Animal & Grassland Research and Innovation Centre

Moorepark

# Moorepark Dairy Levy Research Update

## *Teagasc Greenfield Dairy Programme 2012*

*Moorepark Animal & Grassland Research and Innovation Centre*
*Kilkenny Greenfield Open Day*

*Thursday 21st June, 2012*
*Series 18*

FARMERS JOURNAL

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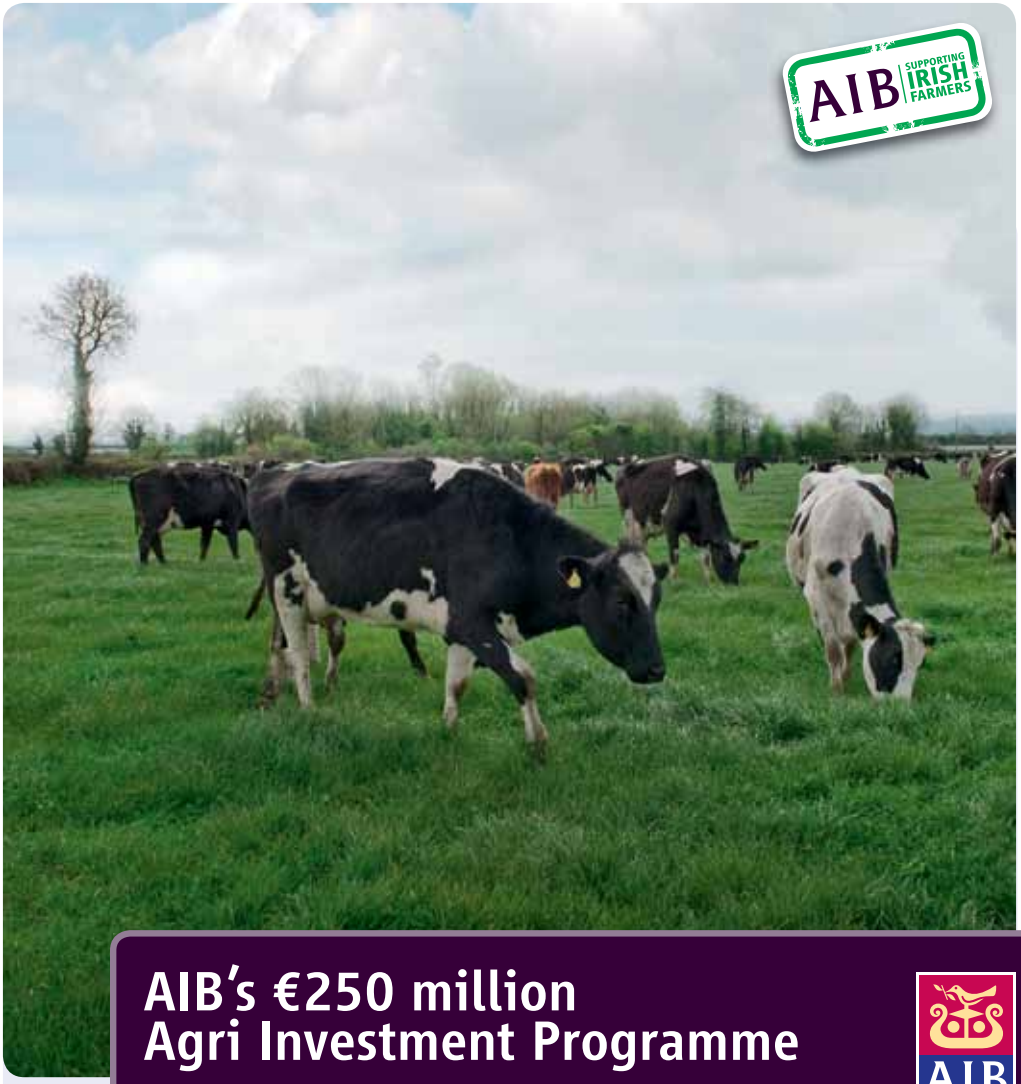


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**Sponsored by A.I.B.**

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# Introduction

## Pat Dillon

**Teagasc, Animal & Grassland Research and Innovation Centre, Moorepark, Fermoy, Co. Cork**

In 2009, Teagasc in conjunction with key stakeholders (Irish Farmers Journal, Department of Agriculture, Fisheries and Food, Glanbia, FBD Trust and AIB) set up the Greenfield Dairy Programme. The programme encapsulated three models of expansion: existing family dairy farms, new entrants to dairying and a new greenfield demonstration farm. Two commercial family owned farms were selected to demonstrate how to maximise financial returns on capital employed within the family farm model. Successful applicants to the New Entrants Schemes to dairying are provided with the required training to set up a new dairy farm operation. The third model was the conversion of 112 ha tillage farm to a new low capital cost 300 cow dairy unit. The objective of the Greenfield dairy farm is to:

1. Demonstrate the design and set up of a grass based Greenfield dairy farm
2. Demonstrate profitable operation of a relatively large scale grass based unit
3. Provide direction and confidence to farmers considering large scale expansion
4. Identify the risks and demonstrate the risk management strategies associated with dairy expansion.

The project is now in its 3rd year and the main outcomes for the first two years of the Greenfield dairy farm are:

1. Future milk production systems must be based on low cost to insulate family farm business from milk price volatility and generate funds to finance expansion going forward
2. Capital investment on expanding dairy farms should be concentrated on productive assets such as stock plus grazing and milking infrastructure
3. Key to a successful dairy expansion programme at farm level are excellent financial management and a high level of technical efficiency
4. In 2011 and 2012 both cash surplus and profitability on the Greenfield farm are ahead of that original budgeted mainly driven by the higher milk price received and higher level of technical performance.
5. Increase grass DM production, and higher EBI cows in association with an appropriate calving pattern will further increase grass utilisation and milk solids production in the coming years

The support of all the stakeholders in the project is greatly acknowledged. All information pertaining to the Greenfield Dairy Programme as well as weekly update is available on the Greenfield website at: http://www.greenfielddairy.ie/

# Basic Principles Informing Profitable Expanding Milk Production Systems

Brendan Horan and Padraig French
Teagasc, Animal & Grassland Research and Innovation Centre, Moorepark, Fermoy, Co. Cork

## Summary

- Irish milk production systems must maintain low production costs to insulate the farm business from increasing milk price volatility and generate funds to finance business expansion as opportunities arise.
- Expansion places additional costs, risk and strain to the dairy farm business and requires excellent financial management and technically efficient systems.
- Capital investment on expanding dairy farms should be concentrated on productive assets such as stock, grazing and milking infrastructure.
- Grass growth will limit the productivity of expanding dairy farms and grazing management practices must focus on increasing grass growth and utilisation.
- Increased stocking rates in association with an appropriate calving date will deliver increased grass utilisation and milk solids production.
- High EBI animals will deliver increased milk solids production and profitability within larger scale and increasingly feed limited dairy herds.

## Introduction

The mindset and approach to milk production on Irish dairy farms must change after milk quotas are removed. Post quotas and with profitability per hectare as the core objective, Irish pasture-based production systems must focus on increasing home grown pasture production and utilisation through new feed management objectives, increased stocking rates, accelerated cow and maiden heifers calving rates (90% in six weeks; 50% in 10 days), reduced supplementary feed usage and a more feed efficient high Economic Breeding Index (EBI) dairy cow. In the next decade, fewer dairy farmers with increased operational scale will leverage increased productivity and profitability from grass based systems fuelled by leading edge management technologies. Every dairy farm business must use the intervening years to quota abolition to develop their farming operations in a manner consistent with the requirements of a vibrant and expanding industry for the future. This paper will describe the characteristics of profitable grass based systems post milk quota and the steps that farmers must now take to expand their dairy farm business for long term and sustainable profitability.

## The milk production environment post EU milk quotas

While it is impossible to predict the likely trends in international commodity markets, it is widely acknowledged that global demand for food is outgrowing food supplies and that the overall outlook for food prices are positive. Within that context and as a small open export oriented economy, it is also increasingly evident that the milk price received by Irish producers will become increasingly volatile (and our industry has already experienced some price volatility in

recent years (Figure 1)). Fundamentally, price volatility requires that our dairy production systems must maintain a low production cost base to insulate dairy farm businesses from price shocks and generate sufficient funds in better times to permit business expansion.

Dairy farm expansion puts significant additional pressures on the existing dairy farm business and should not be considered without due regard for repayment capacity and the impacts on the family unit. Such expansion necessitates technically excellent systems which are entirely profit focused and highly efficient per unit of land, labour, capital and environmental resources. With excellent management, expanding dairy farms rarely achieve high levels of productive efficiency during the initial years of expansion as new infrastructure and people, deficient soils, and immature or mixed source herds take time to settle and average initial operational performance places additional pressure on farm cash flows. A provisional analysis of 2011 profit monitor data indicates that the top 10 per cent of dairy farmers completing profit monitor achieved an average overall net farm profit of €1,708/hectare (ha) based on milk solids (fat plus protein; MS) output of 846 kg/ha, a relatively low overall stocking rate (2.1 cows/ha) and overall production costs (including full labour) of €3.61 /kg MS. In comparison, and despite higher milk production than the top 10 per cent of dairy farms (965 kg MS/ha), the net profitability of the Greenfield dairy farm was lower at €721/ha in 2011 due to the higher overall milk production cost (€4.93/kg MS) associated with full labour costs, land leasing, contract rearing of large numbers of young stock and depreciation and interest on capital investment. The results from 2011 indicate that, even where managerial competence and animal performance are high and an aggressive focus on low cost production exists, the net profit margin from an expansion development such as the Greenfield farm will be below the levels of profitability achieved by existing commercial dairy herds (Table 1). While lower in terms of profitability, the Greenfield project increases the value of owned assets as a significant number of additional young stock are produced within the project to compensate for the lower net profit margin per ha. The results also indicate that, as even the top 10 per cent of dairy farmers would need to reduce production costs by up to €0.30/kg MS to achieve a similar margin per kg MS on a newly leased dairy farm, excellent technical management is required for profitable milk production expansion. The objective of this paper is to outline the basic principles of highly profitable milk production systems for expanding Irish dairy farms in the years ahead.


**Figure 1**. Average milk prices and production costs on Irish dairy farms from 2006 to 2011 (Source: Teagasc National Farm Survey, various years)

**Table 1. A comparison of the biological and financial performance indicators of profitable dairy farm systems**

| Based on 2011 + full labour | Top10% | Greenfield | Target |
|---|---|---|---|
| Grass growth (t DM/ ha/yr) | 9.5 | 11.8 | 16+ |
| Stocking rate (cows/ha) | 2.1 | 2.7 | 2.94 |
| Herd EBI (€) | 120 | 107 | 200 |
| 42 day calving rate (%) | 65 | 68 | 90 |
| External feed (kg/ ha/yr) | 1,575 | 914 | <1,000 |
| Fertilizer (kg N/ ha/yr) | 250 | 250 | 250 |
| Milk solids (Fat + Protein; kg/ha) | 846 | 965 | 1,250 |
| | | | |
| Total production cost (€/kg MS) | **3.61** | **4.93** | **2.50** |
| Net margin (€/ha) | 1,708 | 721 | 2,500 |
| Asset growth (€/ha/yr) | - | **460** | - |

## The defining characteristics of profitable milk production post milk quotas

To facilitate profitable expansion, dairy farmers must implement technologies that minimise capital investment requirements and cost, increase pasture production and utilisation, improve nutrient use efficiency and increase both the proportion of grazed grass in the dairy cow diet and the amount of product which is subsequently produced. The following technologies should be implemented on Irish dairy farms to increase the overall efficiency of the production system and achieve increased farm profitability.

### *1. Low capital cost infrastructure*

Capital investment at the Greenfield dairy farm has prioritised productive areas such as high quality dairy stock, milking and grazing infrastructure, soil fertility and the development of high performing pastures in preference to investment in non-productive depreciating assets such as farm buildings and machinery. During the initial expansion phase, the financial position of the Greenfield farm is fragile until a high level of operational performance is achieved and the project would be unable to support a higher level of capital investment. Consequently, minimising capital requirements in all areas that do not directly affect farm productivity has to be the main focus. Excluding stock, it is recommended that capital investment should not exceed €2,300/additional cow during expansion to avoid overburdening the business. While each farm will vary in terms of required and available infrastructure, it is broadly recommended that €911/cow is budgeted for milking facilities, a further €570 per cow for grazing infrastructure leaving the remaining €819/cow for wintering accommodation. The capital cost breakdown for each item of expenditure at the Greenfield dairy farm is detailed in Table 2.

**Table 2. Investment costs for the set up of the Greenfield dairy farm**

| Item | Description | Cost (€) |
|---|---|---|
| Reseeding of farm | 117 ha, one pass + grass seed + fertiliser | 48,589 |
| Fencing | 20,000 m @ €0.9/m | 17,617 |
| Water supply | 40 troughs + water pipe laid + store+ well | 29,040 |
| Infrastructure | Stand off pad, Earthen bank tank, feed bin, roadways, site work, gate, tank fencing, bark mulch, head feed, calf shed, gates, yards | 330,738 |
| Milking parlour | 30 unit herringbone/ office/ collecting yard | 228,709 |
| Electricity supply | 3 phase transformer + connection fee | 8,584 |
| Planning | Drawings/ assessment/ mapping/ planning | 12,770 |
| Office | incl. computer + software/ phone/ broadband | 25,688 |
| **Total (ex. VAT)** | | **701,735** |
| **Total (€ /cow ex VAT)** | | **2,004** |

*2. Stocking rate and mean calving date*

To capture the maximum benefits of grazed grass, the most fundamental management practice must be to have the correct number of cows calving compactly at the beginning of the growth season (Figure 2). Stocking rate, traditionally expressed as cows per ha is widely recognised as the major factor governing productivity from grass and previous research indicates that, while milk production per cow is reduced, milk production per hectare will tend to be maximised at higher stocking rates as increased animal demand drives more efficient grazing practices and improved sward utilisation. While delivering superior per hectare productivity, increased stocking rates reduce winter feed production capability and may result in increased feed and capital costs (associated with accommodating and feeding increased numbers of animals). It is therefore recommended that the overall stocking rate of the farm is closely aligned to the individual farms grass growth capability. While increasing stocking rate beyond the growth capability of the farm can be used as a short term strategy to increase animal numbers in advance of expansion, in the longer term, stocking rates that exceed the growth capability of the farm result in significant increases in purchased feed and overall milk production costs, increased nutrient loss to the environment and reduced animal welfare status. On the basis that Irish farms have the potential to achieve annual pasture production of 15 - 16 tons of grass DM production/ha, the recommended best practice stocking rate for an enclosed production system is 2.94 cows/hectare. Consequently, on milk quota abolition and, based on a successful application for a nitrate derogation, Irish dairy farms can confidently increase stocking rate to improve grazed grass utilisation and farm system productivity.

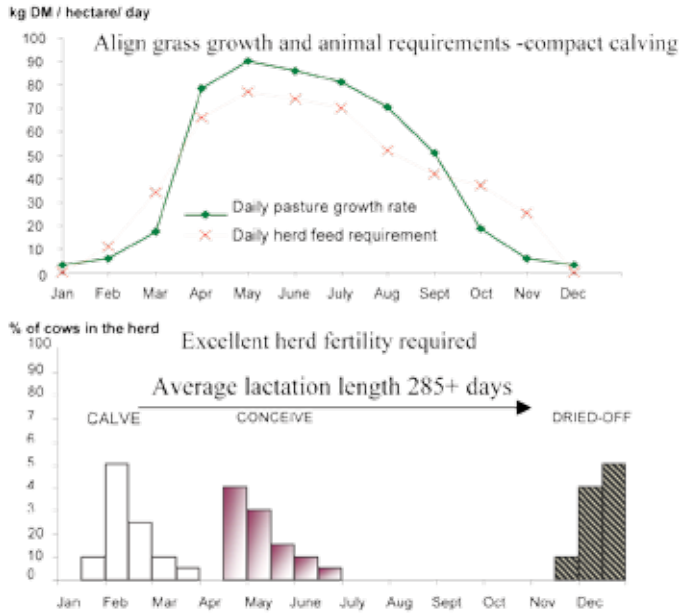


**Figure 2**. The importance of calving date and stocking rate to the overall design of highly profitable grazing systems

As farmers increase stocking rate, total milk output from the dairy farm will increasingly be limited by grass growth and so the development of grazing management practices to improve grass production and quality will take precedent over practices informed by the milk quota era and individual animal performance. Grazing (and nutrient) management post milk quotas will be concerned with achieving adequate soil fertility, reseeding under performing swards and grazing strategies to increase the DM productivity and grass utilisation on each hectare of farmland available for milk production. Land previously used for cropping is often lower in organic matter and so requires an additional capital spend on fertilisation.

In seasonal grazing dairy systems, the planned start of calving, the calving rate (pattern) and the mean calving date are also critical in terms of optimising the match of feed supply and herd feed demand (Figure 2). Calving on dairy farms should be concentrated just before the start of the grazing season to maximise grass utilisation and minimise feed supplementation. At a given stocking rate, the correct calving date will maximise animal performance by increasing the length of lactation as well as having a high level of production per day of lactation. Calving too early, in particular at higher stocking rates, will lead to underfeeding or a requirement for increased supplementation as grass growth rates will be unable to match herd demand in early spring. Conversely, a spread out calving rate or delayed calving date will lead to reduced grass utilisation. In general, the herd should be calved as early as possible, provided that it can be fed adequately from a predominantly grazing diet throughout the lactation. While there is no ideal mean calving date that will be appropriate to every farm (due to differences in ground conditions, grass growth rates, stocking rates, etc.), a mean calving date of February

15 - 25th with 90 per cent of the herd calved in 42 days appears to be generally appropriate for most Irish dairy farms in comparison to the current average mean calving date of March 15th.

*3. The genetic potential (EBI) of the dairy herd*

The ability of Irish dairy farms to achieve the calving targets outlined above and to achieve high animal performance over a long grazing season is entirely reliant on the capacity on Irish dairy cows to calve compactly. Currently, national statistics reveal that the average Irish dairy herd, with a calving interval of 402 days and 42 day calving rate of 52 per cent (ICBF, 2012), would be unable to achieve the desired calving pattern as outlined in Figure 2 above. Poor dairy herd reproductive performance will also limit replacement heifer availability for expansion post quota thereby adding significant additional costs to the expansion process. Consequently, it is recommended that in the intervening years to quota abolition, dairy farmers should select only AI sires with a high overall EBI (> €200) and fertility sub-index (> €100) to ensure that future generations of dairy cattle are suited to the Irish grazing system. Recent research has clearly demonstrated that higher EBI animals will deliver increased milk solids production within the context of higher stocking rate systems, have improved reproductive performance and increase overall farm profitability. A recent study has also quantified that for every €1 increase in average herd EBI, overall farm profit increases by €2/cow/year.

## Conclusions

Dairy farm expansion puts significant additional pressures on the existing dairy farm business and necessitates systems which are entirely profit focused to meet debt repayment commitments. High profit dairy farming occurs where low capital investment costs are combined with grazing systems which achieve high levels of milk solids productivity from grazed grass. As producers aim for larger and higher EBI herds, pasture growth will limit productivity and consequently every effort should be made to adopt grazing and nutrient management practices that ensure high levels of annual pasture productivity. Subsequently, increasing stocking rate in association with an appropriate calving pattern will increase the productivity of expanding Irish dairy farms post EU milk quotas.

# The Greenfield Business Plan

Laurence Shalloo[1], James O'Loughlin[1], Abigail Ryan[1] and Michael Long[2]

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[2]Farm Manager, Greenfield Farm, Kilkenny.

## Summary

- When compared to the original plan the farm has spent an additional €100,000 in capital which was borrowed, herbage production and milk output are ahead of target, cow numbers are higher than projected and the milk price received is substantially higher than in the original budget.
- Surplus cash generated and profitability are both ahead of the original budget targets mainly driven by a higher milk price received based on higher milk solids concentrations and a higher base milk price.
- Reducing potential risk exposure of the business is a key focus in the business management, thus one key strategy in 2011 was to invest a component of the surplus cash generated in 2011 (strong milk price) in a high interest-low risk bank account that will provide back up funds if required in the future.
- A key component of the 2012 business plan has been around reacting to changing circumstances outside the farm e.g. milk price changes, thus ensuring that the farm is sustainable as milk price drops.

## Introduction

Milk price volatility as evidenced since 2006 and in particular in the past few months requires production systems that are focused on minimising costs, through maximising grass utilisation and minimising capital investment on farm. There is a requirement for a strong focus on cost minimising technologies as well as a focus on increasing grass utilisation at farm level. Expansion at farm level should be driven based on these principles, thus insuring against overall price volatility. There will be a significant drain on cash resources during the expansion period as investment is placed in additional dairy stock, increased grazing and milking infrastructure and additional wintering facilities. There is a requirement for increased focus on budgeting and planning and in particular cash flow planning both within and between years in the future. Any expansion carried out on farm should only be considered if firstly there is a comprehensive budget completed and that the farm can with stand price and production shocks. The model used for the Greenfield dairy farm is designed to produce milk at the lowest possible cost, while reducing lead-in capital investment using low cost housing technologies. This paper will discuss;

1. Original Projections
2. Performance in 2011
3. Projections for 2012

## 1. Original Projections

The original farm business plan for the Greenfield dairy farm can be accessed at (http://www.greenfielddairy.ie/node/103). The plan was based on minimising capital

investment on the farm while expanding cow numbers in order to maximise grass utilisation (Table 1). The business plan assumed that there would be a total of €1.1 million invested in all with €350,000 of that originating from the three shareholders involved. Cow numbers were projected to increase from 250 in year 1 to 350 in year 10. Milk solids yield per hectare was projected to increase from 760/ha in year 1 to 1300kg/ha in year 10. The projected base milk price was included at 24 c/litre with the farm plan only showing modest cash flows and profitability until year 5. The actual total capital expenditure was €1.2 million for a number of reasons which include overruns in certain areas (e.g. farmyard), additional facilities (e.g. mobile home and new gate entrance) and also because it was decided to increase the rate of expansion resulting in more cows being bought for year 2. The additional investment was borrowed from AIB and was part of the original loan facility with €850,000 borrowed out of a potential €900,000. Average cow numbers were 250 in year 1, 300 in year 2 (2011) with 307 available for calving down at the start of year 3 (2012) which should result in a cow number average of between 290 and 295 cows on the farm for 2012. Milk solids per hectare was 743kg/ha in year 1 and 965kg/ha in year 2. Herbage production, milk fat and milk protein concentration have been ahead of projections for the first two full years of the plan. The base milk price and the milk price received has been substantially higher than the original projections with a base milk price of 28 cent per litre and 32 cent per litre in years 1 and 2, respectively.

**Table 1. Farm level projections for Greenfield Dairy Farm in the original business plan**

| Year | Cow Nos. | Grass growth kg/Ha | Labour Costs € | Protein % | Fat % | MS Kg/Ha | MS kg |
|---|---|---|---|---|---|---|---|
| 1 Projected | 250 | 9,205 | 88,800 | 3.41 | 3.90 | 761 | 91,081 |
| **1 Actual** | **248** | ***12,000** | **87,810** | **3.54** | **4.28** | **743** | **83,197** |
| 2 Projected | 270 | 10,386 | 91,020 | 3.41 | 3.90 | 846 | 101,143 |
| **2 Actual** | **300** | **11,800** | **90,347** | **3.52** | **4.41** | **965** | **109,045** |
| 3 Projected | 290 | 11,667 | 93,240 | 3.42 | 3.93 | 933 | 111,504 |
| 4 Projected | 300 | 12,462 | 95,460 | 3.46 | 3.99 | 999 | 119,357 |
| 5 Projected | 310 | 13,216 | 97,680 | 3.48 | 4.03 | 1,049 | 125,393 |
| 6 Projected | 320 | 14,059 | 99,900 | 3.49 | 4.07 | 1,101 | 131,458 |
| 7 Projected | 330 | 14,714 | 102,120 | 3.52 | 4.11 | 1,146 | 137,025 |
| 8 Projected | 340 | 15,349 | 104,340 | 3.54 | 4.15 | 1,191 | 142,192 |
| 9 Projected | 350 | 15,997 | 106,560 | 3.57 | 4.18 | 1,235 | 147,517 |
| 10 Projected | 350 | 16,091 | 108,780 | 3.61 | 4.22 | 1,283 | 149,039 |
| 11 Projected | 350 | 16,170 | 111,000 | 3.63 | 4.26 | 1,294 | 150,181 |
| 12 Projected | 350 | 16,244 | 113,220 | 3.65 | 4.30 | 1,303 | 151,324 |
| 13 Projected | 350 | 16,244 | 115,440 | 3.65 | 4.30 | 1,303 | 151,324 |
| 14 Projected | 350 | 16,244 | 117,660 | 3.65 | 4.30 | 1,303 | 151,324 |
| 15 Projected | 350 | 16,244 | 119,880 | 3.65 | 4.30 | 1,303 | 151,324 |

* Guesstimate based on grass utilised calculation for the farm

## 2. Performance in 2011

A summarised trading, profit and loss account and operating cash flow statement are included in Table 2. These figures have been summarized for the purpose of this analysis.

There was a strong financial performance in the Greenfield Dairy farm in 2011 with both the farm profitability and farm cash flow recording strong positive performance. The farm generated €103,334 in surplus cash and €81,433 in profitability. On any start up farm situation, the most important component is to generate a cash surplus. Solvency is ensured when surplus cash is generated. It is important to differentiate between cash flow and profitability, with inventory change and depreciation included in profitability and capital repayments included in cash flow. The Greenfield dairy farm had a two year moratorium from capital repayments in the original bank deal. The farm has started to pay back capital in 2012. Milk receipts and livestock sales were €501,329 and €65,994 resulting in total receipts of €5.20/kg MS. Total cash costs on the farm in 2011 was €463,989 (€4.26/kgMS). Of this labour, land rental, contract heifer rearing and bank interest charges accounted for €237,494 or 51 per cent. As there is a requirement to increase the culling rate for a number of different reasons as well as to grow the herd into the future, there was 126 replacement heifers sent to a contract rearer in 2011, which resulted in a total contract rearing cost of €65,095. Other significant costs include fertiliser costs (€48,375), contractor costs (€39,404) and pad costs (€14,274). Clearly there is a requirement to continue to increase productivity from the farm.

As part of the risk management policy at the Greenfield farm a decision was made in 2011 to invest some of the surplus cash (€70,000) generated from the farm into a long term high interest bank account. This decision was taken to create a buffer against potential risk on the farm. The key risk identified at present is around milk price volatility, however there are other potential risks, (such as a health issue on the farm, a poor grass growth year, etc). This strategy will continue and it is expected that an additional €30,000 to €40,000 can be added to the €70,000 put away in 2011 in 2012. The policy of creating the buffer when times are good, rather than paying down debt will give a greater return in the long term as long as it is invested in high interest returning facilities that are secure.

**Table 2.** Greenfield Dairy Partners profit and operating cash flow outputs for 2011

| Receipts | Profitability € | Profitability €/kgMS | Cash Flow € | Cash Flow €/kgMS |
|---|---|---|---|---|
| Livestock | 65,994 | 0.61 | 65,994 | 0.61 |
| Milk | 501,329 | 4.60 | 501,329 | 4.60 |
| Sales | 567,323 | 5.20 | 567,323 | 5.20 |
| **Variable Costs** | | | | |
| Concentrate | 24,615 | 0.23 | 24,615 | 0.23 |
| Fertiliser, lime & reseeding | 48,375 | 0.44 | 48,375 | 0.44 |
| Contractor | 39,404 | 0.36 | 39,404 | 0.36 |
| Vet/ AI & medicine | 36,836 | 0.34 | 36,836 | 0.34 |
| Other | 9,400 | 0.09 | 9,400 | 0.09 |
| ESB & oil | 5,313 | 0.05 | 5,313 | 0.05 |
| Diesel & motor expenses jeep | 6,569 | 0.06 | 6,569 | 0.06 |
| **Total variable costs** | **170,512** | **1.56** | **170,512** | **1.56** |
| **Fixed Costs** | | | | |
| Wages and salaries | 90,627 | 0.83 | 90,627 | 0.83 |
| Land lease payable | 52,798 | 0.48 | 52,798 | 0.48 |
| Levies | 5,433 | 0.05 | 5,433 | 0.05 |
| Insurance | 5,960 | 0.06 | 5,960 | 0.06 |
| Machinery running and repair | 8,685 | 0.08 | 8,685 | 0.08 |
| Telephone | 1,106 | 0.01 | 1,106 | 0.01 |
| Consultancy | 1,152 | 0.01 | 1,152 | 0.01 |
| Accountancy | 2,823 | 0.03 | 2,823 | 0.03 |
| General expenses | 11,234 | 0.10 | 11,234 | 0.10 |
| Depreciation | 73,651 | 0.68 | - | - |
| Bank loan interest | 28,974 | 0.27 | 28,974 | 0.27 |
| Contract rearing | 65,095 | 0.60 | 65,095 | 0.60 |
| Wood Chip | 14,274 | 0.13 | 14,274 | 0.13 |
| General maintenance | 5,316 | 0.05 | 5,316 | 0.05 |
| **Total Fixed Costs** | **367,128** | **3.37** | **293,477** | **2.69** |
| **Inventory change** | **51,750** | **0.47** | - | - |
| **Net** | **81,433** | **0.75** | **103,334** | **0.95** |

## 3. Projections for 2012

A detailed monthly cash flow budget has been completed for the dairy farm for 2012. A quarterly summarised budget is presented in Table 3. An off the shelf accountancy package called Quick books which is being used on the farm to record all financial transactions was used in the budgeting strategies. Outputs from this package for 2011 were used when setting up the plan for 2012. The plan assumed that there was 307 cows available to calf and that on average there would be 285 cows being milked in May and in June. The herd mean calving date was included in the budget at March 11th with peak herd milk yields included at 23.0 litres/cow/day. It is projected that milk output from the farm will be 1.4 million litres in 2012 with milk solid outputs of 117,437kg or. 1,039kg MS/ha, which is an increase of over 7.7% on 2011 milk output. A base milk price of €4.20/ kg milk solids (29.0/l) was included in the budget at the start of 2012, which has been subsequently revised to 27c/l for the remainder of the year. One of the most difficult components in relation to setting the budget for 2012 has been around milk price. Within the budget it has been updated on a number of occasions already. Included in the budget is that 100 replacement heifer calves would be retained between the contract rearer and the farm. Table 3 presents actual recorded information from January until the end of May and projected figures for June to December. There has been four updates on the budget this year based on recorded data and projected changes in for example price of both milk and livestock. Farm management decisions are changing based on this process.

It is expected that the farm will generate over €44,000 in surplus cash in 2012 based on the performance projections and expected input costs and output prices. This includes both capital and interest repayments to the bank and includes a provision to deal with an issue around the functionality of the stand off pad €15,000 and a provision for the Glanbia seasonality scheme of €5,000. It is planned that a large component of this money would be again locked away into an account that will return a high interest payment.

**Table 3.** Shows the 2012 Cash flow budget

| | First Quarter | Second Quarter | Third Quarter | Fourth Quarter | Total |
|---|---|---|---|---|---|
| Livestock sales | 15,283 | 26,699 | 10,000 | 42,000 | **93,982** |
| Milk | 7,571 | 159,327 | 173,360 | 132,530 | **472,787** |
| **Total Receipts** | **22,854** | **186,026** | **183,360** | **174,530** | **566,769** |
| Accountancy/Consultancy fees | 981 | 631 | 250 | 2,000 | **3,862** |
| Agricultural Contracting | 0 | 4,303 | 18,000 | 6,700 | **29,003** |
| AI straws/Heat Detection/ Animal Tags | 1,692 | 9,461 | 6,353 | 1,700 | **19,205** |
| Bank interest/Fees and Capital | 7,303 | 12,000 | 36,065 | 24,142 | **79,511** |
| Calf Feed | 0 | 686 | 600 | 0 | **1,286** |
| Dairy Feed | 4,818 | 0 | 5,460 | 2,576 | **12,853** |
| Dairy Supplies | 1,775 | 313 | 666 | 803 | **3,557** |
| Dead animal collection/Herd Plus | 0 | 560 | 0 | 1,000 | **1,560** |
| Electricity | 845 | 1,813 | 2,800 | 1,000 | **6,458** |
| Farm Machinery fuel and repair | 1,032 | 961 | 1,354 | 500 | **3,847** |
| Fertilizers | 9,035 | 14,755 | 7,370 | 8,500 | **39,660** |
| Grass seeds/Sprays | 525 | 580 | 0 | 0 | **1,105** |
| Heifer rearing | 0 | 28,179 | 16,805 | 18,210 | **63,194** |
| Insurance | 5,000 | 0 | 0 | 770 | **5,770** |
| Lagoon and pad emptying | 2,685 | 5,000 | 14,200 | 2,200 | **24,085** |
| Land Rental | 26,399 | 0 | 26,399 | 0 | **52,798** |
| Milk Levies | 71 | 1,930 | 2,417 | 1,587 | **6,006** |
| Glanbia Milk Penalties | 0 | 0 | 5,000 | 0 | **5,000** |
| Milk recording | 266 | 0 | 887 | 1,313 | **2,466** |
| Milking Machine Parts and serv | 1,218 | 899 | 509 | 45 | **2,670** |
| Total Minerals | 5,559 | 3,564 | 600 | 1,000 | **10,723** |
| Motor Diesel, tax and maintenance | 674 | 426 | 780 | 1,549 | **3,428** |
| Other stock wintering | 0 | 2,853 | 0 | 0 | **2,853** |
| Repairs and maintenance | 162 | 370 | 562 | 1,173 | **2,266** |
| Repairs and maintenance (Dairy) | 125 | 0 | 0 | 400 | **525** |
| Revenue commission | 2,300 | 8,448 | 6,336 | 6,336 | **23,420** |
| Silage purchased/Expenses | 1,327 | 175 | 10,300 | 0 | **11,802** |
| Staff accommodation/Training | 905 | 300 | 0 | 240 | **1,445** |
| Office Telephone & Computer | 299 | 202 | 525 | 435 | **1,461** |
| Planning and pad issues | 0 | 6,000 | 9,000 | 0 | **15,000** |
| Veterinary/vaccines/Hoof Care | 2,209 | 6,631 | 1,119 | 7,584 | **17,543** |
| Wages/ Relief Milking/Casual Labour | 15,786 | 18,374 | 17,084 | 16,834 | **68,077** |
| **Total Expenses** | 92,992 | 129,413 | 191,439 | 108,595 | **522,440** |
| **Net Farm Position** | -70,138 | 56,612 | -8,079 | 65,934 | **44,330** |

# Profitable Farm Expansion

Tadhg Buckley
AIB Agri Adviser

## Summary

- The key driver of dairy expansion is to increase the profitability of the farm business.
- Expansion should allow most dairy farmers to reduce unit fixed cost of production, while variable costs are likely to increase in line with production – therefore, they need to be at a competitive level prior to commencing expansion.
- For any business there is a level beyond which it is unprofitable to further expand based on grazing platform i.e. law of diminishing returns.
- It is likely to take 10 years or more to see the full benefits of a substantial expansion in a dairy business
- Only the top 1/3 of dairy farmers in terms of financial performance could justify a significant per cow cost with expansion.

## Introduction

The capacity of the agri-food sector to expand was recognised in the Food Harvest 2020 report and our expectation is that on-farm investment will increase over the medium-term. 2011 proved to be one of the most profitable years for most farm sectors and led to a very positive sentiment in the sector. The first half of 2012 has been a more challenging one for Irish dairy farmers with reducing milk price and poor weather eroding margins. The continued price volatility re-emphasises that when planning on-farm investment it is unwise to base any investment decision on the performance of the farm in a very good year or indeed a very bad year. We advise farmers to take a multi-annual view of their farms and examine the performance over the previous 3-5 years, accounting for variances in profitability.

The key driver of expansion is to increase the profitability of the farm. It is, therefore, worth asking the question prior to embarking on expansion: what is the proposed expansion worth to the business? In order to achieve profitable farm expansion there are a number of key conditions that need to be met.

## Considerations prior to expansion

### *1. Low variable cost base*

The competitive position of your existing business prior to expansion is vital in achieving profitable expansion. For a dairy business, the level of variable costs in particular is the key. Expansion should allow a farmer to reduce his/her unit fixed cost as the fixed cost base is spread over a larger production base. However, variable costs are likely to increase in line with production – therefore, they need to be at a competitive level prior to commencing expansion.

George Ramsbottom of Teagasc recently carried out an analysis of the benefits of expansion for low cost (LC), average cost (AC) and high cost (HC) dairy farmers. Table 1 is based on the 2010 National Farm Survey and shows the financial performance of the three categories.

**Table 1. Financial Performance of dairy farmers**

| €/cow | Top 1/3 (LC) | Middle 1/3 (AC) | Bottom 1/3 (HC) |
|---|---|---|---|
| Gross output | 1,631 | 1,556 | 1,390 |
| Variable costs | 495 | 591 | 709 |
| Fixed costs | 520 | 540 | 591 |
| Net Margin | 615 | 424 | 90 |

As illustrated in the above table there is a substantial difference in net margin between low cost, average cost and high cost enterprises. This is driven by a combination of the difference in gross output (€/cow) and variable costs (€/cow).

*2. Stocking rate on milk production platform*

In order to expand efficiently, in particular for Spring-milk systems, grazed grass will need to continue to form the vast bulk of the dairy cow's diet. Therefore, the milk production platform available will have a major influence on how much a dairy farmer can expand on a profitable basis. For any business there is a level beyond which it is unprofitable to further expand i.e. law of diminishing returns. When assessing a dairy farmer's business, this principle is most appropriately tested by examining the stocking rate on the milking platform.

*3. Infrastructural cost of expansion*

Another major consideration is the capital expenditure required to achieve the proposed expansion. In terms of a dairy farm, the main areas of capital expenditure are milking facilities, wintering accommodation and milk quota (pre-2015). In some cases farmers future-proofed their business over the past five years by installing capacity beyond their current requirements. This was done in the knowledge that they would be expanding output in the medium-term. For others, a substantial revamp of milking facilities or additional slurry storage may have to be constructed in order to expand. The cost of expansion will vary greatly in these two different scenarios.

*4. Age profile and potential successor*

It is likely to take 10 years or more to see the full benefits of substantial expansion. In addition, the initial expansion phase is likely to involve a heavier workload for the farmer. When considering expansion the farmer in question must take a long-term view of the enterprise examining:

- The long-term plan for the operation
- If a likely successor has been identified
- If there will be significant off-farm financial demands on the business in the intervening period (such as family education, off farm investment, house mortgage etc.)

## Financial benefits from expansion

In the case of increasing cow numbers, the cost of expansion can range from €2,000/cow to €6,000/cow depending on the level of investment required. If we take, for example, a 6 per cent fixed interest rate with a 10-year repayment schedule the annual cost of expansion/cow is shown in Table 2.

**Table 2. The annual cost of expansion/cow with a 10 year repayment schedule**

| Cost/cow | Repayment/cow/year |
|---|---|
| €2,000 | €274 |
| €4,000 | €548 |
| €6,000 | €822 |

It should be noted that the additional net margin/cow will be higher on the additional cows under expansion than the farmer's current net margin/cow as fixed costs will not increase in line with expansion. George Ramsbottom has done further work on this, assuming that on expansion, variable costs/ cow increase in line with increased production while fixed costs increase by 50 per cent of the production increase. Table 3 projects the residual net margin per extra cow based on an expansion cost of €2k, €4k and €6k/cow.

**Table 3. Projected residual net margin per cow based on expansion cost**

| €/cow | Top 1/3 (LC) | Middle 1/3 (AC) | Bottom 1/3 (HC) |
|---|---|---|---|
| Additional net margin/cow (from expansion – no investment) | 876 | 695 | 385 |
| Residual/cow (€2k investment) | 602 | 421 | 111 |
| Residual/cow (€4k investment) | 328 | 147 | -163 |
| Residual/cow (€6k investment) | 54 | -127 | -437 |

Note: All of the above calculations exclude the cost of quota. If expansion is planned prior to 2015 and quota must be purchased based on the above calculations, the bottom 1/3 of producers could not justify any expansion.

As this table shows, the highest cost producers can just about justify an investment of €2k/cow while the lowest cost producers can justify up to triple that investment. Obviously, every case will be different as the cost of capital expenditure will vary. However, the key message remains the same – based on the above calculations only the top 1/3 of dairy farmers could justify expansion with a significant per cow cost.

## Conclusion

As Irish agriculture is now more exposed to the influence of world markets, volatility is a phenomenon that we are likely to experience more of in the future. Managing volatility will be a key component in any future farm expansion plans. As such, proper financial planning will be required prior to expansion, with expansion plans stress tested for periods of depressed commodity prices.

Prior to embarking on any expansion there are a number of factors that need to be taken into consideration. As analysis from Teagasc shows, high-cost producers will find it difficult to make a positive return from high cost expansion.

# Building Farm Infrastructure & Managing Labour – 2012 Update

Jack Kennedy[1], Tom Ryan[2] and Michael Long[3]
[1]Irish Farmers Journal, Irish Farm Centre, Bluebell, Dublin 12, [2]Teagasc Kildalton, Piltown, Co Kilkenny and [3]Farm Manager, Greenfield Farm, Kilkenny

## Summary

- When development starts it is beneficial to give responsibility to one overall site manager during the construction phase.
- A budget should be set for the overall investment and good record keeping is required. Plan your repayments relative to the overall scale of the business and repayment capacity.
- As dairy farming is capital intensive in the start up phase it is very important to prioritise spending on what is essential rather than what it might be nice to spend money on.
- For winter housing a woodchip standoff pad linked to an earth lined store has advantages and disadvantages but can be a low cost alternative or a suitable addition to conventional housing.
- Spending time to map the right location for farm paddocks and roadways is essential. In large scale grass based dairying cow walking time to milking is significant so any investment to speed up or reduce walking time is worthwhile.
- Farm roadways take time to settle in and are best constructed during dry weather. During construction we used a lot more stone than planned simply because farm roadways were constructed during winter months.
- If possible scraping slurry from the concrete standing area on a standoff pad directly into an earthen lined store is a lot more practical rather than pumping or using a flow channel to divert slurry into a storage area.
- For contract heifer rearing a written contract is essential for clarity between both parties and strategic weighing should be part of the contract.

## Introduction

The objective of this stand (paper) is to bring together some of the decisions on capital expenditure and relate it to what is happening with labour on this farm. We will relate both to the overall business plan and discuss some of the options available to new or expanding dairy farms.

Farm staff is employed by the company but are not living on the farm. There are approx 300 milking cows, 12 clean up stock bulls, and 40 replacement heifer calves kept on the farm. All other stock are at the contract rearing farm.

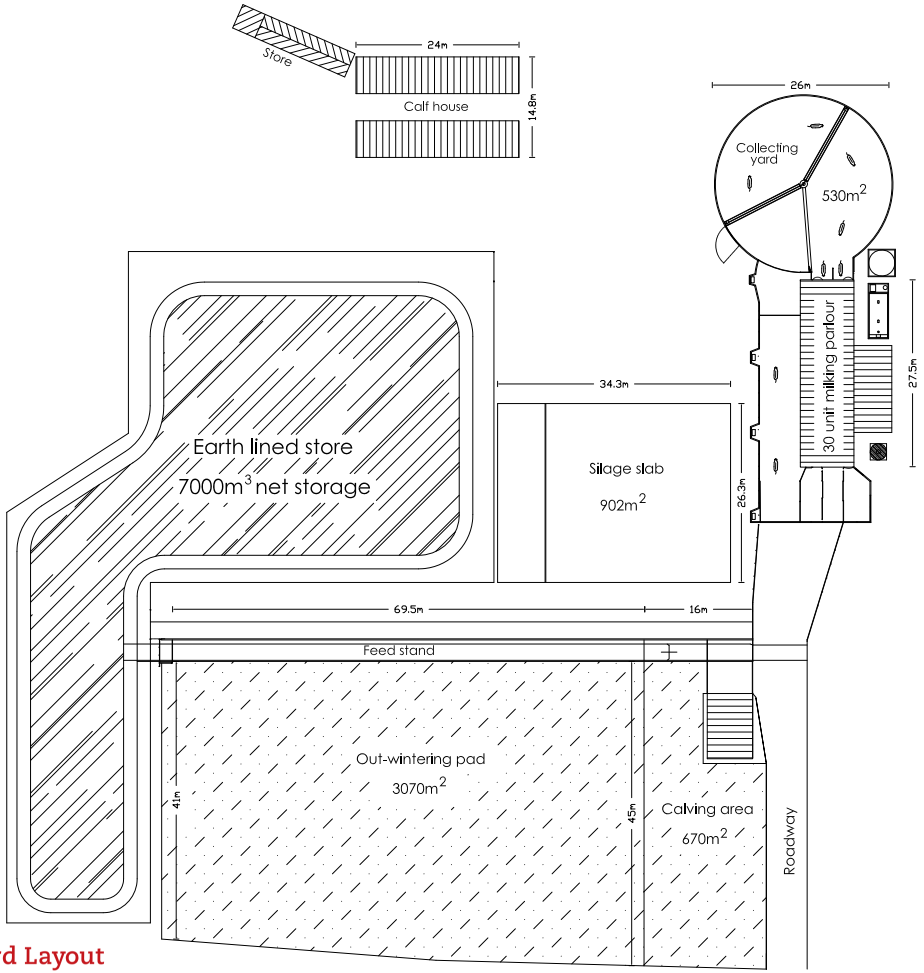
There were no buildings on this tillage farm when the lease started in late 2009 and it remains the case that there are little or no buildings on this farm except for, isolation boxes, calf pens and a small calving shed on the stand off pad. Remember also there is little or no machinery on this farm with only €16,000 spent on two farm jeeps (one for farm and one for the road use) and a John Deere tractor.

Our aim with this paper is not to repeat the messages delivered in previous papers at the last two open days but to update you on what's happening and some of the issues around labour and farm infrastructure on a large dairy farm.

In relation to the Infrastructure or type of buildings/investments on this farm there have been a number of publications related to this topic already in previous Open Day booklets. See papers such as;

- Milking large herds – optimal parlour size? Open Day Booklet, 2010 - Jenny Jago – p31
- Greenfield farm design – P. French et al –p51 Open Day Booklet, 2010
- Infrastructural requirements for a Greenfield Dairy farm – p19, Open Day Booklet, 2011
- Greenfield farm milking facilities – J. Upton et al p48 Open Day Booklet 2011
- Guidelines for the contracting and hiring of labour in a large dairy unit – p61 Booklet 2011
- Milking process efficiency – B. O'Brien p80 Booklet 2011

Let's remind ourselves of the infrastructural developments on this farm. If we look at Map 1 we can see farm yard developments and location of each in the farmyard. In Table 1 we can see the cost of each investment when constructed in 2009/10. In this paper we will aim to relate each investment to labour input required.




Map 1. Farmyard Layout

**Table 1. Infrastructural Investment, usage and unit cost**

| Item | Usage | Cost | Essential | Non-Essential |
|---|---|---|---|---|
| **Grazing Infrastructure** | | | | |
| Fencing | All day, every day | €18,000 (0.9/m) | * | |
| Water | All day, every day | €30,000 or €1,100/paddock | * | |
| Roadways | 2 to 3 hours/day | €18/metre | * | |
| Reseeding | All day, every day | €50,000 or €440/ hectare | * | |
| **Milking Parlour & Associated Milking Costs** | | | | |
| 30 unit Herringbone<br>Bulk tank (22,000ltr)<br>Plate cooler<br>Dairy, collecting yard, office, wiring, batch crush, plumbing, heating etc | 3 hours/day<br>10 mts<br>10 mts | All inclusive €7,623/milking unit | *<br>*<br>* | Cluster removers<br>Air purge<br>Meal feeders<br>Milk meters<br>Other |
| **Some Key Farmyard Development Costs** | | | | |
| Standoff pad | 2 mts/12 | €16,000 + | * | |
| Silage slab | Year 2 investment | €20,000 | * | |
| Small calving shed | Sporadically | €7,000 | * | |
| Calf sheds/ isolation | 4 mts/12 | €28,000 | * | |
| Earth lined store | All day, every day | €30,000 | * | |
| **Other** | | | | |
| Tractor, Jeeps | every day | €16,000 | * | |

We have broken the investment down into three parts for ease of explanation: (1) Grazing Infrastructure, (2) the Farmyard and, (3) the milking parlour.

*1. Grazing Infrastructure*

Approx €170,000 (€485/cow) has been spent on grazing infrastructure. This was mainly in the form of reseeding, supplying water/fencing to all paddocks, and building farm roadways. For the farm roadways all stone was purchased and contractors carried out all the work. Fencing of paddocks was also contracted out.

Paddocks are essential to manage grass quality and quantity and make grassland management easier. Paddocks need to be big enough so they contain enough grass for 24 to 36 hours of grazing. Again the objective must be to have smooth flow from the paddock to the parlour with no sharp turns which will slow down cow movement. This farm was designed to have four hectare paddocks to facilitate a 24 hour grazing for 300 cows from April onwards (eg. 4 hectares x 1,500kg grass dry matter = 6,000kg DM/24 hours = 20kg dry matter per cow).

In terms of the farm roadways the objective is to have cows walking comfortably at 3 to 4 km/hour and they must be able to look where they are going, not jostling up and down behind each other. Actual speed will be determined by walking surface and cow fitness/ability. On this farm the roadways are curved (highest in centre), wide enough (>5m), and have a good surface (smooth) to allow the cows walk two and three deep across the farm roadway.

Remember walking to and from paddocks burns up energy that could otherwise be used for producing milk. Large herds will require a large grazing area and hence will have long distances to walk. Australian and New Zealand figures suggest that a cow uses one MJ ME to walk one kilometre on flat land. This increases to five and six MJ ME per kilometre going up and down hills.

In terms of the distance cows have to walk we measured how far it is to the entrance of each paddock to the gate in the circular yard. The distance ranges from 0.5km for the paddocks beside the parlour to as far as 1.4km for the paddocks furthest away from the parlour. The average paddock is 0.75km from the parlour. When twice a day milking this means four journeys to the paddock each day, in for milking in the morning, back after morning milking, in for milking in evening and back from evening milking. If cows are walking on average 0.75km per journey it means a distance of approx 3.0km just going to and from milking. As discussed there is an energy requirement for the cow and a subsequent depression in milk yield but there is also a labour requirement because staff accompany cows in for milking.

We timed how long it takes to bring the cows in both in the morning and the evening. From start (first cow onto farm roadway) to finish (gate closed in collecting yard) it can take up to 45 minutes to bring the cows in from the furthest paddocks right down to approx 20 minutes for the 300 cows to filter in from the near paddocks. In terms of speed of walking it works out that the cows are moving at a speed of between 3.5 to 4km/hour. After milking cows exit the parlour and walk back to the paddocks, single file, at their ease, one cow following the other.

On average the milking herd are walking a minimum of two hours per day or 14 hours per week when they are just walking to and from milking alone. You can begin to see why it is so important to get farm roadway infrastructure right in terms of conserving cow's energy and reducing cow walking and staff time. On this farm cows are not driven on the farm roadways - they walk at their own pace. It is also imperative that lame cows are not left with the milking herd. This would further increase the time required when bringing cows in for milking. On this farm lame cows are left in a paddock near the parlour so that they conserve energy, and the claw is given time to heal.

*2. Farm yard*

The milking parlour and associated farm yard buildings are situated approx 0.5km off the public road and are pretty centrally located on the farm. If the farmyard can be centrally located to the grazing paddocks it reduces the walking distance for cows to the milking parlour every day. The intention in Kilkenny was to situate the parlour, silage slab and standoff pad towards the top of a natural gradient to favour easy drainage to the earth lined store.

The wintering facilities on this farm consist of an out wintering pad linked to an earth lined store. The size of the wood chip pad on this farm is 85m x 45m (3825 sq. metres) in size and is designed to house approx 320 cows at 12 square metres per cow. There is a long concrete standing feeding area (87m) where 160 cows can feed at the one time. The extension to the earthen bank tank measures 16.7 metres by 53 metres. The original tank measured 41m by 46.5 metres. At a 3.5m depth the net capacity is approx 7,000m3. All out wintering pads require planning permission and a Site Assessment Report. Some locations will be unsuitable for earth lined out wintering pads. If the tank had to be lined it would cost approx €60 to €70,000 extra.

Remember when planning this farm in 2009 the cost of conventional housing (Cubicle and underground slatted storage) was approx twice the price that it is today. In 2009 the cost of conventional housing was approx €2,000 to €2,500 per cow versus approx €1,000 to €1,500 per cow today depending on scale and own labour input. Research has shown at a cost of approx €850/cow conventional slurry storage and housing is better value than low cost alternatives costing €300 per cow with higher annual running costs.

The capital cost of developing an earth lined store and standoff pad has not decreased to the same extent. In 2009 the price of woodchip was a lot cheaper than it is today so running costs of the standoff pad and earth lined store have increased. One of the objectives of this farm was to minimise capital outlay in buildings at the start of the project and prioritise the limited capital towards productive assets such as stock and paddock reseeding.

There are a number of advantages to out wintering pads but there are also a number of disadvantages. The first advantage is the low capital cost relative to conventional housing. Even with the reduced price of conventional housing an out wintering pad and earthen lined store is still only half the price of conventional housing. Pads offer improved performance and welfare for stock when constructed and managed properly. They are very adaptable to different classes of stock eg they will house heifers the same as cows or stock bulls.

The disadvantage is that they require specific site analysis but more importantly they have a large annual bedding requirement so they have a much higher running cost. On this farm we are spending approx €15,000 per year (€50/cow) on replacing wood chip. The other big disadvantage is that they are unsuitable for housing milking cows.

Cows near calving are held in a section of the pad near the small calving shed. The majority of cows calve themselves on the stand-off pad and there is plenty of room to allow cows move about and lie out on the pad. The installation of the automatic scraper along the concrete standing area helped to reduce the amount of dung getting back onto the pad and reduced the labour input required.

Pad performance - It is fair to say we have not been happy with the performance of our stand-off pad for the last two winters. Farm staff had to spend a lot of time during the winter when it's fully stocked managing the pad making sure there was no build up of dung on the pad. In periods of heavy rainfall drainage off the pad can be very slow and it can get mucky. This summer we plan to investigate drainage on the pad further and it may entail further spending on improved drainage pipes and/or drainage stone.

Another consideration with our standoff pad is that there is only head space available for feeding half the cows (160 cows) at any one time. Other standoff pad developments around Ireland have a central feeding passage with standing area both sides which increases the amount of concrete standing area which has the knock on effect of reducing the traffic on the woodchip allowing it to stay clean longer. Secondly a feeding area that allows all cows to feed at the one time is advantageous to herd feeding management. It is fair to say that a feeding area where you could feed (meal or silage) to all cows at the one time would be beneficial and is something we have considered, and may yet develop. The location of our standoff pad relative to earth lined store etc and farmyard mean we cannot develop our existing feed passage to have a standing area both sides.

During initial development an attempt was made to collect the slurry at the end of the long concrete standing area in front of the standoff pad and allow it to flow via a slurry channel into the earthen lined store. This proved difficult to manage and in year two it was decided to extend the earthen lined store down behind the standoff pad to facilitate the scraping of slurry straight into the earthen lined store.

The farmyard development was restricted and limited by water tables and gradient issues but in hindsight it might have been a good idea to move the yard slightly closer to the public road which would mean it was not as central to the paddocks but it would have been further from natural water courses and woodland (which cannot be moved) if farm yard changes or developments are required.

Another worthwhile investment for managing numbers is the use of a batch crush where cows are standing side by side like the milking parlour rather than head to tail like an ordinary crush. It is used a lot during spring when on some mornings there could be 15 cows for AI. They are loaded into the batch crush and are held in the crush while all cows are inseminated. There is no head baling or loading and unloading of cows.

On this farm there is a round circular yard and an automated backing gate. Attached to the gate there is a light scraper (dung buster) which scrapes and washes muck towards the centre of the yard when the gate moves. This means it is not necessary to hose down the circular collecting yard after milking. The size of the yard is important so that you don't have to be getting in and out of the pit opening or moving gates. The industry standard is that cows require between 1.2 m and 1.5 m2 per cow depending on cow size. This multiplied by the maximum number of cows will give you the area of holding yard required. The circular yard provides good cow flow and you can hold a second herd behind the backing gate. In other cases a rectangular yard works well and in some cases can be easier to extend if required.

Despite the fact that there is a dung scraper and hose on the backing gate washing down the entrance yard and parlour after milking still takes up a significant amount of time. We estimate from our recordings that in total it takes between one and a half to two hours per day to wash down the parlour and associated yards every day. The use of high volume hoses facilitates the washing down of yards and access points with quick, strong and durable attachments are absolutely critical.

### *3. Milking parlour*

On this farm there is a 30 unit herringbone milking parlour. The total investment including the dairy, collecting yard, concrete entrance race, farm office, storage area, wiring, plumbing and water heating cost €228,709 or €7,623/milking unit. There is little automation, no cluster removers and no feed troughs in the milking parlour.

We measured milking speed and performance at peak milk yield (average 23 to 24 litres) per cow over the last month. Actual milking time at peak takes approx one hour and 30 minutes (10 rows of cows). Row time is broken down into approx seven minutes per cow when clusters are attached and approx two minutes per row to exit and teat dip (4 secs per cow). When cows are at grazing full time only dirty cows are washed pre milking. There are two operators in the pit at all times. When deciding on the type of parlour five key questions need to be asked.

- What money is available for investment?
- How many cows are to be milked?
- How many people milking?
- What milking time is acceptable?
- Milk produced at peak?
- Milking routine?

The answers will determine parlour type, size, design and capital expenditure.

*4. Labour structure*

Let's briefly review the labour situation on this farm. There are two full time labour units working on the farm – Michael Long, Farm manager and Tomas Lyng. At various times during the year we also have a student of agriculture employed from the Universities or the Agricultural Colleges. Farm Relief staff fill in when farm staff are on holidays or days off.

In the first four months of the year the main farm tasks involve calving and calf care, herding and daily stock routines, milking and associated work, recording information and office work. From mid April to end of July milking, grassland management, and breeding take up the majority of time. From July to end of the year grassland management and milking are the key time consuming chores.

All machinery work is contracted out. This includes fertiliser/slurry spreading, silage (round bales and pit), reseeding, and any hedge cutting required.

Winter feeding is contracted out and every second day when cows are on the stand off pad the feeding contractor calls to the farm to fill silage into the feed barrier. The silage pit is right beside the stand-off pad to facilitate easy movement from the silage pit to the feed face. There is no turning around corners or driving through narrow channels. The feed face is easily accessible and is only metres from the round bale stack or silage pit.

Calves are transferred to the calf rearing pens very soon after birth. They are housed in batches of ten and are fed via nipple feeders. Milk is transported from the dairy in a large container on the back of the tractor and then fed out into the nipple feeders down at the calf shed. Heifer calves that are going for contract rearing leave the farm within two to three weeks of birth. Bull calves are sold within two to three weeks also.

*5. Contract heifer rearing*

A significant element of reducing labour on this farm is the fact that most young stock, all except 36 heifer calves, are contract reared away from the farm. Replacement heifer calves leave the farm at three weeks of age and return a month before calving. This allows farm staff to concentrate on the milking herd and simplifies the labour required. This year we have 126 maiden heifers in contract rearing and 59 heifer calves (95 calves in total).

We have drawn up a contract with our rearer and feel strongly that all contract rearing arrangements should be written down to ensure each party is clear on what is required and who is responsible for what. We also feel that strategic weighing of animals at specified times of the year is essential to a good working arrangement.

*Example copy*

**Terms of Agreement between _____(the owner) and _____heifer rearing farm (the rearer) – from January 2012**

Date: **X February 2012**

**THE CONTRACT**

1. **Duration** - This contract will have a duration of on average 640 days. The contract will commence on the date the first group of calves are removed from Greenfield Dairy Company (GDC) premises (mid February). The dates that calves and heifers move between farms will vary between years. Heifers will leave the farm before two weeks of age and will return in November prior to calving down.

2. **Payment** - The _____ (stock owning company) will make a biannual payment of 80% of the agreed fee by bank transfer every two months on receipt of invoice, of €_____incl VAT per day to _____ (Contract Rearer) for _____ heifers (the number of stock). The stock will be transferred from _____ (owner) herd to _____ (the rearer's) herd number but ownership is to remain with the GDC. The additional 20% of the standard fee will be paid on reaching target breeding weight as per point 8 below.

3. **Transport** - The heifers will be transferred from the GDC, at a minimum of **14** days of age (in minimum group sizes of **10** animals) by the contract rearer. The heifers should be weighed on departure and an assessment form filled out to assess general health (form details will have calf id, description of healthy/unhealthy signs or any defects and calf weight). Farm-to-farm movement notification forms (NBAS 31A) will be obtained by GDC, completed by both parties as required by the Department and returned to the Department by the contract rearer. The in-calf heifers will be returned to the GDC organised and paid by GDC in mid November of the second year. The NBA form serves as a receipt for animals.

4. **Calf Management** - All heifer calves to be de-horned before **3** weeks of age by the contract rearer.

5. All heifers to be worm dosed with product supplied and administered by the contract rearer for the duration of the contract. GDC reserve the right to take a dung sample so that necessary treatment and products can be determined and administered.

6. All vaccines to be supplied by GDC but administered by the contract rearer.

7. Each party to cover one disease test hence GDC will carry the cost of one year and the rearer carry the cost of herd testing the following year. In the event that there is a breakdown in respect of disease ie TB/Brucellosis then the refund payable by the Department of Agriculture shall be paid to the owner (in this case GDC).

8. Growth targets and performance need to be agreed by the GDC and the rearer. The intention is that all animals transferred should be eligible target weight (330kg for Hols Fr and 300kg for Jersey cross) to be bred at 15 months of age. All heifer calves should be weight monitored at critical times (at housing as weanlings, early spring, and at mating and at return to GDC. As a general rule April born heifer calves will not reach target weights outlined above or below and hence are not part of this agreement.

    - Heifer calves need to be 30% of mature weight at 6 months of age
    - Heifer calves need to be target weight at breeding as described above.
    - Heifers need to 60% of mature weight at 15 months of age

    To achieve the above targets it is advisable to set targets for other stages.

    All heifers to be weighed on departure of GDC premises – very light heifers or twins to be noted. Calves must be visibly healthy. Sick calves should not be transferred. Research advice suggests all heifers should be weaned at 80kg for Jersey Cross animals and 100kg for Holstein Friesian animals.

    Heifers should be re-weighed at 3 month intervals, to ensure growth target milestones achieved. The rearer is responsible for meeting targets. Any discussion required around targets and milestones should be between the GDC Farm Manager and the rearer. Weighing results in full should be sent to GDC when recorded. It is the responsibility of the rearer to meet target weights. Increased supplementary feeding or whatever other mechanism must be used if required to meet target weights. It is the responsibility of the rearer to ensure additional meal or better quality silage is provided. Failure to reach weight targets for breeding start date will result in non payment of the 20% standard fee per animal below target.

9. GDC heifers will be isolated as a separate herd for the duration of the contract including both grazing and housing periods.

10. **Breeding/Artificial Insemination** - The GDC will organise delivery of straws and/or stock bulls and clean up bulls to the rearer's farm. It is envisaged that AI will commence in mid/late April of the second year at the rearers. GDC will cover the costs of straws and insemination and any hormone treatment. The rearer will organise heat detection and pull out heifers as required each day for inseminator.

11. **Scanning** - GDC is responsible for scanning the heifers in October of the second year prior to departure in November. An acceptable empty rate is 6% not in calf after 12 weeks breeding.

12. The contract rearer is responsible for providing replacement ID tags.

13. **Records & Reporting** – The contract rearer is responsible for ensuring identification and stock records to comply with legislation.

14. **Death Loss & Liability** - Deaths less than or equal to 6% in first three months and less than or equal to 3% from 3 months of age to departure are described as normal and not the responsibility of contract rearer and rearing fees should be paid up to death date by owner. Disposal charges are the responsibility of the rearer. Any deaths over and above this level are the responsibility of the contract rearer and rearing costs will be reimbursed to owner up to death date. All deaths should be reported as soon as they happen.

15. **Communication** – good communication is key to the success of any joint venture. Both parties must be clear as to the manner by which they communicate with each other, preferably by mobile phone if available. Any time the Farm Manager of the GDC wants to visit GDC stock it must be prior arranged with contract rearer but must be allowed within a suitable timeframe.

16. **Arbitration** – in the event of a problem or misunderstanding both parties (the owner & the contract rearer) reserve the right to bring another person into the debate for discussion. If this group cannot decide the issue then this group must then decide on a neutral person to join the debate and the decision of that person is final.

17. **Conditions for Termination of this contract:** the contract must be specific over time periods for termination of an agreement so that both parties are able to find replacement stock in the case of the rearer and another rearer or land in the case of the owner to keep youngstock. The GDC (the owner) must notify the rearer of their intentions for the coming year when in calf heifers are returned to the owner's farm (November) so in effect three months notice. The same (3 months notice) must be required of the rearer if he/she is changing owners or changing enterprise. Failure to adhere to this time frame will result in a 10% deduction from outstanding fees.

18. We agree to abide by all terms and conditions as described above

Signed (representing the owner): _____ (position) _____

Signed (representing the rearer): _____ (position) _____

**Footnote:** This is just one of a number of example contract rearing arrangements available. Many farmers may have to make additions or edit/change above to suit their circumstances. Teagasc have also just recently launched a new contract rearing document.

## Lessons from Greenfield re labour and infrastructure

- When development starts it is beneficial to have one overall site manager during the construction phase.
- Spending time to map the right location for farm paddocks and roadways is essential. In large scale grass based dairying cow walking time to milking is significant so any investment to speed up or reduce walking time is worthwhile.
- Farm roadways take time to settle in and are best constructed during dry weather. During construction we used a lot more stone than planned simply because farm roadways were constructed during winter months.
- If possible scraping slurry from the concrete standing area on a standoff pad directly into an earthen lined store is a lot more practical rather than pumping or using a flow channel to divert slurry into a storage area.
- As dairy farming is capital intensive in start up phase it is very important to prioritise spending on what is essential rather than what might be nice.
- A budget should be set for the overall investment and good record keeping is required. Plan your repayments relative to the overall scale of the business and repayment capacity.

## Summary statistics

- Two full time labour units plus relief/student help
- Stock numbers are approx 300 milkers, 36 replacement calves and 12 clean stock bulls
- Cows on this farm are walking at approx 3.5 to 4km/hour so it takes approx between 20 and 45 minutes to bring cows in for milking depending where cows are grazing.
- Our average paddock is 0.75km from the milking parlour which means on average the herd are walking on average 3km/day to and from milking alone and it takes approx two hours per day.
- The running costs of the standoff pad have increased and we are spending approx €50/cow on replacing woodchip alone.
- Actual milking time is one hour and 30 minutes at peak milk yield for 10 rows of cows with two operators in the pit at all times.

# Managing Grass at the Greenfield Dairy Farm

Abigail Ryan[1], Michael O'Donovan[1] and Mark Trimble[2]

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## Summary

- In 2011, 961kg milk solids/ha were produced at a stocking rate of 2.8cows/ha with a concentrate input of 840kg/ha.
- Grass production was on average of 11.8 tonnes of DM/ha in 2011. The paddock range in DM production varied between 8.6 (new reseed) to 14.7 t/DM/ha.
- Nine different grass cultivars are sown on the farm, each cultivar is sown as a monoculture.
- The level of K on the farm is low, up to half of the farm is at index 1 and 2, this will be addressed in the coming season.
- P levels are adequate on the farm.
- This farm can be exposed to prolonged dry periods, sulphur will be applied routinely during the grazing season (April to June).

## Introduction

The main focus of the Greenfield dairy farm is to demonstrate efficient and profitable pasture based dairying. This farm was set up in 2009 converted from a well managed tillage farm. At the outset while soil fertility levels were good, the farm is still adjusting to growing grass. When tillage land moves to pasture, soil organic matter can be low and can take time to build. The farm is really only settling down as a pasture growing farm, however a number of key issues have been established in the past two years. The grazing management decisions across the seasons are based on the spring rotation planner at turnout, using the grass wedge and targeting the appropriate pre grazing herbage masses during the main grazing season and using grass budgeting in the autumn. The pastures on the farm are based around monoculture swards (single grass cultivars) with a clover inclusion. The purpose of this paper is to discuss the grazing management issues that are apparent on the farm in the last year and for the current season.

## Farm performance

Table 1, shows the performance of the farm in 2011 and until the end of May this year. Overall stocking rate was 2.8cows/ha giving a milk solids production of 961kg milk solids/ha. Concentrate input averaged 300kg/cow, which equates to 840kg concentrate/ha. While the dry matter (DM) production of the farm was 11.8t DM/ha in 2011, a number of issues were identified last year which may be reducing the farm grass production. Two main reasons are given for this, low K levels, and insufficient sulphur been applied during the April to June period. Last year, this farm suffered from a number moisture deficits during the grazing season, this may also have impacted on grass production performance.

**Table 1.** Greenfield farm details 2012 and 2011

| Farm Details | 2011 Jan - 1st June | 2012 Jan - 1st June |
|---|---|---|
| Number of cows | 305 | 294 |
| Stocking rate | 2.80 | 2.70 |
| Fat (%) | 4.33 | 4.67 |
| Protein (%) | 3.39 | 3.48 |
| Milk solids (kg MS/cow) | 127 | 141 |
| Milk solids/ha | 342 | 369 |
| Concentrate offered (kg/cow) | 100 | 45 |
| Nitrogen allowed to be Applied(kg) | 29,000 | 29,000 |
| Nitrogen applied to end June (% of total) | | 66 |
| Phosphorus Applied(kg/ha) | 0 | 0 |
| Sulphur Applied(kg/ha) | 10 | 34 |
| Potash Applied(kg/ha) | 17 | 23 |
| Round Bale silage produced (bales) | 200 | 185 |
| Bought in silage(kg DM/cow) | 120 | none to date |

The weekly grass demand, growth rate and the grass cover available for the 2012 grazing season is shown in Figure 1. The opening cover was almost 700 kg DM/ha pre turnout. All cows were turned out to grass full time as they calved. Due to the low stocking rate and scattered calving pattern, 50 dry cows (the last 50 cows to calve) were grazed full time from early February until they calved. This spring has highlighted that the calving pattern on the Greenfield farm was not compact enough and this needs to be addressed. Grazing conditions were excellent this spring and high levels of grass utilisation were achieved. The post grazing height of the paddocks in the first rotation averaged 3.5cm. In fact to date in 2012 only 157 mm of rain has been recorded at this farm, 40% of the rainfall was recorded in April. The spring rotation planner was used to allocate grass until mid March. From there on the spring rotation planner and grass budget were used weekly. The first rotation finished on April 10th, a decision was then taken to close 25ha for first cut silage.

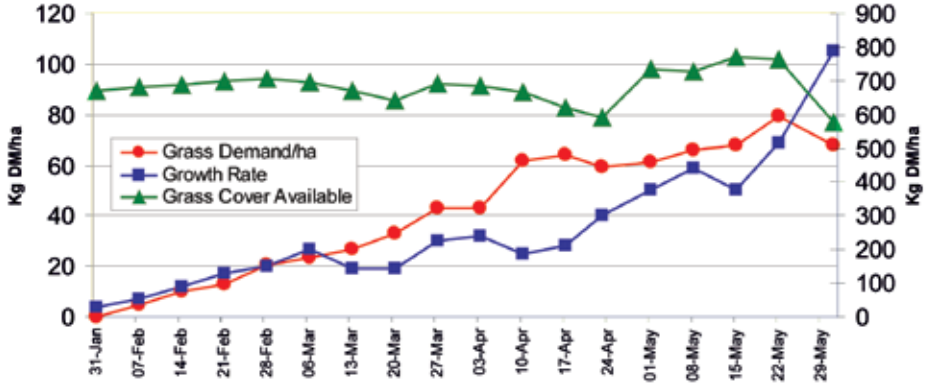


**Figure 1.** Grass Demand (kg DM/ha), grass growth (kg DM/ha) and farm cover (kg DM/ha) available in 2012

To date 45kg concentrate/cow has been offered to the herd this year. No concentrate has been offered to the herd since early April, minerals and trace elements are supplied daily to the herd through the water supply.

The farm is walked weekly and biweekly during periods of high grass growth, the grass wedge and weekly farm cover are the basis for making grazing management decisions during the main grazing season. The weekly farm cover data and management decisions are available to be viewed on the website www.greenfielddairy.ie. A number of paddocks are sampled weekly for grass DM, crude protein and DMD per cent, respectively. Pasture quality so far is excellent with most paddocks achieving >80 per cent DMD. Surplus grass is conserved when it presents itself, so far 185 round bales have been conserved. It is expected to harvest another 150 bales from surplus paddocks. By late August it will be known, what level of winter feed will be conserved on the farm. The objective is to ensure that the farm can produce sufficient grass to sustain the above stocking rate (to achieve winter feed self sufficiency). If this is not possible the outstanding winter feed deficit will be purchased.

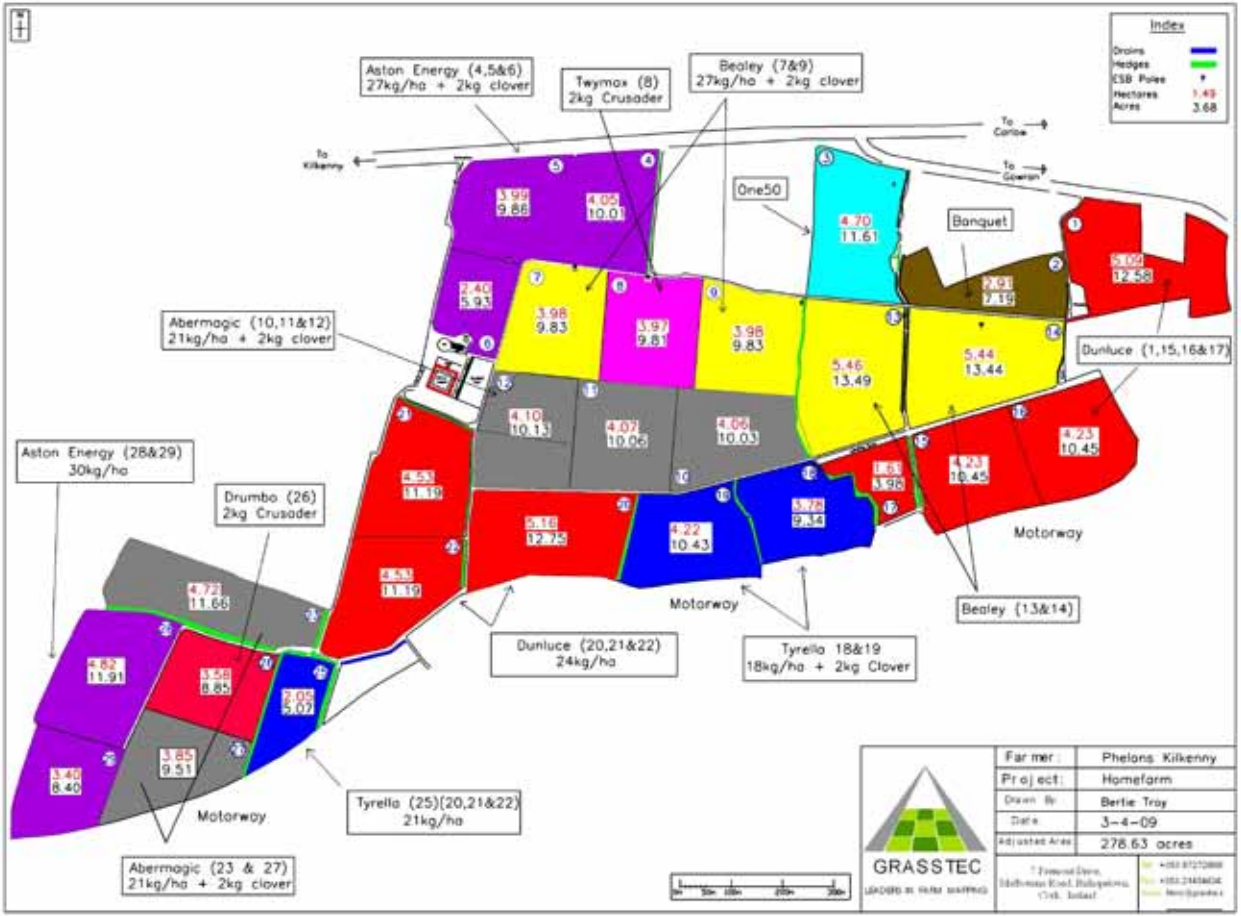


**Figure 2.** Farm Map with Grass Cultivar History

**Table 2. Paddock dry matter yield (tDM/ha) performance and soil fertility in 2011**

| Paddock | Cutlivar | Grazing DM yield | Silage DM yield | Total DM yield | P Index | K Index |
|---|---|---|---|---|---|---|
| 1 | Dunluce | 4.6 **(4)** | 10 | 14.59 | 2 | 2 |
| 2 | One 50 | 9.4 **(8)** | 5 | 14.4 | 4 | 2 |
| 3 | Banquet | 9.6 **(9)** | 4.5 | 14.07 | 3 | 3 |
| 4 | Astonenergy +Clover | 9.9 **(13)** | | 9.95 | 4 | 3 |
| 5 | Astonenergy +Clover | 11.1 **(15)** | | 11.1 | 4 | 3 |
| 6 | Astonenergy +Clover | 11.5 **(7)** | | 11.5 | 4 | 2 |
| 7 | Bealey+Clover | 13.3 **(11)** | | 13.3 | 4 | 3 |
| 8 | Twymax+Clover | 8.6 **(11)** | | 8.6(New '11) | 4 | 3 |
| 9 | Bealey+Clover | 14.0 **(10)** | | 14 | 4 | 3 |
| 10 | Abermagic+Clover | 9.9 **(12)** | | 9.9 | 4 | 2 |
| 11 | Abermagic+Clover | 10.8 **(13)** | | 10.8 | 4 | 3 |
| 12 | Abermagic+Clover | 9.6 **(13)** | | 9.6 | 4 | 2 |
| 13 | Bealey+Clover | 9.6 **(10)** | | 9.6 | 4 | 4 |
| 14 | Bealey+Clover | 7.9 **(8)** | 3.5 | 11.4 | 4 | 3 |
| 15 | Dunluce | 5.4 **(5)** | 9 | 14.4 | 3 | 3 |
| 16 | Dunluce | 5.5 **(5)** | 9 | 14.5 | 3 | 3 |
| 17 | Dunluce | 8.1 **(6)** | | 8.1 | 3 | 4 |
| 18 | Tyrella+Clover | 12.2 **(11)** | | 12.2 | 3 | 3 |
| 19 | Tyrella+Clover | 10.9 **(10)** | 2.6 | 13.5 | 3 | 3 |
| 20 | Dunluce+Clover | 12.2 **(9)** | | 12.2 | 4 | 2 |
| 21 | Dunluce+Clover | 9.7 **(9)** | 2 | 11.7 | 4 | 2 |
| 22 | Dunluce+Clover | 10.6 **(10)** | | 10.6 | 4 | 1 |
| 23 | Abermagic | 8.0 **(9)** | 3 | 11 | 4 | 1 |
| 26 | Drumbo | 7.8 **(7)** | | 7.8(New '11) | 3 | 1 |
| 27 | Abermagic | 9.3 **(10)** | 2 | 11.3 | 2 | 1 |
| 28 | Astonenergy +Clover | 13.2 **(12)** | | 13.2 | 3 | 1 |
| 29 | Astonenergy +Clover | 9.7 **(9)** | 5 | 14.7 | 1 | 2 |
| **Average** | | **9.5 (9)** | **2.3** | **11.8** | **3** | **2** |

*Number of grazings achieved in bold and brackets

Table 2 shows the individual paddock performance in 2011. It is too early to make conclusions on individual cultivar performance, this will be made after the current growing season. A number of trends have emerged, some paddocks are achieving more grazings and higher performance in the grazing season than others.

Ten paddocks have grown in excess of 13t/DM/ha, eight paddocks have produced in excess of 11t DM/ha. The target is to increase paddock DM yield to a higher yield level and to establish a higher base for the lowering growing paddocks. Over time more DM yield data will become available and if certain paddocks do not respond to the management changes in the current season, they will be reseeded.

The overall performance of the farm shows a lot of variation across paddocks, especially for a farm with new reseeds. The management aim will be to reduce this variation in the coming years and to get all paddocks growing to their potential. There is no reseeding planned for this season. However, last year two paddocks were reseeded (Paddocks 8 & 26). Paddock 8, which was sown to Bealey, became over populated by clover, which substantially reduced the perennial ryegrass content. The clover level in the paddock was inconsistent with the remainder of the other pastures and a decision was made to reseed the padoock to a new cultivar. This paddock was reseeded to Twymax. Drumbo replaced Abermagic in paddock number 26, this paddock had underperformed up to that point.

## Farm Soil Fertility status

Figures 3 and 4 show a breakdown of the soil P and K status of the farm. Figure 3. indicates that 57 per cent of the Greenfield farm is at Index 4 for phosphorus. Only 14 per cent of the farm is between soil index level 1 and 2. The nitrate derogation prohibits spreading of chemical phosphorus on this farm. A large proportion of paddocks require additional potassium (Figure 4). The addition of Potassium (K) is not limited by European legislation and it is anticipated that grass DM yield may increase. While 43 per cent of the farm is at soil index 3 for K, 50 per cent of the farm is at index 1 and 2. Potassium is needed to assist the plant retain moisture during periods of dry weather. This is particularly important at this location as annual rainfall is low during the mid season period. The ph level of the farm is adequate with only one paddock requiring lime.

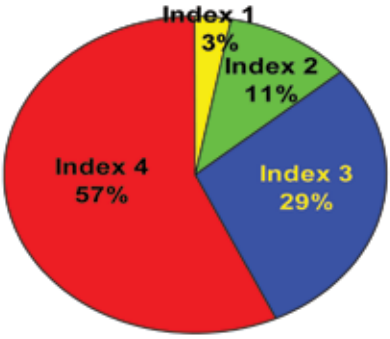


**Figure 3.** Phosphorus (P) Soil index

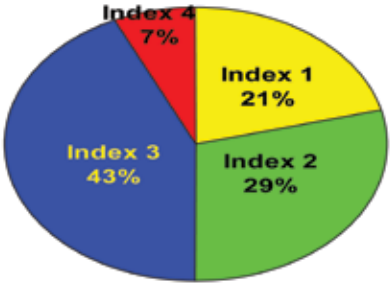


**Figure 4.** Potassium (K) Soil index

## Fertilizer management

The chemical fertiliser plan for the farm is shown in Table 3. The total amount of nitrogen allowed as per the Nitrate regulations is 29,000kg. Two thirds of the entire nitrogen allocation will be applied by the end of June. Slurry was applied to 23 per cent of the farm in late January, a further 20 per cent of the farm received slurry in mid May.

This year, the first three nitrogen applications were applied once per month. Thereafter nitrogen applications were applied twice monthly from the 4th to the 7th application. The last nitrogen application in September will be a blanket application. Sulphur was spread in the form of ASN from early April. There is a high requirement for sulphur in the growing plant mid season with each tonne of grass dry matter grown requiring 2kg of sulphur. As the farm is low in K it is planned to spread K in September and again in the Spring of 2013. The aim will be to establish a K soil index of 4 across the farm.

**Table 3.** Actual and planned fertiliser plan for the grazing area on the Greenfield Farm 2012

| Date Applied | Type of Fertiliser | Proportion of farm | Grazing Area SR (cows/ha) | Ha | Acres | Kgs N/ acre | Total N(kgs) | Nitrogen spread to date (%) |
|---|---|---|---|---|---|---|---|---|
| 7 Feb | Urea (46% N) | Whole farm | 1.4 | 112.9 | 278.8 | 11.5 | 3205.8 | 11 |
| 5 Mar | Urea (46% N) | Whole farm | 2.15 | 112.9 | 278.8 | 23.0 | 6411.6 | 33 |
| 10 Apr | ASN (26% N) | | 3.45 | 112.9 | 278.8 | 10.4 | 2899.2 | 43 |
| 30 Apr | CAN (27.5% N) | 50% of grazing area | 3.6 | 60 | 148.1 | 13.8 | 2037.0 | 50 |
| 15 May | CAN | 50% of grazing area | 3.6 | 27 | 66.7 | 13.8 | 916.6 | 53 |
| 1 June | ASN | 50% of grazing area | 3.99 | 44.66 | 110.3 | 10.4 | 1146.8 | 57 |
| Mid- June | ASN | 50% of grazing area | 3.99 | 42.47 | 104.9 | 10.4 | 1090.6 | 61 |
| Early -June | ASN | After first cut silage (11.77ha) | | 11.77 | 29.1 | 10.4 | 302.2 | |
| Early - July | CAN | TBC | 3.1 | 49.45 | 122.1 | 13.5 | 1648.3 | |
| Early- July | CAN | TBC | 3.1 | 49.45 | 122.1 | 13.5 | 1648.3 | |
| Early -August | CAN | Whole farm (TBC) | 3.1 | 112.9 | 278.8 | 10.0 | 2787.7 | |
| Sept | CAN/20-0-15 | Whole farm (TBC) | 2.78 | 112.9 | 278.8 | 10.0 | 2787.7 | |

# Animal Performance on Greenfield Farm

Padraig French
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## Summary

- A new herd was established in 2010 with primary focus on herd health and purchase price in selecting suitable animals.
- While the farm has had below average cull rate and empty rates, the farm has had to deal with two animal health issues of lameness and somatic cell count and a protracted calving pattern.
- In hindsight the first lactation animals bought were a much better investment than older animals due to lower culling and mortality rates and better calving patterns but the lower milk volumes would have to be factored into cash flow.
- Overall the milk solid sales from the farm are ahead of target due to higher stocking rates and better milk concentrations than predicted.

## Introduction

In February 2010, the Greenfield dairy farm commenced milk production with 220 cows purchased in late January and a further 100 purchased throughout 2010 lactation from a total of nine herds with approximately 20 per cent being first lactation animals and the remainder being a normal age distribution of older animals. The primary selection criteria when sourcing the animals were price, calving date, health and genetics. All animals bought were screened for a range of infectious diseases including BVD PI's, Johnes and neospora and all animals are routinely vaccinated BVD, Lepto, Samonella and IBR. Because of the restrictive stock purchasing budget and the requirement to assemble large numbers over a very short time period a number of entire herds were purchased and some of these herds contained a number of cows which were not fit for purpose. After the first year of assembly which included 70 pregnant heifers for calving in 2011, it was decided to operate a closed herd to minimise the risk of introducing any disease. The number of suitable replacements born in 2010 was only 55 or 18 per cent of the herd and allowed for a minimum of culling to date. However there is 126 replacement heifers bred in 2012 and this should allow a significant cull in late 2012.

## Animal Health

Overall animal health on the farm has been good which justifies the capital investment in disease screening and vaccination. There has been no major outbreak of any infectious disease with the exception of TB in mid 2011 which resulted in the culling of 16 cows and this outbreak was traced to just one source herd which was purchased in late 2010.

Calf and cow mortality has been much lower than expected (Table 1) which in a large part can be accredited to the skilled staff employed on the farm. Culling

rate has also been substantially lower than target and was mainly attributed to infertility (52%), mastitis and lameness. The cows on the farm were purchased from a range of herd sizes and the survivability was very influenced by herd of origin with the lowest culling (<10%) on herds of first lactation animals and highest (>35%) with older and smaller herds.

**Table 1. Animal performance from the Greenfield farm in 2010, 2011 and 2012**

| | 2010 | 2011 | 2012[a] |
|---|---|---|---|
| Cows calved | 320[b] | 307 | 305 |
| Average cows milked | 248 | 280 | |
| Milk fat % | 4.28 | 4.41 | 4.54 |
| Milk protein % | 3.54 | 3.52 | 3.44 |
| Milk yield/cow (l) | 4164 | 4745 | 1650 |
| Milk solid sales (kg) | 83,207 | 108,584 | 39,357 |
| Milk solids/ha (kg) | 737 | 961 | |
| Cow mortality | 2.20% | 1.3% | 0.65% |
| Empty rate | 12.3% | 9% | |
| Culling rate | 21.9% | 18%[c] | |
| Calf mortality | 5.53% | 5.50% | 3.9% |
| SCC (000 cells/ml) | 178 | 171 | 183 |
| Replacements | 70 | 55 | 126 |

[a] From January to May 2012; [b] 100 of these cows were purchased in mid-lactation; [c] includes 16 cows culled with tb

Two animal health issues the farm has had to deal with are lameness and mastitis. The contributing factors to the lameness are the very long distances (up to 1.3km) which the cows have to walk to get to the further paddocks on the farm, the initial settling down of the farm roadways following construction, the mixing of numerous herds with some cows from very small herds merged into a relatively large herd and some older cows with residual lameness problems when purchased. In the short term all cows are foot bathed regularly and any cow showing signs of lameness is kept in a separate herd which is grazed close to the parlour and treated by hoof pairing. It is hoped that the extra replacements available in 2013 will allow the culling of chronically infected cows and the breeding of a smaller crossbred cow will also reduce the problem.

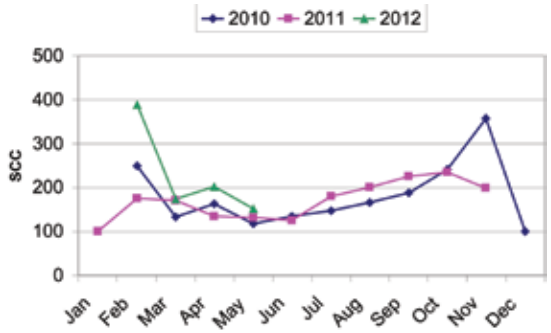



**Figure 1.** Monthly bulk SCC (000 cells/ml) on the farm to date

The second animal health issue the farm has had to deal is sub-clinical staph-aureus infection leading to periodic high bulk SCC tests (Figure 1). Overall the SCC has averaged under 200, 000 cells/ml since the start of the project but this masks a significant problem that was seen at the start and end of 2010 and again in 2012. The primary source of the problem was infected cows that were purchased in 2010 and the low cull rate since then that has allowed very low levels of culling for SCC. In the short term the problem is being contained by keeping a separate herd of high SCC cows and milking these last to prevent cross infection and regularly testing all of the main herd to identify any potentially infected cows. All cows are CMT tested post calving before being left join the main herd. Any high SCC cow which does not respond to treatment has the offending quarter dried off and if there is more than one quarter infected the cow is dried off. Again it is hoped that a significant cull in late 2012 will stem the source of the problem.

## Milk production

In the original budgets that were prepared for the Greenfield farm the target MS sales were 86 t, 95.5 t and 105.5 t for 2010, 2011 and 2012 respectively. In 2010 the production was slightly under target (table 1) primarily due to a delay in assembling the entire herd; however in 2011 the production target was significantly exceeded and this is likely to be so again in 2012. The primary reasons for the higher than budgeted total production was higher cow numbers than planned and higher milk solid concentrations. There is however a significant deficit in production in early spring in 2011 and 2012 as can be seen in Figure 2 relative to our long term target which is caused by a protracted calving pattern. This calving pattern is a residual of the herd that was purchased initially and will be addressed in 2013 by the high replacement rate and the culling of a significant number of late calving cows. The long term objective of the farm is to produce almost 150 t ms from about 350 cows producing about 420 kg ms/cow from a grass diet. This will require a significant increase in grass production to facilitate this stocking rate and an improvement in calving pattern to facilitate increased lactation length and subsequent yield.

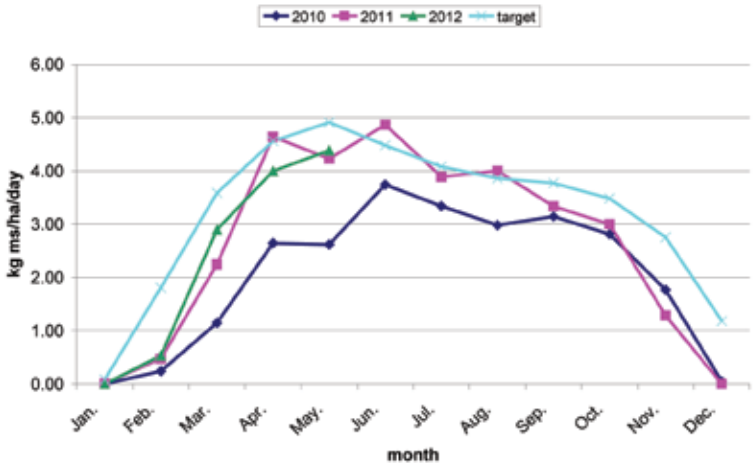



**Figure 1.** MS yield per ha per day from the farm to date and target yield

# Fertility Management on the Greenfield Farm


## Stephen Butler, Frank Buckley, Abigail Ryan and Mary Herlihy

Teagasc, Animal & Grassland Research and Innovation Centre, Moorepark, Fermoy, Co. Cork



### Summary

- At farm level the first step to improving reproductive performance of your herd is to assess the performance using an appropriate fertility management software package-this will identify areas for improvement
- Maximising the proportion of the herd that successfully establish pregnancy in the first six weeks after mating start date (MSD) is a prerequisite for a concentrated calving pattern.
- During the 2011 breeding season conception rate to AI was poor resulting in a prolonged calving pattern during 2012.
- The strategy to overcome this issue includes: breeding maiden heifers earlier than mature herd, using a CIDR-based fix-time AI treatment on a proportion of late calving cows, continue to use high EBI (high fertility sub-index) sires.


### Introduction

The immediate challenge facing Irish dairy farmers is how best to plan between now and milk quota abolition in 2015. The progeny produced from the 2012 breeding programme will be milking in a no quota scenario. With quota abolition there will be a requirement for an increased supply of high EBI replacements. Poor fertility is still the biggest cause of involuntary culling on Irish dairy farms and this will be the main limiting factor to expansion in the coming years. Reducing empty rate from 15 to 10 per cent will result in an increase of one cent/litre in net margin for the average Irish dairy herd. Poor fertility and poor calving patterns are significantly reducing profitability on many dairy farms due to reduced capacity for efficient production of milk from grass.

While fertility levels have improved a little in recent years, current performance continues to be substantially below optimum, negatively impacting dairy farm profits. Data from the ICBF database indicate that the median calving date in Irish spring calving herds is the 9$^{th}$ of March. Performance figures indicate a 21-day submission rate of 60 per cent, 1$^{st}$ service pregnancy rate of 53 per cent, empty rates of 17 per cent, and a six-week calving rate of 52 per cent. These levels are well below the targets of a median calving date of the 20$^{th}$ of February, 21-day submission rate of 90 per cent, 1$^{st}$ service pregnancy rate of 60 per cent, empty rate of <10 per cent and a six-week calving rate of 90 per cent. In a non quota scenario, earlier mean calving date will not only result in greater profitability at farm level but will allow greater plant utilisation at processing level. Additionally, some milk processors are introducing seasonal milk pricing schemes (Glanbia and Dairygold) encouraging a more evenly distributed supply pattern albeit with a compact spring calving production system. Improved reproductive performance at farm level will be achieved through the application of an optimum breeding management

programme, good herd nutritional status (body condition score), increased number and quality of replacements, maintaining a good herd health status and the use of genetically superior AI bulls (EBI).

Maximising the proportion of the herd that successfully establish pregnancy in the first six weeks after mating start date (MSD) is a prerequisite for a concentrated calving pattern. This requires high submission rates and good conception rates during the breeding season. This is only possible, however, if the herd already has an existing compact calving pattern. This is because the single biggest factor that affects fertility performance of the individual cow during the breeding season is how long she has calved. A poor calving pattern, all else being equal, leads to a compounding of the problem year on year. Cows that are calved longest at the farm MSD have already resumed cyclicity, display strong heats, and have good likelihood of conception. On the other hand, cows that calve within six weeks before MSD or after MSD are more likely to be non-cycling at MSD and are less likely to conceive at first insemination.

## Greenfield Farm

The herd on the Greenfield farm was assembled from a number of herds in late 2009, and the calving pattern inherited with these purchased cows was less than ideal (>30% calved after mid-March in 2010). Calving pattern in 2011 was similar. However, in the 2011 breeding season, fertility performance was poor (Table 1).

**Table 1. Fertility in 2011 and industry targets for dairy herd fertility**

| | 2011 | Target |
|---|---|---|
| 3 week submission rate (%) | 72 | 90 |
| First service pregnancy rate (%) | 34 | 60 |
| 6 week in-calf rate (%) | 56 | 75 |
| Overall pregnancy rate (%) | 87 | >90 |

The three-week submission rate was below target. Though 96 per cent of the herd were calved by MSD, 28 per cent of cows were in the category of late calving cows (i.e., calving within six weeks before MSD or after MSD). Of greater concern, however, was the very low first service pregnancy rate of 34 per cent. This is well below the industry target, and it is not possible to attain a compact calving pattern when pregnancy rates are this low. A thorough investigation of the potential reasons for the low pregnancy rate was carried out. Herd body condition score during the breeding season was 2.9, macro and trace minerals were supplemented in the water, and there were no indications of animal health problems. Genetically, the herd comprised relatively high EBI Holstein-Friesians and approximately 20 per cent crossbred cows indicating the potential for good reproductive efficiency. The EBI of the herd in 2011 was €101 (€125 in 2012). Some of the cows have no EBI figures so the EBI figure for 2011 is only based on 65 per cent of the herd. Heat detection rate was very good at 96 per cent, indicating that if cows were cycling, heats were being accurately identified. Analyses of the **Herd Fertility Summary Report** for 2011 (Appendix 1) indicated that conception rate to AI was poor (averaged 37%) while conception rates to natural service was high, or nearer expectation (averaged 56%). Collectively, the evidence pointed to issues relating to insemination as the most likely reason for the low pregnancy rates. In light of this,

farm staff undertook a refresher course for DIY AI in advance of the 2012 breeding season to ensure that both semen straw handling and insemination technique are carried out correctly.

### Improving the herd calving pattern

As a consequence of the poor fertility performance in 2011 the calving pattern in 2012 deteriorated somewhat (45% of cows calved after mid-March). In late March 2012, it was decided to impose a strategy to improve the herd calving pattern. This strategy focused on the reproductive management of both heifers and lactating cows.

### Heifer management

The 2012 farm MSD was April 23rd. It was decided to start breeding the heifers 7 days earlier on April 16th. This decision was taken for a number of reasons:

1. The heifers would calve down early in 2013, giving them a good chance to start cycling and achieve high levels of fertility during the 2013 breeding season.
2. Breeding the heifers earlier than the cows for a number of years will play an important role in improving the overall herd calving pattern.
3. Breeding the heifers early and using synchronisation to get most heifers bred within 15 days allowed staff to focus primarily on breeding the cows after the farm MSD.

The heifer reproductive management was as follows:

- Kamar heat mount detectors were applied to 103 heifers on Monday 16th April.
- The heifers were watched for signs of heat 4-5 times per day for the first 10 days, and inseminated based on observed heat. Insemination was performed once daily using a commercial AI technician service. Jersey crossbred heifers (n = 67) were inseminated using MJI, Friesian heifers (n = 33) were inseminated using OKM, and Norwegian Red crossbred heifers (n = 3) were inseminated using EKE.
- Of the 103 heifers, 43 were bred to a natural heat in the first 10 days.
- On Wednesday April 25th, all heifers not yet bred (n = 60) were injected with prostaglandin (2.0 mL Estrumate i.m.). A further 50 heifers came into heat after the prostaglandin injection.
- This resulted in 90 per cent (n = 93) of the heifers being bred with AI within 15 days, and Jersey crossbred and Aberdeen Angus easy calving stock bulls were used for natural service thereafter.

### Lactating cow management

Pre-breeding heat detection of the lactating cows began on March 28th. Yellow tail paint was applied to all lactating cows, and cows were examined for removal of tail paint every Monday and Thursday morning. When tail paint was removed, the cow number and date was recorded, and her tail paint was topped up with the same colour. To ensure accurate and timely recording of insemination data throughout the breeding season, cow numbers and pre-breeding heat dates were entered on breeding charts, which were placed on the wall in the farm office. After the MSD, all insemination dates were entered on these charts on a daily basis as soon as AI was completed after the morning milking. Insemination was performed once daily by farm staff. Blue tail paint was applied to all cows following insemination.

On April 20th (three days before MSD), all cows that were calved more than 32 days and had not yet been recorded as being in heat were examined by ultrasound to determine (1) if they were cycling and (2) if the uterus was clean. A total of 34 cows were scanned on this date. Of these, 24 cows that were either not cycling or were cycling but calved less than 60 days were treated with a CIDR-based treatment (Figure 1). Cows were injected with GnRH (2.5 mL Receptal i.m.) and a CIDR was inserted on day 0. On day seven, cows were injected with prostaglandin (5 mL Lutalyse i.m.) and the CIDR was removed on day eight at the morning milking. Cows were again injected with GnRH (2.5 mL Receptal i.m.) on day nine after the evening milking, and fixed-time AI was carried out on day 10 after the morning milking. For ease of identification and to ensure compliance to the treatment protocol, treated cows were marked across the back with red tail paint. Treated animals were separated from the main herd when drafted out for prostaglandin treatment after the AM milking, and were re-introduced back in to the main herd at the PM milking on the day AI was completed.

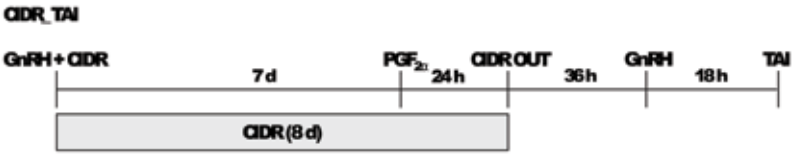



**Figure 1.** CIDR-TAI synchronisation protocol used for treating lactating dairy cows that were not cycling or lactating dairy cows that were cycling but were calved less than 60 days.

The average BCS of the cows treated with the CIDR protocol was 2.66 (range 2.00 – 3.00) and the average days after calving was 51 (range 35 - 88). The decision to treat these cows was taken to increase the number of cows bred in the first three weeks of the breeding season. Cows treated with the CIDR protocol were bred on April 30th. In addition, five cows were diagnosed with a uterine infection, and were washed out with an intra-uterine antibiotic. The remaining 5 cows did not require treatment.

The three week submission rate for lactating cows in the 2012 breeding season was 68 per cent. Again, this figure is disappointing, but not too surprising given the high proportion of late calving cows in 2012. There were 47 per cent of cows left to calve after the 12th March in 2012.

On the 6th June all cows that were inseminated more than 28 days not seen repeating were scanned. Out of the 102 cows scanned, 90 were scanned in calf. This corresponds to a pregnancy rate of 66 per cent to first service for those cows served during the first two weeks of breeding. Twelve out of the 24 cows that had received the CIDR treatment proved in calf equating to a pregnancy rate to first service of 50 per cent for those cows. As a consequence, subject to losses, there will be 90 cows and 75 heifers calving down in the first two weeks of the 2013 calving season. Taking non-return rate into consideration (approximately 60%) for the third week of breeding, the number of cows that will calve during the first three weeks of calving next year will be in excess of 200. All told this is a very positive start to the breeding season and will result in a substantial improvement to next years calving pattern.

Cows that were calved more than 32 days and still not bred were scanned also. One of these cows was found not to be cycling and was treated as per the CIDR programme outlined above. Four of cows were treated for uterine infection.

It is anticipated that the period of AI use will be 8 to 9 weeks, with bulls used to mop up for an additional three to four weeks. Mating End Date is scheduled for mid-July, resulting in a 12 week breeding season.

## The future

In the coming years, heifers will continue to be bred earlier than the lactating herd in an attempt to improve the calving pattern. The fertility performance of the lactating herd will be examined in detail at the end of the breeding season, and a decision made on the level of synchronisation required in next years breeding season. It may be necessary to increase the use of synchronisation if the herd is to reach the industry fertility targets sooner.

Body condition score management during late lactation and the dry period is a critical component of successful reproductive management. Too many cows calved in excessively high BCS in spring 2012, a reflection of excessively long dry periods with ad libitum access to high quality silage, and resulted in some cows with clinical ketosis. Nutritional management in the coming winter will be adjusted to prevent this reoccurring.

The bulls selected for AI use will continue to have a high fertility sub-index. To available of hybrid vigour (estimated to be worth in excess of €100 per lactation in the first cross) a two way crossbreeding strategy will continue to be implemented using high EBI Jersey and Holstein-Friesian sires. Long term approximately €66 per lactation (in addition to improvements in EBI) due to hybrid vigour is anticipated. With each new generation of heifers, this will result in incrementally higher genetic merit for fertility, which should translate into better reproductive performance and a longer productive lifespan in the herd.

# Appendix 1

Teagasc, Animal & Grassland Research and Innovation Centre, Moorepark

## Herd Fertility Summary Report

**Date Produced:** 21-MAR-12 **Page** 1 **of** 6

**Farmer:** Greenfield - M Long
Greenfield
GROVE, DUNBELL
CO KILKENNY

**Advisor:** TEST NAME
**Vet. Practice:** John Mee

**Calving Period:** **Spring** (01/01/11 to 30/06/11)

| Performance Statistics | Cows (LN >= 1) |
|---|---|
| Cows Calved (No.) | 312 |
| Calving Period (Dates) | 19/01/11 to 15/05/11 |
| Mean Calving Date (MCD) | 06/03/11 |
| Breeding Period (Dates) | 26/04/11 to 10/08/11 |
| Breeding Period (Days) | 106 |
| Served of Available % (No.) | 98 (305/312) |

**Group:** 6 **Farm:** 13

| Performance Statistics | | Result | Poor | Achievable | Good |
|---|---|---|---|---|---|
| **Calving** | **Calving Rate** (to all services within 8 weeks of CSD)* | 72% | <70% | | >85% |
| | **Calving Interval** (current) | 394 days | >380 days | | <365 days |
| | **Re-calved Rate** (in same calving period as last year) | | <70% | | >85% |
| **Oestrus** | **Submission Rate -21d** (of cows calved up to MSD + 20d)* | 72% | <60% | | >90% |
| | **Normal Repeats** (all services, 18-24d) | 51% | <45% | | >60% |
| | **Oestrus Detection Rate** (entire breeding period) | 93% | <80% | | >90% |
| **Pregnancy** | **First Service Pregnancy Rate** (56d NRR or PD positive)* | 34% | <45% | | >60% |
| | **6-week Pregnancy Rate** (within 6 wk of MSD) | 56% | <50% | | >80% |
| | **Overall Pregnancy Rate** (within 25wk of MSD) | 87% | <80% | | >95% |

* CSD = Calving Start Date, MSD = Mating Start Date, PD = Pregnancy Detection

For all data relating previous to current calving e.g. Calving Rate, Calving Interval, Re-calved Rate, Calving Pattern(current), the total number of cows is used.

| Teagasc, Animal & Grassland Research and Innovation Centre, Moorepark | | | Calving Report |
|---|---|---|---|
| **Date Produced:** 21-MAR-12 | | | **Page** 2 **of** 6 |
| **Farmer:** Greenfield - M Long<br>Greenfield<br>GROVE, DUNBELL<br>CO KILKENNY | | **Performance Statistics** | **Cows (LN >= 1)** |
| | | Cows Calved (No.) | 312 |
| | | Calving Period (Dates) | 19/01/11 to 15/05/11 |
| **Advisor:** TEST NAME<br>**Vet. Practice:** John Mee | | Calving Period (Days) | 116 |
| **Calving Period:** **Spring** (01/01/11 to 30/06/11) | | Mean Calving Date (MCD) | 06/03/11 |
| **Group:** 6 | **Farm:** 13 | | |

## Calving Performance

| Performance Statistics | Result % (No.) | Achievable |
|---|---|---|
| **Calved at Mating Start Date (MSD)** | 96 (301/312) | 90 - 100 |
| **Late Calving Cows (<42d calved or not calved at MSD)** | 28 (88/312) | 10 - 30 |
| **Calving Rate (8-week)** | 72 (224/312) | 70 - 85 |
| **Calving Interval (current)** | 394d | 380 - 365 |
| **Re-calved Rate (in same calving period as last year)** | | 70 - 85 |

## Calving Pattern - Current and Predicted

| Current | Jan 11 | Feb 11 | Mar 11 | Apr 11 | May 11 | Jun 11 |
|---|---|---|---|---|---|---|
| **Aborted cows** | | | | | | |
| **Induced cows** | | | | | | |
| **Full-term cows** | 20 | 116 | 132 | 35 | 9 | |
| **Total cows (%)** | 20(6) | 116(37) | 132(42) | 35(11) | 9(3) | |

| Predicted | Feb 12 | Mar 12 | Apr 12 | May 12 |
|---|---|---|---|---|
| **Total Cows (%)** | 109(43) | 79(31) | 48(19) | 20(8) |

For all data relating previous to current calving e.g. Calving Rate, Calving Interval, Re-calved Rate, Calving Pattern(current), the total number of cows is used.

Teagasc, Animal & Grassland Research and Innovation Centre, Moorepark

**Oestrus Report**

**Date Produced:** 21-MAR-12 **Page** 3 **of** 6

| | |
|---|---|
| **Farmer:** | Greenfield - M Long<br>Greenfield<br>GROVE, DUNBELL<br>CO KILKENNY |
| **Advisor:** | TEST NAME |
| **Vet. Practice:** | John Mee |
| **Calving Period:** | **Spring** (01/01/11 to 30/06/11) |
| **Group:** | 6 **Farm:** 13 |

| **Performance Statistics** | |
|---|---|
| Available for Service (No.) [NAFS]* | 312 [ 0 ] |
| Served of Available % (No.) | 98 (305/312) |
| Breeding Period (Dates) | 26/04/11 to 10/08/11 |
| Breeding Period (Days) | 106 |

## Accuracy of Oestrous Detection

| Repeat Interval | Days | Result % (No.) | Achievable |
|---|---|---|---|
| Same Oestrous | 0-1 | **12** (46/376) | 0 - 5 |
| Short | 2-17 | **17** (63/376) | 5 - 10 |
| Normal | 18-24 | **51** (191/376) | 55 - 65 |
| Long | 25-35 | **9** (34/376) | 10 - 20 |
| Double | 36-48 | **7** (28/376) | 10 - 15 |
| Late | >48 | **4** (14/376) | 5 - 10 |
| All (repeats for all services) | – | **100** (376/376) | – |

## Efficiency of Oestrous Detection

| Performance Statistics | Units | Result | Achievable |
|---|---|---|---|
| Calving to Service Interval (CSI) | days [SD] | **67** [20] | 70 - 80 |
| Pre-MSD Oestrous Detection Rate (21d) ** | % (No.) | (0/301) | 60 - 90 |
| Submission Rate (7d) | % (No.) | **22** (68/306) | 20 - 30 |
| (14d) | % (No.) | **48** (149/310) | 40 - 60 |
| (21d) | % (No.) | **72** (226/312) | 60 - 90 |
| (106d) | % (No.) | **98** (305/312) | 90 - 100 |
| Oestrous Detection Rate (Breeding Period) | % (No.) | **93** (681/733) | 80 - 90 |
| Non Detected Oestrus (NDO) | % (No.) | **15** (47/305) | 10 - 20 |
| Repeat Ratio (18-24:36-48d) | – | **6.82** | 4 - 6 |

## Submission Rate (21d) - Risk Factors

| Risk Factor | Units | Result % (No.) | Achievable |
|---|---|---|---|
| Lactation | 1 | **78** (58/74) | 60 - 90 |
| | 2 - 4 | **70** (121/174) | 60 - 90 |
| | >= 5 | **73** (47/64) | 60 - 90 |
| Days Calved Pre-MSD | < 42* | **43** (38/88) | 50 - 90 |
| | 42 - 84 | **83** (162/195) | 55 - 90 |
| | >= 85 | **95** (19/20) | 60 - 90 |
| Body Condition Score (BCS) at MSD | < = 2.50 | (0/0) | 50 - 90 |
| | 2.75 - 3.00 | (0/0) | 60 - 90 |
| | >= 3.25 | (0/0) | 60 - 90 |

* NAFS = Not Available for Service/ To Be Culled/ Sold/ Dead
** Includes cows calved up to MSD+20d, MSD = Mating Start Date

For all data relating previous to current calving e.g. Calving Rate, Calving Interval, Re-calved Rate, Calving Pattern(current), the total number of cows is used.

Teagasc, Animal & Grassland Research and Innovation Centre, Moorepark

**Pregnancy Report**

**Date Produced:** 21-MAR-12



**Farmer:** Greenfield - M Long
Greenfield
GROVE, DUNBELL
CO KILKENNY

**Advisor:** TEST NAME
**Vet. Practice:** John Mee

**Calving Period: Spring** (01/01/11 to 30/06/11)

**Group:** 6 **Farm:** 13

| Performance Statistics | |
|---|---|
| Available for Service (No.) [NAFS]* | 312 [ 0 ] |
| Served of Available % (No.) | 98 (305/312) |
| Breeding Period (Dates) | 26/04/11 to 10/08/11 |
| Breeding Period (Days) | 106 |

## Conception Pattern

| Performance Statistics | Units | Result | Achievable |
|---|---|---|---|
| MSD to First Service** | days [SD] | **16** [13] | 10 - 25 |
| MSD to Conception | days [SD] | **38** [28] | 15 - 40 |
| Calving to Conception Interval (CCI) | days [SD] | **91** [27] | 85 - 95 |
| Services per Conception (all services) | (No.) | **2.5** (681/271) | 1.7 - 2.2 |
| Services per Conception (pregnant only) | (No.) | **2.2** (588/271) | 1.5 - 1.8 |
| Repeat Breeders (>=3 services and NIC) | % (No.) | **6** (18/312) | 10 - 20 |
| First Service Pregnancy Rate | % (No.) | **34** (103/305) | 45 - 60 |
| Second Service Pregnancy Rate | % (No.) | **42** (82/197) | 45 - 60 |
| >= Third Service Pregnancy Rate | % (No.) | **48** (86/179) | 45 - 60 |
| 6 - week Pregnancy Rate | % (No.) | **56** (175/312) | 50 - 80 |
| 13 - week Pregnancy Rate | % (No.) | **83** (258/312) | 75 - 95 |
| 25 - week Pregnancy Rate | % (No.) | **87** (271/312) | 80 - 95 |
| Overall Infertile Rate | % (No.) | **13** (41/312) | 10 - 25 |
| Available for Service - Not Served | % (No.) | **2** (7/312) | 10 - 15 |
| Available for Service - Not in Calf (NIC) | % (No.) | **11** (34/312) | 0 - 10 |

## First Service Pregnancy Rate - Risk Factors

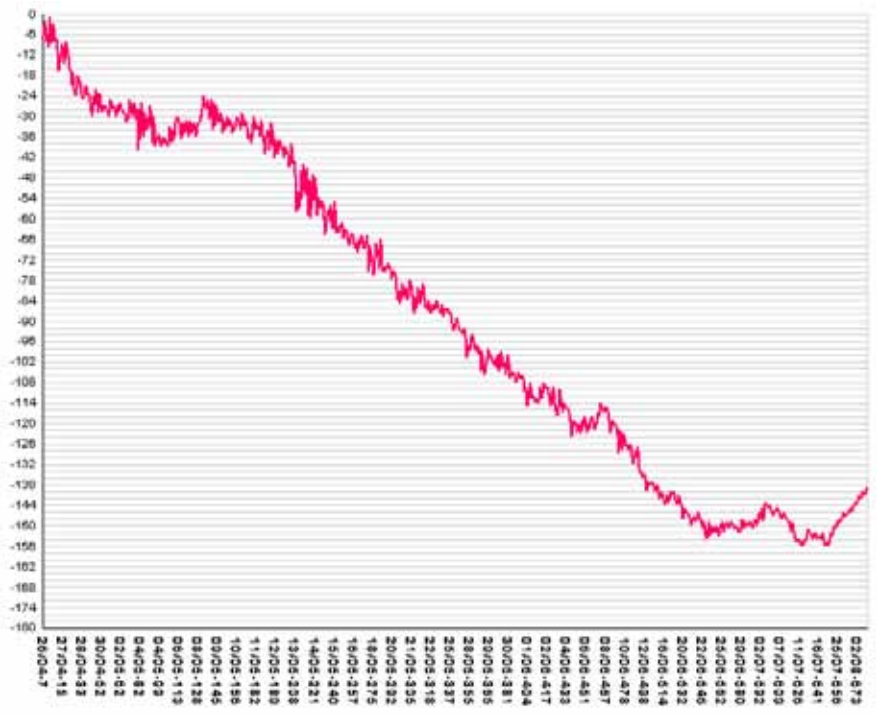
| Risk Factor | Units | Result % (No.) | Achievable |
|---|---|---|---|
| Lactation | 1 | **36** (26/73) | 50 - 60 |
| | 2 - 4 | **33** (57/173) | 45 - 60 |
| | >= 5 | **34** (20/59) | 45 - 60 |
| Days Calved Pre MSD | < 42 | **20** (19/95) | 25 - 60 |
| | 42 - 84 | **36** (69/190) | 45 - 60 |
| | >= 85 | **75** (15/20) | 45 - 60 |
| Body Condition Score (BCS) at MSD | <= 2.50 | (0/0) | 35 - 60 |
| | 2.75 - 3.00 | (0/0) | 45 - 60 |
| | >= 3.25 | (0/0) | 45 - 60 |

* NAFS = Not Available for Service/ To Be Culled/ Sold/ Dead

** MSD = Mating Start Date

For all data relating previous to current calving e.g. Calving Rate, Calving Interval, Re-calved Rate, Calving Pattern(current), the total number of cows is used.

| Teagasc, Animal & Grassland Research and Innovation Centre, Moorepark | | | **CuSum Report** |
|---|---|---|---|
| **Date Produced:** 21-MAR-12 | | | **Page** 5 **of** 6 |
| **Farmer:** Greenfield - M Long<br>Greenfield<br>GROVE, DUNBELL<br>CO KILKENNY | | **Performance Statistics** | |
| | | Available for Service (No.) [NAFS]* | 312 [ 0 ] |
| | | Served of Available % (No.) | 98 (305/312) |
| **Advisor:** TEST NAME<br>**Vet. Practice:** John Mee | | Breeding Period (Dates) | 26/04/11 to 10/08/11 |
| **Calving Period:** Spring (01/01/11 to 30/06/11) | | Breeding Period (Days) | 106 |
| **Group:** 6 **Farm:** 13 | | | |




| Dates | 26-APR-11<br>05-MAY-11 | 06-MAY-11<br>13-MAY-11 | 14-MAY-11<br>24-MAY-11 | 25-MAY-11<br>05-JUN-11 | 06-JUN-11<br>27-JUN-11 | 28-JUN-11<br>10-AUG-11 |
|---|---|---|---|---|---|---|
| **Days** | 9 | 7 | 10 | 11 | 21 | 43 |
| **Services (No.)** | 103 | 106 | 127 | 127 | 121 | 112 |
| **Pregnant (%)** | 33 (32) | 50 (47) | 42 (33) | 40 (36) | 45 (37) | 61 (54) |

*NAFS = Not Available for Service/ To Be Culled/ Sold/ Dead

For all data relating previous to current calving e.g. Calving Rate, Calving Interval, Re-calved Rate, Calving Pattern(current), the total number of cows is used.

Teagasc, Animal & Grassland Research and Innovation Centre, Moorepark

## Insemination Report

**Date Produced:** 21-MAR-12 **Page** 6 **of** 6

**Farmer:** Greenfield - M Long
Greenfield
GROVE, DUNBELL
CO KILKENNY

**Advisor:** TEST NAME
**Vet. Practice:** John Mee
**Calving Period:** **Spring** (01/01/11 to 30/06/11)

| Performance Statistics | |
|---|---|
| Cows Calved (No.) | 312 |
| Available for Service (No.) [NAFS]* | 312 [ 0 ] |
| Served of Available % (No.) | 98 (305/312) |
| Breeding Period (Dates) | 26/04/11 to 10/08/11 |
| Breeding Period (Days) | 106 |

**Group:** 6 **Farm:** 13

| | Pregnancy Rate per Service % (No.) | | | | | |
|---|---|---|---|---|---|---|
| **Sire Code** | **1** | **2** | **3** | **4** | **>= 5** | **All** |
| BHQ | **100** (1/1) | **33** (1/3) | **100** (2/2) | **50** (1/2) | (0/1) | **56** (5/9) |
| BHZ | | **20** (1/5) | (0/1) | **100** (1/1) | | **29** (2/7) |
| BWU | **17** (4/23) | **67** (2/3) | (0/2) | **100** (1/1) | | **24** (7/29) |
| GIP | **13** (1/8) | | | | | **13** (1/8) |
| HWY | **30** (8/27) | **45** (24/53) | **33** (2/6) | (0/1) | | **39** (34/87) |
| HYK | **17** (1/6) | **41** (14/34) | **36** (4/11) | (0/2) | | **36** (19/53) |
| HZS | **41** (7/17) | | | | (0/1) | **39** (7/18) |
| KJW | **67** (2/3) | **27** (4/15) | **27** (3/11) | **43** (3/7) | **50** (1/2) | **34** (13/38) |
| KTR | **39** (11/28) | **25** (2/8) | **56** (5/9) | **50** (2/4) | (0/1) | **40** (20/50) |
| MJD | **48** (10/21) | **67** (2/3) | | | | **50** (12/24) |
| MTW | | (0/1) | | | | (0/1) |
| PKU | | (0/1) | | **100** (1/1) | | **50** (1/2) |
| SBUL | **33** (1/3) | **54** (7/13) | **50** (20/40) | **65** (17/26) | **62** (13/21) | **56** (58/103) |
| SIZ | (0/4) | (0/1) | | | | (0/5) |
| TIO | **36** (29/80) | **50** (10/20) | **100** (2/2) | | | **40** (41/102) |
| UDP | **29** (6/21) | **47** (7/15) | **42** (5/12) | (0/1) | (0/1) | **36** (18/50) |
| WDS | **33** (4/12) | **29** (4/14) | (0/3) | | | **28** (8/29) |
| WFM | **33** (16/48) | | | | | **33** (16/48) |
| WNE | **67** (2/3) | **50** (4/8) | **40** (2/5) | **50** (1/2) | | **50** (9/18) |

* NAFS = Not Available for Service/ To Be Culled/ Sold/ Dead

For all data relating previous to current calving e.g. Calving Rate, Calving Interval, Re-calved Rate, Calving Pattern(current), the total number of cows is used.

# Notes

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