

# **Transition to scale using pastoral dairy farming systems**

**A 2006 Irish Nuffield Farming Scholarship Award**

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# 1. Executive summary

## The key conclusions of this report are:

1. Scale on its own will not improve the lot of Irish dairy farmers – efficiency is essential to derive any benefits from increased herd size.
2. Family farm operations in general will achieve better outcomes than operations that rely on hired labour due to greater attention to detail.
3. Simple grass-based systems are easier to implement and duplicate in large herd situations.
4. Fertile cows enable rapid organic growth. Crossbred cows are more competitive in large herd situations. Once-a-day milking is attractive on difficult geographic farms.
5. Use of supplements are feasible and economic where high stocking rates on the cow grazing area (platform) ensure that substitution of pasture does not occur and milk price ratio relative to the cost of purchased feed is favourable.
6. Simple herringbone sheds with a maximum number of units per person enable rapid throughput. Rotary parlours for herds in excess of 300 cows will enable introduction of automation.
7. The true potential of ryegrass pasture is not appreciated by many dairy farmers.
8. The vibrancy of rural communities may suffer in the absence of income support.
9. Greater land mobility essential for Ireland to achieve its potential as a dairy farming country.

## 2. Recommendations

### 2.1 Policy

1. Milk quota in Ireland must be rendered irrelevant as soon as possible. Ireland should push for a minimum increase in the national quota of 3% per year in the interim period towards quota abolition.<sup>1</sup>
2. Allow REPS<sup>2</sup> participants to lease their holdings long term and partnerships between dairy and non dairy farmers should be facilitated.
3. The REPS and the Single Farm Payments should be means tested and targeted towards vulnerable enterprises so as to break the link between land and non trading income and increase the availability of land for long term leasing.
4. State eradication programme for BVD and Johnes' disease should be established now that Brucellosis seems to be under control.
5. There should be state support for labour saving devices and farm consolidation supports such as underpasses, drafting systems and low cost housing and waste storage.<sup>3</sup>

### 2.2 Research

1. Large scale research farm should be set up as quickly as possible and run as a commercial unit.
2. The use of nitrate leaching inhibitors needs to be evaluated under Irish conditions.

### 2.3 Key performance indicators

1. Live weight of dairy stock should be reassessed as a negative in Irish dairy breeding index.
2. Production per cow should be expressed as kilos of milk solids as a % of that cow's live weight.
3. Comparative stock rate (CSR) measures stocking rate based on cow size and feed available and is a good way of comparing stocking rates across systems with different levels of feeding i.e. 86kg LW/T DM.

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<sup>1</sup> Proposed by the Irish Farmers Association prior to the publication of this report.

<sup>2</sup> Rural environmental protection scheme

<sup>3</sup> Low cost housing eligible for grant aid under farm improvement scheme, announced Aug 2007.

## **2.4 Animal breeding**

1. The massive potential rewards from using gene-marking technology to source animals of superior genetic potential should be investigated to try and rectify the effect of a historically low usage of artificial insemination and milk recording.
2. Cows that do not have full pedigree status (known as ASR and BSR grade) should be qualified as potential bull mothers to help increase the pool size of these animals.

## **2.5 Public relations**

- Dairy farming needs to be aggressively promoted as an attractive industry from the point of view of remuneration and lifestyle.

## **2.6 Impact of de-regulation**

- Dairy farming and cereal growing enterprises will expand on the most favourable soils, assuming artificial market impediments such as REPS are removed, with dry stock enterprises (by and large) developing on marginal land.

### 3. Introduction

I am 39 years old, married to Yvonne and we have four young children. We have leased a family farm of 57 Hectares under the EU early retirement scheme from my father for the past ten years. The main enterprise on the farm is dairy farming, milking 48 cows to fill a quota of 227,000 litres. The rest of the farm area supports a replacement heifer enterprise, beef cattle and a small pedigree sheep flock – a proverbial mixed bag!

It's fair to say that dairy farming is my passion. However, under the milk quota regime as it was run in Ireland, it has been extremely difficult to grow a substantial dairy farming business. In fact we have had access to (on average) 5,500 litres of milk quota annually over the past decade to purchase. Some would say that I could have leased land and quota but I took the view that I would be taking on land which I did not need, reducing efficiency as a result and a beef enterprise done well would deliver the same financial result. Surplus cash invested off-farm has been rewarding but not an immensely satisfying experience.

However, this report is not about looking back, except for creating background information. Dairy farming when I commenced my study found itself at a crossroads. Prices were falling and partial compensation from the EU was paid in the form of a direct payment which was not index linked. The regime left an average herd size nationally competing in a global market where our main competitors in commodity dairy products are substantially bigger at farm and industry level.

Thankfully this situation has improved during 2007 with milk prices starting to rise and opportunities for expansion appearing due to the belated introduction of a milk quota exchange scheme. This scheme was proposed by a previous Nuffield scholarship winner in Ireland, Seamus Quigley over four years ago, which may illustrate a slow rate of change in the Irish dairy industry.

With the milk quota regime in the EU, and latterly in Ireland, starting to loosen its grip, I take the view that for the first time in my career I can concentrate on what I do best – turning grass into milk. This opportunity excited me and encouraged me to apply for a Nuffield scholarship so I could research potential opportunities ahead and hopefully avoid the pitfalls that may lie along the way of growing a dairy farm business.

## 4. Background information

In any discussion involving dairy farmers or the dairy industry, the word ‘scale’ inevitably arises. One is entitled to ask why, but also when we examine the history of dairy farming worldwide over the past decade, it becomes increasingly clear why this is the recurring theme.

The production of commodity products coupled with relentless pressure from supermarket multiples has reduced the dairy farmer’s margin over that time. Figures produced by the milk development council in the UK show that in the period 1995 to 2004, in the case of liquid milk, farm gate price has fallen by 24% in nominal terms while the retail margin has increased from 5% to near 70 %, despite the fact that the retail price only increased by 11%. Similarly, in the case of mild cheddar, a fall of 25 % in the farm gate price has occurred alongside a doubling of the retail margin and a modest 3 % increase in the retail price. It is not the purpose of this report to bamboozle the reader with facts and figures but suffice to say that this trend has been replicated world-wide with other dairy commodities.

How have farmers responded to this phenomenon? Very few countries have been as constrained by the milk quota regime in Europe as Ireland because of liberal milk quota exchange/purchasing systems. In most other European countries, and worldwide, the trend has been clear – namely a fall in dairy farmer numbers, an increase in herd size and increased production per farm. The Prospectus report, a strategic development plan for the Irish dairy processing sector, reported that the average herd size in Denmark and the Netherlands had increased by 100% and 57 % respectively in the 10 year period to 2001. Even across the border in Northern Ireland the average herd now produces in excess of 360,000 litres, over 50% more than in the Irish Republic.

Dairy farmers in Ireland in 2006 were faced with a similar dilemma, now that the Common Agricultural Policy (CAP) reforms are starting to bite. The future is quite predictable, reduced supports for dairy products with partial compensation in the form of a direct payment. The natural response of any business in this situation would be to expand to compensate for reduced margins. As Adie Zwanenberg, Head of research at Rabobank in the Netherlands told me; “...when milk prices fall, farmers produce more milk and when milk prices rise farmers produce more milk!” Perhaps this quote partly explains the introduction of the milk quota regime nearly a quarter of a century ago.

The purpose of this study is to look at the experience of dairy farmers in other countries where production is pasture-based and expansion has taken place over the past ten years. Countries and regions I identified as worth visiting were Pembrokeshire in the UK, Tasmania, Australia and New Zealand.

## 5. The Study

The first leg of my travels in 2006 took me to Pembrokeshire in south Wales, an area with very similar weather patterns to southern Ireland and a tradition of pastoral dairy farming. To all intents and purposes milk quotas became irrelevant in the UK over the past five years due to a failure to fill the national quota because of reduced margins. I was keen to see how farmers had responded to this situation.

Later in the year I travelled to Tasmania in Australia. During a previous visit to New Zealand in 1990 many Kiwis were identifying this state as a land of opportunity for share milkers because of attractive land prices. I wanted to investigate the reality.

New Zealand (NZ) was my next port of call, the home of innovation and enterprise for dairy farmers down through the years. NZ farmers have been unsupported for the best part of twenty years now so complacency at farm level is not an option. NZ has an even higher exposure to world commodity markets than Ireland so a focus on efficiency and maximum use of grazed grass is imperative.

The common theme linking all the above countries is that there is no limit to expansion at farm level although in NZ dairy company shares have to be purchased. In Ireland in 2006 the constraint of quota seemed to be receding and I wished to compile a report which would help to prepare myself and other forward-looking Irish dairy farmers for the next decade.

I visited many dairy farmers in Ireland in between my travels and I genuinely believe that we have some of the best dairy farmers in the world, especially when you consider that they have succeeded in growing their businesses (albeit at a slower pace than our competitors) under one of the most oppressive and politically intrusive regimes imaginable. It has taken the best part of a decade for policy makers in the Irish dairy industry to start to realise that social engineering, which is my own definition of the milk quota re-structuring regime, has delivered the same result as it did in the former communist states of Eastern Europe.

This policy basically diverted small amounts of milk quota to the smallest producers as well as ring fencing milk quota in less favourable areas. When I commenced this study, the average herd size in Ireland was in the region of 50 cows, with many producers using land surplus to requirements for filling their milk quota for less profitable enterprises such as beef production.

The key areas I will analyse in this report are:

- Could increased herd sizes maintain or increase farm incomes?
- Labour and infrastructural requirements for increased herd sizes.
- Advances in grassland management of relevance to Ireland.
- Genetic requirements of dairy cows in pastoral dairy farming systems.
- Potential environmental impacts of increased scale.



## 5.1 New Zealand

**Dairying is the biggest rural industry**  
**3.9 million Dairy cows**  
**14.6 billion litres of milk processed**  
**95 % of milk processed by Fonterra dairy company**  
**20 % of New Zealand's exports and 7% of Gross Domestic Product**  
**Four million people**

As a consequence of the small population in NZ, over 90 % of all milk is exported at a milk price in euro terms of circa 17 cents per litre in 2006 (world market price).

Professor Colin Holmes told me that an average cow in NZ produces about 330 kilos of fat and protein worth 500 - 600 euros per year and she must eat 4.2 tons of dry matter to achieve this. Gross income is therefore about 12 to 18 cents per kg of **dm** eaten and the feed must cost much less than 10 to 18 cents per kilo of dry matter to enable a profit to be made after all other costs are paid. This equation confers that grazed grass at less than 3 cents per kg (variable costs only) is the most profitable feed compared to any of the alternatives which require higher milk prices to ensure profitability.

The recurring theme for dairy farmers in NZ was one of entrenchment, faced with falling payouts and increasing costs. Payment had fallen from 5.30 dollars per kilo of milk solids in 2003 to a projected 4.05 in 2006 with the possibility of a further adjustment downwards.

Colin Armer, a director of Fonterra told me that the exchange rate of 0.66 cents/US dollar, coupled with rising energy costs was crucifying the processor. However in the same period shares in the company had risen from \$2 pre-establishment to a present value of \$6.50, making dairy farmers in effect asset rich and cash poor.

Land values have increased dramatically over the past five years with Peter Buckley, the chairman of Federated Farmers in the Waikato region, telling me that the average dairy farm was selling for in the region of \$35 per kilo of milk solids produced. Therefore an 80 hectare farm at a stocking rate of 3 cows per hectare, producing 1100 kilos of milk solids per hectare would cost over \$3 million. Mike Dalgety, who manages four farms near Ngatea commented that these high prices, coupled with falling payouts, were generating an average return of capital of around 3.5%. The saving grace for the transaction over the past few years has been the absence of capital gains tax in the NZ economy, so farmers selling land at present are generating attractive returns and high returns on equity. Many farmers are happy to gear up<sup>4</sup> significantly targeting high farm earnings before interest and tax payments (EBIT).

The question has to be asked – what is driving these high prices? Buckley told me that many smaller farmers were sub - dividing their properties and selling these sections as lifestyle blocks to people moving from urban areas to the countryside. Also farmers who had received the aforementioned capital gains were willing to trade up again, effectively ignoring the miniscule returns, a situation not unlike the Irish land market.

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<sup>4</sup> Increased level of debt

**It is fair to say that balance sheet farming is widespread in NZ at present with only a committed core group recognising that cash is king and farming with their profit and loss account to the fore of their minds.**

In the September 2006 issue of Fonterra's shareholder magazine, it was stated by the chairman that 71% of dairy farmers in NZ had a cash deficit with a payout of NZ \$4.00 or less per kgMS. In my opinion this is because many farmers lost their focus on grazed grass during high payout years, allowing extra costs such as feed wagons to enter the system. These costs still remain even though a lower payout prevailed during my visit. Since my return from NZ payout has risen significantly – a classic commodity price cycle.

It should be mentioned that dairy farms in NZ are sold inclusive of shares in Fonterra and any potential new supplier has to stump up the value of these shares if they are not attached to the farm. This is creating significant difficulty for the traditional life-blood of the industry – share-makers. The traditional route taken in the dairy industry by share milkers involved working for a wage, moving to varying % takes of the business returns with farm owners as a share milker. The traditional next step was to sell some of their cows, releasing equity which was used as a deposit for their first farm. With high land values, many of these people are now electing to remain on wages or move into equity partnerships, an arrangement where a number of people combine their assets to purchase a farm, splitting the return commensurate to their % stake.

Usually one of the partners acts as manager of the property. However Armer said that if share milkers cut back on the fancy bikes, trucks and holidays, more of them would be able to buy farms!

Astute investors in the dairy industry are now looking off-shore to buy farms in areas such as South America, parts of Australia and even the United States where double-digit returns have been projected. Over the past decade, many traditional beef and sheep farms on the south island have been converted to dairying because of lower land values but this disparity with the north island has been closed. Even forestry land has now been mentioned as ripe for conversion but water use issues may stymie significant development of this land.

This brings me to the other major challenge for NZ dairy farmers at present, increasing environmental restrictions. Recognition of desirability to maintain a clean image in a country so reliant on exports led to more regulation and compliance costs in areas such as dairy effluent disposal. Indeed in the Waikato, helicopter observation of this practice twice monthly has led to stiff penalties for persistent offenders. Buckley commented that stocking rates in the area of 3.2 cows per hectare were on the border of sustainability for effluent disposal. With general lower rates of chemical nitrogen applications compared to European farms, nitrogen loss from animal waste under high stocking rates has been seen as undesirable at government level. Dexcel the research and extension service in NZ are currently undertaking experiments using nitrification inhibitors – enzymes that slow down the process whereby the nitrogen present in urine converts to urea, thereby reducing the leaching of nitrate from pasture over the winter months. I was amused to hear that a new trial involved building a herd home (basically a slatted shed) was being used to capture run off during the winter months! A reduction of 25 % in the level of nitrate leached was achieved in a previous trial by using a stand-off pad at night during winter months. The local Waikato council was setting a target of 40 kilos of nitrogen leached per hectare, which to my mind will necessitate a reduction in stocking rates on dairy farms in the future to circa 3 cows per hectare.

With Fonterra targeting a 3% increase in milk supply yearly, many farmers that I talked to were questioning their motives. Indeed increases in profitability by increasing efficiency rather than milking more cows were seen as more desirable. It should be mentioned that the legislation enacted to create Fonterra enabled smaller companies to be formed, in competition with the dairy giant, with Fonterra obliged to supply these companies with raw milk. One such company in the Waikato, Open Country Cheese has a waiting list of suppliers as they do not have to purchase shares to start supplying the company, as they would if supplying Fonterra.

Debt levels on dairy farms countrywide are running in the region of \$1NZ per kilo of milk solids produced per farm. Indeed Ken Bartlett, a consultant, told me that in his region - the Waikato, in the central North Island - levels were closer to 1.66. With his best client achieving costs on farm of \$1.73 and the average around \$2.15 with average labour charges of circa 0.50 cents per kilo this leaves current returns as modest when a payout of close to \$4 is factored in. Interestingly he told me that banks were quite comfortable with this situation because of the substantial increase in value of farms and Fonterra shares over the past few years even if clients were actually posting a loss! Ken said that banks were probably too flexible with their lending policies at present.

**To demonstrate what is achievable, I look to people such as Steve Atkinson and the Kurigers in Taranaki who are returning farm operating costs in the region of \$1 per kilo of milk solids. Indeed when Steve's interest and farm costs are combined the total is similar to the average farmer's total farm costs, showing what can be achieved by sticking with a simple grass based system.**

### **Conclusions;**

- Short term prospects for the NZ dairy farmer were difficult, but Colin Armer told me that their industry has had to cope with peaks and troughs in the past and has always come out stronger.
- With Fonterra trading 40 % of the world's dairy commodities and aiming to be, as he put it, "the biggest Gorilla on the block", this downturn will be seen as an opportunity by some, especially if farm prices moderate.
- With every one cent movement in the exchange rate with the US dollar, creating an eight cent difference in the payout, the impact of factors outside the NZ dairy farmers control is clear.
- In my view, many farmers could still address their on farm cost structures with significant potential gain when /if payout rises in the future.

## 5.2 Australia

**Dairying is the third biggest rural industry**  
**8840 dairy farms producing around 10 billion litres of milk**  
**Just under 2 million milking cows**  
**61 % rely solely on family labour**

Farm gate prices in Australia have improved in the past year as a result of better export returns and dairy companies competing for milk. Despite these conditions, national milk production has not grown as farmers have focused on consolidating their businesses and improving their financial position rather than producing more milk.

Historically, each Australian state had its own milk pool with no interstate trade even though there was no legal impediment to do so. Queensland's market was predominately liquid milk (drinking) and paid up to 55 cents per litre (c/l) in late 1990. Tasmania's market meanwhile was based predominately on manufacturing (cheese, butter, etc) and delivered returns of only 21 c/l.

Deregulation took place in 2000 with interstate trade commencing and followed by a fall in the disparity in price between regions to a point today where liquid milk only commands a small premium of circa 3 - 5 c/l. Dairy farmers were compensated by virtue of an interest free loan from the Commonwealth Bank and secured by the government. This payment was based on a three year average production profile of each farmer and consisted of a lump sum, which could also be taken over seven years. (Not dissimilar to the single farm payment regime in Europe without terms and conditions!). Many high cost operators took their payment and exited the industry. Land prices have increased from 2 - 3000 Aus dollars to 6-7000 dollars at present (irrigated dairy land) as returns have improved and farmers competed for land.

During my visit in 2006 farmers were struggling with one of the worst droughts in history. Water was extremely scarce, grain was scarce and extremely expensive and Australia's dairy exports look like they would only achieve 50% of normal levels. Many cows were dried off or moved to areas such as Tasmania where the drought has not impacted with the host farmer receiving the milk production income from these cows.

## 5.2.1 Tasmania

Most of my travel time in 2006 was spent in Tasmania, so I will concentrate on the situation in this State. Tasmania is relevant to Ireland as it is an island off the mainland of Australia with milk predominately processed into commodities. The last five years have been characterized by decreasing dairy farmer numbers, static cow numbers, seasonal variability and improved farm productivity.

Tasmania has the largest average herd size in Australia at 275, even though it only produces 6% of Australia's total production. Production is regarded as pasture-based, although with an average production per cow of 4500 litres and an average level of concentrate fed per cow in the region of one ton, I would question this assertion. However with a reliable source of low priced grain, from arable areas and the mainland until recently and an uneven rainfall pattern, this feeding level is not surprising.

The big issue for Australian dairy farmers now and into the future is undoubtedly water availability. On the farm where I based myself, water was collected using dams during the winter period and used for irrigation during the summer dry period from Dec - Feb. Sprinkler systems predominated on the undulating land with some centre pivot systems on flat country. Where water had to be purchased it cost in the region of \$50 per mega litre (1 million litres). Nitrogen use varied depending on the farmers grassland skills with low levels, less than 200 kilos /ha, being used on my base farm where a NZ share milker, Theo Van Brecht and Cheryl McCartie (50% share of profits with farm owner) had a clinical view of cost control. Up to three times this level was used on some farms, much of it introduced through the farm sprinkler system.

One of the big surprises for me was to hear of a region where dairy farmers were paid a bonus of between \$10,500 for a 130 cow herd to \$23,000 for a 600 cow herd for increasing milk production over and above the previous year's production. This encouraged increased herd size. The company paying this bonus is Bonlac which is owned by the New Zealand Company, Fonterra that is aggressively targeting expansion in Victoria and Tasmania and competing with an incumbent processor called Murray Goldburn. However Alan Davenport who is involved in agric-politics told me it was a worry that the major milk processor was owned by the dairy farmers in a major competitor country! He suggested that the Australian dairy farmer may be first in line for price cuts when the inevitable industry downturn materialises.

The new head of the dairy research centre in Tasmania is an Irish man, John Roche from Kerry. At a farm discussion group BBQ, a recently retired farm advisor Ron Hall told me about the current farm development programme in Tasmania, called 20 – 12. This programme sets the target of increasing grass production per hectare to 12 ton on dry land and 20 ton on irrigated pasture by increasing water use efficiency and better use of grass species like fescue. Personally, I feel that better use of existing grassland technology would achieve better financial outcomes for Tasmanian dairy farmers than purely targeting increased grass growth.

I met three dairy farmers, two of them New Zealanders who were producing in excess of 400 kilos of milk solids per cow on virtually grass alone which infers a high level of substitution of pasture with grain at farm level. One of these farmers, Gerry Cairns (an Australian), had cows yielding 28 litres of milk on grass alone in early November, coming up to peak. I spent another day travelling around with an AI technician, Graham Shearer when I experienced the good, bad and ugly of Tasmanian dairy farmers in efficiency terms, going from the above example to a situation where grain was fed at levels up to 7 kilos with grass effectively wasted in the paddock.

Looking at the genetics on offer, which were of North American origin suggested the same levels of infertility in cow herds as in other countries that used this material although it was hard to get an accurate figure from farmers as to exact empty rates because of a high level of carry over of empty cows from one year to the next.

So what are Tasmanian (Australian dairy farmers) earning? Figures were supplied to me by Cheryl McCartie and extrapolated by Lance Davey, a consultant. The average 200,300 and 600 cow owner operators had disposable income of 55, 94 and 146,000 dollars respectively in 2004 with all labour fully costed. Using prevailing exchange rates at the time of writing this would indicate modest returns in an Irish context but it has to be stressed that these are average figures and are two years out of date. However with grain prices having doubled in the first half of 2006 one would expect that incomes for 2006 -07 will not be dissimilar.

### **Conclusions;**

- Tasmania is a state with potential for profitable expansion because of competition between processors, Fonterra and Murray Goldburn, reasonable land prices and scope for increases in pasture utilisation. This has been recognised by neighbouring NZ farmers with Ron Hall telling me that in the region of 50 farmers from that country were looking at potential investment each month. This has happened in the past with the successful investors being the farmers willing to marry NZ pasture management with Tasmanian irrigation techniques and winter feed requirements.
- Australian dairy industry is highly reliant on water for irrigation and grain.
- Neither resource to become more available or cheaper in the medium term because of increasing environmental restraints in the case of water and higher prices because of alternative requirements such as ethanol production in the case of grain.
- Increasing NZ influence with the presence of Fonterra in Victoria and Tasmania and sharemilkers from NZ working on the ground.
- Potential reduction in costs of production in Tasmania by increasing the % grazed grass in the diet.

## 5.3 United Kingdom

**14 billion litres of milk**  
**19300 dairy farmers**  
**Two million dairy cows**  
**Average herd size 92.**  
**Source: Milk Development council (MDC) 2004 data**

### 5.3.1 Pembroke shire

Most of my time spent in the United Kingdom (UK) was spent in the Pembroke shire area of South Wales as it has a similar climate to Ireland and has a tradition of pastoral dairy farming. The UK has not filled its quota in recent years so the price of quota purchase has fallen from 62 pence per litre in 1996 to circa 5 pence in 2005. At this stage nearly 50% of dairy farmers have in excess of three million litres of quota even though it is no longer a constraint. I visited farms that had expanded rapidly over the last decade, with herd sizes similar to NZ now fairly widespread. From this side of the Irish seas we get the impression of a government who do not care about their agricultural industry. This can be a positive as I got the impression that farmers are not over regulated as long as they are not causing damage to the environment.

The Pembroke shire area seems to have a hub of discussion groups who are at various stages of development as regards grassland management standards. Indeed the standards attained by farmers outside these groups did not seem to be as good. I asked one farmer with 600 cows when he introduced supplementary feed. He replied; “when the grass runs out!” This is hardly an indication of good grass budgeting. This is a potential trap that Irish farmers could fall into when land availability becomes a major constraint. I also met farmers who had capitalised their business with excessive machinery. They told me this was to keep the workers busy!

Some of the farmers that I met were looking to niche markets to try and reduce their exposure to the cost price squeeze that was prevalent in the UK, due to the aggressive price deflation pursued by the milk processors. A typical milk pricing system attempted to avoid a widespread move to seasonal calving. The farm milk production was divided by twelve and 80% of this monthly supply was deemed to be the core price, with the other 20% deemed to be the marginal price which varied according to the season. During my visit in July the marginal price was only at 60% of the core price, whereas in October it was set at 140% of the core price. Using the prevailing exchange rate this would indicate a milk price of 20 euro cents per litre during May and June i.e. peak supply for a seasonal calver.

Three of the farmers I visited were trying something different. Will Pritchard of Harverfordwest had negotiated a town supply contract and had started winter milking a section of his herd. Jack and Suzie Warner and Andrew and Rachel Giles had converted to organic production.

Andrew and Rachel Giles story is of interest as he was awarded the title of UK dairy farmer of the year in 2002 and was one of the most impressive performers visited. Andrew grew up on an

arable farm in Portugal but always had an interest in livestock farming. Meeting Rachel at Harper Adams agricultural college, they married and moved to west Wales where they purchased a 125 acre farm which needed extensive development in the late seventies. Through quota purchase and land leasing they grew their business to supplying 2.2 million litres of milk in 1995. At that stage growth was constrained by their land base and they decided to purchase 175 acres with 300,000 litres of quota for £380,000. This included some property. Following a trip to NZ in 1998 they saw the potential of low cost grass-based dairying.

They converted their farm to spring calving entirely and applied for a tenancy on their present holding in Hay on Wye, which was successful. This allowed them to scale up significantly with 450 acres available around the dairy unit. They sold one of their existing farms and put a manager on the other farm. Their biggest difficulty was one that I encountered when talking to many farmers who had followed the same route, namely health issues arising from combining herds and trying to find a cow suited to a grass-based system. Most recommended blanket vaccination and purchase of calved animals that could go straight to grass.

With milk prices falling in the UK, and their manager wishing to leave, they decided to sell their second farm in 2003. The proceeds were used to reduce debt further but continuous price erosion caused them to question the direction they were going so in 2004 they decided to commence conversion to organic status. Andrew explained to me the reasoning behind this decision.

Farm size 480 acres -194 Hectares	
<b>ORGANIC</b>	<b>CONVENTIONAL</b>
<b>300 Cows</b>	<b>500 Cows</b>
<b>23 p per litre</b>	<b>16.5p per litre</b>
<b>414000 Gross income</b>	<b>495000 Gross income</b>
<b>1.5 Lu /Ha @6000 litres</b>	<b>2.5 Lu/Ha @6000 litres</b>

Looking at the figures in the above table it is clear that conventional dairy farming generates a higher gross income but when the extra labour required to run this unit is factored in as well as the obvious savings in fertiliser on the organic system, Andrew and Rachel decided to convert. The fact that all the farm had been reseeded over the last few years, meaning a high percentage of clover was present also was a decisive factor. Andrew stated that the opinion of his peers was one of the biggest difficulties in coming to this decision!

### Conclusions;

- Lack of a co-operative movement has left UK dairy farmer very exposed to whims of supermarkets.
- Benefits of low cost milk production not being fully realised because of penalties for seasonal production.
- Farmers looking at all alternatives such as organic production.
- Spare capacity in processing sector at present that could possibly be of benefit to Ireland.



## 6. Key principles of grassland dairy farming

Adrian Van Bysterveldt made a presentation to The Positive Farmers' conference in Ireland in 2006 outlining the progress made on the Lincoln University Dairy Farm (LUDF) in NZ in increasing the returns from a dairy farm by improving grassland management. He created quite a stir among those present.

On the LUDF over four seasons, performance levels have increased by achieving maximum dry matter intake of the highest possible metabolisable energy (ME) pasture throughout the year. An increase of 400 kilos of milk solids per hectare (ha) was achieved without any increase in purchased supplementary feeding. It must be noted that this performance is achieved using ryegrass/ clover swards growing up to 20 tons of dry matter per ha under irrigation.

While in NZ I was fortunate to visit LUDF as part of my travels and Bysterveldt outlined the target set for the farm -- to grow a large amount of high quality pasture to survive for the maximum possible time, most of which will be either eaten or conserved. Bysterveldt used an amusing analogy to explain the importance of this high ME pasture. If a human being eats a bar of chocolate or a bowl of porridge for his/her breakfast they consume a similar amount of energy. However, after eating the porridge one will be satisfied for a longer period because of the longer digestion period due to a higher level of fibre in the meal. The cow that eats the high ME pasture has the desire to eat more of this material due to the speed of digestion of this material, similar to the human consuming the chocolate bar!

This high ME is achieved by ensuring that residuals post-grazing are managed to around 1480 kg/dry/matter per ha<sup>5</sup>, says Bysterveldt. This prevents development of plant reproductive growth in late spring when reproductive tillers develop at high rates. Interestingly, a presentation at Moorepark Research Station in Ireland by Eimear Kennedy showed similar results.<sup>6</sup> When pre grazing yields were deemed to be excessive (greater than 3200 kg/dm/ha) these paddocks were cut for silage as quickly as possible, assuming the overall farm cover was also rising. The rapid ensiling of these pastures ensured a supply of very high quality feed which could be used during deficit periods. Also the pasture was ready to graze again in the shortest possible time.

The decision whether to make this pasture into silage is taken during a weekly dairy farm meeting where at least two people discuss the grass covers present on the farm. Using a bar graph to present the covers of grass present on each paddock and a line which indicates the ideal wedge shape for the farm at that time this decision making is greatly simplified.

This is not an entirely new development according to Arthur Bryan who outlined his pasture management system when I visited his farm near Cambridge in the central north island. Bryan emigrated to NZ from Ireland nearly 30 years ago, settling in Taranaki initially, moving to his present location in 1989.

Bryan achieved the highest production in his area in 1993 (1300 kg /ms /ha) on non-irrigated pasture with no purchased supplement, managing 380 Jersey cows using the techniques mentioned above. His aim was to give his cows a main meal but no desert for most of the year. This simple system has generated surplus cash, which has allowed Bryan to develop to the point where he now has four farms calving 1480 cows in 2006 with seven full time staff.

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<sup>5</sup> Total grass cover.

<sup>6</sup> Moorepark open day autumn 2006.

As we walked his farms, observing pasture quality and residuals as well as looking at data on current performance for each farm -- which he received from his dairy company -- it struck me that it was a trial of sorts at farm level. Bryan has a policy of minimal re-seeding; believing that [animal] hoof and tooth are key tools for pasture improvement and sustainability. We walked his four farms with Bryan being visibly disappointed with the pasture residuals on display on the first two farms that we visited. When we found residuals to his liking at around 1400 kg /dm/ha he commented that the manager of this farm was frustrated that he was not achieving the production levels of the other farms. Bryan's comment was: "all is not lost until the fat lady sings!" At a time of year akin to May in Ireland his comment re-enforced the long-held principle that grazing management in early season still determines season long production.

Dexcel advisors (dairy advisors to farmers) in Waikato, on the north island of NZ have taken on the LUDF concept as a mantra to graze religiously to 1500 Kg/DM/ha. However the number of clicks on the plate meter which indicates this may be different than in Canterbury in the south island due to different pasture densities.

Indeed, Bryan just tells his men to graze down the pastures to 7-7.5 clicks on the plate meter, assuming average farm covers of 2000-2200 on the grazing platform. This would indicate average maximum pre-grazing covers of 2800 - 3000 kg/dm/ha. In my opinion, this negates one argument proffered as to the inaccuracies of using a plate meter as a grassland measurement tool. The high covers (in excess of 3000 kg/dm/ha) which a plate meter struggles to measure accurately should not be present on an efficient grassland farm to a large extent. It must be said that this system has not been successful on all farms. NZ farm consultant Ken Bartlett said some of his clients with old pastures and weed invasion suffered falls in production when trying to implement the system, indicating that modern ryegrass cultivars are necessary for the system to work.

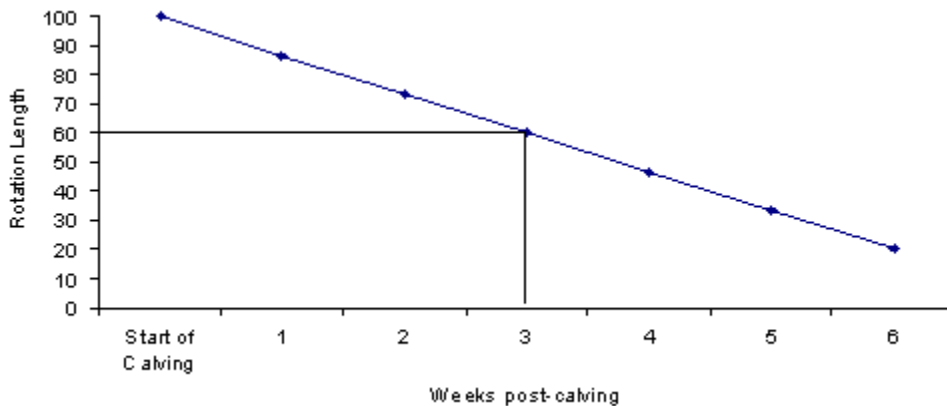
NZ dairy farmer Colin Armer told me of principles used on his many farms carrying in excess of 10,000 cows. This detailed a cover of 2200 kg/dm/ha at drying off on June 1, 2400 at start of calving on August 1 and a cover of 1800 on magic day (when growth exceeds demand) on September 20th. Armer targeted calving a week earlier than his region's average with nil intervention at mating to allow a natural calving spread. His target was a below average production per cow with an above average production per hectare. The key management tool on these farms in early spring was the use of a spring rotation planner, where the areas to be grazed daily between the start of calving and magic day were carefully plotted to ensure that cows did not run out of grass. This also ensured that staff on a multitude of farms was able to duplicate a successful and profitable system.

Steve Atkinson runs 1000 cows on three farms near Matamata in the north island of NZ. Atkinson outlined the importance of the spring rotation planner. His aim is to produce 1250 kgs/ms/ha without any supplementary feed, apart from nitrogen. Even in spring when covers are below target, this tool has ensured that cows do not run out of grass before magic day.<sup>7</sup> It also ensures ease of management when staff knows the exact area to be given to the herd each day. Atkinson is prepared to pinch cows in early lactation to ensure they are on a rising plane of nutrition in the month pre-mating. With higher milk prices at present in Europe, Irish dairy farmers could profitably introduce supplement in this situation.

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<sup>7</sup> The day in spring when pasture growth exceeds the requirements of the animals grazing.

## Spring rotation planner



What happens in a spring when growth rates are ahead of target? Atkinson says that if residuals are starting to rise above acceptable levels they induce late calvers early or drop-out paddocks for silage, or both. In effect, residuals drive a simple system, easily understood by staff and effectively overseen by management, with weekly farm walks providing information to make quick and effective decisions.

With falling milk prices it becomes even more important to look at cost-saving measures that can be taken without increased expenditure. Principles observed on the Lincoln dairy farm, as well as other farms visited, were excellent examples of using well established principles of grassland management on a commercial scale to improve profitability by increasing productivity. This demonstrates the possibility of utilising an extra 1.5-2.5 tons of dry matter, which disappears back into the soil through death and decay under **average** pasture management, be it in NZ or Ireland. This in reality is money down the drain, indicating the opportunity to increase income at farm level by implementing the principles outlined above.

**Dairy cows need to be trained to graze to the correct residual because cows are very good at training farmers to leave behind residuals that are too high to ensure quality pasture at subsequent grazings.**

## 6.1 Understanding ryegrass

In Tasmania, an advisory programme set up to improve grassland management educates farmers as to the correct time of grazing as a prelude to using measurement and budgeting and has been recognised as a first step for farmers addicted to the grain train (what NZ share milkers call the process of pulling the rope to feed cows in the parlour).

To this end, one has to understand the basic structure of ryegrass plants which typically maintain about three green leaves per tiller (stemmed unit). The growing point of an individual tiller is close to the ground to avoid damage during grazing. Leaves are produced from these points at varying speeds -- slowly in mid-winter and quickly in spring. These new leaves grow up through the centre of old leaf sheaths so that the youngest sheath is always at the top of the plant with older leaves located nearer the base. The new leaf is the only one that is growing. The older ones finish their growing as the new leaf appears. Leaf emergence is influenced mainly by temperature with leaf size governed by nutrient supply, especially nitrogen.

Ryegrass plants typically maintain three green leaves per tiller and once this **three leaf stage** has been reached, the oldest leaf will die each time a new leaf has been produced. Thus the lifespan of a ryegrass leaf varies from about 16-30 days in spring to 40-60 days in winter.

Tasmanian dairy farmers have recognised the importance of changing grazing intervals as leaf appearance changes to maximise persistence and productivity of ryegrass plants. This stage is typically between the two and three leaf stage with the **three leaf stage** being the optimum balance between yield and quality. The picture on the next page shows a ryegrass plant at this stage.

**Ryegrass plant at the three leaf stage**



**Tasmanian dairy farmer Theo Van Brecht made the observation that leaf stage indicates grassland quality in the paddock, whereas pasture cover only tells the farmer how big an area the cows need to be given -- notwithstanding the importance of overall farm cover and knowledge of rotation length.**

**How can this technology be adopted at farm level in Ireland where many farmers are dismissive and hesitant of using grassland measurement systems?**

Farmers constrained by land in Ireland should consider increasing the stocking rate on their milking block (platform) so as to eliminate surpluses at peak growth periods and using leased land as wintering blocks. This tactic would ensure optimum farm covers at calving, minimising the need for purchased supplements and possibly reducing the need for investing in facilities to comply with nitrates regulations if the leased farms already have storage / housing in situ. Realistically if significant grass covers are present on these farms when the herd arrives these facilities may only need to be used during periods of inclement weather. Stocking rates of up to 3.5cows/ha should ensure surpluses are reduced on the milking block, allowing the average farm size at present of 32 ha to carry potentially 112 cows and to still comply with stocking rate requirements with the leased land diluting the overall stocking rate.

**A system such as the one outlined above would ensure a continuation of the desirable situation where cows are taken to grass rather than vice -versa , reducing costs complications and wastage if silage or maize for example are carted to the cows.**

**Improvements in efficiency at farm level in Ireland by implementing long standing grassland principles has to be aggressively targeted rather than blindly promoting increases in scale as a means of maintaining/increasing income. As a first step, recognition of the three leaf stage as a prelude to intensive measurement and budgeting is a noble aspiration. Use of the pasture feed wedge graph and the spring rotation planner is the final coup de grace with appropriate software allowing adoption of this cutting edge technology. The importance of grazing residuals and their link to farm profitability must be recognised.**

## 7. Advances in animal breeding

Livestock improvement corporation (LIC) in Hamilton is the dominant player in the cattle breeding industry in NZ (with two other smaller players, Ambreed and Liberty genetics also present).

Using fresh semen which lasts for three days, LIC inseminate 85,000 cows per day at peak, inseminating 3 million cows annually and another ½ million using frozen semen . At present the breakdown by breed is 40 % Jersey, 15 % Cross-bred (x-bred) and the balance Holstein Friesian. Phil McKinnon, general manager of LIC predicted that by 2010 half the cows in NZ will be x - bred. When Cameron Coombs, a dairy farmer on the edge of Hamilton told me that his Jersey and Cross-bred cows were producing the same amount of kilos milk solids as their live weight (450) using a ton of supplements it was easy to see why the trend towards x-breeds is set to continue. He told me that 550 - 600 kilo Friesians on his farm were only achieving the same levels of production indicating that higher levels of efficiency can be achieved by smaller cows.

A widespread key performance indicator (KPI) at present is the level of milk solids production per cow expressed as a percentage of her live weight. Efficient producers such as Leonie Foster and Kieran Guiney target a figure of 90% with minimal supplementation. The Jersey X Friesian cow has a significant advantage over the pure Friesian cow in this regard.

**One would have to question why live weight is regarded as a positive under the Irish ranking system, the economic breeding index (EBI), when land area will become a limiting factor on many Irish farms.**

A subsequent visit to the milk recording centre next door to LIC was most informative. Despite still using the traditional am and pm recording sample procedure because of outdated legislation, a figure of over 85 % herd participation was achieved. This was most impressive when compared to the Irish figures of 33%. With over 70 % of herd owners receiving their results via the internet, an average turnaround time from testing to viewing of results of 3 days was achieved. There are a number of milk recording organisations in Ireland and only a small proportion match these figures.

The highlight of my visit was hearing about the rapidly advancing reliability of a technology called gene marking from Richard Spellman, a senior scientist based in the LIC centre. Deoxy Ribonucleic Acid (DNA) is the genetic code for life. It is contained in very complex structures called chromosomes. Each animal has 2 copies of each chromosome, therefore 2 copies of each gene. These genes carry a code for specific traits such as protein in milk. Each cow carries 30 pairs of chromosomes and over the last 10 years different genes have been discovered so at this stage individual markers have been identified for each gene (gene markers). Following joint research between the USA and NZ, 2000 markers have been identified with the potential discovery of up to a million imminent. The cost of this process has fallen from \$2.50 NZ to 0.03 cents per gene/per animal at this stage with the United States contributing \$15US million and NZ \$1 million to the research programme.

**Richard told me that funding in the region of \$2.5 million NZ approximately would finance a similar research programme at present.**

So how is this work of relevance to dairy farmers?

At present the process of identifying bulls for AI, using them and collecting data from their daughters when they enter a dairy herd, is a long and expensive process. The process takes 6 years from bull identification to enough data being available to give the animal a breeding index of a high reliability pertaining to individual production traits. This reliability figure increases from about 33 % in the case of a young bull to about 85% when the animal is recommended for widespread use.

By comparing the gene markers following a blood test taken from a bull calf with gene markers present in the DNA of samples taken from proven sires and stored in a database, scientists will now be able to predict the potential inheritability of traits such as milk fat for this young bull with reasonable accuracy. Richard told me that the theory is starting to work in reality and in the near future bulls will be given a genomic breeding value of about 60 % in conjunction with an existing progeny breeding value of circa 30 % when they enter a breeding programme. This potentially will reduce the number of young bulls required to enter a breeding programme, saving considerable expense (currently\$ 40,000 NZ per bull in a worse case scenario) with farmers also increasing their usage of young bulls and potentially increasing genetic gain more rapidly than at present in a best case outcome.

**Is this the ‘Get Out of Jail’ card for an Irish progeny test programme that is struggling to identify and source sufficient young bulls each year to increase the genetic gain of the Irish dairy herd? I would have to suggest that it is.**



## 8. Labour - the Achilles heel of large scale dairy farming?

If scale was the word on the tip of my tongue when I commenced my trip, labour was the word ingrained in my head by the time I returned. Having looked at large scale dairy farming through rose tinted glasses prior to departure; I had a slightly more caustic view when I returned from my travels.

The first week of my travels to the southern hemisphere was spent with Theo Van Brecht and Cheryl McCartie, New Zealand share milkers based in Tasmania. Their story is worth telling. Theo, who is 43, had been milking cows for 30 years in various guises and with Cheryl they hoped to purchase their first farm in 2007. Their pathway into dairy farming was traditional, starting as contract milkers for a wage in NZ, moving to share milking positions in their native country and then moving to Tasmania in 1996 because high land prices in NZ was slowing their pathway to farm ownership. With dairy cows their means to build equity and share milking agreements meaning the farm owners received 50 % of their farm income, the need for scale was essential. When I visited them they were milking 600 cows under two such agreements with 2 full time and 2 part time staff. It should be mentioned here that Theo has had serious health issues as a result of a bad sporting injury to his knee and Cheryl is fully involved on the farm. Milking commences on the home farm with at 4am and is finished before their four children depart for school. They employ an occasional relief milker, with a farm manager and his wife and casual labour on the second farm.

Theo told me of his experiences managing labour over the last two years. Tasmanian labour law allows a maximum of 38 working hours in a week and this proviso is rigorously enforced so Cheryl has to devise quite detailed rosters to ensure compliance. Despite a less than demanding working week, finding and keeping good workers has been a constant strain. Theo emphasised that regardless of what you pay workers they will not have the same pride in performance as the owner-operator. Issues such as poor care for farm machinery and livestock were constant irritants. If something was broken the owner paid and if the owner became aggressive with the guilty party there was a possibility of losing an employee. With a high turnover of workers there was a need for constant re-training in relation to issues such as mastitis, heat detection and grassland management.

Tasmanian owner operator Gerry Kearns, who had 160 cows made the comment that no matter what is paid out, an employee can never have the same pride in genetic improvement or production to name just two key indicators. Similarly when in Pembroke shire I talked to Will Pritchard about his experience of employees. His cows were given too much grass following one milking which meant grass wastage, too little following the next milking which meant the cows broke into the next grazing and ensured wastage again in early spring when grass budgeting is essential. While travelling with an AI technician in Australia we visited a 600 cow farm where all cows suspected of being in heat were herded into a crush for his observation. After selecting the cows with tail paint removed and inseminating them he made the comment that 50 % of the cows presented had been in season about two days previously, a depressing discovery from a professional point of view.

Experiences in Ireland largely confirmed these findings. Seamus Quigley told me of gritting his teeth sometimes when visiting his farm because of the imperative to hold onto scarce labour. However he told me that if a worker showed signs of restlessness it was better to allow them to move on rather than persuade them to stay.

In case the reader thinks that all my experiences in relation to labour were negative, I have to state that I did visit many farms on my travels where management was of a high standard but in most of these cases the manager had a stake in the business rather than just a wage, in other words the **owner's eye** was present

Labour issues seemed to be less of a problem where significant numbers of staff were employed. Mitch and Joanne Russell farm 1950 cows near Ashburton on the south island of NZ. With eight full time employees they were able to devise quite imaginative rosters. The basic roster enabled employees to work for eight days and then take three days off. Once calving is finished the roster enables employees to alternate the days when they are milking with no other work for these staff on that day. Mitch told me that with such a large workforce, peer pressure ensured that he never had to actually fire anybody. With such a large herd, a worker who is not pulling his weight is quickly noticed by his or her colleagues and forced to shape up or ship out.

An interesting tool for motivating workers was explained to me by Mike Dalgety, who manages 4 farms for Mark Townsend, a Fonterra director on the Hauraki Plains near Ngatea in NZ. Each contract milker who is paid 98 cents per kilo of milk solids produced has to compile a written report for Mike each week. This report includes details such as grass covers, cow condition, production, casualties, machinery breakages and labour issues. Mike explained to me that this gives him a grasp of performance on each farm very quickly as well as forcing each employee to effectively take on a management role and justify each decision taken on the farm. Even though these men are being paid slightly less than the going rate, Mike had no problem sourcing and retaining workers as employment on these farms was seen as a worthy addition to any CV.

### **So at what stage does an extra full-time labour unit become a requirement?**

The figure of 160 - 180 cows milked was a constant in my discussions worldwide (seasonal calving)<sup>8</sup> with casual labour and relief milking. It should be noted at this stage that figures showing one man handling 200 cows or more in NZ are slightly misleading because they vastly underestimate the massive input that women, spouses and partners have in running a farm. As far as work description is concerned they are on a totally equal footing and I would suggest that very few farms in NZ would survive without this input.

### **What are the requirements to ensure the smooth operation of such a system up to this point without fulltime labour?**

In Ireland a labour study conducted by Teagasc Moorepark in 2005 showed that dairy farmers spent 33% of their time on average milking cows.

I asked many farmers what one operator could handle comfortably. The consensus was 20 - 26 units, depending on routine, in a no frills herringbone milking parlour. Inclusion of add-ons such as swing over arms, automatic cluster removers and low line wash lines were considered unnecessary luxuries. With a row time of 8 to 8.5 mins this would ensure that one person could milk 160 to 180 cows in 60 to 80 minutes.

When herd size reaches 300 the use of rotary sheds has to be seriously considered, leaving aside the extra expense. When one witnesses 80 cows being milked in 11 minutes through an 84 bale shed, as I did on Mitch Russell's property, the reason becomes clear. However Mitch did admit

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<sup>8</sup> Calving in spring with no cows milking during the winter period.

that the construction of two 54 bale sheds would have given him more options in the future regarding re-sale of the property or indeed in the event of financial difficulties. When robotic milking becomes feasible in the future the obvious first step will be into rotary sheds.

Richard Kennedy, an Irishman share-milking 1,000 cows near Waimate however, commented that farmers had little enough contact with cows on a daily basis without detaching further. Interestingly his consultant made the comment that the installation of automatic cup removers had increased the incidence of herd health difficulties on many farms as low skilled labour units had failed to notice difficulties at an early stage with direct contact with the cows falling by 50 %.

Drafting facilities and backing gates were deemed mandatory so as to eliminate time spent outside the pit. Many large herds were now using auto identification in conjunction with computers for drafting and other management procedures. Russell told me that automatic weighing of cows at entry or exit from the shed with a computer identifying unusual disparities would help to pick up sick cows at an early stage. A mirror in the pit would allow milkers to see if the backing gate was being pushed too hard. If a rectangular collecting yard was sloped towards the shed one person could be washing down this yard as the other was milking the last row. These yards also allow the use of flood wash systems, as I saw on Jack Warner and Chris James farms in Wales. I was surprised that these types of yards were not in more widespread use in NZ.

The next biggest strain on time was calf rearing so teat feeding of large batches, preferably out of doors; with submersible pumps for milk transfer was deemed essential. However some farmers in NZ such as Colin Armer believed that calves were better kept indoors for as long as possible so that valuable grass was turned into milk rather than meat! Indeed Armer had a specialised calf rearing unit using meal and milk powder to deal with the large numbers of calves from his farms.

Grassland measurement ensured a wedge of grass at calving time and reduced supplementary feeding requirements. Peter Buckley told me that he had 470 gateways on a farm of 68 hectares which ensured ease of movement of stock during wet weather and when herd size was small post calving. Many farms that I visited were running two herds on their farms when herd size reached 300. This allowed them to separate heifers and shy cows from the main herd, reduce competition and improve the performance of this stock. Also the extra capital investment required to increase the size of water troughs, collecting yards and roadways was avoided.

On Van Brecht's farm in Tasmania, a second herd was milked once a day (OAD) and grazed on paddocks at the extremities of a rectangular property. OAD milking was a growing phenomenon on farms in NZ for a multiplicity of reasons. Many farms with long walking distances had maintained production by switching to OAD milking and increasing their herd size by 20% to compensate for the production drop. These herds had also improved reproductive performance, reduced lameness and reduced labour requirements. On Woolnorth station in north-eastern Tasmania housewives were milking cows on the property when their children had gone to school, solving a labour shortage and providing these women with a valuable income. With many cows on OAD milking producing the same as their counterparts on twice a day (TAD) it would suggest that genetic selection can identify the most suitable cows for this system.

I have to say that the biggest labour saving practice that I saw on my travels was the stand off-wood chip pad with a self feed silage pit en suite! No tractor needed, a few minutes to move the electric fence each day and happy comfortable cows with all waste water collected in a lagoon. This development alone has the potential to slash the time spent on Irish farms each winter feeding stock and implementing all the ancillary duties this entails.

Maximum use of contracting services when available also releases more management time for important jobs such as heat detection. That ensured that Kevin Twomey in Ireland spent 18 hours per cow on his farm during a labour management survey. This translates into an average 8 hour day on his farm over a full year, obviously with seasonal fluctuations. In essence labour efficiency is essential as herd size increases and in reality creative thinking rather than extravagant spending will achieve this goal.

**The biggest drain on labour in an Irish context at present is the low inherent fertility status of the average Irish cow. This results in scattered calving patterns and a huge opportunity cost to farmers whereby farmers are not able to maximise the use of early spring grass and resulting in poor grassland management through the main grazing season. I believe that most farmers do not recognise this vicious circle but thankfully the Irish dairy breeding index is addressing this problem as a matter of urgency.**

**I recommend that a herd size of 160 cows per labour unit with the above management practices and the use of casual labour at calving combined with relief milking is a viable model for Irish dairy farmers in the medium term (7 years).**

Some large herd owners will regard my targets as modest but with an average herd size in Ireland at present of 50 cows this recommendation is relevant to the majority of dairy farmers and is an aggressive rate of development for the industry.

## 9. Obstacles to achieving scale in an Irish context - 2006

To outline the state of play in Ireland I accessed the census of agriculture results for the year 2000 compiled by the Central Statistics Office, the most recent data at the time of writing.

<b>Average farm size</b>	<b>31.4 Hectares</b>
<b>Average no. of parcels</b>	<b>3.1</b>
<b>No. of farms renting land</b>	<b>32 %</b>
<b>Average area rented</b>	<b>18.3 Ha.</b>

To achieve my recommended herd size of 160 cows with a stocking rate of 3 livestock units per hectare with replacement stock grazed elsewhere requires a milking block of 53 Ha which is significantly bigger than the average farm size prevailing in the country in the year 2000. The key requirement to achieve this scale is access to land via long term leasing. Thankfully the budget of 2006 introduced incentives to encourage long term leasing of land with the income deemed to be tax free (subject to some conditions).

However not all farmers will be in a position to grow to this scale. The key requirements for farmers with 32 hectares or less, as above, will be very high levels of efficiency, income support from the state i.e. REPS and probably access to off farm income with the spouse/partner working. A high milk price is critically important in this situation as inflation is undoubtedly the biggest threat for these operations. This would help to maintain vibrant rural communities and avoid a situation where only the largest farmers can survive as I saw to some extent in NZ.

I observed anecdotal evidence of a dwindling rural community when I returned to the area of Maramarua, south of Auckland on the north island which I had visited 12 years earlier. The local primary school had only half the historical number of pupils and the local rugby club was struggling to field a team. In 1990 when I played for this club it had 3 senior teams.

Peter Buckley of Federated Farmers explained what had happened. All subsidies were removed from agriculture in the late 1980s, leaving many farmers in a perilous situation. All dairy farmers were forced to expand to compensate for lower prices. Inevitably many were constrained by land area. They purchased or leased neighbouring farms, if available, or else sold the farm as an entity or sub-divided it into smaller (lifestyle) blocks that were purchased by urban dwellers looking for a place to live in the countryside. The end result was a similar number of people in the area but many less farmers. Ray Russell who has lived in the area all his life told me that the dairy farmers were sorely missed in the area as these people were hugely involved in social activities that the new arrivals to the area did not cherish as highly. Instead they commuted to work in the local town leaving their children to a school outside the area and when they came home in the evening, they were too tired to attend any local events. Ray told me that the dairy farmers that remained were too busy to play rugby so the club struggled as a result.

In contrast when I visited Ashburton on the south island I discovered a vibrant local economy as many dairy farmers had moved into the area and converted sheep and beef farms to dairying. As a result the population and economic activity had increased rapidly. It seems that de-regulation ensures that dairy farming develops in the most favourable regions with the opposite happening where opportunities are restricted.

**So what are the constraints to land availability?**

The rural environmental protection scheme (REPS) is a scheme operated and partly funded by the Irish Department of Agriculture. Operating in Ireland for the past 10 years, this scheme offers an annual payment which rewards farmers for farming in an environmentally friendly fashion. Land owners receiving this payment are unable to lease out their land, save for a possible three month period to facilitate a silage cut. 33% of the total agricultural land area in the country is involved in this scheme.<sup>9</sup>

This data would suggest that until more of this land area becomes available for leasing there is little prospect of dairy farm expansion. Granted some of the participants are dairy farmers but the vast majority are involved in dry stock enterprises which are uneconomic without this support.

### **Why would it be worthwhile for this situation to apply?**

The following data compares the family farm incomes by system in 2005 produced by the Teagasc<sup>10</sup> national farm survey 2005.

<b>Dairying</b>	<b>€39794</b>
<b>Dairying/other</b>	<b>€35946</b>
<b>Cattle</b>	<b>€12729</b>
<b>Cattle/other</b>	<b>€18283</b>
<b>Mainly sheep</b>	<b>€15935</b>
<b>Tillage mainly</b>	<b>€29914</b>

The authors of the National Farm Survey predicted that in 2006 50% of the farm population, or over 50,000 farms, will have a negative income if their subsidies are excluded from their family farm income.

**The following table graphically indicates the perilous financial position of many dry stock farms in 2005.**

<b>Part-time farmers</b>	<b>62%</b>
<b>Part-time farmers with dry stock enterprises</b>	<b>88%</b>
<b>Average cash income of part-time farmers</b>	<b>€13583</b>
<b>Average direct payments and subsidies received by part-time farmers</b>	<b>€14567</b>
<b>Direct payments and subsidies as a % of cash income</b>	<b>128%</b>

<sup>9</sup> Source: Agriculture 2007 Supplement Irish Farmers Journal 2007

<sup>10</sup> Teagasc (State Agricultural Training, Research and Advisory Service)

**An industry such as dairying which generates a significant income per hectare net of state support needs to be facilitated to ensure vibrant rural communities. A recent survey by NUI Maynooth indicates that the average commuting distance to work is now 40 kilometers. Part-time farming does not enable participation in rural activities to a large degree compared to living and working locally as dairy farmers do. Dairy farming has the capacity to stimulate economic activity in rural areas similar to the impact the construction industry has in urban areas over the last decade.**

For the last quarter of a century in Ireland the biggest constraint to achieving scale in an Irish context has been availability or lack of availability of milk quota. With the EU indicating that milk quotas will be eliminated by 2015 and also expressing the desire that they become less of a constraint in the interim period, possibly through increases in each country's national quota, Irish dairy farmers may have the opportunity to grow their dairy farm businesses in the near future.

With the influence of the milk quota system due to wane, Irish dairy farmers will be faced with the same constraint as other dairy farmers worldwide, namely land and the process of developing a dairy farm. When looking for examples of this process in an Irish context, one has to look to NZ because of its many similarities i.e. pasture based, small indigenous population relative to potential production and in general adequate rainfall, although this does not apply to all of NZ. A similar population in both countries means that most of the dairy produce must be exported. This ensures a higher exposure to world commodity prices and an imperative to produce milk at a low cost from grazed grass in both countries.

## **9.1 Transition to scale**

Probably the best example of a dairy farmer growing a significant business that I met on my travels was Colin Armer in NZ. Armer and his wife Dale have grown their business from a position of being share milkers in 1978 to today where they own and run 13 farms and milk 9500 cows with 70 staff on the north island of NZ, as well as having a stake in 23 farms on the south island and 23 farms in Australia through a number of joint ventures.

This scale of operation may seem far removed from an Irish situation but the principles that he espouses are applicable to all farmers in the expansion process, regardless of size.

A share milker's route to building equity is through his dairy herd and NZ dairy farmers have been able to build this equity simply by holding on to as many cows as possible because of the inherent fertility status of their cows. Armer manages to keep 95 % of his cows in the herd every year by running a cross bred herd and this low empty rate ensures that he has surplus heifers for his replacement requirements each year. With many herds he is in a position to fully stock a new farm from his own resources as well as providing significant equity.

**These figures emphasise the huge opportunity cost that the high replacement rates required on Irish dairy farms is creating and vindicates the high fertility component of the Economic Breeding Index (EBI)**

Obviously to use a pasture-based system one needs access to land. Armer consistently targeted purchasing under performing properties, be they dairying or otherwise. He insisted on correcting faults as quickly as possible. This means draining wet areas, applying capital fertiliser to ensure

optimum fertility status and introducing productive pasture species as quickly as possible.

Growing grass grows a business and turns sunlight into milk solids but to do this requires a high level of utilisation. Armer told me that the work in progress at Lincoln University in NZ at present is a vindication of his system. He told me that he targeted using 85 % of the grass on his farms by running a stocking rate applicable to the pasture growth rates in the area, to ensure minimal wastage.

Many farmers I spoke to, such as Paul Hyland in Ireland regretted trying to fund capital investment and improvement from cash flow over a number of years. They all said it would be better to borrow money upfront to ensure the farm is generating maximum return as quickly as possible. With NZ farmers providing much of their equity in the form of cows, this allows them to service high levels of debt. It must be mentioned at this stage that the absence of capital gains tax in NZ ensures very attractive returns from buying under-performing properties, ,i.e. high returns on equity.

Many of the best farmers I met such as Leonie and Kieran Guiney, were quite frugal when it came to capital investment on their farms. Milking sheds were very basic, milking cows not keeping up with the Jones being the primary motivation. These people said that they could put capital to better use than on bells and whistles. Contractors were used as much as possible, this being one of the major differences between the top performers and the rest with the average operators investing in unnecessary machines and gadgets during the last period of high prices in NZ. Unfortunately they are still paying for them even though returns are now much lower.

**With larger herds the need for labour is essential;**

- **Simple grass based systems can reduce labour costs.**
- **Complicated systems add stress and increase costs.**
- **The introduction of supplements can be profitable but these systems demand more management time and are less easily understood by staff.**
- **Fertile cows allow concentrated periods for calving and mating with plenty of time to recover between these procedures and when mating is finished.**

Many Irish farmers seem to question how larger herds can be managed with minimal labour, but the high empty rates at present in Irish dairy herds ensure a constant drain on management time with scattered calving patterns and uneven batches of calves to be reared. Badly designed milking parlours with poor collecting yards and lack of drafting facilities ensure that the demands on time are even further extended. Further poor grassland management and lack of budgeting will add costs and labour at the busiest time of year, i.e. calving.

**In summary good grassland management coupled with:**

- ✓ **fertile cows**
- ✓ **good infrastructure and**
- ✓ **cost control**

**Are the keys to successful pastoral dairy farming.**

**Some may be disappointed that this report presents no groundbreaking new strategies. Instead, I recommend sticking to the KIS principle – Keep it Simple!**



## 10 Conclusions

Scale on its own will not improve the lot of Irish dairy farmers, efficiency is essential to derive any benefits from increased herd size. Inefficient dairy farmers will go broke quicker by engaging in this process rather than improving their management skills.

Family farm operations in general will achieve better outcomes than operations which rely on hired labour because of greater attention to detail.

Simple grass-based systems are easier to implement and duplicate in large herd situations. Use of technology such as spring rotation planners enables staff to implement management decisions more effectively. Incentivisation of staff is useful but not always successful in increasing levels of retention.

Fertile cows enable rapid organic growth. Crossbred cows are more competitive in large herd situations. Once-a-day milking is attractive on difficult geographic farms.

Use of supplements is feasible and economic where high stocking rates on milking platforms ensure that substitution of pasture does not occur and milk price ratio relative to the cost of purchased feed is favourable. Replacement stock needs to be reared elsewhere on leased farms or by contract where land base is limited.

Simple herringbone sheds with maximum number of units per person enable rapid throughput. Rotary parlours for herds in excess of 300 cows will enable the introduction of automation.

The true potential of ryegrass pasture is not appreciated by many dairy farmers.

## 10.1 Recommendations

Milk quota in Ireland must be rendered irrelevant as soon as possible. Ireland should push for a minimum increase in the national quota of 3% per year in the interim period towards quota abolition.

Allow REPS participants to lease their holdings as long as agricultural practices continue to comply with the terms of the scheme. If these people were previously involved in dry stock enterprises they should be able to continue to receive their Single farm and Repts payment and they would be a potential source of labour for dairy farmers using their land if they did not have off - farm employment.

Taking into account the increased profitability of dairy farming relative to the alternatives and the continuation of income support to the owners of these holdings this would be positive economic development in rural areas, a win - win scenario. Also as the worker would also be the lessor of these holdings the important **owner's eye** would be present, overcoming the lack of motivation present with many farm workers at present.

The link between Single Farm Payment and land needs to be broken, thereby making more land available for leasing. 64% of Irish farmers now have of farm income and 88% of these farms involved in dry stock production, with in excess of 120% of the income coming from direct payments .Obviously land is now a means to securing non trading income and while this situation continues a culture of long term leasing of land will be slow to develop. I propose that these payments be means tested so as to target support towards families that need income support to ensure the vitality of rural communities as well as breaking the above link. The Nitrates directive ensures that land is farmed in an environmentally manner.

Partnerships between dairy and non dairy farmers should be encouraged, so as to allow increasing scale and economic activity in rural areas. For example, a situation where you have three averaged sized Irish farms at 32 hectares, one running a dairy enterprise and the other two in dry stock. The dairy farmer wants to expand; the dry stock farmers are making a small margin or none over and above their single farm payment (SFP). A partnership could be formed commensurate to the assets each partner provides, preferably equal shares so that subsequent profits could be shared equally and the dairy farmer receives a salary for running the operation. All continue to receive their SFP and or REPS payment and a higher economic return is generated from the land base relative to the situation pertaining pre-forming the partnership.

Large scale research farms should be set up as quickly as possible and run as a commercial unit. Lincoln University dairy farm in New Zealand commands respect from farmers because it is run as a commercial farm rather than a series of farm lets which is the case at many research centres.

Contract rearing of replacements should be encouraged. This is a potentially profitable enterprise for dairy farmers that exit the industry who have considerable animal husbandry skills and it allows remaining dairy farmers to maximise the use of their land base as well as reducing labour requirements.

Many farms I visited in the southern hemisphere had their replacement stock, once weaned, reared by specialist grazers. These operators were paid per week or more wisely on a per kilo weight gain basis, with penalties for below optimum performance. Rules pertaining to the possibility of operating such a system in Ireland need to be devised to allow the dairy farmer to

ensure that the maximum amount of pasture on his farm is converted into milk solids rather than meat.

Live weight of dairy stock should be reassessed as a negative in Irish dairy breeding index. To maximise production per hectare as much energy as possible should be diverted towards milk solids production rather than live weight maintenance. Lighter animals are also suited to wetter soils that pertain in some parts of Ireland.

State eradication programme for BVD and Johnes' disease should be set in train now that Brucellosis seems to be under control. Eradication of these diseases coupled with a lift in the national herd EBI status could enable Ireland to be a source of high genetic merit dairy stock internationally. Intelligent use of the annual blood sample taken from female stock would suffice.

State support for labour saving devices and farm consolidation supports such as underpasses. Transit New Zealand provides 25% aid for these.

## **10.2 Research**

The use of nitrogen leaching inhibitors needs to be evaluated under Irish conditions. This advance has produced exciting findings in New Zealand and has a potential capacity to reduce the impact of the Nitrates Directive which limits use of this essential ingredient for grass growth in Ireland at present. Nitrogen leaching inhibitors could **ensure maximum return from applications under present restrictions or allow increased applications without damaging environmental consequences.**

## **10.3 Animal breeding**

The massive potential rewards from using gene marking technology to source animals of superior genetic potential could fast track the Irish animal breeding industry, reducing the effect of a low usage of artificial insemination and milk recording.

# Appendix 1

## Disclaimer

The views expressed in this report are entirely my own and do not necessarily represent the views of the Nuffield Farming Scholarships Trust, or my sponsors, or any other sponsoring body.

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