Animal &
Grassland Research
& Innovation
Programme

# Teagasc National Dairy Conference 2012

## ‘Is Ireland ready for more milk?’

**Tuesday, 20th November**

Brandon Hotel,
Tralee,
Co. Kerry

**Wednesday, 21st November**

Mullingar Park Hotel,
Mullingar,
Co. Westmeath

Teagasc
Agriculture and Food Development Authority

# 'Is Ireland ready for more milk'

## Conference Programme – Tralee

| | | | |
|---|---|---|---|
| 10.00 am | **Looking Ahead** | | |
| | Chair: | Prof. Gerry Boyle, Director Teagasc | |
| | Speakers: | Stan McCarthy, CEO Kerry Group plc; Laurence Shalloo, Teagasc | |
| 11.15 am | **Sustainable milk production: managing soil and grass** | | |
| | Chair: | Pat Dillon, Teagasc | |
| | Speakers: | Brendan Horan, Ger Courtney, Teagasc | |
| 12.30 pm | Lunch | | |
| 02.00 pm | **Animal Health Ireland**<br>**Mastitis control: why, what and how** | | |
| | Chair: | Jack Kennedy, Irish Farmers Journal | |
| | Speakers: | Una Geary, Teagasc; Finola McCoy, AHI; Frank O'Sullivan, MRCVS | |
| 03.15 pm | **Managing Risk** | | |
| | Chair: | Sean Coughlan, Chief Executive, ICBF | |
| | Speakers: | Sean McCarthy, DairyNZ<br>John O'Sullivan, Dairy Farmer<br>Tadhg Buckley, Nuffield Scholar & AIB | |
| 04.30 pm | Conference Close – Tea & Coffee | | |

## Conference Programme – Mullingar

| | | | |
|---|---|---|---|
| 10.00 am | **Looking Ahead** | | |
| | Chair: | Prof. Gerry Boyle, Director Teagasc | |
| | Speakers: | Mark Voorbergen, International Dairy Consultant;<br>Laurence Shalloo, Teagasc | |
| 11.15 am | **Sustainable milk production: managing soil and grass** | | |
| | Chair: | Michael Hanley, CEO Lakeland Dairies | |
| | Speakers: | Donal Patton, John Maher, Teagasc | |
| 12.30 pm | Lunch | | |
| 02.00 pm | **Animal Health Ireland**<br>**Mastitis control: why, what and how** | | |
| | Chair: | Mike Magan, Chairman AHI | |
| | Speakers: | Una Geary, Teagasc; Finola McCoy, AHI;<br>Frank O'Sullivan, MRCVS | |
| 03.15 pm | **Managing Risk** | | |
| | Chair: | Tom O'Dwyer, Teagasc | |
| | Speakers: | Sean McCarthy, DairyNZ<br>Ciaran Seery, Dairy Farmer<br>Liam Fenton, FCStone | |
| 04.30 pm | Conference Close – Tea & Coffee | | |

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# Foreword

On behalf of Teagasc, I would like to welcome you to the Teagasc National Dairy Conference 2012. 'Is Ireland ready for more milk?' is the theme for this year's event. This is very appropriate as April 2015 is just over two years away and it is timely to ask whether Ireland is ready for the extra milk production likely to occur.

Milk processors are advancing their plans to put extra milk processing facilities in place. Dairy farmers are breeding more replacements and developing their on-farm facilities. What of the service and support sectors? Will they be able to cope with the extra demand for their services? The banks say that they are ready to support expansion by dairy farmers but what criteria will have to be met? And are they ready to offer new financial products to farmers? New dairy farmers are required – whether new entrants or sons/ daughters of existing dairy farmers. What is being done to smooth the entry of such people into the industry? What of dairy farmers themselves? Winning individuals train before competition. What training are dairy farmers doing now to be ready for 2015?

We are delighted to have Kerry Group plc CEO, Stan McCarthy, speak at the Tralee conference. Kerry Group goes from strength to strength and if anybody has a global view of dairy markets, the supply/ demand balance and emerging trends, it will be the Kerry Group supremo. Mark Voorbergen, international dairy consultant will speak at the Mullingar conference and will present his view on global trends.

Many Irish dairy farmers have the capacity to grow milk output through intensifying existing land use – more cows on the milking platform. A recent Rabobank report suggests that a 34% increase in milk output is possible in Ireland through increasing existing stocking rates alone. But what is the appropriate stocking rate for your farm? What developments will be needed to allow you to achieve this potential? And what adaptations will be required to the grazing management protocol for dairy farms on heavy soils? All of these issues will be addressed in the second session.

High somatic cell counts and mastitis are costing Irish dairy farmers. Animal Health Ireland (AHI), through its CellCheck programme, is aiming to help farmers to tackle this issue. A multidisciplinary approach, involving Teagasc advisers, co-op milk quality advisers, milking machine technicians and veterinary surgeons, is being used to deliver interactive workshops to farmers. Reaction to the pilot workshops, held in September/ October, has been positive. CellCheck workshops will be rolled out nationally in 2013. A new CostCheck calculator is now available.

While expansion is taking place, dairy farmers will have to cope with a number of risks, including price volatility. What options are available to dairy farmers in this area? Sean McCarthy, DairyNZ Developer (but from Co. Kerry) will look at how New Zealand dairy farmers handle the issues of risk and volatility.

Finally, I hope that you this year's Conference provides you with a learning opportunity to help you prepare for life without milk quotas.

*Tom O'Dwyer,*
**Head of Dairy Knowledge Transfer Department.**

# Is EU quota liberalisation only a drop in the ocean of global demand growth?

**Mark Voorbergen, Independent Dairy Consultant**

By 2015, EU milk production growth will have been contained by the milk quota system for over 30 years. Despite a growing pile of research papers and scenario analyses, no one really knows what will happen when the system will be abandoned in 2015 and farmers will once again be able to grow and invest as they please or as much as banks will enable them. At some point in time, economic rationale will take over, but in the initial years after the termination of the quota system, market turbulence seems inevitable. Processors in the European growth regions will find themselves busy building the required capacity and creating new market access for these volumes.

Still, in the bigger scheme of things, the liberalisation of EU milk supply may be a welcome boost of global milk production that will aid supply to keep up with global demand growth for a few more years. Demand growth fundamentals like population growth and income growth in developing dairy markets are very strong and the local supply potential appears to be insufficient to keep up.

Looking through the increased volatility of recent years reveals on overall upward trend for global commodity prices since 2001. Every peak tends to be higher than the last one and lows get higher as well. Developments in recent months indicate that supply is increasingly challenged to keep up with global demand growth. Despite an 18-month series of almost perfect supply conditions, resulting in very strong growth rates in all of the major export regions of the world, dairy commodity prices were barely pushed below the USD 3,000/t mark in the first half of 2012. Currently they already seem back on their way to the next peak in 2013.

Beyond 2017, when Europe has been through most of the post-liberalisation turbulence, it will be interesting to see which value chains in Europe have been capable of translating the mid-term challenge of the termination of the EU quota regime into a platform for capturing the long term value of the opportunities in the global market place. Irish farmers have a great starting point as being among the most efficient producers of milk in Europe. However, the opportunities in the global market also require competing with several of the most consolidated and dominant marketing machines in the world. Is the Irish dairy chain ready for the opportunity?

# Getting ready for Expansion! Lessons from the Greenfield project

**Laurence Shalloo, Abigail Ryan and Padraig French**

*Livestock Systems Research Department, Animal & Grassland Research and Innovation Centre, Teagasc, Moorepark, Fermoy, Co. Cork, Ireland*

## Introduction

The phasing out of milk quota will create significant opportunities for dairy farmers to expand their production for the first time unhindered since milk quotas were introduced in 1984. However, this policy change combined with reduced levels of market support means that dairy farmers may be exposed to increased milk price volatility in the future; similar to what has been observed throughout the 2007 to 2012 period on Irish dairy farms. The clear potential for expansion of the Irish dairy industry has being recognised in both Irish and International studies (Lips and Rieder 2005; O'Donnell *et al*. 2008; DAFM, 2011). The Irish dairy industry has set targets for increased dairy output by 50% by 2020 (Food Harvest 2020, DAFM, 2011). For many dairy farmers this expansion is the first real opportunity they have had to grow their business since the introduction of milk quotas. The increased focus on increasing the number of dairy replacement heifers since the announcement of the relaxation and removal of milk quotas will provide the platform for expansion at farm level. The increased milk and livestock output will substantially increase revenues and receipts on farm. However the profitability associated with this increased output will be very much driven by how farmers interact with expansion. For many the decisions taken now and over the next number of years will be the determinants of how successful expansion will be on farm. This paper will evaluate the key factors that will determine the success associated with expansion and will include;

Profitability associated with expansion

Evaluating the key components required to fuel expansion

a. Livestock
b. Land
c. Labour
d. Capital

Achieving successful expansion - lessons learnt

## (a) Profitability from expansion

The achievement of Food Harvest 2020 targets will result in substantial increases in net revenue at farm level. Increased milk sales, increased calf sales and increased cull cow sales is expected to increase annual net revenue at farm level by between €650-€850 million, €17-€29 million and €40-57 million respectively, depending on milk and beef prices. However there will be a substantial increase in costs associated with expansion, from increasing replacement heifer numbers, investments in grazing, infrastructure, milking and wintering infrastructure. The profitability associated with expansion will be very much dependent on how expansion is handled at farm level, the decisions taken over the next number of years and how the overall dairy industry handles the transition from a production limited situation to a non quota scenario.

In order to indicate the potential profitability associated with expansion the financial projections for the Greenfield dairy farm in Kilkenny are included along with a summary of the performance in 2011. This farm has been leased in a long term lease over a 15 year period with three equal shareholders. The objective of the business is to maximise the return to the shareholders in an environmentally, animal welfare friendly and sustainable manner, maximising labour efficiency. All land, labour and capital costs are included in the plan. 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 altogether with €350,000 of that originating from 3 equal shareholders with the remaining €750,000 borrowed. 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 Kg/Ha in year 1 to 1300kg/Ha in year 10. The projected base milk price was included at 24 cent per litre with the farm plan only showing modest cash flows and profitability until year 5. Over the 15 years of the venture the business plan showed that after year 4 when the farm productivity increased the viability of the business became more robust with the farm in a more sustainable position and better able to cope with milk price volatility (Figure 1). Increased costs associated with inflation mean that once the farm reaches current maximum productivity targets that surplus cash generated starts to become eroded by cost increases.

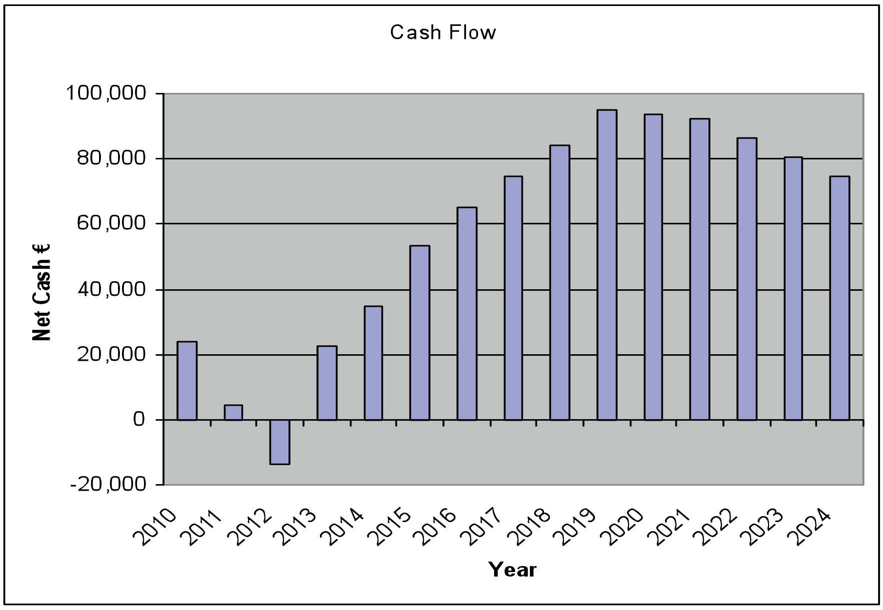


**Figure 1**. *Shows the net cash projections for the Greenfield dairy farm in Kilkenny over the 15 years of the business plan.*

The farm was set up in late 2009 and cows were milked there for the first time in the Spring of 2010. The actual total capital expenditure was €1.239 million. There was an over expenditure in areas such as the farmyard, mobile home, new gate entrance and increased cow purchases. The reason for increased cow purchases in year 2 was to fast forward the expansion process. 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) and 290 for 2012. Milk solids per hectare was 743 kg/ha in year 1 and 965 kg/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.

A summarised trading, profit and loss account and operating cash flow statement are included in Table 1. These figures have been summarized for the purpose of this paper. 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. As part of the risk management policy at the Greenfield farm a decision was made in 2011 to deposit some of the surplus cash (€70,000) generated from the farm into a one-year deposit (3.5%) bank account (interest rate 3.5%). 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 cow health issue on the farm, a poor grass growth year, etc). This strategy will continue and it is expected that an additional €20,000 to €30,000 can be added to the €70,000 invested in 2011 based on surplus cash generated in 2012. The policy of creating the buffer when times are good, rather than paying down additional debt will give a greater return in the long term as long as it is invested into a secure, interest returning account, facilities that are secure.

**Table 1.** 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 | 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** |

## (b) Key components required to fuel expansion

Increased milk output nationally will originate from both increases in milk yield per cow and increased cow numbers. Historically milk yield per cow has been increasing at a rate of approximately 1% per year. It is anticipated that in a post quota environment that this rate of milk yield increase would increase slightly. It is anticipated that there will be a 15% increase in milk yield per cow by 2020 when compared to the average milk yield between 2007 and 2009. In order to meet the 2020 targets of a 50% increase in milk output there is a requirement to increase dairy cow numbers by approximately 350,000 by 2020 when compared to the average cow numbers between 2007 and 2009.

### 1. Livestock

Since 2008 there has been a substantial increase in the number of dairy replacement heifer calves born on Irish dairy farms. Table 2 shows the full breakdown between 2004 and 2012 and includes a projection for the rest of 2012. The number of dairy heifer calves born have increased each year with approximately 100,000 additional dairy replacement heifer calves born in 2012 when compared to 2008. These increases are evident across all counties but are most prominent in Cork, Tipperary, Limerick, Kerry, Kilkenny and Waterford accounting for two-thirds of the total increase. The increased numbers of replacement heifers will be central to achieving increased milk output. Therefore there is a requirement to continue to breed more replacement animals to provide the fuel for expansion.

There are significant costs associated with rearing heifers (approximately €1,500 including the calf value) and therefore the potential profitability of these animals should be maximised by maximising the potential EBI of the heifer calves born through the use of high EBI AI. A number of studies have shown the effect on performance, fertility and profitability from replacement heifers achieving target weights at key dates through their development. Most focus should be placed on achieving target weights (for breed) around the start of the breeding season. A continuous weighing programme should be implemented to ensure animals are at the correct target weights. Remedial action should be taken if heifers are not achieving the target weight for age before they reach puberty. Replacement heifers should be targeted to be bred at the start of the breeding season and therefore calving first within the herd.

**Table 2**. Dairy heifer calves born, 2004 to 2012

| 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|
| 283,507 | 261,802 | 245,485 | 255,777 | 267,735 | 306,200 | 317,951 | 364,097 | *369,191 |

*Projected

## 2. Land

Land area around the milking platform will become the biggest limiting factor on Irish dairy farms in the future. Currently average stocking rates for milking cows on the milking platform are just over 1.8 LU/Ha. The optimum stocking rate is very much dependent on how much grass that the farm is growing, milk price and the costs associated with supplement. Increasing the productivity of pastures on the milking platform will be the first step in the expansion phase. Focus on soil nutrient and pH status, grass cultivars, etc in conjunction with pasture measurement will be essential to indentify the high and low producing paddocks at farm level and will be key to increasing productivity at farm level.

Once existing farm productivity has been optimised the options around increasing land area should be investigated. There is a whole range of different models that can be looked at around increasing land area from land purchase, long term land lease, short term land lease, partnerships, land swapping, etc. Each of these options will have different outcomes depending on the farm and the farmer in question. For some, land purchase will not be an option due to availability and affordability. The current profitability of non dairy associated enterprises is quiet low when compared to dairy related farming activities. Figure 2 shows the net profitability associated with tillage, dairy and beef operations for 2010 and 2011. The graph clearly shows that for 2010 and 2011 dairying returned a substantially higher net margin when compared to any other enterprise. This has been a consistent trend in the past with the exception of 2009.

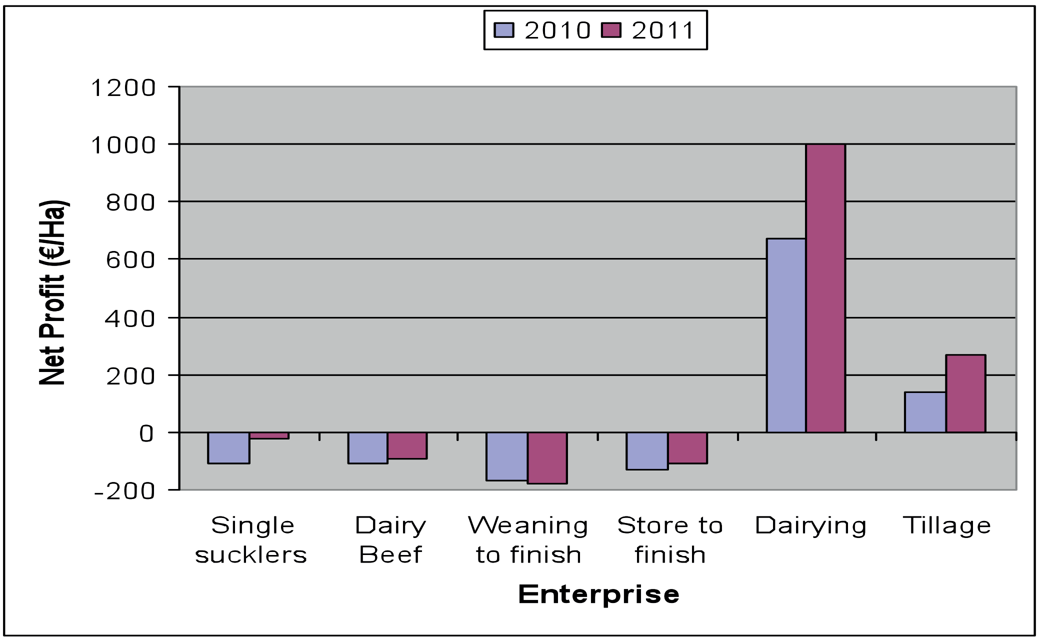


**Figure 2**. *Net profitability (excluding Single Farm Payment)on a per hectare basis of various enterprises for both 2010 and 2011.* *Source: Outlook 2012 (NFS)*

With the removal of milk quotas there will be significant opportunities for farmers that are currently involved in enterprises that are returning low margins to become involved in dairying in one form or another. This will be required to facilitate large scale expansion. Options such as starting up as a new entrant, leasing land to a dairy farmer to expand their existing milking platform, rearing replacement dairy heifers or forming a share farming business/partnership with an existing dairy farmer are real options. Risk and investment sharing, achieved by joining two farms, will be central to successfully increasing the land area in dairying.

## 3. Labour

As dairy farmers expand there will be a requirement for more labour on the farm with a larger proportion of the required labour originating in the form of hired labour. However a study carried out by O Donovan *et al*., (2008) on commercial dairy farms has shown that as herd size increased, the labour requirement per cow decreased. Table 3 shows a summary of the outputs from that study. Across all of the farm tasks, as cow numbers increased the labour requirement for each specific task declined. As herd size increased milking time was the only labour variable that reduced as a proportion of total labour requirements. Total labour requirement showed a 41% reduction in demand when average herd size increased from 44 cows to 147 cows.

**Table 3.** Annual average dairy labour input per cow for combined and specific task categories across 171 farms over a two year period.

| | Small | Medium | Large |
|---|---|---|---|
| Herd size | 44 | 62 | 147 |
| Total labour input Hrs/cow/year | 49.8 | 42.2 | 29.3 |
| Milking Hrs/cow/year | 17.4 | 13.7 | 8.9 |
| Maintenance Hrs/cow/year | 8.5 | 6.8 | 5.3 |
| Grassland Hrs/cow/year | 6.3 | 5.1 | 3.2 |
| Management Hrs/cow/year | 5.0 | 5.0 | 3.5 |
| Cow care Hrs/cow/year | 4.5 | 4.8 | 3.2 |
| Calf care Hrs/cow/year | 3.1 | 2.6 | 2.1 |
| Cleaning Hrs/cow/year | 2.8 | 2.1 | 1.3 |
| Veterinary Hrs/cow/year | 1.7 | 1.5 | 1.2 |
| Miscellaneous Hrs/cow/year | 0.5 | 0.6 | 0.6 |

As herd size increases contract rearing of replacement heifers, contracting all of the machinery operation (e.g. fertiliser and slurry spreading, silage harvesting and feeding) can be practiced to reduce the labour requirement on the farm. Contract rearing of the replacement heifers allows the maximum profitability to be achieved on the milking platform from the most profitable enterprise (milk production) while reducing the labour requirement on the farm. Dillon *et al*., (2011) when analysing the machinery costs in the National Farm Survey showed that the average machinery costs were 8.4c/l for 2008 when machine running, machinery repair and depreciation are included. The corresponding figure for the Greenfield dairy farm was 4.5c/l for 2010, where virtually all of the machinery work is contracted out to contractors, with little or no investment in machinery on the farm. This is particularly important given the demand for capital and labour that will be associated with expansion and the significant pressure that will be on cash flow.

## 4. Capital

There are significant requirements on capital as the dairy herd expands. The stage, speed and scale of the expansion along with the type of infrastructure will be key to the capital investment on the farm. The two key factors that should be considered when investing on the farm relate to the whether the farm cash flow can fund the investment and which investments are going to be central to maximising productivity from the farm. An assessment is required to determine which investments would be desirable to have on the farm and which investments are essential for the farm. A key question around capital investment must centre on the level of borrowings that the farm can sustain and how much cash is available to invest as the farm expands. Table 4 provides a detailed breakdown of the capital expenditure on the Greenfield dairy farm which was set up for 350 cows. The total capital invested on this farm to convert from a tillage farm to dairy farm including all of the grazing and milking infrastructure as well as low cost housing was €1.239 million. At 350 cows, this corresponds to a total investment of €3,540/ cow or borrowings of €2,429/ cow. Like any farm that is expanding the capital investment happens before the expansion takes place resulting in significant pressure on cash flow as cow numbers increase to match the capital invested. In the initial years, when cow numbers are closer to 300 for this farm, the total investment and debt are €4,130 and €2,833/ cow respectively, placing pressure on the expanding system. If conventional housing and slurry storage as well as higher specifications in the milking parlour (automatic cluster removers, automatic bailing, auto drafting, meal feeding facilities etc.) were installed, it could be expected that the capital costs would increase by over €1,500 per cow. This would bring both the debt levels and the bank commitments to an unsustainable level.

**Table 4.** provides a breakdown of the capital expenditure on the Greenfield dairy farm in Kilkenny

| Item | Description | Actual |
|---|---|---|
| Stock | Dairy cows<br>Replacement heifers | €389,268<br>€84,000 |
| Reseeding of farm | 113 ha, one pass till, sow, roll + grass seed + fertiliser | €48,589 |
| Fencing | 20,000 m @ €0.9/m | €17,617 |
| Water supply | 40 water troughs + 7 km water pipe laid + water store + Boring the well | €29,040 |
| Infrastructure | Stand off pad, Earthen bank tank<br>Roadways, Site work, Gates, Tank fencing, Bark Mulch, Head feed, Calf shed, Gates, Yarding | €326,738 |
| Milking parlour | 30 unit herring bone shed + dairy + collecting yard/ and office, wiring, plumbing, heating | €228,709 |
| Feed bin | | €4,000 |
| Electricity supply | 3 phase transformer + connection fee | €8,584 |
| Machinery | Jeeps and tractor | €16,230 |
| Planning | Drawings + site assessment + mapping + planning application + council development fee | €12,770 |
| Working capital | Feed | €24,800 |
| Office | Computer, farm package, phone connection, broadband etc | €25,688 |
| Company | Set up plus legal | €5,705 |
| Contingency | 10% allowance to allow for unexpected costs that may arise | €8,669 |
| **VAT paid** | | €86,000 |
| **Total** | | €1,316,408 |
| **VAT back** | | €77,400 |
| **Net capital** | | **€1,239,008** |

The level of new debt that the farm can sustain is dependent on a whole range of factors, including the efficiency levels of the dairy operation, drawings of the family including tax commitments and the existing debt levels on the farm. The level of debt that a farm can sustain through expansion can only be determined through a business plan. The debt level must be sustainable at low milk prices similar to what was observed in 2009 and also should allow the system to be able to cope with disease issues at farm level or extremely poor weather conditions similar to what was observed in 2009 and 2012.

# (c) Achieving successful expansion - Lessons learned

## 1. Financial planning

The most important feature of expansion for all individual farmers is that the increased herd size and milk output generates higher profits than before the expansion, otherwise expansion should not be attempted. An important component of the financial planning process centres on how financial success is measured on the farm. There are a number of metrics that should be used which include cash flow, overall profitability, overall change in net worth, return on investment and return on equity. All of these components should be combined to assess the financial feasibility of the business before any expansion takes place.

The development and application of a business plan is the first stepping stone in the development of a thriving and successful business. In order for any business to survive and prosper long term they must constantly innovate to reduce costs and increase output. This model has been successful (e.g. Ryanair, Kerry Group, CRH, Dell etc.) A dairy business is no different. In the business plan a review is required of resources and as a result a plan for the future can be prepared. The business model that dairy farmers select for the future must be based around surviving price and weather shocks and be about setting up the business to capitalise when the price increases. This ultimately means producing milk at the lowest cost possible, investing in the technologies that are going to increase farm productivity, while reducing the capital investment requirement through minimising investments in depreciating assets that will not add to farm productivity.

As the herd size grows there will be significant pressure on cash flow. It will take some time for the farm to reach full productivity during the expansion phase as there are generally greater numbers of young stock (generally lower milk yields), culling rates may be lower (maintaining sub standard stock), cell count may be higher as culling is lower, pasture productivity may be sub optimal, etc. The sub optimal productivity coupled with the higher demand for cash associated with growing stock numbers and increased bank commitments as the farm develops result in strains on cash flow while expanding. A full detailed business plan is required to assess the return from the business over a long period as well as having detailed information over the short term.

In the Greenfield farm in Kilkenny there is a monthly budget which is used to assess performance, plan ahead and ensure solvency at all times. A quarterly summarised budget is presented in table 5. A simple accountancy package called '*Quick books'* is used on the farm to record all financial transactions. It was projected that milk output from the farm would 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 when the budget was set at the start of the year. A base milk price of €4.49/ kg milk solids (31.0/l) was included and a projected cash surplus of €58,500 was projected for 2012. The budget has been revised on a continuous basis (8 times) throughout 2012, due to projected milk price reductions and increases, poorer performance due to weather and additional expenditure that was required to comply with planning permission. Table 5 presents actual recorded information from January until the end of October and projected figures for November and December. With most of the year now over, it is projected that milk output will be just over 1.33 million litres, milk solid output will be 112,070kg MS or 992kg/Ha which will be an increase of 4.5% on 2011 levels and milk price will be down to 29c/l or €4.20/kg MS. Additional expenditure in relation to planning permission and the out wintering pad, lower milk output than projected, lower milk price than projected and higher livestock revenues has meant that the projected surplus cash now for 2012 is

€34,166 or 5.9% of total revenue which demonstrates how important it is to have a clear view of where the farm situation will be in relation to surplus cash at all times. This farm could not be successfully run without this detailed budgetary information. This information helps make critical informed decisions at farm level.

**Table 5.** Shows the 2012 Cash flow budget

| | First Quarter | Second Quarter | Third Quarter | Fourth Quarter | Total |
|---|---|---|---|---|---|
| Livestock sales | 15,283 | 28,699 | 28,574 | 39,800 | **112,356** |
| Milk | 7,571 | 160,618 | 160,918 | 140,301 | **469,407** |
| **Total Receipts** | **22,854** | **189,317** | **189,492** | **180,101** | **581,763** |
| Accountancy/Consultancy fees | 981 | 131 | 4,343 | 0 | **5,455** |
| Agricultural Contracting | 0 | 1,103 | 18,160 | 7,000 | **26,263** |
| AI straws/Heat Detection/Animal Tags | 1,692 | 13,512 | 3,163 | 3,000 | **21,367** |
| Bank interest/Fees and Capital | | 26,696 | 39,969 | 13,465 | **80,192** |
| Calf Feed | 0 | 641 | 0 | 0 | **641** |
| Dairy Feed | 4,818 | 0 | 4,835 | 11,000 | **20,653** |
| Dairy Supplies | 1,775 | 1,574 | 1,251 | 803 | **5,403** |
| Dead animal collection/Herd Plus | 0 | 0 | 0 | 750 | **750** |
| Electricity | 845 | 1,813 | 4,048 | 1,000 | **7,707** |
| Farm Machinery fuel and repair | 1,032 | 1,010 | 1,389 | 1,100 | **4,531** |
| Fertilizers | 9,035 | 20,860 | 13,982 | 0 | **43,877** |
| Grass seeds/Sprays | 525 | 123 | 0 | 0 | **648** |
| Heifer rearing | 0 | 23,093 | 21,480 | 22,451 | **64,171** |
| Insurance | 5,000 | 0 | 0 | 770 | **5,770** |
| Lagoon and stand off pad emptying | 2,685 | 2,585 | 16,700 | 6,321 | **28,291** |
| Land Rental | 26,399 | 0 | 26,399 | 0 | **52,798** |
| Milk Levies | 71 | 1,930 | 1,985 | 1,541 | **5,527** |
| Milk recording | 266 | 521 | 1,041 | 1,313 | **3,141** |
| Milking Machine Parts and servicing | 1,218 | 1,473 | 1,605 | 600 | **4,895** |
| Total Minerals | 5,559 | 3,926 | 0 | 1,000 | **10,485** |
| Motor Diesel, tax and maintenance | 674 | 499 | 210 | 1,549 | **2,932** |
| Repairs and maintenance | 162 | 200 | 167 | 1,173 | **1,701** |
| Repairs and maintenance (Dairy) | 125 | 90 | 393 | 400 | **1,008** |
| Silage purchased/Expenses | 1,327 | 175 | 0 | 0 | **1,502** |
| Staff accommodation/Training | 905 | 389 | 0 | 240 | **1,534** |
| Office Telephone & Computer | 299 | 215 | 270 | 435 | **1,219** |
| Planning & out wintering pad issues | 0 | 842 | 2,741 | 16,283 | **19,866** |
| Veterinary/vaccines/Hoof Care | 2,209 | 4,244 | 4,446 | 8,218 | **19,117** |
| Wages/ Relief Milking/Casual Labour | 18,086 | 24,174 | 37,917 | 23,170 | **103,346** |
| **Total Expenses** | **85.749** | **131,774** | **206,493** | **123,581** | **547,597** |
| **Net Farm Position** | **-62,896** | **57,543** | **-17,001** | **56,520** | **34,166** |

## 2. Farm development

Farm layout, applying and managing the application for planning permission and project management in relation to the farm development are extremely important components of dairy farm expansion. Developing the dairy farm is an extremely expensive and time consuming task. Planning the farm layout as the farm is developed is an extremely important task, with minimal opportunities to change once developed. Developing the farm when weather conditions are sub optimal will lead to substantial over runs in relation to costs and may still result in the development not being completed to satisfaction. There is considerable scope for the farm development to go substantially over budget when the planning process doesn't run smoothly, which can subsequently result in timing delays with the start of development on the farm. It is estimated that planning delays, poor weather conditions during development and poor project management added approximately 10% to the development costs of the Greenfield Dairy farm in Kilkenny. Coupled with this initial 10% there has been on going remedial action required for functionality around the stand off pad and earthen lined lagoon and the original planning application that has meant there has been increased costs on the farm in 2011 and 2012. Having a group, individual or company that oversaw the planning layout of the farm, planning permission application and project management of the development while adding an initial cost would have resulted in substantial savings on the Greenfield Dairy farm. During the development phase always keep focus on the original plan for the farm and do not deviate. Always include the contingency requirements when seeking facilities from the bank, but don't use this funding if not required to develop the farm. A contingency plan should be included in the capital budget with a recommendation of between 15 and 20% of the capital development cost to allow for unexpected costs that may arise.

## 3. Farm facility type

When planning the development of the farm, the farm facilities should be planned based on what can be afforded which should be calculated based on available cash and borrowings. In all cases the investment on the farm should be prioritised toward an area which will increase the productivity of the farm. These will include grazing infrastructure (soil fertility, pasture renewal, water system, fencing system and farm roadways). An equally important investment is in relation to the stock that are purchased or reared. Milking and milk storage is the next most important investment on the farm with animal winter accommodation and slurry storage decisions being made on the available capital and requirements for compliance with environmental legislation. This mantra was largely followed on the Greenfield site in Kilkenny. Within the Greenfield dairy farm the investment that was available for cow accommodation was limited due to the availability of finance, sustainability of the business and availability of shareholders capital. Low cost housing and slurry storage was put in place which has implications for ongoing costs on the farm. However decisions were taken to invest in the components that would increase productivity on the farm. If cash flow allows it is possible to upgrade some of the investments in the future if required, but by funding from cash flow and not from borrowed capital at the start the farm sustainability will be maximised.

## 4. Livestock Planning

Increasing dairy herd size will result in reduced time available to spend with individual cows within the herd. As the herd size grows, the overall herd productivity will reduce during the expansion phase. This reduction in performance is mainly associated with the fact that heifers do not produce as much milk as mature cows (circa 75% of mature cow milk yield). There is a requirement that diseases such as mastitis are dealt with in a more proactive way as the herd gets larger. If animals are being purchased a key focus should be placed on the cell count history within the source herd. A mastitis management plan should be developed for the farm with a strategy of preventing spread within the herd. In the Greenfield farm in Kilkenny the one disease that has caused significant hassle for management is mastitis and SCC in general. There has been considerable efforts placed on preventing the spread and managing the herd cell count to avoid penalties. This has resulted in high levels of animal culling for mastitis, which is a significant cost on the farm in relation to dairy cow inventory change and prevention of expansion potential. Greater emphasis should have been placed on cell count when animals were being selected for the farm and greater focus should have been put on reducing the spread within the herd.

## 5. Farming Model

As mentioned previously there are various different models in relation to how additional land can be brought into the dairy farming system (land rental, share farming, etc). There is a requirement for increased mobility of land to ensure that dairy farm size around the milking platforms can be increased and to facilitate Greenfield dairy farms on non owned milking platforms. For many non dairy farmers, the profitability and potential profitability from the farm operations they currently operate is extremely low, often with an operational margin that is negative. For some dairy farmers that are limited on land around the milking platform and currently have substantial livestock resource there is strong potential for a relationship of some type to be formed between both parties in an Irish "Share Milking/Partnership" model. This would not be about milk quota but would be about a relationship where risk is shared, some security available from land would be used to secure debt and the investment would be shared or handled by the land owner with a return paid as part of the profitability calculations. A similar type of model is currently being operated in the tillage sector in Ireland (http://www.teagasc.ie/advisory/share_farming/). In the Greenfield farm in Kilkenny the farm is being operated under a land lease model for the entire 15 years of the project. However it could be expected that a standard land lease system may not facilitate a large amount of joint ventures between dairy and existing beef or tillage farms as it will be difficult for the lessee to secure debt without significant security and there is little or no risk sharing between the parties.

## 6. Service Providers

As farmers expand they require new skill sets. Managing a new project or modifying an existing one will require a lot more skills, knowledge and dynamism. From earlier in the paper it is very clear the messages that are emerging from the Greenfield Dairy farm project. There are many service providers which will have a role in ensuring that expansion is a success at farm level, including farm consultants, bankers, Government, etc. The type, method and level of service required in the future will be substantially different in an expanding dairy industry. Workshops and discussion forums should be used for farmers to brainstorm with other farmers, and with industry service providers, to they tease out their strategy for the future. The emphasis of the workshops should be to encourage and mentor the farmer irrespective of the number of cows they plan to expand to. It has been proven how successful discussion groups are. In the future group members will require a more specific focus or training in certain areas. Farmers want to be with like minded farmers while they are in transition. The role of banks in the future will change with a requirement for a much closer working relationship between the farmer and the banker with tools and facilities in place that help farmers deal with cash flow strains, milk price volatility and that put greater focus and emphasis on cash flow planning. All service providers have a role and a vested interest in ensuring that the correct decisions are taken at farm level and that expansion is successful.

## Conclusion

The targets for a 50% increase in milk output will deliver substantial increases in net revenue within the Irish dairy industry. The associated increase in profitability will be dependent on how the increase in milk output is managed at farm level. Managing cash flow in the expansion phase will be a key requirement to ensure liquidity while expansion takes place. There has been a dramatic increase in the number of dairy heifer calves born annually over the past 4 years. Once pasture productivity around the milking platform has been optimised, options for increasing the land area should be considered. There will be an increased requirement for labour which should be managed by increasing contractor use and by focusing labour activities on the farm around pasture, cow and calf management. There will be a substantial demand for capital as the farm develops. There is only a certain level of debt that the farm can handle and focus should be placed on the investments that are going to result in increased productivity. All available information should be used in the planning phase for expansion. Don't underestimate the pressures that will be on the system as cow numbers increase. Learn from others mistakes and do not expand unless there will be an associated increase in profitability, which can only be determined through detailed financial budgeting and planning.

## Acknowledgements

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# 'What stocking rate for my farm? Maximising milk production from pasture'

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In the next decade, fewer dairy farmers with increased operational scale will take advantage of the opportunities provided by milk quota abolition to increase milk production and farm business profitability from grass based systems fuelled by leading edge management practices. Post quota, and with profitability per hectare as the core objective, Irish dairy farmers must develop and expand their production systems by increasing home grown pasture production and utilisation by virtue of a completely new attitude to dairy herd feed management. In future, dairy farm businesses will become completely specialised in dairying with contract rearing of young stock, higher dairy farm stocking rates (SR) and more feed efficient high Economic Breeding Index (EBI) dairy cattle to maximise milk production from pasture.

National statistics reveal that Irish dairy farmers have already commenced preparations for milk quota abolition as the number of dairy females generated on Irish farms has increased by 50% over the last five years. As dairy herds expand and farm SRs increase, feed supply will become increasingly limited. During expansion, it is imperative that increased operational scale must not be achieved at the expense of the cost competitiveness of our milk production system. As dairy farms expand production and increase herd size, each hectare of land must become more productive to provide the cheap home grown feed required to sustain increased numbers of dairy cattle on all our farms. In addition, grazing management practices must be tailored to budget feed availability, increase grass utilisation and avoid a significant reduction in either the length of the grazing season or individual animal lactation length.

The objective of this paper is to review recent research trials which have examined the impact of SR on the productivity of Irish milk production and subsequently, to use this new information to investigate the likely impact of increasing SR on the profitability of Irish milk production systems post milk quota.

## Why are stocking rate and mean calving date and rate so important?

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 1). Stocking rate is traditionally defined as the number of animals per unit area of land (livestock units/hectare (ha)) and is best considered as a balancing act between feed supply (the amount of grass grown and the level of feed purchased in this case) and herd demand (the number of cows needed to eat the available feed). Stocking rate 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 SRs as increased animal demand drives more efficient grazing practices and improved sward utilisation. While delivering superior per hectare productivity, increased SRs place added pressures on winter feed supplies 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 SR of the farm is closely aligned to the individual farms grass growth capability. The optimum stocking rate should allow relatively high individual animal performance but also relatively high grazed grass utilisation to be achieved.

Calving date is also an important factor in grass-based milk production systems and influences both the milk productivity of the dairy herd (lactation length) and also the requirement for supplementation at grazing. 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 highly dependant on the individual farm characteristics, the optimum herd mean calving date will allow high individual animal performance to be achieved by aligning animal feed requirements with spring grass growth to realise high individual animal performance over a 285 day lactation length with minimal requirement for supplementation at grazing. At a given SR, 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 SRs, will lead to underfeeding or a requirement for increased supplementation as grass growth rates will be unable to match herd demand in early spring. A spread out calving rate or delayed calving date will lead to reduced grass utilisation as insufficient numbers of dairy cattle are available and grass is wasted. While there is no ideal mean calving date that will be appropriate to every farm (due to differences in ground conditions, grass growth rates, SRs, etc.), a mean calving date of February 15$^{th}$ to 25$^{th}$ with 90% 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 15$^{th}$. The current average national SR (1.9 livestock units per hectare; LU/ha) and mean calving date (MCD = March 15$^{th}$) of Irish dairy farms differs considerably from dairy research herds (SR = 2.5 – 3.3 LU/ha and MCD = February 15$^{th}$) and indicates that there is considerable scope to increase productivity on Irish dairy farms post quota.

## A Review of Recent Research Results on Stocking Rate

Recent research at Curtin's Farm, Teagasc Animal and Grassland Research and Innovation Centre Moorepark and Ballyhaise Agricultural College has been investigating the likely effects of changes in SR and herd calving date on the productivity of Irish grass-based milk production systems post milk quota and the main findings of these multi-year experiments are reported here.

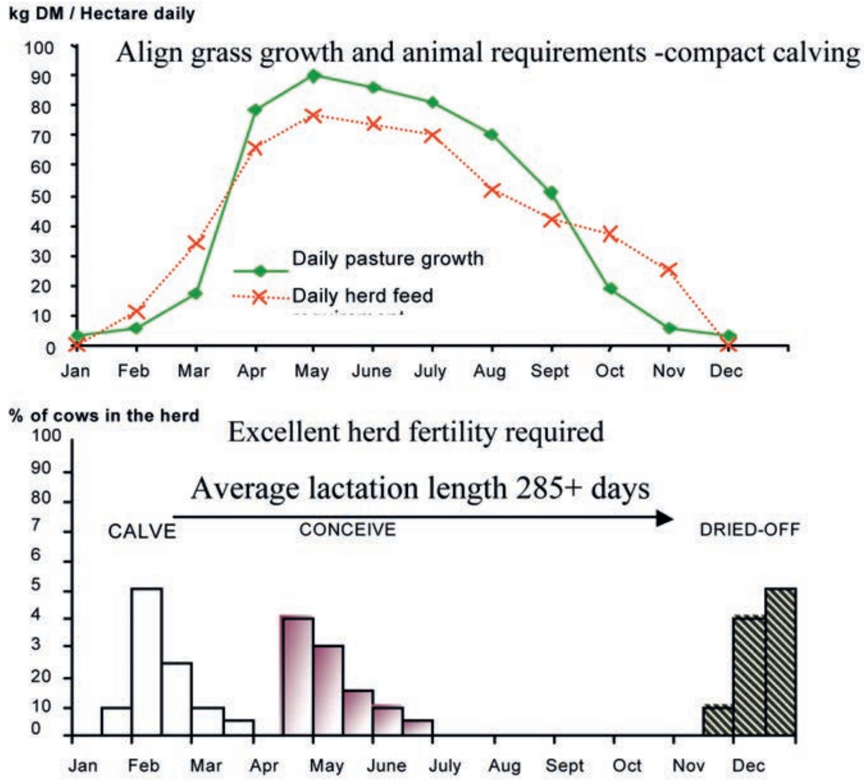



**Figure 1.** *The importance of calving date and rate and stocking rate to the overall design of highly profitable grazing systems.*

## Experiment 1: The Curtin's Farm Stocking Rate Experiment (2009-2012)

The study at Curtin's Farm is testing the productivity and profitability of a range of SR systems (Low: 2.51 cows/ha; Medium: 2.92 cows/ha and High: 3.28 cows/ha) and two compact mean herd calving dates (February 14$^{th}$ and March 1$^{st}$). The study is currently in year 4 and includes high EBI Holstein Friesian cows (EBI = €154). The overall study objective is to identify the optimum overall farm SR and MCD combination to deliver the greatest financial return to the dairy farmer. The low SR treatment was designed to allow each animal to express its milk production potential, unrestricted by limitations in feed supply (based on a target post-grazing residual sward height 4.5 to 5.0 cm). While foregoing individual animal performance targets, the aim of the medium SR and high SR treatments is to investigate the potential to increase animal productivity per ha by increasing herbage utilisation at higher SRs through increased grazing intensity. (The targets for post-grazing residual sward heights were 4.0 to 4.5 cm and 3.5 to 4.0 cm for the medium and high SR treatments, respectively.)

### Milk production performance

The overall milk production performance of each of the three SR treatments was consistent over the three years, and is similar to that reported in previous experiments with Holstein-Friesian dairy cattle at Moorepark. Stocking rate had a significant effect on milk and milk solids yield per cow and per hectare over the three years while calving date had little effect (Table 1). The low SR treatment produced the greatest quantity of milk and milk solids per cow but the lowest quantity of milk and milk solids per hectare. In contrast, the high SR produced the greatest amount of milk and milk solids per hectare, with the medium SR being intermediate.

**Table 1**: Milk production performance of the Curtin's herd (2009-2011).

| Calving Group[1] | | Early | | | Late | |
|---|---|---|---|---|---|---|
| Stocking Rate[2] | Low | Medium | High | Low | Medium | High |
| Lactation length (days) | 293 | 290 | 290 | 281 | 274 | 276 |
| Milk yield (kg) | 5,811 | 5,434 | 5,110 | 5,862 | 5,416 | 5,265 |
| Milk solids yield (kg) | 457 | 426 | 408 | 460 | 418 | 415 |
| Milk yield (kg/ha) | 14,589 | 15,978 | 16,803 | 14,817 | 15,921 | 17,275 |
| Milk solids yield (kg/ha) | 1,144 | 1,249 | 1,338 | 1,162 | 1,227 | 1,359 |

Calving group[1] Early: mean calving date = February 15th, Late: mean calving date = March 1st
Stocking Rate[2]: Low = 2.52 cows/ha, Medium = 2.94 cows/ha, High = 3.28 cows/ha

Similar to Dillon *et al*. (1995), SR also had an effect on the seasonality of milk production. Figure 2 shows the milk production per ha profiles for each SR treatment by week of year during the study. In the April to September period, all three SR treatments produced similar proportions of their total milk production (71%). However the high SR produced 16.7% of total milk production between January and March compared with medium SR and low SR (15.4 and 15.0%, respectively) and less from October to December (12.5% compared with 14.0 and 14.5%, respectively).

## Herbage production and utilisation

As farmers increase SR, total milk output from the dairy farm will increasingly be limited by grass growth and so the development of agronomic practices to improve grass production and quality will take precedent over practices informed by the milk quota era and individual animal performance. Consequently, detailed grazing measurements have been undertaken within the Curtin's SR experiment over the last three years to further understand the important implications of overall farm SR and grazing intensity on pasture production, quality and utilisation and the results are presented in Table 2 below.

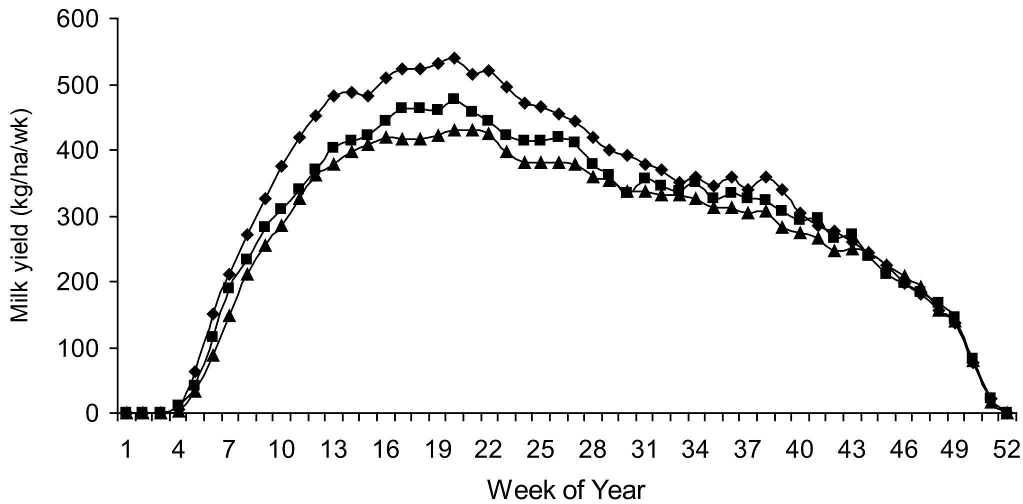



**Figure 2.** *Effect of stocking rate (SR) treatment (low SR = 2.51 cows/ha, ▲; medium SR = 2.92 cows/ha, ■; and high SR = 3.28 cows/ha, ♦) on the weekly milk production per ha supply profile during each calendar week of year.*

The results of the study indicate that although, having only a small effect on total feed utilisation and resulting in a shortage of winter feed, increasing SR increased grazed grass production and utilisation and improved overall grass quality. More detailed sward analysis also indicated that increasing grazing severity to a consistent post-grazing residual height of 3·5 to 4 cm over the entire season resulted in swards with consistently higher grass growth based on higher concentrations of green leaf and digestible nutrients and less senescent material (Figure 3).

**Table 2:** Effect of stocking rate on grazing system productivity (2009-2011)

| Calving Group[1] | | Early | | | Late | |
|---|---|---|---|---|---|---|
| Stocking Rate[2] | Low | Medium | High | Low | Medium | High |
| Postgrazing residual height (mm) | 43.0 | 38.2 | 34.3 | 43.8 | 38.8 | 35.1 |
| Grass growth (tonnes DM/ha/yr) | 14.2 | 14.6 | 15.1 | 14.2 | 14.6 | 15.1 |
| Grass utilisation (tonnes DM/ha/yr) | | | | | | |
| Grazed grass utilised | 8.8 | 9.5 | 9.8 | 9.0 | 9.2 | 9.8 |
| Silage produced | 2.8 | 2.3 | 2.2 | 2.8 | 2.3 | 2.2 |
| Total feed utilisation | 11.6 | 11.5 | 12.0 | 11.8 | 11.5 | 12.0 |
| Winter feed deficit (tonnes DM/ha) | 0.0 | 0.6 | 1.1 | 0.0 | 0.6 | 1.1 |
| Grass Quality (g/kg) | | | | | | |
| Organic Matter Digestibility | 748 | 752 | 766 | 748 | 752 | 766 |
| Crude Protein | 207 | 209 | 213 | 207 | 209 | 213 |

Calving group[1] Early: mean calving date = February 15th, Late: mean calving date = March 1st
Stocking Rate[2]: Low = 2.52 cows/ha, Medium = 2.94 cows/ha, High = 3.28 cows/ha

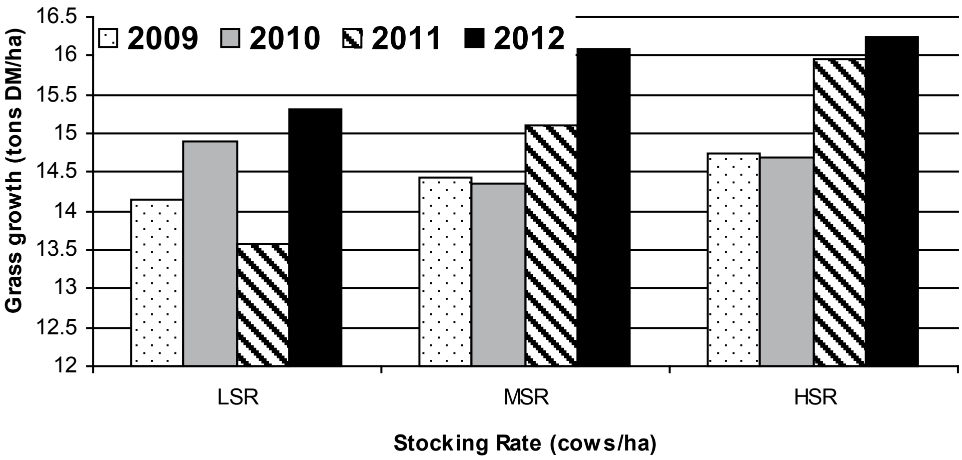



**Figure 3**. The effect of stocking rate on grass growth during the four year study.

### Key lessons from the Curtin's Farm Stocking Rate Study

The results of this study clearly highlight that increasing SR can be used to increase milk output through increased grazed grass growth and utilisation, however winter feed requirements were not achieved for the higher SR treatments within the study. As farmers increase SR, 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 individual animal performance. Grazing (and nutrient) management to support higher SRs post milk quota will be concerned with achieving adequate soil fertility, reseeding underperforming swards and achieving the correct balance between grazing severity and individual animal intake. Further research is required to consistently increase grass DM production and utilisation on each hectare of farmland available for milk production to support higher SRs.

## Experiment 2: The Ballyhaise College Dairy Experiment (2008 – 2011)

The objective of this study was to compare the biological efficiency of two likely future pasture-based production systems of spring milk production differing in overall SR and concentrate supplementation level on a wetland drumlin soil. Data was collected from 120 animals over four years (2008 - 2011). The herd had an MCD of March 1st in each of the four years of the study.

### Systems being evaluated at Ballyhaise:

a) Low cost enclosed system (HG): This was a low cost pasture-based system focused on maximum grass production and conversion to milk and with all winter feed requirements produced from within the grazing platform. The SR of this treatment was 3.1 LU/ha. Concentrate supplementation was set at the minimum level required to buffer periods of low grass growth during the grazing season.

b) High pasture utilisation open system (HI): This was a high supplementation/high output system based on a maximum grass conversion to milk from the grazing platform. Stocking rate on this farmlet was 4.5 LU/ha, while the majority of the winter feed requirements were imported from outside the grazing platform.

The HG system was designed as a low cost pasture management system for a post EU milk quota scenario based on high levels of pasture utilisation and a low level of concentrate supplementation. The HI system was a high productivity pasture system to increase milk output per hectare by increasing SR to utilise more of the available herbage produced during mid-season and supplementing pasture with concentrates and silage during the shoulders of the grazing season when grass growth was insufficient.

### Grass growth and feed utilisation

Average pasture growth at Ballyhaise was 13.2 ton DM/ha between 2008 and 2011. Grazing management practices, based on increased grazing severity and reducing pre-grazing herbage yields to improve pasture quality and increase regrowth rates, were adopted during the study. Annual grass growth rates for both were high at 14.2 and 15.9 tonnes DM/ha, respectively during 2011. The higher growth of the HI system is consistent during the later years of the study and can be partially attributed to an increased level of nutrient loading with the HI system arising from increased feed supplementation over the four years of the experiment.

The feed requirements for the HG and HI systems are outlined in Table 3 below. Grass utilisation was estimated as 10.9 and 10.7 tonnes DM/ha for HG and HI, respectively, during the study, with the remainder of the diet based on grass silage and concentrates. Concentrate supplementation was 542 and 864 kg DM/cow for the HG and HI systems while total silage requirements, including that fed during lactation, was 1,156 and 1,452kg DM/cow respectively. During the study, only 704 and 145 kg DM/ cow of silage was actually conserved for the HG and HI systems, respectively, leaving an annual silage deficit of 451 and 1,317 kg of silage DM/ cow, respectively.

**Table 3.** Effect of feed system[1] on individual animal requirements at Ballyhaise.

| Feed Systems | HG | HI |
|---|---|---|
| Dietary Estimates (kg DM/cow) | | |
| Grass Utilised | 3,516 | 2,378 |
| Concentrate | 542 | 864 |
| Silage | 1,156 | 1,452 |
| Silage produced (kg DM/cow) | 704 | 145 |
| Silage Deficit (tonnes DM/ha) | 1.4 | 5.9 |

Feed system[1] HG = Low input pasture system, HI = High output per hectare system

## Milk production

The effect of system of production on total lactation milk production over the four year period is shown in Table 4. The results demonstrate that with improved grassland management in combination with increased SR, significant increases in milk production per hectare of farm land can be achieved with both HG and HI type systems. During the 2008 to 2011 period, the HI system produced more milk per cow and higher milk solids (fat plus protein) per hectare. The higher total lactation milk, fat, protein and lactose yield achieved with the HI system group was expected, given the large increase in energy supply to this system. The results of this study demonstrate that inclusion of supplements, with a concomitant increase in SR, can have beneficial effects in improving the productivity of grazing dairy systems by achieving high pasture utilisation in addition to high per animal production performance.

**Table 4.** Effect of system of production on milk production at Ballyhaise.

| Feed System[1] | HG | HI |
|---|---|---|
| Silage fed (kg DM/cow) | 326 | 659 |
| Concentrate fed (kg DM/cow) | 542 | 864 |
| Per animal performance | | |
| Total milk yield (kg/cow) | 4,649 | 4,865 |
| MS yield (kg/cow) | 377 | 391 |
| Per hectare performance | | |
| Total milk yield (kg/ha) | 14,084 | 22,228 |
| MS yield (kg/ha) | 1,144 | 1,786 |

Feed system[1] HG = Low input pasture system, HI = High output per hectare system

Both systems of production at Ballyhaise produced no milk between December 20th and start of calving in early February. Figure 4 outlines the milk supply profile for Ballyhaise during the four years of the study and illustrates that even on a wetland soil type, a peak milk supply of just 3.25 - 3.5% during the peak week of supply in mid-May (equivalent to 14 - 14.5% supplied during the peak month of May) can be achieved with a compact calving dairy herd. The overall milk supply profile for both systems at Ballyhaise is also outlined in Table 5. The production system characteristics outlined will maximise profitability at farm level through the efficient conversion of milk from grass and also ensures that 10 months of high quality milk is supplied from a profitable system.

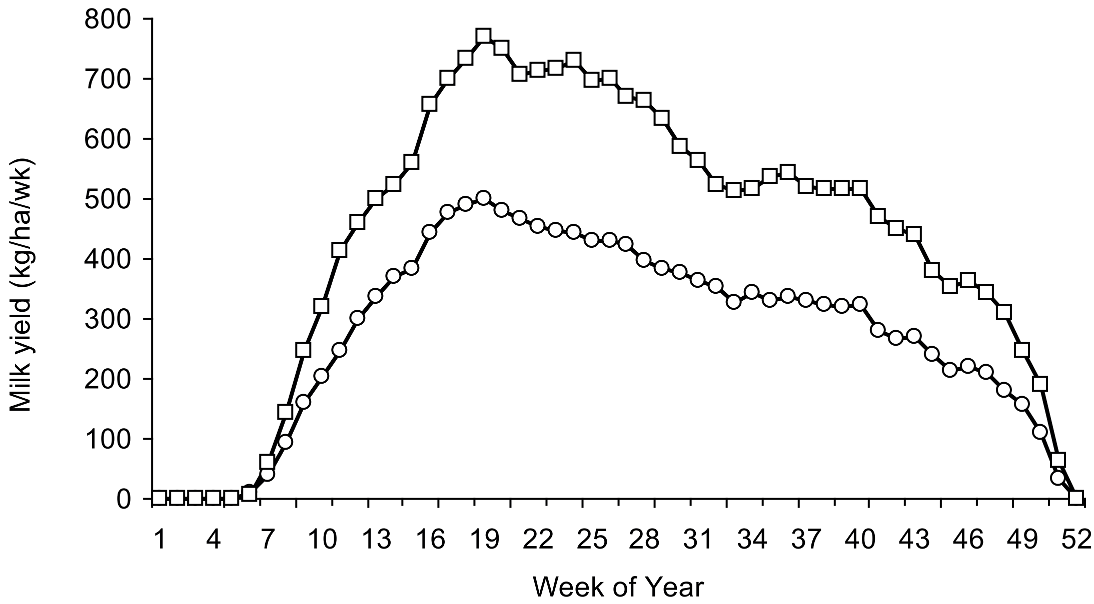



**Figure 4.** *The effect feed system (high grass (○) and high intensity (□) on the milk production per hectare per week of year.*

**Table 5.** The effect of feed system[1] on milk supply profile

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % Milk supply per month | | | | | | | | | | | | |
| HG | 0 | 1.5 | 8.2 | 12.7 | 14.8 | 13.1 | 12.1 | 10.6 | 9.8 | 8.6 | 6.3 | 2.3 |
| HI | 0 | 1.4 | 8.1 | 11.7 | 14.5 | 13.5 | 12.4 | 10.4 | 10.0 | 9.0 | 6.6 | 2.4 |

Feed system[1] HG = Low input pasture system, HI = High output per hectare system

## Key lessons from the Ballyhaise Research Study

While increasing SR beyond the growth capability of the farm greatly increases overall milk productivity and can be used as a short term strategy to increase animal numbers in advance of expanding on to a larger land block, in the longer term, SRs that largely exceed the growth capability of the farm contribute little in terms of additional grass utilisation and consequently result in significant increases in purchased feed and overall milk production costs.

## The financial implications of stocking rate

Based on biological performance data (milk production, feed requirements, grass utilisation) from both SR experiments, the Moorepark Dairy Systems Model (Shalloo *et al.*, 2004) was used to investigate the effects of increased farm SRs on the overall farm economic performance of a 40 hectare dairy farm in the absence of milk quota. The analysis was completed for a top 10% performance dairy farm based on national statistics. The analysis was carried out at three base milk prices (22, 28 and 34 c/l), based on two levels of grass growth (13 and 16 tonnes DM/ha) and includes full labour and capital costs associated with expansion. The basic assumptions used in the analysis are outlined in Table 6 below.

**Table 6.** Model assumptions used in the financial evaluation of stocking rates

| | **2012** |
|---|---|
| Purchased feed costs | |
| Silage (€/ton DM) | 140 |
| Concentrate (€/ton) | 250 |
| Replacement heifer rearing costs (€/cow) | 1,400 |
| Capital costs (€/cow) | 1,500 |
| Labour cost (€/hr) | 12.44 |

The main biological and financial results from this analysis are presented in Table 7 and Figures 5 and 6. As SR on the 40 ha model farm increases from 2.4 LU/ha to 2.8, 3.3 and 4.5 LU/ha, herd size increased from 100 to 116, 136 and 184 cows, respectively. Similar to the experimental results outlined previously, as SR increased, milk production per cow declined, overall milk sales increased and grass growth and utilisation also increased. Total labour costs increased with SR from a minimum of €28,288 (for a herd size of 100 cows) at 2.4 LU/ha up to a maximum of €53,889 (for a herd size of 184 cows) at 4.5 LU/ha.

## Implications of increasing SR when grass growth is 13 tonnes DM/ha

Overall pasture utilisation increases from 11.6 tonnes DM/ha at 2.4 LU/ha to a maximum of 12.7 tonnes DM/ha at 4.5 LU/ha based on increased grass growth and feed utilisation as SR increases. As sufficient grass is not grown to meet individual animal requirements as SR increases, purchased feed costs (including both concentrate and silage) increase from €17,551 at 2.4 LU/ha to €74,366 at 4.5 LU/ha while total costs of production for the 40 ha farm incorporating additional fixed and variable costs associated with increased herd size increase from €153,690 (or 29 c/l) at 2.4 LU/ha to €288,343 (or 34 c/l) at 4.5 LU/ha.

The impact of SR on farm profit is highly sensitive to milk price within the current analysis. At an average milk price (28 c/l), the highest farm net profit per litre (9 c/l) and per cow (€495/cow) is achieved at 2.4 LU/ha while the highest net profit per ha is achieved at 3.3 LU/ha (€1,339/ha). In contrast, the lowest net farm profit per litre, per cow and per ha is achieved at 4.5 LU/ha (5 c/l, €251/cow and €1,153/ha, respectively). At average milk prices (28 c/l) and at the level of the overall 40 ha farm enterprise, the overall impact of increasing SR from 2.4 LU/ha to 2.8 and 3.3 LU/ha is to increase overall farm profit after full labour and capital charges by €566 and €4,082, respectively while increasing SR to 4.5 LU/ha reduces overall farm profit by €-3,358 when compared to the 2.4 LU/ha system. At a low milk price (22 c/l), the highest farm net profit per litre (2 c/l), per cow (€126/cow) and per ha (€315/ha) is achieved at 2.4 LU/ha while the greatest net loss per litre (-2 c/l), per cow (€-72/cow) and per ha (€-331/ha) is realised at 4.5 LU/ha. In years of a high milk price (34 c/l), the highest net profit per litre and per cow is achieved at 2.4 LU/ha (16 c/l and €864/cow) while the highest net profit per ha is achieved at the high SR of 4.5 LU/ha (€2,638/ha).

*Implications of increasing SR when grass growth is 16 tonnes DM/ha*

Based on the higher grass growth rate, overall pasture utilisation increases from 11.6 tonnes DM/ha at 2.4 LU/ha to a maximum of 14.4 tonnes DM/ha at 4.5 LU/ha based on increased grass growth and feed utilisation as SR increases. In addition, purchased feed costs are significantly reduced (by 25%, 26%, 20% and 17% for the 2.4, 2.8, 3.3 and 4.5 LU/ha SR levels, respectively) as more home grown feed is available. As sufficient grass is still not grown to meet individual animal requirements at higher SR, and additional labour and capital are required, milk production costs increase as SR increases. Total milk production costs per litre for the 2.4, 2.8, 3.3 and 4.5 LU/ha SR groups are reduced on average by 3% to 29, 30, 30 and 32 c/l, respectively at the higher growth rate of 16 tonnes DM/ha.

At an average milk price (28 c/l), the highest farm net profit per litre (10c/l) and per cow (€518/cow) is achieved at 2.4 LU/ha while the highest net profit per ha is achieved with the SR of 3.3 and 4.5 LU/ha (€1,451 and €1,449 / ha, respectively) while the lowest net farm profit per litre and per cow is achieved at an SR of 4.5 LU/ha (7 c/l and €315 /cow, respectively). At average milk prices (28 c/l) and at the level of the overall 40 ha farm enterprise, the overall impact of increasing SR from 2.4 LU/ha to 2.8, 3.3 and 4.5 LU/ha is to increase overall farm profit after full labour and capital charges by €1,240 (2%), €6,253 (12%) and €6,172 (12%), respectively when compared to the 2.4 LU/ha system. At a low milk price (22 c/l), the highest farm net profit per litre (3 c/l), per cow (€149 / cow) and per ha (€373 /ha) is achieved at 2.4 LU/ha while the greatest net loss per litre (-0.5 c/l), per cow (€-8 /cow) and per ha (€-36 /ha) is realised at 4.5 LU/ha. At a high milk price (34 c/l), the highest net profit per litre and per cow is achieved at 2.4 LU/ha (17 c/l and €886 /cow) while the highest net profit per ha is achieved at the high SR of 4.5 LU/ha (€2,933 /ha).

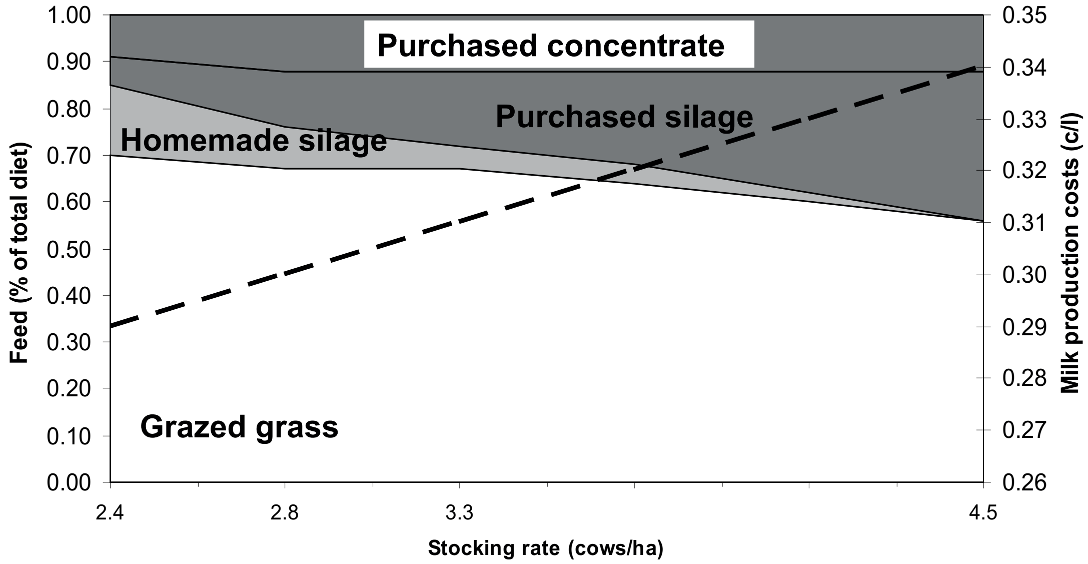
The following general conclusions can be drawn from the above analysis:

- The optimum stocking rate for the milking platform is highly dependant on milk price and the grass growth capacity of the farm.
- Increasing the SR on the milking platform beyond 2.4 LU/ha increases milk production costs and requires high grass growth rates and increased grazed grass utilisation to realise increased farm profits.
- At average milk prices and based on an average farm grass growth rate of between 13 and 16 tonnes DM/ha, the highest profit per ha on the milking platform will be achieved at an SR of 2.8 and 3.3 LU/ha.
- When milk prices are low, 2.4 LU/ha delivers the highest overall profit per ha, regardless of grass growth rate.
- In years of high milk prices (in excess of 34 c/l), higher SRs of up to 4.5 LU/ha can be more profitable per ha.

**Table 7.** The effect of grass growth and farm system stocking rate on key parameters for a top 10% performance 40 hectare dairy farm.

| Herbage Production (t DM/ha) | 13 | | | | 16 | | | |
|---|---|---|---|---|---|---|---|---|
| Stocking rate (cows/ha) | 2.4 | 2.8 | 3.3 | 4.5 | 2.4 | 2.8 | 3.3 | 4.5 |
| Cows calving (No.) | 100 | 116 | 136 | 184 | 100 | 116 | 136 | 184 |
| Milk solids (kg/cow) | 457 | 444 | 432 | 404 | 457 | 444 | 432 | 404 |
| Milk sales (kg) | 532,038 | 598,486 | 678,486 | 856,954 | 532,038 | 598,486 | 678,486 | 856,954 |
| Utilised herbage (t DM/ha) | 11.6 | 11.8 | 12.3 | 12.7 | 11.6 | 12.8 | 14.0 | 14.4 |
| Labour costs (€) | 28,288 | 33,974 | 39,831 | 53,889 | 28,288 | 33,974 | 39,831 | 53,889 |
| Purchased feed costs (€) | 17,551 | 28,982 | 38,023 | 74,366 | 13,211 | 21,533 | 30,479 | 61,767 |
| Total costs (€) | 153,690 | 180,998 | 208,184 | 288,343 | 151,381 | 176,580 | 203,697 | 276,515 |
| **Milk Price at 22 c/ litre** | | | | | | | | |
| Net profit/l milk (€) | 0.02 | 0.01 | 0.01 | -0.02 | 0.03 | 0.02 | 0.02 | 0.00 |
| Net profit/cow (€) | 126 | 62 | 48 | -72 | 149 | 100 | 81 | -8 |
| Net profit/ha (€) | 315 | 179 | 164 | -331 | 373 | 289 | 275 | -36 |
| Net profit/farm (€) | 12,617 | 7,152 | 6,551 | -13,256 | 14,910 | 11,546 | 11,014 | -1,434 |
| **Milk Price at 28 c/ litre** | | | | | | | | |
| Net profit/l milk (€) | 0.09 | 0.08 | 0.08 | 0.05 | 0.10 | 0.09 | 0.09 | 0.07 |
| Net profit/cow (€) | 495 | 431 | 394 | 251 | 518 | 457 | 427 | 315 |
| Net profit/ha (€) | 1,237 | 1,251 | 1,339 | 1,153 | 1,294 | 1,325 | 1,451 | 1,449 |
| Net profit/farm (€) | 49,484 | 50,040 | 53,566 | 46,126 | 51,776 | 53,016 | 58,029 | 57,948 |
| **Milk Price at 34 c/ litre** | | | | | | | | |
| Net profit/l milk (€) | 0.16 | 0.15 | 0.15 | 0.12 | 0.17 | 0.16 | 0.16 | 0.14 |
| Net profit/cow (€) | 864 | 777 | 740 | 573 | 886 | 815 | 772 | 638 |
| Net profit/ha (€) | 2,159 | 2,252 | 2,515 | 2,638 | 2,216 | 2,362 | 2,626 | 2,933 |
| Net profit/farm (€) | 86,350 | 90,093 | 100,581 | 105,508 | 88,642 | 94,487 | 105,043 | 117,330 |

a) Grass production of 13 tonnes DM/ha/yr




b) Grass production of 16 tonnes DM/ha/yr

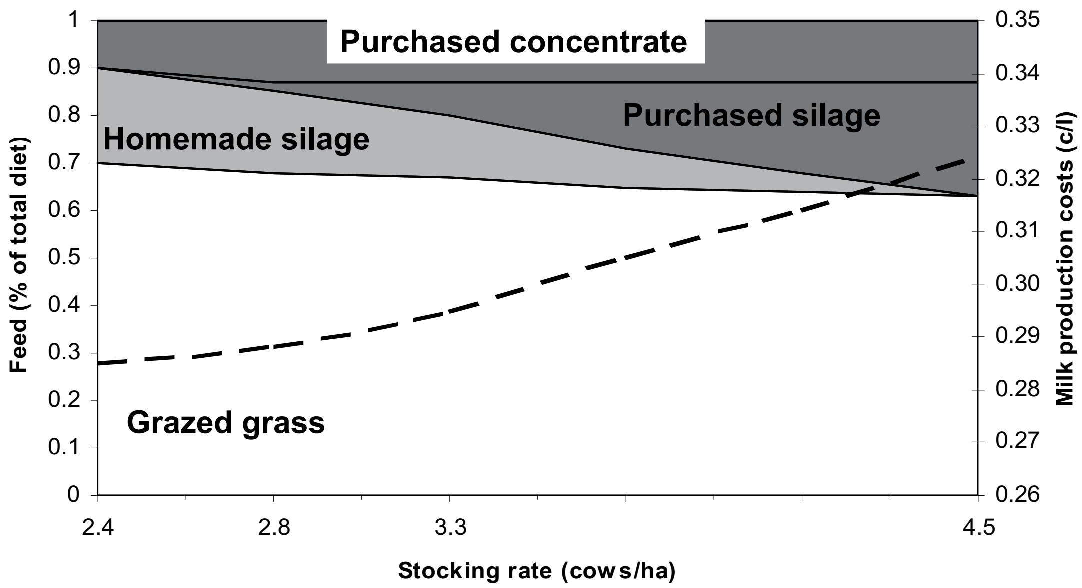



**Figure 5.** *The impact of stocking rate change on the dietary characteristics and costs of milk production for a) a farm growing 13 tonnes DM/ha/yr and b) a farm growing 16 tonnes DM/ha/yr.*

Figure 5 indicates the extent to which purchased concentrate and silage will be required within the diet of the grazing animal as SR increases. Increasing overall farm SR from 2.5 LU/ha to 4.5 LU/ha results in a reduction in home grown feed inclusion from 90% of the animal diet at 2.5 LU/ha, to approximately 60% of the total diet at 4.5 LU/ha. It is also evident from Figure 6 that while milk production costs will increase as SR increases, the extent of the overall increase in milk production costs is highly dependant on the grass growth capability of the farm.

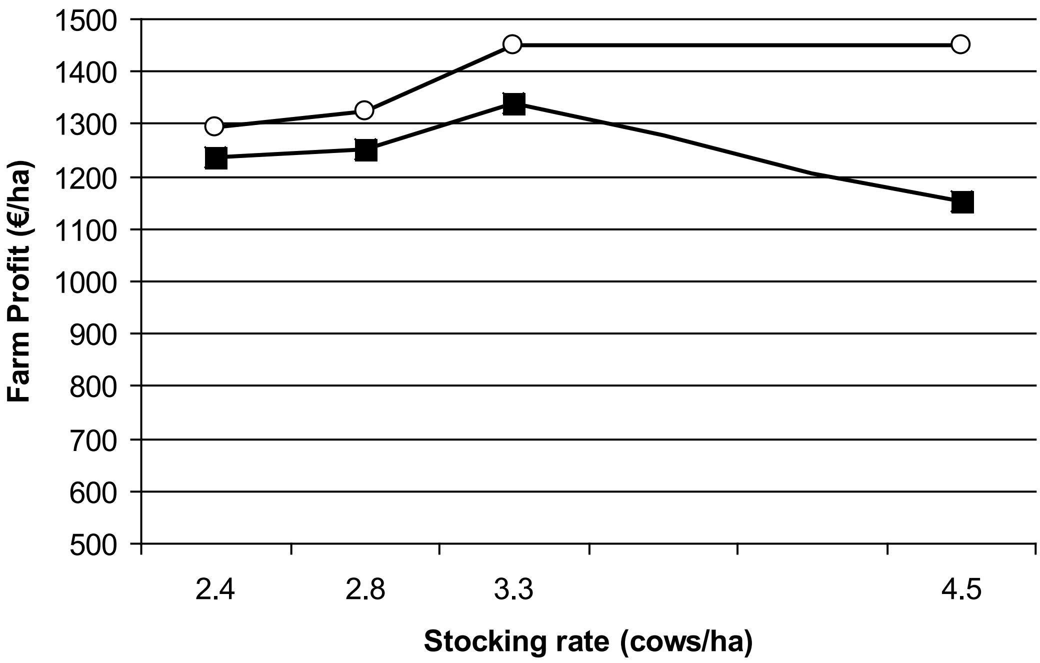



**Figure 6.** The impact of stocking rate change on farm profit (€/ha) for a farm growing 13 tonnes of DM/ha/yr (■) or 16 tonnes DM/ha/yr (O) and based on a milk price of 28 c/l.

The success of higher SR systems is dependant on achieving consistently high grass growth rates (between 13 and 16 tonnes DM/ha) and requires skilled grazing management and feed budgeting, excellent soil fertility and the reseeding of underperforming swards. To that end, dairy farmers who are planning to increase stocking rate beyond 2.5 LU/ha post 2015, should use the intervening years to milk quota abolition to rejuvenate unproductive swards, build soil fertility and develop disciplined grass measurement methods to maximise feed production, quality and utilisation and position the farm to support higher SR levels. With the recent developments in grazing management technology on Irish dairy farms (O'Donovan *et al.*, 2000), Irish dairy farmers who have acquired grass measurement and budgeting skills are well positioned to effectively manage and capture the economic benefits of higher SRs. The management of a higher SR system will also require flexible grazing management practices, feed demand management through unproductive stock identification and feed supply management through strategic supplementation and more efficient use of fertilisers and slurry to overcome the variability in pasture supply. The importance of supplementary feeds or strategic N fertiliser use to remove the constraints of pasture seasonality at high SR will depend primarily on prevailing milk prices but will also depend on both the feed supply pattern and the price of supplementation (Hodgson and Maxwell, 1988).

## 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. The authors of this paper believe that Irish dairy farms should aim to achieve a minimum SR of 2.4 LU/ha and that further increases in SR should only be considered after completely removing beef cattle, lowly productive dairy cows and young stock from the grazing platform. Furthermore, the current analysis indicates that increasing SR beyond 2.8 LU/ha should be considered as a form of intensification based on potential efficiency gains (in terms of grazed grass, labour and capital infrastructure utilisation,) rather than as a long term means of overall farm business expansion. Similar to previous studies, this analysis shows that at average or higher milk prices in future years, increasing milking platform SR beyond 2.4 LU/ha can increase overall farm system profitability although the degree to which farm profit is increased is highly dependant on farm grass growth. As Irish milk producers aim for larger herds post milk quota, pasture growth will limit and frustrate the expansion process. It is therefore essential that dairy farmers use the intervening years to quota abolition to adopt grazing and nutrient management practices that ensure high levels of annual pasture productivity. On dairy farms that achieve annual pasture production of between 13 and 16 tonnes DM/ha/yr, increasing SR to 2.7 to 3.3 LU/ha in combination with an appropriate calving pattern will increase the productivity and profitability of the dairy farms business post EU milk quota.

(Weekly updates on all Moorepark research herds are available online at: www.agresearch.teagasc.ie/moorepark)

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# Teagasc Heavy Soils Dairy Programme Review

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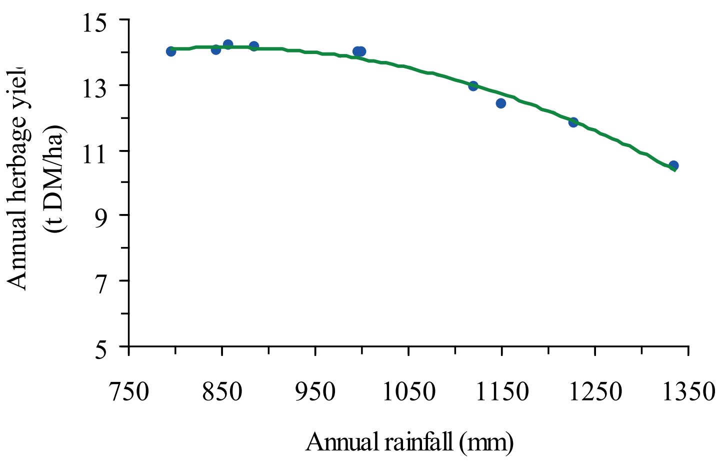
## Summary

- Farms in Clare, Limerick, Tipperary, Kerry and Cork are participating in a heavy soils programme.
- High rainfall is impacting negatively on grass grown and utilised on heavy farms. Grass growth, on these farms, in 2012 was over 2 tonnes DM/ha less than the five year average and 2.8 tonnes DM/ha lower than 2011.
- Concentrate feed costs increased from 3c/litre (2011) to 5.6 c/litre in 2012 based on increased concentrate cost and increased concentrate feed levels. In addition silage fed in the grazing season is valued at 1.9 c/l.
- The provision of adequate forage reserves including a feed buffer for years like 2012 is crucial on farms with heavy soils to ensure the system is sustainable in challenging conditions
- A targeted investment strategy in drainage and grazing infrastructure should be incorporated within the business plan for the farm

The year 2012 has been challenging on all farms but has been especially challenging for farmers on heavy soils. The ongoing and persistent rain from June onwards has made grazing, silage making and slurry spreading very problematic. Systems of milk production on heavier soil types must be robust enough to be able to cope with years like 2012, through having adequate infrastructure and ensuring that surplus feed is harvested in relatively good years which can be used as a buffer in poor weather years. What is clear is that there is a necessity to have good farm infrastructure, have a drainage plan in place and ensure soil fertility is not limiting production.

### Rainfall

High rainfall is the single biggest factor impacting on grass growth and utilisation on heavy soils. Rainfall during the key summer months determines both the amount of grass grown, utilised through grazing and the quantity and quality of silage conserved. Figure 1 shows ten year data from the Teagasc research farm in Solohead showing the relationship between rainfall and herbage production (Humphreys, 2012).



Meteorological data (figure 2) from Castleisland, Co. Kerry shows that in 2012 total rainfall in the critical May – August period was 41% higher than the ten year average and was matched by equally wet summers in 2009 and 2008. Spring 2012 rainfall was at the ten year average and this autumn to date was 12% above average. Total rainfall measurements for January to October 2012 at different national locations showed that Castleisland recorded 1062mm compared to Moorepark 813mm and Kilkenny 653mm. The combined effect of increased total, and out of season, rainfall in combination with heavy soils has meant a reduction in grass growth and utilisation in the South West region.

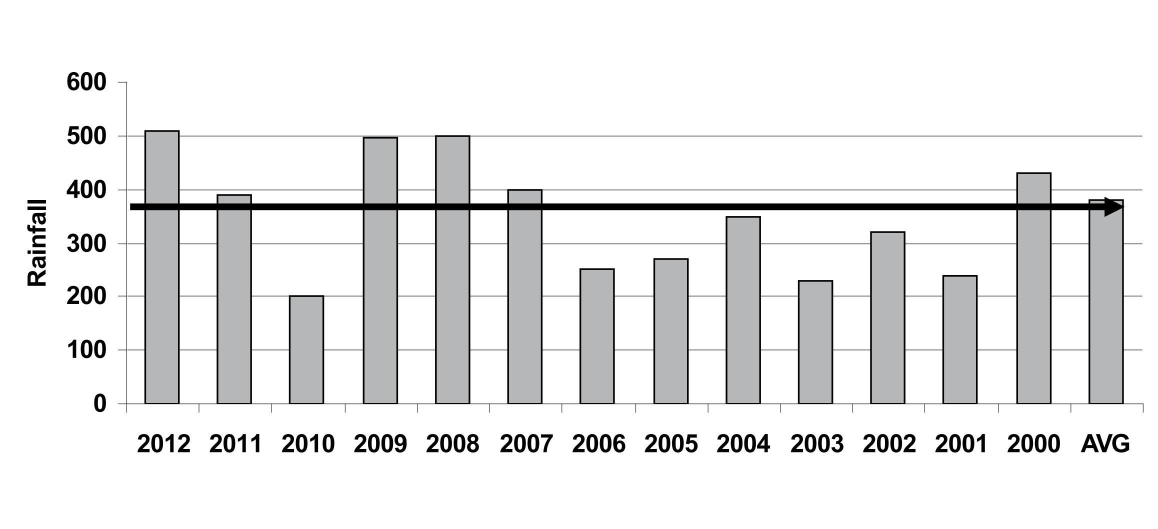



**Figure 2.** *Rainfall (May – August) (mm) in Castleisland, Co Kerry over a twelve year period 2000 - 2012*

Source: G Hurley, Teagasc

The incessant heavy rain impacted on grass growth but even more so on grass utilisation. Data from Kerry farms recording weekly grass growth (see table 1) shows that compared to the average of 2008 – 2011, grass growth for 2012 was 19% lower. Overall 2.1 tonnes DM/ha less was grown in 2012 compared to the 5 year average. Grass utilisation on much of the heavy land was averaging only 50%, with areas of many farms waterlogged and out of the grazing rotation for most of the main grazing season. The 4 year average grass growth was 11.3 tonnes/ha.

**See Table 1** Teagasc Kerry-Grass Dry Matter grown (t/ha) 2008 – 2012 (Source G Hurley)

| Table 1 | **2008** | **2009** | **2010** | **2011** | **2012** | ***Average** |
|---|---|---|---|---|---|---|
| Total DM | 11.2 | 10.8 | 11.7 | 11.6 | 9.2 | 11.3 |
| Spring DM/Ha | 1.5 | 1.9 | 1.2 | 2.0 | 1.5 | 1.7 |
| Summer DM/Ha | 7.6 | 6.6 | 7.8 | 7.1 | 6.2 | 7.3 |
| Autumn DM/ha | 2.1 | 2.2 | 2.7 | 2.5 | 1.6 | 2.4 |

*Average four year data (2008 -2011) - Kerry grass measurement group (n=20)

Compared to the previous four years data 2008 -2011

- Grass Grown in 2012 reduced by 19%
- Spring growth reduced by 13% (15 Feb – 30 April)
- Summer growth reduced by 16% (1 May – 31 Aug)
- Autumn growth reduced by 32% (1 Sept – 1 Nov)

## Farm infrastructure

Farm infrastructure is even more important on heavy soils than on drier soils to ensure maximum grass utilisation. Ensuring maximum grass utilisation will require;

- Good farm roadways
- A well laid out paddock system
- Multiple water access points
- Wintering facilities – slurry storage

## Farm roadways

Ground conditions are often marginal on farms with heavy soils. It is inevitable some damage will be done; therefore it is essential that when animals come off a damaged area, they do not go into that area again until the next rotation. This requires an adequate farm roadway system. It is essential to have good access to all paddocks for animals and machinery. Road layout must allow for good cow flow and have a suitable surface for cow walking speed and hoof welfare. Where a roadway is not necessary for heavy machinery, less expensive cow paths or spur roadways should be used.

## Paddock System

A well laid out paddock system is important for maximising grass utilisation. If not already done, the farm should be mapped and a plan drawn up with the optimum number of paddocks appropriate to the farm. Paddocks should ideally be two day paddocks for the target herd size and have multiple access points. Ideally keep paddocks square or rectangular, if possible depth to width ratio should be 2:1, this will allow paddock to be divided easily for back fencing and on/off grazing. While ground was completely waterlogged on many farms and full time housing was required the principles of on –off grazing are still important in grazing seasons where ground is marginal but not as saturated as experienced this summer. The reality is that 90% of a cows grass requirement can be achieved over a three to four hour grazing bout after each milking. Many farms stood off cows until midday and still maintained reasonable grass intakes when conditions allowed. While poaching damage could not be avoided on farms with heavy soils some farms fared better than others in 2012.

## Water

The importance of access to water can be overlooked when managing cows in difficult conditions. The fact the grass is very wet does not reduce the need for water for the animals, therefore access to water should not compromise grazing or incur extra poaching damage. The layout and placement of water troughs should be incorporated into the paddock plan and will in many cases require more than one trough per paddock.

## Wintering Facilities

Dairy farming on heavy soils will require animals to be housed for longer periods. The aim where possible is to turn out cows to grass after calving but inevitably cows finish lactation indoors and in years similar to 2012 cows may have to be housed at various times during the grazing season. It is important that facilities are clean and suitable for milking cows. The emphasis on any dairy farm will be to maximise the amount of grazed grass in the diet. However, it must be acknowledged that in times of very poor ground conditions the best option may be to house cows for short periods and wait for suitable grazing conditions rather than irrevocably damaging paddocks.

The longer wintering period required for dairy farms on heavy soils means more slurry storage is required. Many farmers who farm on heavy soils have adequate slurry storage and housing for the existing herd. However with expansion, there will be increased demands for slurry storage and housing, all options should be examined and the relative costs of the various option analysed. The necessity to take advantage of ground conditions for slurry spreading has been highlighted in 2012, with a requirement that as much as possible of the slurry is spread in the spring. The use of low ground pressure tyres for slurry tankers (and indeed for the full range of farm machinery) is essential in minimising soil compaction.

## Summary of physical and financial data heavy soils project farms 2012.

The Teagasc heavy soils programme has seven monitor farms located across the Munster region. The farms have assembled physical and financial performance data for 2012 outlined in Table2, Table 3 and Table 4.

Average cow numbers milked remained static in 2012 at 87 cows on a milking block of an average of 41 ha (2.1 LU/Ha).Milk production (5040 litres/cow).

Milk production from the heavy soils farms fell by 5% compared to 2011 and was close to the annual production for 2010.

Spring production had been better than previous years and less than 10 tonnes concentrate/farm or 115kgs/cow (11 % of annual total) had been fed on the heavy soils farms by March 31.

**Table 2** .Milk production (litres) from Heavy soils programme farms 2010 -2012

| Location of farm | 2012 | 2011 | 2010 |
|---|---|---|---|
| Doonbeg | 445,104 | 428,156 | 417,990 |
| Listowel | 390,744 | 453,810 | 404,784 |
| West Limerick | 410,080 | 402,199 | 378,900 |
| Castleisland | 524,706 | 534,978 | 532,760 |
| North Cork | 356,126 | 423,967 | 401,842 |
| Macroom | 488,817 | 510,198 | 489,992 |
| **Average** | **435,930** | **458,945** | **437,711** |

## Supplementary feeding on Heavy soils programme farms

**Table 3.** Cow numbers in 2012 and levels of concentrate feeding in 2011 and 2012 for the Heavy soils programme farms.

| Location | Cow number Avg. 2012 | Conc. fed/cow (kg) 2012 | Conc. fed/cow (kg) 2011 |
|---|---|---|---|
| West Limerick | 88 | 852 | 571 |
| Castleisland | 93 | 1688 | 771 |
| North Cork | 86 | 744 | 380 |
| Listowel | 81 | 775 | 775 |
| Doonbeg | 88 | 953 | 467 |
| Macroom | 84 | 1120 | 770 |
| **Average** | **87** | **1022** | **622** |

Meal feeding per cow increased dramatically from April onwards in 2012. On average 622 kgs/cow was fed in 2011 and this increased by 70% to over a tonne/cow fed in the full year of 2012. Within the group the variation was from 0.74 tonnes/cow up to 1.7 tonnes/cow.

Overall concentrate costs have increased to 5.6 c/litre on the heavy farms in 2012 from on average 3c/litre in 2011. In addition, the heavy farms fed 215 tonnes silage fresh or the equivalent of just under 3 bales of silage per cow (0.49 tonnes DM of silage/cow).This silage was fed during the grazing season period April – September and was additional to the winter feed requirements.

**Table 4.** Additional silage fed on the Heavy soils programme farms April –Sept 2012

| Location | Silage fed (tonnes) April -Sept | Silage reserve (tonnes) in stock May 1 2012 |
|---|---|---|
| West Limerick | 170 (1.9/cow) | 94 |
| Castleisland | 330 (3.5/cow) | 0 |
| North Cork | 280 (3.2/cow) | 0 |
| Listowel | 180 (2.2/cow) | 150 |
| Doonbeg | 250 (2.8/cow) | 324 |
| Macroom | 77 (1.0/cow) | 600 |
| **Average** | **215 (2.5/cow)** | ***195 (2.3/cow)** |

*(=1 tonne DM/ha)

Milk production loss on the 6 farms was minimised by the input of very high levels of supplementation (concentrate + silage) costing an average of 7.5 c/litre. The farms had an average reserve of silage at the end of April 2012 of 195 tonnes or the equivalent of 2.3 tonnes/cow (0.46t DM/cow). One farm had a lot of silage in reserve but most farms had inadequate reserves to meet silage requirements. Silage surpluses made into bales in late May on some farms were also fed throughout the summer months. The farms had to house cows by night on average 62 days in the period April –September and on average 20 days on a fulltime basis. The grazing season finished up quickly with cows housed by night from September 19$^{th}$ onwards and fulltime by October 16$^{th}$. This was on average three weeks earlier than normal fulltime housing. Despite an increase of 5% on already high fertiliser prices the cost of fertiliser remained the same as 2011 at 2.74c/litre. While additional P & K was applied early in the grazing season in response to soil analysis results, nitrogen had to be skipped on a number of occasions and overall N use (180kgs N/Ha) was considerably lower than last year.

## Financial Outcomes for farms in heavy soils programme

A profit monitor report for 2012 (November and December estimated) has been produced by each of the farms participating in the heavy soils programme and a summary of the results is outlined in Table 5. Total costs of production increased by 17% to 24c/l compared to 2011 at 20.6 c/litre. This was largely due to an increase of 24% in variable costs. On top of this there is a deficit in silage on farms which could amount to 350kg DM /cow. This will impact on costs for 2013. Poorer quality silage, averaging 62 DMD and 9% protein will also need to be supplemented with additional concentrate (estimated @ 1.5kg/cow/day).

**Table 5** Comparison 2012 projected v 2011 Profit Monitor data matched Heavy soils programme farms

| | Gross Output c/litre | Variable costs c/litre | Fixed costs c/litre | Total costs c/litre | Net Profit c/litre | MS/cow Kgs/Cow |
|---|---|---|---|---|---|---|
| 2012 | 32.1 | 14.5 | 9.5 | 24.0 | 8.1 | 372 |
| 2011 | 35.8 | 11.7 | 8.9 | 20.6 | 15.2 | 402 |
| Difference | -3.7 | 2.8 | 0.6 | 3.4 | 7.1 | -30.2 |
| **Change** | **-10%** | **24%** | **7%** | **17%** | **-47%** | **-8%** |

## Milk price, milk solids production and Net Profit (estimate)

Milk price fell from 35c/litre to an average of 31.3c/litre (estimated) or an average drop of 3.7 c/litre (10.5%). Milk solids/cow fell by 8% to 372kgs/cow despite concentrate use increasing by 70%. The high inputs of silage negatively impacted on milk solids production and overall supplementary feeding did not replace the energy deficit created by the lack of grass in the diet.

Net profit/litre declined by 47% from 15.2 c/litre in 2011 to a projected 8.1c/litre in 2012 with a winter feed deficit that will add approximately 2c/l to next years costs of production and a requirement for additional concentrate due to silage quality issues.

## Grass Production and Utilisation on the Farms in the Heavy Soils Programme

To capture the maximum benefits of grazed grass the most fundamental management practice must be to have the correct number of cows to match the grass production capability of the farm. Stocking rate traditionally expressed as cows per Ha is widely recognised as the major factor governing productivity from grassland. It is therefore recommended that the overall stocking rate of the farm is closely aligned to the individual farms grass growth capability. 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 but 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.

On the basis that Irish farms have the potential to achieve annual pasture production of 15 – 16 tonnes of grass DM production/ha, the recommended best practice stocking rate for an enclosed production system is 2.9/3.0 cows/hectare (Horan *et al*., 2012).

This equates to a cow requirement of approximately 5 tonnes DM/annum. This provides a benchmark for dairy farmers to establish how many cows can be carried on their farm. Therefore every effort must be made by the farmer to establish what level of grass production is possible on the farm. This technology has been developed for many years through the weekly farm cover measurement (O'Donovan, 2000). Completing this weekly measurement over a number of years will establish the real potential of grass production on the farm.

A number of factors will influence the level of grass production on the farm. These include; rainfall, soil type, altitude, aspect, grassland management, level of ryegrass content, and soil fertility.

In a comparison by Shalloo *et al*. (2004) the level of grass production was substantially lower on a heavy-clay soil with high rainfall (Kilmaley, Co. Clare) compared to low rainfall, free-draining soil (Moorepark, Co. Cork). This result occurred despite the fact that altitude, grassland management skill, soil fertility and level of ryegrass content were similar at both sites.

In recent years soil fertility has been overlooked on many dairy farms. Soil fertility (specifically P, K and lime status) is the foundation on which the grass production potential is achieved. Only about 30% of Irish soils are in the optimum Index of 3 for P & K (O'Donovan *et al*., 2012). The results of soil tests taken from the farms in the heavy soils programme indicate that a large proportion of the soils are at index 1 and 2 and are therefore sub optimal for herbage production (O'Loughlin *et al*., 2012).

Another consequence of poor soil fertility is the lower level of ryegrass survival. The level of ryegrass content was established on the farms of the heavy soils programme. The average ryegrass content of the pastures at the start of this programme was less than 30%. The poor soil fertility status of the farms is an obvious factor influencing ryegrass survival in conjunction with significant poaching during wet years.

Shalloo *et al*. (2010) demonstrated that increasing the level of reseeding on the farm has a positive effect on profitability through an increase in total and seasonal grass production and when accompanied by an increased stocking rate, increased pasture utilisation. All of the farms in the programme are making continued effort to address the poor soil fertility status and level of ryegrass content.

**Table 6.** The level of grass production and utilisation on the farms in the heavy soils programme for the years 2011 and 2012 (tonnes DM/ha)

| | 2011 | 2012 |
|---|---|---|
| Grass Production (tonnes DM/ha) | 10.6 | 7.8 |
| Grass Utilisation (tonnes DM/ha) | 8.1 | 5.4 |

Table 6 shows that grass production was 2.8 tonnes DM/ha lower in 2012 compared to 2011. There was a large difference in the level of grass utilised across the farms in 2012 with the average falling to 5.4 tonnes/ha. This difference was largely due to the level of rainfall rather than the soil type. Grass utilisation ranged from 50% to 80% of the grass produced. While achieving the utilisation efficiency of close to 80% is admirable, the ultimate consequence on grass production in the next season may be compromised due to soil damage this year.

## Impact of lower grass production and utilisation

The financial impact of 2012 is outlined earlier in this paper. However as we have seen over the last few years, the incidence of high rainfall during the main grazing season has become more common. This results in lower grass production and utilisation. The system of milk production practised on farms with difficult soils must be able to cope both physically and financially with this challenge. A dairy cow requires 5 tonnes DM/annum to sustain herself and produce approximately 400kg MS/Yr. For example if cows receive an average 0.7 tonnes concentrate DM/cow. This leaves an annual deficit of about 4.3 *tonnes* DM/cow for the year. Forage production on the farm has to meet this deficit. The average stocking rate of these farms, on the milking platform, is 2.1 cows/ha. If we assume an average utilisation efficiency of 75% of the grass/forage produced, then the farm must produce 12 *tonnes* of DM/ha to meet both grazing and silage requirement.

4.3 tonnes DM/cow divided by 0.75 (utilisation efficiency)

= 5.73 tonnes to be grown/cow

Stocking rate: 2.1 cows/ha

2.1 X 5.73 = 12 tonnes grass DM grown/ha/yr

Of course, most dairy farms have out-farms and the farms in this programme are similar and in reality some of the forage for wintering originates from this source. The average stocking rate on the whole farm for these farms in the programme is close to 1.7 cows per hectare.

It is difficult to meet the silage requirements on farms with difficult soil types as outlined in studies carried out by Browne and Walsh (1966 –1968) especially at high stocking rates. The vast majority (70%) of the farms in the heavy soils programme have generated enough forage to meet their feed requirements this winter. However, it is important to realise that forage produced in the grass production year of 2011 was carried as surplus (1 tonne DM/ha) into 2012 and is main reason that enough winter feed exists on most of these farms (see Table 4). Two of the farms had no silage in stock as of the 1st May 2012. These farms face a significant feed challenge this winter. These farms had no fallback position in feed supply when difficult climatic conditions arose during the main grazing season of 2012. As a result some silage made in 2012 was consumed in the main grazing season of 2012. However, it is worth noting that these farms also have a higher stocking rate than most of the others.

Having a supply of high quality forage is also necessary in a difficult grazing year like 2012. The grazing season is shorter and the amount of time spent indoor is longer both during the grazing season and at the start and end of the season. Round bale silage technology provides the opportunity of taking small surpluses in grass production during the grazing season. This surplus can then be fed back to animals when they are housed and at the same time sustaining good levels of milk solids production (O'Donovan, personal communication) at a reasonable cost. Therefore every effort must be made by the farmer to generate this type of forage at every opportunity. The cost of purchasing additional feed/forage is generally much higher in a year like 2012. There is also risk associated with the quality of the forage purchased. Further research is required to examine other ways of generating high quality forage on these types of farms.

It should not be discounted that these farms can produce higher quantities and quality of forage (grass or silage). As soil fertility and ryegrass content of pastures on these farms begin to improve, grass production and the quality of pasture should increase. In conclusion, it is essential that surplus forage is generated in years of good grass production to have a fallback in feed supply to overcome the deficit generated in years with difficult weather conditions.

## Relative value of feeds

Farms with heavy soils are relatively more dependant on supplementation than farms on more free draining soil type (Shalloo *et al*, 2004). It is important that all supplementary feeds are fully costed on an energy basis which is the main limiting factor when grass intake is restricted due to poor weather conditions. See Table 7 on relative feed values:

**Table 7.** The Relative Cost of some Supplement Options

| Example feeds | Cost € / t DM | Energy Content UFL / kg DM | Cost per € / 1000 UFL |
|---|---|---|---|
| Concentrates (€300/t) | 340 | 1.10 | 375 |
| Soya Hulls (€230/t) | 260 | 1.01 | 264 |
| 70 DMD 1st cut silage-late May[1] | 140 | 0.79 | 177 |
| 63 DMD 1st cut silage-mid-June[1] | 130 | 0.70 | 185 |
| 74 DMD Surplus Baled silage[2] | 84 | 0.84 | 100 |

[1]All costs incl land charge (€640/ha)

[2]Surplus excluding fertilizer charge & land charge and harvested at 2500-3000 kgs DM/ha @€15/bale

The relative value of feeds is constantly changing and different feeds represent good value for money and this needs to be constantly monitored. Surplus baled silage made during periods of rapid growth is always best value. It is a vital tool for good grassland management and is an alternative method of utilising home grown forage. In the above example concentrates are 3.75 times more expensive than home grown high quality surplus baled silage to supply the same amount of energy.

## Conclusion

Data from the Heavy soils programme farms is highlighting the variation in grass output in years of high rainfall and its impact on farm profitability. Maintaining ryegrass swards and the building of silage reserves are key components of a sustainable dairy system on heavy soils.

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# Principles of Land Drainage

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## Summary

- Almost half of agricultural land in Ireland would benefit from reclamation and drainage
- Impeded drainage has three main causes; low *hydraulic conductivity*, high water- table and seepage and springs.
- There is a need for a better understanding of the underlying causes of drainage problems and of the design and implementation of appropriate drainage systems
- The first step of any drainage works is a detailed investigation into the causes of poor drainage using test pits
- Two main types of drainage system exist: a groundwater drainage system and a shallow drainage system. The design of the system depends entirely on the drainage characteristics of the soil.
- The decision between the two main systems essentially comes down to whether or not a layer is present (at a workable depth) that will allow the flow of water with relative ease. If such a layer is evident a piped drain system is likely to be effective, at this depth. If no such layer is found during investigations, it is necessary to improve the water carrying capacity of the soil. This involves a disruption technique such as moling, gravel moling or subsoiling in tandem with collector drains.
- The best way to maintain a drainage system is to maintain its outlets and outfalls.

## Causes of impeded drainage

Drainage problems in Ireland are largely due to our complex geological and glacial history. Glacial processes led to the formation of rolling and undulating landscapes, made up of haphazardly sorted rock and soil materials. Layers of varying texture and composition have the effect of irregularly distributing groundwater flow, with fine textured soils acting as a barrier to movement, impeding drainage, and layers of gravels and sands promoting water flow, transmitting groundwater over large areas with resulting seepages and springs on lower ground.

The rate at which water moves through a soil, *hydraulic conductivity*, varies enormously depending on the soil type and management. Open gravelly soils have a capacity for water flow that is hundreds of thousands of times that of compacted heavy clay. In free draining soils the rate at which water flows downwards through the soil is always greater than then that being supplied by rainfall. In poorly drained soils the rate of infiltration at the soil surface is regularly exceeded by the rainfall rate due to:

- Low *hydraulic conductivity* in the subsoil (or a layer of the subsoil)
- High watertable due to low lying position and poor/poorly-maintained outfall
- Upward movement of water from seepage and springs

## Objectives of land drainage

To achieve effective drainage the works will have to solve one or more of these problems and possibly a combination of all three. The objective of any form of land drainage is to lower the water-table providing suitable conditions for grass growth and utilisation. A controlled water table promotes deeper rooting which improves sward productivity. It also improves load-bearing capacity of the soil and lessens the damage caused by grazing and machinery. When planning any drainage programme, the potential of the land to be drained needs to be first assessed to determine if the costs incurred will result in an economic return through additional yield and utilisation of the grass or other crops grown. Some thought is needed in deciding the most appropriate part of the farm to drain. From a management point of view it is better to drain that land which is nearer to the farmyard and work outwards. However it may be more beneficial to decide where to commence works once the drainage potential has been established by site investigation. This ensures a better return on the investment.

## Drainage investigations

The land drainage problems encountered in Ireland are complex and varied and a full understanding of the issues involved is required before commencing drainage works. The first step is a detailed investigation into the causes of poor drainage.

Knowledge of previous drainage schemes in the area, and their effectiveness will often provide a useful insight. A number of test pits (at least 2.5 m deep) should be excavated within the area to be drained. The test pits should be dug in areas that are representative of area as a whole. As the test pits are dug, the faces of the pits are observed, soil type should be established and the rate and depth of water seepage into the test pit (if any) recorded. Visible cracking, areas of looser soil and rooting depth should be noted as these can convey important information regarding the drainage status of the different layers. The depth and type of the drain to be installed will depend on the interpretation of the characteristics revealed by the test pits.

## Types of drainage system

Two principle types of drainage system are distinguished:

- Groundwater drainage system: A network of piped drains establishing a deep drainage base in the soil
- Shallow drainage system: These are used where the soil is clayey (heavy) and infiltration of water is impeded at all depths.

### Groundwater Drainage System

Strong inflow of water or seepages from the walls of the test pits, indicates that layers of high *hydraulic conductivity* are present. Under these circumstances the use of a piped drainage system is advised. The installation of a piped drain at the depth of inflow will facilitate the removal of groundwater assuming a suitable outfall is available. Conventional piped drains at depths of 0.8 to 1.5 m below ground level (BGL) have been successful where they encounter layers of high *hydraulic conductivity*. However, where layers with high *hydraulic conductivity* are deeper than this, deep drains are required. Deep piped drains are usually installed at a depth of 1.5-2.5 m and at spacings of 15–50 m, depending on the slope of the land and the *hydraulic conductivity* and thickness of the

drainage layer. Piped drains should always be installed across the slope to intercept as much groundwater as possible, with open drains and main piped drains running in the direction of maximum slope.
Due to the risk of drain collapse, deep drains are normally excavated with a tracked digger with a special deep-drain trapezoidal bucket with a bottom width of about 200 mm. For small jobs a 300mm or similar sized bucket may be used but the side walls must be well battered (sloped) to avoid cave-ins. While these drains are more difficult to install, they are very cost effective as so few are required. Where groundwater seepage and springs are identified, deep drains, 2 to 3 m BGL can be used to intercept flow. Pipe drains are most effective in or on the aquifer (layer transmitting groundwater flow characterised by high water breakthrough). This issue is very site specific.

Clean aggregate should to be used to surround the land-drain pipe in conventional and deep drains. The gravel should be filled to a minimum depth of 300 mm from the bottom of the drain to cover the pipe. The stone should provide maximum connectivity to a layer of high *hydraulic conductivity*. The purpose of a drain pipe is to facilitate a path of least resistance for water flow. In long drain lengths (greater than 30m) a drain pipe is vital to allow a high a flow-rate as possible from the drain, stone backfill alone is unlikely to have sufficient flow capacity to cater for the water volume collected. Only short drain lengths (less than 30 m, or the upstream 30m of any drain) are capable of operating at full efficiency without a pipe.

Fig. 1a .Test pit excavation

Fig 1b. Drainage trench excavation

## Shallow Drainage Systems

Where a test pit shows little ingress of water at any depth a shallow drainage system is required. These soils that have no obvious permeable layer and very low hydraulic conductivity are more difficult to drain. Shallow drainage systems are those that aim to improve the capacity of the soil to transmit water, these include mole drainage and gravel mole drainage. The aim of these drainage techniques is to improve hydraulic conductivity by fracturing and cracking the soil and to form a network of closely spaced channels.

Mole drainage is suited to soils with a high clay content which form stable channels. Mole drains are formed with a mole plough comprised of a torpedo-like cylindrical foot attached to a narrow leg, followed by a slightly larger diameter cylindrical expander. The foot and trailing expander form the mole channel while the leg creates a narrow slot that extends from the soil surface down to the mole channel depth. The success of mole drainage depends on the formation of cracks in the soil that radiate from the tip of the mole plough at shallow depths as the soil is displaced forwards, sideways and upwards. Below a *critical depth*, dependent on soil mechanical strength and mole plough geometry, the soil flows forwards and sideways, bringing about compaction at the foot of the plough. Thus the action of the mole plough creates both a zone of increased hydraulic conductivity adjacent to the mole leg (shallower depths) and a channel for water conveyance and outflow at moling depth.

The effectiveness of mole drains depends on the extent of suitable cracking during installation. As such the ideal time for carrying out mole drainage is during dry summer conditions. This will cause maximum cracking in the upper soil layers as well as facilitating adequate traction preventing wheel-spin on the surface.

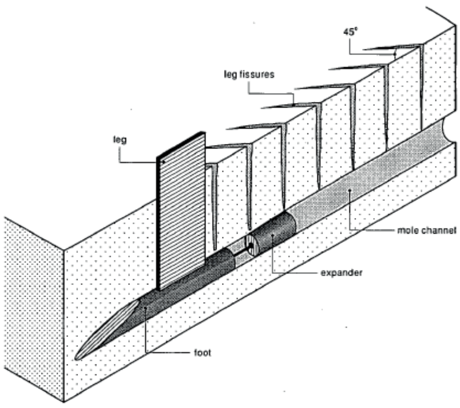


*Fig. 2a .Mole plough showing cylindrical foot and expander, 2b. Cracking and channel formation*

Gravel filled moles employ the same principles as ordinary mole drains but are required where an ordinary mole will not remain open for a sufficiently long period to render its application economical. This is the case in unstable soils having lower clay content. The mole channel is formed in a similar manner but the channel is then filled with gravel which supports the channel walls. The gravel mole plough carries a hopper which has a hydraulically operated shutter to control the flow of gravel; the gravel chute also has an adjustable door which regulates the height of gravel in the mole channel. During the operation the hopper is filled using a loading shovel or alternatively a belt conveyor from an adjacent gravel cart. Gravel moles require a very specific size range of gravel aggregate to ensure that they function properly. Washed aggregate within a 10-20 mm size range should be used.

Subsoiling is used effectively where an iron pan or cemented layer impedes drainage. The effect is to break the layer and crack the soil. A stable outlet channel will not be formed.

*Fig. 3a. Gravel Mole plough showing hopper, 3b. Operation and filling of gravel mole plough*

Collector drains, which are installed across the slope at 0.75 m BGL, are required for all mole drains. Depending on the topography and slope the collector drains will be at a spacing of 10–60 m. A larger spacing reduces costs but results in a higher chance of failure. The mole drains themselves are drawn at right angles to the collectors (up-slope) at spacings of 1.0-1.5 m and a depth of approximately 0.4-0.5 m. Stone backfill for collectors should be filled to within 250 mm of the surface to ensure interconnection with the mole channels.

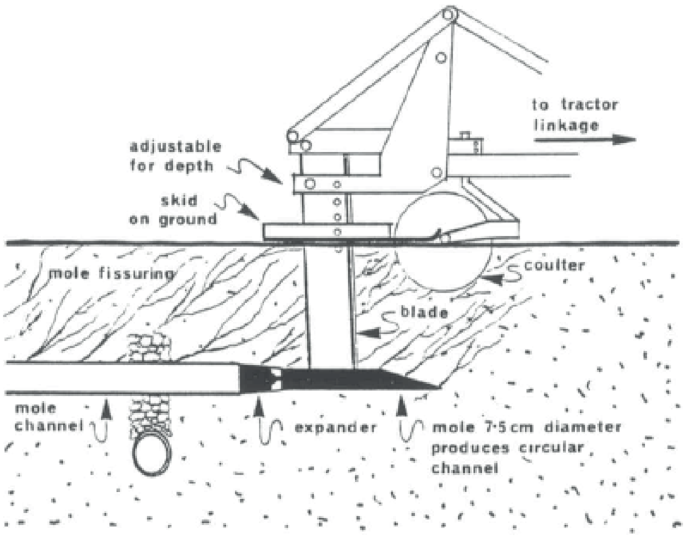


*Fig. 4. Mole ploughing showing intersection with a piped collector drain*

## Outfalls/Maintenance

Every drainage scheme is only as good as its outfall. Cleaning and upgrading of open drains acting as outfalls from land drains is an important step in any drainage scheme. Before commencing land drainage the proposed outfall should be assessed and where necessary upgraded. Open drains, running in the direction of maximum slope, should be established to as great a depth as possible. This will maximise the potential for land drainage, with associated benefits. Spoil from such works, where suitable, can be spread over the adjoining land filling depressions and should not impede surface runoff to the watercourse. Unsuitable spoil should be buried and covered with topsoil or removed to waste ground.

When a drainage scheme has been completed, the layout should be drawn and noted on a farm map. This map can then be used as a guide when maintaining the works, as well as a record of the works. Land drain outlets should be regularly cleaned and maintained especially if open drains are cleaned/upgraded as this may result in blockages at the drain outlet. The use of a concrete or un-perforated plastic pipe over the end of the drain pipe, minimum 1 m in length, will protect the outlet from damage and will make locating and maintaining it easier.

## Approximate Costs

The cost of drainage works will vary depending on such factors as soil type, site access, extent of open drains, availability/cost of backfill stone, and experience with drainage works among other factors. As such, costs are quite variable and will be specific to a particular job. The table below provides guidelines only. Cost for the provision of open drains is not included.

The table covers as far as possible the general arrangements available. Where a shallow drainage system is considered the price will depend largely on the collector drains required. If an existing drainage system of closely spaced piped drains is already in place at the appropriate depth BGL, it may be possible to pull mole drains through this existing network or from existing open drains. In this case the cost of mole drainage can be very cost effective. Where a collector system needs to be installed the total cost will be higher.

It is of the utmost importance that the selection of a drainage system for a particular site is not decided on the basis of cost. An effective drainage system should be designed and costed and then a decision made as to whether or not to proceed.

**Table 1:** Approximate costs of land drainage

| Drainage System | Drain Spacing (m) | Depth (m) | Cost/m (€) | Cost/Ac (€) | Cost/Ha (€) |
|---|---|---|---|---|---|
| **Groundwater Drainage systems** | | | | | |
| Conventional System | 8 | 0.8 - 1.5 | 5-7 | 2500-3500 | 6200-8600 |
| Deep Drainage | 15 - 50 | 1.5 - 2.5 | 9-11 | 1500-2500 | 3700-6200 |
| **Shallow Drainage systems** | | | | | |
| Mole Drainage | 1 - 1.5 | 0.45 – 0.6 | - | 50 | 125 |
| Gravel Mole Drainage | 1 - 1.5 | 0.35 – 0.5 | - | 600 | 1480 |
| Collector Drains | 20 | 0.75 | 5-7 | 1000-1400 | 2500-3500 |
| Collector Drains | 40 | 0.75 | 5-7 | 500-700 | 1200-1700 |
| Collector Drains | 60 | 0.75 | 5-7 | 350-450 | 800-1150 |

## Conclusions

Approximately half the land area in Ireland is in need of reclamation and drainage. There is enormous potential for developing our land resources through effective land drainage. The drainage problems in Ireland are as a result of two major factors; high excess rainfall and a complex geological and glacial history. There is a need for a better understanding of the underlying causes of drainage problems and of the design and implementation of appropriate drainage systems.

# Mastitis: What is it costing you?

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## Summary

- As SCC increases farm costs increase, farm receipts decrease and net farm profit decreases
- Reducing the SCC of your dairy farm significantly reduces the losses associated with high SCC and significantly increases farm profitability
- Use the CostCheck calculator to estimate the cost of SCC to your own dairy farm
- This is available on both the Teagasc and AHI websites at the following links: Teagasc: http://www.agresearch.teagasc.ie/moorepark/docs/costcheck.xls
  Animal Health Ireland: http://www.animalhealthireland.ie

## Introduction

Mastitis is considered to be one of the most costly dairy cattle diseases, thus making it highly relevant to dairy farmers. The losses associated with mastitis are often underestimated at farm level as many of the losses are unseen, like reduced milk production and lower herd growth potential. In New Zealand and the US, mastitis is estimated to cost their respective dairy industries €180 million and €1.3 billion per year. Irish research has demonstrated the impact of mastitis on farm profitability (Geary *et al*., 2012). This research has been used to develop CostCheck, a farm specific cost of mastitis calculator. International research suggests that the single most influencing factor in motivating change is demonstrating the cost of the status quo. Therefore estimating the current cost of mastitis on Irish dairy farms is the first practical step in tacking the problem of mastitis in Ireland.

## Mastitis CostCheck

The objective of the CostCheck calculator is to allow each dairy farmer to estimate the cost of mastitis on his/her dairy farm, using their own data. This tool was developed by Teagasc Moorepark in consultation with the CellCheck Technical Working Group and was funded through the Department of Agriculture, Food and the Marine Research Stimulus Fund. This tool can now be downloaded from the Teagasc and Animal Health Ireland websites (Links provided below).

The CostCheck calculator is a Microsoft Excel based tool which has a user friendly interface. Provided below is an outline of the mastitis CostCheck calculator and how it works.

## Opening screen


**Figure 1.** Opening screen of the Mastitis CostCheck Calculator

This is the first screen the user will see upon opening the mastitis CostCheck calculator. The user has a choice of using either the Quick CostCheck calculator or the Complete CostCheck calculator. The 'quick' calculator requires only two inputs and provides an estimate of the impact of mastitis on net farm profit; the 'Complete' calculator allows the user to input more data for a farm specific analysis.

## Quick CostCheck Calculator

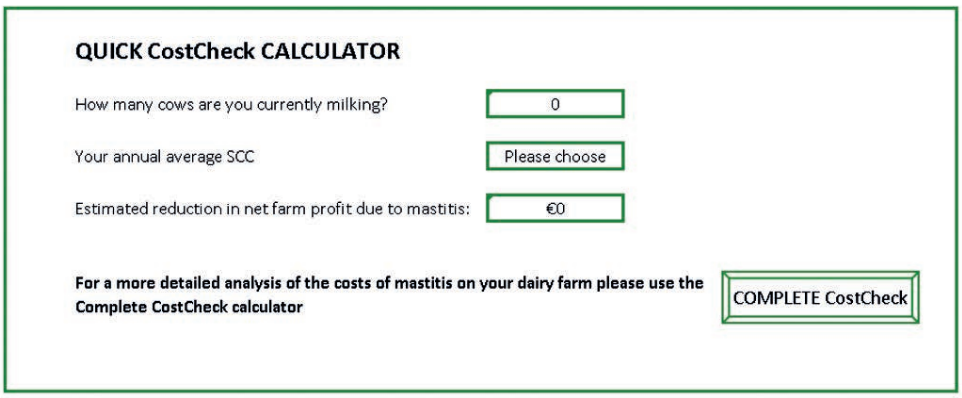


**Figure 2.** Quick CostCheck calculator

On selecting the 'Quick' calculator this screen is displayed. The only data required is the number of cows milking and the annual average SCC category of their dairy farm (as reported in your milk statement). The calculator then returns an estimate of the reduction in net farm profit due to mastitis on your dairy farm.

If the user wants a more detailed analysis then he/she can select the 'Complete CostCheck' button and this will bring the user back to the opening screen.

## Complete CostCheck Calculator

On selecting the 'Complete CostCheck' calculator the user will see a screen where numerous inputs are required.

### Inputs

**INPUTS**

*Note: Values highlighted in yellow can be modified*

| YOUR FARM DETAILS & FARM PRACTICE ASSUMPTIONS | |
|---|---|
| Average milk production per lactation per cow on your dairy farm (litres) | 5,500 |

| HERD & FARM PRACTICE ASSUMPTIONS | CURRENT | TARGET |
|---|---|---|
| Total number of cows and heifers milking (Please enter) | 100 | 100 |
| Annual average SCC category (Select from the drop down menu) | 300-400 | 100-200 |
| Estimated milk production loss per cow as indicated by herd SCC, litres/lactation | -367 | -174 |
| How many cases did you treat in this lactation? (including repeats) | 32 | 17 |
| How many cows were culled due to mastitis? | 11 | 5 |
| How many cows died due to mastitis? | 0 | 0 |
| How much have you paid in processor SCC fines in this lactation? | €0 | €0 |

**Figure 3.** Herd and Farm inputs of the mastitis CostCheck calculator

- While the yellow cells are pre-populated with estimated values based on the selected SCC categories all values highlighted in yellow can be changed by the user based on their own data.
- The calculator begins by capturing data on the average milk production per lactation per cow on your farm. The baseline assumption is 5,500 litres, this can be modified by the user.
- The user then enters the number of cows and heifers they are currently milking (100 in this example). The target number of cows and heifers milking is the same as the current to ensure a like for like comparison.
- The user then selects the current SCC category of their dairy farm (300-400,000 cells/ml in this example) and the target SCC category i.e. what you would aim to and could achievably reduce the SCC to (100-200,000 cells/ml in this example).
- Based on the selected SCC category the calculator selects the appropriate milk production loss based on research carried out by Teagasc Moorepark. The user cannot modify this assumption.
- The calculator will pre-populate the number of cases treated in total across the herd for both the current and target, based on the SCC categories selected. If the user does not agree with the estimated figures he/she can change the figures based on their own data.
- The calculator will also pre-populate the number of cows culled due to mastitis for both the current and target, based on the SCC categories selected. If the user does not agree with the estimated figures he/she can change them based on their own data.

- There is also an opportunity to account for cows that might have died due to mastitis in the current lactation. The user can also account for any penalties incurred in the current lactation due to SCC exceeding 400,000 cells/ml. The baseline assumptions in the model for both these categories is zero; however the user can, and should, change these if applicable to them.

## Cost assumptions

| COST ASSUMPTIONS | EURO |
|---|---|
| Milk sales net margin (cents/litre) | 21 |
| Treatment costs (euro) | |
| CURRENT: Treatment cost per case treated | 20.51 |
| TARGET: Treatment cost per case treated | 18.21 |
| Volume of milk withheld per case treated | 118 |
| Cull cow value (euro) | 550 |
| Heifer replacement costs (euro) | 1,451 |

**Figure 7.** Cost inputs of the mastitis CostCheck calculator

- The milk sales net margin is assumed at 21 cent per litre, based on a milk price of 27 cent per litre less 6 cent for milk related production costs (deducted as the milk is not produced). This can be modified if the user requires.
- The treatment costs in the calculator are based on a survey carried out with commercial dairy farmers. They account for antibiotics, veterinary costs and treatment practices which will vary across each SCC category. The treatment costs for each SCC category are pre-populated based on research but the user can modify these costs if more farm-specific information is available.
- The cull cow value and heifer replacement costs are pre-populated with €550 and €1,451, respectively. The user can amend these costs where they have more information.
- More detail is available on all background assumptions by clicking on the 'Assumptions' button which is to the right of the cost assumptions in the Complete CostCheck calculator.

## Results

The results are split into two sections; Summary Results and Detailed Results. The Summary Result provides an estimate of the gain on net farm profit from reducing SCC. The Detailed Results provides a breakdown of the cost components: milk production, treatment, culling and other costs.

## Summary results

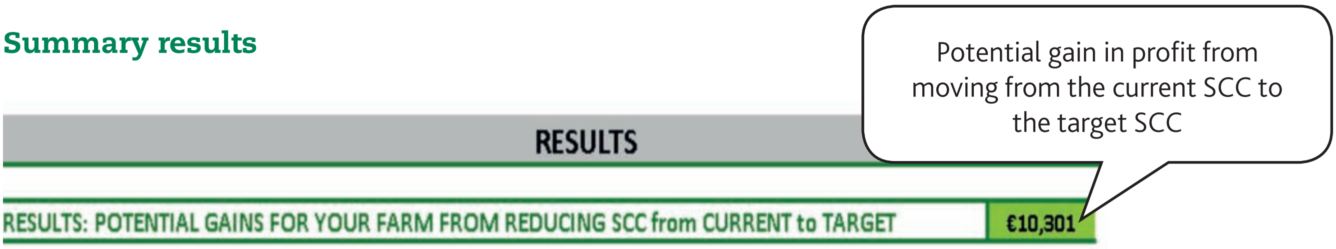


**Figure 4.** Summary results of the mastitis CostCheck calculator

- The potential gain/money that could be saved by reducing your SCC from the current category to the target category is reported (€10,301 in this example)

## Detailed results

Total volume of milk not produced by the herd based on the Target SCC category when compared to an average SCC of <100,000 cells/ml

Total volume of milk not produced by the herd based on the Current SCC category when compared to an average SCC <100,000 cells/ml

| RESULTS: BREAKDOWN OF COSTS OF MASTITIS | CURRENT | TARGET |
|---|---|---|
| **Milk production losses** | | |
| Volume of reduced milk production (litres) | -36,733 | -17,412 |
| Value of lost milk production | €7,714 | €3,656 |
| **Potential gain from reducing SCC** | | **€4,058** |
| **Treatment** | | |
| Cost of treatment | €558 | €198 |
| Cost of days of milk withheld | €784 | €413 |
| **Potential gain from reducing SCC** | | **€731** |
| **Culling** | | |
| Value of cull cows | €5,843 | €2,478 |
| Cost of replacing culled cows with heifers | €15,415 | €6,537 |
| Net culling costs | €9,572 | €4,059 |
| **Potential gain from reducing SCC** | | **€5,513** |
| **Other costs** | | |
| Cost of replacing cows died due to mastitis | €0 | €0 |
| Cost of penalties imposed due to high SCC | €0 | €0 |
| **Potential gain from reducing SCC** | | **€0** |
| **Total** | **€18,627** | **€8,326** |

**Figure 5.** Breakdown of the Current and Target costs

Net profit foregone from reduced milk sales (36,733*€0.21 cents/litre)

Net profit foregone from reduced milk sales (17,412*€0.21 cents/litre)

- A detailed breakdown of the current and target cost components of mastitis is provided:

  - Milk production: The reduction in the volume of milk produced for the herd with the current (36,733 litres) and target (17,412 litres) SCC over the length of the lactation is provided. The reduction in net profit due to reduced milk sales is also reported for the current (36,733*0.21 = €7,714 in this example) and target SCC categories (17,412*0.21 = €3,656 in this example).
  - Treatment: The current (€558 in this example) and •target (€198 in this example) treatment costs incurred as well as the value of milk withheld during treatment are reported.
  - Culling: The receipts generated from cull cows, the cost of purchasing heifers to replace the cull cows and the net culling cost for both the current (€9,572 in this example) and target (€4,059 in this example) SCC categories are reported.
  - Other Costs: The cost of replacing cows that died due to mastitis and the cost of penalties imposed for high SCC milk is also presented. In the example presented here this herd has not incurred any of these costs.

## Getting started

- The mastitis CostCheck calculator is now available from the Teagasc Moorepark website and the AHI CellCheck websites:

  Teagasc: http://www.agresearch.teagasc.ie/moorepark/docs/costcheck.xls

  Animal Health Ireland: http://www.animalhealthireland.ie/page.php?id=29

- Carry out this analysis for your dairy farm
- Set achievable targets
- Work in conjunction with your Teagasc adviser, veterinarian, milking machine technician, co-op advisers and milkers to implement effective management practices to help achieve your target
- Consult the CellCheck Farm Guidelines for Mastitis Control for practical advice and information

## Case studies

The inputs and results of three case studies are presented below. These case studies demonstrate how the mastitis CostCheck calculator can be used by farms with various SCC categories.

Farm 1: 50 hectare farm, milking 80 cows, annual average milk production per cow is 5,000 litres. The current SCC is 450,000 cells/ml. The target SCC is 250,000 cells/ml. Penalties were incurred.

Farm 2: 50 hectare farm, milking 80 cows, annual average milk production per cow is 5,000 litres. The current SCC is 350,000 cells/ml. The target SCC is 150,000 cells/ml. Penalties were incurred.

Farm 3: 50 hectare farm, milking 80 cows, annual average milk production per cow is 5,000 litres. The current SCC is 250,000 cells/ml. The target SCC is <100,000 cells/ml. No penalties were incurred.

### Key points

Farm 1: Decreasing SCC from 450,000 cells/ml to 250,000 cells/ml the net farm profit was estimated to increase by €9,212. Recovering 43% of the reduction in net farm profit at the higher SCC category.

Farm 2: Decreasing SCC from 350,000 cells/ml to 150,000 cells/ml the net farm profit was estimated to increase by €10,614. Recovering 62% of the reduction in net farm profit at the higher SCC category.

Farm 3: Decreasing SCC from 250,000 cells/ml to <100,000 cells/ml the net farm profit was estimated to increase by €9,772. Recovering 80% of the reduction in net farm profit at the higher SCC category.

### Case Study 1

**INPUTS**

*Note: Values highlighted in yellow can be modified*

| YOUR FARM DETAILS & FARM PRACTICE ASSUMPTIONS | |
|---|---|
| Average milk production per lactation per cow on your dairy farm (litres) | 5,000 |

| HERD & FARM PRACTICE ASSUMPTIONS | CURRENT | TARGET |
|---|---|---|
| Total number of cows and heifers milking (Please enter) | 80 | 80 |
| Annual average SCC category (Select from the drop down menu) | >400 | 200-300 |
| Estimated milk production loss per cow as indicated by herd SCC, litres/lactation | -422 | -309 |
| How many cases did you treat in this lactation? (including repeats) | 31 | 20 |
| How many cows were culled due to mastitis? | 10 | 7 |
| How many cows died due to mastitis? | 0 | 0 |
| How much have you paid in processor SCC fines in this lactation? | €3,900 | €0 |

| COST ASSUMPTIONS | EURO | SOURCE |
|---|---|---|
| Milk sales gross margin (cents/litre) | 21 | See Assumptions |
| Treatment costs (euro) | | |
| CURRENT: Treatment cost per case treated | 20.51 | Treatment costs are based on rates of treatment and |
| TARGET: Treatment cost per case treated | 15.07 | treatment practices. See assumptions for more details |
| Volume of milk withheld per case treated | 107 | Assuming 6 days of milk withheld |
| Cull cow value (euro) | 550 | Industry expertise, updated annually |
| Heifer replacement costs (euro) | 1,451 | Kennedy et al., 2011 |

| RESULTS | |
|---|---|
| RESULTS: POTENTIAL GAINS FOR YOUR FARM FROM REDUCING SCC from CURRENT to TARGET | €9,212 |

**Warning: These calculations do not account for diagnostic testing, increased labour, discarded milk or the quality of life impact (stress) of dealing with mastitis in a herd. If these costs were quantified and included the gains from reducing SCC would be even greater.**

**Please also note that there is a cost involved in reducing SCC (e.g. gloves, teat spraying, liner change) however the gains far outweigh the costs.**

| RESULTS: BREAKDOWN OF COSTS OF MASTITIS | CURRENT | TARGET |
|---|---|---|
| **Milk production losses** | | |
| Volume of reduced milk production (litres) | -33,736 | -24,681 |
| Value of lost milk production | €7,084 | €5,183 |
| **Potential gain from reducing SCC** | | **€1,901** |
| **Treatment** | | |
| Cost of treatment | €637 | €295 |
| Cost of days of milk withheld | €699 | €441 |
| **Potential gain from reducing SCC** | | **€601** |
| **Culling** | | |
| Value of cull cows | €5,532 | €3,817 |
| Cost of replacing culled cows with heifers | €14,595 | €10,069 |
| Net culling costs | €9,063 | €6,253 |
| **Potential gain from reducing SCC** | | **€2,810** |
| **Other costs** | | |
| Cost of replacing cows died due to mastitis | €0 | €0 |
| Cost of penalties imposed due to high SCC | €3,900 | €0 |
| **Potential gain from reducing SCC** | | **€3,900** |
| **Total** | **€21,384** | **€12,171** |

## Case Study 2

**INPUTS**

*Note: Values highlighted in yellow can be modified*

| YOUR FARM DETAILS & FARM PRACTICE ASSUMPTIONS | |
|---|---|
| Average milk production per lactation per cow on your dairy farm (litres) | 5,000 |

| HERD & FARM PRACTICE ASSUMPTIONS | CURRENT | TARGET |
|---|---|---|
| Total number of cows and heifers milking (Please enter) | 80 | 80 |
| Annual average SCC category (Select from the drop down menu) | 300-400 | 100-200 |
| Estimated milk production loss per cow as indicated by herd SCC, litres/lactation | -367 | -174 |
| How many cases did you treat in this lactation? (including repeats) | 25 | 13 |
| How many cows were culled due to mastitis? | 8 | 4 |
| How many cows died due to mastitis? | 0 | 0 |
| How much have you paid in processor SCC fines in this lactation? | €2,400 | €0 |

| COST ASSUMPTIONS | EURO | SOURCE |
|---|---|---|
| Milk sales gross margin (cents/litre) | 21 | See Assumptions |
| Treatment costs (euro) | | |
| CURRENT: Treatment cost per case treated | 17.61 | Treatment costs are based on rates of treatment and |
| TARGET: Treatment cost per case treated | 11.85 | treatment practices. See assumptions for more details |
| Volume of milk withheld per case treated | 107 | Assuming 6 days of milk withheld |
| Cull cow value (euro) | 550 | Industry expertise, updated annually |
| Heifer replacement costs (euro) | 1,451 | Kennedy et al., 2011 |

| RESULTS | |
|---|---|
| RESULTS: POTENTIAL GAINS FOR YOUR FARM FROM REDUCING SCC from CURRENT to TARGET | €10,614 |

**Warning: These calculations do not account for diagnostic testing, increased labour, discarded milk or the quality of life impact (stress) of dealing with mastitis in a herd. If these costs were quantified and included the gains from reducing SCC would be even greater.**

**Please also note that there is a cost involved in reducing SCC (e.g. gloves, teat spraying, liner change) however the gains far outweigh the costs.**

| RESULTS: BREAKDOWN OF COSTS OF MASTITIS | CURRENT | TARGET |
|---|---|---|
| **Milk production losses** | | |
| Volume of reduced milk production (litres) | -29,387 | -13,929 |
| Value of lost milk production | €6,171 | €2,925 |
| **Potential gain from reducing SCC** | | **€3,246** |
| **Treatment** | | |
| Cost of treatment | €446 | €158 |
| Cost of days of milk withheld | €570 | €300 |
| **Potential gain from reducing SCC** | | **€558** |
| **Culling** | | |
| Value of cull cows | €4,674 | €1,982 |
| Cost of replacing culled cows with heifers | €12,332 | €5,230 |
| Net culling costs | €7,658 | €3,247 |
| **Potential gain from reducing SCC** | | **€4,410** |
| **Other costs** | | |
| Cost of replacing cows died due to mastitis | €0 | €0 |
| Cost of penalties imposed due to high SCC | €2,400 | €0 |
| **Potential gain from reducing SCC** | | **€2,400** |
| **Total** | **€17,245** | **€6,631** |

## Case Study 3

**INPUTS**

*Note: Values highlighted in yellow can be modified*

| YOUR FARM DETAILS & FARM PRACTICE ASSUMPTIONS | |
|---|---|
| Average milk production per lactation per cow on your dairy farm (litres) | 5,000 |

| HERD & FARM PRACTICE ASSUMPTIONS | CURRENT | TARGET |
|---|---|---|
| Total number of cows and heifers milking (Please enter) | 80 | 80 |
| Annual average SCC category (Select from the drop down menu) | 200-300 | <100 |
| Estimated milk production loss per cow as indicated by herd SCC, litres/lactation | -309 | 0 |
| How many cases did you treat in this lactation? (including repeats) | 20 | 9 |
| How many cows were culled due to mastitis? | 7 | 2 |
| How many cows died due to mastitis? | 0 | 0 |
| How much have you paid in processor SCC fines in this lactation? | €0 | €0 |

| COST ASSUMPTIONS | EURO | SOURCE |
|---|---|---|
| Milk sales gross margin (cents/litre) | 21 | See Assumptions |
| Treatment costs (euro) | | |
| CURRENT: Treatment cost per case treated | 15.07 | Treatment costs are based on rates of treatment and |
| TARGET: Treatment cost per case treated | 18.21 | treatment practices. See assumptions for more details |
| Volume of milk withheld per case treated | 107 | Assuming 6 days of milk withheld |
| Cull cow value (euro) | 550 | Industry expertise, updated annually |
| Heifer replacement costs (euro) | 1,451 | Kennedy et al., 2011 |

**RESULTS**

| RESULTS: POTENTIAL GAINS FOR YOUR FARM FROM REDUCING SCC from CURRENT to TARGET | €9,772 |
|---|---|

**Warning:** These calculations do not account for diagnostic testing, increased labour, discarded milk or the quality of life impact (stress) of dealing with mastitis in a herd. If these costs were quantified and included the gains from reducing SCC would be even greater.

Please also note that there is a cost involved in reducing SCC (e.g. gloves, teat spraying, liner change) however the gains far outweigh the costs.

| RESULTS: BREAKDOWN OF COSTS OF MASTITIS | CURRENT | TARGET |
|---|---|---|
| **Milk production losses** | | |
| Volume of reduced milk production (litres) | -24,681 | 0 |
| Value of lost milk production | €5,183 | €0 |
| **Potential gain from reducing SCC** | | **€5,183** |
| **Treatment** | | |
| Cost of treatment | €295 | €168 |
| Cost of days of milk withheld | €441 | €208 |
| **Potential gain from reducing SCC** | | **€359** |
| **Culling** | | |
| Value of cull cows | €3,817 | €1,235 |
| Cost of replacing culled cows with heifers | €10,069 | €3,257 |
| Net culling costs | €6,253 | €2,023 |
| **Potential gain from reducing SCC** | | **€4,230** |
| **Other costs** | | |
| Cost of replacing cows died due to mastitis | €0 | €0 |
| Cost of penalties imposed due to high SCC | €0 | €0 |
| **Potential gain from reducing SCC** | | **€0** |
| **Total** | **€12,171** | **€2,399** |

## References


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Kelly, P. 2009. A study of the somatic cell count (SCC) of Irish milk from herd management and environmental perspectives. PhD Thesis 10732. Dublin, University College Dublin, Ireland.

Shalloo, L., P. Dillion, M. Rath, and M. Wallace. 2004. Description and validation of the Moorepark Dairy System Model. J. Dairy Sci. 87: 1946-1959.

CellCheck Farm Guidelines for mastitis Control, CellCheck Programme, Animal Health Ireland, November 2011

# CellCheck – National Mastitis Programme

**Finola McCoy, Programme Manager, CellCheck**

CellCheck is the national mastitis control programme, coordinated and facilitated by Animal Health Ireland. The programme is developed and delivered in partnership with industry bodies representing farmers, processors, service providers and Government.

We don't need to reinvent the wheel when it comes to mastitis control; we do, however, need to make sure that all the wheels run smoothly and in the same direction. This is where CellCheck has a role to play.

The objectives of CellCheck are:

- **Building Awareness**
- **Establishing Best Practice**
- **Setting Goals**
- **Building Capacity**
- **Evaluating Change**

The CellCheck programme will deliver on these objectives through the following activities and resources:

## 1. Monthly articles

In March 2011 a communications strategy was put in place to help build awareness about the CellCheck programme and the value of improved udder health, as well as to provide some key practical advice. These monthly articles appear in the Irish Farmers Journal on the first Thursday of every month, and are also available in the Teagasc Dairy Management Notes, co-op newsletters, vet clinic newsletters and the CellCheck website.

## 2. CellCheck Farm Guidelines for Mastitis Control

The *CellCheck Farm Guidelines for Mastitis Control* were developed by the CellCheck Technical Working Group, following a review of the *Countdown Downunder* mastitis programme in Australia. The *Farm Guidelines* were launched by the Minister for Agriculture Food and the Marine, Simon Coveney in February 2012. They are a collation of national and international scientific research and best practice in mastitis control. They contain independent, evidence-based information, providing clear, consistent messages. The *Farm Guidelines* are intended to be a practical management and advisory tool for farmers and service providers alike and are available to purchase from your local co-op or veterinary clinic at a cost of €15.

## 3. CostCheck

Based on recent Teagasc economic research, this interactive mastitis cost calculator allows the farmer to see the financial benefits of lower SCC by quantifying the financial gain that can be achieved by reducing SCC from current levels to a given target level.

## 4. Regional Coordinators

To date, 7 co-op representatives are working with CellCheck as Regional Coordinators. Their role is to be a local point of contact and information on the CellCheck programme, and to coordinate CellCheck Farmer Workshops, along with local service providers. They also provide the CellCheck team with feedback from the field to ensure continued improvement of the programme. They are based in the following locations:

- **Paul Cullinan** (Connacht Gold) – Mayo/Sligo/Galway
  ***Contact Details:*** pcullinan@cgold.ie or mobile 087 2470803

- **Tom Downes** (Lakelands Co-op) – Longford/Monaghan/Louth/Meath
  ***Contact Details:*** downest@lakeland.ie or mobile 087 2564669

- **Brendan Dillon** (Glanbia) – Kilkenny/Laois/Kildare
  ***Contact Details:*** brdillon@glanbia.ie or mobile 087 2626851

- **Tom Starr** (Arrabawn Co-op) – Tipperary/Limerick
  ***Contact Details:*** tstarr@arrabawn.ie or mobile 087 6697010

- **Paddy Coyle** (Connacht Gold (Donegal) – Donegal
  ***Contact Details:*** pcoyle@cgold.ie or mobile 087 2513096

- **Joe Moriarty** (Kerry Agri-business) – Kerry/Limerick
  *Contact Details:* joe.moriarty@kerry.ie or mobile 087 2341836

- **Sinead Treanor** (Carbery Group) – West Cork
  *Contact Details:* streanor@carbery.com or mobile 086 3585579

Further details are available from: www.cellcheck.ie

## 5. Stage 2 service provider training

CellCheck is providing training opportunities for all service provider groups – vets, farm advisers, dairy co-op milk quality advisers and milking machine technicians – to work together to provide farmers with a consistent and complete approach to mastitis control. Nationwide, multidisciplinary training for service providers started in February 2012, and almost 500 people have attended so far. Advanced training provides service providers with the skills, tools and techniques required to effectively deliver CellCheck Farmer Workshops, as part of a multi-disciplinary team.

## 6. CellCheck Farmer Workshops

The objective of these workshops is to help farmers to understand the causes of mastitis and highlight how making simple changes in their everyday milking routines can improve and maintain lower SCC levels in their herd. The workshops are delivered by teams of 4 trained local service providers. These teams consist of a farm adviser, a vet, a milking machine technician and a co-op milk quality adviser. Each workshop is 3 hours in duration; it is a farm-based workshop with a mixture of interactive, classroom style learning, practical workstations and group discussion. Group sizes are small (maximum 15 farmers), and there is a charge of €30 per farmer to attend. To participate in a CellCheck Farmer Workshop, contact your Teagasc adviser, vet, co-op milk quality adviser or milking machine technician. Alternatively, contact the Regional Coordinator for your area for details of the regular CellCheck Farmer Workshops being held around the country throughout 2013.

## 7. CellCheck Farm Summary Report

The Farm Summary Report has been developed by ICBF and members of the CellCheck Technical Working Group. This milk recording report provides the farmer with a clear overview of how their herd is performing in the area of mastitis control. It shows if a herd is on, above, or below target. It highlights the areas of excellence, and directs the farmer towards areas that may need to be looked at in more detail.

## 8. www.cellcheck.ie

For further information, check out the CellCheck website which contains information about the programme, planned events, as well as practical and technical information on mastitis control.

# Managing Risk to Secure Greener Pastures

**Sean McCarthy**

*Developer, DairyNZ, New Zealand*

## Summary


- Huge opportunities will be presented in a quota-free environment
- Define and manage the risks in your business
    - Risk is the effect of uncertainty on meeting objectives
- Set clear goals
- Generate a business model which delivers to the goals of everyone involved
- Establish current physical and financial performance
- Plan, budget and monitor spending
- Employ exceptional staff
- Maximise grass growth and optimise utilisation
- Breed and select for a robust and fertile dairy herd
- Create farm infrastructure which facilitates efficient use of labour
- Ensure efficient use of nutrients
- Collaboration within the industry will ensure productivity gains are achieved


## Introduction

The Irish dairy industry is about to enter an exciting period with the Food Harvest 2020 report proposing a 50% increase in milk output. This will provide great opportunities for existing farm businesses, new entrants to dairying and the wider rural professional industry. However, opportunity is associated with risk and it is important to eliminate unnecessary risk and establish management practices within the farm gate to minimise the impact of unavoidable risk.

From an industry perspective, any increases in scale must be aligned with increases in productivity. O'Donnell *et al*., (2008) identified opportunities for increased per animal production, increased stocking density and increased specialisation in dairying as opportunities to increase productivity on Irish dairy farms. Reflection on total factor productivity movements on New Zealand dairy farms over the past decade, a period where milk production on the average dairy farm increased by 53%, suggests some challenges in aligning expansion and productivity gains, Figure 1.

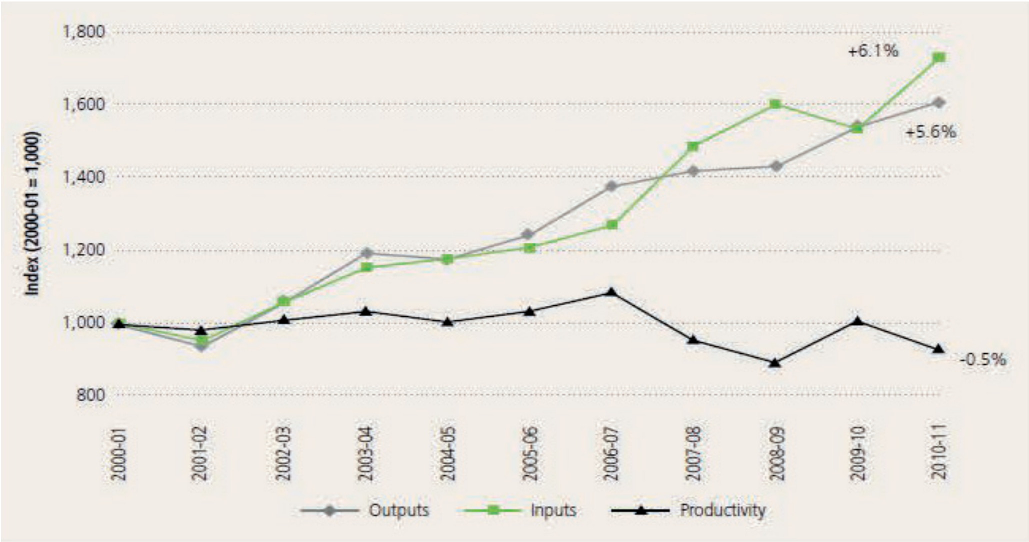


**Figure 1: New Zealand Dairy farm output, input and productivity movements** (2000-2011; *Source DairyNZ Economic Survey 2010-11*)

Management of risk within the farm gate will help realise those greener pastures while innovation across the industry will be required to ensure productivity gains occur. This paper focuses on key components of a successful farm business, (figure 2), and outlines some risk management strategies that can be implemented to ensure these components function as required.

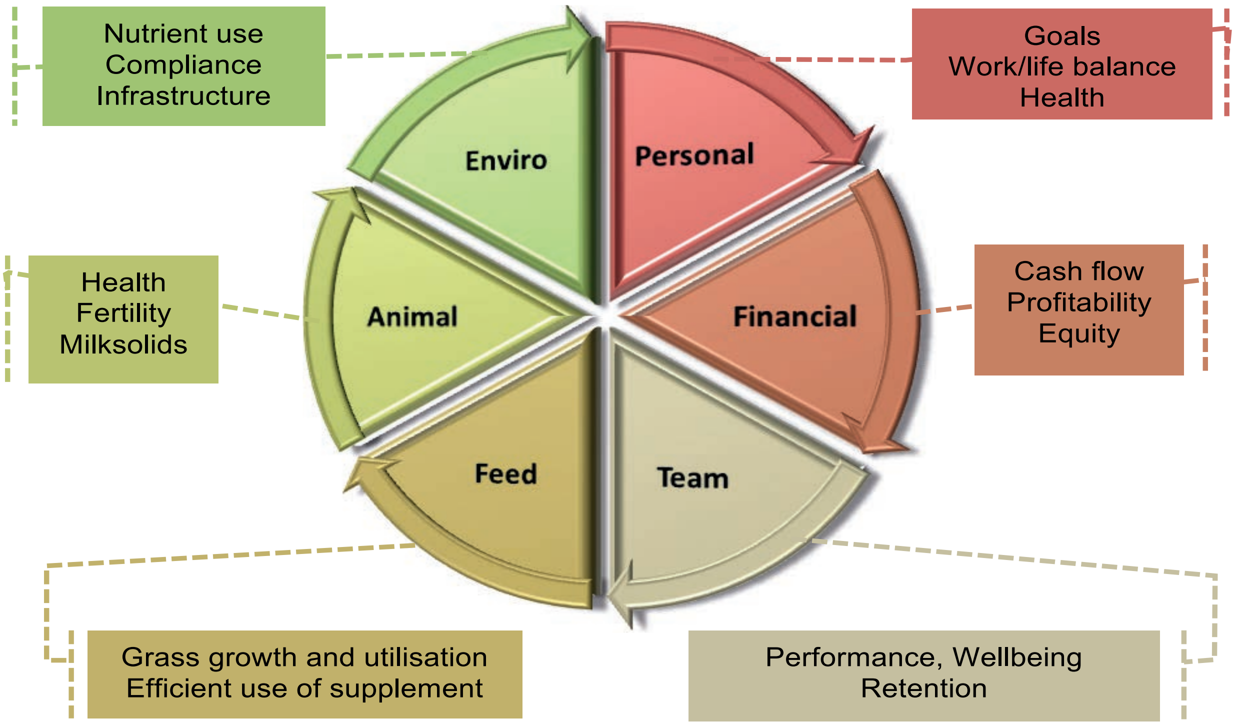


**Figure 2:** Critical components of a successful farm business

## Personal & Business Goals

A quota-free environment will present the opportunity to increase production levels. This must only be undertaken however where it delivers to personal and business goals. It is imperative to establish the goals of all stakeholders in the business. This ensures subjects such as personal needs and desires, succession planning and future proofing of the business for the next generation are discussed. Create a vision statement: How do you see your future life? What you want to achieve? What are the core principles and values you want to live by? Similarly, generate a picture of the farm business which will deliver this vision. Focus on aspects such as scale, cash flow and hours worked. Integration of these visions with written goals and action plans will allow for better decision making and assist in finding and evaluating opportunities.

Within the on farm environment, a team consisting of family members may fail to implement the tools required for an effective team environment. Create clearly defined roles and responsibilities for each individual and ensure access to relevant information for the successful execution of these roles. Ensure effective communication through formal team meetings, as required, to assist in ensuring good relationships are maintained.

As a business grows, it is essential to take time to work outside of the operational and management duties and review performance and strategy of the business. Ideally, this should be completed off farm. Network and interact with motivated people and learn from different approaches as this will positively impact on you and your business. Up-skill in areas including financial budgeting, human resource management and personal efficiency.

## Financial

An environment without milk quota will necessitate increased levels of financial acumen to address milk price volatility and assist in evaluating opportunities. With regard to milk price volatility, a major risk item, create a farm business which meets its financial commitments each year irrespective of the prevailing milk price. These commitments include the cash cost of production, interest and capital repayments, rent, tax and personal drawings. As risk management includes both minimising adverse events and maximising positive events, farm systems which offer the ability to produce milk at low cost in low milk price years and embrace opportunities in high milk price years are ideal. However, it proves extremely difficult to alternate between these scenarios as decisions made based on high milk price lead to investment in capital items which cannot be side-lined in low milk price years. In New Zealand, farm production systems have intensified in recent years and this has coincided with a sharp increase in breakeven payout, amount required for drawings, tax, interest, rent and farm working expenses (Figure 3). More intensive systems are associated with increased risk from milk price volatility due to increased sensitivity on the relativity between input and output prices. Inability to reduce costs in low payout seasons will result in financial woe. Therefore, it is extremely important in high milk price years, within a volatile environment, not to tie in costs associated with capturing this opportunity.

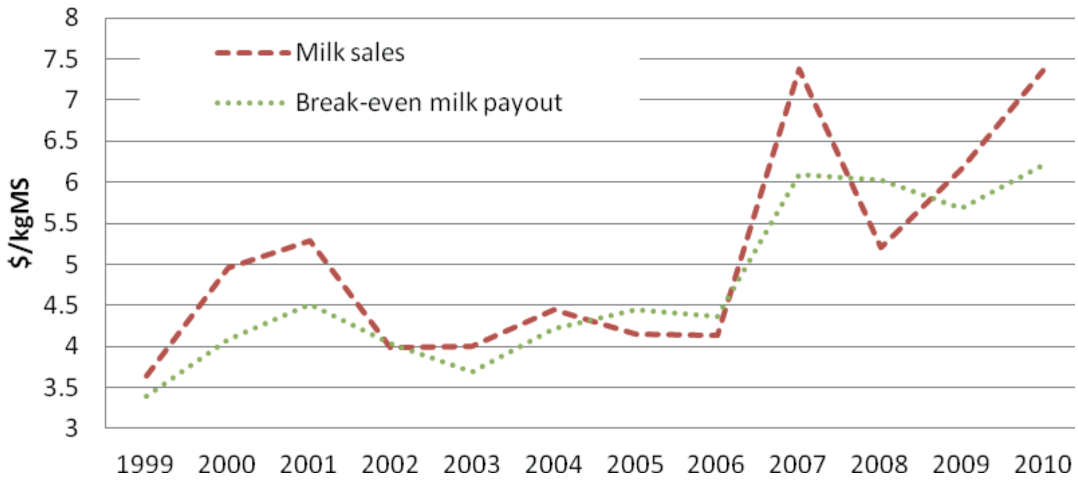


**Figure 3: Trends in milk sales and breakeven payout in New Zealand** (Source, DairyNZ Economic survey, 2010/11)

## Business planning

Formal long-term business planning is imperative when contemplating change. This relies on comprehensive and accurate records of past and present business performance, or prediction of first year's performance in the case of a new business, and predictions of future performance. The Teagasc Greenfield programme (www.greenfielddairy.ie) is an excellent resource providing insight into the physical and financial performance of new and expanding businesses which can be used in conjunction with other sources of knowledge such as your rural professional team (adviser/accountant/vet/banker etc). In-depth financial planning is also imperative in any land leasing scenarios to evaluate the return on any capital investment required and to determine the essential lease period and the appropriate lease price relative to return and risk. Ensure good financial planning is undertaken to allow good decision making in key areas of profitability, liquidity and solvency of the business.

## Cash flow planning

While business planning is a must, the actual level of profit subsequently realised will be determined by your approach to monitoring and tactical decision making. Effective budgeting and monitoring of cash flow will allow you be proactive and calculated with decision making. In addition to ensuring that the business is better prepared to meet on-going challenges, this will provide a low stress environment which will readily facilitate beneficial opportunities presented in a quota-free environment. Different approaches to preparing budgets are used including zero budgeting, where each year the entire budget is rebuilt, or alternatively simply focussing on the "big ticket" items and rolling over the other costs. This budget must be filed as a reference document with significant changes in prices during the year prompting a change to budgeted figures.  Create a plan for these scenarios at the outset of the year. Tight years need to be addressed in the good ones, by focusing on additional maintenance, additional reseeding or creating financial or feed buffers. For more information on budgeting resources contact your local Teagasc adviser or see: www.teagasc.ie/advisory/farm_management/monitor_budget_cashflow/

Unfortunately, capital expenditure is unplanned in many situations. Prepare a "wish list" at the beginning of the year with regard to capital expenditure, prioritising items based on the contribution to achieving goals and purchase only when the budget allows. Financial budgets need to be transparent to everyone with a significant influence on the financial performance of the business. Monitor actual results against budgeted figures, ideally monthly, and compensate for any overspending in one area by under spending in another. Ensure drawings are budgeted also. Partial budgets should be used to evaluate the financial impact of any incremental changes through the year.

## Team

A successful business is reliant on having a strong team on and off farm. Increases in herd size will result in an increasing reliance on hired labour, be it in the busy spring period or over the course of the entire year. It is clearly evident that high performing farms require exceptional people and therefore strategies to attract and retain the best people are paramount. Staff management will be new to many and will prove uncomfortable at first as control is partially relinquished. Job descriptions must become common-place, adding great value when seeking to employ people and subsequently in outlining responsibilities and determining any training requirements.

Labour sustainability will be determined by the complexity of the operation and the skills and attitude of the individual in charge. Any adaptations to the farming operation must be based on proven farming principles that can be easily implemented.  Create standard operating procedures for key tasks to ensure consistency and maximum efficiency is achieved. Where possible, instructions should be visual and at the point of use. Create simple systems with very clear parameters, policies and decision rules and incorporate new cost effective technologies to improve labour efficiency.

A competent rural professional team will positively impact on your farm business. Ensure meaningful interaction with individuals who will add value to your business including a farm consultant, banker, vet, Teagasc adviser, accountant among other service providers and select the most competent individual in each case. The increasing need for one on one advice to accommodate individual farm situations will require additional farm consultants offering proven technical and business planning advice. Private consultants need to up-skill in this changing environment and ensure that they have the resources to address the new challenges faced on farm and the ability to add increasing value to their clients' businesses. Teagasc must play a key role in ensuring adequate training and resources are available to enable this to occur.

The Irish banking sector will play a key role in allowing farmers the opportunity to capture viable business improvement and expansion opportunities. Rural bankers must contribute in a meaningful way to business planning in order to enhance their understanding of, and to add value to, their clients businesses. Those with an in-depth understanding of dairy farming and a willingness to work with their clients in a progressive manner will excel.

The areas of animal health and husbandry will require increased attention. Vets must provide input into the creation of animal health plans while breeding companies must ensure that they offer high quality products and services. Other service providers such as those supplying milking equipment, handling facilities and farm infrastructure must fully engage with the changing needs of farmers as herds expand and labour efficiency comes to the fore. The functionality of new infrastructure is paramount as is the need for easily operated and maintained systems given the inevitable fluidness of hired labour.

Dairy farmers around the world are renowned for their willingness to share ideas with their peers. It is through this sharing of ideas and critical analysis of new practices and technologies that viable changes are made on farm. Teagasc Dairy Advisers will be tasked with facilitating discussions on new challenges and opportunities. They will therefore need exposure to innovations of the most successful pasture based farmers as they increase scale and productivity, access to key research findings in a timely manner and resources to achieve on farm adoption of new technologies. Teagasc researchers must continue to enhance Irish pasture based systems with continual progress in all key areas including farm systems, animal genetics, grazing management, grass varieties, grass growth, farm infrastructure, labour efficiency, forage crops, animal husbandry, nutrient use and ultimately, farm profitability.

The knowledge gap on farm, in areas such as business planning, large herd, staff, project and business management, and the increased requirement for labour within the industry will prove to be a major challenge in the short to medium term. Teagasc research and extension will be required to ensure needs are met. Success will be determined by the rate of on farm adoption and hence a critical review of the current structure and approach to extension is required. Interaction with a greater number of farmers and service providers will be essential to allow progression on farm based on proven technologies. In essence, all rural professionals now need to reassess their service offering.

## Feed, Animals and Environment

Ireland has a competitive advantage in its ability to sustain low cost pasture based systems which offers the opportunity to achieve a low breakeven milk price and hence mitigate the effects of milk price volatility. The success of these systems is largely dependent on maximising the conversion of grazed feed to saleable milk and maintaining low animal wastage within the system. Dillon (2011) estimated that approximately 6.6 t DM/ha of grass was utilised on the average dairy farm in Ireland in 2010 with each additional tonne of grass utilised associated with an increase in net profit of €162/ha. All avenues to optimise the amount of pasture eaten on farm must be exhausted in order to reduce costs. Therefore, additional understanding of pasture and soil management in terms of pasture growth and utilisation is required.

Incorporate a planned approach to ensure a reliable supply of quality pasture is created and refine management and farm systems to optimise pasture utilisation. A schematic representation of a stepwise approach is suggested in Figure 4. Addressing challenges presented by soil fertility and physical characteristics (Moorepark Dairy Levy Research Update, Series 19) is the initial step. Existing pastures must be assessed and necessary reseeding undertaken. Ensure that grass growth and utilisation on the best soils are optimised before addressing the marginal areas on the farm. Assuming correct alignment of feed demand with grass growth, (through calving date and stocking rate) and the adoption of good grazing management techniques, strategies to ensure all milking areas are reseeded within 10 years should be devised. This will ensure maximum productivity is achieved given the low levels of sward renewal currently undertaken on Irish dairy farms (Creighton *et al*., 2011). Apply good pasture management techniques to optimise pasture eaten and to ensure efficient use of inputs of supplements and fertiliser.

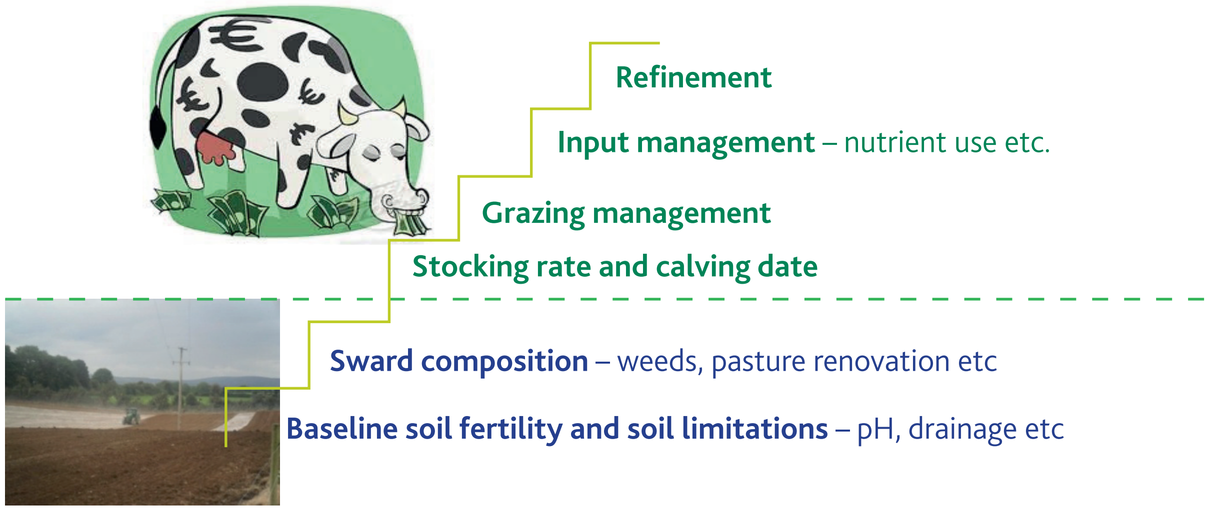


**Figure 4: Optimising pasture production and utilisation**

While grazed grass offers a low cost source of feed, it also brings some associated challenges including volatility in growth and utilisation. The first priority must be to offer an adequate daily amount of high quality grass to milking cows with low cost supplementary feed used in adverse periods. The use of pasture management tools such as the grass wedge, spring rotation planner and autumn planner are essential in addressing the challenges posed by volatility in pasture growth while grazing techniques and good farm infrastructure will impact on utilisation. Where supplementation is required, for cows grazing ryegrass pastures, energy intake is the predominant limiting factor. Therefore, feeds such as citrus pulp, soya hulls or good quality baled silage, harvested in surplus periods, are ideal supplement feed sources. Cost per kg dry matter or per unit of energy (UFL) must be the deciding factor.

Optimising grass consumption relies on understanding the management effects on plant growth and persistence, the benefits of using inputs at key times to manage pasture and choosing a stocking rate which allows these components to integrate successfully. Farm stocking rate must reflect the capacity of the farm to grow and harvest grazed grass. Summer 2012 again highlighted the exposure of grazing systems to climatic risk and hence the need for improved understanding with regard to drainage, farm infrastructure and other beneficial farm system approaches. The Teagasc Heavy Soils programme is a fundamental resource in this regard.

Continued selection of cows which suit the challenges associated with seasonal calving and a grazing environment is paramount and the economic breeding index (EBI) is providing more profitable herds (Ramsbottom *et al*., 2007). The accelerated uptake of high EBI genetics is commendable. Organic increase in herd size relies on low involuntary culling rates, or fertile and healthy cows. These traits benefit from hybrid vigour gains through crossbreeding. Liveweight per hectare and production efficiency differences between breeds (Prendiville *et al*., 2009), must be considered on heavier farms. Accurate record keeping will enable informed decisions on culling, breeding and animal health management and larger herds will necessitate increased use of animal identification markers.

Establish current performance before considering any future change with regard to key performance indicators (KPI's) such as grass harvested per hectare, milksolids per hectare, % in calf in the first 6 weeks of mating, variable and fixed costs. Benchmark your performance against others with a similar resource base using tools such as the Teagasc Profit Monitor and Grass Growth Calculator and ICBF reports.

## Conclusion

Establishing current performance, planning, monitoring and decisive reactions are key to ensuring those greener pastures are secured. Start the process now and complete the two actions below.

**Actions:**

1. Assess each risk by placing an **X** in the appropriate column based on the Probability of occurrence and the Impact on your goals. This will identify the greatest risks to you and your business which need to be managed.

| | PROBABILITY | | | | IMPACT | | |
|---|---|---|---|---|---|---|---|
| **RISK** | **Low** | **Medium** | **High** | | **Low** | **Medium** | **High** |
| Low milk price | | | | | | | |
| Personal sickness | | | | | | | |
| Adverse weather | | | | | | | |
| Animal disease | | | | | | | |
| High supplement price | | | | | | | |
| Inadequate feed supply | | | | | | | |
| Low grass eaten/ha | | | | | | | |
| Incompliance | | | | | | | |
| Machinery breakdown | | | | | | | |
| High empty rate | | | | | | | |
| Low 6 week in calf rate | | | | | | | |
| Reduced cash flow | | | | | | | |
| Poor work/life balance | | | | | | | |
| Poor staff performance | | | | | | | |
| High milk price | | | | | | | |
| Staff retention | | | | | | | |
| Ineffective service provider | | | | | | | |
| Succession | | | | | | | |
| High fertiliser price | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Prioritise the High Probability, High Impact risks and formulate the first management action

| **Risk** | **Priority** (1 - 5) | **Action** |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |

1. Complete this SWOT analysis of your business. Ensure a comprehensive review is achieved and consider updating this the next time your local discussion group visit.

| Focus Areas: Personal, Financial, Team, Feed, Animal, Environment | | | |
|---|---|---|---|
| INTERNAL | **Strengths**<br>*Build on...* | **Opportunities**<br>*Take advantage of...* | EXTERNAL |
| | **Weaknesses**<br>*Correct or avoid...* | **Threats**<br>*Steer away from...* | |

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# Managing Risk on an Expanding Farm

John O'Sullivan, Ballygree, Castleisland, Co. Kerry

## Introduction

I, together with my wife Marian and three children, farm a 25 ha owned dairy milking block on the outskirts of Castleisland Co. Kerry. The farm was purchased by my late father Christy in the late 1960s and has continually evolved with further expansion in mind. A pedigree herd of Holstein Friesian cows was started in the early 1970s giving the base for the herd that is milked today. The herd expanded in size over the years to 66 cows in 2008 and today the herd is at 93 cows producing over 500,000 litres. In 2009, 26 ha of adjoining land become available for a six year lease and presented an opportunity to significantly reduce my concentrate expenditure and expand my dairy herd. To date the herd has expanded by 30% and feed bill has dropped by 50% (excluding 2012). The leased land was in poor condition with little or no rye/grass, overgrown hedges and a poor road and water network. During 2009, 25% was reseeded with a further 50% in 2010.

## Key Risks that I have identified during my farm expansion

### Return on investment on leased land

One of my initial challenges was balancing the level of investment required to (a) upgrade the land and (b) expand the herd versus the potential return during the six year lease period.

### Upgrading the land

Since 2009, I have put in new roadways and cow paths, cleaned off ditches and drains around every field, reseeded 75% of the leased block and increased soil fertility through the application of fertilisers and lime. I would put an estimated cost of €700/ha on what work has been done to date for reseeding, hedges, roads and water. With this level of cost, together with the grazing time lost during the reseeding period, the potential to yield a return during the six year lease is challenging.

I would recommend that a dairy farmer should clearly understand the type of ground on offer and the level of investment required to yield a return. This is critical if the soil fertility is poor and land is not well maintained. I soil tested the farm in 2010 and all of the leased ground was below index 3 for phosphorous indicating how poor it was and how costly it was going to be to increase it's grass growing potential. I strongly believe that the higher the investment required, the longer the lease needs to be to allow the farmer to recover their investment and make a profit.

### Expanding the herd

When the leased land became available in 2009, I was fortunate to have a good infrastructure with sufficient housing and slurry storage available. While I had some replacements available, I had insufficient stock to fully benefit from the increased acreage immediately. There was a significant cost and time investment to bring these additional replacements to the milking herd and I had to balance this investment against the return I would achieve during the six year lease. My milking herd has now increased by 30% and the stocking rate on the milking platform this year was 2.4cows/ha.

While these additional stocks are farm assets, they are linked to the leased land, and therefore there is a risk that these extra cattle would need to be sold if the lease was not renewed. Using the Teagasc figure of €1,553 to rear an in-calf heifer, it is critical that I recoup my costs with the six year lease term.

## Cash Flow

For famers who are planning to expand into the future I think cash flow will be a huge stumbling block. Some elements to be considered include:

- Upgrading the land – This is key if soil indices are low and land requires significant investment to bring it up to a reasonable standard.
- Expanding the Herd – There is a considerable up-front investment to bring replacement stock through to the milking herd before they start to deliver a return.
- Infrastructure – expanding the herd can require additional housing, slurry storage, roadways etc. which will require early investment without an immediate return.
- Milk Price – Due to the risk of a fluctuation in milk price, cash availability during the expansion period can be a challenge.

What, if anything can be put in place to bridge these cash flow gaps?? Will the banks put facilities in place in the future for farmers like me who are expanding their farms?

## Controlling Farm Costs

Farming on heavy soils means that my costs are higher due to extra feeding, extra ground maintenance, etc. Over recent years, costs have been put under further pressure with poor weather, increasing input prices and poor milk price. The squeeze that is being put on my net margin is a risk to my business and is a major influencing factor on my expansion plans. I believe that if I did not regularly assess my costs this year by completing the Cost Control Planner weekly, the cost to produce a litre of milk could have spiralled up towards 30c/litre. My projected total costs for this year are 25.4/litre which excludes my own labour. This compares to an average of 20.1c/litre over the previous four years. This year's level of cost is unsustainable into the future.

## Grow and utilise more grass

One strategy to reduce risk on the farm is to reduce meal feeding and to grow and utilize more grass. With the exception of 2012, there has been a decreasing trend in total costs, specifically feed costs, while stocking rate has increased. Through improving soil fertility, reseeding, drainage and grass budgeting the farm is growing more grass. Using methods such as on/off grazing improved infrastructure and grass budgeting, I am aiming to utilise more grass. However, this has been a challenge in recent years with high rainfall throughout the year. Table 2 shows the level of grass grown and utilised on the dairy milking block. I estimate grass grown to be 2.6 tonnes DM/ha lower in 2012 than in 2011. Overall utilisation fell from 75% to 56% this year. While the farm has potential to grow a lot of grass on a good year, the high rainfall in each of the summer months greatly reduced my ability to get use out of grass grown. In fact if I had not harvested baled silage from the milking block in early September my utilisation would have been considerably lower

**Table 2.** Grass grown and utilised and meal fed, 2011 and 2012

| | Grass Tonnage Grown (tonnes DM/ha) | Grass Utilized (tonnes DM/ha) | Milking platform stocking rate (cow/ha) | Meal fed/cow (tonnes DM/cow) |
|---|---|---|---|---|
| 2012* (Projected) | 9.1 | 5.1 | 2.4 | 1.6 |
| 2011 | 11.7 | 8.8 | 2.46 | 0.85 |

* measured up to 30 October 2012

## Weather – Who can predict the forecast?

While nobody can predict the weather it represents one of the most challenging factors for the Irish dairy farmer. This challenge is compounded by the heavy soils in Kerry and can result in huge financial pressure if it goes in the wrong direction. I have been unfortunate that the weather during 2009, 2011 and 2012 has not been ideal and has added pressure to generate a return on the leased land. However I still believe that farmers need to take the risk!!

To counteract these poor weather conditions, my strategy is to increase silage reserves in the future, by tightening up the stocking rate on the milking platform from April to June and take off more high quality first cut silage. With average rainfall of 1200mm and 30% of this falling during May - August it can be difficult to plan ahead to build up silage reserves. With my heavy soils and wet summers I don't think I can rely on taking enough surplus high quality paddocks out for round bale silage. I do grass budget weekly and I will take out surplus paddocks as high quality bales as they arise but this will be a bonus in my system – I will not rely on this fully. There is little opportunity to take off surplus bales in average to highly stocked farms on heavy soils.

### Disease

With my plans of expansion, keeping a closed herd is important to me. I vaccinate for Salmonella and Leptospirosis and have been screening young replacements for BVD antibodies. While I am confident in my bio security and vaccination programme, the introduction of disease is always a real risk. For farmers who decide to expand through purchasing replacement stock, the risk of introducing disease is significant.

With my heavy soils liver fluke has been a major challenge for me especially in the last two years. With wetter summers and the restriction of many liver fluke dosing products, I have seen a huge increase in liver fluke infestation. I think that cows should be condition scored at dry off and reviewed again during the dry cow period. Cows calved down in poor body condition last spring and this didn't help getting them back in calf. The empty rate this year was 17%. On heavy farms, liver fluke is always an ongoing problem so using good fluke products and keeping a close eye on body condition is vital.

## Balancing Work and Family Life

I think one aspect that farmers forget about when talking about expansion is their own health. While there can be financial benefits to expanding the herd, this needs to be balanced with your family life. Some farms have increased cow numbers to over 120 cows without the support of additional labour and end up spending 5 to 6 hours a day milking cows. The finance may not be in place for some farmers to put in extra housing and facilities and they work long and hard hours to milk these extra cows. But I think this could have a negative effect on farmer's health. As for myself, I plan to milk 100 cows and carry replacements, while keeping in good health and lifestyle. Future expansion would have to be reviewed in terms of labour and infrastructure. Time management and planning are vital and we need to learn more about them. Planning your yard smartly and putting up good facilities will save a lot of time and energy. But again there are costs and risks associated with these for farmers expanding – the main one being the cost of putting in these facilities and bridging that cash flow gap.

## Strategies I have put in place to minimise risk on my farm

a) Soil sampling: This was the first step I took when taking on the leased land. This enabled me to draw up a nutrient plan for the farm and I could then plan ahead with what investment was required to increase soil fertility and to grow more grass.

b) Grass budgeting: I learned the skills of grass budgeting in 2009 and since 2010 I have been walking my farm up to 42 times a year, measuring and budgeting grass. As I mentioned, one of my goals in expansion was to reduce my concentrate expenditure which meant making more use of grass. By weekly grass measuring I know exactly how much grass is in each paddock and I can plan from there.

c) Cost Control Planner: I strongly believe in knowing what costs I have on the farm and I want to have control over them as much as I can. I have always kept a close eye on my costs by completing the Teagasc Profit Monitor but completing the Cost Control Planner weekly has given me even more control.

d) Housing cows during adverse weather: Rainfall this summer was 40% above average for this region. As a result I had to house the cows 60 nights and 30 days fulltime during the 2012 grazing season. This is a strategy I took on so as to avoid poaching the ground. I did feed extra silage and up to 1.6 tonnes meal/ cow but milk production was on par with 2011 and I will have grass for next spring rather than damaged ground producing less grass.

e) I bought a cattle weighing scales with three other members of my local discussion group in 2009. I weigh the heifers regularly during the year. This enables me to have heifers at target weight for breeding and calving down. Weighing the young stock takes the guessing work out of breeding and feeding decisions. I am currently feeding the young weanlings 3kg concentrate, mainly to stretch silage stocks. Based on their current weights I am confident they will reach target weight of 330kg by 1 May for breeding next year.

## Summary

Farming on heavy soils represents a challenge with many risks encountered along the way. How well I plan for those risks will determine how well the farm business can continue to deliver a reasonable standard of living for myself and my family. Thank you.

*"Only those who will risk going too far can possibly find out how far they can go."*
**T.S. Eliot**

# Starting dairying through partnership

**Ciaran and Seamus Seery,**
*Ballybrown, Streamstown, Co Westmeath*

## Summary

- In 1999 I qualified as a farm manager (FAB course) and by 2002 was working as a farm manager.
- My father, Seamus, was milking 55 cows and rearing cattle to one and a half years in 2002.
- We decided that we would form a partnership in 2002 and aim to make take two incomes from dairying on our farm
- Since the commencement of the partnership we have increased cow numbers to 110, invested in wintering facilities, built a new milking parlour and increased farm efficiency.
- With any decision there are risks. We are aware of the need to manage the risks to our business.
- Over the previous 10 years a lot of the decision making in the partnership has transferred to me, with my father taking less responsibility.

## Introduction

After qualifying from Mountbellew Agricultural College in 1996, I spent three years with the Farm Apprentice Board (FAB) programme and worked in Galway, Kilkenny and Meath. I qualified in 1999. My father, Seamus, was still actively farming at home, so I worked on dairy farms after qualifying from FAB and by 2002 I was working as a farm manager. Working away from home allowed me to experience different farm operations or as my father says "knocked the edges off me".

It was always my intention to return back to the home farm. However at the time the farm was carrying 55 dairy cows and rearing all claves to stores. Did the farm have the potential to deliver an income to me and to my parents? At the time the Celtic Tiger was really starting to take hold and many of my friends were getting big wages on construction jobs around the country. It was decision time for me and my family. At the same time the partnership scheme was launched. We were advised by our Teagasc Adviser at the time, Peter Burke, that we were eligible to form a farm partnership.

The main advantage for the partnership at the time was we could freely access quota. We sat down with our adviser, accountant and solicitor and drew up the partnership agreement.

Our plan was to increase cow numbers and continue to improve efficiency. On entering the partnership, we purchased as much quota as possible. Having bought the quota we were now in a rush to grow our cow numbers to match our quota size. We expanded rapidly. Maybe, in hindsight, we would have built slower over time and concentrated more on breeding, but we did benefit over the last 10 years from an increased Single Farm Payment.

## Progress to date

| | |
|---|---|
| 2002 | Partnership formed<br>Milking 55 cows<br>Started to purchase quota<br>Started to purchase cows |
| 2004 | Joined Purchasing Group |
| 2008 | Built new cubicle shed<br>No more cows purchased |
| 2008 | Built slurry storage (lagoon) |
| 2009 | New milking parlour (20 units)<br>Part of the farm transferred to me |
| 2012 | Milking 110 cows, rearing surplus replacements<br>Stocked at 3.45 cows on the milking block |

**Table 1:** Cow numbers and performance over the last 10 years

| Year | Cows | SR | Kg MS/Ha |
|---|---|---|---|
| | | | |
| 2002 | 55 | 1.77 | 766 |
| 2003 | 68 | 2.19 | 937 |
| 2004 | 90 | 2.9 | 1162 |
| 2005 | 101 | 3.25 | 1374 |
| 2006 | 93 | 3 | 1293 |
| 2007 | 104 | 3.35 | 1452 |
| 2008 | 106 | 3.42 | 1388 |
| 2009 | 100 | 3.22 | 1277 |
| 2010 | 115 | 3.71 | 1420 |
| 2011 | 107 | 3.45 | 1493 |
| Average | 94 | 3.02 | 1256 |

## Partnership Operation

It was a huge change for my father when I returned home. He had farmed the home farm on his own since he was 17. At the start, most management decisions were made by my father. As the years went by, I started to take more responsibility on farm. For example, at the start my father would have made all the grassland management decisions. As I upskilled myself on grassland management techniques, I started to have more of an input and now I do all the grass walks and make the grassland management decisions. This is just a small example. The same pattern happened in all aspects of managing the farm. The handover of management was a gradual process. It was not written down but happened as time went by. I do feel it's very important for the working of a partnership. If my father was still making all the management decisions on the farm I would be the same as hired help with no influence on decision making. This would lead to a lot of disquiet in the partnership.

Another key area in any partnership is the division of money. We have structured the partnership as a profit sharing agreement. Also we are both given an equal wage off the farm. Having a profit sharing arrangement is crucially important. This means that in any expansion or improvement plans both partners benefit. To manage our finances we sit down every few months and do cashflows to make sure we know where we stand. While there is a structure of how the profits are divided common sense is also used. Each partner will help out the other, like when I was building my house and some of the extra money from the farm was used.

I am not saying there have been no disagreements over the years. Like any father and son relationship there has been the odd argument. This is normal in any business and once you are both working to a common goal then it's easy to sort out any disagreements. My mother also gives us both great support and is a great mediator in any dispute.

## Unseen Benefits

When looking at partnership most think the sole benefit is accessing quota. While this has had a huge benefit on our farm there are a lot of other benefits to a partnership. Let's say I had got wrapped up in the Celtic Tiger construction boom. I would now be unemployed and looking to go back home. The farm would still be milking 60 cows and would have had not expanded its facilities. So the partnership allowed us to expand the farm sooner than if we I had stayed working. Also, if I was returning home to farm now after 10 years working in construction would I be able to manage and operate a farm to the same level my father did? I would not have gained the experience of his grassland management, financial management etc in the gradual change of responsibility over the last10 years. It would take me a number of years to pick up all these skills as my father hits an age where he hopes to step back more from the physical work on the farm. The partnership agreement allowed me to learn my trade before I had to manage the farm on my own. This leaves us in a far stronger position.

Allowing young potential successors a few years away from their home farm to see and learn new things is a good idea and it is to be welcomed. However I do feel it's important to start working on your own business by your mid twenties. Too often the successor comes home and there is no agreement or plan for the farm and they get disillusioned by farming. A partnership agreement allows all to grow the farm business together.

## 3 main messages

1. Both partners must work together, and have a common goal. We have had disagreements, but they were overcome as it was the same result we were after.
2. Financial position – this must be understood by both partners. We also were flexible, if one partner needed extra cash, it could be taken out of the business.
3. Age of entry – I feel we were both at the correct age entering the partnership. My father had almost 40 years of dairy and decision making complete, I had got my qualification and worked for a few years. If we had waited – perhaps we would not have the same ambition.

## What would we do differently?

Probably very little. I think we communicated very well, had trust and goodwill and any differences were overcome. We did purchase a lot of quota initially, but felt it was an opportunity that would not always be available. We did not focus enough on breeding initially, when we were chasing cow numbers

## Managing Risk

With any decision there are risks. The partnership agreement for us is no different. We are working to get two incomes from our farm while we also pay back the bank for our capital expansion. This means we have high drawings on the farm. Therefore it is essential we focus on efficiency every year to manage our risks. We cannot afford to be high cost operators. My father was a Teagasc Monitor Farmer before I came back home. We also took part in the Grass Roots programme and are active members in our local discussion group. All these have helped us to focus and improve our grassland management, fertility performance and financial management. I feel these are essential on any farm but when you have high drawings it focuses the mind more. We can't control the base price of milk and we have seen over the last few years an early taste of price fluctuation. By focusing on costs and efficiency we can mange the risk of a low price year.

Also our partnership meeting where we plan cashflows over the coming months give us control over the farm and where we are going. If we did not plan like this we could easily run the farm into a deficit.

We are running a high stocking rate on the milking platform. We reseed some part of the grazing platform each year to allow the farm to grow as much grass as possible. As we are stocked so high we would see having enough outside ground to deliver our fodder requirements a risk to the farm. Securing land by lease for fodder and replacement stock would be ideal. We may have to look at other options to help us manage this risk.

While the partnership may have brought some risks into our system it also helped us avoid other risks. I have now the experience and knowledge to operate the farm. If I had not this would be a major risk to the farm. The farm is developed and is at a more viable size into the future. If we had not expanded when we did, would we be able to do so now?

## Looking Forward

Over the next few years we will continue to operate in a partnership with my father stepping back more from the physical work on the farm. We will continue to focus on efficiency. We will look at opportunities that may arise over the next number of years to expand but will only do so if it is viable to do so. The availability of land is our area is a huge constraint at present. Hopefully over time this will free up and maybe we will be able to expand further.

# Managing Price Volatility in Dairy Farming

**Tadhg Buckley**

*Agri Advisor, AIB Bank. 2009 Nuffield Scholar*

## Summary

- Price volatility is part of a normal functioning market but excessive volatility can have negative consequences. Excessive volatility makes financial planning more difficult and may also result in the Irish dairy industry failing to maximise its medium-term potential due to reduced levels of investment both at primary and processor level.

- The financial effect of volatility is substantial. Based on 2011 Teagasc Profit Monitor data, a 6% drop in milk price equates to a 13% drop in net margin and is also the equivalent of a 53% increase in feed costs or an 85% increase in fertiliser costs.

- Milk price volatility has always been evident on world dairy markets. However, EU producers were shielded from its effects due to market management mechanisms administered by the European Union (EU). These market support mechanisms have been gradually removed since 2005 thus allowing EU dairy markets to become more closely aligned with international dairy markets. This has lead to a massive increase in volatility on EU markets since 2006.

- Volatility on world dairy markets has also increased since 2006. This is due to a combination of factors including the price inelasticity of dairy commodities; increasing integration of food commodity markets with financial markets and the increased globalisation of dairy trade.

- Farmers are more exposed than others to price volatility as they are price takers rather than price makers. In addition, the Irish Dairy Industry is also heavily export-dependent making it even more exposed to price volatility.

- The most effective way a farmer can reduce the worst effects of price volatility is by improving his/her competitive position. This is achieved by either increasing milk output price and/or decreasing average cost of production.

- There are currently a limited number of options available to dairy farmers to cope with price volatility. These include building a cash buffer, forward-purchase of inputs or adjusting capital spending.

- There are other options used internationally that need to be considered for Irish/EU producers. These include an income stabilisation tool, forward contracts and farm savings accounts.

- It is likely that price volatility, if not managed, will lead to reduced investment in the Irish dairy industry both at primary and processor level. It is therefore a major threat to the Irish dairy industry fully maximising the opportunity presented in a post-quota environment.

## Price Volatility – why is it a challenge?

Price fluctuation is part of a normal functioning market and allows supply and demand signals to be passed to producers. However, extreme fluctuations or volatility can have significant negative consequences. At producer level, excessive volatility makes financial planning and investment decisions more difficult. The completion of accurate cashflows is significantly more challenging when carrying out analysis of a potential dairy investment proposal. In addition, excessive price fluctuations may also lead those who are uncomfortable with constantly changing prices to decide against additional investment. This applies at producer level and processor level and could prevent the Industry as a whole from maximising its potential should it transpire.

During periods of very low output prices, only the most competitive of producers typically make positive margins from milk production. The deficit incurred during substantial downturns will require funding, most likely from either own resources or Bank finance.

End users who encounter substantial price volatility may consider switching from dairy ingredients to other ingredients. During periods of sustained price volatility, end users will consider investing in new processes that allow them to substitute other products that are less volatile for dairy ingredients e.g. butterfat with vegetable oil. Similarly, there are examples where food producers used other sugar-based products in place of lactose during sustained price peaks and changed their processes to facilitate this. There is no guarantee that these producers will switch back to the initial ingredient if it subsequently returns to more competitive pricing levels relative to the substitute ingredient. However, the movement of other commodities in tandem with dairy commodities does help reduce the risk of product substitution occurring.

## Price volatility – financial effect at producer level

A small change in milk price has a major financial effect for dairy producers. This is best illustrated by taking the example of a 500,000 litre dairy farmer in spring milk production. It is also assumed that the farmer in question has €300,000 of term borrowings over a 12-year term. A 2 cent/litre drop in milk price equates to a €10,000/ annum drop in revenue. Based on 2011 Teagasc Profit Monitor data this equates to:

- a 6% drop in milk price[i]
- a 13% drop in net margin[i]
- a 53% increase in total feed costs[i]
- a 85% increase in fertiliser costs[i]
- 116% of total Vet/AI costs[i]
- 122% of total contractor charges[i]
- a 30% increase in loan repayments[ii]

[i] Based on 2011 Teagasc Dairy Profit Monitor – average producer excluding own labour charge and direct payment income.
[ii] Loan interest rate of 5% assumed – used for illustrative purposes only and may not reflect current interest rates.

It is notable that the percentage drop in milk price has over twice the effect on net margin. Average milk price for 2012 is likely to be around 4 cent/litre lower than 2011 or levels double the above scenario. It is therefore very clear that changes in milk output price have by far the largest financial effect on milk producers.

## Why is price volatility now more evident?

For dairy producers in the EU, price volatility is a relatively new phenomenon. Prior to 2005 milk price was remarkably stable across the EU, as the European Commission (EC) managed the internal dairy markets, keeping prices stable through various market management mechanisms. However, these controls had significant market-altering effects on international dairy markets. Prior to the last World Trade Organisation (WTO) agreement, the EC agreed to significantly reduce market support and allow internal EU milk markets to become more closely aligned with international dairy market movements. The effect has been dramatic, with massive price movements evident since this policy shift in 2005.

This increased volatility, internally in the EU, has not been solely as a result of dairy policy changes. The policy shift was quickly followed with a substantial increase in dairy prices in 2007-2008 followed by a collapse in 2009 – price movements that were extreme in historical terms. However, dairy markets internationally have always been volatile.

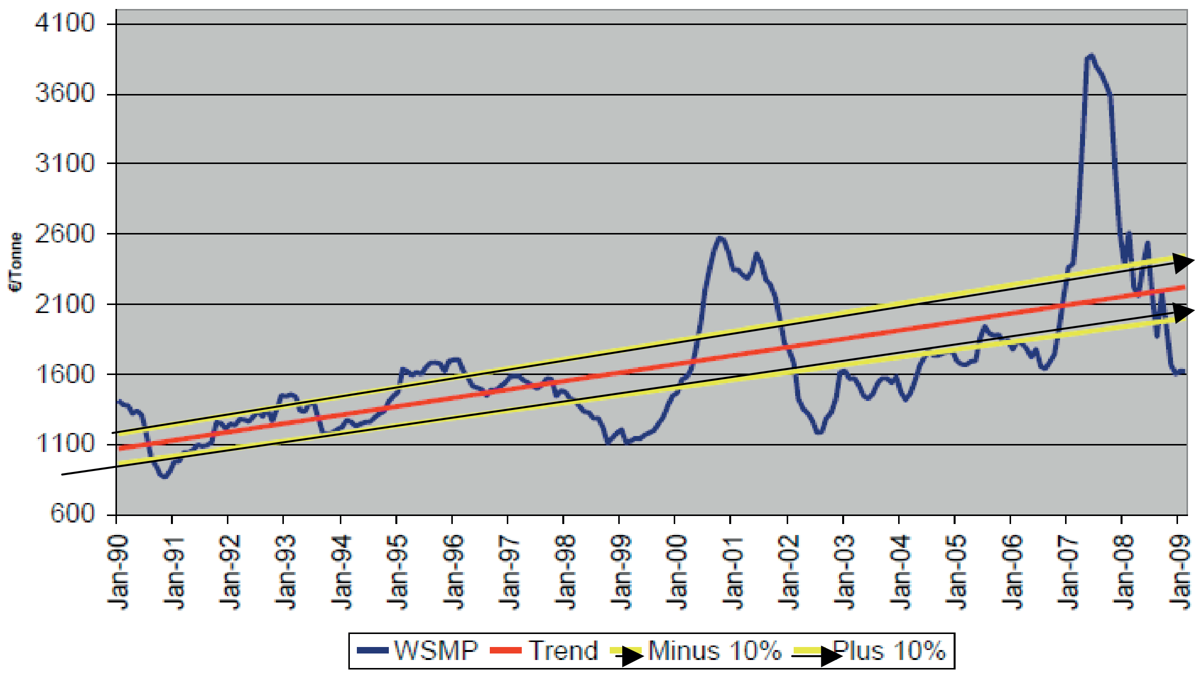


**Figure 1: World Skim Milk Powder, Trend and 10% Bands**

Source: Dr M Keane, UCC – presentation at Risk Management Conference, Amsterdam, October 2010

Figure 1 illustrates the level of volatility that has been evident over the past 20 years and shows that for sustained periods SMP (Skimmed Milk Powder) prices were at levels of greater than 10% above or below the trend price for the period. However, it is clear that there has been a marked increase in volatility since 2007.

There are a number of reasons why dairy prices are more volatile than before. Some of these reasons are as follows:

- Dairy (and other food) commodities are inelastic in terms of price demand. This means that a modest scarcity of product causes a major increase in prices and vice versa.
- Supply response in terms of increased production of dairy products is slow following a change in price. This is due to the nature of the production cycle in dairy farming which is prolonged when compared with other production cycles e.g. pigs.
- There is an increasing integration of global commodity markets with financial markets which is likely to have some effect in increasing speculation in food commodity markets.
- Increased globalisation of dairy commodity trade and increased price transparency e.g. Globaldairytrade auctions.

Taking the above factors into consideration, it is reasonable to assume that the current trend in price volatility in dairy markets is likely to continue into the future.

## Why Farmers are most exposed

Farmers are more exposed than others in the dairy industry to the worst effects of price volatility for a number of reasons:

- Farmers are price takers rather than price makers and are unable to easily pass on input price increases. In addition, farmers are exposed to both input price and output price risks. Milk processors and end users can limit their risk by passing on input price increases – this option is not readily available to primary dairy producers. It should be noted though that the increased power of retailers is making it more difficult for processors to pass on input price increases also.
- Irish and EU milk producers have limited options to hedge their milk price to reduce the worst effects of volatility. Hedging is defined as making an investment to reduce the risk of adverse price movements. In practical terms, it would involve a dairy farmer fixing the price of his/her milk for a defined period of time in order to provide milk price stability.
- The Irish Dairy Industry is heavily export-dependent and is a seasonal producer of mainly commodity products. This makes the Irish dairy sector more exposed to volatility than other EU countries.

## Which Farmers are most exposed to the effects of price volatility

Price volatility will not impact on all dairy farmers in a similar fashion. The potential impact will be very much down to the competitive position of the farmer in question. In addition, the type of farming system employed will also govern what type of hedging of milk price will be available to the producer.

Before any farmer makes a decision on hedging milk price, if that option is available, he/she must first establish their competitive position, as it will govern what effect price volatility will have on their business. The basis of this theory was put forward by Torsten Hemme, Chairman of the IFCN Dairy Network at the 2009 World Dairy Summit and is best explained by Figure 2:

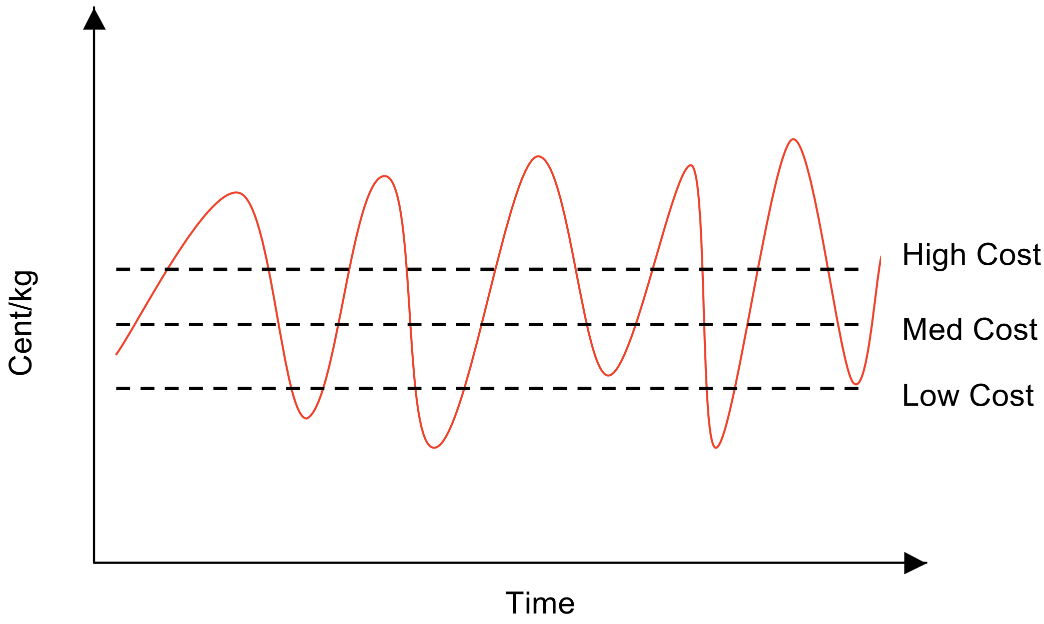


**Figure 2: Competitiveness comparison – high cost vs low cost producer**

The erratic line above represents a volatile milk price while the broken lines represent the cost of production of three different producers. These three different producers have been categorised into high cost, medium cost and low cost. So what effect does price volatility have on each of these producers?

### High cost Producer

Managing price risk and volatility is not the issue here, it is competitiveness. This producer will struggle to operate profitably with the exception of unusually high milk price periods and will eventually be forced to exit dairy farming unless he/she improves competitiveness. Price adequacy rather than price volatility is the issue in this case – the average milk price is not adequate to sustain the business at its current cost of production. The main objective for this farmer must be to reduce his/her cost of production and/or increase their average output price (most likely through improving milk solids) to a level which is sustainable in the medium-term.

### Medium cost Producer

This producer will benefit from risk management on milk price. Hedging of milk price will not improve their average milk price, (if anything it will slightly reduce it), but this producer will manage better financially with periods of very low milk price as in 2009. This producer is typically farming an efficient high-input system. Therefore, any price risk management strategy needs to incorporate management of input costs particularly given the recent volatility of input prices.

### Low cost Producer

This producer can cope with periods of very low milk price relatively comfortably. Therefore, hedging of milk price will not confer the benefits that it will to a medium-cost producer as milk price volatility does not have any significant long-term financial implications. Potentially, they may gain more from not hedging as a hedged milk price will be slightly lower on average in the medium-term than the unhedged market price. This low-cost producer is most likely in a low input grass-based production system.

## How to reduce price volatility effects

The options to manage price risk available to Irish producers are currently limited. Some of the options available are as follows:

- As shown earlier in the paper, improving competitiveness is a very effective way of positioning your farm business to deal effectively with price volatility.
- Build a cash reserve during high margin periods – this reserve can then be used to fund any deficits incurred during periods of low milk price.
- Use bank finance to fund cash deficit periods. This option is available, but its effectiveness will be governed by how efficient the farm business is. For high-cost inefficient businesses, there will be substantial deficits to finance and it may take a substantial period of time before the deficit incurred is repaid, possibly not before another deficit period is encountered.
- Forward-purchase of inputs as well as adjusting capital spending (e.g. capital fertilisers (lime, P and K), re-seeding) are methods of managing cashflow in order to better prepare a farm business for a downturn.
- Income averaging can be used in order to reduce variances in tax liabilities incurred, thus helping to manage farm cashflow more successfully.

## Managing price volatility – other potential options

There are other potential options available and in use in other countries to help farmers manage price volatility. Four of these options are examined in detail below:

### Income Stabilisation Tool

This is a subsidised mutual insurance fund which producers would contribute to and avail of under a specific set of circumstances. An Income Stabilisation Tool proposal is currently included as part of the draft Pillar II CAP reform proposals. Under this proposal farmers would be able to access the fund under the following circumstances:

- Farm income drops by over 30% of previous 3-year average or Olympic average of previous 5 years.
- Compensation cannot exceed 70% of income loss.
- Maximum community funding of 65% of total cost of fund.

It is likely that a fund of this type would be cumbersome to operate from an administrative point of view. In addition, it remains to be seen whether the proposal makes the final CAP Reform agreement. The aspect of co-financing may also make it unattractive to some states should it become available.

It should also be noted that income is defined as inclusive of any direct payments. Going forward, the EU still views the Single Farm Payment in its revised form as the primary tool to reduce the worst effects of market price volatility.

### Hedging of milk price using futures markets

Hedging of price is defined as making an investment to reduce the risk of adverse price movements. An example of this would be a dairy farmer availing of a futures contract to reduce the risk of a fall in milk price. Dairy futures markets are well-established in the US where some dairy farmers use them directly to hedge milk price. Where using futures markets to hedge output price, it is also strongly recommended to hedge the bulk of your inputs also. This reduces the risk of a negative movement in input prices eroding a farmer’s net margin.

Despite the availability of futures markets in the US for around 20 years, less than 5% of dairy farmers use them directly. This is explained by a number of reasons; only very large farmers can justify using them directly, they are complex and therefore need a high level of understanding to use them effectively and there can also be substantial financial deposits required to use them.

Futures markets in the EU are still at a very early stage and the lack of an independent auditable milk price index is a major drawback in their development. Futures markets are of major benefit to heavy end users of product who can use them to stabilise the price of their dairy inputs.

## Hedging using forward contracts

This is similar to hedging using futures markets. However, forward contracts are more flexible and are generally offered through a milk processor. A recent example of this would be the Glanbia Fixed Price Scheme. As with futures contracts it is important to hedge input prices in tandem. Forward contracts are used successfully in the US where milk processors offer them usually in conjunction with a commodities broker. The disadvantages of these are that you are tied to the milk processor for the duration of the contract and a farmer cannot exit should milk price increase substantially.

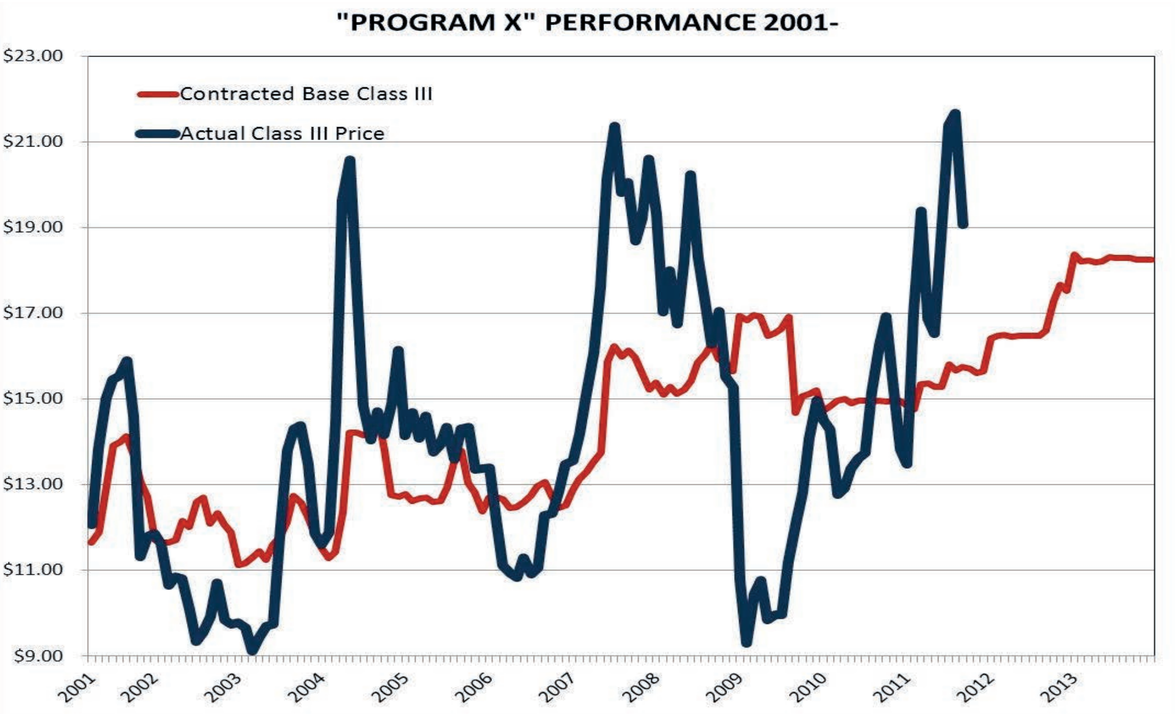


**Figure 3: Forward Dairy Contract – US Example** *Source: Blimling & Associates*

During the above 12-year period, the average hedged milk price was $13.84/cwt versus an average unhedged milk price of $14.15/cwt, a 2% difference in milk price. This illustrates the fact that you cannot beat the market, but you can make the ride less bumpy. Hedging of milk price gives producers some degree of certainty, avoids the peaks and troughs that those in unhedged positions experience and it results in a very similar milk price over a long-term period.

Even with the option of forward contracts, such as above, the use of this remains quite low in the US. In all, it is estimated that as little as 20% of US dairy producers use some form of price risk management.

### Farm Savings Accounts

This is a designated savings or deposit account designed to encourage farmers to build a cash buffer fund during high margin periods for use during cash deficit periods. Their use is encouraged normally through a tax deferral incentive. Various eligibility criteria can be incorporated, including a maximum deposit per farmer and a maximum length of time before the tax deferral expires. In terms of tax planning they are quite similar to the existing income-averaging option; however they also encourage participants to build up a cash buffer. Their availability would also reduce solely tax-driven investment. Variants of these savings accounts are currently in use in Australia and Canada.

## Conclusion

- Price volatility is a relatively new phenomenon for Irish and EU dairy farmers who were previously shielded from its worst effects. However, all indications are that the price volatility evident over the past 5 years, is likely to continue into the future.

- Dairy farmers, due to the nature of their business, are significantly exposed to the effects of price volatility. Those in high-cost production systems are even more exposed and need to look at improving competitiveness as their first priority in order to position their business to better cope with the effects of volatility going forward.

- Currently, the options to manage volatility are limited for Irish dairy farmers. Internationally, there are other potential options available, such as forward contracts and farm savings accounts, whose use could help substantially in managing future price volatility in Ireland.

- It is likely that price volatility, if not managed, will lead to reduced investment in the Irish dairy industry both at primary and processor level. It is therefore a major threat to the Irish dairy industry fully maximising the opportunity presented in a post-quota environment.

# Is Ireland ready for more milk?

Liam Fenton, FCStone

FCStone Commodity Services (Europe) Ltd.

The European dairy market has fundamentally changed as a result of changes to the Common Agricultural policy. One of the adverse effects of this is the volatility, which we have seen in the prices of agricultural commodities. This is a pattern we have seen in other Dairy markets before, and unless we see a return to CAP this is not going away.

The positive side of this reform of CAP is that it presents a tremendous opportunity for Ireland to expand production and capitalise on what we do best "grow grass"! It is also our view that taking in to account demographics and expansion of middle class population in BRIC countries, dairy is the commodity that will have issues increasing supply to cope with demand.

Ireland has the capacity to increase production but from our perspective this is going to take a lot of Investment with everybody along the supply chain. The companies that are going to contract and consume this product. The processors of this milk, in the form of new driers and production facilities. The farmers producing this extra milk in the form of more cows, slurry spreader's, slatted sheds.

At farm level, this time last year we had just come off two years of good grass growing conditions, increasing milk prices up to 34 cents a litre. The press was talking about a 50% increase in production by 2020. The natural instinct is to go out and invest to increase production. For the majority of farmers in this situation this investment is going to be done on borrowed money.

So six months on we have the perfect storm, grass isn't growing, grain prices are going through the roof and the price of milk is collapsing. Suddenly we had gone from a situation where we had borrowed to invest to where we are trying to borrow to stay in business with no guarantees of any improvement next year.

How can we cope with this volatility? Well the good news is that there are tools to cope with these uncertainties that have been used in other agricultural markets for over a hundred years. These financial tools help us cope with the price volatility so no matter where your place is in the supply chain if you have financial exposure to an adverse price movement then you can hedge this risk.

This enables the farmer when he is planning on borrowing for future investments create some certainty as to regards both his inputs and his outputs. So as in my example above where the farmer would have been able to secure the price of 20% of his production for the next two years at 34 cents a litre.

They allow processors hedge their future production from a price perspective and enable them raise finance to expand this production.

INTL FCStone started originally as a Co-Operative, in the mid west of America, formed by 550 other Co-Ops to develop for their farmers and their customers and indeed the Co-Op itself in ways of managing price risk and educating the supply chain on these tools.

We have now started to develop a similar role for ourselves here in Europe and at Teagasc National Dairy conference we would like to take the opportunity to explain how these tools work and how they can be adopted to take an important part in the growth of the Irish Dairy industry.

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