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Overcoming and Adapting to Farm Fragmentation

Sean O'Donnell, Behybeg, Ballina, Co.Mayo.

Introduction

My name is Sean O'Donnell and I am married to Jackie. We have four boys and we farm 3 miles from the town of Ballina. I graduated from Galway/ Mayo institute of Technology with an honours degree in business in 2002. Afterwards I worked off farm for six years until my father entered the Early Farm Retirement Scheme in 2008. I took over the farm which at the time was milking 44 cows with a 22ha milking platform and a 13ha outside block. I have expanded the farm over the last few years and we are now milking 120 spring block calving Friesian/Jersey crossbred cows farming 75ha, of which 50ha is owned and the remainder is leased or rented. I have just leased a further 40ha farm which I intend to convert into a new dairy farm this year. The plan is to milk 230-240 cows between both farms.

In 2013 I was awarded a Nuffield farming scholarship and chose to study the topic of "Farm Fragmentation Overcoming and Adapting to it" and how land away from the original milking platform could be utilised for milk production. I also won the Macra/FBD young farmer of the year award in 2014. I am currently a member of three discussion groups which are a huge benefit to how my farm is run. As part of this paper I will give an insight into how I run my own fragmented farm, the performance we are achieving and how it will run into the future. I will also cover my Nuffield study topic with an emphasis on the report findings and conclusions.

My approach to a fragmented farm:

Currently the home farm consists of 3 main land parcels with the milking platform consisting of 34 ha split 1/3rd and 2/3rd by a main road. The remainder is in two main blocks which have been used for silage and rearing calves.

The milking platform is highly stocked at 3.52 cows/ha and is used solely for producing milk. We are currently growing 14 tonnes of grass per ha. Cow performance is 440kg/MS per head with usually 650kg meal fed. Six week calving rate is 88% and for the last five years, empty rate has averaged 7%. Cost of production is 27.5c/l including €40k for labour. My focus since I started has been to try and become "brilliant at the basics".

Over the last few years as we have expanded the business I have tried a number of different strategies around maximising resources and developing an efficient system.

Contract Rearing

In 2012 I was unable to source enough land for rearing heifers away from the milking platform. Rather than exaggerate my fragmentation issue further, I approached a friend of mine who was exiting milk production. He lives 40 minutes away and I asked if he would be interested in contract rearing heifers. He duly agreed and I send him my 1-2 year old heifers which he winters, grazes and puts in calf. It has freed up my time to focus on cows and grass and eliminates an extra complication

to the work load. I still rear my calves until they are 10 months old and then swap them with the in calf heifers.

Contract Silage

Over the last 5 years, prior to securing land on lease or for rent, I approached under stocked beef & sheep farmers local to me and asked them to grow crops of silage for me. It acted generally as a means of securing a feed bank without the hassle of commuting to outside blocks of land. Also the grass was more likely to be cut and saved during good weather! I have primarily used this silage as bulk feed for dry cows and it is a handy way of importing P and K. Generally the silage has been fertilized, sprayed, cut, baled and delivered into the yard, cheaper than if I leased the land and did all of the work myself, never mind allowing for a cost on my time. It also has been a very good way of getting to know landowners with one or two farmers eventually opting to lease/rent their land.

Buffer feeding & Out farms

As my milking platform is used solely for milk production and it is stocked relatively heavily, there are times of the year, mainly spring and autumn, where grass growth does not match the cows' demand. At these times I use high quality baled silage to buffer feed the cows. For me though I will only make a limited amount of bales on my milking platform. The majority are made on the out farms, generally by targeting pre-cutting covers of 2,000-2,200kg/DM per hectare. The aim is to make 78% DMD silage that can be fed at any time during the year without impacting on milk production. This year I cut four bales per cow of this quality material averaging 79% DMD. All of this silage is returned and stacked in the home farmyard, thus reducing the time involved in feeding it out at a later stage.

Some parts of my out farms are not suitable for cutting so I use my calves for grazing this land.

Farm expansion to an outside block

This farm is 40ha and is 3 miles from my home farm. There is currently only a 4 bay slatted shed on it. My intention is to construct a parlour, roadway and paddock system on the farm and use it as a second milking block. All cows will be wintered and calved on my home farm. From an infrastructure point of view, setting up this farm will be fairly straight forward.

Labour

I will be employing a husband and wife team who will contract milk this farm. Essentially they will be self-employed contractors (contract milkers) who will have responsibility for milking duties, moving fences etc., and also A.I and hoof care. They will also carry out approximately 25% of the milking on my home farm. They will be responsible for providing their own relief and will bill me on a monthly basis for their work. This will free up my time to focus on the management of the overall farm.

Nuffield scholarship

In 2012 I applied for a Nuffield scholarship and was delighted to be chosen as one of six scholars for 2013. I decided to look at the area of farm fragmentation for the following reasons:

- I was personally farming a fragmented holding with limited potential to expand around my existing milking platform so I wanted to see if there were "other" options;
- Being a member of different discussion groups in the lead up to quota removal pre-2015, the buzz was all around expansion. Many of the farmers in my groups had small milking blocks and were wondering where they were going to fit post quota.
- To look at fragmentation as an opportunity rather than a negative. Basically an opportunity to make something happen rather than waiting for another scheme from the government to help farmers out!

As I travelled and met different people, I figured out that it wasn't cows or land or capital but rather it is adaptability and mind-set that will have a much greater influence on Irish dairy farms and their ability to grow. So I settled on my topic of:

"Farm Fragmentation in Irish Dairying - Overcoming and adapting to it."

Dairy farming has consistently been the most profitable farming sector in Irish Agriculture. However farm fragmentation is a major limiting factor in relation to dairy expansion in Ireland. The average farm in Ireland consists of 3.5 land parcels. Since 2015, the appetite within Irish dairying to expand has been huge. Land availability around the milking parlour will now become the new "quota". However mind set and adaptability will have a much greater influence on Irish farms and their ability to grow.

The development of second milking sites within a fragmented dairy farm will deliver a more profitable return than the alternative sectors, albeit less efficiently than if all of the lands were together.

Aims and Objectives of the study

To find alternative solutions to the farm fragmentation issue:

- To identify the various milking systems that could facilitate farmers to increase cow numbers where land fragmentation and milking platform size limits the development of viable spring calving units. The focus was mainly on:
    - Robotic Milking units;
    - Second parlours;
    - Zero grazing systems;
    - Once a day (OAD) milking through a second parlour.
- To determine which of these systems are the most cost effective and efficient in bringing those out farms into milk production;
- To elaborate on the advantages and disadvantages of each system;
- To make recommendations for smaller scale dairy farmers who wish to increase cow numbers where land around the milking platform is limiting.

In researching this topic I embarked on study trips to Canada, New Zealand, Holland, the UK and throughout Ireland. A number of farm visits and interviews were conducted during these trips. Research was also conducted through consultation of many written papers and on-line publications.

Findings

- The development of second milking sites within a fragmented dairy farm will deliver a more profitable return than the alternative sectors albeit less efficiently than if all the lands were together:
- Robotic Milking Systems will work in a low input grass based system;
- Robotic milking systems are capital intensive and this will limit their uptake – particularly on greenfield sites where additional infrastructure is limited;
- There is a huge level of marketing and salesmanship surrounding Robotic milking systems which have yet to be validated through independent research;
- Developing a second milking parlour allows greater flexibility in terms of future expansion on outside blocks of land, although they rely heavily on additional labour where cows are milked twice a day;
- Zero Grazing Systems may have a limited role in overcoming farm fragmentation, possibly to reduce the dependence on meal feeding during the spring and autumn where the milking platform is heavily stocked;
- The long term sustainability of the Zero Grazing System is questionable due to its demand on labour, also some of the hype surrounding the capability of this system needs to be questioned;
- Once a Day (OAD) will result in 20 –30% drop in milk production, but overall farm production can be partially offset with an increase in stocking rate;
- OAD is potentially the highest profit system in a farm fragmentation context but it is hugely dependent on a reduction of production costs and labour input in line with the drop in milk production;
- Overcoming the drop in production/income in year 1 and in some cases year 2 can be a challenge on farm. However in most cases both have at least returned to parity by year 4. The reduction in labour and associated costs can mean an overall profit increase.

Automatic Milking Systems (AMS)

- AMS will work in a low input grass based system. The reliability and technology of the AMS have improved greatly. AMS have the ability to bring outside blocks of land into milk production, however the settling in period during setup may restrict its uptake.
- AMS are capital intensive and this will limit their use. As yet the true cost of running an robotic system is undetermined with most of the research around grassland management. Farmers are rarely made aware of servicing costs, software upgrades and breakdown cost during the sales pitch.
- It is questionable how truly independent the current research is! Robotic milking units will not universally suit every fragmented farm situation as additional infrastructure will be needed.
- Development of a Robotic milking unit on an outside block of land is better suited where the land is fully owned, as operation on a leased holding is not profitable.

The Second Milking Parlour

- Developing a second parlour allows greater flexibility in terms of future expansion. However, the second parlour system is hugely reliant on labour input, meaning that a minimum level of scale is required to make it economic.
- Second milking parlours can be constructed cheaply, meaning capital expenditure is reduced. It would cause little disruption to the running of the farm system other than extra

milking, however this should not be underestimated as labour management is currently beyond the capabilities of some Irish farmers.

Zero Grazing System

- Zero grazers can have a role in overcoming farm fragmentation, predominantly to reduce dependence on meal feeding during spring and autumn where the milking platform has been heavily stocked.
- However other less invested options should be investigated first.
- The feeding value and performance from zero grazed grass is greater than from feeding silage in a grazing system
- The Zero grazing system is labour intensive and when labour charges are included it increases the running cost of the farming system.
- Zero grazing can be used where cows are housed full time and grass is brought into the cows from outside lands, however these systems are much more labour intensive and usually have higher operating costs.
- Stocking a milking platform that is growing 13T DM/ha above 3.6cows/ha and using zero grazing to increase stocking rate is not profitable.
- The long term sustainability of the system is questionable.

Once a Day Milking

- Will result in 20-30% drop in milk production, but overall farm production can be partially offset with an increase in stocking rate.
- Hugely beneficial as a means to reduce labour input.
- Will result in a higher milk price on a per litre or kilos of milk solids basis.
- Potentially highest profit performance of all systems but it is hugely dependent on production costs reducing in line with milk yield.
- Year 1 in particular of transition to OAD milking is financially difficult. Careful management of the transition and the lead in is critical.
- The majority of farmers choose OAD for lifestyle reasons, and they have great lifestyles.
- However some farmers whom I met, chose OAD for business reasons and they in turn run great businesses!

Thank you.

UCD Lyons: Investigating the high yield, high stocking rate option

Dr Karina Pierce. Lecturer in Dairy Production, School of Agriculture and Food Science, UCD.

Background

The abolition of the European milk quota system in 2015 paves the way to increase cow numbers and milk output. However, the profitability associated with this extra production for individual farms needs to be examined and there must be a continuing focus on improving efficiencies.

It is widely recognised that grass based systems will predominate in Ireland post quota abolition and that land will be the main limiting resource on most farms. In more intensive dairying areas, competition for land is intense. In many cases, a limiting factor to expansion on these dairy farms is the availability of land around the milking platform (MP). Indeed, profit monitor data for spring milk producers (Ramsbottom 2016, per comms) indicates that the average MP is 43ha and stocking rate on the MP is 2.54 cows/ha (2.2 cows/ha whole farm).

In other parts of the country, farm fragmentation is the main issue. A recent Nuffield report (O'Donnell, 2014) highlighted that the average farm in Ireland consists of 3.5 land parcels and a survey conducted with Tipperary Co-op suppliers in 2016 indicated that for every hectare farmers have on the MP, they have another 0.6/0.7 ha away from the MP (Mullane 2016, per comms).

Given the significant costs associated with expansion and the fact that many farmers are operating on a land-bank that is limiting the expansion of their business, a higher input – higher output spring calving grazing system may prove to be attractive. Such a system might facilitate the successful expansion of the farm business without the need to buy or rent extra land, to buy stock, to acquire extra labour or to provide extra cow facilities.

The main aim of the research at UCD Lyons Farm is to evaluate the feasibility (including profitability) of a higher input/output grazing system within such a limited land holding scenario. The focus in such a system is on maximising milk/milk solids output from the existing land holding which involves high output from individual cows and high stocking rates on the MP. This will occur most efficiently through maximising the use of grazed grass/home grown forage in the system and the strategic use of supplementation thereafter.

Investigating the high yield, high stocking rate option

The targets (Table 1) in this system involve high milk outputs of 7,500-8,000 litres and over 600 kg of fat and protein per cow per lactation using higher than conventional levels of concentrate feed inputs (1.5 tonnes of concentrate per cow per lactation) but with the diet still consisting of mainly grass and grass silage (75% of the feed budget). The stocking rate on the MP in this system is 3.4 cows/ha.

Like any other 'grass based system', the principles of grassland management, appropriate breeding strategies, fertility and financial management are key to success.

Table 1. Targets for the system.

Parameter	Target
Stocking rate on milking platform	3.4 LU per ha
Stocking rate whole farm	2.25 LU per ha
Milk yield per cow	7,500-8,000 kgs
Milk solids per cow	625 kgs
6 week in calf rate	70%
Concentrate (kg/cow/year)	1,500 kgs
% diet as grazed grass	51
% diet as grazed grass and grass silage	75

Genetics of the herd

The herd of 60 cows is a high-EBI Holstein Friesian herd (Table 2). Within the herd, a genetic comparison will be made with one cow group (30 cows) having a high PTA for milk (+188 kgs) and one group (30 cows) with a lower PTA for milk (+33 kgs Milk).

Table 2. Genetic comparison of the high milk PTA and low milk PTA genetic groups at Lyons (calving in 2017).

	EBI(€)	Milk (€)	Fert (€)	Calv (€)	Beef (€)	Maint (€)	Health (€)	Mgt (€)
High milk	136	46.2	53.3	36.8	-7.0	4.4	0.5	1.4
Low milk	139	43.7	59.2	36.5	-8.4	5.5	0.6	1.4
Average	**137**	**44.9**	**56.3**	**36.7**	**-7.7**	**5.0**	**0.6**	**1.4**
	Milk (Kg)	**Fat (Kg)**	**Prot (Kg)**	**Fat (%)**	**Prot (%)**	**Calv Int (days)**	**Surv (%)**	
High milk	188	11.1	7.8	0.07	0.02	-2.4	2.0	
Low milk	33	10.5	5.4	0.16	0.08	-3.0	1.8	
Average	**110**	**10.8**	**6.6**	**0.11**	**0.05**	**-2.7**	**1.9**	

Feed Budget

In order to achieve and sustain high milk and milk solids output along with good fertility, high energy intakes are essential. Table 3 shows the target feed budget for 2016. High allocations of concentrates are offered for the first 120 days of lactation and drop significantly thereafter. For the purposes of this research project, concentrate inputs are fixed and this poses some challenges in terms of grassland management, especially in the spring time. Concentrate allowances were arrived at by considering the UFL requirements of the cow at each stage below.

Table 3. Feed budget.

Days in milk	0-20	20-60	60-120	120-180	180-240	240-270	270-305	306-365 (dry)*	Total annual DMI (t DM)
Milk yield	31	34	32	27	22	19	15	-	7500
Silage DM	12	0	0	0	0	6	10	11	1.5
Grass DM	0	15	16	15	13	6	0	-	3.6
Concentrate	8	8	7	3.5	2.5	2.5	6	-	1.3

*Current dry cow diets where BCS is near target involves grass silage and a good dry cow mineral. Where cows need to gain close on 0.5 of a BCS, silage is offered ad lib along with 2 kgs of barley and minerals.

The average BCS at the start of breeding was 2.8 with the range from 2.75 to 3.25 (0% thin). The average for the breeding season was 2.9 with 16 cows with a BCS between 2.25 and 2.5 (28% thin) by the end of the breeding season. Average cow live weight in May was 600 kg (average lactation number of 2.6).

Grassland management throughout the grazing season

Grazed grass is the corner stone of this system. Grass is measured in every paddock on a Monday morning with a platemeter and covers are entered into Agrinet. Three conventional grassland management tools are used throughout the grazing season (1st February – 21st November) to manage grass demand and supply:

- 60:40 Autumn planner;
- Spring rotation planner;
- Grass wedge.

Table 4. 2016 Grassland Performance.

Grass Summary	Week 30/11/2016
AFC (kg DM/ha)	815
Cover/LU (kg DM/ha)	-
Fertiliser N (kg/ha)	235
Fertiliser P (kg/ha)	9.3
Fertiliser K (kg/ha)	31.7
Turnout by day	Mid Feb
Turnout full time	1st March
Full time housing to date	6 days in April & > Oct 28th
Start date of closing	7th Oct
Full time housing date	October 28th
Target closing cover	700-750 kg DM/ ha (Dec 1st)
Grass growth (t/ha)	13.06
Silage on MP (t/ha)	1.7

Financial Targets

Our initial financial assumptions involved costs for the system of 21c/litre (12c variable, 9c fixed) or a breakeven milk price of €2.62/kg MS (Table 5). Analysis in the coming months will confirm actual costs for 2016. Financial success is predicated on high output per cow and per ha and good herd fertility.

Table 5. Financial Assumptions.

Parameter	
SR Cows/ha milking platform	3.40
SR Overall LU/ha	2.25
Milk Solids (kg/cow)	625
Milk Solids (kg/ha)	2,130
Concentrates (t DM/cow)	1.30
Grazed Grass (t DM/cow)	3.70
Grass Silage (t DM/cow)	1.50
Milk output (€/cow)	2,597
Milk output (€/ha)	5847
Gross Margin (€/cow)	1,675
Gross Margin (€/ha)	3,771
Net Margin (€/cow)	955
Net Margin (€/ha)	2,150
Breakeven milk price (€/kg MS)	2.62
* Milk price €4.14 /kg MS; Conc Price €300/t DM	

2016 Performance

2016 is the first full year of this study and therefore it is very early days for results. Systems research requires several years for concrete conclusions as this overcomes a specific 'year' effect on the results.

Cows are milk recorded twice monthly (Table 6) and these results are compared with the daily yields from the milking parlour. Table 6 below shows the most recent milk recording. Due to the small numbers of cows in the high and low PTA groups, overall results for the group are shown.

Table 6. Milk recording results (23 November, 2016).

Parameter	Overall	Heifers	Cows
No. of animals	55	13	42
Average lactation days	279	290	276
Yield/cow (305days predicted)	7,451	6,045	7,886
Milk solids/cow (305 days predicted)	593	482	627
Yield/cow to date (MR)	7,065	5,839	7,444
Milk solids/cow to date (MR)	557	463	586
Daily milk yield, kg (MR)	16	15	17
Fat % (MR)	5.1	5.0	5.1
Protein % (MR)	3.9	3.9	3.9
SCC (MR)	88	66	94

Note: MR results are compared with actual calibrated yields recorded from the parlour and the difference is <3%.

2016 Fertility Performance

Breeding started on the 25 April and continued for 12 weeks. All breeding was by A.I and the list of bulls used is shown in Table 7 below.

Table 7. Bulls used in 2016.

Low Milk (low PTA group)	High Milk (high PTA group)
YKZ, OZG, DBW, CSW, RNO	YGM, ZOL, AGH, SEW, FAD, HZB, YRY

The 2016 reproductive performance is shown in Table 8. Submission rate was high at 91%, however, conception rates were low and while the empty rate was respectable at 9%, the 6-week calving rate for 2017 will be lower than expected.

Five cows were not pregnant when they were scanned in early September resulting in an empty rate of 9%. Replacement rate will be 25%.

Table 8. 2016 Reproductive performance.

	Overall
Number of cows	58
Submission rate	91%
First serve conception rate	43%
Average conception rate	50%
6 week pregnancy rate	59%
Empty rate	9%

Acknowledgements

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References

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Dairy Farming at High Stocking Rate and Late Calving Date

Chris Mossman, Llangrannog, West Wales

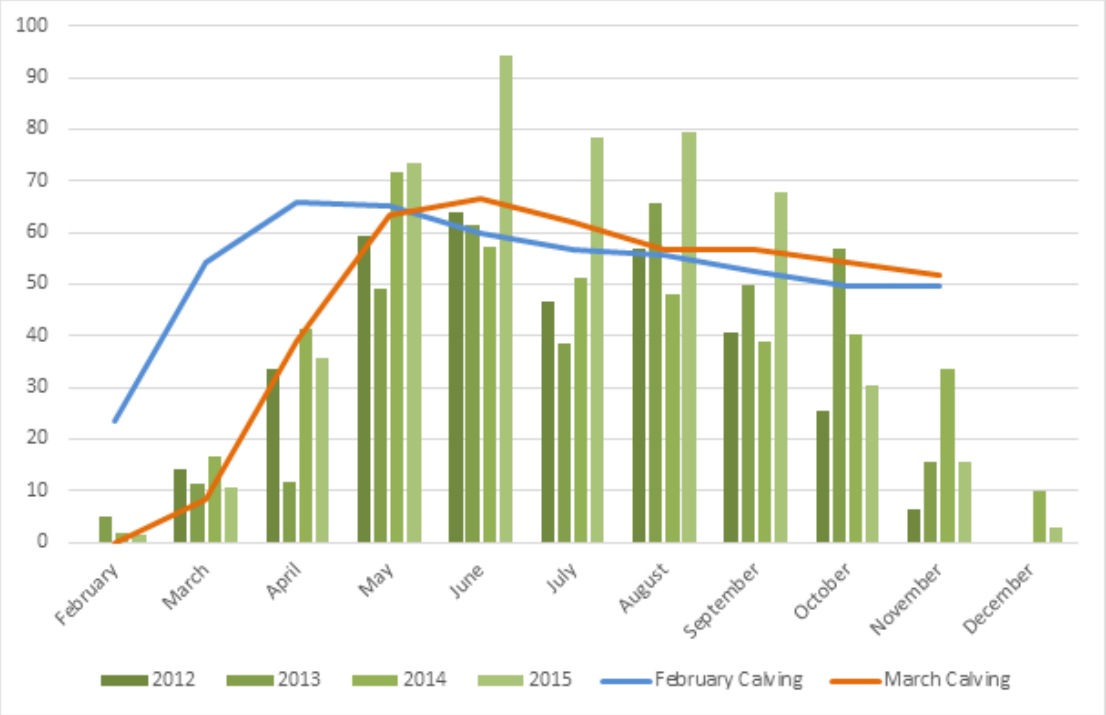
Introduction

Calving date and stocking rate are absolutely a farm and farmer-led decision.

- As an individual are you risk averse or do you enjoy the thrill of pushing the boundaries?
- Is your farm particularly wet or dry?
- Is your farm at sea level or half way up a mountain?

This presentation explains briefly how I farm and why.

The following graph is fundamental in explaining why I have chosen to move my calving date forward.



The blue and red lines indicate the total herd demand. The columns are grass growth rates over the 2012-2015 seasons on my farm. Blue is February 1st calving demand, Red is 20th March demand line. As you see, there is a large forage deficit with the blue line early season. At this point the energy demand is high, i.e. approx. 220mj/day. The forage gap therefore has to be filled with good silage and a high allowance of concentrates. If a farmer calves later, he still has to fill the gap but the gap is now at the end of the lactation when the cow's demand has dropped to approximately 160mj/day. This can be more easily filled with silage.

Therefore, subject to farm and stocking rate, calving later may result in harvesting more grazed grass.

Background

Farming 202 Ha in Llangrannog on the coast of West Wales.
400 spring calving Friesian X Jersey cows on a 142 ha platform
250 followers R1 & R2

Following a fortuitous visit to Ireland in 1999 to visit Mike Murphy, I have been spring calving since 2001. Started crossbreeding in 2003 when I crossed ALL our Holstein/Friesians with a Jersey

From 2001 – 2009 I milked 120 cows on a 38HA platform, 3.3 cows/ha (1600kg LWT/ha) supported by a 36ha run off. We were achieving 430 kg MS /cow off 400- 600 kg of supplement.

In 2009, I was offered the opportunity to expand by renting a next-door farm; 106HA + 22 HA of off platform land! This is on a15year Farm Business Tenancy taking us to 2024. As the landlord de-stocked (sucklers and sheep) I was drip fed chunks of land until, by 2013 when we had had it all. As such, we have bred all stock for our expansion. Expensive and Slow. However the silver lining is that it demanded that we became good at retaining cows in the system. We also had to up our game with our young stock management.

In 2015, we finally finished all infrastructure (except for an underpass). This includes parlour, tracks, water, fencing, lagoon, cubicles etc. Importantly we could now get cows to every hectare on the platform.

We expected to milk 420 cows in 2016, reaching our target of 3 cows/ha, however TB struck (for the first time in my career) and the average number of cows in milk this year will be 386. We carry 464 in calf animals into the next TB test in January.

Farm targets

- 500KG MS/COW
- 3 COWS/HA 1550KG LW/HA
- 85% CALVED IN 6 WEEKS
- LESS THAN 10% EMPTY AFTER 10 WEEKS
- LESS THAN 10% OF HEIFERS BELOW TARGET WEIGHT AT CALVING
- AVERAGE CELL COUNTS OF LESS THAN 120,000
- CLINICAL CASES OF MASTITIS AT LESS THAN 12%
- NO MORE THAN 15% OVERALL LOSSES/YEAR (EXCLUDING TB)
- CHALLENGING BUT HAPPY PLACE TO WORK

The challenge is to produce kilogrammes of milk solids efficiently and profitably

Farm performance

Year	Litres/cow	Milk solids (kg/cow)	Tonnes fed/cow
2011	5902	503	1.04
2012	5650	488	1.2
2013[1]	5933	501	1.4
2014	6073	517	1.08
2015	6210	528	1.1
2016	6000	500-510	1.0

My target cost of production for 2016 is 18ppl (including heifer rearing costs) before depreciation and unpaid labour, including the rearing costs of replacement heifers.
Our cost of production for the last 5 years has been around 21ppl. This reflects in part large numbers of replacements required to drive expansion and high labour costs whilst developing the farm.
Labour is my largest cost and I need to control it.
The whole job needs to be kept simple.

Need more of this……. COWS & STOCK AT GRASS
Need less of this……. WAGON/SILAGE
SCRAPING
BEDDING
When all 660 stock are at grass, the 500 acres are very simple for 3 people to run. However, once silage/housing are involved, the labour demands increase.

Stocking rate
The stocking rate for a particular farm needs to be carefully considered:

- What do we grow/ha?
- Are we prone to water logging/heavy soils or summer droughts?
- How much supplement are we prepared to feed and how easy are they to feed out?

My thought processes are as follows\;

- I have light, free draining soil with 30” of rain;
- I am susceptible to summer drought;
- We grow 11.5-12 tonnes DM/year;
- I am comfortable with feeding up to 1 tonne/cow of concentrate supplement;
- I do not want to be out purchasing silage more often than 1 year in 5;
- Historically, we have easily grazed from 14th Feb until 20th December due to soil type, topography and a good track/water infrastructure;
- Knowing our growth rates, a demand of 50kg/DM/day is comfortable.

A cow requires 5.5 tons DM/YR
I am aiming at 3 cows / HA

[1] Cold spring and dry summer

3 cows/HA x 5.5 tons/DM = 16.5 tons/HA
16.5 tons DM/HA – 3 tons concentrate supplement/Ha= 13.5
Average grown is 12 tons at 80% utilisation = 9.6 tons DM/HA
The deficit is filled from the support block of 60 HA or 9 tons DM/HA.

Our future objective is to grow more DM/ha
When we do consistently manage to grow more DM/ha, we have the option to milk more cows OR to reduce concentrate supplement

MY THOUGHTS ON GROWING and harvesting MORE DM

- Improving our soil fertility (lime, P&K bang on across farm at all times)
- Reseeding and using improved cultivars
- Improving our grazing skills
- Improving the efficiency of the herd (in our herd our cows have a range of between .6 and 1.4 kg/ms per kg of lwt.)
- Re-looking at the role of clover

All of the above have massive room for improvement.
Having decided on stocking rate and that we want our cows at grass…..when do we calve?

Calving date and rate
Historically we have always calved on the 14th February with heifers front loaded.
Kiwi rule of thumb is to aim at mean calving date 60 days before "magic day".
BUT
Even in a good spring, we run short of grass, so for 2017 we have moved to 21st February start date and bred for 9 weeks ONLY
This is in an attempt to more readily avoid silage feeding and rehousing.

Our objective has always been to calve fast and furious.

	Number	**50% herd calved**
2007	120	14 days
2012	302	17 days
2014	352	15 days
2015	373	14 days
2016	407	9 days

To give us confidence to calve quickly:

- We make heavy use of autumn and spring grass budgets on Agrinet;
- Closing/Opening covers are vital;
- Knowledge of magic day;
- Anticipate magic day but defend average total cover of 1800/Ha at all costs;
- Be prepared to fully feed cows at all times.

The advantages of 'Fast and Furious' are:

- Get cows at grass (no silage and out of buildings) but have good days in milk (in 2014 and 2015 our average days in milk were 285 and286 respectively);
- Gets all replacement heifer calves in the first 2 weeks (big benefit to simplifying rearing);
- Concentrates labour effort at calving …we put staff on 24/7 for 3 weeks to get colostrum into calves.
- Then we can tail off significantly for final 6 weeks;
- Much easier to graze effectively with a large number of cows;
- Harvest the maximum amount of grass through the cow.

RECENT CALVING PERFORMANCE AND 6 WEEK INCALF %

2013 335 calved (With 81 heifers OR 24%) 332 served

2014 352 calved (With 55 heifers OR 16%) 350 served
Based on 2013 breeding performance;
234 COWS calved in 6 weeks. This is at a 65% in calf rate in 6 weeks .
13 days to calve half the COWS
9 days to calve half the herd (cows and heifers)
86% of herd calved in 6 weeks
6% empty after 10 weeks

2015 372 calved (With71 heifers OR 19%) 371 served
Based on 2014 breeding performance;
264 COWS calved in 6 weeks. This is a 75% in calf rate in 6 weeks
14 days to calve half the COWS
12 days to calve half the herd (cows and heifers)
90% of herd calved in 6 weeks
11% empty after 10 weeks

2016 404 calved (With 91 heifers OR 23%) 399 served
Based on 2015 breeding performance;
222 COWS calved in 6 weeks .This is a 71% in calf rate in 6 weeks
12 days to calve half the COWS
9 days to calve half the herd (cows and heifers)
87% calved in 6 weeks
8.5% empty after 10 weeks

PREDICTED 2017
464 to calve (With131 heifers OR 28%)
75% 6 week in calf rate
15 days to calve half the cows
10 days to calve half the herd
91% calved in 6 weeks
13% empty after 9 weeks

WHAT HAVE WE DONE TO ASSIST FAST CALVING?

- Calve at condition score 3
- Jersey AI on heifers (ensure Jersey sweeper bulls)
- The Jersey influence on the herd helps with unassisted calvings
- Decide if you are producing milk or producing beef calves
- PLENTY of bedding if you calve indoors…cervix is open only twice a year so attempt to be as hygienic as possible
- Any intervention: use Pen & Strep, gloves and plenty of hibitane scrub (a gentle disinfectant)
- Use Oxytocin and Metacam on difficult calvings to help uterus close down and improve recovery
- Use Propalene Glycol on cows with twins/difficult calvings
- Stockmanship to detect metritis early
- Metri check all cows early April
- The use of intervention drugs
- Blood/milk tests to give an indication of the herd energy status 4 to 5 weeks into production

Breeding routine

PRE-PLANNING:- 'It's a busy time!"

- Book vets well ahead
- Ensure you are well staffed
- Have plenty of bulls lined up

In the last two breeding seasons we have used more intervention drugs.
We have inserted CIDRs into non cyclers EARLIER
We have used the "Why Wait" programme.
We aim to serve two thirds of the herd in the first week of AI

We expect to get a return on our investment in intervention (£5.56 /head [approx. €7.00] over all cows and heifers) through days in milk. We also hope to be creating a "virtuous circle" for the future by increasing post calving to breeding days.

Conclusion

Moving calving date towards March will have positive effects on my farm,
BUT
This positive impact of late calving date is dependent on a short calving window and rapid calving otherwise there is a danger of grass growth getting completely out of control !!

ITS ALL GREAT FUN !!!!

Farming a large herd to a high health status

Shane and Fiona Fitzgerald, Garrycahera, Ballynoe, Fermoy, Co. Cork

Introduction

Myself and my wife Fiona farm near a small village called Ballynoe, which lies between the towns of Midleton and Fermoy. In this presentation I would like to focus on the approach we take in calving our herd of dairy cows compactly in spring while maintaining a high level of the health within our herd. Details of our farm are presented in the following Table.

Table 1. Fitzgerald farm details.

Farm Size	140 ha Grassland
Soil type	Mixture of shale and sandstone based soils
Milking platform	76 ha; 16.8 t DM/ha grown in '16
Milk produced	1.54m lits supplied in '16 (5,900 lits/cow; 4.48% fat & 3.75% pr.)
Dairy cows	Average 254 crossbred cows milked; EBI €120
In-calf heifers	67
Heifer calves	115
Farm labour	Shane; full-time worker; weekend help; my dad Jerry; spring student. In partnership with my uncle John

Bull calves are sold off farm at 1 to 2 weeks of age. Beginning in the early 2000's, my father Jerry crossed our Holstein Friesian herd with high EBI New Zealand Friesian AI sires. From 2004-2009 we used both New Zealand Friesian and Norwegian Red AI while participating in the Moorepark led Norwegian Red trial. In 2010-2015 we used mostly Norwegian Reds. Since then we have used mainly Jersey and Kiwi Cross AI.

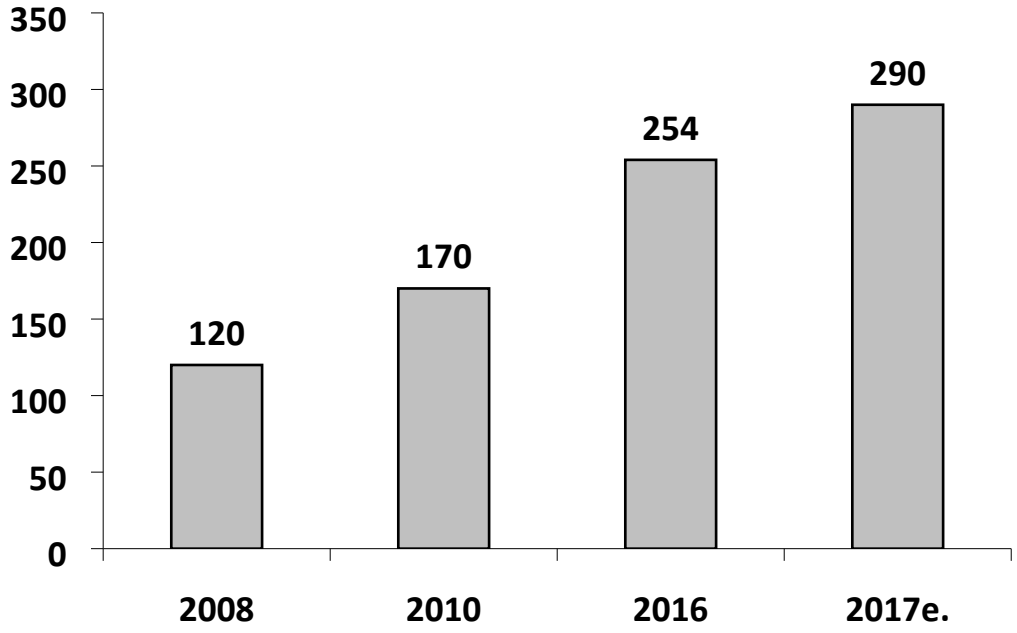
Fertility Performance 2016 – whole herd

- Calving interval 368 days
- Start calving 19th January
- Median calving date 16th February
- 6 week calving rate 83%
- Total calvings 267
- Calves born alive 261 (+ 3 losses to still births)
- Empty rate 9% empty after 9.5 weeks breeding

Ten years of expansion

We've spent the past ten seasons expanding the herd since I took over the farm. Details of the herd's expansion are presented in Table 2.

Table 2. Expansion of the Fitzgerald herd from 2008 to 2017 est.



Our herd expanded from 120 cows to 170 cows in the spring of 2010. That spring was a crunch time on the farm with a number of diseases that we had avoided dealing with coming to the surface at the same time after a very challenging 2009. They included Fluke (both rumen and liver) and Salmonella (which tend to come together); IBR; BVD (even though we were vaccinating); and mineral deficiencies including phosphorus and trace elements. We estimate that the health issues we faced that spring cost us **€250 per cow**.

Herd health plan

1. Autumn planning

Planning for spring grazing and spring calving both start in the autumn on our farm. We sit down in early October with our vet and pull out all of the records and reports and review them. These include: bulk milk screening tests; milk recording; and our soil and grass tests. We also review the infrastructure on the farm, in particular the calf house to see what improvements can be made.

2. Calving management

- Cows that are close to calving are walked through the parlour each day. Those at the point of calving are drafted out to the calving shed for greater supervision.
- A night calver is employed on the farm for the month of February when the majority of the cows calve (this year 195/267 calving's). Newborn calves are snatched after birth and moved to straw bedded calf holding pens and have their navel disinfected. The calves are tagged as they are taken from the calving shed and the number recorded and registered through the Irish farm computers package. This is located in the farm office next to the milking parlour and allows for immediate registration of calves and updating drug remedies as they are administered.
  Then they are fed pooled colostrum as soon as possible after birth. This colostrum is taken from cows that are tested negative for Johnes. Each calf is offered 6 litres – typically 5 litres is consumed. The colostrum is fed with a stomach tube.

3. Calf management

- Bull calves for sale are moved to sheds on Shane's uncle's farm where they are fed on teat feeders until sold. Replacement heifer calves are teat trained in the group pens and moved to the customised calf shed on the home farm in groups of 30. Here they are reared on the farm's automatic calf feeder which has now completed its second season.
- While indoors, calves receive their first blackleg vaccination (the second vaccination occurs a month later) and are dehorned within a week of birth and intranasal vaccination (RSVP PI3) is administered on day 9. Bovipast will be administered in the autumn.
- This year they were also treated for cryptosporidium with halacur and also decox was administered through the calf ration for coccidiosis.
- Cydectin LA is administered at turn out to grass or within 3 weeks. Twenty weeks later- zearl every 8 weeks. Worms/fluke/lice at housing.

4. Milking Herd

- All vaccinations and dosing are done in January. This is to save on labour during the peak calving season;
- February is for calving cows and getting 25 % of grazing platform grazed;
- Fertilizer, slurry and lime is bulk spread by a contractor;
- Once a day milking for peak calving.

5. Weanling Heifers

- All weighed and vaccinated in January, lighter animals go to grass ASAP;
- Synchronised for AI to allow for compact calving;
- This is done 1 week before cows start breeding.

6. Labour

- Be organised before calving starts;
- Evaluate what labour is on the farm and define roles;
- Days off and enough sleep (7 hours/ night) vital even in peak calving;
- Technology will play a key part going forward (moo-monitor recently installed);
- More contractor used (currently selling machinery);
- Improve cow flow in parlour and speed up washing time.

Winning the spring grazing challenge!

Michael Egan, Michael O'Donovan, Deirdre Hennessy, John Maher and Micheal O'Leary
Animal and Grassland Innovation Centre, Teagasc, Moorepark, Fermoy, Co Cork.
Michael.Egan@teagasc.ie

Summary

- Successful spring grazing needs to have a plan in place for fertiliser and grazing management
- A flexible management approach is needed depending on spring weather patterns
- Spring grazing targets must be adhered to - every 1% of the grazing platform grazed in February results in an additional 14 kg DM/ha grown by April 10th
- Farms finishing their first rotation before April 10th grew 20% more grass in spring compared to farms who finished the first rotation after April 10th
- Average opening farm cover for a stocking rate of 2.5 to 3.0 LU/ha should be 800 to 1000 kg DM/ha to ensure a predominantly grass diet
- Target 70 units/acre of nitrogen to be applied by April 1st
- Target average farm cover should be 450 kg DM/ha at the beginning of the second rotation in early April
- Regrowth levels need to be monitored through the spring period especially during March
- Poaching damage can reduce pre-grazing covers by 30 to 50% the following grazing

Introduction

Milk production in Ireland is seasonal and grass based, with calving date targeted to coincide with the start of grass growth. Feed supply in the form of grazed grass matches or exceeds the demand for spring calving dairy cows from approximately mid-April to mid-October. A significant quantity of milk is produced in the shoulder periods (spring and autumn) of the year and so it is important to exploit the potential of grazed-grass available during this period (Roche et al., 1996), because it is a low cost and high quality feed (Finneran et al., 2012). The availability of sufficient herbage for grazing in early spring is possible through appropriate autumn grazing management, timing and quantity of spring nitrogen (N) fertiliser application and through grass budgeting in spring (Murphy, 1977; O'Donovan et al., 2002; Kennedy et al., 2006). Increasing stocking rates (an additional 100,000 cows calved in spring 2016; ICBF, 2016) and compactness of calving (a reduction in mean calving date of five days and an improvement in six week calving rate of 6% - 2011-2015; ICBF, 2016) (Figure 1) has increased spring feed demand on dairy farms. Extra grass must be grown and utilised in this period to avoid increases in supplementary feed use. PastureBase Ireland (PBI) (Hanrahan et al., 2015) data shows that insufficient grass quantities on dairy farms at calving commencement and a large variation is spring grass growth (Figure 2), resulting in high supplementation levels. In spring 2016 daily grass growth rates reduced by 40% from mid-March to early-April; this had a significant effect on grass availability in the second rotation and subsequently grass allocation per cow. This period of poor spring grass growth in 2016 resulted in 13% less grass grown by April 10th compared to the previous 2 year average (Table 1), following key principles is important, spring grassland management must involve regular measuring and budgeting to optimise farm performance.

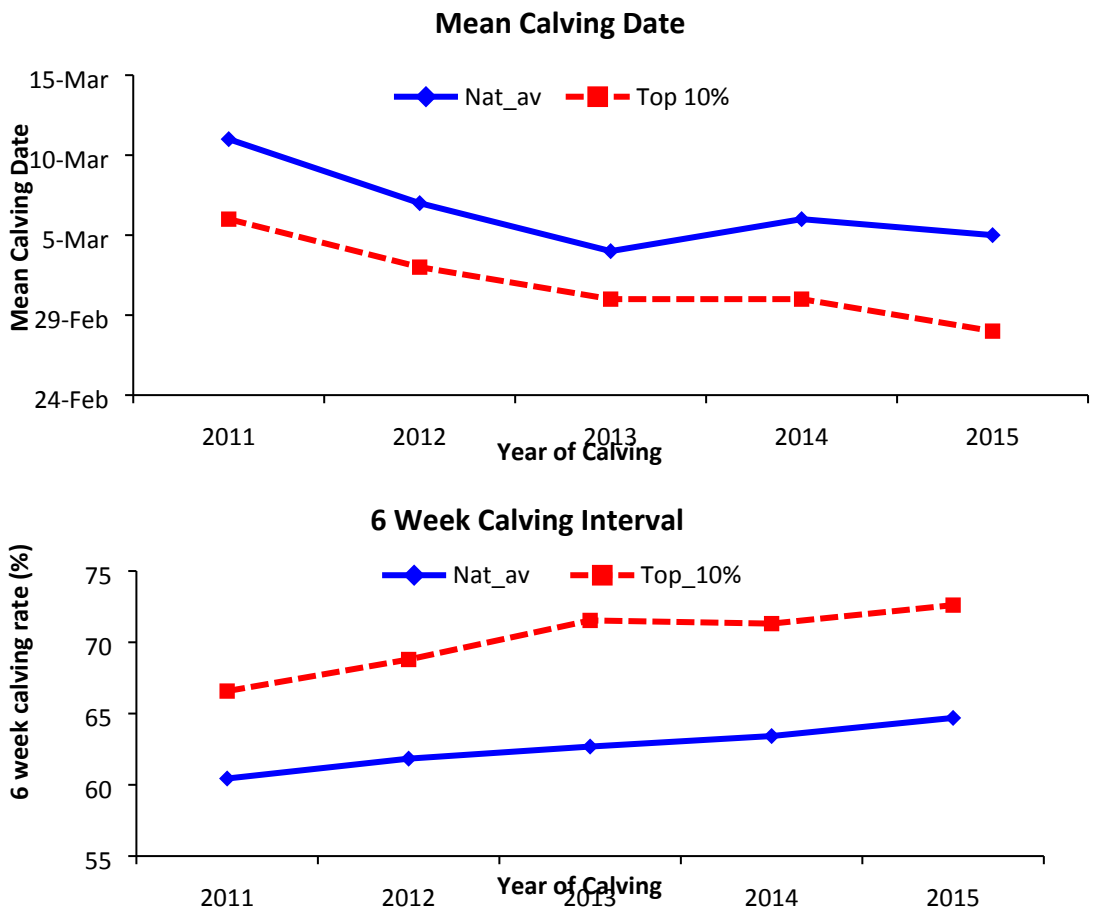


Figure 1. Trends for mean calving date and 6 week calving rate for cows in the tops 10% (Broken red line) and national average (Solid blue line) EBI.

The main objectives of spring grazing management are (1) to increase the proportion of grazed grass in the diet of the dairy cow and (2) to condition swards for subsequent grazing rotations. The first rotation should start in February and continue until early to mid-April. This varies from farm to farm and year to year but the most important aspect of grazing management is to make good use of spring grass. The period from calving to breeding is a critical time for both herd and grassland management. Cows should be turned out to grass as soon as possible post-calving (1 – 2 days). Profitability will increase as higher cost feeds such as grass silage and concentrate are reduced or eliminated from the diet. This paper will discuss spring grazing management, PBI findings, and will outline developments in spring grazing management on farm in six key areas, 1) benefits of early spring grass, 2) spring rotation planner, 3) farm cover management, 4) spring N fertiliser application, 5) impacts of poaching damage and 6) wet weather management.

Table 1. Three year (2014, 2015 and 2016) mean spring DM production (January 1st to April 10th) from PastureBase Ireland farms (n = 200).

	Year		
	Kg DM/ha		
	2014	**2015**	**2016**
Mean	1141	1213	1025
Minimum	553	345	334
Maximum	1966	1789	1720

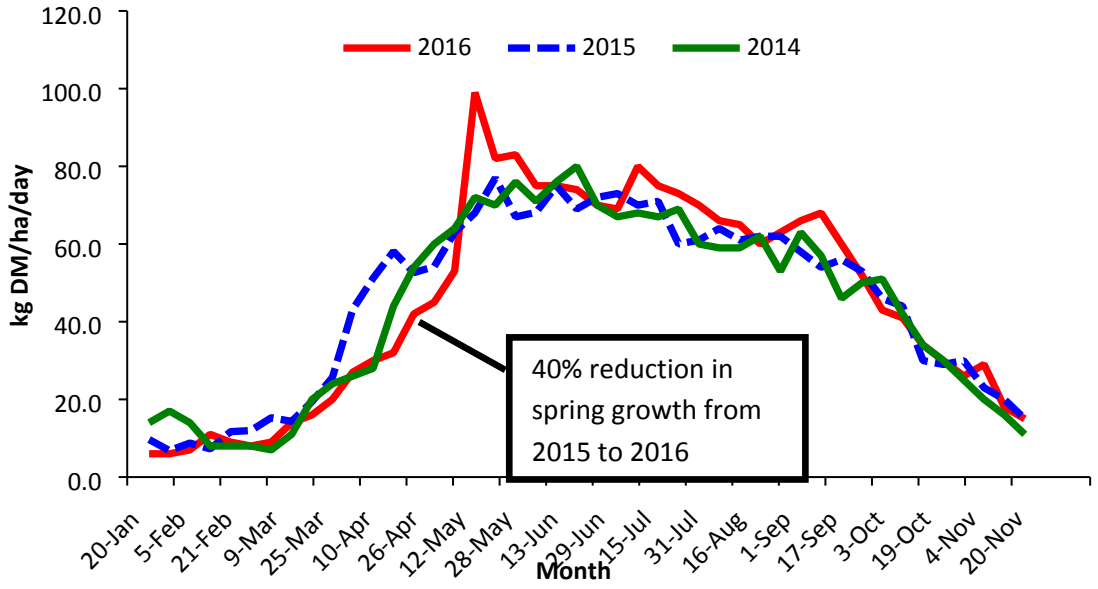


Figure 2. Mean daily growth rates (kg DM/ha/day) for PastureBase Ireland farms for 2014 to 2016.

Spring grazing management

1. Benefit of early spring grass

Spring grass quality is superior to grass silage, with higher crude protein (CP), organic matter digestibility (OMD) and lower neutral detergent fibre (NDF). Spring grass DM content can range from 150 to 210 g/kg DM, crude protein content – 210 to 280 g/kg DM, organic matter digestibility (OMD) – 810 to 840 g/kg DM. In general, concentrate crude protein levels can be adjusted based on the high level of crude protein available in spring grass. Spring grass can support high levels of milk production, Kennedy et al., (2006) reported that animals produced similar levels of daily milk yield and fat content but 0.3% higher milk protein when allocated 13 kg of grass and 3 kg concentrate compared to cows offered 6 kg silage and 9 kg concentrate per cow per day. As we strive to put more grass into the spring, closing paddocks early does mean these paddocks need to be grazed early in the spring period. Garry *et al*. (2015) reported that for the early grazing period (February to mid-March) there was no effect of closing date on grass digestibility. Paddocks closed early the previous autumn (October) did reduce by 45 g/kg DM in OMD compared to November closed paddocks when grazed from mid-March. This means that early closed swards require to be grazed early in the first rotation, and preferably in late February/early March, to reduce any negative effects on grass digestibility.

2. Spring Rotation Planner

Grazing management in the first two months after calving largely determines spring grass growth and how well fed the herd are at the onset of breeding. The spring rotation planner (SRP) is a tool to guide farmers in tracking the area of the farm grazed off at different time points in the spring. It divides the area of the farm into weekly portions and takes the guesswork out of grazing management over this critical period. The best way of managing grass in spring is to set out the area to graze weekly and implement the plan during the spring period. The SPR works off simple parameters; turnout date, grazing area and the targeted first rotation finish date. The SRP shows the proportion of the farm to be grazed by three key points in the early grazing season March 1st, March 17th and the desired end of the first grazing rotation (approximately April 1st - 10th). The SRP, will not inform the farmer the quantity of grass available in the paddock at grazing, so farmers will have to monitor the quantity of grass in each paddock. Supplementation and what levels to be offered should be managed according to post-grazing residuals; post-grazing residual height should be maintained at 3.5 cm during the 1st rotation. If post-grazing height exceeds 3.5 cm based on the daily area allocation, demand per day must be increased by reducing/eliminating supplementation. If post-grazing residual height falls below 3.0 cm, supplementation must be increased.

PastureBase Ireland data for 2016 (n= 65 farms) shows on a range of soil types that the average turnout date was February 8th with a range from January 16th to March 6th. Soil type has an impact on initial turnout date; a typical SRP can be seen in Table 2a. In general the dates by which a certain proportion of the farm should be grazed are 10 days later on heavy or slow-growing farms compared to dry farms (Table 2b). The targeted end date of the first rotation may need to be adjusted, given some of the weather challenges encountered during the spring period, so it is important to monitor spring farm cover during this period.

Table 2a. Spring grazing area allocations when grazing commencing in early February (Source; Grazing guide two).

Week end date	% of total farm area grazed at week end
15th February	Start grazing
15th March	30% Grazed
27th March	66%
12th April	Begin rotation 2

Table 2b. Spring grazing area allocations on heavy soils when grazing commencing in mid-February.

Week end date	% of total farm area grazed at week end
1st February	Start grazing
1st March	30% Grazed
17th March	66%
5th April	Begin rotation 2

The impact of early spring grazing has been advocated on many occasions for grass production, as growth rates are usually greater on grazed swards compared to ungrazed swards at this time of year. Kennedy et al. (2006), in a comparison of early spring grazing versus late turnout, found that February grazed swards subsequently grew more grass in the second rotation than later grazed swards. By grazing a certain area per week, a wedge shape grass supply is created. The importance of creating a wedge-shape grass supply is crucial to ensure enough grass is available in the second rotation. Data from PBI shows that in 2016 on average 21% (range 0 to 52%) of the grazing platform was grazed in February, which may have been accounted for by unfavorable weather conditions in spring 2016. In spring 2015, however, had similar results, with, on average, 22% (range 0 to 46%) of the grazing platform grazed in February. These figures are below the target of a minimum of 30% grazed by March 1st. The target is set to grow 1200 kg DM/ha from the 1st January to 10th April. PastureBase Ireland data (2015 & 2016) shows that for every 1% area grazed in February an additional 14 kg DM/ha is grown by April 10th, which equates to an additional 125 kg DM/ha grown on farms when 30% of the grazing platform grazed in February compared to 21% grazed in February. In 2015 and 2016 farms who grazed ≥ 30%, grew, 133 kg DM/ha more than farms that grazed < 30% (1086 and 1220 kg DM/ha, respectively), an 11% increase in spring grass. On a 40 ha farm this means that there is an additional 5320 kg DM available to the grazing animals, which can substantially reduce the requirement for additional supplementation. If it is proving difficult to meet the target proportions grazed, low pre-grazing covers should be grazed first as this will increase area allocated per day, and allow the SRP planner targets be achieved.

The 2015 & 2016 PBI data shows mean spring grass production from January 1st to April 10th was 1239 kg DM/ha on farms grazed by April 10th compared to 994 kg DM/ha for farms grazed after April 10th, 20% difference. The farms that had finished the first rotation by April 10th had 29% of the area grazed by March 1st. The February grazed area had an adequate regrowth interval to ensure availability of grass for the start of the second rotation.

The main points of the SRP are:

- To get freshly calved cows out grazing as soon as possible post-calving. Feed allowance increases steadily from calving until the breeding season
- To graze a minimum of 30% of the farm area during February to stimulate regrowth for the second rotation, which will commence between April 1st and 10th depending on grass growth rates.
- To have 66% of the farm area grazed by March 17th, and to stretch the remaining 40% until early April (and later if growth rates are below normal).

The effect of spring DM production on annual DM production has previously been shown (O'Donovan et al., 2015), with spring DM production accounting for 43% of the variation in annual grazing DM production. It's clear Irish farms are not achieving the required targets set by the SRP and are finishing the first rotation too late.

Spring rotation planner: *Every 1% of the grazing platform grazed in February resulted in an additional 14 kg DM/ha grown by April 10th.*

3. Average farm cover and feed budget

A grazing management plan in place for spring is crucial, in many ways grazing during early spring means managing a feed deficit, as demand for grass is higher than grass growth. This results at first in a decline in average farm cover, a plan is required to control the rate of farm cover decline, otherwise farm covers will be run down too far.

Higher stocking rate will place added pressure on available feed resources on farms. The development of disciplined feed budgeting during spring will be among the greatest opportunities for Irish dairy farmers to expand their businesses profitably while continuing to harness the benefits of a predominantly grass-based diet. Farm stocking rate and how you manage your pasture through autumn and spring will dictate how much purchased supplements you will need during the 1st rotation. Opening spring farm cover has a large impact on impending spring herbage allocation to the herd. Opening with a low average farm cover means there is less available grass available for grazing. In 2015, the autumn closing cover on 65 PBI farms was 782 kg DM/ha, (range 312 to 1153 kg DM/ha), the corresponding opening farm cover in 2016 was 998 kg DM/ha, (range 417 to 1307 kg DM/ha) which equated to an overwinter growth rate of approximately 3.5 kg DM/ha/day. Most farms at high stocking rates (>3 LU/ha) require a farm cover of approximately 900 – 1,000 kg DM/ha at the start of calving. The ideal average farm cover of >800 kg DM/ha on February 1st allows a farm operating at a SR of 2.5 to 2.9 LU/ha to turn freshly calved cows out full time to a predominantly grass diet and extend the 1st rotation to April 5th, and require less than 300 kg concentrate/cow. Figure 3 shows the target average farm cover during spring to allow a farm carry a stocking rate of 2.5 to 2.9 LU/ha to achieve a high proportion of grazed grass in the diet while reducing supplementation. A large variation in opening farm cover, such as that seen in spring 2016 has huge implications at farm level. McCarthy et al (2015) showed that a 260 kg DM/ha reduction in opening farm cover (Clonakility research farm) resulted in an additional 150 kg DM/cow of silage been fed. Previous research shows that higher opening farm covers result in greater early-spring growth rates, and greater cow intakes and milk production. The amount of feed on the farm at calving is strongly linked to the amount of milk produced from pasture before summer without supplements. O'Donovan et al (2015) reported that an additional 100 kg DM/ha opening far cover results in an extra six days grazing, while PBI data shows that every 100 kg DM/ha increase in opening farm cover, pasture growth rate was increased by 3 kg DM/ha/day in early March (Figure 4).

A spring feed budget is essential to make the best decisions around managing feed requirements at this time of year. Feed budgets incorporate feed supply and demand, facilitating decision making around feeding cows and maintaining average farm cover. They assist the farmer to predict forward and forecast the amount of feed available and supplementation requirement. Regrowth rates on the grazed ground and average farm cover, must to be monitored particularly from early March, and average farm cover should not be allowed to drop below 450 kg DM/ha at the beginning of April prior to the start of the second rotation (Figure 3).

Irish Grassland Association

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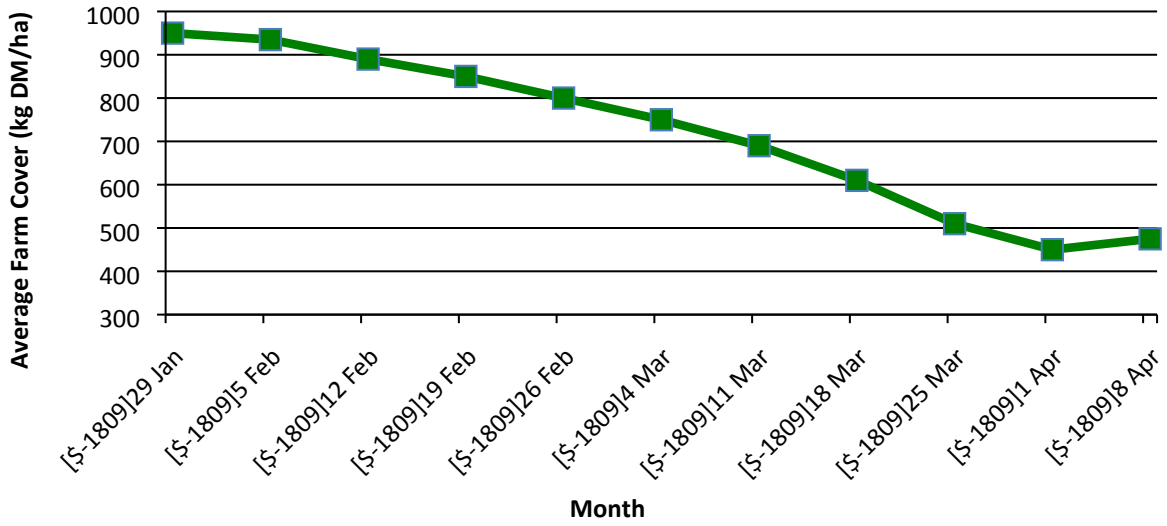

Figure 3. Recommended average farm cover (Average Farm Cover; kg DM/ha) for a farm stocked at 2.5 to 2.9 LU/ha.

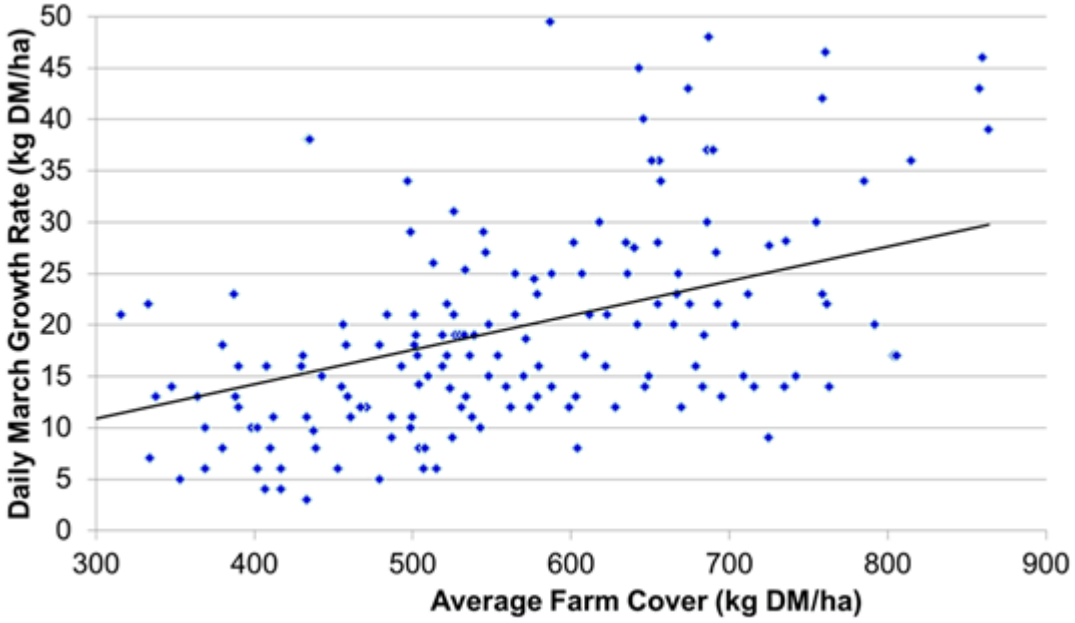

Figure 4. March grass growth increased by 3kg DM/day for every 100kg DM/ha increase in average opening farm cover on Irish dairy farms (PastureBase, 2015).

Average farm cover: *Average opening farm cover for a stocking rate of 2.5 to 3 LU/ha should be 800 to 1000 kg DM/ha. Average farm cover should be 450 kg DM/ha at the beginning of the second rotation in early April.*

4. Spring nitrogen fertiliser

One of the most important factors affecting spring grass growth on Irish dairy farms is the date and quantity of spring N fertiliser application. The application of N in early spring increases grass growth to allow the majority of the nutrient requirements of cows to be met from grazed grass. A number of experiments in Ireland (Murphy, 1977; O'Donovan et al., 2004) have shown responses ≥10 kg DM/kg N applied in spring. Despite the weather conditions in the spring of 2016, early N fertilizer still had a positive effect on spring DM production.

McCarthy (1984) reported that the date in spring at which a given grass yield is obtained could be brought forward by three weeks when N fertiliser was applied at the correct time. Precise prediction of the appropriate N application date is difficult because of variation in soil and air temperatures from year to year (Stevens et al, 1989). Date of N application will also depend on when grass is required and if it can be utilised as grazed grass. Murphy (1977) and O'Donovan et al., (2004) showed that there is considerable variation in the optimum time for applying N but concluded that the optimum date for the southern half of Ireland was usually in mid- to late-January while Stevens et al., (1989) found that early- to mid-February was the optimum time for the midlands and north of Ireland. Van Burg (1968) reported that first N applications in late February result in lower DM production, especially when combined with an early harvest date. For most intensive dairy farms in Ireland the optimum level of N to apply is 30 kg N/ha (23 units/acre) in mid-January to early-February and 56 kg N/ha (46 units/acre) in March, a total of 85 kg N/ha (70 units/acre) by April 1st for early spring grass (Table 3). The opportunity to spread early spring fertiliser cannot be missed, as spring farm workloads increase; farmers should look at the possibility to get contractors to spread spring N fertiliser. In 2016, PBI data found that the majority of farms were applying early spring N fertiliser, with 33 kg/ha (27 units/acre) applied by mid-February, however there is still quite a large variation in quantity with a range of 0 to 65 kg/ha (0 to 52 units/acre). By April 1st PBI farms (n = 65 farms) had on average 110 kg N/ha (88 units/acre) applied, however there was still a large variation between farms, with a range of 64 to 167 kg N/ha (51 to 134 units/acre). This variation can have a large impact on grass DM production in the spring period, farms who applied less than 100 kg N/ha (80 units/acre) grew 24% (275 kg DM/ha) less DM by April 10th, than farms who had applied 100 kg N/ha or more (80 units/acre).

Table 3. Nitrogen fertilizer application plan for the spring period.

Month	Product	Rate	Area
January	Slurry	2500 gal/acre	1/3 of grazing platform (covers <600 kg DM/ha)
January/February	Urea	23 units/acre	2/3 of grazing platform
March	Urea	46 units/acre	Entire grazing platform
February/March	Slurry	2000 gals/acre	1/3 of grazing platform (paddocks that were grazed first)
Total applied N by 1st April		**70 units/acre**	

Spring nitrogen fertiliser: *Target 70 units/acre of nitrogen to be applied by April 1st*

Comparison of urea versus CAN

It is still a good time to look at the differences between calcium ammonium nitrate (CAN 27% N) and urea (46% N), and evaluate which is the most cost-effective to use and when. Urea has the highest N content of all solid nitrogenous fertilisers in common use. More than 90% of world industrial production of urea is destined for use as a nitrogen-release fertiliser; urea is made up of 46% nitrogen, the form of N is Ammonium (NH_4^+). Urea is positively charged, while clay particles are negatively charged, and therefore urea is held by clay particles provided moisture is present. It is readily absorbed by plants, and is the dominant source of N for plant growth. Calcium ammonium nitrate is made up of 27% N, the form of N is 50% nitrate (NO_3) and 50% ammonium.
Once fertiliser N is applied, it is not all taken up at once; it is taken up over a period of 4 to 8 weeks after application. Calcium ammonium nitrate is available immediately for plant growth, whereas urea takes 2/4 days to convert to ammonia, provided moisture is present. Losses of N as volatilised ammonia from urea can occur in dry and warm weather conditions. Rainfall will ensure the urea will

be washed into the soil, where nitrifying bacteria convert it to ammonium-N and the ammonium-N to nitrate, which is then available for uptake by the plant. At higher temperatures and at low levels of rainfall, large amounts of ammonia gas will be lost to the atmosphere; as a result, grass growth response to urea will be below that of CAN. In optimum conditions, the response to urea can significantly outperform CAN (+33%; see Table 4).

Table 4. Relative response (%) of grass growth to application of urea N compared to CAN depending on rainfall and air temperature conditions (values above 100% indicates a grass growth advantage to urea N; valves below 100% indicate a disadvantage to urea N) (Source; Grassland soils and fertiliser; digging out the answer, 2011).

Amount of rain falling in the 3 days after N application	Average air temperature in the 3 days after N application				
	0°C	**5°C**	**10°C**	**15°C**	**20°C**
0 mm	90	84	79	73	68
5 mm	100	95	90	84	78
10 mm	111	106	100	95	90
15 mm	123	117	111	106	100
20 mm	133	128	123	117	111

Best results from urea fertiliser will be obtained when application is followed by approximately 10 mm of rainfall within three days. Obviously, farmers need to be vigilant to avoid heavy rainfall events when targeting N fertiliser application based on weather forecasts, as removals through run-off and leaching must be avoided. Watson et al. (1990) reviewed twenty experiments involving comparison between CAN and urea applied in spring, and concluded that urea produced at least 95% of the response of CAN. Currently, quoted prices for urea are in the region of €223/ton for CAN and €333/ton for urea (CSO, October 2016), which is equivalent to €0.83/kg N for CAN, and €0.72/kg N for urea. Urea is therefore currently 15% cheaper per kg N than CAN. At the current CAN and urea prices, CAN would need to be €195/ton or less to be more cost effective to spread than urea (€333/ton). Therefore, because urea is cheaper than CAN in terms of €/kg N applied, and response rates are similar urea is the more cost-effective fertiliser to apply during the spring or as long as weather conditions allow.

CAN vs. urea: *Urea is the 15% cheaper per kg N applied and should be the choice of fertiliser during the spring period*

5. Poaching damage during periods of inclement weather

A powerful means of increasing the quantity of grazed grass in the animal's diet is by extending the grazing season in spring and autumn (Kennedy et al., 2007). A drawback of earlier turnout and later housing can be the increased risk of poaching damage. A survey carried out Creighton et al (2011) reported that 60% of farmers stated that soil conditions were the most limiting factor in extending the length of the grazing season. Poaching damage is caused from the combined effects of animal, soil, plants and soil moisture content. Poaching damage can cause leaf burial in soil, crushing and bruising of the plants and reductions in both shoot and root growth. Poaching damage also causes increases in unevenness of the soil surface and can often increase soil bulk density (compaction)

(Drewry et al., 2008). As a result subsequent losses in herbage production can often be recorded following poaching damage. Poaching can be divided into different classifications based on cow hoot-print depth; (i) light damage; hoof-print depth 3 – 4 cm, (ii) moderate damage; hoof-print depth 4 – 7 cm and (iii) severe damage; hoof-print depth 7 – 11 cm.
Tùnon et al (2013) quantified the effect of poaching damage on two soil types 1) freely-draining acid-brown-earth and 2) poorly-drained heavy brown-earth of sandy loam texture in Ireland. A severe poaching event in spring on a freely-draining soil (Table 5a) reduced herbage production by 30% in the following grazing rotation, with no effect on herbage production on the little or moderate poaching damage. Cumulative herbage production was not affected by poaching on a freely drained soil. Poaching damage on a poorly-drained soils (Table 5b) resulted in a reduction in herbage production of 21, 69 and 97% at the first grazing after poaching and 31, 52 and 88% at the second grazing after poaching (little, moderate and severe damage, respectively) compared to un-damaged paddocks. Poaching on a poorly drained soil resulted in a 14, 14 and 30% reduction (little, moderate and severe damage, respectively) on cumulative herbage production on soils damaged in the spring.

If there is a reduction in perennial ryegrass tiller density as a result of poaching, herbage mass can be reduced (Nie et al., 2001) and the increased possibility of weed encroachment. In the study reported by Tùnon et al (2013) tiller density was not reduced on the free-draining soil; however on the poorly-drained soil perennial ryegrass tiller density was reduced by 15% as result of poaching, which accounted for the reduction in cumulative herbage production. When paddocks received two poaching-damage events, there was a detrimental effect on herbage production when compared to one (Tùnon et al., 2013). Poorly-drained soils damaged twice resulted in herbage production reductions of 46, 96 and 96% at the first grazing after poaching event (little, moderate and severe damage, respectively) and 83% at the second grazing after poaching event for moderate and severe and 80% at the third grazing for severely damaged paddocks, when compared to un-damaged paddocks. This resulted in a reduction in cumulative herbage production of 22, 22 and 49% for little, moderate and severe damage, respectively, compared to un-damaged paddocks.

The difference in herbage production between the poaching treatments was as a result of time taken for full recovery of production, meaning the number of days taken for damaged paddocks to achieve similar DM yields as un-damaged paddocks. Tùnon et al (2013) reported recovery time ranged from 73 on the once damaged on a free-draining soil to 275 days on the twice damaged on a poorly-drained soil as a result of severe poaching, with once damaged poorly-drained soils intermediate.

Table 5a. Pre-grazing herbage mass (kg DM ha, >4 cm) on paddocks allocated to one of four treading-damage treatments: control (C, no damage), light damage, moderate damage and severe damage in spring, on a freely-draining soil. (Source; Tùnon et al 2013).

		Treatment			
		Kg DM/ha			
	Date	Control	Light	Moderate	Severe
Pre-Experiment	09-Mar	1008	911	917	846
Spring Poaching	17-Mar	-	-	-	-
1	05-May	2295	2404	2243	1629
2	29-May	1176	1320	1369	1342
3	25-Jun	2207	2331	2472	2498
4	22-Jul	1498	1557	1587	1698
5	28-Aug	2035	1984	2156	2148
6	07-Oct	1822	1833	1878	1832
7	10-Nov	454	466	527	493

Table 5b. Pre-grazing herbage mass (kg DM/ha, >4 cm) on paddocks allocated to one of four treading-damage treatments: control (no damage), light damage, moderate damage and severe damage in spring on a poorly drained soil. (Source; Tùnon et al 2013).

		Treatment			
		Kg DM/ha			
	Date	Control	Light	Moderate	Severe
Pre-Experiment	07-Apr	606	545	583	497
Spring Poaching	09-Apr	-	-	-	-
1	05-May	690	546	217	19
2	27-May	1007	694	481	120
3	22-Jun	981	775	778	491
4	22-Jul	556	670	898	709
5	05-Oct	1400	1290	1376	1616

Given the weather condition in spring and autumn, soil conditions be challenging in many parts of the country, making them susceptible to poaching damage. Poaching damage can be minimised by reducing grazing pressure using grazing management techniques such as 'on/off grazing' (Kennedy et al., 2009) during periods of high rainfall.

Poaching damage: *Poaching damage can reduce pre-grazing covers by 30 to 50% the following grazing*

6. Wet weather grazing management

The fear of wet weather can stop farmers turning animals out to grass early in spring. The main criterion for the application of spring grazing is a flexible attitude. Any increase in the proportion of grass in the diet will pay dividends in terms of animal performance (Kennedy et al., 2009) and also spring growth (O'Donovan et al., 2015). On/off grazing has been successfully used on dairy farms to retain animals at pasture during periods of wet weather. It is also used as a strategy for earlier turnout of animals on heavier soil types. On/off grazing is where the animals are turned out to grass with an appetite, they then graze continuously for a fixed period of time, when animals finish grazing

and lie down or walk, they are brought back to a stand-off area or shed. On/off grazing takes advantage of the animal's natural grazing pattern, letting them graze when they choose to graze, i.e. directly after milking. Kennedy et al., (2009) concluded that if access time to pasture is restricted, then the total access time should be 6 hours and that it needs to be split into 2 distinct periods. Kennedy et al., (2009) reported that animals with access to pasture for 6 hours/day divided into 2 × 3 hour intervals after morning and afternoon milking, had similar milk production to animals with full access to pasture. Likewise, animals with 2 × 3 hour access time had 95% of the daily DM intake of animals with full access to pasture. There was no reduction in milk production or loss of body condition score. This minimises soil damage but ensures that grass is being well utilised. Kennedy et al., (2011) reported that when supplementation (access to silage when housed) during on/off grazing is practiced there was no benefit in terms of milk production compared to no access to silage when housed. Sward utilization, however, was reduced from 82% to 67% by adding silage into the animal's diet and grass DM intake was reduced from 12.2 to 9.6 kg/cow/day on 2 × 3 hour with no silage and 2 × 3 hour with access to silage, respectively. If there is sufficient grass available, there is no need to supplement cows with silage when they return indoors.
Early spring grazing and grazing during difficult weather conditions is also facilitated by correct infrastructure such as a good network of farm roadways and multiple access points to paddocks to avoid trampling over the same area multiple times and a good water trough layout to allow the implementation of back fencing/strip grazing. Strip grazing and back fencing are as important during periods of wet weather in autumn as spring.

Wet weather management: *On/off grazing should be practiced during wet weather to reduce poaching damage*

Conclusion

The importance of spring grass in the diet of early lactation animals and its impact on subsequent sward production has previously been shown, and management rules have been developed to assist farmers manage spring grass. There needs to be a renewed focus by farmers on early spring grazing. Spring rotation plan targets are not being met by many farmers, and as a result spring DM production on those farms is below that of farms that are reaching the SRP targets.

Increased focus must be placed on utilising grass early in lactation and trying to stimulate high farm grass growth rates earlier (late February/March). Spreading N to influence spring growth and hitting the grazing targets across the spring period are part of this process. Farm growth rates and average farm cover must to be monitored to ensure that there is sufficient grass available and farm cover remains above 450 kg DM/ha at the beginning of the second rotation in early April.

Flexibility in spring grassland management is required, achieving grazing targets is important, and farmers must avoid poaching damage, as subsequent growth rates will be reduced. Much preparatory work and management must be in place to achieve the benefits of early spring grazing. Autumn and spring pasture management, spring fertilizer application, land type and farm layout all have major implications for the success of spring grazing management.

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Business Planning – Teagasc Expansion Service Perspective.

Patrick Gowing, Teagasc Moorepark

Introduction

A well prepared business plan is crucial to the viability of an expansion plan. While preparing your plan be sure to consider all options but understand the cash costs of each choice you make. In this paper I will focus on three issues that commonly arise when expanding or developing a new dairy farm:

- A key to success on all plans is having the highest genetic merit stock possible. When building your herd there are pros and cons to starting with calves and building up or purchasing heifers at the point of calving. From a cash consumed perspective both will cost the same but there is a critical difference from a cash flow perspective. When considering your initial starting point for your herd, starting from a low base and growing organically can put an increased pressure on cash flow as you will have an increased number of heifers compared to cows on farm.
- Starting with a higher number closer to your final number can match your debt per cow, increase initial turnover and mature the herd faster which will all protect your business in the initial years.
- There is no correct figure for the appropriate debt that a farm can carry per cow. It varies enormously from farm to farm. This is particularly important in expanding herds where output is low because of a large proportion of first and second lactation cows; such farms are unable to support high levels of borrowings. Keeping the borrowings per cow low and over the appropriate term are critically important.

Background

The Teagasc Dairy Expansion service was launched over a year ago to provide a Teagasc consultancy service for new and expanding dairy farmers to support their business plans. I was appointed to deliver the service which is based on proving one to one advice for the individual farmer. I walk the farm and give advice; typically I will focus on the grazing infrastructure and it's design; yard infrastructure, cow flow and parlour location. Afterwards I will prepare a capital budget. When this is completed, I will prepare a detailed 6 year plan to investigate the most viable way to progress the business.

Over the last 12 months more than 100 farmers have employed my services. Based on this experience I will focus on three of the main mistakes that farmers make when developing their farms.

Starting Too Small

Farmers often ask whether it is better to rear heifers from calves or buy in heifers closer to the point of calving. From a business planning point of view they will both cost the same amount of cash to the system however the cash is used on different ways. If rearing heifer calves be sure you have included all costs into your projections.

Heifers are the ultimate cash soakers on farm. The interval between the arrival of a heifer calf and the arrival of the first cheque for her milk is two years. What's more, it's not until half way through

her second lactation that she actually recoups her costs. The costs incurred by 600 spring calving dairy farms in the glanbia region for 2015 are presented in the following table.

Table 1. Fixed and variable costs incurred rearing replacement heifers on spring calving dairy farms in the glanbia region.

	Costs per LU
Variable costs	
Feed	€83
Fertiliser	€132
AI	€16
Vet	€53
Contractor	€94
Total variable costs	€440
Total fixed costs	€209
Total variable & fixed costs	€649
Land opportunity cost	€170[2]
Own labour cost	€209[3]
Total costs incurred per LU	€1,028

The data in Table 1 show that the total cost of rearing a replacement heifer to calving at 2 years of age is €1,028. This included non-cash costs such as depreciation and opportunity costs for owned land and labour and for the heifer herself. The actual cash costs over the two year period for the farms were €600 per heifer reared. Imagine carrying this cost while building numbers to expand herd size?

To some starting at a reduced scale initially and growing into a larger herd over time is the preferred option. It gives the farm an opportunity to learn with smaller numbers while growing into a larger herd. While it may be the better option for some, it puts increased pressure on the cash flow of the business. The main reason for this is because of the proportion of replacement heifers to milking cows on farm. Or simply put the proportion of 'cash soakers' to 'cash makers'. Typically on an established farm with a 20% replacement rate there will be 80% cows as a % of total livestock units (LU) on the farm. In effect this means the 80% pays for the 100%. In expanding or new entrant farms, this figure can drop dramatically and put strain on the business cash flow.

In the majority of expansion plans that I encounter, the parlour, holding yard, bulk tank and slurry storage are often developed for the final number of cows rather than some initial or intermediate number. Thus the repayments are based on the final herd size increasing the cash flow pressure on the farm.

To protect the cash flow of the business it is often a more viable plan to front load the cow numbers to increase the farm output initially. While starting with a larger herd of cows may require additional investment, it improves the cash flow as you have more cows as a percentage of total stock. It also helps you to achieve your desired number of cows faster and will spread the investment cost per

[2] Based on a land charge of €500/ha; stocking rate of 2.2 LU/ha and 75% of the land used by the heifers owned.

[3] Based on a labour charge of €220 (19 hours @ €12/hr) *less* €19/LU hired labour charge from Profit Monitor

cow protecting the cash flow of the business when it's most vulnerable – in the initial years of the conversion.

Consider the following, a new entrant farmer planning on milking 275 cows. They have the stock on hand to purchase 280 dairy Livestock units. They have 2 options. One is to start with a reduced scale and purchase replacements to allow for further expansion in the coming years or they can invest in extra cows and start at their planned cow numbers.

An analysis of profit monitors from the Glanbia region shows it costs on average €1,000 to carry a cow for the year. As we have seen from the above section heifers also cost over €1,000. Therefore for the example below we have used a cost of €1,000/LU on farm. There can be a large variance from farm to farm on the cost per LU.

Table 1. Growing herd.

Year	**1**	**2**	**3**	**4**	**5**
Cows	150	230	275	275	275
Heifer LU's	130	69	50	50	50
Cows%/total LU	**54%**	**76%**	**80%**	**80%**	**80%**
Milk sales (Litres/cow)	4000	4300	4500	4850	5000
Cash output/l	33c/l	33c/l	33c/l	33c/l	33c/l
Cash income	€198,000	€326,370	€408,000	€440,000	€453,000
Total LU	280	299	325	325	325
Total Costs	€280,000	€299,000	€325,000	€325,000	€325,000
Net Cash flow	**-€82,000**	**€27,370**	**€83,000**	**€115,000**	**€128,000**
Cumulative cash					**€271,370**

As shown in Table 1, starting at a lower scale and growing organically to 275 results in a negative in cash flow in year 1 as the milk volume is reduced due to the parity structure of the herd and also the lower number and proportion of cows. If the same farm had started at the target cow numbers and using the same milk yield and milk price per cow (as seen in Table 2).

Table 2. Starting at 275 cows.

Year	**1**	**2**	**3**	**4**	**5**
Cows	275	250	275	275	275
Heifer LU's	25	60	50	50	50
Cows%/total LU	**91%**	**80.6%**	**80%**	**80%**	**80%**
Milk sales (Litres/cow)	4000	4300	4500	4850	5000
Cash output/l	33c/l	33c/l	33c/l	33c/l	33c/l
Cash income	€363,000	€354,000	€408,000	€440,000	€453,000
Total LU	300	310	325	325	325
Total Costs	€300,000	€310,000	€325,000	€325,000	€325,000
Net Cash flow	**€63,000**	**€44,000**	**€83,000**	**€115,000**	**€128,000**
Cumulative cash					**€433,000**

Note: Costs per LU are the same as there is similar stock on farm in both scenarios so it is assumed all capital is invested.

Cow numbers reduce in year 2 as it has none of its own replacements in that year. This example has a positive cash flow in all years and protects the business while option 1 was vulnerable for the first 3 years.

In Table 2 the farms starts with extra cows. If the farm has to borrow or lease for the additional cows it would cost an annual charge of €229/cow per year over 7 years at 5% at a purchase price of €1,350 per cow

There are an extra 20 cows in Table 2. If they were financed for it would cost an €4,580 per year, or €22,900 over the 5 years represented in Table 2. This will still leave the farm in a far stronger position from a cashflow point of view.

Having a low percentage of cows to total livestock on farm will negatively impact on cash flow, also seen in dairy herds with poor fertility where a higher replacement rate is required to even maintain herd size.

The optimum starting cow number on farm will vary from farm to farm and will depend on the capital available, banking proposal and other sources of income to support the farm in the early years. But starting with a low proportion of cows will impact on your cash flow in the establishment phase.

Grazing infrastructure capital costs

When calculating the capital required for a development plan, most farmers can easily identify the big ticket items such as the milking parlour, cubicle sheds and slurry storage facilities required. While all are needed in one shape or form, the grazing infrastructure is often overlooked completely or poorly budgeted for. This often results in the farm developing the grazing platform out of cash flow. As outlined in Tables 1 and 2, conversion farms do not have large surpluses of cash for capital reinvestment in the early years – the same applies on expanding farms. Without a properly developed grazing infrastructure it is unlikely the farm will achieve the targets set out on the business plan. The capital costs incurred on grazing infrastructure during the conversion of the typical farm are presented in Table 3.

Table 3. Grazing infrastructural costs typically incurred during the conversion of a hectare of land from drystock to dairying[4].

Grazing	Amount	Unit Cost	Total
Lime (t/Ha)	5	€25	€125
P&K (per Ha)	5	€20	€100
Reseeding (€/Ha)	1	€667	€667
New farm road (€/m)	25	€20	€500
Fencing (€/m)	212	€1.1	€233
Water (€/cow)	2.5	€100	€250
Drainage (€/acre)			
Total (Ha)			**€1,875**

The total cost per hectare for converting the typical drystock hectare to dairying is approximately €1,875 per hectare as detailed in Table 3. So the potential cost of converting a 40 hectare grazing platform from scratch is €75,000. Or €750/cow based at 2.5cows/Ha. If this not accounted for in your capital budget again it can put pressure on your cash flow in the initial years.

Depending on your current infrastructure you may not have to invest all initially but it is essential to have your soil indexes, pH and grass quality right. As a rule, of thumb I recommend each farmer to have at least one acre of high quality grass per cow they plan to milk.

Borrowings per cow

A common question I'm often asked is how much can I borrow per cow or what is a safe level to borrow. In short there is no answer and depends on a lot of variables on farm. The key drivers to how much you can borrow are:

- How efficient you are or plan to be;
- Your drawings requirement; and,
- The structure of the debt.

If you operate an inefficient farm, i.e. a farm that is not retaining cash in the business, you are very limited in what you can borrow. The question here is not how much I can borrow but how do I improve my efficiency?

Likewise having a large drawing requirement reduces the amount of available cash remaining for repayments. A major issue on farms from a business planning perspective is that many farmers do not know how much cash their household requires either currently or in the future. Using a "guessed" drawings figure on a business plan means the plan is wrong before you start.

In an expanding or new entrant farm the level of borrowings per cow and the term are very important. Irish farmers have a tendency to pay down loans too quickly, which will have an impact on cash flow. The data in Table 4 shows the repayment requirement (c/litre) for varying term lengths and milk yield per cow.

[4] The initial cost of converting a hectare of land assuming no current infrastructure, soil index 1 for P and K and a 5 t/ha lime deficit.

Table 4. Effect of term and milk yield per cow on repayment commitments[5].

Debt per cow	€3,000	€3,000	€3,000
Term	5	10	15
€/cow/year repayments	679	382	285
Litres/cow	c/l		
4000	16.98	9.55	7.13
5000	13.58	7.64	5.70
6000	11.32	6.37	4.75

As you can see above short term debt is extremely costly at lower milk yields and especially with shorter term loans. Such low yields are more likely to prevail when herds are younger which often happens during periods of rapid expansion on with new conversions. It is critically important to structure your debt over the appropriate period. The interaction between level of debt and milk yield are presented in Table 5.

Table 5: Repayment (c/litre) for different levels of debt and milk yield over a 10 year repayment period.

Debt per cow	€3,000	€4,500	€6,000
Annual repayment	382	573	764
Milk yield			
4,000 litres/cow	9.55	14.32	19.10
5,000 litres/cow	7.64	11.46	15.28
6,000 litres/cow	6.36	9.55	12.73

High debt levels per cow are unsustainable. Make sure the capital you invest will increase performance and not just increase costs!

When investing, make sure you are investing in items that will give you the quickest return on your investment. Stock and grass will always give you the highest return. If you don't invest in having quality stock and grass then you are putting the business plan in jeopardy.

[5] Assumes a 5% interest rate in all cases

Living with price volatility – the pig farmer perspective

Paul Tully, Ballinakill, Co. Laois

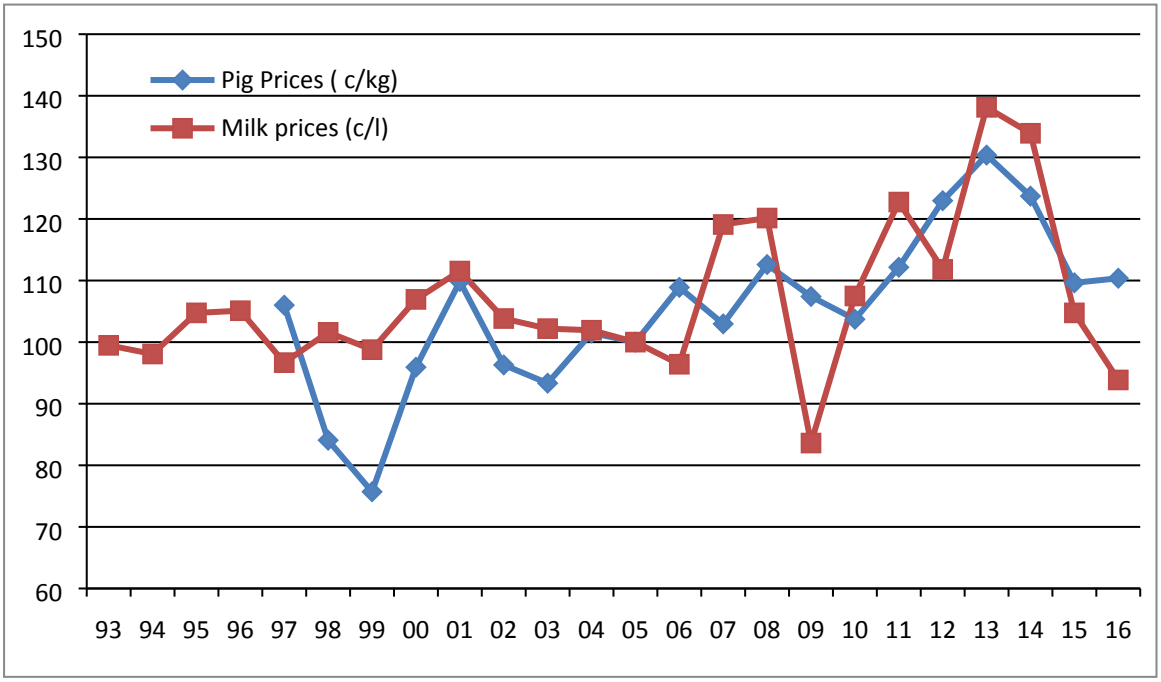
Background

I come from a farming background in Ballyjamesduff in County Cavan. Completing the Farm Apprenticeship Scheme in 1989, I returned to work as assistant manager on the pig farm near Ballinakill that I worked on during the course. I've outlined by progression through the pig industry in the Table below.

Year	Event	Labour employed
1989	Completed Farm Apprenticeship Scheme	
1989-1993 **1993-1999**	Worked as farm assistant manager on FAB host farm Rented 200 sow partially finishing unit Built finishing to increase weights at sale Selling 350,000 kg meat/year	2 ½ men ½ truck
2000-2003	Purchased pig farm Improving efficiencies – more pigs per sow produced Better genetics largely responsible for increased litter size Better husbandry resulted in lower mortality More pigs needed more accommodation Older buildings were more labour intensive and had to be modernised. Built more finishing houses to house extra production and further increase sale weight. By end of period Farming over 300 sows Selling 800,000 kg meat/year	2 ½ men ½ truck
2004-	Bought 630 sow farm producing 900,000 kg meat/year	5 men ½ truck
	Modernised buildings Built more accommodation Better genetics Better veterinary focus Independent nutritional advice + control/honesty on diets / quality	
Present	1,100 sows Selling 2.75m tonnes of meat / year	7 men 1 truck

Being involved in the pig industry for almost three decades, price volatility is nothing new to me. The progress made has been achieved against a backdrop of a highly volatile pig price detailed in Figure 1.

Figure 1. Pig and milk prices over the past 20 years[6].



What's also apparent from Figure 1 is the relatively stable milk price dairy farmers obtained until 2006. So the volatility you're now experiencing is similar to the volatility I've faced for the whole of my working career.

To insulate myself from such volatility I've focused on cost of production while achieving more output from two sources – efficiency improvement and production expansion as detailed in the following table.

Efficiency improvements	Production expansion
Improved genetics	More sows
Husbandry	More pigs per sow
Feed	Heavier slaughter weights
Veterinary	
Buildings	

Efficiency improvements and increased production have both played their part in increasing overall output and reducing costs more and more. This in turn has resulted in a more robust and sustainable business position for me. This means that the business is generating profit for three purposes:

1. Living expenses / drawings;
2. Meeting bank principle repayments;
3. Generating a cash surplus that can part fund future borrowings for any new opportunities.

I can now handle volatility and essential maintenance requirements.

[6] Pig prices from a group of 20 pig producers; Milk prices from CSO database, actual price paid *(2016 estimated)*. Both pig and milk prices indexed to 2005 = 100.

IF I were a dairy farmer!!!

I would want to identify what is the maximum output I can produce from my present land base and facilities through investment and improvement in the following areas

1. **Optimise grassland production.** I'd make sure that I had the right sward / quality of pasture – reseeded and fertilised.
2. **Stocking rate**. I'd farm the right number of cows for the area farmed. I'd maximise grass grown and complement with concentrates. Is grass produced on purchased land delivering energy at a competitive cost?
3. **Genetics.** One hundred good cows will produce more milk solids than 100 bad cows and dilute costs more as they do it. My pigs use 0.36kgs less feed to put on 1kg liveweight now than 10 years ago!
4. **Diet.** Don't rely on the 'a la carte'. Its focus is probably on making a profit for the co-op or miller rather than for the farmer. Test your supplements and finished feeds and share the results with the miller, 15% tolerance allowed from the spec on the docket - get independent nutritional advice.
5. **Machinery Shed.** I'd sell/liquidate the implements only used seasonally, and use the proceeds to put in a slatted tank, buy more stock and import forage/concentrates to increase my output and further dilute my costs. Might even have enough left over to build the extension the better half harps about every night at about 11pm when I'm fit to fall over!! Point being, the contractor is diluting his depreciation more than us farmers could ever dream of. Put something in the shed that doesn't depreciate!
6. **Finance.** Establish the correct financial structure for your farm. Capital expenditure should be underpinned by loans, Minimise short term/long term credit. Shift debt to the bank and don't compromise your buying power with a complex dragged out payment plan with your supplier of inputs.
7. **Lifestyle.** The farming business like any other business needs to be able to reward with time out with family or hobbies and give a competitive income without being 24/7. What we're all doing here today is so necessary, a day off, sharing problems/solutions, networking / benchmarking and making new friends.
8. **Positive Thinking.** This worked much better for me when I tried to do as many of the above as possible. I had to identify and square up to the elephant in the room!

Living with price volatility – the dairy farmer perspective

Olin Greenan, Dairy Farmer, South Auckland, New Zealand

Introduction

My wife Anna and I, together with our two young sons Jack (3 years) and Noah (1 year) are currently sharemilking 480 cows in Clevedon, South Auckland, New Zealand. I am originally from Newbliss County Monaghan but have lived in New Zealand (NZ) since 2001. I would like to share my experiences of how I have progressed through the New Zealand Dairy Industry and key factors of our success to date.

Background

I grew up on a small dairy farm in Newbliss Co Monaghan. After finishing secondary school, I travelled to the UK to study a BSc Honours in Agriculture at Writtle Agricultural College. Following graduation in 2001, a visit to NZ was on my 'to do' list, and over 15 years later, I am still there.

Since arriving in NZ I have worked on numerous dairy farms, steadily progressing through their recognisable career pathway. I met Anna in 2006 and together we laid plans to achieve farm ownership. Anna is a qualified dietitian and worked off farm full time before the birth of our children.

New Zealand Career Pathway:

- **Farm Assistant**, 2 ½ years, 550 cows, Bird Farm, Gordonton;
- **Sole Charge Management**, 2 years, 260 cows, Hunt Farm, Taupiri;
- **Contract Milking,** 3 years, 550 cows, Bird Farm, Gordonton;
- **50/50 sharemilking,** 4 years, 300 cows, Van de Pas Farm, Eureka;
- **50/50 sharemilking,** current, 480 cows, Meiklejohn Farm, Clevedon.

Our Ingredients for Success

Passion

I strongly believe that having a passion for what you do helps you to succeed. I am very lucky that from an early age, I have loved all things farming. This passion has driven me to always aim high. In 2008, I won the New Zealand Dairy Industry Awards Farm Manager of The Year. This opened doors for our farming career pathway and was also a massive confidence boost for me.

Every day, aspects of my job allow me to keep my passion alive. It helps me stay positive when times are tough and I enjoy encouraging others to pursue farming as a career. I am involved in the industry at a number of levels and work part time as a dairy tutor. I realise the importance of being a good role model, as a parent and as a progressive dairy farmer.

People

We have a strong focus on maintaining and building relationships with the people involved in our business, especially our staff, who we realise are an integral part of our team.

Below outlines key aspects of our approach to staff management:

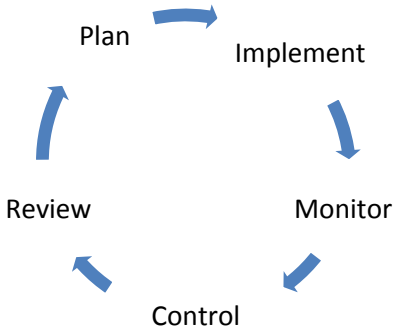
- Formal recruitment and orientation;
- We share our values, goals and philosophy with our team and regularly refer to these;
- Communication is key;
- Praise and reward;
- Annual performance appraisals (bi-annual where required);
- Delegate and give ownership;
- Train, coach and mentor (the 'why' is as important as the 'how').

Dealing with other key stakeholders in our business (such as bank manager, accountant, farm owner, reps etc.) requires great communication and it is crucial to invest time maintaining and nourishing these relationships. Examples below of how we strive to achieve this:

- Building a rapport is crucial;
- Ensure fair outcome for both parties (win-win);
- Always remember you have two ears and only one mouth (listen carefully);

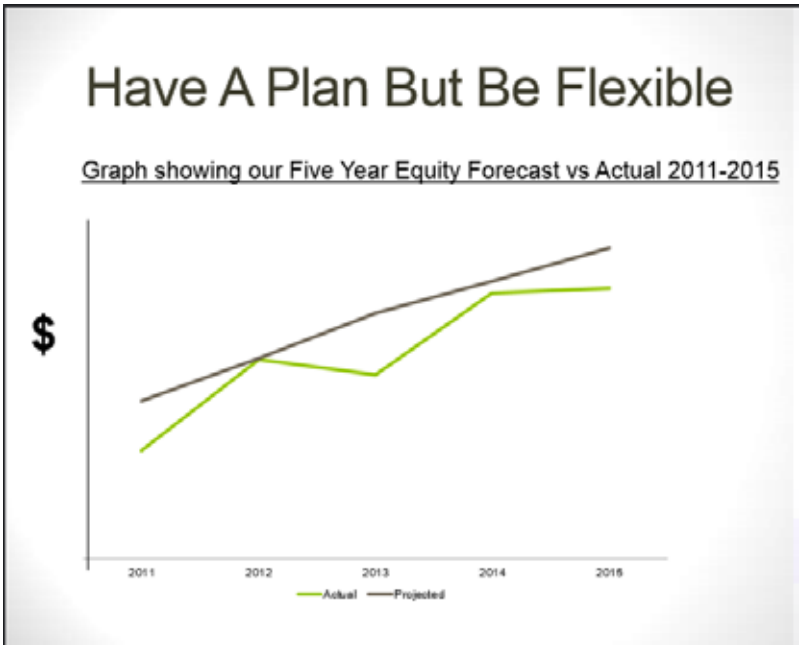
- Put yourself in their shoes and look at it from their angle;
- Remove emotion and use facts;
- Have a plan A and a plan B;
- Keep yourself and other parties honest.

Planning



Strategic Planning has played an important role in our journey to date. In 2010, Anna and I attended a Dairy NZ course called 'Mark and Measure'. This is a business strategy seminar, with practical, relevant information and advice to help each individual/partnership form clear business and personal goals. We walked away from this course with a firm ten year plan to reach farm ownership, while also well aware of the challenges ahead in achieving this. We would strongly recommend undertaking such a course as we found it invaluable and hugely motivating.

Farming is a long term game and you have to be prepared for the highs and lows. Having a long term plan helps take stock to evaluate where you are.



Planning in our business can be broken down into three key areas:

- Business and Financial Planning;
- Work Life Balance Planning;
- Farm Systems Planning.

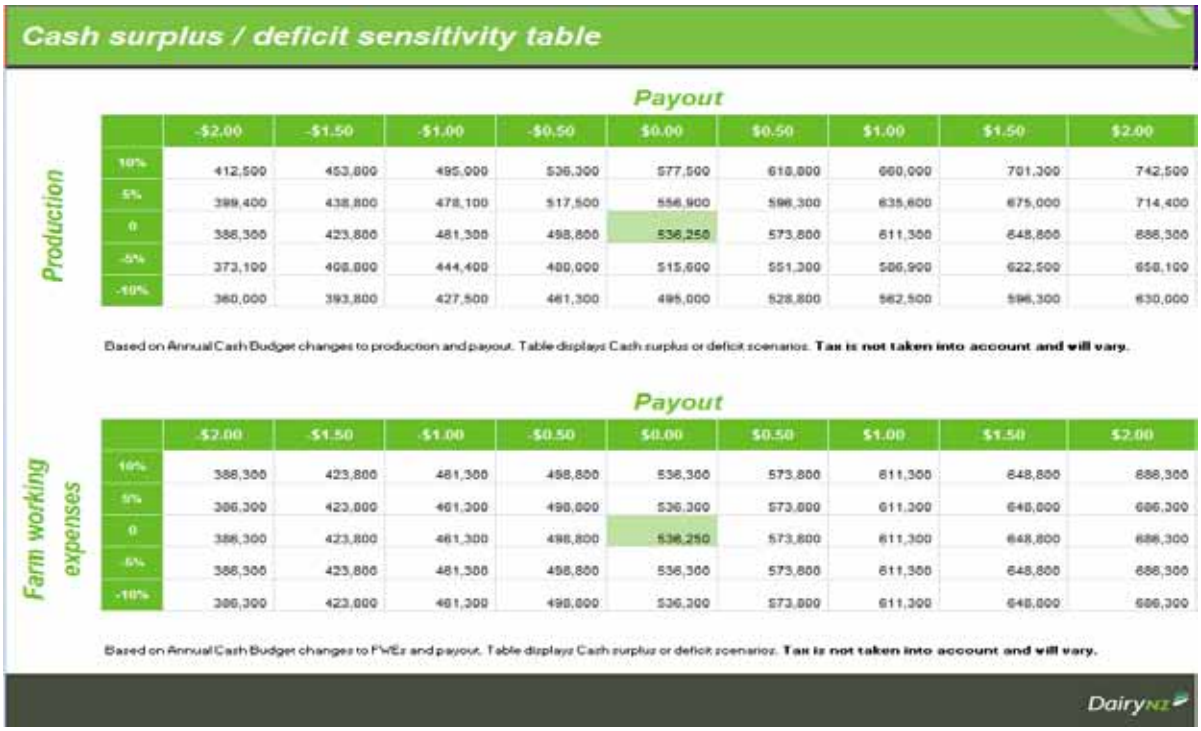
Business and Financial Planning

Having a good level of financial literacy is very important. A large portion of my time is spent focusing on this area. Good preparation in the financial aspects will help counteract volatility. Our own sharemilking business is very prone to volatility from a number of different sources:

Milk Price	Cow Prices
Interest Rates	Weather

These volatile aspects make planning prudent. In simple terms, it's recognising things that you have control of and concentrating on them. By doing this, you further insulate yourself from external variables. For example, achieving a low cost of production allows us to weather the risk of fluctuating milk prices. I tend not to spend too much time on predicting a milk price as this really is a massive guessing game. Instead, I focus on cost control and optimum productivity within the farm gate. Having a basic sensitivity analysis allows for a snap shot look at how well your business can cope with reduced milk price, increased costs or reduced production. It also serves useful in a positive sense as can indicate opportunities that may arise if all of these factors improve.

The data in the figure above shows how much NZ milk price has changed throughout seasons highlighting the fact that it's a guessing game



Cash surplus / deficit sensitivity table

Payout

Production	-$2.00	-$1.50	-$1.00	-$0.50	$0.00	$0.50	$1.00	$1.50	$2.00
10%	412,500	453,800	495,000	536,300	577,500	618,800	660,000	701,300	742,500
5%	389,400	438,800	478,100	517,500	556,900	596,300	635,600	675,000	714,400
0	388,300	423,800	461,300	498,800	536,250	573,800	611,300	648,800	686,300
-5%	373,100	408,800	444,400	480,000	515,600	551,300	586,900	622,500	658,100
-10%	360,000	393,800	427,500	461,300	495,000	528,800	562,500	596,300	630,000

Based on Annual Cash Budget changes to production and payout. Table displays Cash surplus or deficit scenarios. **Tax is not taken into account and will vary.**

Payout

Farm working expenses	-$2.00	-$1.50	-$1.00	-$0.50	$0.00	$0.50	$1.00	$1.50	$2.00
10%	388,300	423,800	461,300	498,800	536,300	573,800	611,300	648,800	686,300
5%	386,300	423,800	461,300	498,800	536,300	573,800	611,300	648,800	686,300
0	388,300	423,800	461,300	498,800	536,250	573,800	611,300	648,800	686,300
-5%	388,300	423,800	461,300	498,800	536,300	573,800	611,300	648,800	686,300
-10%	386,300	423,800	461,300	498,800	536,200	573,800	611,300	648,800	686,300

Based on Annual Cash Budget changes to FWEs and payout. Table displays Cash surplus or deficit scenarios. **Tax is not taken into account and will vary.**

DairyNZ

The figure above shows an example of a Dairy NZ Sensitivity table.

Important Financial Documents Used

- Annual Cash Flow Budget;
- Actual vs. Budget (updated monthly) – variance reports;
- Profit and Loss Report;
- Balance Sheet / End of Year Statement of Position;
- Benchmark data and multiyear summary.

The key thing is to keep your cash flow budget as a fluid and live document. It needs to be updated regularly as things change. This gives you more power, effectively having your finger on the pulse at all times. Being proactive with this not only helps your business but also helps build confidence with your financers. It will provide detailed information for seasonal finance requirements and outline any tax commitments and how they will be funded. Loan repayments can be tailored to your cash flow also.

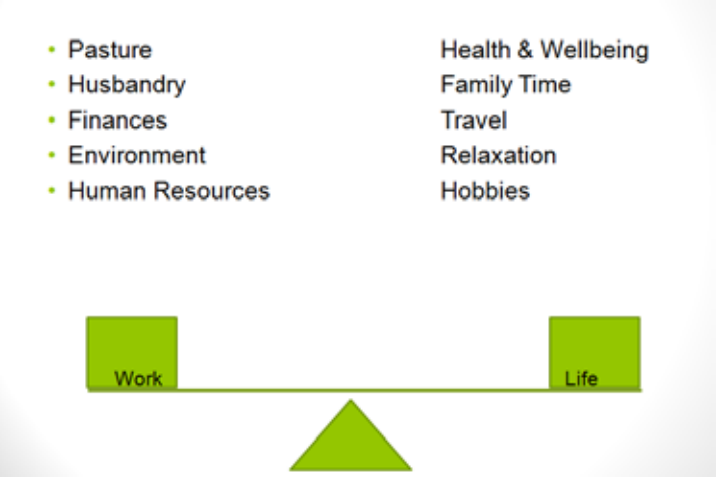
A Profit and Loss report can be useful for tax planning and also drive useful benchmarking data. Benchmarking is a very powerful tool which we use to compare how we are performing at a regional and national level. I would strongly encourage everyone to contribute data for benchmarking. It can be fully anonymous and the more data, the more useful it becomes.

It is important to analyse your balance sheet annually as this will highlight movement in net worth.

Goals and targets should be set and reviewed annually. Setting the budget is the easy part, implementing and sticking to it is where the main challenge lies. It is quite easy to get persuaded by powerful sales people, but with a firm plan laid out, you should be less likely to 'give in to pressure'. There are always factors changing within farming (milk price, weather, cost of supplements etc) and it is important to have a level of flexibility provided the overall bottom line doesn't alter too much.

Spending time researching prices for inputs can be useful and it's a balancing act in getting value for money, but at the same time ensuring you are supporting local business as we both need each other. In this instance, keeping everyone honest it the best move.

Work Life Balance Planning



There is no denying the fact that running a busy farm and striving to maintain a good balanced lifestyle is a challenge. As a parent of two young boys, many have reminded me to cherish the moments when they are young as it passes by very quickly. It is very important not to take those nearest and dearest to you for granted. I am extremely lucky to have Anna as a very supportive wife and together we work hard to ensure our journey through life can be enjoyable whilst at the same time maintaining the focus on our goal of farm ownership. Yes there are sacrifices to be made in the quest for any major goal, but it is important to enjoy the moment as well. I am aware this all sounds very clichéd and I would be lying if I said we don't struggle to find the right balance at times.

There are a number of things we do in our business in an effort to try and achieve "balance":

- Recruiting the right people: it's important that you have the confidence to leave the farm in their hands in your absence;
- Have systems on farm in place which creates accountability and efficiencies;
- Flexible roster and plan holidays in advance;
- Ensure an adequate level of relief milking is budgeted for;
- Keep an eye on the big picture;
- Have off farm interests.

Farm Systems Planning

It is very important to be clear about what system you are going to farm. This needs to be documented and adhered to. Below is a list of our annual targets and objectives. It takes time to find the perfect recipe. Bouncing ideas off other farmers has been very useful as well as uptake of knowledge from discussion groups.

- Grow and utilise pasture efficiently (14 tonnes DM/ha);
- Use home grown crops to counter act dry summers;
- Only use supplements in times of genuine feed deficit <450kgs DM/cow;

- Convert grass into milk as cheaply and efficiently as possible: Farm Working Expenses (FWE) <NZ$3.50/kg MS;
- Aim to achieve FWE within top 20% of New Zealand Farmers (use FWE rather than production per cow as KPI);
- Aim to achieve cow fertility and Somatic Cell Count levels within top 20% nationwide >78% six week In Calf Rate, Somatic Cell Count < 120,000;
- Use free cash to reduce debt and fund a comfortable lifestyle;
- Be caretakers for our land and look after our environment;
- Support staff and help their development.

Persistency

I have seen significant changes within the New Zealand dairy industry since I arrived over fifteen years ago. Historically New Zealand, with its temperate climate, focused solely on low cost pastoral farming. Improved commodity prices since the mid 2000's has led to a number of farmers pursuing additional production. Farmers started to become more production orientated, losing sight of the many fundamentals that had helped them become so resilient in years gone by.

Challenging drier summers led to the increased uptake of bought in supplementary feeding. Farmers noticed increases in production and slowly started to drift towards a higher input system. Many of these systems demanded capital investments in feeding equipment and facilities.

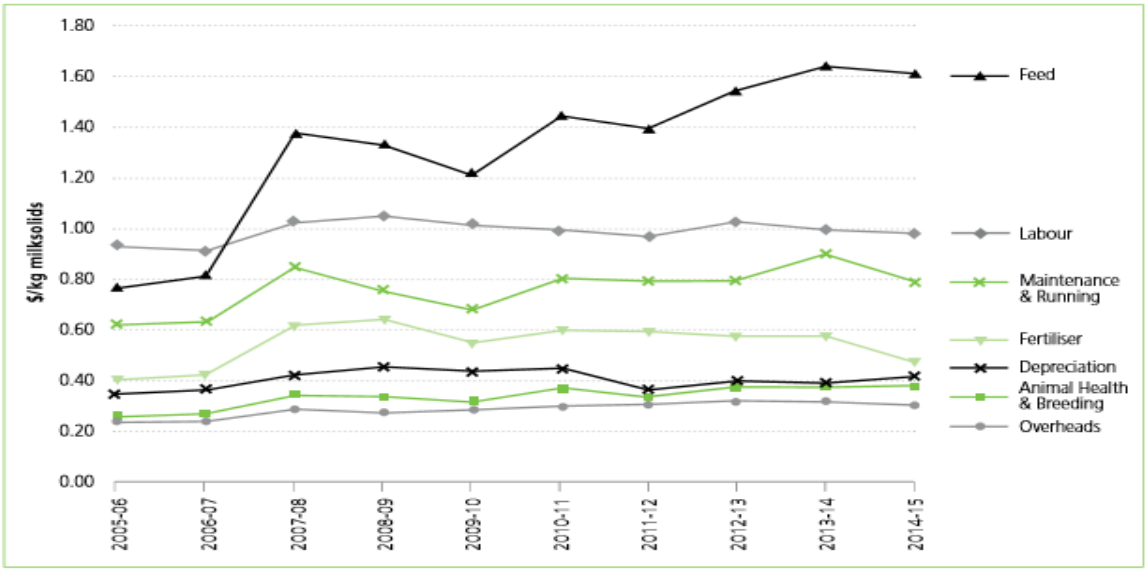
Through time, cost structures crept up whilst the milk price was still favourable. This also fueled greater demand on land and many became further indebted by buying one or more extra farms.

In the space of less than ten years, farm working expenses and debt servicing requirements increased therefore leading to an increase in the need for a higher break even milk price.

The past two seasons of reduced milk prices, has put a lot of pressure on a number of farms and in some cases farmers have had to re finance to keep going, only adding to their problems.

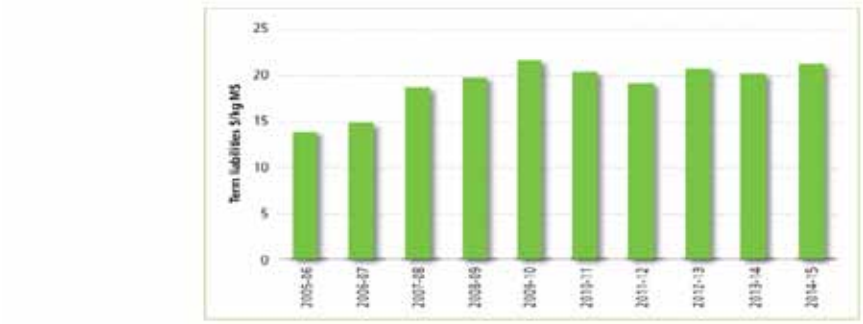
Despite the temptations of increasing milk prices, we stuck to our guns and never drifted away from our low input system.

When the down turn came we never had to cut anything significant out of our inputs and still achieved the same physical results. I believe there is huge value in this for our business as we have a sustainable system which can still break even in low milk price years. Going forward, we have a model that I know will work for farm ownership with the upside of generating surplus cash in high milk price years.



DairyNZ Economic Survey 2014-15

The figure above shows the national trends in costs of production and highlights rising feed costs since 2006-2007.



The figure above shows the national trend in Closing Term Liabilities (NZ$ per kg MS). How did we manage to 'stick to our guns' and not follow the crowd?

- Believe in research: I am a firm believer in research data around the correlation between profit and pasture utilised.
- Have faith in your own ability: whilst being surrounded by farmers who increased supplement usage, my gut feeling told me what I was doing was right. The more times you get it right, the easier it becomes.
- Our system suited the lifestyle we wanted: farms using a lot of supplement generally create a bigger workload, increased complexity, invested capital and depreciation.
- Having financial literacy: the ability to financially critique your own and other systems.

Final Messages

Spend time to identify the core objectives of your business: convert as much pasture to milk as cheaply as possible and use the surplus cash wisely. Devote time to your strategy.

Recognise the competitive advantage in your business and maximise it.

Look after yourself, cherish family and friends and farm safely

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