

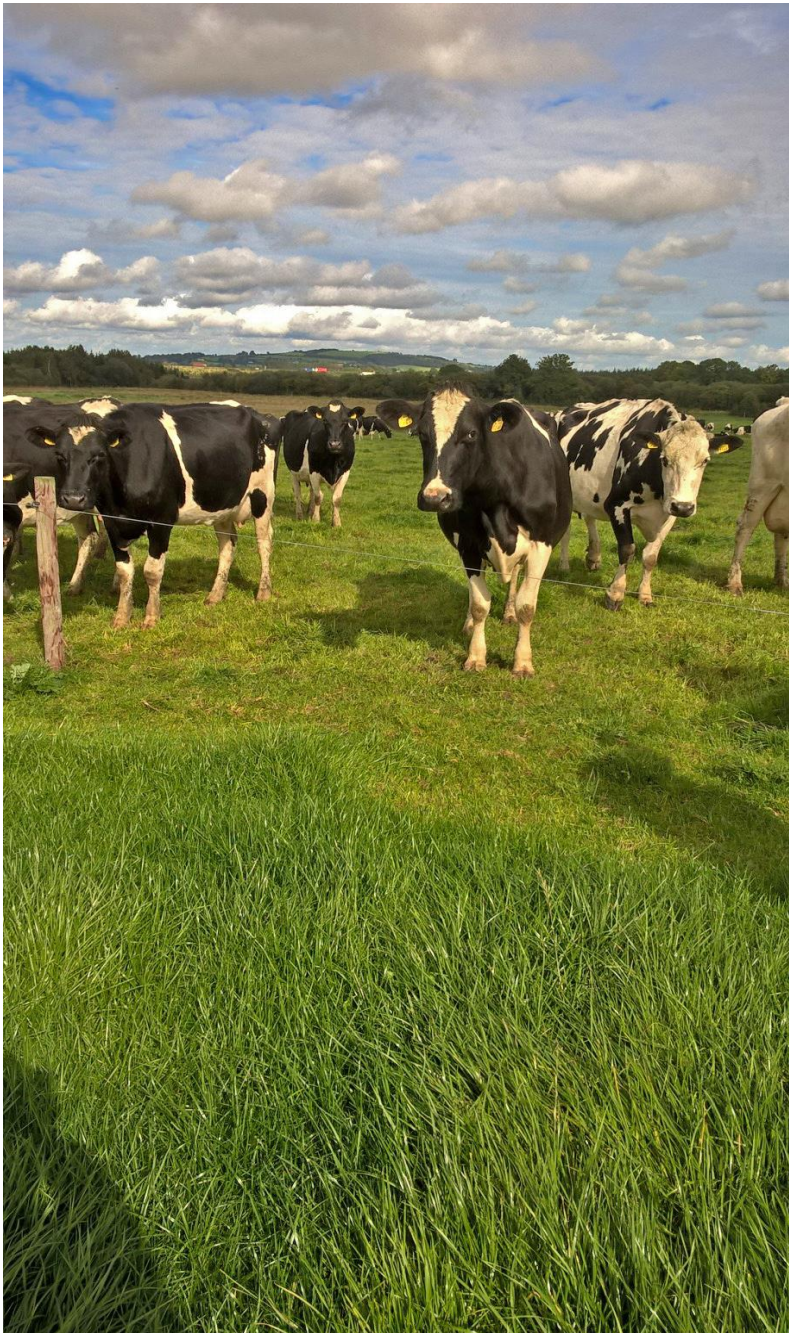
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# Milk Manager NEWS



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## Market Update

### UK Wholesale Dairy Commodity Market

- Fonterra's latest on-line GDT auction (1st May) resulted in a 1.1% decrease in the weighted average price across all products, reaching US \$3,465/t. The previous auction on 17<sup>th</sup> April was the first positive movement (+2.7%) since 20<sup>th</sup> February, with the previous 4 auctions all returning a negative price change. The biggest movers in the most recent auction were SMP (skim milk powder, +3.6% to \$1,999/t) and cheddar (+3.1% to \$4,024/t). Surprisingly, butter showed no movement in price, staying at \$5,647/t.
- UK wholesale markets picked up in April, with butter and cream showing the biggest rises on the back of strong demand, low stocks and milk production back in the region of 3-5% for the month. More milk was expected this month and buyers have had to buy on the spot market to fulfil orders, with some reported to have paid over £5,000/t.

Commodity	Apr 2018 £/T	Mar 2018 £/T	% Difference Monthly	Apr 2017 £/T	% Diff 2018-2017
Bulk Cream	2,080	1,930	8	1,730	20
Butter	4,660	4,220	10	3,725	25
SMP	1,155	1,150	0	1,500	-23
Mild Cheddar	2,920	2,900	1	2,975	2

Source: AHDB Dairy - based on trade agreed from 1<sup>st</sup> to 27<sup>th</sup> April 2018. Note these are average prices indicating prices traded across the whole of the past month.

- The average rise of £150/t for cream, means that the estimated income from cream to a liquid processor is up by 0.91ppl for April, to 12.16ppl (8.1% rise from March).
- A significant volume of SMP (compared to recent tenders) of just under 25,000t was sold out of EU intervention stocks in April, at the minimum fixed price of €1,051/t (£922/t) set by the European Commission. This brings the quantity currently in storage to just under 376,000t. Demand for these stocks is increasing due to concerns over milk production levels. Buyers are worried that the cold spring weather and lack of grass will curb future supply.

- Both AMPE and MCVE increased in value in April, with AMPE up 2.22ppl and MCVE up 0.33ppl from March. Much of the rise in AMPE is due to butter rising in value although SMP also increased slightly for the month of April.

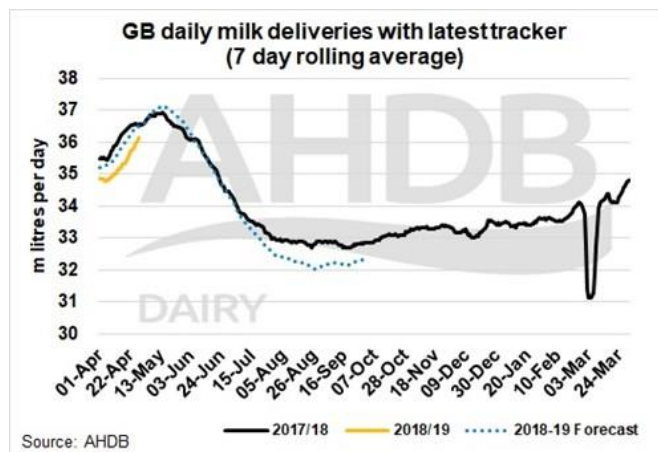
	Apr 2018	Mar 2018	12 months previously	Net Amount less 2ppl Haulage – APR 18
AMPE	28.90ppl	26.68ppl	27.67ppl	26.90ppl
MCVE	31.38ppl	31.05ppl	31.79ppl	29.38ppl

Source: AHDB Dairy

- Cheese exports showed a significant increase on the previous year, rising by 23%. This is equivalent to over 170,000t with a value of over £615 million.

### UK Milk Deliveries and Global Production

- Over the month of April, milk production has been behind the same month for the previous year on the back of the late spring. For the week ending 28th April, UK milk deliveries increased on the previous week by 1.6%, to a daily average of 36.51m litres. Compared to the same week last year, deliveries are down 1.1%, which is roughly 400,000 litres/day.

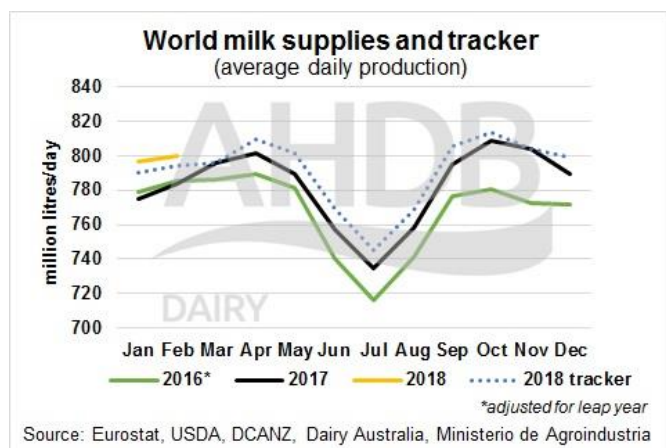


- EU milk production so far this year is up on last year, with a 4% rise for January, equivalent to 501,000t more milk. The biggest increases in production were seen in Denmark, France, Italy and Poland. Milk production for February was also up 3.7% compared to February 2017. Milk production in the EU is expected to slow down further throughout the year with a 1.4% growth predicted for 2018 (European Commission Short-Term Outlook for EU Agricultural Markets Spring 2018 report).



# Milk Manager NEWS

- Global production is also on the rise, with the five key exporting regions (EU-28, Argentina, Australia, New Zealand and the US) up 2.1% for February (equivalent to 800m litres/day) compared to the same month last year. Year-on-year, only New Zealand produced less milk (2.3%) and Argentina's dairy industry has recovered from two years of suppressed production, helping raise global production over what has been expected, based on the tracker.



## Monthly Price Movements for May 2018

Commodity Produced	Company Contract	Price Change from Apr 2018	Standard Litre Price May 2018
Liquid & Cheese	<b>Arla Farmers UK</b>	No change	26.39ppl liquid, 27.43ppl manufacture
Liquid & Cheese	<b>Arla Direct</b>	No change	24.3ppl liquid, 25.32ppl manufacture
Liquid & Brokered Milk	<b>First Milk Mainland Scotland</b>	No change	26.0ppl liquid
Cheese	<b>Fresh Milk Company (Lactalis)</b>	No change	26.0ppl liquid, 26.91ppl manufacture
Liquid & Manufacture	<b>Grahams</b>	-0.5ppl	26.25ppl
Liquid & Manufacture	<b>Müller Direct</b>	-0.5ppl	26.00 ppl
Liquid & Manufacture	<b>Müller (Co-op)</b>	-0.88ppl	27.99ppl
Liquid & Manufacture	<b>Müller (Tesco)</b>	+0.32ppl	29.84ppl
Liquid, Powder & Brokered	<b>Yew Tree Dairies</b>	No change	26.5ppl Standard A litre price

- Müller's Direct May price increases to 26.2ppl on the back of the retailer supplement being

0.2ppl. Direct suppliers will also receive a retailer supplement of around 0.15ppl for April deliveries. Müller are also one of the first companies to announce an increase in farm-gate price for June, with a rise of 0.75ppl on the back of greater returns from firming wholesale cream and butter markets (June liquid standard litre price 26.75ppl).

- Müller has recently announced details on fixing milk price for their direct farm suppliers, helping reduce volatility of farm-gate milk prices. On the back of their deal with Lidl, as the supermarket's main milk supplier, farmers can fix up to 50% of their production at 28ppl for up to 3 years. This fixed price contract is available from 1<sup>st</sup> June and up to 10,000 litres a month is the maximum volume that can be fixed. This offer, given the current milk price looks favourable and uptake is expected to be high.
- First Milk's cheese creameries on Arran and in Campbeltown are up for sale. Shelagh Hancock, CEO of First Milk has stated that the sale will enable the company to invest and focus on production at its other Aspatia and Haverfordwest creameries. The creameries will continue to function as normal throughout the sale process, and First Milk will work closely with the new buyer to ensure a smooth transition for its farmer suppliers.
- While most milk buyers are either holding or reducing their farm-gate price, only Tesco aligned contracts have seen their milk price increase for May. So far this year, the Tesco Sustainable Dairy Group milk price has increased by 0.39ppl, 0.07ppl in February, with another 0.32ppl for May. The increased cost of production calculated for October 2017-September 2018 has come about from higher variable costs (up 0.61ppl to 16.63ppl) and depreciation increasing by 0.06ppl to 2.13ppl. Overhead costs reduce marginally by 0.01ppl to 11.34ppl. Taking into account a decrease in feed, fuel and fertiliser costs of 0.26ppl, the total cost of production for April 2018 to June 2018 has increased to 29.84ppl from 29.52ppl in the previous quarter, hence the 0.32ppl increase. For suppliers in the Müller Milk Group, the liquid standard price for May is 29.84ppl and for Arla suppliers, the same 0.32ppl increase is applied after haulage, taking their price up from 29.27ppl to 29.59ppl.

- The organic milk supply in the EU is increasing and as a result, farm-gate prices are starting to drop. Arla's UK suppliers will see a 0.88ppl (1 Euro cent) cut bringing their price back to 40.43ppl for a liquid standard litre and 42.04ppl for manufacturing. Danish and Swedish organic milk suppliers will receive a 2 euro cent price cut for May deliveries.

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## Straights Update

Straights prices for delivery in artic loads as of early May are as follows (varies depending on location):

£/T for 29t loads delivery + £7/t haulage to central belt	May 18	Jun 18 Jul 18	Aug 18 Oct 18	Nov 18 Apr 19
<b>Proteins</b>				
Hipro Soya	385	384	382	380
Rapeseed Meal	POA	POA	214	-
Wheat Distillers Pellets	POA	Jul 226	226	-
<b>Starch</b>				
Wheat	162	164	162	164
Barley	152	154	137	142
Maize	180	182	Jun 181.50 Jul 185	180
<b>Fibre</b>				
Sugar Beet Pulp	202	Jun 202 Jul 205	205	-
Soya Hulls	POA	Jun 188 Jul 176	176	-

Source: Straights Direct and Cefetra on 4<sup>th</sup> May. Barley and wheat prices are based on delivery to central belt (for North-East, deduct £5/t for wheat), courtesy of Julian Bell, Senior Rural Business Consultant, SAC Consulting. Prices do not include seller's margin.

## Global News

- Globally grain and oilseed prices are up due to weather concerns affecting US wheat and South American soya and maize. However, to some extent this is being buffered by increased global stocks. In the US, crop development was well behind last year at the end of April, with only 13% of the US winter wheat crop at the headed stage, compared to 30% this time last year. Kansas, a key wheat producing state, had no wheat at the headed stage, compared to 23% a year ago. This slow progress could hinder potential yield and influence the output from this year's harvest.

- Although world stocks of soya are reported to be sound, weather and politics still dictate. The US has planted more wheat versus soya beans and drought conditions in Argentina have also kept the soya market firm, and it looks to remain this way well into next winter. This time last year soya was £310/t and is now currently around £390/t based on artic loads delivered into the central belt.

- Closer to home, central Europe is experiencing hot dry conditions, and with a cold, wet spring in Russia, winter wheat growth is also behind last year, helping support prices.

## UK and Scottish News

- Cereal prices have risen £2-£4/t in the last week. In Scotland, the North British distillery is switching from wheat back to maize, though this does not appear to have had a negative effect on Scottish wheat prices, which are still around the £155/t mark for May and harvest. Elsewhere in the UK the Viverno ethanol plant on Humberside has announced it will restart ethanol production and are now buying wheat again including new crop. The late spring also leaves UK livestock feed and forage stocks at low levels, with grass growth several weeks behind normal. This boosts short-term feed demand and is also likely to raise feed demand come the autumn. Overall the balance sheet for wheat and barley looks like it could be tight again in 2018.
- After a long winter there has been a lot of feed used and replacement straights for the summer are not looking cheap. On average, blends and compounds could be up by £5-7/t on current prices and even more if feed was contracted earlier in the winter. These rising costs are on the back of increases in cereals, soya and sugar beet pulp prices. Some ruminant feeds may be less of a rise as wheatfeed and malt culms are back in price for the summer.
- Mineral prices should ease back again in the summer with the rebuilding of the vitamin plant in Germany that went on fire. However, the human health industry will likely have priority over increased supply, so it may take a bit of time to filter through to animal feed.
- Invergordon is reported to be closing their dark grain plant in the near future (converting to AD

production). Dark grains look to be dear all summer and it might be worth looking at other options such as imported product (if available) or other liquid products. Pot ale syrup still remains very good value and may be worth investigating availability and summer price.

- Draff looks to be a bit more available than was anticipated this time last year, although prices will be higher than what we are traditionally used to at this time of year (due to competition with AD plants). However, draff is still reasonable value compared to some other feeds. For example 4kg of draff replaces 1kg of maize gluten. It is worth spending a bit of time considering suitable storage of draff to reduce wastage when paying more for it, especially in the warmer summer months.
- Potatoes and turnips are currently available around £12-15/t ex farm. Potatoes look very good value with barley currently around £145/t ex farm (4kg potatoes replaces 1kg dried barley).

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## Keeping Heifer Growth on Track at Grass

It will have been tempting this year to get as much youngstock turned out to grass as soon as possible to save precious silage stocks and straw for bedding. However, with heifers being the genetically superior animals on the farm and the future milking herd, growth performance must not be compromised if heifers are to achieve their target weights at certain stages throughout the rearing period.

Much attention is paid to grassland management, ensuring grass is at the correct stage for grazing the milking herd. The same attention to grassland management should be applied for dairy heifers to achieve optimum growth rates. Heifers are often left to graze the poorer fields or tidy up after the milking cows and if the grass is not at the 3 leaf stage for grazing, quality is greatly compromised.

Ideally dairy heifers should be reared on straw and concentrates until 6 months of age. At 6 months, assuming a birth weight of 40kg and growth rate of

0.8kg/day, they will be just under 200kg. Even on high quality spring grass over 12ME, a 200kg heifer may only be able to eat sufficient dry matter from grass to support growth of 0.6kg/day and on very wet days, growth will be even poorer. Dry matter intake is the main limiting factor at grass, with heifers over 300kg on good quality grazing being able to achieve up to 1kg growth/day without supplementary feeding.

If possible, weigh heifers at turnout and then a month later to see what growth they have achieved. Smaller heifers or those with poorer growth rates could be separated and given concentrates to improve their performance.

In the early grazing season, grass contains significantly more protein than is required by growing heifers, so any supplementary feed should be of low protein and fibrous in nature. Early in the season, grass may be 20% protein or even more but young heifers generally require in the region of 14-16% protein depending on stage of growth and down to 12% for in calf heifers. Level of supplementation will depend on grass quality and quantity but in the region of 1-2kg/head/day. Barley alone (if fed at 2kg) may cause digestive upsets if given in 1 feed but if mixed with 50% beet pulp would be more suitable.

Don't forget mineral supplementation. Although a deficiency may not be immediately apparent, supplementation has been shown to improve growth rates in the region of 10-20%. Longer-term, mineral supplementation will support better health, immunity and conception rates. Be aware of the lungworm risk on your farm. If heifers have not been exposed before, vaccination against lungworm in the spring is a must.

A significant increase in rearing costs can result if target growth rates are not achieved at grass. Delayed service past 15 months means that 24 month calving is not achieved, and lifetime performance, milk yield and fertility is compromised. A heifer calving at 24 months will break-even half way through her 2<sup>nd</sup> lactation. However, a heifer calving at 30 months will not break-even until into her third lactation. Heifers must be between 55-60% of mature body weight for service at 13 to 14 months of age, which is roughly a minimum 360kg, assuming 650kg mature liveweight (see table below for growth



targets). This is equivalent to a minimum wither height of 125cm for Holstein-Friesians.

## Weight for Age Targets for Dairy Heifers

Age	% of Mature Weight	Liveweight kgs
Birth	-	40
8 weeks	12	80
6 months	30	195
9 months	40	260
13-14 months (mating)	55-60	357-390
Pre-calving	90	585
Post-calving	85	550
2 <sup>nd</sup> calving	92	598

Based on Holstein-Friesian mature body weight of 650kg  
(adapted from AHDB Dairy)

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## Preventing Udder Oedema

Transitioning heifers into the milking herd smoothly is critical for success in the first lactation. Udder oedema can affect first-calf heifers more than older cows and depending on severity, can increase the risk of mastitis, affect the udder's support tissues and interfere with the ability to milk. Cluster attachment and milk let down may be affected by tenderness and altered shape of the teats. Production may also be affected as heifers with oedema, are more likely to have lower milk yield at first recording compared to heifers without oedema.

### Swollen abdomen from udder oedema



Source:

[http://www.dairyweb.ca/Resources/DPPH/DPP\\_Health\\_068.p](http://www.dairyweb.ca/Resources/DPPH/DPP_Health_068.p)

Oedema arises when fluid is retained within the extracellular spaces within mammary tissue, causing swelling of the udder and teats, as well as extending into the abdomen.

Several factors have been implicated in the development of udder oedema, including nutrition, genetics, age at first calving (with older heifers having greater risk), gestation length and lack of exercise pre-calving.

Normal physiological changes prior to calving also have an influence. In late pregnancy, there is increased blood flow to the udder, which occurs alongside restricted blood and lymph flow away from the udder, due to foetal growth increasing pressure in the abdomen. As heifers have a smaller, less developed vascular system, this explains why they are more at risk than older cows. When blood flow is compromised, immunity in the udder also falls, increasing the risk of mastitis. Also, the reduction in blood proteins, as immunoglobulins are transferred to colostrum, may result in greater permeability of blood vessels, increasing the chance of a build-up of fluid.

Nutrition is an area where preventative measures can be taken. Oedema is thought to be influenced by sodium and potassium levels in the diet, as well as excess concentrate intake (high energy diets). Avoid close up diets in excess of 130MJ intake.

If grass silage is used as the basis of dry cow rations, unless it has been produced from ground that has had no slurry applied, chances are the potassium levels are higher than required (typically over 2%). Ideally, potassium should be less than 1.4% in the ration on a dry matter basis and salt should be limited to no more than 0.15% or less than 30g intake. Both these major minerals increase the risk of fluid retention. Low magnesium may also be a cause, so aim for no less than 0.4% magnesium in pre-calving rations.

The condition usually clears up after calving but the following practices can help alleviate symptoms:

- Milk heifers before calving (beware milking older cows before calving as this may make them more susceptible to milk fever).
- Application of liniment.
- Use of diuretics and corticosteroids post-calving for serious cases (always take veterinary advice for best course of action).
- Increase milking frequency post-calving.
- Udder massage (10-20 minutes twice a day).

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## Dealing with Volatility

Rebuilding feed stocks will be a priority for most Scottish dairy farmers this year. A task made more difficult by the damage done to many fields last year owing to the wet weather. Furthermore, this will have to be achieved against a backdrop of worries over the milk price for most producers. Time for a bit of budgeting!

Yet few farmers actually use a budget to manage their farms. The reason often cited is that the future is so uncertain, budgeting is useless. Of course, the truth is quite the contrary. The process of budgeting reduces the unknown and, critically allows you to have contingencies in place should weather, prices and so forth, turn out better or worse than expected.

To help Scottish farmers “do a budget” an easy to use template can be downloaded from [www.fas.scot/cash-flow-budgeting/](http://www.fas.scot/cash-flow-budgeting/). Simply save a copy of the blank excel file to a folder on your computer and remember to backup often. A worked example is available to show what a completed budget looks like. So what is the process of doing a cashflow budget?

A cashflow budget involves detailing down all income coming into your business and all the expenditure going out, regardless of whether it's trading, personal or capital related. If you run the business through one bank account, you are simply trying to predict how the bank balance will change each month. The secret of producing a good budget is taking the time and effort to work out your income and expenditure step-by-step. Always write down your workings for reference and try to get a complete draft done in one sitting. Even if the draft is “a bit rough”, it's far easier to complete a cashflow by refining drafts, rather than trying to get it right first time.

- First, establish your starting position. What 12 months are you covering? Don't worry if you are a few months into the year, simply complete those months with the help of your bank statements. Always remember to adjust the opening figure in your bank statement for unrepresented cheques and receipts.
- Complete a livestock and crop reconciliation to calculate the physical numbers of livestock and crops you expect to trade in the year. Most

importantly, work out how much milk will be produced each month. Be realistic: if you have a clamp of low quality silage, target yields over the winter will typically be lower unless a lift in milk price will cover the cost of extra concentrates.

- Calculating receipts then involves multiplying the physical sales by forecast prices (e.g. milk price forecast for August). But remember the cashflow must be allocated against the month the money is banked, not produced. Hence, the milk income in the first month will relate to that produced in the previous month. Besides subsidy income, also detail down what other trading income (e.g. biomass boiler FITS) is due. The spreadsheet not only allows you to play around with the price per litre of milk, per calf, etc., it keeps the prices and quantities you have assumed for future reference.
- Then set down what capital receipts are likely (e.g. machinery sales, new loan).
- The trading costs are worked out net of VAT (the tool will add the VAT in). Purchased feed is a major input on most dairy farms so accurately budgeting tonnages required and cost per tonne is essential (you may decide to forward contract based on your budget).
- Fixed costs often prove a stumbling block. If the farm hasn't changed much in the past year or so, use the fixed costs in the latest accounts as a starting point and simply tweak based on what you plan to do in the coming year (e.g. repair the back shed). Don't waste time trying to allocate fixed costs precisely between months. Some costs can simply be spread equally over the 12 months.
- Personal spending is also, typically, spread evenly through the year, though watch for tax bills. As for capital spending, monthly commitments to loans are normally known (don't try and split out the interest element although it is strictly a trading expense). Importantly, replacement of machinery and other investments may well depend on what the budget looks like. That is, if the bank balance is under pressure, deferring capital spending is often the first option for improving cashflow.

Having established a budget based on the prices, production and costs you think most likely to occur, the next step is to stress test it. How sensitive is it to changes in milk price, cost of concentrates or monthly yields? Under the worse-case scenario, will you breach your overdraft limit? If so, what contingencies do you need to put in place?

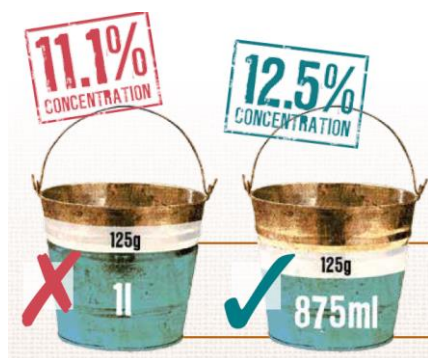
Critically, a cashflow budget is a working document. When the bank statement comes in, check how actual cashflow compares. If it differs, do you need to act or is it simply earlier payment of a big bill or a delay in, for instance, the Basic Payment being banked? To sum up: "doing a budget" is one of the most effective means of managing a dairy farm in these uncertain times.

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## Calf Milk Replacer vs Whole Milk

Feeding milk replacer powder is the safest and controversially the cheapest way to feed calves, providing manufacturers instructions are followed. Feeding calves at the standard 12.5% inclusion costs anywhere between 19-24ppl pence per litre depending on specification and quality of powder, whereas feeding milk from the bulk tank is effectively costing 26ppl depending on the milk contract which the business is on.

### Correct mixing of calf milk replacer at 12.5% inclusion



Source: Volac

There are many different milk powders on the market, so it is key to know what you are feeding. Similar to feeding cake or blend to the milking herd, it is equally important to know what is in your powder, the source and level of protein and fat content. Proteins in milk replacers can be either

milk based (dried skimmed milk or dried whey), vegetable based (e.g. soya, wheat or pea protein) or egg based.

Powders made from milk based proteins are more easily digested especially by the younger calf. The fibre content on the label is an indicator of the proteins used, with fibre levels over 0.2% indicative that there are higher than desired levels of plant proteins and the higher the fibre content, the lower the protein quality and digestibility. The protein source can be determined by checking the ingredients list, which will be in descending order of inclusion. Therefore, milk based proteins should ideally be first on the list.

Milk replacers can vary from 18% to 26% protein, with fat content ranging from 14% to 20%. Most powders contain vegetable fat (e.g. palm and coconut) which has a comparable digestibility to milk fats for calves older than 2 weeks.

Most milk replacers advise feeding 6 litres at a minimum 12.5% inclusion across 2 feeds for optimum health and growth, although 15% inclusion is becoming more common, especially during the colder months to increase energy intake and growth performance. Increasing concentration to 15% raises the cost in the region of 25-28.5ppl pence per litre, potentially still saving over feeding bulk tank milk for a whey based milk powder, with skim based powders generally being more expensive.

Feeding whole milk may seem like the easier and cheaper option, especially if it is waste milk not destined for the tank. However, factor in the risk of disease spread such as Johnes, or mastitic milk containing antibiotics and the health risks to the calf are greater, with potentially poorer performance. Feeding whole milk is also a less consistent product than milk replacer and any changes to the ration being fed to the cows may have an effect on the milk composition, again, upsetting the calf's digestive system. When mixed to the correct concentration, milk powder is potentially a healthier, more consistent product with virtually no variation in compositional content.

However, feeding milk replacer is the second rung on the ladder of feeding calves efficiently and if the first rung is not successful then every step thereafter will have problems. It has been well studied and documented that calves which receive



insufficient colostrum within 6 hours of birth will suffer from compromised immunity in the early weeks of life, with many suffering varying levels of illness, mainly scour and pneumonia. Some studies have also shown that insufficient colostrum at birth results in a calf never reaching its full potential.

The most efficient phase for growth is the milk phase, with calves able to grow at well over 1kg per day if housing and management conditions are favourable. However, this is also the stage where calves are most vulnerable to diseases and infections. Spending a few extra minutes daily to ensure hygienic feeding conditions, with ad-lib water and quality starter feed available at an early stage (day 4 onwards), pays dividends to the resulting replacement heifer.

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## What do Future Breeding Goals Look Like - Efficiency and Greenhouse Gases

Current broader breeding goals that select on both production and fitness traits can help to mitigate greenhouse gases (GHG) from many livestock systems. Selection for efficiency of production in livestock species will help to reduce emissions. In many cases this can be achieved simply through selection on production traits. Reducing the number of animals required to produce a fixed level of output reduces the GHG (including methane) produced per unit of product. For example, the dairy sector in Canada has reduced its methane emissions by 10% since 1990 by reducing the number of animals (Désilets, 2006).

Selection for fitness traits (lifespan, health and fertility) will help to reduce emissions by reducing wastage of animals. Improving lifespan in dairy cows will reduce wastage by reducing the number of followers. For example, improving lifespan in dairy cows from 3.02 to 3.5 lactations will reduce methane emissions by 3% (Wall et al, 2012). Improving health and fertility will reduce involuntary culling rates and reduce emissions from dairy systems by reducing the numbers of followers required. Improving fertility will reduce calving intervals and inseminations resulting in shorter dry/unproductive periods. This reduces management costs as well as emissions.

Improving health reduces the incidence of health problems/diseases, thereby improving animal welfare and reducing treatment costs (and lower antibiotic use) and reducing emissions by maintaining the productivity level of the animal (which is reduced during periods of poor health).

Feed utilisation has been considered in selection programmes for pig and poultry species. Due to the nature of many ruminant production systems, with less opportunity for intensive feed recording, the use of such traits in selection has been limited. Herd et al. (2002) showed that there is decreased enteric methane production per day in animals selected for reduced residual feed intake. Reduced residual feed intake is akin to selection for high feed efficiency as an animal is eating less but maintaining a similar growth rate (high net feed efficiency) and therefore less feed is required to produce a unit of output. This shows the possibilities for selection of reduced GHG emissions through the selection of animals which use less feed and produce less methane than average, to achieve a given level of performance.

Many traits, including those routinely included in current breeding goals, have an indirect environmental impact and therefore the effect of a change in these traits can be expressed in an environmental impact unit such as Global Warming Potential or carbon equivalents. Farm models have been used to model the emissions from a livestock system and the effect that a change in a trait (e.g., fertility, feed efficiency) would have on overall emissions. We have looked at what would happen if dairy farmers selected on an environmental focused breeding goal versus an economic focused breeding goal (see table below) by quantifying the expected economic and GHG responses/cow. We can see that selection on an economic focused goal is reducing GHG emissions per breeding female (and per kg product) with a 0.53% reduction in kg CO<sub>2</sub>e/cow/annum in dairy cattle systems. The impact of an exclusively environmental goal on GHG emissions would result in a 1.01% reduction in kg CO<sub>2</sub>e/cow/annum in dairy cattle systems with a reduction in the rate of economic improvement.

## Effect of environment focused versus economic focused breeding goals

		Breeding objectives & responses per annum	
		Economic	GHG
Selection index weights used	Units		
Current index	£/cow	£7.11	£3.21
GHG reduction per cow	kg CO <sub>2</sub> e/cow	-33.50	-64.07
GHG reduction per kg product produced	g CO <sub>2</sub> e/kg product	-14.15	-28.79

Source: SRUC 2018

However, the effects on GHG emissions for a given change in a trait may differ depending on the system. For example, the economics of body tissue mobilisation differs depending on the calving system employed (spring vs. autumn) due to the different costs of feed at grazing opposed to winter feeding (Wall et al., 2008). There is also likely to be environmental impact differences in traits related to tissue utilisation and wastage depending on system types. In developing environmental indices, it will be important to consider the different systems to help farmers consider the long-term environmental impact in their choice of breeding animals, specific to their system of production. For example, in dairy cows is it better in environmental terms to gather and preserve feed for winter feeding or for cows to store some of that energy as body lipid and then use it during the winter? The answer to these and other questions may dictate the type of dairy cow for the future.

### References

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Wall, E., Coffey, M. P., & Pollott, G. E. (2012). The effect of lactation length on greenhouse gas emissions from the national dairy herd. *Animal*, 6(11), 1857-1867.

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## Dates for your Diary

- 16<sup>th</sup> May - **Pedigree Holstein Cattle - Show and Sale on behalf of Border and Lakeland Holstein Club.** Borderway Mart, Carlisle, CA1 2RS. Time: 11.00.
- 6<sup>th</sup> June - **Borderway Monthly Dairy Day Sale.** Borderway Mart, Carlisle, CA1 2RS. Time: 11.00.
- 12<sup>th</sup> June - **Field Lab: All Over Clover.** Mossiel Farm, Mauchline, Ayrshire, KA5 5LL. Time 12.30-15.00. Event Organiser: Soil Association, t: 0131 666 2474, email: [idingwall@soilassociation.org](mailto:idingwall@soilassociation.org)
- 14<sup>th</sup> June - **NMR/RABDF Gold Cup Open Day 2018.** The Leen, Pembridge, Leominster, HR6 9HN. Time 10.30-15.30. Event organisers: RABDF.
- 21<sup>st</sup> - 24<sup>th</sup> June - **Royal Highland Show.** Royal Highland Centre, Ingliston, Edinburgh, EH28 8NB.
- 28<sup>th</sup> June - **Premier Pedigree Herd Open Day.** Boclair Farm, Bearsden, Glasgow, Lanarkshire, G61 2TH. Time: 10.00-15.00. Event organiser: Holstein UK.
- 4<sup>th</sup> - 5<sup>th</sup> July - **TotalDairy Seminar 2018.** Crowne Plaza, Bridgefoot, Stratford-Upon-Avon, CV37 6YR. Event Organiser: TotalDairy t: 01768 877 094, [info@totaldairy.com](mailto:info@totaldairy.com)

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