Irish Grassland Association

Dairy Information Booklet

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How much do we need to do?

David Kerr, Ross, Ballyfin, Co. Laois

Background

This paper is written in the context of a circa 50 % increase in milk production in Ireland since quota abolition. This has led to an increase in the average herd size and a resulting demand for greater labour requirements on many dairy farms. In 2007 I completed a Nuffield Scholarship, entitled "*Transition to scale, using pastoral dairy farming systems*". A chapter of this report addressed the labour requirements of expanding dairy farms. In the ensuing decade our farm has moved from milking 42 dairy cows with drystock to milking 155 dairy cows, without employing any full time paid labour.

I am married to Yvonne and we have 4 children aged between 17 and 23. My father George is still active, not in a physical sense but can oversee operations while I am away and this has to be acknowledged.

Farm statistics

- 64 Hectares
- Grass grown: 14 tonne DM/ha
- 2.6 cows per hectare
- Herd EBI 140 (65 % crossbred)
- 493 kg MS/cow delivered (1281 kg MS/ farm hectare)
- 550 kg meal fed/cow
- Six-week calving rate: 90%
- Average milk price 2017 42 c/litre (estimated at 4.90 % fat, 3.88% protein)
- A small rare breed sheep flock is also kept on farm.

Conclusions of Nuffield study

In 2006 I spent a month travelling around New Zealand, meeting dairy farmers, looking at their infrastructure and listening to their observations. I was struck at the time that labour on these farms were not actually very busy between milking once calving and breeding seasons were completed. A lot of machinery operations were contracted out and practically all replacement rearing was also contracted at that stage. It has to be said that this was before the significant spike in milk prices which seemed to have increased supplementation and complicated systems.

Some observations at that time:

1. Simple grass based systems reduce labour requirements;
2. The introduction of supplements can be profitable with high milk prices but they demand more management time and are less easily understood by staff;
3. Fertile cows allow concentrated periods for calving and mating with plenty of time to recover between these periods;
4. Cow flow through yards, milking parlours and around farms did not require huge investment but allowed ease of management of larger herds of cows;
5. Larger herds with greater staffing requirements seemed to work better because of peer pressure relating to completion of tasks;
6. Paid labour rarely had the same pride in performance as owner operators;
7. One third of Irish dairy farmers' time was spent milking cows so improvements in this area had greatest effect on labour efficiency.

I recommended at that time that 160 cows per labour unit with the above management practices and the use of casual labour at calving with relief milking was a viable model for Irish dairy farmers in the medium term.

Home Farm development timeline

Year	**Stock**	
2006	42 cows, 65 calves, 65 1 to 2 year olds, 100 sheep	6 unit herringbone
2007	71 cows,70 calves, 20 repl. heifers, 25 sheep	
2008	86 cows, 40 calves, 35 heifers, 25 sheep	Built 22 unit herringbone, collecting yard and lagoon
2009	92 cows, 50 calves, 25 sheep, repl. heifers contract reared	Built 40 cow kennels
2010	107 cows, 50 calves, 25 sheep	Built 30 cow kennels
2011	119 cows, 50 calves, 25 sheep	Purchased 30 acres of land across road
2012	107 cows 60 calves, 25 sheep, repl. heifers back home in June	
2013	130 cows, 50 calves, 25 sheep	
2014	140 cows, 50 calves, 25 sheep	Built 60 cow kennels and feeding area
2015	150 cows, 25 sheep, calves contract reared	
2016	155 cows, 25 sheep	
2017	155 cows, 25 sheep	

We started availing of students from Switzerland and Holland in 2006 and they have been a constant with the exception of one year. They stay for approx. 10 weeks from late January to early April. We strongly encourage them to travel around Ireland for a week before they go home and provide them with a car if necessary. Many of these students have returned to visit in subsequent years.

The only investments in machinery over this period have been an agitator for the lagoon in conjunction with a neighbour and a new yard scraper.

The only investment in automation has been an auto drafting system in conjunction with the milking parlour which is a no frills 22 unit herringbone built in 2008.

Grassland management

We have been measuring grass for over 20 years but it was the advent of the Agri Net programme that really increased the accuracy of the decision making. The farm is walked twice weekly during periods of rapid growth and less often during autumn and winter. So what has this got to do with labour efficiency?

It is absolutely critical that we have a cover of 950 plus on the farm at the start of calving so as to get cows to grass straight away and out of yards with associated work and health issues i.e. mastitis. We aim to graze cows on the driest part of the farm for weeks 2 and 3 of calving which is the busiest time so that there is little chance of weather related issues affecting us at this time. This land is across a public road and cows are milked OAD at this time.

We aim to graze all the farm, including silage ground twice before true surpluses appear, again to maximise grass in the diet in this period. One spring the silage ground was grazed 3 times due to poor growth. Silage is cut in early June and late July to introduce after grass quickly as growth slows in the autumn.

- During the summer period the grass wedge determines whether surpluses need to be removed or supplement introduced. Demand is rarely over 60 kg DM/ha at this time so usually we don't need to feed meal except to prevent tetany in May. Surpluses are taken as bales quickly, which has practically eliminated topping which would have been commonplace 10 years ago. The downside of this seems to be a greater demand for potash.

Because we own a fair share of wet land, we target a maximum average farm cover of 1000 kg DM/ha in the autumn and keep silage out of the diet for as long as possible. We find that the introduction of silage reduces utilisation of pasture on our farm.

Cows were fully housed in early November last year which was the earliest in over 20 years but we were happy to do so at a cover of 650 kg DM/ha, knowing that the farm is in a good growing state to hit target opening covers this spring. Grass

measurement provides information to aid decision making and reduce the possibility of introducing forage supplementation which increases the workload.

The farm is consistently growing between 13.5 and 14 tonnes of grass dry matter per hectare. Stocked at 2.6 LU/ha and allowing for half a ton of meal fed per cow, it is a relatively simple system. Stocking higher than this just increases the need for forage supplementation at the shoulders with increased demand on labour.

My point is to match your stocking rate to what your farm can grow.

Cow breeding and calf rearing

With a very compact calving pattern, very few cows calve in April and if numbers permit, these cows are often sold. We do not undertake any pre mating heat detection. No bull has been used on the farm in 70 years and given we mate for 12 weeks, pre breeding attention would probably lead to fatigue.

All cows are tail painted the day before we start AI on the 7th of May. Cows are observed at milking times and at 9 pm which we feel is the most productive observation. As cows are served, scratch cards are applied with carpet glue. Constantly touching up tail paint is too time-consuming for a one person operation although cows being served in the second half of first cycle will need attention. A relief milker comes in when painting.

Dairy breeds, Holstein and Jersey are used for circa the first four weeks and then we switch to short gestation Hereford and Angus sires. All Holstein sires must be easy calving, this is taken as a given with Jersey bulls. We breed for 12 weeks while cows not bred are scanned 5 weeks after breeding begins (usually one or two).

A whole herd scan is not undertaken as this requires help, so we only scan cows continuously repeating. Last autumn 7.7% were scanned empty. We usually pick up one more cow before calving ends. Cows are dried off 6 weeks before calving; with heifers getting a 9 week dry period. Dry cow silage is milking quality which we dilute with hay or straw to avoid over fat cows having milk fever. This was a problem last year.

As cows and heifers come near calving, they are run through the milking parlour to train the heifers and draft cows on the point of calving. These cows are put in a large loose shed. No night feeding takes place as we prefer cows to calve at night. Sub dividing these cows into smaller sheds reduces but does not avoid mismothering.

Cows are checked at 11.30 pm and again at 6 am. Any cows with concerns at the night check will be checked again. Next morning fresh calves are tagged, navel dressed and will receive 2 litres of colostrum via a tube. Calves are initially housed in groups of 4 until sucking and then in groups of 10 or 15. All cows are vaccinated for rota virus which devastated calving a number of years ago.

Male calves leave the farm as quickly as possible and surplus dairy heifers sold at the same time. After 5 weeks there will only be 50 dairy heifer calves plus the very young calves. Once calves are weaned, they leave the farm to go for contract rearing in Kilkenny.

Contract rearing

We commenced contract rearing in 2009 with the maiden heifers. In 2015, we moved off the heifer calves as well as cows numbers increased. Land could have been leased for this purpose but I felt this would add to the workload and in overall terms would be a more costly option.

Both Jerry Lanigan initially and Sidney Colclough in more recent years who both farm in North Kilkenny have proven great stockmen. We do not have formal contracts as this arrangement is all about trust. I check heifers monthly and pay by electronic transfer. The mainly crossbred type heifers come home on the point of calving weighing 480 to 490 kgs which is a good result.

Potential pitfalls are a TB breakdown or health issues. Heifers are tested early in the year so there is plenty of time to get clear before they come home. Thankfully this issue has not arisen yet. All stock are on a full vaccination programme for BVD, IBR, Salmonella and Leptospirosis. This is all time consuming work for a one person unit and when you factor in heat detection and AI, it has dramatically reduced my workload.

Last year a proven easy calving Norwegian red bull was used across all bloodlines just for simplicity with Angus semen after 4 weeks. No bull was used last year, staying with a vasectomised bull for 12 weeks and continuous scanning. Empty rate, at 10% last year, was twice normal, possibly due to over conditioned stock that hit grass in late January with no setbacks subsequently.

I struggle to understand why more people do not explore this option.

Milking routine

Our parlour is a 22 unit herringbone. There are no automatic cluster removers or swing arms. The pit has space for another 6 units. This space is critical for cow flow with no gate behind the cows once milking commences. If the last cow in the last row is not in a safe position to milk, she is simply not milked. This is rare enough. Air gates at the front are opened after 16 clusters are removed or earlier as the cows slow in the autumn.

Heifers will start going through the parlour and the drafting unit as soon as they come home from the rearer. They start calving earlier than the main herd so dry cows will run through with them until they calve. An adjustable breast rail which is at maximum spacing the previous autumn is left in this position initially with dry cows at the back. The rail will be tightened when heifers are fully trained.

Fresh cows are drafted and run through again in the last row as there is no dump line. This prevents milking being slowed. Two of us milk OAD for the first 2 to 3 weeks. At that stage 90 % of heifers will have calved and settled down to the milking routine. My student totally concentrates on calf rearing then and I will milk alone for the rest of the year with relief milkers as required. Milking time is circa 140 cows per hour at peak with washing up to follow.

The parlour is open on 3 sides which permits plenty of natural light in so cows eyes do not have to adjust when entering the parlour. They enter straight in with a backing gate available when meal feeding ceases. A fire alarm when started moves them as it is associated with the gate. The pit is 4 feet wide to minimise walking. Cows have to turn 90° when exiting, but there is space for 40 cows in this area so flow is not impeded. An open trough ensures there is no meal left in trough when cows exit to slow down flow. To draft the cows they have to turn 180° into an Afco unit. This allows them to recycle through the parlour. This turn impedes flow in autumn so is rarely used at that time until drying off.

Contractors

A team of contractors is the absolute key to my whole system. The genesis of this thinking was a farm which I worked on in NZ in 1990 which only had a small tractor, a transport box and a feedout wagon. I was never really attracted to machinery so as the machines on our farm aged I simply did not replace them and employed contractors instead. There are five men who are called on as required.

1. The contract rearer who was covered in a previous section.
2. Pat Walsh has been making the pit silage and bales for over 20 years. This includes wrapping and drawing in. He also spreads some slurry and does all of the hedge cutting. Four years ago he began winter feeding of three quarters of the herd. A new silage feed rail is a long way from the pits so a diet feeder is used as a transporter. This is fed out every second day to milkers and every three days to dry cows. High quality silage is always targeted so straw or hay will be included for the dry cows. Pat also has a plant hire and construction company which we have used in the past.
3. Pat Finn has been spreading fertiliser for 10 years. We blanket spread the whole farm every 4 weeks or earlier depending on the weather forecast. This includes where the cows are grazing on that day. He also spreads lime as required as well as supplying, delivering and stacking straw.
4. Robert Roe agitates slatted tanks that we have and does lighter digger work. He built the milking parlour with me and is an important source of advice too. He has worked with us for 15 years.
5. Denis Kelly has been our relief milker for 25 years and also looks after hoof care. Two of the children are able to milk now too so time away is not an issue.

As mentioned before my father can keep a watchful eye when I am away and this is reassuring. All contractors are given as much notice of impending jobs as possible and are paid promptly. Electronic transfer has practically taken over from cheques at this stage.

Managing labour on Shinagh Dairy Farm

Kevin Ahern, Shinagh, Bandon, Co. Cork

Background

Shinagh Dairy Farm was established up in 2011 by the four West Cork Co-ops, Bandon, Barryroe, Drinagh and Lisavaird in conjunction with Teagasc and Carbery. The company is leasing 78 adj. hectares of land from Shinagh Estates Ltd. and has just completed its seventh year of a 15 year project. The herd is almost fully crossbred at this stage. The original herd of 200 in-calf heifers comprised of 50% Black & White, 25% Jersey cross and 25% Norwegian Red cross heifers. A further 40 crossbred heifers were bought in 2011 as replacements for the following spring. Every heifer born on the farm since its establishment is crossbred. The only straight bred animals on the farm are some of the original cows that calved for the first time in 2011.

Our farm is run with one full time employee (myself) and casual labour hired for busy periods and to cover time off. All machinery work is done by contractors. This allows me to concentrate on the animals to achieve all the important targets to make this a profitable business.

Farm team

I am the only full time employee on the farm. We hire a student from our local Agricultural College or a student from the CIT agricultural course for the spring time. The student starts in February and stays for a 12 or 15 week placement depending on which course they are doing. We also employ local part time help, usually local farmers' sons or daughters, who are happy to do part time work.

Busy periods

With busy periods in year a lot of hours are put in on the first half of the year.

Month	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Hours worked	124	796	844	480	381	267	275	275	267	275	215	124
% total hours	3%	18%	20%	11%	9%	6%	6%	6%	6%	6%	5%	5%
Total hours worked : 4,322												
Av. cows : 230												
Hours worked per cow : 19												

Busy calving period

Spring time is the busiest period on the farm. We have achieved a high 6 week calving rate over the last number of years and need extra help just to get through it. In addition to myself and the student, relief workers are employed at this time.

We operate a 12 day on, 2 day off work rota during calving season. This starts on a Monday with myself and the student working for 12 days. The relief help comes in on weekends to cover time off. The relief help we've employed are past students who know the system we operate on the farm. We are proud that we have a good relationship with past students and they are happy to come back and continue working with us.

For the first three weeks of the calving season, we have someone on the farm 24 hours a day and operate an every third or fourth night calving shift. For this service, we pay a set nightly rate this is not based on hours worked. Night duties consist of feeding and tagging calves and moving newborns to calf houses. We have a supply of colostrum ready for feeding during the night. Close up cows are moved into the straw bedded calving shed approximately 5 days before calving. This happens in the morning time to eliminate the need to move cows during the night.

Every morning, freshly calved cows are moved into the colostrum group of cows and remain in that group until their milk is suitable for the bulk tank. We run the cows in two separate groups during the spring. Once cow's milk is suitable for the bulk tank, they join the "main group" which go to grass while the "colostrum group" remain inside until their milk is suitable for sale. The colostrum group are milked once a day, and are brought to the parlour every morning and milked after the main group. Our rule is that these cows cannot enter the parlour until the pipe is out of the tank. This reduces the chance of antibiotic milk entering the tank.

We run two separate calf sheds, the H shed and the B shed. All heifer calves which are being kept as herd replacements enter the H shed. All other calves are put into the B shed. These are both bull calves and surplus heifer calves. A calf buyer comes to the farm at least once a week to buy all our bull calves so we don't need to take calves to the mart during this busy period. To reduce the risk of an outbreak of calf scour, nobody is allowed to enter the calf houses during the spring expect our farm staff and the calf buyer who is well disinfected beforehand. Even the vet isn't allowed in the calf houses – calves in need of veterinary attention are taken out of the shed to the vet.

Calf rearing

Calves are fed the first feed of colostrum by nipple if possible. If they fail to finish colostrum by nipple or refuse to suck, they will be tubed. Once calves have received colostrum, they are moved to the calf houses and put into pens of 6 and fed on a milk bar feeder. Heifer calves are fed milk powder from the fourth feed; they are fed

in the morning while cows are being taken to the parlour. Bull calves are fed whole milk from the colostrum group after morning milking; milk for the evening feed is also collected at morning milking. All calves are fed again before evening milking. Heifer calves are put on once a day feeding at four weeks of age; they are fed after morning milking.

Busy breeding period

The next busy period for us is the breeding season. As we have grown in confidence with the fertility of the herd over the years, we don't carry out any pre-breeding heat detection. We condition score (BCS) the whole herd at the end of March. Cows of BCS <2.75 and cows calving after 1st April (regardless of BCS) are put on once a day milking (OAD) and remain on it until they are bred. We continue to monitor condition score between the end of March and breeding and may put more cows on OAD if necessary.

Heat detection is for me the most important job in the month of May. We heat detect at least 5 times a day during the first three weeks of the breeding season:

- 20 minutes before cows leave the paddock in the morning;
- 20 minutes after breakfast;
- 20 minutes at lunch time;
- 20 minutes before cows leave the paddock before evening milking;
- 20 minutes while locking in the cows after evening milking.

Two people work in the parlour during the first three weeks of the breeding season to keep tail paint topped up and to draft cows for AI. A technician is employed to AI the herd. For the second three weeks of the breeding season, we introduce three vasectomised bulls to assist us with detection. We still observe the cows as often. For the remaining 6 weeks of the breeding season, we rotate five stock bulls with the herd.

Milking routine

We have a 20 unit parlour. At various times of the year we have two people milking:

- Feb-March. Two people milking. We strip every cow at every milking during this period as early detection of mastitis aids recovery.
- April-early May. One person will milk and only strip cows at morning milking.
- First three weeks of the breeding season. Two people in the parlour for morning milking. This is for tail painting and drafting cows. No stripping cows now unless filter is dirty or SCC level increases.
- Remainder of year. One person milking.

Contact rearing

We contract rear all our replacement heifers. We send our heifers to Fermoy to Kathleen and Donal Howard. This is our second year in contract with this family. Our previous contract rearers converted their farm to dairying. We rear the calves until they are weaned and are ready to go to grass. Heifers do not return to the farm on December 1st prior to calving.

Grass management

Grass measurement is carried out by the farm team. Whoever is working on the farm on the day (usually a Monday or Tuesday) goes on the walk. The walk gives us time to clear our heads and allows everyone to get a better understanding of the grassland management plan for the week ahead - whether we need to supplement or remove grass surpluses.

Contracted jobs

The following tasks are contracted out:

- Fertiliser spreading;
- Spraying;
- Reseeding (ploughing, one pass, land levelling, lime spreading and rolling);
- Silage (bales & pit);
- Silage feeding in winter;
- Slurry and dung spreading.

Two contractors do all the contracting work for us. One feeds the silage, sprays and spreads fertiliser, draws and stacks bales of silage. The second carries out all other work on the farm. We try to organise big jobs like silage making by telling the contractors well in advance of our planned cutting date. We have built up great relationships with our contractors and get on really well.

Cover for time off

To cover time off, we guarantee every second weekend milkings so our relief workers know exactly when they are needed. By knowing this, if anyone needs to swap weekends we have plenty of time to give notice. The relief workers provide cover for holidays and days when we are busy such as herd testing or vaccinating.

Discussion groups - Labour efficiency and practices

Pat Clarke,

Teagasc Athenry, Co. Galway

Introduction

In advance of milk quota abolition a number of discussion groups wanted to look at farm labour efficiency and farm practices that impact on workload. The expectation was that production was forecast to increase by 50% (Food Harvest 2020) and these groups wanted to be better prepared for the increase in herd size associated with this expansion.

Twelve discussion groups were initially selected as a pilot project. A questionnaire was completed by each member, the results analysed and feedback given to the groups. This feedback resulted in further refinement of the questionnaire for use with other groups.

Completing this questionnaire allowed each farmer to:

(a) Quantify the labour input for their own farm;
(b) Quantify the average labour input for their discussion group;
(c) Identify the most labour efficient farms and highlight the components and practices of these labour efficient farms.

After completion of the questionnaire, each facilitator received an individual report for every farmer that participated. The report included an analysis of labour usage plus components that contribute to labour efficiency. Each farmer could benchmark themselves against their group and the top 5% of efficient farms. Reports were used as group support material for group meetings on labour efficiency or as support material when the group visited member's farms.

Average herd size was 106 cows for the 75 groups which completed the questionnaire; this is greater than the National Farm Survey herd average of 65 cows.

Acceptable Working Week

All farmers were asked what was an acceptable number of hours to work per week? The average response was 58 hours (ranging from 39 to 80). The actual hours worked was calculated and was estimated at 63 hours per week. This difference (5 hours) was the starting point for discussions on labour efficiency.

Acceptable working week	58
Actual working week	63
	-5

Most Labour Efficient Farms

Two criteria were used to select labour efficient farms. Firstly, they were rated on hours of work per cow. The total hours worked did not include contractor hours. This showed that some farms that were very efficient (hours/cow), but had an unsustainable working week (hours/week) for the farmer themselves. A second criterion was then used – any farmer with working week above the average acceptable working week (58 hours) was excluded from the top 5%. Some of the key differences between the average farms and the top 5% included:

	All farms	**Top 5%**
Hours of work per cow	47	25
Actual hours per week worked by farmer	63	57
Acceptable working week (hrs) as stated by farmer	58	55
Difference (hrs/week)	**- 5**	**- 2**
Average finish time through the year	7:02 PM	6:01 PM
Start of evening milking	5:13 PM	4:20 PM
Interval between milking (hr:mins)	09:54	08:57
Date first calves go to grass	10-Apr	22-Mar
Feeding calves once a day	28%	58%
Serious assists as % cows calved	9%	6%
Slurry work contracted	36%	50%
Fertiliser spreading contracted	11%	23%
Heifers rearing contracted out	5%	18%
Length of breeding season (weeks)	15.5	13.8
Percentage with teaser bull	33%	44%
Are heifers synchronised	32%	51%
How many groups of stock are grazing in July/Aug	4.7	6.3
Farms where paddocks are topped once or never	57%	82%
Roadway surface described as above average	46%	64%
Farms milking cows throughout winter	38%	24%
Is there a handling facility on every land parcel?	62%	84%

Some labour efficient tips/practices emerging from the groups

System

- Dairy enterprise only - a single farm enterprise simplifies overall operation. Consider contract rearing of replacements.
- Seasonal milk production will reduce overall labour requirement compared to winter and spring calving. The herd is treated as one – one calving season, one feeding system, etc.
- Compact spring calving allows for a dry period in December / January. Compact calving will increase labour requirement in the February-April period but this can be planned and paid for by the increased milk produced off grass (more profit).
- Avoid complex systems e.g. where alternative feeds are fed, such as cereal crops, maize and mixtures of straights. These systems require extra machinery to mix and feed, increasing costs and labour requirement. Calve the herd to match grass availability in spring.

Calving

- Compact calving focuses the work into a short period when everyone is prepared for calving.
- Prevention of calving problems – use preventative practices e.g. correct calving body condition, adequate feeding, batching cows, dry cow minerals etc. to prevent problem and downer cows.
- Freshly calved cows – keep in separate group from milking herd, near the parlour and milk once a day.
- Easy calving sires - will reduce the number of assists during calving.
- Night feeding of silage - feeding cows in late evening after a period of no access to silage results in more calvings by day.
- Night calving have cows in good fit condition, organise night help for large herds. Calving camera can reduce time spent travelling to/from house and calving facility.
- Group calving reduces feeding time and observation time.
- Outdoor calving reduces the need for bedding.
- Two year old calving results in having fewer groups of replacement stock to manage and feed.

Calf Rearing

- Group feeding - feed calves in group pens. Individual pens (even for a few days) require more individual calf attention.
- Calf movements – get caves settled in their pen quickly, minimise moving calves from pen to pen.

- Outdoor rearing of calves with shelter will reduce the labour input for bedding and feeding.
- Milk transfer - pumping systems for milk transfer from dairy to calf house and within a calf house will reduce manual labour and reduce feeding time.
- Calf feeder on quad – easy movement of milk from parlour to calf house and calf rearing paddock.
- Mechanical cleaning of calf house - doorways with access for a loader to allow for quick and easy cleaning.
- Adequate facilities - new shed and bigger feeders required as number of calves reared increases.
- OAD feeding – feed calves once a day after three weeks of age.
- Beef calves – sell early and focus on dairy stock.

Milking

- Number of milking units – the actual milking process comprises approximately 33% of the working day, having sufficient units will go a long way to reducing your daily labour input. Target between 7 and 8 rows of cows for one person operations.
- Early evening milking – an earlier evening milking forces better time management. Target 4.00 pm start of evening milking. No effect of 18/6 hour versus 12/12 hour milking interval with herds averaging < 6,000kg/cow.
- Once day milking can be used as a management tool at any stage during the lactation to reduce labour. It is particularly useful in early lactation during the peak calving period.
- Drafting facilities - either manual or electronic (operated from pit) will mean the milker need not leave the pit during milking to hold cows.
- Collecting yard - slatted yards or good channels in the collecting yard and high volume wash pumps will speed up.
- ACRs will allow one person to manage a large number of units without concerns of over-milking.
- Backing gates eliminate the need to leave the parlour to get cows in.
- Automatic machine washing will help to reduce the labour input for machine cleaning.

Grassland

- Improved roads - a good farm roadway is essential with a smooth surface to allow easy movement of cows to the parlour. A clean roadway will reduce the preparation time of udders for milking.
- Less topping – better grassland management minimises need for topping

- Paddock map – allows better communication and planning between farmer and family/employee/contractor.
- Three grazings per paddock - Grass can be allocated every 24 / 36 hrs during summer, avoiding the need for wires and 12 allocations.
- Paddock access - extra entry gates/gaps will allow more access and facilitate a longer grazing season.
- Early spring grazing - cleaner cows reducing preparation time and possible infections.
- Later autumn grazing - likewise grazing cows later in the Autumn will reduce the labour input with cubicle cleaning and slurry spreading.
- Short of grass (autumn/spring) – consider leaving half the cows indoors and half outdoors rather than letting all of the herd out for three hours grazing and then re-housing.
- Quad bike - used for herding/fetching cows.
- Tunnels – eliminate the need for a second person when crossing public roads.

Breeding

- Heat detection aids minimize the observation time required for detecting cows in heat.
- Teaser bull is useful after the first 3 weeks of the breeding season are completed.
- Auto heat detection minimizes observation time or detecting cows in heat.
- AI technician – some large herds are reverting back to technicians to save time spent inseminating.
- OAD AI – one drafting time only.
- Synchronize heifers – heat detection and insemination can be confined to a 10 day period with synchronization.

Animal health

- Handling unit - good handling facilities are vital for AI, vaccinations, herd testing, hoof care etc.
- Out farms – it's essential that there's a handling unit on all land parcels;
- Disease prevention – implementing an animal health programme will minimise health issues;
- Bulk milk screening – the more labour efficient herds are practising bulk milk screening as an early signal for monitoring and controlling animal health issues.

Setting new targets for a new era in dairying

Michael Bateman[1], Crookstown, Co. Cork

My name is Michael Bateman. I am a dairy farmer from Crookstown in Cork and also a council member of the Irish Grassland Association. It is with my IGA hat on that I present this paper. I would like to acknowledge the input of the people listed below who have contributed to this paper.

This is an Irish Grassland Association initiative, borne out of frustration arising from which are the best figures to present at conferences and farm walks. Confusion exists about what figures mean and what is included or not included in the costs of production. For example, is own labour included or excluded; are costs expressed on a per hectare farmed, per hectare used by the dairy cows or per milking platform hectare? With this in mind, we established a working group composed of agri-business and Teagasc personnel and consultants to discuss and establish the appropriate financial measures for the top farmers in an expanding dairy industry.

Goals of the working group

As a result of our discussions, the goals of the working group were:

1. To identify important farm financial KPIs;
2. Propose them as the industry *Gold Standard*:
3. Present them to the wider industry – today's Conference is our first opportunity to do this;
4. To get 'buy in' from;
    a. Farmers (from all enterprises);
    b. Teagasc advisory and research personnel;
    c. Agri-business personnel working for Irish Banks, agri-consultancy and accountancy firms.

Issues

A number of issues were identified by the working group for further consideration:

1. Land as the major limiting factor on dairy farms;
2. What does the €2,500/ha profit presented as the new Moorepark target really mean and how do farmers' own figures compare with it?

[1] With the help of Laurence Shalloo, Teagasc; George Ramsbottom, Teagasc; John Fitzgerald, Bank of Ireland; Tadgh Buckley, AIB; Mike Brady, Brady Group; Laurence Sexton, IGA council member and dairy farmer; Bernard Ging, IGA council member and dairy farmer; Paul Hyland, IGA council member and dairy farmer.

a. For example included in the per hectare figures are all hectares farmed;
b. Also included is a charge for all labour worked including that of the farm family in the costs – not just the cost of hired labour;

3. Identifying important financial KPIs. This objective wasn't seen as important at the start of the discussion by the working group. However, when we analysed the KPIs selected for early Profit Monitor 2017 users, it soon became clear how crucial identifying a small number of important KPIs was for farmers to make progress with their farm businesses;
4. The reports need to be relevant not just for discussion group meetings and farm walks but also for meetings with agri-consultants and banks i.e. the reports need to reflect the tax accounts as closely as possible.

Issues identified and discussed

Issue	Decision
Cash flow vs. net profit	Both are needed in the report
Inventory	Remain the same
Depreciation	Need to be consistent (5%/10%)
Labour	All labour needs to be included (both hired and owned)
Contract rearing	Needs a separate category in the input sheet
Land change	Owned land not included as a cost category
Return on asset	Needs to be generated

Main recommendations

1. Whole farm figures. All output and costs across all enterprises are to be included in the summary and more detailed farm reports. We think that overall hectares farmed give the best picture of the business. For example if the total fertiliser bill is €15,000 then this is the figure that is included wherever it was spread on the farm. These figures will be presented on a total farm and per hectare farmed basis.
2. Stop dividing into fixed and variable just total costs. Total costs include an owned labour charge (the farmer's estimate of hours worked on the farm valued at a rate of €15/hour). The point here is that the line between fixed and variable cost has become very blurred with things such as machinery running, contractor costs and contract rearing. It was felt it would be better just to compare total costs.
3. Return on asset (defined in Laurence Shalloo's paper in this proceedings).
4. Moorepark targets need to be clear. The €2,500 figure outlined at last summer's open day needs to be outlined and broken down for each cost so that farmers can compare themselves to best practice. Laurence Shalloo will address this area in the paper that follows.

Short report

The report presented in Table 1 is an example of the short report which we believe is a good overview of the business, and would bring people up to speed very quickly as to how a farm was preforming, combine this with Moorepark targets for same and very quickly you would get a clear picture of the financial performance of a farm.

Table 1. Template of the overall farm financial report for use at future IGA events.

	Total	Per hectare farmed	Moorepark targets
Gross output			6,531
Total costs			4,043
Net profit			2,489
Cash flow			2,740
Return on asset (+SFP)			8%

Profit monitor analysis

After we had completed this paper we returned to the Profit Monitor database to see how the early 2017 Profit Monitor reports compared to our draft report and the Moorepark Targets. The preliminary analysis of 60 spring milk producers are presented in Table 2.

Table 2. Net profit/ha for the first 60 spring milk producers by enterprise category for 2017.

Enterprise	Net profit/ha	No. (%) with the enterprise	Av. no. ha
Dairying	€2,599	60 (100%)	74
Replacement heifer	€149	60 (100%)	22
Other enterprise	€155	35 (58%)	4

The early Profit Monitor completers are specialised dairy farmers with a proportionately large replacement heifer enterprise and practically no other animals on the farm. At first glance it appears that they have achieved the Moorepark target of €2,500/ha. However an own labour charge is not included in the net profit figures quoted, the base milk price of 29 c/litre used in the model is lower than the price prevailing in 2017 and not the net profit figure included in Table 2 is for the land engaged in dairying rather than for the overall farm.

Detailed report

The report presented in Table 3 is an example of the more detailed report which we think will present a more detailed report of the performance of the farm business,

while still allowing users to compare themselves to the Moorepark targets and establish a clear picture of the financial performance of a farm.

Table 3. Template of the detailed farm financial report.

	Total	Per hectare farmed	Moorepark targets[2]
Output			
Milk sales			5,873
Livestock sales			659
Other sales			
Livestock purchases			
Inventory change			
Gross output			**6,531**
Costs			
Feed (Concentrate)			294
Feed (Fodder & Bedding)			
Fertiliser, Seeds & Sprays			355
Vet, Med & AI			346
Contractors (silage)			150
Contractors (other incl mach hire)			155
Dairy (incl Parlour & Milk Recording)			131
Electricity			45
Car & Phone			169
Insurance			59
Professional fees			
Machinery Operating Costs (incl Oil)			
General Maintenance & Repairs			140
Sundries & other			100
Contract heifer rearing			606
Labour (Employed)			682
*Labour (Owned)			-
Land rent (incl Rates)			-
Loan interest			224
*Depreciation (buildings)			422
*Depreciation (machinery)			162
Total costs			**4,043**
Net profit			**2,489**
***Cash surplus**			**2,740**
Return on assets			**8%**

Using the summary report outlined in Table 1, the figures presented in Table 4 emerge for the same group of dairy farmers.

[2] A more detailed explanation of the Moorepark targets is presented in Laurence Shalloo's paper is this Conference proceedings.

Table 4. Short report for a group of 60 spring milk producers for 2017 compared to the Moorepark targets.

	Per ha farmed	Moorepark targets
Gross output	4,563	6,531
Total costs	3,126	4,043
Net profit	1,438	2,489
Cash flow (-depreciation)	1,647	2,740
Return on asset (+SFP)	??	8%

The analysis presented in Table 4 shows that on average the spring milk producers in the analysis had a lower gross output but lower production costs. Despite the higher milk price achieved in 2017 than used in the Moorepark targets, the net profit per hectare farmed was approximately €1,050 per hectare lower than the Moorepark target and cash flow was similarly €1,000 lower per hectare than the Moorepark target. We were unable to generate a return on asset because only a small number of the farmers completed the balance sheet. As in most similar analysis there was a large range in the net profit being generated between farms as shown in Figure 1.

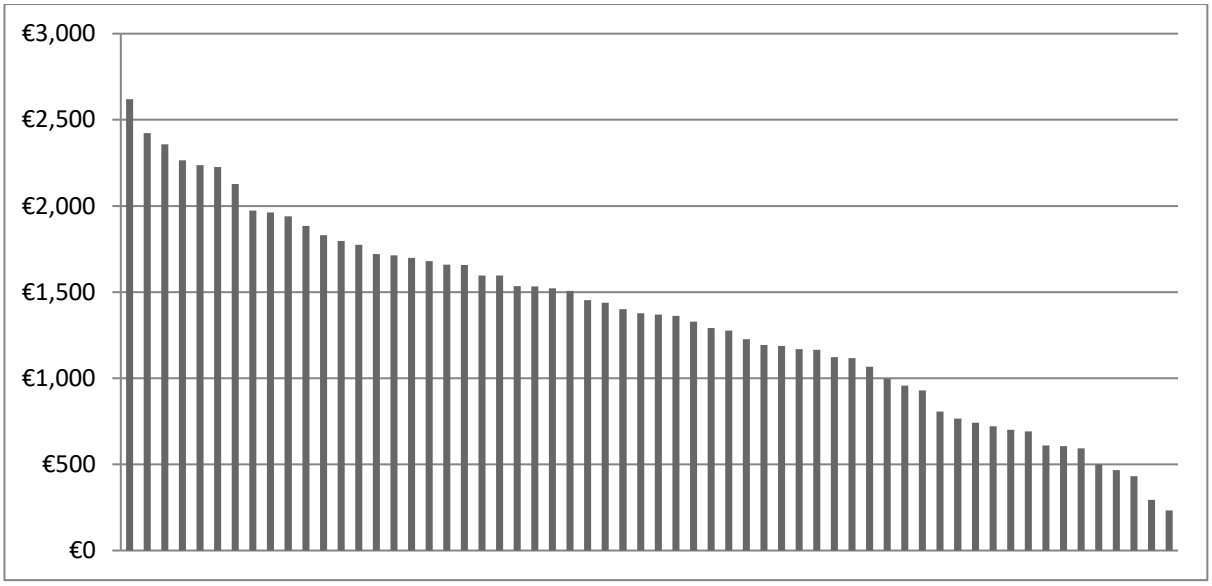

Figure 1. Range in net profit per hectare for 60 specialised spring milk producers in 2017.

Reasons for the net profit shortfall

A number of reasons were identified for the lower level of profitability.

- Approximately 1/3 of the land farmed was rented – all of the land included in the Moorepark model is owned so this would have the effect of lowering the comparable net profit margin.
- In the Moorepark model, all of the land farmed is engaged in milk production – approximately one quarter of the land farmed in our analysis was occupied by

animals other than cows – practically all with replacement heifers. While the overall stocking rate of the group was 2.54 LU/ha, the cow stocking rate on the milking platform was 2.99 cows/ha.

- Costs of production at €3.65/ kg milk solids were €0.70 higher than those in the Moorepark model.
- Grass utilised by the group was 11.3 t DM/ha, while high, was still lower than the Moorepark target of 13.0 t DM/ha.

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Driving profitability per hectare!

Laurence Shalloo, Liam Hanrahan, George Ramsbottom and Brendan Horan

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

Summary

- A resilient dairy business will be sustainable to survive milk price drops while being very profitable when milk price is high, while being sustainable across all of the sustainability indicators.
- The term resilient means able to "recover, respond, deal, withstand" different internal and external challenges that may manifest themselves within the farm business from time to time.
- There is significant potential to increase efficiency and productivity at farm level when compared with the average farm nationally.
- The focus at farm level must be about increasing grass growth and utilisation and converting that feed to milk solids sales in as low a cost as possible.
- Increasing labour efficiency by operating more streamlined work practices, using contractors and contract rearing of heifers will have a major impact on labour cost – farm labour requirements, ultimately affecting the efficiency of the overall business.

Introduction

Milk price volatility is a key feature of dairy farming today and this is likely to continue as the world market responds to changes in product supply and demand. In the past, various levels of protection, operating mainly at EU level, provided market support at times when there was an imbalance in the Global supply/demand dynamic. However, this protection has only operated since 2007 (in exceptional circumstances). This has meant that the milk price received by farmers is much more volatile now than that experienced in the past (Figure 1). Currently, milk price has reached a peak, from a trough which lasted for over two years and caused many problems for virtually all dairy industries around the world. Ireland's milk production represents approximately 0.9% of global production and irrespective of our scale or how much we expand; in general we are price takers. Recent global insecurities, driven by geopolitical events, have created an atmosphere which suggests that increased volatility should be expected in the future. This, coupled with the issues associated with Brexit, require dairy businesses to refocus on being highly profitable, labour efficient and low cost employing resilient technologies and prioritising all investment into making the farm more resilient. The term resilient means to be able to "recover, respond, deal, withstand" one or a number of shocks within any business. These shocks may originate in the form of weather events, disease incidences, troughs in milk prices, etc. How the business and system operated is implemented will determine the capability of the business to respond to such events.

There is considerable potential to increase profitability at farm level by focusing on the core technologies of grass based systems and through having the right cow for that system (high milk solids, robust with good fertility). The objective of this paper is to lay out in both physical and financial terms what is needed to achieve a net profit per ha of €2,500 at a milk price of €0.29/l. This paper will evaluate:

a. Achieving €2,500/ha net profit;
b. Return from investment in different technologies to drive performance;
c. Understanding the metrics in order to evaluate across business structure.

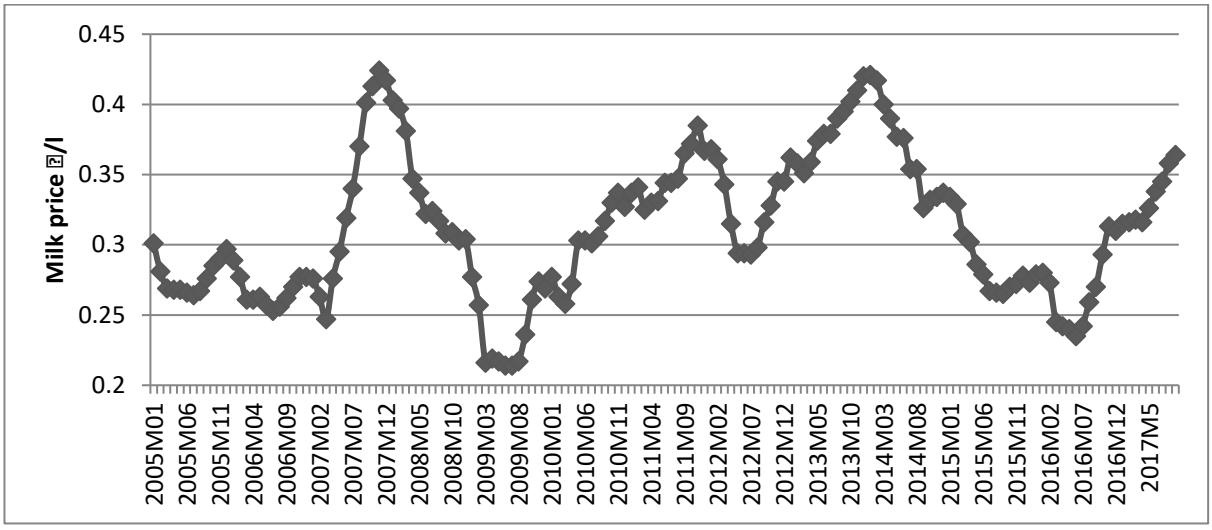

Figure 1. Milk price received by Irish dairy farmers between 2005 and May 2017.

Achieving €2,500/ha net profit

The Target system operated on farm is based on maximising the performance from the existing platform while at the same time ensuring there is a minimum number of unproductive livestock on the farm and that the farm is operating to its full potential. Realistically, setting a net profit Target of €2,500/ha and achieving that Target is based on significant attention to detail across all of the components of the farm business. However the rewards are huge and place the business in a very positive position when dealing with milk price volatility as well as realising returns from the business that are comparable with some of the best possible investments on or off farm. Whether you are achieving the Target, close to the Target, or are a long way from the Target, the direction of travel should be the same for the business. The Targets will be detailed in this paper under physical and financial headings and will be compared to the National Average performance over the period 2014 to 2016, all of which is calculated with a base milk price of €0.29/l at 3.3% protein and 3.6% fat. All labour costs are included at €15/hr and all other costs are included based on the most up to date costs and prices. It is assumed that the farm operates contract rearing in the Target system with calves leaving the farm at 2 weeks of age, while in

the National Average situation it is assumed that replacement heifers are reared on the farm.

The key driver to earning a high profit per hectare centres on achieving the physical performance of the farm to a very high level. Table 1 shows a breakdown of the physical farm performance included in the model in both the current National Average and the Target performance scenarios. Central to achieving the Targets are both high animal and farm performance across a range of impact categories. The physical performance required to achieve the Target include >13.1 t DM/ha of grass utilised, milk solids output of 1,380 kg/ha, while feeding low levels of concentrate (<450kg per cow). In order to achieve these Targets, there is a requirement to have a highly fertile herd with a low replacement rate <18%, high six week calving rate circa 90%, with a herd mean calving date of mid-February. All of which are achieved with a farm operated at high levels of labour efficiency where the focus is on cows and grass, thus facilitating these achievements with total labour input of <16 hours per cow per year. In Table 1, the performance Targets are compared to the National Average performance over the period 2014 to 2016 for comparative purposes. Within the Target situation, there is an increase in stocking rate based on increases in grass growth, but there is also a change in enterprise as all replacement stock are moved off the milking platform to a contract rearing enterprise. Cow numbers increase by 42% in the Target scenario from 76 to 108. This increase in cow numbers is facilitated by both an increase in grass growth and subsequent utilisation but also through the removal of none productive stock from the milking platform. It is also assumed that higher fertiliser levels are applied under the Target system with a higher level of annual reseeding carried out on annual basis.

Table 1. Shows the physical performance required to achieve the National Average and Target performance on Irish dairy farms.

	National Average	**Target**
Milk Yield kg MS/Cow	405	475
Milk yield kg/Cow	5,409	5,800
Milk Protein %	3.45	3.70
Milk Fat %	4.06	4.50
Milk kg/Ha	11,090	16,820
Milk Solids kg/Ha	825	1,380
Calving interval days	394	365
Mean Calving Date	6th March	14th Feb
Six Week Calving Rate %	58	90
Replacement Rate %	23	18
Labour Hrs/Cow	30	16
SR Cows/Ha	2.05	2.90
Concentrate feeding kg/Cow	933	450
Herbage utilised (T DM/Ha	8.0	13.1

Financial

Table 2 provides a breakdown of the financial performance of a farm that is achieving the physical outputs defined in Table 1 for the National Average and the Target situation for a 35.6 hectare farm. The analysis is completed for the farm as a whole and on a per kg MS and per hectare farmed basis. Clearly the differences in financial performance between the National Average and the Target situations are very stark. The farm that is operating to the Target performance levels is achieving 5.3 times more profit. The question centres on whether this is possible? The answer is very much dependent on whether you believe the physical performance outlined in Table 1 is possible. If you do, then the financial performance differences are real and tangible. Analysis from both the Profit Monitor and the National Farm Survey have shown that the magnitude of performance difference between different cohorts of farms operating at the top and bottom levels of efficiency is huge. In order to understand the differences between the different categories of farms it is important to evaluate where the differences are coming from in Table 2. The major change in performance is in the form of an output increase, there is a huge difference in farm receipts on the farm and per hectare with an almost 82% increase in outputs originating from a 72% increase in livestock sales and 84% increase in milk receipts. The milk output increases are based on higher value milk, higher milk yields per cow and the farm carrying higher stocking rates with the higher stocking rates facilitated by high grass growth and utilisation. There is little change in output per kg MS. On the cost side, there are increases in overall costs per farm and per hectare to the tune of 30% but there is a dramatic reduction in costs per unit of output of the order of 28%. Therefore the expansion has occurred in the Target system with the unit output costs reducing resulting in dramatic increases in profitability. This mirrors what has happened in the dairy industry since the removal of milk quotas (Hanrahan *et al*., 2017). The major cost categories that showed reductions include concentrate feed and labour costs while other cost category reductions were based on the output growth per cow and per hectare and the removal of heifer rearing costs from each of the cost categories. Contract rearing costs for heifers had the opposite effect as this was included as a new category. In reality the total costs for heifer rearing have not increased that dramatically when comparing the National Average and Target situations because when the heifers were contract reared there was a cost saving on the existing milking platform. While there is a very large increase in labour efficiency modelled, some of these increases are originating from the removal of heifer rearing from the labour requirements on the farm. Recent research has shown that there are substantial differences in labour efficiency between farms with the more labour efficient farmers tending to be larger, using the contractor more, less likely to be rearing calves and more likely to have appropriate facilities (Deming *et al*., 2017). Ultimately, the financial performance of the farm in relation to net profit has increased dramatically across all of the metrics shown, with net profit for the farm, per hectare and per kg MS increasing by 427%, 441% and 194% respectively.

Table 2 also includes the cash that is being generated from the farm. Essentially it is a reflection of the cash that is entering and leaving the business in any one period of time. It is an important metric because it reflects the businesses ability to meet its long and short term cash commitments. The cash flow statement is easily prepared from the income and expenditure statements. It includes only cash coming into and leaving the business (excludes depreciation, inventory change and own labour) but includes other income, drawings/taxation, capital repayments (€8,759 and €11,835 in the National Average and Target respectively) and capital development or purchases. For the purposes of this analysis, it was assumed that the labour costs and the drawings were equal (no single farm payment included). Table 2 shows in this scenario that the cash generated from the business is higher than the profit, this would generally not be the case where there was expansion with the business as the growth in stock numbers would be reflected in the profit figures but would actually be a drain on the cash flows. This has been evidenced on many farms over the past 8-10 years.

Table 2. The financial performance of the National Average and Target farms.

	National Average			Road-map Target		
	Farm €	**Per kg MS €**	**Per Ha €**	**Farm €**	**Per kg MS €**	**Per Ha €**
Receipts						
Milk	113,819	4.21	3,197	209,071	4.28	5,873
Livestock	13,620	0.50	383	23,443	0.48	659
Inventory change						
Purchases						
Livestock						
Gross output	**127,438**	**4.72**	**3,580**	**232,514**	**4.76**	**6,531**
Costs						
Concentrate	17,552	0.65	493	10,465	0.21	294
Purchased Forage	0	0	0	0	0	0
Fert/Reseeding	10,056	0.37	282	12,627	0.26	355
Contract Heifer	-	-	-	21,587	0.44	606
Contractor other	1,275	0.05	36	5,526	0.11	155
Contractor Silage	6,195	0.23	174	5,328	0.11	150
Vet/AI	8,006	0.30	225	12,320	0.25	346
Elect/Phone/Car	6,747	0.25	190	7,594	0.16	214
Hired Labour	27,126	1.00	762	24,302	0.50	682
Milk Recording and parlour	3,687	0.14	104	4,660	0.10	131
Insurance	1,850	0.07	52	2,150	0.04	59
Sundries/Other	2,273	0.08	64	3,551	0.07	100
Machinery Lease						
Repairs and Maintenance	2,500	0.09	70	5,000	0.10	140
Owned Labour	0	0	0	0	0	0
Land Lease	0	0	0	0	0	0
Loan Interest	7,133	0.26	200	7,993	0.16	224
Depr. Buildings	11,812	0.44	332	15,042	0.31	422
Depr. Machinery	4,403	0.16	124	5,771	0.12	162
Total costs	**110,617**	**4.09**	**3,170**	**143,916**	**2.95**	**4,043**
Net Profit	**16,821**	**0.62**	**473**	**88,598**	**1.82**	**2,489**
Total Cash	**24,277**	**0.90**	**682**	**97,576**	**2.00**	**2,740**
ROA%	**2**			**8**		

Return from focusing on different technologies at farm level

In reality, all of the increased financial performance shown in Table 2 is based on different components of the farm system that can be changed within the farm gate to

one extent or another. While there are, in some circumstances, physical farm constraints (e.g. soil type, climatic conditions) that prevent the full achievement of the targets, there is potential to make changes to increase key performance indicators on all farms and metrics. The focus should be on investing in the right areas on the farm to achieve those targets and ensuring that the direction of travel is correct for the farm rather than about the distance to travel. There are very few farmers nationally that can say that they are in that Target situation across all of the metrics shown. Therefore it is imperative that we continue to remind ourselves of the potential to increase profitability from investment in basic technologies at farm level and to prioritise investment in these technologies (especially when milk price is high) in order to reap the dividends (especially when milk price is low). Table 3 highlights the net financial benefit from various increases in technical efficiency across the farm. This list is not exhaustive, but sets out the potential from these traits. These include:

1. Increasing fat concentration;
2. Increasing protein concentration;
3. Increasing milk volume – from grass;
4. Increasing grass utilisation;
5. Increasing the age profile of the herd;
6. Reducing replacement rate;
7. Reducing calving interval.

A similar approach was taken to the analysis as highlighted in Table 1 and Table 2 on a farm size of 35.6ha.

Table 3. Financial implications of improvement in various technologies operated at farm level.

	Unit Change	**Financial Benefit**	
		€ Farm	**€/kg MS**
Increasing Fat Concentration	0.1%	1,195	0.03
Increasing Protein Concentration	0.1%	2,530	0.09
Increasing Milk Volume – from grass	100L	2,027	0.06
Increasing grass utilisation	100kg DM/ha	484	0.01
Reducing Replacement Rate	1%	1,218	0.035
Reducing Calving Interval	1 day	247	0.009

The analysis shows that improvements in each of the individual components of the farm have varying effects on the financial performance of the farm overall. All are positive in terms of the general operation of the farm and all have different effects on farm profitability. If we take an example of a farm with 35.6 ha, and over a five year period they increase grass utilisation by 3 t DM/ha, milk fat concentration from 4.05% to 4.25%, milk protein concentration from 3.45% to 3.65%, reduce replacement rate

from 23% to 20% and have a mean calving date that is one week earlier, they will increase their net profit on the farm by over €27,353 and their profit per kg MS by €0.71, while increasing profit per hectare by €768. This is all achieved while the cost base is reduced and the value of what is sold from the farm is increased, which is ultimately increasing the resilience of the business as a whole. In the Target system outlined in Table 2, these different components of the system are included to an even greater level and the dramatic increase in labour efficiency is also included.

Understanding the metrics to evaluate across business structure

In reality, it is possible to be achieving very high performance on farm and to be not achieving the target of €2,500/ha or close to it. If you are not achieving that Target, does this mean that you are a bad farmer or have a lot to improve? To answer that question, we have to think of the myriad of different business structures that are now evident on dairy farms in Ireland. For example some famers now run dairy businesses but actually do not own land and therefore have invested less in the business overall and will ultimately have higher costs within the business as land rental may form a part of the overall cost structures. Therefore we need to evaluate the business by more than just one metric like net profit per hectare and we need to also use metrics that reflect the investment structure of the business to establish a picture of the returns not alone from the operational side of the business but also reflecting the capital employed. If we focused solely on profit per hectare for example we may never expand the business as the reduction in performance initially would be viewed negatively or we may not look at options that might be positive for the business (e.g. leasing). Therefore, it is important to ensure that when evaluating the business, we not alone look at the net profit but also that we look at the returns for the assets employed as a measure of the profitability of the business relative to the assets employed. This is an important metric because if we have two farmers with the same profit per hectare and one has double the amount of assets employed per hectare in the business then the potential for net worth growth is different than if both have the same level of total assets. This situation arises where the land that is farmed is not owned by the individual that is farming it whether through share milking, leasing or in any other form or where land value is lower per hectare for example with poor or heavier soils.

ROA

ROA is a performance measure of profitability relative to the assets employed.
Overall return on investment based on the total investment
((Income + Interest) /Total Assets)

The profit achieved under the National Average and Target technical performance was further analysed under a scenario where land is owned and where land is leased. The calculations were completed assuming a land lease charge of €450/ha

and it was assumed that for every dairy cow in the system there was €3,500 tied up in capital in the form of livestock and fixed assets. In the leased land scenario, this was the total assets employed in the business while in the land owned scenario there was €25,000/ha assumed for land. The net profit figure was reduced by the land rental costs per hectare in the land leased scenarios.

Table 4 shows that in both the National Average and the Target performance scenarios, even though the net profit per hectare reduces due to land rental costs, the return on assets is substantially higher when the farm is leased. As previously stated, this reflects the profit achieved for the capital invested. A good Target for return on assets from the literature suggests a figure of 5% over the costs of funds. If we take an example of costs of funds of 5%, a target of >10% is the benchmark when evaluating the business performance. It is important to use both metrics, because as can be seen in Table 4, if we only focused on the net profit per hectare we may not be identifying the business that will give higher returns overall. In the land leased scenario, 3.35 times less capital is tied up than in the land owned scenario. Another way of looking at it is, if the same amount of overall capital was employed in both scenarios, the land leased scenario could be 3.35 times bigger while still only having the same amount invested as the land owned scenario. While the profit per hectare is 18% lower, the operation being 3.35 times bigger, would result in a much higher overall return from the business. In the land ownership situation, there could be potential to increase the returns through property price inflation. However this should not be included in the calculations of return on assets in any budget being completed as there can be substantial short term volatility in the price of land (as we have seen in the last 10 years), any increase in land value should be taken as a bonus to the business overall as it will only ever be realised if the land is sold which is not common in Ireland. For example, between 2014 and 2016, only between 0.3 and 0.5% of agricultural land was traded annually. While this analysis might suggest that land ownership results in poor returns, there are other benefits around security of tenure that is not possible in the leased scenario. Ultimately a balance of ownership and leasing could provide both security of tenure as well as achieving the returns possible under the leasing scenario, with the combined business generating substantial returns overall.

Overall farms that are operating with National Average levels of technical efficiency should not consider leasing additional land and should instead focus on increasing the efficiency of the business. Poor technical performance with increased costs due to land rental costs has the potential to generate significant problems for the business. On the contrary, farms that are operating at the Target technical performance standards detailed here, have the potential to make very large returns in the leased scenario with returns of over 20% annually. Therefore, for such farms, driving technical performance on the milking platform, removing replacement stock

and then increasing the scale of the operation will generate very strong returns for the business as a whole albeit with lower profitability on a per hectare basis.

Table 4. Net profit per hectare for the National Average and Target technical performance in land owned or leased land scenarios.

		National Average		Target	
		Farm owned €	**Farm Leased €**	**Farm owned €**	**Farm Leased €**
Profit	Net	16,821	801	88,598	72,745
Profit	Net Ha	460	22.5	2,489	2,043
Investment		1,156,000	266,000	1,268,000	378,000
ROA		2	3	8	21

Land lease costs included @€450/ha per annum

Conclusion

Milk quotas have now been abolished for over two years, with huge expansion at farm level. To date this expansion has been associated with increased grass utilisation, increased milk value, reduced costs (excl. labour) at farm level. Focusing on ensuring that the overall business is resilient into the future will involve a continued focus on increasing grass growth and utilisation and matching the feed available on farm with the demand through operating the appropriate stocking rate. There is substantial potential for technological improvement at farm level across a whole range of areas. While it has to be recognised that there has been very good progress in the past number of years nationally when evaluating a business it is important to not just focus on one metric. The inclusion of both net profit and a profit figure that reflects the overall farm investment are extremely important to ensure that the correct strategies are taken for the business as a whole.

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My philosophy on being an employer

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Summary

- Almost half (47%) of all Irish cows are now milked in herds greater than 100 cows.
- Recruitment and retention of well trained and skilled farm operatives and managers will be the limiting factor for expansion for many farmers in the future.
- Dairy farming must be considered an attractive career option, provide competitive returns per hour worked and adequate time-off and a sustainable workload for everybody working on the farm.
- There is a requirement to reduce the workload on dairy farms through a combination of using labour efficient practices, improving farm infrastructure, and out-sourcing specific tasks.
- The principles of Lean management could be applied to dairy farms to increase efficiencies.
- The Irish dairy industry should develop a workplace action plan setting out clear targets and goals around employment practices on dairy farms.
- Planning and preparation for compact spring calving is essential to minimise the stress associated with the peak workload

Introduction

The future competitiveness and sustainability of the Irish dairy industry is dependent on four main pillars: (1) the availability of high genetic merit grass-based genetics; (2) high pasture productivity and utilisation at farm level; (3) farm systems that are sustainable - financially, socially and environmentally; and, (4) an adequate supply of highly skilled, well trained and highly motivated young dairy farmers. All four pillars are equally important, and therefore require equal emphasis if the dairy industry is to continue to develop. This paper deals specifically with pillar four i.e. the people aspect with particular emphasis on attracting, developing and retaining staff.

Current trends in dairy farm structures

Table 1 and Table 2 shows the number of dairy cows by herd size and number of dairy farms by herd size from 2005 to 2016, respectively using data from the CSO Farm Structure Survey 2005 to 2016 (Kelly *et al*., 2017). The data shows that the number of dairy herds has remained relatively static over the last 6-years. The

number of 'new entrants' to dairying are replacing the number of dairy farmers who exit milk production.

Average herd size has increased from 45 cows in 2005 to 76 cows in 2016. Excluding dairy farms milking less than 30 cows (who can potentially double in herd size without requiring extra labour), the average herd size of the remaining 15,339 dairy herds in 2016 is 87 cows. Additionally, the proportion of cows in herds of greater than 100 cows has increased from 13% in 2005 to 47% in 2016. The number of dairy farms with herds greater than 100 cows has increased from 1,080 (4.5%) in 2005 to 4,262 (23%) in 2016. The average herd size for farmers in this category is now 155 cows.

Table 1. Number of dairy cows by herd size 2005 to 2016.

Herd size	**2005**	**2007**	**2010**	**2013**	**2016**
10 to 19 cows	35,180	24,640	30,780	25,290	20,595
20 to 29 cows	78,120	65,270	56,720	47,480	38,828
30 to 49 cows	294,100	252,750	194,450	171,640	142,922
50 to 99 cows	523,400	525,900	486,850	518,110	536,390
>than 100 cows	144,620	184,910	302,060	400,690	659,149
Total	1,081,960	1,058,210	1,070,860	1,163,200	1,397,884
Avg. herd size cows	48	52	58	64	76

Reference: Kelly *et al*., 2017

Table 2. Number of dairy farm by herd size 2005 to 2016.

Herd size	**2005**	**2007**	**2010**	**2013**	**2016**
10 to 19 cows	2,390	1,700	2,110	1,730	1,437
20 to 29 cows	3,230	2,680	2,310	1,930	1,575
30 to 49 cows	7,550	6,480	4,910	4,330	3,589
50 to 99 cows	8,080	7,960	7,050	7,420	7,488
> than 100 cows	1,080	1,350	2,080	2,740	4,262
Total	23,820	21,320	18,460	18,150	18,351

Reference: Kelly *et al*., 2017

This analysis shows that the structure of Irish dairy farms has changed significantly (since 2010 in particular) and that this is likely to continue. There has been a dramatic shift to larger herds over this time with a fourfold increase in both the number of cows being milked in herds of greater than 100 cows and the number of farmers milking herds of greater than 100 cows. This trend is likely to continue as indicated by national statistics of dairy young stock and from supplier surveys currently being carried out by some of the major milk processors.

The rapid increase of herds greater than 100 cows highlights a potential mismatch between the availability of family labour and the workload on farms. While the CSO Farm Structure Survey in 2013 highlighted that a large amount of family labour exists on dairy farms, there is no guarantee this labour exists especially on the farms milking greater than 100 cows where it is particularly needed, or that family labour is available at busy times in the season e.g. during calving in February and March. Hence there is a growing requirement for both full and part time employees to work on dairy farms.

A modelling exercise was carried out to predict the future people requirement of Irish dairying using data from the Farm Structure Survey 2013 and 2016. Assuming the national herd will grow to 1.6 million cows by 2025 then, even when accounting for improvements in labour efficiency, its predicted we will need over 6,000 people to enter the industry. This consists of 2,300 new employees and 3,900 future successors.

New Zealand approach to develop a high quality work environment on dairy farms

DairyNZ in association with the Federated Farmers of New Zealand have developed a Workplace Action Plan (https://www.dairynz.co.nz/...workplace-action-plan/workplace-action-plan-employee) to assist the dairy industry to adopt good workplace management practices which are essential to attract and retain good people. It sets out a number of targets and goals for the industry; some are minimum standards required to comply with the law. The Workplace Action Plan contains five pillars of good people management:

1. Balanced and productive work time

This deal mostly with appropriate work/life balance in terms of employees work time.

- are not likely to work more than 50 hours a week
- are not likely to work more than 10 hours a day
- are not likely to work more than 4 hours in any day before a break is taken
- have at least two consecutive days off in two weeks

2. Fair remuneration

This mostly deals with wages and salary rates.

- minimum wages or above are paid for all hours worked
- employment agreement are in place for all employees
- records of hours worked and wages paid are kept
- holidays and leave are recorded
- remuneration package typically includes a non-cash benefit
- formal accommodation agreement in place

3. Wellness, wellbeing and health and safety.

Dairy farms must be safe places of work.

- the workplace is physically safe, emotionally secure and free from bullying
- accommodation complies with legal requirements
- employees are engaged in setting and operating the farm health and safety plan
- staff have access to personal protective equipment where appropriate

4. Effective team culture

The dairy farm is an enjoyable place to work.

- there is good communication between employer and employees
- there is good communication between employees
- mutual respect and care is extended to all team members
- diversity is understood and respected

5. Rewarding career

Employees are encouraged to further career development.

- continuous improvement through on-going skills development
- employees have opportunity for personal growth and career development

The Workplace Action Plan includes actions that both DairyNZ and Federated Farmers will deliver and there is annual monitoring and reporting associated with each of the five pillars.

Retention on dairy farms

The recent and further planned expansion of the Irish dairy industry means that many farms have grown beyond the labour capacity of immediate family. Therefore, one of the challenges faced by many farmers is becoming an employer and working with short and long term hired non-family labour. Along with financial, business and

technical skills, farmers have identified people management skills as important skills to have to ensure successful expansion (Bewley et al. 2001, Hadley et al., 2002). Having good employment practices on dairy farms is essential to having a successful industry which attracts and retains good people. Retention refers to the efforts of an employer to create an enjoyable workplace, avoid employees leaving when it is preferred that they stay and reward and acknowledge good performance (Nettle et al., 2011). Anecdotal evidence would suggest that retention of employees is an issue on some Irish dairy farms. Replacing employees is costly and it is estimated that every time a business replaces a salaried employee it costs 6 to 9 months' salary on average. The difficulties in retaining employees in the agricultural sector globally centred on four key issues:

1. Poor working conditions;
2. Lack of career development and promotion opportunities;
3. Neglect in occupational health and safety;
4. Availability of alternative employment.

Source: Nettle *et al.*, 2011)

To overcome these issues suggested strategies include having flexible working hours, competitive wage and benefits such as bonuses and profit share and providing training. In 2018, it is predicted there will be full employment in Ireland coupled with increasing wages in other sectors there will be increased competition for skilled labour. Therefore dairy farmers will need to ensure that they are providing a quality workplace as it would be challenging to compete in terms of wages alone compared with other industries. In a study of work practices by Nettle et al. (2011) employees were influenced to stay with their employer because they experienced:

1. Higher than average pay
2. Flexible work hours
3. Limited weekend hours and very long shifts
4. Varied work
5. Training and development opportunities
6. Feedback and appreciation for a job well done
7. Individual attention to career development and mentoring
8. An enjoyable work environment with good facilities

Practices, such as effective work organisation and good communication, may improve employee satisfaction, thereby increasing the effectiveness of the labour input and increasing profitability of the farm business. This stands true when working with both family and non-family labour and also with others such as contractors in the farm business.

Work practices – Lean on Dairy Farms

Work practices that have been done routinely for years may no longer be suitable on a farm given the increased workload with extra cows. Making changes to how work

is done on the farm can save large amounts of time without any reduction in farm performance, and often with very little cost. A set of techniques that were developed by the automotive industry 30 years ago (Lean) have evolved and can be adapted to any sector that has people, processes and problems. These techniques seek to identify and remove unnecessary activities so that work requires less effort and capital and improves safety. It can provide a clear, structured management system for the farm to deliver productivity gain and sustain them over time. Some of techniques used are:

Standard work

This technique involves mapping out a set of steps or listing instructions for specific tasks for example how to operate the milking machine or how to operate the feeders in the parlour. These instructions should be visible to everyone and preferably posted where the task takes place. Well-written instructions simplify tasks, improve communication, reduce training time, and improve work consistency. The overall farm business benefits from consistent work performance and predictable results regardless of who is completing the task giving the owner confidence in a job being done correctly.

Visual controls

Communication of information on farm is necessary to ensure that everyone is clear regarding what the business needs to achieve on any given day. Unless this information is relevant and easy to see, it will not be used. White boards are one method of communicating the tasks for that day or week visually with employees. They should be placed somewhere that everyone has access to such as the dairy or farm office. A farm map with paddocks numbered and a list of key phone numbers should be available.

'A place for everything and everything its place'

This technique improves workplace efficiency and eliminates waste. The result is that the workplace becomes organised, work is done efficiently and safely, and problems are quickly found and eliminated. Briefly it involves focusing on one area such as workshop or milking parlour and taking a before photo. Tidy up the space by going through every item and removing any items that are not used or that are broken. If an item is used regularly then give it a permanent home near where it is used. Label the location or take a picture to show what it should look like. Once everything is sorted take an after photo and agree how to maintain the new organised area. Well organised workplaces reduce time spent looking for tools and improves safety on the farm.

'You can't manage what you don't measure'

Although dairy farmers use metrics and benchmarking to determine how well they are doing in animal and grass production and profitability, there are few commonly

used employment metrics. Measurement helps establish a baseline figure at a single point in time and gives the ability to identify any change into the future. Therefore, to become better employers, it is necessary to assess the factors associated with being an employer of choice. Figure 1 is a self-assessment tool for farmers to evaluate themselves as employers. There are 5 segments to the circle each representing a factor that is important to being a successful employer. Working from inside the circle to the outside each ring equates to 25% so the inside ring equates to 25% and the outer ring equals 100%. Each factor should be scored out of 100%. After completing the scorecard, areas of improvement will be easily identified and actions can be taken. For example a good employer regarding health and safety and people management is one who is achieving all four points in the wellness, wellbeing and health and safety and effective team culture pillars as outlined above. A good employer regarding labour efficiency is one who is achieving the points outlined under the balanced and productive wok time pillar as well has having efficient work practices and labour efficient facilities on farm as outlined below. Regarding wages and benefits and career progression, a good employer is achieving the points outlined under the fair remuneration and rewarding career pillars. A great employer is one who is going over and above what a good employer does by ensuring their employees experience the eight work practices outlined by Nettle *et al*. (2011).

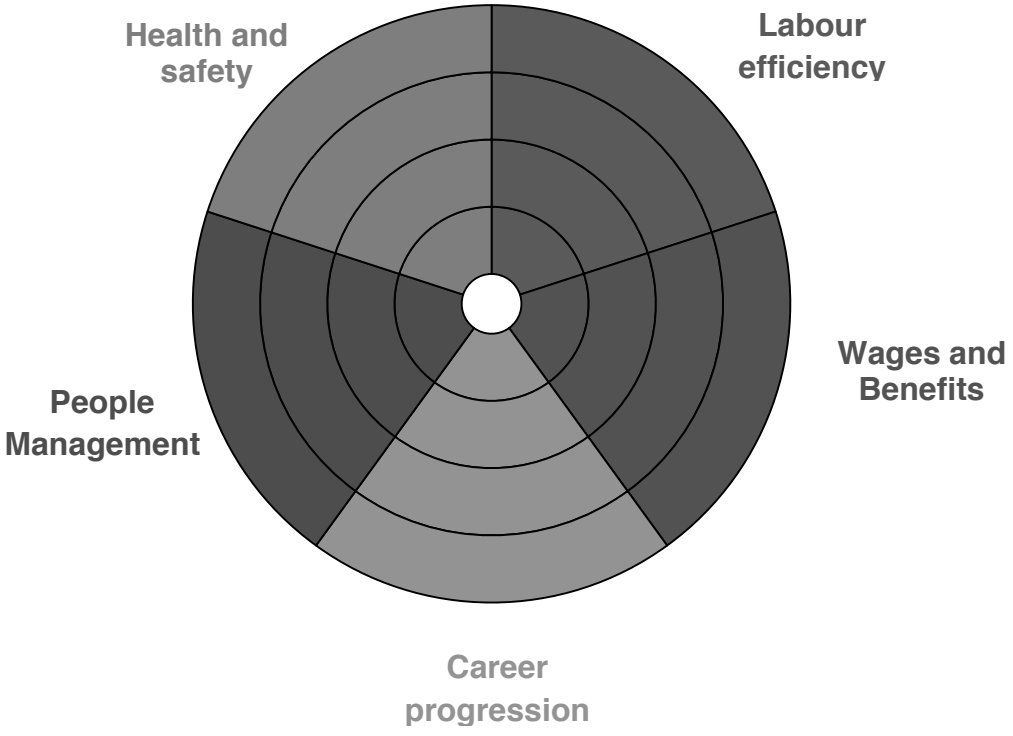

Figure 1. Employer self-assessment tool to assess employment skills,

How to achieve a sustainable workload

There are a variety of options to consider that will reduce the workload on any given farm. These can be broken into the following categories:

Changing work practices

Making changes to how work is done on the farm can save large amounts of time without any reduction in farm performance, and often with very little cost. Increased cows on farms may require changing work practices to save time. Examples of changes which can save time include:

- Once a day calf feeding from three weeks of age;
- Vaccine use in cows/calves to reduce animal health issues e.g. for scour or pneumonia;
- Night time feeding of dry cows during late pregnancy to increase the number calving during the day;
- Grazing cows in 36 hour blocks to avoid needing strip wires during the main grazing season;
- Only milk cows once daily for the first three weeks of the calving season.

Making the farm set-up more labour efficient

Facilities have a major influence on labour efficiency. Milking is the main task on a dairy farm and typically consumes over 30% of total labour input. Therefore the milking parlour set-up has a large influence on farm labour efficiency. Cow flow into and out of the parlour and the number of rows to be milked are key considerations. Calf rearing facilities tend to be the least modern on many farms, and this has very negative effects on labour efficiency as it increases the workload during the busiest time of the year. Having tractor access to clean out pens, not having to carry milk long distances to calves and being able to rear calves in batches of 10 or more are all essential on a modern dairy farm.

Out-sourcing work

Many of the most labour efficient farmers reduce the hours of work for themselves and their farm team by out-sourcing work. On larger scale farms, this can mean all machinery work being done by contractors (fertilizer, slurry, silage, winter feeding etc.) and on smaller scale farms this might involve using contractors at particularly busy times of the year (e.g. slurry and fertilizer spreading in spring). Many farmers rule out this option due to the cost of the service but fail to consider the huge potential gains – your time as the manager of your business is extremely valuable, especially in the first half of the year during calving and breeding. Ensuring the job gets done on time is another important benefit. For example, a delay in getting fertilizer out in spring can be a huge cost in terms of lost grass growth. Savings on machinery running costs are another big positive; some farms using all contractors for machinery work have a lower contracting bill than the combined contracting and machinery running bills of farms with their own machinery.

There are also many other options to out-source work. Contract heifer rearing is becoming more and more popular, and an increasing number of farmers are now getting calves contract reared from two weeks of age to further reduce the workload during the spring. Contractors can be used for almost any job on the farm from fencing to power hosing sheds etc. Out sourcing work is an ideal method for any farmer to reduce their workload.

Hiring full or part time help

As dairy farms continue to increase in scale, there will be a greater requirement for part time and full time help. While the workload on many farms was manageable for one person up to the recent post-quota expansion, increased scale and the seasonality of the workload means that extra help is needed. The key change when becoming an employer is that the farm is now a place of work for another person. This is where the farm set-up becomes more important: the easier that jobs are to do, the better they are likely to be done.

How many cows can one person sustainably manage?

When discussing labour efficiency, a question is often asked: how many cows can one person manage? The first point to make is there should be no such thing as a one man farm. Every person needs a break from work and so every dairy farm business should have people available to offer the farmer time away from the farm, regardless of scale. This may be family members or paid relief help.

Cows per person are influenced by two things:

- How many hours of work does each cow require during the year?
- How many hours is the person willing to work?

Using data from previous Teagasc labour research, this relationship is illustrated in Table 3. Based on the national average herd size (75 cows in 2016), average labour efficiency nationally is estimated to be 40 hours per cow per year. This includes the workload associated with rearing replacement heifers for the farm.

Farms operating very labour efficient systems (e.g. those with labour efficient set-ups, contract rearing heifers and contracting out machinery work etc.) are achieving efficiency levels of less than 20 hours per cow per year. As can be seen from Table 3, this difference in labour efficiency could easily allow one person manage another 60 cows without doing any extra work.

The other key variable is how many hours is a person willing to work? Achieving high levels of labour efficiency by simply working longer hours is unsustainable. The farm will look impressive using the key performance indicator of cows per person, but chances are that profit is not being maximised as people are too busy working and management decisions suffer. Combining current national average levels of labour efficiency with maintaining a reasonable working week of 50 hours per week over 48

weeks would mean that one person can effectively manage 60 cows. While this analysis looks at annual labour efficiency, another key consideration is the workload at different times of the year, especially in the spring.

Table 3. The effect of labour efficiency (hours/cow/year) and the duration of the working week on the number of cows that one person can manage.

	Hours per cow per year			
Hours per person per week	**25**	**30**	**35**	**40**
50	96	80	69	60
54	104	87	74	65
58	112	93	80	70

Features of labour efficient dairy farms

- Simple farm system that can be easily communicated and operated by others.
- Minimum number of enterprises on the farm (e.g., sale of all surplus calves and contract rearing replacements).
- Suitable cow type that doesn't require individual attention i.e. high EBI genetics.
- An appropriate calving date and stocking rate for the farm that minimises the need for supplementary feed (reducing both workload and farms costs).
- Good grazing infrastructure that facilitates easy movement of animals to and from grazing by a single operator.
- Good milking infrastructure in terms of number of cows per milking unit, backing gate, drafting and cow flow.
- Adequate well organised farmyard infrastructure that facilitates the easy movement of stock, particularly at calving and calf rearing.

Conclusion

Based on international studies, difficulties in retaining employees in the dairy sector have centred on four key issues namely: inadequate working conditions, lack of clear career development and promotion opportunities, neglect of occupational health and safety; and the availability of alternative employment. The suggested response to this should include: setting clear HR polices; offering a competitive remuneration package, not just covering wages but including benefits and bonuses or profit sharing plans; flexible scheduling of working hours plus the provision of excellent training and career advancement opportunities.

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(*https://www.dairynz.co.nz/...workplace-action-plan/workplace-action-plan-employee)*

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Irish Grassland Association

DATES FOR YOUR DIARY

Topical Event
25th April 2018

Sheep Conference and Farm Walk
22nd May 2018

Beef Conference and Farm Walk
24th May 2018

Dairy Summer Tour
24th July 2018

Annual General Meeting
6th September 2018

Student Conference and Farm Walk
8th October 2018

Dairy Conference
16th January 2019

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