Outlook 2019
Economic Prospects for Agriculture

CONTRIBUTORS

Emma Dillon, Trevor Donnellan, Kevin Hanrahan, Tom Houlihan,
Anne Kinsella, Jason Loughrey, Michael McKeon, Brian Moran and Fiona Thorne

Agricultural Economics and Farm Surveys Department

Teagasc

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Summary Review of 2018

Global Economy

- **Strong global growth continued**
- **Brexit uncertainty remains**
- **Sterling remains weak**

Aggregate Agricultural Income 2018e vs 2017

Margins (relative to 2017)

- Dairy - down significantly due to higher production costs
- Beef - down significantly due to higher production costs
- Sheep - down significantly due to higher production costs
- Tillage - up significantly due to higher prices in spite of lower yields
- Pigs - down significantly due to lower pig prices and higher costs

Average NFS Farm Income 2018e vs 2017

Support Payments (relative to 2017)

- Total payments relatively unchanged

Input Costs
Up substantially.
Increases in feed use along with higher feed, fertiliser and fuel prices.

Fertiliser Prices
Up slightly relative to the 2017 level.

Feed Prices
Higher in 2018 due to strong demand and lower stocks.

Oil Prices
Moved upwards as OPEC and Russia tightened global oil supplies. Sharp fall in prices towards year end.

Average Annual Exchange Rate in 2018e
$ 1.18 / Euro
£0.88 / Euro

Eurozone inflation remains very low.

Irish Unemployment fell below 6% in 2018.

Weather conditions a dramatic year, with a long winter and summer drought, but good autumn. Grass growth and cereal yields badly affected.

Summary of Prospects for 2019

Global Economy

- Positive but uncertain economic outlook
- Brexit transition agreement critical
- Uncertain exchange rate prospects
- Global trade tensions a concern

Aggregate Agricultural Income 2019f vs 2018e

Margins in 2019 (relative to 2018)

- **Dairy** - Up mainly due to lower production costs
- **Beef** - Up mainly due to lower production costs
- **Sheep** - Up due to lower production costs
- **Tillage** - Down due to lower cereal prices in spite of yield increases
- **Pigs** - Up due to higher pig prices

Average NFS Farm Income 2019f vs 2018e

Support Payments (relative to 2018)

- Total Payments relatively unchanged

Input Costs
Upward pressure on some input prices, but lower feed use for grassland systems

Fertiliser Prices
up significantly on the 2018 level

Feed Prices
Little changed on the 2018 annual average

Oil Prices
Little movement in oil prices anticipated

Average Annual Exchange Rate 2019f
$ 1.15 / Euro
£ 0.88 / Euro

Eurozone inflation
Remains very low

Irish Unemployment
to remain at 5%

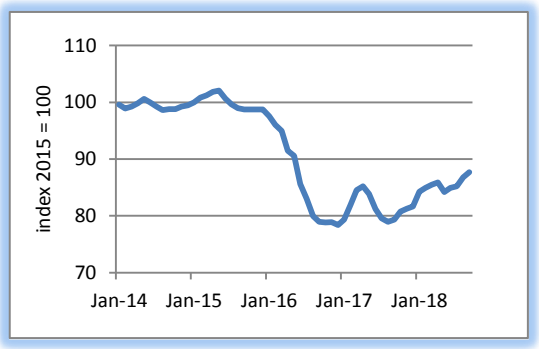
Weather conditions
Normal weather assumed

Overall Sector: Summary Review of 2018

Output Value	Input Spend	Support Payments	Income
Down	Up	Up marginally	Down

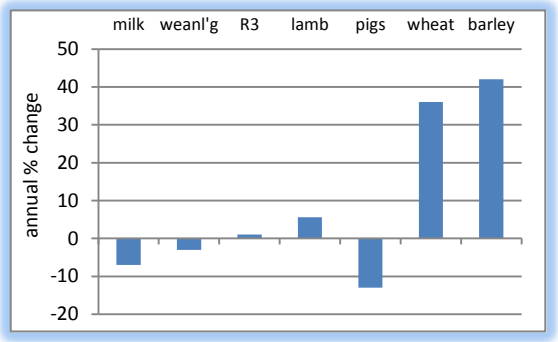
- Weather conditions in 2018 were extremely difficult. Grass growth was well down on normal over the summer months and there was a large drop in cereals yields for spring sown crops.
- Total production costs increased in 2018 due to higher feed, fertiliser and fuel prices, but the major driver was a dramatic increase in purchased feed volume for grassland systems.
- Milk producers experienced a 7 percent drop in output prices in 2018, with prices averaging 34 cent per litre. In spite of the unfavourable weather, Irish milk production is estimated to have expanded by a further 3 percent in 2018.
- In 2018 lower milk prices, combined with the dramatic increase in feed expenditure, resulted in a drop in average dairy net margin of 34 percent to an estimated 9.8 cent per litre.
- Prices of finished cattle in 2018 were up marginally on the 2017 level. Prices of weanlings in 2018 decreased by 3 percent, while prices of store cattle in 2018 decreased by 8 percent relative to the 2017 level.
- In spite of stable output prices, the largely feed driven increase in production costs, led to a fall in gross margins on the single suckling enterprise of 19 percent in 2018.
- Gross margins on the cattle finishing enterprise fell by 11 percent in 2018.
- Due to the feed related increase in sheep production cost, the average sheep farm gross margin is estimated to have decreased by 3 percent in 2018.
- The receipt in 2018 of Sheep Welfare Scheme payments supports sheep enterprise margins.
- In 2018 Irish cereal yields for major crops were down about 20 percent on the 2017 level. Cereal prices at harvest in Ireland were up considerably on the 2017 level, due to a lower domestic and international harvest.
- Cereal direct costs increased slightly in 2018, due mainly to an increase in fertiliser and seed expenditure. As a consequence of the poor harvest, cereal and straw prices were higher, leading to an increase in cereal margins in 2018.
- Pig producers experienced a large reduction in pig prices of 13 percent in 2018.
- An increase in pig feed prices led to higher pig production costs. In combination, the fall in pig prices and rise in feed costs led to a significant drop in margins from pig production in 2018.

Figure E1: Monthly Price Index of Fertiliser in Ireland from 2014 to 2018



Source: CSO (various years)

Figure E2: Change in Output Prices 2018 vs 2017



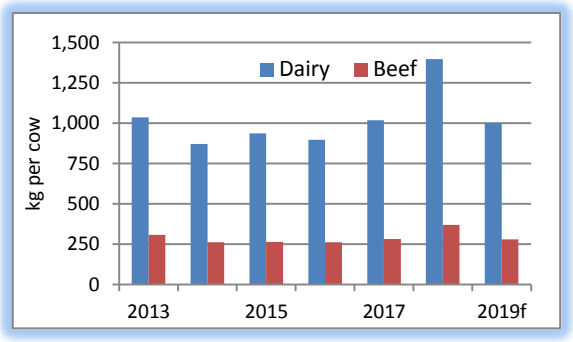
Source: Authors' estimates

Overall Sector: Outlook for 2019

Output Value	Input Spend	Support Payments	Income
Up	Down	Unchanged	Up

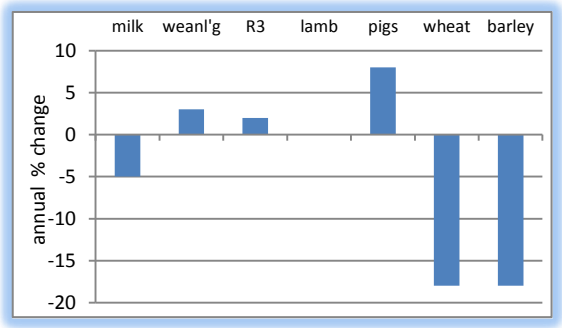
- The outlook for 2019 for the Irish agricultural sector as a whole is conditioned by the assumption that normal weather returns.
- With normal weather there should be a major drop in feed volumes in 2019 for all grassland enterprises.
- Feed prices are forecast to remain in line with 2018 levels.
- Fertiliser prices are forecast to rise by 16 percent in 2019. Limited grass supplies led to an increase in grassland fertiliser sales volume in 2018, but volume should drop back in 2019.
- Fuel prices are forecast to be unchanged in 2019, as oil prices are likely to be similar to the average level in 2018. Electricity prices are forecast to remain unchanged in 2019.
- In 2019 Irish milk prices are likely to weaken slightly, averaging 5 percent lower than in 2018. While feed and fertiliser prices are forecast to rise, dairy production costs should fall in 2019 due to lower feed use.
- Irish beef prices are forecast to be up marginally in 2019, due to tightening supplies at EU level.
- Costs of production for beef are forecast to fall in 2019. With beef prices up marginally, margins will increase on both single suckling and cattle finishing enterprises.
- In 2019, with lower input expenditure and stable output prices, margins on sheep farms are forecast to increase from the level estimated for 2018.
- Stock levels on international grain markets have begun to fall due to a lower global harvest. Irish cereal prices at harvest in 2019 will be highly dependent on growing conditions globally.
- On the assumption that global yields are normal, global supply and stock levels in 2019 are forecast to rise relative to the 2018 level. Irish cereal prices are forecast to decline relative to 2018.
- Overall costs on cereal farms look set to rise, due to increasing fertiliser prices. With a normal yield forecast and a decline in prices, margins for most crops in 2019 will decline on the 2018 levels.
- Pig meat prices are forecast to rise by 8 percent in 2019. With a stable feed price in 2019, margins will improve from the very low 2018 level.

Figure E3: Dairy and Beef Feed Use 2013 – 2019



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

Figure E4: Forecast Change in Output Prices 2019 vs 2018



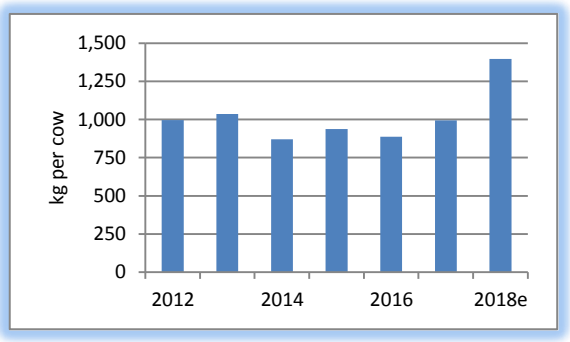
Source: Authors' forecasts

Dairy: Review of 2018

Output Value	Input Spend	Income
↓ Down	↑ Up	↓ Down

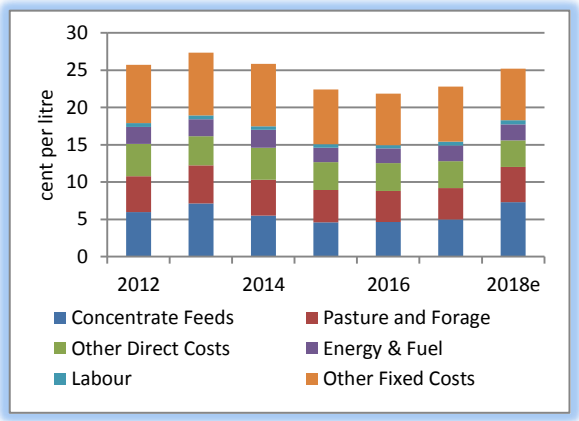
- The annual average national milk price for 2018 is estimated to have decreased by 7 percent to an average of 34 cent per litre (CSO actual fat and protein).
- It is estimated that aggregate Irish milk production increased by 3 percent in 2018.
- Dairy cow numbers are estimated to have increased by 3.5 percent in 2018.
- On a per cow basis, dairy feed usage is estimated to have increased by 38 percent in 2018 to about 1,400 kg.
- Increased feed usage, combined with higher feed prices, increased cow numbers and higher milk production, resulted in a 52 percent increase in dairy feed expenditure in 2018 on a per hectare basis, and a 47 percent increase on a per litre basis.
- Fertiliser use increased in 2018, in comparison with 2017 on foot of pressure to produce additional late season grass and silage. There was also a need to purchase more forage on some farms. This is estimated to have resulted in a 19 percent increase in pasture and forage costs on a per hectare basis and a 13 percent increase on a per litre basis.
- Total milk production costs are estimated to have increased in 2018 on a per hectare basis by 15 percent, with an 11 percent increase recorded on a per litre basis (to 25.2 cent per litre). This was composed of a sharp increase in direct costs and a slight reduction in overhead costs for the dairy enterprise.
- The escalation in production costs, a weaker milk price and a modest increase in milk production, resulted in an estimated net margin per litre of 9.8 cent per litre in 2018. This reflects a decrease of 34 percent year-on-year.
- With an assumed 3 percent increase in milk production per hectare, it is estimated that the net margin per hectare decreased to a national average of €1,227 in 2018.

Figure E5: Irish Dairy Cow feed use 2012 to 2018



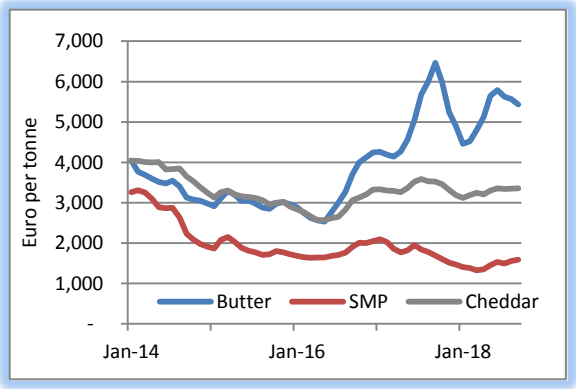
Source: Authors'estimates derived from DAFM and CSO data
Note: e = estimate

Figure E6: Average Total Milk Production Costs (cent per litre) in Ireland: 2012 to 2018



Source: Teagasc National Farm Survey and Authors' Estimate

Figure E7: Monthly European Dairy Product Prices Jan 2014-to Sept 2018



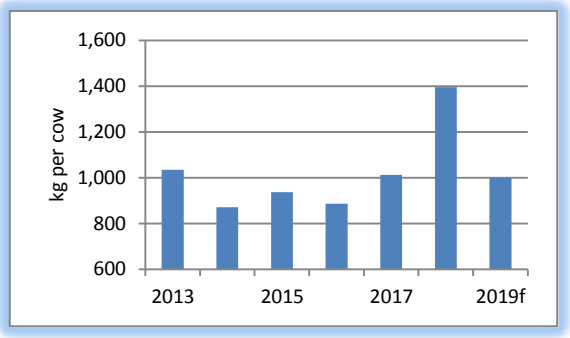
Source: USDA

Dairy: Outlook for 2019

Output Value	Input Spend	Income
Up	Down	Up

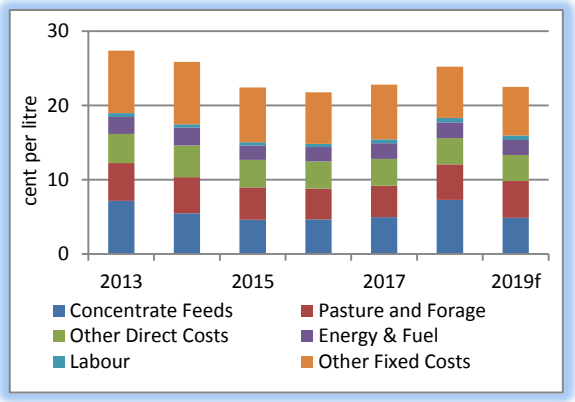
- Global dairy production growth is set to continue in 2019, slightly outpacing consumption growth. Butter prices are forecast to weaken slightly, while SMP prices continue to recover.
- It is forecast that the annual average milk price will fall by 5 percent in 2019 relative to the average 2018 level. This would represent an annual average milk price of around 32.6 cent per litre (CSO actual fat and protein).
- Assuming normal weather conditions in 2019, feed use per head on dairy farms is expected to drop back to normal levels. Feed prices are expected to remain unchanged and expenditure will fall substantially due to reduced volume.
- Expenditure on fertiliser will increase in 2019, with fertiliser prices expected to rise by 16 percent. With sales volume having already increased substantially in 2017 and 2018, a slight reduction in use is forecast for 2019.
- Fuel prices are forecast to remain unchanged in 2019.
- Further growth in Irish milk production is forecast in 2019. Following the estimated 3 percent increase in production in 2018, further growth of 6 percent is forecast in 2019.
- With increased milk production, total costs per hectare are forecast to decrease by 6 percent, while costs on a per litre basis in 2019 are forecast to fall by 11 percent.
- On a per litre basis, net margins are forecast to increase by 10 percent in 2019 relative to the 2018 level, to an average of 10.8 cent per litre.
- Farmers expanding production are assumed to benefit from some economies of scale. Based on a milk production volume increase of 6 percent, and a 5 percent reduction in milk price, the forecast average net margin per hectare in 2019 is €1,398, an increase of 14 percent on the estimated 2018 level.

Figure E8: Irish Dairy Cow feed use: 2013 to 2019



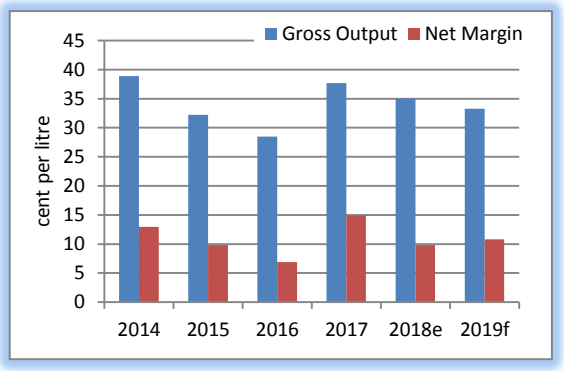
Source: FAPRI-Ireland (adapted from DAFM and CSO data). 2018 is an estimate and 2019 is forecast

Figure E9: Average Total Milk Production Costs (cent per litre) in Ireland: 2013 to 2019



Source: Teagasc National Farm Survey, Authors' Estimate for 2018 and Authors' Forecast for 2019

Figure E10: Dairy Gross Output and Net Margin 2014-2019



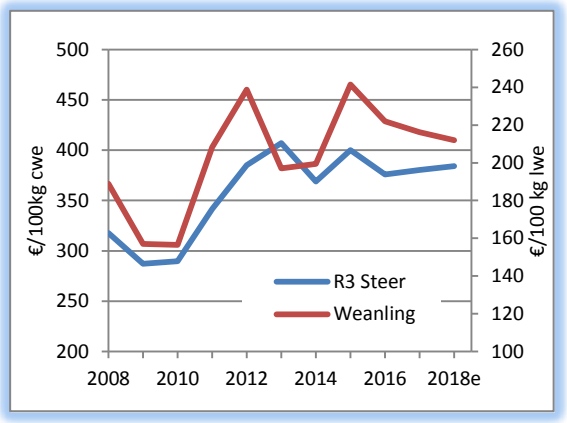
Source: Teagasc National Farm Survey, Authors' Estimates for 2018 and Authors' Forecast for 2019

Cattle: Review of 2018

Output Value	Input Spend	Income
Mixed	Up	Down

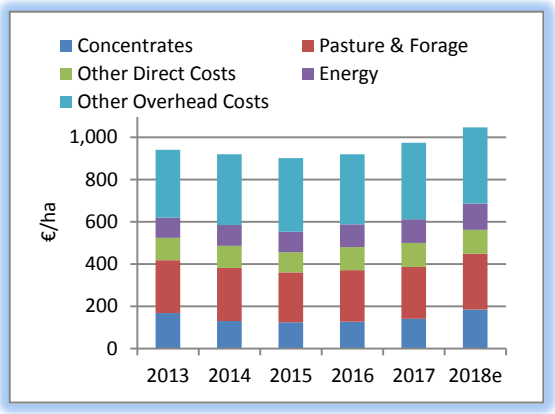
- In 2018, prices for most categories of finished cattle increased by 1 percent relative to 2017, with the exception of young bull prices which declined by 7 percent.
- Higher volumes of finished cattle in 2018 have led to higher output value on Cattle Finishing enterprises.
- Lower prices for younger cattle in 2018 have led to a reduction in output value on Single Suckling enterprises.
- Increased feed prices, and large increases in feed usage, have contributed towards substantially higher feed expenditures on both Single Suckling and Cattle Finishing enterprises.
- Increased fertiliser prices and usage have led to higher expenditure on pasture and forage in 2018 compared to 2017.
- In 2018, the average gross margin per hectare earned on Single Suckling enterprises is estimated to have decreased to €381 per hectare.
- In 2018, the average gross margin per hectare earned on Cattle Finishing enterprises is estimated to be €428 per hectare in 2018, 11 percent down on the 2017 level.

Figure E11: Finished Cattle and Young Cattle Prices



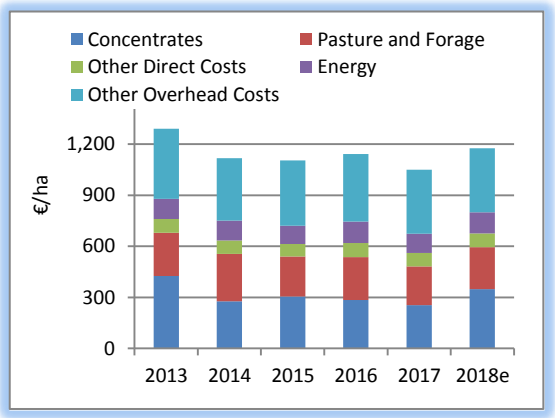
Source: 2008-2017 DG Agri, CSO, 2018 Authors' estimate

Figure E12: Costs of Production Single Suckling (SS)



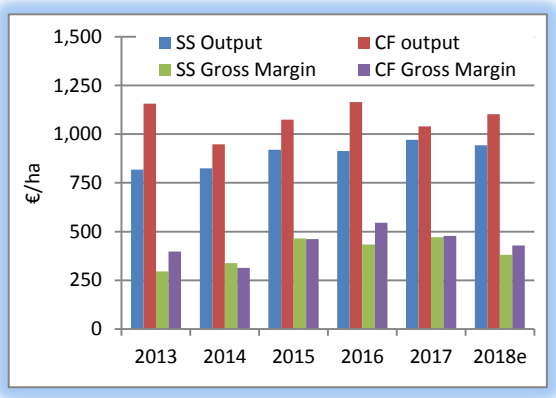
Source: 2013-2017 Teagasc NFS, 2018 Authors' Estimate

Figure E13: Cost of Production Cattle Finishing (CF)



Source: 2013-2017 Teagasc NFS, 2018 Authors' Estimate

Figure E14: Output and Gross Margin



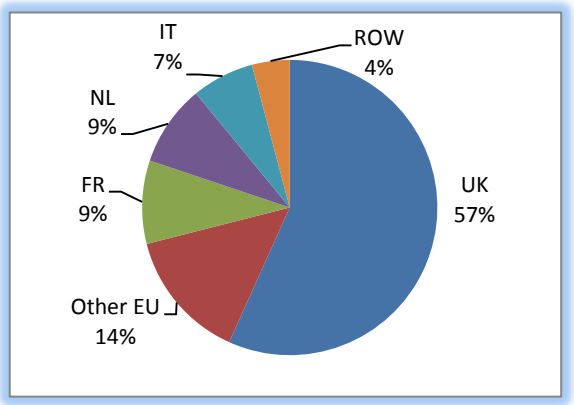
Source: 2013-2017 Teagasc NFS, 2018 Authors' Estimate

Cattle: Outlook for 2019

Output Value	Input Spend	Income
↑ Up	↓ Down	↑ Up

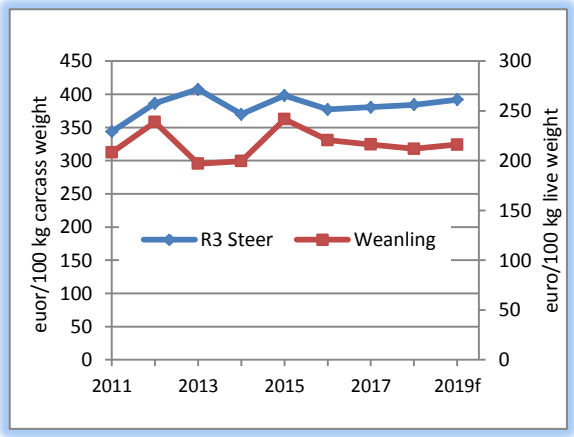
- EU supplies of beef are forecast to change little in 2019.
- Global beef markets are forecast to strengthen, with EU imports expected to rise in 2019.
- The UK remains Ireland's most important beef market.
- The Brexit referendum result and depreciation of the pound sterling against the euro has continues to exacerbate the competitiveness challenge for the Irish beef industry.
- The forecast for Irish finished cattle prices is a 2 percent increase in 2019 relative to the 2018 level.
- Young cattle prices are forecast to also increase, with prices 4 percent higher than in 2018.
- Input volumes on a per hectare basis in 2019 are forecast to decrease significantly on the 2018 levels due to lower feed use.
- Fertiliser prices are forecast to increase significantly.
- Direct costs of production on Single Suckling enterprises are forecast to decrease by approximately 7 percent.
- Direct costs of production on Cattle Finishing enterprises are forecast to decrease by approximately 12 percent.
- With significant declines projected in the direct costs of production, changes in margins on Single Suckling and Cattle Finishing enterprises in 2019 are forecast to be positive.
- In 2019, the average gross margin per hectare on Single Sucking enterprises is forecast to increase by 20 percent to €458 per hectare.
- Higher young cattle prices should moderate the impact of higher finished cattle prices. In 2019, the average gross margin per hectare on Cattle Finishing enterprises is forecast to be 19 percent higher at €509 per hectare, primarily due to lower feed costs.

Figure E15: Irish Beef Export by Volume in 2018



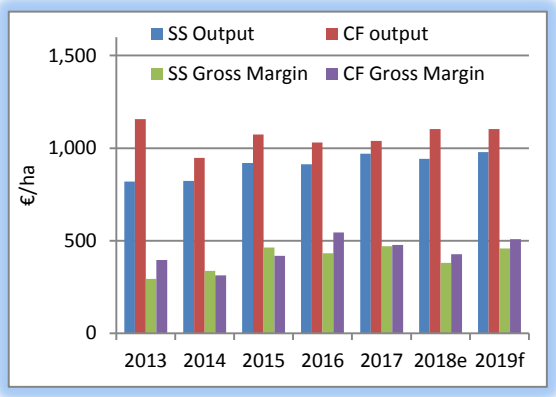
Source: Eurostat COMEXT (year through September)

Figure E16: Forecast Cattle prices 2019



Source: Authors' forecast

Figure E17: Single Suckling (SS) and Cattle Finishing (CF) Output and Gross Margin per ha



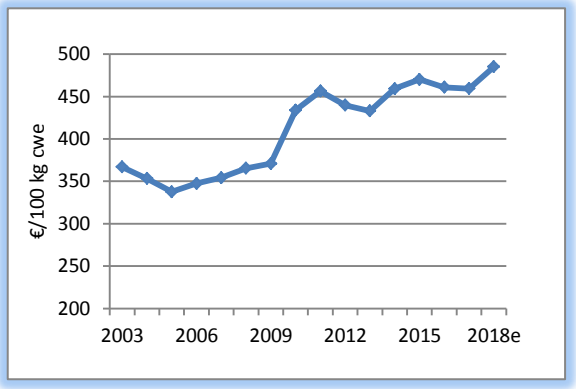
Source: 2013 to 2017 Teagasc NFS, 2018 Authors' estimate, 2019 Authors' forecast

Sheep: Review of 2018

Output Value	Input Spend	Income
↑ Up	↑ Up	↓ Down

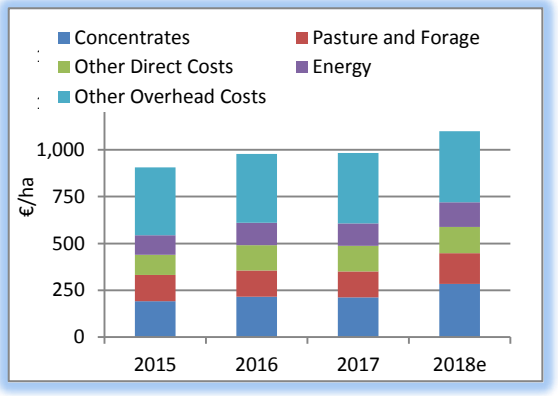
- Supplies of lamb and mutton on the global market are estimated to have tightened in 2018.
- Global demand remained strong, which support international sheep meat prices.
- Prices on the European lamb market in 2018 were higher than in 2017, particularly in H1.
- It is expected that the average lamb price in Ireland for 2018 year as a whole will remain higher than in 2017. The year on year price change is estimated at 5.6 percent.
- Total direct costs of production for Irish mid-season lowland lamb enterprises are estimated to have increased by just over 18 percent in 2018.
- Overhead costs of production are estimated to have increased by 3 percent.
- Gross margins per hectare for Irish mid-season lowland lamb producers are estimated to have declined in 2018 by just under 3 percent, due to increases in input cost expenditure.
- The receipt of Sheep Welfare Scheme direct payments boosted margins in 2018.
- In the absence of the coupled payment received from the Sheep Welfare Scheme, margins in 2018 would have decreased by 13 percent relative to 2017.
- In 2018 the average gross margin on mid-season lowland enterprises are estimated to be €693 per hectare.

Figure E18: Irish Sheep price 2003-2017, with estimate for 2018



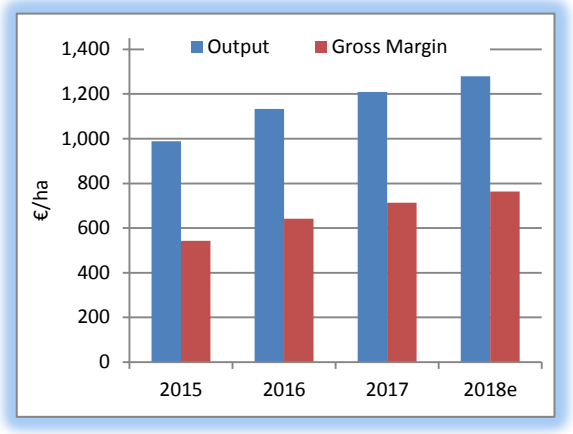
Source: DG Agri 2003-2017; Authors' Estimate for 2018

Figure E19: Average Sheep production costs 2015-2017 and estimate for 2018



Source: Teagasc NFS 2015- 2017, Authors' Estimate for 2018

Figure E20: Average Sheep output 2015-2017 & margin estimate for 2018



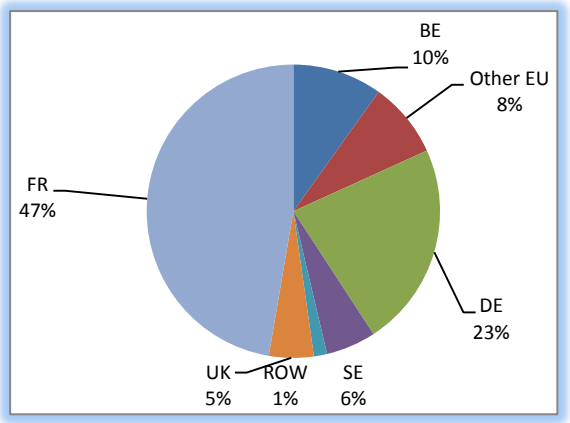
Source: Teagasc NFS 2015-2017, 2018 Authors' Estimate

Sheep: Outlook for 2019

Output Value	Input Spend	Income
Unchanged	Down	Up

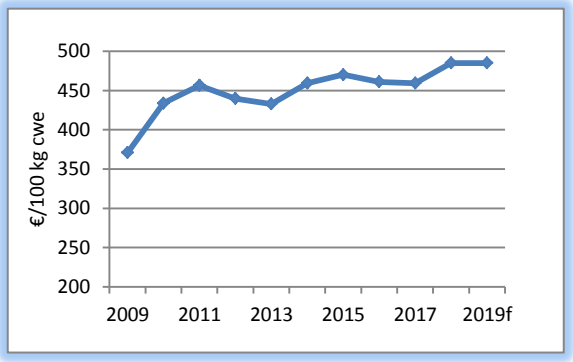
- The outlook for Irish and EU lamb prices for 2019 is stable.
- Tighter global supplies of mutton and lamb are forecast for 2019.
- Relatively stable EU production and somewhat higher level of EU imports are forecast to leave EU and Irish lamb prices similar to 2018 levels.
- Sheep feed expenditure is forecast to decrease. With concentrate prices forecast to remain relatively stable, the volume of feed use is forecast to decline by circa one third.
- Fertiliser prices are forecast to increase relative to 2018. With decreased fertiliser usage, pasture and forage costs are expected to increase in 2019 owing to the price magnitude.
- With lower costs of production in 2019 and relatively stable output value, gross margins for mid-season lowland lamb enterprises in 2019 are expected to increase by circa 10 percent.
- The coupled Sheep Welfare Scheme payment in 2019 will continue to support margins from mid-season lowland lamb production.
- In 2019 the average gross margin per hectare earned by Irish midseason lowland lamb enterprises is forecast to increase to €764 per hectare.

Figure E21: Irish Sheep Meat Exports in 2018



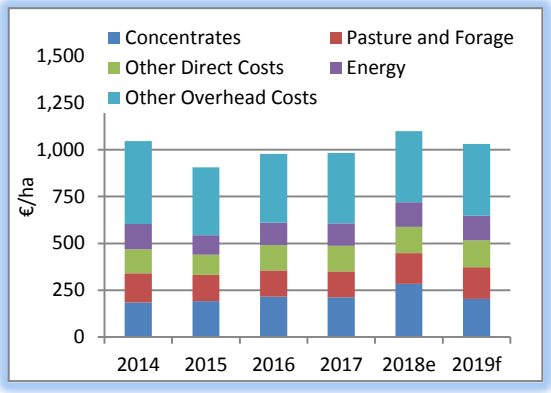
Source: Eurostat COMEXT (Volume, year to end September 2018)

Figure E22: Sheep price forecast for 2019



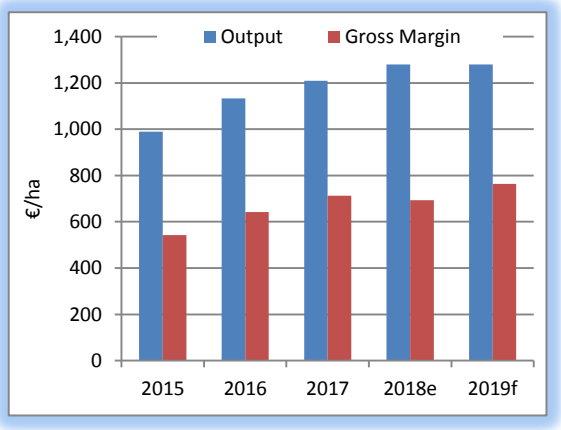
Source: DG Agri 2009-2017; Authors' Estimate 2018; Authors' forecast 2019

Figure E23: Sheep production costs forecast 2019



Source: Teagasc NFS 2014-2017, Authors' Estimate 2018, Authors' Forecast 2019

Figure E24: Average Sheep output & margins with forecast for 2019



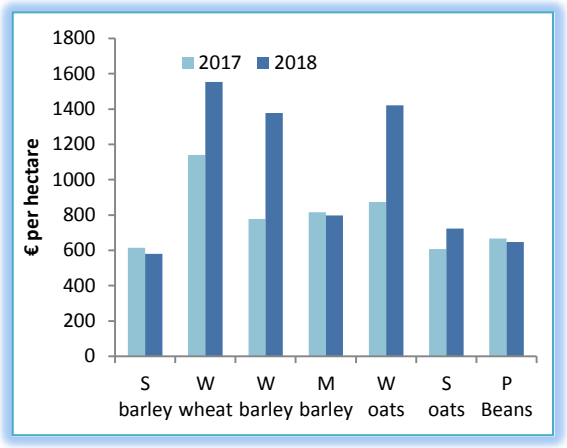
Source: Teagasc NFS 2015-2017, Authors' Estimate 2018, Authors' Forecast 2019

Cereals: Review of 2018

Output Value	Input Spend	Net Margin per ha
↑ Up	↑ Up	↑ Up

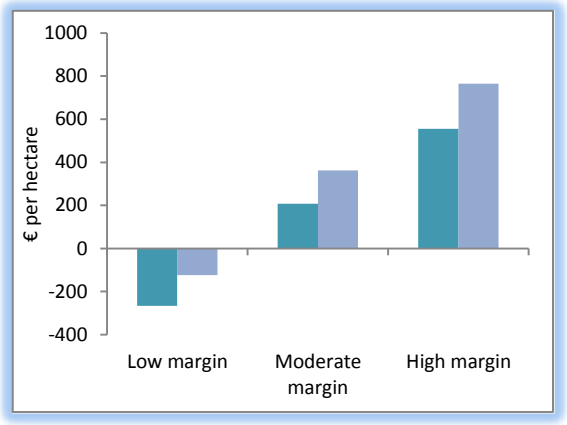
- A decline in international cereal stock levels across the key growing regions of the world, led to a significant increase in cereal prices at harvest 2018, with on account Irish harvest prices increasing by between 30 and 40 percent.
- There was however a decrease in yields of the main cereal crops in Ireland in 2018. Irish spring barley yields decreased by 2.3 tonnes per hectare, while winter wheat yields decreased by 1.5 tonnes per hectare, compared to 2017.
- Direct costs of production on Irish cereal farms increased slightly in 2018 compared to 2017. Fuel related costs on cereal farms witnessed the largest percent decrease, at 10 percent on winter and spring cereal crops respectively.
- Increases in other cost components, such as fertiliser and crop protection, meant that direct costs of production increased by on average 2 percent in 2018. Overall overhead costs increased slightly in 2018.
- The net effect of output value and input cost changes saw an increase in the average gross margins on most cereal crops in 2018. The average gross margin for winter wheat is estimated to be up by over €400 per hectare, while the average gross margin for winter barley is estimated to be up approximately €600 per hectare. The average gross margin for spring barley is estimated to be down slightly, by approximately €30 per hectare, due to the significant reduction in yield on spring barely crops, due to drought conditions during grain fill.
- 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 will return a slight positive market based net margin in 2018. But behind this average figure is a range, with the bottom 1/3 of farms earning a negative market based net margin of - €125, while the top 1/3 of farms earned over €750 per hectare.
- Overall, there was an €150 per hectare increase in average market based net margin in 2018, relative to 2017. This can be attributed to significant increases in cereal prices and straw returns, which were large enough to negate the impact of yield decreases and cost increases.

Figure E25: Gross Margin for Main Cereal Crops



Source: Teagasc, National Farm Survey Data & Author's estimate for 2018

Figure E26: Cereal Enterprise Net Margin on Specialist Tillage Farms



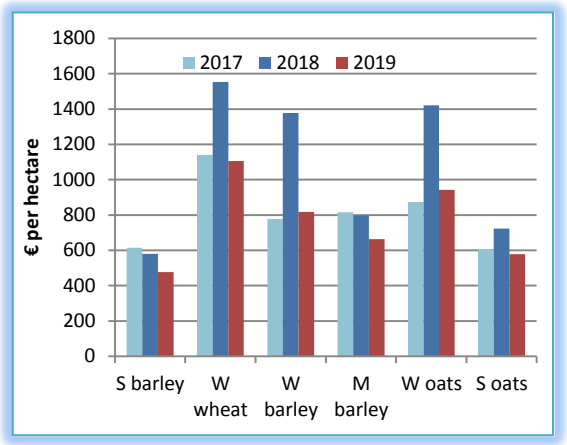
Source: Teagasc, National Farm Survey Data & Author's estimates for 2018

Cereals: Outlook for 2019

Output Value	Input Spend	Net margin per ha
Down	Up	Down

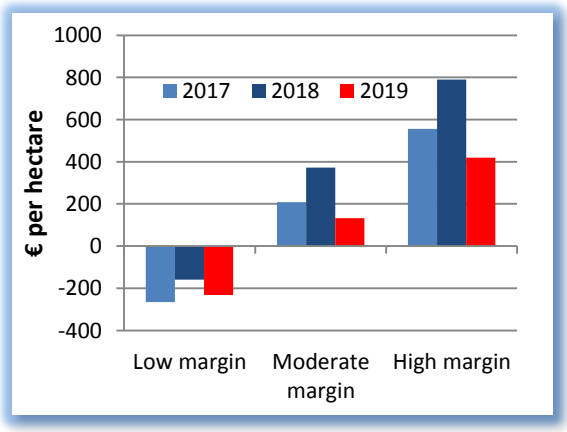
- World grain stocks decreased in 2018. In terms of market supply and demand, there is a lot of uncertainty at present, as stocks to use ratios are at a 5 year low.
- Current (November 2018) futures markets indicate that 2019 harvest prices will be lower than those that prevailed at harvest 2018, by about 18 percent. This downward movement in prices can be explained by the expected reversion to trend yields in 2019 and a forecast for a higher ending stock position coming out of 2019 compared to the previous year.
- A return to trend yields in Ireland in 2019 would mean an increase in terms of yields achieved compared to 2018.
- Direct costs of production on cereal farms are expected to increase slightly in 2019, with key inputs such as fertiliser and seed expected to increase.
- Little movement in overhead costs is expected in 2019, given that no change in fuel price is expected, which is a key diver of many overhead cost items.
- The net effect of the changes in output value and input expenditure is that 2019 gross margins for most cereals are forecast to decrease over 2018 levels.
- The average gross margin for spring barley is forecast to decline by approximately €100 per hectare. The average winter wheat gross margin is forecast to decrease by €450 per hectare, and the average winter barley gross margin is forecast to decrease by €550 per hectare in 2019.
- The cereal enterprise market based net margin on specialist tillage farms in 2019 is forecast to decrease on the 2018 level. It is forecast that the average specialist tillage farm will return a market based net margin of approximately €130 per hectare in 2019.
- It is forecast that approximately 35 percent of specialist tillage farmers will return a negative market based net margin in 2019.

Figure E27: Gross Margin for Main Cereal Crops (2018 estimate & 2019 forecast)



Source: Teagasc, National Farm Survey Data & Author's estimate for 2018 & forecast for 2019

Figure E28: Cereal Enterprise Net Margin on Specialist Tillage Farms, 2019 forecast



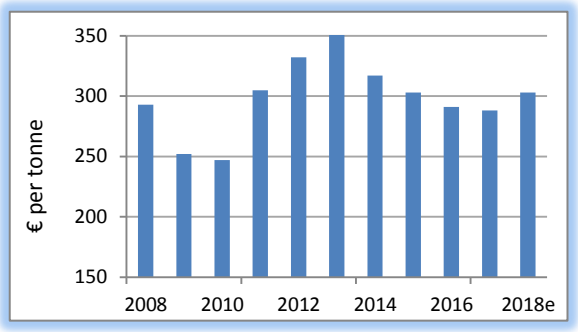
Source: Teagasc, National Farm Survey Data & Author's estimate for 2018 & forecast for 2019

Pigs: Review of 2018

Output Value	Input Spend	Income
Down	Up	Down

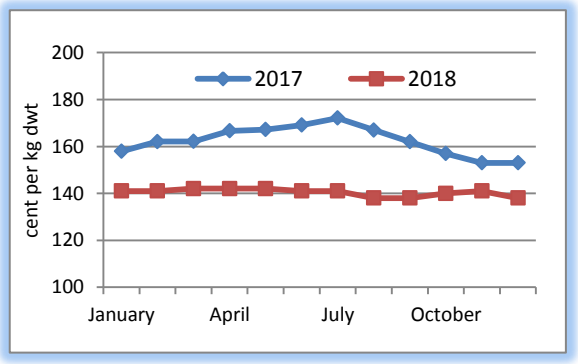
- The prices of the main pig feed ingredients increased in Q3 & Q4 in 2018.
- The annual average feed cost in 2018 was 107 c/kg dwt, which was 3 percent higher than 2017 and 2 percent lower than the 5 year average of 109 c/kg dwt.
- The 2018 Irish pig price was significantly lower than in 2017 (140 vs 162 c/kg). This was primarily due to increased EU production and reduced pigmeat imports by China.
- The estimated 2018 average pig price of 140 cent is significantly below the five year average (2014-2018) of 153 cent per kg.
- The 2018 'Margin Over Feed' per kg is estimated to be 33 cent, which is the lowest since 1999 (26c/kg). The five and 10 year average for Margin Over Feed are 44c/kg and 45c/kg respectively
- The volume of Irish (IRL) pigs slaughtered increased to 3.80 million which was an increase of 120,000 on the 2017 level.
- In 2018, pig slaughter volumes in the principal European pig producing countries increased by 1.9 percent when compared to 2017. The countries with the largest increases were Spain (4.9 percent) and the Netherlands (4.5 percent).

Figure E29: Irish Compound Pig Feed Price 2008 to 2018



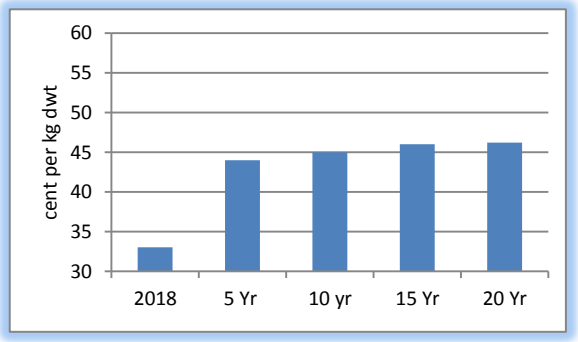
Source: Teagasc Pig Development Department Author's estimate for 2018

Figure E30: Monthly Irish Pig Prices 2017 - 2018



Source: Teagasc Pig Development Department Author's estimate for 2018

Figure E31: Margin Over Feed: Historical Comparison with 2018



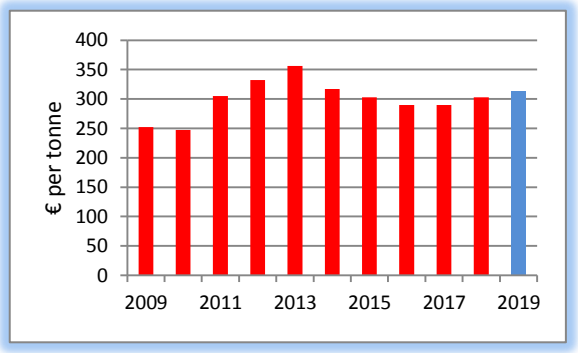
Source: Teagasc Pig Development Department

Pigs: Outlook for 2019

Output Value	Input Spend	Income
Up	Unchanged	Up

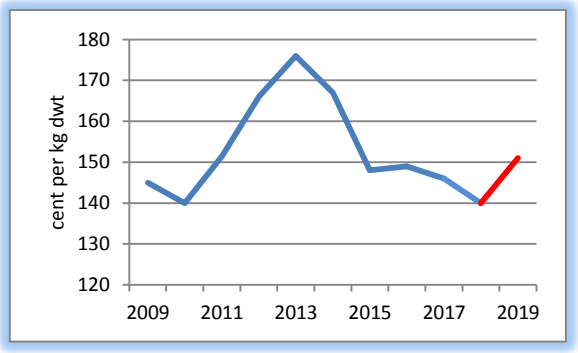
- The higher grain prices in 2018 as a result of the summer drought will continue into 2019.
- In 2019, an assumed harvest volume equivalent to the 5 year average would reduce grain ingredient prices by 5 percent compared with 2018.
- Forecasts for the 2019 South American soyabean harvest suggest it will be higher than 2018. Brazil is forecast to produce 118 Mt in 2019 would be a new record.
- While this would suggest a fall in soybean prices in 2019, the China-U.S. trade war is increasing exports of Brazilian soyabeans to China.
- The outlook for 2019 is for the annualised composite pig feed price to remain steady (€313) when compared to 2018.
- In 2019 the EU sow herd size is likely to remain static, with the possibility of an decrease in some countries.
- The size of the Irish sow herd is expected to remain unchanged, but the volume of Irish pigs being slaughtered is expected to increase by 2 percent to 3.88 million.
- The European market will continue to have high volumes of pigmeat production in 2019, but the volume of slaughter pigs will only increase moderately (+1 percent).
- The volume of Chinese pigmeat imports from the EU will have an important influence on the Irish pig price. It is expected that Chinese imports levels will increase in 2019. The extent of the increase will depend on whether the China/US trade war continues into 2019. Increased competition for Chinese imports is expected from Brazil and Canada.
- African Swine Fever will continue to feature in 2019. The Chinese will implement higher culling levels to control the disease and the EU will tighten biosecurity to prevent any further spread.
- In 2019, Irish pig prices are forecast to increase by 8 percent relative to the average 2018 level.

Figure E32: Historical Compound Pig Feed Price and forecast for 2019



Source: Teagasc Pig Development Department Author's estimate for 2018 & forecast for 2019

Figure E33: Historical Irish Pig Prices and forecast for 2019 (c/kg dwt)



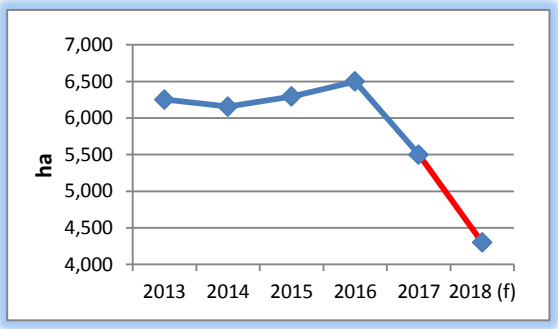
Source: Teagasc Pig Development Department Author's estimate for 2018 & forecast for 2019

Forestry Sector: Review of 2018

Afforestation levels	Actual Timber demand	Timber prices
Down	Up	Up

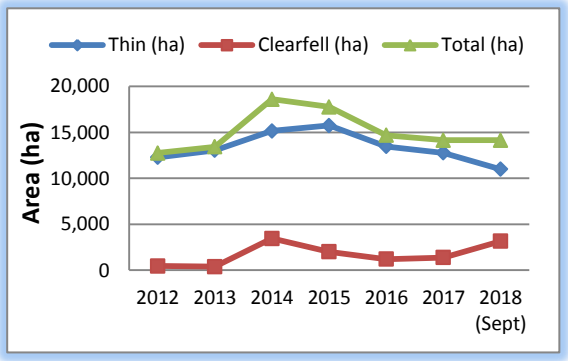
- Annual afforestation figures for 2018 have declined below 2017 levels, with 3,709 ha planted by November 20, 2018. The end of year figure is projected to be between 4,000 and 4,500 ha, which is significantly below target levels (7,205 ha).
- Both Coillte and privately sourced timber have shown significant price increases during 2018, particularly in sawlog and palletwood categories. There remains a variation in timber prices due to factors such as region, forest type, harvest type, timber quality, lot size and access.
- The area licensed for private thinning and clearfell up to the September, 2018 is similar to that approved in the same period last year.
- A total of 60 km of forest roads have been completed to date in 2018.
- The overall net demand for roundwood/wood fibre on the island of Ireland was forecast to increase from 5.47 million cubic metres (m^3) in 2017 to 5.81 million m^3 in 2018, an increase of 6 percent.
- In 2017, overall roundwood intake by sawmills increased by 8.6 percent over 2016 levels. An estimated 43 percent of the Irish market for sawn timber was supplied by domestic production. Sawmill intake for 2018 is estimated to exceed 2017 levels.
- Irish house completions for 2018 are estimated to reach over 18,500 units.
- UK timber demand has remained buoyant during 2018.
- The Irish timber sector remains very dependent on the export market, worth €423 million in 2017, an 11.3 percent increase over the 2016 value. Wood based panels accounted for €224 million, the balance comprising paper and sawn timber exports. Key export markets include the UK and the Benelux countries.

Figure E34: Annual planting 2011 to 2017, with 2018 forecast (f)



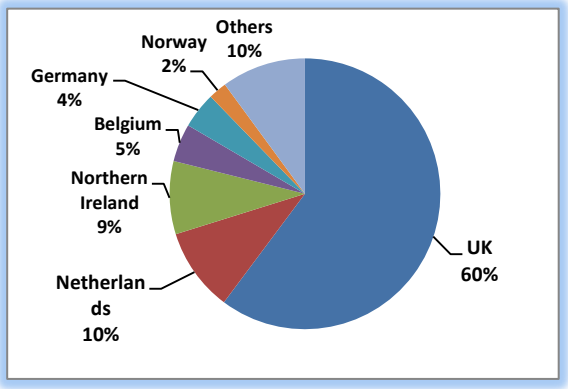
Source: DAFM, various years

Figure E35: Areas licenced for harvesting in private forests, 2012-2018



Source: DAFM, various years

Figure E36: Key export markets for panel products manufactured in Ireland (2011-2016)



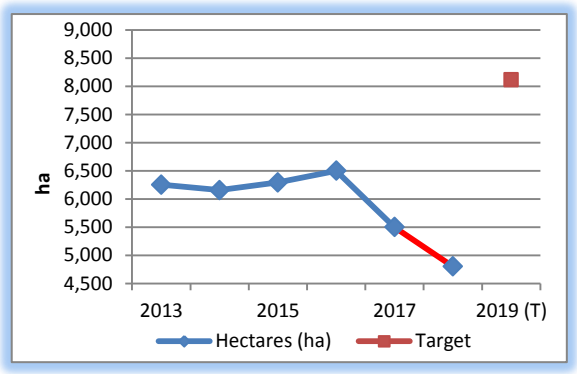
Source: Central Statistics Office

Forestry Sector: Outlook for of 2019

Afforestation levels	Timber demand	Timber prices
↑ Up	↑ Overall net demand increase	→ Depends on Brexit scenario

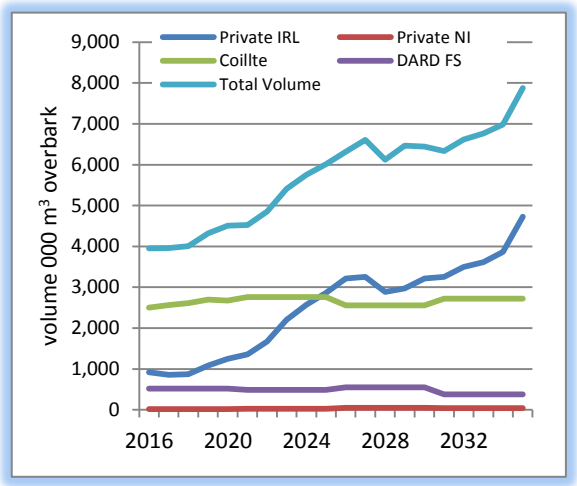
- Cautious optimism is reported within the sector for the upcoming planting season, with the recent budget allocation considered sufficient to support a strong afforestation programme.
- Brexit-related uncertainties and currency fluctuations are forecast to continue to influence the market for Irish timber in 2019, but there is a level of confidence among timber processors regarding the continued buoyancy of UK timber markets, despite signals of a slowdown in construction growth.
- Other developments, including the proposed Sustainable Scheme for Renewable Heat, possible changes to Combined Heat and Power (CHP) supports and fossil fuel prices are likely to impact on demand for wood based biomass for energy provision.
- 2,257 felling licenses (FLs) have been issued to the end of September 2018 representing an area of 28,557 ha, comprising both Coillte and private sector forestry. Under the 2014 Forestry Act, felling licences may be issued for up to 10 year duration. All felling cannot occur in the year that the licences are issued. It is anticipated that a higher level of harvesting will occur in 2019.
- Forecasts indicate that the net realisable volume (NRV) from private sector in Ireland will increase from 0.867 million m^3 in 2018 to 1.08 million m^3 in 2019. Private sector volume production is predicted to increase steadily, reaching 1.24 million m^3 in 2020 and 2.86 million m^3 by 2025.
- Based on demand surveys, roundwood demand from sawmills is predicted to grow rapidly to 2.9 million m^3 by 2020. The supply demand position shows a continued shortfall in supply of roundwood to the sawmilling sector, reaching 0.46 million m^3 per annum by 2020.

Figure E37: Annual planting 2011 to 2017, with 2018 forecast (f) & 2018 target (t)



Source: DAFM, various years

Figure E38: Forecast of Total Net Realisable Volume Production to 2035 (000m3)



Source: All-Ireland Roundwood Production Forecast 2016-2035 (COFORD, 2016)

Irish Dairy Farming in 2017

Irish Milk Deliveries
7,263 million litres (up 9%)

Days at Grass
235 days (unchanged)

Milk Production per cow
average 5,406 litres (up 5%)

Stocking Rate
average of 2.08 lu/ha

Milk price (Teagasc NFS)
average 36.9 cent per litre (up 32%)

Milk Production per ha
average 11,279 litres (up 2%)

Irish Dairy Cow Numbers (Dec)
1.343 million (up 4%)

Milk Fat Content (CSO)
average 4.09% (down 1 basis point)

Concentrate Fed/Dairy Cow
average 1,032 kg (up 10%)

Milk Protein Content (CSO)
average 3.48% (up 3 basis points)

Concentrates fed/litre of milk
average 0.19 kg (up 6%)

Milk Solids per Cow (NFS)
average 401 kg (down 3%)

Nitrogen per ha of grassland
average 176 kg

Basic Payment Scheme
per farm € 16,010

Total Production Costs
avg. 22.8 cent per litre (up 5%)
avg. €2,528 per hectare (up 5%)

Somatic Cell Count
average 168,000 cells/ml (unchanged)

Gross Margin for Dairy Enterprise
avg. 24.9 cent per litre (up 55%)
avg. €2,884 per hectare (up 62%)

Net Margin for Dairy Enterprise
avg. 14.9 cent per litre (up 121%)
avg. €1,730 per hectare (up 118%)

Source: Teagasc National Farm Survey and Central Statistics Office

Irish Dairy Farming in 2018

Moderate reduction in milk prices
but further expansion in Irish milk production

Irish Milk Production
up 3% on the 2017 level

Irish Milk price
down 7% on the 2017 level

Weather Conditions
extremely challenging for much of the year. South and East worst affected.

Grass Availability
a major problem during the summer

Fertiliser Prices up 7%
Fertiliser Use up on 2017

Feed Prices up 6% in 2018
Feed use up 38% per head

Other Direct Costs
down 2% on the 2017 level

Fuel prices
up 10% on the 2017 level

Total Costs per litre of milk
up 11% on the 2017 level

Net Margin for Dairy Enterprise
down 34% per litre on 2017

Irish Dairy Farming in 2019

Stable milk prices
international supply and demand in reasonable balance

Irish Milk Production
up 6% on the 2018 level

Irish Milk price
down 5% on the 2018 level

Weather Conditions
Normal weather assumed

Grass Availability
assumed to be normal

Fertiliser Prices up 16%
Fertiliser Use down on 2018

Feed Prices unchanged in 2019
Feed use down 30% per head

Other Direct Costs
down 2% on the 2018 level

Fuel prices
unchanged on the 2018 level

Total Costs per litre of milk
down 11% on the 2018 level

Net Margin for Dairy Enterprise
up 10% per litre on 2018

Source: Teagasc Estimates for 2018 and Forecasts for 2019

Review of Dairy Farming in 2018 and Outlook for 2019

Trevor Donnellan and Emma Dillon

Agricultural Economics and Farm Surveys Department, Teagasc

1. Introduction

This paper looks back on dairy farm performance in 2017, reviews the outcomes for 2018 and looks ahead to the prospects for 2019. Data from the Teagasc NFS are used in our review of 2017. The milk price and key input cost estimates for 2018 are used to produce an overall estimate of dairy enterprise margins for 2018. Finally, in the concluding sections of the paper, the forecast for milk price, production costs and dairy farm margins in 2019 are presented.

2017 was a very positive year for the Irish dairy sector with a dramatic recovery in the milk price. This led to an 8 percent increase in national production. As a result, the average Family Farm Income (FFI) recorded through the Teagasc National Farm Survey (NFS) was at a record high of €86,069. The 65 percent year-on-year increase following a very difficult 2016 reflects the volatility inherent in the system. Although input prices generally declined in 2017, usage increased in line with production.

Weather conditions in 2017 were generally favourable early on, although poor ground conditions in some regions led to difficult grazing conditions and earlier winter housing. This posed difficulties for some around the availability of fodder in winter 2017/18, a situation which was further exacerbated by the prolonged winter and unprecedented weather conditions experienced during spring and summer 2018.

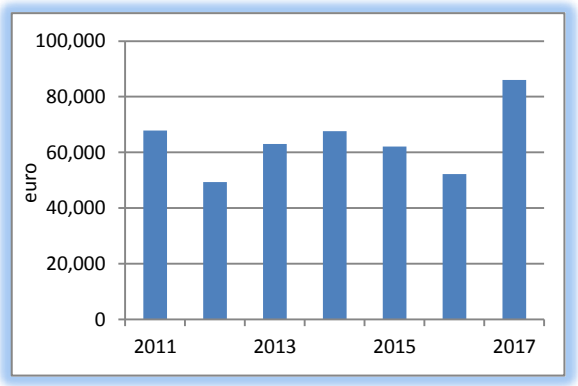
The highs of 2017 were certainly short-lived with very difficult conditions experienced during 2018. Inclement weather and poor grass growth resulted in animals being housed for longer during the first half of 2018. The recovery anticipated during the summer months was slow to come, with drought conditions experienced in many areas. Overall, this resulted in elevated feed costs, the magnitude of which varied by region and farm. The particular characteristics of the farm, e.g. stocking intensity, grass availability and fodder stocks were all important factors in determining the extent of the challenges posed by difficult weather conditions.

As a result, milk production was impacted in the first half of the year with some recovery in Q4. Irish milk prices fell, but the reduction was limited by lower than anticipated growth in global production. This, coupled with the capacity to increase production, helped maintain a higher level of income on Irish dairy farms in 2018 than would otherwise have been the case.

2. Review of the Economic Performance of Dairy Farms in 2017

Results from the Teagasc NFS 2017 for dairy farms are summarised here. Figure 1 presents the average FFI on *Specialist Dairy* farms over the years 2011 to 2017. Average FFI on Irish dairy farms fell from 2014 to 2016 due to the depressed milk price, despite increased milk production post-quota abolition. A dramatic recovery was evident in 2017 due to a strong milk price and the increase in milk production. This resulted in a record average farm income of €86,069 in 2017.

Figure 1: Average Income on Irish Specialist Dairy Farms 2011 to 2017



Source: Teagasc National Farm Survey (various years)

To further explore the economic performance of dairy farms in 2017, we next look at how margins have changed in the past few years. Table A1 (see appendix) presents the average gross output, gross margin and net margin per litre of milk produced in 2016 and 2017. Farms producing mainly liquid milk are excluded from the sample, as are herds of 10 cows or less.

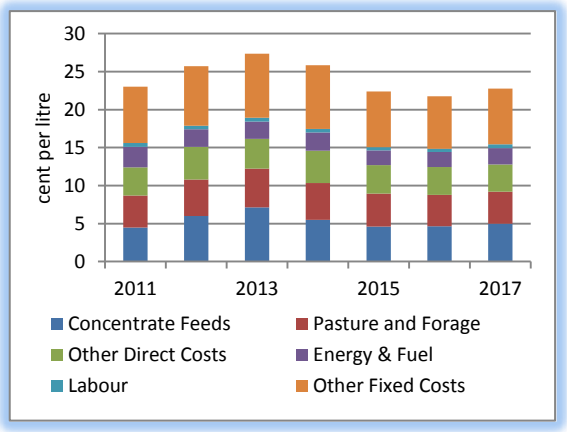
The gross output measure includes the value of milk and calf sales minus replacement costs. The data indicates that gross output per litre increased by 32 percent in 2017 relative to 2016, due to the increased milk price and increased deliveries. This followed two years of decline due to weak milk prices. Total direct costs increased by 3 percent in 2017. Although there were reductions in feed and fertiliser prices in particular, usage volumes increased in 2017. Overall fixed costs per litre increased by 7 percent year-on-year. The average gross margin in 2017 increased to 24.9 cent per litre. The average net margin in 2017 was 14.9 cent per litre, representing a 121 percent increase on the 2016 level.

Table A2 (in the appendix) presents gross output, total costs and net margin per hectare of forage area allocated to the dairy enterprise for 2016 and 2017. Production per hectare increased by 2 percent in 2017, with overall net margin per hectare increasing by 118 percent, due to the strong recovery in milk price.

The cost and margin data in Table A3 allow us to examine the variability in economic performance across dairy farms in 2017. 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 well performing one-third (Bottom). On a per litre basis, production costs for the Bottom group (25.1 cent) are 19 percent higher than for the Top group (21.1 cent) and the net margin for the Bottom group (11.8 cent) is two-thirds that of the Top group (17.6 cent). This reflects a narrowing in the profitability differential between the Top and Bottom groups in 2017 relative to 2016, when the Bottom group were achieving a net margin only one-third that of the Top group.

Figure 2 indicates that total milk production costs increased by 6 percent in 2017. Although input prices declined in general, usage volumes increased. The main drivers of the increase in production costs related to increased expenditure on concentrates, electricity and fuel and also hired labour. Total production costs per litre increased by 5 percent year-on-year to 22.8 cent per litre on average. The increase in production costs in 2017 was notable in that it reversed some of the post quota elimination cost reductions observed in 2015 and 2016.

Figure 2: Total Milk Production Costs (cent per litre) in Ireland: 2011 to 2017



Source: Teagasc National Farm Survey Data

3. Review of 2018 Estimated Performance

This section of the paper presents a review of dairying in 2018. Teagasc NFS results for 2018 will not be available until the middle of 2019. Therefore, it is necessary to estimate the price and volume of inputs and outputs in 2018, in order to estimate the outcome for margins. The following section of the paper first discusses cost estimates for 2018, looking at both input prices and input usage volumes. Finally, the development of dairy product markets in 2018, in terms of both price and volume changes, is discussed.

The discussion of production costs in 2018 is complicated by the extremely challenging year which dairy farmers experienced due to the long winter and extremely dry summer. The impact of these weather conditions will have been highly farm specific, with factors such as farm location, soil type, stocking rate and dependency on feed, all affecting production costs. Here we present an assessment based on the average farm, reflective of the overall experience at national level. The situation on individual farms may not mirror this overall national picture. This analysis cannot attempt to represent the experience on each individual farm in 2018.

3.1 Estimated Input Usage and Price 2018

It is not yet possible to offer a comprehensive assessment of precise changes in costs at the farm level in 2018. While the difficult weather conditions will have adversely affected all farms, the extent of

the impact will be worse on some farms than on others. In this analysis of likely changes in production costs in 2018, it is assumed that the average farm increased its milk production by 3 percent in 2018.

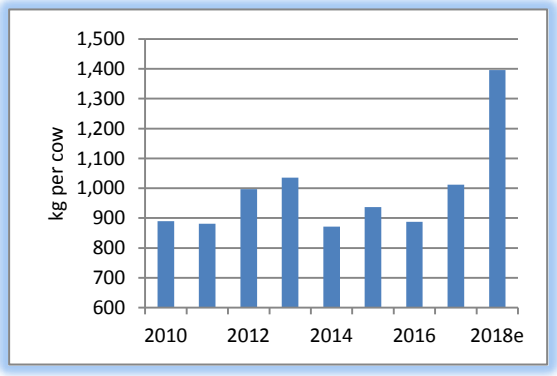
3.1.1 Feedstuff – usage and price 2018

Purchased feed (concentrates) is an important element of dairy production costs in Ireland, typically accounting for about 20 percent of total production costs, although this varies by farm and by year. However, in 2018 feed expenditure will have made up a much larger share of production costs.

While official aggregate feed sales data for the full year are not yet available, provisional data illustrate that dairy feed sales increased dramatically in 2018, with aggregate dairy feeds sales to the end of Q3 up over 40 percent in volume terms on the same period in 2017. Given that the Irish dairy cow population is estimated to have increased by 3.5 percent in 2018, this means that there has been a substantial increase in feed use per dairy cow in 2018, estimated for the full year to be about 38 percent. Weather conditions have been generally favourable through the final third of 2018. Without these favourable grass growth conditions, the increase in feed use (due to limited fodder availability) for the year as a whole could have been even greater, with follow on implications for the level of feed requirements in Q1 of 2019. The average milk yield per cow is estimated to have dropped very slightly in 2018 relative to 2017.

Figure 3 shows the average volume of compound feed use per cow, including an estimate for 2018.

Figure 3: Compound Feed Purchases per Dairy Cow in Ireland: National Average for 2010 to 2018



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

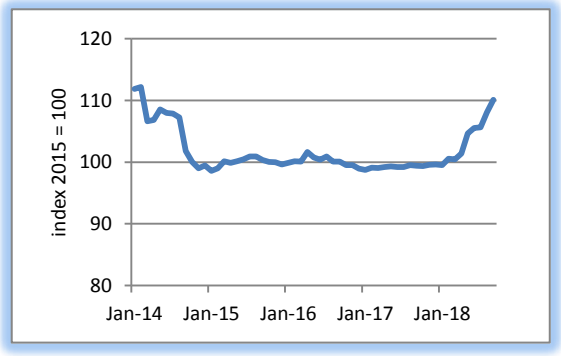
These data are derived from Department of Agriculture, Food and the Marine (DAFM) figures on feed sales to the end of Q3 and estimates for Q4 2018 by the authors, along with Central Statistics Office (CSO) data on animal numbers.

For the average dairy farm, expanding milk production by 3 percent in 2018, feed use per cow, is estimated at just under 1,400 kg, a 38 percent increase in volume terms relative to 2017. The increase in feed usage on individual farms will differ from this average story. In particular, it is likely that feed use will have increased by a much greater percentage on farms where normally the level of feed usage would be well below the average.

Challenging weather conditions globally in 2018 resulted in lower grain production, a decrease in global grain stocks and a more constrained global supply and demand balance. This led to an upward movement in cereal prices in 2018, with a consequential increase in prices on the Irish feed market.

Figure 4 shows an index of monthly Irish cattle feed prices from 2014 to 2018. The annual average feed price for 2018 is estimated to be €279 per tonne, representing a 5 percent increase on the 2017 level. The increase in feed prices in 2018, combined with the dramatic increase in feed volume, imply that total expenditure on dairy feed in 2018 rose substantially.

Figure 4: Monthly Price Index of Cattle Meal in Ireland 2014 to 2018



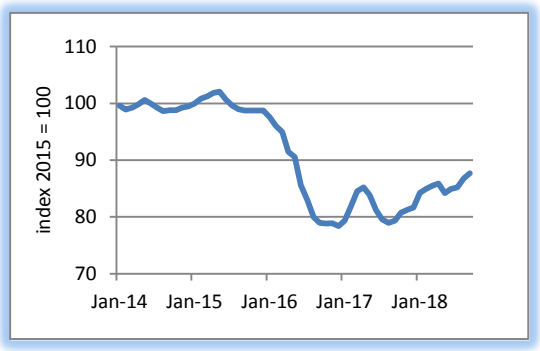
Source: Central Statistics Office (Various Years)

On a per litre basis, the expenditure on feed is estimated to have increased by 47 percent in 2018. While feed costs, measured on a per hectare basis, are estimated to have increased by over 52 percent on the average farm producing 3 percent more milk in 2018.

3.1.2 Fertiliser – usage and price 2018

Pasture and forage costs typically comprise about 20 percent of total production costs on dairy farms. Fertiliser purchases comprise about half of the pasture and forage cost element, with contractor costs accounting for most of the remainder. Figure 5 charts the Irish monthly index of farm level fertiliser prices from 2014 through to 2018.

Figure 5: Monthly Price Index of Fertiliser in Ireland for 2014 to 2018

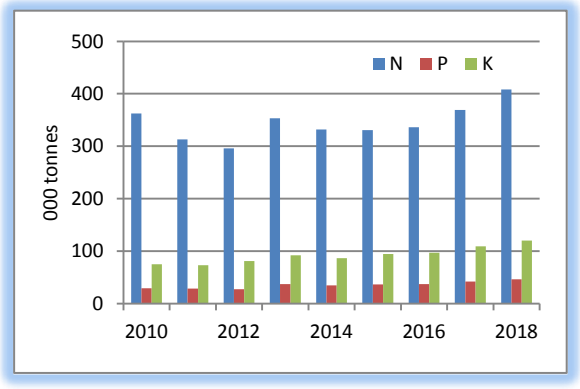


Source: Central Statistics Office (Various Years)

There was an increase in fertiliser prices in 2018. This reflected the increase in production costs internationally associated with higher energy prices. Gas is by far the largest cost component of nitrogen based fertilisers. Irish fertiliser prices for 2018 as a whole were about 5 percent higher than in 2017.

In 2018 nitrogen fertiliser sales nationally increased. DAFM sales figures for 2018, as reported in Figure 6, indicate an 11 percent increase in nitrogen (N) and a 12 percent increase in both phosphorus (P) and potassium (K) sales volume relative to 2017.

Figure 6: Irish Fertiliser Sales by Compounders 2010 to 2018 (Oct-Sept)



Source: DAFM (various years)

Overall, taking account of the increase in the level of fertiliser sales and the rise in price, fertiliser expenditure per hectare on the average dairy farm in 2018 is estimated to have increased considerably compared to the 2017 level.

3.1.3 Contractor Costs - usage and price 2018

Contractor costs comprise the remaining 50 percent of the pasture and forage cost element. While no official figures are available, it is assumed that there has been no change in contractor prices in 2018.

3.1.4 Pasture and Forage – usage and price 2018

With fertiliser expenditure estimated to have increased in 2018 relative to 2017 and expenditure on contracting estimated to have increased also due to increased production of third cut silage, pasture and forage expenditure is estimated to have increased on a per hectare basis in 2018 by about 19 percent. Expenditure on pasture and forage has increased on a per litre basis by 13 percent on farms where milk production has increased by the national average of 3 percent.

3.1.5 Electricity and Fuel – usage and price 2018

Electricity and fuel are less important inputs than feed and fertiliser, comprising less than 10 percent of total costs on dairy farms. Electricity typically comprises about 30 percent of the total expenditure on energy and fuel on dairy farms, with motor fuel accounting for the remaining 70 percent.

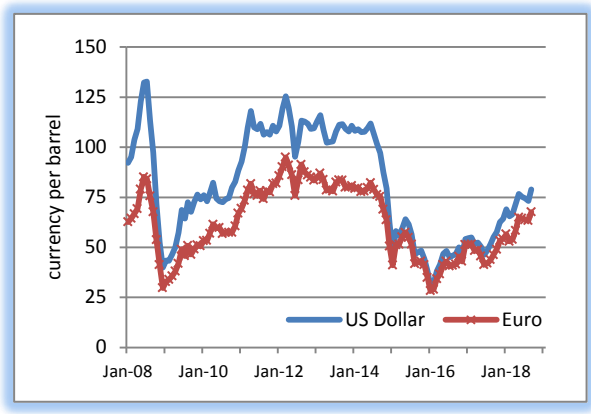
Crude Oil and Motor Fuel Prices: The global oil market tightened in the first half of 2018 as OPEC and Russia agreed to curb supplies. Brent oil prices peaked at over $80 per barrel (pb) in Q3 of 2018. In Q4 of 2018 substantial players within OPEC, such as Saudi Arabia, have come under international political pressure, to maintain oil supplies. Brent prices have slid considerably in Q4 of 2018 to US$60 territory.

Crude oil prices are presented in Figure 7. The average annual price for 2018 will be about US $72 pb, which represents an increase of 32 percent on the average oil price in 2017 (US $54 pb).

While the value of the euro against the US dollar fell gradually over the course of 2018, it did so from a high of US$1.22 in January to about US$1.15 by year end. For 2018 as a whole there was a 5 percent increase in the value of the euro against the

US dollar compared with its 2017 level. This appreciation of the euro moderated the increase in oil prices in euro terms.

Figure 7: Monthly Average Brent Crude oil prices in Euro and US dollar from 2008 to 2018



Source: St Louis Fed.

Hence, the estimated average crude oil price for 2018 was over €61 pb, an increase in euro terms of about 27 percent on the 2017 value of €48 pb. Overall, farm level fuel costs in Ireland experienced an increase in 2018, with fuel prices approximately 9 percent higher in 2018 relative to the 2017 level.

Electricity Prices: Electricity costs change infrequently in Ireland due to price regulation. Monthly prices have risen on two occasions in 2018. For 2018 as a whole, electricity prices are likely to be 8 percent higher than in 2017.

Fuel and Electricity Volumes: Demand by farmers for fuel and electricity tends to be relatively inelastic with respect to price. It is difficult to determine to what extent increased milk production has had an impact on energy and fuel requirements.

Given that milk production is estimated to have increased nationally by 3 percent, this suggests that electricity and fuel expenditure per litre of milk produced will not have increased in percentage terms by as much as the farm level percentage increase. For the average dairy farm, the overall expenditure on both electricity and fuel is estimated to be up 9 percent on a per hectare basis in 2018, with a smaller increase when measured on a per litre of milk basis.

3.1.6 Other Direct and Fixed Costs– usage and price 2018

It is estimated that there was a 1 percent increase in agricultural wages in Ireland in 2018. It is assumed that the quantity of hired labour used on farms is likely to have increased slightly to cater for increased milk production and perhaps also to deal with the difficult weather conditions at various points in 2018. However, this is dependent on decisions made at farm level about the mix of own labour and hired labour to be used.

There was no increase in other input cost items in 2018. It is assumed that usage volume of these input items is unchanged.

The assessment of fixed costs in the Teagasc NFS is quite complex and definitive information on how fixed costs have changed in 2018 will not be available until the Teagasc NFS results for 2018 are published in 2019. At the overall farm level, it is estimated that fixed costs on dairy farms have not changed in 2018. However, factoring in the fall in milk price in 2018 and the further increase in milk production, the value of milk output will have fallen. Hence the share of fixed costs allocated to the dairy enterprise on dairy farms is estimated to have fallen slightly in 2018.

3.1.7 Estimate of Total Input expenditure for 2018

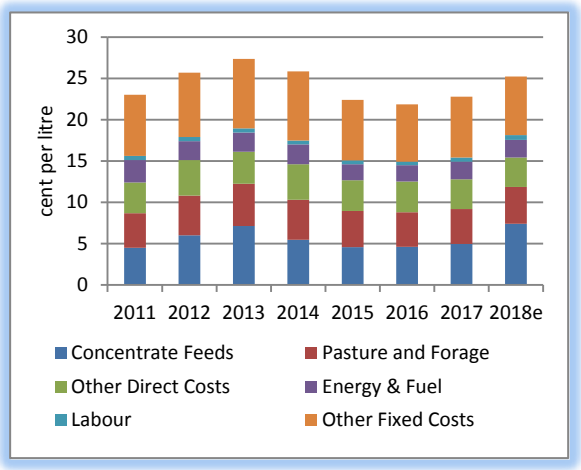
While production conditions on Irish dairy farms in 2018 were at times extremely difficult, late season production conditions were much more favourable. Consequently, the increase in dairy cow numbers in 2018 was sufficient to result in an overall increase in Irish milk production, in spite of a slight reduction in milk yields relative to the 2017 level.

Increasingly, the assessment of costs on a per hectare basis will become the most relevant measure, but costs are also assessed here on a per litre basis, since it provides a useful comparator with previous years.

A comprehensive assessment of the impact of increased milk production on production costs is not possible given the heterogeneity of farms and the fact that some farm were more adversely affected by weather conditions in 2018 than others. Here the impact on production costs for the average farm that expanded its milk production by 3 percent in 2018 is considered.

Figure 8 charts the average total cost of production and its subcomponents for selected years from 2011 to 2017 and the associated estimate for 2018.

Figure 8: Total Costs of Milk Production in Ireland from 2011 to 2018



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

It is estimated that the average total cost of milk production in Ireland in 2018 was 25.2 cent per litre compared to an average of 22.8 cent per litre in 2017. The total cost figure for 2018 largely reflects an increase in direct input expenditure, mainly driven by the substantial increase in feed usage.

3.2 Review of Dairy Market in 2018

Following a good year for farm milk prices in 2017, there was a moderate decrease in milk prices in 2018. Butter prices dropped from an historic peak, and cheddar prices moved over a relatively narrow range. While SMP prices improved in 2018, they remained at very low levels due to the continuing presence of high EU intervention stocks.

Growth in global dairy production increased in 2017 and continued through 2018. In Q1 of 2018 NZ milk production was below the level of the same period in 2017, while Q2 2018 saw a strong close to the year.

Early season NZ production in 2018/19 has been the highest since 2014/15 and is running about 5 percent higher than in the 2017/18 season. For calendar year 2018 NZ milk production is likely to be up by 2 to 2.5 percent, equivalent to over 0.5 Mt. Overall, this means that NZ production in calendar year 2019 could be the highest ever.

EU milk production growth continued in 2018 in spite of the impact of adverse weather across much of the Northern European dairy belt. For the EU as a whole, milk production in 2018 is likely to show an increase of about 1.5 percent, or 2 Mt, on the 2017 level.

The overall EU production story in 2018 masks quite a degree of variability at the MS level. The largest percentage increases have been recorded in Bulgaria and Romania, but neither has any significant export capacity. Among the main dairy producers in the EU, Belgium recorded the strongest increase of 5 percent in the year to September, followed by Germany, Spain and Poland at close to 3 percent. Production increases in France, Italy and Denmark have been lower, at 1.5 percent to 2 percent. In the UK and Ireland, the impact of drought conditions has meant that it took until the autumn for year to date production in 2018 to pull ahead of the 2017 level. Production in the Netherlands in 2018 has fallen by over 1 percent due to the herd limitations related to phosphate.

Milk production growth in the US in 2018 began strongly and in the first quarter of 2018 was almost 2 percent ahead of the same period in 2017. As the season progressed however production growth has slowed, but it remains more than 1 percent ahead of the 2017 level. For the full calendar year in 2018 US milk production should be about 1.0 Mt up on the 2017 level.

After a strong performance in Q1 of 2018, milk production in Australia has been adversely affected in Q2 and Q3 by limited rainfall/drought conditions. For the year to September production was up 1.6 percent relative to the same period in 2017.

Flooding led to a sharp contraction in milk production in Argentina in 2016 and 2017, but production has rebounded considerably in 2018. Year to date production was up 9 percent by the end of August 2018 relative to the same period in 2017.

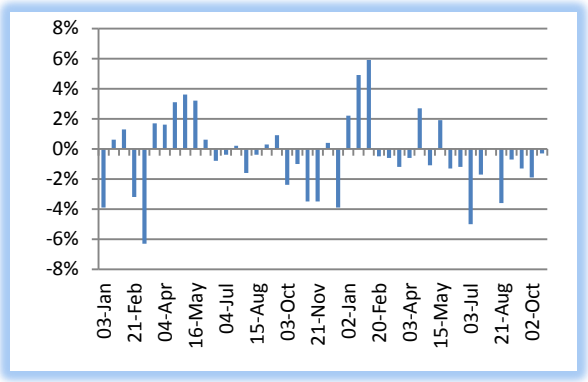
In 2017 global milk production grew by 1.4 percent (IDF, 2018). In spite of weakening commodity prices in 2018, milk production growth for 2018 is likely to be stronger than in 2017. Global milk production may have increased to 868 Mt in 2018, compared with 850 Mt in 2017. This annual rate of increase of about 2 percent is still below the trend of the last fifteen years, which averaged close to 2.3 percent per annum.

On the demand side the Russian market remained closed to EU exports in 2018. In 2018 EU SMP exports to third countries were on a par with 2017. SMP demand from China in 2018 has been slightly stronger than in 2017. For the period January to September 2018, Chinese imports of SMP from the EU were over 9 percent above the same period in 2017. Exports of SMP to Algeria have grown further in 2018, up almost 20 percent in the January to September 2018 period relative to the same period in 2017.

By contrast, EU exports of WMP to third countries have decreased. Chinese imports of WMP from the EU are down 5 percent in the period January to September 2018 relative to the same period in 2017. Of greater consequence is a sharp decrease in WMP exports to Algeria which has been the main factor in an overall reduction in EU WMP exports to third countries.

Figure 9 shows price movements in the influential New Zealand Global Dairy Trade (GDT) Auction Index. Following some strong increases in Q1 of 2018, the overall auction price has generally been on a slow but continuous downward trend in Q2, Q3 and Q4 of 2018.

Figure 9: Monthly GDT Auction Index Price movements in 2017 and 2018

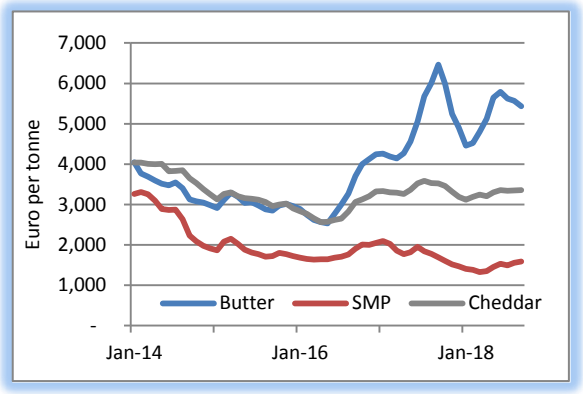


Source: GDT Auction 2018

European wholesale dairy product prices are shown in Figure 10. Record European butter prices were a feature of the dairy market through much of 2017, but prices had dropped below €5,000 per tonne by early 2018. However, as the year progressed butter prices again moved upward, reaching the €5,800 level in mid 2018, before easing slightly in Q3. Notably, European dairy prices have not moved downward to reflect the lower GDT auction prices of recent months.

By contrast EU SMP prices, while in a process of recovery, have remained extremely weak and have yet to reach €1,800 per tonne. The European Commission has managed reduce its intervention stocks by 100,000 tonnes over the course of 2018.

Figure 10: European Dairy Product Prices 2014-18



Source: USDA 2018

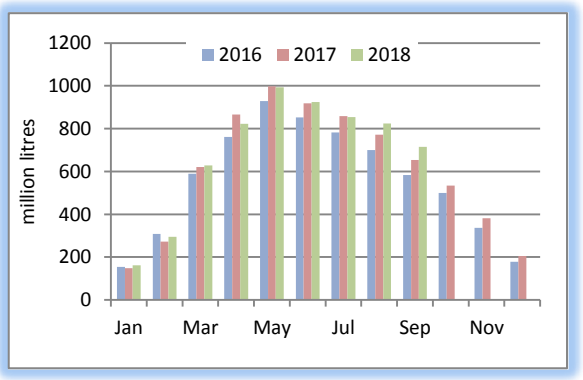
The contrasting developments in butter and SMP prices are evident in Figure 10. The strength of butter prices relative to SMP over the last 2 years is atypical.

3.3 Estimated Output Values 2018

In 2018 milk production continued to increase in Ireland, in spite of very difficult production conditions at various points in the production season. The dairy cow herd continued to grow but yields fell slightly.

Figure 11 shows monthly Irish milk deliveries in 2018. In H1 of 2018 production fell relative to H1 2017 due to adverse weather conditions, while production recovered from August onwards.

Figure 11: Monthly Irish Milk Deliveries in 2016 to 2018



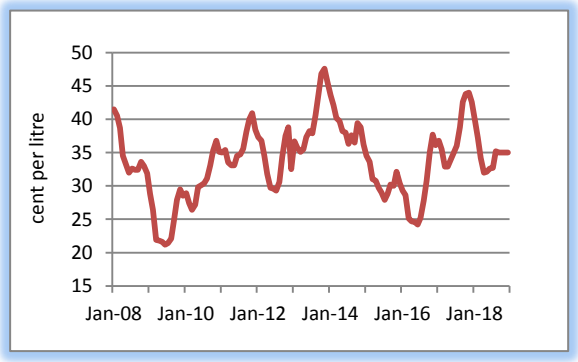
Source: CSO, DAFM 2018

For 2018 as a whole, milk production is likely to be about 3 percent up on the 2017 level. Irish dairy

cow numbers, as recorded in June 2018 increased to 1.48 million, compared with 1.433 million in 2017, an increase of 3.4 percent (CSO 2018). This means that the increase in June Irish dairy cow numbers since 2010 is 38 percent.

Figure 12 presents monthly Irish milk prices recorded by the CSO from January 2008 through to September of 2018. In Ireland the 2018 manufacturing milk price is estimated to have decreased by about 7 percent relative to the 2017 level on an actual constituent basis.

Figure 12: Irish Farm Gate Milk Prices Actual fat (vat incl.) Jan 2008 – Sept 2018

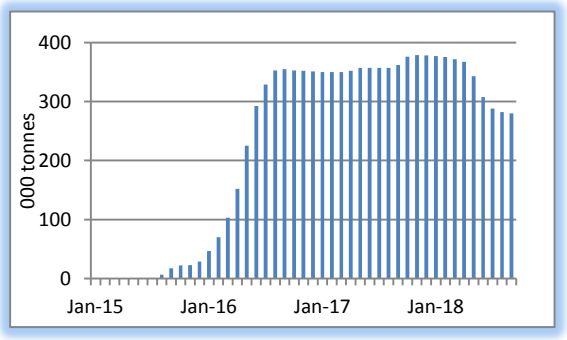


Source: CSO.
Note: Actual fat (VAT inclusive)

Some farmers will have milk in fixed price contracts and therefore may not obtain the spot prices quoted in this paper. The annual average national milk price (CSO definition) is estimated to be close to 34 cent per litre (vat inclusive) in 2018 on an actual fat and protein basis (estimated to be 4.08 percent fat and 3.45 percent protein).

The large volume of SMP stocks that built up in the EU in 2016 persisted through 2017, but began to decrease through 2018.

Figure 13: EU SMP Intervention Stocks 2015 to 2018

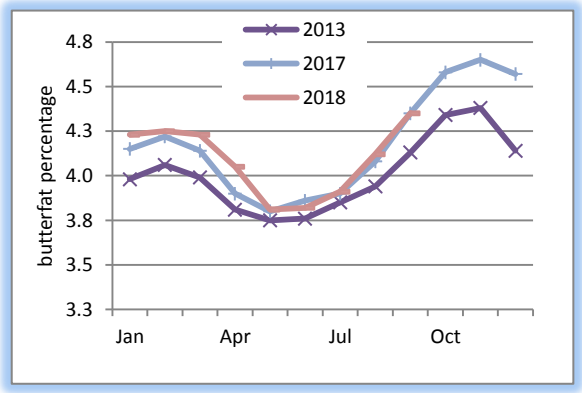


Source: Milk Market Observatory

Relative to their peak at the end of 2017 at almost 380,000 tonnes, EU SMP intervention stocks fell by over 100,000 tonnes by the middle of 2018. The decline in stocks has been reflected in some improvement in SMP prices in 2018.

In addition to the growth in milk production volumes, there has been an increase in both fat and protein levels in Irish milk deliveries in recent years as illustrated in Figure 14. However, there has been no further improvement in milk constituents in 2018 due to difficult production conditions.

Figure 14: Butterfat in Irish Milk Deliveries 2013, 2017 and 2018



Source: CSO

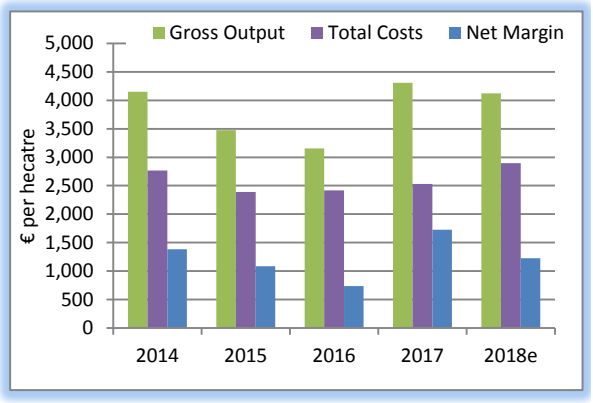
3.4 Review of Dairy Enterprise Net Margins in 2018

The review of milk prices showed that the average milk price for 2018 was down 7 percent on the 2017 level. The review of input costs concluded that for the average farm, having expanded its milk production by 3 percent, the total production costs on a per litre basis are estimated to have increased by 11 percent in 2018 relative to 2017.

It is not possible to provide a farm specific indication of the change in margin per litre (or per hectare) in 2018, due to the heterogeneous impact of the adverse weather conditions on Irish dairy farms in 2018.

Margin per hectare is described before examining the margin on a per litre basis. Figure 15 presents the estimated average gross output, production costs and net margin per hectare for 2018 in comparison to recent years on the basis of a 3 percent increase in milk production in 2018.

Figure 15: Average Gross Output, Costs & Margins per hectare for Irish Milk Production in 2014-2017 & estimate for 2018

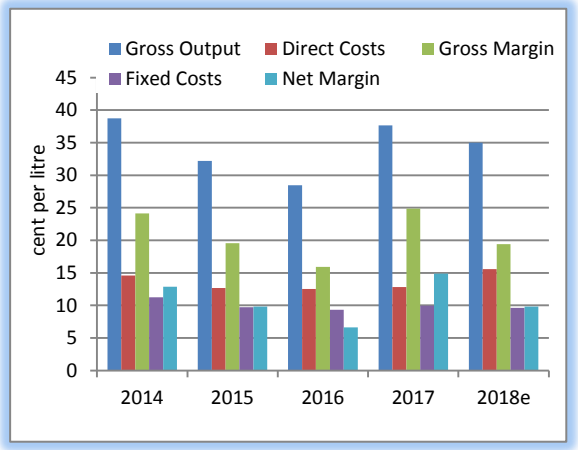


Source: Teagasc National Farm Survey Data and Authors' estimates Note: e = estimate

For 2018 the net margin for milk production averaged €1,227 per hectare. This means that the average net margin in 2018 has fallen by about €500 relative to the record year in 2017. Relative to 2017, the decrease in margin per hectare in 2018 is estimated to have been 29 percent. A larger decrease in margin per hectare is likely to have been recorded on more highly stocked farms on light soils, operating a low feed system, as these farms will have experienced the greatest shortages in grass supplies and the largest increase in feed requirements in 2018.

Estimated average gross output per litre in 2018 is shown in Figure 16 on the basis of a 3 percent increase in milk production.

Figure 16: Average Gross Output, Costs & Margins per litre for Irish milk production in 2014-2017 and estimates for 2018



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

Average gross output per litre is estimated to have decreased in 2018 to 35 cent per litre, representing a decrease of just over 2.5 cent compared with gross output in 2017.

The estimated net margin in 2018, of 9.8 cent per litre, represents a 34 percent decrease on that recorded in 2017. See Table A5 (appendix) for estimates of output, costs and margins on a per litre basis for a farm that has achieved a 3 percent expansion in milk production in 2018.

4. Dairy Outlook for 2019

The discussion of production costs in 2019 is complicated by the fact that fodder reserves will be limited entering 2019 and early season production costs in 2019 could be strongly influenced by the coming winter/spring weather conditions. Even if conditions in winter 2018/spring 2019 are favourable, there will be pressure to produce additional fodder in 2019, to build up stocks as a hedge against the risk of a future period of poor grass growing conditions. For the purposes of this analysis, a 6 percent increase in total Irish milk production in 2019 is forecast, with a slight increase of 1 percent in the dairy enterprise's land base.

A further increase in production in 2019 can be expected to lead to increased input usage on farms where expansion takes place. The extent of this increase will be highly farm specific.

4.1 Outlook for Input Expenditure 2019

In this analysis of likely changes in production costs in 2019, for simplicity it is assumed that the average farm increases its milk production by 6 percent in 2019, equivalent to the forecast percentage increase in national production.

4.1.1 Feed - usage and price 2019

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. Cereal prices at harvest 2018 were up 30 to 40 percent on the 2017 level. The international wheat harvest will decrease in 2018 for the first time in six years, mainly due to lower harvested in Australia, the EU, Russia and Argentina.

Feed prices in 2019 will depend in part on cereal prices for harvest 2019, but the main determinant will be harvest prices in 2018. Farmers have already seen an increase in feed costs in the back end of 2018, reflecting the higher prices paid for cereals at

harvest time. Feed prices are forecast to remain unchanged in 2019 relative to the 2018 level.

The volume of dairy feed used increased dramatically in Ireland in 2018 by about 38 percent per head, driven by the late spring, the shortage of grass over the summer and high late season milk prices. With the assumption of normal weather in Ireland in 2019, feed volume requirements per head for grassland enterprises are expected to revert to normal levels.

A decrease in feed volume of 30 percent per head is factored in for 2019. Allowing for a 1 percent increase in dairy hectarage, this would mean a 30 percent decrease in feed expenditure on a per hectare basis. Given the assumed 6 percent farm level increase in milk output, this would mean that expenditure on feed is estimated to decrease by 33 percent on a per litre basis in 2019.

4.1.2 Fertiliser & Contracting Costs– usage and price 2019

Fertiliser prices are forecast to move upwards through 2019. This means that fertiliser prices in early 2019 will be above the price that prevailed in early 2018. Overall, the annual average fertiliser price in 2019 is forecast to be up 16 percent in 2019 compared with the 2018 level.

On the assumption of normal weather, it is forecast that fertiliser use in 2019 will decrease relative to the 2018 level, perhaps by 5 percent. With fertiliser prices rising considerably and usage levels falling, this would mean that the total expenditure on fertiliser in 2019 would increase by 10 percent on a per hectare basis.

No change in agricultural contracting charges is forecast, but the volume of contracting undertaken and the associated expenditure may remain high in 2019, given the requirement to rebuild silage reserves. Overall, this would leave total pasture and forage costs per hectare up about 10 percent in 2019 relative to 2018. However, with a forecast increase in milk production of 6 percent, fertiliser and contracting charges in aggregate would increase by 5 percent on a per litre basis in 2019.

4.1.3 Electricity and Fuel – usage and price 2019

As of November 2018, there are mixed views on prospects for the US $ /Euro exchange rate in 2019. For the purposes of the Outlook a rate of $1.15 is assumed.

An analysis of futures prices indicates that Brent crude oil prices could remain close to $70 over the course of 2019. This equates to a €61 pb at a US dollar/euro exchange rate of $1.15, which would represent little change in average Brent oil prices in euro terms in 2019 relative to the average 2018 level. This suggests that there would be no change in farm level fuel prices in 2019. Electricity prices are also assumed to remain unchanged in 2019. This would leave expenditure per hectare on energy and fuel unchanged in 2019.

4.1.4 Other Direct and Fixed Costs – usage and price 2019

While the UK's Brexit decision creates uncertainty, macroeconomic indicators for Ireland remain reasonably positive. The public finances are more or less in balance. Ireland's debt to GDP ratio continues to fall and is now 64 percent. Real GDP growth in 2019 is forecast to be 4.5 percent, which is lower than the estimated 8.9 percent for 2018 (ESRI, 2018). Irish unemployment has averaged around 5.7 percent in 2018, and is forecast to fall to 5.1 percent by the end of 2019.

It can be expected that wage inflation will pick up slightly in 2019, as the labour market tightens further. Therefore an increase in wage rates in 2019 of 1 percent is forecast. The increase in the general inflation affecting other farm costs in 2019 is forecast to be 3 percent on a per hectare basis. Allowing for an increase in milk production of 6 percent, this would correspond with a 3 percent increase in other direct costs relative to 2018 on a per hectare basis. However, on a per litre basis, these other direct costs would be down 2 percent.

At an overall farm level fixed costs on dairy farms rose in 2017, are estimated to have remained unchanged in 2018 and are forecast to remain unchanged in 2019. With a forecast increase in the value of milk production in 2019 and a reduction in milk price, the output value of the dairy enterprise should change relatively little in 2019 and the dairy enterprise fixed cost allocation with the overall dairy farm should therefore be in line with 2018.

4.1.5 Estimate of Total Input expenditure for 2019

Overall, direct costs per hectare are forecast to decrease in 2019. In spite of forecast higher

fertiliser prices, the forecast reversion of feed volumes to normal levels will be sufficient to lead to a fall of 15 percent in direct costs on a per litre basis. Factoring in a stable fixed costs allocation to the dairy enterprise, this would leave total production costs per litre in 2019 down 11 percent on the 2018 level.

4.2 The Outlook for Dairy Markets in 2019

Dairy market prospects for 2019 suggest no dramatic movement in dairy product or milk prices. Milk supply growth may be hampered by the rise in feed prices, but that could also be offset by better production conditions in 2019 in the EU, NZ and Australia than prevailed in 2018.

It is notable that NZ milk production has enjoyed a strong start to the 2018/19 production season, which will boost the NZ dairy export capacity in 2019.

There is some concern that international dairy demand growth may ease. Given its growing importance in global terms, any weakening of Chinese dairy demand, due to slower Chinese economic activity, would be a concern for the global dairy sector. Developments and consequences of the emerging US/China trade dispute will therefore be watched closely.

While EU SMP intervention stocks have been reduced to about two thirds of their peak level in 2017, the level of intervention stocks is still high and will represent a drag on the international SMP market. It will require continued strong demand for SMP to absorb these stocks into the market and allow a further recovery in SMP prices in 2019.

The high and volatile butter price is a source of uncertainty for food industry customers and this may depress demand for butter in 2019.

From an Irish perspective the cheddar export market to the UK is vulnerable to a disorderly Brexit that fails to provide a smooth transition period. For the purposes of this outlook it is assumed, that a UK Withdrawal Agreement is in place when the UK leaves the EU on March 29th 2019.

EU milk production is likely to continue to increase in 2019, perhaps by 1 percent. In 2019 EU dairy cow numbers are likely to continue to fall by a further 0.1 to 0.2 M head. However, the contraction in cow numbers should be more than offset by stronger growth in milk yields given the expected return of normal weather through 2019.

For 2019, latest forecasts suggest a 1.5 percent (1.4 Mt) increase in US milk production. This increase reflects a combination of increased milk yields and a growth in cow numbers (USDA, 2018).

Barring a weather reverse, production growth in NZ is likely to improve in 2019. Monthly production to date in the 2018/19 season has generally been quite strong. An increase in NZ milk production of 3 percent (0.8 Mt) in 2019 is forecast.

On the demand side internal EU consumption should continue to increase, with stronger consumption growth for cheese and SMP than in the case of butter, where continuing high prices are likely to constrain demand. Demand for drinking milk continues to be challenged by competition from nut and soya based substitutes across the EU.

Taking these factors into consideration, it is likely that milk supply growth may slightly exceed demand growth globally in 2019, leading to somewhat lower prices for butter. A rise in SMP prices could partially offset any butter price reduction. Cheddar prices are likely to be influenced by exchange rate developments, which are heavily tied to the Brexit issue. However, with a smooth Brexit transition, little change in cheddar prices would be expected in 2019.

The annual average Irish milk price in 2019 is likely to be down slightly on the 2018 level. A further improvement in milk fat and protein content may limit the fall in milk prices on an actual constituent basis. Overall, it is estimated that the annual average farm milk price in 2019 will be 5 percent lower than that of 2018, leading to an annual average milk price (CSO definition) of about 32.5 cent per litre, on an actual fat, vat inclusive, basis.

4.3 The Outlook for Milk Production in 2019

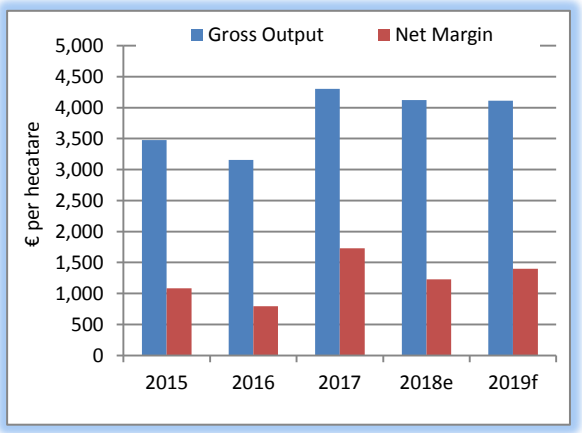
In spite of very difficult production conditions through much of 2018, there was a further increase in Irish milk production of an estimated 3 percent. This increase was driven by an increase in cow numbers, while yields remained stagnant. It is reasonable to expect that, with further additions to the herd and a return to normal weather, further expansion in milk production will occur in 2019. A national increase of 6 percent is forecast relative to the 2018 level.

4.4 The Outlook for Dairy Enterprise Net Margins in 2019

This section considers the impact of changes in milk prices and production costs on gross and net margins on dairy farms in 2019. With the exception of fertiliser, the main sub-components within the dairy production cost basket are forecast to exhibit little change in price in 2019 relative to 2018. It is assumed that further milk expansion in 2019 takes place on a 1 percent larger land area than in 2018. It is also assumed that, on average, milk production per hectare will increase by 5 percent in 2019 relative to 2018.

In 2019, profitability per hectare, as measured by the net margin on the average dairy farm, producing 5 percent more milk per hectare, is forecast to increase. Average net margin per hectare is estimated to be €1,227 for 2018, but is forecast to increase to €1,398 (14 percent) in 2019, as illustrated in Figure 17.

Figure 17: Average Gross Output and Net Margin per hectare for 2015 to 2018 with Forecast for 2019

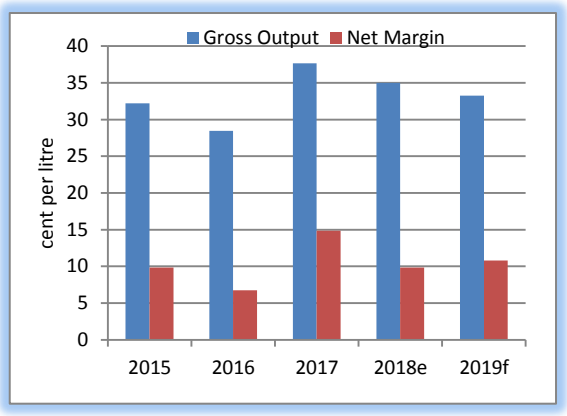


Source: Teagasc National Farm Survey Data and Authors' estimates. Note: e = estimate f= forecast

The additional milk production is assumed to be produced at a low marginal cost, which contributes to the higher margin achieved per hectare. Production costs for the marginal litres are lower since some cost items do not increase in a linear fashion when production increases, e.g. fertiliser expenditure, other direct costs, energy and hired labour and, in particular, fixed costs.

Figure 18 presents a margin forecast on a per litre basis for the average dairy farm, where production increases by 6 percent in 2019 relative to the 2018 level.

Figure 18: Average Gross Output and Net Margin per litre in Ireland 2015 to 2018, with Forecast for 2019



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

Given the forecast 5 percent milk price reduction in 2019, and the forecast fall in production costs, gross and net margins are forecast to increase in 2019. Net margin per litre is forecast to increase by 10 percent in 2019, to an average of 10.8 cent per litre.

5. Concluding Comments

Due to adverse weather, Irish dairy farmers faced extremely challenging production conditions through much of 2018. This led to a dramatic escalation in feed expenditure on many farms.

While milk prices were lower in 2018, they fell by less than had been anticipated. Overall, there was a sharp reduction in net margin per hectare and per litre of milk produced in 2018. The precise decline in margins in 2018 will be highly farm specific and reflect individual farm circumstances, such as stocking rate, soil type and farm location. On average it is estimated that net margin per hectare declined by 29 percent in 2018 to €1,227.

In 2019 milk prices are forecast to decline by 5 percent relative to the 2018 level. On the assumption that normal weather is experienced in 2019, feed expenditure should fall considerably, leading to an overall reduction in production costs in 2019. Milk production in 2019 should continue to expand, increasing by about 6 percent relative to 2018.

Dairy farm margins in 2019 will increase as a result, with the average net margin per hectare likely to be up 14 percent on the 2018 level at €1,398.

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Table A1: Average Gross and Net Margin of Milk Produced

	2016	2017	% Change
	cent/litre		
Total Gross Output	28.47	37.65	+32%
Concentrate Costs	4.65	4.98	+7%
Pasture and Forage Costs	4.15	4.20	+1%
Other Direct Costs	3.65	3.62	+1%
Total Direct Costs	12.45	12.80	+3%
Gross Margin	16.02	24.86	+55%
Energy and Fuel	1.96	2.11	+8%
Labour	0.43	0.51	+19%
Other Fixed Costs	6.91	7.36	+7%
Total Fixed Costs	9.30	9.98	+7%
Net Margin	6.72	14.87	+121%

Source: Teagasc National Farm Survey Data

Table A2: Average Net Margin per hectare*

		2016	2017	% Change
Milk Produced	litres/ha	11,087	11,279	+2%
Total Gross Output	€/ha	3,153	4,280	+36%
Total Costs	€/ha	2,378	2,529	+6%
Net Margin	€/ha	792	1,730	+118%

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

Table A3: Costs and profit (cent per litre) for Top, Middle and Bottom one-third of farms in 2017

	Top	Middle	Bottom
		cent/litre	
Concentrate Feeds	4.33	4.69	5.90
Pasture & Forage	3.73	4.04	4.82
Other Direct Costs	3.45	3.52	3.89
Energy & Fuel	1.77	2.00	2.56
Labour	0.77	0.49	0.27
Other Fixed Costs	7.06	7.38	7.65
Total Costs	**21.11**	**22.12**	**25.10**
Net Margin	**17.61**	**15.28**	**11.75**

Source: Teagasc National Farm Survey Data

Table A4: Output and profit per hectare for Top, Middle and Bottom one third of farms in 2017

		Top	Middle	Bottom
Stocking rate	cows/ha	2.53	2.06	1.65
Milk sold	litres per ha	14,928	11,150	7,799
Concentrates fed per cow	kg	1,032	1,004	1,061
Concentrates fed per litre of milk produced	kg	0.17	0.18	0.22
Gross output	€ per ha	5,778	4,158	2,857
Direct Costs	€ per ha	1,733	1,387	1,146
Gross Margin	€ per ha	**4,045**	**2,771**	**1,710**

Source: Teagasc National Farm Survey Data

Table A5: Average Gross and Net Margin per litre of Milk Produced 2016-2019

	2016	2017	2018e	2019f
		cent/litre		
Total Gross Output	28.47	37.65	35.02	33.27
Concentrate Costs	4.65	4.98	7.30	4.87
Pasture and Forage Costs	4.15	4.20	4.75	4.98
Other Direct Costs	3.65	3.62	3.54	3.47
Total Direct Costs	12.45	12.80	15.59	13.31
Gross Margin	16.02	24.86	19.43	19.95
Energy and Fuel	1.96	2.11	2.13	2.05
Labour	0.43	0.51	0.58	0.56
Other Fixed Costs	6.91	7.36	6.89	6.56
Total Fixed Costs	9.30	9.98	9.60	9.17
Net Margin	**6.72**	**14.87**	**9.83**	**10.78**

Source: Teagasc National Farm Survey Data. Figures for 2018 are estimates, Figures for 2019 are forecasts.

Irish Cattle Farming in 2017

Irish Cattle Slaughter
1.85 million head (up 6%)

Live Exports
188,508 head (up 30%)

Irish Suckler Cow Numbers
1.01 million (down 2%)

Weanling price
average €830/head (up 2%)

Male Store price
average €952/head (down 1%)

Female Store sale price
average €924/head (up 2%)

Male Finished Animals Price
average €1,471 per head (up 1%)

Female Finished Animals Price
average €1,266 per head (unchanged)

Gross Margin
(Single Suckling)
average €471 per hectare (up 9%)

Gross Margin
(Cattle Finishing)
average €478 per hectare (down 12%)

Stocking Rate (Calf to Weanling)
average of 1.26 lu/ha (unchanged)

Stocking Rate (Calf to Store)
average of 1.47 LU/ha (unchanged)

Stocking Rate (Calf to Finishing)
average of 1.67 LU/ha (up 4%)

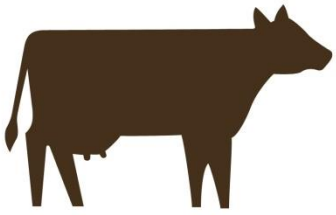
Stocking Rate (Cattle Finishing)
average of 1.5 LU/ha (unchanged)

Concentrate Fed/LU
(Cattle Finishers)
average 652 kg (down 9%)

Slaughter Weight/Head
average 333 kg (down 1%)

Total Production Costs
(Single Suckling)
average €974 per hectare (up 6%)

Total Production Costs
(Cattle Finishing)
average €1,050 per hectare (down 6%)



Source: Teagasc National Farm Survey, Central Statistics Office and Bord Bia

Irish Cattle Farming in 2018

Lower calf prices
down 10% on the 2017 level

R3 Steer price
up 1% on the 2017 level

Weanling and Store prices
down 3% and down 8% respectively

Weather Conditions
Very difficult Spring and Summer

Grass Availability
Well below normal

Fertiliser Prices
up 7% on 2017 level
Fertiliser Use
up 10% on 2017 level

Feed Prices up 5%
Feed use up 30%

Other Direct Costs
up 1% on the 2017 level

Fuel prices
up 10% on the 2017 level

Total Input Costs
up significantly in 2018

Gross Margin (Suckler)
down 19% on the 2017 level
Gross Margin (Finisher)
down 11% on the 2017 level

Irish Cattle Farming in 2019

Higher calf prices
up 10% on the 2018 level

R3 Steer prices
up 2% on the 2018 level

Weanling and Store prices
up 3% and 6% respectively on the 2018 level

Weather Conditions
Normal weather assumed

Grass Availability
better than 2018

Fertiliser Prices
up 16% on 2018 level
Fertiliser Use
down 10% on 2018 level

Feed Prices unchanged
Feed use down

Other Direct Costs
up 1% on 2018 level

Fuel prices
unchanged on 2018 level

Total Input Costs
significantly lower than in 2018

Gross Margin (Suckler)
up 20% on the 2018 level
Gross Margin (Finisher)
up 19% on the 2018 level

Source: Teagasc Estimates for 2018 and Forecasts for 2019

Review of Cattle Farming in 2018 and Outlook for 2019

Jason Loughrey and Kevin Hanrahan

Agricultural Economics and Farm Surveys Department, Teagasc

1. Introduction

This paper presents a review of the economic performance of Irish cattle farms in 2017 based on data provided by the Teagasc National Farm Survey (Dillon et al. 2018). Estimated returns from cattle production in 2018 and the forecast for 2019 are also presented.

The average annual price for most categories of finished cattle increased by approximately 1 percent relative to the average levels reported for 2017, with the exception of young bulls where prices have fallen by approximately 7 percent. Irish finished cattle prices performed well in the first six months of 2018 with prices 2 percent higher than for the same period in 2017. In the second half of 2018, Irish finished cattle prices have declined to levels similar to those observed during the same period in 2017.

Finished cattle prices averaged higher in 2018 than 2017. This contrasts with the pattern of significant declines in young cattle prices, particularly during the second half of 2018. Calf prices have also declined in 2018, with prices for beef calves approximately 10 percent lower compared with 2017.

Weanling and store cattle prices have declined to varying degrees during 2018. Weanling prices are approximately 3 percent lower in 2018 compared with 2017. Store cattle prices in 2018 are estimated to be approximately 8 percent lower than in 2017. Prices of young cattle were similar to 2017 during the spring, but over the course of the year, with adverse grass growing conditions and reduced grass availability, young cattle prices have declined significantly.

These price dynamics have meant that the market value of farm output on Irish cattle rearing and finishing farms has diverged in 2018. The value of farm output has increased on the average Cattle Finishing enterprise, while we estimate that it has declined on Single Suckling enterprises due to the lower store, weanling and calf prices received in 2018. On Cattle Finishing farms, the lower prices paid for cattle purchased affects the value of output. The reduction in the price of young cattle combined with a modest increase in the number of finished cattle sold and somewhat higher finished cattle prices is estimated to have increased the Gross Output on Cattle Finishing farms.

The extraordinary weather conditions of 2018 have heavily influenced the economic performance of Irish cattle production and these adverse weather conditions have resulted in large increases in the quantity of concentrates used with a 30 percent increase estimated for the average Cattle finishing enterprise.

This rise in concentrate usage means that the rise in Gross Output value in 2018 does not translate into any improvement in margins earned. Higher overall input expenditure overwhelmed the positive impact of higher output value on margins with gross margin per hectare declining by 11 percent on the average Cattle Finishing enterprise.

The average gross margins on Single Suckling farms are estimated to have declined significantly in 2018 with higher direct costs of production combining with a reduction in output value. The receipt of payments under the Beef Data Genomics Programme (BDGP) is estimated to have supported Gross Margins on Cattle Rearing farms. On average Single Suckling farms are estimated to have earned negative net margins in 2018.

On Cattle Finishing enterprises the reduction in young cattle prices in 2018 and higher levels of output volume per hectare, were reflected in higher output value. Overall, cattle finishers are expected to see output value increases in the region of 6 percent during the course of 2018.

However, this increase in Gross Output per hectare is overwhelmed by the effect of increasing input costs primarily driven by higher feed costs. The average Gross margin per hectare on the Cattle Finishing enterprise decreased in absolute terms by €50 to reach €412 per hectare in 2018. A relatively small increase in overhead costs due to a rise in fuel costs has made a small negative impact on net margins. The Cattle Finishing enterprises

net margins have declined to -€72 per hectare in 2018.

The outlook for Irish cattle markets in 2019 is for an improvement in margins but this is surrounded by acute uncertainty due to Brexit. However, under an assumption that the Central Case Scenario where the UK leaves the EU but remains effectively within the Single Market during 2019, supply and use developments for beef in Ireland and the EU are likely to mean that cattle prices in Ireland in 2019 will increase relative to the average levels received by Irish farmers in 2018.

Irish cattle prices, given the continuing reliance on the UK market, are also affected by developments in the currency exchange rate between the pound sterling and the euro. On the assumption that the euro/pound sterling exchange rate stays at or close to the value currently observed, our forecast is that prices for cattle in 2019 will be slightly higher than in 2018. Growth in per capita demand for beef in the EU is forecast to be marginally lower due to an increase in beef prices (European Commission 2018). UK demand is likely to remain subdued as a result of relatively weak economic growth (HM Treasury 2018). Rising pig meat prices in 2018 should also support the consumption of beef. The rising price of pig meat will limit the extent of substitution away from beef.

EU beef supplies increased between 2012 and 2018 but this trend is expected to be reversed over the short to medium term. The dynamics behind recent increases are attributed largely to developments in dairy markets. In 2016, low milk prices led to a large increase in the volume of cows slaughtered in the EU, which boosted EU beef production. This increase in cow slaughter was reflected in the cessation of the post-quota expansion of the EU dairy cow herd. In 2018, the onset of the summer drought in North Western Europe and low milk prices led to an increase in the volume of cows slaughtered in the EU which for the year to date are almost 3 percent higher than in 2017.

Growing global beef demand in 2019 will support stronger world market prices while EU beef production remains relatively stable (USDA, 2018). This is expected to translate into some increases in EU cattle prices. Global production of beef is expected to grow slightly in 2019 (USDA, 2018). The forecast increase in global meat production is largely driven by developments in the US, Argentina and Brazil with declines forecast for Australia. In the US, the recent breeding herd rebuilding phase is now being reflected in increased meat production. Robust growth in China's demand for beef is expected to underpin global beef prices in 2019. Beef demand in Brazil is also forecasted to continue growing in 2019 (USDA, 2018).

On balance our forecast for 2019 is that Irish cattle prices will increase moderately. Higher EU cattle and beef prices and an unchanged average euro pound sterling exchange rate in 2019 are expected to result in Irish finished cattle prices that are 2 percent higher than those observed in 2018.

As in previous years, developments in the euro/pound sterling exchange rate will affect Irish cattle prices given the continuing dependence of the Irish beef industry on the UK market. In recent years, the weakening of sterling undermined Irish cattle prices. In this outlook, we have assumed no further depreciation of the pound relative to the euro from its current level (November 2018). Continued uncertainty over the evolution of the exchange rates constitutes a very major element of the uncertainty in these forecasts.

The BDGP and the recently announced Beef Environmental Efficiency Pilot (BEEP) schemes will provide exchequer support to participating farmers to enable them to improve the genetic merit of their beef animals and thereby lower the greenhouse gas intensity of their beef production.

The BDGP involves a payment of approximately €80 per cow for participating farmers. However, not all suckler cows will be farmed by participating farmers and the budget for the programme is limited to approximately €52 m per annum. This means that the average value of the BDGP per cow to suckler cow farmers will be lower than the headline rate. In this analysis as in Hanrahan (2016) we have assumed that the average suckler farmer will receive a payment of €44 per hectare from the BDGP in 2018 and 2019.

Budget 2019 has led to the introduction of a new scheme entitled the Beef Environmental Efficiency Pilot (BEEP) scheme. As in the case of the BDGP programme, not all suckler cows will be farmed by participating farmers and the budget for the programme is limited to approximately €20 m per annum. Costs may be incurred by farmers in weighing cattle and these may vary by herd size.

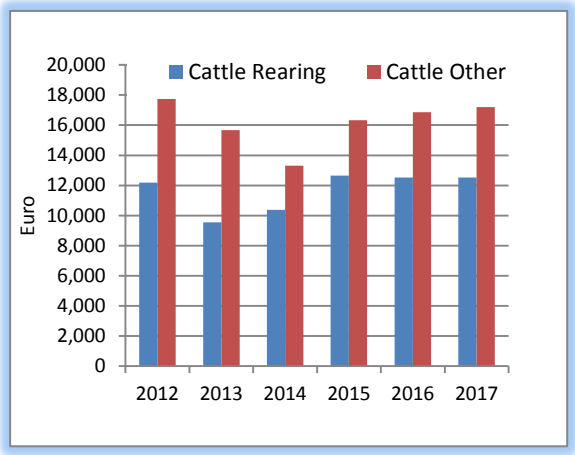
Taking these costs into account, we have assumed that the average suckler farmer will earn an additional €17 per hectare from the BEEP programme in 2019.

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 2017

The trends in average family farm income (FFI) for the two types of cattle farms identified in the Teagasc NFS over the period 2012 to 2017 are shown in Figure 1. In 2017, the average FFI on Teagasc NFS *Cattle Other* farms increased by 2 percent compared with 2016 levels while the average FFI on Teagasc NFS *Cattle Rearing* farms remained unchanged. Figure 1 also illustrates that the gap in average FFI earned by farms in the *Cattle Rearing* system and *Cattle Other* system was maintained in 2017.

Figure 1: Family Farm Income on Cattle Rearing and Cattle Other Farm Systems: 2012 to 2017



Source: 2017 Teagasc National Farm Survey (2018)

In this year's 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 the Teagasc NFS cattle enterprise fact sheets (Teagasc, 2018a and 2018b).

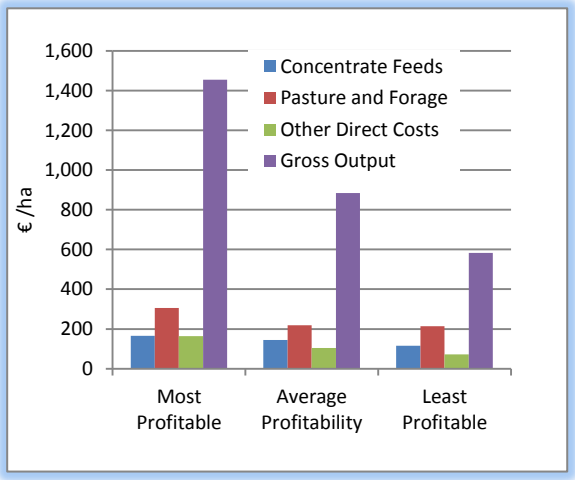
Single Suckling enterprises in the analysis that follows are enterprises with more than 10 cows, while the Cattle Finishing enterprises analysed are those with more than 10 livestock units where more than 70 percent of the animals sold off of the farm were sold for slaughter. In total, these two enterprises were present on more than 40,000 farms nationally.

2.1 Irish Beef Enterprise Performance in 2017

This section discusses the cost structure of Single Suckling and Cattle Finishing enterprises in Ireland. 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 2017, the average direct cost of production per hectare for Single Suckling enterprises ranged from €402 per hectare, on those farms with the lowest average gross margin, to €635 per hectare on the most profitable farms (see Figure 2). 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 €116 per hectare on the least profitable farms to €165 per hectare on the most profitable farms.

Figure 2: Variation in Total Production Costs and Gross Output on Single Suckling enterprises in 2017



Source: 2017 Teagasc National Farm Survey (2018)

There was considerably more variability in the average gross output per hectare between the least profitable and most profitable farms. The

most profitable third of Single Suckling enterprises earned an average gross output of €1,455 per hectare, compared with an average gross output of €583 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 on the more profitable farms. In 2017, the most profitable Single Suckling enterprises had an average stocking rate of 1.91 livestock units (LU) per hectare compared with 1.07 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 limited by the quality of the land farmed. In 2017, three quarters 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 19 percent.

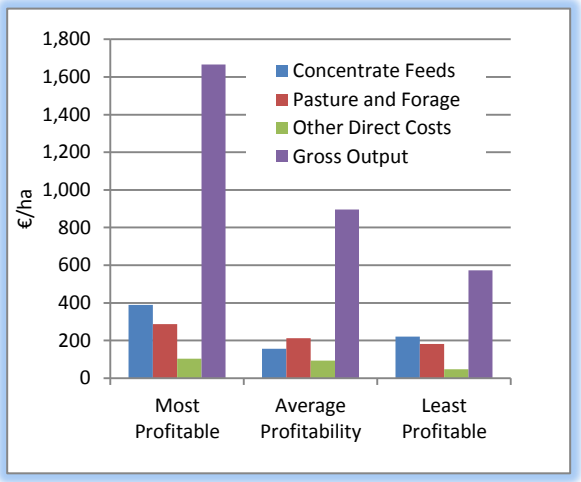
The most profitable one third of Single Suckling enterprises in 2017 had an average gross output per hectare that was 250 percent higher than the average output per hectare on the least profitable one third of enterprises, while average direct costs per hectare were 58 percent higher.

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 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 with lower levels 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 €1,666 per hectare compared with €573 per hectare on the least profitable Cattle Finishing enterprises.

As with Single Suckling enterprises, there is a large 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 1.12 LU per hectare, while the average stocking rate on the most profitable one third of Cattle Finishing enterprises was 1.98 LU per hectare. In general, more profitable Cattle Finishing enterprises were on farms with better soil, 68 percent of the most profitable Cattle Finishing enterprises farmed *very good* soils, while only 54 percent of the least profitable farms farmed very good soils.

Figure 3: Variation in Total Production Costs and Gross Output on Cattle Finishing Enterprises in 2017



Source: 2017 Teagasc National Farm Survey (2018)

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 high 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.

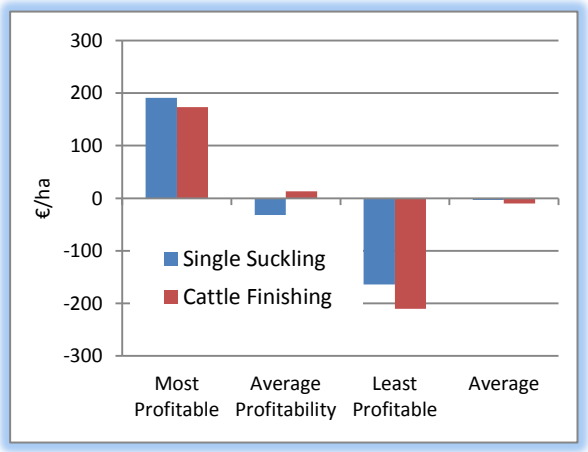
Average overhead costs per hectare on the Cattle Finishing and Single Sucking enterprises were €488 and €474 per hectare respectively (see Appendix Table A1 and Table A2 at the end of this paper). The higher level of overhead expenditure on Cattle Finishing farms reflects both the higher average intensity of production on these farms when compared with Single Suckling enterprises and their higher average stock of non-livestock capital (buildings and machinery) per hectare.

A comparison of the net margins earned by the Single Suckling and Cattle Finishing enterprises in 2017 shows little difference in performance, on average, between the Cattle Finishing enterprises and the Single Suckling enterprises. The average

net margin was slightly negative for Single Suckling farms in 2017.

On Single Suckling farms, the net margins remained slightly negative in 2017 with no major improvement relative to the situation in 2016. The reduced performance of the Cattle Finishing enterprises can be attributed to the decline in gross output value. Figure 4 shows the net margins earned on the two cattle enterprises analysed and illustrates that in 2017 only the most profitable one thirds of Single Suckling enterprises earned positive net margins.

Figure 4: Cattle Enterprise Net Margins per hectare in 2017



Source: 2017 Teagasc National Farm Survey (2018)

3. Estimated Performance of Irish Cattle Farms in 2018

This section of the paper presents a review of the economic performance of Irish cattle enterprises in 2018. A discussion of the estimated changes in input usage and input costs in 2018 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 2018 are then presented.

Estimates for 2018 and forecasts for margins in 2019 (which are presented in Section 4) are based on small increases in the intensity of production per hectare on the average cattle finishing farms. The impact of an increase in the intensity of production on individual enterprises would be expected to vary from farm to farm. In some cases, it could increase profitability, in others it could give rise to lower margins. In 2018 and 2019, aggregate production of beef in Ireland is expected to increase, while suckler cow inventories in 2018 are estimated to have declined relative to 2017.

3.1 Estimated Input Usage and Price 2018

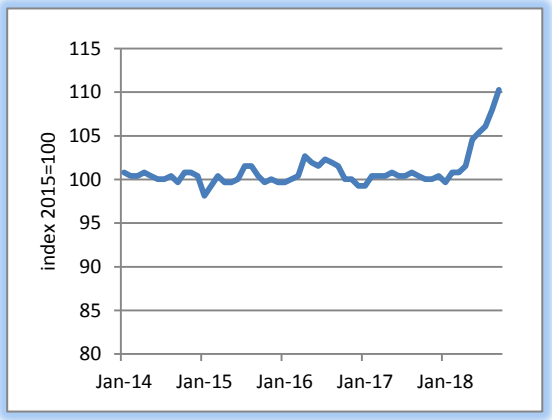
3.1.1 Feedstuffs

Purchased feed (concentrates) 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.

2018 was an extraordinarily poor year in terms of grass growing conditions and as a consequence the shortage of grass was a major driver of changes in the volumes of feed stuffs purchased by Irish beef farmers. The aggregate volume of purchased feed used by Irish cattle farms in 2018 is estimated to have been much higher than in 2017. Overall, it is estimated that feed use per head will be substantially higher in 2018 relative to 2017.

Figure 5 presents the CSO monthly price index for cattle feed stuffs for the period January 2014 to September 2018. Cattle feed prices increased significantly in the second and third quarters of 2018 and over the course of the full year cattle feed prices are estimated to have increased relative to 2017.

Figure 5: Monthly Price Index of Cattle Meal in Ireland 2014 to 2018



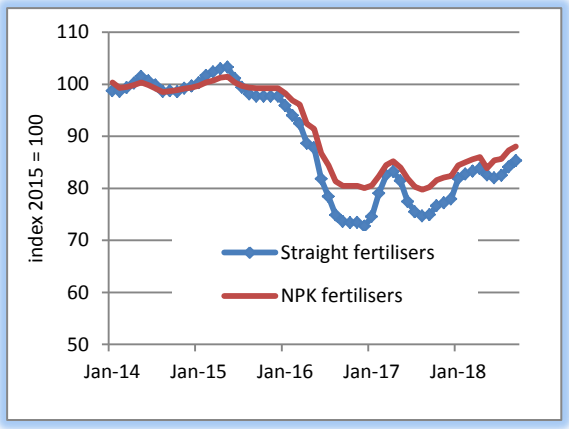
Source: CSO (2018)

With some increase in livestock numbers on a per hectare basis, extraordinarily poor weather conditions for grass growth and an increase in feed prices, we estimate that expenditure on concentrates by Irish cattle farmers in 2018 will be significantly higher as compared to 2017.

3.1.2 Fertiliser in 2018

Figure 6 presents data on fertiliser prices over the past five years. Fertiliser prices increased over the course of 2018, a reversal of the trend observed during the second half of 2017.

Figure 6: Monthly Price Index of Fertiliser in Ireland from 2014 to 2018



Source: CSO (2018)

The rising levels of Irish fertiliser prices have contributed to increases in the direct costs of production on Irish cattle farms. It is estimated that the increase in fertiliser prices and higher fertiliser usage in 2018 have both contributed to a rise in overall direct costs.

3.1.3 Energy and Fuel in 2018

In 2018, the average price for crude oil increased to over $80 per barrel (pb) in Q3 of 2018. Brent prices have slid considerably in Q4 of 2018 to US$60 territory. The average annual price for 2018 will be about US $72 pb, which represents an increase of 32 percent on the average oil price in 2017 (US $54 pb).

As a result of the change in oil prices and the inelastic nature of farmer demand for fuel, fuel expenditure on Irish cattle farms is estimated to have increased by 10 percent in 2018 relative to the 2017 level. The smaller increase in farm level fuel costs as compared to crude oil prices reflects the impact of taxes and other activity along the energy supply chain.

While no official data on contractor charges exists, based on industry provided information, we estimate that for 2018 farmer contracting charges will have remained largely unchanged as compared to 2017. When combined with higher expenditure on fertiliser, this means that overall expenditure on pasture and forage by cattle farmers in 2018 is estimated to have increased when compared to 2017.

Electricity costs change infrequently in Ireland due to the regulation of energy prices. On an annual average basis, prices in 2018 are estimated to have increased by 8 percent compared to 2017.

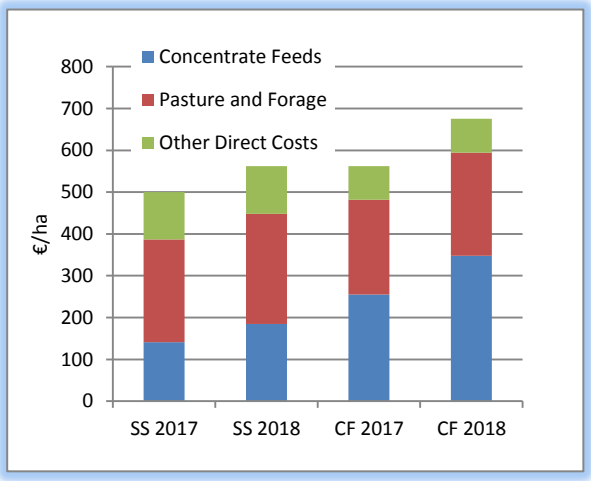
3.1.4 All Other Direct and Overhead Costs– usage and price 2018

Wages in Ireland are estimated to have increased by 1 percent in 2018 due to the on-going recovery in the Irish labour market; 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 contribute towards an estimated 1 percent increase in other direct costs for 2018. No change in expenditure on other fixed costs is estimated to have arisen during 2018.

3.1.5 Estimate of Total Direct Costs for 2018

Figure 7 compares the average direct costs of production for the Single Suckling and Cattle Finishing enterprises in 2017 with the estimated direct costs for 2018.

Figure 7: 2017 Direct Costs and Estimated 2018 Direct Costs for Single Suckling (SS) and Cattle Finishing (CF) Enterprises



Source: Teagasc National Farm Survey (2018) and Author's Estimates

On average total direct costs on Single Suckling enterprises are estimated to have increased by 12 percent and direct costs on Cattle Finishing enterprises are estimated to also have increased by 20 percent. These increases are primarily due to

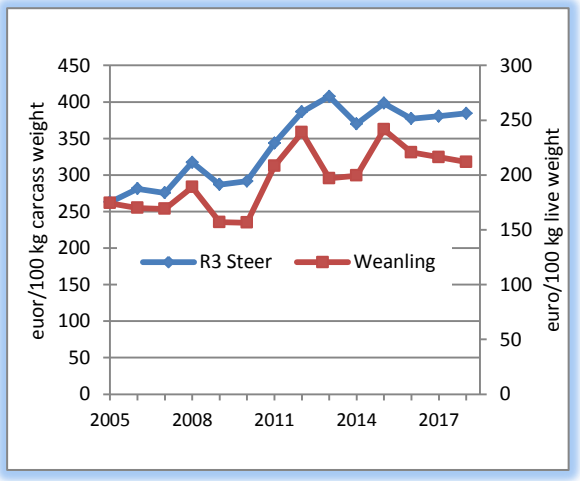
the rise in concentrate usage attributable to the extraordinary weather conditions and associated reduced grass availability. Rising fuel costs in 2018 contributed towards increasing overhead costs. The overall costs of production in 2018 are estimated to have increased by 8 percent on Single Suckling farms and by 12 percent on Cattle Finishing farms.

3.2 Estimated Output Values 2018

The value of gross output on Single Suckling enterprises is estimated to have declined in 2018, with lower prices for young cattle observed particularly in the second half of 2018. The estimated average R3 steer price for 2018 of around €385/100kg represents a 1 percent increase on the price level in 2017. The average decrease in young bull prices in 2018 is larger, with prices in 2018 estimated to be approximately 7 percent lower than in 2017. Figure 8 presents average R3 steer and weanling prices for the period 2005 to 2017 and an estimate for 2018.

Developments in estimated output per hectare on Cattle Finishing farms are driven by finished cattle prices at factories, the price of cattle purchased in and the volume of output produced per hectare. Our estimate is that market output value on Cattle Finishing farms in 2018 has increased by more than the headline increase in finished cattle prices due to reduced prices for cattle purchased in and higher volumes of output per hectare. In 2018, the value of output per hectare on Cattle Finishing farms is estimated to be €1,103.

Figure 8: Irish Cattle Prices 2005 to 2018

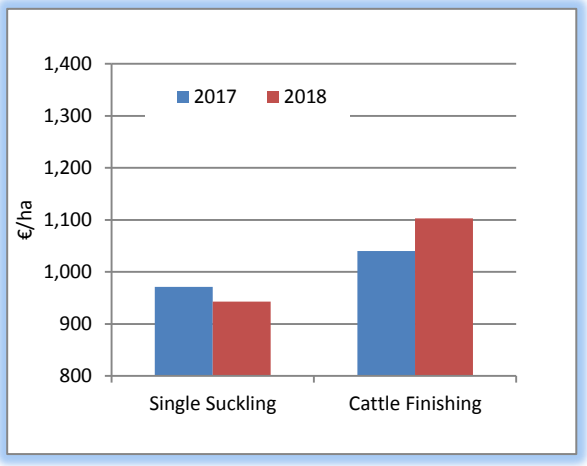


Source: DG Agri. and CSO; * Author's estimate 2018.

Gross output per hectare on Single Suckling farms in 2018 is estimated to have declined to €943 per hectare. The most profitable one third of Single Suckling enterprises, due to higher stocking rates and other factors, continue to achieve significantly higher output per hectare (€1,455 per hectare) as compared to the average (€885 per hectare) and least profitable (€583 per hectare) enterprise groups.

Gross output per hectare in 2018 was on average higher on Cattle Finishing enterprises than on Single Suckling enterprises. This largely reflects the higher stocking density per hectare on these farms. The average level of gross output per hectare for Cattle Finishing enterprise in 2018 is estimated to be €1,103 (an increase of 6 percent on the level in 2017).

Figure 9: 2017 Gross Output for Single Suckling (SS) and Cattle Finishing (CF) Enterprises and Estimate for 2018



Source: 2017 National Farm Survey (2017) and Author's Estimates 2018

In our estimates and forecasts for 2018 and 2019 we have incorporated the payments made to cattle farmers under the Government's BDGP and BEEP schemes. The payments under these schemes are contingent on farmers undertaking specified measures, some of which will involve additional costs. Nevertheless, payments under the BGDP and BEEP are still likely to add to participant's output value. However, not all farmers with suckler cows will be able or want to participate in the programme. Current information indicates that approximately 24,000 farms with 650,000 cows are participating in the BDGP programme. The BDGP has an annual budget of €52m. The BEEP has an annual budget of €20m. In our analysis, the return per hectare in 2018 and 2019 is assumed to be €44 per hectare from participation in the BDGP scheme. It is assumed that the return per hectare for the BEEP scheme in 2019 will be €17 per hectare.

For suckler farmers who actually participate in these programmes the value per hectare of participation will be higher than the level assumed which represents the outcomes for the average Single Suckling enterprise.

Again, as with Single Suckling enterprises, there is a large degree of variation in the value of gross output per hectare between the least profitable, average profitability and most profitable groups of Cattle Finishing enterprises. The most profitable Cattle Finishing enterprises are estimated to have produced an average level of gross output per hectare (€1,666 per hectare) that was 190 percent higher than the average value of output per hectare on the least profitable group of Cattle Finishing enterprises (€573 per hectare).

3.3 Beef Enterprise Margin Estimates for 2018

As shown in Figure 7, the estimated expenditure on concentrate feed by finished cattle enterprises increased in 2018. Increased feed volumes combined with an increase in feed prices are estimated to have led to significantly higher overall expenditure on purchased feed. In the case of the Single Suckling enterprise, the output price decline is the dominant factor in the lower margins earned, with higher feed expenditure on Single Suckling enterprises exacerbating the impact of lower cattle prices in 2018.

On both the Single Suckling and Cattle Finishing enterprises the expenditure on pasture and forage costs increased in 2018. Total direct costs on both cattle rearing and cattle finishing enterprises are estimated to have increased substantially in 2018.

On single suckling enterprises in 2018, the reduction in young cattle prices and the increase in direct costs have combined to lead to lower margins than in 2017. For the cattle finishing enterprise, gross margins are estimated to have decreased in 2018 with the substantially higher direct costs of production overwhelming the positive impact of higher output prices and increased volumes of output per hectare on margins.

Single Suckling enterprises in 2018, are on average estimated to have earned a negative net margin of €104 per hectare and farmers that are not participating in the BDGP are likely to have incurred larger negative net margins. Cattle Finishing enterprises are estimated to have earned a negative net margin of €72 per hectare.

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 2018.

For both the Cattle Finishing and Single Suckling enterprises, only the top one third of farmers are estimated to have earned positive net margins in 2018. For both the Cattle Finishing and Single Suckling enterprises, the middle and bottom third of farmers experienced negative net margins. This highlights the persistent profitability challenges in Irish beef production.

4. Outlook for 2019

In this section, we forecast the expenditure for various input items, the beef price that is expected to prevail in 2019 and the incomes from the production of cattle in 2019.

4.1 The Outlook for Input Expenditure

4.1.1 Feedstuffs in 2019

Global cereal and oilseed futures market prices point to no increases in feed prices in 2019. Cereal and other feed ingredient input prices have increased somewhat in 2018 as compared to 2017. The 2018 harvest price for cereals and oilseeds will affect the price of feed in the back end of 2018. At this stage, our forecast for world cereal and oilseed prices in 2019 is for some decrease relative to 2018.

For 2019, our feed use forecasts are based on an assumption of normal grass growing conditions. This is likely to lead to a substantial decline in feed use per livestock unit in 2019. The cattle population on finished cattle enterprises is forecast to change very little in 2019. With cattle feed prices forecast to be unchanged in 2019 and volumes used decrease, our forecast is for a 26 percent decrease in overall feed expenditure on Cattle Finishing enterprises. It is projected that no change in livestock numbers will occur on the Single Suckling enterprises. It is therefore estimated that a 25 percent decrease in overall feed expenditure will occur on Single Suckling enterprises during 2019.

4.1.2 Fertiliser in 2019

Given the developments in global supply and global demand, the outlook for international fertiliser prices in 2019 is for prices for most fertilisers to increase relative to 2018 levels. However, this will mean that fertiliser prices in 2019 are forecast to be on average 16 percent higher than in 2018.

Fertiliser use on grassland farms was higher in 2018 than in 2017. In our 2019 forecast, we assume that on average fertiliser use will be down 10 percent relative to the 2018 level.

With significantly higher prices influencing a reduction in fertiliser usage, our forecast for total expenditure on fertiliser is for a 4 percent increase in 2019 relative to 2018. With contracting charges not expected to change in 2019, total expenditure on pasture and forage by Irish cattle farmers in 2019 is forecast to increase by approximately 2 percent relative to the 2018 level.

4.1.3 Energy and Fuel in 2019

An analysis of futures prices indicates that Brent crude oil prices remaining close to $70 over the course of 2019. This equates to close to €61 pb at a US dollar/euro exchange rate of $1.15, which would represent little change in average Brent oil prices in euro terms in 2019 relative to the average 2018 level. This suggests that there would be no change in farm level fuel prices in 2019. Electricity prices are also assumed to remain unchanged in 2019. This would leave expenditure per hectare on energy and fuel unchanged in 2019.

4.1.4 Other Direct and Fixed Costs in 2019

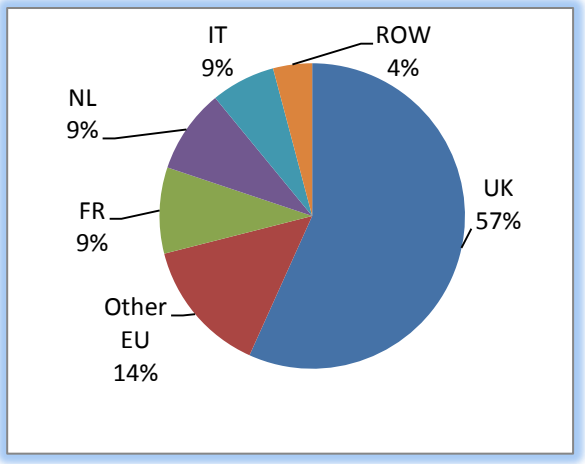
Increases in the cost of labour are forecast for 2019 due to continuing growth in the Irish economy, however, on the average Irish cattle enterprises hired labour costs are very small and inflation in labour costs is not expected to have a major impact on costs of production. General inflation is likely to continue to be low and lead to an increase in other direct costs of 1 percent. Other overhead (fixed) costs are forecast to remain unchanged in 2019.

4.2 The Outlook for Cattle and Beef Markets 2019

Ireland exports close to 90 percent of its beef production (CSO 2018c). 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 2018 (year to end of September). The continuing dominance of the UK in Ireland's beef exports is clear as is the relatively minor role of extra-EU markets in the current Irish beef export mix. The dominance of the UK largely reflects the relative profitability of the UK as an export destination.

Figure 10: Estimate of Irish Beef Export Markets by Volume in 2018



Source: Eurostat COMEXT, January to September (2018)

Developments in the sterling exchange rate since the calling of the UK Brexit referendum have dramatically reduced the euro value of Irish beef exports to the UK market (relative to what they would have been if the referendum had not been called). Over the medium to longer term, the introduction of any barriers to trade between the UK and Ireland (and other EU member states) will also be reflected in lower Irish cattle prices.

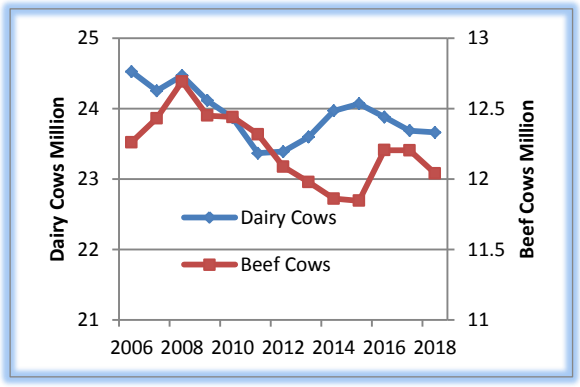
In the short run, the outlook for finished cattle supplies and for beef supply in Ireland are determined by the current inventories of animals aged 1-2 years. Data from the Department of Agriculture, Food and the Marine AIMS database provide insights into developments in these inventories. Inventories for animals aged 18-24 months of age are slightly higher than in 2017, indicating that in 2019, supplies of finished cattle will increase moderately relative to current (2018) levels. The projected increase in supplies of

finished cattle will be significantly lower than the increases observed in 2017 and 2018.

In the rest of the EU, supplies of cattle for slaughter in 2019 are likely to be similar to 2018. Overall EU production of beef in 2019 will be stable relative to 2018. Supplies of finished cattle in Ireland and beef production are over the full year likely to be only slightly higher than in 2018.

In the medium term (beyond 2018) inventories of breeding animals are the key determinant of beef supply. Figure 11 illustrates the recent trends in dairy and beef cow inventories in the EU (readers should note that the different scales on right and left axes). In anticipation of the abolition of milk quotas in April 2015, the numbers of dairy cows in the EU increased, however low levels of profitability in recent years has effectively halted and reversed this trend.

Figure 11: EU28 Cow Numbers (June) 2006 - 2018



Source: Own elaboration based on Eurostat (2018)

Dairy cows now account for approximately two thirds of the stock of cows in the EU. Under the CAP, many Member States have introduced coupled direct payments related to both numbers of dairy and suckler cows and these policy measures will mitigate the impact of on-going low levels of profitability on cow numbers. Over the medium term, however, the greater profitability of dairy production in the EU, when compared to suckler cow production, is likely to lead to an increase in the share of dairy cows in the total EU breeding cow stock. Developments in dairy production and dairy cow numbers will increasingly dictate the volume of EU beef production and specialised beef producers will increasingly see, in the post-quota world, their economic fortunes buffeted by developments in cattle supplies that originate in the dairy sector.

The outlook for EU (and Irish) finished cattle prices depends importantly on the prospects for beef demand in the UK and the Eurozone, and on developments in the euro exchange rate with the pound sterling.

The macroeconomic outlook for the Eurozone remains positive but uncertainty around the post-Brexit relationship with the UK and wider international issues relating to emerging barriers to trade, are dampening expectations. The forecast macroeconomic outlook for the UK, the Irish beef sector's largest export market is towards weak economic growth (HM Treasury, 2018). While the UK economy continues to grow, Brexit is expected to lead to lower rates of growth in 2019. Beef production is forecast to increase slightly in Ireland and decline slightly in the UK (AHDB, 2018) while the outlook for EU cattle prices is for moderate increases.

Our forecast is that EU and Irish cattle price will be higher in 2019 than in 2018. The increase in Ireland of 2 percent is similar to that forecast for the EU. In our forecasts, we have assumed that the current (early November 2018) exchange rate between the euro and sterling will prevail through all of 2019.

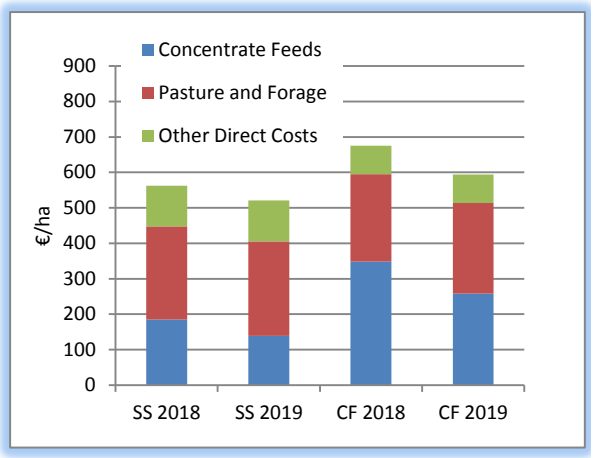
The forecast higher price of finished cattle is expected to be reflected in higher calf, weanlings and store cattle prices in Ireland. Our forecast is that younger cattle prices in 2019 will increase by 4 percent relative to 2018 levels.

4.2.1 Outlook for Beef Enterprise Net Margins in 2019

Figure 12 compares the estimated and forecast average direct costs per hectare in 2018 and 2019 for the Single Suckling and Cattle Finishing enterprises. With prices for cattle of all ages forecast to increase in 2019, gross output for the Single Suckling enterprises is forecast to improve on the estimated 2018 levels. The increase in prices for young cattle is forecast to offset the positive impact of increased finished cattle prices, and gross output for the Cattle Finishing enterprise is forecast to remain stable in 2019 relative to 2018. Expenditure on feed is forecast to be substantially lower in 2019, while pasture and forage expenditure is expected to increase slightly. Margins earned on both Single Suckling and Cattle Finishing enterprises are forecast to improve significantly on the levels estimated for 2018.

Gross margins for Single Suckling enterprises are forecast to increase by 20 percent to €458 per hectare. Net margins for the Single Suckling enterprise are also forecast to improve in 2019, but on average to remain negative. On the Single Suckling enterprise, a negative average net margin per hectare of €27 is forecast.

Figure 12: Estimated Direct Costs for 2018 and Forecast Direct Costs for 2019



Source: Author's Estimates 2018 and Forecasts 2019

The forecast increase in gross margin per hectare on Cattle Finishing farms in 2019 is 19 percent. For Cattle Finishing enterprises, the forecast increase in finished cattle prices in 2019 is offset by the impact of higher young cattle prices, which cattle finishers pay for cattle purchased in.

Net margins on average on Cattle Finishing farms are forecast to improve in 2019, with a forecast average positive net margin of €9 per hectare. The forecast average margins earned on the least, average and most profitable of the Single Suckling and Cattle Finishing enterprises in 2019 are presented in Table A3 and Table A4.

5. Concluding Comments

In 2018, the increase in feed costs played a dominant role in influencing margins for both the Cattle Finishing and Single Suckling enterprises. For Single Suckling enterprises, the decline in young cattle prices in the second half of the year has contributed to sharp declines in both the gross margin and net margin.

Higher production and lower cattle purchased prices boosted the value of output on Cattle Finishing farms. In 2018, the price for most categories of Irish finished cattle prices increased by approximately 1 percent. Prices for younger cattle declined significantly in the second half of 2018. During 2018, higher feed expenditure and fertiliser expenditures contributed to substantial increases in the overall costs of production relative to 2017. The substantial rise in costs of production overwhelmed the positive impact of higher output prices on cattle finishing enterprise resulting in negative gross margins for the average cattle finishing enterprise.

The estimated gross margins earned in 2018 on Cattle Finishing enterprises have decreased relative to 2017. In 2018, we estimate that the net margin earned on the average Single Suckling enterprise is negative and significantly lower than that earned on average in 2017. The estimated average net margin earned on the average Cattle Finishing enterprise in 2018 is also estimated to be negative.

The very moderate increase in Irish finished cattle prices in 2018 was influenced strongly by the unexpected expansion in EU beef production, which can be attributed to the increased slaughtering of cows and heifers due to low milk prices and the effects of the summer drought on farmers in North Western Europe. Our forecast for 2019 is for a moderate improvement in Irish cattle prices. This outlook is driven by moderate beef price growth on the EU market. Forecast increases in pig meat prices in the EU will also reduce the tendency for consumers to substitute away from beef and will support the beef share of meat consumption.

Exchange rate developments in 2019 will have a major bearing on the extent to which the Irish price developments diverge from average EU price developments. Given Ireland's continued dependence on the UK market, a further weakening of sterling in in 2019 could lead to an even more pessimistic outcome for Irish cattle prices. However, it should be noted that such a development while negative from an output value perspective would also likely lead to some offsetting decreases in some input prices.

The levels of profit forecast for the Cattle Finishing enterprises are significantly higher than the average observed over the period 2012-2017. In the case of the Single Suckling enterprises, the levels of profit forecast are also higher than the average of the period 2012-2017. 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. On Single Suckling enterprises, the farmers' output value for most years (2015 was an exception) has been lower than the total costs of production. While the top one third of both Single Suckling and Cattle Finishing enterprise often earn positive net margins, most enterprises are generally failing to 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.

The ongoing profitability challenge faced by Irish beef farmers, and especially by Single Suckling farmers may be exacerbated by the impact of Brexit. The urgent challenge facing the wider Irish beef industry will be to develop new markets for Irish beef that can begin to reduce the dependence on the UK market that has traditionally been Ireland's second "home" market.

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Table A1: 2017 and Estimated 2018 Financial Performance per hectare: Single Suckling Enterprise

	Most Profitable	Average Profitability	Least Profitable	Average
Gross Output 2017	1,455	885	583	971
Direct Costs 2017	635	467	402	500
Concentrate Costs	165	144	116	141
Pasture and Forage Costs	306	218	214	246
Other Direct Costs	164	105	72	*113*
Gross Margin 2017	820	418	181	471
Overhead Costs 2017	564	429	366	474
Net Margin 2017	256	-11	-185	-3
Gross Output 2018	1,411	858	566	943
Direct Costs 2018	635	467	402	562
Concentrate Costs	165	144	116	*185*
Pasture and Forage Costs	306	218	214	*263*
Other Direct Costs	164	105	72	*381*
Gross Margin 2018	776	391	164	381
Overhead Costs 2018	635	467	402	485
Net Margin 2018	141	-76	-238	-104

Source: Teagasc National Farm Survey Single Suckling Enterprise Fact Sheet 2017 (Teagasc NFS, 2018a) and Authors' Estimates 2018

Table A2: 2017 and Estimated 2018 Financial Performance per hectare: Cattle Finishing Enterprise

	Most Profitable	Average Profitability	Least Profitable	Average
Gross Output 2017	1,666	896	573	1,165
Direct Costs 2017	779	462	448	619
Concentrate Costs	389	156	220	284
Pasture and Forage Costs	287	213	181	252
Other Direct Costs	103	93	47	83
Gross Margin 2017	983	433	125	546
Overhead Costs 2017	713	420	336	514
Net Margin 2017	270	13	-211	-10
Gross Output 2018	1,767	950	608	1,103
Direct Costs 2018	947	571	532	676
Concentrate Costs	531	246	288	*348*
Pasture and Forage Costs	312	231	197	*247*
Other Direct Costs	104	94	47	*81*
Gross Margin 2018	820	379	76	428
Overhead Costs 2018	713	420	336	500
Net Margin 2018	107	-41	-260	-72

Source: Teagasc National Farm Survey Cattle Finishing Enterprise Fact Sheet 2017 (Teagasc NFS, 2018b) and Authors' Estimates 2018

Table A3: Forecast 2019 Single Suckling Enterprise Financial Performance per hectare

	Most Profitable	Average Profitability	Least Profitable	Average
Gross Output 2019	1,468	893	588	978
Direct Costs 2019	661	461	433	520
Concentrate Costs	162	142	114	*139*
Pasture and Forage Costs	331	236	232	*266*
Other Direct Costs	*167*	*107*	*73*	*115*
Gross Margin 2019	807	432	155	458
Overhead Costs 2019	635	467	402	485
Net Margin 2019	172	-35	-247	-27

Source: Authors' forecast 2019

Table A4: Forecast 2019 Cattle Finishing Enterprise Financial Performance per hectare

	Most Profitable	Average Profitability	Least Profitable	Average
Gross Output 2019	1,767	950	608	1,103
Direct Costs 2019	821	517	465	594
Concentrate Costs	*393*	*182*	*213*	*258*
Pasture and Forage Costs	*323*	*240*	*204*	*256*
Other Direct Costs	*105*	*95*	*48*	*81*
Gross Margin 2019	946	433	143	509
Overhead Costs 2019	713	420	336	500
Net Margin 2019	233	13	-193	9

Source: Authors' forecast 2019

Irish Sheep Farming in 2017

Irish Sheep Slaughter
3.18 million head (up 10%)

Irish Lamb Slaughter
2.7 million head (up 9%)

Sheep Meat Exports
57,000 tonnes (up 12%)

Irish Ewe Numbers
2.7 million (up 11%)

Lamb price
average €459/100kg (down 0.4%)

Lamb Carcass per head
unchanged on 2016 level

Total Production Costs
(Mid Season Lowland)
average €127 per ewe (down 3%)

Total Production Costs
(Mid Season Lowland)
average €991 per hectare (up 1%)

Gross Margin
(Mid Season Lowland)
average €713 per hectare (up 11%)

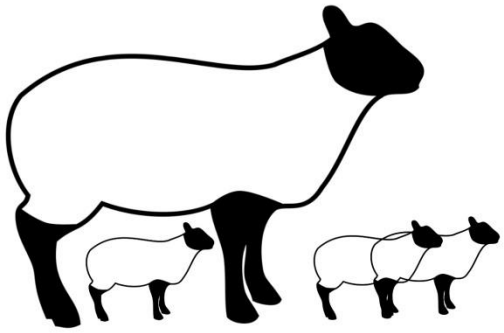
Net Margin
(Mid Season Lowland)
average €217 per ewe (up 40%)

Stocking Rate
(Mid Season Lowland)
average 8.1 ewes/ha

Weaning Rate
(Mid Season Lowland)
down - average 1.34 lambs/ewe

Lamb Mortality
(Mid Season Lowland)
Up - average of 7%

Lambs Weaned/ ha
(Mid Season Lowland)
unchanged - average 11 lambs/ha



Source: Teagasc National Farm Survey and Central Statistics Office

Irish Sheep Farming in 2018

Higher lamb prices
tighter supplies in H1 2018

Lamb Slaughter
up 1%

Lamb Prices
up 6%

Weather Conditions
Poor spring and summer

Grass Availability
below normal

Fertiliser Prices
up 5% on 2017 level
Fertiliser Use
up 10% on the 2017 level

Feed Prices up 5%
Feed use up 28%

Other Direct Costs
up 2% on the 2017 level

Fuel prices
up 10% on the 2017 level

Total Input Costs
up 11% on the 2017 level

Gross Margin per ha
(Mid Season Lowland Lamb)
€692 (down 3% on 2017)

Source: Teagasc Estimates for 2018 and Forecasts for 2019

Irish Sheep Farming in 2019

Stable lamb prices
stable EU market situation

Lamb Slaughter
down slightly

Lamb prices
unchanged on 2018

Weather Conditions
normal weather assumed

Grass Availability
assumed normal

Fertiliser Prices
up 16% on 2018 level
Fertiliser Use
down 10% on 2018 level

Feed Prices stable
Feed use down 28%

Other Direct Costs
up 2% on the 2018 level

Fuel prices
unchanged on 2018 level

Total Input Costs
down 6% on the 2018 level

Gross Margin per ha*
(Mid Season Lowland Lamb)
€764 (up 10% on the 2018 level)

* Margins in 2018 & 2019 benefit from the Sheep Welfare Scheme

Review of Sheep Farming in 2018 and Outlook for 2019

Kevin Hanrahan and Anne Kinsella

Agricultural Economics and Farm Surveys Department, Teagasc

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 2018 are based on 2017 Teagasc NFS data and on CSO price indices for the year to date (CSO, 2018a) and preliminary CSO estimates for 2018 (CSO, 2018b). Forecasts for sheep enterprise margins for 2019 are based on our estimates of margins for 2018, and our forecasts of input and output price and volume changes in 2019.

We begin the paper with a brief review of the outturn for family farm income (FFI) for the Teagasc NFS mainly sheep farms in 2017. A detailed assessment of the 2017 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 5. Estimates and forecasts of margins for the mid-season lowland lamb enterprise for 2018 and 2019 are then presented in sections 6 and 7. 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 2019 we have assumed that the Sheep Welfare Payment scheme will continue in 2019. As in 2018, we have assumed that the payment will be paid be on a per ewe basis, at a rate of €10 a ewe. At an average stocking rate of approximately 7 ewes per hectare, this is equivalent to about €70 per hectare. This payment is incorporated in estimates of enterprise output for 2018 and forecasts for 2019 because it is linked to production.

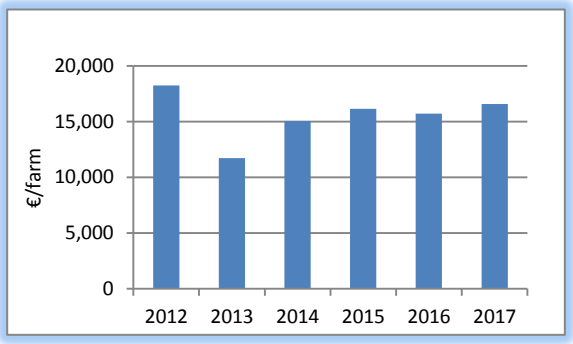
2. Review of the Economic Performance of Sheep Farms in 2017

FFI on those farms classified by the Teagasc NFS as mainly sheep farms increased in 2017, with FFI on sheep farms up 6 percent on the level earned in 2016. The average FFI earned on these farms for the period 2012 through 2017 is shown in Figure 1.

The increase in FFI on sheep farms in 2017 was due to stronger lamb prices, as well as a 7 percent increase in direct payments. The increase in direct payments for these farms was primarily due to the introduction of the Sheep Welfare Scheme which augmented margins on the average sheep farm in 2017.

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. In 2017 the value of cattle and crop output on farms classified as sheep farms by the Teagasc NFS fell while the output value of sheep production increased.

Figure 1: Average Income on Mainly Sheep Farms in Ireland: 2012 to 2017



Source: 2017 Teagasc National Farm Survey (2018)

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 payments that are decoupled from production. However, enterprise margins for mid-season lowland lamb do include coupled payments. In 2018 and 2019 payments to farmers participating in the Irish Government's Sheep Welfare Scheme will boost the value of gross output and margins per hectare.

3. Sheep Margins in 2017

Changes in the value of output, costs and gross margin per hectare for the mid-season lowland lamb enterprise in 2017 are shown in Table A1 of the Appendix to this paper. For 2017, the value of gross output for mid-season lamb enterprises increased by 7 percent. This improvement in output value was due to stronger prices, coupled with growth in the volume of lamb produced per hectare. In 2017 the stocking rate of ewes per hectare increased. However, this was partly offset by a decline in the weaning rate (lambs per ewe), with overall lamb carcass per ha increasing by 3 percent.

In 2017 total direct costs per hectare on the average mid-season lamb enterprise increased by just 1 percent. Pasture and forage costs remained unchanged relative to 2016, while expenditure on concentrate feed declined by 2 percent. The marginal increase in direct costs was related to "other" direct costs increasing year on year. Gross margins in 2017 increased relative to 2016, due to growth in output value that outpaced growth in direct costs of production.

Historically, there has been a wide range in profitability of sheep farms operating the mid-season lamb system. This range in profitability continues to persist. 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 the intensity of production

For comparison purposes, in Table A2 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 and 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 €1,195 euro per hectare in 2017, while farms in the bottom group earned an average gross margin of only €284 per hectare. Top producers earned, on average, 4 times more per hectare than their counterparts in the bottom group.

The large differences between the value of output per hectare between the three groups of farms are due to differences in weaning and stocking rates. Higher levels of technical performance are reflected in an average carcass output per hectare of 293 kg on the most profitable mid-season lamb enterprises, versus 175 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). Total direct costs per hectare are highest for the group with the highest level of profitability, reflecting the higher stocking rate on these farms.

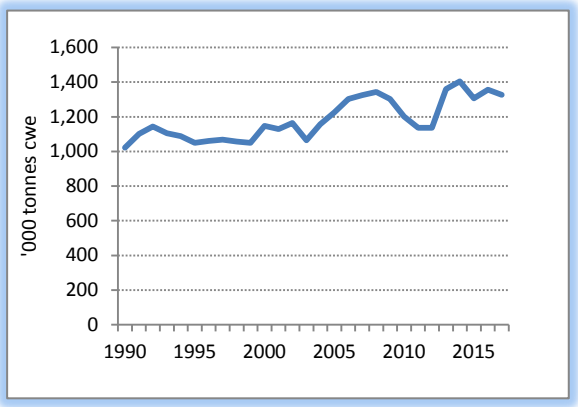
When direct costs of production per kg of lamb carcass produced are compared, the impact of different levels of production intensity per hectare can be taken into account. Direct costs of production per kg of lamb carcass produced on the least profitable farms are 72 percent higher than the costs per kg incurred on the most profitable of the mid-season lamb enterprises.

With strong growth in gross margin earned in 2017 and a decline in sheep enterprise overheard costs, the average net margins for midseason lamb enterprises increased dramatically in 2017. The average net margin earned on the mid-season lamb enterprises analysed in 2017 was €217 per hectare. This represents a 40 percent increase on the net margin earned in 2016. As the data in Table A2 show, the large variation in gross margin earned per hectare is also reflected in variation in net margins earned. The most profitable mid-season lowland lamb enterprises on average earned a net margin of over €578 per hectare while the least profitable lowland lamb enterprises had on average negative net margins (i.e. losses) of €93 per hectare.

4. Global development in Sheep meat Trade

Global trade in sheep meat has grown by over 30 percent since 1990 (see Figure 2). Throughout this period international trade has been dominated by Australia and New Zealand. In 2017 Australia and New Zealand accounted for more than two thirds of the value of global sheep meat exports (UN, 2018). In all years since 1990 Australia and New Zealand have accounted for more than 70 percent of the sheep meat that is internationally traded.

Figure 2: Global Lamb exports 1990– 2017



Source: OECD

The recent 4-year drought (2013-2016) in Australia has had a large impact on the Australian sheep flock. The breaking of the drought in 2016 has encouraged flock rebuilding in subsequent years and caused prices for sheep (and cattle) in Australia and on the world market to increase.

Global sheep meat prices have a pronounced seasonal pattern. In addition to factors like overall demand development and growing population of Muslim societies, seasonal sheep prices are driven by religious holidays, among them Easter in Christian countries and Eid Al-Fitr and Eid Al-Adha in Muslim countries. The time interval between such religious holidays is an important factor in determining price movements. Over the next 6 years, as Fennell (2018) has highlighted, the period between the Christian holiday of Easter and the Muslim holiday of Eid Al-Fitr will narrow to 2 weeks. This development will likely result in increased within year variation in lamb and sheep prices.

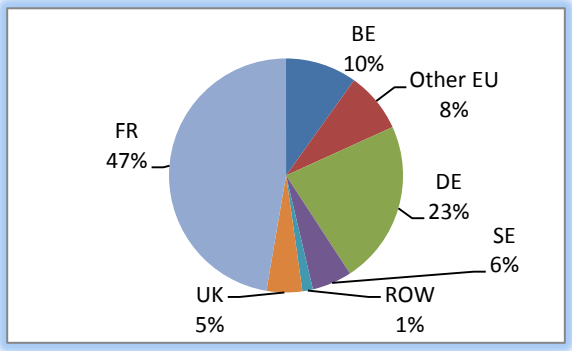
5. Sheep Meat Markets: Short run outlook

The bulk of Irish sheep meat production is destined for foreign markets. In 2017 over 72 percent of Irish sheep meat production was exported (CSO, 2018d). Irish self-sufficiency in sheep meat increased from 335 percent to 365 percent between the years 2015 to 2017. This means that understanding likely lamb price developments on Ireland's export markets is critical in assessing the prices that Irish sheep farmers are likely to receive for their output in 2019. The relative prices of competing meats (beef, pig and poultry meat) will also have an impact on demand for Irish lamb, both in Ireland and on export markets, and hence also affect the prices for lamb that Irish sheep farmers receive.

Continental EU markets account for the majority of Irish lamb exports, with almost one half of all exports destined for French market, with Germany accounting for a further one quarter. The share destined for the UK market has declined considerably. UK lamb, together with non-EU imports (mostly sourced from New Zealand and Australia), also competes with Irish lamb on Continental EU markets. The UK market in 2018 (year to end of September) accounted for an estimated 5 percent of Irish sheep meat exports as illustrated in Figure 3.

In the UK, the breeding flock is forecast to decline slightly in 2019. This is in part due to higher than average ewe mortality during lambing in 2018, and the uncertainty currently surrounding Brexit. AHDB forecast the breeding flock in December 2018 to stand at 14.5 million head, 3 percent down from the AHDB estimated figure for December 2017 (AHDB 2018). In line with the decline in production, UK exports are forecast to decline by 12 percent in 2018. This is primarily due to the decline in UK production, as historically there is a close relationship between production levels and exports. The premium at which UK lamb traded over French lamb prices during spring 2018 also put some pressure on UK exports.

Figure 3: Irish Sheep and Lamb Meat Exports (Volume) by Destination in 2018



Source: Eurostat COMTRADE database, year to September 2018 (ROW = Rest of World)

With a stable EU supply situation for 2018 as a whole, the outlook for EU sheep meat prices in 2018 was driven by developments in EU demand. During the first half of 2018, domestic demand for lamb was ahead of indigenous supplies and sheep meat prices outperformed those observed in 2017. With supply and demand for the remainder of 2018 expected to be largely in balance, the

average price for the year is not expected to diverge on 2017 price levels for the remainder of 2018.

The indigenous production of lamb in the EU in 2019 will largely be a function of the 2018 ending inventory of breeding ewes. Total EU ending inventories of ewes in 2018 are forecast to be stable and as a result total EU indigenous production of sheep meat is not forecast to change significantly from the 2018 level.

Beef and Lamb New Zealand (B&L NZ, 2018) expect New Zealand lamb shipments in 2018/19 to decrease (-1.7 percent on the level in 2017/18) due to a reduction in lambs available for slaughter. However, it is expected that this will be partly offset by small increase in average carcase weights. ABARES (2018) is forecasting that Australian lamb exports earnings in 2018/19 will increase by 9 percent. On-going flock rebuilding is forecast to limit the magnitude of likely expansion in the volume of Australian production in 2019, with stronger lamb prices boosting export earnings.

Overall, supplies of lamb on the global market are expected to tighten, with mutton production likely to follow a similar trend. With global demand expected to remain strong in 2019, world sheep meat prices should improve (AHDB, 2018).

Irish sheep throughput, for the year to date, is slightly higher in 2018 than in 2017. A marginal increase in in the supply of lambs (+1 percent) has been supplemented by increased ewe slaughter (+14 percent). For 2018 Irish sheep meat production is estimated to have remained on a par with 2017.

Opening ewe inventories in 2019 are expected to remain largely stable across the EU. In 2019, the EU supply of sheep meat is expected to increase modestly relative to 2018. With income growth in the EU not expected to be a driver of increased EU demand for lamb, and high world prices limiting growth in imports, the growth in indigenous EU supply is likely to limit the scope for any improvement in lamb prices in 2019.

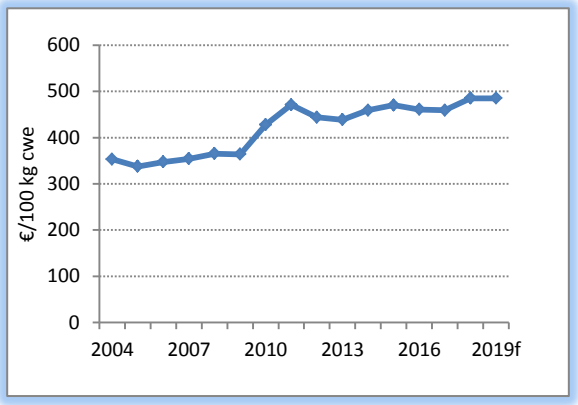
Up to June 2018, Irish lamb prices averaged over 10 percent higher than for the same period in 2017. With the seasonal reduction in lamb prices currently underway, and a weak sterling outlook for the foreseeable future, it is expected that the average prices for 2018 as a whole will be significantly above the 2017 prices.

Our estimate is that lamb prices in 2018 will be 5.6 percent higher relative to their 2017 level. Our forecast for 2019 is that on average Irish lamb prices will remain on a par with 2018 price levels. A contraction in Irish supplies should help to offset some downward movement in EU average prices.

6. Estimated Sheep Gross Margins 2018

To obtain an estimate of farm profitability for 2018, 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 2018 (and forecasts for 2019) we have assumed that the volume of spring lamb produced per hectare nationally remains constant and this is reflected in weaning rates and stocking rates in 2018 and 2019 in line with those reported in 2017. It is also assumed that in 2018 (and 2019) the Irish Government's *Sheep Welfare Scheme* will add approximately €70 per hectare to the value of gross output on the average mid-season lamb enterprise.

Figure 4: Irish Lamb Price, 2004 – 2018e, 2019f



Source: European Commission DG AGRI and author estimate 2018, forecast 2019

The EU sheep and lamb market in 2018 was characterised by higher prices in the first two quarters of the year, with average prices in 2018 higher than in 2017. As a result, the overall value of market based gross output per hectare for the mid-season lamb system in 2018 is estimated to have increased by 4 percent. The volume of output per hectare is estimated to have remained relatively stable. Our assessment is that output per hectare in 2019 will not increase relative to the levels estimated for 2018.

The main direct costs of production for Irish sheep farms are purchased feed, pasture and forage costs. Overall input costs are estimated to have increased substantially in 2018. As a direct consequence of the inclement weather conditions, the quantity of both concentrate feed and fertiliser used was well ahead of 2017 levels.

Purchased feeds typically account for 40 percent of total direct input expenditure on the average mid-season lowland lamb system. Over the course of 2018 purchased sheep feed prices are estimated to have increased by circa 5 percent and this coupled with a one third increase in the volume of purchased feed used means that for 2018 concentrate feed purchases are estimated to have accounted for over 50 percent of total input expenditure.

Pasture and forage costs typically account for 30 percent of total direct costs on the mid-season lowland lamb system. Despite the poor weather in 2018, this percentage still holds true for 2018. Fertiliser prices increased in 2018, with prices estimated to have increased by 7 percent in 2018. Fertiliser sales data from DAFM indicate that the volume of fertiliser sales in 2018 has increased strongly. In our estimates for 2018 we have assumed that a 10 percent increase in the volumes of fertiliser used by mid-season lowland enterprises has occurred in 2018. Contracting charges in 2018 are estimated to have increased marginally, and overall we estimate that expenditure on pasture and forage in 2018 increased by over 17 percent, compared to 2017.

In 2018 total direct costs of production on the mid-season lowland land enterprise are estimated to have increased by just over 18 percent on 2017 levels. Overhead costs of production are estimated to have increased by 3 percent, so that total costs of production on the mid-season lamb enterprise are estimated to have increased by just under 11 percent when compared with 2017.

Despite higher marketed output value and the receipt of payments from the *Sheep Welfare Scheme*, increased input costs expenditure in 2018 are estimated to have resulted in lower margins on the average mid-season lowland lamb enterprise. The gross margin earned in 2018 is estimated to have declined by just under 3 percent to €693 per hectare (see Table A3). The receipt of payments from participation in the Sheep Welfare Scheme payment is estimated to have boosted the gross margin in 2018. In the absence of this coupled payment, the estimated decline in gross margins would have been closer to 13 percent. Increases in overhead costs in 2018 mean that the enterprise net margin on the mid-season lowland lamb enterprise is estimated to have decreased by 16 percent. The estimated average net margin per hectare on mid-season lowland sheep farms in 2018 is €182 per hectare.

7. Outlook for the Sheep Enterprise Gross Margin in 2019

The outlook for input expenditure in 2019, from the perspective of Irish sheep farmers, is more positive than in 2018. While the prices of the key inputs to sheep production are forecast to increase, a reduction in the volume of inputs used in 2019 is forecast to lead to reduced costs of production.

Concentrate costs are the largest direct cost item for mid-season lowland lamb enterprises and prices of concentrates are forecast to remain relatively stable in 2019. The volume of feed use is forecast to be decline in 2019 relative to 2018 by circa 28 percent. This will return feed use volumes to close to 2017 and previously observed “normal use” levels. Total expenditure on concentrates is expected to decrease by 28 percent.

The price of fertiliser is forecast to increase in 2019. Contractor charges are expected to increase marginally in 2019. Overall, pasture and forage costs on Irish lowland mid-season lamb enterprises are forecast to increase by 3 percent in 2019.

Table A3 summarises our forecasts of output, costs and margins for the mid-season lamb enterprise for 2019. Given the relatively stable outlook for lamb prices in 2019, and the forecast decrease in direct costs of production, the average gross margin earned from sheep farming is expected to increase in 2019. The gross margin per hectare for the mid-season lamb system in 2019 is forecast to be €764 per hectare, a 10 percent increase on our 2018 estimate. In 2019 margins earned on the midseason lowland enterprises will continue to be boosted by the receipt of the coupled Sheep Welfare Scheme payment.

Total overhead costs for the average mid-season lamb enterprise are forecast to increase by less than 1 percent in 2019. As a result of the forecast large reductions in input volumes in 2019, total

costs of production are expected to be circa 6 percent lower in 2019 than in 2018. With relatively constant output value forecast, net margins per hectare from sheep production are expected to increase by 37 percent to €250 per hectare in 2019.

8. Concluding Comments

The average gross margin earned by mid-season lamb producers in 2018 is estimated to have declined compared to that earned in 2017. Stronger lamb prices and higher gross output were more than offset by higher input prices and increased input volumes. Increased direct payment receipts associated with participation in the *Sheep Welfare Scheme* is estimated to have mitigated the negative impact of the poor weather on sheep margins.

Our forecast is that 2019 Irish lamb prices will remain largely on a par with 2018 prices. Our forecast is that gross margins earned by the average mid-season lamb enterprise in 2019 will increase relative to those estimated for 2018, due largely to significantly lower costs of production as concentrate feed usage returns to normal levels. The forecast gross margin for 2019 is €764 per hectare, a 10 percent increase on the estimated gross margin for 2018. Average net margins are also forecast to increase, with the average mid-season lamb enterprise forecast to earn a net margin of €250 per hectare in 2019 that is 37 percent higher than estimated for 2018.

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

	2017	2018e
	€/ha	
Gross output	1,209	1,280
Coupled Payments (Sheep Grassland/Sheep Welfare)	50	70
Direct Costs	496	587
Concentrates	211	284
Pasture and Forage costs	140	164
Other direct costs	137	140
Gross Margin	713	693
Overhead Costs	495	510
Net Margin	217	182
Ewes/ha	8.1	8.1
Lambs per ewe	1.3	1.3
Lamb Carcass (kg)/ha	224	224

Source: Teagasc National Farm Survey and Authors' estimates for 2018
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 2017 by gross margin grouping

	Most Profitable	Average Profitability	Least Profitable
		€/ha	
Gross Output	1,767	1,126	756
Direct Costs			
Concentrates	238	162	232
Pasture and Forage	177	141	96
Other Direct Costs	156	144	144
Gross Margin	1,195	679	284
Net Margin	578	182	-93
Ewe/ha	10.05	7.51	6.79
Lambs/ewe	1.46	1.40	1.29
Lamb carcass (kg)/ha	293.5	210.3	175.2
Dir. costs €/kg carcass	1.95	2.13	2.69

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, 2016 – 2019

	2017	2018 e	2019f
		€/ha	
Total Direct Costs	496	587	516
Concentrates	211	284	204
Pasture and Forage	140	164	169
Other Direct Costs	137	140	143
Gross Output	1,209	1,210	1,210
Sheep Grassland /Sheep Welfare Payment	50	70	70
Gross Margin	712	692	764
Overhead Costs	495	510	514
Net Margin	217	182	250

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

Irish Cereal Farming in 2017

Irish Cereal Production
2.4 million tonnes (up 3%)

Irish Cereal Area
271,700 ha (down 3%)

Irish Barley Area
180,200 ha (down 5%)

Irish Wheat Area
67,000 ha (down 1%)

Spring Barley price
average €151 per tonne (up 7%)

Winter Wheat price
average €159 per tonne (up 7%)

Spring Barley Yield per ha
average 7.9 tonnes (up 8%)

Winter Wheat Yield per ha
average 10.4 tonnes (up 7%)

Total Production Cost per ha
Spring Barley
average €1,069 (up 2%)

Total Production Cost per ha
Winter Wheat
average €1,398 (down 1%)

Net Margin for Spring Barley
average €189 per hectare

Net Margin for Winter Wheat
average €500 per hectare

Target Yield for Spring Barley
7.4 tonnes per hectare
achieved on 41% of farms

Target Yields for Winter Wheat
10.2 tonnes per hectare
achieved on 75% of farms

Gross Margin Target Spring Barley
€540 per hectare
achieved on 62% of farms

Gross Margin Target Winter Wheat
€860 per hectare
achieved on 66% of farms

Source: Teagasc National Farm Survey and Central Statistics Office

Irish Cereal Farming in 2018

Reduced Global Cereal Harvest
with a reduced stocks to use ratio for main exporters globally

Irish Cereal Yields
down 14% for winter wheat and 30% for spring barley

Barley and Wheat prices
up on 2017 level

Weather Conditions
unfavourable for grain fill but favourable harvest conditions

Fertiliser Prices
up 3% on the 2017 level
Fertiliser Use
little changed on 2017

Seed Prices
little changed on 2017

Other Direct Costs
little changed on 2017

Fuel prices
up 10% on the 2017 level

Total Direct Costs
Overall, input costs up on 2017

Gross Margin
Spring Barley
down €35 per ha on 2017
Winter Wheat
up €400 per ha on 2017

Net Margin
Average Cereal Enterprise
up €150 per ha

Source: Teagasc Estimates for 2018 and Forecasts for 2019

Irish Cereal Farming in 2019

Higher Global Cereal Production
reversion of yields to more normal levels

Irish Cereal Yields
up 20% for spring barley and 9% for winter wheat vs. 2018

Cereal prices
down 18% on the 2018 level

Weather Conditions
Normal weather assumed

Fertiliser Prices
up 10% on the 2018 level
Fertiliser Use
little changed on 2018

Seed Prices
up 15% on the 2018 level

Other Direct Costs
no change on the 2018 level

Fuel prices
little changed on 2018

Total Direct Costs
Overall, input costs up on 2018

Gross Margin
Spring Barley
down €100 per ha on 2018
Winter Wheat
down by over €400 per ha on 2018

Net Margin
Average Cereal Enterprise
down by over €200 per ha

Review of Tillage Farming in 2018 and Outlook for 2019

Fiona Thorne

Agricultural Economics and Farm Surveys Department, Teagasc

1. Introduction

Harvest prices in the cereals sector in 2018 were substantially higher than those achieved in 2017. However, yields for the majority of Irish cereal crops were lower than those achieved at harvest 2017. Straw prices were also generally higher in 2018. Taken together these developments resulted in higher gross output values on a per hectare basis in 2018 relative to 2017. However, there was also some cost inflation in 2018, with the majority of direct costs increasing during the year.

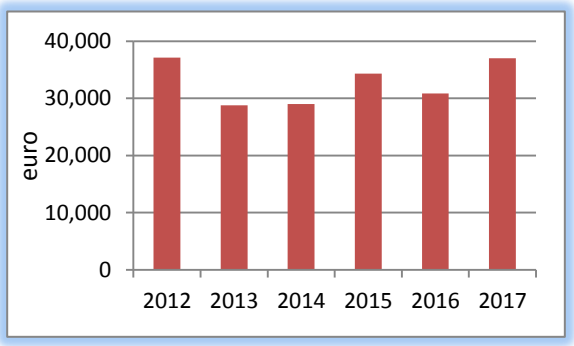
The upward movement in cereal prices in 2018 was associated with several factors, the most important of which was a decrease in the production estimates for some crops in key producing countries. Lower production globally resulted in a decrease in stocks and a more constrained global supply and demand balance in 2018/19.

This paper will consider whether the price increases of the 2018 harvest can be considered atypical or whether prices will continue at these levels into the 2019 harvest. The paper uses Irish Teagasc National Farm Survey (NFS) data to conduct a review of the financial performance of tillage farms in 2017. Following this, prices and costs are estimated for 2018 and these are used to produce an estimate of net margin for the 2018 harvest year. In the concluding sections of the paper, forecasts for 2019 are presented.

2. Review of the Economic Performance of Tillage Farms in 2017

Approximately 7,400 specialist tillage farms were represented by the Teagasc NFS in 2017. Income on tillage farms increased by 20 percent year-on-year. Gross output on a whole farm basis declined by 5 percent, while direct payments decreased by 12 percent. Direct costs and overhead costs decreased on a whole farm basis, which was mainly driven by a reduction in tillage area in 2017. Overall, total costs on a whole farm basis declined by 14 percent. These changes resulted in an average family farm income (FFI) in 2017 of €37,028 which is equivalent to a 15 percent increase on the average FFI on tillage farms over the previous five year average.

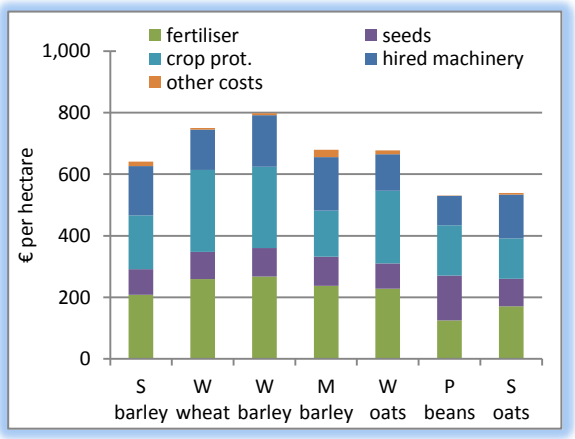
Figure 1: Average Income on Irish Specialist Tillage Farms 2012 to 2017



Source: Teagasc, National Farm Survey (various years)

To understand the economic performance of tillage farms in 2017, 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 2017.

Figure 2: Composition of Direct Costs for Cereal Crops, 2017

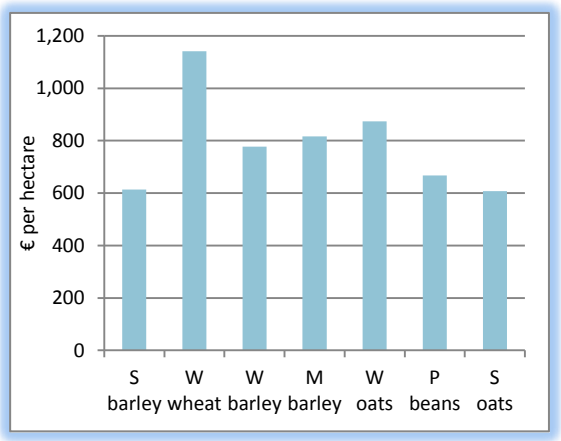


Source: Teagasc, National Farm Survey

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: Gross Margins per ha for Cereal Crops, 2017



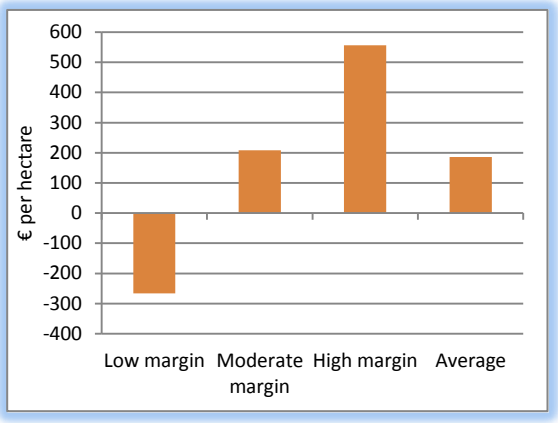
Source: Teagasc, National Farm Survey Data

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 and winter oats recorded the highest gross margins and spring barley the lowest margin of all cereal crops examined in 2017 (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 2017 relative to 2016, by over €100 and €200 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. For this reason, the net margin of the cereal enterprise of the entire specialist tillage farming population within the NFS is examined, and this is shown in Figure 4.

To examine the variation in net margins earned by tillage farms the sample was divided into 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 moderate margin and the poorest performing one third described 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 2017 was €556 compared to €208 on moderate margin farms and -€266 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.

Figure 4: Cereal Enterprise on Specialist Tillage System Farms: Net Margin Distributions, 2017



Source: Teagasc, National Farm Survey Data

3. Estimate of 2018 Performance

This section of the paper presents a review of the cereal sector in 2018. 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 2018. 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 2018.

3.1 Estimated Input Usage and Price 2018

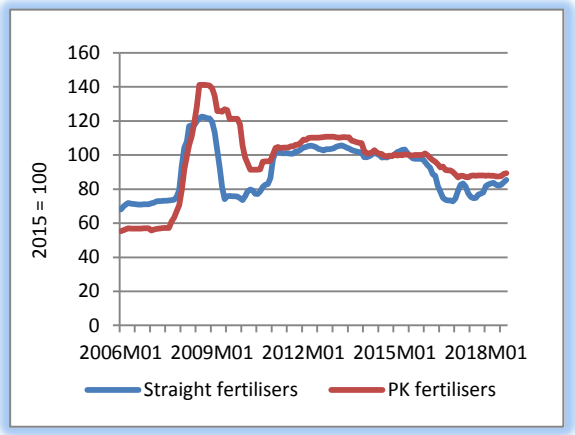
3.1.1 Fertiliser – Usage and Price 2018

In the early half of the last decade fertiliser costs typically comprised about 25 percent of direct costs and just over 10 percent of total costs on tillage farms. However, as illustrated in Figure 5, fertiliser types commonly used on tillage farms have increased substantially in price since 2006. The price increases in recent years have meant that expenditure on fertilisers now represents a larger proportion of costs on tillage farms than previously; in 2017 fertiliser costs represented about 32 percent of direct costs on tillage farms and around 19 percent of total costs. In particular the price of natural gas which is a key determinant of fertiliser price was the major driving force

behind the upward trend for fertiliser prices through the second half of the 2000s. Increased demand and relatively fixed production capacity were also factors.

However, following the peak in 2008 and 2009, the pressure on fertiliser prices has been mixed in more recent years, but with upward pressure on prices arising in 2018, for tillage farms in particular, where seasonality of purchase and application has an influence on overall expenditure for tillage farms. On a calendar year basis, for winter sown cereal crops, straight nitrogen based fertiliser products are estimated to be up by about 4 percent whereas P and K fertiliser products are estimated to be unchanged in 2018 compared to 2017. It is estimated here that for the 2017/18 harvest year in aggregate, NPK fertiliser prices were up by about 3 percent for winter and spring cereal crops, with no reported differences between winter and spring sown crops.

Figure 5: Irish Farm Gate Price Index of Fertilisers 2006 to 2018



Source: Central Statistics Office data for 2000 to 2018.

The pattern of fertiliser purchases on cereal farms is somewhat different from that on grassland farms, with applications being spread throughout the sowing and growing season from September of one year to May or June of the following year, depending on whether the crop is spring or winter sown. On this basis, it is sometimes the case that the fertiliser prices for cereal crops for a calendar year can be somewhat different to that experienced for grassland systems over the production year. During 2018 the story for fertiliser price differentials between cereal and grassland farms has been that price increases were more significant on grassland farms than cereal farms due to the timing of the price drop and also due to the use of different fertiliser products.

On the usage side, DAFM figures indicate that fertiliser purchases in the 2018 fertiliser year (October 2017/September 2018) were up 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 2018. Reports from a number of sources indicate that fertiliser usage per hectare have increased marginally compared to 2017, due to increased fertiliser use on leased land. Hence, in per hectare terms (per crop) it is estimated that 2018 usage of fertiliser was marginally up on that applied in 2017. With a slight increase in fertiliser usage on crop farms (per hectare) and upward movement in fertiliser prices, overall expenditure on fertiliser in 2018 is estimated to have increased.

3.1.2 Seed – Usage and Price 2018

Expenditure on purchased seed on crop farms comprises between 11 and 17 percent of direct costs for cereal production. In terms of the composition of total costs, seed represented about 7 percent of total costs in 2017. In 2018, cereal farmers did not experience any major shift in seed costs relative to the previous year due to little movement in the prices for the main cereals at harvest 2017. In autumn 2017 when seed supplies were purchased for the 2018 harvested winter crops, blue label seed costs were trading at about €460 per tonne, which was about 2 percent higher than in autumn 2016. This price was also evident in 2018 for spring sown crops.

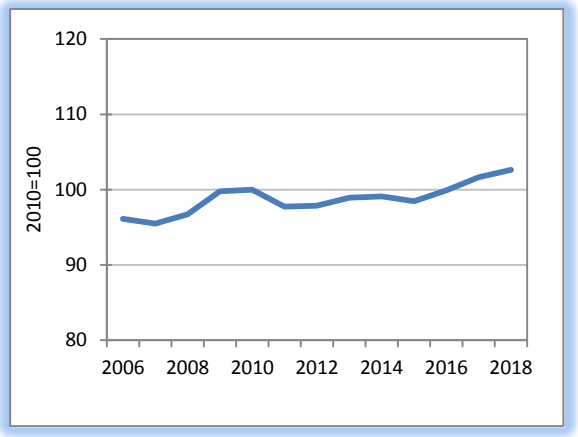
3.1.3 Crop protection – Usage and Price 2018

The expenditure on crop protection by specialist tillage farms in 2018 accounted for 24 percent of direct costs and 12 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 2018, crop protection costs accounted for 35 percent of direct costs as compared to 27 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. Figure 6 shows that the increase

in the costs of crop protection products from 2005 to 2018 was approximately 5 percent and that between 2017 and 2018 costs are estimated to have increased by about 1 percent.

Figure 6: Price Index of Plant Protection products in Ireland 2006- 2018



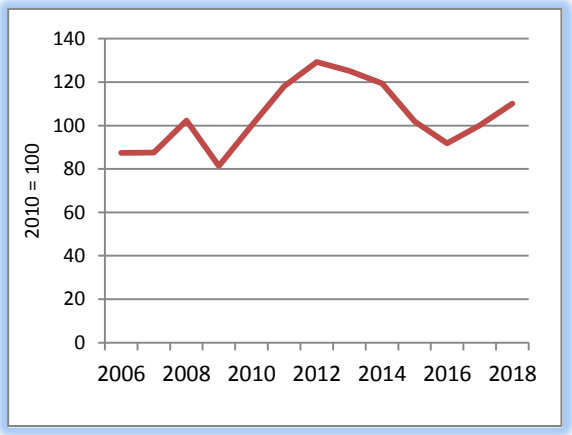
Source: Central Statistics Office and Author's own estimates

3.1.4 Energy and Fuel – Usage and Price 2018

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 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 15 percent of total costs on tillage farms in 2017.

Based on the CSO estimates presented in Figure 7, the farm level price of fuel has increased by over 23 percent between 2005 and 2017 (the last full year for which data is available). Between 2017 and 2018 as a result of an increase in Brent crude oil prices, and only a slight movement in the US dollar to Euro exchange rate, fuel prices on Irish tillage farmers were elevated by 10 percent in 2018 relative to 2017. This estimate is based on a comparison of the agricultural motor fuel index from the CSO for 2017 and the first nine months of 2018. For winter and spring sown crops the increase in energy prices is estimated at around 10 percent. Demand for these input items tends to be relatively inelastic with respect to price and therefore it is assumed that usage in 2018 will similar to the 2017 level. Overall expenditure on fuel related items is likely to be 10 percent higher in 2018 relative to 2017.

Figure 7: Price Index of Fuel products in Ireland 2006 – 2018



Source: Central Statistics Office and Author's own estimates

3.1.5 All other direct and overhead costs – Usage and Price 2018

Based on CSO estimates for the first nine months of 2018 compared to the same time period in 2017 it is assumed that 'other direct costs' within agriculture have remained more or less static.

The average cost of land rental in 2017 on specialist tillage farms represented 7 percent of total costs. Given that farm gate cereal prices and yields increased in 2017, there was anecdotal evidence that land rents per hectare increased again in 2018 relative to 2017. While the convention is to assume that land rental prices react strongly to changes in cereal prices, NFS data indicates that cereal price inflation/deflation is not translated in its entirety into land rental charges. It is assumed that the average land rental per hectare increased by about 5 percent in 2018. Much of this inflation in rental prices can be attributed to the need to maintain area to claim direct payments and demand for additional land from the dairy sector in particular. However, the methods employed here reflecting costs per crop hectare do not capture changes in the volume of land rented, and for 2018, with a significant decline in cereal area, it is assumed that a large element of this decrease in cereal area can be associated with rented land. Hence, for 2018, it is assumed that any change in land rent price per hectare is cancelled out by a reduction in the volume of rented land in 2018. On a total farm basis the actual impact will only be fully reflected in the final

Teagasc NFS figures for 2018 which will be published in mid-2019.

3.1.6 Estimate of Total Input expenditure for 2018

Total expenditure on all input items is estimated to have increased in 2018 relative to 2017. The most significant increase in expenditure occurred on fuel related items, which are estimated to have increased by about 10 percent between 2017 and 2018. On average, the estimated increase in total direct costs was approximately 3 percent in 2018 relative to the 2017 level.

Figure 8A: Direct Costs in major Crops in Ireland 2017 and Estimates for 2018

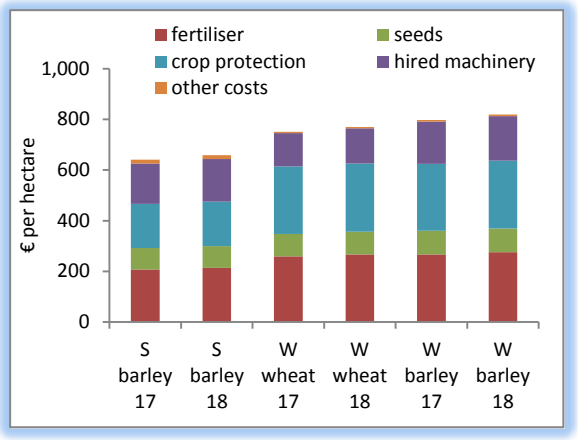
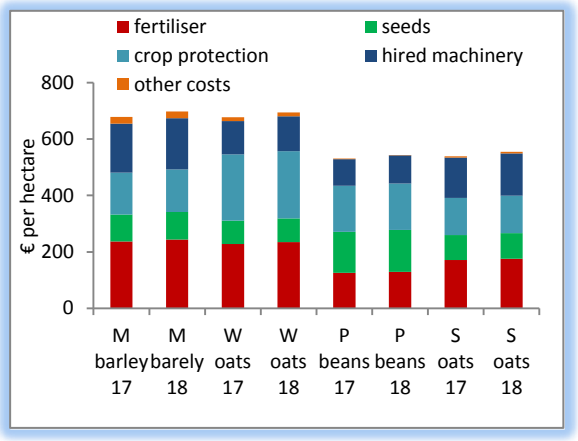


Figure 8B: Direct Costs in Minor Crops Ireland 2017 and Estimates for 2018



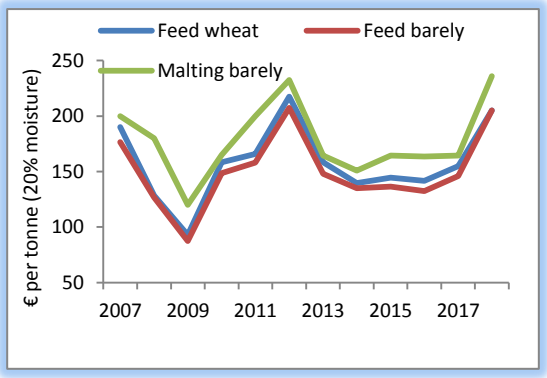
Source: Teagasc, National Farm Survey Data and Author's estimates for 2018

3.2 Estimated Output Values 2018

3.2.1 Price, yield and moisture levels in 2018

Unprecedented volatility has been witnessed in cereal prices in Ireland since 2006, with prices reaching a historical high in nominal terms in 2012. In 2013 and again in 2014, year-on-year farm gate cereal prices decreased considerably. However, since 2015, there has not been as much movement in cereal prices, with prices increasing slightly in some years and decreasing slightly in other years. In 2017, and again in 2018, ensuing from lower stock levels internationally, and top up loyalty payments from Irish processors, farm gate feed wheat, barley and oat prices at 20 percent moisture (paid at harvest time) were up on 2016 levels (see Figure 9). Across most major crops it is estimated that on account harvest prices for cereals in 2018 were up by between 30 and 40 percent on 2017 levels, with merchants in some cases paying loyalty bonuses to customers based on minimum purchase levels.

Figure 9: Farm Gate Cereal Prices (major crops), 2000-2018



Source: Teagasc, National Farm Survey Data and Author's estimate for 2018.

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 2016, the NFS recorded that approximately 13 percent of total cereal production was forward sold by farmers prior to harvest. Hence, it is assumed that

in 2018 just over 10 percent of total cereals were forward sold.

Market data shows that, on average, those farmers that forward sold in 2018 did not receive significantly higher market prices than those that waited until harvest time to agree a price. However, as noted earlier, it is estimated that the number of farmers engaged in forward contracting in 2018 was still a relatively small proportion of total production.

Table 1: Average Yields Levels, 2017 and 2018 Harvest

	Yield (tonne per ha.)	
	2017	2018
Winter Wheat	10.4	8.9
Winter Barley	9.1	8.8
Winter Oats	8.9	7.8
Spring Wheat	8.2	6.7
Spring Barley	7.9	5.6
Spring Oats	7.6	5.7

Source: CSO (2018) & Forthcoming Teagasc Harvest Report (2018)

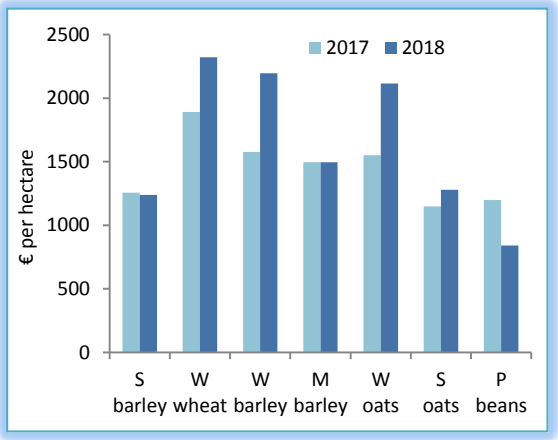
Table 1 shows the average green yields obtained in 2017 and 2018. In general, for the 2018 harvested crops the yields are estimated to be lower than 2017. Yields of all cereals were below average as late planting of spring crops and a summer drought had a significant impact on crop yield. The greatest impact of the drought was on yields in the south and east of the country while the north and west were least affected. However, readers should note that these yields are green yields and are thus not adjusted for moisture content.

The last variable which must be assessed in calculating cereal output value per hectare is the value of straw. Following a decrease in straw stocks over the past number of years, the demand for straw in 2018 has increased significantly, which has had a very positive effect on straw prices in 2018. Lower than normal straw yields combined with increased demand and an overall reduction in the area planted has resulted in straw price increases of 50-100 percent per bale in some areas.

3.2.2 Estimate of Total Output Value for 2018

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 2017 and 2018 are very crop specific. However, in overall terms, the general trend has been an increase in output value in 2018 relative to 2017. This growth arises due to the increases in cereal prices and straw value, which together more than compensated for the reduction in yields. Output value per hectare in 2018 is estimated to have increased by on average 15 percent across the crops examined.

Figure 10: Actual Gross Output per Hectare 2017 & Estimated Gross Output per Hectare 2018



Source: Teagasc, National Farm Survey Data and Author's estimates for 2018

3.2.3 Estimate of Total Production 2018

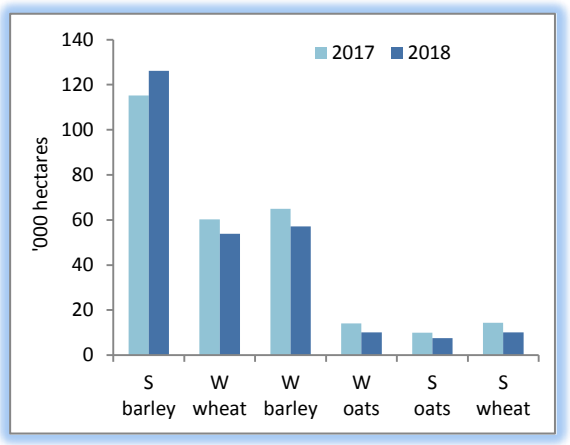
The figures presented in section 3.2.2 provide estimates of output value per hectare. However, these estimates do not take into consideration changes in the area devoted to cereal crops in 2018. Figure 11 shows the area estimates for 2018 based on Teagasc Harvest Report data (forthcoming December 2018).

Figure 11 shows that the total area devoted to cereal production decreased by 4.9 percent in the 2017/18 crop year compared to the 2016/17 crop year. There was also some switching between winter and spring sown crops which was weather related.

Table 2 combines actual total cereal production for 2017, as reported by the CSO, with estimated total cereal production for 2018. The estimated 2018

production of wheat, barley and oats is based on 2018 yield estimates from the Teagasc harvest report. The overall production of cereals for 2018 is estimated to be approximately 1.8 million tonnes, down from 2.3 million tonnes in 2017. This 1.8 million tonne harvest in 2018 is significantly below the 5 year rolling average of 2.3 million tonnes. Indeed, it is the smallest recorded harvest since 1995.

Figure 11: Change in Irish Crop Area from 2016/2017 to 2017/18 crop year in Ireland



Source: CSO and Teagasc, Teagasc Final Harvest Report 2018

Table 2: Actual & Estimated Production 2017 & 2018 ('000 Tonnes)

	2017	2018	% Change
Wheat	671	504	-25%
Barley	1502	1213	-19%
Oats	204	122	-40%
Total	2377	1839	-23%

Source: CSO and Teagasc, Teagasc Final Harvest Report 2017

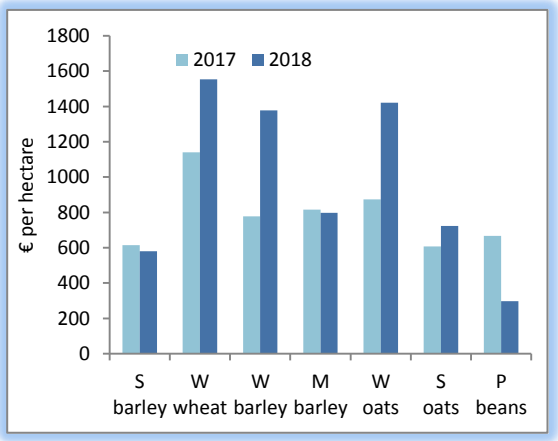
3.2.4 International Production Estimates for 2018

While production estimates for Irish cereals are important from a national supply, demand and balance sheet perspective, it is primarily developments in the international supply and use balance for cereals that affect price developments in Ireland. For this reason a review of the international ending stocks for cereals is more informative when near term price developments are concerned. The IGC and Strategie Grains estimates (Strategie Grains, November 2018) show that global total grain production and carry out stocks for the 2018/19 marketing year will be down on the previous year's levels. Production of wheat and barley were down significantly, putting pressure on maize stocks, with the end result of ending stocks of wheat, barley and maize down significantly on 2017/18.

3.3 Review of Tillage Enterprise Margins in 2018

The review of cereal output value showed that the average value of output received by farmers was higher in 2018 compared to 2017. The review of input costs concluded that total direct costs were slightly higher in 2018 compared to 2017, due mainly to an increase in oil and fertiliser prices. Figure 12 presents the effect of these estimates on the estimated gross margin for each of the main Irish cereal crops.

Figure 12: Actual Gross Margin in 2017 & Estimated Gross Margin for 2018 for each of the Main Crops

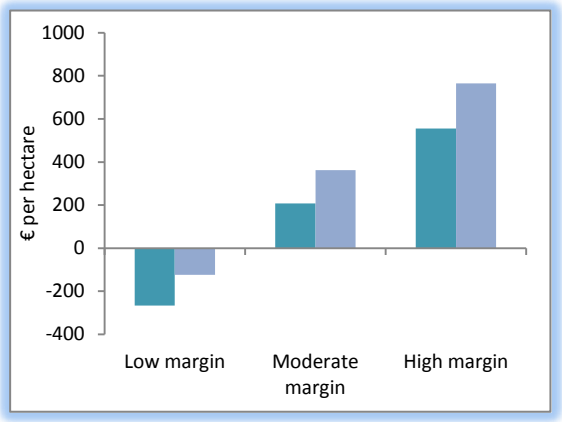


Source: Teagasc, National Farm Survey Data and Author's estimates for 2018

Figure 12 shows a mixed story in terms of the change in gross margin in 2018 relative to 2017. The relative shift in yields, crop prices, straw returns and input expenditure has been positive for the majority of crops between 2017 and 2018, with a slight decline recorded for spring and malting barley in 2018 and a larger decline in the margin for spring beans. In terms of the major crops, the gross margin for spring barley was down by just over €30 per hectare and winter barley is estimated to be up by about €600 per hectare, while the margin for winter wheat is estimated to be up by over €400 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.

The estimated net margins for 2018 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 2017 and Estimated Net Margin for 2018 for the Cereal Enterprise on Specialist Tillage Farms



Source: Teagasc, National Farm Survey Data and Author's estimates for 2018

Figure 13 shows the cereal enterprise net margin estimates for 2018 relative to 2017, 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 2018 is higher than in 2017 given upward movement in gross margins per hectare and less significant upward movement in overhead costs. For the best performing one-third of tillage farms the estimated net margin for 2018 was approx. €750 per hectare compared to the average, where the net margin was approx. €340 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 realised when the final Teagasc, NFS figures are available for 2018.

4. Outlook for 2019

In this section forecasts are provided for the expenditure for various input items in 2019, the likely farm gate cereal price that will prevail at harvest 2019 and the likely net margin of tillage farms in 2019.

4.1 The Outlook for Input Expenditure

4.1.1 Fertiliser – usage and price 2019

A number of factors need to be considered when forecasting price and volume changes for fertiliser on crop farms in 2019. CSO official monthly price indices for fertilisers for 2018 are only available up until the end of September. Market report data coming from the fertiliser industry at present point to some supply/demand constraints for nitrogen based products in 2019. Market sources are indicating that the price of N based products in particular could move off the prices observed at the end of September 2018 due to price pressure from the supply side and energy costs. Taking all of these issues into account, including seasonality of purchases, it is forecast that the increase in fertiliser price for cereal crops in 2018/19 is 12 percent.

Fertiliser usage in 2019 could be expected to decrease slightly due to decreased yields in 2018 for most crops, resulting in decreased fertiliser demand associated with nutrient off-takes. Overall, it can be expected that fertiliser expenditure will be about 10 to 12 percent higher per hectare on cereal farms in 2019 relative to the 2018 level.

4.1.2 Seed – usage and price 2019

As mentioned previously, cereal farmers experienced little change in seed costs in 2018 relative to the previous year due to little change in cereal prices in 2017. Given that cereal prices at harvest increased significantly in 2018 relative to 2017, this price increase has been transmitted to seed prices, with blue label seed costing around €520 per tonne for 2019, which is about 15 percent higher than 2018 prices.

4.1.3 Crop protection – usage and price 2019

The increase in crop protection costs in 2019 relative to 2018 is forecast to be of a similar magnitude to the changes seen in each of the last three to four years. Price changes have been minimal, at about 1 to 2 percent per year. Taking volume and price changes into account, based on recent data from the Teagasc, NFS, a 1 percent increase in crop protection expenditure is forecast for 2019.

4.1.4 Energy and Fuel – usage and price 2019

Fuel costs in 2019 will depend mainly on the evolution of crude oil prices. Current crude oil futures prices suggest that prices will remain unchanged in 2019 relative to 2018 prices. Assuming that usage is unchanged, expenditure on fuel related charges is forecast to remain stable in 2019. Contractor charges are expected to remain similar to those experienced in 2018.

4.1.5 All other direct and overhead costs 2019

All other direct costs are expected to remain static in 2019, in line with recent price changes of such items. In terms of land rental prices for 2019, as in previous years, anecdotal evidence is mixed regarding rental prices this early in the season. A forecast 5 percent increase has been assumed for 2019. This increase in land rental prices can be attributed mainly to competitive pressure from non-cereal uses, dairy farming in particular and also the increase in cereal prices at harvest 2018. Hence, for 2019 it is assumed that land rental prices will increase by 5 percent.

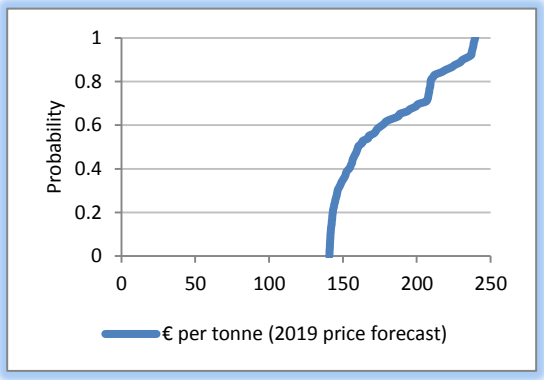
4.2 The Outlook for Markets 2019

The cereals market has experienced significant volatility in recent years. Planting decisions by farmers will be influenced by expected farm gate cereal prices (and margins) in 2019. 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 2019 harvest price an econometric analysis was conducted to predict the probability that the 2019 farm gate price will be higher or lower than the 2018 price. This analysis was based on the November 2018 MATIFF futures prices for November 2019 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 been 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 2019 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 2019. Based on the econometric model developed, it shows that there is significant uncertainty concerning the predicted harvest price for September 2019. This predicted range is based on current (MATIFF) futures trading prices (November 2018), 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.

Figure 14: Probability Distribution of the predicted 2019 Wheat Harvest Price

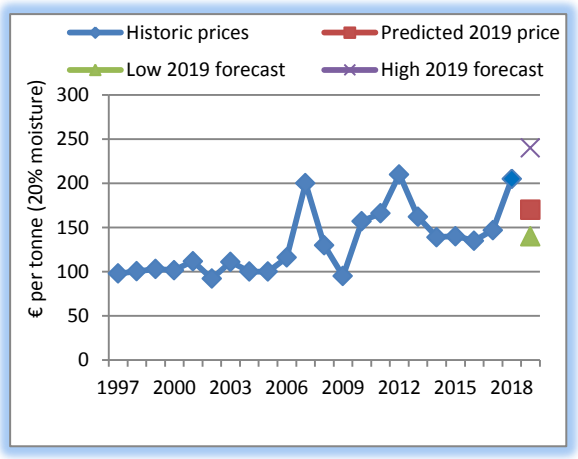


Source: Author's own estimates.

Based on market reports of forward prices and the probabilities of achieving different harvest prices, the average predicted value for the farm gate wheat price is approximately €170 per tonne at 20 percent moisture, which is an approximately 18 percent decrease over harvest prices paid in 2018. However, there is significant variation surrounding this figure and based on a 90 percent confidence interval, it is forecast that the figure could be as low as €140 per tonne or as high as €240 per tonne (Figure 15).

The latest edition of *Strategie Grains* (November 2018) outlines a more positive picture in terms of production potential in the EU for the 2019/20 marketing year. In the last couple of weeks, much-needed rains have arrived across western and northern parts of the EU, giving farmers the opportunity to plant significantly more wheat than last year. However, conditions remain very dry in the southeastern EU countries. Soft wheat area in EU is forecast to rise to 24.3 Mha (+6 percent compared with 2018/19). Total EU barley acreage is expected to remain near stable and grain maize area is forecast to increase by 4 percent.

Figure 15: Historic, Estimated & Forecast Farm Gate Feed Wheat Price (1997– 2019)



Source: Author's own estimates, 2019 forecast, at 90 percent confidence interval

The change in cereal area (in the EU) is coupled with an assumption of achievement of trend yields in 2019 (see Appendix A3 for further details on forecast changes in arable crop areas in the EU28 for 2019/20). An achievement of trend yields internationally, *ceteris paribus,* is assumed to have a positive impact on price given the reduction in production internationally in 2018. This assumption of course ignores a lot of other variables which potentially could have an impact on price, namely Brexit, significant exchange rate movements and considerable changes in demand from feed and food sources. 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 predictions at this time of the year.

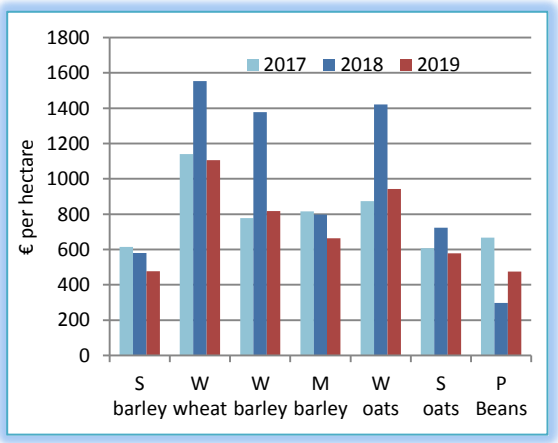
Based on the futures market forecast and the adjustments made in the regression analysis for predicted versus actual outcomes, our forecast is that farm gate cereal prices will decrease by a about 17 percent at harvest 2019.

4.3 The Outlook for Tillage Enterprise Margin in 2019

Direct costs are forecast to be slightly higher in 2019 relative to 2018, due to the forecast increase in fertiliser expenditure, seed costs and crop protection in 2019. Whilst all other direct costs of production (machinery hire and other direct costs) are forecast to remain the same, overall direct costs should be higher than 2018 levels. Furthermore, output value on average is forecast to be lower in 2019 for most crops due to the forecast reduction in cereal and straw price at harvest 2019, which are not compensated by the assumed increase in yields, when 3 year trend yields are assumed. Figure 16 presents the actual gross margin for each of the main cereal crops in 2017, and the respective estimates and forecasts for 2018 and 2019.

The net effect of input price, output price and volume movements is forecast to have a broadly negative effect on gross margins for 2019, with most margins forecast to revert to levels similar to 2017. For example, gross margins for winter wheat are forecast to decrease by over €400 per hectare, while gross margins for spring barley are forecast to decrease by over €100 per hectare and winter barley are forecast to decrease by over €500 hectare. The overall story for the 2019 forecast is for a decline in gross margins as a reversion to average yields will not be enough to compensate for a decline in output price, straw price and an increase in direct costs.

Figure 16: Actual 2017, Estimate 2018 and Forecast 2019, for Cereal Crop Gross Margins



Source: Teagasc, National Farm Survey Data and Author's estimates for 2018 & forecast for 2019

Similar to the format used to present margins in 2017 and 2018 earlier in the paper, the forecast net margins for 2019, 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.

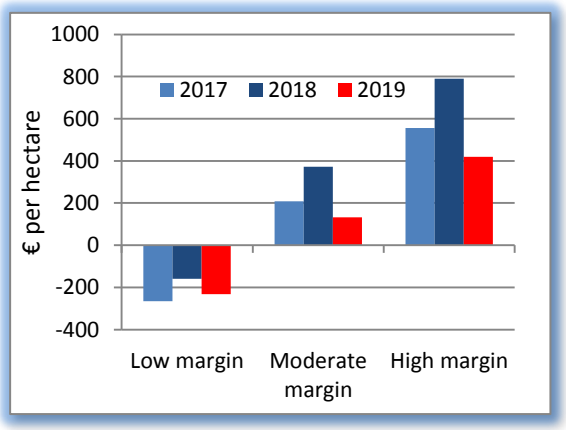
Figure 17 shows that the forecast net margins for the cereal enterprise in 2019 are lower than in 2018, and similar to 2017. The downward movement in margins is associated with the mainly negative set of assumptions for the components of gross margin, namely, cereal price, straw price and

direct costs, with the only positive for 2019 associated with yield forecasts.

With fuel related items forecast to remain static in 2019, the main overhead cost item forecast to increase again in 2019 is land rent. Given the increase in cereal prices and margins in 2018, it is likely that upwards pressure on land rent will be present for 2019. Hence, the narrative for net margin is broadly in line with the gross margin story presented earlier for 2019. Overall, the net margin for the average cereal enterprise in 2019 is forecast to decrease by about €250 per hectare relative to 2018.

This leaves net margins for the cereal enterprise significantly less than the dairy enterprise and on a par with beef and sheep margins.

Figure 17: Net Margin Actual 2017, Estimate 2018 and Forecast 2019 for the Cereal Enterprise on Specialist Tillage Farms



Source: Teagasc, National Farm Survey Data and Author's estimates for 2018 & forecast for 2019

5. Concluding Comments

The 2017/2018 production year saw upward movement in cereal gross and net margins for the main cereal crops. With a significant decrease in cereal yields and increase in cereal prices, significant straw price increases and only a slight increase in some overhead cost items, there was upward movement in the majority of gross and net margins in 2018. Spring barley gross margin decreased slightly by approximately €30 per hectare due to disappointing yields associated with drought conditions, whilst winter barley gross margins increased by approx. €600 per hectare, while winter wheat increased by approximately €400 per hectare. The highest estimated gross margin of all tillage crops in 2018 was winter wheat.

The forecast for net margins on tillage farms in 2019 is for a decrease in margins, with a forecast 18 percent decrease in cereal prices in 2019, a return to trend yields and a slight increase in direct costs. The overall picture for cereal crops is that in general margins will be very tight in 2019, with any upward movement in margins forecast for 2019 not sufficient to return positive net margins on approximately one third of all specialist tillage farms in 2019.

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Acknowledgements

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Table A1: Production Costs, Output and Gross Margin for Major Cereal Crops in 2017 (€/ha)

	S barley	W wheat	W barley	M barley	W oats	S oats	P beans
Gross Output	1,256	1,891	1,575	1,495	1,551	1,147	1,198
Fertiliser	208	260	267	237	228	171	125
Seeds	84	88	93	95	82	89	146
Crop Protection	175	266	264	150	236	131	163
Hired Machinery	160	132	168	174	118	143	95
Other Direct Costs	14	5	6	24	13	5	1
Total Direct Costs	640	750	798	679	678	539	531
Gross Margin	615	1141	777	816	873	608	667

Source: Teagasc National Farm Survey Data (2017)

Table A2: Variation in output and margin 2017: top and bottom performing cereal farms*

	Bottom	Top	% Diff.
Average crop area (hectares)	18	21	18%
Yield (tonnes per hectare)	6.3	7.6	20%
Price per tonne	150	152	1%
Gross output (€ per hectare)	1,087	1,345	24%
Fert., seed, spray (€ per hectare)	533	472	-11%
Machinery hire (€ per hectare)	178	90	-50%
Other direct costs (€ per hectare)	29	9	-67%
Gross Margin (€ per hectare)	347	771	122%
Fixed Costs (€ per hectare)	435	440	1%
Total Costs (€ per hectare)	1,175	1,015	-14%
Net Margin (€ per hectare)	-89	330	373%

Source: National Farm Survey Data (2017)

**Excluding farms with less than 10 hectares*

Table A3: Changes in arable crop areas in the EU28

	18/19M Ha	19/20M Ha	% Change
Soft wheat	22.92	24.26	+6%
Maize	8.41	8.47	+4%
Barley	12.37	12.33	~
Total wheat, barley, maize area	43.7	45.06	+3%

Source: Strategie Grains (November 2018)

Irish Pig Sector in 2017

Sow population
153,000 head
up 3% on the 2016 level

Live Pig Exports
433,000 head
up 6.9% on the 2016 level

Pig Slaughter
3.68 million head
up 1.5% on the 2016 level

Feed Prices
€288 per tonne
down 1% on the 2016 level

Pig prices
€1.62 per kg
up 8.7% on the 2016 level

Margin over feed cost
59 cent per kg
up 37% on the 2016 level

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

Irish Pig Sector in 2018

Sow Population
147,000 head
down 4% on the 2017 level

Pig Slaughter
3.8 million head
up 3.2% on the 2017 level

Live Pig Exports
463,000 head
up 6.9% on the 2017 level

Pig prices
€1.40 per kg
down 13.6% on the 2017 level

Feed Prices
€303 per tonne
up 5.2% on the 2017 level

Margin over Feed Costs
33 cent per kg
down 44% on the 2017 level

Irish Pig Sector in 2019

Sow Population
147,000 head
unchanged on the 2018 level

Pig Slaughter
3.88 million head
up 2% on the 2018 level

Live Pig Exports
463,000 head
unchanged on the 2018 level

Pig Prices
€1.51 per kg
up 7.8% on the 2018 level

Feed Prices
€313 per tonne
up 3.3% on the 2018 level

Margin over Feed Costs
40 cent per kg
up 21.2% on the 2018 level

Source: Teagasc Pig Development Unit Estimates for 2018 and Forecasts for 2019

Review of Pig Sector in 2018 and Outlook for 2019

Michael McKeon

Pig Development Department, Teagasc

1. Introduction

In the two year period 2016-2017 the Irish pig industry experienced higher than average profitability. This was due to low/stable feed prices and high pigmeat prices in the sector. In the last twelve months a cooling of the Chinese export market has reduced pig prices and a drought across Europe has increased feed costs. This has resulted in the November 2018 margin-over-feed (MOF) being estimated at 27c/kg which has only been equalled in 1998, when a major fire in a slaughter plant limited national pig slaughter capacity.

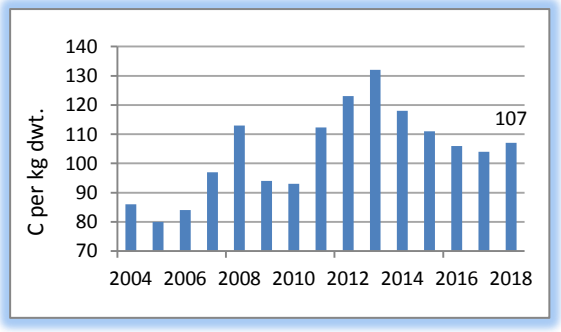
2. Irish Pig Production Costs 2018

The cost of producing pigmeat in Ireland can be broken into feed cost and non-feed costs. Feed currently constitutes 70 percent of the total cost of producing a pig, with the non-feed inputs contributing the remaining 30 percent.

2.1 Irish Pig Feed Costs 2017

Annual Irish composite pig feed prices are shown in Figure 1, expressed in terms of the cost per kg deadweight (dwt.). Feed prices were largely stable from January to May 2018 with a composite pig feed price of €291. The summer drought in Ireland and across Europe then began to increase feed ingredient prices. The current composite feed price is €318 per tonne (November 2018) and the 2018 annualised composite feed price per tonne is estimated to be €303, a 5 percent increase when compared to 2017 (€288).

Figure 1: Irish pig feed cost 2002-2018



Source: Teagasc Pig Development Department

When the composite feed price is examined over a longer time period the 2018 price of €303 is marginally higher than the 5 year average (2014-2018) and 10 year average (2009-2018), €300 and €299 respectively.

The annualised feed cost of 107 cent per kg dead weight is similar to the five year average of 109c/kg. The highest feed cost in recent years was in 2012 at 132c/kg which is 19 percent higher than in 2018.

2.2 Non-feed costs in Irish Pig Production in 2018

There are currently 80,000 sows on the Teagasc ePM database from a national herd of an estimated 147,000 (54 percent of total). The non-feed costs quoted are based on the national 2017 ePM data, which are the most recent analysis of annualised costs available. Non-feed costs (excluding building depreciation and financial costs) are itemised in Table 1.

Table 1: Non-Feed Costs in ePM Recorded Herds

Cost Item	2017	2013-2017
	cent per kg dwt.	
Healthcare	6.3	6.3
Heat, Power Light	4.2	4.2
Transport	1.3	1.2
AI	1.9	1.8
Manure	1.7	1.6
Labour/Management	14.4	13.4
Repairs	3.0	2.6
Phone/Office	0.9	0.8
Environment	0.5	0.5
Insurance	1.0	0.9
House rental	2.5	1.7
Contract Costs	2.4	1.9
Water	0.5	0.5
Dead Pigs Disposal	0.8	0.8
Stock Depreciation	1.8	1.8
Miscellaneous	1.2	1.2
Total	**44.4**	**41.0**

Source: Teagasc ePM Report 2017

2.3 Financial Costs in Irish Pig Production in 2018

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 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 in recent years due to the low profitability of the industry.

Table 2: Financial Costs in ePM recorded herds

Cost Item	2017	2013-2017
	cent per kg dwt.	
Interest	1.4	1.6
Building Depreciation	4.3	4.3
Total	5.7	5.9

Source: Teagasc Pigsys Report 2017

2.4 Total Cost of Irish Pig Production in 2018

The estimated annualised cost of production in 2018 (based on 2017 non-feed costs and 2018 feed costs) was 157.1 cent per kilogram dwt. for pigs delivered to the slaughter plant.

3. Irish Pig Prices in 2018

The estimated average pig price in 2018 was 140 cent per kg dwt., which was significantly lower than the five year average (2014-2018) of 153 cent per kg dwt. respectively.

The annualised 2018 pig price was a substantial 22 cent/kg dwt. (14 percent) lower than in 2017 (162c/kg). The monthly pig price fell rapidly from 160c/kg in November 2017 to 141c/kg (January 2018) and continued on this low plateaux for the reminder of the year.

The EU pig price in 2016 was moderately good due to the Chinese sow herd reducing by 12 million in the preceding years. In the first part of 2017 the price rise continued until it reached a peak in July 2017. From July 2017 to January 2018 the EU pig price decreased due to three factors; reduced Chinese pigmeat import volumes, increased US competition due to reduced use of the growth promoter "Paylean" and the strengthening of the euro exchange rate reducing Irish competiveness.

Table 3: Monthly Irish Pig Price in 2018

Month	Pig Price
	Cent per kg dwt.
January	141
February	141
March	142
April	142
May	142
June	141
July	141
August	138
September	138
October	140
November*	141
December*	138
Average	**140**

Source: Teagasc Pig Development Department * Estimate / Forecast

4. Profitability of Irish Pig Production in 2018

The margin over feed cost was 33 c/kg per kg dwt. in 2018, the lowest since 1998 and a 44 percent decrease over 2017.

Table 4: Average Margin over Feed Costs from Compound Feed from 2009-2018

Year	Pig Price (Net)	Feed Cost	Margin over Feed
	Cent per kg dwt.		
2010	140	93	47
2011	151	112	39
2012	166	123	43
2013	176	132	44
2014	167	118	49
2015	148	111	37
2016	149	106	43
2017	162	104	58
2018*	140	107	33

Source: Teagasc Pig Development Department *Estimate

When the 2018 margin over feed (MOF) is compared to the average margin over feed of the last five, ten, fifteen, and twenty years (see Table

5) the difficult trading conditions and low profitability of recent years becomes clear.

If an average MOF of 50 cent per kg is the requirement to meet all production costs including financial repayments then the 58 c/kg achieved in 2017, exceeded this target for the first time in 5 years. Unfortunately however this financial buoyancy has now being cancelled by a substantial financial loss 2018. The profitability in 2017 was used to reduce the length of feed credit and other short term liabilities but it required a further 12 months of sustained profitability to achieve significant reductions in these liabilities. Unfortunately this financial progress has now stalled.

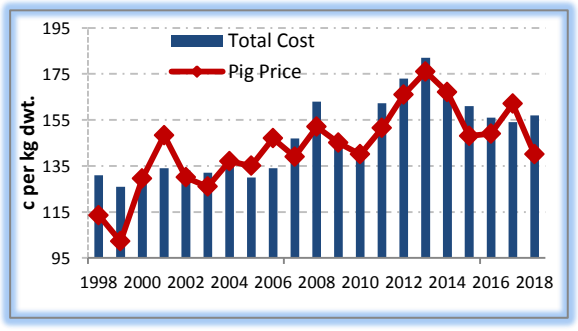
Table 5: Margin Over Feed in 2018 compared to the 5, 10, 15, and 20 year average

	Margin Over Feed	% Diff.
	cent per kg/dwt.	
2018*	33	-
5 Yr average	44.0	-25
10 Yr average	45.0	-27
15 Yr average	46.0	-28
20 Yr average	46.2	-28

Source: Teagasc Pig Development Department *Estimate

Figure 2 illustrates the pig price received when compared to the total production cost (feed plus 50 cent) since 1997.

Figure 2: Pig Price compared to estimated Total Production Cost



Source: Teagasc Pig Development Department
2018 is an estimated value

5. Irish Pig and Sow numbers in 2018

The estimated number of pigs slaughtered is illustrated in Table 6. The number of Irish pig disposals in 2018 is estimated to be 3.8 million pigs which is substantially higher than in 2017, and continues the upward trend of the last few years (+36 percent in 10 years). This is a reflection of the increased number of pigs born alive in the national herd and the improved national herd health.

Table 6: Irish born pigs slaughtered: 2014-2018

Year	2014	2015	2017	2018
	million head			
Slaughter Pigs	3.65	3.63	3.68	3.80*

Source: Teagasc Pig Department *estimate

Table 7: Slaughter and Live Export to N. Ireland of Irish Born Pigs from 2009-2018

Year	Licensed Export Plants in Ireland	Exports to Northern Ireland	Exports as % of Total
	million head		%
2009	2.363	0.482	17%
2010	2.601	0.558	18%
2011	2.847	0.610	18%
2012	2.907	0.612	17%
2013	2.829	0.570	20%
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%

Source: DAFM & DARDNI *estimate

The export of Irish born pigs to Northern Ireland (NI) has stabilised since 2017, but at a lower level than in recent years. In 2018 the annual number of pigs exported to NI has decreased by an estimated 150,000 pigs compared with 2012.

The trend of falling European pig slaughter disposals in 2016 and 2017 was reversed during 2018 as illustrated in Table 8.

Table 8: European & N. American Pig Disposals

	2017*	2018*	Change
Country	Million head		%
Germany	42.7	41.7	-2.3%
Spain	32.9	34.6	4.9%
France	15.6	16.1	2.8%
Denmark	13.9	14.4	4.0%
Netherlands	12.4	12.9	4.5%
UK	7.7	7.9	3.2%
Total	**125.2**	**127.6**	**1.9%**
U.S.	101.2	103.5	2.3%
Canada	17.1	16.9	-0.9%

*Based on 44 weeks of production
Source: MPB 2018

6. EU Pigmeat Exports & Imports in 2018

The export of pigmeat products from the EU decreased in 2017 by 11 percent (Jan-Aug) but this was in response to a previously unsustainable increase in 2016 of 33 percent. During 2018 the EU export volume stabilised at this lower level. The reduced level is due to reduced Chinese imports volumes and increased competition in to the Chinese market.

Table 9: Pigmeat exports from selected countries

Country	2017	2018*	change
	million tonnes		%
EU	2.54	2.56	1.0
USA	1.61	1.63	1.5
Canada	0.86	0.83	-2.8
Brazil	0.45	0.40	-12.5
Total	5.46	5.42	-0.7

Source: MDP * Jan-Aug 18

7. Outlook for the Irish Pig Market in 2019

The outlook for the pig market is a reflection of global pig feed and pig price trends.

7.1 Irish Pig Feed Price Outlook in 2018

The estimated composite compound pig feed price in December 2018 is €318 per tonne. The drought conditions across Europe and the Black Sea region in summer 2018 resulted in a tight local supply of wheat and barley across Europe. The global supply has being further restricted due to the Australian government's forecasted low wheat harvest of 16.5MT, which is a significant reduction on their recent harvests of 24-26 MT and the lowest potential export volume (11Mt) since 2007. One bright note is the continued high stock to use ratios for wheat and maize of 28 percent and 25 percent respectively. This should prevent further feed ingredient price escalation provided the harvest 2019 is normal (5 year average).

The South American soyabean planting is currently being completed with Brazilian production quantities of 118 million tonnes forecast, which would be setting a new Brazilian harvest record. The soyabean outlook is more complicated than usual due to the trade war between China and the US. China had traditionally sourced the bulk of its soyabean from the US, but due to the trade tariffs being imposed by both parties they are now sourcing more from Brazil. It is expected that they will import 84MT of Brazilian soyabean in 2019, an increase of 15MT (22 percent). This may create difficulties for the EU as they source a significant amount of soybean from Brazil as they usually use an older GM licensed soyabean – some of the newer GM varieties may not yet be licensed for use in EU.

The market reports that there is a significant amount of U.S. soybean in storage awaiting a breakthrough in the trade war. This will have to be released onto the market soon which could cause downward pressure on the international soyabean price.

The 2019 feed price forecast is for the compound feed price to remain high in the first and second quarter with upward price pressure on grain ingredients. The harvest 2019 grain price is expected to fall 5 percent when compared to harvest 2018, with the annual pig feed compound price for 2019 marginally higher than 2018 (€313 vs. €303).
This would equate to a feed price of 111 cent per kg dwt.

7.1.1 Profit Margin in 2019

The national sow herds in the principal EU pig producing countries increased in 2017 by 1 percent and this is demonstrated by the increased pig slaughterings in 2018 (+2 percent). However the June 2018 Danish census has shown no increase in sow numbers (1.25 million) for the first time since January 2017. Anecdotal evidence also suggests that the December 2018 EU sow census will show other countries' sow herds unchanged or even showing a slight decrease with the exception of Spain. The Spanish sow herd has being growing rapidly over the last 5 years and this growth is expected to continue, albeit at a lower rate. It is expected therefore that the volume of pigmeat on the EU market will stabilise in 2019 with a slight reduction in supply in the last quarter.

African Swine Fever has being spreading in Eastern Europe and Russia over the last 5 years. In August 2018 it was discovered in China and in September 2018 there was an outbreak in wild boar in Belgium. The outbreak in Belgium has being confined but the disease continues to spread in China – with cases 74 at time of writing. The

Chinese authorities have indicated that they will have to take tough measures to curtail and eliminate the spread of this disease. This indicates that a significant pig culling program will take place in 2019 which will reduce local supply and require increased imports. If the current China –U.S. trade war continues then the source of this pigmeat will predominately come from the E.U. In 2016 when Chinese exports were high the Teagasc Pig Department estimated that this delivered an additional 15c/kg to the pig price in Ireland. If similar export volumes occur in 2019 the expected price lift would bring the sector back in to a profitable position.

Overall, the pig price will remain low in the first quarter but it will gradually rise through the year to give an annualised pig price of 151c/kg (+8 percent) for 2019.

8. Conclusion

After a very profitable year in 2017, with the one of the highest Margin Over Feed in the last decade, 2018 has since a dramatic drop in margins with the second lowest Margin Over Feed in nearly 30 years.

The forecast is for margins in 2019 to show a recovery based on the pig price rising slowly as the year progresses and the harvest 2019 reducing feed ingredient prices. The recovery however will be slow and while the last two quarters of 2019 will see a return to profitability, the annualised MOF is only expected to be 40c/kg dwt.

Situation and Outlook for Forestry 2019

Tom Houlihan

Forestry Specialist
Forestry Development Department,
Teagasc, Killarney, Co. Kerry

1. Introduction

Ireland's forests and woodlands contribute to the achievement of many rural development objectives and can continue to provide many future benefits. The latter include the provision of a sustainable secure source of income to forest owners, a valuable raw material for timber processing and energy, employment in rural areas and a range of recreational and ecosystem services including biodiversity, carbon and water quality (COFORD, 2018a). Much of the private forest resource is now coming into production and, if properly managed, can make a significant contribution to the local economies of rural communities throughout Ireland (DAFM, 2017).

During 2017, €93.6 million of capital expenditure was invested in forestry development, 93 percent of which went towards afforestation grants and premiums. An additional €5.88 million was spent on other support schemes for forestry, woodland reconstitution and development projects (DAFM, 2018a). Forest policy, as set out in *Forests, Products and People – Ireland's Forest Policy – A Renewed Vision* (Government of Ireland, 2014), is to increase Ireland's forest cover from the current 11 to 18 percent of the land area by 2046. This ambitious target must be achieved in a sustainable manner that provides the best economic, social and environmental returns to landowners, communities, and the country (COFORD, 2018a).

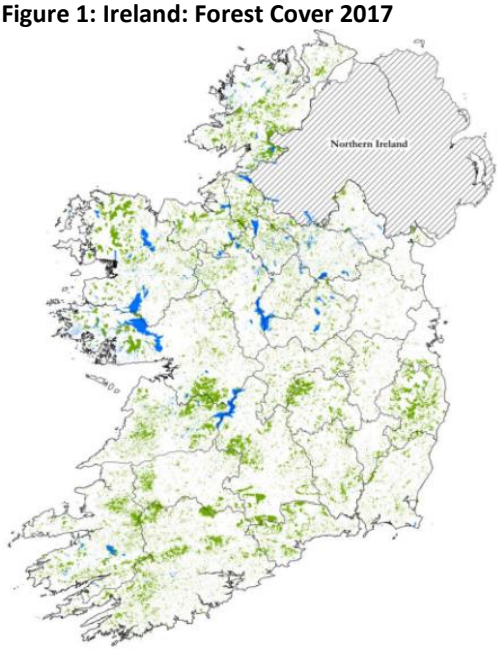
The on-going contribution of the forestry sector and its importance for the rural economy, sustainability and climate change mitigation was recently reflected in the Government allocation of €103 million for 2019.
2018 has been a year of both significant progress as well as on-going challenges within the sector. A co-ordinated and sustained effort will continue to be required to help achieve critical afforestation and timber mobilisation targets. Continued unhindered access to the UK market is also vital to the sustained expansion of the industry and the employment, exports and environmental returns that it creates (McAuley, 2018).

2. Third National Forest Inventory (NFI)

The third NFI records and assesses the nature and extent of Ireland's forests (DAFM, 2018b). It is based on a detailed periodic survey of permanent forest sample plots, using a randomised systematic grid sample design, based on a 2km x 2km density. Results of the third cycle of the NFI became available during 2018.

The total forest area increased from over 697,800 hectares in 2006 to over 770,000 hectares in 2017 (Figure 1). This increase in area is a result of afforestation and the inclusion of some pre-existing forests for the first time during this third NFI cycle. A total of 378,663 hectares of forests are in private ownership, representing 49.2 percent of the estate. The private share of the national forest estate has increased by over 6 percent since 2006, with almost 22,000 individual forest owners having established one or more grant aided forest since 1980 (DAFM, 2017). Farmers account for 83 percent of the private afforestation since 1980.

Figure 1: Ireland: Forest Cover 2017



Source DAFM (2018b)

Conifer species are the dominant species present, representing 71.2 percent of the stocked forest area while broadleaved species account for 28.8 percent of the area. The share of broadleaf species in the national forest estate has increased by 3 percent between 2013 and 2017 (DAFM, 2018b).

3: Mid-term Review

A midterm review (MTR) of measures introduced as part of the Forestry Programme (2014-2020) was undertaken in 2017. The aim was to compare targets against outturn, identify reasons where targets were not achieved and propose measures to help address barriers to achieving these targets. The MTR proposals are primarily aimed at enhancing the environmental benefits of forestry while at the same time addressing challenges in key target areas. These include the achievement of increased forest cover, species diversification and the commitment to meet a 30 percent annual planting target for broadleaves. This is a required to comply with European Union State Aid approval of the Forestry Programme.

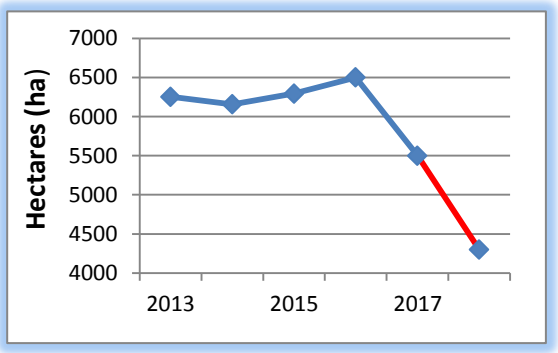
The resultant changes in the Forestry Programme have come into effect since February 2018. Significant changes include: increases in afforestation grants and premiums, particularly for broadleaves and diverse conifers, increases in the Agroforestry and Forestry for Fibre planting supports, the establishment of a 'Woodland Fund' to further incentivise native woodland establishment and the extension of the opening period and scheme allocations for the NeighbourWood Scheme. Other changes focused on providing support for the improved forest management and mobilisation of our forest resource. Further changes include the introduction of enhanced support for forest protection and also for forest roads, a second thinning grant for broadleaves, a new continuous cover pilot initiative as well as a national scheme for forestry Knowledge Transfer Groups to stimulate timber mobilisation.

3. Planting in 2017/2018

3.1 Planting levels

The achievement of sustainable planting targets continues to be critical to the goals of the Forestry Programme in Ireland, with knock-on implications across the sector from nursery production through to timber processing. In 2017 5,536 hectares of land were planted which was down from a level of 6,500 hectares in 2016. Current year-to-date figures (to October 2018) indicate that grant aided afforestation is below the equivalent level for 2017 and projected at between 4,000 and 4,500 hectares for year-end, 2018 (Figure 2). The delivery of a sustainable increase in afforestation levels for 2019 and future years continues to be a key challenge.

Figure 2: Annual planting 2013 to 2017, with projection for 2018



Source: DAFM/Forest Service, various years

Recent research by Teagasc shows that significant gains from planting may be generated on land classified as limited or very limited for agricultural use (Ryan et al., 2016) and the current average plantation size of 6.4 hectares indicates that farmers are planting part but not all of their holdings.

There are clear opportunities for forests as a complementary enterprise on farms in all counties in Ireland, taking into account the necessary economic, environmental and social considerations. Balanced regional development and well planned forests and woodlands with suitably selected species can provide multiple benefits.

3.2 Deciding to plant

Current shortfalls in targeted planting levels may be associated with a complex range of factors according to the Forest Land Availability Implementation Group (FLAIG), established by the COFORD Council in May 2016. This followed on from the publication of '*Land Availability for Afforestation – Exploring opportunities for expanding Ireland's forest resource*' by COFORD in 2016.

Part of the remit of FLAIG was to identify and address, as far as possible, factors perceived as currently impacting (negatively and positively) on afforestation and overall confidence in the sector. Though not exhaustive, the following factors were identified (COFORD, 2018b):

- Agri-environment schemes which favour short-term decisions and depending on land parcel selection, may result in penalties for those wishing to move between schemes;
- Measures encouraging long-term land leasing for agriculture (although this may be desirable from a land mobility/agriculture expansion perspective);
- The appeals process and publicity around this process;
- Financial claw-backs on land already planted in certain cases;
- The requirement for forestry site notices
- Delays in scheme payment relating to forestry parcels in BPS;
- Ash die-back and recent storm events and publicity around these;
- CAP post-2020 and the publicised need to continue to 'farm actively';
- Current negative narrative in relation to certain types of afforestation;
- Current high timber prices.

The work of the FLAIG was to consider the impact of specific restrictions and, as appropriate, suggest how they could be removed or changed to enable additional landowners, where appropriate, to make the decision to plant (COFORD, 2018b). Outputs from the FLAIG report (2018) can provide a positive platform to stimulate afforestation uptake.

Farmers' attitudes towards forestry are strongly linked with land quality and possible alternative land uses (Ryan *et al.*, 2013). Ryan and O'Donoghue (2016) also show that soil type and the agricultural market income and subsidies prevailing in the year of planting all have an effect on the economic attractiveness of afforestation. The potential relative returns to agriculture and forestry was also found to be a significant driver of the afforestation decision in the study.

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 84,599 farms represented by the survey in 2017 (Dillon *et al*., 2018), 8,279 farms (over 9 percent) have forests, with an average ownership of 10.4 hectares per forest owner. Those farmers participating in the NFS will have forests spread over a range of age classes. An analysis, by NFS farm system, indicating the extent to which farms and farming systems include forests is shown in Table 1.

Howley *et al.* (2011) find that farmers involved in livestock production (cattle and sheep systems) are more likely to have a forest enterprise than those in dairy and tillage systems.

Table 1: Table 1: Forestry on Irish Farms

System	Farm Population	Population with forest (Number)	% with forest	Average forest area per farm (ha)
Dairy	15,639	1,215	8	8.2
Cattle Rearing	19,952	1,840	9	10.1
Cattle Other	27,025	2,770	10	10.5
Sheep	12,758	916	7	15
Tillage	7,387	1,130	15	9
Mixed Livestock	1,838	133	7	14.3
ALL	**84,599**	**8,003**	**9**	**10.4**

Source: Dillon et al. 2018

The 2017 Teagasc, NFS data indicate that the largest populations with forests are those with cattle systems (cattle rearing/cattle other). Farms with sheep enterprises contain the highest average forest area per farm, reflecting a relatively high average farm size in the survey (51 hectares). Despite the above trends, forestry is seen to have a significant representation in sectors such as dairy and tillage within the NFS (Table 1).

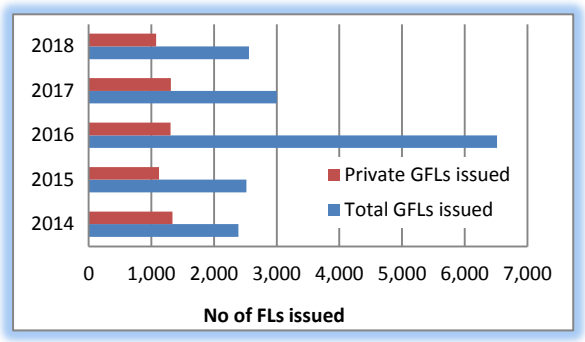
Teagasc, in conjunction with the DAFM, are actively engaged in awareness-raising of the benefits of well-planned and sustainable farm forestry up to 2020 and beyond. The on-going support and input of all stakeholders across the forest sector is a critical requirement to achieve desired impacts.

4. Timber Harvest and Processing

4.1 Timber Harvesting

The DAFM regulate and licence the felling of trees in Ireland. The Forestry Act 2014 requires applicants to provide notice of intention to fell trees and provides for a single licencing process for felling. Felling licences may be valid for up to 10 years duration; this may be extended by the DAFM for one or more further periods, as appropriate. The number of felling licences (FLs) issued annually may be indicative of the number of forest owners who are considering future harvesting in their forests. These figures are presented in Figure 3.

Figure 3: Felling Licences issued, 2013 to September, 2018



Source: DAFM/Forest Service reports (2013-2018)

A total of 2,557 felling licences were issued as of September 30, 2018 representing an area of 28,308 hectares. This comprised similar overall licenced felling areas for both Coillte and private forestry. Not all felling will occur in the year that felling licences issue. The total number of felling licences issued to September 30, 2018 is over 12 percent higher than the corresponding period in 2017 (DAFM, 2018), while the area (thinning and clearfell) represented is comparable. There was a large spike in Coillte felling applications in the October-December 2016 period, some of which is likely to have contributed to subsequent harvesting programmes.

Table 2 presents the forest areas with felling licences approvals for both thinning and clearfelling in privately-owned forests between 2011 and 2018.

Table 2: Area of felling licences issued for private forests, 2011-2018

Year	Thin (ha)	Clearfell (ha)	Total (ha)
2011	12,275	590	12,865
2012	13,037	467	13,504
2013	15,150	394	15,544
2014	15,742	3,447	19,189
2015	11,198	2,012	13,210
2016	16,549	1,348	17,897
2017 (to Sept)	11,799	1,232	13,013
2017	12,767	1,377	14,144
2018 (to Sept)	10,988	3,150	14,138

Source: DAFM, various years

The yearly areas issued with felling licences for thinning have been somewhat variable since 2014, the year when Storm Darwin occurred.

Based on recent trends and data to September 2018, it is anticipated that the licenced felling area for 2018 will surpass the equivalent area for 2017.

Of significant note is the area of private forestry licenced for clearfelling up to September 30, 2018. This area has increased by a factor of 2.55 since September of the previous year (Table 2). This significant increase reflects a number of factors. These include the maturing status of our forest resource, the high timber prices achieved during 2018 and the fact that forest owners can now apply for multiple harvest events on the same forest plot in a felling licence application, meaning that clearfelling may not be on the immediate horizon (DAFM, 2018, pers. comm.)

The DAFM Felling Decision Tool is a very useful support regarding the decision of when to clearfell, by providing financial information on the implication of felling earlier or later than the production and/or financial optimum.

4.2 Timber Processing

In 2017, 3.54 million cubic metres (m^3) of roundwood (including firewood) was harvested in the Republic of Ireland. This represents an increase of 5.6 percent over 2016 levels. It continues the trend of increased levels of harvesting in recent years, largely driven by an increase in the private roundwood harvest. The latter increased from 0.68 million m^3 in 2016, to almost 0.83 million m^3 in 2017 (DAFM & Drima Market Research, 2018). A substantial part of the increase can be attributed to the increasing crop maturity of the private forest resource. In 2017, 3.24 million m^3 of roundwood (firewood is excluded) was available for processing, a 4.3 percent increase on equivalent 2016 levels.

Interim figures for felling licences issued up to September 30, 2017 combined with feedback from industry suggest that that volume of private timber harvested will be above the equivalent level for 2018. The figure for 2019 is again expected to show growth, but is strongly dependent on continued buoyancy in UK markets and an increased concentration on timber mobilisation in private forests.

Table 3: Total roundwood in Ireland (2013- 2017)

Source	2013	2014	2015	2016	2017
	000 m^3overbark				
Coillte	2,588	2,517	2,470	2,377	2,714
Private	448	597	780	622	828
Total	3,036	3,114	3,250	3,355	3,542

Source: DAFM/Drima Market Research 2018

Over 90 percent of Irish sawmilling output is from eight companies, supplying the main markets for sawlog and stakewood assortments coming from Irish forests. In 2017, sawmill roundwood intake was 2.33 million m^3 which converted to 1.05 million m^3 of sawn timber and 0.14 million m^3 of round stakes. Overall, sawmill roundwood intake increased by 8.6 percent over 2016 levels, (Drima Market Research, 2018). Over 75 percent of the roundwood requirement of sawmills was provided by Coillte with the balance supplied by the private sector, with some imports. The production of wood residues (bark, wood chip, sawdust and post-consumer wood product) increased by over 10 percent to 1.42 million m^3 over the period 2016-2017. These provide the base for a range of uses, including panel board manufacture and as CHP/boiler fuel, residue exports and mulches.

In 2017, an estimated 0.836 million m^3 of wood based panels were produced in three major panel board mills from an input of 1.5 million m^3 of wood fibre, an increase of 8 percent on 2016 levels (DAFM & Drima Market Research, 2018).

5. Timber Markets 2017/2018

5.1 Sectoral Demand/Supply

The COFORD Wood Mobilisation and Production Forecasting Group (CWMPFG) has forecast the likely future demand and supply in terms of the main wood product in 2020 and 2025. Their forecast is that roundwood and wood residue demand for the sawmilling, wood based panels and wood energy sectors will all increase significantly over the period up to 2025. The rates of growth in demand for raw material are directly linked to the expected growth in product demand. (CWMFG, 2018)

Sawmilling Sector

The supply-demand position shows a continued shortfall in supply of roundwood to the sawmilling sector, reaching 0.46 million m^3 by 2020 in the Republic of Ireland and 0.76 million m^3 from an all -Ireland perspective. Supply and demand is predicted to be largely in balance by 2025 (COFORD, 2018). This is based on an estimated all-Ireland demand of 3.6 million m^3 and 4.12 million m^3 for 2020 and 2025 respectively.

Wood Based Panel (WBP) Sector

From 2020 to 2025, the estimated all-Ireland demand for wood by the WBP sector increases from 1.78 million m^3 to 1.92 million m^3. It is anticipated that wood demand for process use by the wood based panel (WBP) sector will be met in full by indigenous supply in the same period.

Wood Energy Sector

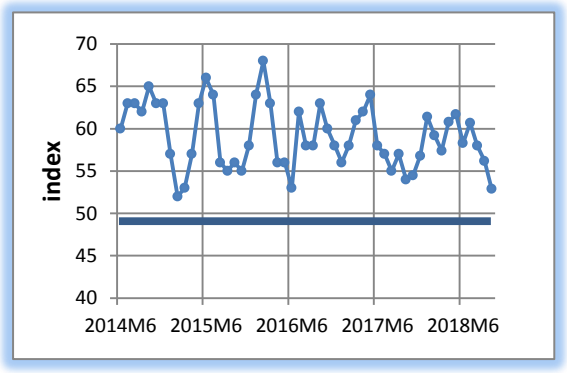
Under the conservative demand scenario presented for the island of Ireland, a substantial deficit of 2.8 million m^3 per and 3.0 million m^3 is predicted for 2020 and 2025 respectively. The optimistic scenario shows an estimated supply deficit of 2.73 million m^3 in 2020 which increases to 4.74 million m^3 in 2025 (CWMPFG, 2018). COFORD also suggest that while there may be scope to sustainably increase the harvest level over that forecast, it is also likely that part of the supply deficit will be met by wood imports.

5.2 Domestic Demand

In 2017, the output of the Irish construction industry was €16.9 billion, an increase of 12.4 percent over 2016 (DAFM & Drima Market Research, 2018). The continued buoyant demand in the domestic timber markets for the sawmilling sector is consistent with a prediction of Irish GDP growth forecast of 8.9 percent for 2018 and 4.5 percent in 2019 as outlined in the ESRI quarterly Economic Commentary (McQuinn *et al.*, 2018). The Ulster Bank Construction Purchasing Managers Index (PMI), measures activity in the construction sector. An index reading above 50.0 indicates that the economy is generally expanding. While the index slipped to 52.9 in October 2018 from 56.2 in the previous month, nonetheless, it has expanded for 62 successive months, with housing and commercial construction showing strong growth (Figure 4).

In 2017, an estimated 43 percent of the Irish market for sawn softwood timber was supplied by domestic production, with the balance being imported (DAFM & Drima Market Research, 2018).

Figure 4: Five-Year Construction PMI



Source: Ulster Bank, (index readings above 50 indicates expansion in the economy)

The demand for higher value construction timber has risen in recent years, with a very tangible pickup evident in investment within the construction sector. The Economic and Social Research Institute (McQuinn et *al*., 2018) estimates that the level of new residential completions for 2018 will be 18,550 units with this figure expected to increase to 24,500 units in 2019 (Table 5). Based on trends in household formation, there is likely to be an increase in demand for housing to over 30,000 per annum by 2024 (Bergin *et al*, 2016).

Table 5: Actual & forecast house completions in Ireland from 2012 to 2018 (forecast (f))

Year	House completions*	Growth rate 1990 = 100
2012	8,488	43.44
2013	8,301	42.48
2014	11,016	56.38
2015	12,666	64.84
2016	14,932	76.43
2017	14,446	73.93
2018f	18,550	97.24
2019f	24,500	107.40

Sources: CSO and ESRI Quarterly Economic Commentary, autumn 2018 (f= forecast)

Table 5 presents data for housing completions in Ireland since 2012. A very tangible pickup can be seen in the Irish construction sector during recent reporting periods. In 2018 Q3, there were 4,673 new dwelling completions, compared with 3,786 completions in the same period last year, an increase of 23.4 percent. This brings the total number of new dwellings completed in 2018 to 12,582, an increase of 27.7 percent over 2017 when 9,856 dwellings were completed in the first three quarters of that year (CSO, 2018).

The primary data source used for the New Dwellings Completions series is the ESB Networks new domestic connections dataset where the date that the connection is energised determines the date of completion. It is accepted that the ESB domestic connections dataset is overestimating new dwellings and the CSO has adjusted for this potential over-count by using additional information from ESB and other data sources.

Energy Generation

Last year, approximately 42 percent of the available roundwood in the Ireland was used for energy generation, mainly within the forest products sector. Also in 2017, the output of the forest-based biomass energy sector grew by 12 percent over 2016 levels. The use of wood biomass energy in Ireland results in greenhouse gas (GHG) emission savings from the displacement of fossil fuels, resulting in savings of over 0.99 million tonnes of carbon dioxide (CO_2). This was an increase of almost 30 percent on 2016 levels (DAFM & Drima Market Research, 2018).

Overall, 239,000 m^3 of firewood, valued at €35 million, was used in Ireland in 2017, providing a steady and growing outlet for some first thinnings. A small proportion of the supply, 4,000 m^3 was imported. Forest owners also harvest firewood for their domestic usage. This is not accounted for in current figures. The 2017 estimates (Table 6) represent over 61 percent increase in firewood consumption since the 2006 figure recorded by Central Statistics Office (CSO) Household Budget Survey.

Table 6: Volume and value of domestic firewood market in Ireland 2012-2017

Year	2012	2013	2014	2015	2016	2017
'000 m^3	225	230	235	237	237	239
€ mill	32.6	33.3	34.0	34.3	34.3	34.6

Source: UNECE Report 2018. DAFM/Drima Market Research

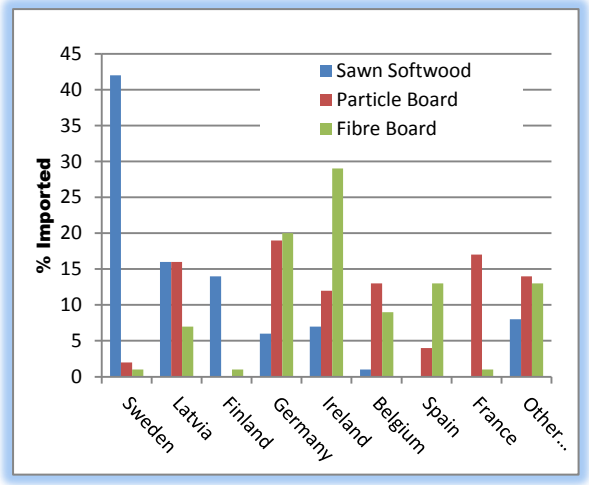
5.3 Export Markets

The UK was the world's second largest net importer of forest products in 2016, behind China (Forestry Commission 2018). The United Kingdom (UK) is also by far the largest single importer in the EU and is the key market for Irish timber products. In 2017 for example, UK domestic production accounted for 33 percent of the UK sawnwood market. In the same year, 7.8 million m^3 of sawnwood was imported to the UK. This was a 16 percent increase from 2016 and was valued at

UK£1.63 billion. Imports of wood based panels (WBP) into the UK increased by just 1 percent during 2017 (DAFM and Drima Market Research, 2018). Apparent consumption (timber used as wood and wood products by people and industries) was calculated at 57 million m^3 of wood raw material equivalent underbark, representing a one percent increase in the previous year (Forestry Commission, 2018).

In 2017, Irish exports of wood products reached €423 million, an 11.3 percent increase on 2016 levels. Wood-based panels accounted for €224 million, with the balance comprising sawn timber (€129m) and paper product exports (DAFM & Drima Market Research, 2018). The UK is the main market outlet for almost all Irish exported sawn products and a high proportion of Ireland's panel board products. The most recent Forestry Commission figures for 2017 show that Ireland supplied 7 percent of the UK sawn products market (involving over 80 percent of Irish sawmill output) while Sweden (42 percent), Latvia (16 percent) and Finland (14 percent) provided the majority of sawn softwood to the UK (Figure 5).

Figure 5: Country of origin of wood imports (percent) to the UK, 2017



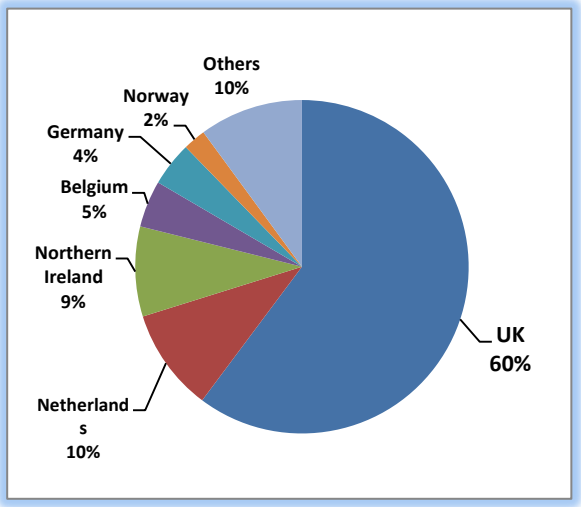
Source: Forestry Commission, 2018

A total of 3.44 million m^3 of wood-based panel products, including particleboard & fibreboard, valued at £1.08 billion were imported into the UK in 2017, a slight increase on 2016 levels. A total of 99 percent of particleboard imports to the UK in 2017 came from within the EU; mainly Germany (19 percent), France (17 percent), Belgium (13 percent) and Ireland (12 percent). The EU also supplied the majority of fibreboard imports to the UK market. Ireland retained its leading supplier role at 29 percent, followed by Germany (20 percent) and Spain (13 percent) in 2017 (Forestry Commission, 2018). Key export markets for Irish panel wood products are indicated in Figure 6.

Brexit and the UK Timber Market

The UK timber products market is subject to cyclical prices, reflecting growth rates in the UK economy.

Figure 6: Key export markets for panel products manufactured in Ireland (2011-2016)



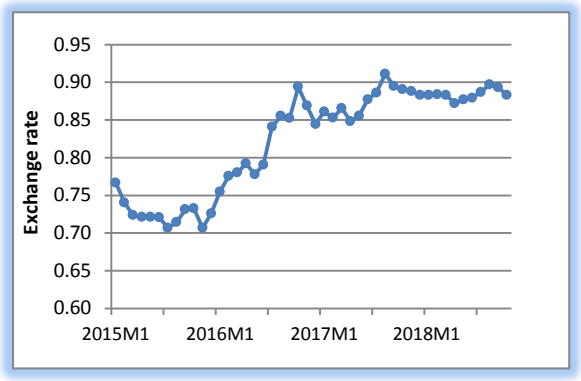
Source: Central Statistics Office, www.cso.ie

The existing and potential supply of timber products from third countries is also a significant factor which comes into play.

Since the Brexit decision, the most acute impacts relate to adverse currency movements which are on-going. Figure 7 presents the euro-sterling (€/£) relationship between January 2015 and November 2018. The lowest recent value for sterling against the euro was reached on 29th August 2017 (93 pence) when the value of products sold into the UK had fallen by over 24 percent. Sterling exchange values have remained relatively challenging since then (Figure 7.) Currency related shocks in UK end markets and consequent reductions in end-market prices can flow upstream through the supply chain to growers and contractors. The effect on timber prices will be analysed in section 6.

With almost 80 percent of Irish timber production destined for the UK, the Irish forestry and timber sector remains extremely concerned about the future trading relationship with the UK. It is the foremost market for Irish timber and, given the buoyant status of that market, it remains the best place to sell our timber.

Figure 7: Euro- Sterling Exchange Rate Jan 2015 to Oct 2018



Source: European Central Bank, 2018

Over the period 2007-2017, Ireland's share of the UK sawn softwood timber market has grown by more than 50 percent, from 3.3 percent in 2007 to 7.0 percent in 2017. The volume of timber movements is very large with 40,000 truck movements every year. The UK market is largely supplied from Ireland on a 'just in time' basis, meaning swift and uninterrupted movement North-South and East-West is essential. Future customs and plant health regimes must be capable of supporting such rapid movement (McAuley, 2018).

Exports to the UK are important for all components of our timber trade including sawn timber, panel products, pallet, fencing and other products. Ireland also imports round wood from the UK and it is important that this supply continues. A number of companies have made investments in the UK to mitigate Brexit risks and improve market penetration.

The Irish forestry and timber sector has been engaged in a comprehensive engagement on Brexit. This has included two major visits of delegations to Brussels to meet with the European Commission's Taskforce 50 which is handling the Brexit process for the EU side. The industry also travelled to London to meet with the UK industry and senior political figures. All sides are aware that a coordinated approach will be essential to managing Brexit and the industry has met with a positive response from both the EU and UK (McAuley, 2018). Support continues to be provided to the sector through Enterprise Ireland. It is essential that the Irish forest sector maintains high quality, unhindered access to its most important market.

From a positive viewpoint, Ireland is well positioned geographically to capitalise on existing and future market opportunities in the UK, which imported sawn wood products to the value of UK£1.62 billion in 2017 (Forestry Commission, 2018). While there may be early signals of a slowdown, there has been growth in the UK construction market over the last 2 years. Exchange rate impacts have also been offset by significant volume demand and strong growth in the Irish construction sector.

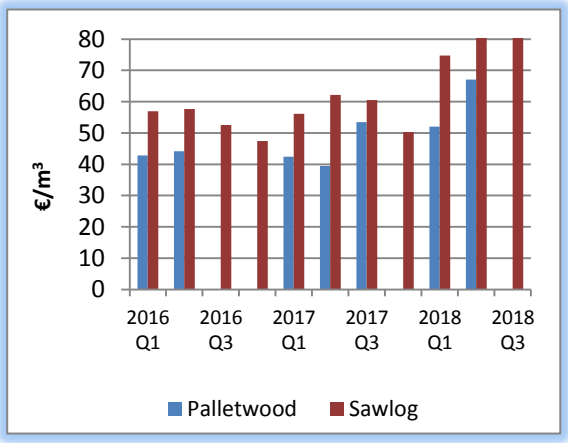
6. Timber prices

6.1 Coillte Timber prices

Coillte remains the dominant supplier of logs to the Irish processing sector. It sells timber through both its timber sales electronic auctioning system as well as contract sales. The standing timber price is the price paid to the forest owner by the buyer of the timber standing in the forest. The buyer then incurs the costs of harvesting and extraction.

Figure 8 presents Coillte quarterly contracted standing sales (€/m^3) for selected average size categories between Quarter 1 (Q1) 2016 and Q3 2018. Timber prices are recorded in terms of 16 categories of average tree size (volume). For simplicity of analysis, palletwood and sawlog timber assortments are represented by the 0.225 to 0.274 m^3 and 0.500 to 0.599 m^3 average size categories respectively.

Figure 8: Coillte Quarterly Contracted Standing Sales: Q1 2016 to Q3 2018



Source: www.itga.ie, www.teagasc.ie

Sales of smaller logs (pulpwood and energy wood) are not represented in Coillte data as such logs are generally retained in the company's own Medite Smartply panel board mills in Clonmel and Waterford.

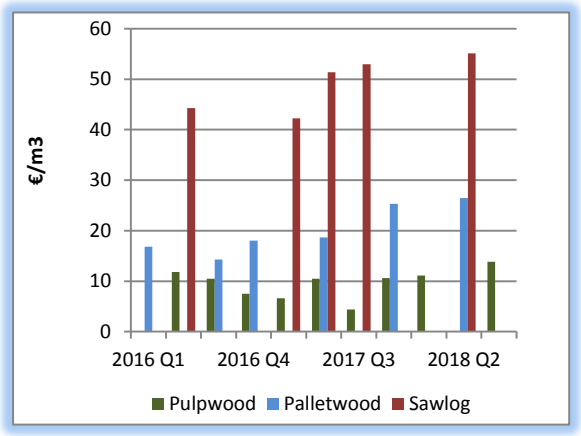
Timber prices showed a very positive trend during the first half of 2018 with significant increases in both medium and larger log sizes (Figure 8). This trend has largely been continued into Q3 2018. It reflects an increased demand from the timber processing sector. Despite the significant threat of Brexit and on-going currency exchange issues demand from both domestic and export markets remained buoyant which is very welcome for the industry. Magner (2018) reported record prices achieved for Coillte standing timber during the period April to June 2018, with all log categories greater than 0.324m^3 receiving an average of €81.00 /m^3 compared with €55.00 in 2017.

6.2 Private timber prices

Prices from private timber sales are available for each quarter through the Wood Price Quarterly (WPQ) collated by University College Dublin in conjunction with the Irish Timber Growers Association (ITGA). While the availability of private timber sale data has improved with the introduction of the WPQ, the larger volume of Coillte sales makes their prices more robust than current private sales data. Coillte prices generally represent larger sale lots than the private sector.

Figure 9 presents quarterly private standing prices (€/m^3) for selected average size categories between quarter 1, 2016 and quarter 2, 2018.

Figure 9: Private Quarterly Roundwood prices: Q1 2016 to Q2 2018



Source: www.itga.ie

This price data is based on a smaller sample, it includes some pulpwood prices (represented here by average tree size category up to 0.074 m^3) from the private sector which are absent from the Coillte price date. While it is more difficult to analyse price trends due to missing data in some assortment categories a recent increase (2018 Q2) in prices is evident, particularly for the palletwood and sawlog assortments. This also reflects the situation encountered during recent engagement with private forest owners. On this basis, the current price trends mirror the equivalent pattern for Coillte prices.

Private forest prices are indicative and can fluctuate according to factors such as region, forest type, harvest type, timber quality, woodlot size and access in the prices offered for private timber sales. The Irish Farmer's Association Farm Forestry Timber Price survey (July-September, 2018) also indicates improvements in price for palletwood categories particularly for palletwood and sawlog within the ranges provided (Table 7) since the previous survey in for March/April 2018. It should be noted that price ranges provided are indicative rather than absolute, are expressed as roadside sales and also in €/tonne.

Table 7: IFA Farm Forestry Timber Price Surveys March-April and July -Sept. 2018

Product	**Length** (m)	**Diameter** (cm)	**Roadside Price March-April 2018** (€/tonne) (Ex VAT)	**Roadside Price July-Sept 2018** (€/tonne) (Ex VAT)
Pulp	3	< 7	25-30	25-34
Stake	1.6	>8 <15	40-46	40-46
Pallet	2.5	14+	40-46	40-52
	3.1	14+	42-50	48-60
	3.4	14+	50-55	56-60
	3.7	14+	48-66	56-64
Sawlog	4.9	20+	68-84	72-86
	5.5	20+	86	80-90

Source: IFA Farm Forest Timber Price Surveys 2018, Note: Prices are roadside and expressed as €/tonne

The differential between Coillte and private sector prices may be attributed to a number of factors. A higher proportion of Coillte sawlog is sourced from clearfell operations compared with the private sector which produces more from thinning. Harvesting costs in thinnings are significantly greater than those in clearfell operations. In addition, private sales are generally advertised in smaller lots than in Coillte sales. The resultant costs of moving harvesting and forwarding machinery to a multiple of smaller sites impacts on overall prices. Opportunities now exist to develop economies of scale through forest owner co-operation and can have a double benefit of increasing woodlot size and reducing overall costs.

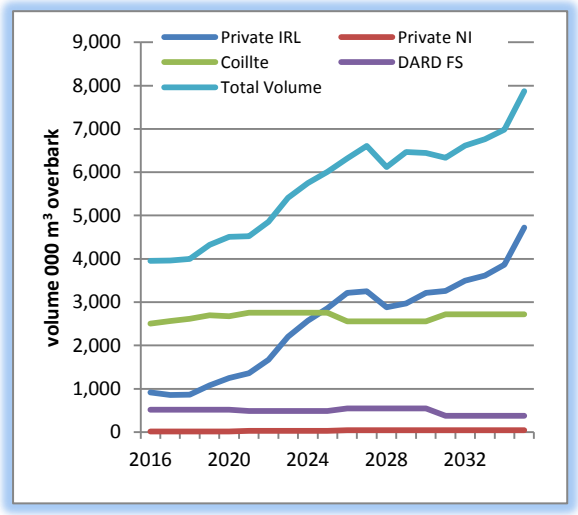
7. Factors influencing timber supply and demand

7.1 Long term Supply and Demand

During 2016, COFORD produced a timber supply forecast to 2035 for the entire island of Ireland, to include both private and public forests. The total net realisable volume (the estimated roundwood volume that will potentially be available to the end user) will increase from 3.95 million m^3 in 2016 to 7.86 million m^3 in 2035 (Phillips *et al.*, 2016). This significant increase in roundwood supply volumes is forecast to come almost exclusively from privately-owned forest in Ireland and primarily in the larger size assortments (Figure 10).

As can be seen from Figure 10, any real increase in the timber volume produced in Ireland to 2035 will necessitate the mobilisation of the private forest timber resource. In contrast, the Coillte Roundwood Supply Forecast 2011- 2025 projected an increase in the thinning volume and a decrease in the clearfell area and volume in the period 2021- 2025 for the Coillte timber resource (Coillte, 2011).

Figure 10: Forecast of Total Net Realisable Volume Production to 2035



Source: All-Ireland Roundwood Production Forecast 2016-2035 (COFORD, 2016)

Growth in the UK's construction sector next year has been downgraded amid signs that Brexit uncertainty and on-going delays in the delivery of major infrastructure projects continue to impact on activity. The UK Construction Products Association (2018) anticipates growth will remain flat in 2018, and rise by only 0.6 percent in 2019, a downward revision from its previous estimate of 2.3 percent. Despite a weakened market, private housing continues to be a key sector of growth for the UK construction industry. The forecasted increase in domestic demand for Irish construction timber is likely to take some pressure off exports in the medium term.

7.2 Renewable Energy Market

The current driver for policy in renewable energy is the European Renewable Energy Directive (2009/28/EC) which sets out targets for 2020 on an EU basis. The target for Ireland is for renewable sources to account for 16 percent of gross final energy consumption. To this end, the Government has set targets of 12 percent heat and 40 percent electricity to come from renewable sources by 2020. Forestry has a significant role to play in supporting Ireland's approach to land-based climate change mitigation and its transition to a low carbon economy by reducing dependence on fossil fuels.

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 draft terms and conditions of the scheme were published during August 2018. The scheme will financially support the replacement of fossil fuel heating systems with renewable energy for non-domestic heat users in the non-emissions trading sector (DCCAE, 2018) and will include an operational support for biomass heating systems. The National Development Plan sets out an indicative allocation of €30 million for the rollout of the scheme for the period 2018-2027. The scheme is anticipated to commence operation following receipt of State Aid approval (DCCAE, 2018).

The scheme presents opportunities and can be the primary support mechanism in the heating sector designed to help meet Ireland's renewable obligations. However, while there is a growing supply of forest-based biomass to become available over the period to 2035, a key challenge in future years will be to develop and ensure a balanced approach to the development of the island'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 (CWMPFG, 2018) as outlined in section 5.1. It is essential that the most efficient use is made of domestic forest-based biomass, both from an emissions and heating perspective (DAFM and Drima Market Research, 2018). There is also significant potential in the rapidly developing bioeconomy.

8. Opportunities in the Bioeconomy

The bioeconomy concept has emerged as a response to the challenges of achieving food security, energy security, climate change and the depletion of non-renewable resources. The substitution of sustainably produced biomass for fossil resources facilitates decarbonisation and continued economic growth. A shift from fossil resources toward biomass also improves resilience and has strong potential for revitalising rural economies. The 2017 COFORD report, '*Growing the Irish Forest Bioeconomy*', brings forward 12 proposals for the development of a vibrant bioeconomy in Ireland. These include positioning forestry as a central pillar of Ireland's National Policy for the Bioeconomy, embedding the cascading use principle for wood resource management, developing an integrated carbon and land-use policy and ensuring a long-term, consistent and growing supply of roundwood to the processing industry.

Ireland's forests already make a significant contribution to the economy and society. However, due to our relatively low forest cover, the age structure of our forest estate and the emergence of new scientific and technological developments, there is potential to substantially increase this contribution in the years to come (COFORD, 2017). There is very significant potential to advance the sector through the use of new wood products and building systems, as well as through the rapidly emerging use of wood fibre across a range of innovative products and ecosystem services. All this can be achieved with a strong forest bioeconomy while decarbonising our economy now and into the future (DAFM, 2018 pers. comm.)

9. Certification

Forest certification is a voluntary process used by forest owners to reassure consumers that the wood and wood products they buy come from sustainably managed forests. Certification independently assesses forest management planning and practices against a sustainable forest management standard. Barriers to forest certification for private forest owners include the cost and complexity of achieving this accreditation (DAFM 2018a). Many thousands of hectares of private woodland are approaching the stage of first and subsequent thinnings, resulting in a sharp increase in supply of logs from this source in the near future. There is a limit of 30 percent of uncertified material that saw and panel mills can absorb and the supply of timber from private forests is now close to exceeding this figure (DAFM, 2018).

A forest certification initiative by DAFM has resulted in the establishment of two certification groups to help foster a national certification network. This initiative has also provided certification templates. Mechanisms for on-going progress and the need for growing membership of certification groups are being considered by DAFM, forest owners and other stakeholders.

Meeting certification standards involves a chain of custody recording and compliance with environmental and social principles. There will be a financial cost attached to 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 thereby providing a competitive advantage. It remains to be seen how the EU's Timber Regulation (EUTR) and Brexit will impact on certification schemes.

10. Forest Health

A number of serious diseases present a challenge to specific species within our national forest resource. The following updates on three fungal-based diseases exemplify such challenges.

Ash dieback

Ash dieback, *Hymenoscyphus fraxineus*, continues to develop across the island of Ireland. Our ash resource, particularly the first rotation woodlands, is quite unique and is at particular risk from Ash Dieback. As of April 2018, over 560 plantations had been confirmed with the disease. These were in addition to non-forestry findings.

Based on updated scientific advice on the prevalence of the Ash Dieback, DAFM carried out an appraisal of the national response to Ash Dieback during 2018. This included a review of the policy response to the disease, the relevant support schemes and the all-Ireland Control Strategy (2013). A resultant DAFM public consultation on the policy response to the disease was undertaken in 2018. The approach to Ash Dieback has moved from one of eradication to one of living with the disease and minimising its impact through proactive and appropriate woodland management, where appropriate.

The new policy response will mean more options for owners whose woodlands are affected with the disease (DAFM 2018c). These will include the opportunity for owners of suitable larger trees to grow their woodlands on with the objective of achieving marketable produce. The review of DAFM's approach to ash dieback disease is at an advanced stage and it is planned to publish the outcome on the DAFM website in December following which there will be a brief consultation period with a view to rolling out the Scheme soon afterwards (DAFM, 2018 pers. comm). A proactive approach will be required to minimise the economic, ecological and social impact of the disease. In order for this to happen, forest owners will also require clear guidance regarding options for positive management interventions. Teagasc will continue to actively support this essential effort. Teagasc is also working with research partners to procure individual trees of ash which show resistance / tolerance to Ash Dieback and use them to bulk up stocks of resistant trees vegetatively as well as for establishing seed producing orchards with resistant parent trees.

Sudden Oak Death

Sudden Oak Death, caused by the fungal agent *Phytophthora ramorum* was first detected on Japanese larch in 2010. These trees showed extensive dieback from the crown and along the stem. Under current plant health policy, *P. ramorum* control has resulted in the removal of more than 1,300 ha of larch forests on the island of Ireland (DAFM, 2015b). Phytophthora ramorum has been confirmed on Japanese larch at 52 forest plantations. Aerial surveys with the assistance of the Irish Air Corps continued during 2018 and ground surveys and sampling are being carried out on suspect sites.

Dothistroma Needle Blight

Dothistroma Needle Blight (DNB) is a significant disease of pine species. Its causal agents include two fungal pathogens, *Dothistroma septosporum* and *Dothistroma pini*. The disease was first found in Ireland during September 2016 (DAFM, 2018b). Defoliation of the previous season's needles and weakening of trees can be characteristic of infection. Generally the disease will only cause mortality where the infections levels are high for successive years. Surveys and sampling have confirmed the presence of DNB on pine at 31 sites in 14 counties on lodgepole pine, Scots pine and Corsican pine. In early 2018 the fungal disease *Lecanosticta acicola*, which also causes needle blight on pines, known as brown spot needle blight (BSNB) was found for the first time in Ireland in Co. Wexford. Further surveys for this needle blight are on-going.

Pine species account for an estimated 10.7 percent of the stocked forest area in Ireland. These species include Lodgepole pine (9.6 percent) with the remainder being made up of Scots pine (1.1 percent) and small areas of Monterey and Corsican pine (DAFM 2018a). Sitka spruce, the most common species in commercial forests, is deemed to have a low susceptibility to the disease. The DAFM carries out on-going surveys for DNB presence within pine forests and in pine-producing nurseries.

The diseases outlined have both direct and indirect effects on timber supply and demand. These effects include the cost of eradication/ containment, the opportunity cost associated with suspended or restricted planting of specific tree species and the price effect on a diminishing supply of a particular species. It is likely that the long term biotic threat will increase, partly due to increased levels of free trade and personal travel and the possible increase in disease risk due to climate change. Horizon scanning for future potential risks must continue to be a focus area for the Irish forest industry.

11. Carbon Sequestration

The removal of carbon dioxide from our atmosphere and its storage in plant biomass, deadwood and harvested wood products is termed sequestration. Forests offer significant potential to sequester carbon dioxide, thereby offsetting greenhouse gas (GHG) emissions from other sectors of society and industry and contributing to climate change abatement.

There are a number of ways that trees, woodlands and forests can take up GHGs from the atmosphere, not only through the maintenance of existing forests and the creation of new ones, but also in the active storage of carbon in harvested wood products. A further key mechanism meriting consideration involves the substitution of energy-intensive products derived from aluminium, concrete and steel by wood products, significantly reducing the energy cost of buildings and providing sustainable solutions for the building sector (Black 2018, pers. comm.).

Afforestation

The second iteration of the Greenhouse Gas Marginal Abatement Cost Curve (GHG MACC) for

Irish Agriculture was published by Teagasc during 2018. The GHG MACC quantifies the opportunities for abatement of agricultural greenhouse gases, as well as the associated costs/benefits and visualises the abatement potential of GHG mitigation measures, and the relative costs associated with each of these measures. In addition to a proposed suite of farm efficiency measures, Teagasc has identified the appropriate and sustainable planting of trees as a key strategy to help reduce agricultural emissions (Teagasc Greenhouse Gas Working Group, 2018).

Under the 2016 EU Commission Effort Sharing Regulation proposals, currently under negotiations, Ireland has the potential to contribute 2.7Mt CO_2 equivalent per annum through LULUCF (Land Use, Land Use Change and Forestry) activities in order to meet its reduction emission requirements over the period 2021-2030 (DCCAE, 2017). This is based on a combined contribution of net afforestation, over a 30 year historical period as well as cropland and grassland management.

Research suggests that the national carbon sequestration potential of forestry may fall after 2035 due to the decline in afforestation rates after 1997 (Hendrick and Black, 2009).

Forest products usage for bioenergy generation

The use of wood biomass energy in Ireland results in GHG emission savings from the displacement of fossil fuels. The saving in 2018 was estimated at over 0.99 million tonnes of carbon dioxide (CO_2), up almost 30 percent on the 2017 level of 0.76 million tonnes (DAFM & Drima Market research, 2018). The output of the forest-based biomass energy sector grew by 12 percent over 2016 to 1.78 million m^3 during 2017.

Optimising forest productivity

Appropriate species selection offers the potential to optimise afforestation scheme participation in order to maximise their carbon sequestration potential. Use of high quality planting stock can also help optimise productivity. For example, the use of improved planting stock can offer a simple means to increase volume yields from Sitka spruce sites by at least one Yield Class (Philips and Thomson, 2010). Appropriate forest management practices can also influence carbon mitigation. Carbon sequestration by forests is largely determined by gross primary productivity and, as such, is strongly influenced by growth rates, species selection and management interventions (Chen *et al*. 2014).

12. Innovation Partnerships

The agricultural European Innovation Partnership (EIP-AGRI) works to foster competitive and sustainable farming that 'achieves more and better from less'. It focuses on forming partnerships and linking people from different professional backgrounds in the EIP-AGRI network through different types of activities, such as Operational Groups and EIP-AGRI Focus Groups.

A recent Focus Group report examined the potential to increase the sustainable mobilisation of forest biomass as a key renewable resource. At two face-to-face meetings, 20 European experts, including Teagasc, shared their experience and carried out group work, to identify the most relevant questions in relation to sustainable mobilisation of forest biomass. This included the identification of success and fail factors that stimulate or limit the supply of forest biomass and how these factors might be addressed by exploring the role of innovation and knowledge exchange.

The group identified and discussed relevant examples, best practices and tools and also barriers to their implementation in different regions. An important area identified was how to improve the co-operation between forest owners of small-scale forest areas. The report also took into account supply and demand factors and the potential to provide a link between the two, e.g. via electronic marketing tools. The experts' findings led to a set of ideas for research and innovation activities to stimulate the knowledge and use of management practices and strategies in mobilising forest biomass.

During 2018, the DAFM announced results of the second competitive Open Call to select proposals to proceed to the full implementation phase of the Irish European Innovation Partnerships Initiative (EIP). Projects developed under the EIP initiative are developed by Operational Groups, and will form part of the Department's new 'Locally-Led' initiative, a co-funded measure proposed by Ireland under the Rural Development Programme 2014 – 2020. The project '*A whole farm approach to landscape management* (Inishowen Upland Farmers) was one of nine projects that were selected under this process. This project will focus on best practice in managing upland habitat, together with innovative practices, including agroforestry options and climate smart

innovations on improved lowland to reduce costs and maximise returns. An additional 12 projects had been funded in December 2017 under the first call for proposals under the EIP competitive process. The latter included a project on Biomass to Bio-carbon for farm Bioeconomy.

13. Outlook for 2019 and beyond

The COFORD Forest Policy Review Group was established in 2016 to track the implementation of the Forest Policy recommendations and monitor and report on progress in implementing the stated Strategic Actions. Recurring cross-cutting themes were identified during this review (COFORD, 2018). These themes include the need for continued improved communications and co-ordination within the sector and with other related sectors and stakeholders, the need to establish a forestry policy platform and the significance of technology use across the sector. Progress was identified in relation to a range of recommendations across thirteen chapter headings. However, the review also highlights where limited progress was expressed by stakeholders against strategic actions such as the national afforestation programme, incentivising active management within private forestry, improving communications across the sector, funding for forest research, control of deer and action on invasive species COFORD (2018).

Afforestation

It is critical that afforestation levels are increased in 2019 and subsequent years if adequate progress is to be made towards a range of national strategic objectives. While most new planting will continue to occur on farmer-owned land, afforestation by cohorts classed as 'non-farmers' is also likely, partly in response to common afforestation premium rates for both groups. The non-farmer category can include cohorts such as retired farmers and family members inheriting land holdings. COFORD (2018a) provides a range of recommendations based on a progress review into expanding the forest resource. These include the incorporation of flexibilities into current forestry schemes regarding how existing targets can be achieved, the provision of greater integration between agriculture and forestry schemes, emphasis on riparian woodlands and a focus on the younger generation with regard to forestry promotion.

The FLAIG Report (2018) proposes a range of actions to enhance future afforestation rates. These include actions relating to promotion and education, environmental actions and relevant measures on income and future land use. In addition to the above, a number of research actions with potential to impact on planting rates are proposed.

Teagasc, in conjunction with the forest industry is building awareness of the benefits of well-planned, sustainable forestry and its role as a complementary farm enterprise. This promotion seeks to address key proposals from FLAIG (2018), including the further integration of forestry into agricultural education and awareness-raising of carbon-related benefits. It is anticipated that changes in the Mid-term Review of the Forestry Programme and addressing of appropriate barriers to facilitate landowner decisions on afforestation can also have a positive effect on planting levels.

For example, planting under the Native Woodland Grant and Premium Category (GPC) of the afforestation programme has increased from 134 ha to over 300 ha in the year to date (DAFM 2018, pers. comm.) and there may be further scope for uptake with judicious application of the recently-launched Native Woodland Fund, a pilot initiative. Cautious optimism is reported within the sector for the upcoming planting season, with the recent budget allocation considered sufficient to support a strong afforestation programme (Magner, 2018).

Timber Mobilisation

Demand by indigenous industry for forest fibre on the island of Ireland already exceeds the capacity of state and private forests. An existing supply deficit is also likely to substantially increase over the period up to 2025 and beyond, despite the near doubling of roundwood output on an all island basis between 2017 and 2035.

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 an increase state investment in forestry and country roads, as well as continued and sharp focus on the reduction or elimination of other barriers to identified wood mobilisation (COFORD Wood Mobilisation Group 2018).

The harvest of timber 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 crucial that appropriate thinning be conducted on suitable private forestry plantations. Teagasc, in co-operation will all sectors of the forestry industry, is seeking to mobilise the private forest

thinning resource through dissemination of research, training and the building of familiarity with and confidence in the harvesting and marketing of the timber resource. The empowerment of private forest owners through a range of knowledge transfer events and initiatives, capacity building and a sense of ownership is central to the realisation of the private timber resource production potential and to the optimisation of ecosystem services.

While domestic sawmilling demand is forecast to increase by 3.5 percent year-on-year between now and 2020, the sawmilling sector will continue to be dependent on its strong presence in the highly competitive UK market, as well as in Europe.

The Irish forest products sector is largely export oriented, exporting 75 percent of its production output in 2016. Exports of forest products in 2018 totalled €470 million. Key markets are Northern Ireland, the UK and the Benelux Countries. The single most important export market for Irish forest products is the United Kingdom of Great Britain and Northern Ireland (IFFPA, 2017) and this situation is likely to continue into the future. The potential consequences of Brexit and its impact on the timber export market are very unclear at this stage. Its constraint on Irish growth prospects in the short term remains a big concern. Other key issues of concern include a slowdown in the UK economy and a further weakening of sterling (DAFM & Drima Market Research, 2018).

Engagement with timber buyers provides insights into the continued demand for timber to meet the on-going requirements of the processing sector. Enhanced 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 on-going development of forest owner groups/clusters will continue to help facilitate additional thinning and harvesting capacity and supply. The current DAFM-supported Knowledge Transfer Group (KTG) scheme, modelled on DAFM's existing KTGs for beef, sheep and other sectors of agriculture, aims to increase the level of forest management activity among participating forest owners and to increase their awareness of the value of their forests. Mechanisms and funding to progress private certification following the successful pilot project to develop a group certification template for private forest owners are necessary and currently under consideration by relevant industry stakeholders.

The wood energy market continues to develop as technologies are adapted or introduced to optimise the contribution of forestry to the bioeconomy. The forecasted deficits in wood biomass supply to 2020 and 2025 present a significant challenge to existing timber processing sectors. Other non-timber benefits of forestry such as ecosystem services, tourism and recreation have potential added-value in the longer term.

CAP post 2020

Currently the structure of the new CAP is being negotiated and this is an opportunity to ensure that a positive framework is in place to support afforestation at national and farm level in the coming years. CAP post-2020 and the review of state aid rules will have a significant influence on measures and targets contained in the next forestry programme. It is vital that provisions for support of Ireland's forestry sector are maintained. This is particularly so in relation to farm forestry and timber mobilisation objectives.

Investment Packages

The trading of semi-mature forest properties and related investment packages continue to evolve. Such packages include propositions on the forward selling of timber harvest rights. This is a new development in the private forest sector and may involve a range of investment scenarios and options for private forest owners (Irish Farmers Journal, 2016). A robust analysis of such investment scenarios from an economic and legal perspective is central to exploring the merits of this expanding forest investment sector. In certain 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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