Outlook 2016
Economic Prospects for Agriculture

CONTRIBUTORS

Trevor Donnellan, Kevin Hanrahan, Michael McKeon, Fiona Thorne, Thia Hennessy, Anne Kinsella and Brian Moran

Compiled by Marian Moloney

Agricultural Economics and Farm Surveys Department

Teagasc

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Global Economy

- Mixed economic picture
- US and UK economies outperform EU
- Euro depreciation
- Some concern about prospects in emerging markets

Average Family Farm Income 2015

Output Value (relative to 2014)

- **Dairy** -down sharply due to lower prices
- **Beef** - up due to higher prices
- **Sheep** - up due to higher prices
- **Tillage** - down slightly due to lower area
- **Pigs** - down due to lower prices

Input Costs
Little change, with reductions in feed and fuel being offset by increases in some other cost items

Fertiliser Prices
Little change on the 2014 level

Feed Prices
Lower in 2015 due to good cereal harvests in 2014 and 2015

Oil Prices
Down to half the 2014 level

Food Demand
Mixed picture, with stronger demand for meats and grains and weaker demand for dairy

Eurozone inflation
remains very low

Irish Unemployment
fell below 9%

Weather conditions
better than 2014 in eastern and southern counties

Summary of Prospects for 2016

Global Economy

- Mixed economic picture continues
- US and UK continuing to outperform EU
- Euro to remain weak and aid competitiveness
- Continuing growth prospects in emerging economies

Average Family Farm Income 2016

Output Value (relative to 2015)

- **Dairy** -Up due to higher price and volume
- **Beef** - Down due to lower prices
- **Sheep** -Up due to higher prices
- **Tillage** -Up due to higher prices
- **Pigs** -Up due to higher prices

Input Costs
Slight upward pressure on some input prices

Fertiliser Prices
Unchanged on the 2015 level

Feed Prices
Slightly higher towards end of 2016

Oil Prices
To remain at a low level

Food Demand
Mixed picture, with stronger demand for meats and grains and slow recovery in dairy demand growth

Eurozone inflation
Remains very low

Irish Unemployment
to fall to 8%

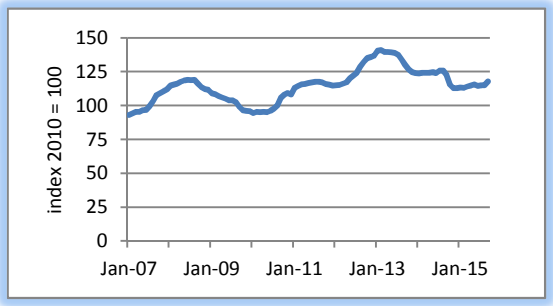
Weather conditions
Unlikely to be as favourable as in 2015

Overall Sector: Summary Review of 2015

Output Value	Input Spend	Income
Down	Neutral	Down

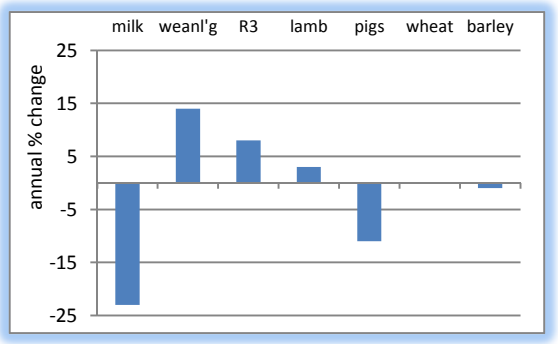
- Excellent weather throughout 2015 meant that growing conditions were better than normal and this boosted grass growth and cereal yields.
- Lower input expenditure has been a feature of all of the grassland enterprises in 2015, driven by lower levels of feed and fertiliser use, as well as lower feed and fuel prices.
- Milk quota removal allowed an expansion in milk production of 10 percent. Milk producers experienced a 9 cent per litre decrease in output prices in 2015, which eroded the benefit of increased production and lower input costs.
- Dairy net margin per litre declined by 50 percent in 2015, with a smaller decrease on a per hectare basis.
- Prices of finished cattle in 2015 recovered almost all of the ground lost during the "beef crisis" of 2014. Price of calves, weanlings and store cattle also increased strongly with weanling and store prices up by 15 percent on 2014 levels.
- With largely stable costs of production and strong growth in output value, margins on both single suckling and cattle finishing enterprise increased strongly in 2015.
- In 2015 the average single suckling enterprise is estimated to have earned a small positive net margin per hectare (€19/ha), while the negative net margin earned on the average cattle finisher declined by 46% to -€77/ha.
- Sheep farmers saw their margins improve in 2015 as their costs of production decreased and lamb prices on average were marginally higher than in 2014.
- A favourable summer meant that cereal yields for major crops were above normal in 2015. However, a large global harvest has meant that the low cereal prices of 2014 have persisted into 2015. Cereal direct costs declined in 2015 and strong yields were insufficient to deliver much change in cereal margins.
- Pig producers saw a large decrease in pig prices in 2015, mainly due to the impact of the on-going Russian embargo and the return to the global market of US pork exports following the end of the 2014 PEDv outbreak. Despite a decrease in production costs in 2015, overall margins from pig production decreased.

Figure E1: Index of Irish Cattle Feed Prices



Source: CSO

Figure E2: Change in Output Prices 2015 vs 2014



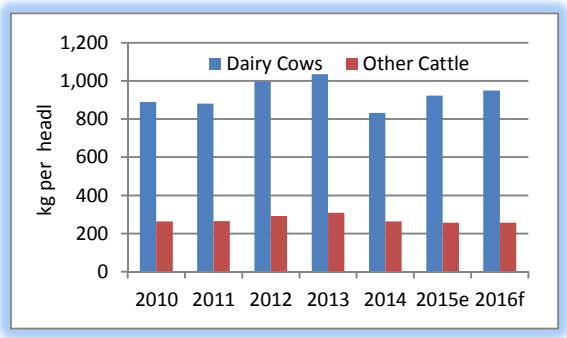
Source: Authors' estimates

Overall Sector: Outlook for 2016

Output Value	Input Spend	Income
↑ Up Slightly	↑ Up Slightly	↑ Up

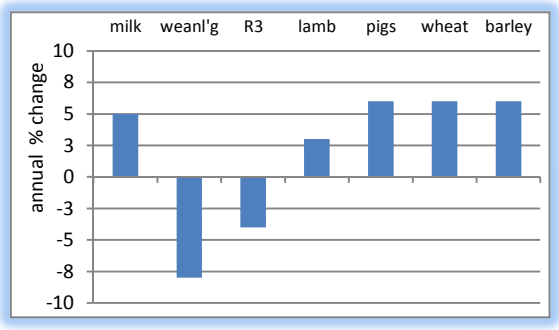
- The outlook for 2016 for the Irish agriculture sector as a whole is conditioned by the assumption that normal weather prevails.
- With normal weather there should be little change in feed bills in 2016 for all grassland enterprises, with the exception of dairy farms that are continuing to expand.
- Fertiliser prices are not forecast to increase in 2016 and stable fertiliser usage should lead to stable fertiliser expenditure for all grassland systems in 2016.
- Tillage producers will experience a slight increase in fertiliser prices and pig producers will face a slight upward movement in feed costs in 2016.
- A further small decline in fuel prices is forecast in 2016, with electricity prices also forecast to decline slightly.
- Milk prices are expected to recover some of the recent decline in price in the second half of 2016, with price forecast to increase by 5 percent on the estimated 2015 level.
- Beef prices are forecast to decline in 2016, and with costs of production forecast to be largely stable, this is expected to lead to lower margins on both single suckling and cattle finishing enterprises.
- Sheep prices are expected to increase modestly in 2016 and with stable production costs this is expected to lead to increased sheep margins.
- Stock levels on international grain markets have recovered due to the recent series of strong global harvests. Cereal prices at harvest in 2016 will be highly dependent on growing conditions globally.
- On the assumption that global yields revert to normal, global supply and stock levels in 2016 are not forecast to increase over the 2015 level. Cereal prices are forecast to improve slightly relative to 2015.
- Overall costs on cereal farms look set to increase very slightly. With yields reverting to normal levels, then margins for most crops in 2016 will be only slightly improved on 2015 levels.
- Pig meat prices are forecast to increase by 6 percent in 2015, with marginally higher feed prices in 2016, a moderate improvement in margins in 2016 is forecast.

Figure E3: Dairy and Beef Feed Use 2010 - 2016



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

Figure E4: Forecast Change in Output Prices 2016 vs 2015



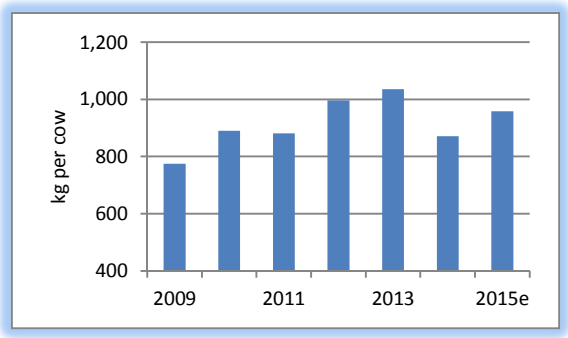
Source: Authors' estimates

Dairy: Review of 2015

Output Value	Input Spend	Income
Down	Down	Down

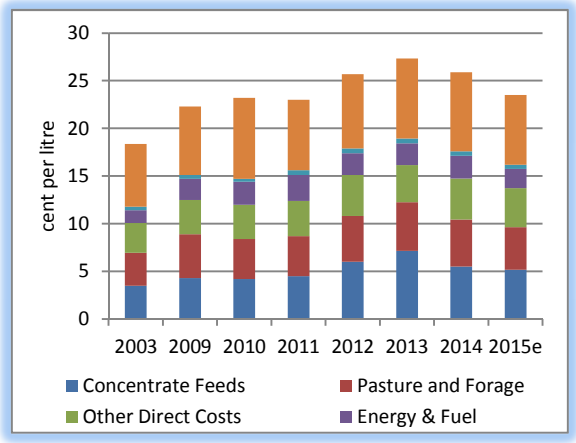
- Irish milk prices dropped substantially in 2015, reflecting the depressed world market situation. As a result, the annual average national milk price for 2015 is estimated to have fallen by 24 percent to an average of 30 cent per litre.
- In response to low milk prices the European Commission issued an emergency relief package worth €500m across the Community which helped to support income.
- In the 2014/15 milk quota year elevated production levels created a superlevy bill of about €70 million at the end of March 2015.
- It is estimated that aggregate milk production increased by 10 percent in 2015.
- Feed usage on dairy farms is estimated to have increased in 2015, with some uncertainty as to the extent of the increase. Increased usage combined with a 6 percent reduction in price resulted in an increase in dairy feed expenditure in 2015 on a per hectare basis but a reduction on a per litre basis.
- Fertiliser use was little changed in 2015, in comparison with 2014 and prices remained relatively stable. There was no overall change in fertiliser expenditure and so usage per litre of milk produced actually fell.
- Total milk production costs are estimated to have been unchanged in 2015 on a per hectare basis, with a 9 percent (23.5 cent per litre) decline recorded on a per litre basis, owing to increased milk production.
- The reduction in production costs and increase in milk production was insufficient to offset the declining milk price and it is estimated that the net margin per litre of milk produced declined by 6.5 cents (50 percent) in 2015 to a national average of 6.5 cent per litre.
- Given the increase in national milk production in 2015, production also increased on a per hectare basis. With an assumed 10 percent increase in milk production per hectare, it is estimated that the net margin per hectare still decreased by 45 percent to a national average of €770.

Figure E5: Irish Dairy Cow feed use 2009 to 2015



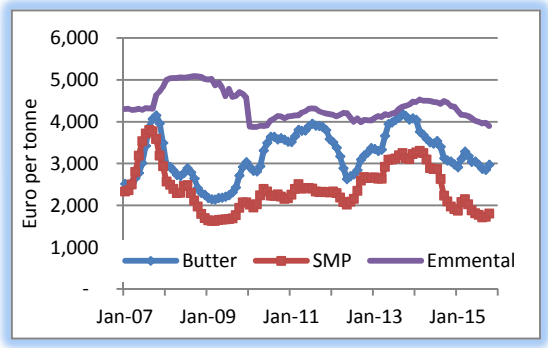
Source: FAPRI-Ireland (adapted from DAFM and CSO data) 2015 figure is an estimate

Figure E6: Average Total Milk Production Costs (cent per litre) in Ireland: 2003 to 2015



Source: Teagasc National Farm Survey and Authors' Estimate

Figure E7: European Dairy Product Prices



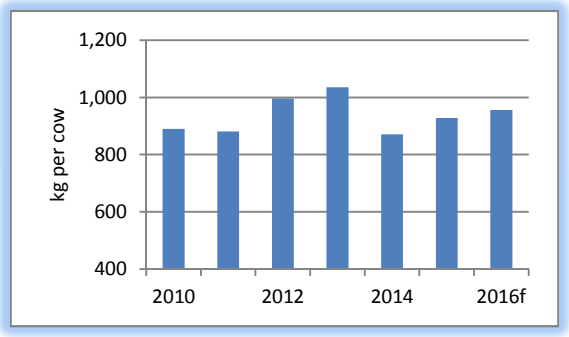
Source: Dairy Co UK

Dairy: Outlook for 2016

Output Value	Input Spend	Income
Up	Up	Up

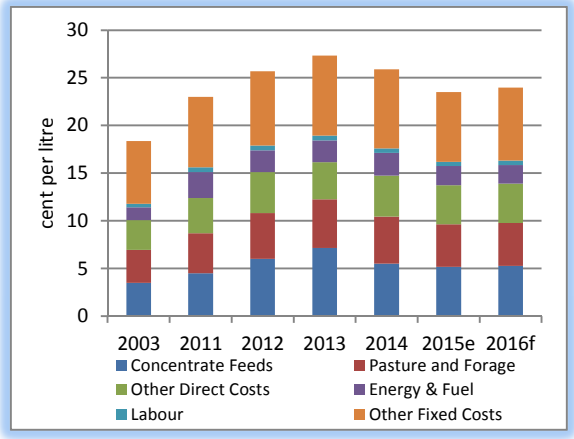
- Dairy markets are expected to slowly recover from their depressed levels in the first half of 2016. It is forecast that the annual average milk price will increase only marginally in 2016 relative to the 2015 level, bringing the annual average milk price to 31.5 cent per litre.
- Assuming normal weather conditions in 2016, feed expenditure on dairy farms is expected to increase particularly on farms that are that expanding production. Fertiliser prices are expected to be unchanged in 2016
- Following the removal of the milk quota in 2015, further growth in Irish national milk production is forecast in 2016. Following the estimated 10 percent increase in production in 2015, further growth of 7 percent is forecast in 2016.
- With increased national milk production of 7 percent forecast, costs per hectare are forecast to increase by 5 percent, while costs on a per litre of milk produced are forecast to decline marginally on the 2015 level, to an average of approximately 23.3 cent per litre.
- On a per litre basis, net margins are forecast to increase by 25 percent in 2016 relative to the 2015 levels, to an average of 8.2 cent per litre.
- Farmers expanding production are assumed to benefit from some economies of scale. Farmers expanding milk production by 7 percent per hectare will see net margins increasing by approximately 34 percent to an average of €1,030 per hectare.

Figure E8: Irish Dairy Cow feed use 2010 to 2016



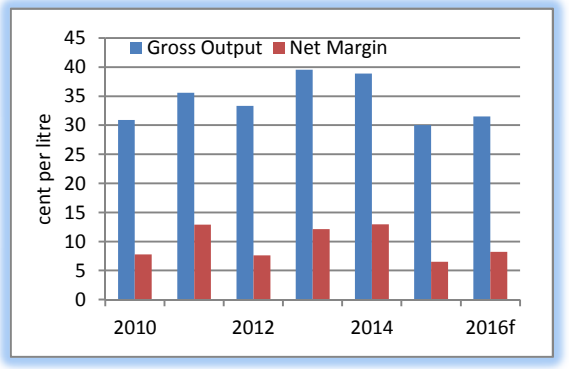
Source: FAPRI-Ireland (adapted from DAFM and CSO data) 2015 figure is an estimate and 2016 figures is a forecasts

Figure E9: Average Total Milk Production Costs (cent per litre) in Ireland: 2003 to 2016



Source: Teagasc National Farm Survey, Authors' Estimate for 2015 and Author's Forecast for 2016

Figure E10: Dairy Gross Output and Net Margin



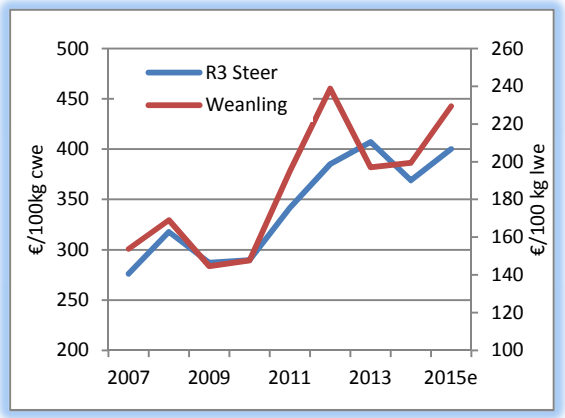
Source: Teagasc National Farm Survey, Authors' Estimates for 2015 and Authors' Forecast for 2016

Cattle: Review of 2015

Output Value	Input Spend	Income
Up	Down	Up

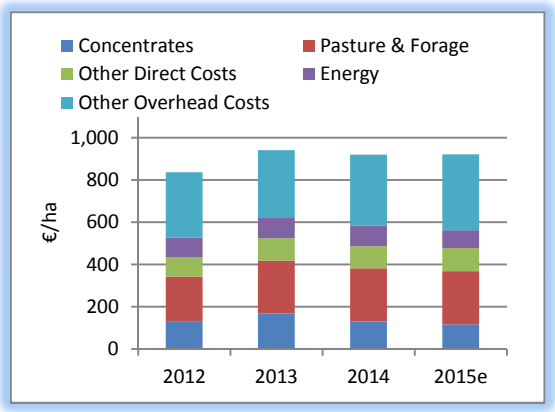
- In 2015 finished cattle prices increased by 9 percent relative to 2014, while prices of weanlings and store cattle increased by an average of 15 percent.
- Positive price trends for all categories of cattle in 2015 have led to higher output value on both Single Suckling and Cattle Finishing enterprises.
- Small decreases in the volume of feed used and lower feed and fuel prices have led to decreases in direct costs of production on all cattle farms in 2015.
- The decrease in costs of production and increased output value has led to large percentage increases in gross margins per hectare on both Single Suckling and Cattle Finishing enterprises.
- In 2015 the average gross margin per hectare earned on Single Suckling enterprises is estimated to have increased by 37 percent to €464 per hectare.
- Cattle Finishing enterprise output value also increased and gross margin is estimated to be €418 per hectare in 2015, 33 percent up on the 2014 level.

Figure E11: Finished Cattle and Young Cattle Prices



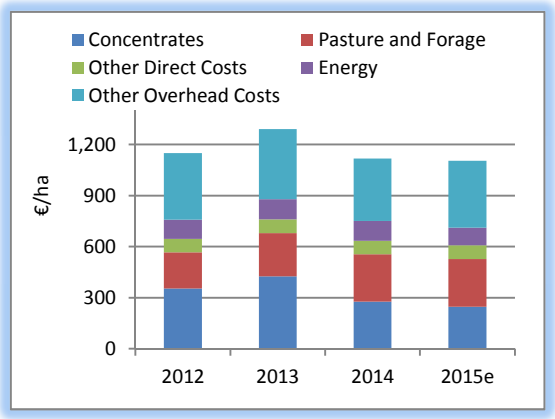
Source: 2005-2014 DG Agri, CSO, 2015 Authors' estimate

Figure E12: Costs of Production Single Suckling (SS)



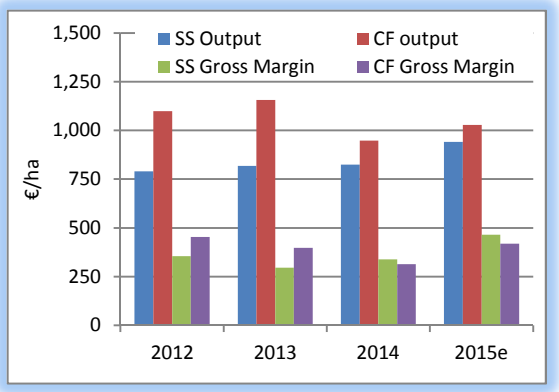
Source: 2012, 2013 & 2014 Teagasc NFS, 2015 Author's Estimate

Figure E13: Cost of Production Cattle Finishing (CF)



Source: 2012, 2013 & 2014 Teagasc NFS, 2015 Author's Estimate

Figure E14: Output and Gross Margin



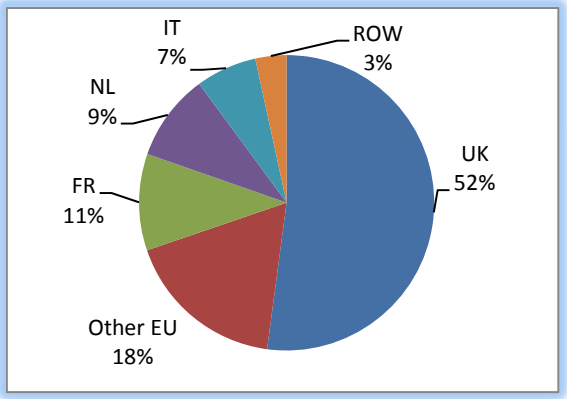
Source: 2012, 2013 & 2014 Teagasc NFS, 2015 Author's Estimate

Cattle: Outlook for 2016

Output Value	Input Spend	Income
Down	Up Slightly	Down

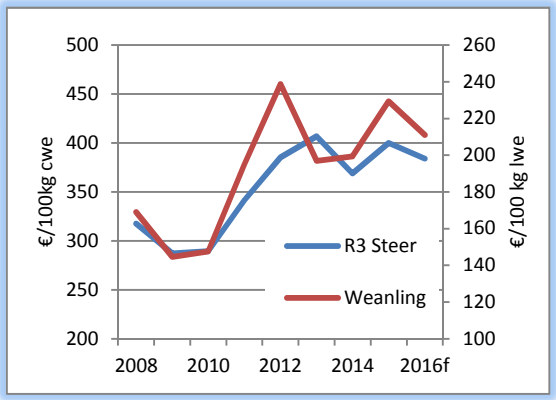
- EU supplies of beef are forecast to grow moderately in 2016.
- Global beef markets in 2016 are forecast to weaken, though EU imports are expected to remain stable and world prices are expected to decline.
- The UK remains Ireland's most important beef market and the relatively strong growth in the UK economy will support Irish cattle prices.
- The forecast for Irish finished cattle prices is a 4 percent reduction in 2016 relative to the 2015 level.
- Young cattle prices are forecast to also decline, with prices up to 8 percent lower than in 2015.
- Input volumes in 2016 are forecast to remain unchanged on the 2015 level.
- Most input prices are forecast to change only marginally.
- Direct costs of production on Single Suckling and Cattle Finishing enterprises are forecast to increase by 1 and 2 percent respectively.
- With lower output values, as a result of the forecast contraction in cattle prices and marginally higher direct costs of production, changes in margins on Single Suckling and Cattle Finishing enterprises in 2016 will be negative.
- In 2016 gross margin per hectare on Single Sucking enterprises are forecast to decline by 15 percent to €397 per hectare.
- Lower young cattle prices moderate the impact of lower finished cattle prices to leave forecast gross margins on Cattle Finishing enterprises 11 percent lower at €370 per hectare.

Figure E15: 2015 Irish Beef Export by Volume



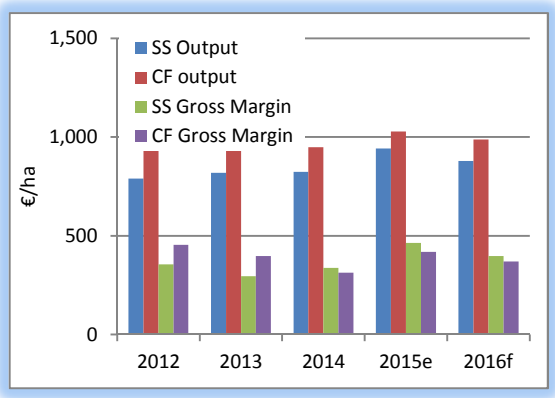
Source: Eurostat COMEXT (year through August)

Figure E16: Forecast 2016 Cattle prices



Source: Authors' forecast

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



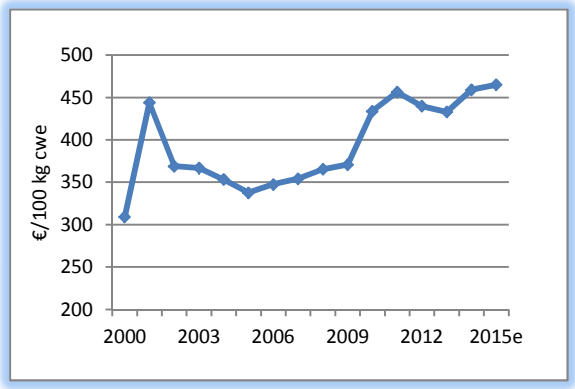
Source: 2012, 2013 & 2014 Teagasc NFS, 2015 Author's Estimate, 2016 Author's forecast

Sheep: Review of 2015

Output Value	Input Spend	Income
Up	Unchanged	Up

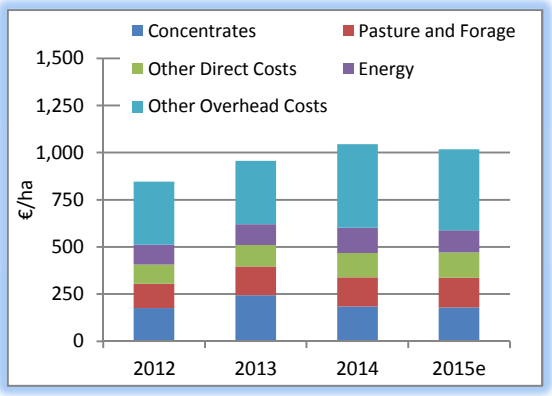
- Growth in demand for lamb in the EU and stable imports as well as the decline in the euro/sterling exchange rate, helped maintain EU lamb prices, despite growth in EU production.
- European lamb market prices in 2015 were marginally higher than in 2014.
- 2015 lamb prices in Ireland are also estimated to have been higher than in 2014.
- Costs of production for Irish mid-season lowland lamb enterprises declined marginally in 2015 due mostly to changes in feed and fuel prices.
- Gross margins per hectare for Irish mid-season lowland lamb producers are estimated to have increased in 2015 due to lower input costs and small improvements in output value.
- In 2015 gross margins on mid-season lowland enterprises are estimated to be €700 per hectare.

Figure E18: Irish Sheep price with estimate for 2015



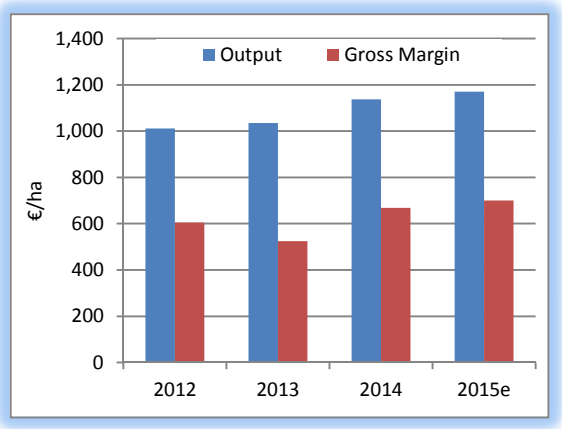
Source: 1999-2012 DG Agri; 2015 Authors' Estimate

Figure E19: Average Sheep production costs 2012-2014 and estimate for 2015



Source: 2012, 2013 & 2014 Teagasc NFS, 2015 Author's Estimate

Figure E20: Average Sheep output & margin estimate for 2015



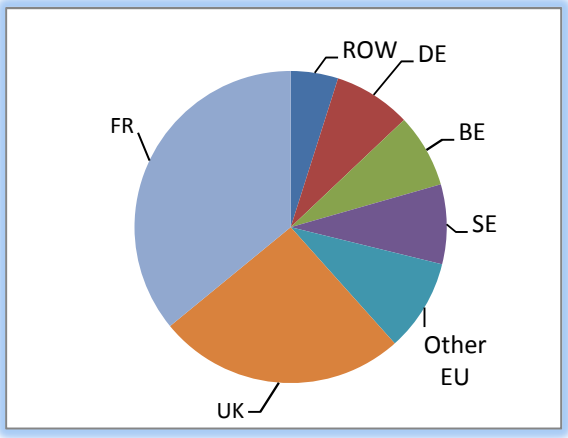
Source: 2012, 2013 & 2014 Teagasc NFS, 2015 Author's Estimate

Sheep: Outlook for 2016

Output Value	Input Spend	Income
Up	Up Slightly	Unchanged

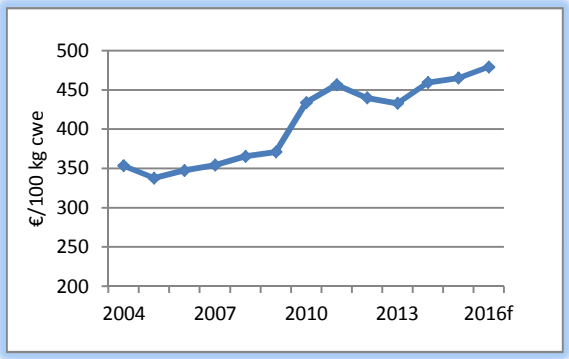
- The outlook for Irish and EU lamb prices for 2015 is positive with a small improvement forecast.
- Tight global supplies of mutton and lamb are forecast for 2016.
- With increasing global prices and stable EU production, growth in demand in the EU is forecast to leave lamb prices marginally higher than in 2015.
- Sheep feed expenditure is forecast to increase marginally in 2016 driven by an expected 2 percent increase in prices. No change in the volume of feed used on Irish sheep farms is forecast for 2016.
- Fertiliser prices and usage are not forecast to increase in 2016.
- With slightly higher costs of production in 2016 and higher output value, gross margins for mid-season lowland lamb enterprises in 2016 are forecast to increase by 4 percent.
- In 2015 the average gross margin per hectare earned by Irish midseason lowland lamb enterprises is forecast to be €729 per hectare.

Figure E21: 2015 Irish Lamb Exports by Volume



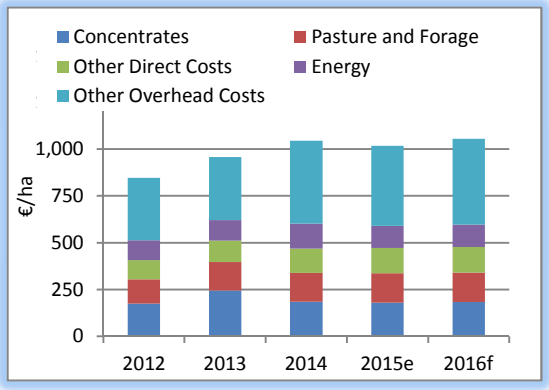
Source: Eurostat COMEXT (year to end of August)

Figure E22: Sheep price forecast for 2016



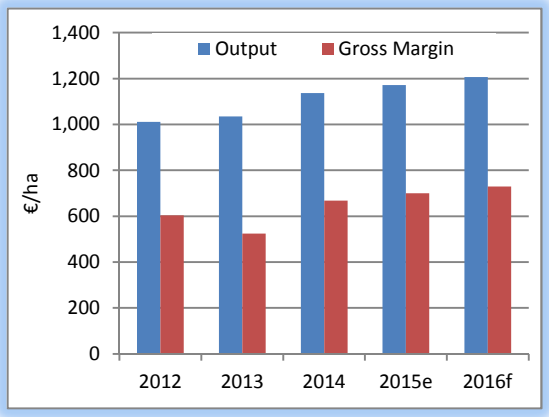
Source: 2003-2014 DG Agri; 2015 Authors' Estimate; 2016 Authors' forecast

Figure E23: Sheep production costs forecast



Source: 2011-2014 Teagasc NFS, 2015 Authors' Estimate, 2016 Authors' Forecast

Figure E24: Average Sheep output & margins with forecast for 2016



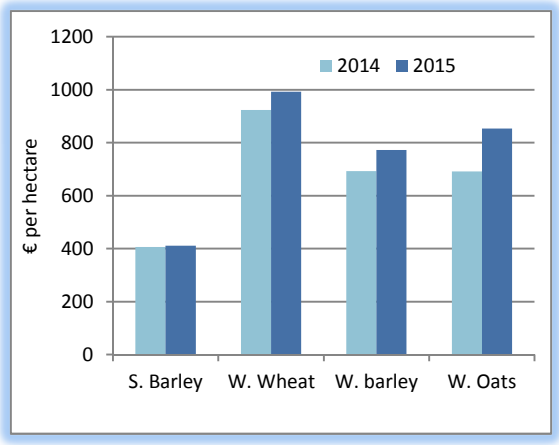
Source: 2011-2014 Teagasc NFS, 2015 Authors' Estimate, 2016 Authors' Forecast

Cereals: Review of 2015

Output Value	Input Spend	Income
Unchanged	Unchanged	Unchanged

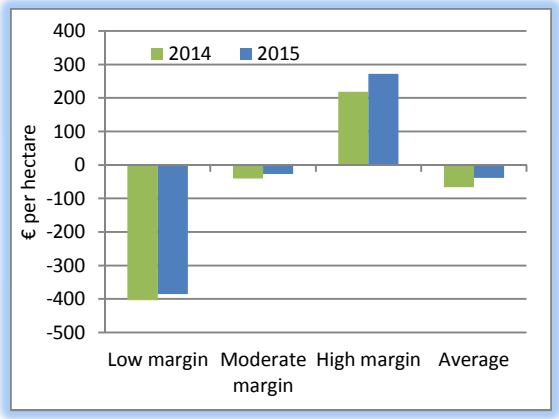
- Improved cereal yields across the key growing regions of the world led to a further increase in stock levels worldwide. Grain prices remained low in 2015 as a result.
- However, these relatively low prices were offset to some extent by above average yields of the main cereal crops in 2015. For example, spring barley yields increased by 0.2 tonnes per hectare, while winter wheat yields increased by 0.4 tonnes per hectare, compared to 2014.
- Direct costs of production on cereal farms decreased very slightly in 2015 compared to 2014. Seed costs and fuel related costs on cereal farms witnessed the largest percent decrease, at 8 percent and 13 percent respectively. Increases in other cost components such as crop protection meant that direct costs of production decreased by about 1 per cent in 2015. Overhead costs remained more or less the same in 2015.
- The net effect of output value and input cost changes on cereal gross margin was a slight increase in the gross margins on nearly all cereal crops in 2015. The gross margin for winter wheat is estimated to be up by about €70 per hectare, while the margins for the other main crops, winter barley and spring barley, are estimated to be up by about €80 and €6 per hectare respectively.
- There remains a wide variation in terms of economic performance of individual cereal farms nationally. It is estimated that the average cereal enterprise on specialist tillage farms will return a slightly negative market based net margin in 2015. But behind this average figure is a range, with the bottom 1/3 of farms receiving a negative market based net margin of - €385 to the top 1/3 of farms receiving €270 per hectare.
- The overall very slight increase in average market based net margin in 2015, relative to 2014, to -€38 per hectare, can be attributed mainly to the increase in yields achieved in 2015.

Figure E25: Gross Margin for Main Cereal Crops (2014 Actual and 2015 Estimated)



Source: Teagasc, National Farm Survey Data & Authors' estimate for 2015

Figure E26: Cereal Enterprise Net Margin on Specialist Tillage Farms (2014 Actual and 2015 Estimated)



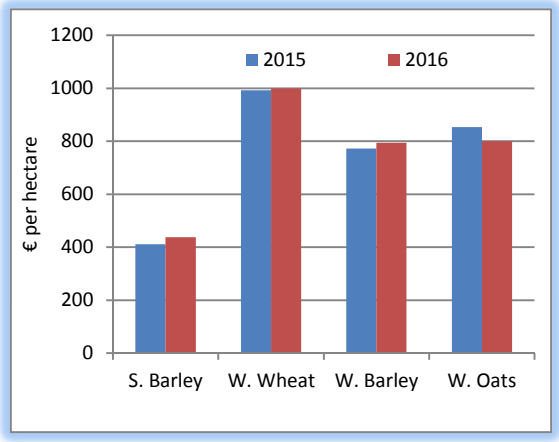
Source: Teagasc, National Farm Survey Data and Authors' estimates for 2015

Cereals: Outlook for 2016

Output Value	Input Spend	Income
Unchanged	Unchanged	Unchanged

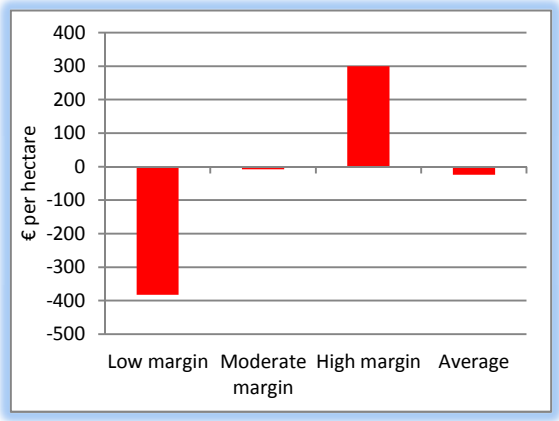
- World grain stocks have increased following two years of record harvests worldwide and this is likely to ease grain price volatility in the short term.
- In terms of market supply and demand, there does not appear to be anything evident that would suggest that prices will move dramatically before harvest 2016.
- At present (November 2015) futures markets indicate that 2016 harvest prices will be about 6 percent higher than 2015 harvest prices. This slight upward movement in prices can be explained by a reversion to trend yields in 2016.
- A return to more normal Irish cereal yields in 2016 would mean a slight decrease on the levels recorded in 2015.
- Costs of production on cereal farms are not expected to change much in 2016, with key inputs such as fertiliser and seed expected to remain unchanged.
- Furthermore, movements in other cost items are expected to cancel each other out, with fuel expected to decline slightly, whilst other items such as crop protection and land rent expected to increase slightly.
- The net effect of output value and input expenditure changes means that the 2016 forecast for gross margins for most cereals is for only a very slight increase over 2015 gross margins.
- The gross margin for spring barley, winter wheat and winter barley are all forecast to increase by less than €30 per hectare in 2016.
- The forecast for cereal enterprise market based net margin on specialist tillage farms in 2016 is only slightly higher than the 2015 level, with the average farmer losing €25 per hectare after all costs are paid.

Figure E27: Gross Margin for Main Cereal Crops (2015 Estimated & 2016 forecast)



Source: Teagasc, National Farm Survey Data & Authors' estimate for 2015 & forecast for 2016

Figure E28: Cereal Enterprise Net Margin on Specialist Tillage Farms, 2016 Forecast



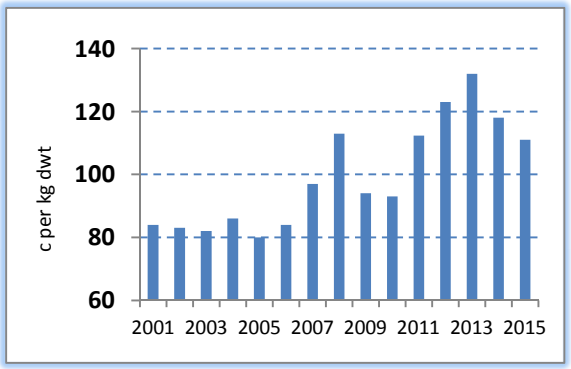
Source: Teagasc, National Farm Survey Data and Authors' forecast for 2016

Pigs: Review of 2015

Output Value	Input Spend	Income
Down	Down	Down

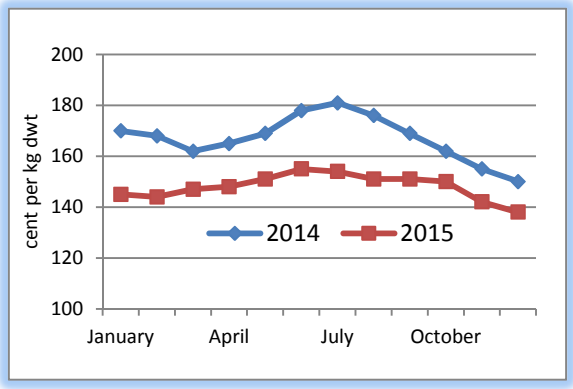
- The price of the main pig feed ingredients declined in 2015.
- The annual average feed cost in 2015 was 111 c/kg dwt, which was 6 percent lower than 2014 and 7 percent lower than the 5 year average of 119 c/kg dwt.
- The Irish pig price fell by 11 percent in comparison with 2014, with a rapid decline in the last quarter.
- The estimated average pig price in 2015 was 148 cent which was significantly below the five year average (2011-2015) of 162 cent per kg.
- The weak price was due to the increased volume of European pigs produced and a rebound of the US pig production output after their PEDv disease outbreak in 2014.
- The 'Margin Over Feed' per kg deadweight was 37 cent in 2015, the lowest since 1999. When the 2015 margin over feed is compared to the average margin over feed of the last five, ten, fifteen and twenty years, the difficult trading conditions and low profitability of recent years becomes clear.

Figure E29: Irish Compound Pig Feed Price 1992 to 2015



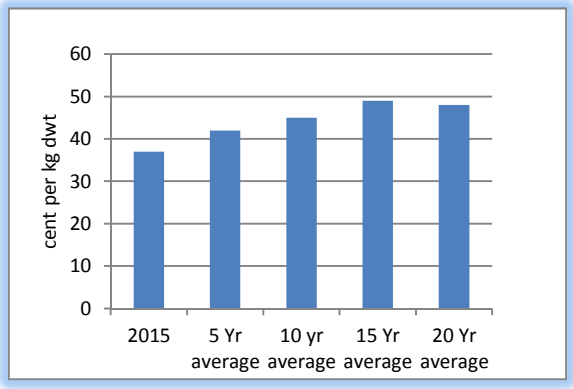
Source: Teagasc Pig Department

Figure E30: Monthly Irish Pig Prices 2015



Source: Teagasc Pig Department
December Figure is an Estimate

Figure E31: Margin Over Feed



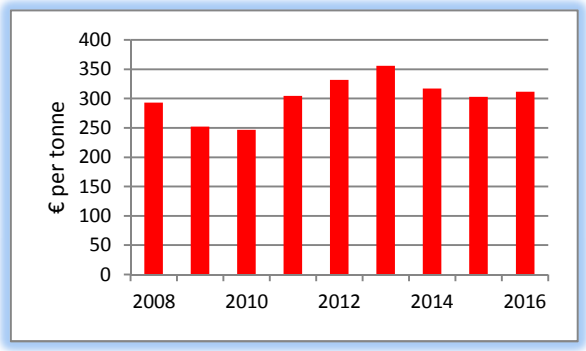
Source: Teagasc Pig Department

Pigs: Outlook for 2016

Output Value	Input Spend	Income
Up	Unchanged	Up

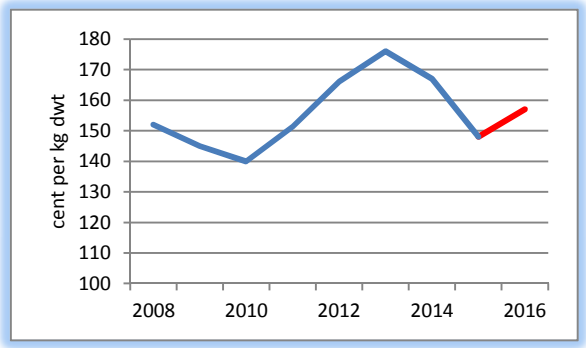
- The bumper harvests in 2014 and 2015 have resulted in a significant build-up of global cereal and soybean stocks.
- This is forecast to generate stable prices until mid-2016 where-upon harvest 2016 will dictate prices for the latter half.
- Predictions for the South American soyabean harvest suggest one of the largest harvests ever with the Brazilian crop estimated to exceed 100 million tonnes for the first time.
- While this should dictate a fall in soyabean prices in 2016, this may be offset by increased Chinese imports of 81 million tonnes and the weak euro exchange rate.
- The outlook for 2016 is for the annualised composite pig feed cost to rise marginally when compared to 2015 (+3%). This would increase the compound feed price from €303 to €312.
- A stabilisation of the EU sow herd size and increased number of piglets born alive will increase the supply of European pigs. It is estimated this increase may be in the region of 2 to 2.5 percent.
- This increased volume of pigs on the market will continue to lead to a sluggish pigmeat market in early 2016, but overall the price is expected to increase by 6 percent.
- Two significant factors may give the pig price a boost; increased Chinese pigmeat imports to offset the decline in domestic production and a disease outbreak in Europe. Either of these outcomes would significantly improve the price outlook.

Figure E32: Historical Compound Pig Feed Price and forecast for 2016



Source: Teagasc Pig Department

Figure E33: Historical Irish Pig Prices and forecast for 2016 (c/kg dwt)



Source: Teagasc Pig Department

Irish Dairy Farming in 2014

Irish Milk Deliveries
5,649 million litres (up 3%)

Days at Grass
244 days (+3%)

Milk Production per cow
average 5,170 litres (up 1%)

Stocking Rate
average of 2.04 lu/ha

Milk price
average 39.5 cent per litre (0%)

Milk Production per ha
average 10,686 litres (up 3%)

Irish Dairy Cow Numbers
1.226 million (up 5.4%)

Milk Fat Content
average 3.98% (+4 basis points)

Concentrate Fed/Dairy Cow
average 959 kg (down 17%)

Milk Protein Content
average 3.43% (+4 basis points)

Concentrates fed/litre of milk
average 0.19 kg (down 18%)

Milk Solids per Cow
average 375kg (up 1%)

Nitrogen per ha of grassland
average 178 kg (down 3%)

Single Farm Payment
average €16,603 per farm

Total Production Costs
average 25.9 cent per litre (down 6%)
average €2,698 per hectare (down 4%)

Somatic Cell Count
average 198,000 cells/ml (down 12%)

Gross Margin for Dairy Enterprise
average 24.13 cent per litre (up 3%)
average €2,577 per hectare (up 6%)

Net Margin for Dairy Enterprise
average 12.97 cent per litre (up 3%)
average €1,390 per hectare (up 8%)

Source: Teagasc National Farm Survey and Central Statistics Office

Irish Dairy Farming in 2015

Sharp fall in milk prices
but strong expansion in Irish milk production

Milk Production
up 10% on the 2014 level

Milk price
down 24% on the 2014 level

Weather Conditions
Excellent. Mild spring/autumn and no summer drought

Grass Availability
Excellent

Fertiliser Prices
little changed on 2014 level
Fertiliser Use
little changed on 2014 level

Feed Prices down 7%
Feed use up 7% per head

Other Direct Costs
up 4% on the 2014 level

Fuel prices
down 13% on the 2014 level

Total Input Costs
Overall, input costs slightly lower than in 2014

Net Margin for Dairy Enterprise
down 50% per litre on 2014 level
down 45% per ha on the 2014 level

Irish Dairy Farming in 2016

Modest recovery in milk prices
market balance slowly restored

Milk Production
up 7% on the 2015 level

Milk price
up 5% on the 2015 level

Weather Conditions
Reversion to more normal weather

Grass Availability
Not as good as 2015

Fertiliser Prices
little changed on 2015 level
Fertiliser Use
little changed on 2015 level

Feed Prices up 2%
Feed use up 3% per head

Other Direct Costs
up 2% on the 2015 level

Fuel prices
down 3% on the 2015 level

Total Input Costs
Overall, input costs slightly higher than in 2015

Net Margin for Dairy Enterprise
up 25% per litre on 2015 level
up 34% per ha on 2015 level

Source: Teagasc Estimates for 2015 and Forecasts for 2016

Review of Dairy Farming in 2015 and Outlook for 2016

Trevor Donnellan, Thia Hennessy and Brian Moran
Agricultural Economics and Farm Surveys Department, Teagasc

1. Introduction

2014 was a particularly good year for dairy farmers with income increasing by 7 percent bringing average Family Farm Income (FFI) on dairy farms to €67,598. Although milk price declined slightly in 2014, production levels were up and costs of production were down significantly.

After 31 years in existence, the EU milk quota system was abolished in 2015 leading to an expansion of milk production in some EU member states including Ireland. However, there were some market developments in the run up to milk quota removal leading to a depression in dairy product prices.

The high milk prices, good production conditions and low feed prices of 2014 made for an oversupply of dairy products in 2015 on global markets. Falling milk prices throughout 2015 were therefore inevitable. The weakness in dairy markets cannot be attributed to the removal of the milk quota. Continuing global milk supply growth in 2015 and weaker Chinese import demand for milk powders were the main factors. Processors in Ireland and elsewhere in Europe have intervened to limit the effects of the milk price reduction, via top up payments on the milk price.

The market weakness has persisted for longer than had been expected and the anticipated recovery in dairy product and milk prices has yet to materialise. At this point it appears that a better market balance may not be achieved until the middle of 2016. Given the seasonality of Irish milk production there is a risk that much of Ireland's milk deliveries in 2016 may achieve a low milk price.

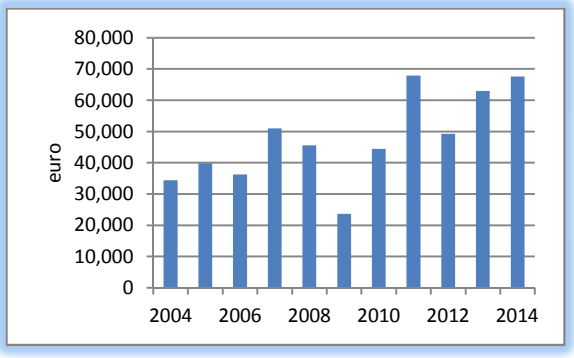
This paper looks back on dairy farm performance in 2014, reviews the outcome for 2015 and looks ahead to the prospects for 2016. Data from the Teagasc National Farm Survey (Teagasc NFS) are used in our review of 2014. The milk price and key input cost estimates for 2015 are used to produce an overall estimate of dairy enterprise margins for 2015. Finally, in the concluding sections of the paper, the forecast for milk price, production costs and dairy farm margins in 2016 are presented.

2. Review of the Economic Performance of Dairy Farms in 2014

National Farm Survey results for 2014 were finalised in May 2015, and the results for dairy farms are summarised here. To examine the economic performance of dairy farms in 2014, we first look at how dairy farm income has changed over the last number of years. Figure 1 presents the average Family Farm Income (FFI) on *Specialist Dairy* farms over the years 2004 to 2014. Average FFI reached €67,598 in 2011. The very poor production conditions and fodder crisis in 2012 put downward pressure on incomes. Some of that decline in farm incomes was reversed in 2013. Production costs fell again in 2014 and although milk price was on a downward path, the savings in expenditure and the increased volume of deliveries were sufficient to deliver an average income increase in the order of 7 percent, returning average incomes in 2014 to the 2011 position.

To further explore the economic performance of dairy farms in 2014, 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 2013 and 2014. Farms producing mainly liquid milk are excluded from the sample, as are herds of 10 cows or less.

Figure 1: Average Income on Irish Specialist Dairy Farms 2004 to 2014



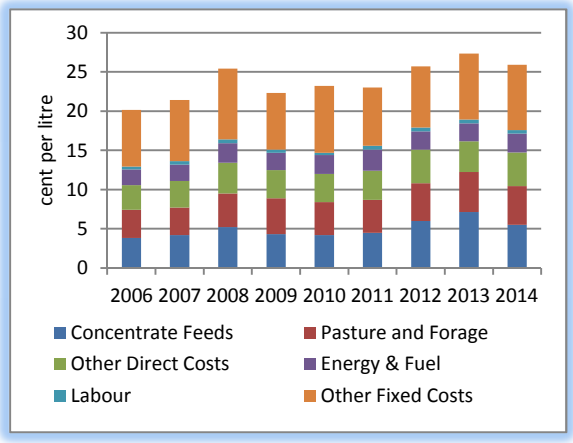
Source: Teagasc National Farm Survey (various years)

The gross output measure includes the value of milk and calf sales minus replacement costs. Gross output per litre was down 2 percent in 2014 relative to 2013. Total direct costs were down by 9 percent in 2014 compared to 2013, mainly due to a recovery to more normal production conditions following the fodder crisis. As a result, the average gross margin in 2014 increased by 3 percent on a cent per litre basis relative to 2013. In 2014, total fixed costs decreased by 1 percent relative to 2013. The average net margin in 2014 was 12.97 cent per litre, representing a 7 per cent increase on the 2013 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 2013 and 2014. Production per hectare increased by 3 percent in 2014 and overall net margin per hectare increased by 8 percent.

The cost and margin data in Table A3 allow us to examine the variability in economic performance across dairy farms in 2014. 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 (29.16 cent) are almost 25 percent higher than for the Top group (23.45 cent) and the net margin is more than 50 percent higher for the Top group (15.73 cent) compared to the Bottom group (10.09 cent).

Figure 2: Total Milk Production Costs (cent per litre) in Ireland: 2006 to 2014



Source: Teagasc National Farm Survey Data

As shown in Figure 2, total milk production costs declined in 2014. The main driver of this decline was reduced expenditure on concentrate feed, which was at particularly elevated levels in 2012 and 2013. Total production costs returned to levels similar to 2012 but not back to the levels recorded in the 2009 to 2011 period.

3. Review of 2015 Estimated Performance

This section of the paper presents a review of dairying in 2015. Teagasc NFS results for 2015 will not be available until the middle of 2016. Therefore, it is necessary to estimate the price and volume of inputs and outputs in 2015, in order to assess the outcome for margins. The following section of the paper first discusses cost estimates for 2015, looking at both input prices and input usage volumes. Finally, the development of dairy product markets in 2015 in terms of both price and volume changes is discussed.

The discussion of production costs in 2015 is complicated by the fact that milk production has increased substantially in 2015 due to the removal of milk quotas in April 2015. This increase in production has led to some increase in input usage on farms. The extent of this increase will be highly farm specific and will have varied by region so this analysis cannot attempt to cover the experience on every farm in 2015. Some consideration of the effect of changes in the volume of production costs and the value of production is given in section 3.1 and 3.3. However, a more detailed consideration is provided in the discussion of margins in Section 3.4.

3.1 Estimated Input Usage and Price 2015

It is not possible to offer a comprehensive assessment of likely changes in costs at the farm level in 2015, given that the post milk quota expansion strategy of the farm will itself influence the change in production costs, whether expressed on a per hectare or per litre basis. In this analysis of likely changes in production costs in 2015, it is assumed that the average farm increases its milk production by 10 percent in 2015. Where relevant in section 3.1, reference is made of the impact of expansion on production costs, but a more detailed consideration is deferred to section 3.4 which considers the margins achieved.

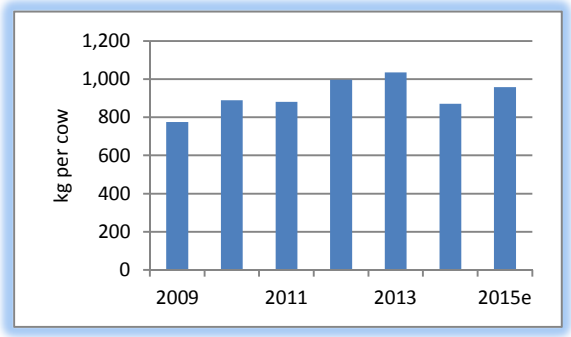
3.1.1 Feedstuff – usage and price 2015

Purchased feed (concentrates) is an important element of dairy production costs in Ireland, typically accounting for about 20 percent of total input expenditure, although this varies by farm and by year.

While official feed sales data for the full year are not yet available, these data provide evidence of an upward trend in feed use per cow in 2015. Weather conditions in 2015 have been generally favourable for grass growth, which suggests that the increase in feed use may be attributable to the removal of the milk quota and subsequent increase in milk yields. The average milk yield per cow is estimated to have increased by 5 percent in 2015 relative to 2014.

Figure 3 shows the average volume of compound feed use per cow, including an estimate for 2015. These data are derived from Department of Agriculture, Food and Marine (DAFM) figures on feed sales, from Central Statistics Office (CSO) data on animal numbers and estimates by the authors.

Figure 3: Compound Feed Purchases per Dairy Cow in Ireland: National Average for 2009 to 2015



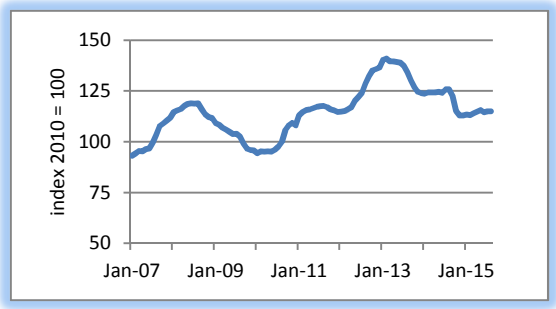
Source: Authors' estimates derived from DAFM and CSO data
Note: e = estimate

Individual farm data are not yet available, but clearly the outcome in terms of feed use for 2015 will vary by farm and by region. For the average dairy farm, expanding production by 10 percent, feed use per cow is likely to be 5 percent higher in volume terms than in 2014.

Weather conditions globally for cereal and other grain producers have been quite good in 2013, and 2014. A succession of good harvests has led to a rebuilding of global cereal stocks and generally lower international cereal prices. Conditions were again quite good in 2015, further contributing to the recovery in stock levels and leading to lower grain prices. These grain price reductions were eventually transmitted to the Irish feed market, leaving feed prices at a lower level in 2015 than in 2014.

Figure 4 shows an index of monthly Irish cattle feed prices from 2007 to 2015. The annual average feed price for 2015 is estimated to be €282 per tonne, corresponding to a 6 percent price decrease on the average 2014 level. This decrease in feed prices in 2015, combined with an estimated 10 percent increase in dairy aggregate dairy feed use, suggests that total expenditure on dairy feed in 2015 increased by 3 percent on the level recorded in 2014. However, it should be noted that this additional expenditure was supporting higher production levels. This means that on a per litre basis the expenditure on feed has actually declined by 6 percent.

Figure 4: Monthly Price Index of Cattle Meal in Ireland 2007 to 2015



Source: Central Statistics Office (Various Years)

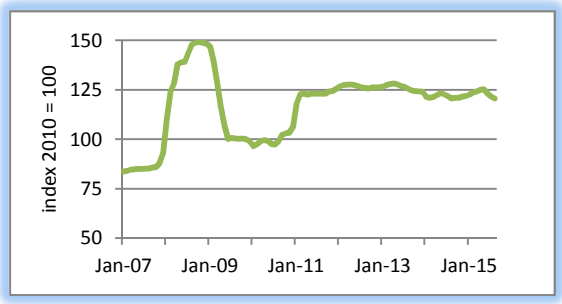
3.1.2 Fertiliser – usage and price 2015

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.

There was little change in fertiliser prices in 2015. However, this was down to two countervailing effects. It had been expected that fertiliser prices would rise in 2015, on the basis of the weakening of the euro versus the US dollar and the fact that the EU is a price taker in terms of fertiliser prices. In other words, world prices determine EU prices. However, the fall in oil prices which began to accelerate in early 2015 precipitated a fall in gas prices. Gas is by far the largest cost component of nitrogen based fertilisers.

So while world fertiliser prices fell in US dollar terms the price reduction in euro terms was minimal due to the weaker value of the euro in 2015. Figure 5 charts the Irish monthly index of farm level fertiliser prices from 2007 through to 2015.

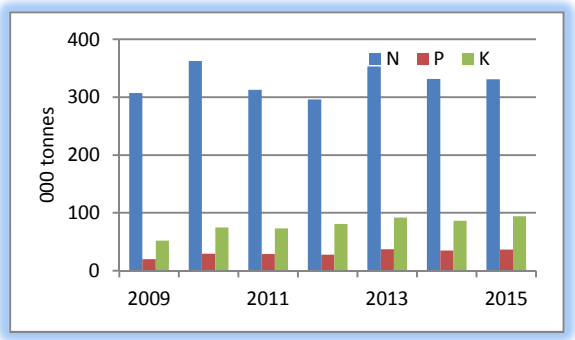
Figure 5: Monthly Price Index of Fertiliser in Ireland for 2007 to 2015



Source: Central Statistics Office (Various Years)

Nitrogen fertiliser sales were relatively static in 2015 in comparison with 2014. It seems that the good weather conditions of 2015 have meant that farmers did not need to increase nitrogen usage. DAFM sales figures for 2015 indicate a 1 percent volume reduction for nitrogen (N). By contrast the sales of phosphorus (P) and potassium (K) increased again in 2015 by 2.5 percent and 1.5 percent respectively. There is evidence of an upward trend in phosphorus and potassium sales in recent years. These fertiliser sales data are reported in Figure 6.

Figure 6: Irish Fertiliser Sales by Compounders 2009 to 2015



Source: DAFM (various years)

Overall, taking account of the marginal change in the level of fertiliser sales and the marginal decline in price, there has been little or no change in fertiliser expenditure on dairy farms in 2015 compared with the 2014 figure. Given that milk production has increased nationally, this suggests that fertiliser expenditure per litre of milk produced has declined on farms that have increased milk production.

3.1.3 Contractor Costs usage and price 2015

Contractor costs comprise the remaining 50 percent of the pasture and forage cost element. While no official figures are available, the fall in fuel prices in 2015 does not seem, on the basis of industry information, to have led to any reported change in contracting charges in 2015.

3.1.4 Pasture and Forage – usage and price 2015

With fertiliser expenditure estimated to be unchanged in 2015 relative to 2014 and expenditure on contracting estimated to be also unchanged, pasture and forage expenditure is estimated to have been similar on a per hectare basis in 2015 to that of 2014. This implies that expenditure on pasture and forage has fallen on a per litre basis on farms where milk production has increased. On a typical farm where production has increased by 10 percent the decrease in expenditure on pasture and forage is estimated to be 9 percent.

3.1.5 Energy and Fuel – usage and price 2015

Energy 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.

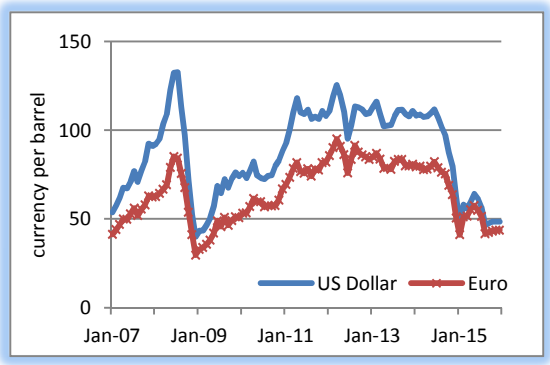
Motor Fuel: Crude oil prices are presented in Figure 7. Brent crude oil prices collapsed in 2015, much like they did when the global recession set in in 2008/2009. Oil supplies have been growing due to the return of production in regions of the world where geopolitical tensions have been a problem and also because of the growth in production of oil from fracking.

A price war of sorts has broken out, with OPEC seemingly intent on managing production at a level which has forced the price below $50 through much of 2015. It seems that OPEC's strategy is designed to secure a larger share of the global oil market for OPEC by dissuading future investment in higher cost oil extraction in particular the oil produced in the US from fracking.

Brent crude oil prices have now tumbled to an eight year low. Over much of 2015 crude oil prices have moved over a range of US$40 to US$60. The average annual price for 2015 will be just US$53, which represents a reduction of 46 percent on the average oil price in 2014 (US$99).

The euro has lost a lot of ground against the US dollar in 2015 as a result of stronger US growth prospects and the advent of quantitative easing in the Eurozone. The monthly average rate, as of November 2015, had declined to just US$1.07. On an annual average basis, the euro, moved from an average of $1.33 in 2014 to $1.12 in 2015. Hence, the estimated average crude oil price for 2015 was over €48 pb, a decrease in euro terms of about 35 percent on the 2014 value of €74pb. Overall, fuel costs in Ireland experienced a decrease in 2014, with diesel prices approximately 13 percent lower in 2015 relative to the 2014 level.

Figure 7: Monthly Average Brent Crude oil prices in Euro and US dollar from 2007 to 2015



Source: St Louis Fed.

Electricity: Electricity costs change infrequently in Ireland due to price regulation. Prices were relatively stable in 2014. In spite of the fall in oil prices, electricity prices have been slow to decrease in 2015. However, this reflects the fact that Ireland's electricity is produced mainly from gas and coal rather than oil. While gas and coal prices have been falling the transmission of electricity price reductions to the consumer has occurred only gradually. On an annual average basis, electricity prices were relatively unchanged in 2015 relative to 2014.

Energy and Fuel: Demand by farmers for fuel and electricity tends to be relatively inelastic with respect to price. There will be some increase in energy requirements associated with additional milk production, but on a per litre basis the energy cost for these marginal litres should be considerably lower than the average energy cost per litre. The overall expenditure on both electricity and fuel is estimated to have decreased by 7 percent in 2015 relative to 2014 on a per hectare basis.
Given that milk production has increased nationally by over 10 percent, this is suggests that energy and fertiliser expenditure per litre of milk produced has declined even further on farms where milk production has increased. The decrease in expenditure on energy is estimated to have been 16 percent on a farm that has expanded milk production by 10 percent.

3.1.6 Other Direct and Fixed Costs– usage and price 2015

It is estimated that there was a 1 percent increase in agricultural wages in Ireland in 2015. Again, it is assumed that the quantity of hired labour used on farms is likely to have changed little year on year. Additional hours may have been required on farms that have expanded milk production.

Breaking with the trend of recent years, there is evidence of higher inflation in other input cost items. Whereas inflation in other input costs items has been typically no more than 1 to 2 percent per year, this has risen to 4 percent in 2015. It is assumed that usage of these input items will be unchanged and, as a result, the increase in prices is reflected in a corresponding increase in expenditure on these items.

The assessment of fixed costs in the Teagasc National Farm Survey is quite complex and definitive information on how fixed costs have changed in 2015 will not be available until the National Farm Survey results for 2015 become available. While is it estimated that at the overall farm level fixed costs on dairy farms are relatively unchanged in 2015, the share of fixed cost allocated to the dairy enterprise on dairy farms is estimated to have declined.

3.1.7 Estimate of Total Input expenditure for 2015

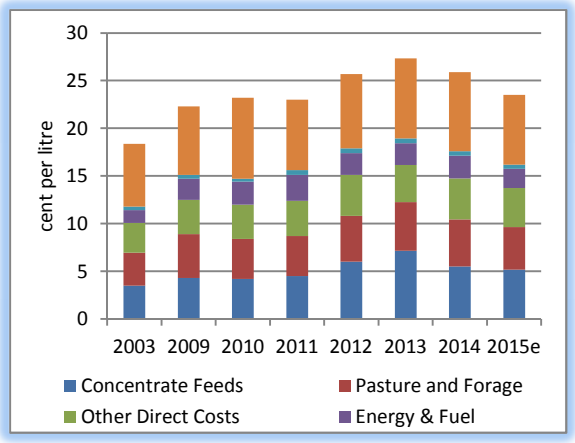
With the removal of the milk quota most dairy farms in Ireland are now engaged in a phase of expansion. The capacity to produce more milk should allow dairy farmers to tap into some previously unexploited productivity improvements and these in turn will have an impact on the cost of production on both a per litre and per hectare basis. 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

their differing expansions strategies. Here it is assumed that the average farm has expanded its milk production by 10 percent in 2015, which is close to the national average rate of expansion.

Figure 8 charts the average total cost of production and its subcomponents for selected years from 2003 to 2014 and the associated estimates for 2015.

Figure 8: Total Costs of Milk Production in Ireland for selected years and estimate for 2015



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

It is estimated that the total cost of production for in Ireland in 2015 was 23.5 cent per litre compared to an average of 25.9 cent per litre in 2014. This is equivalent to a 9 percent decrease in costs in 2015 relative to 2014 on a per litre basis. This cost reduction is mostly driven by productivity gains as the volume of milk produced in 2015 has increased by 10 percent on average. While no hard data are available yet, it is estimated that these additional litres have been produced with a pro rata increase in the volume of feed used, and without any increase in the volume of fertiliser used or silage made. There is even a suggestion that silage production may have fallen in 2015, given the ample stocks of silage available on many farms when grazing began in 2015. However, this is not factored into the cost estimates for 2015, given the lack of supporting data at this time.

3.2 Review of Dairy Market in 2015

As was forecast in Outlook 2015 (Donnellan et al 2014), there was a sharp decrease in dairy commodity and milk prices in 2015. The fall in prices was brought about by the strong growth in global milk production in the main dairy surplus regions globally (New Zealand, European Union and United States) that had occurred through 2014 and the persistence of this growth into 2015.

In the calendar year 2015, milk production in New Zealand is likely to register a decrease of about 3 percent, which is significant in the context of the strong growth in New Zealand production in previous years. However, in 2015 milk production has continued to grow in the EU, aided by the quota elimination. Ireland, the Netherlands and Poland have recorded the largest percentage increases. These increases were offset to a degree by a continuing decline in milk production in parts of Southern and Eastern Europe. Total EU milk production in 2015 is likely to be up by 1 percent. It is estimated that production has also increased in 2015 in the US by 1.3 percent (USDA 2015), reflecting an increase in both cow numbers and milk yields. As with the EU, there a regional variation in production developments in the US in 2015, with strong milk production growth in the Mid-Western states of the US, offsetting a contraction in production on the West Coast.

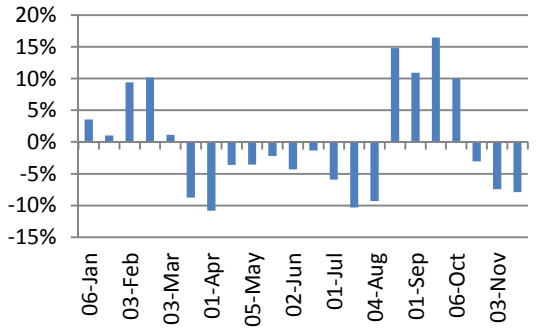
In 2014 global milk production grew by 3.3 percent, but lower milk prices affected production growth for 2015 (IDF, 2015). Provisional estimates suggest that global milk production increased to 814 million tonnes (mt) in 2015, compared with 802 mt in 2014. This annual rate of increase of 1.5 percent is below the trend of the last fifteen years, which was 2.3 percent per annum.

The supply side is only part of the story. On the demand side the EU continued to deal with the closure of the Russian market, which had some knock on consequences even in member states that traditionally had little dairy trade with Russia. In 2015 Russia announced that the embargo, which began in 2014, would be extended into 2016.

More importantly however, powder demand from China in 2015 was considerably weaker than in 2014. Expectations had been that EU powder exports to China would have become more buoyant, but this has not been the case. For the period January to September 2015 Chinese imports of SMP were 22 percent below the same period in 2014. The reduction for WMP has been more pronounced, with a 52 percent drop in January to September 2015 relative to the same period in 2014.

Figure 9 shows price movements in the influential New Zealand Global Dairy Trade (GDT) Auction Index. With only a few exceptions there has been a general downward trend in the index through much of 2015. There was a slight upward bounce in prices in February 2015, and a temporary recovery in early autumn, but the index has returned to negative territory in November 2015.

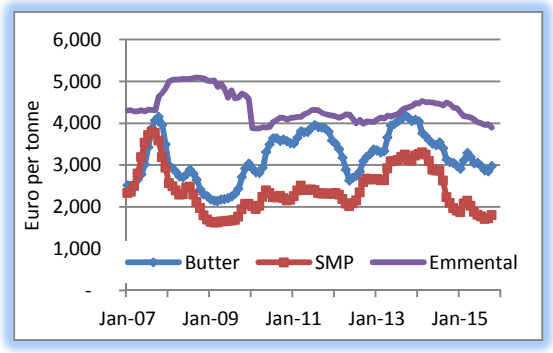
Figure 9: GDT Auction Index Price movements in 2015



Source: GDT Auction

European wholesale dairy product prices are shown in Figure 10. A sharp decline in dairy production prices is evident over the last 12 months. Notably, butter prices have not weakened to the same extent as SMP prices.

Figure 10: European Dairy Product Prices 2007-15



Source: AHDB 2015

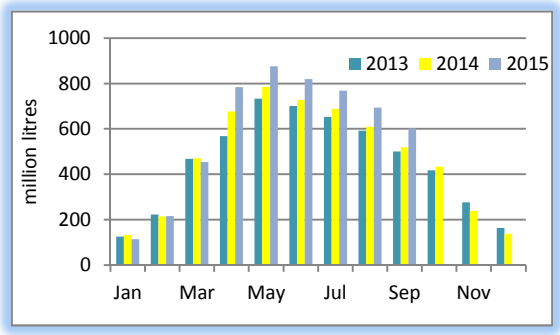
3.3 Estimated Output Values 2015

The elimination of the milk quota in April 2015 has paved the way for a strong increase in the volume of milk delivered in 2015. In the first quarter of 2015 production was constrained by the milk quota, but even so Irish production was still 4.4 percent over quota. As illustrated in Figure 11, monthly Irish milk deliveries in 2015 surged ahead from April onwards, with increases over the corresponding months in 2014 ranging from 10 to 16 percent.

While grass growing conditions were good in 2015, low milk prices led to much lower profitability than in 2014. The strength of the increase in milk production reflects further additions to the dairy cow herd and a relaxation of the constraint on milk yield that had been imposed by the growing cow herd in the final years of the milk quota. Some producers may also have been compelled to boost production for cash flow reasons given the hit which the fall in milk price would otherwise have delivered to their milk cheques.

Overall, Irish milk production in the 2015 calendar year is estimated to be up by about 10 percent on the 2014 level and possibly more, depending on the extent of late season production. Irish dairy cow numbers, as recorded in June 2015 increased to 1.295 million, compared with 1.226 million in 2014, an increase of 5.7 percent (CSO 2015). This means that the increase in Irish dairy cow numbers since 2010 is over 21 percent.

Figure 11: Monthly Irish Milk Deliveries in 2013, 2014 and 2015

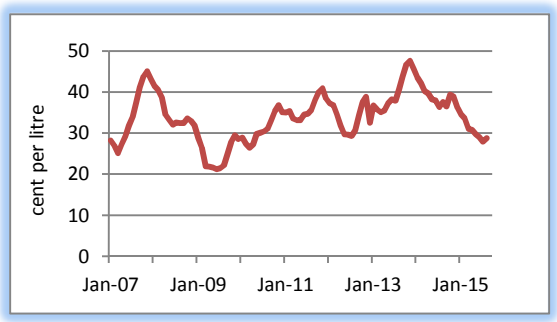


Source: CSO, DAFM

The Irish dairy sector was partially insulated from the fall in global dairy commodity prices by the weakening of euro against both the US dollar and sterling. Figure 12 presents monthly Irish milk prices recorded by the CSO from January 2007 through to September of 2015. In Ireland the 2015 manufacturing milk price is estimated to have decreased by about 24 percent relative to the 2014 level on a standardised constituent basis. Milk prices declined steadily through the year.

The decline in prices was such in 2015 that in Ireland processors found it necessary to intervene to support farm milk prices through top up payments additional to their monthly milk price. This alleviated some of the pressure that high cost producers in particular were feeling.

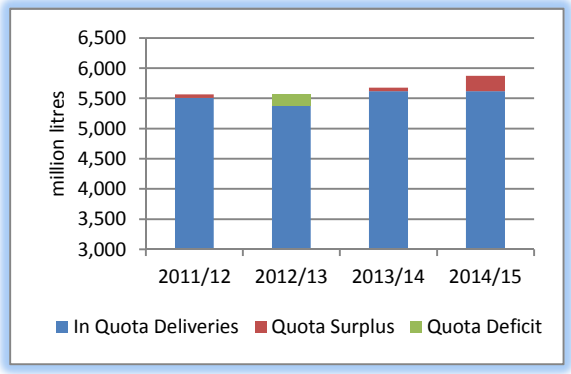
Figure 12: Irish Farm Gate Milk Prices Actual fat (vat incl.) 2007 – Sept 2015



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

The annual average national milk price is estimated to be almost 30 cent per litre (vat inclusive) in 2015 on an actual fat and protein basis. The actual constituent milk price benefitted from an increase in the fat and protein content.

Figure 13: Irish Milk Deliveries (fat adjusted) and Quota Surplus/Deficit (quota year basis)



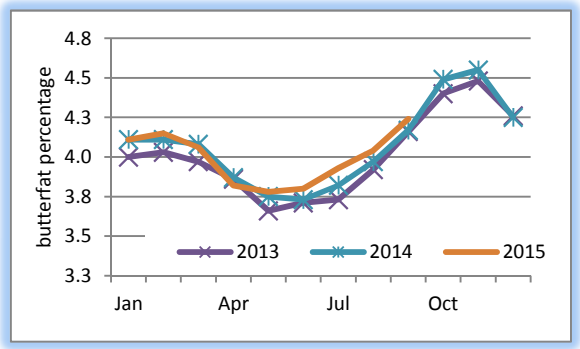
Source: Adapted from CSO data and Authors' calculations
Note: Figures exclude imported milk for processing
e = estimate

Even though the milk quota has been eliminated, it left one parting shot in 2015, in the form of an EU wide super levy bill of €818 million which has affected almost half of the EU member states. Figure 13 illustrates that, on a calendar year basis, Irish milk deliveries in the 2014/15 milk quota year were about 4 percent over quota, leading to an Irish superlevy bill of €69 million. This is equivalent to almost €4,000 for the average dairy farm, but it should be noted that some farms will face a much larger bill.

Arrangements have been put in place to give farmers the option to discharge this obligation over a three year period, to reduce the immediate effect of the fine on their cashflow. Not all farmers with a superlevy bill have availed of this option. Overall, it is estimated that €35 million has been paid by Irish dairy farmers in superlevy fines in 2015. The balance of the fine (another €35 million) will be paid in a staggered manner over 2016 and 2017.

Acknowledging the difficult dairy and pig market situation, the European Commission announced an emergency aid package in September 2015. This package was worth €22 million to Irish farmers in 2015.

Figure 14: Butterfat in Irish Milk Deliveries 2013-2015



Source: CSO

Monthly butterfat and protein levels in 2015 have increased considerably on the 2014 level as illustrated in Figure 14. The average fat content of Irish milk deliveries in 2015 is likely to rise to about 4.04 percent and protein should average about 3.50 percent.

3.4 Review of Dairy Enterprise Net Margins in 2015

The review of milk prices showed that the average milk price for 2015 was down 24 percent on the 2014 level, while the review of input costs concluded that total production costs on a per litre basis are estimated to have decreased by 9 percent in 2015 relative to 2014, aided by the 10 percent increase in milk production.

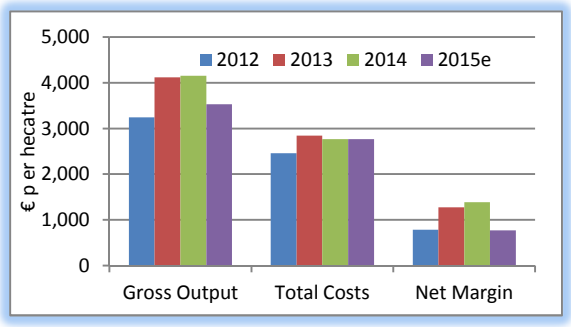
It is not possible to provide a farm specific indication of the change in margin per litre (or per hectare) in 2015, given that individual farms will have expanded production to differing extents and will have faced differing marginal costs for the additional milk produced. These uncertainties feed into the calculation of the average margin per litre (hectare) that was achieved in 2015.

On average milk production increased by 10 percent in 2015 and allowance for this has been made in the cost per litre (hectare) and margin per

litre (hectare) calculation. In reality many dairy farmers will now be more interested in monitoring their margin per hectare rather than in their margin per litre. Margin per hectare is described in this section before turning to margin on a per litre basis. Figure 15 presents the estimated average gross output, production costs and net margin per hectare for 2015 in comparison to recent years on the basis of a 10 percent increase in milk production.

In estimating the margin per hectare, changes in the price of milk and in the price of input items tells only part of the story. The increase in milk production will also have had an impact on the output, costs and margin per hectare that was achieved. Some farms will have produced additional litres with additional land, while other farms will have intensified production on the same land base. Other farms will have adopted a combination of both approaches. Here we assume that expansion has taken place on the same land base.

Figure 15: Average Gross Output, Costs & Margins per hectare for Irish Milk Production in 2012-2014 & estimate for 2015

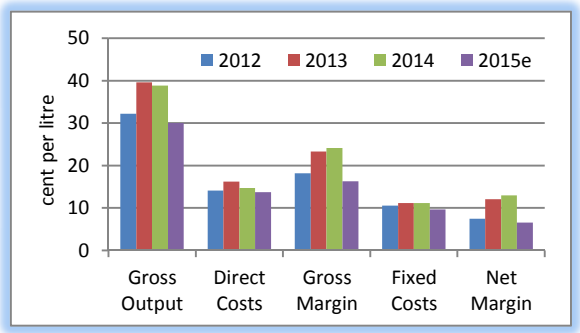


Source: Teagasc National Farm Survey Data and Authors' Estimates
Note: e = estimate

For 2015 the net margin for milk production averaged €770 per hectare. For many farms this makes 2015 the lowest margin year since 2009, in spite of the increase in milk production per farm in the intervening years. The decline in margin per hectare in 2015 is estimated to have been 45 percent. A sharper decline in margin per hectare will have been recorded on farms with a more modest increase in milk deliveries or on farms where expansion was primarily achieved through the farming of addition hectares rather than the production of additional litres on an unchanged land base.

Estimated average net margin per litre is shown in Figure 16 on the basis of a 10 percent increase in milk production. Gross output per litre is estimated to have decreased in 2015 to 30 cent per litre. Input costs also decreased due, in the main, to lower, feed and fuel expenditure and productivity gains. Even though milk production increased in volume terms, there was no increase in the fixed cost allocation to the dairy enterprise. This is because the fall in milk prices more than offset the rise in milk production, meaning that the value of milk sales on the average farm actually declined in 2015. Overall, the just over 2 cent per litre drop in total costs in 2015 did little to alleviate the effect of the 9 cent fall in milk prices. The estimated net margin in 2015, of 6.5 cent per litre, represents a 45 percent reduction on that recorded in 2014. The smaller decrease in margin per litre in comparison with margin per hectare is due to the 10 percent increase in production that has been assumed to have been produced with the same land requirement. See Table A5 and Table A6 for estimates of output, costs and margins on a per litre and a per hectare basis for a farm that has achieved a 10 percent expansion in milk production in 2015.

Figure 16: Average Gross Output, Costs & Margins per litre for Irish milk production in 2012-2014 and estimates for 2015



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

It should be noted that the net margin calculation presented here does not reflect the superlevy fine or the emergency compensation package, as these are accounted for in the overall farm income measure rather than the margin calculation.

4. Outlook for 2016

The discussion of production costs in 2016 is complicated by the fact that milk production is likely to increase again in 2016. For the purposes of this analysis we have forecast an increase in production in 2016 of 7 percent on the existing land base. The cost of producing additional milk would

typically be higher than illustrated here in cases where the land area being farmed has increased.

A further increase in production in 2016 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. The impact of increased production on the value of milk output and input expenditure is considered separately in the discussion of margins in Section 4.4.

4.1 Outlook for Input Expenditure 2016

As was the case in estimating production costs in 2015, it is impossible to offer a comprehensive assessment of likely changes in costs at the farm level, given that the expansion strategy of the farm will itself influence the change in production costs, whether expressed on a per hectare or per litre basis. In this analysis of likely changes in production costs in 2016, it is assumed that the average farm increases its milk production by 7 percent in 2016.
Where relevant in section 4.1 reference is made to the impact of expansion on production costs, but a more detailed consideration is deferred to section 4.4, which considers the margin forecast.

4.1.1 Feed usage and price 2016

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. Having fallen steeply in both 2013, and 2014, cereal prices at harvest 2015 were more or less unchanged on the previous year. This reflected yet another good international harvest across much of the main production regions of the world, for the third year in succession.

The volume of dairy feed per head appears to have increased in Ireland in 2015 by about 5 percent, which has contributed to the increase in milk yields. With the assumption of normal weather in Ireland in 2016, feed volume requirements per head for grassland enterprises are expected to remain at least at 2015 levels and will probably increase on farms continuing to increase production through yield growth.

Farmers should not see much variation in feed prices at least until harvest 2016 approaches, with international weather conditions likely to determine exactly how grain and feed prices move at that point. Having had three successive years of favourable weather conditions and above average yields, futures markets appear to be betting on a reversion to normal weather conditions, lower yields and some contraction in the area planted, leading to a reduced harvest in 2016 and hence slightly higher international cereal prices than in 2015.
It is reasonable to suggest that upside feed price pressure is more limited given the recovery in cereal stock levels over the last three years. A 5 percent increase in cereal prices is forecast in 2016, which will put slight upward pressure of feed prices in the latter months of 2016. Taking account of 2015 harvest prices and projected harvest prices in 2016, average annual Irish feed prices in 2016 should be about 2 percent higher than average 2015 feed prices.

A small increase in feed volume of 3 percent is factored in which would give rise to a 5 percent increase in feed expenditure on a per hectare basis. Given the assumed 7 percent increase in milk output, this would mean that expenditure on feed would actually fall marginally (down 1%) on a per litre basis in 2016.

4.1.2 Fertiliser & Contracting Costs– usage and price 2016

It is difficult to gauge how fertiliser prices might move in 2016. A decline in prices on the world market in 2015 was not replicated in the Eurozone due to the weakening of the euro against the US dollar.

Looking at production costs, gas prices are expected to remain low and the supply/demand balance for nitrogen based products does not suggest that prices should increase. A further weakening of the euro cannot be ruled out and this would erode the potential for any further reduction in prices. On balance no change in fertiliser prices is forecast for 2016.

It is assumed that on average fertiliser use in 2016 will be on a par with the 2015 level, acknowledging that there is potential for an increase in fertiliser use per hectare in 2016 on farms with more ambitious expansion plans. A reversion to more average weather could also impact on fertiliser usage. With fertiliser prices and usage levels forecast to be unchanged, this would mean that the total expenditure on fertiliser in 2016 would be unchanged.

No change in agricultural contracting charges is forecast, with the volume of contracting undertaken and the associated expenditure assumed to remain unchanged in 2016. This would

leave total pasture and forage costs per hectare unchanged in 2016 relative to 2015. However, with a forecast increase in milk production of 7 percent, fertiliser and contracting charges would decrease by 7 percent on a per litre basis in 2016.

4.1.3 Energy and Fuel – usage and price 2016

An analysis of futures prices indicates that the balance of market opinion sees Brent crude oil prices remaining close to $50 over the course of 2016. This equates to about €45 pb at a euro exchange rate of $1.10, which would represent a decrease of 7 percent in oil prices in euro terms on the average 2015 level. This suggests that there would be a 3 percent drop in farm diesel prices in 2016. Electricity prices are assumed to decline slightly by 3 percent in 2016, as more of the decrease in gas and oil prices is passed back to consumers. Factoring in a slight increase in usage volume associated with increased milk production, this would leave overall dairy farm expenditure on energy and fuel down about 1 percent in 2016 relative to the 2015 level on a per hectare basis. On a typical farm, expanding its production by 7 percent, this would equate to a larger reduction of about 7 percent on a per litre basis.

4.1.4 Other Direct and Fixed Costs – usage and price 2016

Macroeconomic indicators for Ireland remain positive with another year of strong economic growth forecast for 2016 (ESRI, 2015). As Irish unemployment continues to fall towards 8 percent, it can be expected that wage inflation will pick up slightly in 2016. Therefore an increase in labour costs in 2015 of 2 percent is forecast. The increase in the general inflation affecting other farm costs in 2015 is forecast to be 2 percent on a per hectare basis. Allowing for an increase in milk production of 7 percent this would correspond with a 5 percent reduction on a per litre basis.

With the dairy enterprise in expansionary mode on most Irish dairy farms, other things being equal the share of fixed cost allocated to the dairy enterprise would increase. However, low milk prices mean that the dairy enterprise fixed cost allocation may not have change significantly in 2015 relative to 2014. However, a slight increase in fixed cost allocation is factored in as part of the 2016 forecast.

4.1.5 Estimate of Total Input expenditure for 2015

Overall, production costs per hectare should be up by about 6 percent in 2016, mainly due to higher feed expenditure and a higher fixed cost allocation. However, increased milk production should leave production costs unchanged on a per litre basis.

4.2 The Outlook for Dairy Markets in 2016

Prospects for 2016 remain uncertain. The evidence to date is that the current price trough has not been as extreme as in 2009, but has persisted for a longer period. In 2009 prices rebounded quickly from the lowest point, but during the existing price crisis there have already been a few false dawns where prices have rallied for a short period only for that rally to unravel quickly in subsequent weeks. While the period of greatest market weakness may have passed, the time line for a complete recovery to prices that would be considered normal is uncertain and unlikely to occur until we are in the peak production season of 2016.

A further slowdown in global milk production growth will bring about a quicker recovery in prices. The evident stagnation in New Zealand's dairy expansion is perhaps the most critical development. Production in New Zealand has contracted in 2015 and low milk prices should mean a further contraction in 2016.

In the final quarter of 2015 there is evidence of a slowdown in milk production growth in many EU Member States, which suggests that EU milk production growth in the first half of 2016 should be more limited. Nevertheless, the long established trend of declining dairy cow numbers in the EU has been broken over the last couple of years, with cow number stabilising and then increasing in the run up to milk quota removal. This means that even with very modest increases in average milk yields, an expansion in EU production in the short run is probable unless the EU herd moves back into decline.

For 2016 latest forecasts suggest a 2 percent increase in US milk production. This increase would come mainly from increased milk yield, rather than a growth in cow numbers (USDA, 2015).

On the demand side internal EU consumption should continue to increase. However, prospects for EU export markets in 2016 remain somewhat

negative. The Russian market is likely to remain closed to EU exports. The continuation of low crude oil prices may dampen dairy product import demand in countries where oil revenues represent a major share GDP. Chinese dairy import demand may pick up, but there has been growth in Chinese domestic production which could limit the recovery in import demand. The sharp weakening of the euro in 2015 assisted exports to non-Eurozone markets, but a further sharp devaluation of the euro is unlikely in 2016.

Taking these factors into consideration, it is likely that a weak dairy market situation will persist into the first half of 2016. Given the seasonal milk production profile in Ireland, an increase in prices by peak season would bring a greater benefit to producers in 2016.

Current (November 2015) Irish milk prices are at their lowest since 2009, but remain above the level currently being returned by the market. With little prospect of a major price improvement in the short term, this means that the annual average Irish milk price in 2016 is unlikely to be significantly higher than the 2015 level. A further improvement in milk fat and protein content may also help to lift milk prices on actual constituents basis. Overall, it is estimated that the annual average farm milk price in 2016 will be 5 percent higher than that of 2015, giving an annual average price of 31.5 cent per litre on an actual fat, vat inclusive, basis.

4.3 The Outlook for Milk Production in 2016

In spite of the fall in milk prices in 2015, the removal of milk quotas saw Irish milk production increase by more than 10 percent. This was achieved via an increase in cow number of over 5 percent, with the balance of the increase associated with higher milk yields. While short term prospects for the dairy sector mean that milk price will not be significantly higher in 2016, it is reasonable to expect that given the continued positive net margin in milk production, further expansion in milk production will still occur. This expansion will be based on increased cow numbers and further yield improvement, with a national average increase of 7 percent forecast relative to the 2015 level.

In 2014 Teagasc conducted a survey of dairy farmers' short term milk expansion plans. On the basis of this survey it was concluded that, in the aggregate, Irish milk production would increase by 10 percent in 2015 (Donnellan et al., 2014). This forecast has been shown to be quite close to the actual rate of increase in production in 2015. The same survey indicated that there would be a further increase in production in 2016.

This survey was taken before the weaker dairy market environment emerged and this may have tempered the confidence of some producers in pursuing immediate further expansion. Equally some producers will feel that the worst of the market weakness has passed and that prices should move upwards rather than downward as we enter 2016.

On balance a further 7 percent increase in Irish milk output is forecast for 2016. This would take the increase in Irish milk production relative to the Food Harvest 2020 base period to over 30 percent.

4.4 The Outlook for Dairy Enterprise Net Margins in 2016

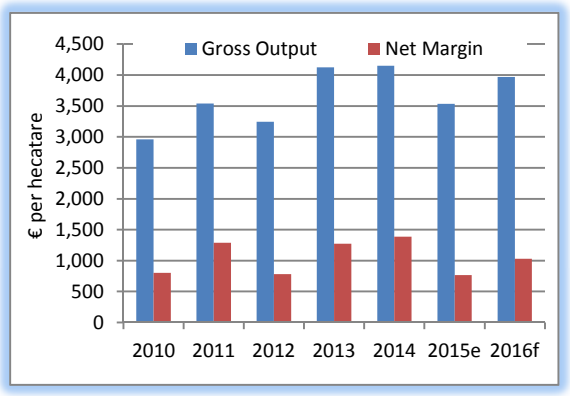
This section considers the impact of changes in milk prices and production costs on gross and net margins on dairy farms. The main subcomponents within the dairy production cost basket are forecast to exhibit little change in price in 2016 relative to 2015.

For simplicity of comparison with the farm's performance in 2015, we assume that expansion in 2016 takes place on the same land area that was used in 2015, i.e. it is assumed that milk production per hectare will increase by 7 percent in 2016 relative to 2015 on the existing land base. In cases where additional land is required, this would impact on the cost of producing additional litres.

In 2016, profitability per hectare, as measured by the net margin on the average dairy farm, producing 7 percent more milk, is forecast to increase. Average net margin per hectare is estimated to be €770 for 2015, but is forecast to increase to €1,030 or 34 percent in 2016, as illustrated in Figure 17.

The additional milk production is assumed to be produced at a lower marginal cost, which contributes to the 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, eg fertiliser expenditure, other direct costs, energy and hired labour.

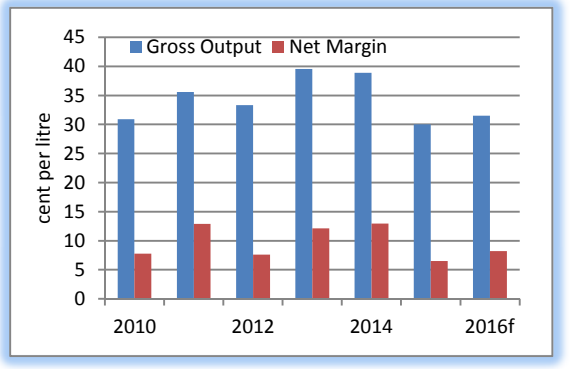
Figure 17: Average Gross Output and Net Margin for per hectare for 2010 to 2015 with Forecast for 2016



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

Figure 18 presents a margin forecast on a per litre basis for the average dairy farm where production increases by 7 percent in 2016 relative to the 2015 level. Given the forecast 5 percent increase in the annual average milk price in 2016, gross and net margins are forecast to improve in 2016. Net margin per litre is forecast to increase by 25 percent in 2016, to an average of 8.2 cent per litre.

Figure 18: Average Gross Output and Net Margin per litre in Ireland 2010 to 2015, with Forecast for 2016



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

5. Concluding Comments

Dairy incomes reached record levels in 2014, with marginally lower milk prices more than offset by lower costs of production. Again in 2015, production costs decreased marginally on a per hectare basis due, in the main, to lower feed and fuel prices. The removal of milk quotas also facilitated productivity improvement which led to a reduction in costs measured on a per litre basis. However, there was a very substantial decrease in milk prices in 2015 which was not offset by the increase in milk production that has taken place since quota elimination. As a result the average net margin for milk production in 2015 is estimated to have declined by about 6.5 cent per litre to an average of 6.5 cent or €770 per hectare.

International dairy market prices will recover gradually in the first half of 2016. A recovery in prices in time for the peak Irish milk delivery months could allow for an overall milk price improvement in 2016. An annual average increase in milk prices of about 5 percent is forecast for 2016 compared with 2015.

Overall, a decrease in production costs per litre in 2016 relative to 2015 can be expected, particularly on farms that further increase production. Even on farms where production remains static in 2016, there should be a modest reduction in production costs.

Based on these forecast production levels, output price and input cost movements, dairy margins per litre and per hectare are likely to improve in 2016 compared with 2015. Average net margins are forecast to be about 8.2 cent per litre or €1,030 per hectare in 2016, surpassing the income performance of 2012, but still falling short of the income levels earned in 2013 and 2014.

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Table A1: Average Gross and Net Margin of Milk Produced

	2013	2014	% Change
	cent/litre		
Total Gross Output	39.50	38.86	-2
Concentrate Costs	7.10	5.49	-23
Pasture and Forage Costs	5.10	4.94	-3
Other Direct Costs	3.90	4.31	+10
Total Direct Costs	**16.1**	**14.74**	**-9**
Gross Margin	**23.3**	**24.13**	**+3**
Energy and Fuel	2.40	2.39	+1
Labour	0.50	0.46	-13
Other Fixed Costs	8.40	8.31	-1
Total Fixed Costs	**11.25**	**11.16**	**-1**
Net Margin	**12.10**	**12.97**	**+7**

Source: Teagasc National Farm Survey Data

Table A2: Average Net Margin per hectare*

		2013	2014	% Change
Milk Produced	litres/ha	10,375	10,686	+3
Total Gross Output	€/ha	4,107	4,080	-1
Total Costs	€/ha	2,817	2,698	-4
Net Margin	€/ha	1,290	1,390	+8

* - 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 2014

	Top	Middle	Bottom
		cent/litre	
Concentrate Feeds	4.91	4.97	6.58
Pasture & Forage	4.42	4.72	5.67
Other Direct Costs	4.03	4.35	4.55
Energy & Fuel	2.04	2.24	2.89
Labour	0.66	0.50	0.22
Other Fixed Costs	7.39	8.28	9.24
Total Costs	**23.45**	**25.06**	**29.16**
Net Margin	**15.73**	**13.11**	**10.09**

Source: Teagasc National Farm Survey Data

Table A4: Output and profit per hectare for Top, Middle and Bottom one third of farms in 2014

		Top	Middle	Bottom
Stocking rate	cows/ha	2.51	2.04	1.63
Milk Sold	Litres per ha	14,226	10,469	7,398
Concentrates fed per cow	kg	996	912	968
Concentrates fed per litre of milk produced	kg	0.17	0.17	0.22
Gross output	€ per ha	5,551	3,978	2,750
Direct Costs	€ per ha	1,955	1,493	1,191
Gross Margin	€ per ha	3,596	2,485	1,559

Source: Teagasc National Farm Survey Data

Table A5: Average Gross and Net Margin per litre of Milk Produced 2013-2015

	2013	2014	**2015e**
		cent/litre	
Total Gross Output	39.50	38.86	30.0
Concentrate Costs	7.10	5.49	5.2
Pasture and Forage Costs	5.10	4.94	4.5
Other Direct Costs	3.90	4.31	4.1
Total Direct Costs	**16.1**	**14.74**	**13.7**
Gross Margin	**23.3**	**24.13**	**16.3**
Energy and Fuel	2.40	2.39	1.8
Labour	0.50	0.46	0.4
Other Fixed Costs	8.40	8.31	7.5
Total Fixed Costs	**11.25**	**11.16**	**9.7**
Net Margin	**12.10**	**12.97**	**6.6**

Source: Teagasc National Farm Survey Data. Figures for 2015 are estimates

Table A6: Average Gross and Net Margin per hectare 2013 -2015

	2013	2014	**2015e**
		€ per hectare	
Total Gross Output	4,121	4,153	3,532
Concentrate Costs	749	587	607
Pasture and Forage Costs	525	528	528
Other Direct Costs	412	461	479
Total Direct Costs	**1,686**	**1,575**	**1,614**
Gross Margin	**2,435**	**2,577**	**1,918**
Energy and Fuel	234	255	237
Labour	75	49	52
Other Fixed Costs	851	888	861
Total Fixed Costs	**1,160**	**1,193**	**1,150**
Net Margin	**1,275**	**1,385**	**768**

Source: Teagasc National Farm Survey Data. Figures for 2015 are estimates

Irish Cattle Farming in 2014

Irish Cattle Slaughter
1.748 million head (up 10%)

Live Exports
0.241 million head (up 13%)

Irish Suckler Cow Numbers
1.042 million (down 4%)

Weanling price
average €614/head (0%)

Male Store price
average €900/head (down 4%)

Female Store sale price
average €862/head (down 2%)

Male Finished Animals Price
average €370/100kg (down 9%)

Female Finished Animals Price
average €380/100kg (down 9%)

Gross Margin
(Single Suckling)
average €338 per hectare (+15%)

Gross Margin
(Cattle Finishing)
average €314 per hectare (-21%)

Stocking Rate (Calf to Weanling)
average of 1.16 lu/ha

Stocking Rate (Calf to Store)
average of 1.41 LU/ha

Stocking Rate (Calf to Finishing)
average of 1.70 LU/ha

Stocking Rate (Cattle Finishing)
average of 1.53 LU/ha

Concentrate Fed/LU
(Cattle Finishers)
average 686 kg (down 16%)

Slaughter Weight/Head
average 332 kg (up 2%)

Total Production Costs
(Single Suckling)
average €920 per hectare (down 2%)

Total Production Costs
(Cattle Finishing)
average €1,118 per hectare (down 13%)

Source: Teagasc National Farm Survey and Central Statistics Office

Irish Cattle Farming in 2015

Higher output prices
for calves and adult animals

R3 Steer price
up 8% on the 2014 level

Weanling and Store prices
up 15% on the 2014 level

Weather Conditions
Excellent Mild
Spring/Autumn, No Drought

Grass Availability
Excellent

Fertiliser Prices
little changed on 2014 level
Fertiliser Use
little changed on 2014 level

Feed Prices down 6%
Feed use down slightly

Other Direct Costs
up 4% on the 2014 level

Fuel prices
down 13% on the 2014 level

Total Input Costs
Overall, input costs slightly lower than in 2014

Gross Margin (Suckler)
up 37% on the 2014 level
Gross Margin (Finisher)
up 33% on the 2014 level

Source: Teagasc Estimates for 2015 and Forecasts for 2016

Irish Cattle Farming in 2016

Lower output prices
for calves and adult animals

R3 Steer prices
down 4% on the 2015 level

Weanling and Store prices
down 7% on the 2015 level

Weather Conditions
Reversion to more normal weather

Grass Availability
Not as good as 2015

Fertiliser Prices
little changed on 2015 level
Fertiliser Use
little changed on 2015 level

Feed Prices up 2%
Feed use unchanged

Other Direct Costs
up 2% on the 2015 level

Fuel prices
down 3% on the 2015 level

Total Input Costs
Overall, input costs slightly higher than in 2015

Gross Margin (Suckler)
down 15% on the 2015 level
Gross Margin (Finisher)
down 11% on the 2015 level

Review of Cattle Farming in 2015 and Outlook for 2016

Kevin Hanrahan

Agricultural Economics and Farm Surveys Department, Teagasc

1. Introduction

This paper presents a review of the economic performance of Irish cattle production in 2015 based on data provided by the Teagasc National Farm Survey (Hennessy and Moran, 2015). Estimated returns from cattle production in 2015 and the forecast for 2016 are also presented.

In 2015 Irish cattle prices, across all age categories, have increased relative to their levels in 2014. The decline in finished cattle prices experienced in 2014 has been reversed in 2015, with prices for R3 steers returning close to the average level received in 2014. Prices for younger cattle have also been higher than those received in 2014.

Higher prices on Irish cattle markets have been driven by increased demand for beef on our export markets, the weakening of the euro against sterling, and the decline in the availability of cattle for slaughter in Ireland.

The evolution of Irish cattle prices of different age categories in 2015 has been consistently positive across all animal categories when compared to 2014. Prices of finished cattle in 2015 have increased on levels observed in 2014, with R3 steer prices, on average, 8 percent higher than in 2014 (young bull prices have increased on average by close to 13 percent). Calf prices have increased strongly in 2015, with prices for beef calves 18 percent higher than in 2014. Weanling and store cattle prices have also been stronger in 2015, with prices on average 15 percent higher than in 2014.

These positive price dynamics mean that the value of farm output on Irish cattle farms has increased in 2015, with the generally smaller increase in finished cattle prices being reflected in a somewhat smaller increase in output value on Cattle Finishing enterprises as compared to Single Suckling enterprise. On Single Suckling enterprises changes in calf, weanling, store and finished cattle prices directly affect the value of output per hectare. On the Cattle Finishing enterprise higher (lower) prices paid for calves and weanlings purchased in reduces (increases) the value of enterprise output.

The positive story for beef farmers of higher cattle prices in 2015 has been buttressed by generally lower levels of expenditure on inputs, particularly on purchased feed and energy. The estimated lower overall input expenditure reinforces the positive impact of higher output value on margins.

On average gross margins on Single Suckling farms are estimated to have improved in 2015 by 37 percent with most of the improvement due to the higher output value that has arisen as a result of the increase in Irish cattle prices in 2015. On average Single Suckling farms are estimated to have earned a small positive net margin in 2015. On Cattle Finishing enterprises the increase in finished cattle prices in 2015 is also reflected in higher output value. The impact on output value of the higher level of finished cattle prices is partially offset by the higher prices that many of these farmers have paid for weanlings and store cattle in 2015. However, overall cattle finishers are still expected to see output value increase and in combination with lower input expenditure, gross margins are estimated to increase by 38 percent. In contrast to the estimated positive average net margins earned on Single Suckling enterprise, Cattle Finishers in 2015 are estimated to still have earned negative net margins (-€62), though the magnitude of these margins is estimated to have declined considerably when compared with 2014.

The outlook for Irish cattle markets in 2016 is for modest reductions in cattle prices. Growth in demand for beef in the EU will be underpinned by a positive, though weak, economic growth in the Eurozone (CEPR 2015) and stronger growth in the Irish beef industry's most important export market the UK (HM Treasury 2015). EU beef supplies are also expected to increase in 2016 as a result of the recent expansion in the EU dairy cow breeding herd. The growth in aggregate EU production and supply of beef and weaker world markets are expected lead to some reduction in cattle prices despite on-going recovery in EU beef demand.

The global production and exports of beef are expected to increase in 2016 (USDA, 2015). The

forecast increase in meat production is largely driven by developments in the US and Brazil where the recent breeding herd rebuilding phase will be reflected in increased meat production in 2016. The weaker Brazilian Real and slowdown in domestic Brazilian economic growth and demand for beef is also forecast to lead to an increase in Brazilian beef exports in 2016. Any slowdown in global economic growth will mean that world beef prices are likely to fall in 2016 as compared to 2015.

On balance our forecast for 2016 is that Irish cattle prices will decrease modestly in 2016. Increases in the volume of cattle available for slaughter in Ireland combined with somewhat lower EU cattle and beef prices are forecast to result in Irish cattle prices that are lower than observed in 2015.

Developments in the euro/pound sterling exchange rate have been an important positive factor in the recovery in Irish cattle prices in 2015 and could again be important in determining whether Irish cattle prices in 2016 decline or continue to increase. The euro has on average during the first 10 months of 2015 depreciated by 10 percent relative to the pound sterling. In this outlook we have assumed no further depreciation of the euro. In the event that the euro/GBP exchange rate weakens further during 2016 this could be sufficient to leave cattle prices unchanged or even higher than in 2015. Uncertainty over the evolution of the exchange rates constitutes a major element of the uncertainty in these forecasts.

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

2. Review of the Economic Performance of Beef Farms in 2014

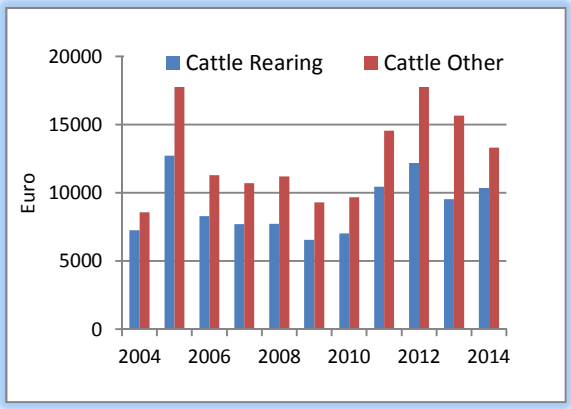
The trends in average family farm income (FFI) for the two types of cattle farms identified in the Teagasc NFS over the period 2004 to 2014 are shown in Figure 1. Readers should note that the narrowing of the Teagasc NFS sampling frame in 2012 is likely to have affected the average level of FFI on Irish cattle farms as measured by the Teagasc NFS. Some of the growth in FFI over the period since 2011 may be attributable to the sample change rather than to fundamental changes in the profitability of Irish agriculture. A reweighted sample extending back over time is to be released in 2016.

In 2014 the average FFI on Teagasc NFS *Cattle Other* farms decreased substantially compared with 2013 levels, while the income level on *Cattle Rearing* farms increased. The 2014 FFI on Cattle Rearing farms increased by 9 percent when compared with the 2013 level, while the decrease in FFI on Other Cattle farms was 15 percent. FFI on both cattle farm types remains very low, at only €10,369 and €13,321 respectively. Figure 1 also illustrates that the gap in average FFI earned by farms in the cattle rearing system and cattle other system has narrowed considerably in 2014.

In this year's analysis we present results based on the two way categorisation of Irish cattle enterprises: *Single Suckling* and *Cattle Finishing* enterprises used first in Breen and Hanrahan (2012) and the Teagasc NFS cattle enterprise fact sheets (Teagasc, 2015a and 2015b).

Single Suckling enterprises in the analysis that follows are enterprises with more than 10 cows, while the Cattle Finishing enterprises analysed were those with more than 10 livestock units and 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.

Figure 1: Family Farm Income on Cattle Rearing and Cattle Other Farm Systems: 2004 to 2014



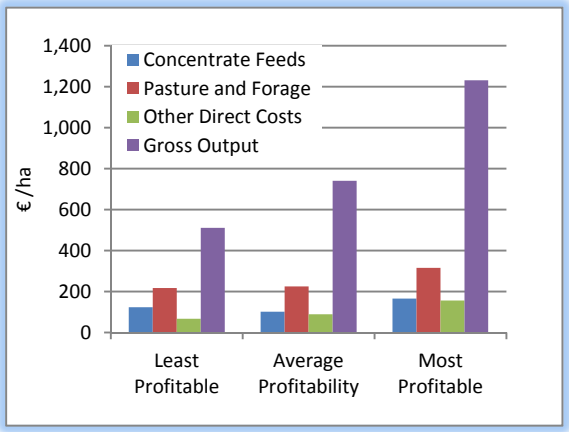
Source: Teagasc National Farm Survey (2015)

2.1 Irish Beef Enterprise Performance in 2015

This section discusses the cost structure of Single Suckling and Cattle Finishing enterprises in Ireland. Farms with these two 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 groups, which we have termed farms that are *least profitable,* those that have *average profitability* and those that are *most profitable*.

Single Suckling: In 2014 the average direct cost of production per hectare for Single Suckling enterprises ranged from €409 per hectare, on those farms with the lowest average gross margin, to €636 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 Single Suckling farms. The average expenditure on concentrate feed varied from €123 per hectare on the low profitability farms to €165 per hectare on the high profitability farms.

Figure 2: Variation in Total Production Costs and Gross Output on Single Suckling enterprises in 2014



Source: Teagasc National Farm Survey (2015)

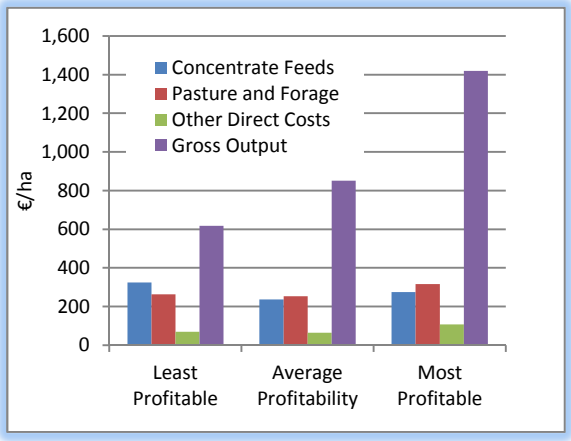
There was considerably more variability in the average gross output per hectare between the least profitable and most profitable farms. The most profitable third of Single Suckling enterprises earned an average gross output of €1,231 per hectare compared with an average gross output of €511 per hectare 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 2014 the most profitable Single Suckling enterprises had an average stocking rate of 1.83 livestock units (LU) per hectare compared with only 1.04 LU per hectare for those enterprises with the lowest levels of profitability. The capacity of farms to operate at high stocking rates is limited by the soil quality of the land farmed. In 2014, 70 percent of the most profitable Single Suckling enterprises farmed *very good* soils, whereas the proportion of the least profitable Single Suckling farms on very good soils was considerably lower at 30 percent.

The most profitable one third of Single Suckling enterprises in 2014 had an average gross output per hectare that was 141 percent higher than the average output per hectare on the least profitable one third of enterprises, while average direct costs per hectare were only 56 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 ha 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 €1,420 per hectare compared with €618 per hectare on the least profitable Cattle Finishing enterprises.

Figure 3: Variation in Total Production Costs and Gross Output on Cattle Finishing Enterprises in 2014



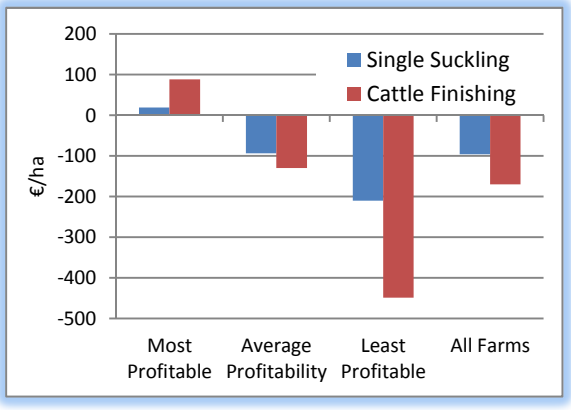
Source: Teagasc National Farm Survey (2015)

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 1.33 LU per hectare, while the average stocking rate on the most profitable one third of Cattle Finishing enterprises was 1.88 LU per hectare. In general more profitable Cattle Finishing enterprises were on farms with better soil. Close to 90 percent of the most profitable Cattle Finishing enterprises farmed *very good* soils, while only 42 percent of the least profitable farms farmed very good soils.

The results presented in Figures 2 and 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 with 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 €484 and €434 per hectare respectively (see Appendix Table A1 and Table A2 at the end of the 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.

Figure 4: Cattle Enterprise Net Margins per hectare in 2014



Source: Teagasc National Farm Survey (2015)

The movements in the net margins earned by the Single Suckling and Cattle Finishing enterprises matched that in gross margins. The negative net margins earned on the average Single Suckling enterprise were reduced in 2014, while the losses on Cattle Finishing farms increased in 2014 due to lower finished cattle prices. Figure 4 shows the net margins earned on the two cattle enterprises analysed and illustrates that in 2014 only the most profitable one third of Cattle Finishing and Single Suckling enterprises earned positive net margins.

3. Estimated Performance of Irish Cattle Farms in 2015

This section of the paper presents a review of the economic performance of Irish cattle enterprises in 2015. A discussion of the estimated changes in input usage and input costs in 2015 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 2015 are then presented. Estimates for 2015 and forecasts for margins in 2016 (which are presented in Section 4) are based on an assumption of unchanged intensity of production per hectare. The impact of an increase in the intensity of production on individual enterprises would vary from enterprise to enterprise. In some cases it could increase profitability in others it could give rise to lower margins.

3.1 Estimated Input Usage and Price 2015

3.1.1 Feedstuffs

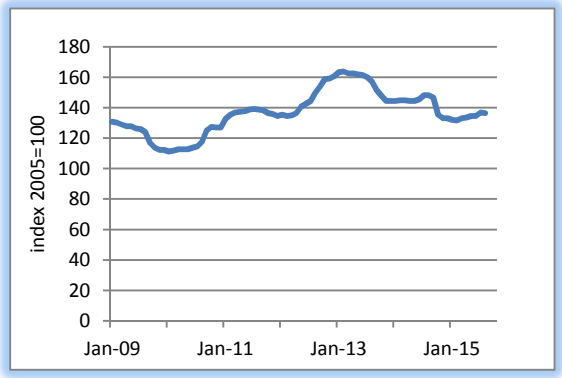
Purchased feed (concentrates) is an important element of the direct cost of beef production in Ireland. Typically this cost item accounts for approximately 30 percent of total direct costs on Single Suckling enterprises and 40 percent of direct costs on Cattle Finishing enterprises.

2015, like 2014, was a good year in terms of grass growing conditions and as a consequence the availability of grass was not 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 2015 is lower than in 2014. Lower beef cow numbers and lower animals brought to slaughter in 2015 would have been expected to have led to a reduction in aggregate feed use. However, increases in the number of younger cattle on feed, partly as a result of much lower live exports, has supported

aggregate feed use. Overall, it is estimated that feed use per head declined by 6% in 2015 based on latest estimates of non-dairy cattle on feed and volumes of total feed purchased in the first three quarters of 2015.

Figure 5 presents the CSO monthly price index for cattle feed stuffs for the period January 2009 to September 2015. Cattle feed prices have declined particularly through the first three quarters of 2015 and over the course of the full year cattle feed prices are estimated to have declined by 5 percent.

Figure 5: Monthly Price Index of Cattle Meal in Ireland 2009 to 2015



Source: CSO (2015)

With lower levels of feed purchased by cattle farms on a per hectare basis and lower feed prices, we estimate that expenditure on concentrates by Irish cattle farmers in 2015 has decreased by 9 percent as compared to 2014.

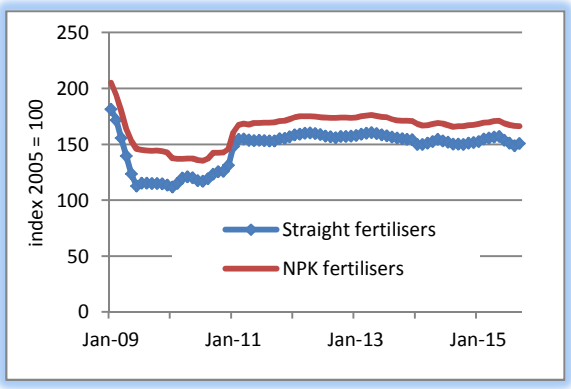
3.1.2 Fertiliser – usage and price 2015

Figure 6 presents data on fertiliser prices over the past seven years. Fertiliser prices have been more or less stable through the course of 2015.

The stable path of Irish fertiliser prices may seem at variance with developments in global energy prices, but the weakening euro/US dollar exchange rate through the course of 2015 has meant that lower global US dollar prices have not been reflected in euro denominated prices.

With little if any change in fertiliser prices, and no major change in the intensity of production on Irish cattle farms, overall expenditure on fertiliser is also estimated to have remained unchanged in 2015.

Figure 6: Monthly Price Index of Fertiliser in Ireland from 2009 to 2015



Source: CSO (2015)

3.1.3 Energy and Fuel – usage and price 2015

In 2015 the average price for crude oil in was $53 per barrel (pb). Given movements in the euro/US dollar exchange rate, which saw the euro depreciating against the dollar; this translates into a price of approximately €48 pb. This price level represents a decrease of 36% on the price in 2014. As a result of the large decrease in oil prices when expressed in euro, and the inelastic nature of farmer demand for fuel, fuel costs are estimated to have decreased by 13 percent in 2015 relative to the 2014 level. The smaller decrease 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 2015 farmer contracting costs will have remained largely unchanged as compared to 2014. When combined with stable expenditure on fertiliser, this means that overall expenditure on pasture and forage by cattle farmers in 2015 is estimated to have remained largely unchanged when compared to 2014.

Electricity costs change infrequently in Ireland due to energy price regulation. The minor price changes that have occurred during 2015 reflect the rise in the costs associated with Irish electricity production and distribution in Ireland. On an annual average basis, prices are estimated to have declined marginally in 2015 compared to 2014.

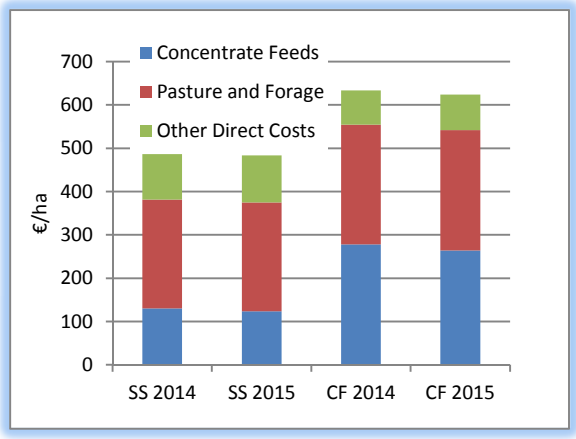
3.1.4 All Other Direct and Overhead Costs– usage and price 2015

Wages in Ireland are estimated to have increased in 2015 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. The price level of other direct costs is estimated to have increased by 4 percent in 2015 due to the impact of the weaker euro on the price of imported input items. Given the nature of overhead costs, there is little capacity for changes in volume used, and therefore the change in expenditure on other fixed costs is estimated to be 2 percent higher in 2015 compared to 2014.

3.1.5 Estimate of Total Direct Costs for 2015

Figure 7 compares the average direct costs of production for the Single Suckling and Cattle Finishing enterprises in 2014 with the estimated direct costs for 2015. Average total direct costs are estimated to have decreased in 2015, with total direct costs on Single Suckling enterprises declining by 2 percent and direct cost on Cattle Finishing enterprises estimated to have decreased by 4 percent. The larger reduction on Cattle Finishing enterprises is due to the greater importance of purchased feed in their direct costs of production. Overall with little or no change in the volume of inputs used and, with the exception of fuel, only minor changes in other input prices the estimated changes in costs of production in 2015, in contrast to 2014, are modest.

Figure 7: 2014 Direct Costs and Estimated 2015 Direct Costs for Single Suckling (SS) and Cattle Finishing (CF) Enterprises



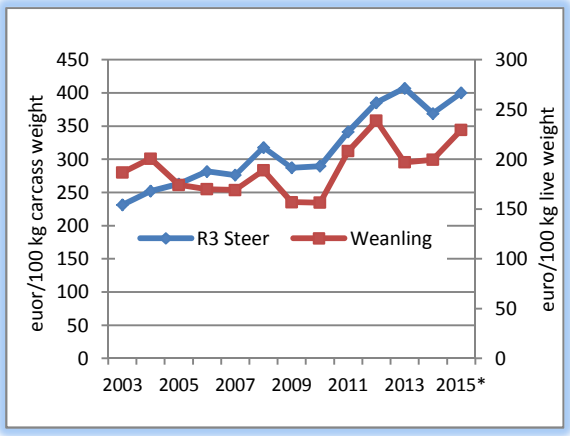
Source: Teagasc National Farm Survey (2015) and Author's Estimates

3.2 Estimated Output Values 2015

The value of gross output on Single Suckling enterprises is estimated to have increased strongly in 2015, due to strong increases in average prices for all categories of cattle. Average weanling prices in 2015 are estimated to be 15 percent higher than in 2014. While the estimated average R3 steer price for 2015 of €400/100kg represents an 8 percent increase on the price level in 2014. The average increase in young bull prices in 2015 was closer to 12 percent. Figure 8 presents average steer and weanling prices for the period 2009 to 2014 and an estimate for 2015.

The higher level of weanling and store cattle prices received by Single Suckling enterprises indirectly decreases the value of output on Cattle Finishing enterprises by increasing costs of cattle purchased in and this is reflected in our estimate that output value on Cattle Finishing farms in 2015 has increased by less than the headline increase in finished cattle prices.

Figure 8: Irish Cattle Prices 2003 to 2015



Source: DG Agri. and CSO; * Author's estimate 2015.

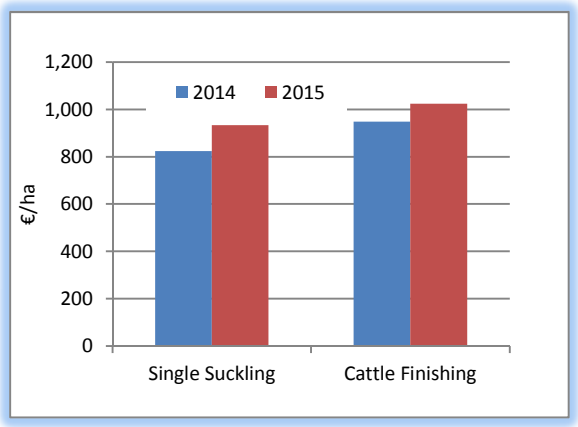
Gross output per hectare on Single Suckling farms in 2015 is estimated to have increased by 13 percent to €942 per hectare. The most profitable one third of Single Suckling enterprises, due to higher stocking rates and other factors, continue to achieve significantly higher output per hectare (€1,403 per hectare) as compared to the average (€844 per hectare) and least profitable (€583 per hectare) enterprise groups.

Gross output per hectare in 2015 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. However, in 2015 the gap in the level of output per hectare narrowed due to the relative movements of finished cattle and young cattle prices. The

average level of gross output per hectare for Cattle Finishing enterprise in 2015 is estimated to be €1,028 (an increase of 8 percent on the level in 2014).

In our estimates and forecasts for 2015 and 2016 we have attempted to incorporate the payments made to cattle farmers under the Government's *Beef Data Genomics Programme (BGDP)*. The payments under the BDGP are contingent on farmers undertaking specified measures some of which will incur additional costs but payments under the BGDP 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. DAFM (2015c) have stated that approximately 30,000 farms with 560,000 cows have applied to participate in the programme. The BDGP has an annual budget of €50m. In this analysis average payment per hectare in 2015 and 2016 is assumed to be €40. For suckler farmers who actually participate in the programme the value per hectare of BDGP participation will be higher than the level assumed.

Figure 9: 2014 Gross Output for Single Suckling (SS) and Cattle Finishing (CF) Enterprises and Estimate for 2015



Source: National Farm Survey (2015) and Author's Estimates 2015

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 (€1,539 per hectare) that was 130 percent higher than the average value of output per hectare on the least profitable group of Cattle Finishing enterprises (€670 per hectare).

3.3 Beef Enterprise Margin Estimates for 2015

As shown in Figure 7, the estimated expenditure on concentrate feed by cattle enterprises decreased in 2015, while expenditure on pasture and forage costs was largely stable. The resulting decrease in direct costs (-4 percent) when combined with higher gross output on both Cattle Finishing and Single Suckling enterprises is estimated to have led to increases in gross margin on all cattle enterprises in 2015.

The gross margins earned on the Single Suckling enterprises are estimated to have increased in 2015 by 37 percent; this large percentage increase on the average Single Suckling enterprise is due primarily to the large increase in the value of output in 2015. Prices of all categories of cattle have increased strongly in 2015 with the largest increases on younger animals. Margins on those Single Suckling enterprises that are specialised in raising cattle to finish will have seen their output value increase by less than those enterprises that sell cattle as weanlings and stores.

Average gross margins earned on Cattle Finishing enterprises in 2015 are estimated to have increased by 33 percent. As on Single Suckling enterprises the estimated increase in gross margins in 2015 is driven primarily by developments in the value of output rather than by changes in the costs of production.

Single Suckling enterprises in 2015 are, on average, estimated to have earned a small positive net margin of €19 per hectare, while Cattle Finishing enterprises are estimated to have earned, on average, a negative net margin of €77 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 2015. The share of purchased feed expenditure in the direct costs of the least profitable farms is in general greater than average and as a result they are estimated to have gained more from the reduction in expenditure on feed in 2015.

For the Cattle Finishing enterprise only the top one third of farmers on average earn a positive net margin, while due to the large improvement in margins on Single Suckling enterprises both the top

and middle one third of Single Suckling enterprises are estimated to have earned positive net margins in 2015. The negative net margins earned on the average Cattle Finishing enterprises highlights the profitability challenges in Irish beef production that persist even in what most would consider a good year for cattle prices.

4. Outlook for 2016

In this section we forecast the expenditure for various input items, the beef price that is expected to prevail in 2016 and the incomes from the production of cattle in 2016.

4.1 The Outlook for Input Expenditure

4.1.1 Feedstuffs in 2016

Global cereal and oilseed futures market prices point to stable feed prices through early 2016. Cereal and other feed ingredient input prices have not increased significantly in 2015 over their level in 2014 and these market developments will determine the likely level of concentrate prices for much of 2016. The 2016 harvest price for cereals and oilseeds will affect the price of feed in the back end of 2016. At this stage our forecast for world cereal and oilseed prices is for little change relative to 2015.

For 2016 our feed use forecasts are based on an assumption of normal grass growing conditions. This is likely to lead to little or no change in feed use in 2016. Cattle feed prices are forecast to increase by 2 percent in 2016 relative to 2015. With volumes used unchanged, a 2 percent increase in overall feed expenditure is forecast for 2016.

4.1.2 Fertiliser in 2016

Despite the recent and forecast future reductions in energy prices, a weaker euro means that fertiliser prices in 2016 are forecast to be unchanged relative to 2015.

Fertiliser use on grassland farms was stable in 2015. In our 2016 forecast we assume that on average fertiliser use in 2016 will also be unchanged relative to the 2015 level.

Stable prices and usage levels mean that our forecast for total expenditure on fertiliser in 2016 is for it to remain static. With contracting costs not expected to change in 2015 total expenditure on pasture and forage by Irish cattle farmers in 2016 is forecast to remain unchanged on the 2015 level.

4.1.3 Energy and Fuel

An analysis of futures prices indicates that the balance of market opinion sees Brent crude oil prices averaging close to the current (November 2014) spot price of to US $51pb for 2016. This futures contract price, if reflected in spot prices through 2016, would represent a decrease of about 4 percent on the average 2015 level. However, exchange rate movements between the euro and the US dollar remain an area of great uncertainty and a potential source of energy price inflation in the eurozone.

Electricity prices in 2015 were almost unchanged as compared to 2014. Given the regulation of these prices, and recent developments in energy feedstock prices (natural gas and coal) some reductions in energy prices may arise but the extent of any change is likely to be mitigated by the role of network and other costs in Irish electricity prices. Given that the outlook for energy prices is negative, our forecast is that that electricity prices in 2016 will decline on the 2015 level by 3 percent. This would leave overall expenditure on energy and fuel on cattle enterprises down approximately 6 percent in 2016 relative to the 2015 level.

4.1.4 Other Direct and Fixed Costs

Increases in the cost of labour are forecast for 2016 due to on-going recovery 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 an increase in other direct costs of 2 percent with no volume change is assumed. Other overhead (fixed) costs are also forecast to increase by 2 percent in 2016 relative to their level in 2015.

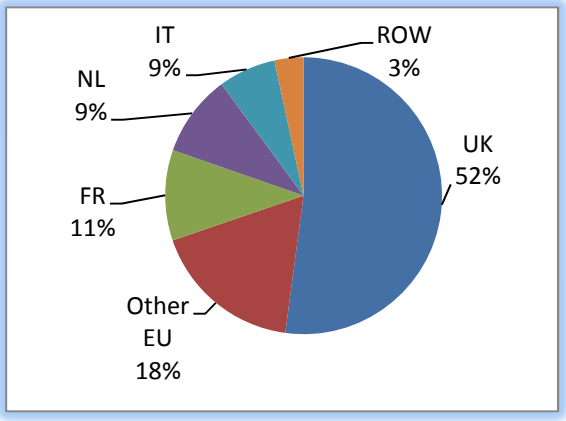
4.2 The Outlook for Cattle and Beef Markets 2016

Ireland exports close to 90 percent of its beef production and is the fifth largest net-exporter of beef in the world (CSO 2015c, USDA 2015). Conditions in markets to which Irish beef and cattle are exported largely determine Irish cattle prices, though supply developments in Ireland, as in the second half of 2014, can cause Irish cattle prices to deviate from export market prices over the short run.

Figure 10 provides an estimate of 2015 Irish beef export destinations based on trade data for the year to the end of August 2015 and illustrates the continuing dominance of the UK in Irish beef exports and the relatively minor role of extra-EU markets in the current Irish beef export mix.

The dominance of the UK as an export destination when measured by volume in 2015 is also reflected in the value of beef exports by destination, with the UK accounting for almost 48 percent of exports when measured by value. The lower share of beef exports to the UK, when measured by value rather than volume, indicates that the unit value of the average tonne of beef shipped to the UK is somewhat lower than the value of the average tonne of beef shipped to other destinations, in particular continental destinations.

Figure 10: Estimate of Irish Beef Export Markets by Volume in 2015



Source: Eurostat COMEXT, January to August (2015)

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 considerably lower than in 2014, indicating that at least in early 2016 the current tight supplies of finished cattle will continue. In second half of 2016 the higher inventories of animals aged 12-18 months that are currently on Irish farms will begin to feed through into increased availability of finished cattle in Ireland.

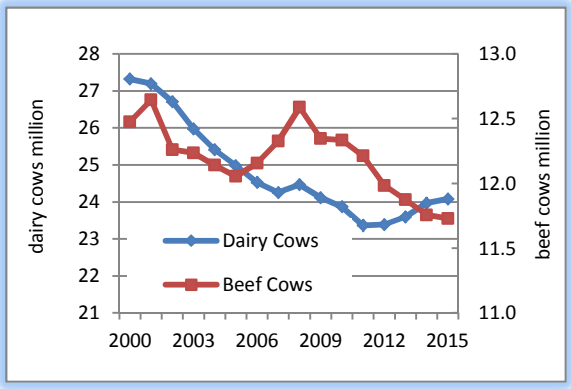
In the rest of the EU supplies of cattle for slaughter in 2016 are likely to be higher than in 2015 due to the recent increases in the EU dairy cow herd (see Figure 11). Overall EU production of beef in 2016 will be higher than in 2015, while supplies of finished cattle in Ireland and beef production are over the full year likely to be close and possibly a little ahead of 2015 levels.

In the medium term (beyond 2016) 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 2015 the numbers of dairy cows in the EU increased. With dairy cows accounting for over two thirds of the stock of cows in the EU currently, the upturn in EU dairy cow numbers has meant that aggregate cow numbers have increased marginally through 2013, 2014 and 2015 despite declining inventories of suckler cows in the EU.

Whether these developments continue is the major uncertainty in the development of aggregate EU beef supply. Many member states have under the recent CAP reform 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.

The current low levels of profitability in dairy production may lead in the short run to a slowdown or reversal of the recent increases in dairy 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 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.

Figure 11: EU28 Cow Numbers (June) 2000 - 2015



Source: Eurostat

Given the modest increase in beef production forecast for the EU in 2016, the outlook for EU (and Irish) finished cattle prices depends importantly on the prospects for demand in the UK and the eurozone, with developments in the euro exchange rate with the pound sterling also important given the dependence of the Irish beef industry on the UK market.

The macroeconomic outlook for the Eurozone is improving if only slowly. The CEPR Eurozone Business Cycle Dating Committee has recently concluded that the Eurozone has excited recession that it entered in Q3 2011 (CEPR, 2015). The macroeconomic outlook for the UK, the Irish beef sector's largest export market, by contrast seems to offer the prospect of growth in consumer demand (HM Treasury, 2015). The UK economy continues to grow at a relatively strong rate, and with falling unemployment and increases in disposable incomes the demand for beef should grow. With largely stable beef production forecast in Ireland and an increase forecast for the UK in 2016 (AHDB, 2015) it is however unclear whether the demand growth will be sufficient to provide space for higher cattle prices in Ireland and UK given the expected growth in beef production.

The European Commission's most recent forecasts (EC, October 2015) show both EU beef consumption and production increasing in 2016 compared to 2015. EU cattle prices are forecast to decline relative to 2015. Beef imports into the EU in 2016 are unlikely to grow over and above the volumes imported in 2015, however, lower world beef prices may be a source of additional downward pressure on EU prices.

Our 2016 forecast is that Irish cattle prices will decline by 4 percent over their 2015 level, with average EU prices forecast to decline by 5 percent. Tight cattle supplies in the first two quarters of 2016 on both UK and Irish markets should help in offsetting some of the impact of the forecast weakness in EU markets in 2016.

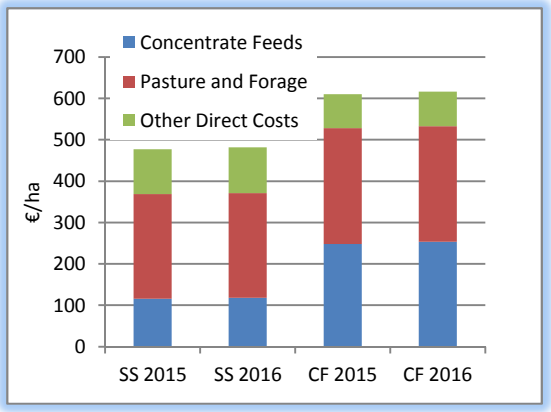
Prices of calves, weanlings and store cattle in Ireland have in recent years fluctuated very widely. In 2015 the prices of these animals increased very strongly, our expectation is that Irish calf, weanling and store prices in 2016 will decrease due to the forecast low levels of profitability in Cattle Finishing, lower finished cattle prices and the increased supplies of younger cattle in Ireland.

The forecast increase in young cattle numbers in 2016 is due to higher dairy cows numbers that are likely to more than offset the decline in suckler cow numbers as well as significantly lower levels of live exports from Ireland during 2015.

4.2.1 Outlook for Beef Enterprise Net Margins in 2016

Figure 12 compares the estimated and forecast average direct costs per hectare in 2015 and 2016 for the Single Suckling and Cattle Finishing enterprises. With prices for cattle of all ages forecast to decrease in 2016, gross output on both Single Suckling and Cattle Finishing enterprises are forecast to contract on the estimated 2015 levels. With expenditure on feed forecast to be more or less unchanged in 2016 and pasture and forage expenditure costs expected to increase slightly, margins earned on both Single Suckling and Cattle Finishing enterprises are forecast to disimprove on the levels estimated for 2015.

Figure 12: Estimated Direct Costs for 2015 and Forecast Direct Costs for 2016



Source: Author's Estimates 2015 and Forecasts 2016

Gross margins for the Single Suckling enterprise are forecast to decline in 2016, with the 2016 level forecast to be 15 percent lower than that estimated to have been earned in 2015. The forecast decline in prices and output value outweighs the positive impact of forecast lower direct costs of production.

The forecast decline in gross margin per hectare on Cattle Finishing farms in 2016 is 11 percent. For Cattle Finishing enterprises the decline in finished cattle prices in 2016 is partly offset by the impact of lower young cattle prices that cattle finishers pay for cattle purchased in. As on Single Suckling enterprises, marginal declines in direct costs of production are insufficient to offset the negative

impact of lower output prices on Cattle Finishing enterprise gross margins.

The average net margin per hectare for Single Suckling enterprises in 2016 is forecast to be -€94, a deterioration on the estimated minor positive margin of €19/ha in 2015. Net margins on average on Cattle Finishing farms are also forecast to decline in 2016, with the forecast average margin of -€130 also lower than the average negative net margin of -€77 per hectare estimated for 2015. The forecast average margins earned on the least, average and most profitable of the Single Suckling and Cattle Finishing enterprises are presented in Table A3 and Table A4.

5. Concluding Comments

In 2015 the economic performance of Cattle Finishing and Single Suckling enterprises was dominated by developments in output prices rather than in costs of production. In 2015 Irish finished cattle price have recovered almost the entire decline in prices experienced in 2014. While finished cattle prices increased in 2015, prices for younger cattle increased by even more with weanling prices up 15% on price levels in 2014. During 2015 with only minor change in the volume of inputs used and relatively modest changes in input prices, output price developments have driven the improvements in margins earned on Irish cattle farms.

The estimated gross margins earned in 2015 on both the Single Suckling and Cattle Finishing enterprises have increased relative to 2014. Margins on Single Suckling enterprises have improved more because the increases in the prices of young cattle in 2015 have exceeded the increase in finished cattle prices. In 2015 we estimate that the net margin earned on the average Single Suckling enterprise to be marginally positive. Estimated net margins earned on the average Cattle Finishing enterprise in 2015 are estimated to be negative but to have declined significantly relative to the level in 2014.

The increases in Irish prices in 2015 have been driven in part by improving EU prices but also by improvements in UK prices and a weakening euro/pound exchange rate. Our forecast is for some modest deterioration in Irish cattle prices in 2016. This mildly unoptimistic outlook is driven by increasing supplies of beef on the EU market and weaker world beef prices. The emergence of the Eurozone from recession in 2015 and continued growth in the UK economy should underpin per capita demand for beef in the EU but are not forecast to be sufficiently strong to lead to higher prices in 2016.

Exchange rate developments in 2016, as in 2015, will have a major bearing on whether Irish price developments diverge from average EU story. Given our continued dependence on the UK market a further weakening of the euro in 2016 could lead to a more optimistic outcome for cattle prices. However, it should be noted that such a development while positive from an output value perspective would also likely lead to offsetting increases in some input prices.

The large improvement in gross and net margins in 2015 is not all retained in 2016 due to the forecast decline in output prices. The lower levels of profit forecast for both Cattle Finishing and Single Suckling enterprises are close to the average of recent years. The volatility in cattle prices experienced in the last number of years has been reflected in large swings in output value and margins earned, however the profitability of the average Single Suckling and Cattle Finishing enterprise, when decoupled direct payments are excluded, has been usually negative. Cattle farmer's output value for most years is less than their total costs of production. While the top one third of both Single Suckling and Cattle Finishing enterprise consistently earn positive net margins the average enterprise is usually failing to cover costs of production with the value of output sold. This lack of profitability reflects the structure of the industry and it is unlikely to be resolved by cattle market price developments.

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Table A1: 2014 and Estimated 2015 Financial Performance per hectare: Single Suckling Enterprise

	Most Profitable	Average Profitability	Least Profitable	Average
Gross Output 2014	1,231	740	511	824
Direct Costs 2014	637	416	408	486
Concentrate Costs	*165*	*102*	*123*	*130*
Pasture and Forage Costs	*315*	*225*	*217*	*252*
Other Direct Costs	*157*	*89*	*68*	*104*
Gross Margin 2014	595	323	102	338
Overhead Costs 2014	575	417	312	434
Net Margin 2014	19	-94	-210	-96
Gross Output 2015	1403	844	583	942
Direct Costs 2015	622	407	396	477
Concentrate Costs	147	91	110	*116*
Pasture and Forage Costs	316	226	218	*253*
Other Direct Costs	158	89	68	*108*
Gross Margin 2015	782	437	186	464
Overhead Costs 2015	590	428	320	445
Net Margin 2015	192	9	-134	19

Source: Teagasc National Farm Survey Single Suckling Enterprise Fact Sheet 2014 (Teagasc NFS, 2015a) and Authors' Estimates 2015

Table A2: 2014and Estimated 2015 Financial Performance per hectare: Cattle Finishing Enterprise

	Most Profitable	Average Profitability	Least Profitable	Average
Gross Output 2014	1,420	851	618	948
Direct Costs 2014	699	555	657	634
Concentrate Costs	275	237	324	278
Pasture and Forage Costs	317	253	264	277
Other Direct Costs	107	65	69	79
Gross Margin 2014	721	296	-39	314
Overhead Costs 2014	633	426	410	484
Net Margin 2014	88	-130	-449	-170
Gross Output 2015	1,539	922	670	1,028
Direct Costs 2015	677	535	627	610
Concentrate Costs	246	212	289	248
Pasture and Forage Costs	320	255	266	279
Other Direct Costs	111	68	72	82
Gross Margin 2015	863	368	66	418
Overhead Costs 2015	648	436	419	495
Net Margin 2015	215	-68	-353	-77

Source: Teagasc National Farm Survey Cattle Finishing Enterprise Fact Sheet 2014 (Teagasc NFS, 2015b) and Authors' Estimates 2015

Table A3: Forecast 2016 Single Suckling Enterprise Financial Performance per hectare

	Most Profitable	Average Profitability	Least Profitable	Average
Gross Output 2016	1,305	785	542	879
Direct Costs 2016	628	410	400	482
Concentrate Costs	150	93	112	118
Pasture and Forage Costs	316	226	218	253
Other Direct Costs	161	91	70	111
Gross Margin 2016	677	374	142	397
Overhead Costs 2016	613	444	332	451
Net Margin 2016	65	-70	-190	-94

Source: Author's forecast 2016

Table A4: Forecast 2016 Cattle Finishing Enterprise Financial Performance per hectare

	Most Profitable	Average Profitability	Least Profitable	Average
Gross Output 2016	1,478	886	643	987
Direct Costs 2016	684	540	635	617
Concentrate Costs	250	216	295	253
Pasture and Forage Costs	320	255	266	279
Other Direct Costs	114	69	73	84
Gross Margin 2016	794	368	66	370
Overhead Costs 2016	669	450	433	500
Net Margin 2016	125	-82	-367	-130

Source: Author's forecast 2016

Irish Sheep Farming in 2014

Irish Sheep Slaughter
2.837 million head (down 1.3%)

Irish lamb Slaughter
2.475 million head (down 1%)

Live Exports
0.047 million head (down 31%)

Irish Ewe Numbers
2.430 million (down 1.7%)

Lamb price
average €459/100kg (5%)

Lamb Carcass/ha
average 20.3 kg (up 2%)

Total Production Costs
(Mid Season Lowland)
average €140 per ewe (up 3%)

Total Production Costs
(Mid Season Lowland)
average €1,046 per hectare (down 5%)

Gross Margin
(Mid Season Lowland)
average €32 per ewe (+15%)

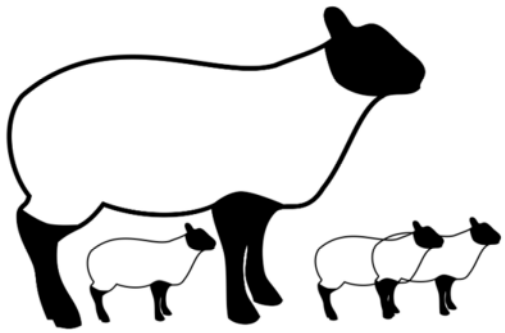
Net Margin
(Mid Season Lowland)
average €13 per ewe (+550%)

Stocking Rate
(Mid Season Lowland)
average of 7.6 ewes/ha

Weaning Rate
(Mid Season Lowland)
average of 1.3 lambs/ewe

Lamb Mortality
(Mid Season Lowland)
average of 7%

Lambs Weaned/ ha
(Mid Season Lowland)
average of 10 lambs/ha



Source: Teagasc National Farm Survey and Central Statistics Office

Irish Sheep Farming in 2015

Slightly higher output prices
growth in demand and favourable sterling rate

Lamb Slaughter
up 2%

Lamb prices
up 2%

Weather Conditions
Poor May, but generally good for rest of 2015

Grass Availability
Good, but not Excellent

Fertiliser Prices
little changed on 2014 level
Fertiliser Use
little changed on 2014 level

Feed Prices down 7%
Feed use up 5%

Other Direct Costs
up 4% on the 2014 level

Fuel prices
down 13% on the 2014 level

Total Input Costs
Overall, input costs slightly lower than in 2014

Gross Margin
(Mid Season Lowland Lamb)
up 5% on the 2014 level

Irish Sheep Farming in 2016

Slightly higher output prices
EU demand growth and tighter world market

Lamb Slaughter
up 3%

Lamb prices
up 3%

Weather Conditions
Reversion to more normal weather

Grass Availability
Not as good as 2015

Fertiliser Prices
little changed on 2015 level
Fertiliser Use
little changed on 2015 level

Feed Prices up 2%
Feed use unchanged

Other Direct Costs
up 2% on the 2015 level

Fuel prices
down 3% on the 2015 level

Total Input Costs
Overall, input costs slightly higher than in 2015

Gross Margin
(Mid Season Lowland Lamb)
up 4% on the 2015 level

Source: Teagasc Estimates for 2015 and Forecasts for 2016

Review of Sheep Farming in 2015 and Outlook for 2016

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. This information, together with data from Bord Bia, the Central Statistics Office (CSO), European Commission DG Agri and Eurostat, is used to analyse the financial performance of Irish sheep farms. Estimates of enterprise margins for 2015 are based on 2014 Teagasc NFS data (Hennessy and Moran 2015) and CSO price indices for the year to date (CSO, 2015b) and preliminary estimates for 2015 (CSO, 2015c). Forecasts for sheep enterprise margins for 2016 are based on our estimates of margins for 2015, and forecasts of input and output price changes in 2016.

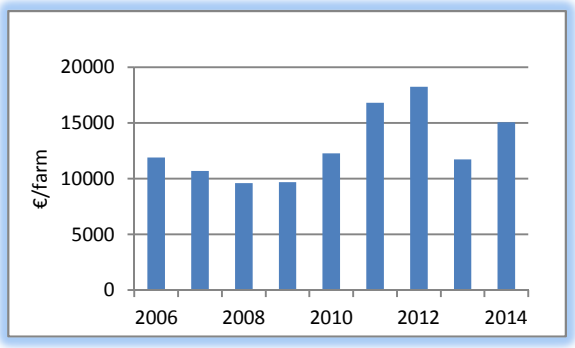
We begin the paper with a brief review of the outturn for family farm income (FFI) for the Teagasc NFS *mainly sheep* farms in 2014. A detailed assessment of the 2014 mid-season lowland lamb enterprise margins is then presented in section 3. This is followed by an overview of the current short term outlook for European and Irish sheep markets in section 4. Estimates and forecasts of margins for the lowland mid-season lamb enterprise for 2015 and 2016 are then presented in sections 5 and 6. The mid-season lowland lamb enterprise is the predominant lowland sheep system in Ireland. In our analysis we have limited the sample analysed to those enterprises with more than 20 breeding ewes.

National policy in relation to the sheep sector, namely the *Sheep Grassland Scheme,* has operated since 2010. This scheme has boosted sheep enterprise margins over the period 2010-2014. Implementation of the June 2013 CAP reform agreement in Ireland in 2015 has led to the incorporation of the Sheep Grassland Scheme's payment within the decoupled direct payment (the Basic Payment) received by sheep farmers. Consequently, this element of farm gross output value, which was previously an element of the sheep enterprise gross output, no longer contributes to enterprise margins. Comparison of enterprise margins between 2014 and 2015 and later years should take into account the impact of this policy change.

2. Review of the Economic Performance of Sheep Farms in 2014

FFI on those farms classified by the Teagasc NFS as *mainly sheep* farms increased strongly in 2014, with FFI on sheep farms increasing by over 28 percent on the previous year. The average FFI earned on these farms for the period 2006 to 2014 are shown in Figure 1. Readers should note that the narrowing of the Teagasc NFS sampling frame in 2012 is likely to have affected the average level of FFI on Irish sheep farms as measured by the Teagasc NFS. Some of the growth in FFI over the period since 2011 may be attributable to the sample change rather than to fundamental changes in the profitability of Irish agriculture. A reweighted sample extending back over time is to be released in 2016.

Figure 1: Average Income on Mainly Sheep Farms in Ireland: 2006 to 2014



Source: Teagasc National Farm Survey (2015)

The large increase in FFI on sheep farms in 2014 was due to a large increase in output value driven by higher lamb prices and lamb output per hectare and lower input expenditure, particularly on concentrates. The increase in output was exclusively associated with the sheep enterprise as output value from cattle and other farm enterprises on sheep farms was largely unchanged in 2014.

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 profitability of Irish sheep production.

3. Sheep Margins in 2014

Changes in the value of output, costs and gross margin per hectare for the mid-season lowland lamb enterprise in 2014 are shown in Table A1 of the Appendix to this paper. The value of gross output for mid-season lamb enterprises in 2014 increased due to improvements in lamb prices over those that prevailed in 2013 and an increase in the volume of lamb produced on most farms due to good lambing conditions in the winter/spring of 2014. Gross margins in 2014 also improved as a result of lower expenditure on concentrates.

Total direct costs per hectare on the average mid-season lamb enterprise declined by 8 percent in 2014. This decrease in direct costs was due to decreases in the cost of concentrates with other elements of direct costs increasing as compared to 2013. Large differences in the profitability of sheep farms operating the mid-season lamb system continue to persist, and reflect continuing differences in the intensity of production and farm management performance.

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, 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 of €1,085 per hectare in 2014, while farms in the bottom group earned an average gross margin of only €308 per hectare. This means that the top producers earned, on average, more than 3 times more per hectare than their counterparts in the bottom group. The large differences in gross margin earned per hectare reflect differences in intensity of production, but also differences in direct costs per hectare (see Table A2). Total direct costs per hectare are greatest on the group with the highest level of profitability reflecting the higher stocking rate on these farms.

The large differences between the values 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 the average carcass output per hectare of 246 kg on the most profitable mid-season lamb enterprises, versus 135 kg on the least profitable enterprises.

When direct costs of production per kilo 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 kilo of lamb carcass produced on the least profitable farms are almost 45 percent higher than the costs per kilo incurred on the most profitable of the mid-season lamb enterprises.

The average net margins for midseason lamb enterprises have increased in strongly in 2014. The average net margin earned on the mid-season lamb enterprises analysed in 2014 was €91 per hectare. As the data in Table A2 show, the large variation in gross margin earned per hectare is also reflected in variation in the net margins earned.

4. Sheep Meat Markets: Short run outlook

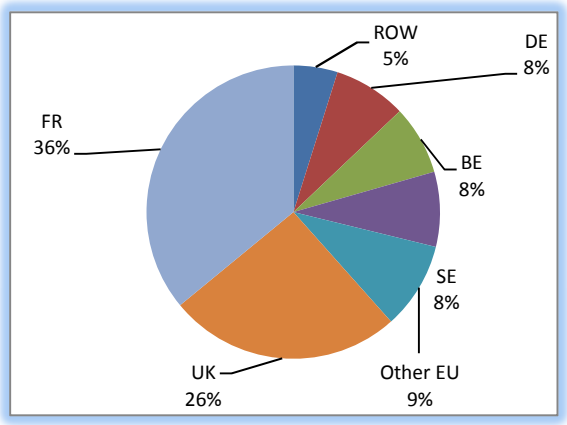
The bulk of Irish lamb output is destined for foreign markets and in 2014 over 82 percent of Irish lamb production was exported (CSO, 2015d). This means that anticipating lamb price developments for Ireland's export markets is critical in determining the prices that Irish sheep farmers will receive for their output in 2016. 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.

Though continental EU markets account for the majority of Irish lamb exports, the UK market remains important for Irish exports. UK lamb, together with non-EU imports (mostly sourced from New Zealand and Australia), compete with Irish lamb on Continental EU and UK markets. The UK in 2015 accounted for an estimated 26 percent of Irish sheep meat exports as illustrated in Figure 2. Aggregate EU demand for lamb has been contracting in recent years, however the European Commission's latest forecasts are for consumption of sheep meat to stabilise in 2016 (EC, 2015). The outlook for the Eurozone macroeconomy in 2016 is weak but positive, and economic growth will mean that per capita demand for lamb in 2016 is likely to be unchanged from 2015. The positive European demand outlook, combined with developments in

sheep supply, both within the EU and on the world market, will determine the short-run outlook for European (and Irish) lamb prices.

The outlook for the supply of sheep meat within the EU is forecast to be positive in 2016, with growth in heavy lamb output in Ireland and the UK. While growth in Irish ewe numbers has on the basis of the June 2015 CSO livestock survey (CSO, 2015a) halted, reduced levels of ewe slaughter in 2015 as compared to 2014 are indicative of a stable (if not growing) beginning breeding inventory in 2016.

Figure 2: Irish Sheep and Lamb Meat Exports (Volume) by Destination in 2015



Source: Eurostat COMTRADE database, year to August.

The indigenous production of lamb in the EU in 2016 will largely be a function of the 2015 ending inventory of breeding ewes. Total EU ending inventories of ewes in 2015 are forecast to be largely stable. The UK sheep breeding flock in June 2015 decreased marginally over the level in 2014, while UK stocks of ewes intended for first time breeding were up almost 4 percent (DEFRA, 2015). With lower total June 2015 inventories AHDB (2015) expects that breeding ewe numbers in December 2015 will be marginally lower than in 2014. Continental EU inventories of breeding sheep and lambs available for slaughter are forecast to be marginally stronger in 2015 than in 2014 (EC, 2015) supported by the introduction in many Member States of coupled direct payments related to sheep production. Overall, the EU supply of sheep meat is forecast to be 1 to 2 percent higher as compared to 2015.

Beef and Lamb New Zealand (B&LNZ, 2015) expect New Zealand lamb shipments in 2016 to be down by 6 percent on the level in 2015 due to a smaller lamb crop and increased retention of hoggets by New Zealand farmers for breeding purposes. New Zealand's lamb EU Tariff Rate Quota (TRQ) was not fully utilised in 2014 and given imports from New Zealand for the year to date it is unlikely to be fully filled in 2015. Australian lamb exports are also expected to decrease in 2016. ABARES is forecasting that Australian lamb exports in 2015/16 will decrease by 5 percent (ABARES, 2015). Australian lamb production was exceptionally high in 2014/15 due in part to unfavourable weather conditions; more favourable conditions will see the beginning of a flock-rebuilding process that will see lamb slaughter decline. The continued reorientation of Australian exports to East Asian markets is expected though growth in indigenous Chinese production is expected to lower the rate of growth in Chinese sheep meat imports.

With some increase in EU supply of sheep meat and lower imports from Australia and New Zealand, the outlook for European and Irish lamb prices in 2016 depends on the outlook for demand for lamb. Per capita demand for sheep meat which had contracted since the onset of the Eurozone recession in 2011, stabilised in 2014 and 2015 (EC, 2015). The current macroeconomic outlook for the Eurozone, of slow but positive growth, suggests that European lamb prices will increase relative to 2015. Our forecast is that lamb prices in 2016 will increase by 3 percent on 2015 levels due to higher global sheep meat prices, recovering EU demand and lower levels of production in France.

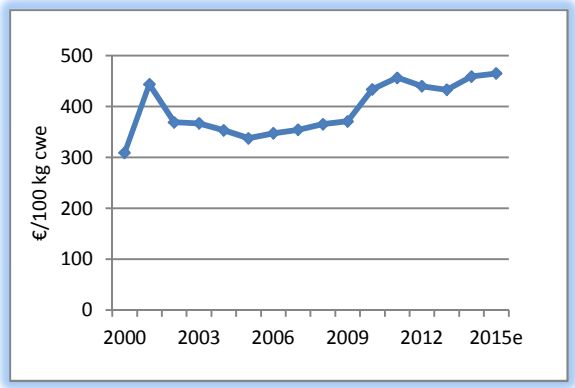
5. Estimated Sheep Gross Margins 2015

To obtain an estimate of farm profitability for 2015, it is necessary to estimate the volume and price of inputs likely to have been used in producing lambs, as well the volume and value of the lamb produced. In our estimates for 2015 (and forecasts for 2016) we have assumed that stocking rates per hectare and weaning rates are unchanged from the observed 2014 levels. An increase in the intensity of lamb production, such as for example an increase in the number of ewes stocked per hectare or in the numbers of lambs per ewe, would change both the costs of production per hectare and the gross output per hectare. Such changes could lead to improvements in enterprise profitability. There are most likely also farms for which an increase in stocking rates could lead to lower profits.

The EU sheep and lamb market in 2015 was characterised by stable imports and slightly higher indigenous supplies of EU sheep meat. This

increase in the supply of lamb was matched by increased domestic use of sheep meat driven by stable per capita use and population growth.

Figure 3: Irish Lamb Price, 2000 – 2015



Source: European Commission DG AGRI and Bord Bia and author estimate 2015

As a result of the largely unchanged supply and use balance on the EU market meant that European prices for heavy lamb were largely stable in 2015. Irish lamb prices in 2015 were marginally ahead of those in 2015(see Figure 3). While lamb prices in the first quarter of the year were ahead of 2014 levels, over the remainder of the year prices have been close to or below 2014 levels. Overall the value of market based gross output per hectare for the mid-season lamb system in 2015 is estimated to have increased marginally from the level in 2014, with higher lamb prices and a small increase in output volume per hectare leading to an increase in output value of 3 percent.

The incorporation of the sheep grassland payment into the Basic Payment received by Irish sheep farmers was discussed in Hanrahan and Kinsella (2014). This now decoupled payment no longer enters the mid-season lowland lamb enterprise gross output or margin calculations.

The main direct costs of production for Irish sheep farms are purchased feed, pasture and forage costs. Overall input costs are estimated to have been largely stable in 2015, with lower feed prices offset by some increase in the volume of feed used, while pasture and forage costs largely unchanged .As a result a small increase in the sheep enterprise gross margin is estimated for 2015.

Purchased feeds typically account for 40 percent of total direct input expenditure on the average mid-season lowland lamb system. Over the course of 2015 purchased sheep feed prices are estimate to have declined by 7 percent. In 2015 with normal grass growing conditions feed use is not estimated to have changed significantly relative to 2014, though heavier than normal rainfall in May 2015 is thought to have led to higher levels of concentrate feed use on some sheep farms particularly in the northern and western counties (Met Eireann, 2015). Department of Agriculture, Food and the Marine data for the first three quarters of 2015 (DAFM, 2015) indicate that total sales of sheep feed were 10 percent higher, in volume terms, than in the same period in 2014. We estimate that total concentrate use per hectare on the average mid-season lowland lamb enterprise in 2015 is likely to have increased by up to 5 percent on the level observed in 2014. Given the decrease in the price of sheep feed and the small increase in volumes of feed used, expenditure on concentrates is estimated to have decreased by 2 percent in 2015.

Pasture and forage costs typically account for approximately 30 percent of total direct costs on the mid-season lowland lamb system. Fertiliser prices have increased marginally in 2015, with prices estimated to have increased by 1 percent in 2015 (CSO, 2015a, 2015b). Fertiliser sales data from the Department of Agriculture, Food and the Marine (DAFM) indicate that the volume of fertiliser sales in 2015 is on a par with 2014. We estimate that fertiliser applications by Irish sheep farmers have remained largely unchanged in 2015. Contracting charges in 2015 are not thought to have changed in 2015, and overall we estimate that expenditure on pasture and forage in 2015 increased by 1 percent.

In 2015 total direct costs of production on the mid-season lowland land enterprise are estimated to be marginally higher than in 2014. Reduced expenditure on concentrates has been offset by increases in pasture and forage and other direct costs of production. With output value slightly higher in 2015 the gross margin earned from lowland mid-season lamb enterprise in 2014 is estimated to have increased by 5 percent to €700 per hectare (see Table A3).

6. Outlook for the Sheep Enterprise Gross Margin in 2016

Despite the forecast increase in aggregate European supplies in 2016, a tightening global supply situation, and stable per capita demand for sheep meat on EU markets is forecast to leave Irish

and EU prices in 2016 3 percent higher than in 2015.

The outlook for input prices in 2015, from the perspective of Irish sheep farmers, is broadly neutral. Forecast Increases in the prices of some inputs are likely to be offset by declines in others.

Concentrate costs are the largest direct cost item for mid-season lowland lamb enterprises and prices of concentrates are forecast to increase by 2 percent in 2016, with volume of feed use forecast to be unchanged in 2016 relative to 2015, total expenditure on concentrates is expected to increase by 2 percent.

The price of fertiliser is forecast to remain unchanged in 2016. With negative energy price inflation forecast for 2016, contractor costs are expected to be largely stable. Overall, pasture and forage costs on Irish lowland mid-season lamb enterprises are forecast to remain close to 2015 levels in 2016.

Table A3 summarises our forecasts of output, costs and margins for the mid-season lamb enterprise for 2016. Given the positive outlook for lamb prices in 2016, and the largely stable direct costs of production forecast, the average gross margin earned from sheep farming is forecast to increase again in 2016.

The gross margin per hectare for the mid-season lamb system in 2016 is forecast to be €729, a 4 percent increase on the 2015 estimate.

On the basis of our analysis of future contract prices for crude oil, fuel costs are expected to fall in 2016. Other fixed costs are forecast to increase in 2016, so that total overhead costs on the mid-season lamb enterprise are forecast to increase in 2016

With higher lamb prices, marginally higher direct costs and higher overhead costs, average net margins per hectare from sheep production are forecast to decline in 2015 to €150 per hectare in 2016.

7. Concluding Comments

The average gross margin earned by mid-season lamb producers in 2015 is estimated to have increased relative to that earned in 2014. Stable lamb prices, with some increase in output volume per hectare, were only partially offset by slightly higher direct costs of production.

Output prices in 2016 are likely to be higher than those observed in 2015. Stable per capita demand for lamb in the EU in 2016 due to the recovery in the Eurozone economy, tighter global markets for sheep meat due to reduced exports from Australia and New Zealand, will be sufficient to leave EU prices higher than in 2015. This positive outlook is despite some expansion in aggregate EU lamb production. French production of lamb is forecast to contract in 2016 and given the importance of the French market to Irish lamb producers this is a an important reason to expect that lamb prices in Ireland will be stable to positive in 2016.

Our forecast is that gross margins earned by the average mid-season lamb enterprise in 2016 will be €729 per hectare, an increase of 4 percent from the estimated gross margin in 2015. Despite higher gross margins, average net margins are not forecast to increase due to increases in overhead costs, with the average mid-season lamb enterprise forecast to earn a net margin of €150 per hectare in 2016 which represents a marginal decline on the estimated level in 2015.

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

	2014	2015e
	€/ha	
Gross output	1137	1,171
Sheep Grassland Scheme Payment	55	0
Direct Costs	469	471
Concentrates	184	180
Pasture and Forage costs	155	157
Other direct costs	129	135
Gross Margin	668	700
Overhead Costs	577	546
Net Margin	91	154
Ewes/ha	7.6	7.45
Lambs per ewe	1.3	1.23
Lamb Carcass (kg)/ha	202	202

Source: Teagasc National Farm Survey and Authors' estimates for 2015
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 2014 by gross margin grouping

	Most Profitable	Average Profitability	Least Profitable
		€/ha	
Gross Output	1,614	1,075	733
Direct Costs	528	455	425
Concentrates	196	187	170
Pasture and Forage	179	149	135
Other Direct Costs	153	119	120
Gross Margin	1,085	620	308
Net Margin	334	74	-128
Ewe/ha	9.07	7.43	6.35
Lambs/ewe	1.46	1.32	1.16
Lamb carcass (kg)/ha	265	196	147
Dir. costs €/kg carcass	*1.99*	2.32	2.84

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, 2014 – 2016

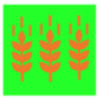
	2014	2015 [e]	2016 [f]
		€/ha	
Total Direct Costs	469	471	478
Concentrates	184	180	183
Pasture and Forage	155	157	157
Other Direct Costs	129	135	137
Gross Output	1137	1,171	1,206
Sheep Grassland Payment	55	0	0
Overhead Costs	577	546	578
Net Margin	91	154	150

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

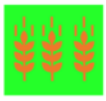
Irish Cereal Farming in 2014

Irish Cereal Production
2.598 million tonnes (up 8%)

Irish Cereal Area
306,000 ha (0%)



Irish Barley Area
215,700 ha (down 2%)



Irish Wheat Area
71,600 ha (up 18%)

Spring Barley price
average €145 per tonne (down 12%)

Winter Wheat price
average €158 per tonne (down 12%)

Spring Barley Yield per ha
average 7.5 tonnes (up 4%)

Winter Wheat Yield per ha
average 10.2 tonnes (up 10%)

Total Production Cost per ha
Spring Barley
average €1,141 (down 5%)

Total Production Cost per ha
Winter Wheat
average €1,449 (down 2%)

Net Margin for Spring Barley
average €-43 per hectare

Net Margin for Winter Wheat
average €215 per hectare

Target Yield for Spring Barley
7.3 tonnes per hectare
achieved on 38% of farms

Target Yields for Winter Wheat
9.5 tonnes per hectare
achieved on 79% of farms

Cost Targets for Spring Barley
€950 per hectare
achieved on 24% of farms

Cost Targets for Winter Wheat
€1,100 per hectare
achieved on 4% of farms

Source: Teagasc National Farm Survey and Central Statistics Office

Irish Cereal Farming in 2015

Higher Global Cereal Production
Another good international harvest

Irish Cereal Yields
up 4% for wheat and 3% for barley vs. 2014 level

Barley and Wheat prices
virtually unchanged on 2014 level

Weather Conditions
Excellent Mild Spring/Autumn, No Drought

Fertiliser Prices
little changed on 2014 level

Fertiliser Use
little changed on 2014 level

Seed Prices
down 8% on the 2014 level

Other Direct Costs
up 4% on the 2014 level

Fuel prices
down 13% on the 2014 level

Total Direct Costs
Overall, input costs slightly lower than in 2014

Gross Margin (Spring Barley)
up €5 per ha on the 2014 level

Net Margin (Average Cereal Enterprise)
€-39 per ha

Irish Cereal Farming in 2016

Lower Global Cereal Production
reversion of yields to normal levels

Irish Cereal Yields
down 5% for w. wheat and 3% for s. barley vs. 2015 level

Cereal prices
up 6% on the 2015 level

Weather Conditions
Reversion to more normal weather

Fertiliser Prices
little changed on 2015 level

Fertiliser Use
little changed on 2015 level

Seed Prices
unchanged on the 2015 level

Other Direct Costs
up 2% on the 2015 level

Fuel prices
down 3% on the 2015 level

Total Direct Costs
Overall, input costs only slightly higher than in 2015

Gross Margin (Spring Barley)
up €25 per ha on the 2015 level

Net Margin (Average Cereal Enterprise)
€-24 per ha

Source: Teagasc Estimates for 2015 and Forecasts for 2016

Review of Tillage Farming in 2015 and Outlook for 2016

Fiona Thorne

Agricultural Economics and Farm Surveys Department, Teagasc

1. Introduction

Harvest prices in the cereals sector in 2015 were not largely different from those achieved in 2014, with some crops increasing in price per tonne while others decreased. However, yields for the majority of Irish cereal crops were higher than those achieved at harvest 2014. Taken together these developments lead to a slightly higher gross output value in Euro terms in 2015 than in 2014. Furthermore, for Irish tillage farmers there was good news in terms of how costs evolved in 2015, with most direct costs decreasing slightly.

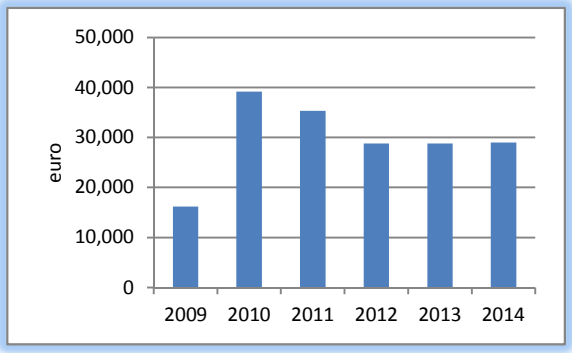
The downward movement in cereal prices, for barley in particular, in 2015 was associated with several factors, the most important of which was an increase in the production estimates for crops in key producing countries. Higher production globally resulted in an increase in stocks and a less constrained global supply and demand balance in 2015/16.

This paper will consider whether the price decreases of the 2015 harvest can be considered atypical or whether prices will continue at these levels into the 2016 harvest. The paper uses Irish Teagasc National Farm Survey (NFS) data to conduct a review of the financial performance of tillage farms in 2014. Following this, prices and costs are estimated for 2015 and these are used to produce an estimate of profit for the 2015 harvest year. In the concluding sections of the paper, forecasts for 2016 are presented.

2. Review of the Economic Performance of Tillage Farms in 2014

Approximately 6,660 mainly tillage farms were represented by the NFS in 2014. Income on tillage farms was largely unchanged between 2013 and 2014. Market based gross output was virtually unchanged, with yield increases counterbalanced by price decreases. Yields per hectare increased by between 4 and 10 percent, depending on the crop examined, while price per tonne decreased by on average 12 percent. Direct costs decreased by about 3 percent. These changes resulted in an average family farm income (FFI) in 2014 of €28,995 which is equivalent to a 2 percent decrease on the average FFI on tillage farms over the previous five year average.

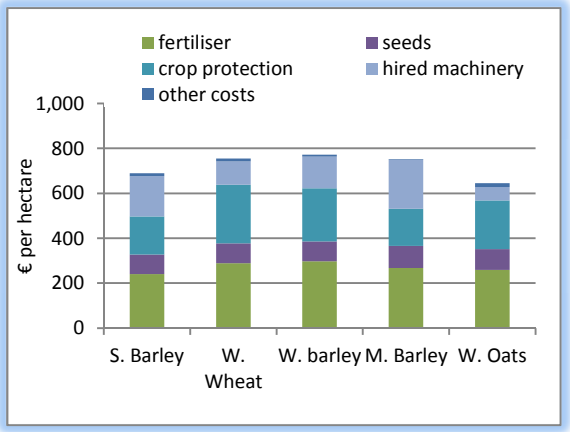
Figure 1: Average Income on Irish Specialist Tillage Farms 2009 to 2014*



Source: Teagasc, National Farm Survey (various years) and authors own estimates
*Adjustments have been made to sample to reflect change in sample selection post 2011.

To understand the economic performance of tillage farms in 2014, we begin with a review of the cost and return structure of the main cereal crops using NFS data. Figure 2 disaggregates the direct 2014 costs of production for the principal cereal crops grown on Irish farms.

Figure 2: Composition of Direct Costs for Cereal Crops, 2014

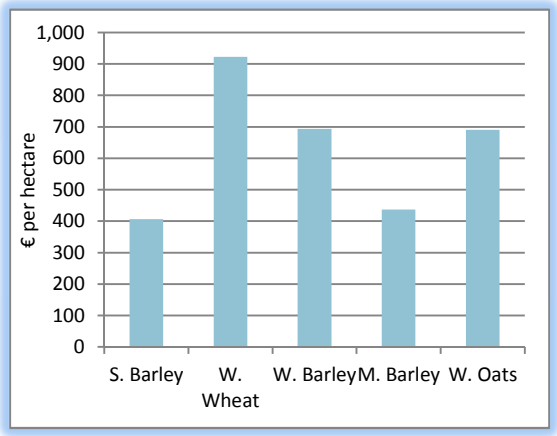


Source: Teagasc, National Farm Survey

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 which is shown in Figure 3.

Figure 3: Gross Margins per ha for Cereal Crops, 2014



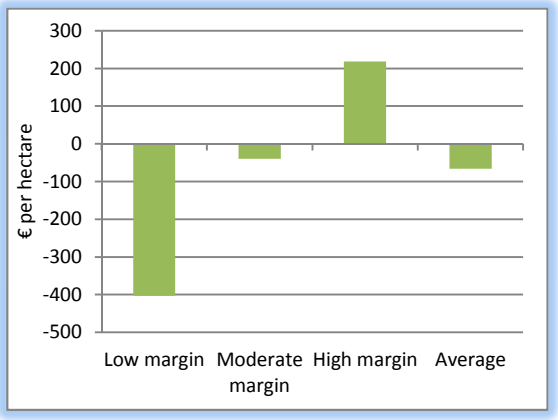
Source: Teagasc, National Farm Survey Data

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 recorded the highest margin of all crops in 2014, followed by winter barley and winter oats (see Table A1 in the appendix to this paper for further details). The gross margin for the two main cereal crops, spring barley and winter wheat, told different stories in 2014 relative to 2013. Spring barley gross margins declined in 2014 relative to 2013 by 15 per cent, while gross margins on winter wheat farms increased by 3 per cent in 2014 relative to 2013.

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 classified into three groups. Farms were classified on the basis of net margin per hectare; the best performing one third of farms are labelled high margin, the middle one third are moderate margin and the poorest performing one third of tillage farms are classified as low margin. The variation in margins across Irish tillage farms is readily apparent from Figure 4. The net margin for the cereal enterprise per hectare on high margin farms in 2014 was €218 per hectare compared to -€40 on moderate margin farms and -€406 per hectare on low margin farms. It is important to remember that these margins include production output only; hence by definition the Single Farm Payment (SFP), which is decoupled from production, is not included in these figures.

Figure 4: Cereal Enterprise on Specialist Tillage System Farms: Net Margin Distributions, 2014



Source: Teagasc, National Farm Survey Data

3. Estimate of 2015 Performance

This section of the paper presents a review of the cereal sector in 2015. To provide an estimate of enterprise profitability for the current year, it is necessary to estimate the volume and price of inputs that are likely to have been used as well the volume and value of outputs produced in 2015. 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 2015.

3.1 Estimated Input Usage and Price 2015

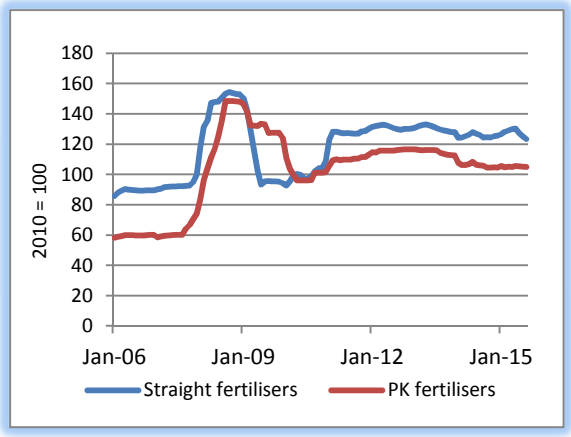
3.1.1 Fertiliser – Usage and Price 2015

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 2005. 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 2014 fertiliser costs represented about 34 per cent of direct costs on tillage farms

and around 17 per cent of total costs. The Central Statistics Office (CSO) recorded prices in 2008 for P&K and straight nitrogen fertilisers that were approximately 125 percent and 75 percent higher than 2005 levels respectively. Increased energy prices, 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 was also a factor.

However, following the peak in 2008 and 2009, the pressure on fertiliser prices eased somewhat for the 2010 harvest year, but upward pressure on fertiliser prices has arisen in each consecutive harvest year with the exception of 2013 and again in 2014 when a slight decline in fertiliser costs was evident. On a calendar year basis, there was a slight increase in fertiliser prices in 2015 relative to 2014, but seasonality of purchase and application has an influence on overall expenditure. It is estimated here that for the 2014/15 harvest year NPK were down by about 1 per cent for Winter cereal crops but Spring crop compounds were up by about 1 per cent. It is important to note however, that these prices are still well below the prices recorded in the peak period of 2008 and 2009.

Figure 5: Irish Farm Gate Price Index of Fertilisers 2006 to 2015



Source: Central Statistics Office data for 2000 to 2015.

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. However, during 2015 the story for fertiliser price differentials has been relatively benign with prices not that different on cereal and grassland farms.

On the usage side, DAFM figures indicate that fertiliser purchases in the 2015 fertiliser year (October 2014/September 2015) were not very different from those seen in 2014. Nitrogen sales were down only very slightly by less than 1 per cent, with P and K both up by between 1 and 2 per cent. Given that the DAFM figure on fertiliser purchases refers to all fertiliser 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. Reports from a number of sources indicate that fertiliser usage per hectare in 2015 was similar to the levels recorded in 2014. Furthermore, any shift from spring to winter crops in the 2015 harvest year can be assumed to have been counter balanced (in fertiliser requirement terms) by a slight reduction in overall area devoted to cereals in 2015. Hence, in per hectare terms (per crop) it is estimated that 2015 usage of fertiliser was similar to that applied in 2014. With no change in fertiliser usage on crop farms (per hectare) in 2015 and only slight changes in fertiliser prices experienced, overall expenditure per hectare on fertiliser in 2015 is estimated to have increased very slightly on Spring sown crop and decreased slightly for Winter sown crops.

3.1.2 Seed – Usage and Price 2015

Expenditure on purchased seed on crop farms comprises between 11 and 14 per cent of direct costs for cereal and oilseed production. In terms of the composition of total costs, seed represented 5 per cent of total costs in 2014. In 2014, cereal farmers experienced a decrease in seed costs relative to the previous year due to the downward movement in the cereal prices. In the Autumn 2014 when seed supplies were purchased for the 2015 harvested winter crops, blue label seed cost had decreased by approximately 8 per cent, to €495 per tonne. This cost decrease was also evident in 2015 for spring sown crops relative to 2014.

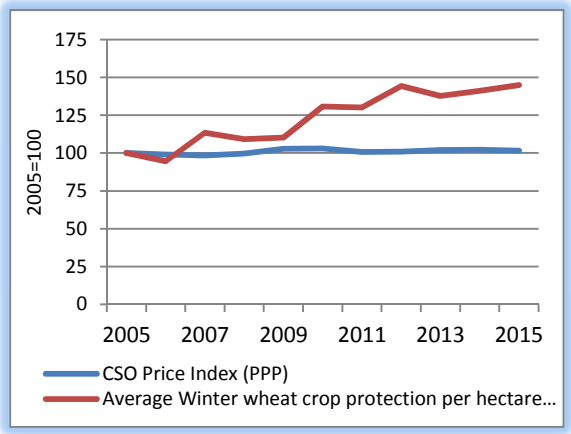
3.1.3 Crop protection – Usage and Price 2015

The expenditure on crop protection by specialist tillage farms in 2014 accounted for 21 percent of

direct costs and 10 percent of total costs. However, the contribution of crop protection to the composition of costs can vary significantly depending on the crop; the percentage spend on crop protection for winter crops is higher than that for spring crops. For example for the winter wheat crop in 2014, crop protection costs accounted for 32 percent of direct costs as compared to 22 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 2015 was less than 5 per cent and that between 2014 and 2015 costs are estimated to have actually decreased by about 1 per cent. However, there is anecdotal evidence and data from the Teagasc National Farm Survey that indicates that the number of sprays per season has increased. Based on this information it is estimated that crop protection costs have increased by about 3 per cent in 2015 relative to 2014.

Figure 6: Price and Volume Index of Plant Protection products in Ireland 2005-2015



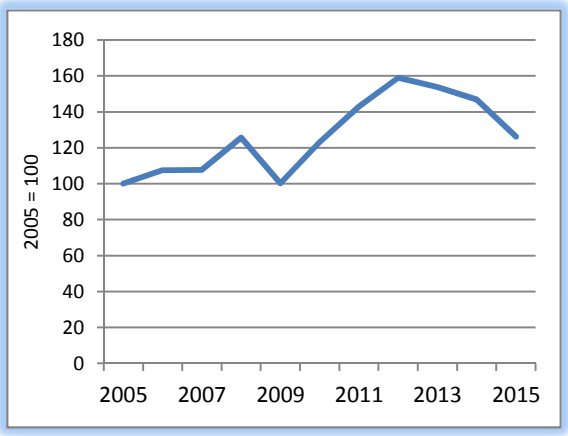
Source: Central Statistics Office, Teagasc National Farm Survey and Author's own estimates

3.1.4 Energy and Fuel – Usage and Price 2015

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 a component of direct costs, and machinery operating expenses which are a component of overhead costs, are directly influenced by energy inflation. These cost items represented approximately 23 percent of total costs on tillage farms in 2014.

Based on the CSO estimates presented in Figure 7, the farm level price of fuel has increased by over 62 percent between 2009 and 2015. Between 2014 and 2015 as a result of a large decrease in Brent crude oil prices, and movement in US dollar to Euro exchange rate, the overall story for fuel prices paid by Irish tillage farmers in 2015 is a 13per cent reduction relative to 2014. This is the third year in a row that fuel prices have declined. This estimate is based on a comparison of the agricultural motor fuel index from the CSO for 2014 and the first nine months of 2015. For winter and spring sown crops the decrease in energy prices is estimated at around 13 per cent. Demand for these input items tends to be relatively inelastic with respect to price and therefore it is assumed that usage in 2015 will similar to the 2014 level. Overall expenditure on fuel related items, including machinery hire, is likely to be 13 per cent lower in 2015 relative to 2014.

Figure 7: Price Index of Fuel products in Ireland 2005 – 2015



Source: Central Statistics Office data for 2000 to 2014. Author's estimates for 2015.

3.1.5 All other direct and overhead costs – Usage and Price 2015

Based on CSO estimates for the first nine months of 2015 compared to the same time period in 2014 it is assumed that labour costs and 'other direct costs' within agriculture have increased by 4 per cent.

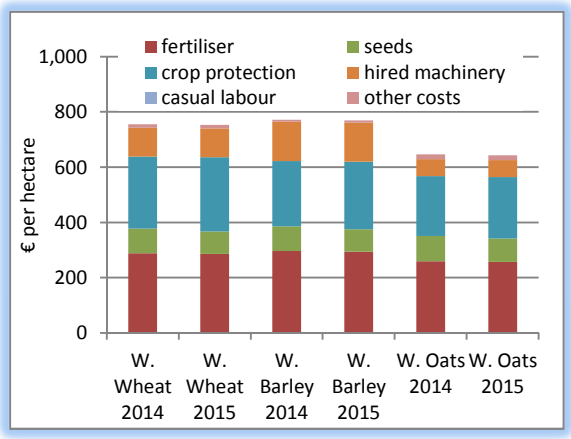
The average cost of land rental in 2014 on specialist tillage farms represented just under 6 per cent of total costs. Despite the fact that farm gate

cereal prices decreased in 2014 there was anecdotal evidence that land rents per hectare increased in 2015 relative to 2014. 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. Hence, despite the decrease in cereal prices in 2014 it is assumed that the average land rental per hectare increased by about 5 percent in 2015. Much of this inflation in rental prices per hectare in 2015 can be attributed to CAP policy uncertainties and demand for additional land from the dairy sector in particular. The methods employed do not allow for changes in the volume of land rented, and any changes here will only be fully reflected in the final Teagasc, NFS figures for 2015.

3.1.6 Estimate of Total Input expenditure for 2015

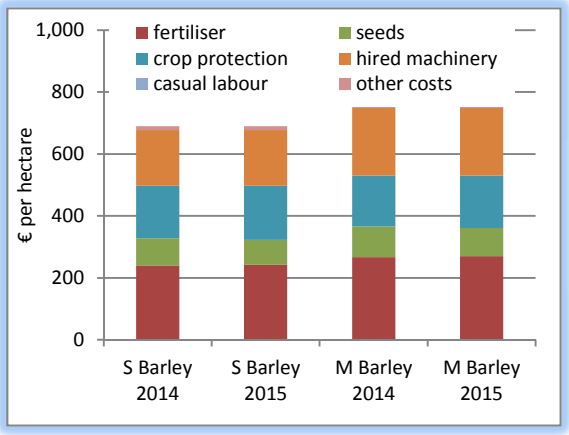
Total expenditure on all input items is estimated to have decreased only very slightly in 2015 relative to 2014. The most significant decrease in expenditure occurred on energy related input items, which are estimated to have decreased by about 13 per cent between 2014 and 2015. On average, however the estimated decrease in total direct costs was approximately 1 per cent in 2015 relative to the 2014 level.

Figure 8A: Direct Costs on Cereal Production in Ireland 2014 and Estimates for 2015 (Winter Crops)



Source: Teagasc, National Farm Survey Data and Author's estimates for 2015

Figure 8B: Direct Costs on Cereal Production in Ireland 201 and Estimates for 2015 (Spring Crops)



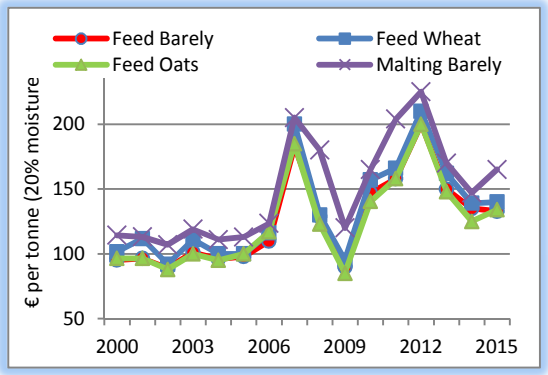
Source: Teagasc, National Farm Survey Data and Author's estimates for 2015

3.2 Estimated Output Values 2015

3.2.1 Price, yield and moisture levels in 2015

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. In 2015, there was not as much movement in cereal prices, with some increasing slightly, whilst others decreased slightly. Figure 9A below shows that farm gate feed wheat, barley and oat prices at 20 per cent moisture (paid at harvest time) were only slightly changed on 2014 levels.

Figure 9A: Farm Gate Cereal Prices (major crops), 2000-2015



Source: Teagasc, National Farm Survey Data and Author's estimate for 2015.

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. A special survey conducted by the Teagasc NFS in 2011 examined the proportion

of the 2011 cereal harvest which was forward sold by farmers. This research indicated that approximately 25 per cent of total cereal production in 2011 was forward sold by farmers. However, the experience of the 2012 harvest, where harvest prices were well in excess of forward contract prices in many cases, had a negative effect on the numbers of farmers willing to engage in forward contracts in recent years. Hence, it is assumed that in 2014 less than 10 per cent of total cereals were forward sold.

Market data shows that, on average, those farmers that forward sold in 2015 received a higher market price 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 2015 was much less than in previous years.

Table 1: Average Yields Levels, 2014 and 2015 Harvest

	Yield (tonne per ha.)	
	2014	2015
Winter Wheat	10.2	10.6
Winter Barley	9.3	10
Winter Oats	8.7	9.7
Spring Wheat	8.3	8.5
Spring Barley	7.5	7.7
Spring Oats	7.3	7.5

Source: CSO 2014 & Forthcoming Teagasc Harvest Report (2015)

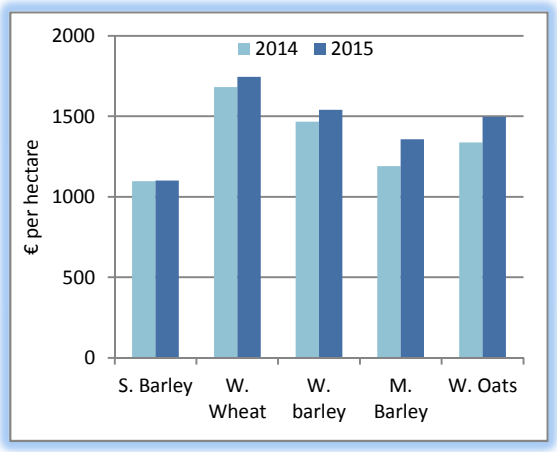
Table 1 shows the average green yields obtained in 2014 and 2015. In general for the 2015 harvested crops weather conditions during the growing season were very favourable with dry weather having a positive impact on grain fill. Hence, for all of the major crops, yields in 2015 were described as above 'average', with the yields of the main cereal crops all above their 5-year trend average. However, readers should note that these yields are green yields and are 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 from the favourable growing conditions during the growing season, yield of straw in 2015 was reported to be very good, but the prices received for straw sold were lower than those achieved in 2014. Taking yield and price into account, it is estimated that straw returns in 2015 were about 10 percent lower than in 2014.

3.2.2 Estimate of Total Output Value for 2015

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 2014 and 2015 are very crop specific. However, in overall terms, the general trend has been a slight increase in output value in 2015 relative to 2014. This increase arises because the fall in cereal prices (for some crops) has been offset by increased yields in 2015. Output value per hectare in 2015 is estimated to have increased by between 1and 14 per cent depending on the crop examined.

Figure 10: Actual Gross Output per Hectare 2014 & Estimated Gross Output per Hectare 2015



Source: Teagasc, National Farm Survey Data and Author's estimates for 2015

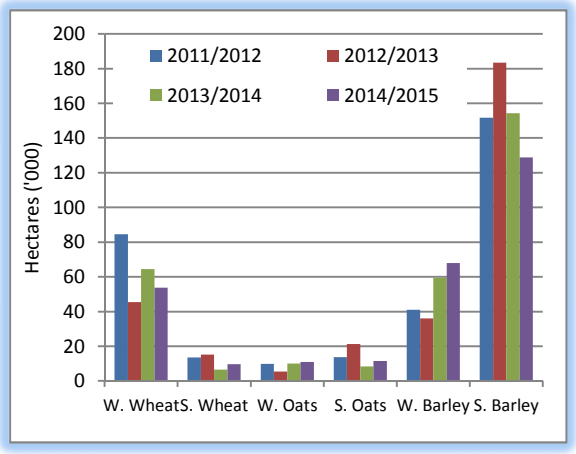
3.2.3 Estimate of Total Production 2015

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 area devoted to cereal crops in 2015. Figure 11 shows the area estimates for 2015 based on CSO June Crops and Livestock Survey (CSO, 2015).

Figure 11 shows that the total area devoted to cereal production decreased by about 8 percent in the 2014/15 crop year compared to the 2013/14 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 2014 as reported by the CSO with estimated total cereal production for 2015. The estimated 2015 production of wheat, barley and oats is based on 2015 yield estimates from Teagasc advisors and CSO statistics for the 2015 area planted. Overall cereal production is estimated to be down very slightly by approximately 87,000 tonnes or 3 percent on 2014 levels.

Figure 11: Change in Irish Crop Area from 2011/12 to 2014/15 crop year in Ireland



Source: CSO and Teagasc, Harvest Report (forthcoming, 2015)

Table 2: Actual & Estimated Production 2014 & 2015('000 Tonnes)

	2014	2015	%Change
Wheat	717	652	-9
Barley	1,731	1,672	-3
Oats	150	187	+25
Total	2,598	2,511	-3

Source: CSO and Teagasc Harvest Report 2015 (forthcoming)

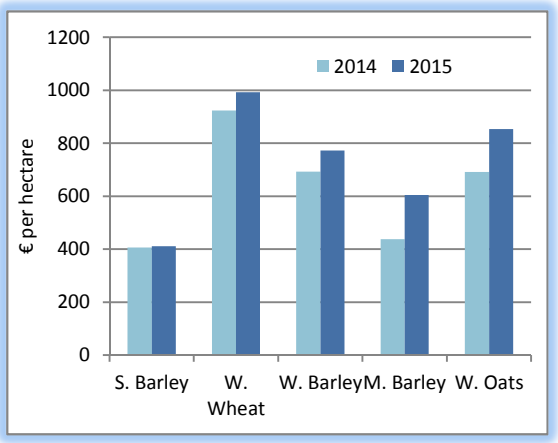
3.2.4 International Production Estimates for 2015

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 2015) show that global wheat and barley production and carry out stocks for 2015/16 marketing year to be up on the previous year's levels.

3.3 Review of Tillage Enterprise Margins in 2015

The review of cereal output value showed that the average value of output received by farmers was higher in 2015 than in 2014. The review of input costs concluded that total direct costs were approximately 1 percent lower in 2015 than in 2014. 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 2014 & Estimated Gross Margin for 2015 for each of the Main Cereal Crops

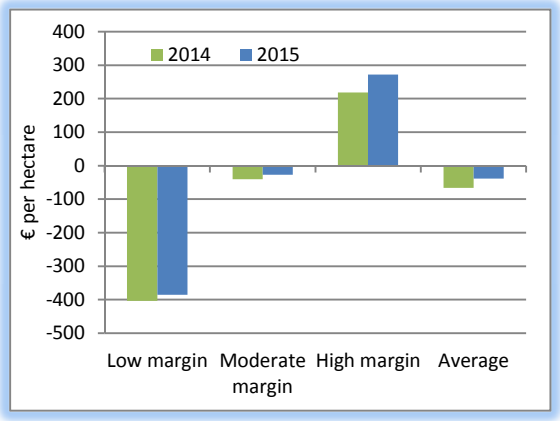


Source: Teagasc, National Farm Survey Data and Author's estimates for 2015

Figure 12 shows a clear story in terms of the change in gross margin in 2015 relative to 2014. The relative shift in yields between 2014 and 2015 has had the biggest effect on margins, with the increase in cereal yields resulting in an overall slight increase in gross margins for all crops examined. In terms of the major crops, the gross margin for winter wheat is estimated to be up by about €70 per hectare, while the margins for the other main crops, winter barley and spring barley, are estimated to be up by €80 and €6 per hectare respectively. It should be noted that the average gross margin figures presented above are market based gross margins and therefore exclude all decoupled payments and do not include overhead costs.

The estimated net margins for 2015 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 2014 and Estimated Net Margin for 2015 for the Cereal Enterprise on Specialist Tillage Farms



Source: Teagasc, National Farm Survey Data and Author's estimates for 2015

Figure 13 shows the cereal enterprise net margin estimates for 2015 relative to 2014, 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 2015 is slightly higher than in 2014 given slight upward movement in gross margins per hectare and a reduction in some important overhead cost items, notably fuel. For the best performing one-third of tillage farmers the estimated net margin for 2015 was €272 per hectare, and for the moderate margin farmer the net margin was negative at -€27 per hectare. It is important to remember that these figures exclude the SFP. 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 2015.

4. Outlook for 2016

In this section forecasts are provided for the expenditure for various input items in 2016, the likely farm gate cereal price that will prevail at harvest 2016 and the likely net margin of tillage farmers in 2016.

4.1 The Outlook for Input Expenditure

4.1.1 Fertiliser – usage and price 2016

A number of factors need to be considered when forecasting price and volume changes for fertiliser on crop farms for 2016. CSO official monthly price indices for fertilisers for 2015 are only available up until the end of September; these data indicate a price reduction in N based products in particular over the last few months of the 2015 fertiliser year. Some anecdotal evidence seems to suggest that manufacturers will try to recoup this downward movement in N products in 2016. However, given that global agricultural commodity prices have been low in recent months, this would not suggest a significant upsurge in demand for fertiliser in 2016. Based on short term supply and demand estimates for fertiliser products from the International Fertiliser Association (IFA, 2015) it would appear that supply will be more than ample to meet demand. Furthermore, if a further slight weakening of the Euro against the dollar (in yearly average terms) occurs, this would mean that any downward movement in fertiliser prices (due to lower demand) would be arrested. Hence, it is assumed that fertiliser prices for 2016 will be unchanged from the 2015 level.

Fertiliser usage in 2016 is expected to be on a par with 2015 levels, given that for agronomic reasons the scope for reduction in use in response to higher fertiliser prices is limited for cereal farmers. Overall, it can be expected that fertiliser expenditure will be more or less unchanged on cereal farms in 2016 relative to the 2015 level.

4.1.2 Seed – usage and price 2016

As mentioned previously in the paper, cereal farmers experienced a decrease in seed costs in 2015 relative to the previous year due to the downward movement in the cereal markets. Given that cereal prices did not change significantly at harvest 2015 relative to 2014, no change is expected in seed prices for 2016.

4.1.3 Crop protection – usage and price 2016

The increase in crop protection costs in 2016 relative to 2015 is forecast to be of a similar magnitude to the changes seen in each of the last three or four years. Whilst price changes have been minimal at just under 1 per cent on the price side, more substantial volume changes have been evident recently due to increased number of sprays per season. Taking volume and price changes into account, based on recent data from the Teagasc, National Farm Survey, a 3 per cent increase in crop protection expenditure is forecast for 2016.

4.1.4 Energy and Fuel – usage and price 2016

Fuel costs in 2016 will depend mainly on the evolution of crude oil prices. Current crude oil futures prices suggest that prices will decrease

from the 2015 average during the course of 2016 by about 7 per cent. Assuming that usage is unchanged, expenditure on fuel related charges are forecast to be down about 3 per cent in 2016. Contractor charges are expected to remain similar to those experienced in 2015.

4.1.5 All other direct overhead costs 2016

All other direct and overhead costs are expected to increase by a very small amount, in line with recent price changes of such items, at about zero to 2 percent depending on the cost item.

In terms of land rental prices for 2016, there appears again to be some upward pressure on prices for 2016 compared to 2015. This increase in land rental prices can be attributed mainly to competitive pressure from non-cereal uses, dairy farming in particular. Hence, for 2016 it is assumed that land rental prices will increase by 5 per cent.

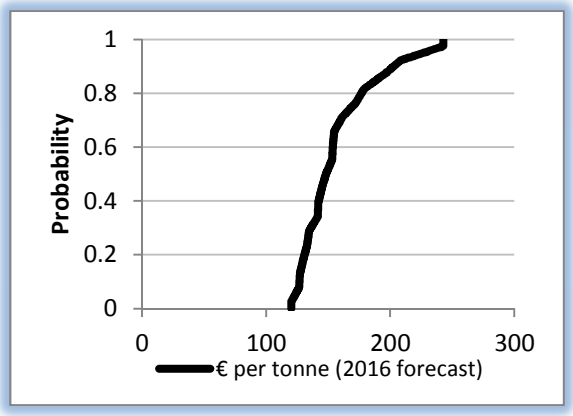
4.2 The Outlook for Markets 2016

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 2016. 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 2016 harvest price an econometric analysis was conducted to predict the probability that the 2016 farm gate price will be higher or lower than the 2015 price. This analysis was based on the November 2015 LIFEE and MATIFF futures prices for November 2016 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 2016 Irish farm gate cereal price for wheat taking into consideration the differences between the historic predicted values and the actual outcomes.

Figure 14 outlines the probability of achieving various harvest prices in September 2016. Based on the econometric model developed, it shows that there is significant uncertainty concerning the predicted harvest price for September 2016. This predicted range is based on current futures trading prices (November 2015), 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 2016 Wheat Harvest Price

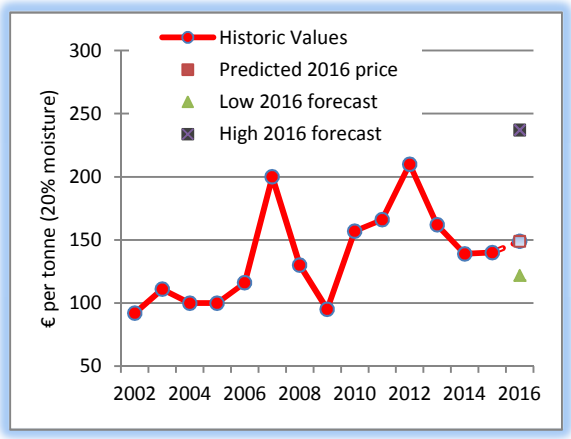


Source: Author's own estimates.

Based on the probabilities of achieving different harvest prices, the average predicted value from the model for the farm gate wheat price is approximately €149 per tonne at 20 percent moisture. 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 €122 per tonne or as high as €237 per tonne (Figure 15).

In terms of a rationale for the forecast slight increase in cereal prices in 2016, various market reports have been be examined. The latest edition of *Strategie Grains* (November 2015) forecasts a decrease in EU soft wheat and barley production in 2016/17. Soft wheat is forecast to decline by 6 million tonnes and barley to decline by 2 million tonnes compared to 2015/16.

Figure 15: Historic, Estimated & Forecasted Farm Gate Feed Wheat Price (2002 – 2016)



Source: Author's own estimates, 2016 forecast, at 90 percent confidence interval

This reduction in production is forecast despite an expected upward movement in cereal area within the EU, but the main driver of change in production levels comes from an assumption of a return to trend yields in 2016 (seen Appendix A3 for further details on forecasted changes in arable crop areas in the EU28 for 2016/17). This estimated decrease in production area could, *ceteris paribus,* be assumed to have a positive impact on price. This assumption of course ignores a lot of other variables which potentially could have an impact on price, namely stock levels and 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.

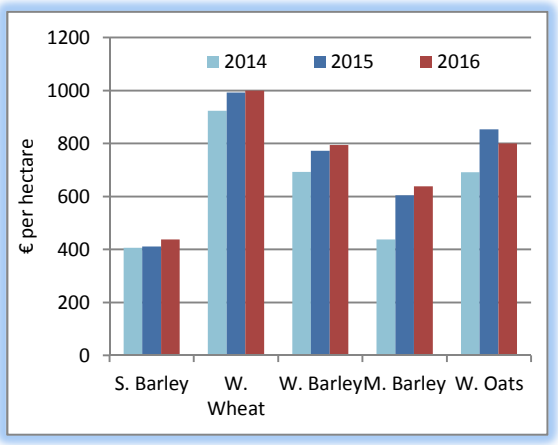
Based on the futures market forecast and the adjustments made in the regression analysis for predicted versus actual outcomes, our forecast is that farm gate cereal prices will increase by a about 6 per cent in 2016.

4.3 The Outlook for Tillage Enterprise Margin in 2016

No change in seed and fertiliser prices, and decreases in fuel prices, coupled with increases in crop protection, land rent and other inputs, suggests that overall cereal production costs are likely to be slightly higher in 2016 relative to 2015. Furthermore, output value on average is forecast to be slightly higher in 2016 for most crops except winter oats, due to yield and output price changes. Figure 16 presents the actual gross margin for each of the main cereal crops in 2014, and the respective estimates and forecasts for 2015 and 2016.

The net effect of input price, output price and volume movements is forecast to have only a slight effect on gross margins for 2016, with the majority of crops experiencing a slight increase in margin, with Winter oats the only crops forecast to experience a decline in gross margin. For example, gross margins for winter wheat are forecast to increase by €8 per hectare, while gross margins for spring barley and winter barely are forecast to increase by approximately €27 and €22 per hectare respectively. The overall story for 2016 is one of very little movement in margin terms over those experienced in 2015, except for Winter oats which is forecast to have a larger decline in yields (and margins) in 2016 relative to other crops if a reversion to trend yields is assumed. It should be noted that the average gross margin figures presented are market based gross margins.

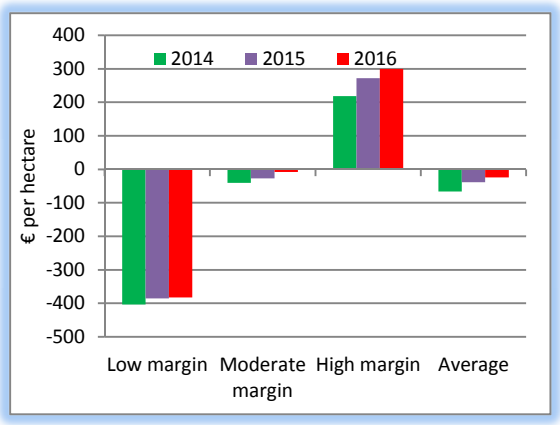
Figure 16: Actual 2014, Estimate 2015 and Forecast 2016 for Cereal Crop Gross Margins



Source: Teagasc, National Farm Survey Data and Author's estimates for 2015 & forecast for 2016

Similar to the format used to present margins in 2014 and 2015 earlier in the paper, the forecasted net margins for 2016, 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 2016 are slightly higher in 2016 than those recorded in 2015. The reason for the minor movement in margins is because the positive impact of our forecast upward movement in prices is offset by our assumption of a reversion to trend yields in 2016.

Figure 17: Net Margin Actual 2014, Estimate 2015 and Forecast 2016 for the Cereal Enterprise on Specialist Tillage Farms



Source: Teagasc, National Farm Survey Data and Author's estimates for 2015 & forecast for 2016

5. Concluding Comments

The 2014/2015 production year saw only slight upward movement in cereal net margins, given that gross margins per hectare for most cereal crops on a per hectare basis were up slightly. Whilst yields for the main crops were well above average, with little movement in output prices and a slight increase in total costs, gross margins were only slightly higher overall in 2015. Spring barley gross margins increased by a mere €6 per hectare, while Winter wheat margins were up by about €70 per hectare and Winter barley was up by €80 per hectare. The highest recorded gross margin of all tillage crops in 2015 was winter wheat.

The forecast for net margins on tillage farms in 2016 is for relatively little change from 2015,with the forecast 6 per cent increase in cereal prices in 2016 offset by our assumption of a return to trend yields and a slight increase in direct costs. The overall picture for cereal crops is that in general margins will remain very tight in 2016, with only a slight upward movement in average gross and net margins in 2016.

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Provisional Teagasc Harvest Report (September2015)

Stategie Grains (2015) November 2015

Table A1: Production Costs, Output and Gross Margin for All Cereal Crops in 2014 (€/ha)

	S. Barley	W. Wheat	W. barley	M. Barley	W. Oats
Gross Output	1,096	1,681	1,467	1,190	1,337
Fertiliser	240	289	297	267	259
Seeds	87	88	89	99	92
Crop Protection	169	261	237	165	217
Hired Machinery	180	104	142	218	61
Other Direct Costs	12	13	8	4	17
Total Direct Costs	690	758	774	753	646
Gross Margin	406	923	693	437	691

Source: 2014 National Farm Survey Data

Table A2: Variation in output and margin 2014: top and bottom performing cereal farms*

	Spring Barley			Winter Wheat		
	Bottom	Top	% Diff.	Bottom	Top	% Diff.
Yield (tonnes per hectare)	6.9	7	1%	10	9.9	-1%
Price per tonne	141	148	5%	150	183	22%
Gross output (€ per hectare)	1,054	1,148	9%	1,547	1,762	14%
Fert., seed, spray (€ per hectare)	525	470	-10%	630	612	-3%
Machinery hire (€ per hectare)	198	118	-40%	82	52	-37%
Other direct costs (€ per hectare)	215	122	-43%	98	58	-41%
Gross Margin (€ per hectare)	314	556	77%	819	1,093	33%
Land rent (€ per hectare)	44	35	-20%	107	82	-23%
Other Fixed Costs (€ per hectare)	270	367	35%	736	594	-20%
Total Costs (€ per hectare)	1,273	994	-22%	1,571	1,346	-14%
Net Margin (€ per hectare)	-219	154	-170%	-24	416	-1833%

Source: 2014 National Farm Survey Data
**Excluding farms with less than 10 hectares*

Table A3: Changes in arable crop areas in the EU28

Areas (kha)				
	2013/14	***2014/15***	***2015/16***	***2016/17***
Total Cereals	57,460	57,830	57,120	57,340
Total Oilseeds (including crops grown on set-aside)	12,140	11,950	11,850	12,000
Total Protein Crops	1,200	1,350	1,610	1,570
Silage	6,100	6,000	6,170	6,020
Set-aside & Fallow Land (non food crops excluded)	5,216	5,000	5,500	5,265
Sugar beet	1,600	1,320	1,460	1,480
Total area cultivated and set-aside	**83,626**	**83,750**	**83,710**	**83,675**

Source: Strategie Grains (November 2015)

Irish Pig Sector in 2014

Sow Population
1.51 million head
up 2.4% on the 2013 level

Live Pig Exports
0.519 million head
down 3.9% on the 2013 level

Pig Slaughter
2.94 million head
up 3.9% on the 2013 level

Feed Prices
€317 per tonne
down 10% on the 2013 level

Pig price
167 cent per 100kg
down 5.1% on the 2013 level

Margin over feed costs
49 cent per kg dwt
up 11% on the 2013 level

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

Irish Pig Sector in 2015

Sow Population
1.50 million head
down 0.8% on the 2014 level

Pig Slaughter
3.132 million head
up 6.5% on the 2014 level

Live Pig Exports
0.514 million head
down 6.5% on the 2014 level

Pig Price
148 cent per kg dwt
down 11.4% on the 2014 level

Feed Prices
€303 per tonne
down 5% on the 2014 level

Margin over feed costs
37 cent per kg dwt
down 25% on the 2014 level

Irish Pig Sector in 2016

Sow population
1.49 million head
down 0.6% on the 2015 level

Pig Slaughter
3.17 million head
up 1.5% on the 2015 level

Live Pig Exports
0.519 million head
no change on the 2015 level

Pig Price
157 cent per kg dwt
up 6% on the 2015 level

Feed Prices
€312 per tonne
up 3% on the 2015 level

Margin over feed costs
43 cent per kg dwt
up 6 cent on the 2015 level

Source: Teagasc Pig Development Unit Estimates for 2015 and Forecasts for 2016

Review of Pig Sector in 2015 and Outlook for 2016

Michael McKeon

Pig Development Department, Teagasc

1. Introduction

In 2014 the Irish pig industry recovered to a profitable position after a number of years of low or negative profitability. However, the profit margin declined in December 2014 and remained at a low level throughout 2015.

The pigmeat market price was high in 2014, despite the closure of the Russian market to European pigmeat exports from January 2014. This unexpected market development was primarily due to a disease outbreak in the U.S. The disease (PEDv) was contained during 2015, which led to renewed growth in global pigmeat stocks and a consequential slump in the 2015 European pig price.

During 2015, the low pig price relative to cereal prices, resulted in a poor 'Margin over Feed' especially in the latter half of the year. The fourth quarter of 2015 had the lowest margin since the fourth quarter of 2011.

2. Irish Pig Production Costs 2015

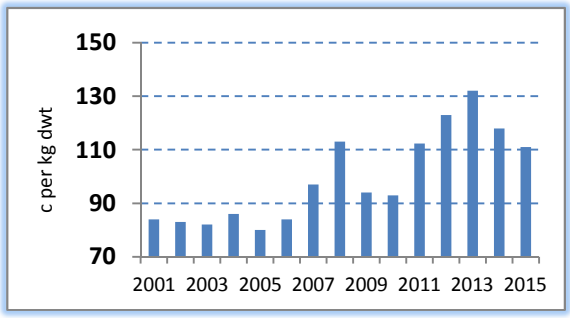
The cost of producing pigmeat in Ireland can be broken into feed cost and non-feed costs. Feed currently constitutes 71 percent of the total cost of producing a pig, with the non-feed inputs contributing the remaining 29 percent. The primary source of volatility over the last three years has been due to the feed cost element.

2.1 Irish Pig Feed Costs 2015

Feed prices were stable in 2015 after a number of turbulent years. The large global harvests in 2014 and 2015 ensured that world stocks were high and therefore prices remained stable. The 2015 composite feed price per tonne was €303, a drop of 4.5% in composite feed cost per tonne when compared to 2014.

When the composite feed price is examined over a longer period the 2015 price of €303 is lower than the 5 year average (2011-2015) of €323 but substantially higher than the 10 year average (2006-2015) of €287. Annual Irish composite pig feed prices are shown in Figure 1, expressed in terms of the cost per kg deadweight (dwt).

Figure 1: Irish pig feed cost 2001-2015



Source: Teagasc Pig Department

The composite compound feed price remained extremely stable throughout the year. Monthly pig feed prices for 2015 are shown in Table 1.

Table 1: Purchased Irish Compound Feed Prices in 2015

Month	Composite Feed Price € per Ton	Feed Cost cent per kg dwt
January	302	111
February	302	111
March	302	111
April	303	111
May	303	110
June	304	111
July	304	111
August	305	111
September	304	111
October	303	110
November	301	110
December*	301	110
Average	**303**	**111**

Source: Teagasc Pig Department
*December 2015 figure is an estimate

The annualised feed cost per kg dead weight of 111 cent is significantly lower than previous years (118c/kg, 2014) and would have generated a modest profit margin in 2015 if the pig price had not declined significantly.

2.2 Non-feed costs in Irish Pig Production in 2014

The non-feed costs can be decomposed into *Common Costs* and *Herd Specific Costs*. The common costs apply on all units and represent the largest component of non-feed costs. The data quoted for the Irish industry is collected from herds using the Teagasc ePM herd recording system which records, analyses and benchmarks herd productivity and financial performance. There are currently 84,000 sows on the database from a national herd of about 150,000 (56% of total). The costs quoted are based on the national 2014 ePM data, which are the most recent analysis of annualised costs available. Common costs are itemised in Table 2.

Table 2: Common Costs in ePM Recorded Herds

Cost Item	2014	2010-2014
	cent per kg dwt.	
Healthcare	6.3	6.1
Heat, Power Light	4.1	4.2
Transport	1.1	1.2
AI	1.7	1.6
Manure	1.5	1.8
Labour/Management	12.4	12.6
Repairs	2.4	1.9
Phone/Office	0.5	0.5
Environment	0.4	0.6
Insurance	0.7	0.7
House rental	0.9	-
Contract Costs	1.3	-
Water	0.3	-
Dead Pigs Disposal	0.4	-
Stock Depreciation	1.7	0.8
Miscellaneous	1.2	2.0
Total	**36.9**	**33.9**

Source: Teagasc ePM Report 2014

The common costs in 2014 were three cent per kg dwt lower when compared to the previous five year average, but seven cent higher than the 2012 price of 29.8 cent per kg dwt. The single largest increase in 2014 costs when compared to 2013 was an increase in labour costs which rose by one cent per kg dwt.

2.3 Herd Specific Costs in Irish Pig Production in 2014

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. Herd specific costs are itemised in Table 3.

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 3: Herd Specific Costs in ePM recorded herds

Cost Item	2014	2010-2014
	cent per kg dwt.	
Interest	1.9	1.9
Building Depreciation	4.3	3.6
Total	6.2	5.5

Source: Teagasc Pigsys Report 2014

2.4 Total Cost of Irish Pig Production in 2015

The estimated annualised cost of production in 2015 (based on 2014 non-feed costs and 2015 feed costs) was 154 cent per kilogram dwt for pigs delivered to the slaughter plant. This production cost remained very stable throughout the year reflecting the stable feed cost.

3. Irish Pig Prices in 2015

The estimated average pig price in 2015 was 148 cent which was significantly below the previous five year average (2011-2015) of 162 cent.

The annualised 2015 pig price fell by 11% in comparison with 2014. This is the lowest pig price since 1999, when a freak fire in a pig processing plant reduced slaughter capacity.

The closure of the Russian market in January 2014 and a large European production was offset during 2014 by an outbreak of PEDv disease in the US which resulted in an estimated seven million less US pigs reaching the marketplace. The reduced global pigmeat production and diminished US competition due to high US domestic prices, allowed the European industry to enjoy high pig prices during 2014.

Table 4: Monthly Irish Pig Price in 2015

Month	Pig Price
	cent per kg dwt
January	145
February	144
March	147
April	148
May	151
June	155
July	154
August	151
September	151
October	150
November	142
December*	138
Average	**148**

Source: Teagasc Pig Department
*December 2015 figure is an estimate

Unfortunately for European producers the PEDv disease outbreak in the US was controlled in late 2014 with a consequential surge in US production and exports therefore decreasing the European pig price. This trend continued throughout 2015 as the loss of the Russian market really started to bite for Irish and European pig producers.

Table 5: European Pig Prices January to November 2014 and 2015

	2014	2015	
Country	Jan – Nov	Jan – Nov	Change
	Euro per kg	Euro per kg	%
NE Monfoort	1.53	1.33	-13
DK 61%	1.41	1.24	-12
DE ZMP 56%	1.58	1.41	-11
ES Llerida vif	1.31	1.16	-11
IT vif Modena	1.41	1.28	-9
FR MPB 56%	1.37	1.37	0

Source: MPB 2015

4. Profitability of Irish Pig Production in 2015

The margin over feed costs per kg dwt in 2015 was 37 cent, the lowest since 1999.

Table 6: Average Margin over Feed Costs from Compound Feed from 2008-2015

Year	Pig Price (Net)	Feed Cost	Margin over Feed
	Cent per kg dwt		
2008	152	113	39
2009	145	94	51
2010	140	93	47
2011	151	112	39
2012	166	123	43
2013	176	132	44
2014	167	118	49
2015*	148	111	37

Source: Teagasc Pig Development Department *estimated

When the 2015 margin over feed is compared to the average margin over feed of the last five, ten, fifteen, and twenty years (see Table 7) the difficult trading conditions and low profitability of recent years becomes clear.

If an average margin of 50 cent per kg (estimated by the author as a requirement to meet all production costs including financial repayments) is added to the feed costs incurred during 2015 then the margin over feed at 37 cent is critically short of this target. The low margin in the previous five year's (42 cent per kg dwt) now requires a substantially higher margin over feed then 50 cent in order to reduce the accumulated feed credit debt and poor building maintenance that now exists in the sector.

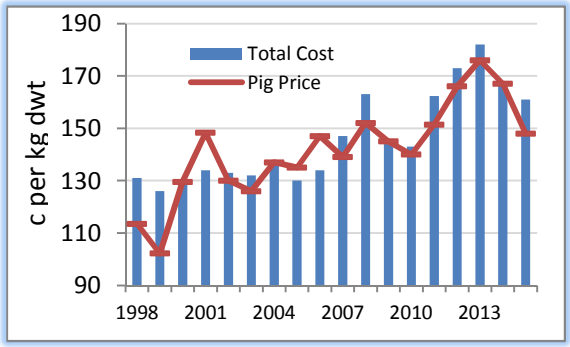
Table 7: Margin Over Feed in 2015 compared to the 5, 10, 15, and 20 year average

	Margin Over Feed	% Diff.
	cent per kg/dwt	
2015*	37	-
5 Yr average	42	+12
10 yr average	45	+18
15 Yr average	49	+24
20 Yr average	48	+23

Source: Teagasc Pig Development Department *estimated

Figure 2 shows the pig price received when compared to the total production cost (feed plus 50 cent) since 1998.

Figure 2: Estimate of Pig Price compared to Total Production Cost



Source: Teagasc Pig Development Department
2015 is an estimated value

5. Irish Pig and Sow numbers in 2015

The latest sow survey of commercial pig production units revealed a slight decline in sow numbers when compared to the previous survey. Irish sow numbers are shown in Table 8.

Table 8: Sow Numbers in Commercial Pig Herds 2010-2015

Year	Sow Numbers
	000 head
2010	161.4
2011	156.2
2012	145.7
2013	147.5
2014	151.1
2015	149.9

Source: Teagasc Pig Development Department

The sow herd census indicates that the Irish sow population continues to remain remarkably robust around 150,000, sows despite low profitability.

Table 9: Irish born pigs slaughtered: 2012 to 2015

Year	2012	2013	2014	2015
	million head			
Slaughter Pigs	3.5	3.4	3.5	3.65*

Source: Teagasc Pig Department *Estimated

The number of Irish pig disposals in 2015 is estimated to be 3.65 million pigs which would be 4% higher than in 2014 and the highest annual number of pigs born in the Republic of Ireland (ROI) pigs slaughtered in ROI. This is a reflection of the increased number of pigs born alive in the national herd and improved national herd health.

Table 10: Slaughter and Live Export to N. Ireland of Irish Born Pigs from 2006 to 2015

Year	Rep. of Ireland Licensed Export Plants	Exports to Northern Ireland	% Exports of Total
	million head		%
2006	2.619	0.478	15%
2007	2.570	0.512	17%
2008	2.511	0.457	15%
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%

Source: DAFM & DARDNI *estimated

The export of Irish born pigs to Northern Ireland (NI) is estimated to have fallen by 3% during 2015 which continues the downward trend in recent years. Since 2012 the number of pigs exported to NI has decreased annually by an estimated 95,000 pigs.

The trend of increased Irish slaughter pig disposals in 2015 was also reflected across other European countries as illustrated in Table 11.

Table 11: European & N. American Pig Disposals

	2014*	2015*	Change
Country	Million head		%
Germany	42.7	43.3	1.5%
Spain	28.3	30.2	6.7%
France	15.9	15.8	-0.1%
Denmark	13.9	13.7	-1.4%
Netherlands	12.2	12.4	2.3%
UK	7.5	7.8	3.7%
Total	**120.4**	**123.2**	**2.4%**
U.S.	85.4	92.4	8.1%
Canada	16.1	16.5	2.4%

*Based on 44 weeks of production
Source: MPB 2015

Over the first 44 weeks of 2015 the combined pig slaughtering of the major European producing countries increased by an estimated 2.4% when compared to 2014. Spain had the single biggest increase with 1.9 million extra pigs slaughtered in

2015. The U.S. slaughterings also rebounded (+8%) after their PEDv disease outbreak in 2014.

6. EU Pigmeat Exports & Imports in 2015

The export of pigmeat products from the EU increased in 2015 (Jan-Aug) by 5.4 percent as shown in Table 12. However, these statistics do not reflect the strength of U.S. exports in the latter half of 2015, which had detrimental consequences for EU pigmeat prices.

Table 12: Pigmeat exports from selected countries

Country	2014*	2015*	change
	million tonnes		%
EU	1.84	1.94	+5.4
USA	1.48	1.41	-4.7
Canada	0.75	0.73	-2.9
Brazil	0.32	0.33	+4.9
Total	4.39	4.41	+0.4

Source: MDP * Jan-Aug 15

7. Outlook for the Irish Pig Market in 2016

The outlook for the pig market will be a reflection of pig feed and pig price developments during 2016 as these are the key factors affecting profitability.

7.1 Irish Pig Feed Price Outlook in 2016

Pig feed is the single largest input cost. Therefore the trend in the price of this input will have a substantial effect on the profitability of the sector in 2016. The feed price outlook is dependent on wheat, maize and soyabeans, as these are the principal pig feed cost drivers.

The predicted 2016 composite compound pig feed price in December 2015 is €301 per tonne. The bumper global harvests in 2014 and 2015 have resulted in very healthy predicted use-to-ending stock percentages for wheat (31.7%), maize (21.8%) and soyabean (26.5%) – USDA November 2015. These copious stocks should ensure stable prices until mid-2016, where upon the progress of the autumn harvest 2016 will dictate prices for the latter half of 2016.

The South American soyabean harvest is currently being planted with Brazilian production quantities of 101 million tonnes forecast, which would generate the largest Brazilian harvest ever. While this should dictate a fall in soyabean prices in 2016, it is expected to be offset by higher Chinese imports of 80.5 million tonnes and a continuing weak euro exchange rate. The outlook for soyabean prices therefore is for little change, provided normal weather conditions prevail.

The current feed ingredients futures market prices indicate an annual increase of 3 percent over the 2015 annual composite pig feed price. This would increase the composite compound pig feed price from €303 to €312 for 2016.

7.1.1 Irish Pig Prices in 2016

The Irish pig price was weak in 2015 with a sharp decrease in the last quarter. The return to stability of the EU sow herd in 2016 and increased numbers of piglets born alive, will increase the supply of European pigs. It is estimated this may be in the region of 2% - 2.5 percent. This increased EU volume on the market, with continued increases in U.S. slaughter volumes, will provide very competitive and difficult export conditions especially in Q1 and Q2 of 2016.

Irish and European pig prices will be significantly influenced by the level of Chinese pigmeat imports in 2016. The Chinese pig herd has reduced by 12.4 million sows since 2013 and the scarcity of pigmeat has resulted in domestic Chinese pig producers currently achieving profit levels of US $67/pig. If the Chinese herd begins expanding immediately, then it will be the end of 2016 before they return to previous domestic supply levels. In the interim the shortfall may be filled by European exports which will thereby reduce the volume of pigmeat overhanging the European market thereby increasing the pig price. Overall, a 6 percent increase in the pig price is foreccast for 2016.

7.1.2 Profit Margin in 2016

If the composite feed price increases moderately in the latter half of 2016 and the pig price increases due to increased Chinese imports, then there will be a profitable margin for Irish pig producers in 2016. The industry requires a period of prolonged profitability in order to reduce current high levels of feed credit and undertake required repairs and capital investment.

8. Conclusion

In 2015 the Irish pig industry experienced moderate feed prices, but the declining pig price returned a very low margin-over-feed of 37 cent per kg dwt. That is the lowest since 1999 and

critically it is below the minimum required margin-over-feed of 50 cent. The estimated composite pig feed cost of €301 per tonne in December 2015 is expected to be maintained until June 2016, with the possibility of a moderate increase in the latter half of 2016.

It is expected that the market conditions in 2016 will return a lower pig price for the first half of 2016, primarily due to an increased number of pig disposals in the main European pig producing countries, but that Chinese import demand may drive an increase in EU prices in the latter half of the year.

The outlook for 2016 is for profitability in the pig industry to continue to remain challenging, with a positive outlook heavily dependent on the export market or a disease outbreak in Europe.

Special Report:

Comparison of cost measures in Teagasc National Farm Survey and Teagasc eProfit Monitor

A note on the methodologies used by Teagasc for the estimation of costs of production by the Teagasc National Farm Survey (NFS), eProfit Monitor (ePM) and Moorepark Dairy Systems Model (MDSM)

Tom O'Dwyer, Thia Hennessy, Laurence Shalloo, Kevin Connolly,

George Ramsbottom and Brian Moran

Teagasc

Overview

Within Teagasc there are currently three methodologies used to measure/estimate the output and costs of dairy farms. These are the Teagasc National Farm Survey (NFS), eProfit Monitor (ePM) and Moorepark Dairy Systems Model (MDSM). Each has its own purpose and addresses different issues both within and outside Teagasc. The purpose of this note is to first briefly describe the three methodologies before then exploring the approach used by each, including the apportionment of costs and the treatment of certain cost items. The note concludes with recommendations for future developments.

Description of three methodologies

The Teagasc National Farm Survey (NFS) involves data collection from a random, nationally representative sample, of between 1,000 and 1,200 farms by a team of data recorders, on an annual basis. Data validation is undertaken by the Teagasc data recorder. Each farm is assigned a weighting factor so that the results of the survey are representative of the national population of farms. As well as informing Teagasc research and policy, NFS results are used to determine the financial and technical situation for the many systems and size groups that make up the Irish farming sector. The results generated can be used by Teagasc advisors to benchmark farm performance. One of the groups represented in the survey are 'specialist dairy' farmers. All direct costs of production are accurately allocated to each specific enterprise at the point of data entry, having being verified by the Teagasc data recorder with reference to the farm's finance information. The NFS is the only unbiased representative source of costs of production recorded on a system basis in Ireland.

Benchmarking data is another source of costs and returns data on Irish farms. The Teagasc eProfit Monitor (ePM) is an example of such a system; it is an online financial analysis tool that is available to all Teagasc clients via the Teagasc website. Data (both technical and financial) is provided by the farmer through the completion of an Input Sheet and can be entered directly by the farmer or (as is more likely) by his/her Teagasc advisor. ePM data analysis allows for an examination of both whole farm and enterprise profitability. Advisors select farmers to complete the benchmarking analysis and users are encouraged to repeat the analysis over a number of years. Data validation is by the Teagasc advisor. The results generated are not nationally representative as the farms included in the annual dataset do not proportionally represent the entire farming population. Farmers participating in ePM tend to be larger scale and have higher efficiency levels than those participating in NFS. Traditionally the use of the data generated using ePM has been for extension and education purposes.

The Moorepark Dairy Systems Model (MDSM) is a stochastic budgetary simulation model of a dairy farm. The model is designed to determine the effects of technical, institutional and physical change on the overall production systems. The model integrates animal inventory and valuation, milk supply, feed requirement, land and labour utilisation and economic analysis. Stochastic simulation is used to determine the influence of variation of key input variables on output variables such as farm profitability. To date the primary use of the MDSM has been for research purposes e.g. the study of the effects of soil type and climatic conditions on the profitability of milk production systems and the effects of genotype and concentrate feeding level on farm profitability. Data is provided by researchers.

Comparison of results between NFS, ePM and MDSM is plagued with difficulties. Notwithstanding the difference in sampling approaches between NFS and ePM and the modelling approach, the output, costs and returns figures are calculated somewhat differently by the three systems. The following section summarises the key differences.

Differences in the calculation of output, costs and returns

1. Whole farm

All three systems produce reports outlining whole farm performance following a similar outline i.e. Gross Output minus Variable (or Direct) Costs equals Gross Margin; Gross Margin minus Fixed (or Overhead) Costs equals Net Margin (or Net Profit, referred to as Family Farm Income (FFI) in NFS). There are some differences in the cost headings employed (see Table 2); depreciation is calculated differently (see below) and a charge against own labour is included in the MDSM only. There are also some differences in the treatment of subsidies with subsidies added at the Gross Output stage on NFS and after the Net Profit stage in ePM. Subsidies are typically not included in MSDM but if they are, they are included after the Net Profit stage (similar to ePM).

2. Enterprise analysis – apportionment of costs

Given the mix of enterprises (dairy, replacements, drystock, tillage) on the majority of dairy farms, it is useful to examine the performance of the separate enterprises in addition to the performance of the overall farm. In this way, farmers can opt to increase/ reduce enterprises based on their relative financial performance. Two of the three data systems conduct enterprise analysis – ePM and NFS; the third system, MDSM, does not conduct an enterprise analysis.

In order to conduct enterprise analysis, certain assumptions have to be made regarding (1) the apportionment of costs and (2) the transfer of animals from one enterprise to another. ePM apportions variable costs on a LU basis and fixed costs on an enterprise output basis (unless previously apportioned by the farmer on the Input Sheet). NFS uses a similar approach, although in the case of Variable Costs the allocation of costs is discussed between the Teagasc data recorder and the farmer.

Enterprise analysis must also reflect the movement of animals from one enterprise to another. For example, calves born to the dairy enterprise must be transferred to either the replacement or drystock enterprise if retained on the farm – in this way the 'transfer out' becomes part of the dairy enterprise output and a cost to either the replacement or drystock enterprise gross output. Transfer values do not appear on the Whole Farm Reports. ePM uses standard transfer values for the different animal categories; NFS uses values agreed between the Teagasc data recorder and the farmer.

Finally, it is important to note that an enterprise analysis based on either NFS or ePM figures should not be used to calculate whole farm income. The enterprise analysis (1) omits decoupled subsidies (these are only included in the Whole Farm Reports) and (2) the other farm enterprises – drystock, replacements, tillage – may be adding to or reducing the whole farm Net Profit figure.

3. Treatment of costs associated with heifer rearing

The costs associated with heifer rearing are apportioned by the ePM software (see explanation above) unless the farmer supplies their own figures. The costs associated with heifer rearing can then be viewed in the 'All Enterprises' report (either total € or € per ha).

On the ePM Dairy Enterprise report, the cost associated with heifer rearing is reflected on the output part of the report – weaned dairy female calves are transferred out at a standard value (currently €300 per calf) while replacement heifers are transferred into the herd, also at a standard value (currently €1000 per animal). Consequently, in a stable herd transferring out 20 calves and transferring in 20 freshly calved heifers, the net cost would be €700 per replacement. This is part of the output side of the report and in effect, reduces the output value of the dairy enterprise.

The Teagasc NFS transfers all calves over a week old to the cattle enterprise at a value agreed between the farmer and the data collector. All rearing/feeding charges for these animals are borne by the cattle herd. The animals are transferred back into the dairy herd at the point of calving; the value used is the average value of the dairy cows in that herd plus the value of a calf and therefore reflects the varying value of animals across farms due to breed, genetic profile etc.

The MDSM calculates a cost for heifer rearing based on costs included in the model and such costs are included as part of each of the Variable and Fixed Costs listed in Table 2. As stated previously MSDM does not conduct an enterprise analysis.

4. Treatment of own labour

A cost against own labour is not included in the calculation of Net Profit in either NFS or ePM. Net Profit is strictly defined and is a well understood concept – the same as Net Cash Flow is an accepted concept and the differences between the two measures are clear. The inclusion of a notional cost for own labour would result in the calculation of a figure which is neither Net Profit nor Net Cash Flow. In contrast, MDSM does include a charge against the farmer's own labour.

A labour adjustment (Dairy NZ, 2014) should value both the management input of the business owner as well as the unpaid work performed by both the business owner(s) and other family members.

However, the calculation of a labour adjustment figure raises a number of questions:

1. How is an appropriate labour adjustment figure calculated? How does one validate the hours worked by the farmer? What rate should be allocated to the hours worked? Are all hours worked valued at the same rate? These are key questions as a farm owner would have a realistic expectation of a higher reward for his/her input in running the farm since they have responsibility for business decision making.
2. Where is the labour adjustment figure deducted (as part of Fixed or Variable Costs or following the calculation of Net Profit)?
3. In a multi-enterprise business, how is the labour adjustment figure allocated to the separate enterprises? Or is it only calculated for the whole farm situation?
4. Will a labour adjustment figure be included for all enterprises?

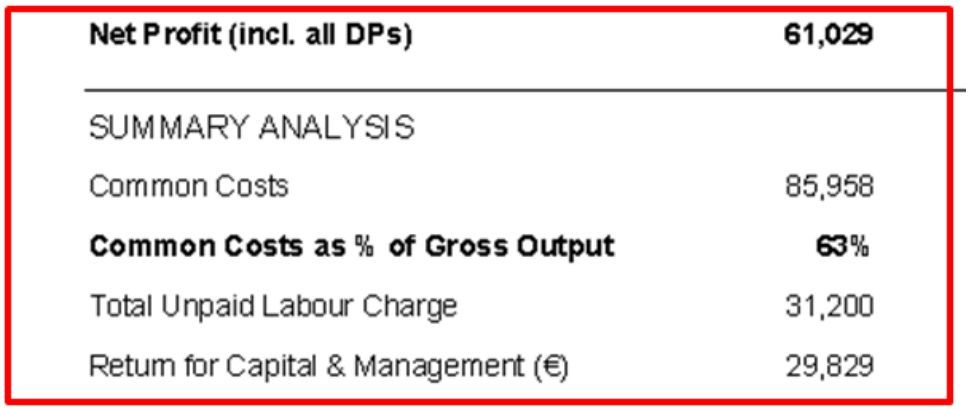
It is the strong recommendation of this report that a scientific basis is needed for the calculation of the labour adjustment figure. One such approach would be the use of the Standard Man Days[1] (SMDs) approach. But the figures currently available are outdated and need to be revised to reflect modern farming practices. It is the considered view of the authors of this report that this approach (or similar) needs to be developed before ePM or NFS methodologies are modified to include such a labour adjustment figure. A scientific/ research backed approach must be favoured over a 'self-assessed' or 'self-reported' approach to the calculation of a labour

[1] See Teagasc Management Data for Farm Planning 2013 – 2014 for details.

adjustment figure. Furthermore, the authors recommend that the labour adjustment be deducted from Net Profit (as currently calculated). This recommendation is on the basis that (1) the current definitions of Variable and Fixed costs are broadly well understood; (2) it is an adjustment and not an actual cash cost; (3) internationally (Dairy NZ, 2014) the labour adjustment is made following the calculation of an Operating Profit figure (sales minus cash costs).

ePM provides a facility to enter an estimate of "Average number of unpaid labour hours per week" and to multiply this by a labour charge per hour. The resultant amount labelled "Total Unpaid Labour Charge" is deducted from Whole Farm Net Profit to give "Return for Capital and Management". This figure is presented on a whole farm basis and is NOT split by enterprise (see below). This is a voluntary data entry field; about 50% of ePM dairy farms report this estimate. The average numbers of unpaid labour hours per week is self-assessed by the farmer, as is the labour charge per week.

Figure 1: Extract from ePM Whole Farm Report



Net Profit (incl. all DPs)	**61,029**
SUMMARY ANALYSIS	
Common Costs	85,958
Common Costs as % of Gross Output	**63%**
Total Unpaid Labour Charge	31,200
Return for Capital & Management (€)	29,829

Another question which arises is whether a charge against own land, livestock and machinery should also be calculated and deducted from Net Profit (as currently calculated) so as to calculate Total Economic Costs (and Total Economic Profit). It would seem sensible to consider this and jointly develop both labour adjustment and land adjustment protocols prior to modification of ePM and NFS methodologies.

5. Depreciation

A depreciation figure is included in each of the three methodologies but there are different approaches taken in the calculation of the depreciation figures. In addition, a depreciation figure for 'Land Improvements' is included in both NFS and MDSM but not ePM. The Teagasc NFS uses replacement cost depreciation methodology, this method has been applied consistently to the full sample of farms for over 20 years. The overall impact of depreciation estimates on final farm income figures can be very significant.

6. Stock/ Inventory

The Teagasc NFS records all inventory (feed, fertiliser) on the farm at the end of each year. Inventories of fodder are used to calculate a fodder crop adjustment cost; this is important in years where inventories may change, such as was the case before and after the recent fodder crisis.

Any inventory change which occurs is reflected in MSDM also. There is a facility to record inventory changes within ePM but it is rarely used by farmers/ advisers (on the basis of the assumption that inventories change little from year to year).

Summary and Recommendations

This report has highlighted a number of differences between the three methodologies currently used to measure/ estimate output and costs on dairy farms by Teagasc researchers and advisers. While all

methodologies estimate Output, Costs and Net Profit, it is apparent that the results from the different methodologies are not directly comparable due to differences in the treatment of certain cost items. Consequently it is imperative that the source for the Output, Costs and Profit figures is always referenced. By highlighting the source of the data to the user, the usefulness and limitations of the data should be apparent.

A useful future development would be the agreement of a set of standardised terminologies across the three methodologies. Furthermore, there may be merit in developing a further analysis/ report which examines the total economic costs of milk production; this would involve the inclusion of both land and labour adjustment figures. Such an analysis/ report should not replace existing reports but should build on existing analysis/ reports. Such a development would also have to involve guidelines on the appropriate assumptions to be made around the costs of own land and own labour. The treatment of heifer rearing costs on both NFS and ePM analyses is also an area which requires examination, especially on those farms which are specialised in dairying (say > 70% LU are dairy cows). Another important development would be the development of a Whole Farm Standardised Cash Flow report – which would incorporate all movements of cash through the business and include loan repayments (principal and interest), drawings and taxation.

Finally, given the advisory and farm management focus of the ePM system, this is the most suitable data source for farm advisory events such as farm walks. However, given the representative nature of the Teagasc NFS and the verifiable data collection process, this data should be used in all presentation of national results and especially in issues pertaining to government policy, economic planning and cross-country comparisons.

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Appendix 1: Summary of key features of three systems

Table 1: Summary of key features of National Farm Survey (NFS), eProfit Monitor (ePM) and Moorepark Dairy Systems Model (MDSM)

	National Farm Survey (NFS)	**eProfit Monitor (ePM)**	**Moorepark Dairy Systems Model (MDSM)**
Data collection	Data provided by farmer and verified by Research Technician with reference to financial documents (invoices etc.)	Data provided by farmer using Input Sheet and verified by Dairy Adviser	Model used for research purposes only; data supplied by researcher
Calculation of total costs	Costs grouped into 'Direct' and 'Overhead' categories	Costs grouped into 'Variable' and 'Fixed' categories	Costs grouped into 'Variable' and 'Fixed' categories
Apportionment of costs	Similar to ePM except discussion takes place between Technician and farmer re allocation	For the Dairy Detailed report, variable costs are allocated on the basis of LUs; fixed costs are allocated on the basis of output	Enterprise analysis not conducted
Treatment of heifer rearing costs	Similar to ePM except transfer values are agreed between data recorder and farmer (standardised values used in ePM)	Heifer rearing charge included against Gross Output on Dairy Enterprise report; separate Replacement Enterprise report shows costs/ profit of replacement enterprise	Heifer rearing costs included as a portion of each cost item
Treatment of own labour	Own labour charge not included	Own labour charge not included	Own labour charge included
Land charge	No land charge included for owned land	No land charge included for owned land	Land charge included where land usage is different between scenarios under examination
Depreciation	Replacement method used	Straight line method used based on original asset value	Straight line method used based on original asset value
Reports	Whole farm and dairy enterprise reports	Whole farm and enterprise reports; analysis available on € total, €/ha, €/cow, €/kg MS and c/litre.	Whole farm reports only

Appendix 2: Summary of cost headings used in three systems

Table 2: Summary of cost headings used in National Farm Survey (NFS), eProfit Monitor (ePM) and Moorepark Dairy Systems Model (MDSM)

	National Farm Survey (NFS)	eProfit Monitor (ePM)	Moorepark Farm Systems Model (MDSM)
Direct or Variable Costs	**Direct Costs** Purchased Concentrates Purchased Bulky Feed Fertiliser Crop Protection Purchased Feed Hire of Machinery Transport Livestock (AI, Vet) Casual Labour Other Fodder Crop Adjustment	**Variable Costs** Purchased Concentrates Home Grown Concentrates Purchased Forage Fertiliser Lime Vet AI/ Breeding Contractor Seeds and Sprays Milk Recording and Parlour Silage Additive and Polythene Levies and Transport Straw Sundry Variable Costs	**Variable Costs** Concentrates Fertiliser, lime, reseeding Land and quota rental Livestock purchases Machinery hire Milk replacer Silage making Vet, AI and medicine Quota Lease
Fixed or Overhead Costs	**Overhead Costs** Rent of Conacre Car, ESB, Phone Current Hired Labour Interest Charges Machinery Depreciation Machinery Operating Buildings Depreciation Building Maintenance Land Improvement Depreciation Land Improvement Maintenance Other	**Fixed Costs** Hired Labour Machinery Running Machinery Leases Overdraft and Credit Interest Car (Farm) ESB (Farm) Phone (Farm) Depreciation – Buildings Depreciation - Machinery Repairs and Maintenance Insurance Professional Fees Sundry Fixed Costs Land Lease Quota Lease	**Fixed Costs** Car and Phone Use Electricity Labour, Living Expenses Machinery Operation and repair Insurance, Transport, Sundries Farm Maintenance Interest Miscellaneous (Depreciation charges are included in a separate category to the Fixed Costs above and are allocated to Land Improvement, Buildings and Machinery)

Appendix 3: Comparison of results from ePM and NFS systems for one dairy farmer whose data was analysed using both NFS and ePM

The data presented in Table 3 compare costs of production for the same farm as analysed by ePM and NFS systems for the 2013 production year. This farmer was not chosen as representative of either NFS or ePM; rather as a farmer whose data was analysed using both systems. His performance would reflect above average performance for the year in question (2013) – see Appendix 4 for summary of financial performance of farmers using NFS and ePM systems in 2014.

Table 3: Comparison of the results from ePM and NFS systems

	ePM cent per litre	NFS cent per litre	Difference cent per litre
Gross Output	41.29	40.55	0.74
Direct Costs	11.76	14.16	-2.4
Gross Margin	29.53	26.39	3.14
Overhead Costs	8.78	6.56	2.22
Total Costs	20.54	20.72	-0.18
Net Margin	20.76	19.83	0.93

1. There is a difference in Gross Output of 0.7 cent per litre. This is due to three main issues:
    a. The calf value assigned by the NFS data recorder to calves transferring out of the dairy herd is higher than that assigned by the Teagasc advisor completing ePM.
    b. The calculation of replacement value which involves the valuation of inventories and the transfer of heifers into the dairy herd differed slightly; the advisor completing ePM used default values as set by the ePM system whereas the NFS data farm recorder used a market value which was determined in consultation with the farmer.
    c. The NFS values milk fed to calves at 14 cent per litre; the ePM does not value such milk as it assumes that is reflected in the value of calf sales or transfers.
2. There is a difference in Direct Costs of 2.4 cent per litre. This relates to the categorisation of casual hired labour which is classified as a Direct Cost in the NFS and an Overhead Cost in ePM.
3. When Total Costs are considered there is very little difference between the two approaches.
4. There is less than a 1 cent per litre difference in Net Margin between the two approaches; this arises mostly from the treatment of replacement costs.

If the same farm's data were to be processed through the MDSM, the following changes would be expected:

- Assuming a replacement heifer rearing cost of €1,000, a replacement rate of 20% and milk yield of 5,000 litres per cow, replacement rearing costs would be +4c/Lit. Under MSDM, this would be treated as a cost leading to a 4.0 cent per litre increase in costs. The output figure also be higher as both ePM and NFS include a heifer rearing charge against dairy output (in the case of ePM, this is €1,000 replacement transfer into dairy herd minus €300 calf transfer to replacement enterprise).
- Depending on the scenario, generally full labour costs work out at between + 6c/Lit (Aug) and 7.0 cent per litre. There is hired labour in ePM and NFS of approx. 1.0 cent per litre.
- So including the replacement heifer rearing and the full labour costs would increase total costs by between 9.0 and 11.0 cent per litre (minus the hired labour cost already included in ePM and NFS)
- Full land costs would correspond to approximately 4.0 cent per litre based on Greenfield estimates.

Appendix 4: A Comparison of the Financial Performance of Dairy Farms Participating in the 2014 Teagasc National Farm Survey and the Teagasc eProfit Monitor

Summary of Key Findings

- In 2014 1,363 dairy farms participated in ePM compared to 319 dairy farms in the NFS sample. Almost 50 per cent of the NFS farms also participated in ePM.
- Farms participating in ePM are almost 40 per cent larger, when measured in herd size, than the NFS farms and also more productive with higher stocking rates and milk solids per cow.
- Across all farms in the two samples a simple comparison shows that ePM farms were 25 per cent more profitable on a cent per litre basis in 2014 and 30 per cent more profitable on a per hectare basis. It should be noted that this comparison does not take account of the different characteristics of farmers in the two samples.
- Following disaggregation of both samples on the basis of gross margin per hectare, comparisons were made between the different cohorts. When comparing the Top one-third of farms in the two samples the profit differential between the ePM and the NFS was smaller than for the full samples but when comparing the Bottom performing one-third of farms the profit differential was larger. This suggests that the "best" farms in the two groups are more comparable than the "poorest" farms.
- The Top one-third of ePM farms were 18 per cent more profitable on a per litre basis in 2013 than the Top farms in the NFS and 12 per cent more profitable on a per hectare basis.
- The Bottom one-third of ePM farms were 36 per cent more profitable on a per litre basis in 2013 and 55 per cent more profitable on a per hectare basis.
- Further analysis is required to control for the differences in the two samples when comparing profit levels. Econometric models could be employed to control for the differences both observable, such as farm size and resources, and unobservable, such as motivation and ability. This would yield a more accurate measure of the differences in profitability between the two groups.

Introduction

The Teagasc National Farm Survey (NFS) is the official nationally representative source of data on output, input and income in farming in Ireland. The NFS, which has been in operation for over 40 years, records data on a sample of approximately 1,000 farms each year, with a sub-sample of approximately 300 dairy farms. The Teagasc eProfit Monitor (ePM) database was established in 2003 and its use has grown steadily throughout the farm sector. It is an online financial analysis tool that is available to all Teagasc clients via the Teagasc website. Data (both technical and financial) are provided by the farmer through the completion of an Input Sheet and can be entered directly by the farmer or (as is more likely) by his/her Teagasc Adviser. This section compares the characteristics and performance of dairy farms participating in the NFS and ePM in 2014.

A priori, one would expect that ePM farms should perform better, possibly along both technical and financial measures, than NFS farms. Farms participating in ePM are doing so for farm management reasons and as such are likely to be more motivated than the general population of farms. Furthermore, ePM farms are likely to be learning from their interaction with the financial management tool and their farm advisor, and therefore should be improving their performance year on year. Farms participating in the NFS on the other hand, are not self-selecting into the survey. They participate in the survey because they fulfil a certain criteria required to make the sample representative. The NFS sample contains farms of all sizes, systems and from all geographic areas, some farms in the sample may use ePM (48% in 2013) but historically the majority did not. It is also possible that differences also arise in the results of ePM and NFS due to methodological reasons. However, a recent analysis of the methodologies used by the two data sources concluded that the differences between the two approaches were minimal. This was validated by running the two methodologies on the same farm and comparing the results.

Characteristics of ePM and NFS Dairy Farms

Table 1 outlines the main characteristics of the dairy farms participating in the NFS and ePM in 2014. As shown, 1,363 dairy farms participated in ePM in 2014[2] compared to 319 in the NFS. The 1,363 farms participating in the ePM are on average much larger, almost 43 per cent, than the farms in the NFS sample. As expected, the ePM farms are also more intensively managed, with higher output per hectare and stocking rate. While the milk yield per cow is similar across both groups of farms when measured in litres, the milk solids per cow are higher on the ePM farms implying a higher fat and protein content.

Table 1: Characteristics of the average dairy farm in the Teagasc NFS and the Teagasc ePM: 2014

	NFS	ePM
	(n=318)	(n = 1363)
Herd Size (cows)	68	97
Total Milk production (litres)	351,560	497,901
Stocking Rate	2.07	2.17
Yield Per Cow (litres)	5,170	5,133
Milk Solids per cow (kg)	375	402
Milk Solids per hectare (kg)	775	872
Grass utilised (kgDM/ha)	7.41	8.5

Comparing the Financial Performance of ePM and NFS Dairy Farms

Table 2 summarises the financial results for the average farm participating in the NFS and ePM in 2014. The difference in gross output per litre between the two groups is very marginal. However, it should be noted that the NFS and ePM use different methodologies to estimate replacement costs which are a key element of gross output. Direct and fixed costs were 14 and 8 per cent higher respectively on the average NFS farm in 2014. Furthermore, the net margin when measured on a cent per litre basis was 25 per cent higher on ePM farms than NFS farms and 30 per cent higher when measured on a per hectare basis.

Table 2: Output, Costs and Profit (cent per litre) for the average dairy farm in the Teagasc NFS and the Teagasc ePM: 2014

	NFS	ePM
	(n=318)	(n = 1363)
Milk Price	39.5	39.26
Gross Output	38.9	39.43
Total Direct Costs	14.74	12.90
Total Fixed Costs	11.16	10.31
Net Margin (cent per litre)	12.97	16.21
Net Margin (€ per cow)	671	832
Net Margin (€ per hectare)	1,386	1,806

In order to examine the financial performance of the farms in more depth, 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 poorest performing one-third (Bottom). This allows us to examine the Top performing one-third of farms in both the NFS and ePM samples.

Table 3 summarises financial results for the Top farms in each group. The profit differential between the ePM and NFS farms is still present when examining the Top group but has converged somewhat. On a per litre basis the net margin was 18 per cent higher on ePM farms, while net margin per hectare was 12 per cent higher.

[2] Data accessed 8/2/2015; additional dairy farmers have completed eProfit Monitor analysis since this date.

Table 3: Costs and profit cent per litre for the Top one-third of farms in the Teagasc NFS and the Teagasc ePM: 2014

	Top NFS	Top ePM
	(n=96)	(n = 454)
Key Technical Indicators		
Stocking rate (Cows/Hectare)	2.51	2.52
Milk yield per cow (litres)	5,667	5,365
Financial Indicators (cent per litre)		
Gross Output	39.18	41.07
Total Direct Costs	13.36	12.21
Total Fixed Costs	10.09	10.30
Total Costs	23.45	22.50
Net Margin (cent per litre)	15.73	18.57
Net Margin (€ per cow)	893	996
Net Margin (€ per hectare)	2,238	2,511

Table 4 summarises financial results for the Middle performing one-third of farms in the two samples. The profit differential between the ePM and NFS farms is more pronounced for the Middle groups than the Top group. On a per litre basis the ePM farms were 24 per cent more profitable than the NFS farms in 2013, and this differential increased to 30 per cent when measured on a per hectare basis.

Table 4: Costs and profit cent per litre for the Middle one-third of farms in the Teagasc NFS and the Teagasc ePM: 2014

	Middle NFS	Middle ePM
	(n=108)	(n = 455)
Key Technical Indicators		
Stocking rate (Cows/Hectare)	2.04	2.19
Milk yield per cow (litres)	5,131	5,009
Financial Indicators (cent per litre)		
Gross Output	38.17	39.62
Total Direct Costs	14.04	12.88
Total Fixed Costs	11.02	10.49
Total Costs	25.06	23.33
Net Margin (cent per litre)	13.11	16.25
Net Margin (€ per cow)	673	814
Net Margin (€ per hectare)	1,372	1,783

Finally, Table 5 summarises financial results for the Bottom performing one-third of farms in the two samples. The profit differential between the ePM and NFS farms is again further pronounced when examining the poorest performing group of farms. However, it is interesting to note that this is driven by production costs rather than output values with output values being higher on the NFS farms. On a per litre basis the ePM farms were 36 per cent more profitable than the NFS farms in 2014, and this differential increased to 55 per cent when measured on a per hectare basis.

Table 5: Costs and profit cent per litre for the Bottom one-third of f farms in the Teagasc NFS and the Teagasc ePM: 2014

	Bottom NFS	Bottom ePM
	(n=115)	(n = 454)
Key Technical Indicators		
Stocking rate (Cows/Hectare)	1.63	1.78
Milk yield per cow (litres)	4,538	4,769
Financial Indicators (cent per litre)		
Gross Output	39.25	37.98
Total Direct Costs	16.8	13.84
Total Fixed Costs	12.36	10.46
Total Costs	29.16	24.30
Net Margin (cent per litre)	10.09	13.68
Net Margin (€ per cow)	458	652
Net Margin (€ per hectare)	746	1,161

Concluding Comments

A simple comparison of the ePM and NFS dairy farms reveals that ePM farms were more profitable in 2014. This profit differential was more pronounced for the poorest performing one-third of farms. However, a comparison of the characteristics of the two farm groups also showed that ePM farms are larger and more productive. Further analysis is required to control for the differences in the two samples when comparing profit levels. Econometric models could be employed to control for the differences both observable, such as farm size and resources, and unobservable, such as motivation and ability. This would yield a more accurate measure of the differences in profitability between the two groups.

Appendix 5: Standard Man Days (SMDs)

A Standard Man Day (SMD) is defined as eight hours of work supplied by a person over 18 years of age. The number of SMDs required per hectare for the different crops, and per head for various categories of livestock, is used to calculate the total number of SMDs required to operate the farm.

Figure 2: Standard labour requirements for dairying (Source: Teagasc Management Data for Farm Planning 2013 – 2014)

DAIRYING: (SMD's/Cow)

Modern buildings, self feed silage, paddocks, roadway, bulk tank etc.		Self feed Silage, cubicles		
		Efficient layout Herringbone/ Abreast	Moderate layout Abreast/ Bucket	Poor layout Abreast/ Bucket
Herringbone	Abreast			
5 6		7	9	10

Appendix 6: Labour Adjustment

Dairy NZ (2014) define their labour adjustment figure as comprising of two components: (1) unpaid management based on the size of the herd and time worked; plus (2) unpaid labour valued at the hourly market rate.

1. Wage for management
    a. If the principal farm manager is employed, then the wage cost of the manager will already be included as a cost item (hired labour) – no wage for management is needed.
    b. If the farm manager is the farm owner, a wage for management needs to be included to value the both the management and labour of the owner. This figure is based on both the number of cows milked at peak (with a scale of values based on herd size) and a management adjustment (with a base assumed of 2,400 hours worked per year; hours worked above the base are calculated at a standard rate).
2. Additional unpaid family labour is also valued on the basis of 1 FTE = 2,400 hours @ $12.50 per hour.

Wage for management ($) + Value of unpaid family labour ($) = Labour Adjustment ($)