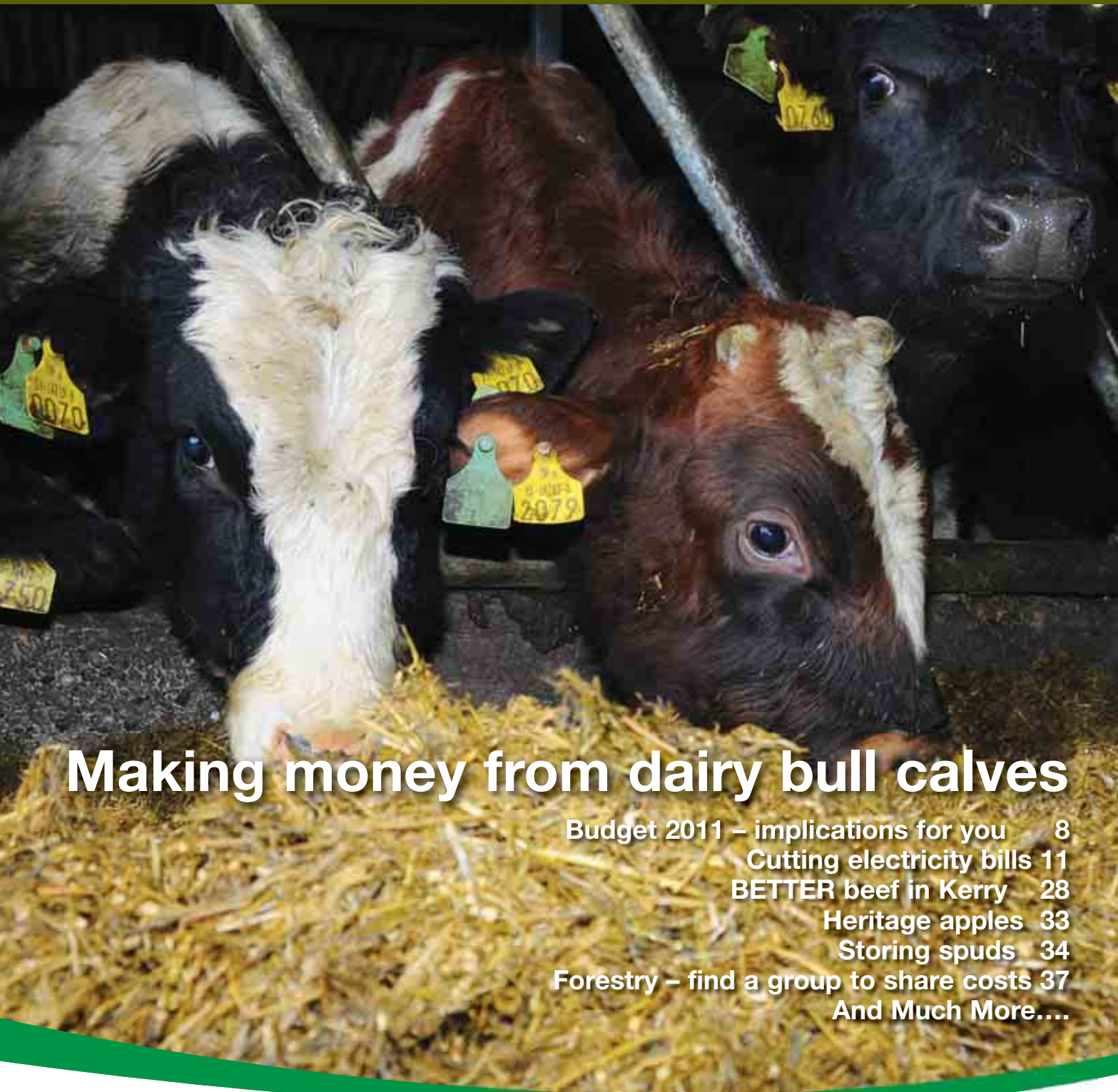


TEAGASC Today's farm

JANUARY-FEBRUARY 2011 VOLUME 22 NUMBER 1

Advice on business, production, environment, and countryside issues



Making money from dairy bull calves

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AGRICULTURE AND FOOD DEVELOPMENT AUTHORITY

Two Problems

One Solution

CYDECTIN TriclaMox is a new combination fluke and worm drench.

It contains moxidectin and triclabendazole and is the ONLY product to kill all stages of fluke and provide long-lasting worm control* in a single dose.

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Pfizer Animal Health, 9 Riverwalk, Citywest Business Campus, Dublin 24. Telephone 01 467 6650.

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COVER | caption:

These lucky dairy bull calves are eating excellent silage. Research at Johnstown Castle suggests that optimising profit from such animals means maximising the role of grazed pasture in their lifetime feed intake.

PICTURE: Mark Moore

COMMENT

Building from a position of strength



Mark Moore
Editor,
Today's farm

In the 'Celtic Tiger' years, agriculture was caught in a classic price/cost squeeze. Markets were subdued and input prices were rising, partly driven by the property 'bubble'. As a result of this pressure, agriculture is now lean and competitive, just as prices are improving across virtually all sectors. This is a very satisfactory situation, and agriculture and food can play a significant role in 'rescuing' the rest of the economy.

But there are no grounds for complacency. The economy as a whole started the last decade in a similarly competitive situation but squandered the hard-won progress. Farmers must be careful to use current profitability to enhance their future competitiveness, perhaps by investing now to reduce costs later. One example is electricity — John Upton outlines on pages 11-13 how new technologies can dramatically reduce electricity costs. Investing in education is always a shrewd move (see Paddy Browne's article on page 34)

Another key step in building competitiveness is to constantly review what you are producing and how you are producing it. Teagasc is working hard to find the optimal use of bull calves from the dairy herd, whose numbers will inevitably grow as the dairy industry expands to meet market opportunities. See the article by Rob Prendiville and others starting on page 22.

Constantly focussing on long-term competitiveness will offer the best chance of sustained prosperity. As George Ramsbottom outlines on page 18, that may mean slightly larger average herd size. Achieving structural reform without creating more unsustainable asset 'bubbles' will be a major challenge in coming years.



Bearing fruit
Heritage apples 33

Is é Today's farm an iris do chliaint Teagasc. Bíonn altanna teicniúla ann faoi chúrsaí déiríochta, faoin eallach, faoi chaoirigh agus faoin gcuradóireacht, agus faoi go leor eile. Is minic altanna faoin timpeallacht agus faoi dheiseanna éagsúlaithe feirme san iris freisin. Gné an-tábhachtach den iris is ea na haltanna faoin gcaoi le cúrsaí gnó na feirme a láimhseáil. Ar na topaicí eile a chlúdófar amach anseo beidh táirgeadh fuinnimh ar an bhfeirm, an fhraoiseacht, an ghairneoireacht, srl. Agus beidh altanna ann ó thráth go chéile faoi chúrsaí feirmeoireachta thar lear freisin.

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Upcoming events

TEAGASC NATIONAL TILLAGE CONFERENCE, 27 JANUARY 2011, SEVEN OAKS HOTEL, CARLOW, 10.30AM TO 4.30PM

This year's Teagasc tillage conference is taking place after a year of volatile grain prices. Hear a UK farmer's practical approach to grain marketing. As more farmers in Ireland opt to grow winter barley and oilseed rape this year, get the latest management updates. Gather the latest strategies to reduce and control machinery costs. (See page 36 also).

Conference programme

9.30	Coffee and registration
10.30	Conference opens — Prof. Gerry Boyle
Chair	— John Spink, Teagasc, Oak Park
10.45	Grain marketing a farmers approach — Mark Woods, Farm Manager UK
11.30	The tillage better farms programme — Tim O'Donovan
12.00	Nitrates & Nitrogen for Cereals — Richie Hackett
12.30	Machinery: controlling your largest costs — Dermot Forristal
13.00	Lunch
Chair	— Andy Doyle, IFJ
14.30	Septoria sensitivity and disease control — Steven Kildea
15.00	Oilseed rape management & disease control — John Spink
15.30	Winter barley: maximising yield — Michael Hennessey
16.00	Close of conference — Dr Frank O'Mara
16.15	Tea and depart

Registration & booking

To register and prepay contact: Eleanor Butler (eleanor.butler@teagasc.ie) Tel: 059 9170204 (credit card and laser accepted)

- Conference fee: €55
- Teagasc clients: €35
- Lunch: €15



TEAGASC ECONOMICS CONFERENCE, 20 JANUARY, THE HERITAGE HOTEL, PORTLAOISE

Following the difficult year experienced in 2009, agricultural incomes increased in Ireland in 2010.

A moderation in the cost of production, along with an increase in output prices, particularly in the case of milk and crops, have given rise to improved margins. This year's conference will address several questions:

- Can prices be sustained?
- Will cost pressures return?
- What options exist to deal with price volatility?

The outlook for dairy, beef, sheep, pigs, crops and inputs in 2011 will be critical in making informed planning decisions for the short to medium term. The conference includes detailed economic analysis for each enterprise and will be followed by a special session on price volatility.

This conference will be of interest to:

- Farmers and their representative organisations
- The agribusiness sector and credit institutions
- Food processors and suppliers of farm inputs
- Policy makers, consultants, advisers and researchers
- Academics, students and others with an interest in the agri-food sector.

How to book

Early registration is advised. By credit card or Laser, call: 091-845863. By cheque (in advance): please complete the registration form and return with payment to Marian Moloney, Agri Economics and Farm Surveys Dept., Teagasc, Athenry, Co Galway. e-mail: marian.moloney@teagasc.ie by Fri-

day 14 January 2011. Download registration form and conference programme (1.4MB, PDF format).

Important alert

Advanced Certificate in Agriculture (ACA) Online Applications 2011

Application forms and details for the FETAC level 6 Advanced Certificate in Agriculture for non-agricultural award holders are now available on the Teagasc website www.Teagasc.ie/ecollege

Also available on the site are course details and closing dates.



ORGANIC PRODUCTION COURSES

FETAC accredited courses

Teagasc will host a series of 25-hour FETAC accredited courses in Organic Production.

On completion of the course, participants will be proficient in:

- Interpretation of organic standards
- The principles of organic production
- Assessing economic viability and market opportunities

These courses qualify applicants to the Organic Farming Scheme.

25 January	Macroom	Pat Barry
26 January	Ballinasloe	Dan Clavin
26 January	Tullamore	James McDonnell
27 January	Clonmel	Pat Barry
27 January	Mohill	Elaine Leavy
27 January	Swinford	Dan Clavin
28 January	Ballyhaise	Elaine Leavy
28 January	Tinahely	James McDonnell

All courses run from 10 am — 4 pm, one day per week over five consecutive weeks. Cost €200. Pre booking essential.

Further information from course leaders:

- Pat Barry, Moorepark, 087 2138331
- Dan Clavin, Athenry, 087 9368506
- Elaine Leavy, Grange, 087 9853285
- James McDonnell, Oak Park, 087 3293820

AGRICULTURAL EDUCATION: SUPPORTING ECONOMIC RECOVERY, THURSDAY 10 FEBRUARY 2011, DUBLIN CASTLE

10.00	Registration / Coffee
10.30	Opening of Conference, Dr Noel Cawley, Chairman, Teagasc
Session I	The Future Challenges for Agricultural Education in Ireland and Europe
Chairperson:	Professor John Coolahan, NUI Maynooth
	Direction of EU Agriculture and Implications for Agricultural Education - Mairead McGuinness, MEP
	Role of Education in Irish Economic Recovery - Professor John Fitzgerald, ESRI
	A New Concept of Irish Agriculture Implications for Agricultural Education
	Dr Liam Downey, Former Director, Teagasc
	The Challenges Facing the Teagasc Education and Training Programme
	Paddy Browne, Head of Education, Teagasc
Discussion	
12:30	Lunch

1:45	Session II - International and Industry Perspective
Chairperson:	Michael Gowing, President Macra na Feirme
	Results of EUROPEA Chavet Research Project on the Evolving Requirements for European Agricultural Education - Elisabeth Honigsberge, EUROPEA
	The Northern Ireland Agricultural Education System — Challenges and Perspectives - John Fay, Head of CAFRE
	The Scottish Agricultural College Experience - David McKenzie, Vice Principal SAC
Discussion	
2.45	Session III — Forum Discussion on Benchmarking Farms/Discussion Groups in Action. Chairperson: Dr Tom Kelly, Head of Knowledge Transfer, Teagasc
3.45	FBD Student of the Year Award
Bookings: Return the booking form by Friday 4 February.	

Irish sweet potato?

Sweet Potato (*Ipomoea batatas*) is a root crop well established throughout the world's tropical and sub-tropical regions. Despite its importance in developing countries, it has only recently been gaining popularity with western consumers.

Currently, 90% of global sweet potato output is harvested and utilised in developing countries. However, there has been a turn recently where western consumers are demanding superfoods like sweet potato but without the air miles. They are a trendy, luxury vegetable in Japan at present. Sweet potatoes are one of the highest ranked vegetables on the nutrition scale.

Sweet potatoes high in fibre, Vitamin A, Vitamin C, Vitamin B6, potassium and manganese. Containing complex carbohydrates, they can also help to stabilise blood sugar, which means they're a good choice for diabetics. They're relatively low in calories for all of the nutritional power they pack, at about 95 calories each.

Work is underway at Kildalton College, Kilkenny, between the horticultural development department there and Fitzgerald Nurseries, Co Kilkenny, to assess production possibilities in an Irish context. Early trials suggest that potential exists to grow sweet potatoes here, as a niche crop, and that organic production may be possible, based on the 2010 trial at Kildalton. Further research is planned for 2011.

The Irish market for sweet potato is small but growing strongly in line with most western markets.



Electronic Herd Register for Cattle

Farmers with computers now have an opportunity to dispense with the requirement to maintain the blue book (on farm herd register).

The Animal Identification and Movement system known as AIM (formerly called CMMS) can be used as an electronic herd register by farmers who sign up and use the Department of Agriculture, Fisheries and Food's website at www.agfood.ie to register calves and record farm to farm movement notifications.

This development reduces the burden of maintaining paper records for farmers as well as reducing the risk of financial penalties arising at cross compliance inspections.

In 2010, over half a million calves (one in four) were registered electronically. About 300,000 calves were registered through the Department's www.agfood.ie website, while over 200,000 calves were registered using farm management packages.

Farmers using a farm management package approved as an electronic herd register by the Department are exempt from maintaining the blue book also.

Collins Tree Guide (Harper Collins), Owen Johnson & David More

Farmers with an interest in trees need one good reference book on the bookshelf and the Collins Tree Guide, being the most complete field guide to the trees of northern Europe, earns this place.

The illustrations are the best of their kind, showing the main leaves, buds and flowers, as well as the tree as a whole. It's a compact size, robust, and the text is detailed, accurate and geared to providing practical data while still finding space for interesting background or historical information — like the plant-hunter given unfamiliar seeds for dessert in Chile and germinating them on his voyage home in 1792 and thereby introducing the Monkey Puzzle tree to Europe.

There are 14 pages (out of a total of over 460), for example, describing and illustrating pine trees. While it doesn't tell you that the Monterey Pine (*Pinus radiata*) is also called the *Pinus insignis*, it does point out the useful fact that it withstands salt spray and grows well near coasts.

Most good bookshops should stock this book and, if not, could easily order a copy. The list price is €21 but an online purchase from The Book Depository (www.bookdepository.co.uk) costs €13.31, and this includes postage to Ireland.



Free weed guide

Stephen Alexander (pictured) of Teagasc Kinsealy has recently produced an Illustrated Guide to Tillage Weeds. It's aimed at farmers and growers who want to be able to identify arable weeds. Copies can be downloaded from the Teagasc website under Publications · Publica-

tions By Date. Hard copies are not available but interested farmers or growers can download the publications for free and use them on their own computers or print out copies. <http://www.teagasc.ie/publications/2010/55/55.Guide.to.Identifying.Tillage.Weeds.pdf>

New map of Roscommon

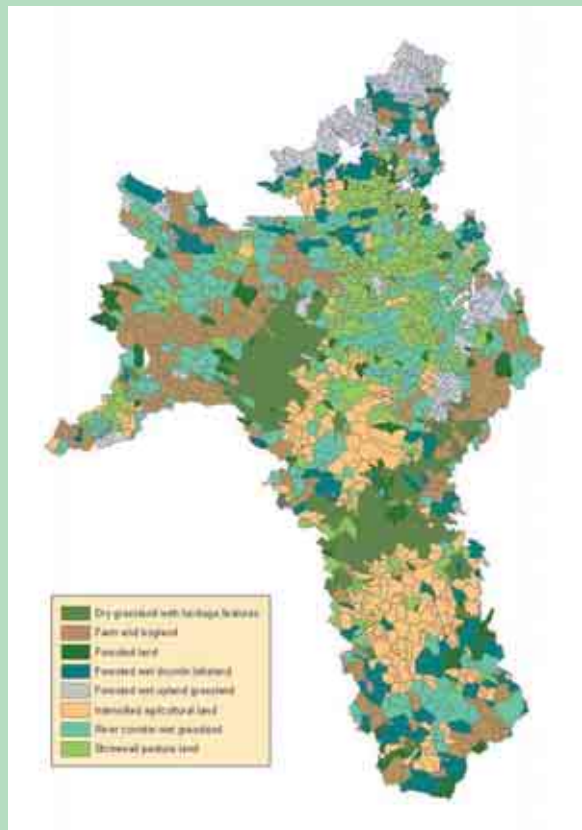
This map is part of a research programme looking at the Rural Environment Protection Scheme (REPS) with a view to producing a Strategic Environmental Assessment (SEA) method of the schemes with respect to their effect on landscape.

In order to look at landscape, a characterisation map, where areas of similar landscape are grouped together, is needed. The conventional method relies upon the drafter making judgements on what constitutes an area and labelling it with a description.

The map shows the output of a successful method, using statistical clustering of farming, environmental and topographical data at a townland scale, to generate a landscape characterisation of Co Roscommon without any prior human judgement of value.

In other words, while beauty may be in the eye of the beholder, an objective method of describing landscape would be beneficial. The Teagasc researchers believe that the Landscape Character Assessment (LCA) method could be used to generate a national LCA without imposing subjective judgements.

"There are potentially very practical benefits," says Jackie Whelan, who carried out the work as part of a PhD thesis funded under the Walsh Fellowship Scheme and directed under the supervision of Stuart Green, Teagasc, Kinsealy, and John Fry, UCD. "For example, it could potentially enable tourists to gather information about areas they intend to visit."



Budget 2011

What it means for you



Kevin Connolly
Financial Management Specialist, Teagasc

THE budget announced last 7 December was one of the most closely followed in recent years. For most people, the main concern was whether or not there would be higher tax bills coming for 2011. In looking at the tax you might have to pay, the first area people focus on is the rate of tax. Despite speculation, the two rates of income tax were not touched — the low rate (or standard rate) remains at 20% and the high rate remains at 41%. However, it was not all good news with regard to income tax.

Changes

Sadly, changes to the standard rate bands and the tax credits will generally mean that there are higher tax bills in store for most people.

The standard rate band sets the cut-off point at which people switch from paying income tax at the low rate (20%) to tax at the higher rate (41%).

Budget 2011 lowered the bands by 10%, which means that people will be paying a higher rate of tax on a bigger proportion of their income. This will be particularly important to those with annual incomes at or around the new cut-off point of €32,800 for a single person or €41,800 for a married couple with one income.

Under the new bands, a married couple with one income will start paying tax at the 41% rate on any income above €41,800 in 2011 compared with €45,400 for

“ While this may be painful on the pocket, there is an old saying that is useful to remember: ‘Never be afraid of paying tax. If you’re paying tax, you’re earning profit

the previous year. Of significance to every taxpayer is that many of the key tax credits were also reduced by 10%. Tax credits are very valuable in that they are allowed as a direct deduction from the potential tax payable to arrive at the final tax payable. The reduction in these credits results in an increase in the potential tax payable.

The tax credit for a single person is now €1,650, down from €1,830 in 2010 which, in effect, means an additional €180 on the tax bill.

‘Other’ taxes

As mentioned, while the income tax rates are unchanged, the news is not so good for other rates of taxes and charges.

Farmers, like other self-employed people, are expected to make annual Pay Related Social Insurance (PRSI) payments. Farmers making Class S PRSI payments are entitled to the Contributory Old Age Pension when they reach 66. The Class S PRSI rate has been raised from 3% to 4% and this rate is applied to all income.

A new tax or charge, the Universal Social Charge (USC), has been introduced as a replacement for two existing levies — the Health Levy and the Income Levy. The rules for applying this charge are slightly different from those for the abolished Health and Income levies and the net result is a higher levy charge for certain taxpayers.

Once an individual’s annual income is greater than €4,004, they become liable to the USC on all their income, starting at a rate of 2% up to a maximum rate of 7%.

The top rate of 7% applies to all income in excess of €16,016. Those aged over 70 will pay the USC at a maximum of 4%. Contributions paid in to a pension fund will not escape this charge; this is similar to the way the old levy system operated.

One favourable change made is that capital allowances (the tax write-offs allowed for spending on buildings and machinery) will be allowed as a deduction from farm taxable income in calculating the final USC.

Those who are employing their children on the farm may be affected as the new rules will require the children to pay the charge if their annual income is greater than €4,004 (€77) per week. Previously, they were exempt from paying any PRSI or Health Levy if their weekly income was less than €352.

The net result of these tax band, credit and levy changes for those on an



Table 1 | Impact of the Budget 2011 changes on the maximum tax rate

Income Tax (High Rate)	41%
PRSI	4%
Universal Social Charge	7%
Total	52%

income which exceeds the standard rate band is that the percentage tax payable on the income above the band is now 52% (Table 1).

Specific farming reliefs

The concession to allow capital allowances for the net amount spent on farm pollution control measures (tanks, sheds, roofing, yards, etc) to be claimed over the shortened three-year period is



being discontinued for any new application since 31 December 2010.

This measure was used widely by farmers who spent heavily on farm buildings in the last few years and was introduced as a temporary measure to give a tax break on this investment.

Those who have already made an initial claim under this accelerated scheme will still be allowed to continue to claim their remaining allowances.

The existing long-running option of writing off spending on farm buildings over a seven-year period (six years at 15% and 10% in year seven) will still be available.

Stock relief, a specific farming measure which is useful in offsetting the effect on taxable profit of an increase in the value of stock held during the year, is also

being extended until 31 December 2012. This extension applies to the 100% relief for young, trained, farmers as well as the 25% relief for normal qualifying farmers.

Capital taxes

Changes to capital taxes which would be of importance in the transfer or sale of capital assets, such as land, buildings, quota or residential houses, were not as widespread as were expected. However this is likely to be the calm before the storm as the Government have flagged their intention to bring in major changes to this area. This is a cause of concern for farmers as there are some agriculture-specific reliefs (tax reducing measures) which could be in line for major changes.

Budget 2011 made changes to the stamp duty levied on the transfer of re-

sidential property and of interest to farmers is the scrapping of the stamp duty exemption on the transfer of a site to a child. These site transfers will now be subject to stamp duty at the non-residential rates, which were not changed.

These same non-residential rates apply on lifetime transfers of land and buildings. Of the two other significant taxes imposed on farm asset transfers, Capital Acquisitions Tax (CAT) and Capital Gains Tax (CGT), only CAT was changed. The tax-free thresholds applied in the calculation of CAT were reduced by 20% in respect of gifts or inheritances taken on or after 8 December, 2010. This move was expected, given that land and other asset values have declined in the last few years.

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The concession to allow capital allowances for the net amount spent on farm pollution control measures (tanks, sheds, roofing, yards, etc) to be claimed over the shortened three-year period is being discontinued for any new application since 31 December 2010.

This change will increase the likelihood that a CAT bill will be levied on larger value farm transfers as the thresholds are more likely to be exceeded. No change was made to the rate of Capital Acquisitions Tax, which remains at 25%.

Changes in the pipeline

The main area of concern with regard to asset transfers is that as part of the National Recovery Plan 2011-2014, the government have indicated that significant changes are planned to the taxes applied to these transactions. These changes will likely take the form of a move from a single CAT tax rate, currently 25%, to a banded rate system where the tax is calculated using one rate up to a certain cut-off point and then it is calculated at a higher rate above this.

Another proposal is to significantly restrict or reduce the valuable Agricultural Relief that applies to the transfer of agricultural assets. These proposals, if implemented, could result in much

“ Changes to capital taxes were not as widespread as were expected, but the Government have flagged their intention to bring in major changes to this area

higher CAT bills on transfer of assets to the next generation.

To pay the tax, the unthinkable might have to be considered — that is selling land or stock — or having to borrow funds to pay the tax.

Although it escaped without any change in the most recent budget, Capital Gains Tax is another asset tax that is

likely to be in the firing line in future budgets. CGT is a tax levied on the life-time handover or sale of assets, farm business assets included. Once again, any changes are likely to be targeted at the very generous relief available for CGT, known as Retirement Relief. Putting an upper limit on the total value of the assets is one potential route of attack; a figure of €3 million has been put forward in the Commission of Taxation report.

Only way is up

This is only a summary of the measures introduced under Budget 2011. No doubt, there will be more detail on some of these changes when the Finance Bill is released in January 2011.

There can be little doubt also that there is an upward trend in all our tax contributions. While this may be painful on the pocket, there is an old saying that is useful to remember: 'Never be afraid of paying tax. If you're paying tax, you're earning profit.'

Energy saving

How dairy farms can cut their electricity bills in half



John Upton,
Animal & Grassland
Research and
Innovation Centre,
Teagasc Moorepark
& **Michael Murphy**

THE energy research programme at Moorepark was initiated with the aim of reducing electricity consumption/costs on dairy farms. The first task was to establish how energy is used on dairy units. Detailed energy audits were carried out on three Teagasc Research Farms from March to November 2009.

Results showed that milk cooling is the biggest consumer of electricity, followed by water heating. Vacuum pumps, lighting and other items, such as wash pumps, milk pumps, feed augers and air compressors, make up the balance (*Figure 1*). Collecting milk production data allowed electricity cost, in cent per litre of milk, to be calculated. These figures varied from 0.47 cent/litre to 0.69 cent/litre and averaged 0.60 cent/litre. Electricity consumption per dairy cow milked varied from 4.0kWh/cow/week to 7.3 kWh/cow/week.

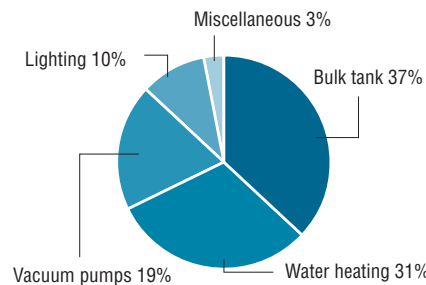
Results to date indicate that electricity usage on dairy farms could be cut by half. The first step is to reduce energy wastage, i.e. fix hot water leaks, insulate hot water piping and refrigerant gas piping, use lights only when necessary and make use of night rate electricity.

Reducing milk production cost is an obvious benefit, and when you consider that 86% of electricity generated in Ireland is from fossil fuels, 531g CO₂ are produced for every kWh of electricity



Reduce energy costs by eliminating energy wastage.

Figure 1: Results of electricity audit on three Teagasc research farms



used. Reducing electricity consumption reduces the industry's carbon footprint.

• **Water heating:** electricity used by water heating equipment can add up to two kWhs per cow per week. The most common method of providing hot water on dairy farms is electrical water heating, with oil fired boilers also being a popular choice, particularly on larger units.

Table 1 displays the results of a recent water heating trial in Moorepark where

500 litres of water were heated from 14°C to 80°C with a 3kW element and a 26kW oil fired burner running on kerosene.

The amount of useable water was defined as the quantity of water drawn off from the cylinder between 60°C and 80°C. A 3kW immersion element takes over 16 hours to heat the 500 litre tank to the final temperature of 80°C. This would not be satisfactory as night rate electricity should be utilised for electrical water heating. This element would not be capable of heating the water on night rate alone.

Table 1 shows a comparison of electricity and oil as energy sources to heat water. Tariffs used for these calculations are shown in *Table 2*.

Table 1 shows that the oil boiler can produce 100 litres of useable water at a much lower cost than the 3kW element on night rate and substantially cheaper than the electrical element on day rate.

Oil prices fluctuate but would need to increase substantially from today's price to match the cost of the electrical heating system.

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Table 2 | Tariffs used for calculating water heating costs (Correct on 15/10/2010)

Unit type	Cost per Unit (€) ex-VAT	Tariff
Electricity Day units (kWh)	0.15	ESB Rural night saver
Electricity Night units (kWh)	0.07	ESB Rural night saver
Kerosene (Litre / kWh)	0.57 / 0.06	Based on quote for 1,000l

Table 1 | Comparison of electricity and oil for water heating

Heating method	Power Consumed (kWh)	Time (Hrs)	System Efficiency*	Useable Water** (litre)	Cost per 100 litres (€) Night/Day Rate	Kg of Co ₂ Produced
Electricity	48.24	16.5	79%	411	0.87 / 1.77	25.6
Oil	45.5 (4.4l Kerosene)	1.75	84%	415	0.60	12.7

*System efficiency is the ratio of energy extracted from the system in terms of hot water, to energy consumed by the system (i.e. electricity or oil)
**Useable water is defined as the amount of water drawn from the cylinder between 60°C and 80°C

Another advantage of the oil fired system is that recovery time is very low, which means that hot water will be available both morning and evening if required.

The amount of CO₂ emitted by the oil fired system is much lower than the comparable electrical system. The capital investment of the oil fired system will be higher than the electrical system but, as Table 1 illustrates, the savings involved can be noteworthy, depending on hot water usage and whether or not night rate electricity is available.

In any case, serious consideration should be given not only to initial purchase cost but also to running costs and the environmental impact.

• **Vacuum pumps:** introducing variable speed drive (VSD) technology for controlling vacuum in a milking system can reduce energy use, while still producing equivalent vacuum stability.

Over a two-month period at Moorepark the power usage of the vacuum pumps was monitored, pre and post VSD installation on a 30-unit herringbone milking machine.

The milking equipment consists of a highly automated 30-unit milking machine with two DM 5 vacuum pumps driven by two 4kW motors. The vacuum pump capacity is 2,600 litres of free air per minute. The plant consumption is 1,200 litres per minute during milking. The unit chosen was an Invertek optidrive E2 AC variable speed drive. In addition to power consumption, cow numbers milked, milk yields and milking time were recorded.

The annual energy consumption of the vacuum pumps before the VSD was installed was over 16,300kWh. With the installation of the VSD, the electrical energy use dropped to 4,700kWh, giving a saving of 11,600kWh. The payback for the VSD installation is 2.85 years, based on an initial cost of €5,000 and an annual cost saving of €1,752. The annual saving of CO₂ as a result of the VSD installation is 6.2 tonnes/year.

• **Milk cooling:** milk cooling is vital to maintain milk quality but it is also the largest consumer of energy on Irish dairy farms.

Pre-cooling is achieved by passing the hot milk through a Plate Heat Exchanger (PHE) before it enters the bulk tank. Cold water pumped through the opposite side of the PHE absorbs a portion of the heat, pre-cooling the milk. Each PHE has a specific milk to water flow ratio and



Electricity contributes, on average, 0.60 cent/litre to milk production costs. Consumption per dairy cow milked ranges from four kWh/cow/week to 7.3 kWh/cow/week

Figure 2: Energy consumption of vacuum pumps pre and post VSD installation

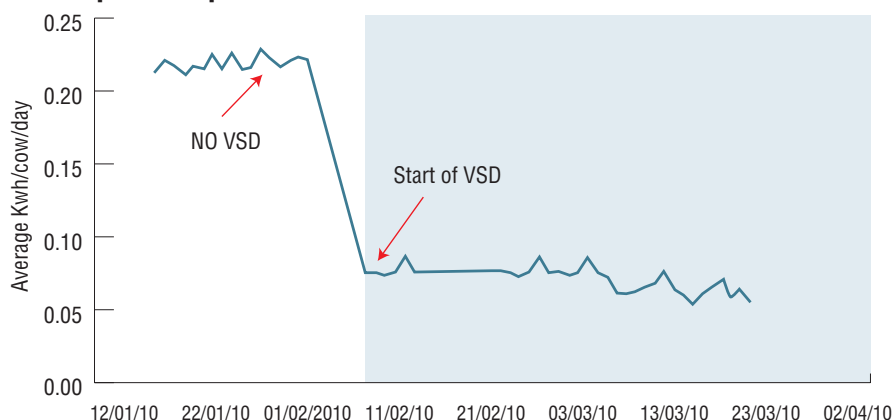


Table 3 | Table 3: Milk exit temperatures (°C) for a PHE ratio and plate capacity test

No. Plates	Milk:Water ratio			
	1:1	1:2	1:3	1:4
25	20.8	16.8	14.8	13.7
29	20.7	16.6	14.6	13.6
33	20.5	16.3	14.5	13.5
37	20.5	16.1	14.3	13.3
41	20.4	16.0	14.1	13.2
45	20.4	15.9	14.0	12.9

extra plates can be added to accommodate very large milk flow rates.

In July 2010, Teagasc Moorepark conducted a series of audits on plate heat exchangers currently being used on active dairy farms. The results from these audits concluded that the vast majority of plate heat exchangers were performing at only a fraction of their full cooling effectiveness. This was mainly due to the improper milk to water flow ratios being employed, the average of which was 1:1.2.

PHE manufacturers recommend milk to water flow ratios of between 1:2.5 and 1:3, depending on the model. If a PHE is sized correctly in relation to the power of the milk pump and the correct ratio of water is supplied, then the power consumed during the refrigeration stage can be dramatically reduced.

Table 3 shows the results of PHE testing carried out at Moorepark Engineering Laboratories. A PHE was analysed at varying milk to water flow rates and with an increasing number of plates. The milk and water entry temperatures were set to 35°C and 10°C, respectively, and the milk exiting temperature from each test was recorded.

The most noticeable result from the above test is the reduction in milk exiting temperature corresponding with the increased milk to water ratio. However, it takes an ever increasing water flow rate to reduce the milk temperature. As the ratio increases, the cooling effect per litre of water is reduced.

Another observation from the test is the influence of increased plate capacity on milk temperature. The extra plates have a mild effect on the performance of the PHE. The addition of extra plates to

the heat exchanger increases its heat transfer area, but this also increases the number of flow channels, thus reducing the milk and water flow velocities at a set flow rate. This reduction in flow velocities retards the heat transfer rate in the PHE. The result is that increasing the number of plates on a PHE produces only a modest increase in cooling performance.

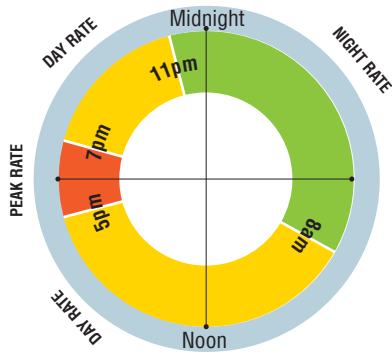
Smart metering

Two types of milk cooling systems are used on Irish dairy farms. Firstly 'Direct expansion' (DX) refers to a system where the evaporator plates are incorporated in the lower portion of the storage tank in direct contact with the milk. Liquid refrigerant expands inside the evaporator, taking heat out of the milk directly, thus the name 'direct expansion'. Milk cooling takes place within the tank.

Generally, this milk cooling system cannot cool the milk as fast as the milk enters the tank. The cooling system must run for a period during and after milking. DX cooling systems are the most efficient cooling system in terms of kWhs consumed per litre of milked cooled, but they must operate on day rate electricity.

'Instant' cooling is where the milk cooling is completed outside the storage tank and then pumped in. An intermediate cooling fluid, such as chilled water from an ice builder, is used to cool milk rapidly in a dual phase plate heat exchanger. This cooling system is less efficient in terms of kWh consumed per litre of milk cooled. However, ice bank builders can generate enough ice at night to meet the entire milk cooling demand the next day. This system takes

Figure 4: Smart metering plan



advantage of significantly cheaper night rate electricity.

In 2009, the Central Energy Regulator (CER) began trialling a new electricity pricing system called Smart Metering, (Figure 4). Smart Metering allows for the price of electricity to reflect the load on the national grid.

Over the next decade this new structure will be rolled out nationwide. Smart Metering will result in cheaper electricity during the night and much more expensive electricity during the peak period. Bearing this in mind, plus the fact that the evening milk cooling load may land partially or entirely on the 'peak' tariff, the case for ice builders with instant cooling will become stronger.

• **Lighting:** the energy used by lighting equipment in all areas of the milking operation is often underestimated and can add up to one kWh per cow per week. Moisture-resistant double fluorescents, or high bay metal halide lamps, are the most common types of lights used on Irish dairy farms.

Energy audits have shown that similar size dairies using metal halide luminaries can use over three times more electricity on lighting than a farm using fluorescent type luminaries. This is due to the high wattage of the metal halide fittings.

Metal halide fittings are typically suspended from the dairy roof in a single row over the pit, which usually leads to shadows from the milking machine, stallwork, milk meters and automatic cluster removers, and poor light conditions in the pit.

The alternative, fluorescent lighting, generally consists of two rows of double tube luminaries mounted over the edges of the pit. These provide uniform lighting with little or no shadow.

During the lighting experiments in Moorepark we noted that modern fluorescent tube fittings tend to interfere with the milking parlour's automatic cow identification system, reducing the effective distance from the cow's ear tag to the antenna. The older switch start or magnetic ballast fluorescent tubes are still available and where automatic identification systems are installed these lights are the only viable option.

>> Next page



A well lit parlour with two rows of double fluorescent fittings.

“ LED tubes are very efficient and would save 48% on power usage but, at over €85 per tube, the price will need to come down before they will be widely adopted

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Electricity contributes, on average, 0.60 cent/litre to milk production costs.

While not the most efficient solution, they offer substantial savings over the high-bay metal halide lamp and will provide sufficient light at the cow's udder.

Where automatic cow identification is not employed, any type of fluorescent can be used, and the focus should be on maximum energy efficiency.

The most commonly used type of fluorescent tube found in the dairy is the double five foot fluorescent tube. These tubes have a diameter of one inch and are referred to as 'T8' fittings.

A number of options exist to improve the efficiency of these fittings. The 'T5' fitting is an increasingly popular development in fluorescent lighting. 'T5' lamps have a diameter equal to 5/8". These lamps are approximately 40% smaller than 'T8' lamps.

Traditionally, upgrading to 'T5' lamps required the purchase of a new light fixture. 'T8' to 'T5' converters are now commercially available to convert existing 'T8' fittings to higher efficiency 'T5' fittings without the need to change the fixture itself. 'T8' LED (Light Emitting Diode) tubes are also available, although these are quite new to the market. Luminous efficiency, power consumption and a lux value recorded one metre from the light fittings are shown in Table 4.

Using the double 58 watt 5ft 'T8' as the

Table 4 | Results of the lighting experiment carried out in Moorepark

	Double 19W LED	Double 49W T5	T8 to T5 converter	Double 58W T8 High Frequency	Double 58W T8 Switch Start (Magnetic)
Luminous Efficiency (%)	16.32	15.15	11.91	10.4	10.6
Energy Use (l)	0.16	0.4	0.23	0.33	0.53
Lux at 1 Metre	653	1516	685	853	1402
Tag read distance* (cm)	31	28	37	55	102

Tag read distance is the functional distance from the antenna to the ear tag with the light fitting suspended 1 metre above the antenna

benchmark and current industry standard, it is clear that efficiency gains can be made by upgrading existing lighting. The IES (Illuminating Engineering Society) recommend 500 lux at the cow's udder for the milking routine.

One point to note is that the lux values for the 'T5' fitting are far higher than required; in fact the number of luminaires in the dairy could be halved while still meeting the required 500 lux standard.

Moving from double 'T8' fittings to half the number of 'T5' fittings would reduce power consumption on lighting by 40% while still providing the 500 lux recommended.

Simply using a 'T8' to 'T5' converter will save 30% on lighting power usage.

LED tubes are very efficient and would save 48% on power usage but, at over €85 per tube, the price will need to come down considerably before they will be widely adopted.

KEY POINTS | energy saving

- Electricity contributes, on average, 0.60 cent/litre to milk production costs.
- Consumption per dairy cow milked ranges from 4.0kWh/cow/week to 7.3 kWh/cow/week, (€0.60/cow/week to €1.10/cow/week).
- Reduce energy costs by eliminating energy wastage: fixing all hot water leaks, insulating hot water piping and refrigerant gas piping and using lights only when necessary.
- A leak of just one litre/hour wastes 8,500

- litres of hot water and 3,800 kWh per year.
- Optimising plate cooling: increasing the milk to water flow ratios from 1:1 to 1:3 can reduce bulk tank power consumption by over 40%.
- Switching all water heating to night rate electricity.
- Consider an oil fired boiler.
- Install a variable speed drive controller which can save over 60% on vacuum pump running costs.
- Switch to energy efficient lighting.

Acknowledgements

We would like to acknowledge the support of the Dairy Levy Research Fund and technical assistance from the Mechanical Engineering Department in Cork Institute of Technology.

Herd size and profit

Not surprisingly, well-managed larger dairy herds tend to generate bigger farm incomes



George Ramsbottom,
Teagasc Oak Park



Neither milk yield nor quality was compromised by larger scale.

G OING bigger is trotted out as a cure for all ills, but will it simply result in us just running faster to stand still? This question often crops up at discussion groups.

Information on scale efficiency on dairy farms is scant, apart from some analysis conducted by the National Farm Survey. Yet, a number of dairy farmer surveys confirm farmers' intentions to increase the scale of their dairy herds by between 20% and 50%.

Recently, we looked at over 2,000 Profit Monitor reports from the 2007-2009 financial years for messages on scale efficiency. Cow herd size on spring calving dairy farms ranged from 20 to 400 cows over the three years.

The data in *Table 1* shows that, on average, herd size in the study group increased by 12 cows between 2007 and 2009. Herd size was approximately 20 cows larger than the national average. Approximately half of the farms in the study were present for all three finan-

“ The average milk price tended to be higher in larger herds, suggesting that the composition of the milk produced was higher

cial years and they increased herd size at the same rate as the other herds included in the study.

The association between herd size on milk production and financial performance is presented in *Table 2*. The results

also showed that there was no difference in milk yield per cow in the larger herds compared with smaller units. The average milk price tended to be higher in larger herds, suggesting that the composition of the milk produced in larger herds was higher. This was worth approximately €1.25 per cow in increased milk sales value per 10-cow larger herd size.

These results in *Table 2* show that profit per cow declined by only €4 per cow for a 10-cow larger herd size. The reduction in profit per cow was not due to changes in variable costs. However, fixed costs tended to rise per cow in larger herds. Every 10-cow larger herd size was associated with a €5.50 increase in fixed costs. Obviously, farm income rises as a result of adding the additional 10 cows.

Table 1 | Average and range in herd size of the farms included in the study over the 2007 to 2009 period

Year	Number	Average herd size (cows/farm)
2007	647	77.5
2008	776	82.9
2009	778	89.9

Table 2 | The association between herd size and production and financial performance of dairy herds

	Effect — per 10 cow larger herd size
Production	
Milk yield (litres/cow)	No effect
Milk price (c/l)	Increased by 0.025c/litre
Financial	
Variable costs (€/cow)	No effect
Fixed costs (€/cow)	Increased by €5.50/cow
Net margin (€/cow)	Declined by €4.00/cow

KEY POINTS | herd size

- Neither milk yield nor quality was compromised by larger scale, indicating that cow husbandry standards had not declined in the bigger herds. Indeed, because milk price tended to increase, the indication was that milk composition tended to be better in the larger herds
- Larger herds can potentially deliver higher incomes. The small reduction in profitability per cow observed in this study in larger herds is more than compensated for by the larger scale of the enterprise. Careful financial planning and cost control are necessary if the benefits of larger scale are to be realised.

dairying

Beware hidden milk fever



Siobhán Kavanagh
Teagasc Kildalton

MILK fever — clinical and subclinical — is the most important metabolic disease in dairy cows around calving. While a downer cow is the classical sign of a clinical milk fever problem, subclinical milk fever is more difficult to identify as symptoms are less obvious.

Slow and difficult calvings, retained cleanings and uterine infections can all be indicators of a subclinical milk fever problem.

Other consequences of both clinical or subclinical milk fever include mastitis, displaced abomasums, reduced feed intake, excessive body condition loss and fertility problems.

Retained cleanings are commonly assumed to be a trace element problem (i.e. iodine and selenium) but, in many reported cases in recent years, subclinical milk fever has been the main cause.

Why does milk fever occur?

The cow's demand for calcium increases rapidly at the onset of lactation, rising twofold within a couple of days. Milk fe-



Consequences of both clinical or subclinical milk fever include mastitis, displaced abomasums, reduced feed intake, excessive body condition loss and fertility problems



ver arises when blood calcium levels become insufficient to maintain normal body functions.

If the cow has been well set up during the dry period, adequate calcium can be mobilised and the risk of milk fever is limited. A well managed control programme involves identifying the risk factors and eliminating these risks associated with both clinical and subclinical milk fever.

Risk factors

• Body Condition Score

Cows with a condition score of less than 2.5 or greater than 3.5 are at higher risk of milk fever.

In general, silage quality this year is excellent, with high dry matter and digestibility, so keep an eye on cow condition.

Group cows according to condition and restrict access to good quality silage

for over-conditioned cows. Low digestibility forages such as straw or hay can be used to dilute the energy content of good silage. Late calving cows are at greater risk of being over-conditioned due to the long dry period.

• Age

The risk of milk fever increases by approximately 9% per lactation. Milk fever is more prevalent in third calvers and older. Cull old cows and cows which suffer recurrent cases of milk fever.

Milk fever cases tend to recur so that culling persistent offenders may be beneficial.

• Supplementation method

Make sure you are feeding the correct rate of minerals. Check the packaging for feeding rates. Feeding rate can vary from 60 to 150 grams per head per day, depending on supplier.

It is important that animals have adequate feeding space (2ft/cow) and

CASESTUDY

Thomas O'Meara, Co Offaly

In 2010, Thomas O'Meara, Co Offaly, was having problems around calving time. While cows were not showing the classical signs of milk fever, they were continuing to bleed a few days after calving and he ran into problems with uterine infections.

In general, there was no problem with retained cleanings or slow, difficult calvings. This is classical subclinical milk fever — difficult to diagnose.

Investigations by his Teagasc adviser Michael Hogan, Nenagh, and the local vet suggested that the problem was a subclinical milk fever problem.

Strategies

"We tried a number of strategies to sort out the problem," said Thomas.

"We fed straw to dilute down the silage. We fed extra magnesium to the dry cows. Cows got a bottle of calcium under the skin at calving time and anionic salts were used within a few days of calving. The problem was alleviated but it is difficult to say which strategy contributed most."

In 2011, Thomas will send a grass silage sample for complete mineral analysis. Risk factors, such as potassium level, will help him to establish a strategy for preventing the problem rather than the costly and labour-intensive approach of treatment.



minerals are offered twice daily on pit silage and three to four times daily on baled silage.

Shake minerals across the silage, not in a line along the silage. Fixed rate feeding of minerals (e.g. top dressing on silage) is more accurate than free access minerals (e.g. buckets or licks).

Minerals may be administered via water but water intake is low during the winter months.

If you are using boluses, remember that boluses tend to only supply three to four trace elements.

Major elements such as phosphorous, magnesium and sodium are not supplied in boluses and magnesium is a key component in the prevention of subclinical milk fever. Do not feed minerals left lying around since last year.

• Magnesium supplementation

Inadequate magnesium intake reduces the ability of the gut to absorb calcium

and also reduces calcium mobilisation from bone reserves, which predisposes the cow to milk fever.

Adequate magnesium supplementation is essential for the prevention of milk fever.

The requirement of the dry cow is 0.4% magnesium per kg dry matter intake. Supplementation rates of 15 to 25g of magnesium are required in the pre-calver mineral to meet the magnesium requirement of the dry cow.

Assuming a feeding rate of:

— 100g per day, the percentage on the label should be 15% to 25%.

— 75g per day, the percentage on the label should be 20% to 33%.

• High potassium intake pre-calving

High potassium levels in silage, from excessive spreading of slurry on silage ground in late spring, can reduce the uptake of magnesium from the gut and increase the risk of clinical and subcli-

nical milk fever. Without silage analysis, this will be unknown. It can be useful to get a full mineral profile done on silage to identify some of risk factors associated with milk fever. If you are having problems, dilute the silage by feeding 1kg to 2kg of an alternative forage source with it, such as hay or straw.

The balance of minerals, sodium, potassium, chlorine and sulphur (dietary cation anion balance — DCAB) can influence the risk of milk fever.

Anionic salts can be used to counter the negative effects of this in the dry cow and, while there has been some success with these salts, care should be taken in using them.

These salts are unpalatable and can be difficult to feed. While these salts are effective, the underlying causes of the problem need to be diagnosed correctly as anionic salts are an expensive means of dealing with the problem.

dairying

Liquid milk farms need to tackle feed costs this spring



Joe Patton,
Teagasc

THE first hint of spring offers some prospect of respite for liquid milk farmers, who have endured a winter of plummeting temperatures and rising feed prices. Frozen milking parlours have created no end of disruption but, thankfully, this has been a relatively rare occurrence over the years.

In contrast, the cost of purchased feed is a silent, perennial problem on many liquid milk farms. Teagasc analysis for the last decade has consistently shown a 3c to 4c per litre gap in annual feed cost between the spring and winter milk sectors, which means €12,000 to €16,000 greater spending for the average size liquid herd.

What is the reason for this substantial difference in feed cost? The direct expense of feeding lactating cows during the winter is often cited. This is true to a certain degree, because it costs around €1.80 (or 5cpl) extra per day to feed the early lactation cow indoors compared with at pasture, despite a higher yield (Table 1). A milk price premium is clearly needed to justify winter production in this case.



Teagasc analysis for the last decade has consistently shown a 3c to 4c per litre gap in annual feed cost between the spring and winter milk sectors

However, the simple comparison shown is for a given day during winter or summer, which does not tell the full story on annual feed cost at farm level. To begin with, liquid milk herds supply all-year-round so only a percentage of annual output is required during the high cost months (less than 20% for the average contract, Table 2). Also, the average size of a liquid milk contract is around 55% of total production but this differs widely from farm to farm.

The proportion of winter supply should, in theory, vary according to size

of contract. Furthermore, there is large range (over 5c per litre) in feed costs for herds within the liquid milk sector, even with similar milk contracts and supply curves.

The variation indicates that factors independent of winter feeding costs may influence the annual feed bill on liquid milk farms. Identifying these factors is one of the main objectives of the Teagasc BETTER liquid milk project, which was established in 2009 to benchmark the production, breeding, feed management and economics for liquid milk herds.

Table 1 | Diet costs for summer and winter milk production

	Summer	Winter
Milk Yield	27 litres	31 litres
Purchased concentrate Cost:		
— per litre	2.3cpl	6.2cpl
Total daily* diet cost:		
— per cow	€1.92	€3.72

*Total diet cost including full forage and purchased concentrate expenses

Table 2 | Milk supply in winter months as a proportion of annual production

Annual Total Milk Litres	500,000
Liquid Milk Contract %	55%
Daily Liquid Milk Supply Litres	753
Winter Litres Required*	97,000
Proportion required as winter production	19.5%

*Total litres required to meet liquid contract from 15 October to 1 March

Key messages for spring feeding management on liquid milk herds

THE BETTER liquid milk project consists of 14 farms, selected in consultation with Teagasc B&T dairy advisers. Each submits a monthly summary of milk yield, feeding rates and grazing management, which builds information on the pattern of yield and supplementation across the year. This data can then be related back to annual costs and profit through eProfit Monitor data.

Outcomes

Opinions on feeding management are varied across the group, but there are some interesting outcomes which should be considered when planning your approach to spring 2011.

• Liquid milk farms with the highest feed bills incur extra cost in spring

This challenges the view that higher costs are solely the result of winter feeding. The point is illustrated in *Figure 1*, which charts the monthly feed input for the three highest (8.7cpl) and three lowest (3.1cpl) BETTER herds in terms of feed cost per litre.

The graph shows that daily feeding rates per cow are similar during the winter but high feed cost farms offer much greater levels of supplement from February to May.

A practical conclusion is that management during the early grazing season needs to be highlighted as a priority area on high feed costs farms. Pasture budgeting techniques, such as the spring rotation planner, are equally as important in a liquid milk situation as for spring calving herds.

The spring rotation plan is easily adapted for split calving and has potential to markedly reduce costs when pasture becomes available. It also helps set up pasture quality for subsequent rotations.

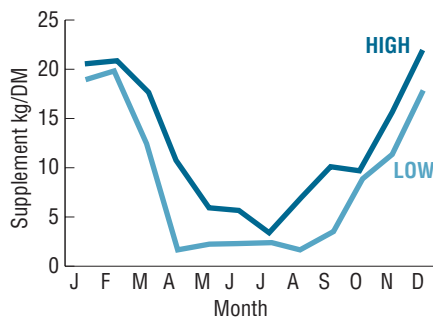
• Liquid milk farms with lower feed cost match supplements to available grass

Concentrates can be used to achieve a target yield per cow or to balance pasture intake and availability.

The BETTER farms with the lowest feed cost (and highest milk output per hectare) tend to make feeding decisions as a combination of both, offering moderate amounts of concentrate in spring but supplementing according to a grass budget in mid-season.

Too much focus on maintaining high daily yields of individual cows generally leads to excessive meal feeding of the herd. This is a

Figure 1. Feed supplement profiles for high and low feed cost BETTER liquid milk farms



real issue in split calving herds with high yielding spring calvers.

• Liquid milk herds with highest feed cost buffer feed without budgeting

Issues around buffer feeding with mixed diets have become more prevalent in recent seasons, especially in relation to increasing stocking rate on the milking platform.

Teagasc research for winter milk systems at Johnstown Cas-

tle has shown that a buffer feeding system may be profitable but only if stocking rate is increased, grass utilisation is at maximum and milk price is high.

Data from the BETTER farms is showing that buffer feeding without pasture budgeting in spring leads to inefficient use of feed and wasted pasture. The simple message for this spring is: don't buffer without budgeting.

• Liquid milk herds with lower feed costs have better genetics for fertility

Using dairy AI sires with a high fertility sub-index is perhaps the most important long-term management step for addressing feed costs.

This trend can be observed on the BETTER liquid milk farms. Improving the herd's EBI for fertility allows for greater control of calving pattern and lactation length. This means better planning of winter milk supply, more days in milk, and fewer carryover cows in the system.

There is a tendency for herds with low EBI for fertility to look for a feeding solution to the problem, which is almost always expensive but seldom successful.

For liquid milk herds, the conclusion for spring 2011 is: select bulls with at least €100 fertility in the proof.

“Data from the BETTER farms is showing that buffer feeding without pasture budgeting in spring leads to inefficient use of feed and wasted pasture. The message for this spring is: don't buffer without budgeting

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MASTITIS

Focus on these five areas to minimise mastitis



Don Crowley,
Teagasc

CALVING is in full swing on some farms and getting started on others. With seasonal calving, the workload can be overwhelming, especially when problems arise. Preparation and getting organised are crucial to minimising problems and ensuring you can cope with what the spring throws at you. The following areas should be addressed to make sure they are not an issue at calving.

ONE: calving pens and cubicles

Calving pens and cubicles play a crucial part in the control of mastitis and cell count in cows and in-calf heifers. They are often neglected and many sheds are overstocked. The ideal situation is to have one cubicle per cow and/or heifer.

Many studies have shown that the five to seven-day period prior to calving is the crucial time for preventing mastitis in the dry period and early lactation. If a sealer is used in conjunction with dry cow antibiotics, this will help to reduce the incidence of mastitis around calving greatly. Place a drum of disinfectant at the entrance to these pens.

TWO: cubicle management

Cubicle management is really important if you want to prevent mastitis. Cubicles should be cleaned and dusted with lime twice per day. It is important to keep cubicles as dry as possible.

Fix any leaks in roofs and run scrapers every two to three hours per day. This may seem a lot; try it and you will see the improvement on how clean and dry the cubicles are.

A common issue I see at farm level is turning off scrapers at night, fearful that a cow may calve in the cubicles. Avoid this if at all possible; move cows to calving pens if in doubt.

Keep a constant check on the composition of cow dung. If cows are very loose, make some fibre available, e.g. hay or straw. This will help to dry up dung and cubicles will be a lot cleaner and easier to keep clean.



Cubicle management is really important if you want to prevent mastitis.

There are a number of disinfectant products on the market which will help to reduce the incidence of mastitis if used on a weekly basis. Stalosan F or Prosonex are just two examples of powder-based products. These should be applied twice weekly to disinfect cubicles and keep them dry. These products are proving very successful at preventing dry cow mastitis and mastitis in early lactation.

THREE: calving box management

These should be cleaned and disinfected prior to the calving season. Make sure all calving boxes have proper water supply and groove floors to aid cows getting up after calving; 30% to 40% of mastitis at calving occurs five days prior to calving.

Vigilance is crucial at this stage. On many farms, calving pens are overstocked and not cleaned out and disinfected regularly.

This has a serious effect on heifers prior to calving as they have no dry cow or sealer as protection. The floors in cal-

“ Make sure all calving boxes have proper water supply and groove floors to aid cows getting up after calving; 30% to 40% of mastitis at calving occurs five days prior to calving. Vigilance is crucial at this stage. On many farms, calving pens are overstocked and not cleaned out and disinfected regularly



ving pens should be grooved to aid cows getting up after calving.

Clean out after each calving and disinfect with Prosonex or Stalosan F or a similar product. These products help greatly to prevent mastitis in early lactation and help minimise high cell counts.

Navel infections and associated problems have also been greatly reduced with the use of these products.

Check all cows for mastitis during the first 10 days after calving. Remember that 70% of all clinical mastitis occurs in the first 10 days after calving.

FOUR: mastitis in heifers

Heifers can be more prone to mastitis at calving due to lack of dry cow therapy and sealer. In-calf heifers should not be housed on slats, particularly close to calving.

Train them to lie up, and work on heifers that don't lie up on cubicles. Teat spray heifers for five days prior to calving, or

dip teats with sealer dips, e.g. Dry flex or MHC teat seal barrier. Avoid feeding mastitis milk to replacements to prevent cross infection to future generations. This milk should be discarded or fed to male calves.

FIVE: prevent mastitis at milking

At calving, all cows will should be checked for mastitis. The following procedure to prevent mastitis, cross infection and reduce cell count is proving very successful:

- Wear gloves, e.g. nitrile disposable gloves.
- Pre-spray all cows, foremilk and dry wipe.
- Disinfect clusters after removing from cow in peracetic acid, e.g. Cluster XX or Romit or similar products. Mixing rate 20mls to two gallons of water and change solution after 10 to 12 cluster dips.
- Post spray all cows after milking. Ensure a drop is formed at the end of each teat. If you are using a hand-held sprayer,

one 600ml sprayer will do 50 cows for one milking.

- A separate group, if feasible, is an excellent control measure.

Early detection and knowing your high cell count cows is very important. Early milk recording is crucial. Many farmers wait until most cows have calved before first milk recording.

Your first milk recording should occur no later than four weeks after calving.

All clusters should be dipped after milking until individual SCC results are back. Once you know the high cell count cows, pre-spray and dry wipe these cows with teat spray prior to milking and dip the clusters in peracetic acid after these cows have been milked. This will prevent cross infection, reduce cell count and stop new cases of mastitis. Spending a few hours with this checklist, and ensuring your milking equipment is working perfectly, will pay huge dividends for the season. If you require any assistance, contact your Teagasc dairy adviser.

What will we do with the dairy bull calves?

With the national dairy herd expected to expand in coming years, the additional bull calves are both a challenge and an opportunity, writes **Bernard Smyth**, Teagasc Programme Manager, Drystock

IN 2010, up to half the dairy calves (almost 160,000 head) were exported live within the EU, with over 80% going to Holland, Spain and Belgium for veal production. Significant extra value could be added to Irish agricultural output if some or all of the male dairy calves could be finished profitably to beef on Irish farms.

Food Harvest 2020 sets a target of increasing the value of agricultural beef output by 20% over the next 10 years; profitable finishing systems for dairy beef calves have the potential to deliver much of this target.

Finishing systems

A sustainable system must yield a product that meets market requirements and achieves a viable beef price for producers. Run efficiently, bull and steer finishing systems can satisfy both requirements.

With bull systems, the preferred age at slaughter is up to 16 months, at carcass weights of 240kg to 340kg and fat cover of 2+ to 4-. Up to 18 months may also be acceptable. Steer systems should target 24-month finishing for early born calves with carcass weights of approximately 320kg; later born calves can be finished off grass at 27 to 30 months.

The importance of grass.

Key to achieving profit with all cattle systems is maximising the proportion of total liveweight gain from grass in the animal's lifetime; this also holds true for dairy beef finishing. Over 80% of dairy calves are born in the first four months of the year and this seasonal calving pattern is likely to continue.

Autumn or January/February-born calves going to grass in spring can utilise



Autumn and early spring-born dairy calves have the potential to maximise the gain from grazed grass and thereby minimise the indoor finishing period required; they offer the best profit potential

Bernard Smyth

grass to good effect and achieve cheap weight gain. Later born calves are more suitable to steer systems or for live export if they can not be profitably finished in Ireland.

The concentrate input will vary with the system but can be minimised for all systems by exploiting gains at grass and including excellent quality silage in the indoor finishing period. The recent increase in meal prices will militate against ad lib meal finishing systems, especially for bull systems that run up to 180 days. Dairy beef finishers have much higher intakes and lower feed conversion efficiency than continental beef finishers and it is important to avoid very long indoor finishing periods with dairy progeny.

At the Johnstown Castle Dairy Beef Open Day in November, Pearse Kelly outlined potential profit margins per head of €47 for 15 month bulls, €107 per head for 18 month bulls and €118 per head for 24-month steers from spring-born dairy calves. The indoor finishing period was based on good quality silage plus 6kg concentrates daily for bull systems and 5kg concentrates daily for steers. Concentrates were included at €220 per tonne and beef price assumed was €3/kg.

With concentrate price likely to be up by about €50 per tonne and beef price up €0.30 per kg, there is little change in bull margins, and 24-month steer margins would be up to €40 higher per head. Increased concentrate prices will place even greater emphasis on keeping the indoor finishing period to the minimum.

Potential average daily gain indoors with bulls on excellent silage plus 6kg meals is 1.1kg to 1.2kg/day and up to 1.35kg/day on ad lib meals. Potential daily gain indoors with steers on excellent silage plus 5kg meals is 0.9kg/day. Autumn and early spring-born dairy calves have the potential to maximise the gain from grazed grass and thereby minimise the indoor finishing period required; they offer the best profit potential.

Later born calves may be more suited to steer systems finishing off grass at 27 to 30 months or possibly bull systems at 18 months following two short indoor winters, 100 days at grass followed by 100+ days on ad lib meals indoors.

Dairy calf to beef unit

Rob Prendiville, Johnstown Castle

THE dairy calf to beef trial was established in Johnstown Castle in April 2010 — a joint venture between Teagasc and Dawn Meats. The aims of the study are to integrate different bull beef production systems with product marketing and develop systems of production that are efficient and profitable for the producer and provide a product that is marketable by the processor.

The breed types included in the study represent male progeny from both current and projected future breeding policies of Irish dairy producers. The Holstein-Friesian (HF) is the dominant breed in the Irish dairy cow population. Also, due to performance results of the Jersey X Holstein-Friesian (JEX) cows from New Zealand and the 'Ballydague' Research farm, Moorepark, more and more dairy farmers are going down the route of Jersey crossbreeding. As a result, the proportion of JEX bull calves is expected to rise.

The research demonstration farm consists of 300 spring-born dairy bull calves; 165 Holstein-Friesian and 108 Jersey X Holstein-Friesian and 27 three-way crossbred animals (Norwegian Red bull X Jersey crossbred cow).

Animals arrived on site in late April/early May (10-12 weeks of age). All calves were weaned at the time of purchase. Calves were randomly assigned to one of 10 systems according to breed type, date of birth and bodyweight on arrival at Johnstown Castle and farm origin.

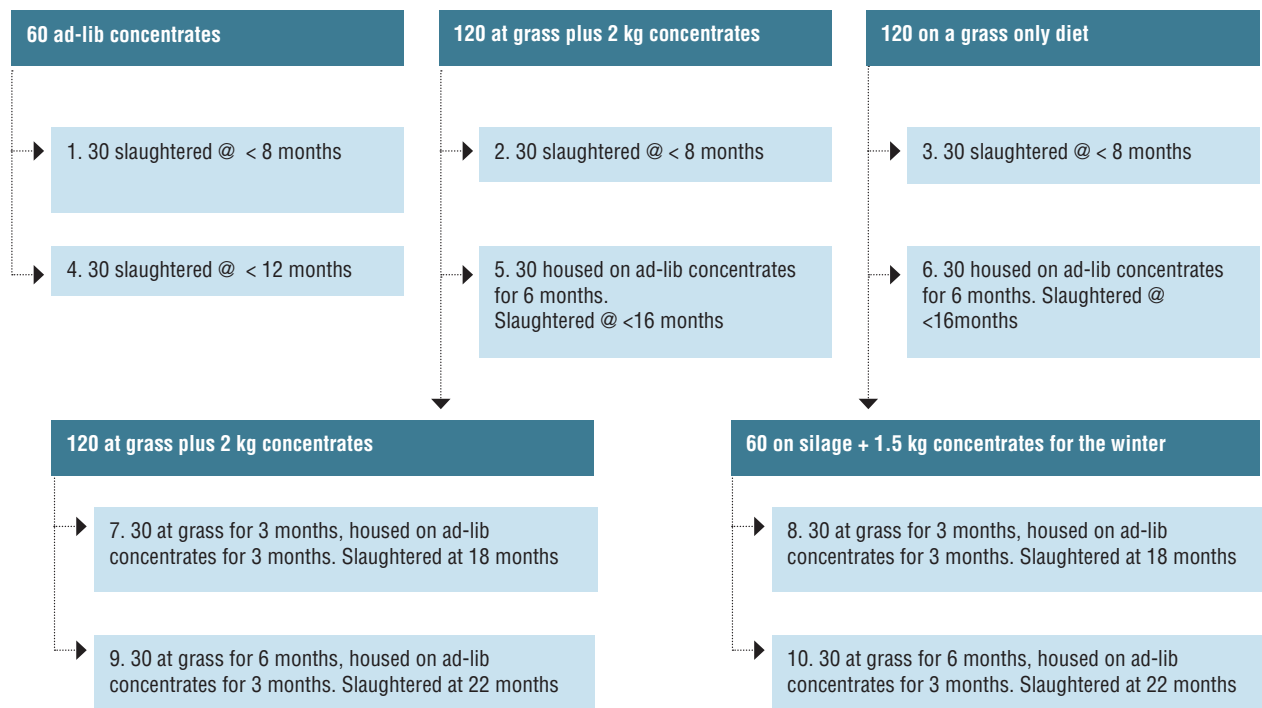
Three groups (90 calves) were finished at less than eight months: 30 calves on ad-lib concentrates indoors (AL), 30 calves at pasture plus 2kg concentrate (PC) and 30 calves on pasture only (PO) (groups 1, 2 and 3 — *Figure 1*). The concentrate mix was 80% barley, 14% soya, 4% molasses and 2% minerals. Ad-lib calves were housed and the remaining 240 calves were put out to grass.

Throughout the grazing season, PC calves were given their 2kg allocation of concentrate, with the remaining 120 calves staying on PO. In doing so, the effect of lifetime performance of concentrate supplementation in the first summer for calves at pasture can also be evaluated. The remaining 30 animals on AL will be slaughtered at less than 12 months of age (group 4). In total, 120 animals will be slaughtered at less than 12 months of age.

The remaining 180 bulls will be slaughtered under three different systems: 15, 18 and 22 months of age. Thirty bulls from each system (PC and PO) will be housed at the end of the grazing season and built up onto an ad-lib diet for six months (groups 5 and 6 — *Figure 1*).

In spring 2011, 120 bulls will be turned

Figure 1: Finishing treatments of the dairy calf to beef system at Johnstown Castle.



out to pasture (60 calves from the PC group and 60 PO calves). These have been carried over the winter on an ad-lib silage diet plus 1.5kg concentrate. After three months at pasture, 30 bulls from each group (groups 7 and 8 — Figure 1) will be housed and built up onto an ad-lib concentrate diet for three months.

The remaining 60 bulls (groups 9 and 10) will remain at pasture until September before being housed on an ad-lib concentrate diet for three months. This group will be slaughtered at 22 months.

General management

As Bernard Smyth points out, maximising the proportion of good quality pasture is of utmost importance for profitable beef production systems.

The calves involved in the trial (120 grass only calves and 120 calves at pasture plus 2kg concentrate) were the sole stock available on the land area. Therefore, this year pasture management was somewhat artificial in that no adult animals were on the grazing platform and grass demand was low.

The two groups at grass were further subdivided into groups of 60. This ensured that the smaller calves on concentrates received their 2kg allocation. Grass budgeting was carried out weekly and target pre-grazing herbage yields were established.



Food Harvest 2020 sets a target of increasing the value of agricultural beef output by 20% over the next 10 years; profitable finishing systems for dairy beef calves have the potential to deliver much of this target

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Table 1 | Production performance of dairy bull calves on three feeding systems on 21 December

	Indoors		2 kg meal + pasture 1st season				Pasture only for 1st season				
Slaughter dates	<12 months		<16 months		18 & 22 months		< 16 months		18 & 22 months		
Feed system	Ad-lib meal + straw		Ad-lib meal + straw		1.5 kg meal + ad-lib silage		Ad-lib meal + straw		1.5 kg meal + ad-lib silage		
BODYWEIGHT (KG):											
Housing (12 November)	320		239		242		188		189		
21 December	364		298		275		234		209		
*ADG (KG/D):											
From beginning	1.23		0.93		0.84		0.69		0.54		
Since 12 November	-		1.53		0.80		1.11		0.40		
BREED GROUPS											
	HF	JEX	HF	JEX	HF	JEX	HF	JEX	HF	JEX	
Body weight (kg):											
Housing (12 November)	338	298	240	241	249	232	189	185	191	190	
21 December	375	347	294	294	279	264	235	218	206	208	
ADG (KG/D):											
From beginning	1.27	1.18	0.93	0.93	0.84	0.80	0.65	0.60	0.52	0.55	
Since 12 November	1.09	1.21	1.65	1.43	0.81	0.89	1.32	0.90	0.42	0.43	

NB: These are raw data that have not been statistically analysed and, therefore, no definite conclusions can be drawn from them.

Pre-grazing herbage yields averaged 917kgDM/ha (8.4cm) for the summer months (May to July). Pre-grazing herbage yields that exceeded 1,400kgDM/ha were not grazed and subsequently removed from the rotation as baled silage. Pre-grazing herbage yields increased in the autumn.

Average pre-grazing herbage yields for this period was 1,150kgDM/ha. Throughout the grazing season fresh pasture was allocated to the calves every two to three days. Post-grazing heights for the swards averaged 4.8cm.

A reseeding programme was also put in place. Twelve hectares of the lower yielding paddocks were reseeded in 2010: five hectares in April and seven hectares in August. The grass seed mixture used in the spring consisted of 44% Tyrella, 44% Abermagic and 12% clover (Crusader). With the exception of Astonenergy replacing Abermagic, the grass seed mixture used in the autumn was the same.

The importance of having a healthy calf to begin with cannot be over emphasised. On arrival, all calves were tested for bovine viral diarrhoea (BVD) and vaccinated for infectious bovine rhinotracheitis (IBR), using an intranasal vaccine, and also for Black Leg. Numerous incidences of respiratory diseases were encountered throughout



Rob Prendiville at Teagasc, Johnstown Castle.

“ The research work in Johnstown Castle, funded by Dawn Meats, into the many different possible systems of finishing dairy bull calves, is complemented by six demonstration farms

the experimental period. Isolated incidences of Pink eye occurred in the late summer/autumn. All animals were treated for internal and external parasites. Calf mortality for the year was 5%. Such losses were largely attributed to respiratory problems.

Animal performance

Liveweight and average daily gain (ADG) of the three feed systems are presented in *Table 1*. Animals were housed on 12 November. At housing, calves on PO were 52kg lighter than PC and 131kg

lighter than AL. Average daily gain throughout the first season was highest with the AL, lowest with the PO and PC intermediate. On the day of housing, all animals were penned according to their allocated groups. Animals selected for slaughter less than 16 months were built up onto ad-lib ration over a three-week period. Since housing, ADG of the animals less than 16 months were 1.53 and 1.11kg/d for the PC and PO groups, respectively. Average daily gains were similar for the HF and JEX in these groups.

Calf to beef demo farms

Pearse Kelly, Teagasc Cattle Specialist

THE research work in Johnstown Castle, funded by Dawn Meats, into the many different possible systems of finishing dairy bull calves, is complemented by six demonstration farms. These are commercial beef farmers who are clients of Teagasc and are either already finishing Friesian bulls or are now starting such a system on their farm. The aim is to show how the systems work and to examine their profitability at farm level so that other farmers can consider following their lead.

The six farms are spread across Tipperary, Laois, Kilkenny, and Wexford. Each of these farms will be working closely with Rob Prendiville, their own local Teagasc advisers and myself. Farm plans have been drawn up for each of them, which have looked at the resources available, the systems that would most suit their farms and the numbers that can be finished each year.

All six farms are planning to finish spring-born bulls either out of the shed after housing in the autumn or letting them back to grass as yearlings for a short period before intensively feeding them indoors again for 80 to 100 days. A number of them are also buying a proportion of their calves in the autumn to finish at less than 16 months.

Three of the farms are buying two to three-week-old calves and rearing them on their own farms while the other three demo farms are buying reared calves at 12 weeks of age. By buying a three-month-old calf, while you are paying more for him, you are reducing the workload involved in rearing calves and are also reducing the likelihood of deaths. For farmers who do not have the facilities, or have never artificially reared calves, this is an option worth



Teagasc Enniscorthy adviser Michael Fitzgerald says the work at Johnstown Castle, and elsewhere, should generate opportunity for two categories of farmer: dairy bull calf rearers and, also, dairy bull calf finishers.

considering. As part of the project, Teagasc also hope to have a small number of contract rearing demo farms to show the potential there is for some farmers to rear dairy bull calves for other farmers to buy and finish.

Each of the six demo farms will be pushing their stocking rate as far as the housing available on their farms allows. This is an important part of their plan as high numbers finished per hectare is essential in order to maximise the profitability of dairy bull beef systems.

Excellent grassland management is also needed if high stocking rates are to be maintained and if key performance targets are to be met. Rotational grazing with a paddock system, along with regular measurement of grass covers and herd demand, will take place on each of the farms. Reseeding will be done where necessary.

All of the dairy bulls on each farm will be weighed three to four times before they are slaughtered. This will show the level of performance achieved at each

stage throughout their life. Regular and accurate weighings allow us to identify very quickly if targets are not being met and to take action.

A profit monitor will be completed for each farm at the end of each year. This will show the output and costs associated with it. The Teagasc/*Irish Farmers Journal* BETTER farm programme has a target of €1,000 gross margin per hectare for each of its suckler farms. The Derrypatrick suckler herd in Grange has a similar target. These six dairy calf to beef demonstration farms will be looking to match this gross margin per hectare.

2011 is the first year that these demonstration farms will be fully part of this programme with Teagasc.

A more detailed profile of each of the farms will follow in future issues of *Today's Farm* and the progress they are making.

There will also be farm walks on their farms over the coming years while discussion groups will also be given the opportunity to visit them.

Dawn Meats' Dairy Beef Club

Paul Nolan, Dawn Meats

As part of its agriculture plan 2010, Dawn Meats launched its Dairy Beef Club. Under this scheme trials were set up with Teagasc in Johnstown Castle to look at a number of dairy beef production systems.

At the same time, both parties identified and have engaged with demonstration farms to benchmark these over the year ahead.

One of the key early findings in 2010 was that proper calf rearing is crucial



regardless of the finishing system adapted. As a result, Dawn are currently developing partnerships with a number of rearers this spring. The aim is to identify 'best in class' rearing systems that will produce a robust, healthy 12-week-old Holstein bull calf at 115kg for beef finishers to finish at 16 months of age. Dawn will provide back-up

professional advice with regular visits and reports, and the project will be monitored with assistance from Teagasc.

Costs, no doubt, will fluctuate and will be carefully monitored, but the prime aim of this rearing venture is to identify and make available best practice for those interested in supplying finishers in the future.

It is expected that the calves reared in this project in 2011 will be placed with finishers for 13 months for slaughter, at carcass weights of 280kg grading O, fat class 2= in early/mid-2012.

Lamb production synchron

This Kerry group knew they must adapt their lambing dates to meet market demand



Michael Gottstein,
Teagasc
Killarney

MARKETING lamb has always been a difficult task — so difficult that some of the major red meat processors have exited the sheep meat business. A group of 27 Kerry sheep farmers have bucked this trend and started their own business, marketing their own lambs throughout Ireland.

In July 2009 the Ring of Kerry Quality Lamb group started marketing their lambs directly to consumers.

From modest beginnings, the group managed to process 70 lambs per month during the first six months in business. 2010 started slow, but soon, throughput doubled and then tripled to over 200 lambs per month.

Very quickly the group realised that because most of its members were hill sheep farmers, supplying customers with spring lamb in the months of April to July would be a significant challenge.

Having worked hard to break into the lamb meat market, and having established a brand, everything was going to be jeopardised if the group could not meet the demand of its core customer base with spring lamb for the months of April, May and June.

Producing early lambs on hill sheep

“Ewes identified for sponging should have been weaned from the previous lamb crop at least four weeks prior to sponge insertion. This takes some planning ahead. Ewes must be in good body condition



farms is a challenge. Scottish Blackface ewes do not lend themselves to early lamb production systems and, even if they did, most of the 5,000 ewes in the group would be suckling their lambs into July (when they should be flushing/sponged for early lamb production).

Requiring 200 lambs per month would mean that 500 ewes would have to be sponged. This figure was arrived at by assuming that 70% of the ewes would conceive to the mating from being sponged, plus one repeat mating, and achieve a litter size of 1.5.

All members were asked to select a small proportion of their flock of 10 to 50 ewes depending on flock size. Certain members opted not to lamb early but over half of the member farms mated almost 600 ewes to lamb from the middle of December to the middle of January.

Each member farm that opted to mate ewes was given a sponging/mating plan with all the key dates relating to sponge insertion, removal and mating plus ex-

pected lambing dates.

Because early synchronised matings require a much lower ram to ewe ratio (typically one ram for every eight ewes), group members pooled their terminal sire rams. This allowed members to use even lower ram to ewe ratios in addition to being able to try out different breeds of rams.

Founding member

Tomás O'Leary is one of the founding members of the Ring of Kerry Quality Lamb Group. He is also the procurement officer for the group who, together with the group secretary, manage the group's weekly lamb kill.

Tomás farms a mixed cattle and sheep enterprise and produces approximately 200 lambs per year, with lambing starting from the middle of February.

This year, Tomás pulled 20 ewes out of his normal production system and sponged them in early July — target lambing date of 15 December.

Chronising with demand



The ewes selected were either dry ewes (whose lambs had been drafted in late May/early June) or hogget ewes. Sponges were inserted for 12 days and at the time of sponge removal the ewes were injected with 750 international units of PMSG. Because the PMSG comes in 7,500 unit bottles, it makes sense to sponge ewes in lots of 10.

Forty eight hours after sponge removal, one ram was introduced for every seven ewes sponged. Two days after the rams were introduced, they were removed, and Tomás opted not to allow the rams back in 10 days later for the repeat matings.

Fifty days later the ewes were scanned; 18 showed up in lamb, six singles, 10 twins and two triplets. These were the best results achieved by any of the members who sponged ewes. Of the 14 members who sponged ewes, the results in terms of conception rate to first service ranged from a low of 25% to 90%.

The results clearly demonstrate the

difficulty in predicting the potential from sponging ewes.

To retain market share in the marketplace, sheep farmers need to be able to supply a consistent quality product 12 months of the year. Failure to achieve this will result in imported product replacing the locally produced product or

lamb being replaced by other protein sources such as poultry, pork or beef at retail level.

Sponging ewes is a useful method to bring ewes into season earlier and thereby facilitate lambing 'out of season'. However, it is not a replacement for good management practices.

KEY | messages

Key messages that can be taken from the experience of the members of the Ring of Kerry Quality Lamb group:

- Ewes identified for sponging should have been weaned from the previous lamb crop at least four weeks prior to sponge insertion. This takes some planning ahead.
- Ewes must be in good body condition — thin ewes won't go in lamb.
- Ewes that are barren from the previous year are not ideal candidates for sponging

— many of these showed up as being barren again at scanning

- Ram ratio/fertility is very important. Mating in July/early August is out of season for the rams too. Therefore, fertility is lower than one would expect in October/November
- Rotating rams during the mating period is important to insure against a dud ram. Change the rams around after six hours, especially if single sire mating is being used.

All going to plan at this Kerry BETTER Farm

An update on developments at this superb suckler unit. **John Carroll** and **Shane McHugh** report



Shane McHugh,
BETTER Farm
programme adviser



KEY TARGETS | in the Farm Plan

- Increase suckler cows from 38 to 55.
- All cows to calve in autumn.
- Replacements purchased as in-calf heifers or cows with calves at foot.
- All calves to be sold as weanlings.
- Increase liveweight output from improved grassland management.
- Reduce variable costs.

L EONARD and Liz McEnery farm 34 adjusted hectares near Farnfore. The farm has a number of land types from free draining land on an outside leased block to very heavy peaty soils around the farmyard. The aim is to produce top quality weanlings for the export market.

The herd consists of Simmental, Simmental cross Belgian Blue and Limousin cross cows. Many cows are now three-quarter bred Belgian Blue. AI Belgian Blue sires are mostly used. Calving begins in September.

On joining the Teagasc/*Irish Farmers Journal* BETTER Farm programme in autumn 2009, the first task for Leonard and Liz was to complete a three-year farm plan.

Grassland management

Grassland management was prioritised in the three-year plan. The leased land was reseeded in September 2009 and a rotational paddock grazing system was used last year, with greater emphasis

being placed on the use of compound fertilizer as opposed to straight nitrogen.

Calves born in autumn 2009/2010 were grazed around the farmyard from January 2010. Paddocks earmarked for first cut silage were grazed by calves before closing up in early April. In the past this would not have been possible as land would have been unable to carry both cows and calves in the spring.

Spring grazing by the calves has resulted in a remarkable improvement in the quality of the silage. Autumn calving demands a silage quality of at least 70% DMD. Early grazing in the McEnery farm resulted in:

- Reduction in the meal required for weanlings.
- Increased daily liveweight gain from grass.
- Reduced costs for straw bedding.
- Fewer calf respiratory problems.

The first batch of calves were weaned in April 2010. These performed remark-



ably well, averaging 377kg on 6 May. Leonard and Liz are convinced of the benefits of early weaning and intend to wean all calves from mid-March in 2011. Sale dates for export weanlings in Kerry have gradually moved earlier over the last number of years. In 2010, the McEnery's first batch of calves were sold on 17 May at Castleisland mart.

Building adjustments

Increasing cow numbers from 33 to 55 will require additional housing. During the summer, Leonard and Liz McEnery decided to convert an old cubicle shed into a dry bedded area to house the calves. This shed was split in the centre to allow older and younger calves to be batched accordingly. Calves are allowed to suckle morning and evening only.

Two rows of blocks were removed and four sheets of tin on the roof were raised to improve ventilation. This improved airflow across the top of the calves without causing draughts.

Veterinary

Vaccination programmes are in place for BVD, leptospirosis, scour and pneumonia in calves. During spring 2010 all purchased animals were screened for BVD, using the Enfer Tag system. No PIs were



ABOVE: Tom Shanahan, area manager, Teagasc Kerry, with Leonard and Liz McEnery

MAIN PICTURE: John Carroll, Teagasc, Kerry, with Teagasc beef specialist Aidan Murray.



detected and a full BVD vaccination programme was started in August 2010. Purchased animals are also BVD screened before entering the farm.

Leonard and Liz purchased additional breeding stock in autumn 2009. New-born suckler calves encountered E-Coli scour problems. Two calves were lost at six days of age and many more had to be treated with intravenous antibiotics by the vet.

In 2010, to avoid similar problems, Leonard vaccinated all cows five to six weeks before calving with Trivacton 6. Calf scour was not an issue in 2010.

Calf pneumonia was also a problem in 2009. This drove up the vet bill. In 2010, Bovipast RSP and IBR vaccines were administered to all autumn-born calves prior to housing.

Consequently, pneumonia did not arise in 2010. However, during the cold spell of December last, calves developed a cough. This was quickly cleared by CTC powder, recommended by the vet.

Thankfully, the pneumonia vaccination programme in 2010 resulted in no severe infestation developing. No fluke treatments have been administered to date this winter.

However, faecal samples from cows and calves will be collected in the next 10

days. Treatment will depend on the results from this monitoring.

AI usage

Traditionally, a stock bull was used on the farm. Leonard then moved to a combination of AI and stock bull usage. However, for both the 2009 and 2010 breeding seasons, 100% AI has been used. Leonard is aiming for a 10-week calving spread in the autumn of 2011 with a 365-day calving interval. His 2010 autumn-born calves are bred by EDJ, OVO, DEP, FHZ and ELZ.

Leonard said he was disappointed by the quality of stock out of FHZ and ELZ. These sires have not been used for re-breeding. Sires used over the recent breeding season have been primarily the Belgian Blue bull BYU. Some straws by Belgian Blue bull Barbier (S656) and the Parthenaise bull Sirex (IRX) have also been used. Leonard completed the DIY AI course in autumn 2009 and has been putting his skills into practice over the recent breeding season.

Weanling management

Traditionally, cows and newly born calves had free access to each other. However, in autumn 2010, Leonard restricted calf access to the cows. Calves

were only allowed to suckle twice daily—morning and late evening. “We found that this led to cows coming back into heat more quickly,” said Leonard. “This should help to maintain a tight calving pattern in the herd.” Calves have had no problem in adapting. They also have access to creep. At Christmas, calves were eating 2kg daily. Since 10 January 2011, calves have access to a paddock close to the yard during the day. Meal feeding has been cut to 1kg per head per day.

● **John A. Carroll** is a Teagasc B&T adviser based in Tralee. **Shane McHugh** is a Teagasc/Irish Farmers Journal BETTER Farm programme adviser.

“ The first batch of calves were weaned in April 2010. These performed remarkably well, averaging 377kg on 6 May

Gearing up for expansion



Paddy Browne,
Head of Education,
Teagasc

ONE of very few upsidesto the economic collapse has been the renewed recognition of the importance of indigenous sectors like agriculture and their potential to boost exports and fuel economic recovery. The enhanced image of agriculture has been underpinned by the Food Harvest 2020 report which charts an expansionary path for the sector, especially in dairying with the ending of the milk quota system.

Trends

The economic downturn, especially in construction, combined with the renewed confidence in agriculture, has resulted in a very significant increase in enrolments at agricultural colleges in recent years. Enrolments in colleges increased again in the current year and are now up 80% compared with 2006.

The number of new entrants is 1,113 with 2,249 students in total. All colleges are at full capacity and were forced to turn away over 200 students this year. Many of these have been catered for on the part-time Advanced Certificate in Agriculture courses, held at local Teagasc centres.

These courses cater for 667 participants with a further 340 completing the online version of the programme. In

“ The economic downturn, especially in construction, combined with the renewed confidence in agriculture, has resulted in a very significant increase in enrolments at agricultural colleges

summary, when all of the various programmes for future farmers outlined above are combined, the total number of new enrollees amounts to 1,673 and the total numbers participating in these programmes is 3,256.

Developments

The information revolution that is driving changes throughout the economy, including advances in science and technology, are transforming agriculture and horticulture into a more knowledge intensive industry.

As the industry becomes more knowledge-intensive, the range of skills and competencies required by producers become critical for success. Teagasc seek to continuously upgrade programmes to meet these requirements. The following gives a flavour of just some of the new innovative elements of our training programmes.

• **Discussion groups and benchmarking farms:** the classroom has been brought out onto the farm through the introduction of the discussion group methodology in recent years.

Second year students now participate in a discussion group on benchmarking farms. These are leading edge farmers who co-facilitate the groups with the teacher or adviser. The groups meet throughout the year and are given access to the technical and financial data on the farms, which means they can track real progress on the farms. This, in turn, enables the students to complete a major project relating to their home farm, usually the ICBF HerdPlus programme.

• **Financial management training:** there is major emphasis now on financial management training. This reflects the fact that farming must increasingly be run as a business. All the recognised Teagasc tools are employed, with students completing an e-profit monitor and a six-year computerised farm plan. Students also receive training in cost/benefit analysis, investment appraisal as well as all aspects of taxation.

• **Grassland technology:** Teagasc are lucky to have, in one organisation, education, advisory and research functions. As new technology is developed, it is immediately packaged and made available to students. A good example of this is the state-of-the-art grassland technology developed at Moorepark.

Students, especially those on ad-



vanced specialised courses, are fully exposed to measurement of grass covers and grass budgeting. Students are also required to complete a wide range of projects relating to their home farms, including fertilizer plans, risk assessments and ration formulations.

• **Online learning:** to meet the needs of part-time farmers, Teagasc deliver the Advanced Certificate in Agriculture online to some 300 participants each year. Because of the applied nature of agricultural education, a portion of the programme is delivered face to face, particularly the skills training element of the programme.

This type of approach is known as ‘blended learning’ and is becoming recognised as an excellent teaching methodology.

• **Higher education:** Teagasc are involved with six Institutes of Technology, UCD and DCU in the joint delivery of 12 higher level programmes right up to Level 8 honours degree level. These links help to raise the standing of all our programmes and provide vital progression routes for those who want to progress to higher level education.

AGRICULTURAL EDUCATION
CONFERENCE, 10 FEBRUARY,
DUBLIN CASTLE

Agricultural education: supporting economic recovery

Teagasc is holding an important agricultural education conference on Thursday 10 February at Dublin Castle. The purpose of the conference is to take stock of the current situation in Ireland and internationally in terms of the provision of agricultural education and to look ahead at future requirements/developments in this area as well as the drivers and trends which will set the scene for these developments.

We have put together a panel of Irish and international experts on this subject and our objective is to raise the profile of agricultural education as well as benchmarking where we are at and seeking to determine the best way forward.

The event will be opened by Dr Noel Cawley, chairman of Teagasc, and the first session, which will be chaired by Professor John Coolahan, will look at the challenges facing agricultural education from a European as well as an Irish perspective. Mairead McGuinness MEP will outline her vision of how policy developments at EU level will affect agricultural education while Professor John Fitzgerald of the ESRI will discuss the role of education in Irish economic recovery.

This will be followed by Dr Liam Downey, former director of Teagasc, who will present a new model of Irish agriculture and its agricultural education requirements, while Paddy Browne, Head of Education in Teagasc, will present the challenges facing Teagasc's education programme.

Session 2, which will be chaired by Michael Gowing, president of Macra na Feirme, will have an international flavour, with a look at the Scottish and Northern Ireland agricultural education systems. The results of a European project called 'Chavet', which has studied the evolving requirements for European agricultural education, will be presented.

Session 3 will consist of a discussion forum facilitated by Dr Tom Kelly, Head of Knowledge Transfer in Teagasc. It will focus on the use of the discussion group methodology in agricultural education.

Professor Gerry Boyle, Director of Teagasc, will close the conference and will call on Brendan Smith, Minister for Agriculture, to announce the 2010 FBD Teagasc 'Student of the Year' as the final part of the conference.



ABOVE: Minister Brendan Smith, Tony Pettit, Teagasc director Professor Gerry Boyle and Teagasc chairman Dr Noel Cawley at the opening of state of the art facilities at Teagasc Kildalton in 2009.
MAIN PICTURE: Equine husbandry lecturer Crea Warner at Teagasc Kildalton.

environment

Everyone wins by reducing nutrient loss

Alice Melland & Per-Erik Mellander,
Teagasc Agricultural
Catchments Programme (ACP)

WITHIN the Agricultural Catchments Programme (ACP), Teagasc staff are measuring how plant nutrients such as nitrogen and phosphorus are moving through the landscape in a range of agricultural catchments across Ireland.

The six catchments differ in terms of their nutrient loss potential; for example, poorly drained soil versus well drained soils and permeable versus less permeable underlying bedrock. All the catchments are at the higher end of land-use intensity, with stocking rates of up to 2.3LU/ha. Two catchments include winter wheat and spring barley cropping.

Why is nutrient loss from soils a problem?

Apart from the financial cost, nutrient loss (whether artificial or released by the soil) can have an environmental effect. Nutrients moving from land into water can boost the growth of algae and other organisms. Excess growth of algae clogs



A group of Louth farmers at an ACP farm walk.

pumps, is unattractive to bathers and chokes out less competitive aquatic life, such as salmon and trout. Some algae produce substances toxic to humans and animals.

When the algal blooms die, oxygen in the water is depleted, possibly leading to fish kills. There are also limits set by the EU and World Health Organisation on nitrates in human drinking water. Improving and sustaining water quality is the ultimate goal of the EU Water Framework and Nitrates Directives and Ireland's Good Agricultural Practice (GAP) regulations.

How does nutrient loss occur?

When nutrients find their way into run-off or drainage water that is not recaptured on a farm (such as by plant roots), the nutrients can reach rivers, lakes and groundwater.

Nutrients are usually applied in fertilizers or manures or deposited by animals at or near the soil surface. Nitrogen (N) and Phosphorus (P) behave differently in soil; P forms that are readily available for plant growth are generally fixed to soil particles so P tends to accumulate at the soil surface. Both available forms (loosely bound to soil particles or dissolved in the soil solution) and unavailable forms of P (strongly bound to soil particles) can then be washed off the land by rainwater, floods, and erosion.

In contrast, plant-available N forms are not readily fixed to soil particles and, therefore, tend to drain down through the soil.

What are the main factors causing nutrient loss?

Ireland's rainfall — ranging from 750 to 1,200mm — is similar, for example, to New Zealand's, but wetter than the European average. Also, our climate is cooler than continental Europe which means

that less water is lost to evaporation and net run-off is high.

Where run-off and drainage water come into contact with high levels of nutrients they can be lost to waterbodies. This is why keeping clean water separated from manure and other nutrient sources in farmyards is critical.

There is little a farmer can do to reduce the amount of surplus water leaving a farm. One farmer at an ACP farm walk told of frustration that the (GAP) regulations don't account for flooding of his farm — over which he has no control.

The ACP is working with farmers to determine how the GAP regulations can improve the situation to benefit both them and the environment. For example the ACP will test whether the GAP regulations will minimise the risk of soil and nutrient loss during storm floods.

The ACP will also study whether changes in farm practice are likely to influence the quality of water during the drier months — when water quality problems such as algal blooms tend to occur.

More information can be found on www.teagasc.ie/agcatchments

“ Where run-off and drainage water come into contact with high levels of nutrients they can be lost to waterbodies. This is why keeping clean water separated from manure and other nutrient sources in farmyards is critical

Bucking the Mc-world trend

Apples, like much else in our busy lives can be a little predictable. Traditional varieties offer new experiences of aroma, taste and texture, writes **Catherine Keena**

WE live in a McDonald's-influenced world where multi-national companies ensure you have exactly the same experience whether you're in Wicklow or Warsaw, Limerick or London. Low prices and reliable, if average, quality have hugely benefited consumers, but we've lost something along the way.

A similar process happened with the apple crop in the 1950s. New varieties brought advantages in terms of yield and disease control but they squeezed out types which had useful characteristics of flavour, texture and colour.

Fortunately, Dr JGD Lamb, who was Chief Horticultural Officer in Kinsealy Research Centre at that time, together with others, catalogued and championed many varieties which were being grown in Ireland. Today, landowners can carry on this valuable work by choosing traditional varieties, when establishing orchards under agri-environment schemes, thus preserving them for our enjoyment and ensuring a gene pool for future development.

The range of shape, size, texture, flavour and colour in these traditional types is immense. Dermot Callaghan, Teagasc Horticultural Officer, suggests adding a few extra commercial varieties, such as Bramley, to boost overall yield, but these additional trees will not be eligible for AEOS payments.

How to do it

"Plant apple trees after St. Patrick's Day



Ard Cairn Russet — an eating/cider variety from Cork which flowers mid-season and produces fruit in October/November.

as soon as ground conditions allow, as they do not like to sit in wet soil," says Dermot. "Also avoid planting in wet areas where possible. If you are holding bare-rooted trees for any length of time before planting, dig or heel them into soil. You must not let the roots dry out. Take care to protect unplanted trees from rabbits and hares.

"Get 8' apple tree stakes (circa 2.2m), if possible, which are made from treated wood. Drive the stakes 18" into the ground at seven-metre centres, using them to mark out the locations for the trees. With the stake next to the prevailing wind (normally south west), dig the hole on the leeward side, so that the tree will not be blown into the stake causing damage.

"Plant the tree to the depth originally planted in the nursery. Keep the root collar and not the graft line at soil level. Do not create a dip around the tree for

water to lie. Get a roll of tree-tie tubing (www.dekerhort.ie) to make ties. Tie around the stake first and then around the tree, with the knot in between preventing friction. Check the ties periodically to ensure growth of the tree has not caused them to become too tight.

"An area of at least one metre in diameter must be kept weed free. Use a circle of plastic, or biodegradable mulch mats, including pegs, to hold them down, such as those available from Kestral Forestry (www.kestralforestry.ie). These should be put in place underneath the tree guard, which is essential to protect from rabbits. Guards can be cut from a roll of chicken wire, placing the cut side up to prevent hares putting their paws on the top, and stapling the overlapping edges to the stake."

AEOS

Traditional varieties of apple trees must be used under AEOS. There is no limit on the number of apple trees within an AEOS orchard.

The capital cost allowed for each tree is €75. Allowing 50% of this for labour, farmers can submit receipts of €37.50 for the tree, stake and other planting costs.

If the full capital amount is claimed, farmers receive an annual payment of €20 per tree, each year for five years.

The AEOS scheme is available again in 2011. Contact your local Teagasc office for details. Teagasc and the Irish Seed Savers Association are planning four regional Traditional Orchard events in October 2011.

CASESTUDY

Planting a traditional orchard

Maeve O'Hair, Rocker, Loughmore, Templemore, Co Tipperary, is one of many farmers planting a traditional orchard at present under the Agri-Environment Options Scheme (AEOS).

Having discussed the options with Sandra Hayes, her local Teagasc adviser, she opted for a traditional orchard and a crop of wild bird cover which provides seed food for birds in winter.

Maeve purchased her trees from Future Forests in Kealkill, Bantry, Co Cork. She said: "I wanted a mix of early, mid and late flowering and fruiting trees, including

eating and cooking varieties, of traditional apple trees, and got eight varieties — Kilkenny Pearmain, Kerry Pippin, Gibbons Russet, Scarlet Croften, Ballyvaughan, Lough Tree of Wexford, Dick Davies and Ard Cairn Russet."

Her trees are on MM 106 rootstocks, which are better on exposed windy sites. They grow to between 15ft and 18ft and fruit in four to six years.

Maeve hopes to make use of the apples in the future and is interested in recommended planting and maintenance procedures.



Maeve, Béibhinn and Rory O'Hair, Rocker, Loughmore, Templemore, Co Tipperary, with a mix of early, mid and late flowering and fruiting trees, including eating and cooking varieties, of traditional apple trees.

Attention to detail is vital to p

With any crop costing over €2,000 per acre to grow, attention to detail is vital to protect and improve profitability. These County Dublin growers hit all the targets, writes **Shay Phelan, Teagasc**

JOHN and David Rodgers farm near Ballyboughal, north Dublin, along with brothers Richard and Thomas and their father Joe. In total, they grow over 2,000 acres of crops including wheat, barley, oats, maize, potatoes and onions. Like most tillage farmers, they rely heavily on rented ground which further reduces the margin for error. Wherever feasible, they test ground for disease such as eelworm and fertilizer status. Such attention to detail is central to the entire operation as small mistakes can quickly cost a lot of money.

All crops are evaluated using the Teagasc e-crops programme. "It's an invaluable tool in making decisions for the farm," says John. In total, about 350 acres of potatoes are grown each year for the supermarket trade by the family.

The Rodgers supply potatoes all year round which was made possible by investment in refrigerated stores over the last 10 years. These stores allow the farm to supply a consistent product to the supermarket buyers all year round. However, the cycle begins a year in advance of the potatoes hitting the shelf with the seed.

All the seed is carefully selected as clean seed, imperative in producing washing quality potatoes which the supermarkets demand. When the seed enters the farm, it is carefully inspected to check for rots and diseases. It is then treated, if needed, and trayed up into



“ Depending on seed size, there could be significant variations in rate per hectare and, consequently, cost

sprouting trays. In years where there is variation in seed size, the seed is split graded according to size to ensure even planting.

Here, the seed is carefully monitored over the winter months to ensure that there are good sprouts on the seed that will survive planting so as to ensure earlier emergence and hopefully increase yield. The Rodgers' plan their planting meticulously and ensure the tubers get at least 28°C days. In weather like the last two winters, this has meant actually having to heat the sprouting houses on a regular basis to avoid frost damage.

A dedicated shed has been erected to harden off the sprouts closer to planting, which gives adequate light to all the trays and reduces the need for artificial light or for moving the trays outside. This has reduced the electrical costs associated with the sprouting process, while also reducing the labour input.

Good quality land and good rotations are also vital to the production of good potatoes which is why the Rodgers will

Table 1 | variety — British Queens

Seed count/ 50kgs	Population/ha	Tonnes/ha	Spacing cm 1.8m wheelings
500	30,000	3	37
700	35,500	2.53	31
900	40,000	2.22	28
1100	45,000	2.04	25
1300	49,500	1.90	22
1500	54,000	1.80	21

profitable potato production



always try to rent relatively fresh land. David Hudson, one of the leading potato agronomists in Britain, showed how important rotation was to clean potato production at a recent Teagasc event in Oakpark.

David suggested that five years, and preferably more, between crops is as effective at reducing problems like black scurf as chemical treatments.

While the crop is in the ground, both John and David pay great attention to pesticide use to ensure that there is as little waste as possible.

Good field records are vital at this time as they can identify any problems as well as keeping on the right side of the authorities. "We have found the Euroblight comparison of blight fungicides very useful," says David.

"This gives a good insight into the strengths and weaknesses of each product and where they might best fit into our programme."

When it comes to harvesting and storing the crop, the brothers are ex-

ceptionally careful to ensure as little damage as possible is done to the potatoes going into store. In the field, drops are reduced as much as possible and cushioned trailers are used to fill the boxes and reduce bruising.

The crop is carefully dried, cured and put into the store. In-store checks are carried out on the crop to make sure that the fridge is at the correct temperature to control diseases like silver scurf, which likes temperatures above 5°C to spread. With the fluctuation in outside temperatures of over 20°C in the last month alone, the effect on the operation of the fridges has to be carefully monitored.

The stores will also be inspected regularly for condensation and wet spots which would indicate that there wasn't enough time spent drying and curing. At the first sign of either, action would be taken to rectify the problem, the problem won't go away by itself. "It's not what goes into the store," concludes David. "It's what comes out that counts."

MAIN PICTURE: John Rodgers, Shay Phelan of Teagasc and David Rodgers.

ABOVE: David Rodgers says seed management is a vital part of potato production.

KEY POINTS | potatoes

- Know your seed rate for the crop you intend to plant.
- Calculate tubers per hectare rather than tonnes per acre.
- Depending on seed size, there could be significant variations in rate per hectare and, consequently, cost.
- Where there is variation in seed size, split grading should be carried out.
- Table 1 gives an indication of seed rates based on seed size. Simply count the number of tubers in 50kg of seed and use this as the basis of your seeding rate.



This year's National Conference will offer strategies to deal with volatility in all aspects of tillage.

Thriving in volatile times

NATIONAL TILLAGE CONFERENCE 2011,
THE SEVEN OAKS HOTEL, CARLOW,
27 JANUARY

THE start of 2011 sees the tillage industry in a much better financial position than the same time last year. World markets are finely balanced and poor harvests elsewhere in the world resulted in significant price increases as harvest 2010 approached, a development that none of the market experts predicted.

While this was welcome, it is a good example of the price volatility we must cope with now.

This year's national conference will offer strategies to deal with volatility in all aspects of tillage.

Traditionally, Irish grain has been sold green off the combine, leaving growers vulnerable to price volatility. This year is the first year where the opportunity to sell grain in advance of harvest has been widely available, offering the opportunity to accurately predict the value of the harvest either before drilling or fixed during the life of the crop.

Advanced sales have been available to farmers in the UK for many years, but

how do they decide when to sell or not?

Mark Wood is a farm manager from the west of England where conditions are not dissimilar to those in Ireland. At the conference he will describe his thought processes in trading his grain. He will emphasise that the most important step in the process is to know your costs of production.

From a production point of view the only protection against price volatility is to maximise output and minimise costs. The most significant cost on a tillage farm is machinery, which is relatively inflexible from year to year and must be carried in poor as well as good years.

Dermot Forristal will look in detail at combining costs to explain how to minimise the costs that must be carried but to maintain sufficient capacity to bring in the harvest, even in a wet year.

Despite 2010 having been probably the lowest disease year for over a decade due to the dry weather, disease remains an ever-present threat. Steven Kildea will describe the latest developments in our septoria populations and how we can incorporate the new fungicides coming onto the market this year to keep ahead.

As well as price variability, tillage farmers need to cope with unpredictable

weather which can influence not only disease but also nitrogen availability in most seasons. Richie Hackett will describe new work which is being undertaken to account for this variability and help growers target the correct nitrogen rate to meet yield and market requirements.

Winter barley and oilseed rape have both seen significant increases in area for 2011. While they bring useful diversity to the rotation, they must earn their place. Recent work has emphasised that to achieve high yields, both crops need to set high seed numbers, but how they get there is very different.

Michael Hennessey will explain that for winter barley to set a high number of seeds, it needs to set a large number of ears. He highlights the husbandry approach needed to achieve it. Conversely, in oilseed rape, large numbers of flowers and pods need to be avoided; John Spink will explain why, and describe agronomic approaches to maximise yield.

Finally, Tim O'Donovan will explain how the innovations described above are being combined into practical whole farm approaches, and demonstrated on the Teagasc Tillage BETTER farms programme.

Co-operating to compete

A brief report from the National Forestry Producer Group Conference by **Frances McHugh, Teagasc**

THERE are 330,000 hectares of private forests in the country, involving almost 16,000 growers. Many of these forests were planted in the early 1990s and are 'due' a thinning. However, growers have little tradition and experience in managing, utilising and marketing their timber crops.

This is complicated by the large number of small plantations (less than 8ha), often fragmented, with difficult road access, at a distance to markets and consist of mixed quality crops.

The National Forestry Producer Group conference and demonstration held in the Conference Centre at Camp-hill Ballytobin, Callan, Co Kilkenny, offered potential solutions.

Representatives

Representatives from many of the now 18 forestry producer groups gathered to compare notes, to learn and to reignite their enthusiasm for the work involved in forming and running a successful producer group.

Among the speakers was Karsten Raae from the Danish Forestry Extension, who presented some thoughts on best practice for forest owner groups.

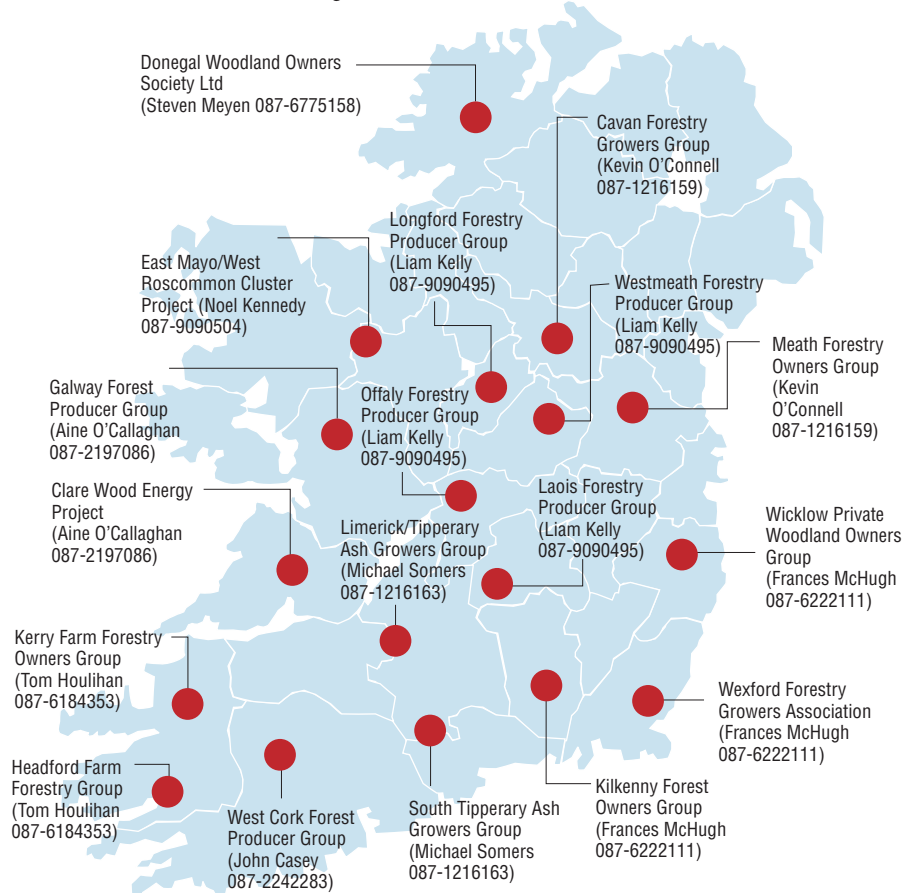
He said that, ideally, forest owner groups should deal with advice, supply and marketing.

Donal Whelan, technical director, Irish Timber Growers Association, spoke about a Model Timber Sales Dispatch System for Private Timber Growers. This system tackles the issue of sales security

“ It is an exciting time in the private forestry industry. There are many opportunities for local development and rural employment as this new timber market emerges

Farm forest producer groups

In association with Teagasc, contact name and number in brackets



in private forests. A full step-by-step outline of this sales system can be downloaded from the ITGA website, www.itga.ie

Paul McCarthy, Teagasc Rural Enterprise Specialist, outlined the importance of good planning when it comes to producing and marketing a product.

He said that farmers have many strengths when it comes to initiative and starting a new business.

Farmers are already in business, have assets, maybe some relevant machinery and generally have a good reputation as hard-working honest people. This all bodes well for starting a new enterprise such as marketing your own timber.

Business plan

Paul emphasised the importance of a good business plan. This should be written down and understood by all involved.

Patrick Lydon from Camphill Callan spoke about a local wood energy supply chain working in the Callan area. Callan Renewable Energy Supply Company (CRESCO) supplies woodchip to three boilers in Callan and others in the surrounding area. They have purchased a

chipper and trailer and have also built a weighbridge with the help of the local LEADER company.

Their plan is to expand a district heating system around Callan and supply it with woodchip from forests in the surrounding area of Callan.

Benefit

They are working with the newly formed Kilkenny Forestry Producer Group to ensure that woodchip is bought as locally as possible so that all involved will benefit. It is an exciting time in the private forestry industry.

There are many opportunities for local development and rural employment as this new timber market emerges. There are also many challenges to be faced.

If this conference is anything to go by, these challenges will be overcome in time, as there is such enthusiasm for this story to turn to success for all involved.

All of the above mentioned presentations are available for download from the Teagasc forestry website, www.teagasc.ie/forestry. Contact details of your local timber producer group or forestry adviser are also available.

Botanic Gardens

Hard lessons learned from Jack Frost

THOUGH January has proven relatively mild so far, few readers need to be reminded that December 2010 saw some of the lowest temperatures ever recorded in Ireland. Met Ireland reports that — 17.5°C was recorded in Straide, Co Mayo. This created problems for many gardens and plant collections.

The Irish flora is quite restricted in the number of native trees and shrubs. Only five evergreen tree genera (*Arbutus*, *Holly*, *Yew*, *Juniper*, and *Scots Pine*) and 13 deciduous genera (*Alnus*, *Betula*, *Corylus*, *Crataegus*, *Fraxinus*, *Malus*, *Populus*, *Prunus*, *Quercus*, *Rhamnus*, *Salix*, *Sorbus* and *Ulmus*) are native. However, the climate allows for the growth of a far greater range of exotic trees and shrubs than anywhere else of similar size in the world. Mount Stewart garden in Co Down has the largest and most diverse collection of trees and shrubs of any National Trust garden in the UK. Exotic introductions from all over the world have made Irish gardens particularly attractive for the garden tourist.

Many of these plant introductions originated in Asia, North America and Europe. A significant number, about 25%, come from Australasia and areas such as Madeira and the Canary Islands. Many of these plants are at the limit of their cold tolerance in the Irish garden.

It is notoriously difficult to predict the survival of plants at low temperatures. Some rules apply. Plants survive cold spells by entering dormancy. This often means they shed their leaves and, in general, deciduous broad leaf plants are more frost tolerant than evergreen broadleaf plants.

The suddenness of the cold snap is important. Plants can acclimatise to cold weather and in some cases they will retain leaves in a mild winter and shed them in cold winters.

Winter survival of wood and buds depends on the ripening and toughening of the wood during a hot summer. The warm summer we had last year would have improved the chances of survival during the December cold period. Plants that have matured are usually more likely to survive than young soft plants. Many young *Griselinia* hedges have been lost this year. On the other hand, some species, such as *Ceanothus* (Californian



Dead leaves on *Abelia triflora*. This shrub was introduced in 1847 from seed collected by Captain Edward Madden of Kilkenny.



Beschorneria damaged by frost.



Frost damage on *Griselinia*.



An occasional series by experts at the Teagasc college at the National Botanic gardens aimed at adding to the appearance and value of your farm

Lilac) and *Cistus*, are more vulnerable when mature and some fine specimens of *Ceanothus* have been lost.

Soil conditions also play their part. The broom, *Genista tinctoria*, can survive low temperatures when grown in poor dry soils but produces soft frost-tender growth in rich moist soils.

In checking out the damage in our own gardens, brown foliage is most likely dead. The buds may not be dead, however, so wait at least until June before abandoning hope. Try watering, mulching and top-dressing the plant in spring. Frost-damaged plants that shed their leaves soon after the frost are probably more likely to survive than where the damaged leaves remain on the plant.

Remove broken branches as soon as possible to prevent tearing. Where frost heaving has lifted the plants out of the ground, re-firm and mulch (but don't mulch if the ground remains frozen).

Lessons for the future | How to deal with cold weather in the garden

- Consider the differences within your garden when placing plants. Avoid east-facing sites for plants with tender buds.
- Sites against a south or west wall will encourage the ripening of wood that will withstand cold conditions so use for more tender plants.
- Generally golden variegated plants should be in the warmer locations.

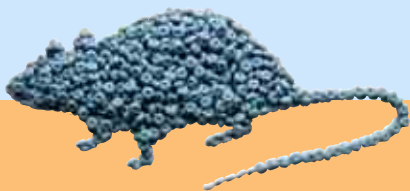
- Wrap containers in bubble wrap or take them inside to avoid frost fracture.
- Wash away salt if used for de-icing.
- Frost protection for tender plants can be made by covering with a cage or blanket made from chicken wire stuffed with bracken or straw. Horticultural fleece could also be purchased for this.
- Remove heavy weight of snow from

branches by gently sweeping it off in an upward direction.

- Well-grown plants are most likely to survive and, where losses occur, try to see it as an opportunity. The Irish nursery stock industry can supply you with replacements or alternatives. Support your local nurseryman or garden centre. You will get advice and service and high-quality plants.



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- The FBD Young Farmer of the Year Award
- The Farmers Journal FBD National Farmyard Awards
- Macra 3C Discussion Groups for young farmers

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