein crops which was promoted by policy in 2023 could affect these estimates but were not considered here.

Figure 5: Tillage Farm GHG Emissions by emission category - Rolling 3 year average

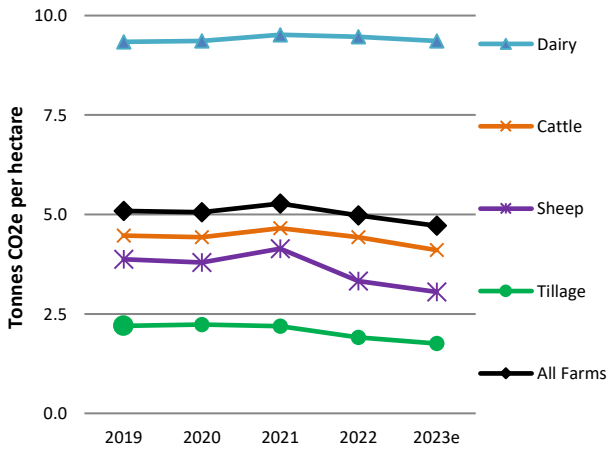


Source: Teagasc Sustainability Report and Author's estimate

3.1.5 GHG on All Farms

Figure 6 illustrates trends in average GHG emission per hectare across the different farm types. Declining GHG emissions are projected for 2023 across all farm system mainly driven by reduction in livestock numbers on some farms and reduced chemical N across all farm systems.

Figure 6: Total GHG Emissions (CO2e) per hectare by farm type - Rolling 3 Year average



Source: Teagasc Sustainability Report and Author's estimate

3.2 Ammonia Emissions

Ammonia (NH_3) is an air pollutant contributing to eutrophication and acidification of terrestrial and aquatic ecosystems. It is also an indirect source of the potent greenhouse gas nitrous oxide (Sutton et al., 1992). The EU and its Member States are parties to the Convention on Long-Range Transboundary

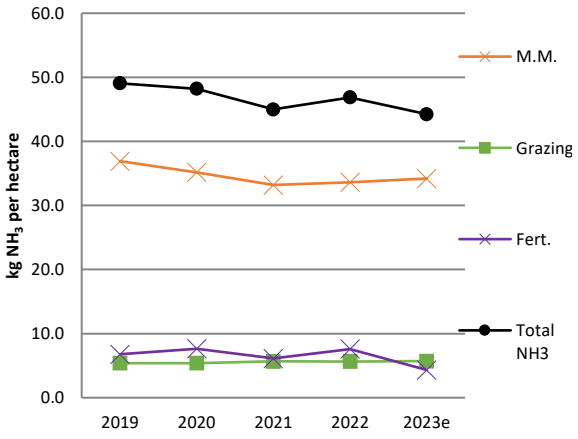
Air Pollution, which regulates trans-boundary air pollutants, including ammonia (NH_3). Within the EU, NH_3 emissions are regulated through the National Emissions Ceiling (NEC) Directive (EU, Commission 2016). Over 99.4% of Ireland's NH_3 emissions originate within agriculture, principally from animal waste and the application of synthetic fertilisers (Hyde et al., 2023). The fact that ammonia emissions in Ireland come almost exclusively from agriculture means that any future national ammonia reduction target for Ireland *de facto* represent a reduction target to be achieved by the agricultural sector.

The national inventory accounting methodology as applied by the Environmental Protection Agency (Hyde et al., 2023) in conjunction with the projected activity data for NFS farms in 2023 (as set out in section 2) is used for estimating NH_3 emission indicators across different farm types for 2023.

3.1.6 NH_3 on Dairy Farms

Figure 7 outlines kg of NH_3 emission per hectare on dairy farms. The manure management (MM) category linked to manure generated from animals during the winter housing period is the largest category of NH_3 emissions. This covers the housing, storage and land spreading phases of manure management and is the major NH_3 emissions category on livestock orientated farms (accounting for over 70% of NH_3 emissions on dairy farms). The emissions associated with grazing livestock and with chemical fertiliser application making up the remaining emission categories (12-15% on dairy farms).

Figure 7: Dairy Farm NH_3 emissions by category - Rolling 3 Year average



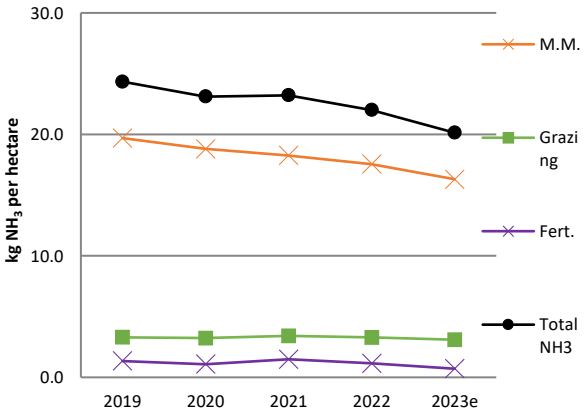
Source: Teagasc Sustainability Report and Author's estimate

Ammonia emissions on dairy farms are projected to decline slightly in 2023 compared to 2022. This is mainly driven by reduction in chemical fertilisers used in 2023 compared to 2022. These ammonia emission reductions in addition with the assumed increases in adoption rates of Low Emission Slurry Spreading techniques, were sufficient to off-set increases in the manure management category due to an increase in the dairy herd size.

3.1.7 NH_3 on Cattle Farms

NH_3 emissions on cattle farms are outlined in Figure 8. The NH_3 emissions on cattle farms are projected to decline in 2023 compared to 2022. This projected decline was driven by an increase in the adoption rates of LESS, lower animal numbers on farm and reduced application rates of chemical fertiliser

Figure 8: Cattle Farm NH_3 emissions (kg NH3 ha^{-1}) by category - Rolling 3 Year average

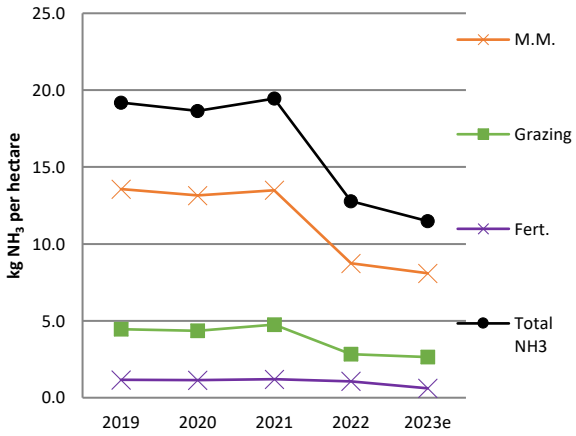


Source: Teagasc Sustainability Report and Author's estimate

3.1.8 NH_3 on Sheep Farms

Figure 9 reports kg of NH_3 emission per hectare on sheep farms.

Figure 9: Sheep Farm NH_3 emissions by category - Rolling 3 Year average



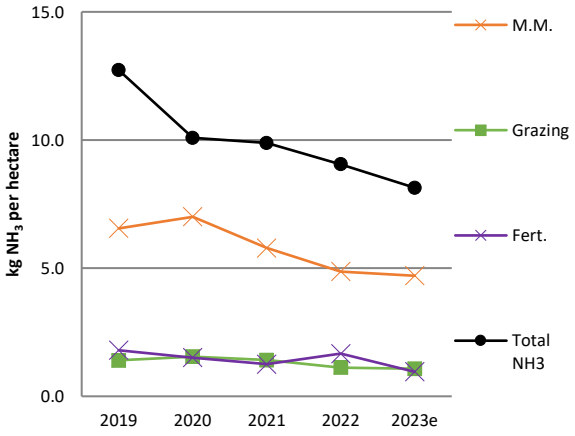
Source: Teagasc Sustainability Report and Author's estimate

Ammonia emissions per hectare on sheep farms are projected to decline in 2023 compared to 2022. Similar to results for the cattle farms this projected decline was driven by an increase in the assumed adoption rates of LESS, lower animal numbers on farm and reduced application rates of chemical fertiliser.

3.1.9 NH_3 on Tillage Farms

NH_3 emissions on tillage farms are reported in Figure 10. Although these farms are classified as specialist tillage farms, on average, they have a significant cattle or sheep enterprises (or both) and this is reflected in their emission profile in Figure 10. Ammonia emissions per hectare on tillage farms are also projected to decline on foot of increased adoption rates of LESS, lower animal numbers and reduced application rates of chemical fertiliser.

Figure 10: Tillage Farm NH_3 emissions by category average 2016-2022e



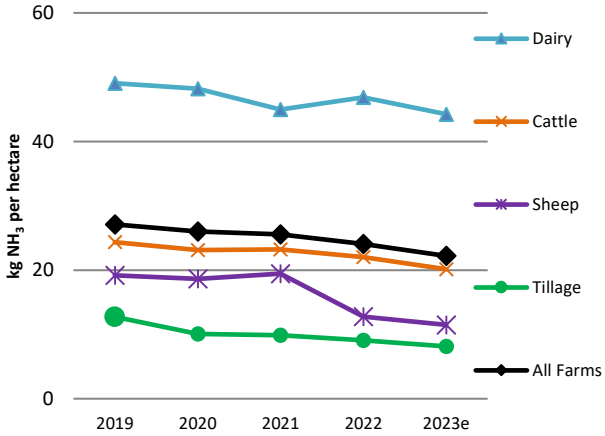
Source: Teagasc Sustainability Report and Author's estimate

3.1.10 NH_3 on All Farms

Figure 11 illustrates trends in total NH_3 per hectare across the different farm types. All farm systems are projected to show a decline in ammonia emissions in 2023 compared to 2022. This reduction is estimated to be driven by projected increases in adoption rates of LESS, lower animal numbers on some farms farm and reduced application rates of chemical fertiliser in general.

All farm systems are projected to show a decline in ammonia emissions in 2023 compared to 2022. This reduction is estimated to be driven by projected increases in adoption rates of LESS, lower animal numbers on some farms farm and reduced application rates of chemical fertiliser in general.

Figure 11: Total NH_3 Emissions (kg per hectare) by farm type - Rolling 3 Year average



Source: Teagasc Sustainability Report and Author's estimate

4. Summary Conclusions

- GHG and NH_3 emission projections for 2023 are based on changes in farm activity levels around livestock numbers, chemical fertilisers / lime use and the adoption of certain technologies.
- Based on the CSO June livestock survey overall cattle numbers are projected to decline by 0.74%. However, there were differences across animal categories with Dairy cows (+1.19%) and cattle 2years and over (+7.6%) numbers increasing while other cows (-4.5%), bulls (-3.73%), Cattle 1-2 years (-1.39%) and Cattle under 1 year (-2.82%) numbers all declined.
- Overall, sheep numbers increased very marginally (+0.27%), again there were differences across categories with ewe numbers declining (-3.05%) and rams/other sheep increasing (+4.67% and +3.52 % respectively).
- Chemical fertiliser is projected to decline by circa 17% between 2022 & 2023. All categories of chemical N types (e.g. CAN, NPK compounds) fell by double digits in percentage terms except for protected urea which fell marginally by 1%. However, there may have been a hangover of fertiliser stocks held on farm from the previous year. So this estimate maybe inflated.
- The aggregate quantity of slurry spread by LESS increased from 48% in 2021 to 59% in 2022. It is assumed this transition continues in 2023.
- Lime applied is projected to decrease by circa 16% between 2022 and 2023.
- Projections for 2023 indicate a slight decline in GHG and ammonia emissions on dairy farms compared to 2022, with increased emissions associated with increases in the dairy herd

being offset by significant reductions in chemical N and lime usage.

- More significant reductions in GHG and ammonia emissions were projected for drystock and tillage farms on the back of reduced livestock numbers and chemical N / lime applications as well as transition to the use of LESS.

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