National Dairy Conferences

'NEW VISION FOR THE IRISH DAIRY INDUSTRY'

PROCEEDINGS

National Dairy Conference

15 November 2006

**South Court Hotel
Limerick**

National Dairy Conference

16 November 2006

**Slieve Russell Hotel
Ballyconnell, Co. Cavan**

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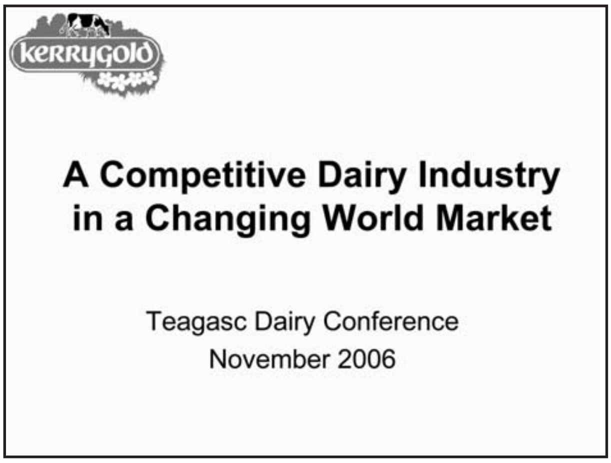
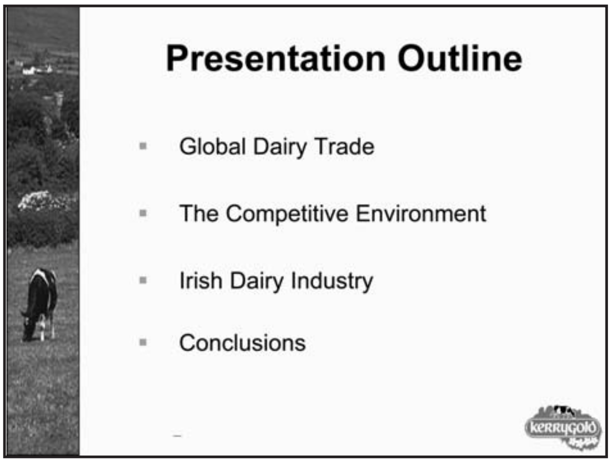

A Competitive Dairy Industry in a Changing World Market
Teagasc Dairy Conference
November 2006


Presentation Outline
Global Dairy Trade
The Competitive Environment
Irish Dairy Industry
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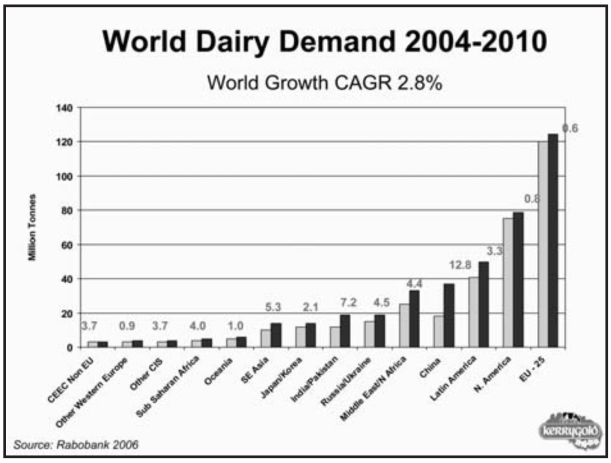
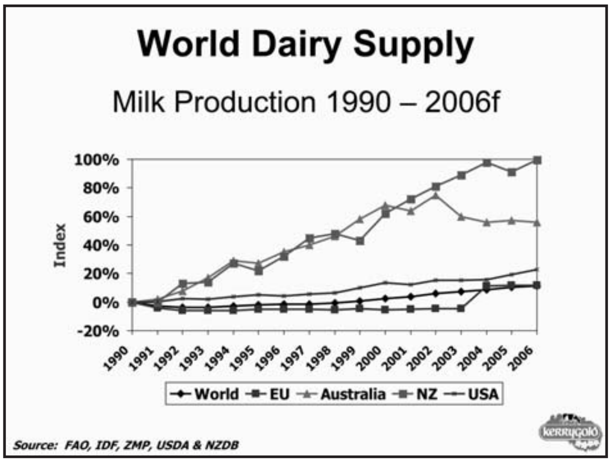
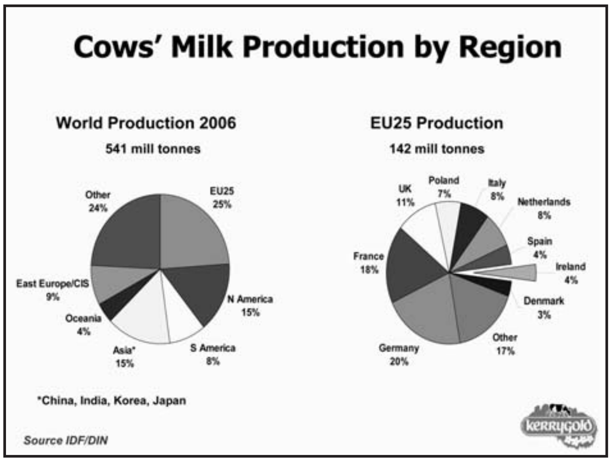
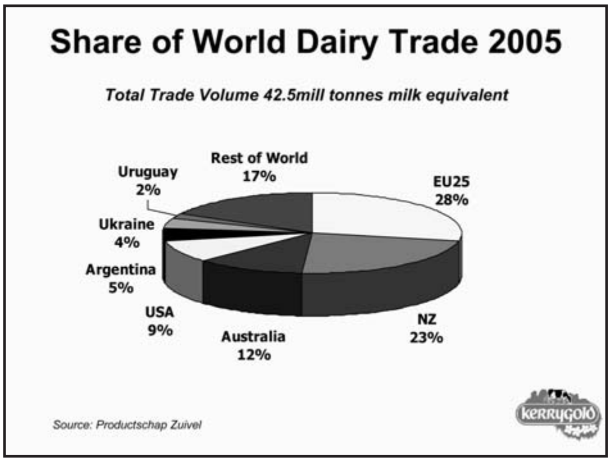
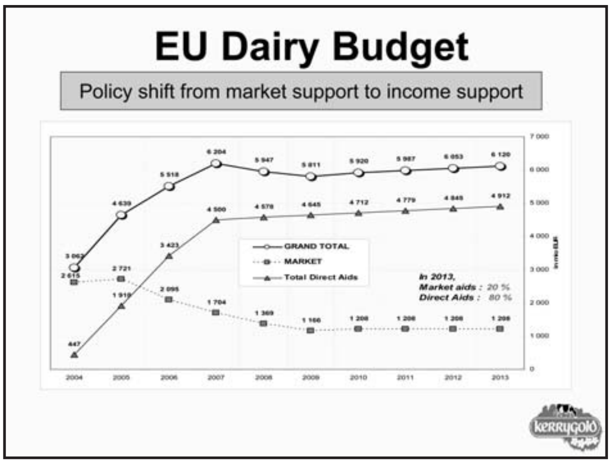

World Dairy Demand 2004-2010
World Growth CAGR 2.8%
Million Tonnes
CEEC Non EU
Other Western Europe
Other CIS
Sub Saharan Africa
Oceania
SE Asia
Japan/Korea
India/Pakistan
Russia/Ukraine
Middle East/N Africa
China
Latin America
N. America
EU - 25
Source: Rabobank 2006


World Dairy Supply
Milk Production 1990 – 2006f
Index
World
EU
Australia
NZ
USA
Source: FAO, IDF, ZMP, USDA & NZDB


Cows' Milk Production by Region
World Production 2006
541 mill tonnes
EU25 Production
142 mill tonnes
Other 24%
EU25 25%
N America 15%
S America 8%
Asia* 15%
Oceania 4%
East Europe/CIS 9%
UK 11%
Poland 7%
Italy 8%
Netherlands 8%
Spain 4%
Ireland 4%
Denmark 3%
Other 17%
Germany 20%
France 18%
*China, India, Korea, Japan
Source IDF/DIN


Share of World Dairy Trade 2005
Total Trade Volume 42.5mill tonnes milk equivalent
Rest of World 17%
Uruguay 2%
EU25 28%
Ukraine 4%
Argentina 5%
USA 9%
Australia 12%
NZ 23%
Source: Productschap Zuivel

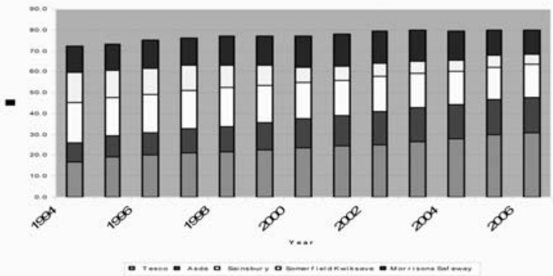

External Policy Issues
WTO Negotiations
CAP Reform
Further EU Enlargement
Regulatory Controls


EU Dairy Budget
Policy shift from market support to income support
GRAND TOTAL
MARKET
Total Direct Aids

The Competitive Environment
- Customers -

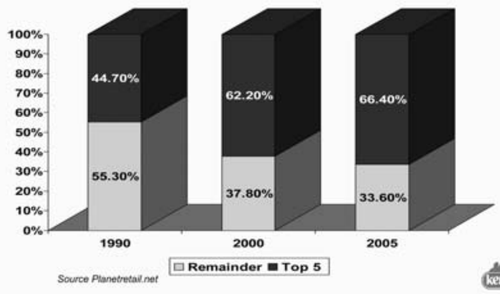
- Relentless rationalisation trend
- Retail sector mature
- Consolidation across the sector
- Partnerships the way forward

UK Retail Market Share



	1994	2006
Top 3 Retailer	50.3	63.3
Top 5 Retailer	72	79.8

German Market Share of Top 5 Retailers



Source Planetretail.net

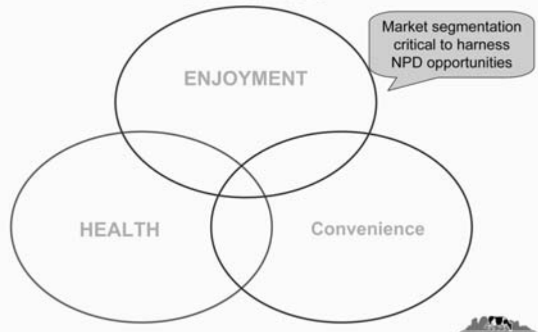
Top 10 EU Retailers 2004

Company	Origin	T/O €bn	Pan Europe Presence
Carrefour	France	75.7	10
Metro Group	Germany	60.3	16
Tesco	U.K.	49.7	6
Rewe	Germany	44.1	9
Auchan	France	38.4	7
Intermarche	France	37.4	6
Schwarz Group	Germany	37.0	15
Aldi	Germany	32.5	8
Edeka	Germany	31.6	4
Casino	France	29.5	3

The Competitive Environment
- Consumers -

- Lifestyle changes
- Increasing affluence
- Consumer concerns

The Competitive Environment
- Consumers -



Source: TNS Superpanel 05

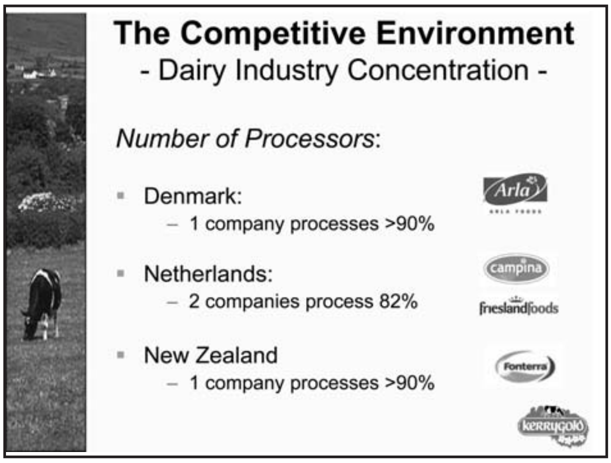
The Competitive Environment
- Competitors -

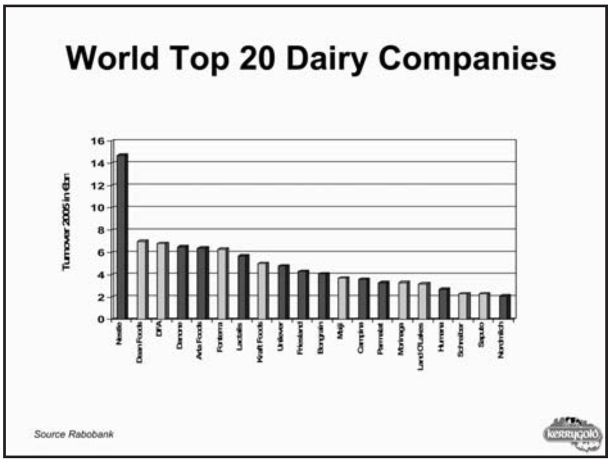
- Category leadership:
  - Branding
  - Innovation
  - Regional strength
  - Scale

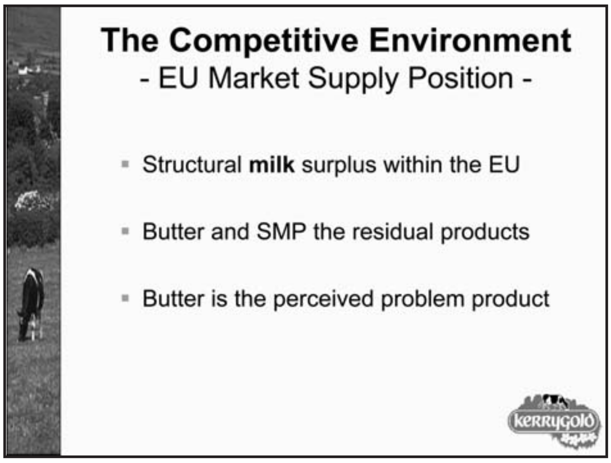
The Competitive Environment
- Competitors - *Contd.*

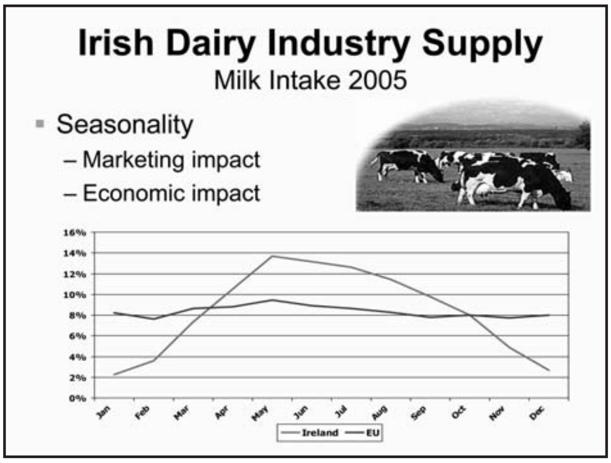
Scale:

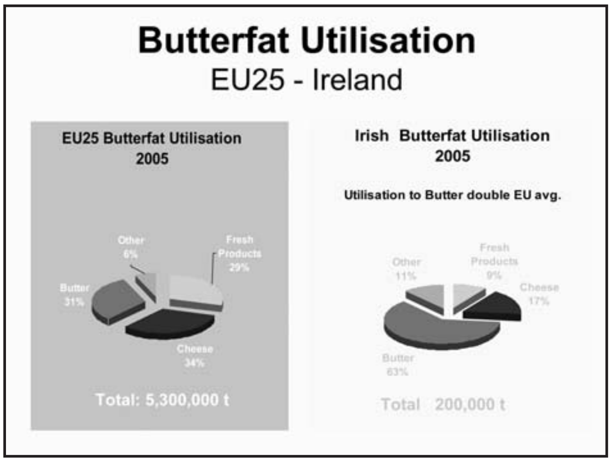
- Consolidation pattern:
  - National > Trans-National > Global
  - Common to both Co-op and Plc structures
- Significant consolidation across EU
- Irish industry fragmented by comparison

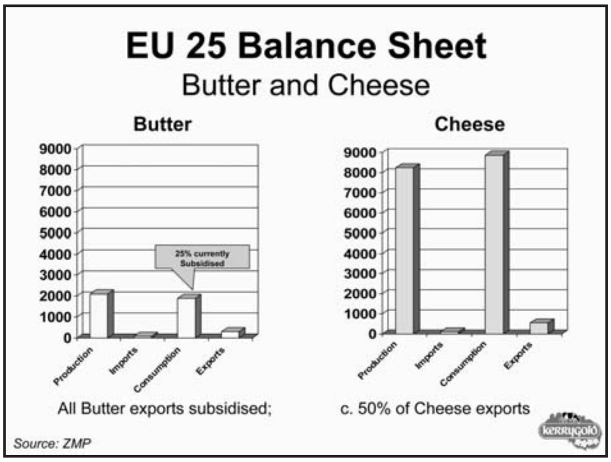

The Competitive Environment
- Dairy Industry Concentration -
Number of Processors:
Denmark:
– 1 company processes >90%
Netherlands:
– 2 companies process 82%
New Zealand
– 1 company processes >90%
Arla
campina
frieslandfoods
Fonterra
kerrygold


World Top 20 Dairy Companies
Turnover 2005 in €bn
0
2
4
6
8
10
12
14
16
Nestle
Dean Foods
DFA
Danone
Arla Foods
Fonterra
Lactalis
Kraft Foods
Unilever
Friesland
Bongrain
Meiji
Campina
Parmalat
Morinaga
Land O'Lakes
Humana
Schreiber
Saputo
Nordmilch
Source Rabobank
kerrygold

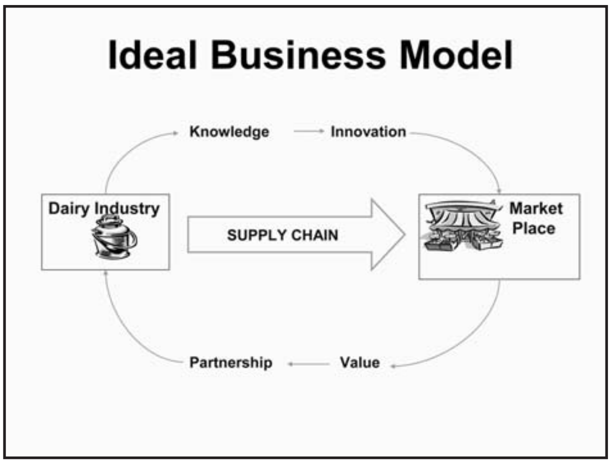

The Competitive Environment
- EU Market Supply Position -
Structural milk surplus within the EU
Butter and SMP the residual products
Butter is the perceived problem product
kerrygold


Irish Dairy Industry Supply
Milk Intake 2005
Seasonality
– Marketing impact
– Economic impact
0%
2%
4%
6%
8%
10%
12%
14%
16%
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Ireland
EU


Butterfat Utilisation
EU25 - Ireland
EU25 Butterfat Utilisation
2005
Other
6%
Fresh
Products
29%
Butter
31%
Cheese
34%
Total: 5,300,000 t
Irish Butterfat Utilisation
2005
Utilisation to Butter double EU avg.
Other
11%
Fresh
Products
9%
Cheese
17%
Butter
63%
Total 200,000 t


EU 25 Balance Sheet
Butter and Cheese
Butter
Cheese
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
25% currently
Subsidised
Production
Imports
Consumption
Exports
All Butter exports subsidised;
c. 50% of Cheese exports
Source: ZMP
kerrygold


Implications for Ireland
Ireland has an 80% export dependence
National Product Mix in need of radical overhaul
Market focus and operational scale required to compete
kerrygold


Ideal Business Model
Knowledge
Innovation
Dairy Industry
SUPPLY CHAIN
Market
Place
Partnership
Value

5 Year Challenge

- Substantially increase cheese output
- Reduce Butter utilisation from 63% to 50%

Delivery

- Re-orientate product mix
  - Target the Continental EU cheese market
- Re-configure processing capacity to achieve scale
- Harness a national unity of purpose in order to spread the risk
  - A quantum change to the product mix presents serious challenges

Delivery

The Cheese Challenge:-

- Establish EU market presence
  - Retail own label
  - Niche branded products
  - Ingredient sector
  - Food service sector
- Build on existing market strengths in the UK

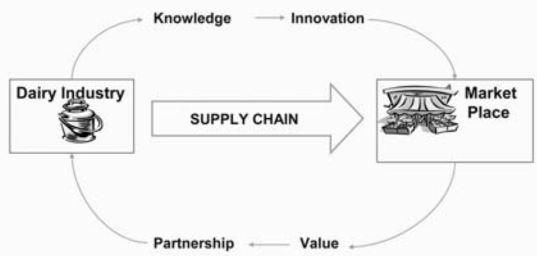
Enabling Strategies

- Cost leadership
- Kerrygold brand leverage
- R + D / Innovation
  - Functional Foods

Conclusions

- Global dairy industry constantly evolving
- The Irish dairy industry must adapt
  - Should be effectively structured to react strategically and tactically
- Significant cultural change involved
  - Move from market regulation to market-led solutions
- The decision making process needs to be consolidated within a cohesive framework

A Competitive Dairy Industry



Totally dynamic

Thank You

A Competitive Dairy Industry in a Changing World Market

Teagasc Dairy Conference
November 2006

Is Milk Quota Worthless?

Laurence Shalloo and Pat Dillon, Dairy Production Research Centre,
Teagasc, Moorepark, Fermoy, Co. Cork

Executive Summary

- Dairy farmers who want to buy milk quota will have to analyse their own current position when assessing whether or not they can afford to buy milk quota on the new milk quota Exchange system.
- The price that individual dairy farmers can afford to pay for milk quota will vary greatly depending on
    - Farm cost base
    - Future milk price
    - The level of increased cost incurred on the farm to facilitate the increased production
- When major additional expenditures on extra facilities and labour are required, the economic value of milk quota rapidly diminishes.
- When milk yield was increased by 10 per cent per cow and the beef enterprise replaced the maximum the low, average and high cost producers could afford to pay for milk quota in 2007 was 52cpl, 19cpl and -6cpl under an MTR milk price. Under the WTO projected milk price, the affordability of milk quota is substantially reduced.

Introduction

Since joining the European Community in 1973, Irish milk producers have enjoyed relatively high milk prices due to the support system of the Common Agricultural Policy (CAP). However, dairy farmers are now facing important changes to their economic environment. In particular, the Luxembourg agreement on the reform of the CAP (Mid-Term Review) entails a fundamental change in agricultural policy with the decoupling of support measures from production. In Ireland, full decoupling was introduced in 2005 and milk price is projected to fall by 4.0 to 5.5cpl due to reduced price support for butter and skimmed milk powder. In conjunction with CAP reform, there is the continued reform of the World Trade Organisation (WTO) agreement. This round of reform, if agreed, will put further pressure on milk price due to the abolition of Export Refunds, reduction of tariff support and increased access to EU markets for some products. These changes mean that many dairy farmers need to reappraise their business strategy and consider necessary adjustments that will ensure viability in the longer term.

Historically, milk quota transfer in Ireland takes place through an administrated system with a fixed price and reallocation based on a priority system which favours smaller milk producers. Therefore, the true market value of milk quota is unknown in Ireland. The Minister for Agriculture and Food has set the price of milk quota with advice from the Milk Quota Review Group. However, there will be changes to this administered system from 2007. Traditionally the quantity of milk quota available for restructuring in Ireland has been limited. FAPRI-Ireland farm-level research suggested that post-decoupling (2005) a larger amount of milk will be available for restructuring when the dairy premium is decoupled. However, to-date, this has not materialised. In a market-based system, the price that a producer should pay for quota should be related to the additional farm profit he/she expects to earn in the future from that additional quota acquired. The objective of this paper is to examine what dairy farmers can afford to pay for milk quota.

How much can dairy farmers afford to pay for milk quota?

The amount any individual farmer can pay for milk quota will mainly depend on the expected milk price and the expected cost of milk production for every year that the quota remains binding. To allow for inflation, the future farm profit must be discounted (adjusted) to present day values. Apart from the variable costs of producing the additional milk, the cost of farm expansion to produce the additional quota must also be considered.

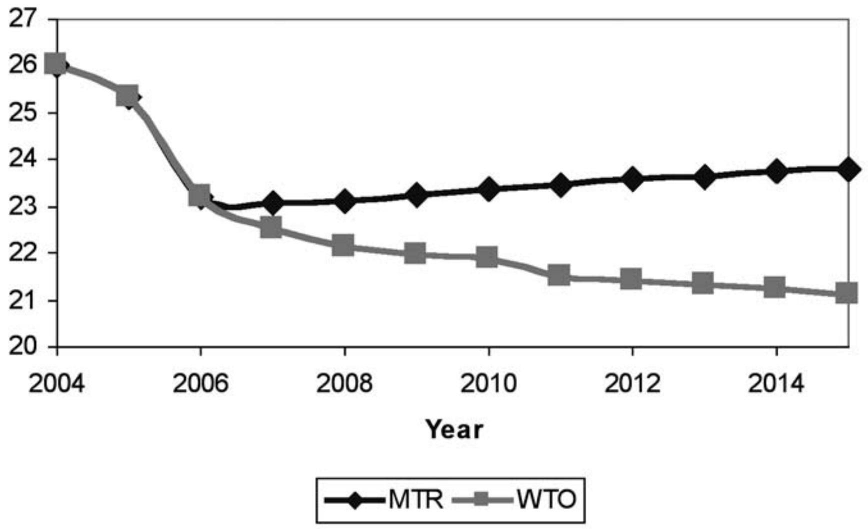
We have defined three distinct stages of expansion for dairy farms:
Stage 1: Increase deliveries per cow through longer lactation and better feeding/management.
Stage 2: Replace alternative grazing livestock with dairy cows and increase the specialisation in milk production.
Stage 3: Expand production using additional animals, housing, land and labour.

In Stage 1, expansion requires no capital investment as cow numbers remain unchanged. However variable costs of production (mainly feed costs) increase in line with increased milk production. At this stage of development, dairy farmers can afford to pay a relatively high price for milk quota. However, for the purpose of this analysis, it was not considered as a separate expansion scenario but as part of any expansion plan. It is estimated that milk production could be increased by 10per cent in Stage 1, which is composed of a 6 to 7 per cent increase through longer lactations and a 3 to 4 per cent increase through better feeding/management.

Methodology used in the economic analysis

Two expansion scenarios are considered over the period 2007 to 2008. As there is no guarantee of milk quotas remaining beyond 2014, the additional milk quota purchased in all three scenarios was depreciated in value to zero by 2014. In all three scenarios there is a 10 per cent increase in milk production in Year 1 of expansion as outlined above and 1 per cent in yield per cow in each year thereafter. Based on the Moorepark Dairy Systems Model (MDSM) (Shalloo et al., 2004a), the additional cost associated with this increase in milk production is 5cpl (variable feed cost of production). The farm used in this analysis is based on the average specialist dairy farm from the National Farm Survey sample in 2003. In the analysis all three scenarios are investigated for low cost producers (LC; costs 14.24cpl), average cost producer (AC; costs 17.29cpl) and high cost producers (HC; costs 20.37cpl). The LC group is the average of the 40 per cent lowest-cost producers (average of Quintiles 1 and 2). The AC group is the overall average of specialist producers, while the HC group is the average of the 40 per cent highest cost producers (average of Quintiles 4 and 5).
Figure 1 presents the FAPRI-Ireland projections of Irish farm level milk price under the MTR and WTO scenarios (Binfield et al 2006) which were used in this analysis. The farm level milk price is projected to decline as a result of reductions in support for EU commodity prices agreed under the MTR of the CAP in 2003. This will result in almost 10 per cent of a decline in farm level milk price in 2015 when compared to 2004 levels. Under the WTO scenario, Export Refund expenditure limits will be zero by 2013, leading to sharp reductions in cheese, butter and whole milk powder exports from the EU and Ireland to non-EU markets. Skimmed milk powder (SMP) prices, will have less of an impact by the elimination of export refunds as the EU SMP price is already closer to the world price. It is projected that the elimination of export subsidies, in conjunction with the reduction in import tariffs, is likely to lead to further declines in commodity prices than projected under MTR. Binfield et al (2006) project the price of butter to decline by 18 per cent, the price of cheese to decline by 10 per cent and the price of SMP by 6 per cent relative to the 2015 MTR levels. The overall effect is that the Irish farm level milk price is projected to decline further under the WTO scenario than under the MTR. Relative to 2004, the Irish farm level milk price is projected to be almost 20 per cent lower by 2015 under a WTO scenario compared to 10 per cent in a situation where there is no WTO reform. This would reduce Irish average milk price to about 20.9c/l by 2015 compared to an EU average of 24.2cl under MTR. Milk quota purchase price was calculated for both the MTR and WTO milk prices.

Figure 1: Projections of Milk Prices MTR and WTO Scenarios



Source: FAPRI-Ireland Model (Binfield et al 2006)

Table 1 shows the key herd parameters used in the economic analysis. The average farm size (total forage area) is 52.2 ha, with an EU milk quota of 243,470 litres and 54 dairy cows. The average milk production delivered per cow is 4,643 litres, with a further 310 litres per cow retained on the farm. The average number of livestock units of cattle (excluding cows and dairy replacements) is 32.

Table 1: Key herd parameters used in the analysis.

	Average cost (AC)	**Low Cost (LC)**	**High cost (HC)**
Land Area (ha)	52.2	52.2	52.2
Cow number	54	54	54
Quota size (l)	243,400	243,400	243,400
Milk sold per cow (l)	4643	4643	4643
Average number of beef units	32	32	32
Variable costs (cpl)	9.16	7.57	10.88
Fixed costs (cpl)	8.13	6.67	9.49

Inflation over the period of analysis is based on FAPRI projections (i.e. 1.25 and 2.5 per cent per year for variable and fixed costs, respectively). All purchase of milk quota is financed up to 2014 at 6 per cent interest rate. The length of the loan depended on year of purchase. Cull cow and male calf values were included based on projections from (Binfield et al., 2006). The opportunity cost of land was included based on €268/ha.

It is assumed that the average specialist dairy farmer had no additional free labour available. Therefore labour cost increased in line with increased cow numbers. However, as the farmers will be exiting beef production in all three scenarios it was assumed that there was 250 hours of labour freed up as a result of exiting beef production which was used in the dairy operation. Data from the Moorepark labour study (O'Donovan et al., 2003) has shown that as the cow numbers in a herd increase the overall time required per cow decreases. Based on the Moorepark farm labour study an increase of 40 hours per year for each additional cow between 55 and 79 cows and 35 hours per cow between 79 and 100 cows, at a cost of €12.50/hour was assumed.
In all three scenarios, the break even cost of quota purchased is calculated for years 2007 and 2008 for the LC, AC and HC producers, using total discounted net farm profit over a 10 year period. Since it is possible to receive capital allowances for the construction of farm buildings, machinery and milk quota, the three scenarios investigated are compared net of tax. Capital allowances for milk quota purchase, construction of housing and improvement in milking facilities are included at 15 per cent for

the first 6 years and 10 per cent for the seventh year (Teagasc, 2006). The 6 per cent interest rate for quota purchase corresponds to an opportunity cost of having additional money tied up in milk quota.

Scenarios investigated
Table 2 shows the key parameters associated with the baseline and the three expansion scenarios. The baseline situation is where the farm remained static over the ten year period.
Scenario 1(S1):
- 25 dairy cows and 7 replacement units replace the 32 cattle units
- Dairy cows are purchased at a unit cost of €1,320, financed over 10 years at 6 per cent, where the interest portion is considered an expense
- There is an additional housing cost of €300/cow for modification of beef housing for dairy cows
- There is no additional cost in milking facilities
- A new milk bulk tank is purchased at a net cost of €13,000, financed over 10 years at 6 per cent, with both interest and depreciation (15 years) considered an expense
- Labour requirement is increased by 1,000 hours for the dairy herd (40 hours* 25), while labour for the beef operation is reduced by 250 hours (10 hours* 25), therefore the net increase in labour per year was 750 hours

Scenario 2 (S2):
- S2 is similar to S1 in that 25 dairy cows and their replacements replaced the 32 beef units and the sale of the beef cattle finance the purchase of the dairy stock
- However cow numbers are further increased by 21, purchased at a unit cost of €1,320, financed over 10 years at 6 per cent, where the interest portion is considered an expense
- Milking facility is expanded at a cost of €9,600 (an additional unit per 7 cows) and more housing added at a cost of €33,600 (€1,600/cow). Both investments are financed over 20 years at 6 per cent
- An additional 10 hectares of land is needed and is rented at a cost of €268/ha
- Labour is increased by a further 735 hours (35 hours/cow)

Scenario 3 (S3):
- S3 is similar to S2 in all respects except that a low cost housing system is included. This includes a stand-off pad and earthen bank to contain slurry and soiled water, at a cost of €262/cow instead of conventional housing for the additional cows in the herd

Each scenario is compared to the Baseline Scenario where no expansion took place. A computer programme called Solver in Microsoft Excel is used to calculate the milk quota purchase price where the calculated total discounted farm profit over the 10 year period is equal to the baseline farm profit.

Table 2: Key physical data used in the scenarios investigated.

	Baseline	Scenario 1	Scenario 2	Scenario 3
Land Area (ha)	52.2	52.2	62.2	62.2
Cow number	54	79	100	100
Original Milk Quota size (l)	243400	243400	243400	243400
Additional Milk Supplied (l)	-	152760	260010	260010
New Milk Quota Size (l)	243400	396200	503400	503400
Milk sold per cow (l)	4643	5107	5107	5107
Beef cattle units (number)	32	-	-	-

Scenario Results and Sensitivities
Table 3 shows the baseline 10 year total discounted farm profit for the LC, AC and HC producers from the NFS for years 2007 to 2008. The baseline total discounted net farm profit is derived by adding 10 years of farm net profit together with each year discounted for inflation. Therefore, the baseline for 2007 is the 10 subsequent years with each year discounted to correct for inflation. On average over the 10-year period the difference in farm profit between LC and AC cost producers is €36,241, while that between the LC and HC is €80,860 for the MTR milk price, while the difference in farm profit between LC and AC producers is €38,435, while that between the LC and HC is €88,717 for the WTO milk price.

Table 3: Baseline scenario 10-year total discounted farm net profit (€) by production cost variation.

	2007		2008	
	MTR	**WTO**	**MTR**	**WTO**
Low cost (LC)	324,059	304,416	311,243	290,005
Average cost (AC)	287,818	265,981	275,765	251,233
High cost (HC)	243,199	215,699	231,613	201,880

Table 4 shows the break even price is 52cpl (€2.36/gal), 19 cpl (€0.86/gal), for the LC and AC producers while the HC producers did not achieve the baseline profit in S1 and would have to receive 6cpl (€0.27/gal) with the quota to reach the break even farm profit under the MTR milk price in 2007. Under WTO milk price the break even price was 33cpl (€1.50/gal), the LC and AC producers would have to receive 1cpl (€0.5/gal), while the HC producers would have to receive 17cpl (€0.77/gal) to reach break even price. The corresponding values in 2008 are 51cpl (€2.32/gal), 17cpl (€0.77/gal) and -7cpl (-€0.32/gal) under MTR with 29cpl (€1.32c/gal), -3cpl (-€0.14/gal) and -17cpl (-€0.86/gal) under WTO for the LC, AC and HC producers, respectively. The results also indicate that the break even price that a farmer could pay for additional quota decreases over the period. This is because of declining milk prices, increasing production costs and that additional milk quota has to be financed over a shorter time period. The high-cost producers would have to get money with the quota in the years 2007 and 2008 to reach the break even level with both milk prices. The LC and AC producers can afford to pay for milk quota under the MTR milk price in all years, while under the WTO milk price, the LC producers could afford to pay for milk quota in S1 while the AC producers could not afford to buy quota in any year. The HC producers cannot afford to pay for milk quota in any year or under either of the two milk prices included in the analysis.

Table 4: Break even quota purchase price (€/l) by year of purchase and by production cost level for Scenario 1.

	2007		2008	
	MTR	**WTO**	**MTR**	**WTO**
Low cost (LC)	0.52	0.33	0.51	0.29
Average cost (LC)	0.19	*-0.01	017	*-0.03
High cost (HC)	*-0.06	*-0.17	*-0.07	*-0.19

* Base Farm Profit could not be reached therefore quota could not be purchased economically.

Table 5 shows that the break even price for additional milk quota is much reduced where the costs of expansion are higher. Only the LC producers can afford to pay for milk quota under the MTR milk price. AC and HC producers cannot afford to expand under either of the two milk prices where conventional housing is included in the analysis with expansion.

Table 5: Break even quota purchase price (€/l) by year of purchase and by production cost level for Scenario 2 (S2).

	2007		2008	
	MTR	**WTO**	**MTR**	**WTO**
Low cost (LC)	0.20	0.02	0.19	*-0.01
Average cost (LC)	*-0.07	*-0.20	*-0.08	*-0.23
High cost (HC)	*-0.30	*-0.47	*-0.31	*-0.49

* Base Farm Profit could not be reached therefore quota could not be purchased economically.

Table 6 shows the influence of quota purchase year and producer cost variation on the break even quota price for scenario 3 (S3). Using a low-cost housing system (€262/cow) as compared to traditional higher cost housing (€1,600/cow), the break even price was increased by 5 to 6cpl.

Table 6: Break even quota purchase price (€/l) by year of purchase and by production cost level for Scenario 3 (S3).

	2007		2008	
	MTR	**WTO**	**MTR**	**WTO**
Low cost (LC)	0.25	0.07	0.24	0.03
Average cost (LC)	*-0.04	*-0.16	*-0.04	*-0.18
High cost (HC)	*-0.24	*-0.40	*-0.24	*-0.42

* Base Farm Profit could not be reached therefore quota could not be purchased economically

Sensitivity analysis

Milk price and additional labour cost are shown to have a large effect on the break even milk quota purchase price, while when milk quota was abolished they had a smaller effect. Table 7 shows the influence of variation for S1 for the LC, AC and HC producers. It indicates that for every two cpl increase in milk price the break even price of quota will increase by 25, 24 and 16cpl for the LC, AC and HC producers. Similarly, for a reduction of 2 cent in milk price the break even price of milk quota will reduce by 24.0, 22.0, and 14.0cpl for the LC, AC and HC producers.

Table 7: Effects of variation in milk price on break even quota purchase price (€/l) by producer cost level for Scenario 1 for 2007 under the MTR milk price.

	LC	AC	HC
MTR projected milk price	0.52	0.19	*-0.06
Increase of 2 c/l	0.77	0.44	0.10
Reduction of 2 c/l	0.28	*-0.03	*-0.20

* Base Farm Profit could not be reached therefore quota could not be purchased economically

Table 8 shows the influences of additional labour cost in 2007 on the break even quota price for S1 for the LC, AC and HC producers. In a scenario where no additional labour is required, the break even price is increased by 41cpl when purchased in 2007 for the LC, AC and HC producers.

Table 8. Effects of variation in labour efficiency in 2007 on break even quota purchase price (€/l) by producer cost level in Scenario 1 under the MTR milk price.

	LC	AC	HC
MTR projected milk price	0.52	0.19	*-0.06
No labour cost with expansion	0.93	0.61	0.35

* Base Farm Profit could not be reached therefore quota could not be purchased economically

Therefore, the additional labour required would have a large influence on the price that dairy farmers can afford to pay for milk quota. If dairy farmers can achieve expansion at farm level without additional labour requirements, through increased efficiency, this increases the price can be paid considerably.

Table 9 shows the influence of when milk quota is abolished on the break even price in 2007 that LC, AC and HC producers could afford to pay for milk quota. In all the analysis carried out, it was assumed that milk quota would last until 2014; therefore the additional milk quota was depreciated to zero by 2014. However, if milk quota was abolished earlier (e.g. 2010), this would affect the amount that dairy farmers could afford to pay for milk quota. To carry out the effect of milk quota abolition by 2010, the quota was depreciated to zero by 2010 and the loan for quota purchase was also borrowed over a shorter timeframe in so that quota was not paid for after it was abolished. The break even quota purchase price was reduced by 5cpl and 1cpl for the LC and the AC producers when it was abolished by 2010 while the HC producers were not affected as they were not able to pay for milk quota.

Table 9. Effects of milk quota abolition on the break even quota purchase price (€/l) in 2007 by producer cost level in Scenario 1 under the MTR milk price.

	LC	AC	HC
MTR projected milk price	0.52	0.19	*-0.06
Milk quota abolished in 2010	0.47	0.18	*-0.06

Implications and Conclusions

Dairy farmers that opt to remain static under the MTR milk price reductions can expect a reduction of 15 per cent in nominal terms in net farm income (Shalloo et al., 2004b). The reductions in milk price projected as a result of MTR and WTO will require a significant restructuring within the dairy sector. The results of the present study indicate

The price that individual dairy farmers can afford to pay for milk quota will vary greatly depending on farm cost base, milk price, and the level of increased cost incurred on the farm to facilitate the increased production.

When major additional expenditures on extra facilities and labour are required, the economic value of milk quota rapidly diminishes.

The purchase of quota will be financially much more difficult for AC and HC producers. Including increased labour costs has a large effect on the break even purchase price for milk quota. The productivity, availability and cost of labour will place major restrictions to expansion over the coming years. High-cost housing and slurry storage facilities likewise reduce the break even purchase price of milk quota. Finally, quota transaction costs influence profit and therefore the viability of expansion. Quota depreciation and interest charges rise rapidly as quota purchase price increases.

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Long Term Vision for the Irish Dairy Industry

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Executive Summary

- In Ireland pasture based dairy farming is the most profitable enterprise when based on the efficient conversion of grazed grass into milk. Allowing for increases in land and labour productivity dairy farming in Ireland can be the most competitive within the EU.
- The EU policy of ongoing trade liberalisation will continue to push EU milk price downwards increasing the necessity for dairy farmers to increase efficiency and scale in order to maintain incomes.
- Continued technical innovation in increasing animal performance from grazed grass, the use of high EBI genetics, labour efficient systems and the development of low fixed cost systems will be essential.
- Policy changes at EU level will require the Irish dairy industry to increase efficiency in the processing of commodity products while at the same time extracting greater value from milk by producing products that return a higher margin i.e. reduce dependency on commodity type products. This must be reflected in milk payment systems to dairy farmers.
- The early abolition of the EU milk quota may be beneficial to the Irish dairy industry in that it would allow dairy farmers eager to expand to do so and possible facilitates growth in Irish milk production.
- Government policies that facilitate long term leasing of land and greater access for young people into dairy farming will be important in allowing the Irish dairy industry to compete successfully against major international competitors in the future.
- Given that we are entering a new era in dairy farming in Ireland it is important that all stakeholders work together to ensure that we have a stronger dairy industry into the future

Introduction

The dairy industry is one of the most important sectors of Irish Agriculture and accounts for 27 per cent of agricultural output (Department of Agriculture and Food, 2006) with the production of 5.35 million tonnes of milk per annum. The dairy industry also makes a significant contribution to sustaining rural communities, with the dairy processing industry employing over 7,000 people. In 2005, the average family farm income (excluding arrears brought forward from 2004) on specialist dairy farms in Ireland was approximately €36,690 compared to just under €8,030 on cattle rearing farms, the poorest sector (National Farm Survey, 2005). Direct payments/subsidies contributed as a percentage of family farm income a total of 48 per cent, 130 per cent, 125 per cent and 99 per cent of income for dairying, cattle rearing, sheep and tillage farming respectively in 2005 (National Farm Survey, 2005). National Farm Survey figures also show that on average, dairy farm incomes exceed average industrial wages. However, despite the apparent relative profitability of dairy farming, dairy farm numbers are declining faster than any other system of farming. According to the Department of Agriculture and Food (2006) there were approximately 22,386 active dairy producers in Ireland in 2005; this compares to 28,000 in 2001 and a significantly larger 42,000 active suppliers ten years earlier in 1993.

In this paper the Irish dairy industry is examined in terms of its competitive strength and as a producer of dairy products in a scenario of increasing world demand. It is reviewed in a background of changing EU and international trade polices, an Irish economy of continuing economic growth and uncertainties about future markets for present dairy product range.

Evolution of EU Policy

The dairy policy regime has been one of the main structures of the Common Agricultural Policy since the creation of the European Community in 1963. From 1973, when Ireland joined the community, to 1984, milk production increased from 91.3 to 110 million tonnes, creating market surpluses with the result that by 1983 the milk support system was costing over 30 per cent of the CAP market support budget. This high cost of the milk sector became politically unsupportable and in 1984/85 milk quotas were introduced. The quotas were made effective by the imposition of heavy fines (super levies) on the delivery of milk above each national quota. The adoption of milk quotas ensured the retention of price protection for EU producers. The quota scheme required the continued use of high levels of export refunds for milk products and of subsidies for various forms of disposal (ice cream making, confectionary, and animal feeds) in the internal EU market

The MacSharry reforms agreed in 1992 involved the reduction of support prices and provided compensation for farmers by means of direct aids. Several rural development measures were introduced, notably to encourage more environmentally friendly and less intensive systems of farming. This shift in emphasis in the CAP entered a new phase in 1999 with the ‘Agenda 2000’ reforms. These reforms further reduced price supports and compensated farmers with direct payments and the reforms also introduced improved incentives to farm in a more environmentally sensitive way.

In June 2003, a further fundamental reform was agreed following an undertaking to carry out a Mid-Term Review of Agenda 2000. This reform, known as the Luxembourg Agreement, constituted a fundamental change in the way the EU supports farming. The aim of the Luxembourg Agreement was to take the concerns of the consumers and taxpayers into account while giving EU farmers the freedom to produce what the market wants and to continue to protect farmers’ incomes through a mechanism that does not distort international trade. The Luxembourg Agreement substantially breaks the link between the income support of the CAP and agricultural production. Therefore, the decision of the Irish government to decouple payments from production from 2005 has brought a renewed focus on the structure of the dairy industry. This reform of the CAP, involved a reduction in support for skim milk powder (SMP) and butter by 15 per cent and 25 per cent, respectively by 2007. The reduction in support was partially offset by the introduction of a Single Farm Payment (SFP) of 1.2, 2.4 and 3.5c/l in 2004, 2005 and 2006, respectively, and each year subsequently, which was fully decoupled from production in April 2005.

There have been several WTO (previously GATT) multilateral agreements or ‘Rounds’ with the objective of increasing trade liberalisation. The Uruguay Round Agreement, 1995-2000, introduced for the first time a comprehensive set of rules governing trade in agricultural and food products. The agreement on agricultural trading in the Uruguay Round required a commitment on WTO members to reduce domestic support by 20 per cent, reduce import tariffs by, on average, 36 per cent and export subsidies by 36 per cent with a 21 per cent reduction in volume. The EU has honored its commitments under the Uruguay Round in full. However, further trade liberalisation is planned and following the breakdown of negotiations on the WTO round in Cancun, negotiations resumed in Geneva and agreement was reached in Doha in August 2004. While the specific reductions in the levels of protection and support were not discussed, the main elements of the agreement included further reduction in domestic support, increased market access and reduced export subsidies. At the sixth WTO Ministerial meeting in Hong Kong in December 2005 there was agreement on the elimination of all forms of agriculture commodity export subsidies by 2013; however, the exact schedule has not yet been agreed. Agreement on market access and domestic support of agriculture was not completed in Hong Kong but was to be completed in 2006. In July 2006 the talks were suspended indefinitely and will now probably be replaced by new bilateral trade agreements between different trading nations.

The Luxembourg Agreement allowed for a review of the CAP in 2008, which will include a review of the EU’s dairy markets regime assessing the effect of policy reforms on the sector and internal national markets. It is also possible that further reductions of export support and market protection in the framework of WTO may be agreed which would further reduce EU milk price, to a level where the quota system may not be effective anymore.

Irish Milk Production Efficiency

Table 1 shows the evolution of input costs, gross outputs and margins from 1990 to 2004 in nominal terms for specialist manufacturing milk herds in Ireland. The results show that *total input costs* have increased on average by 1.6 c/l or less than 1 per cent per annum from 1990-92 to 2002/04 in nominal terms, which is relatively low considering that inflation ran at an average rate of 2.5 per cent per annum over the period. Direct costs increased by 1.0c/l and overhead costs by 0.5c/l over the period. The CSO Agricultural price index for total agricultural inputs rose by 13.6 per cent between 1990 and 2004 whereas total costs for specialist milk production (Table 1) showed an increase of 9.7 per cent. This indicates a real decrease in unit costs or an efficiency gain of 2.6 per cent over a 12-year period. The results also indicate that direct costs (+1.07c/l) increased at twice the rate of overhead costs (+0.50 c/l).

Table 1: Itemised costs, outputs and net margin (c/l) of milk production for specialist manufacturing milk herds 1990-2004

Year	*Direct Costs*	*Overhead Costs*	*Total Costs*	*Gross Output*	*Net Margin*	*Cost / Output Ratio*
1990	8.34	8.21	16.55	27.72	11.17	0.60
1991	8.09	7.93	16.02	25.60	9.58	0.63
1992	8.27	7.80	16.07	27.43	11.65	0.59
1993	8.87	8.23	17.10	29.80	12.70	0.57
1994	9.36	7.86	17.22	29.63	12.41	0.58
1995	9.87	8.50	18.37	31.02	12.65	0.59
1996	9.84	8.63	18.47	30.00	11.53	0.62
1997	8.62	8.20	16.82	28.50	11.67	0.59
1998	9.12	8.30	17.42	29.30	11.88	0.59
1999	9.08	8.22	17.30	27.85	10.56	0.62
2000	8.83	8.65	17.49	29.49	12.01	0.59
2001	9.11	8.76	17.88	30.73	12.85	0.58
2002	9.63	8.56	18.19	28.47	10.27	0.64
2003	9.16	8.13	17.29	28.05	10.76	0.62
2004	8.89	8.76	17.65	29.37	11.72	0.60

Source: *Derived from National Farm Survey records*

Variation in input costs

Table 2 shows the gross output, total input costs, direct costs, overhead costs and net margin (c/l) for the five cost in 2004. The total cost of production for the lowest quintile (20 per cent) was 13.0 c/l, compared to 22.8 c/l for the highest quintile, or a difference of 9.8 c/l; while the average cost of production (quintile 3) was 17.1 c/l. The high cost group were effectively producing a litre of milk at 75 per cent higher input costs than their more efficient counterparts and almost 33 per cent above the overall average. This difference in cost of production between the lowest and highest quintiles represents 9.0 c/l (16.1 c/l vs. 6.1 c/l) in net margin; while the net margin of the average producer was 12.4 c/l. Differences in feed costs (mainly concentrate costs) were responsible for 42 per cent of the total cost difference. Of the overhead cost items – hired labour (8.4 per cent), machinery operating and depreciation charges (11.8 per cent), land rental charges (6.4 per cent) and interest payments on loans (7.3 per cent) were the major contributors to overall variation in unit input costs.

Table 2: Variation in unit costs by quintile for specialist dairy farms in 2004 (population results)

Quintile	**Q1** c/l	**Q2** c/l	**Q3** c/l	**Q4** c/l	**Q5** c/l
Gross Output	29.17	28.88	29.49	29.30	29.93
Total Costs	13.04	15.38	17.12	19.27	22.80
Direct Costs	6.71	7.91	8.70	9.53	11.32
Fixed Costs	6.33	7.47	8.42	9.74	11.48
Net Margin	16.13	13.50	12.37	10.03	7.13

Source: *Derived from National Farm Survey records.*

These results demonstrate that a lot of variation exists in the efficiency of milk production. The projected milk price under the Luxembourg agreement and WTO reforms is between 24.0 and 21.0 c/l (Binfield *et al.,* October, 2003; Binfield *et al.,* 2006). The top two quintiles (i.e. total costs of production of 19.3 and 22.8 c/l) will be producing milk at very low profit or at a loss and therefore their viability in the dairy industry has to be questioned.

The Outlook for Dairy Farms Under Future Likely Policy Developments

Outlook for dairy farms under Luxembourg Agreement

As outlined above, the Luxembourg Agreement in 2003 included significant reduction in intervention prices and the introduction of decoupled compensation for the dairy sector from 2005. Under the terms of the agreement the reduction in intervention prices are to occur from 2005 to 2007 and in Ireland compensation for price reductions was decoupled from production in 2005. Table 3 shows average entitlements estimated from National Farm Survey data for specialist dairy farms and dairy farms with another farm enterprise.

Table 3: Estimates of entitlements by 2008 (€/ha)

	Average	Maximum	Minimum	Standard Deviation
Dairy Specialist	300	608	77	102
Dairy and Other	373	1369	65	172

Source: *Breen and Hennessy (2003).*

The projection is that both EU and Irish milk prices will continue to decrease in 2007 as the final intervention price reduction agreed under the Luxembourg Agreement is implemented. The projected effects of the agreement on farm-level milk price are shown in Figure 1 where direct payments are decoupled from production. Much will depend on the international market situations and the attitude of the European Commission towards the provision of export refunds. The EU cheese, SMP and butter prices are projected to decline by 5 per cent, 8 per cent and 23 per cent as a direct result of cuts in intervention prices. This will result in a 10 per cent decline in farm-level milk price in 2007 compared with 2004, recovering to within 8 per cent by 2015 (Binfield et al., 2006). By 2015, the value of Irish milk output is projected to be almost 15 per cent lower than in 2004. Cheese production is projected to increase to 131,000 tonnes per year by 2015.

Outlook for dairy farms under WTO

As outlined, WTO negotiations were ongoing in Hong Kong early in 2006 and while a specific agreement was not reached, there was agreement in principle to abolish export subsidies and to improve EU market access. The elimination of export subsidies will have a significant impact on agricultural markets. Export subsidies expenditure has two effects; first, it supports domestic prices by facilitating the sale of surplus products on non-EU markets, and second, it reduces the exposure of European prices to the volatility of world markets and exchange rates. In recent years the move from support prices to direct payments has seen export subsidies used in a price stabilisation role, i.e. providing a safety net when there is downward pressure on EU prices.

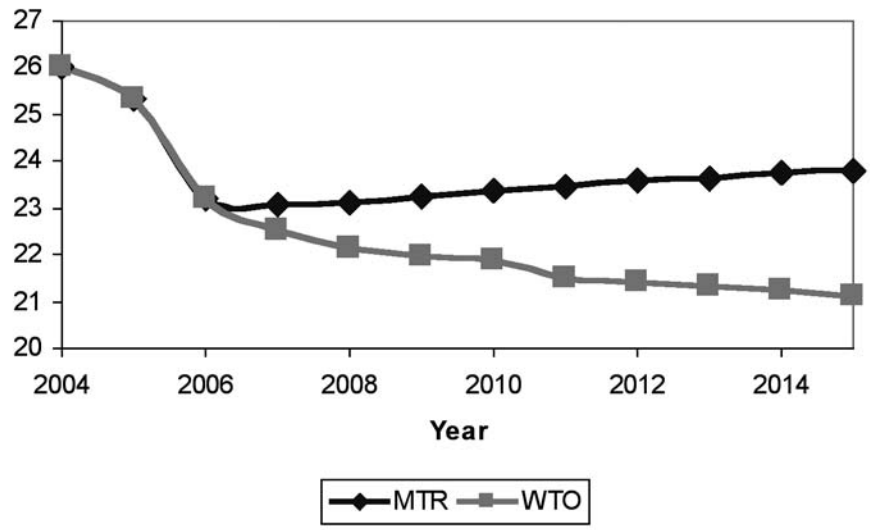
Although the WTO negotiations have been suspended indefinitely at present the EU commission has indicated that further reform of the EU internal market is likely under the CAP review in 2008 which may result in further trade liberalisation. The extent of milk price reduction will depend on EU and external market developments and the implementation of trade liberalisation agreements. This may include abolishing export refunds as offered in the WTO negotiations, even if no WTO agreement is reached. If WTO agreement was reached, concessions on import duties as well as abolition of export refunds would be required. This would have a knock-on-effect for internal EU prices and would create further impetus for CAP reform, particularly for butter, if large quantities of cheaper third country imports are to be avoided on the internal market.

Binfield et al., (2006) analysed three possible WTO reforms. In this study the analysis focuses on the implications of the most likely scenario, that is the WTO High scenario. The details of the WTO High scenario are as follows;

- Domestic Support – 70 per cent reduction in the aggregate measure of support (AMS) based on Uruguay Round Agreement on Agriculture final bound levels
- Export Competition – Phasing out of EU export subsidies over the course of 10 years with the elimination front loaded a 50 per cent cut in export subsidies in 2007 and with the remaining export subsidies eliminated in equal installments over the remaining 9 years
- Market Access – 60 per cent average cut in tariffs, with a 25 per cent cut in tariffs applied to sensitive products
- No expansion of tariff rate quota associated with the designation of beef and butter as sensitive products

Under the WTO scenario, export refund expenditure limits will be close to zero by 2015, leading to sharp reductions in cheese, butter and whole milk powder exports from the EU and Ireland to non-EU markets. Skimmed milk powder prices, however, will be less impacted by the elimination of export refunds as the EU SMP price is already closer to the world price. It is projected that the elimination of export subsidies in conjunction with the reduction in import tariffs is likely to lead to greater declines in commodity prices than projected under MTR. Binfield et al (2006) projected that the price of butter would decline by 18 percent, the price of cheese by 10 percent and the price of SMP by 6 percent relative to the 2015 MTR levels. The overall effect is that the Irish farm level milk price is projected to decline further under the WTO scenario than under the MTR, see Figure 1. Relative to 2004, the Irish farm level milk price is projected to be almost 20 percent lower by 2015 under a WTO scenario compared to 8-10 percent in a situation where there is no WTO reform. This would reduce Irish average milk price to about 20.9 c/l by 2015 compared to an EU average of 24.2. Also in this scenario there would be greater fluctuations in EU milk price from year to year due to variation in international markets for dairy products.

Figure 1: Projections of Milk Prices (excluding VAT) MTR and WTO Scenarios



Source: FAPRI-Ireland Model (Binfield et al 2006)

Implications for dairy farm numbers

Previous policy analysis studies by the FAPRI-Ireland Partnership projected that the decoupling of direct payments and the reduction in dairy intervention prices agreed in the MTR were likely to cause a considerable exodus from dairy farming. Breen and Hennessy (2003) projected that the number of dairy producers in Ireland would fall from approximately 26,000 in 2002 to 18,000 in 2012 and 14,000 in 2015 as a result of the MTR of the CAP. According to National Farm Survey (2004) data the average producer size is 225,000 litres and this is projected to increase to almost 300,000 litres by 2012, 350,000 litres by 2015 as a result of the MTR of the CAP.

Given that the milk price is projected to fall to a greater extent in the WTO scenario the implication for dairy producer numbers is likely to be more negative. Hennessey and Thorne (2006) projected that the WTO high scenario would have very severe consequences for dairy producer numbers with more than half of them exiting milk production over the next 10 years. They projected that active dairy producers would fall to approximately 9,000 by 2015 under WTO as compared to 14,000 under MTR, increasing the average milk producer size to almost 500,000 litres.

Effect of MTR and WTO on dairy farm incomes

Based on a farm income of €60,000 in 2006 (single farm payment not included) and €78,286 in 2015 (3 per cent inflation adjusted), Table 4 shows the level of milk production and cow numbers required for various levels of efficiency using both MTR and WTO milk price. The 2006 milk price used for the average cost and 20 per cent lowest cost milk producer was 25.2c/l (VAT included) and a gross dairy output of 26.7c/l, while the milk price used for the Moorepark best technology was 27.7c/l and a gross dairy output of 29.7c/l. The higher milk price with the best Moorepark technology was as result of the higher milk composition and the higher gross sales due to better fertility (see Table 6). By 2015 milk price in a WTO scenario was almost 3c/l lower than in the MTR scenario. The variable and fixed costs of milk production for both average NSF and 20 per cent lowest NFS cost dairy farms were taken from the National Farm Survey 2004, while for the Moorepark best technology from the Moorepark Dairy System Model (Shalloo et al., 2004).

Based on the average specialist dairy farm from the National Farm Survey, the level of milk production required in 2006 is 667,000 litres to obtain a farm income of €60,000 and this would increase to 822,000 litres in 2015 to maintain the same inflation adjusted income (or a 23 per cent increase) using MTR milk price projections. This would have to increase further using WTO projected milk price to 1,227,000 litres (or an 83 per cent increase) in 2015. The corresponding values for the 20 per cent most efficient dairy farmers from the NFS are 441,000 litres in 2006, 553,000 litres in 2015 using MTR milk prices and 712,000 using WTO milk price projections. Based on the best Moorepark technology the levels of production required are 358,000 litres in 2006, 453,000 litres in 2015 based on MTR milk prices and 553,000 litres in 2015 based on WTO projected milk prices. These increases would require large increases in herd sizes, from 138 cows in 2006 for the average specialist dairy farm to 171 cows in 2015 using MTR milk prices and to 256 using WTO milk price projections. For the 20 per cent most efficient producers the cow numbers are much lower going from 92 cows in 2006, to 115 cows in 2015 under MTR, to 148 cows under WTO. Based on the best Moorepark technology the cow numbers required in 2006 are 58, increasing to 73 in 2015 based on MTR milk prices and 89 in 2015 based on WTO projected milk prices. Hennessy and Thorne (2006) projected that the average producer size would be 350,000 litres by 2015 as a result of the MTR of CAP and almost 500,000 litres as a result of WTO milk price projected. Therefore, the average levels of milk production per supplier will not be sufficient to facilitate such increases in scale of milk production to obtain farm income of €60,000 in 2006 and €78,286 in 2015 .

Table 4: The effect of level of efficiency on the scale of milk production and cow numbers required to obtain €60,000 farm profit			
	NFS 20% Lowest cost	**NFS Average cost**	**Moorepark Best Technology**
		Milk production (litre)	
2006	441,000	667,000	358,000
2015 MTR	553,000	822,000	453,000
2015 WTO	712,000	1,227,000	553,000
		Cow numbers	
2006	92	138	58
2015 MTR	115	171	73
2015 WTO	148	256	89

Future EU milk quota policy

The present EU dairy market regime combines price support, through measures like intervention buying, import tariffs and export subsidies, with milk quotas to limit production levels. The 2003 reform of CAP agreed to retain the present milk quota system until April 2015, however, it is expected that the quota issue will form an important part of the 2008 review of CAP. It is possible that further reductions of export support and market protection in the framework of WTO maybe agreed as part of the review which would reduce EU milk price further, to a level where a quota system may not be effective anymore. The EU Commission's wish to phase out milk quotas coincides with a desire to have a lower milk price in order to cope with lower import tariffs and end export refunds, to avoid possible pressure for compensation for loss of quota assets, avoid pressure from new member states for additional quota and pressure from free-market member states (the London group) to end milk quotas.

A Dutch study has just been completed on the impact of quota abolition on the Dutch dairy sector (van Berkum and Helming 2006). The report highlights that under MTR incomes will decline by between 8 to 10 per cent and if inflation, quota costs and other input costs are included income levels will be further reduced resulting in a large reduction in dairy farm numbers. This is not taking into account further milk price reductions as a result of further trade liberalization. The model simulation used in the analysis assumed that milk prices would be further reduced by 5 per cent as a result of further trade liberalization where milk quotas were maintained until 2015 and 15 per cent where milk quotas were abolished in 2009. Table 5 shows the economic outcome of the different scenarios in 2015.

Table 5: Total income per farm in 2015 under different scenarios			
	Reference Scenario	***WTO scenario***	
		Quota until 2015	*Quota abolished 2009*
Category	*Income in millon €*	*%change relative to reference scenario*	
Large with low costs	*1086*	*-7*	*-8*
Large with high costs	*688*	*-8*	*-5*
Small with low costs	*336*	*-8*	*-10*
Small with high costs	*182*	*-8*	*-28*
Total	***2292***	***-8***	***-9***
Note: Average quota price is €1 per kg over the period 2002-2015			

Source: van Berkum and Helming 2006

The simulation showed that the WTO scenario with quota continuation until 2015 resulted in a similar reduction in farm profit as WTO with quota abolition in 2009. Quota abolition in 2009 resulted in an average increase in total milk supply of 21 per cent; +28 per cent for large low cost farms, +27 per cent for large high cost farms, +8 per cent for small low cost farms and -13 per cent small high cost farms. The results also indicated that under the WTO scenario, with early abolition of milk quotas, milk production would be concentrated in fewer larger farms. The study indicated that milk production within the EU would shift to areas of lower cost e.g. Ireland, Denmark and Holland and away from high cost production areas like south Germany, south France, south Italy, Sweden and Greece.

During the Agenda 2000 negotiations four member states, Denmark, Italy, Sweden and the United Kingdom unsuccessfully campaigned for a dismantling of the quota system (Benjamin et al., 1999). As EU milk price moves closer to world market prices as a result of greater trade liberalization, it is possible that more countries will favour the abolition of milk quotas. From an Irish point of view it will be important to know the effect on milk price and milk production nationally if EU milk quotas were abolished. From the studies that are available up to now the indications are that if milk quotas were abolished milk price would reduce by 15 to 20 per cent more than that in MTR but that milk production would increase significantly (Lips and Rieder, 2005; van Berkum and Helming 2006). It would also result in a significant reduction in dairy farm numbers and a shift to lower cost larger farm units. However, this requires further analysis before more definite conclusions can be established.

Hennessy and Thorne (2006) concluded that following the abolition of export subsidies the Irish milk quota would still be filled but that milk quotas would have almost zero value. However, whether Ireland would benefit or not from milk quota liberalisation is highly dependent on the ability of the Irish dairy sector to retain and expand international markets and to compete internationally. It is evident then that the international competitiveness of Irish dairy farmers and the Irish dairy processing sector should be considered before any debate on the long-term outlook for milk quota policy can take place.

COMPETITIVENESS OF THE IRISH DAIRY INDUSTRY

The ability of the dairy farmer to survive is dependent on having information to enable informed decisions. For individual producers competitiveness means the ability to outbid rivals in securing customers they desire. Competitiveness in the past generally referred to cost competitiveness. It now has to be considered in broader terms. Issues such as type of technology used to produce food, the environment, animal welfare, scale of enterprise, government regulatory policies, as well as development and taxation policies, education level of farm work force, rate of adoption of new technologies, milk processing sector structure etc also need to be considered. Production systems will need to incorporate many of these issues as well as being cost competitive.

In the next section of this paper we examine the relative competitiveness of Irish specialist milk producers vis-a-via those in Belgium, Denmark, France, Germany, Italy and the Netherlands using data from the European Commission's Farm Accountancy Data Network (FADN) (Thorne and Fingleton, 2005). Country specific information on the extent of intra-EU trade of milk products is not available but over 85 per cent of the EU production of butter and cheese is accounted for by the countries specified (Eurostat, 2003). Data analysis was confined to specialist dairy farms as defined by FADN, on which the standard gross margin from dairying accounts for at least two-thirds of the farm total gross margin and were weighted to estimates of population means. The results presented for each of the countries is the average for the years 1996 to 2003 and indexed relative to Ireland.

Comparison of partial productivity in selected EU dairy farms

The partial productivity indicators used in this analysis for the dairy sector were defined by Fingleton (1995). The measures relate to animal, land and labour productivities. They are:

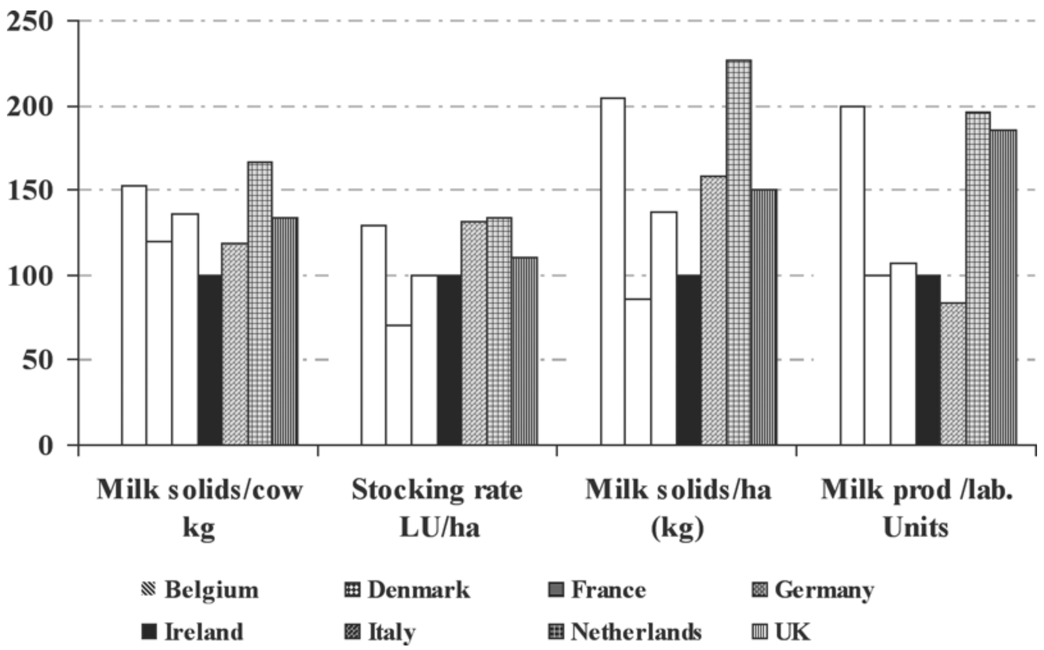
- Milk solids per cow (kg)
- Stocking rate (livestock units/ha)
- Milk solids (kg of fat plus protein) per hectare
- Milk production per labour unit (tonne)

Figure 2 shows that the average milk solids per cow were lowest in Ireland. In particular, milk solids per cow in the Netherlands and Denmark were 66 per cent and 52 per cent higher, respectively, than in Ireland. Similarly, stocking rates in Ireland were low; with only France and Germany having stocking densities equivalent or lower than Ireland. Stocking rates in the Netherlands and Denmark were 34 per cent and 30 per cent higher than in Ireland.

The combination of the generally lower stocking densities and lower milk solids per cow for Ireland result in Ireland having the lowest milk solids per hectare compared with all other countries, with the exception of France. The Netherlands and Denmark again produced well in excess of the other countries examined, with milk solids production per hectare being greater than 200 per cent higher in both Netherlands and Denmark compared with Ireland. The final partial productivity measure – milk production per labour unit was again highest in both the Netherlands and Denmark, with levels in the UK also relatively high. Italy was the only country that exhibited lower labour productivity than Ireland, but average levels in France and Germany were very similar to that in Ireland.

All of the results presented in Figure 2 are calculated with respect to population estimates of all specialist dairy farms in the countries included. Productivity indicators for farms with 50-99 cows were also examined in each of the countries. However, despite the variations in sampling procedures adopted in the FADN survey there was no evidence of pronounced differences in average productivity levels between the sub sample and the whole sample. In general, the productivity rankings between the countries were similar in the two samples but the relative differences between the countries tended to be reduced in the more homogeneous sample of the 50-99 cow farms. This was particularly evident in the use of land and labour productivity measures, where the large disparities between the countries in the average sample of farms were reduced in the 50-99 dairy cow farms size sub sample.

Figure 2: Partial Productivity Measures for selected EU countries (average 1996 to 2003)



The results for the individual years between 1996 and 2003 was examined using a linear regression model which was fitted to measure the trend over time for Irish dairy farms in relation to the average for all countries examined. The average sample of all specialist dairy farms did show a significant trend over time for three of the six partial productivity indicators, namely: milk solids per cow, stocking rate per hectare and milk solids per hectare. Of these indicators, milk solids per cow for Irish dairy farms increased significantly by on average 0.012 kg per cow per year relative to the average of all countries. In contrast, stocking rate (cows per hectare) and milk solids per hectare decreased relative to the average of all countries examined, by on average 0.01 cows per/ha and 0.09kg of milk solids per/ha respectively, over the time period examined.

However, the sub sample of specialist dairy farms, with 50-99 dairy cows, did not show a significant relationship between any of the relative productivity measures in Ireland vis-a-vis our European competitors. While there was a significant positive trend for these larger dairy farms within Ireland, with respect to milk solids per cow (+10.5kg per/cow/year) and milk production per labour unit (+7kg per/LU/year), relative to the average of all countries examined none of these relationships were significant.

Comparison of costs and returns in selected EU dairy farms

For the purpose of examining costs of production, costs were defined as:

(i) Total cash costs, which include all specific costs, directly incurred in the production of a given commodity, for example fertiliser, feedstuffs, seeds etc. plus external costs such as wages, rent and interest paid, plus depreciation charges.

(ii) Total economic costs, which includes all of the cash costs identified above, except interest charges, plus imputed resource costs for family labour, equity capital and owned land.

Figure 3: Cash and economic costs for all specialist dairy farms in selected EU countries (1996-2003)

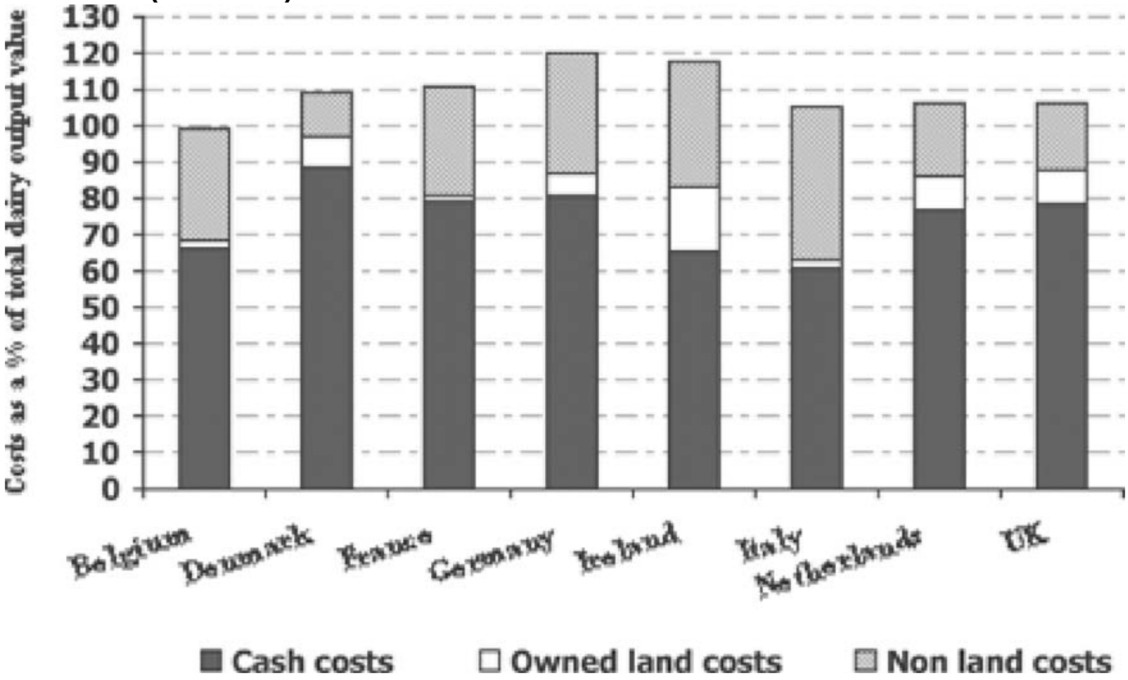


Figure 3 shows total costs as a per cent of dairy output for the eight year average, for each of the selected countries, for all specialist dairy farms in the FADN sample. The value of dairy output was calculated as milk receipts plus dairy calf sales. Cash costs and the imputed charges for owned resources were identified. Cash costs as a percentage of output were relatively low in Ireland over the period 1996 to 2003. Italy had the lowest cash costs as a percentage of output at 61 per cent, but the cost structure in Ireland and Belgium were only slightly higher at 65 and 66 per cent respectively. The highest cash costs as a percentage of output were experienced in Denmark where cash costs were 88 per cent of total output of the enterprise.

The competitive advantage experienced by ‘average’ Irish producers worsens when all imputed charges for owned resources are taken into consideration. Total economic costs as a per cent of output were highest in Germany where costs were 120 per cent of the dairy enterprise output. Ireland followed with the second highest total economic costs at 118 per cent of output. The lowest total economic costs were found in Belgium, where nearly 1 per cent of dairy output remained as profit for dairy producers, on average, over the eight year period (i.e. total economic costs were 99 per cent of total dairy output). The main imputed cost that contributed to the relatively high total economic costs experienced in Ireland was for owned land. This was due to the relatively high imputed rental charge coupled with high levels of land ownership in Irish dairy production. The relatively low stocking rates and milk yields per hectare on Irish dairy farms over the period must also be considered as a contributing factor. Given the milk quota transfer scheme in operation in Ireland over the last number of years, structural change has not occurred as quickly in the Irish dairy farming sector as in other member states and as a result the output per hectare and per labour unit remains low because of the distribution of milk quota. However, it is worthwhile to note that when the imputed land charge for owned resources is not taken into consideration the relative competitive position of Irish dairy farms remains strong, with Irish farms showing one of the lowest cost to output ratios for the period 1996 to 2003.

When total economic costs as a percentage of output of the 50-99 dairy cow size category were considered they were generally substantially lower than the average for all specialist farms. In addition, the competitive position of these larger Irish dairy producers (with 50-99 dairy cows) was substantially improved relative to competing countries; total economic costs as a percentage of output were reduced by 15 per cent on these farms relative to the average producer in Ireland, suggesting that larger farmers are allocating resources more efficiently. This ranked these larger Irish producers as the third lowest total economic cost producer relative to producers in all countries examined. It is worth noting here again, that when the imputed charge for owned land is excluded from the analysis the competitive position of Irish producers improves significantly. In this case these larger Irish producers had 14 per cent of total output remaining to remunerate the opportunity cost of owned land.

The effect of imputed land and labour costs on the long term competitiveness of Irish milk producers is highlighted in this analysis. When these costs were excluded from economic costs Ireland appeared to be quite competitive, with only Italy exhibiting lower costs than the average producer in Ireland, while for the larger sub sample no other country had lower costs than Ireland during the period 1996 to 2003. However, it is important to consider these costs as they are a leading indicator of a farmer's ability to expand milk production in a cost efficient manner and therefore are the key to the success of the Irish dairy farming sector in a more liberal milk quota situation.

A linear regression model was fitted to the data to observe trends over the period 1996 to 2003. For the average sample there was no apparent significant trend over the period, whereas with the sub sample of larger producers there was a significant improvement in cash and economic costs per product volume for Irish producers relative to the average. Cash costs improved at a rate of 2 cent per kg of milk solids per year and economic costs at a rate of 3 cent per year relative to the average of all countries.

It is evident that on a cash cost basis Ireland is in a relatively advantageous position within Europe and may be well placed to compete in a more liberalised milk quota environment. However, total economic costs, which could be considered the leading indicator of the sector's ability to adapt and expand are relatively high and it is therefore important for Irish policy makers to establish policies that will promote the more efficient allocation of land and labour and therefore ensure the sustainability and success of the Irish dairy sector in a post milk quota situation.

Contribution Of Technical Innovation To Sustainability

Regardless of future dairy sector policy, it is clear that the Irish dairy farming sector is facing challenges and continued technical innovation is very important for the sustainability of Irish dairy farming in the long-term. Given that milk prices are projected to fall to approximately 21 to 22 c/l as a result of CAP and WTO reforms, dairy farmers have no option but to increase efficiency and scale of production if they are to maintain incomes. Acquiring and applying newer skills and knowledge needed for more efficient milk production are essential. Through research new technology can be developed which will allow dairy farmers to increase scale while at the same time reduce the unit cost of production. Table 6 shows a comparison of the physical and financial performance from the average specialist dairy farmer in the National Farm Survey (NFS) and potential Moorepark target.

Table 6: Comparison of physical and financial performance from the average specialist dairy farmer from the National Farm Survey (NFS) and potential Moorepark target

	NFS Average	Moorepark Target
Milk yield (l/cow)	4,700	6,280
Protein %	3.30	3.60
Fat %	3.75	4.20
Milk solids yield (kg/cow)	324	505
Concentrate (kg/cow)	713	300
Stocking rate (LU/ha)	1.9	2.5
Calving Interval (days)	394	366
Six wk calving rate (%)	54	75
Net Margin (c/l)	**10**	**19**

Four main areas of technical innovation have been identified which will be important for the sustainability of dairy farming in Ireland:

(1) Using high EBI genetics
(2) Maximising utilisation and performance from grazed grass
(3) Developing labour efficient systems of production
(4) Developing low fixed costs systems that allow dairy farmers expand.

(1) Using high EBI genetics

One of the main factors influencing farm profit now and into the future is the genetic make-up of the dairy herd, which will be critical to the profitability of any dairy enterprise. Until recently, milk yield has been the main objective criterion for selection in most temperate countries, and the use of Holstein-Friesian genetics of high milk production potential has been widespread. Overwhelming evidence shows that selection solely on production traits results in reduced herd health, fertility and welfare (Pryce and Veerkamp, 2001; Horan *et al.,* 2004; Evans *et al.,* 2006) with an almost 1 per cent reduction per year in calving rate to first service in Irish spring-calving herds between 1990 and 2001 (Evans *et al.,* 2006). Reproductive performance affects the amount of milk produced per cow per day of herd life, breeding costs, rate of voluntary and involuntary culling, and the rate of genetic progress for traits of importance (Plaizier *et al.,* 1997) and consequently, results in a reduction in the overall profitability of a dairy herd (Dijkhuizen *et al.,* 1985, Lopez-Villalobos *et al.,* 2000). In Ireland, the relative importance of fertility is higher because milk production is based to a large extent on seasonal pasture production systems and thus profitability is influenced by the ability to calve cows rapidly at the optimum time.

Since 2001, the Economic Breeding Index (EBI) has been in effect in Ireland to identify genetically superior animals in order to increase profitability within Irish dairy herds (Veerkamp *et al.,* 2002). The EBI is currently composed of five sub-indexes (relative emphasis in parenthesis): milk production (49 per cent), fertility/survival (32 per cent), calving performance (8 per cent), beef performance (6 per cent) and health (5 per cent). The EBI favours animals whose progeny have a long herd life, annually producing a large quantity of high composition milk within a 365-day calving interval, are easy calving and have progeny who themselves calve easily in the future and exhibit large carcase weights of good conformation. In 2006, approximately 30 per cent of replacements entering Irish dairy herds will have originated from AI sires, with the remainder resulting from the use of stock bulls (Department of Agriculture and Food, 2005). The average EBI of dairy cows and stock bulls recorded in Ireland is €24 and €8, respectively, with the average EBI of the dairy cow population only increasing by €1/ annum (ICBF, 2005).

Based on the gains observed in research and the prevailing EBI in the national dairy cow population (EBI = €24), an increase in profit of €3,500 per 454,000 litres (100,000 gallons) of milk quota per year through the development of a high EBI herd can be expected in the coming years.

(2) Maximising utilisation and performance from grazed grass

One of the major competitive advantages that Ireland has over most EU countries is the potential production of between 12 to 16t DM/hectare over a long growing season from pasture. It is envisaged that the cost of grass silage will continue to increase due mainly to increases in contractor charges associated with inflation in labour, energy and machinery costs. In recent years grazing management strategies have been identified that increase the proportion of grazed grass and reduce the dependency on grass silage in Irish systems of milk production. Lengthening the grazing season by 27 days has been shown to reduce the cost of milk production by 0.1c/l. Continued technical innovation in grazing management will further reduce the cost of milk production and therefore ensure the viability of the dairy industry as a whole. Figure 4 shows a strong relationship between total costs of production and proportion of grass in the cow's diet in a number of countries. The data also shows that increasing the proportion of grazed grass in a system that already entail a high proportion of grazed grass (UK and Ireland) will have a greater benefit in reducing the cost of milk production than a country that already has a low proportion (Denmark and US).

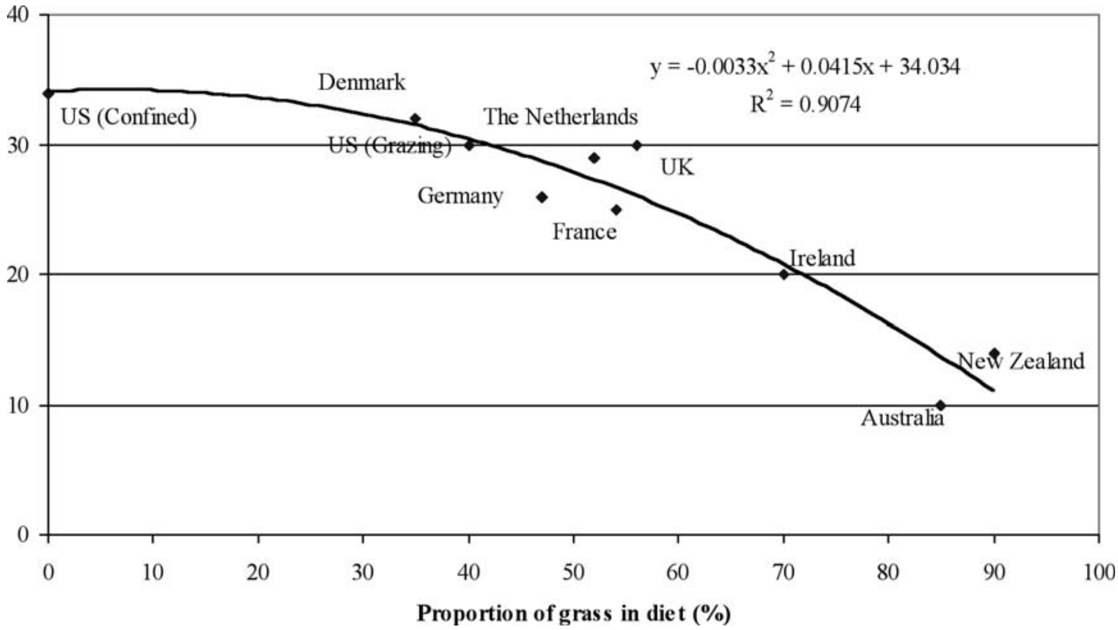


Figure 4: Relationship between total costs of production and proportion of grass in cow's diet

(3) Developing labour efficient systems on milk production

The cost, availability and skill level of farm labour is a critical issue for dairy farmers. It is likely that highly skilled farm labour will insist on getting equity in the farm business in future. This practice has been widespread in New Zealand in the past. New strategies are required to deal with this issue. Farm partnerships offer good opportunities. Access of young people into farming needs to be facilitated. The Moorepark Farm Labour study showed a peak daily labour input of 10.1 hours/day in March and a trough of 7.3 in December in the herd size category from 50 to 80 dairy cows. The efficiency of labour input increased significantly with increased herd size. Milking was the most time consuming task, accounting for over 30-35 per cent of total labour demand. Labour efficiency on dairy farms will have to increase significantly in the future if average quota size increases to 485,780 litres as suggested in the Prospectus Report. Table 7 shows the relationship between herd size and labour efficiency in Irish dairy herds. In New Zealand the average number of hours per cow per year is less than 20 which is much less that that in the larger size group in Ireland.

Table 7: The relationship between herd size and labour efficiency in Irish dairy herds *(O'Donovan et al., 2006)*

	Herd size group		
	Small	Medium	Large
No. of cows	44	62	147
Milk quota (litres)	236,000	296,000	745,000
Hours/cow/year	49	42	29
Milking as a % of total time	35	32	30
Full labour costs (c/l)	10.2	9.7	6.4
Labour as a % of total costs	35	31	24

(4) Developing low fixed costs systems that allow dairy farmers expand.
If dairy farmers are facing into a situation where milk quotas are liberalised but lower milk prices apply then low cost expansion will be the key to the future profitability of dairy farmers in Ireland. To allow for expansion extra housing and milking facilities will be required on dairy farms. The capital cost of conventional housing systems for a 100 cow herd is estimated at €250,000 as compared to €29,000 for an out-wintering pad plus an earth bank tank (no grants included) to contain all slurry plus soiled water. When both systems are financed with a 15 year bank term loan with interest rate fixed at 7.3 per cent the difference in annual costs (interest plus depreciation costs) is 2.4c/l. A major advantage of low capital cost wintering systems is that it allows farmers with limited resources to put facilities in place and thereby gain control over the consolidation or expansion of their business. Therefore, with pressure to reduce costs and the absence of grant-aid for larger farms it is opportune to examine alternative lower cost systems. Recent innovations in using out-wintering pads and earth bank tanks have shown huge potential as alternative reduced housing and effluent management facilities for dairy cows.

ISSUES IN RELATION TO DEVELOPMENT OF THE DAIRY INDUSTRY

As outlined earlier the Irish dairy farming sector is facing many unknowns, most of which are beyond the control of the industry in terms of the development of EU and world trade policy. However, there are still a number of internal issues that the dairy industry needs to address in order to ensure the long-term viability of the sector.

Milk composition and milk pricing

In the future, milk payment systems will have to change to reflect the move towards greater trade liberaliSation which will result in reduced supports for commodity-type products. This will include a negative term for volume in the pricing to recognise the cost of handling and removing water in product manufacture, greater differential between protein and fat and a seasonality weighting that reflects efficient capacity utilisation in processing.

Both the fat and protein content of Irish milk has improved over the last decade, however, both are less than the EU average (fat 3.80 per cent vs 4.12 per cent; protein 3.28 per cent vs 3.30 per cent in 2002), especially compared to countries where a large proportion of milk is utilised for manufacturing. Milk pricing system has a pivotal role in signalling market values of the individual milk components to the producer. The incentive structure provided by the pricing scheme should promote desirable changes in milk composition and provide opportunities for producers to enhance profitability through the production of more valuable milk. Two recent studies (Wallace *et al.,* 2002; Keane 2000) recommend that Irish dairies should move from the present differential-based milk pricing system to either an A+B-C system or a multiple component pricing system. A proportion of Irish dairies include a significant positive constant in their milk pricing schemes. This contrasts sharply with payment schemes operated in other countries where a negative term in the pricing equation recognises the cost of handling and removing water in product manufacture. For example, the Danish volume charge is approximately 7 per cent of the base price while in the Netherlands the volume penalty equates to around 15 per cent of the base price. Given the small proportion of Irish milk sold as fluid, the payment of a positive constant for volume is hard to justify. Furthermore, the inclusion of a positive constant in Irish payment schemes is an undesirable feature as it reduces the value placed on milk solids and thereby diminishes the incentive for increases in fat and protein content. The recent decision by Connaught Gold Co-op to introduce an A+B-C system of milk payment is welcome and hopefully other Co-ops will follow.

The EU Commission has implied that further reform of the EU internal market is likely post MTR in 2008. This may include abolishing export refunds as offered in the WTO negotiations. At present SMP export refunds are at zero with no intervention stocks which implies that the internal market is sufficiently reformed to compete on the world market. In contrast the export refunds for butter are still in the region of €1,000/tonne, while there are 132,000 tonnes in public stocks. Therefore any future CAP reform will focus on butter rather than SMP. This would tilt the fat protein ratio further towards protein. Based on the butterfat and protein price differential paid by Irish processors, the average protein to fat ratio averages 1.8 and varies from 1.1 to 2.5. Based on USDA quotations, Oceania World Prices currently value protein at a ratio of 2.9 more than butterfat, while European World Prices value protein at 3.3 times more than butterfat. FAPRI projections for world prices in 2015 suggest a price differential of 2.6. Therefore, to reflect these changes Irish milk payment systems in the future will require a greater differential between protein and fat.

Product mix, plant utilisation efficiency and seasonality of milk supply

The Irish dairy industry produces a high proportion of its output as base or commodity type products (butter, powder, and bulk cheeses) which up to now relied heavily on EU market intervention and other market supports. Changes to the policy environment at EU and WTO level will result in reduced supports for these commodity type products in the future. These changes will require the dairy industry to make changes to the existing product mix. The potential for increases in efficiency in the processing of commodity milk products and increasing the proportion of output away from base/commodity type products were highlighted as two key strategies for the future in the Prospective Report on the 'Strategic Development Plan for the Irish Dairy Processing Sector'. Rationalising the number of processing plants for butter, powder and casein production from the present level of eleven to four would deliver efficiencies and savings at manufacturing and enterprise level through scale and more efficient use of resources. Also, extract greater value from processed milk by producing products that are growing in demand, results in a higher margin and reduces the dependency on commodity type products.

Milk production in Ireland is predominately based on spring-calving systems. This is because grazed grass is the lowest cost feed and can make up a large proportion of the diet over a long grazing season. For climatic reasons most regions in the EU have a period of six months or longer when cheap production based on grazed grass cannot occur, while in Ireland in dry southern parts this is reduced to less than three months. With normal 10 month lactations Irish conditions permit low cost milk production from pasture while in other EU countries this is not possible. Thus a much larger incentive will be required to ensure all-year-round milk supply in Ireland compared to other EU countries. However, spring-calving systems result in highly seasonal milk supply patterns. At present the peak month of production (May), as measured by milk deliveries, is a multiple of six times of the lowest month's production (January). This has two disadvantages; first this seasonality leads to poor capacity utilisation in the Irish processing industry, adding to the operating costs of the processor. Second, it has restricts the types of products that can be produced especially those that require year-round milk supply.

Table 8 and Table 9 show the trends in milk utilisation and the quantities of major Irish dairy products produced from 1978 to 2005. It shows that the strategy of the Irish dairy industry has concentrated on maximising output within the constraints of quotas through a focus on cost-effective production of commodities and creating maximum values. The product portfolio has a strong emphasis on butter, which has not changed dramatically since EU membership, while the main competitors in other countries have all reduced their dependency on butter in particular. The only noticeable change in the product portfolio in Ireland is increased production of cheese and the reduced emphasis in skim milk powder. Ireland's dependence on butter when compared to the EU average was highlighted in a study carried out by (Pitts and O 'Reilly 2002) which showed that although Ireland produced only 4.7 per cent of the total milk in the EU it produced 7.7 per cent of the total butter produced in the EU.

Table 8: Trends in whole milk utilisation (percentage of total)

	1978	1980	1985	1990	1995	2000	2005
Butter	70.0	66.3	72.8	72.3	67.7	64.5	64.0
Cheese	12.9	13.0	14.3	14.9	15.1	18.8	22.0
WMP	5.4	6.6	4.2	2.1	5.5	5.5	3.0
Butter-oil	6.8	8.7	1.6	1.8	4.6	4.0	6.0
Others	4.9	5.3	7.1	8.9	7.1	7.2	2.0

(**Source:** Irish Dairy Board, Annual Reports)

Table 9: Production of major Irish dairy products 1979-2003 ('000 tonnes)

	1979	1999	2000	2001	2002	2003
Butter	130.5	146.0	145.0	139.0	147.0	149.0
Cheese	57.5	101.8	98.5	122.8	115.9	112.0
Whole milk powder	19.1	33.3	36.7	32.4	26.4	31.0
Skim milk Powder	148.0	84.4	78.8	86.3	97.2	78.4
Casein and Caseinates	13.3	47.0	43.0	51.0	44.0	48.9

(Source: Dairy economic indicators 2004)

Winter milk schemes will have to change to reflect changes in the industry. In Ireland at present there is a requirement for some milk to be produced out of season for the fluid milk market and for the manufacture of specific products all year round. The national strategy should be to have a portion of the national herd calving in the autumn. This is best achieved by having specialist autumn-calving herds. The cost of this strategy is minimal in relation to the potential of adding value to milk and to better plant utilisation in the industry. Farmers have to be compensated for the extra costs involved as well as getting an additional margin over spring-calving production systems. It is suggested that strategies based on 100 per cent autumn-calving in some herds is the most cost-effective method of assembling winter milk. Since herds are likely to be selected on a contract basis, the herds can be clustered together. All the milk over the winter months is early lactation milk, which should give more flexibility in terms of product mix. It also allows for the blending of early lactation milk from autumn-calving herds with late lactation milk from spring-calving herds. The cost of the total milk pool assembled can be lower than that obtained from the current system even though the milk bonus payment is higher for milk from 100 per cent autumn-calving herds.

Land use

When EU milk quotas are abolished it is generally accepted that the next most limiting factor to increased milk production on many dairy farms is grazing land availability. It is likely that land purchase price in Ireland will continue to be high for the foreseeable future. Therefore, it is important that land use policies facilitate the availability of land for dairying through long term leasing arrangements. The most efficient model for milk production in Ireland is the production of milk from grazed grass as this is where our competitive advantage lies. It is also envisaged that herd size will increase substantially over the coming years thereby requiring large blocks of land. Many dairy farms are constrained by size and farm fragmentation. Similarly, it would not be desirable from an environment point of view that intensive indoor high input systems would develop. Therefore, it is important that measures are put in place that allow long term leasing of land and are not constrained by regulations governing REPS and single farm payment.

A major initiative is needed to get young people into dairy farming and into a managerial role at a young age. At present there is a very low level of dairy farmers under the age of 35 years. This is set in a background of an Irish economy of continuing economic growth and a dairy industry of slow structural change. A continued influx of highly trained young people into the industry is critical for long term sustainability.

Animal Health and Welfare

Farming systems need to be sustainable in terms of animal welfare. Ireland has a good track record in this regard. We need to build on this strength. Irish cows graze outdoors for most of the year and consumers perceive this production as more ‘natural’ and ‘welfare friendly’. There need be no conflict between profitable dairy farming and ecological sustainability.

The high animal health status of the Irish national herd is vital to all forms of agricultural and food production and to the export trade in particular. Infectious diseases of livestock impose constraints on production efficiency as well as affecting animal welfare, and the quality and safety of food supply. Bovine TB, Brucellosis, BSE, and Johnes Disease are diseases of major concern in Ireland. These diseases are a cause of concern not only in regard to the health of the animal but also because of the possibility of direct contamination of food (e.g. Salmonella, TB and Johne’s)

Environment

A series of Directives have been introduced with the objective of protecting the natural environment. These include Directives dealing with issues such as water quality, birds, habitats and the protection of the natural environment. The positive contribution of farming and agricultural policy to the reduction of greenhouse gases and increased levels of carbon sequestration should be noted in the context of Ireland’s efforts to achieve targets set out in the Kyoto protocol. The introduction of the Nitrates Directive is a matter of the most interest to Irish dairy farmers. The Directive aims to protect water quality against pollution from agricultural sources, with a primary emphasis on better management of livestock manure and other organic fertilizer. The Nitrates Directive set a legal limit of 170 kg of organic nitrogen that can be applied per hectare (a stocking rate of 2 LU/ha). Analysis shows that approximately 70 per cent of dairy farms and 78 per cent of mixed dairy farms at present comply with the limit of 170 kg of organic N/ha. Economic modelling showed that of the 8,000 dairy farmers (approximately) that exceed the limit of 170 kg/ha of organic N, approximately 1,000 could comply with the 170 kg/ha organic N limit at little or no cost (Hennessy *et al.,* 2005). These farmers are currently operating market-loss-making livestock enterprises on their farms. The remaining 7,000 would experience some financial loss as a result of the 170 kg/ha limit. Approximately 10 per cent of dairy farmers would be <10 per cent worse off financially; 8 per cent would be between 10 and 20 per cent worse off and 5 per cent would be >20 per cent worse off financially as a result of the 170 kg/ha organic limit. The analysis also shows that the imposition of the organic N limit of 170 kg will result in relatively greater financial loss at farm level in the future because of reduction in dairy farm numbers, therefore, it is important that Ireland obtains derogation of up to 250 kg of organic N/ha for these farms at higher stocking rates. There is much evidence to show that Ireland’s weather pattern, soil type and grass based system should warrant a higher limit. Therefore, it is important that we do not erode the competitiveness of the grass based system relative to other higher input systems in EU with over regulatory environmental legislation.

Conclusions

This paper reviews recent trends in Irish dairy farming and contemplates the short to medium term outlook for farming. Statistics from the Irish Department of Agriculture show that dairy farm numbers are falling faster than any other system of farming despite the fact that National Farm Survey data shows dairy farms incomes to be higher than any other system. This paper outlines the challenges facing dairy farmers in Ireland in terms of the outlook for milk price and the continued uncertainty regarding the future of international trade agreements and the EU milk quota system. The paper discusses the advantage of retaining the milk quota system and concludes that in a situation where export subsidies are abolished, the milk price may fall to a level where the EU milk quota no longer serves any purpose. Analysis of international data suggests that Ireland has one of the lowest cash costs of production but that our use of land and labour are still relatively inefficient. If the industry is to prepare for an era of more liberal milk production, then the management and policies supporting the allocation of farm land and labour is key to future success. The paper also highlights the capacity for continued technical improvement at the farm level which will be key for the sustainability of Irish dairy farming in the long term.

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Vital First Steps and Investment Decisions

Matt Ryan, Teagasc, Dairy Programme Manager, Dairying

Executive Summary

- The pressures dairy farming is facing will force farmers to decide where their long term future lies. As it is unlikely that part-time dairy farming will survive past one generation, it is probable that labour and land availability will dictate herd size in the future.

- It is likely that in 5 to 10 years time most dairy farmers will have herd sizes of 80-150 cows and, by necessity, this will be a one-man operation with family or casual labour. Another group, 15-20 per cent, will have herd sizes of 160+ cows, with two or more labour units plus casual labour, involved with the operation.

- We know that only the very efficient farmers, who can and are prepared to expand, will derive one full family farm income from farming in the future. Present income has to increase by 22 per cent, 48 per cent, 80 per cent and 110 per cent over the next 5, 10, 15 and 20 years, respectively, to have the same buying (spending) power as this year.

- Improved efficiency represents the cheapest and most logical way of maintaining / improving farm incomes. The targets to aim for are net profits of 15 c/l (€34,000 per 227,000 litres), €900 per cow and/or €2,500 per hectare – depending on farm circumstances. Only about 10 per cent of all dairy farmers are currently achieving these targets.

- Investment in expansion must be planned carefully so as to 'future proof' any investment being made. "How long will I be farming?" "What investments should I make?" "Can I afford the investment?" These questions must be addressed. Irish farming tends to be over-capitalised and under-knowledged.

- The EU's drive to improve the relationship between the environment and agriculture will result in farmers not alone being quality food producers but also being land managers. Like most obstacles farmers encounter, the Nitrates Directive can be managed and need not greatly impinge on farm profit.

- Because of the structure of Irish farming, all the stakeholders will need to work together to put in place structures that will allow dairy farming achieve the scale that is required by young, well educated, committed dairy farmers.

- Teagasc Advisory Service is responding to the changing environment by putting in place a Specialised Advisory Service network to cater for the technical and business needs of 8,500 progressive dairy farmers.

Introduction:

From the outset it is necessary to state that dairy farmers are essential for the long-term future of rural Ireland.

Dr. Pat Dillon has outlined the long-term vision for the Irish dairy industry. Now it behoves dairy farmers to identify where <u>their</u> future lies and take steps to achieve <u>their</u> goals.

Many factors come into the equation in deciding on where your future lies and on how to get there. I propose to outline the pathway in getting to 80-150 cows and/or to 200+ cows. Many of the same issues have to be addressed for both situations but extra issues such as increased knowledge, labour efficiency and excellence in communication, come into play when aiming for the larger herd size. I propose to examine and outline the pathway under the following headings:-

- Economic Health Check
- Options Analysis
- Efficiency
- Expansion
- Quota Purchase
- Repayment Capacity
- Investments
- Environment
- Structural Changes / Grants
- Knowledge
- Labour Efficiency
- Communication

Economic Health Check
An economic health check for a farm family revolves around the amount of money required to support the family home compared with what can be generated by the farm (and other sources).

The CSO estimate that each consumption unit (person over 13 years) requires €13,000 in living expenses per year. A child (under 13 years) requires €6,500 in living expenses. Therefore, a husband and wife plus two teenagers require €52,000 in living expenses. However, families will have different aspirations – some will have higher living expenses while others will have lower.

To keep pace with inflation (4 per cent) and farmers paying 20 per cent tax, then the income to meet those expenses will have to increase by at least 4 per cent per year to have the same buying power as currently (Table 1).

Table 1: ***Income required in the future to provide spending power as for 2006***

2006	5 Years	10 Years	15 Years	20 Years
100%	122%	148%	180%	219%
€50,000	€61,000	€74,000	€90,000	€109,500

Table 1 highlights that income will have to increase by 22 per cent, 48 per cent, 80 per cent and 119 per cent over the next 5, 10, 15 and 20 years respectively, to provide the same buying (spending) power as this year.

However, farm cash demands will be greater. It is estimated that these could be €72,000 for an average sized farm. (Appendix 1)

But family farm income falls well below these requirements, as evidenced by the National Farm Survey (NFS) 2005 results. (Appendix 2). Farmers do and have to supplement their farm incomes from many other sources.

Key Message: ***In the light of these income requirements, it is necessary for all farm families to analyse their options.***

Options Analysis
Need drives behaviour! In the light of the above income needs, what options are available to dairy farmers?

- Retire from farming / let or sell farm.
- Get out of dairying – take off-farm employment and cattle.
- Stay as I am with minimum investment + part-time work.
- Improve farm efficiency / join REPS

- Improve farm efficiency and expand.

In considering all possible options it is important to taken into consideration your:-

- Age
- Health
- Successor
- Education
- Motivation (attitude)
- Capabilities (knowledge / skills)
- Resources (land, labour and capital)

To systematically do this, you should do an honest SWOT analysis on yourself, your farm and your farming system. This means examining your strength(S), weaknesses (W), opportunities (O) and threats (T). The following layout may help:-

	You	Farm/System
S: Strengths		
W: Weaknesses		
O: Opportunities		
T: Threats		

A farmer's strengths might be his age, knowledge, positive attitude, with a big farm and a low cost system.
Another farmer's weaknesses might be his lack of education, poor skills, a negative outlook, with a small milking platform.
Opportunities may exist in the form of a possible partnership arrangement, availability of quota in Co-op area, land rental locally, or full-time/part-time employment locally.
We may feel threatened by fear of cross-compliance, environmental issues, lack of finance, possible health problems, urban dwellers nearby, or unable to generate enough income.

Because of the changes taking place in farming at this point in time, it is opportune and necessary for all farm families to discuss and analyse their future options. Teagasc provides help and advice in this area.

However, lest there appear to be no hope, there are many efficient, medium size farmers making very good incomes.

Efficiency

There is wide variation between the costs and profits of the best 20 per cent and the bottom 20 per cent of dairy farmers, as highlighted in Table 2 from the 2005 Dairy Profit Monitor summary.

Table 2:
A Comparison of 2005 Dairy Profit Monitors (DPM) by Cost and Net Margin per Litre.

	Top 20%	**Average**	**Bottom 20%**	**Top Vs Average**
Effect on 50,000				
Gallon Quota				
Total Costs (c/l)	13.71	16.1	19.6	€5,432
Net Margin (c/l)	15.58	11.62	6.79	€8,887

For a 227,300 litre (50,000 gallon) quota holder, the difference in farm profit between the top 20 per cent versus the average and the bottom 20 per cent of farmers is €8,887 and €19,866 respectively. For dairy farmers with the capability and motivation to improve their farm incomes, improved efficiency represents the quickest and cheapest way forward.

The Teagasc target is a net profit of 15c/l or €34,000 for 227,300 litres (50,000 gallons) of quota owned of €900 per cow or €2,500 per hectare depending on land base. These levels of efficiency are achieved by:-

- Good financial management
- The right cow
- Grass, grass and more grass, efficiently utilised
- Labour efficiency

Appendix 3 highlights some efficiency factors (based on Moorepark results) that will improve the profit of every 227,300 litres of milk produced by €13,000. A large proportion of this profit can be realised by most farmers by adopting recommended research practices for grass and animal breeding.

Key Message: Improved efficiency represents the quickest and cheapest way of improving farm profits.

Expansion

Expansion represents the best option available to very efficient farmers who wish to maintain or increase farm income. However, expansion does not represent a viable option for inefficient farmers, because expansion involves increased investment, more borrowings and possible reduced cashflow. This could mean less cash is available for day to day expenditure/living.

For farmers wishing to stay in the business of full-time dairy farming, expansion isn't just an option, it is mandatory. The attitude that surrounds this thinking is also necessary – you must be 'expansion-minded'. Dairy farming is 2-3 times more profitable than all other livestock enterprises (table 3). Consequently, the only enterprise that can meet the income requirements outlined in Table 1 will be increased scale dairying. Cattle and particularly replacements done well can supplement a dairy enterprise where farms are fragmented.

Table 3. Enterprise Gross Margins (GM)

	Dairying	**Cattle**	**Replacements**
G.M./ha (€)	2000-2500	400-800	600-1000

However, the milking platform must be devoted exclusively to dairying. A possible stocking rate of 3 – 3.2 cows/ha might be considered (this is under research review).

Based on labour availability, it is likely that a one man unit (plus casual or family labour) will be 80 – 150 cows. A two man unit (plus casual labour) will be 160+ cows.

Key Message: Expansion isn't just an option, it is mandatory

Quota Purchase

The break even price which various producers can pay for milk quota, depending on their costs of production is shown in Table 4.

Table 4. Break even Price (c/l) for Quota Purchase (2007) in a WTO Scenario (Source: L. Shalloo, Moorepark)

	Options	Low-Cost Producer	All Other Producers
a)	Replace cattle with cows	33 c/litre	0
b)	Extra cows, land rental + conventional housing	2 c/litre	0
c)	Extra cows, land rental + low cost housing	7 c/litre	0

From this, it has been estimated that over 60 per cent of dairy farmers cannot afford to pay anything for quota. In fact, they will lose money even if they get it for free.
However, efficient dairy farmers (low cost producers) will make extra profit by buying quota in 2007 (WTO) Scenario) when

a) Paying 33c/l if replacing cattle with cows;

b) Paying 2c/l if expanding through extra cows, land rental and conventional housing;

c) Paying 7c/l if expanding through extra cows, land rental and low-cost housing;

All the above figures are for the farmer to break even profit-wise; there is 8c/l accommodated in the calculations for a labour cost which may only have to be partially spent, depending on individual circumstances.

Key Message: Quota purchase should only be considered a profitable investment by low cost producers

Repayment Capacity

Farmers must be very careful when making on-farm investments. All borrowed money has to be repaid. With milk price under pressure for a few years, farmers must know their repayment capacity.

Table 5 highlights how living expenses, size of quota and profit per litre of milk influence the level of borrowing that can be sustained on a farm. For example, a quota holder of 227,300 litres (45 cows) cannot borrow any money no matter what his level of efficiency. Neither can a 454,600 litre quota holder if he is making less than 10 c/l profit, but if he makes 14 c/l then he can borrow €123,000 (123k). The Single Farm Payment (SFP) worth 3.64 c/l (on quota owned on 31/3/2004 only), added to the above profit figures per litre will enable extra borrowing to be handled, as will profits generated by other farm enterprises.

Table 5. Capital sum that can be borrowed at various profit levels (c/l) over 15 Years at 7 per cent* when living expenses are €50,000 per year.

Quota Size		Profit (c/l)				
Gallons (,000)	Litres	8	10	12	14	16
50	227,300	0	0	0	0	0
75	340,900	0	0	0	€70	€131K
100	454,600	0	0	€41K	€123K	€205K
150	681,900	€41K	€164K	€286K	€409K	€532K
200	909,200	€205K	€369K	€532K	€696K	€860K

* Repayments - €111 per €1,000 borrowed.

Table 5 highlights the need for all farmers to assess carefully the level of on-farm investment they can afford to make – and to need to select the most critical investment on which to spend their limited funds.

Under no circumstances should off-farm income be used to fund on-farm investment i.e. by helping to meet loan repayments.

Key Message:
All farmers must assess their repayment capacity before making any investments

Investment
To meet the compliant requirements of the various environmental schemes, farmers have to invest heavily on their farms. Table 6 shows that these investments can be divided into two categories. Category 1 type investments are being made in buildings, slurry storage and machinery. Category 2 type investments are animal genetics, information, knowledge, reseeding, labour saving and improved infrastructure, and these give the greatest return for money.

Table 6: Types of on-farm investments

Category 1 Investments	Category 2 Investments
Buildings	Animal Genetics
Slurry Storage	Information
Machinery	Knowledge
	Reseeding
	Labour Saving
	Infrastructure

Because of the importance of Category 2 type investments it is important to judiciously invest in category 1 - investments, thereby, freeing up cash to invest in category 2 investments.

Irish Farming Tends to be Under-Knowledged and over Capitalized.

We know that we have to make expansion investments judiciously if farmers are to have adequate income going forward – (Appendix 4)
To expand by 100 cows on a green field site would cost a minimum of €180,000.
(Appendix 4a)

The housing-slurry storage cost of €400/cow could be achieved by erecting a stand-off pad and earthen bank tank or by using existing buildings plus new conventional housing. Presuming a grant of 50 per cent for this whole investment, the net cost would be €90,000. Replacing the cattle enterprise with cows and buying quota at 10c/l, the total cost would be €195,000 or approximately €2,000 per cow. Repayments on this over 15 years at 7 per cent interest would be €21,645. However, if money could be borrowed at 4 per cent interest (an interest subsidy of 3 per cent) then the repayments would be €17,550. (Appendix 4c)

'Family income' would be €37,450 (4 per cent interest) and €33,355 (7 per cent interest). If profit were pushed up to 15 c/l then 'family income' would be €64,950 (4 per cent interest) and €60,855 (7 per cent interest).

This exercise highlights the need for dairy farmers to:-

(a) Make a profit of 15 c/l
(b) Make low-cost investments in buildings
(c) Receive grants of 50 per cent and over for all capital investments
(d) Receive an interest subsidy – particularly young farmers working to a financial plan (Cost Control Planner plus Dairy Profit Monitor)

Key Message: On farm investment must give worthwhile returns

Environment

In a European context, the relationship between agriculture and the environment is seen as out-of-balance in most countries. Hence, the drive to focus on the environment, by shifting farmers from food producers to land managers. Under the new regime going forward, dairy farmers will have to farm in an eco-friendly way. Hence compliance!

However, it is not all bad news. Farmers stocked at 170-210 kg Organic Nitrogen (N) per hectare over the whole farm will be able to use 286 kgs/ha inorganic Nitrogen (chemical) or 229 units/acre, (or 8½ bags 27½ per cent N/acre). This is being achieved by good grassland farmers. If stocked at 210 – 250 kg Organic N/ha, then only 205 units N/acre can be used. Obviously, the idea is to discourage high stocking rates. But they can apply for a derogation.

Like most challenges farmers encounter, the Nitrates Directive can be managed and need not greatly impinge on farm profit.

Key Message: It is in the farmer's interest, as exporters of quality food, to be seen to be farming to good farming practices.

Structural Changes

Having discussed the theme of this conference with farmers at workshops and discussion groups, it is obvious that many structural changes will have to be made to facilitate scale farming in Ireland in the future.

Problem:

Land fragmentation and inadequate land base at the milking platform.

Land swaps between two appropriate, agreeable farmers should be made possible with no tax penalties.

Long term leasing incentives and/or double payment incentives for young lessees could free up land availability in the current climate.

Partnerships, represent an ideal opportunity to scale up, improve lifestyle, overcome labour problems, increase income either through increased scale and efficiency, and allow off-farm income be generated if required. However, restrictions such as limits on capital grants, REPS etc must be removed.

The construction of underpasses to facilitate free movement of cows from the existing milking platform to land across-the-road should be grant aided. Costing €50,000 (approx), not only do they benefit the dairy farmer but greater benefit accrues to the rural community.

Problem*: Age structure and lack of "New Blood"*

The number of dairy farmers under 36 years is less then 9 per cent and the number of young people interested in farming, as evident by the drop-off at Agricultural Colleges and Management Courses, indicates the possibility of a less than vibrant industry.

Some solutions will have to involve improving the image of farming as a career opportunity for young people and making it more opportunistic for young people to enter dairy farming.

Removing some restrictions from the **Early Retirement Scheme** and improving pension payments should be considered. Young farmers, generally, carry the burden of providing an extra 'pension' for the retiring farmer in the form of high land rental costs. Hence, the need to increase **Installation Aid** for young farmers operating a 5-10 year Business Plan.

Share Farming, whereby farm managers or other suitably qualified persons, working on farms would be eligible to produce milk from their own quota and cows on the farm they work on. This could eventually facilitate the smoother introduction of the 'new farmer' into dairy farming on his own.

Because the net cost of setting up on 100-cow unit on a ‘green field’ site with a low-cost investment system would be €400,000 (approx), this is perceived as one of the barriers for young people to enter dairy farming. The present grants system should positively discriminate in favour of young farmers with possibly 80 per cent grants and an interest subsidy if they operate to an annual Financial Business Plan. This plan would take the form of the Cost Control Planner (or equivalent available from commercial companies), summarised at the end of the year in the Dairy Profit Monitor.

***Problem**: Land rental costs too high*

It is suggested that land restrictions placed by REPS and the Single Farm Payment and forestry, are limiting the amount of land available for rental and consequently increasing the cost of rental. Under REPS 3, farmers are paid €10 per ha. when they own more than 55 ha. It is suggested that REPS farmers be allowed to let land that exceed 55ha but that it must be maintained to REPS standards by the non-REPS farmer. In some situations, it could be in the national interest for a REPS farmer to release land without penalty for a young expanding farmer.

***Problem**: Cost of investment for compliance regulations and labour saving facilities is prohibitive to scale farming.*

To facilitate full-time farming with scale no limit should be placed on the investment to be grant-aided. Because of current labour problems, capital investments will have to be made to facilitate greater labour efficiencies as follows and these should be grant-aided

- Milking machines, bulk tanks,
- Drafting facilities, scrapers, computerised ID, power washer, cluster removers, automatic teat sprayers,
- Rainwater storage and disposal,
- Low-cost investments, such as stand-off pads, earthenbank tanks (slurry storage) and reed-beds.
- New and renewal of paddocks, roadways and water provision.

Key Message: ***Structural change must happen if dairy farming is to maximise its potential in Ireland.***

Knowledge:

“Knowledge is power”. The progress we have made in dairying over the years confirms this. Hence, the need for dairy farmers to positively set time and money aside for the pursuit of knowledge. Computer skills will have to be improved to facilitate sourcing of knowledge, recording and assimilating on-farm financial and management activities. In 5 years time, farmers without good computer skills will effectively be illiterate. Teagasc has training facilities available in all counties for this purpose.

Dairy research in Ireland is highly regarded across the world. The early adoption of new research must be the priority of all dairy farmers wishing to secure their future. Adoption of new research work at farm level is lagging too far behind research findings to secure the viability of farmers.

Contact with the Teagasc Advisory Service and Research facilities through Open Days, Farm Walks, Newsletters, individual farm visits, discussion groups, symposia, web etc. will ensure knowledge won’t be a limiting factor in future progress.

Key Message: ***Former President Clinton says “In the future you will earn what you learn”***

Labour Efficiency

Surveys have shown that long hours of work and the unavailability of casual or permanent labour contribute to frustration and the exit of some dairy farmers from the industry.

Table 7 Economic and Work Time Characteristics on Dairy Farms (Source: Moorepark 2002)

Measure	**20% Most Labour Efficient**	**20% Least Labour Efficient**
Common Dairy Profit (c/l)	22.6	14.5
Net Dairy Profit (c/l)	17.9	12.2
Profit as % Gross Output	56.7	43.5
Cow Number	89	54
Hours / Cow / Year	35	42.2

Because of the cost and the availability of labour, output per labour unit will have to increase as it has over the last number of years. At average net profits of 10c/l and labour costing €30,000 per year, milk sales of 300,000 litres are required to pay for this.

In a labour survey, Teagasc Moorepark found that the average dairy farmer could manage a cow in 35 hours per year. However, the most inefficient farmers devoted 42 hours per year for the same task. (Table 7). The most efficient farmers in this survey were able to manage cows with 20 hrs/cow/year**.**
This was achieved by operating a simple grass based system, efficient milking systems, good milking routine, judicious use of contractors and good farm infrastructure. Our target must be 20 hours/cow/year!

Being the most efficient labour operators didn't reduce profit. In fact they were much more profitable than farmers running labour intensive operations (Table 7). This table shows that the most labour efficient farmers had a net profit / litre 47 per cent higher than the least labour efficient farmers.

Paddy Browne deals with the sourcing and training of farm labour elsewhere in the proceedings. But the target going forward must be for one man plus €6,000–10,000 of employed casual labour to look after 100-150 cows. At the high end of the target, no other animals would be on the farm – all replacements would be contract reared (also discussed elsewhere in the proceedings).

The issue for debate on this topic is not that it can't be done but how.

Key Message: ***Greater labour efficiency is a must – it is not that it can't be done, but how can it be done.***

Communication Skills
As farming becomes more sophisticated and larger, the farmer/manager will need to be an excellent communicator. From one extreme as a financial planner dealing with bank managers and accountants, to the other extreme where he will be teaching milking skills to hired labour (many of whom will be non-nationals), he will have to be able to patiently communicate at all levels to maximise farm profit.

Teaching new skills to immigrant workers every 6-12 months may not be appealing but it will be necessary to maintain labour on farms requiring more than 2 labour units.

Key Message: ***Patience, good 'man-management', and communication skills will be key in dealing with the new labour market***

Dairy Advisory Service
We are coming out of an era where maximising subsidies drove demand for advice and service. Advisors were heavily involved in Area Aid, Farm Waste Management etc. However, because of decoupling, farmers are now free and must maximise their profits through technical competency.

Teagasc is responding to this new environment by making 70 (approx.) Business and Technology dairy advisors available to 8,500 dairy farmer clients. These advisors will concentrate on improving farmers' income by

(i) Financial planning and management
(ii) Improved animal breeding/fertility strategies
(iii) Improved management of grass
(iv) Labour efficiencies

Specialist advisors will provide a high contact, specialised service to clients who want a specific service in the area of

1. Grass budgeting and monitoring grass. The Specialist advisor will contract his services to 25-30 farmers who wish to improve their grass budgeting skills. He will visit the farm every 3 weeks (13-14 times/year), do a grass budget and give advice based on the budget. This service will have to be totally demand driven and can only operate on that basis
2. Mastitis / SCC: Teagasc will contract specially trained mastitis advisors to co-ops to assist farmers needing help in this area
3. Financial Package: Teagasc will provide a financial package comprising of an annual financial plan, collection of data, analysis and review of performance by means of the Dairy Profit Monitor.

Conclusion
Time is of the essence for Irish dairy farming to get its act together. The new era will be challenging to all stakeholders, but opportunities will present themselves for positive, efficient dairy farmers.

Farmers will have to become more financially and labour efficient.
Farmers will have to expand.
Farmers will have to operate in an environmentally friendly way.
Farmers will have to operate to high levels of bio-security and animal welfare standards.
Farmers will have to continue to improve their knowledge and communication levels.

Structural changes and benefits should be targeted to committed dairy farmers for the long term benefit of the dairy industry.

Rural Ireland needs dairy farmers so as to maintain active and vibrant rural areas.

Teagasc has reorganised itself to help farmers to help themselves through this new era

Appendix 1

Approximate Estimate of the Drawing / Investment for Average Sized Farms and Families
(2 Adults + 2 Children – 18years+).

	€
Living Expenses	50,000
Tax	5,000
Pensions / Insurance	5,000
Capital Repayments	5,000
Farm Investments	5,000
TOTAL	70,000

Appendix 2

Family Farm Income by Farm Size for Specialised Dairy Farmers

(Source: NFS 2005)

Size (ha)	**10-20**	**20-30**	**30-50**	**20-100**	**>100**	**Hill Farms**	**All**
FFI (€)	17063	21810	41860	58690	90566	29338	39794
Premia (% of FFI)	36	44	42	53	50	61	48
Income from Farming	10920	12214	24279	31106	45283	11442	20693

Appendix 3

Selected Management Factors to Improve Profit

227,300 Litres ***(42 cows)***	**This Farm**	**Target***	**Effect on Profit (€)**
Meal / Cow (kg)	650	350	2,400
Repl. Rate (%)	26	18	2,546
Calv. Int. (days)	375	365	2,728
Protein (%)	3.35	3.45	1,000
Fat (%)	3.85	3.95	546
Days in Milk	250	280	1,364
Apr-Sept Milk (litres/cow)	3,646	4,100	2,364

** Based on Moorepark Research*

Appendix 4 (a)

Low Cost 100 cow Unit – Green Field, Infrastructure Investment.

Housing – Stand off Pad Slurry Storage – Earthen Bank Tank	€40,000
Milking Parlour / Collecting Yard	€100,000
Bulk Tank	€20,000
Paddocks / Water / Roads	€20,000
TOTAL	**€180,000**

50% Grant? = Net Cost €90,000

Appendix 4 (b)

Low Cost 100 Cow Unit – Green Field Stock and Quota Purchase

Stock – 100 cows less 100 LU beef	€50,000
Quota Purchase – 550,000 litres	€55,000
	€105,000
Plus Infrastructure Costs	€90,000
Total Investment Cost	**€195,000**

Appendix 4 (c)

Low-Cost 100 Cow Unit – Financial Returns

	Profit 10 c/l		Profit 15 c/l	
InteresIncome	**€55,000**		**€82,500**	
Interest Rate	**4%**	**7%**	**4%**	**7%**
Repayment (15 yrs) on €195,000	**€17,550**	**€21,645**	**€17,550**	**€21,645**
"Farm Income"	**€37,450**	**€33,355**	**€64,950**	**€60,855**

Message: **High Profit, Low Cost Housing, Low Interest Rate Necessary**

Personal Reinvention
The Ability to Maximise Your Potential

Watt Nicoll, The Difference Maker, Scotland

Life is not about chance. Success is about decisions, desires and willingness. Watt Nicoll has spent his life working with virtually thousands of people from Major Corporates to Sports Stars who have turned their life around and his talk will disclose some of the hitherto secrets of extremely successful businesses. Known in America as the Guru of Personal Reinvention and recognised in British industry and sport as the Difference Maker, his time is normally costly and his advice is seldom ignored.

An insight into one mans' life work with people from all walks of life and with a variety of backgrounds who believe that they have a right to claim everything in life they are entitled to.

This is an exciting source of information and inspiration for everyone who has ever indulged the thought **–**
"If I could only start all over again – knowing what I know now"!
To redesign yourself, maximise your potential and be what you really want to be, do what you really want to do, have what you really want to have

- **The Ultimate Makeover**

The mental equivalent to Cosmetic Surgery
To look good is cosmetic
To be capable is hard work, smart work or both

To be, have and do everything you are capable of requires:
- **Self-Belief**

Vision
Determination
Positive Perception
Willingness

The acquisition of skills such as:
- **Decision Making**
- **Communication**
- **Problem Solving**
- **Neural Inquisition**
- **Lateral Perception**
- **Positive Self Analyses**

This session provides case studies and an overview of the process and is designed to be highly inspirational, enlightening and entertaining.
Participants will leave with a skeletal understanding of how to create a Personal Development Plan and a clear understanding of how to redesign their circumstances and attitudes to cope with their chosen lifestyle and challenges.

The essential techniques are explained to widen horizons and excite the individual with awareness of their potential, irrespective of their existing circumstances or past successes/ failures.

A **S.W.O.T.** analysis will enable participants to understand their personal strengths and weaknesses, their opportunities and the latent threats to existing comfort zones and make participants aware of their natural characteristics and how this can either restrict or support enthusiastic progress in any life pursuit, but they will also hear how to detect and exploit the natural characteristics (driving forces) of others.

The effective formula for personal change will evolve through visual projection creating the essential discomfort of the present and the strong desire to change, which embraces the emotional intelligence necessary to create a quality PDP (Personal Development Plan). The effective results from the application of this system is the 'X' factor separating achievers from dreamers, winners from triers and leaders from followers.

You can be anything you want if you know what you want, know why you want it, and are prepared to do what has to be done to get it.

The Changes Necessary to Secure my Long-Term Future.

John MacNamara, Young Farmer of the Future 2005

Executive summary

The changes necessary to secure my future in dairying include:

- Improved land mobility.
- Cheap access to milk quota.
- Continuing support to improve farm management skills.
- Processing costs controlled and minimised.
- Regulation must be realistic and not an unnecessary burden.
- The milk price signal must encourage milk solids production.
- We must all highlight the positives in dairying.

Introduction

Dairy farming is in a transition state at the moment. To secure the long-term future of dairy farmers and the dairy industry numerous changes are required. We are in serious danger of losing a whole generation of farmers if we do nothing. But what can be done I ask you? I sincerely believe a lot can be done. As Peter Druker the author once said "*the only way to predict the future is to create it".*

Can this be equated to all aspects of Dairy Farming I ask you? Can we say this about our own individual farms?

Key questions are: Do I want to remain in dairy farming? What are my long term objectives and what can I realistically produce from the milking platform going forward?

The answer to the first part is yes. I feel passionate about, and enjoy, the job. You are all well aware of the advantages of a farming career but it is important when looking at negatives that you see them as challenges and a challenge is always something that can be overcome.

I believe I can produce 730,000 litres from 100 cows on the 40 ha milking platform. This will be a high output, low cost spring milk production system maximising the number of days on grass.

The limitations to me in achieving this are:

- Land availability
- Access to quota
- Milk price
- Investment costs with increased numbers and to meet cross-compliance issues

Lets look at my long-term farm business objectives.

To facilitate this exercise I have used 2005 as a base year calculating production levels from the Dairy unit. I then projected forward to 2010 showing the expansion required.

- There is a 53 per cent increase in milk solids production planned from the milking platform
- Milk composition: Milk protein of 3.47 per cent and B/fat of 3.90 per cent in 2005 increasing to milk protein of 3.55 per cent and B/fat of 4.10 per cent in 2010
- Yield per cow 6200 litres in 2005
  7300 litres in 2010
- Replacement rate in 2005 was 29 per cent and is targeted to be 17 per cent in 2010

To create this expansion the planned stocking rate will increase from 2.2 LU/ha to 2.5 LU/ha (assumes EU derogation for this stocking rate).To achieve these targets I will need a herd that has strong genetics for milk solids and fertility.

I believe all dairy farmers will need to increase the stocking rate on the milking platform and use other land, if available, as a backup in order to keep income increasing. I am able to use owned outside land to carry heifers, calves and make silage so that I can maximise milk output from the home farm.

Herd performance targets

This year will be remembered as a difficult year cost wise for dairying. Table 1 shows how our herd has performed up to the 31st October compared to the same period last year.

Table 1 the herd performance in 2005 and 2006.

	Year to 31 Oct.2006	Year to 31 Oct.2005
Milk produced/cow (litres)	6135	5710
% B/Fat	3.88	3.88
% Protein	3.43	3.45
Meals fed. (Kgs/cow)	696	310

Concentrate feeding more than doubled on the farm this year compared to 2005. With a more mature herd with less first calvers the overall yield /cow was up. To the end of October the herd had produced 462 kgs of milk solids/cow compared to 431 kgs/cow for the same period last year.

The main performance targets to be met in the coming years include :

- Days on grass will need to be close to 300 with 90-95 per cent of the cows diet from forage. Active pasture monitoring to be included. Expansion will only be achieved by maximising the number of days on grass. Grass is the cheapest resource we all have on our farms and we need to exploit its advantages to favour our low cost system
- Lactation length will need to increase from 270 days to near 300
- EBI to be at least €80 in 2010. EBI is currently €44 having come from €24 in Oct 2004
- My breeding policy will be geared towards increased kgs of Fat/Protein with a strong black and white type cow
- Compact calving will even become more critical for me as a cow calved in Feb. as against late March is worth 1000 litres more milk/year
- Fertility needs to be maintained with an infertile rate of less than 10 per cent in a twelve week breeding season

This will allow me to keep the replacement rate low thus selling surplus stock while increasing farm receipts.

Farm Profitability

The financial objective of the business is to increase the overall profitability of the dairy enterprise by increasing quota size, dairy sales and continued focus on costs. In 2005, net profit was 16.14 c/l. I need my income to be increasing by a minimum of 4 per cent each year while maintaining the cash flow ratio at 40 per cent over the next five years. This will require common costs to be maintained at 10 -11 c/l.

To this effect I completed a Farm Business Plan for 2005 to 2010.

An assumption I made was that milk price would be 25c/l by 2010 at milk solids of 3.55 per cent protein and 4.1 per cent fat. In 2005 my Co-op price was 28.4c/l with 3.47 per cent protein and 3.90 per cent fat. I'm assuming 1c/l drop in milk price each year until 2009 and then steady at 25c/l.

The plan shows a 4 per cent rise in net profit each year, after the servicing of investment costs, while also increasing the cash flow of the business based on the extra production achieved.

In short, I want to expand my current system without changing the system. To do this I will need 40 per cent more quota, stocking rate increasing a little while achieving a strong cash flow.

The restrictions on me achieving these targets are-

1. Land availability

Realistically, I cannot see any land becoming available to me near the milking platform over the next five years. As a result – I must increase the stocking rate. I don't want to go away and buy a 100 ha dairy farm and sell my own - when you grow up working, living, and helping in a community you get attached. This is very true in the parish of Knockainey where I live and I'm sure similar in many parishes across this country.

The whole land mobility issue will seriously need to be looked at. With substantial direct payments linked to land there is no necessity to rent out land. The government will need to continually look at land policy issues to see if there is a way to allow more land be leased long term to active producers.

2. Access to quota

In order for me to take the milking platform to its full potential I will need 40 per cent more quota by 2010. This is the only way I have of keeping the cashflow in order by increasing receipts, as costs are going up and there will be an investment cost.

Hopefully the new quota exchange system should supply me with this quota. I am a low cost producer and I am not going to pay more than restructuring price which is 10-12 c/l. Quotas are a depreciating asset to be gone in 3 to 5 years. I have concerns about the impact on my planned cash flow of upfront lump sum payments for quota. Any business plans its cash flow well in advance and farming is no different. All capital expenditure on milk quota must be given full tax relief without restriction.

3. Milk price

I will be trying to maximise milk price through increasing solids over the coming years and made the assumption of 25 c/l being got for the milk in 2009/2010. Every plus/minus 1 c/l on the above is worth €7000 to me in 2010. This is why it is so critical, as that money almost covers the ration bill for the year. Neither can SCC be a cost on the system. Achieving the milk quality standards will be vital.

Milk price remains a key driver of profitability on any farm. With this mindset we will have to keep encouraging change at processing level. Cost cutting and overall rationalisation in co-ops has to be kept up to speed. We need a central milk testing lab. that independently tests the milk and results to follow within 24hrs of collection. There are still two to three lorries passing my door at the moment and surely now it is time to get someone to coordinate the collection of milk nationally.

4. Investment plans

To achieve my plan I intend to invest in a 16 unit parlour in order to maximise efficiency at milking times. By moving to the new parlour it allows me to maximise existing tanks for slurry only. Currently dairy washing and slurry are being mixed.

I am only short four weeks slurry storage. I plan to build a tank underground connecting to existing buildings to facilitate this. The old parlour will be converted to provide extra cubicles. The total investment cost has been estimated at €150,000.

I'm on a low fixed cost farm and the challenge is to keep it that way. Energy costs are a big worry and will remain so. I have very little machinery on the farm so that is not a big impact on fixed costs. Labour is not an issue at the moment for me, but to the wider community it could become a problem.

Maybe my target should be 120 cows if more land becomes available. All animal health issues need to be kept under control. Technology would have to further improve for cow collecting, flow through and handling around the parlour. Two areas need to be noted: - management cannot afford to be lessened and the lifestyle for the farmer has to be a priority with the increased numbers.

Way Forward

Discussion Groups and continuing advisory contact have a key role to play in getting ideas and information to farmers. Farmers need to realise that no matter what group meeting you attend you take home some message from it. Also, it is very important in my opinion, to maximise the progress of the group, that the farmer contributes to individual meetings.

Financial management is a big part of my participation in the Teagasc/Kerry Agribusiness Joint Programme. Tools that I use on the farm are the Cost Control Planner, Profit Monitor, Milk recording/ICBF reports and grass budgeting. The impact that these have on the physical management of the farm cannot be over estimated. These tools allow me to drive the system.

In conclusion, the next five years will define dairy farming for us all. My plan is based on assumptions that I believe should, and hopefully will, happen and help me to stay dairy farming. I have also tried to describe the problems/limitations that I am facing, maybe that we are all facing. We need to see these as challenges and a challenge is something that can be overcome.

"*Remember to the brave and faithful nothing is impossible"*

Sourcing and Training for Tomorrows Milkers

Paddy Browne, Assistant Director, Teagasc Training and Development Directorate

Executive Summary

- Meeting the future labour requirements on Irish dairy farms will require a supply of young trained farmers and, barring the collapse of the Celtic Tiger, a supply of foreign workers.
- The farmer/managers will come from the ranks of young entrants to full-time training but a number of part-time farmers will also need to be convinced of a future in dairying and make the transition to full-time farming.
- Family based farms will continue to be the back bone of the sector but will only survive if services and practices are utilised to ensure a reasonable quality life-style.
- Large scale operations will continue to depend on migrant workers and a co-ordinated approach is required to improve the skill levels and retention of these workers

1.0 Introduction

In this presentation, I will begin with an historical perspective regarding trends in labour supply and numbers entering training. I will then describe the present situation and go on to outline the projected future labour needs on Irish dairy farms. Finally I will discuss how these needs might be met

.

2.0 Historical Perspective

Table 1 outlines a number of key trends and the most striking are the fall in the total number of farms and the corresponding increase in the number of part-time farmers.

Table 1: Demographic and Economic Trends 1920 - 2000

Year	1920	1960	1990	2003	2015
Total number of farmers	359,700	210,331	170,578	141,527	106,000
Number of Full-Time Farmers	N.A.	N.A.	124,746	78,723	20,000
Average Farm Size (ha)	12.4	21.1	26	31.4	44.4
Agriculture as % of Total at Work	54%	34%	14.4%	6.0%	
Gross agricultural output as % of GDP	N.A.	28.9%	11.9%	2.5%	

The decreasing importance of agriculture in terms of employment and contribution to the economy has also been quite dramatic. In 1920 agriculture was by far the biggest employer and the major component of the economy whereas in recent years gross agricultural output has fallen to less than 3 per cent of gross domestic product.

However, agriculture is still a significant sector and, when account is taken of the import content of non-agricultural exports, the agri-food sector makes a vital contribution to this country's foreign earnings.

By 2015 it is predicted that we will have 20,000 full time and 60,000 part-time farmers with a further 20,000 in transition out of farming.

2.1 Agricultural Training in Ireland

The first agricultural colleges were established in 1900 and participation rates peaked in 1986 when there were over 2,000 enrolments in 20 colleges and also at local centres. Enrolments fell during the 1990's but have stabilised somewhat in recent years largely as a result of the recent upgrading of programmes. **Table 2** shows the enrolment pattern in both colleges and local centres in recent years.

Table 2: Entrants to Agricultural Training 1994 – 2006

Year	Overall Number of Entrants: Further Level Courses – Local Centres	Further Level Courses – Colleges	Higher Level Courses	Total
1994	656	1,112	n/a	1,768
1995	368	1,107	n/a	1,475
1996	512	1,157	n/a	1,669
1997	315	1,045	n/a	1,360
1998	300	1,038	n/a	1,338
1999	121	949	n/a	1,070
2000	209	1,006	n/a	1,215
2001	99	677	218	994
2002	48	657	290	995
2003	127	538	283	948
2004	105	509	229	843
2005	103	471	211	985
2006	235	407	211	848

A noticeable feature of those attending college is a decrease in recent years in the numbers of sons and daughters of sizeable farmers who are attending colleges. Many serious farmers along with career guidance teachers are discouraging their sons and daughters from planning a full-time career in farming and encouraging them to pursue a non-agricultural qualification. Of those who do attend, there is an increasing tendency to follow a higher level course or transfer to a higher level course after first year or second year; their motivation is to progress to degree level and to combine a career as a professional in the agriculture area with part-time farming.

The decline in numbers pursuing full-time further level courses in college has been counterbalanced in recent years by an increase in the numbers of part-time farmers attending the part-time option at local level with 235 new enrolees this year. In addition, there has been a significant increase in the numbers attending the Advanced Certificate in Agriculture (formally the 180 hours courses) with almost 700 participants annually. At this stage half of these are completing this course by elearning. This programme is geared towards holders of a non-agricultural qualification and entitles successful participants to a range of state aids and incentives. So, while the overall numbers attending agriculture training programmes has remained relatively stable, there has been a very significant shift towards the part-time route with at least 80 per cent of participants apparently planning to be part-time farmers.

2.2 Implications for Placement

Participants in the Advanced Certificate in Agriculture (formally the 180 hours programme) and those pursuing the part-time option are required to undertake home farm placement but are not required to complete placement on another farm. Participants on the higher level programmes are required to complete three months placement. Participants on the Advanced Certificate in Agriculture have since 2001, been required to complete 9 months placement a farm. However, this was proven to be a deterrent with only 40 per cent of participants proceeding to the second year of the programme.
Accordingly, the Forum Review of Teagasc's Education and Training provision which was completed in 2005 has resulted in the placement component being reduced to 3 months with an optional additional three months.

2.3 Advanced Certificate in Farm Management

Another very noticeable trend has been the decline in the numbers participating in the Advanced Certificate in Farm Management (formally the Farm Apprenticeship Scheme) (see Table 3).
This programme which incorporates three years placement on a master farm has proven to be an excellent preparation for future farmers and farm managers and some of Ireland's leading farmers are graduates of the programme.

Table 3: Participation Rates in the Advanced Certificate in Farm Management

Year	First Year Recruits	Total Participants
1986	166	371
1990	92	281
1996	93	247
2002	22	87
2005	4	25
2006	0	15

This decline has taken place in spite of very intensive recruitment by the Farm Apprenticeship Board, up until 2002 and subsequently by Teagasc. In addition participation rates in the advanced certificate in Dairy Herd management, incorporating 12 months placement has dropped significantly in recent years.

2.4 Summary

The implications of the above are two-fold.

First, the vast majority of those participating in Agricultural Training are following part-time training options and as such are likely to farm on a part-time basis at least initially.

Second, on-farm placement has proven to be very unpopular with participants in Agricultural Training Programmes and has acted as a deterrent to programme participation.

This is in spite of the value of good placement as a learning experience and the fact that many students, in retrospect, rate placement as the highlight of their course.

The problems with placement can be largely attributed to the Celtic Tiger and the inability and or unwillingness of farmers to match the pay and conditions available in construction and other sectors of the economy. These problems are compounded by the negative perception of farming often promoted by those representing farmers.

3.0 Present Position

As a result of all the trends and programme adjustments outlined above, we are now in a situation where 87 students have just been placed for three months and an additional 200 students will require three months placement next spring. In spite of all the talk about the labour shortage on farms, we have had difficulty in finding suitable farms for the 87 students currently on placement and we are anticipating some difficulty in finding enough suitable farms for the spring placements.

Anecdotally, we are hearing that labour needs are being met by and large by eastern European workers and that, despite some problems with skill levels and retention, most needs are being met.

4.0 Future Labour Needs

As indicated by earlier speakers, it is projected that the dairy industry of the future will comprise a total of 12,000 farmers but with two distinct profiles of dairy farmer. The majority of farmers will be in the 80 – 120 cow category and will build their business on the basis of one person operations.

Their buildings and operation will be streamlined so as to minimise labour requirements and they will be looking towards farm practices and services that will give them a reasonable quality life-style while keeping costs to a minimum. The second category of farmers, while small in numbers will be significant in terms of output, and will comprise large scale 300 – 500 cow operations.

These operations will include the owner/manager and will depend on a number of hired in labour units.

5.0 Meeting the Labour Needs of the Future

5.1 One Person Operations

As was shown earlier, there is no shortage of people entering agricultural training but the vast majority are entering with a view towards farming on a part-time basis. a significant proportion of the dairy farmers of the future will come from the ranks of the full-time students but we will also need a proportion of the part-timers to become full-time farmers.

This is often the intention because most farms cannot support two families with the inheritors waiting until the retirement of their parents. However this transition will only happen if these part-timers can see a viable future in full-time dairy farming.

These one-person operations will then need to adopt practices and avail of services which will give them a reasonable quality life-style. The Farm Relief Services will continue to play a vital role in this regard as will students on three month placement during the busy spring period. Other mechanisms of interest include once-a-day milking, farm partnerships and shared labour/machinery arrangements.

5.2 Large Scale Operations

The development of large scale operations is very dependent on hired labour, and barring the total collapse of the Celtic Tiger, it does not appear that this labour need will be met from within the country. Foreign workers fall into 3 distinct categories, western Europeans, eastern Europeans and non-EU workers. Western Europeans generally are confined to students who wish to obtain work experience here for short periods usually 1 – 2 months. While many of them work out quite well, their input is insignificant in the overall scheme of things.

Eastern Europeans, particularly Poles, are the main source of labour on Irish farms at present. As stated earlier, they are meeting the needs of the sector at the moment but there are major problems with skill levels and retention.

While many come from a farming background, they are generally from very small farms with little relevant experience and skills. Subsequently, when they are placed on farms, they use this placement as a stepping stone to better paid employment and very quickly move on.

Teagasc has met with the Master Farmers Central Committee and Macra Na Feirme and initiatives are underway to develop linkages with Agricultural Colleges in Poland with a view towards attracting students from farming backgrounds and the possible recognition placement on farms in Ireland as a part of their training programme.

The aim of this is to improve retention levels but I should point out that Teagasc, while co-operating with initiatives like this, will not become directly involved in recruitment of foreign workers.

Teagasc will, however, become involved in any training initiatives aimed at improving skill levels and retention of migrant workers. We have already been involved in developments in the horticultural sector and as well as the delivery of short training modules at Kildalton College for operatives on dairy and pig farms. These one-week modules are aimed at providing the relevant farming skills combined with language and life skills. Non EU workers particularly Brazilians, have been used to good effect in the meat processing sector and the requirement to obtain visas and work permits, while involving additional red tape, limits the scope of workers to switch employment thereby improving retention levels. This may also apply to the new accession states of Bulgaria and Romania, whose workers will require work permits to work here.

Cost-effective Wintering Options

Padraig French[1], Tom Ryan[2] and James O Loughlin[2]
[1]Teagasc, Moorepark Research Centre, [2]Teagasc Advisory service

Executive Summary

- The cost of wintering dry spring-calving dairy cows in conventional sheds fed grass silage ranges between €240 and €375 per cow per year depending on grant rate available on the initial capital investment.
- The aim of this paper is to evaluate a range of alternative wintering systems based on recent Moorepark research, with respect to the cost, performance, health and welfare of cows, and to compare these to optimal indoor housing (cubicles with mats).
- With the exception of wintering cows on a restrictive grass allowance, all other feed systems allowed cows achieve condition score targets
- Any of the wintering systems compared had very little impact on milk production or reproductive performance in the subsequent lactation.
- It is anticipated that grant-aid will be available for low cost accommodation systems (clay lined OWPs and slurry tanks) in 2007
- Self-feeding silage on clay lined OWP's with clay lined tanks for slurry storage will be the most economically and labour efficient systems for wintering cows on a grass silage diet at approximately €170 per cow per year.
- Further significant cost savings (€40 per cow per year) can be made by grazing forage crops *in-situ* however, underfoot conditions will restrict this to suitable soil types particularly with high yielding crops such as fodder beet and swedes

Introduction

The provision of winter accommodation and feed is the single biggest cost in Irish spring-calving systems of milk production even though little or no milk is produced during this period. The increasing cost of inputs outside of the farmers control such as labour, oil and building materials are continuously increasing the wintering cost of cows. The main cost contributors to our conventional wintering system are the massive capital requirement for construction, and the labour and machinery requirement of drawing the feed to the cows.

Any alternative wintering system to conventional facilities needs to have a low capital cost, a low running cost, be labour efficient and be environmentally secure. It is also imperative that any alternative wintering system has no negative impact on cow productivity or welfare.

Over the last three years research at Moorepark has evaluated a range of alternative systems for wintering dry spring-calving cows and has focused on the impact of these systems on production (body condition scores, weight and feed intake), labour input and running costs, health (hoof health, dirtiness score, mastitis levels, limb lesion score, locomotion scores and any incidences of clinical disease) behaviour and environmental impact. The systems evaluated included alternative designs of OWPs and grazing forage crops (Kale and Swedes) *in-situ*.

Winter accommodation systems

A range of alternative designs of out-wintering pads were constructed in Ballydague in autumn 2004. These pads were used as a complete winter facility for herds of approximately 50 spring-calving cows for the winters of 2005 and 2006.
The four winter accommodation systems compared over the two years were:
(1) indoor cubicle housing with one rubber matted cubicle/cow
(2) an uncovered OWP at a space allowance of 12m^2/cow with easi-feed silage system
(3) an OWP with a self-feed silage system on the OWP at a space allowance of 16m^2/cow and 4m^2 of silage/cow
(4) an OWP at a space allowance of 6m^2/cow with a windbreak and plastic cover overhead. All cow groups except the self feed systems had a concrete feed face adjacent which allowed 0.6 m of feed space/cow.
Animals remained on treatment from December 6 until calving. Because of the delays in setting up the experiment the silage used on the self feed system was harvested much later and of lower quality (65 DMD) than that of all other treatments (72 DMD) in the first winter (2005) but was of similar quality to the other treatments in 2006.

The performance and welfare results from both years are shown in Table 1.The cows on the self-feed pad had poorer condition score gain in the first winter, probably due to the poorer silage quality; however, it had no negative impact on their subsequent milk production. Their cows on the outdoor pads had approximately 4 per cent higher milk solid yield in the subsequent lactations in both years however this was not statistically significant. The cows on the pads had significantly heavier calves than the cows accommodated indoors in both years even though gestation length was similar as was the incidence of calving difficulty. There was no negative impact of wintering cows on pads on cow welfare and some minor improvements in welfare traits such as hoof and limb condition at calving and behaviour during the dry period.

Table 1. The effect of winter accommodation system on performance of Spring-calving dairy cows

	Conventional shed	Self feed	Easi-fed	Covered pad
2005 results				
Silage intake (kgDM/hd/day)	10.3		11.2	10.3
Milk solids yield (kg)**	418	434	424	428
Calf birth weight	38.8	41.7	41.4	41.7
Live weight gain (kg/day)	0.11	-0.11	0.17	0.12
Condition score change	0.074	-0.063	0.027	0.13
<u>Lameness</u>				
Pre-calving	5	0	4	2
Post-calving	2	0	0	1
Limb lesion score[a]	15			2
Locomotion score[b]	9.7		8.8	9.0
6 week in calf rate	63.4	57.1	66.7	61.9
<u>Mastitis</u>				
Pre-calving	2	2	2	2
Post-calving	1	2	1	0
2006 results				
Silage intake (kgDM/day)	10.2	9.9	9.8	10.4
Mastitis – post calving	5	3	4	7
Milk solids yield (kg)***	345	363	356	345
Calf birth weight (kg)	36.7	38.7	38.2	37
Live weight gain (kg/day)	0.65	0.57	0.60	0.52
Condition score change	0.15	0.19	0.13	0.27

In autumn 2004 silage quality on self feed pad was much poorer due to late harvesting,Kg fat and protein from calving to Nov. 1, 2005, *** Kg fat and protein from calving to Oct 22, 2006. [a] A visual score of lesions on cows hocks and knees with higher scores indicating more lesions. [b] A visual assessment of cows gait, with higher scores indicating poorer walking.**

Tables 2 and 3 outline the capital (excluding VAT) and operating costs of a range of alternative winter accommodation systems in two scenarios. In Table 2 the rainfall figures of 27mm /week and a 20 week winter storage requirement are similar to those in Cavan and in Table 3 the winter rainfall of 37 mm/week 16 week storage period are similar to that applying in Cork. In all cases the initial capital investment was depreciated at 5 per cent/annum and the capital investment was financed with borrowed money at 6 per cent interest.

The current upper grant limit of €120,000 would build conventional facilities for approximately 45 cows. However, in facilities designed for relatively small herds of cows it is likely that labour input figures will be far in excessive of the figures used in this exercise which were achieved on the most labour efficient farms with over 100 cows.

In both scenarios, self-feeding silage on clay lined OWPs with clay lined tanks for slurry storage was the most economically and labour efficient system for wintering cows on a grass silage diet. However, certain soil types will not be suitable for the construction of the structures and in that situation plastic lined OWPs and plastic lined slurry tanks are the most economically attractive options.

There are a number of other advantages to these structures which are not evident from Tables 1, 2 and 3 such as:

(1) they are very flexible in the types of animals that can be used and which could be beneficial if enterprise mix on the farm is changed in future

(2) because a bigger proportion of their costs are associated with running costs rather than capital costs, if the dairy enterprise is ceased before the end of lifespan of the facility the subsequent costs are reduced further relative high cost conventional systems

Table 2. The effect of winter accommodation system on construction cost, operating cost and annualized housing cost assuming different grant rates, a 20 week closed period and 27 mm a week winter rainfall.

		Plastic lined		**Clay lined**	
	Conventional shed	**Self feed OWP**	**Easifeed OWP**	**Self feed OWP**	**Easifeed OWP**
Construction costs					
Pad area		18	12	18	12
Slurry storage requirement m^3	6.6	13.9	10.8	13.9	10.8
lying area/cow (€)	1350	198	132	108	72
Slurry storage cost (€)	818	445	346	209	162
Head feed cost/cow (€)	295		76		76
Silage pit cost (€)	205		205		205
Total Construction cost (€)	2668	643	759	317	515
Depreciation & interest/annum (€)	213	51	61	25	41
Running cost (€) (100 day winter)					
Cleaning & bedding (€)	9.5	19.8	13.2	19.8	13.2
Slurry spreading+ agitation (€)	9.6	14.2	11.5	14.2	11.5
Wood chip spreading (€)		15.6	9.4	15.6	9.4
Feeding (€)	36.5	6.3	36.5	6.3	36.5
Sub Total (€)	55.6	55.9	70.6	55.9	70.6
Total housing cost/ cow/year (€)	269	95	124	74	107
70% grant on eligible fractions (€)	120	77	97	74	107
40% grant on eligible fractions(€)	184	78	102	65	92

Table 3. The effect of winter accommodation system on construction cost, operating cost and annualized housing cost assuming different grant rates, a 16 week closed period and 37 mm a week winter rainfall.

		Plastic lined		Clay lined	
	Conventional shed	**Self feed OWP**	**Easifeed OWP**	**Self feed OWP**	**Easifeed OWP**
Construction costs					
Pad area		18	12	18	12
Slurry storage requirement m^3	5.28	12.19	9.71	12.19	9.71
lying area/cow (€)	1350	198	132	108	72
Slurry storage cost (€)	655	390	311	183	146
Head feed cost/cow (€)	295		81		81
Silage pit cost (€)	205		200		200
Total Construction cost (€)	2505	588	724	291	499
Depreciation & interest (€)	200	47	58	23	40
Running cost (€) (100 day winter)					
Cleaning & bedding (€)	10	20	13	20	13
Slurry spreading+ agitation (€)	8	14	11	14	11
Wood chip spreading (€)		16	9	16	9
Feeding (€)	37	6	37	6	37
sub Total (€)	54	56	70	56	70
Total housing cost/ cow/year (€)	254	103	128	80	110
70% grant on eligible fractions (€)	134	85	103	N/A	N/A
40% grant on eligible fractions (€)	174	85	104	70	94

Grazing forages in-situ

One strategy to reduce the cost of wintering cows is to utilise feeds, which can be grazed *in-situ* there-by reducing both variable (harvesting cost) and fixed costs (housing and machinery). Perennial ryegrass, the dominant forage on livestock farms has limitations for out-of-season grazing (December and January). The quantity of DM that can be accumulated for winter grazing is limited, and additionally as the quantity accumulates the quality decreases. There are a variety of other crops available, which grow at lower temperatures than perennial ryegrass and can accumulate higher yields without a decline in feeding value.

Some options are swedes, kale, rape, turnips, forage cereals and short rotation grasses.

Forage brassicas such as swedes, kale, turnips and rape are used extensively in other grass based dairy and beef industries as a source of cheap high quality out of season feed which can be utilised in-situ. Swedes and kale are full season biennial crops usually sown from mid-May to mid-July. The earlier they are sown the higher the utilisable yield. These are used from November to March. Rape and stubble turnips are annuals that need to be set later than swedes and kale for use during the same period. These will have lower yield than either swedes or kale. There would appear to be great potential in Ireland in sowing rape or stubble turnips after harvesting cereals in August to provide a low cost winter feed. Although other crops such as short-term ryegrasses and grazed cereals such as forage oats, rye and triticale can be used in a similar manner to brassicas, there is very little information available on their potential in Ireland. There is however, on-going research in Moorepark evaluating the potential of all these crops.

In June 2005 crops of kale and swedes were sown in Moorepark after harvesting first cut silage and yielded approximately 11 and 15 tDM/ha, respectively, by early winter. In early December 2005, groups of 22 cows were assigned to one of four winter diets which were allowances of:

(1) 8 kg Kale and 4 kg bale silage
(2) 8 kg Swedes and 4 kg silage
(3) 12 kg autumn grown grass
(4) Ad-lib silage fed indoors

The cows remained on their respective diets until approximately one week before calving in mid-February. The cows adapted to the kale very quickly and utilisation was over 80 per cent for most of the winter, however, the cows took approximately three weeks to begin eating the swedes and during this time lost approximately 0.3 of a condition score. Once the cows adapted to eating the crops performance and condition score gain was very satisfactory. The impact of the different winter diets on cow performance and welfare traits is shown in Table 4.The quality of the silage offered to the indoor group was excellent (77 DMD) and they achieved the highest condition at calving. The cows offered kale and swedes achieved target condition scores at calving (>3.15) however, the cows offered grass only were well below target condition at calving.

Table 4. The effect on performance of wintering dry spring-calving dairy cows on crops grazed in-situ relative to grass silage fed indoors.

	Kale	**Swedes**	**Grass**	**Silage/ indoor**
BCS at dry off	2.99	3.03	3.03	3.00
Calving BCS	3.17	3.17	2.77	3.51
BCS 4 wk post calving	2.87	2.88	2.64	3.20
Lameness traits				
Sole Hemorrhage	7.55	8.2	5.42	5.76
Heel Erosion	6.01	6.22	7.37	7.33
Time lying down (hrs)	10.6	10.2	9.5	8.4
Calf birth weight (kg)	47	50	47	47
Colostrum yield (kg)	7.21	7.29	6.36	5.92
Milk solid production (kg)	440	452	455	452
Calving to conception interval (days)	92	94	88	86
Empty rate (%)	13	17	6	13

Winter feed costs

The productivity parameters and costs of production and utilisation of a range of feeds suitable for wintering of dry spring-calving dairy cows are shown in Table 3. In order to economically compare any of the ensiled crops to those grazed *in-situ* the feed costs/100 days in Table 5 should be added to the relevant accommodation systems in Table 2 and 3 and compared to the total wintering costs at the bottom of Table 5.

Fodder beet will give a higher yield of energy/ha than any other crop we can grow and even though it has quite high costs/ha to grow it is the cheapest feed for cows when grazed *in-situ*. However, the use of high yielding crops grazed *in-situ* is limited in the soil types in which this can be practiced as the cows move very slowly through the crop and there may be cross compliance issues with excessive soil poaching. It is necessary with all brassicas to feed a proportion of the diet as fibrous forage and for the purpose of this exercise 3 kgDM of baled grass silage/cow was offered.

If reseeding of the land back to grass has to be included in the costs of the crop production (i.e. where a good ryegrass sward is ploughed up to grow the crop) then the costs of these crops increase significantly and low yielding crops such as rape become non-viable. However, in most situations these crops can be integrated in a necessary reseeding programme.

Table 5. Yields and costs of a range of feeds for wintering of dry spring-calving dairy cow.

	Maize silage	**Grass silage**	**Straw/ conc.**	**Fodder beet**	**Kale**	**Swedes**	**rape**	**Deferred grass**
Yield (tDM/ha)	15.5	10.5		18	10	12	4.2	2.8
Utilisation	0.82	0.75		0.7	0.7	0.7	0.7	0.6
UFL/kg DM	0.8	0.772	0.7	1.12	1.05	1.12	1.05	0.85
Total materials/ha (€)	673	150		580	198	373	177	51
Contractor costs/ha (€)	492	456		293	140	184	152	10
Land charge included (€)	262	183		314	262	262	104	104
Land maintenance and storage costs (€)	50	35		60	50	50	20	20
Total Cost per hectare (€)	1477	824		1247	650	869	454	185
Cost per tDM (€)	116	105		99	93	103	154	110
Cost/UFL (€)	0.15	0.14		0.09	0.09	0.09	0.15	0.13
Bale silage (kgDM)	0	0		3	3	3	3	0
Crop (kgDM)	9.8	10.2		5.4	5.8	5.4	5.8	9.8
Cows wintered/hectare	16.2	9.7		29.2	15.2	19.4	6.4	2.1
Feed cost/100 days (€)	114	107	118	94	94	96	129	109
Total wintering costs /cow (€)				127	127	129	163	142
Including reseeding costs (€)	See tables 4 + 5 for costs other than feed cost			144	160	155	241	

Contract Rearing of Replacement Heifers

John Donworth, George Ramsbottom & Dr. Frank Buckley

Executive Summary

- Contract rearing of replacement heifers is economically viable under certain circumstances. These include:
    - o High profit milk production;
    - o High stocking rate on the cow grazing area;
    - o Substitution of heifers with dairy cows and expansion in milk production at little additional cost.
- Clear written guidelines, targets and should be put in place in advance of any transfer of stock from the owner to the rearer's farm.
- The advantages to the rearer include a possibly higher, steadier income stream.
- Challenges to the rearer include:
    - o Complying with the wishes of a third party (in this case the heifer owner) in how the heifers are raised;
    - o Engaging in a new enterprise with different targets – liveweight, reproductive and husbandry than those associated with conventional drystock production.
- Animal disease issues will represent a serious challenge to both the owner and rearer of the replacement heifers. Clear guidelines and recommendations from the Department of Agriculture in this area are required.

Introduction

A total of 229,600 dairy heifers were present on Irish farms in June 2004 (CSO). Virtually all of these heifers were reared by their owners. This contrasts with the situation in the United States and New Zealand where 10 per cent and 70 per cent respectively of dairy heifers are contract reared.

Interest is emerging in the concept of contract rearing heifers among dairy farmers in Ireland. The level of interest is set to grow even further as the structure of the Irish dairy industry changes. Issues such as labour, the capital investment required, the area available for cows close to the milking parlour and the cost of dairy facilities will move centre stage as dairy farms expand. How many of you here today would welcome the opportunity to focus your energies on cows and milk production only? The objective of this paper is to explore the potential of contract heifer rearing not only for the dairy farmer (the 'owner') but also for the person contracted to rear the heifers (the 'rearer').

Issues from the owner's perspective

Contract heifer rearing is an option worth considering in the following situations:

1. Where overall farm profit can be increased. The replacement heifer enterprise can be considered a "low margin" enterprise. Consequently, where replacement heifer grazing area can be readily converted to cow area, overall farm profit should be increased. Further analysis of this is presented in the economics section of this paper.
2. On farms where labour is a limiting constraint. As dairy farmers expand or the amount of labour available is reduced, removing heifers from the dairying operation will reduce total farm labour requirement, freeing up time and labour for the milking herd. The average replacement heifer requires approximately 15 hours of labour input between 3 and 23 months of age (Shalloo, personal communication). The average spring milk producer who completed Profit Monitor in 2005 introduced 18 replacement heifers to the dairy herd. This represents a labour requirement of 270 hours per annum or 0.7 hours per day;
3. On farms where land is a limiting constraint: As herd size expands, more and more grazing land is required within walking distance of the milking parlour. The Teagasc Moorepark blueprint indicates that approximately 14,500 litres/hectare may be produced in grass based milk production systems (Shalloo, 2004). Analysis of data from Teagasc Dairy Profit Monitor for 2005 indicates that milk production per hectare of land apportioned to the dairy enterprise on the average and top 10 per cent of spring milk dairy farms was approximately 10,600 and 15,150 litres per hectare respectively;

4. On farms where accommodation or its capital cost is a limiting constraint: The cost of providing slurry storage and accommodation varies from €300 to €2,300 per cow for low-cost and high-cost options respectively. Such capital investments would cost between 2 and 7c/l in principal, interest and depreciation charges. Contract rearing of replacement heifers is an option where facilities are currently inadequate for the existing stock numbers on the farm or where expansion means that further investment in such facilities is necessary;
5. On farms where replacement heifers are failing to reach the target liveweights. Data from the Teagasc Moorepark on-farm fertility study show that achieving the recommended liveweights: (presented in Table 5) are critical to their future milk production performance;
6. On farms where separation of cows from replacement heifers (even calves) is required for disease control purposes e.g. Johne's Disease and where the physical removal of replacement heifers from the dairy herd may be advantageous potentially reducing the infection burden in the replacement heifer and thereby increasing the number of lactations expected from the animal once it rejoins the dairy herd;

So contract heifer rearing could be a solution. Land can be released by contract rearing of livestock and the owner remains insulated from the open market while safeguarding the fundamental genetics of his herd.

Contract heifer rearing – issues from the rearer's perspective

From the rearer's perspective there can be a similar list of benefits. Many former livestock farmers have buildings and labour available but may be reluctant to invest significant capital in a new or existing enterprise. In addition, if they are former dairy farmers they will miss the monthly cash injection that used to be provided by the milk cheque. Contract heifer rearing provides a way to utilise buildings without the requirement for a high level of investment and in many cases it can be operated as a part-time enterprise. Other issues that should be considered from the rearer's perspective include:

- The need to go to the livestock mart to buy and sell stock is reduced;
- The cash flow and business risks associated with a drystock enterprise are reduced;
- The business may return a higher profit than the rearer's existing enterprises;
- The stress of selling stock for financial or fodder reasons is reduced or eliminated.

Heifer rearing contracts – issues for both owners and rearers

The preparation of a formal contract is essential to protect the interests of both the owner and the rearer. The following issues should be considered by both before deciding to pursue a contract heifer rearing arrangement:

1. Loss of control in the day to day management of the replacement heifers. To avoid conflict, ensure that the key issues such as breeding management, vaccination, anthelmintic programmes etc. are discussed and agreed in advance of entering into a contract rearing arrangement.
2. Potential exposure to disease. With animals on two farms, the risk of either group contracting diseases such as TB, leptospirosis etc. is doubled. If the rearer is simultaneously taking heifers from other owners or has another livestock enterprise the risks may be further multiplied. Contingency plans must be put in place to ensure that an outbreak of disease does not have implications for the smooth return of the heifers to the dairy farm at the end of the rearing period or result in calving heifers 'stuck' with a rearer with no facilities to calve or milk such animals.
3. Possibly poorer replacement heifers. Not all rearers will be suitably skilled to achieve the target weights set down for replacement heifers. It is imperative that heifers are weighed at defined times throughout the rearing process to ensure that the appropriate targets are achieved. A plan should be put in place in advance of entering the contract to address the issue where targets are not reached e.g. through concentrate supplementation over winter.
4. Risk of conflict between the owner and rearer. In all cases, clear targets must be agreed by both parties in advance of entering the contract arrangement. In addition, an independent arbitrator should be agreed in advance in the event of a conflict occurring between the owner and rearer.

Replacement heifer contracts – key areas to clarify in advance

This contract details responsibilities for all the key areas and provides the framework for a professional relationship. Specifically it should address:

- What age/stage are animals to be reared from and to?
- What age/stage are animals to be bred and to what?
- What growth rates are expected and how often animals will be weighed?
- Who is responsible for veterinary costs/fertility costs?
- Is there a veterinary surgeon agreed for herd health planning and monitoring?
- Who vaccinates the animals or determines which vaccines are to be used and when?
- Who pays for transport?
- What arrangements are in place to ensure adequate biosecurity?
- What about use of slurry?
- What happens if an animal dies, is ill or requires emergency slaughter and/or who covers knackery disposal costs?
- What happens if there are reactors or a restriction notice served under a disease eradication programme or other requirement of the Department of Agriculture?
- How is payment calculated and when are payments made? Normally payment is calculated on a weekly headage basis.
- Legislation requires that the keeper i.e. the person in possession of the animal, be in possession of the relevant passport, maintain a herd register, notify CMMS of the births, deaths and movements of each animal onto and off the holding, sign the passport and ensure tags, passports, movements and medicines records etc. are correct.
- What insurance cover is to be taken out by each party?
- What happens if a heifer calves before planned date or is not returned home in time to produce colostrums specific to the location where the calf will be born/reared?
- What happens if the parties disagree? How is the agreement terminated if all goes wrong?

A standard agreement will ensure that the main issues are covered and other conditions can be added specific to the individual situation. For example, these could include whether the rearer is responsible for cubicle training the heifers. Not only does a contract protect both parties involved but it also provides the discipline to sit down and discuss and agree what both parties require.

But even with a properly drawn up contract available, it may not be the correct choice for some. Individual circumstances will dictate how well the arrangement will work. Before deciding to contract out responsibility for heifer rearing we recommend owners ask themselves some simple questions and answer them honestly!

- Can buildings currently occupied by heifers be used for cows?
- Do you struggle to achieve growth targets and pregnancy rates with heifers?
- Could your time dealing with heifers be better spent keeping more cows or devoting more time to managing the current cows better?
- Do you rent extra land and buildings for the heifers and could these costs be saved?
- Do you have to travel to check the heifers? Do you check them every day?

Equally the potential rearer needs to be honest in answering the following questions:

- Are suitable buildings available for heifer rearing?
- Is contract heifer rearing an enterprise that you could be good at and enjoy?
- Do you need to receive a regular monthly income?
- Have you got grassland/forage area available for the enterprise?
- Would looking after livestock fit in with your daily routine?
- Are you prepared to commit the time to rearing someone else's stock?
- Would you be able to accept someone else monitoring how you manage their stock?

If underdeveloped heifers are returned to the farmer, who is at fault? The easy answer is the rearer. However, both parties are at fault. The rearer failed to manage the heifers and the dairy farmer failed to manage the rearer. Who will pay the higher price? It is the dairy farmer’s future that has been damaged. Heifers that are underweight at calving will produce less milk during their lifetime.

Cost of rearing replacement heifers

Before detailing the various types of replacement heifer contract available, we must review the cost of rearing a replacement heifer. The costs included in

Table 1 are those incorporated in the EBI model (Shalloo, 2003).

Table 1. Costs associated with rearing replacement heifers to calving at 24 months of age (based on Fischler costs and prices).

Category	Cost (€)
Variable Costs	
Concentrates	104.8
Fertilizer, Lime & Reseeding	128.6
Land Rental	118.4
Machinery Hire	9.5
Silage Making	90.4
Vet, AI & Medicine	128.5
Total Variable Costs	**580.2**
Fixed Costs	
Car use, water & electricity	20.0
Labour	221.7
Machinery operation & repair	8.1
Phone	10.0
Insurance, A/C's, transport, sundry	39.6
Interest repayments – term loan	66.7
Total Fixed Costs	**366.1**
Depreciation	
Buildings	58.8
Machinery	20.0
Total Costs	**1,025.1**
Initial value of the calf	330
Sales of heifers failing to conceive	**-36.1**
Net cost of rearing a replacement heifer	**1,319**

The net cost of rearing a replacement is €1,319 per head. The figure includes a charge of €221 per head for the farmers own labour. A land charge based on an opportunity cost of €291/ha (€118/ac) is also included. An adjustment for the cost of empty replacement heifers is incorporated in the model. This data shows that rearing replacement heifers is expensive and places a heavy demand on dairy farm resources.

Examples of replacement heifer contracts

A review of replacement heifer rearing contracts shows that there are essentially four distinct scenarios commonly applied based on the way in which costs are allocated and payments made between the owner and the grower.

1. Contracts based on a per day cost where payment is on a specific day of the month. An example of how this may be calculated is as follows:

   Example of contract on a per day basis

   - Assuming the heifers are sent to the rearer on May 1st and returned to the owner one month before calving on January 15th, the total number of days on the rearer's farm is 625 days.
   - Estimated costs for rearing the heifer from May 1st to January 15th on the farm are €832 per head (variable costs €366 per head; labour costs €221 per head; land charge €100 per head; other fixed costs €145 per head).

- Estimated costs per day for rearing the heifer from May 1st to January 15th are €832/625 days = €1.33/day.

2. Contracts based on weight gain

Heifers are weighed when they are delivered to the rearer and again when they are returned to the producer. An example of how this may be calculated is as follows:

Example of contract on a per unit weight gained basis

- Assuming a heifer weighs 100 kg when it is sent to the rearer and 560 kg when it is returned to the owner.
- Assuming costs for rearing the heifer are €832 per head as outlined above.
- Estimated costs per kg for rearing the heifer are €832/460 kg = €1.81 per kg liveweight gain.

3. Contracts based on a sell/buy back arrangement

The owner sells the calves to the rearer and retains the rights to repurchase the same animal e.g. one month before calving. The rearer pays all costs associated with rearing the heifers and bears all losses that occur during the rearing period.

4. Full contract

The owner provides the rearer with all of the variable inputs, such as feed and medical supplies. The owner dictates to the rearer how the heifers will be cared for and the conditions under which the heifers are managed. The rearer provides the facility, utilities and labour. The owner covers the rearer's costs for labour and facilities as part of the rearer's charge for rearing the heifers (see Table 2). Death losses are borne by the owner.

Table 2. Who is responsible for costs under alternative contracting forms.

	Contract Scenario [1]			
Who pays for:	**1**	**2**	**3**	**4**
Calf	Owner	Owner	Rearer	Owner
Feed	Rearer	Rearer	Rearer	Owner
Veterinary				
Routine [2]	Owner	Owner	Rearer	Owner
Emergency [3]	Rearer	Rearer	Rearer	Owner
Artificial insemination	Owner	Owner	Rearer	Owner
Utilities	Rearer	Rearer	Rearer	Rearer
Bedding	Rearer	Rearer	Rearer	Rearer
Building	Rearer	Rearer	Rearer	Rearer
Labour	Rearer	Rearer	Rearer	Rearer

[1] The owner ultimately covers the rearer's costs as part of the rearer's charge for rearing the heifers.
[2] Routine veterinary costs include items such as services and supplies for vaccination, parasite control and other preventative health measures.
[3] Emergency veterinary costs include services and supplies necessary to treat illness or injury.

In an Irish dairy industry context, the following questions must be asked:

- Which of the contracts outlined above could potentially operate most successfully?
- Are the contracts outlined too rigid?
- Is an alternative Irish heifer rearing form more suited to our farming systems?
- Or are verbal agreements and a handshake enough?

Replacement heifer targets

Liveweight is a key component of successful heifer rearing. Replacement heifer liveweight and milk production were evaluated as part of Moorepark's on-farm fertility study in 1999 and 2000 with 2,380 heifer records analysed.

The data in Table 3 shows the effect of age and weight at first calving on milk and reproductive performance during their first lactation. The milk yield of heifers calving at 2 years of age was intermediate compared to heifers calving at a younger or older age. No difference in empty rate was observed between the age groups.

Table 3. Effect of age and liveweight at first calving on milk production and reproductive performance during the first lactation.

		C. Date	Yield (litres)	Fat %	Protein %	Preg. Rate 1st Service	Empty Rate (%)
Age	< 2 years	6th Feb	5,604	3.87	3.38	50	11
	2 years	13th Feb	5,734	3.86	3.37	56	11
	> 2 years	5th Mar	5,819	3.85	3.37	54	10
Weight	< 530kgs	11th Feb	5,518	3.86	3.36	53	10
	530-600kg	19th Feb	5,686	3.85	3.37	55	9
	> 600kgs	23rd Feb	5,953	3.87	3.38	52	13

The data in Table 3 also indicates that weight at first calving had a significant positive effect on milk production in the first lactation. Heifers calving at over 600kgs had a higher empty rate at the end of the breeding season compared to lighter calving heifers. Data from the Fertility Study was also available to evaluate the carry over effects of age and weight at calving on second lactation milk yield and reproductive performance as outlined in Table 4.

Table 4. Effect of age and liveweight at first calving on milk production and reproductive performance during the second lactation.

		C. Date	Yield (litres)	Fat %	Protein %	Preg. Rate 1st Service	Empty Rate (%)
Age	< 2 years	3rd Mar	6,759	3.80	3.45	61	12
	2 years	1st Mar	6,861	3.81	3.44	51	12
	> 2 years	4th Apr	6,884	3.76	3.42	52	11
Weight	< 530kgs	1st Mar	6,589	3.74	3.41	52	13
	530-600kg	2nd Mar	6,824	3.81	3.45	56	14
	> 600kgs	4th Mar	7,090	3.82	3.45	55	8

Age at first calving had no carry over effect on milk production or reproductive performance in second lactation. Weight at first calving had a significant effect on milk yield in the second lactation. Light heifers (less than 530kgs at first calving) produced significantly less milk of poorer composition in the second lactation compared to heifers calving at 530 to 600kgs. Reproductive performance in the second lactation was unaffected by weight at first calving. However, weight rather than age at first calving appears to have a more long-term impact on animal performance.

The breed composition of the Irish cow population is changing. Through AI, a variety of other dairy breeds and strains have been selected for breeding replacement heifers over the past number of years. Recommended pre-calving weights of replacement heifers for a variety of breeds are presented in Table 5.

Table 5. Recommended pre-calving liveweights of replacement heifers by breed.

Breed	Weight (kgs)
Holstein-Friesian	560
Norwegian Red	530
Norwegian Red / Holstein Friesian Cross	560
New Zealand Friesian (pure)	530
New Zealand / Holstein Friesian Cross	560
Montbeliarde	560
Jersey	410
Jersey / Holstein / Friesian Cross	490

As part of the Moorepark On-Farm Norwegian Red Study, 1,500 heifers were weighed on 47 farms during January/February 2006 (prior to calving). The pre-calving weights of the top 5 per cent, average and bottom 5 per cent of farms are outlined in Table 6.

Table 6. Pre-calving liveweights of replacement heifers by breed on the top 5 per cent, average and bottom 5 per cent of study farms.

Breed / crossbreed	Top 5%	Average	Bottom 5%
Holstein	563	532	480
Norwegian Red	539	514	472
Holstein X Norwegian Red	569	538	491

The data in Table 6 shows that a difference of approximately 80kgs exists in the pre-calving weight between the top and bottom 5 per cent of herds. The study also indicated hybrid vigour of 3 per cent or 15kgs for liveweight exhibited by the Norwegian Red / Holstein Friesian cross replacement heifers. More significantly the study also shows that on average, the dairy farmers involved in the study did not achieve the recommended pre-calving liveweight outlined in Table 5 for dairy replacements.

Economics of contract rearing for the rearer

Engaging in a replacement heifer rearing arrangement can only be justified if both parties benefit in the process. The key to success lies in how the contract is structured to ensure that both parties benefit from the arrangement.

For the enterprise to be attractive to the rearer, contract heifer rearing must deliver a margin greater than that currently available from sheep or cattle farming. The rearer could be a drystock farmer or a dairy farmer with a substantial area of land available for heifer rearing. The data in Table 7 outlines the 2005 margins obtained on the top one third of different categories of drystock farms ranked by profit per hectare (exclusive of the Single Farm Payment).

Table 7. Top third gross and net margins (€/ha) on cattle non-breeding, suckler and sheep farms (2005)[1].

	Cattle (non-breeding) (€/ha)	Suckler farms (€/ha)	Sheep farms (€/ha)
Gross margin	794	719	626
Net margin (excl. SFP)	317	197	205
Stocking rate (LU/ha)	2.00	1.98	2.09

[1] Extracted from Teagasc e-Profit Monitor Analysis - *Drystock Farms 2005*.

This data suggests that the top third of drystock farmers earned between €100 and €160 per LU in 2005. Early indications for 2006, would suggest that net profit per hectare and per LU will be higher in 2006. To make the replacement heifer rearing enterprise attractive to the top drystock farmers, a margin comparable or higher than that currently available from drystock farming would have to be obtained. An average labour input of 15 hours per head is required to rear the replacement heifer from 10 weeks of age to one month prior to calving (Shalloo, pers. comm.). Assuming a charge of €12.44 per hour worked, the total cost of the labour input per replacement heifer reared is €221 when a 7.5 per cent empty rate is included in the calculations. This is the return allocated to the rearer for his time and management input. At a stocking rate of 2.0 replacement heifer units per hectare, this would yield a net margin of €442 per hectare (before the Single Farm Payment) to the replacement heifer rearer. In addition, a land charge of €100 per replacement heifer unit, if included to compensate the rearer for the land occupied by the replacement heifer during her period on the farm, would return another €200 per hectare.

Economics of contract rearing for the owner

Can the costs associated with contracting out replacement heifers be borne by the dairy enterprise? This will vary considerably between farms. The key issue determining success is the return obtained from the land released – in most cases, the land released from heifer rearing must return a margin equal to or greater than the margin paid to the rearer. An estimate of the net margin per hectare for the top third, average and bottom third of spring milk producers in 2005 is outlined in Table 8.

Table 8. Net profit (€/ha) for the top third, average and bottom third of spring milk producers (2005) ranked by net profit per hectare[1].

	Top 1/3	Average	Bottom 1/3
Net margin (€/ha)	1,788	1,225	699

[1] Extracted from Teagasc Dairy Profit Monitor Analysis of 738 spring-calving farms, 2005.

The data in Table 8 suggests that for the average spring milk producer and using the costs outlined in

Table 1, where expansion in dairying is limited by replacement heifers on the 'grazing platform', moving the replacement heifers off-farm is a viable economic option. Partial budget analysis of the likely costs and benefits of contract rearing of replacement heifers for the three categories of spring milk producer outlined in Table 8 is presented in Table 9 for the average spring milk herd analysed using dairy Profit Monitor in 2005. In all cases, a herd size of 69 cows is used. The physical and financial performance parameters used are based on those observed for the three categories from Dairy Profit Monitor.

Table 9. Additional profit per farm generated following contract heifer rearing on the top third, average and bottom third of spring milk producers (2005)[1].

	Top 1/3	Average	Bottom 1/3
Milk yield (litres/cow)	5,577	5,289	5,035
Stocking rate (LU/ha)	2.26	2.02	1.78
	c/litre	**c/litre**	**c/litre**
Gross output	28.44	27.57	26.70
Variable costs	7.33	7.99	8.88
Fixed costs	6.69	8.17	9.84
Net margin	**14.43**	**12.63**	**7.98**
Net margin per cow	**€804**	**€668**	**€402**
Extra profit generated by increasing cow number by 25% and before additional capital costs[2]	€13,668	€10,336	€6,834
Additional replacement heifer contract costs	€8,388	€8,388	€8,388
Additional profit (loss) per farm before capital costs	**€5,280**	**€1,948**	**- €1,554**
Sensitivity[3]			
Quota purchase		€1,851	
Cows		€3,672	
Accommodation adjustment		€918	
Bulk tank		€3,600	
Parlour		€1,800	

[1] Based on the additional fixed costs outlined in

Table 1, a labour charge of €221/heifer and a land charge of €100 per replacement heifer unit.
[2] Herd size increased by 17 cows.
[3]Annual repayments (principal and interest) on capital borrowed at 6 per cent over a period of 7 years. Quota – 85,000 litres purchased at 12.1 c/litre; Cows - €1,200 per cow; Accommodation adjustment of €300 per cow place; Bulk tank – net cost €20,000; Parlour extension – net cost €10,000.

A substantial difference in the profitability of spring milk producers ranked by net margin per hectare is evident in Table 9**.** The net profit per cow on the top third of farms was double that of the bottom third of farms. The contributors of this difference in profitability included higher yields per cow and lower costs per litre. Combined with the higher stocking rate of the top third of spring milk producers, the net margin per hectare was €1,089/hectare higher on the top farms as outlined in Table 8.

The data in Table 9 indicates that the profitability for the owner of engaging in a contract to rear replacement heifers off-farm is affected by the current physical and financial performance of the dairy herd. Contract replacement heifer rearing is most attractive for the top third of spring milk farms because of their higher net profit per hectare. Contract rearing is still economically attractive for the average spring milk producer in this analysis before additional investment costs are included for expansion of the dairy enterprise. Even before such additional costs are included, contract rearing of replacement heifers is not attractive to the bottom third of spring milk producers.

Expansion costs will vary between farms depending on it's stage of development. In most cases, quota purchase will be necessary. Under such circumstances, contract rearing of replacement heifers is of marginal economic benefit to the average spring milk producer included in our analysis. Quota purchase, at the price outlined in Table 9**,** could be profitably borne by the top third of spring milk producers but significant additional expansion costs could undermine the viability of rearing heifers on contract. In total, expansion costs of over €29,000 would negate the financial gains of contract rearing for the top third of producers in the case study farm outlined in Table 9**.**

Appendix 1.
Sample heifer grazing contract from New Zealand

GRAZING CONTRACT TO BE SIGNED BY ALL PARTIES

1. This is a contract for grazing stock between:-

and

Telephone……………………………..(hereinafter called the stockowner)

2. Commencement date of contract………………………………………..........

3. Completion date of contract…………..30 April 2007…………………….

4. Number and description of stock to be grazed:

……………………………………………………………………………....

5. GST will be added to all figures quoted in this contract. The rate charged for each head of stock grazed from 01/05/06 until 30/04/07 will be a minimum of $6.70 per head per week and a maximum of $7.00 per head per week. The actual price charged will be related to the final milk payout for Fonterra for the year ending 31/5/05 before deduction of the Dairy Insight levy. Should the final Fonterra payout be $3.80 or less per kg of Milk Solids then the minimum grazing price of $6.70 per head per week will be charged. During the contracted period the grazing price will increase by 1 cent for each animal per week for the full grazing period for each 1 cent increase above $3.80 per kg of milk solids Fonterra payout. Provided that the maximum grazing price payable will be $7.00 per head per week of the Fonterra payout is $4.10 or more. (This means that the grazing price charged for the year will be $6.70 for a $3.80 payout, $6.80 for a $3.90 payout, $6.90 for a $4.00 payout etc.)

   At the beginning of the contracted period the price charged will be $6.70 per week, adjustments will be made to the price charged following Fonterra forecast payout announcements (expected to be October 2006 and February 2007). If the forecast includes a price range then the lowest price in the range will be used. When the adjustment is made it will be backdated to 1/5/06 or such other time that grazing commenced.

   The final grazing price calculation will take place after the final Fonterra payout is announced (probably May 2007). At this time the stockowner will be charged a final grazing figure to bring the grazing price paid to the new adjusted price. Should the final price be lower than previously calculated (using the above formula) then the landowner will credit the stockowner with the difference.

6. **Early termination of contract.** If this contract is terminated before 30th April 2007 then the grazing price charged as calculated in clause 5 is increased by $2.00 per head per week for the period 1st May 2006 to 31st October 2006 and decreased by $2.00 per head per week from the price calculated in cause 5 for the period 1st November 2006 until the stock are removed.

7. Payment for grazing will be made in 12 monthly payments at the rate as calculated in Cause 5 and will be **due on the 20th of the month.**
Accounts will be rendered monthly by the landowner for all veterinary expenses, animal health costs and any other costs incurred, including cost of zinc used for facial eczema protection.
Credits will be issued for any grazing fees paid on animals that have died.

8. Payment of all grazing fees, animal health costs and interest incurred will be made **in full** before any animals leave the property of the landowner.
Interest will be payable on all fees not paid within seven days of due date, calculated on a daily basis at the rate of 14 per cent per annum from the date on which payment was due

9 The landowner will farm the stock in a good and proper manner but will accept no responsibility for the loss of stock by death or straying. The stockowner will ensure all stock are clearly marked with ear mark and/or tag.

10. Any dispute between the parties arising out of this contract shall be determined by a sole arbitrator who shall conduct the proceedings in accordance with the Arbitration act 1996 and any amendments thereto. If the parties are unable to agree upon an arbitrator, the president of the Arbitrators and Mediators Institute of New Zealand shall be asked to appoint an arbitrator.

11. Should the services of a Veterinary Surgeon be necessary the fee for this service shall be the responsibility of the stockowner.

12 Drench will be supplied by the landowner and charged to the stockowner and drenching will be carried out in May, July, September and February by the landowner. Please note all heifers will be drenched on 1st May (or on arrival) unless advised otherwise by the owner.

13 The stockowner may inspect his stock at any time but only by prior appointment with the landowner or Farm Manager.

14 All stock will be weighed by the landowner on or near the following dates. On arrival on the landowners farm, 1st July, 1st September, 1st February and 1st April. A stock weight report will report will be forwarded to the stockowner immediately after each weighing.

15 This contract firmly binds both the landowner and the stockowner for the period stated. Only in the event of the said stock not being farmed in a good and proper manner and agreed upon by the arbitrator appointed by ___________, can this contract in any way be terminated.

16 Special conditions that we need to know about your heifers arriving at ___________:-
Is your herd EBL free?
Have they been BVD & Catarrh vaccinated
At least one month apart?
Do they need a BVD booster vaccine 14 days prior to mating?
Have they had both leptospirosis vaccines?
Do they need a leptospirosis vaccine in Feb/March?

17 It is requested that all stock be dehorned before they arrive.

18. Jersey or Angus Bulls will be supplied by the landowner (other breeds by arrangement). Yearling Bulls will be run at a ratio of 1 to 18 and two year old bulls at a ratio of 1 to 25 unless otherwise requested by the stockowner. Yearling Bulls will be charged at a price of $280 and two year old Bulls at a price of $400.

19. What breed of bull is required? ☐ Jersey ☐ Angus ☐ Other

What age bulls? Yearling ☐ 2 Year Olds ☐

How many bulls would you like used with your ☐ heifers

20. What date would like the bulls in? ……………………………………………..
What date would you like the bulls removed? ……………………………..

21. TB certificates must accompany the stock on arrival.
a. Please advise the TB status of your herd………………………………
b. Have your heifers grazed on other farms

prior to their despatch to?

c. If so, please advise details and the TB status of those properties…
………………………………………………………………………………
………………………………………………………………………………

22. Please state you preferred trucking company…………………………………

Right	Earmark	Left	EARTAG NUMBERS (Include herd A.I. No.:)

(Signed)……………………….. (Signed)……………………….
STOCKOWNER

DATE: DATE:

Research Challenges for Competitive Milk Production

Sinclair Mayne
Agri-Food and Biosciences Institute, Hillsborough, Co Down

Executive Summary

- Given current low milk prices, cost control on farms is critical for survival. This requires a detailed knowledge of production costs and the factors which influence these costs at an individual farm level.
- In the longer term, survival in dairying will require business expansion to achieve economy of scale, but expansion must be carefully managed to avoid excessive increases in production costs in the short term.
- Results of recent economic models indicate that, under prevailing conditions, profitability is maximised with moderate output systems (7,000 litre spring-calving or 8,000 litre autumn-calving systems).
- To remain competitive within Europe, there must be a relentless focus on improved efficiency within these production systems, with specific emphasis on improved production and utilisation of grazed grass and on controlling costs during the indoor housed period.
- Future research needs to focus on these areas within the context of the increasing impact of environmental constraints on nutrient inputs to crops and improved efficiency of use of animal manures.

Introduction

The key challenges facing dairy farmers in Ireland at present are lower milk prices (arising from reform of the Common Agricultural Policy), increased costs (e.g. fuel and labour costs) and implications of European legislation targeted at environmental issues (Nitrates Directive, Water Framework Directive etc.). Given differences in quota regimes between Northern Ireland (NI) and the Republic of Ireland (ROI), farmers have responded to these challenges in different ways. The focus in ROI has been very clearly on cost reduction whereas in NI, increased milk output (based on transfer of quota within the United Kingdom) has been the approach taken by many producers. Given current and future market predictions it is clear that a viable, competitive dairy industry will require both a relentless focus on efficiency of production <u>and</u> expansion at individual farm level. The aim of this paper is to highlight the role of research in assisting the industry to further improve production efficiency.

Which Production System?

Milk production systems within the island of Ireland span the entire spectrum from grass-based, New Zealand type systems to high input total mixed ration systems based on those developed in the United States. However, the climatic and economic conditions prevailing in Ireland are different to those in the United States and New Zealand. Using research and farm costing data generated over many years, we have recently undertaken a comprehensive economic modelling exercise to evaluate the optimal production system (in terms of farm profit) for a typical Northern Ireland dairy farm (Anderson and Mayne, 2006). Using baseline data for an average dairy farm (70 cows plus followers, 109 acres available land and 402,000 litres of milk quota) a range of dairy systems have been evaluated spanning the range of 5,000 to 10,000 litre yields/lactation and including both seasonal and non-seasonal production systems. Using current feed costs and milk seasonality payment differentials, profitability is maximised with either a spring-calving system producing 7,000 litres/cow or an autumn-calving system producing 8,000 litres/cow. Lower or higher yielding systems are consistently less profitable over a wide range of milk prices from 16 to 21 pence/litre (23 to 30c/l).

Given our climatic and soil conditions (and environmental legislation), results of the economic modelling exercise indicate that the optimal production system will have a distinct indoor housed period, where cost control is critical, but will also involve a prolonged period of reliance on grazed grass. In order for these systems to be competitive within Europe, there must be a relentless focus on improving efficiency – in particular grass productivity, utilisation under grazing and efficient conservation - whilst on the cow side, use of appropriate genetics and achievement of high levels of fertility is equally critical.

Efficient Production and Utilisation of Grass

Relatively limited progress has been made in increasing the yields of grass grown or utilised on farms throughout Ireland in recent years. Constraints on the level of chemical N fertiliser which can be applied in future (under the Nitrates Directive) could also potentially limit future progress.

The major challenge for research is to identify new grass varieties/mixtures which are more productive under moderate N inputs. Furthermore, the efficiency of use of manure N excreted during grazing must be improved, with current efficiency levels of 10-25 per cent. Yet the Nitrates Directive indicates overall efficiencies of manure N for all of Ireland of 30 per cent in 2007, increasing to 40 per cent in 2010.

In order to maintain the competitive advantages of grass-based systems, the overall target must be to achieve a utilised yield (grass harvested by the cow) under grazing of 10 t DM/ha. Relatively few farms are achieving this level of performance and even fewer are measuring it. The importance of utilised grass yield is best put in context by highlighting results of detailed costings of forage crops, which indicates that feed cost per tonne of dry matter is similar for poorly utilised grazed grass (7 t DM/ha utilised) or an excellent crop of forage maize (16 t DM/ha utilised).

In relation to winter feeding there are opportunities to reduce costs of conserved forage. Research studies at Hillsborough over the last three years (Dale and Laidlaw, 2006) have shown harvested forage yields (three cut system) in excess of 16 t DM/ha for separate grass and red clover swards which have received no chemical N fertiliser. All N requirements of the crop have been supplied by cattle slurry applied using a trailing shoe application system (three applications per season in March, May and July).

Cow Genotype

There has been much debate within the dairy industry in Ireland, both north and south, in relation to cow genotype. The evidence now indicates that there are significant genotype x environment interactions, particularly in relation to non-production traits such as fertility. Given the optimal production systems identified earlier in this paper, the critical issues in relation to cow genotype are as follows:

- **Moderate production potential (7,000 – 8,000 litres/lactation) with milk composition becoming increasingly important.**
- Robust cows with easy calving, good fertility and longevity and good legs and feet.

It is important that these criteria are incorporated within bull selection criteria and, given the major impact of heterosis on non-production traits, cross-breeding will have a major role to play in relation to overcoming the problem of poor herd fertility.

References

Anderson, D. and Mayne, C.S. (2006). Identifying optimal Northern Ireland Milk Production Systems. End of Project Report – AgriSearch.

Dale, A. and Laidlaw, A.S. (2006). Alternative forages to utilize cattle slurry within the growing season. Project Progress Report – AgriSearch.

The Changes Necessary to Secure My Long Term Future

Ian Marshall, Markethill, Co. Armagh, Northern Ireland.

Introduction

- **Farm profile**
  I own and manage a dairy farm situated near Markethill, midway between Armagh and Newry. Approximately 260 acres are farmed which is mainly medium heavy clay loam, typical of this Drumlin area. The annual rainfall is about 42-44 inches (1050-1100 mm). This combination of climatic conditions and soil type results in excellent grass growing conditions, but provides a lot of challenges in adverse weather.

- **History**
  The farm has always been, and continues to be very much a family farm.
  In 1993 we were milking 60 cows with an annual production of about 287,000 litres. This was a grass based system with two cuts of silage and about one tonne of meal fed per lactation. Cows were housed in cubicle houses and fed in ring feeders in covered silos. Grazing was 24 hours / day in the summer on a twenty-one day paddock rotation. At the time this was very much a typical dairy business.
  When I left Greenmount Agricultural College in 1986, I wanted to expand cow numbers from 50 to 100 cows. This I declared would be the upper limit which I would not cross. However it all changed with the shift in profitability of agriculture.
  At this time I established that the development of the dairy enterprise had to be in a very well planned and structured format and not in a disorganised fashion on a year-to-year basis.
  I also identified that the business had to be costed and benchmarked, I needed to know costs, performance, profit margins, and I had to be in a position to identify where the problem areas were, and to take any necessary action. As a result I began benchmarking seven years ago working with Greenmount College, through Michael Garvey, my local dairy development adviser - collating information and examining reports. Complacency was no longer acceptable - improvements in performance had to be monitored.

- **Expansion**
  When I began increasing cow numbers, I soon realised that some investment in housing and accommodation was necessary. At this early stage the investment was fairly modest and small, with no major capital loans required, and it soon became apparent, as time went on and numbers increased, that more capital expenditure was essential.
  The chronological list following illustrates the development of the farm over the last number of years.

  - 1993 Milking 60 cows producing 287,000 litres.
    Purchase of the first computer and a move to keeping all herd records on computer.
  - 1996 A move to TMR feeding with the purchase of the first Keenan diet feeder. Some alterations to existing buildings had to be carried out to allow feeder access. In the beginning two meal bins were raised to permit the feeder to reverse underneath.
    A dairy blend and a beef blend were purchased and a very simple TMR feeding system was undertaken.
  - 1998 Cows were batched according to yield into two groups.
  - 1999 Installation of a Gascoigne 10:20 milking parlour, computerised, with milk meters to give very accurate milk recording and the ability to feed cows in the parlour via a computer programme.
    At this stage I reached 100 cows with about 525,000 litres of milk produced.
  - 2000 The decision was made to erect a feed store to provide better facilities for handling storing and home mixing of feeds.
  - 2001 Extra comfort cubicles and mattresses for a large percentage of the herd were fitted. Slurry storage capacity was increased and more feed trough space per cow was provided.

- 2006 Under the Farm Nutrient Management Scheme, I have just erected a reinforced underground slurry store approximately 130' x 60'. I am currently trying to complete a house on top of this tank. It should provide 60 extra cubicles, calving boxes, and calf accommodation with an automatic feeder. It should give me the ability to feed the 'transition' cow in the dry period, and prepare her for the next lactation.

Approximately 750,000 litres (165,000 gallons) of milk quota have been purchased during this period.

- **Current position**

  As the dairy business expanded, I realised that there were a number of problems and issues that developed with scale.
  - Availability of land for both grazing and harvesting was one of the major limitations. This influenced the direction in which the dairy herd was going to progress. I decided that if I was to increase in size, I needed to move to a high input system with less reliance on grazed grass.
  - Adverse weather and soil type affected the grazing potential of the land. In other words, getting a large number of cows in and out of paddocks in wet weather was becoming a serious issue, with land getting poached and damaged.
  - I felt that Holstein dairy cows could not sustain production on a low input grass based system, and that more supplementation of the diet was essential.
  - Due to the fact that the farm is divided by a major road, the grazing area is limited to 17 hectares (42 acres) on the home farm side if I want to avoid crossing this road with a large number of cows twice daily.

  Consequently, the decision was taken to graze only by day, with the herd housed at night and fed TMR twelve months of the year. Limited use is made of alternative forages, with the TMR based mainly on the use of home produced silage and wholecrop, with the competitive purchase of straights and alternative feeds such as brewers grains and crimped wheat.

- **Greenmount dairy benchmarking results 2005/06**

  149 cows

  7,349 lts/cow (1,615 gallons) produced using 2,148 kgs meal/cow

  Variable costs 11.9 cent/litre (54c/gal)

  Common costs 15.7 cent/litre (71c/gal)

  Stocking rate 2.53 cows/ha

  Milk production per labour unit (dairy herd only) 919,058 litres

  Replacements are mostly home-bred from AI sires with Holstein and Limousine bulls used as sweepers. A small beef enterprise is managed along with the dairy replacements, using calves produced on farm.

- **The future**

  The herd currently extends to around 170 mainly pedigree cows with the intention to increase to 200 by spring 2007.

  My priority for the future is to have as much flexibility as possible to address adverse weather and soil conditions, whilst having limited access to grazing. Flexibility and the ability to change or adapt the business has been central to many of the decisions taken in recent years.

  Economics of scale and more production per labour unit is now more crucial than ever, especially since labour has become the limiting factor on many farms. On DARD benchmarked farms, only about 22 per cent actually employ labour and most currently depend on family help on either a full-time or part-time basis.

- **What are ‘the changes necessary to secure my long term future’**

  On the island of Ireland we currently produce and deliver good quality, good value, consistently good food. However there are a number of issues which need to be addressed to ensure that I and others like-minded farmers can secure our long term future.

- **Level playing field**

  In a recent article in the Food magazine Emma Hockridge reported on a visit to China. She stated that China has a population of 1.3bn, 22 per cent of the world population, on 7 per cent of the world’s arable land. It is a country where the comfort feeling of high animal welfare standards will not be seen in the near future. A dairy farm she visited had 3,000 cows, all shackled on short chains, in 90 per cent humidity, in temperatures of 40^{o}c, on concrete floors, showing widespread lameness and mastitis. If we all compete and trade on a world market does this represent a level playing field?

  In the EU we have to adhere to the five freedoms for animal welfare. We have quality assurance, traceability, and things like the Nitrates and Water Framework Directives. All of the above are not relevant in many countries around the world.

  Even when we examine our counterparts in the US, they are in a position where milk is produced on a daily basis with the aid of BST, yet for ourselves in the EU this is not on option. Is this fair?

- **Transparency**

  If we have to trade our produce on a world market we cannot dictate price. In this environment we have to accept what the market will deliver. As farmers we all strive to be as cost-effective and efficient as possible, but what we need is a fair share of the price. From the primary producer to the processor and then on to the supermarket there needs to be transparency which, if demonstrated, would give each link in the chain its fair share of profit and give us a sustainable industry.

  In the UK we have an organisation called Fair Trade which strives to get a better share for producers in developing countries. For my security in years to come I will require some fair trade closer to home!

- **Perception**

  Farmers and food must be valued and not just regarded as cheap commodities. We are the custodians of the countryside and should be appreciated and respected.

  With the changes in farm size there is a move to many larger dairy businesses and with this comes the misguided perception that ‘big is bad’. This is very often not the case, as in many instances, expansion and development have brought many improvements in animal welfare and better protection for the environment. The general public and consumers have to be made aware that we do a good job.

  Under the CAP and over the last few years, we all have been encouraged to play the numbers game and maximise premiums. We never have been rewarded for doing our job efficiently or to a higher standard. Through the focus farm initiative with DARD and AI Services came the opportunity to be acknowledged for trying to do the job to the best of our ability. When I was offered the chance to apply to this I relished the challenge and since 2004 have benefited from the programme as hopefully many others have too.

- **The future of my farm**

  I have already plans well under way to expand my dairy business to 200 cows. The new slurry tank and cubicle house will give me slurry storage for these 200 cows. I will have dry cow accommodation to better manage the transition cow and an automatic calf feeder to help with labour management of the farm. My decision is already made – make the investment in facilities and carry on in dairying. My youngest daughter is 6 years old so I am committed to dairying for at least 10 years to ensure my children get a good secondary education. If they wish to continue dairy farming, the investment has been made to allow them to take over a competitive dairy business – the choice will be theirs. If they do not wish to farm, we can then decide what to do with our dairy farming assets.

  the dairy farm business is currently operating at above the 170 kg organic nitrogen per hectare. I have already secured additional rented land in a single block that will allow me to grow cereals as part of the dairy farming system which will help to balance the nitrogen loading.

- **Conclusion**

  Agriculture is under immense pressure at the moment but people need food and providing farmers here get a fair crack of the whip, I have no doubt that we can compete and co-exist with other farm businesses around the world. Currently we are not getting this chance. However, we may have to accept some short term pain for long term gain.

Changes Necessary to Secure My Long Term Future

Martin Flanagan, Dairy Farmer, Co. Mayo

Introduction

Farm Size - 50 acres owned
16 acres leased (8.5 mls)

Herd Size/Performance

40 Cows
30 Followers
305 Day Yield – 2299 gals
3.91 per cent - BF
3.38 per cent Pr.
171 SCC

EBI = 23 (August '06)

Permanent Quota = 414,323 litres

Aim to produce - 450,000 litres

Changes needed to secure my future

- Land Policy
- Co-op Restructuring
- National Research and Advisory

Land Policy

Unused/underutilised land
- balance between land value and possible financial returns

Lease system preferable (5-7 years)

Must be non-inflationary

Co-op Restructuring

Rationalisation on-going 18 months = 10c/gal.

Very little Co-op efficiency in evidence

Rationalisation = cut the milk price

Research and Advisory

Many types of Dairy Cow/Farmer

Different limiting production factors -

Land
Quota
Labour

All research/advice geared to Quota Limiting Factor

West of Ireland context - poor value for money

>EBI geared advice:

Poor relevance to: High production cows
Land limited farmers

> Nitrates Directive?

>Conflicting advice from Teagasc/ICBF re EBI Reports

Recent Developments in Regional Research

Brendan Horan[1], Eugene Cahill[2], Frank Kelly[1] and Laurence Shalloo[1]
Moorepark, Dairy Production Research Centre, Fermoy, Co. Cork[1]
Teagasc Ballyhaise[2]

Summary.

- Expansion in a lower milk price scenario will only be possible in a low cost, high EBI efficient grass based system of milk production.

- The most limiting factors to increased farm profit at the Ballyhaise College Farm is the poor fertility of the low EBI herd. Improved reproductive performance would increase the profitability of the herd by 60 per cent and will be best achieved through the use of high EBI sires with particular emphasis on the fertility sub-index.

- On the 16 dairy herds, milk production performance was higher than that from the NFS, however, the data show that milk composition must be improved.

- Overall farm stocking rates observed on this study were 2.0 LU/hectare on the grazing area around the parlour. At this stocking rate, the current average level of concentrate usage is in general too high and is reducing farm profitability.

- Reproductive performance on the study farms was well below optimum. While empty rate was low, the length of the breeding period was excessively long at 19 weeks. The average 6 week pregnancy rate of 53 per cent was well below the target of 75 per cent; similarly the calving interval of 404 days was well in excess of the target of 365. These farms can substantially improve profitability through the usage of high EBI AI sires with a high genetic potential for fertility.

- Average economic performance for the study farms was similar to that of the National Farm Survey (NFS); however the results displayed large variability demonstrating that highly profitable milk production is possible in the region when milk production and reproductive performance are good, and costs of production are maintained at low levels.

Introduction

Irish dairy farmers are facing a fundamental shift in their economic environment based on CAP reform, increased retailer power and growing consumer concerns regarding food safety. With revenue from milk production projected to fall, national farm statistics show that costs of milk production are increasing by 15c/l/year while the variation between the highest cost and lowest cost producers is in excess of 9.2c/l. While some of this difference may relate to differences in soil type and climatic conditions, this data suggests that producers in all regions need to focus on achieving cost efficient milk production. While grazed grass will continue to be the cheapest feed available on most dairy farms, its utilisation is reduced in the west, northwest and northeast regions of Ireland due to such limitations as shorter grass-growing season, impeded land drainage, topography, high rainfall and northerly aspect. Wet drumlin type soil has only 80 per cent of the growth potential of a free draining loamy type soil with lower growth rates both in spring and autumn due to the much higher specific heat capacity of such soils. Such factors have the effect of shortening the grazing season and reducing the potential of farms in the region to utilize grass effectively.

In the northern region of Ireland milk quota is becoming more freely available. In some situations area available for grazing on the milking platform is limited due to smaller farm size and fragmentation. If concentrate supplementation could be used strategically and grass utilisation maintained, higher concentrate input systems may be a realistic alternative for such dairy farmers allowing for higher animal performance and higher output per unit area. Two research projects have been undertaken by Teagasc in association with the regions milk processors and University College Dublin. The first of these research projects, based at Ballyhaise Agricultural College in County Cavan will evaluate various high and low input pasture-based grazing systems. The second component will be based on the physical and financial performance of a sample of 16 dairy farms located throughout the region from 2005 to 2008.

The Ballyhaise College Farm Experiment

Two systems of milk production are being compared at the Ballyhaise College dairy farm.

High Grass System (HG) - In this system cows are

- Stocked at 2.5 cows per hectare
- Supplemented with 400 kg of concentrate in early lactation,
- Nitrogen input of 220 kg/hectare per year

High Concentrate Feeding System (HM) - In this system cows are

- Stocked at 2.8 cows per hectare
- Supplemented with 1,200 kg of concentrate throughout lactation
- Nitrogen input of 270 kg/hectare per year

The two systems are managed independently, with grass allocation on a 24 hour basis during the main grazing season and facilitated by strip grazing during poor weather conditions. Concentrate was fed in the parlour. Data collected included milk production, fertility, blood metabolite and mineral concentrations, pre- and post service uterine scores (ultrasound scanning), body condition score and live weight as well as all available genetic information on the experimental animals.

The objective of the study will be first, to quantify the biological influence of the two production systems on the animal and second, to carry out an economic comparison of the two systems using various milk prices, concentrate cost, milk quota size and milk quota leasing costs scenarios. This study should provide new insights into the development of milk production systems in high rainfall and heavy soil areas with various constraints such as milk quota and land availability.

The Genetic Potential of the Dairy Herd in 2005

The EBI of the Ballyhaise herd in 2006 based on the November 2005 proofs is shown on Table 1. The average EBI of the herd is very similar to that of the national herd which is on average €35 EBI. However, most of the EBI is coming from the milk production subindex (€25) with only a very small contribution coming from fertility traits (fertility subindex).

Table 1. The genetic potential of the Ballyhaise herd in 2006

2006 Herd Profile	EBI (€)	Milk Subindex (€)	Fertility Subindex (€)	Calving Subindex (€)	Health Subindex (€)	Beef Subindex (€)
Milking Herd	40	25	13	1	0	2
Incalf heifers	45	40	6	0	-2	1
Calves	63	41	16	4	-2	5

Milk Production Performance 2005

Table 2 shows the milk production and composition for the two contrasting feeding systems in 2005. Both herds had the same mean calving date of 1 March, while the cows on the HM group were supplemented with 817 kg extra concentrates over the lactation. The cows in the HM system produced on average 777 kg milk per cow and 3,086 kg more milk per ha. There was no difference in milk composition between the HG and HM systems.

The average response to the additional concentrates from the cows in the HM system was 0.95 kg additional milk produced per kg of additional concentrate fed. The average milk solids (fat plus protein) production per cow in 2005 was 39 per cent greater than the national average (330kg per cow). This is a reflection of the higher milk yield and composition of the Ballyhaise herd when compared to the national average.

Table 2. Milk Production Performance (2005)

	HG	HM	Sign.
Milk yield (kg/cow)	5,719	6,496	***
Milk yield (kg/ha)	13,154	16,240	
% Fat	4.18	4.27	NS
% Protein	3.34	3.37	NS
% Lactose	4.68	4.69	NS
Milk solids (kg/cow)	430	494	***
Supplement (kg/cow)	439	1,256	

HG = High Grass, HM = High Meal.

Herd Reproductive Performance 2005/2006

The reproductive performance of the Ballyhaise herd in 2005 and 2006 is shown in Table 3. Prior to the commencement of the breeding season, the entire herd was scanned to ensure that all animals submitted for AI were capable of becoming pregnant. The breeding period for both herds was 13 weeks with all AI used during this period. Each cow was blood sampled to establish the blood metabolite and mineral profile (albumin, globulin, total protein, GGT, BHB, calcium, copper, inorganic phosphorus, magnesium, thyroxine and urea) of the herd. The herd was found to be within normal ranges for all variables analysed. It can therefore be concluded that the reproductive performance observed was not a consequence of either pre-breeding management or nutritional or mineral deficiency.

Table 3. Reproductive Performance 2005/2006 during a 13 week breeding period.

Feed system	HG	HM	Sign.
Mean calving date	March 1st	March 2nd	
24-day submission rate (%)	61	54	
Conception rate to first service (%)	41	38	
6-week pregnancy rate (%)	36	41	
Services per cow (no.)	1.9	2.0	
Overall empty rate (%)	34	36	

HG = High Grass, HM = High Meal.

The data shows that the overall reproductive efficiency of the Ballyhaise herd was very poor over the two years, in both the HG and HM systems. It could be concluded that one of the main reasons for the poor reproductive performance was the low genetic potential of the dairy herd for fertility traits. Similarly poor reproductive performance has been observed on commercial dairy herds of similar genetic potential.

Economic Performance 2005

Based on the milk production for each of the two systems (HG and HM) and the average fertility performance in 2005/06 (Tables 2 & 3), the farm profit was estimated for each of the two systems using the Moorepark dairy systems model (MDSM). The following assumptions were used

- Farm size 29.5 hectare
- Farm Milk quota 323,000 kg
- Concentrate cost €220 per tonne
- Quota leasing cost of 3.5 c/kg
- Gross milk price 22.5c/kg (decoupled)
- Replacement heifer price of €1,320
- Cull cow price of €313
- Labour costs associated with the first 323,000 kg of milk quota were not charged, while additional labour charged at €12.50/hour.
- Opportunity cost of land €262/ha

Four alternative production scenarios were investigated

Scenario 1 (S1): Milk output from the farm was fixed at 323,327 kg of EU milk quota with a base fat of 3.6 per cent (Fixed milk quota)

Scenario 2 (S2): Cow numbers were fixed at 51.8 based on cow numbers to fill quota on the HG system (Fixed cow numbers)

Scenario 3 (S3): Based on fixed land area of 21.1 ha (Fixed land area)

Scenario 4 (S4): Unlimited land area with the milk output as S3 (Unlimited land base)

For each scenario, farm profit was estimated using the actual milk production and fertility data from the experiment and also where the same performance is achieved with optimum reproductive performance, no labour cost with expansion, no quota leasing costs and concentrate costs reduced by €70/tonne. The optimum reproductive performance situation was based on a replacement rate of 18 per cent, with infertility levels at the end of a 12 week breeding period of less than 10 per cent. This was to demonstrate the importance of overall reproductive performance on farm profit and how it interacts with feeding system. Table 4 shows the key herd output parameters and financial outcomes of the various analyses carried out.

Scenario 1 (S1)
The analysis shows that in a fixed milk quota scenario where grazing area within the milking platform is not limiting then farm profit is maximised in a low concentrate grass based system (HG) (€16,580 for HG vs. €11,840 for HM). Reducing the concentrate cost by €70/tonne reduced the difference in farm profit between the HG and HM systems from €4740 to €2350. However, if optimum reproductive performance could be achieved then the profitability of both feeding systems would greatly improve (by on average €8,500).

Scenario 2 (S2)
The economic analysis shows that in a fixed cow number scenario the difference in farm profit between the HG and HM systems increased i.e. it was not profitable to produce the extra milk in the HM system because of the increased costs associated with quota leasing, labour charges and land charges. If no extra labour costs or milk quota leasing charges were incurred, the farm profit was similar to that of the HG system.

Scenario 3 (S3)
In a scenario where grazing area within the milking platform is limited and unlimited milk quota was available for leasing, expansion based on a high concentrate feeding system results in reduced farm profit similar to S2. However, if expansion is based on no increase in labour cost and concentrate cost could be reduced to €170/tonne then the farm profit in S3 scenario is approximately €3,340 higher than the HG system in an S1 scenario.

Scenario 4 (S4)
Similar to all other expansion scenarios, farm profit is reduced because of the increased costs associated with quota leasing, labour charges and land charges; where optimum reproductive performance could be achieved then the profitability is marginally increased (€520). If expansion is based on no increase in labour costs and no leasing charge is incurred then farm profit is approximately €6,536 higher than the HG system in an S1 scenario.

Preliminary Indications
This study which will continue for a further two years (2006 and 2007) therefore, the next two years data will be required before definite conclusions can be made. However based on the first years results at the Ballyhaise College farm, a number of preliminary conclusions can be drawn:

1. The Ballyhaise farm is capable of growing a large volume of high quality grass and with grass budgeting can deliver high animal performance at relatively low cost. Such a system within the region should support 1,000 to 1,100 kg MS per hectare at a stocking rate of 2.3 to 2.5 cows/ha and a concentrate input per cow of less than 500 kg.

2. In a scenario where grazing area within the milking platform is limiting, then a higher level of concentrate supplementation may result in an increase in farm profit provided concentrate to milk price ratio allows, grass utilisation is not compromised and the increased milk production per cow is achieved without any additional labour input.

3. The most critical factor to increased farm profit on the Ballyhaise college farm will be to improve the EBI of the dairy herd with particular emphasis on increasing the fertility sub index.

Future Research at Ballyhaise College

All future research at the college will be solely focused on options to increase the profitability of the dairy farm. Over the next three years the college herd will be expanded from the current 84 cows to in excess of 100 cows and will be facilitated through the purchase of high EBI replacement animals. Breeding strategies on the farm will focus on the delivery of a high EBI durable herd of high fertility and capable of increased milk solids production per hectare using sires of both Jersey and Friesian origin. An out-wintering pad will be constructed on the farm in the summer 2007 to facilitate the expansion in animal numbers at the college.

Table 4. Key herd output parameters at the Ballyhaise site in a fixed quota scenario (S1), in a scenario with fixed cow numbers and quota leasing (S2), in a scenario of limited land area with quota leasing (S3) and in a scenario where land is available (S4) for a high grass (BHG) and high concentrate (BHC) and system

	S1		S2	S3	S4
	BHG	**BHC**	**BHC**	**BHC**	**BHG**
Milk price (c/kg)	24.1	24.5	24.5	24.5	24.1
Total hectares used	21.1	16.8	19.5	21.1	26.4
Quota lease (kg)	-	-	46,502	72,990	72,990
Number of cows calving	51.8	44.5	51.8	56.0	64.8
Livestock units (LU)	48.1	41.3	48.1	51.9	60.2
Stocking rate (LU/ha)	2.27	2.47	2.47	2.47	2.27
Milk produced (kg)	296,235	289,291	336,641	363,611	370,739
Milk sales (kg)	290,205	284,109	330,612	357,099	363,193
Fat sales (kg)	12,099	12,142	14,130	15,262	15,142
Protein sales (kg)	9,714	9,600	11,171	12,066	12,157
Milk returns (€)	69,905	69,571	80,729	87,228	87,486
Livestock sales (€)	15,908	13,670	15,908	17,182	19,908
Feed costs per kg milk (c/kg)	4.96	7.32	7.32	7.32	4.96
Total costs (€)	69,198	71,401	85,516	93,821	92,512
Margin per cow (€)	321	266	219	193	230
Margin per kg milk (cents)	5.61	4.09	3.38	2.97	4.01
Additional labour costs (€)	-	-	3,616	5,675	5,675
Farm Profit (€)	16,580	11,840	11,350	10,805	14,881
- Optimum fertility	25,571	19,537	20,307	20,480	26,091
- No additional labour with expansion	16,580	11,840	14,966	16,481	20,557
- No quota leasing costs	16,580	11,840	12,980	13,363	17,440
- Concentrate costs reduced by €70/tonne	18,268	15,918	16,096	15,932	16,951

Introduction to On-farm Research

The second component of the research programme is based on on-farm research. Eleven Discussion Groups across the north-west and north-east regions were surveyed in spring of 2005 on what they considered to be the most important technical issues requiring research for the northern region. The areas highlighted included, grassland management, cow type, cow fertility, systems suitable to overcome farm fragmentation and the identification of region specific targets.

The objectives for on-farm research in the region are (1) observe variations in management strategy and farm performance and (2) establish region specific physical and financial targets for efficient milk production. This will be based on data collected from 16 commercial dairy farms linked to 10 Discussion Groups in the region.

Based on the variation observed and the perceived improvements that can be obtained, targets will be established with respect to land capability to grow grass, overall composition of diet, grassland management and animal performance. Economic modelling using the survey data and incorporating the constraints to milk production that are particular to the various regions (fragmentation, farm size, soil type, length of grass growing season) will be used to determine the target efficiency of production that is optimum to each region within the study.

The Average Genetic Potential of the Dairy Herds in 2006

The average economic breeding index (EBI) of the 16 herds in 2005 based on the November 2005 proofs is shown on Table 1. The average EBI of the herds on the study reflect the national herd very closely, but ranged from €5 to €44. On average, these herds have a lower milk production potential than the Ballyhaise college herd but tended to be more fertile.

Table 1. The genetic potential of the study herds in 2005

2006 Herd Profile	Herd EBI (€)	Milk Subindex (€)	Fertility Subindex (€)	Calving Subindex (€)	Health Subindex (€)	Beef Subindex (€)
Milking cows	28	19	9	0	-1	0
	(-5 to 54)	(2 to 38)	(-18 to 23)	(-3 to 3)	(-3 to 1)	(-2 to 2)
Incalf heifers	32	28	3	0	-1	0
	(3 to 56)	(13 to 49)	(-16 to 17)	(-3 to 3)	(-3 to 1)	(-2 to 2)

(Range in Brackets)

Milk Production Performance of the 16 Dairy Herds in 2005

Table 2 shows the milk production and milk composition for the 16 herds in 2005. The average calving date was March 8th while the cows were, on average, supplemented with 959 kg concentrates over the year. The average stocking rate of dairy animals on the dairy platform during 2005 was 2.0 LU/ha.

Table 2. Milk Production Performance (2005)

Production Variable	Farm Average	Range
Milk yield (kg/cow)	5,825	4,194 to 7,737
Milk yield (kg/ha)	11,592	6,602 to 15,997
% Fat	3.79	3.63 to 3.94
% Protein	3.29	3.11 to 3.49
Milk solids (kg/cow)	412	288 to 556
Supplement (kg/cow)	959	181 to 2,493

The milk production data collected show that on average, milk yields are above average and of similar milk composition when compared to the National Farm Survey average (4,700 litres at 3.75 per cent butterfat and 3.31 per cent protein). This suggests that farmers need to select sires to improve milk composition to increase milk receipts and attempt to reduce concentrate supplementation to reduce costs. Both improved milk composition and reduced costs would be facilitated by increasing both the proportion and quality of pasture in the diet of these herds where possible.

Herd Reproductive Performance of the 16 Dairy Herds in 2005.

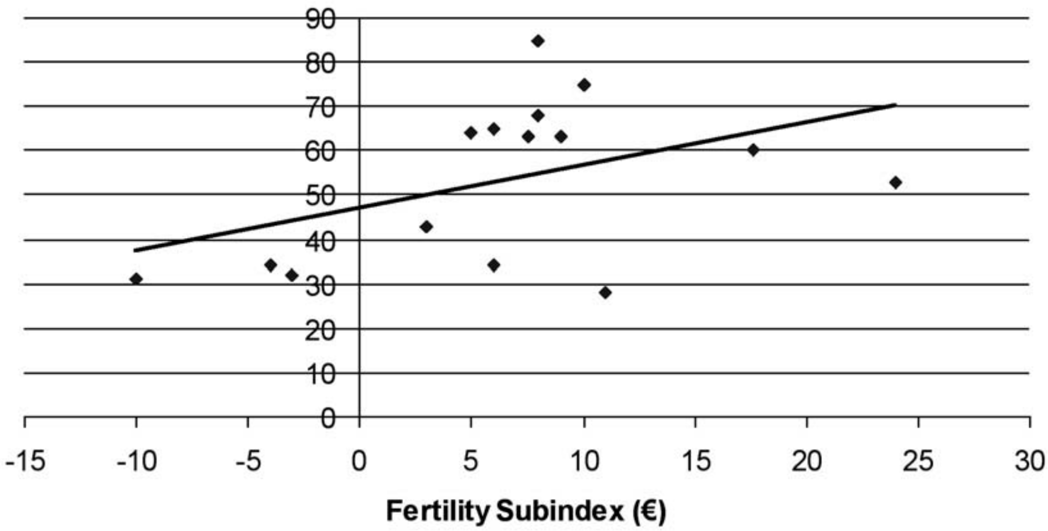
The reproductive performance of the participating herds in 2005 is shown in Table 3. All herds were scanned during the autumn to accurately measure empty rates. The remaining reproductive performance data were collected using the ICBF animal events system. On average, the study farms bred for a period of 19 weeks to achieve the reproductive performance shown below.

Table 3. Reproductive Performance in 2005

Fertility variable	Farm Average	Range
Mean calving date	Mar 8th	Feb 20th to Mar 30th
6-week pregnancy rate (%)	53	28 to 85
Calving interval (days)	404	378 to 432
Overall empty rate (%)	15	7 to 36

While the overall empty rate was low, reproductive performance was poor on average as indicated by the low 6 week pregnancy rate and long calving interval. While some farms achieved high 6 week pregnancy rates and low empty rates, no farm on the study achieved a 365 day calving interval in 2005. Herds with a lower genetic potential for fertility traits, as measured using the EBI (fertility Sub-index value) had poorer reproductive performance (Figure 1). These data suggest that in general, increased emphasis on reproductive efficiency through genetic selection using EBI could greatly enhance both animal and economic performance on these farms.

Figure 1. The influence of herd fertility subindex on 42 day pregnancy rate in 2005.



Economic Performance on the 16 Dairy Herds in 2005.
Based on completed profit monitors on these farms in 2005, Table 4 describes the average economic performance of the herds. The economic performance data collected, thus far, show these farms are of average profitability compared to national farm survey figures for the same period.

Table 4: Economic Performance of Commercial Study Farms in 2005

Economic Variable	Average (c/litre)	Range (c/litre)
Gross Output	27.5	25.5 to 31.8
Feed Costs	3.9	0.9 to 7.2
Fertilizer Costs	1.6	1.0 to 2.5
Total Variable Costs	10.2	5.2 to 15.4
Gross Margin	17.3	12.5 to 20.2
Common Costs	16.7	10.5 to 21.4
Common Profit	**10.9**	**4.3 to 15.9**

The range in financial performance was dramatic suggesting that a substantial opportunity exists for farmers on the study to improve their financial performance based on the best performance currently being achieved. While a closer analysis of the data showed no effect of herd size or milk yield per cow, a strong relationship was observed between farm profitability and variable costs (Figure 2) and between milk solids per hectare and profit per hectare (Figure 3).

Figure 2. The influence of variable costs on common profit on the 16 commercial herds in 2005.

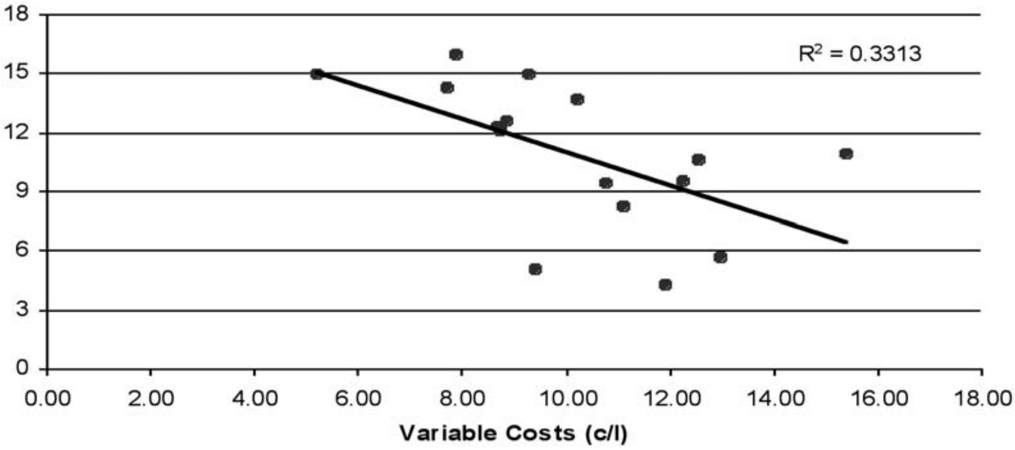
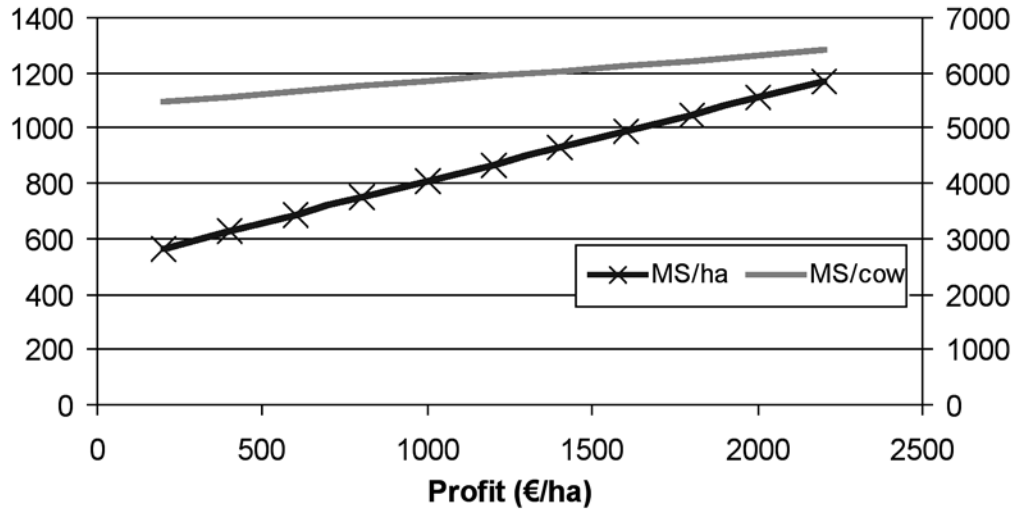


Figure 3. Influence of milk yield per cow and milk solids per hectare on farm profit per hectare of dairy platform.



Preliminary Indications

- While the mean financial performance of the 16 herds was average by national farm survey standards, the large range in performance indicates the potential for profitable milk production that exists within the region.
- There was a difference of 10.4c/l of milk between the farms with the lowest and highest variable costs, indicating large potential for cost reduction.
- In this analysis, none of the dairy farmers reached the target of retaining 60 per cent of gross output to pay the dairy farmer for his own labour input, living expenses and for reinvestment. The lowest, highest and average cost producers retain 51 per cent, -4 per cent and 30 per cent, respectively of gross output.
- Increasing the dependence on grazed grass to replace grass silage and concentrate supplementation, use of high EBI sires and a reduction in machinery costs were identified as the main avenues to increasing farm profit.

Acknowledgements
The authors would like to acknowledge the support of Connacht Gold, Donegal Co-op, Lakeland Dairies and Town of Monaghan Co-op in the development of the research programme. We thank the staff of Ballyhaise College farm for their co-operation, care and management of the experimental animals. Finally, we would like to express our sincerest appreciation to the 16 dairy farmers who have given generously of their time and information for the purposes of this project.

NOTES

Lessons for farmers; Experience of a changing industry – Dairying in New Zealand

Dr John Penno
Chief Executive Officer, Synlait Limited, Canterbury, New Zealand

Time to change

Change is how the future happens. It seems to be happening faster each year.

As part of age old industries, many farmers around the world feel like they are being swept along by global currents of change with little control over their destiny in a world that doesn't really want their products at all.

Consumers go to the supermarket to by sophisticated food products made from agricultural commodities. They don't really think about the products that we sell at the farm gate any more than we consider barley, hops, yeast and water when we buy a pint across the bar.

Western people take for granted that they will always have plentiful high quality food available and concern themselves with how much farmers pollute or the way we treat our animals. Of course they won't consider paying more for food that is produced "sustainably" – they simply find ways to demand compliance.

As a result, Governments of the first world are worrying less about feeding their people and have become more interested in reducing tax, importing low cost high quality food and exporting the environmental concerns of intensive agricultural.

Globalization continues. From the outside, Europe seems, at last, to be moving to bring more common sence to the common agricultural policy. Predictions of a 20 cent milk price are probably real.

Yet in the modern world - where most people live and work together in cities, far from farming, vibrant agricultural industries underpin society as we know it. With a growing world population and rapidly increasing standards of living across China, India and South America demand for high quality animal proteins will only increase.

When I was last in Ireland, at the Grasslands conference 2000, Fischler addressed the meeting. When asked from the audience why milk production should not be deregulated he responded "without regulation milk would simply be produced in the places most suited to milk production".

On the doorstep of Europe deregulation offers a huge opportunity for Ireland's dairy farmers. Production of milk will not decrease, it will simply be produced by fewer larger highly successful businesses.

A bright farming future is assured for those that want it. All we know is that it will be very different from now – if you want to be part of it you are going to need to learn to change fast – farmers need to think less about what is happening outside the farm gate and more control of our farming businesses.

This paper is about just that – taking control and driving positive change.

My perspective on dairying in New Zealand

I began my career 20 years after New Zealand was thrust headlong into the world agricultural markets when Britain joined the EU. During that twenty years there had been two distinct periods;

The first period was one of denial and avoiding the brutal facts of the situation. It set back agricultural development in New Zealand by at least 10 years. Government intervened in ridiculous ways hoping that world prices would come right and allow New Zealand to maintain the high relative standard of living agriculture had provided since the war.

Thankfully the second period was short and sharp! The pain of learning to live within our means – as farmers and as a nation. This period of pain (1985 – 1990) provided a vital catalyst for some and proved to be too much for others. Most of the farming business leaders today lived and farmed through both of theses periods. For many it was the defining period of their careers. The lessons learned on driving change allowed them to build farming businesses that would have been unimaginable at the time.

The last 15 years – the time I have been involved - have been about rebuilding and beginning to prosper as an industry again. Throughout my career in dairy farm extension, research and development and now developing a large scale farming business in New Zealand, I have been in a uniquely privileged position to watch the massive change that has been driven through the New Zealand dairy industry.

Over these 15 years the dairy farmers in New Zealand have doubled the amount of milk they produce and export to the world. There is one key myth about our industry I would like to point out right up front;

The success of dairying in New Zealand has not been based on our processing and marketing structure – it is based on the ability of farmers to innovate and of innovative farmers to continually control more of the farming assets.

While the New Zealand Dairy Board and now Fonterra were and are sound companies in their own right, they have delivered solid not spectacular results to farmers. Comparing international commodity prices and New Zealand farm gate returns suggests there has been no increase in efficiency from the processing and market sector of the industry over the past 15 years.

The farm gate milk price in New Zealand continues to be based completely on the prevailing world commodity prices in $US and the $US:$NZ exchange rate. This year we will receive about 0.17 Euro Cents per litre of milk. The milk price received by Australian farmers will be 10 – 20% higher.

In the midst of this, a small proportion of our dairy farmers have been highly successful. In partnership with Government they have collectively invested in research and development. They have consistently and aggressively innovated, changed and increased productivity.

On average, productivity on New Zealand dairy farms is increasing at 2% per year. As always, averages are distorting the picture. What is really going on is that the progressive upper quartile of farmers are increasing at a much greater rate than the average as they improve performance on their existing farms and buy under performing farms and implement stepwise change bringing them to up to best practice. It is not uncommon for farms to change hands and increase production by 25-50% the first season under new ownership.

I use all this is building our farming business, Synlait. Every day I work to implement the lessons I have learnt from watching and comparing that small group of highly successful dairy farmers to a large group of mediocre farmers and small group of highly unsuccessful farmers. I am probably the least informed person at this conference to comment on how Irish dairy farmers should drive the changes that you will need. What I will share with you is what I have learnt, how I'm using it, and the results it is bringing for Synlait.

Synlait – an example of a recent kiwi dairy farming business

Synlait is a Canterbury dairying business. It is young, nimble and audaciously ambitious.

From a standing start in 2000 the company is now dairy farming about 3,000 ha of irrigated land with about 800 ha in support or in the process of conversion to dairying in. This year the business will produce about 50m litres of milk from about 10,000 cows.

The company is owned by about 35 shareholders. Ten shareholders work in management roles in the company and collectively own more than 50% of the shares. Over $30m of shareholder value has been created in the first six years – while growing shareholder wealth remains the key measure of success – it is not the reason the company exists. The company exists to help the people involved to develop, and to drive innovation in the New Zealand dairy industry.

With a rapidly growing farming business growth has been our primary business focus until recently. We have implemented the basics of pastoral farming and have achieved district average production. This is nowhere good enough for us and we have restructured the business to continue growth, while focusing on profit – EBIT/ha. Step one is getting to top 10% farm performance as defined by local financial benchmarking data.

In addition to the farming division there is a farm development division involved in purchasing and developing new dairy farms each year and developing irrigation infrastructure to support future farm expansion. Our plans are to develop about 1000ha into new dairy farms each year.

Synlait Milk is a fledgling division with advanced plans to construct a milk powder plant. Table one outlines some of the key statistics of the farming part of the business.

Table 1: Synlait Farming Statistics

Dairy farms in operation	Eight
Support farms	three
Total area farmed (ha)	3,800
Peak cows Milked	10,500
Total annual production (l)	50,000,000
Annual production (kg MS)	3,750,000
Average production (kg MS/ha)	1,250
Target	Top 10% financial performance for the district
Primary focus	Profit/ha

Profitable pastoral dairying

I will not pretend that farming in Ireland is like farming in New Zealand. I will, however, point out the basics that result in top 10% performance at home. I'm sure the same principles will apply (Penno, 1998).

- Dairying research and developing in New Zealand has enabled milk production from low input systems to increase from 400 to 1,200 kg MS/ha. While some farmers are profitably achieving up to 1,750kgMS/ha by the use of bought in supplementary feeds, the risks of poor profits are much higher than with low input pasture based systems. We tried and lost money relative to lower input systems.

- Dairy Production from pasture is controlled by two key variables; the amount of pasture grown and the amount of that pasture eaten by healthy productive cows.

- Pasture production is controlled by soil fertility, drainage and the species that are present in the sward. If milk production from pasture is poor, look to these things first. Having the latest varieties of the key pasture species is much less important.

- Pasture utilisation is primarily controlled by stocking rate. There must be enough cows to eat all the pasture that grows each year. Grazing management is primarily about making sure that the pasture is available when the cows need it. Research suggests that the importance of grazing management is over emphasized if the levels of pasture production and stocking rate are right. Comparative stocking rates are now targeted at 80kg liveweight/tonne of total dry matter available each year (pasture grown plus bought in feed). On farms growing 18t DM this results in stocking rates of about three Friesian cows/ha.

- Invest heavily in appreciating assets, minimise investment in depreciating assets – avoid machinery like the plague!

  Leading farmers separate their business thinking, planning and execution into two distinct parts that work together; a property business and a milk production business that uses the farming assets.

Pastoral farming will never give reasonable returns to land in developed economies. That doesn't make buying land a bad investment, to the contrary; in New Zealand it has been one of the best returning investments available showing long run appreciation of 10 per cent. Over the past five years it has been 20 per cent as the benefits of the previous 10 years progress were capitalised into asset values.

Market reality means that the value of land is based on the future value of land not the current productive value. The market will consider the best and highest land uses not just dairying.

In New Zealand land values are often constrained by the debt servicing ability of leading farmers who are usually the only buyers active in the market (average farmers never get to buy enough land to influence the market). When new technology enables increases in productivity and profitability it is quickly capitalised into land values. Leading farmers understand these dynamics and have successful dairy farming businesses and equally successful farm land ownership and development businesses.

- Energy costs will reinforce the importance of farm systems that walk the cows to the feed rather than driving feed to cows. The quality of land and the growth profile of the region will be important drivers of future profitability of dairying.

- Once you have invested in land, cows and people figure out how to maximise the productivity of each.

Driving farm business performance
The following section of this paper attempts to put a conceptual framework around the things that I have observed leading farmers consistently do that the mediocre farmers never do. I will use the Synlait business as a real example to discuss how we are managing the business toward success.

The conceptual framework is taken from a book - Good to Great by Jim Collins (2001). It is well worth reading if you want to consider further how other businesses (often in poor performing sectors) have become highly successful through time.

Leadership
Without a clear understanding of where your business is going, progress will be irrelevant. You have a crucial role in establishing what really matters to you and your family and what doesn't. Your business goals must be the servant of your personal goals not the other way around – but until you have them clearly established and written the business will go nowhere.

Get the right people around your business
People are not your most important asset - the right people are (Collins, 2001).

Once you a clear about your goals, the next step getting the right people in and around your business. This will probably begin with who to move away from your business – peers, staff, advisors, accountants, bankers and service representatives will all have a critical input into the success or otherwise of your business development.

Absolutely key is not beginning to plan what you are going to change and how you are going to make changes until you have the right people around you. Look for people who fit your values and who have a track record of success – in their own lives and businesses or those they work with.

Face the brutal facts
When beginning to plan change you need to look at the numbers. Look hard and long until you have a deep understanding of your business and where it sits in the world. Look at the current and future economic and political environment and the numbers about your own performance relative to your peers and what research would suggest is possible.

Without numbers from research and development, and from good benchmarking information you are planning in the dark. You need to understand where best practice is and how your business stacks up.

In Ireland, it looks to me like you need businesses that can be highly profitable at $20 Euro cents/litre of milk produced. It also looks to me that many of you have a long way to go.

Synlait produced milk last year for €0.15 cent/litre and achieved only average production for our area. Financial benchmarking data shows that operationally, we are only average on financial terms and need to bring down out costs by about 20 per cent and increase production per cow and per ha by about 10 per cent. On the basis of that analysis we have used research information to plan the changes we need to implement to achieve just that.

If your R&D in Ireland does not provide solid financial bench marking that can provide information on what the top 10 per cent are achieving in your area demand it now – it is the most important research information that you will ever use.

Develop a business focus
What it the one thing, that if you consistently focused effort on and improved over time, would drive your business to being highly profitable?

In business, you will get what you focus on. You need to find a focus that is both personally satisfying and that drives your economic engine. Once you have figured it out, focus your efforts single mindedly on achieving it.

For many decades in New Zealand this focus for successful farmers was simply production per ha. It served us very well and it is still an important measure. Until more bought in feed began to be used, increased production per hectare of land almost always resulted in increased profit. Farmers religiously focused on increasing production per hectare – those that made the fastest gains were by enlarge the most profitable and have build the most successful farming businesses.

Synlait's focus is now profit per hectare – measured as net earnings before interest and tax (EBIT)/ha. Everything we invest our capital, time and management effort in, is about increasing profit per hectare, increasing production, per hectare of land, per cow and per person employed, and reducing our costs.

If your business focus cannot be expressed and measured in numbers – it is not a focus at all.

Taking disciplined action

Once you have established your goals, got the right people around your business, faced the brutal facts and established your focus, it is time to plan and implement an action plan in a very disciplined way. So long as the other steps have been followed, you will be very sure of what you are doing and will be prepared to invest time and money in systematically doing the things you need to bring about the changes you need.

You need to know the results the actions will bring. Research and development have a huge part to play in reducing risk and establishing direction. For a start stay low risk implementing proven technology that is consistently delivering great results for the top 10 per cent of farmers in your area.

Once you are in the top 10 per cent you will need to – and will be able to – take a few more risks. Trying lots of new things that align to your focus, keeping the things that work, while quickly stopping what doesn't can be a good strategy.

Using technology to accelerate change toward your focus

In New Zealand there is a vast array of new products and technologies commercially available to farmers. I suspect that Ireland is even worse. The only technology to use will be technology that clearly helps you achieve the targets of your business focus faster. Some might be new electronic wizardry – most will be well tried and true knowledge and techniques.

What it all means for our business

At the moment getting the right people into the business, facing the brutal facts our focus on EBIT/ha, taking disciplined action and using technology to accelerate our progress has driven to following action plan for Synlait Farming;

- Developing new ways of bringing crackerjack young people into the business and helping them grow their wealth by enabling them to invest in the business. We don't give them anything – we teach them the principles of wealth creation and ensure the Synlait business is a better investment than their other options in the industry.

- Benchmarking the physical and financial performance of each farm against the others in the business and against industry statistics each year.

- We have embarked on a major regressing program (to establish the right species) and are increasing soil fertility to increase pasture production and milk production per ha of land.

- Implementing an automated electronic pasture monitoring system that will provide weekly pasture growth rates and pasture mass information for each paddock on each farm.

- Implementing automatic animal identification systems to improve per animal performance through greater attention to basic animal husbandry in our large herds.

- Investing in automatic milking cluster-removers, automatic teat sprayers and in-shed feeding systems to reduce reliance on low skilled labour.

The list above is not a recipe it is an action plan that has arisen from a desire to have a great farming business and developing a deep understanding of what we need to do to get there. Nobody can tell you what your action plan needs to be. You need to develop it through time.

I encourage you to consider the process and get on with the job of developing a highly profitable dairy farming business.

References

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