



Today's Farm

Business, production, environment and countryside issues www.teagasc.ie

Laois family managing a fragmented holding

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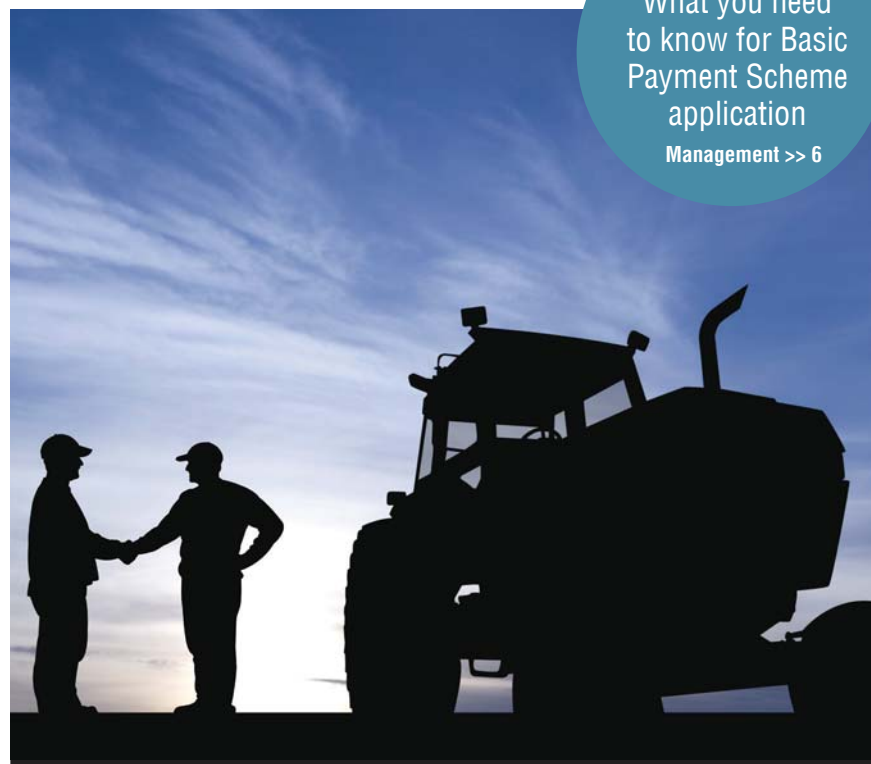
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Cover | Eamonn and Marguerit Duggan with Isabel, Geoffrey, Ned, Eoin Duggan (cousin) and Will. You can read about the Duggans' strategy for operating a highly efficient, but fragmented, dairy farm on page 9.

COMMENT



Mark Moore
Editor,
Today's Farm

Farm families with fragmented holdings

Our greatest disadvantage as a farming nation is the fragmented nature of our holdings. On average, farms have three separate blocks of land. This is a particular problem for dairy farms and we have several articles on how to manage a fragmented dairy farm. Fragmentation can prevent farmers from benefiting from our greatest advantage – our ability to grow highly nutritious grass at a comparatively low cost.

The situation is not improving. In 2011, the average number of parcels was 3.11; in 2012, it actually rose to 3.16 before falling slightly to 3.14 in 2013. The increase may be because farmers are only able to buy land away from their core holding. The Department of Agriculture, Food and the Marine has introduced initiatives to help and Teagasc offers support for those considering partnerships, etc. But one can't help feeling that fragmentation remains the stone in the shoe of farming progress.

Teaghlai ghfheirme a bhfuil gabháltas ilroinnte acu

Is é nádúr ilroinnte ár ngabháltas an míbhuntáiste is mó a bhaineann linn mar náisiún feirmeoireachta. Ar an meán, bíonn trí réimse talún ar leith luaite le feirmeacha. Cruthaíonn sé seo deacracht ar leith d'fheirmeacha déiríochta agus tá roinnt alt scríofa againn maidir le conas feirm dhéiríochta ilroinnte a bhainistiú. D'fhéadfadh ilroinnt a bheith mar bhonn le bac a chur ar fheirmeoirí tairbhe a bhaint as ár mbuntáiste is mó freisin – ár gcumas féar ardscamhardach a fhás ag costas réasúnta íseal.

Níl feabhas ag teacht ar an scéal seo. In 2011, bhí an meánlíon dáileachtaí cothrom le 3.11; in 2012 mhéadaigh an líon dáileachtaí go 3.16, agus in 2013 thit an líon dáileachtaí go 3.14.

D'fhéadfadh an méadú seo a bheith ag eascairt as an gcoinníoll a chiallaíonn nach bhfuil de rogha ag feirmeoirí déiríochta ach talamh a cheannach nach bhfuil gar dá bpríomhghabháltas. Tá tionscnaimh bunaithe ag an Roinn Talmhaíochta, Bia agus Mara chun déileáil leis an deacracht seo agus tá tacaíocht ar fáil ó Teagasc dóibh siúd atá ag smaoineamh ar chomhpháirtíochtaí etc. a bhunú.

SHEEP 2015

SHEEP 2015 will take place at the Animal and Grassland Research & Innovation Centre, Teagasc, Mellows Campus, Athenry, on Saturday 20 June. Teagasc will be joined by a number of the main service providers to the sheep industry, including UCD, Sheep Ireland, Bord Bia, the Department of Agriculture, Food and the Marine and the *Irish Farmers Journal* in organising SHEEP 2015. Title sponsors for the event are Kepak, with a number of other companies also financially supporting what will be the major sheep event of the year.

SHEEP 2015 will first and foremost be a key source of technical information. It will exhibit all the different components that make up the national sheep industry. Several of the main sheep breed societies plan to hold their national championships or other breed competitions at this event and many other societies are also planning exhibits. This is in addition to many commercial exhibitors.

The major event is being geared for an attentive audience with a special interest in sheep but it will also be a strong attraction for families. Food and refreshments will be available. Children's entertainment will be organised and other activities will include cookery demonstrations, sheep dog-training and sheep dog trials.



Technical focus

Technical information will be delivered via a series of 'villages' and will include talks, displays and workshops, covering all up-to-date information of relevance to the sheep industry in Ireland and further afield.

Villages

- Flock health.
- Grassland management.
- Sheep breeding.
- Hill sheep production.
- Environmental management.
- Agricultural education.
- Wool and wool products.
- Meat industry and markets.
- The science of farming.
- Health and safety.

Further information can be obtained from Frank Hynes, Michael Diskin or Norina Coppinger, at Teagasc Athenry, or by emailing sheep2015@teagasc.ie. Details are also available on the Teagasc website, www.teagasc.ie



SHEEP 2015 will exhibit all the different components that make up the national sheep industry.

MOOREPARK OPEN DAY

A national open day will be held at the Teagasc Animal & Grassland Research and Innovation Centre, Moorepark, on Wednesday 1 July. The open day is set against the backdrop of milk-quota abolition, volatility in milk price and a positive market outlook for dairy products due to significant growth in world demand. Attending this event is a necessity for all dairy farmers and stakeholders in the Irish dairy industry.

In our special feature on pages 16 to 22, Moorepark researchers provide a taster of just some of the topics which will be addressed at the open day.



LAND DRAINAGE AND SOILS

An open day will take place on Wednesday 13 May on the farm of Donal and Michael Keane, Listowel, Co Kerry, who are participating in the Teagasc heavy soils programme.

The focus of the open day will be on land drainage, soil fertility and the performance of the host farm. Teagasc advisers, dairy specialists and researchers from Teagasc Johnstown Castle and Teagasc Moorepark will be present and available for questions.

The Teagasc heavy soils programme aims to improve the profitability of farms on heavy soils through the adoption of key technologies, including: high-quality pasture management, land improvement strategies

and efficient herd management.

For more information on the programme, see <http://www.teagasc.ie/heavysoils/Moorepark>

TIMBER 2015

Meet Teagasc representatives at TIMBER 2015 – the Irish Forestry, Woodland & Bio Energy Show – Saturday 9 and Sunday 10 May, Stradbally Hall, Co Laois

Teagasc's Forestry Development Department will be in attendance at the Irish Forestry, Woodland & Bio Energy Show 2015. Teagasc will have its own marquee and demonstration area highlighting its extensive advisory, research and training services.

Forestry advisers, researchers and specialists will be available over the two days to answer your questions on how best to incorporate a forest into your farm and to provide on-the-spot advice regarding your existing forests.

Particular focus this year will be on the New Forestry Programme 2014-2020, with details on each element of the programme.

See the latest research on tree breeding, conifer and broadleaf silviculture, site classification and on how best to prepare your forests for thinning, harvesting and marketing.

Teagasc's education department will also be there highlighting forestry courses and training available.

Information on the many forest owner groups from all around the country will be available in the Teagasc marquee, with details on their activities and contact details on how to join up.

Teagasc will be running a free competition over the two days of the show to promote the Teagasc Forestry



e-newsletter. We look forward to seeing you there.

PIG RESEARCH

The Teagasc pig farmers' research dissemination day will take place at 2pm on Tuesday 12 May in the Paddy O'Keefe Innovation Centre, Teagasc Moorepark, Fermoy, and at 2pm on

Friday 15 May in the Cavan Crystal Hotel. The event will provide attendees with the most up to date research results, an overview of ongoing research and the opportunity to meet with some of our researchers and postgraduate students.

Admission to the event is free of charge and you can register to attend by contacting Roisin Condon at 025-42330, or your local pig adviser.

BETTER FARM BEEF EVENT

There will be a national BETTER farm beef event on the farm of Patrick Grennan in Co Wexford on 21 May. Contact your local adviser or the website for details.

OAK PARK CROPS OPEN DAY

The Teagasc Oak Park Crops Open Day (24 June) will demonstrate the latest technical innovations on a range of crops, including winter and spring barley, winter wheat, oats, oilseed rape and beans. In addition, the potato breeding programme will be on display, as will variety plots from the DAFM and new sugar beet varieties. There is a particular emphasis on break crops as the research

programme responds to the need for crop rotation. The extensive field trial programme will be on view with key topics presented at over 20 information points.

With the Sustainable Use Directive (SUD) focusing attention on sprayers and spraying, the open day incorporates a spraying event with live demonstrations organised in conjunction with the *Irish Farmers Journal*. Key points to be aware of before your sprayer will be tested, spraying with precision, and demonstrations of sprayers from the main manufacturers will be on show in the sprayer arena. There will also be a range of other machinery on display from all of the main manufacturers and dealers, so there will be something for everyone, not just the specialised tillage farmer.

Even when following the best agronomic advice and aiming for a premium market such as malting barley, income can be lost through incorrect combine settings. The main combine manufacturers will also be on hand to demonstrate how to optimise settings to ensure the crop is fully threshed while minimising losses and damage to grain. To give you time to see all that is on offer, the event will run for longer this year starting at 11am and running through to 6pm on 24 June.

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If you are following a succession plan, the 2015 application process is more detailed.

With the 2015 campaign well under way, farmers are at different stages in the BPS process. It's always worthwhile to check, and check again, whether amendments might be needed

James McDonnell
Financial Specialist,
Teagasc Rural Economy and
Development Programme

The Basic Payment Scheme (BPS) that you will receive over the next five years will be determined by key elements of the 2013, 2014 and 2015 applications. As this is currently undergoing a “changeover

process”, it is vital to ensure that your payments are correct as they will dictate a significant part of your income for the next five years.

The 2015 application

As direct payments from 2015 may take the form of four distinct schemes, the payment that a farmer receives under the new direct payment system is no longer a “single payment” but may be a combination of payments under four schemes:

- Basic Payment Scheme
- Greening payment
- Young Farmers' Scheme
- Aid for protein crops (peas, beans and lupins).

All eligible farmers will receive a payment under the BPS and a Greening Payment while some farmers may also qualify for a further payment under the Young Farmers' Scheme or under the Aid for Protein Crops Scheme.

The changeover will be straightforward for the majority of farmers.

This may just involve completing the 2015 BPS application. This year, as in the past, you can complete the form online, but some applications cannot be completed using a paper form.

Partnerships, share-farmers, organic and tillage applications can only be completed online.

If you have been leasing some of your land, following a succession plan or changing to a company structure, the application process in 2015 is a little more complex. It is important to check that all the relevant documents are completed correctly and submitted on time.

This year, under the new CAP programme, the National Reserve has allowed some farmers to get an allocation of entitlements and progress the succession plan on the farm.

This has complicated the application process, so more time should be allowed to get the applications completed.

» Continued on page 8

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Completing the application form

The majority of application forms are completed through the DAFM online system. This year, the system has changed to take into account the recent changes in the CAP, so the system has a new look and feel to it, which may take a bit of getting used to.

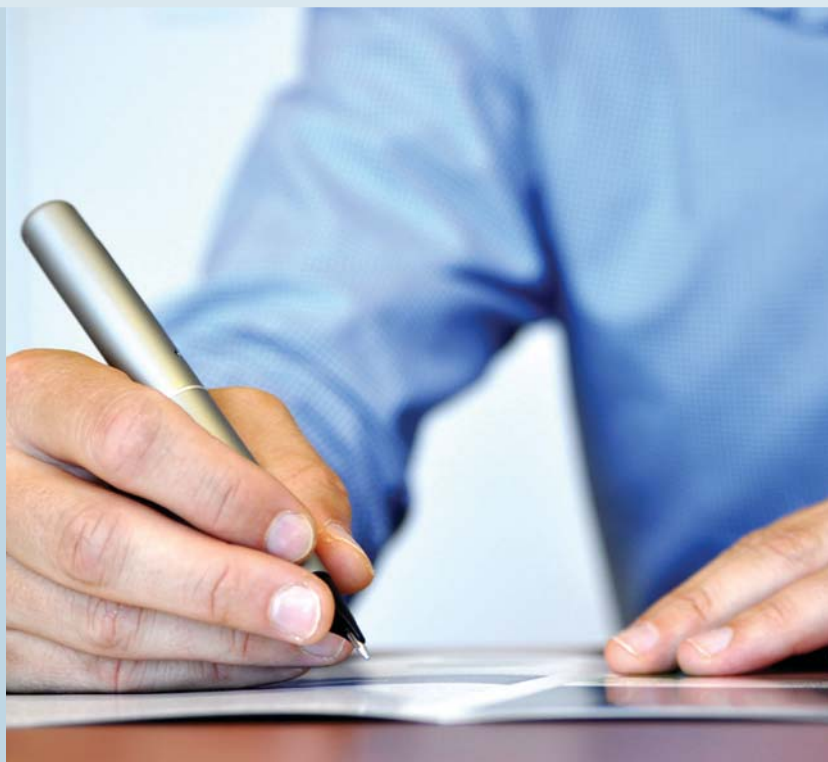
The application process allows you to apply for different schemes as heretofore. Areas of natural constraint, organics and GLAS parcels must be identified if you wish to receive payment under these schemes.

Share-farming and registered farm partnerships can now apply this year for the first time as a group.

Mapping can also be completed online as in the past; you may upload paper maps or post them but, remember, priority is given to maps received online.

New this year is the "greening scheme". If you are in a tillage situation and have more than 10ha, you must complete a second set of mapping online.

The second mapping procedure calculates your ecological focus areas (EFAs). This must be completed online. The purpose of this is to calculate the total area you have dedicated to land deemed



ecological. The minimum target you must reach is 5%.

Getting help with the form

If you intend getting help to complete your application form for the Basic Payment Scheme or any of the other CAP schemes, it is important that you make an appointment with your adviser immediately. In the majority of cases, the application process is

taking more time this year. There are many different reasons for this, some of which have been outlined. In many cases, as you read this you may already have the form completed. It is no harm to have a read over the copy of the form, which has been submitted already, just to double check that you are happy with it.

If there is a problem, now is the time to rectify it.

» From page 6

More complex cases may also require input from a solicitor, accountant or valuer and involve some or all of the following transactions:

- Adding and /or changing the name(s) on the herd number.
- Completing a partnership application.
- Transferring entitlements using the transfer application.
- Private contract clause application.
- Completing a Capital Gains Tax return.
- Completing a VAT return.
- Updating your will.

Getting information

If your situation is complicated by some of the items mentioned above, you will require plenty of information to make a well-informed decision. There is lots of information available to cover the majority of situations. Information overload could easily

become a problem due to the number of schemes and options that have been launched this spring.

The information supplied with the application forms should help the applicant to complete the application successfully, but we must remember that submitting the application is only part of the story.

“ Due to the complex nature of implementing the new CAP payment system, the deadline this year has been extended

The Department of Agriculture, Food and the Marine (DAFM) has made a lot of information available on its website about this new scheme and the effect of the CAP agreement on how your new payment is calculated.

The CAP 2015 information booklet is

a useful guide and there is also a useful calculator that you can use to work out the values of your own future payments in the scheme up to 2019. Log on to <http://www.agriculture.gov.ie> to read and download these documents.

Deadlines

Due to the complexity of implementing the new CAP payment system, the deadline this year has been extended. The Department of Agriculture, Food and the Marine has set a closing date of 29 May 2015. As in other years, amendments can be made after submission of the application. The final date for amendments is also extended this year to 15 June.

The reasons for making an amendment include:

- Correcting an obvious error (minor clerical error/typo, etc).
- Adding or deleting a parcel.
- Change of use of a parcel.
- All amendment forms will be acknowledged in writing.
- Ticking/unticking the ANC box.

Bales the answer on Co Laois farm

High-quality baled silage helps to optimise milk production on this fragmented farm

Richard O'Brien

Teagasc, Kilkenny, co-ordinator of the Joint Teagasc Glanbia (GILL) Monitor Farm Programme

Fintan Monahan

B&T Dairy Adviser, Laois

Eamonn and Marguerit Duggan are farming in Tubberboe, Durrow, Co Laois. They have participated as a Monitor Farm in the Teagasc-Glanbia joint programme from 2011 to 2014.

"For us, two things are key," says Eamonn – tonnes of grass grown and utilised per hectare and targeting a 90% six-week calving rate. In 2014, the milking platform of 36ha grew 13.1t DM/ha. In 2012, the same land grew just 12t DM/ha, fertility was holding back grass production.

"We had the soils on the whole farm analysed in 2012 which indicated that 60% of the soils were below optimum for P and K, but pH was OK and no fields needed lime."

The entire farm was soil sampled again in 2015 and, now, only 10% of the farm is below optimum for P and K. However, the average pH has fallen from 6.65 to 6.2. While Eamonn will address the fall in pH, the bigger challenge on the farm is fragmentation.

The farm is broken into three blocks, the home block of 36ha (milking platform), 30ha owned three miles away (used for heifer rearing) and 20ha of leased land seven miles away (which is used to produce bales of high-quality silage for winter feed and to supplement the grazing platform when there are deficits).

"The overall stocking rate last year was 2.32LU/ha with the milking platform stocked at 3.4LU/ha," says Fintan Monahan, Eamonn's local Teagasc adviser.



Aerial view of the Duggan farm.

The Duggan plan for 20ha block

Winter	Grazed by weanlings
1 February	Closed for silage
10 May	Quality silage cut (2,000kg DM/ha) at three bales per acre
10 July	Dry cow silage cut (4,500kg DM/ha)
5 September	Quality silage cut (2,000kg DM/ha) at three bales per acre



The farm is broken into three blocks, the home block of 36ha, 30ha owned three miles away and 20ha of leased land seven miles away



Continued on p10

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James D Phelan, Mountrath, Co. Laois

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Eamonn Duggan and Richard O'Brien.

» From page 9

"In 2014, Eamonn milked 120 cows with 70 newborn to one-year-old and 71 one- to two-year-old replacement heifers reared on the outside block."

At this overall stocking rate, Eamonn can make enough silage for the winter and buy in very little feed. Last year, he used 450kg of ration with no forage bought in. "Our total costs of production last year were 21.63c/litre and the net profit was 19.40c/litre," says Eamonn. "Our goal is to keep costs below 20c/litre."

Spring feed demand

At a stocking rate of 3.4LU/ha and a 80% calving rate in six weeks, the spring demand is very high. In spring, half of the forage fed is silage, the other half is grass with 3kg of meal. This year, Eamonn has pushed the stocking rate further to 3.9 cows/ha on the milking platform, with a whole farm stocking rate of 2.4LU/ha.

Eamonn aims to maximise produc-

tion on the outblocks and also push the milking platform stocking rate. On the outside block seven miles away, he plans to make 2.5 bales per cow to substitute his high demand for grass during the year.

"Soil fertility, as mentioned earlier, and reseedling must be kept up to date to grow the maximum of grass DM/ha across the whole farm," says Fintan Monaghan. "Eamonn will keep the overall stocking rate at 2.4, so he must grow at least 13t of grass per hectare."

What's the plan?

"The quality of our bales of silage is crucial not only in spring and autumn but, also, during the summer because the farm is very dry and prone to

drought," says Eamonn.

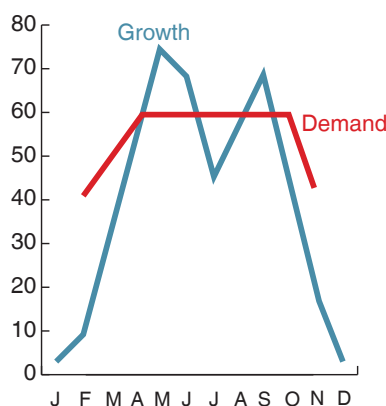
"In 2013 and 2014, we were feeding silage during July and September (Figure 1). "We've been gradually increasing the milking platform stocking rate over the last five years and learning how to manage the system."

Silage is cut in May and September at 2,000kg DM/ha. Eamonn needs 2.5 bales/cow of this type of silage. These quality bales are kept separate from his dry cow bales of silage. The quality bales have tested, on average, 80 DMD+, 30% DM, 15% protein and 0.94 UFL. "We've found that cow intake increases with these bales and yields are easily maintained," says Eamonn.

As can be seen in the picture above, Eamonn's buffer feeding system is set up for this job and 130 cows can feed at the same time. Eamonn has no cubicles, so the two tanks are also used for winter housing and as a standoff when conditions are vulnerable. There is one tractor and loader on the farm. There are no additional machinery costs for feeding out these bales. "The total cost of the quality silage is 17c/kg DM, which is 9c more than grass," says Eamonn. "A zero grazer is approximately the same cost but the bales suit our system. We have the bales in the yard when we want them and they are made when growth and quality are high. We are not travelling every day with a zero grazer and also during period of poor growth, the zero grazer might not have much grass to cut either."

Figure 1

Demand v growth for 2014



2014 v 2015: Cow numbers and stocking rate

	2014	2015
Cow number	120	135
Milking platform stocking rate	3.4	3.8
Overall stocking rate	2.3	2.4



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Triple rinse containers at time of use, puncture and invert to dry.

Beware of ultra-high

While the Laois article shows that land blocks away from the milking platform can be used to help achieve a higher output on the grazing platform, there are limits

Donal Patton

Teagasc Agricultural College, Ballyhaise

Fragmentation can present a particular problem for farmers who wish to expand production. Any land beyond walking distance to the parlour (or robot) cannot contribute to milk from grazed grass. Tunnels and even bridges may play a role, particularly where a busy road dissects the land. Bringing in feed from outblocks and increasing stocking rates (somewhat) on the grazing platform can also help.

Teagasc researchers at Ballyhaise have looked at another option: radically increasing stocking rate on the grazing platform to the point where the conversion of grass to milk solids is maximised and winter forage is imported.

The experiment was run over a four-year period from 2008 to 2011, where we compared stocking rates of 3.1 cows/ha with a rate of 4.5 cows to the hectare. Summarising the key difference between the 3.1 cows/ha and the 4.5 cows/ha systems: At the lower stocking rate, about 30% of winter feed is imported, whereas at 4.5 cows/ha you are importing as much as 95% of winter feed.

We assumed that the winter feed was purchased at an average cost of €150/t DM, which would be the same cost if a farmer were to rent land and grow their own crop. We achieved a higher output of solids per hectare but, interestingly, increasing the stocking rate to 4.5 cows/ha had no effect on grass grown or utilised. Therefore, the extra milk produced was essentially bought in as the level of concentrates and silage consumed had to be increased substantially to plug the deficits in the feed budget.

In my opinion, grassland management is more difficult at the high SR as you have a demand of 75kg DM/ha, so deficits occur more often and will last longer. Maintaining good grass



Donal Patton says that those expanding milk production should be careful that they don't end up with a high-cost system.

farm stocking rates

utilisation while feeding silage was a particular challenge and required accurate daily allocation of both grass and silage.

The secret to profitably expanding production from any block of land is to increase the production of grass from pasture, while keeping concentrate feeding constant. Most dairy farmers will cite access to more land that they can walk cows to as their biggest limiting factor. National statistics, however, suggest that it is the productivity of land that is the first limiting factor on most dairy farms. The average dairy farmer in Ireland could potentially increase production by 60% to 70%, at low cost, on their existing land block through improvements in grass management.

Dairy farmers, in particular, need to carefully consider that an outside block can be an asset but it can also be a liability. On the positive side, it will allow you to increase cow numbers on the grazing platform if you can export silage production and heifer rearing to outblocks. You may also be able to leverage its asset value when borrowing.

Table 1: Effect of feed system on milk production, feed inputs, cost of production and profitability

System	HG	HI	se	Sig.
Farm size (ha)	40	40		
SR (cows/ha)	3.1	4.5		
Milk solids (fat and protein) production				
kg/cow	377	390	4.3	*
kg/ha	1,153	1,786	17.2	***
Feed inputs (kg DM/cow)				
Concentrate	551	872	9.1	***
Silage	1,168	1,431	19.4	***
Cost of production				
Feed costs (€/ha)	819	2,362		
Total costs (€/ha)	5,150	8,013		
Whole farm profit				
@ 22c/l (€/ha)	-580	-1,170		
@ 28c/l (€/ha)	410	326		
@ 34c/l (€/ha)	1401	1,823		

Table 2: Pasture grown (tonnes)

t concentrate DM/cow	10	12	14	16
0.00	1.5	2.0	2.3	2.6
0.25	1.7	2.1	2.4	2.8
0.50	1.8	2.2	2.5	3.0
0.75	1.9	2.3	2.7	3.1
1.00	2.0	2.4	2.9	3.2
1.25	2.1	2.5	3.0	3.4
1.5	2.2	2.6	3.1	3.5

All of these stocking rates equate to 85kg liveweight/t feed DM available



Any land beyond walking distance to the parlour (or robot) cannot contribute to milk from grazed grass



Continued on p14

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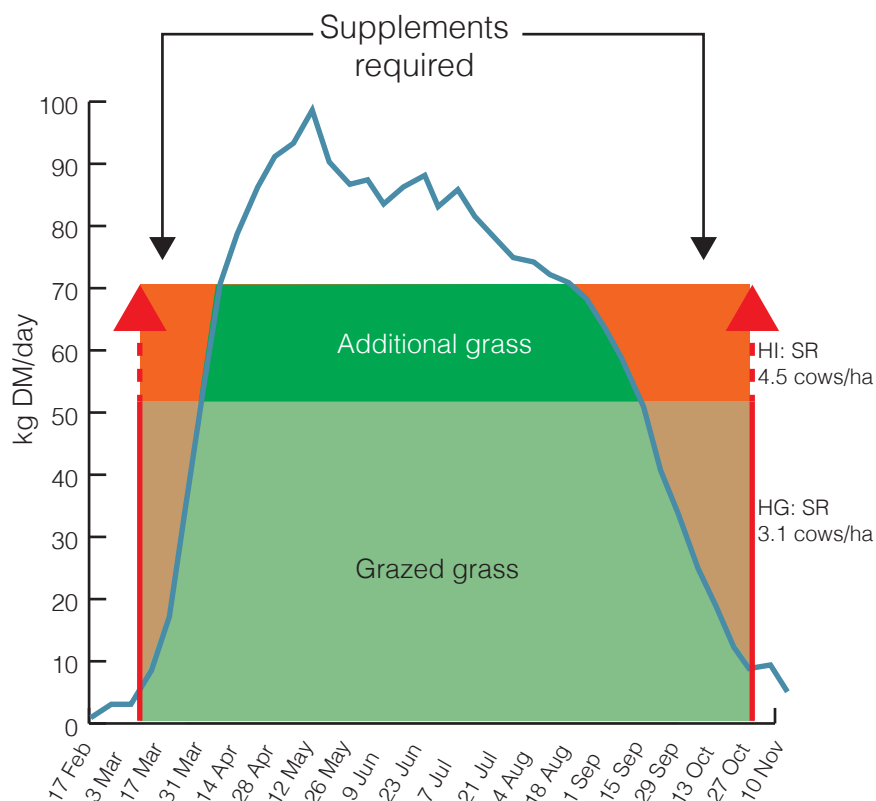
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On the less positive side, owning an outside block can tie up capital with a low return. It may divert attention and management time from the core business, increase workload and complicate your farming operation.

From an economic point of view, the higher stocking rate system is a higher-cost system, which means it is more vulnerable to fluctuating milk prices and also other external factors like feed prices and severe weather events. For this reason, it is not a sustainable system of milk production and should not be viewed as a long-term expansion strategy.

It may, however, be used as a short-term solution for farmers who wish to build up stock numbers that could be used to stock a new block of land or a second unit. In this case, the home farm must be capable of growing at least 16t DM/ha. High quality forages must be sourced at reasonable price, sufficient housing and feeding facilities, in particular, must be in place, base milk price must be above 34c/l and, finally, grassland management must be excellent. While some may well try such systems in the coming years in an attempt to drive increased production, for the majority this will not be viable, even for a short period.



FARM FRAGMENTATION

Zero-grazing system

Padraig O'Kiely
Teagasc Animal and Grassland
Research and Innovation Programme

A zero-grazing system is where grass is mechanically mown and brought to cattle. Used for many years in parts of mainland Europe, it is currently used on only a small number of Irish farms.

Its appeal is that it allows cattle to consume fresh grass from fields that are too far away, or are separated by a busy road, to be included in the grazing rotation.

Zero-grazing can also play a role when utilising fields too wet for grazing, provided the machines employed have sufficiently wide wheels to safely distribute their load.

In the above examples, it is likely that the herd will graze conventionally for most of the season, but receive zero-grazed grass when useful. With large herds operating at high stocking rates, and where animal accom-



Ensure that zero-grazed cattle have sufficient trough space width, so that they can genuinely eat to appetite and achieve a high intake.

modation and feed management are of a high standard, zero-grazing may be operated for longer periods of the year.

When zero-grazing is employed, it needs to be part of a “rotational grazing” system, with excellent grassland management entailing good grass measurement and management practices such as using the “grazing wedge” to ensure effective grass budgeting. Highly digestible grass, grazed by the cow, will virtually always be the most cost-effective feed.

Mown grass is prone to heating, which would reduce its feeding value quickly. Consequently, it is important that grass receives the minimal amount of bruising or laceration before being quickly transported to the feed trough. That's why zero-grazing is usually undertaken daily

with a forage-wagon rather than, for example, a direct-cut or precision-chop harvester.

It is also important that feed troughs are emptied daily. Cattle can “push grass away” from the feed trough while they are eating it and it may need to be pushed back to them more than once daily. Avoid piling it too high in the feed trough to reduce the risks of heating or of the cattle pulling it underfoot.

Finally, ensure that zero-grazed cattle have sufficient trough space width, so that they can genuinely eat to appetite and achieve a high intake. Zero-grazing is a higher cost system than conventional grazing, and will mean greater volumes of slurry to be spread. However, it has the potential to produce high yields of leafy grass within a well-managed system.

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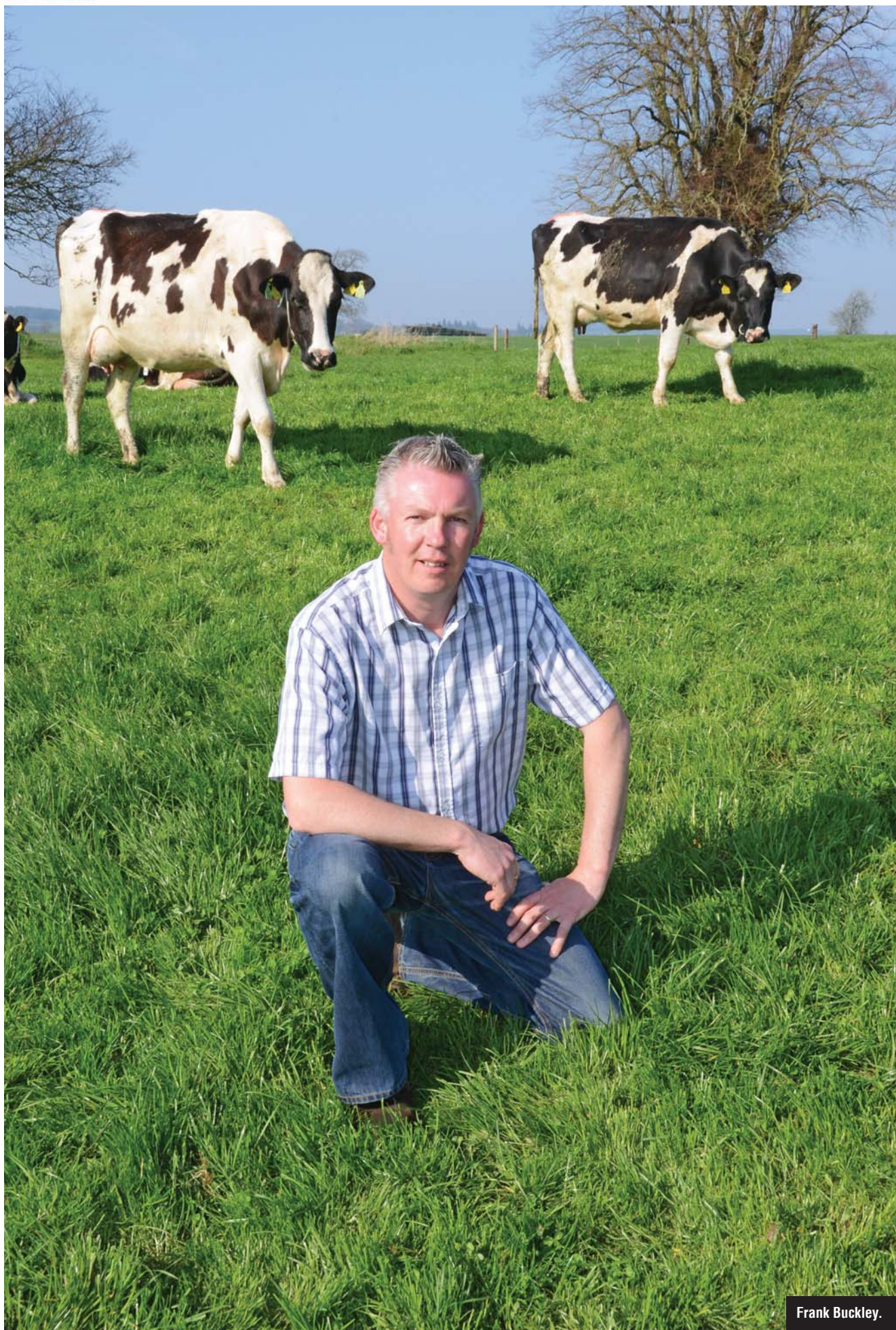
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Frank Buckley.

Breeding, herd health and expansion in focus

A vast range of technologies and information related to dairying will be on display at the Moorepark open day. This preview covers just a small sample of the themes that will be addressed on 1 July

Next Generation Herd

Frank Buckley

Teagasc Animal & Grassland Research and Innovation Programme

In 2001, Teagasc Moorepark, in conjunction with ICBF, developed the Economic Breeding Index (EBI) for dairy cattle, which included performance traits related to revenue (milk production) and costs (fertility). The goal of the EBI was to identify animals whose progeny will be most profitable under future Irish production systems. Today, the EBI includes 19 traits related to milk production, fertility and longevity, calving performance, efficiency, beef performance, health and milking management.

Analysis of commercial farm data by George Ramsbottom has shown that each €1 increase in herd EBI results in a €2 increase in profit/cow/lactation. Genetic gain decreased over time to a modest €11/cow/year in 2011. The introduction of genomic selection in 2009, however, has accelerated the theoretical rate of increase in EBI to €38/cow/year.

The Next Generation Herd was established as a strategic resource to validate that genetic selection based on the EBI will deliver as expected, and continue to do so into the future. The aim is to provide clear and precise indications of the compatibility of cows of extremely high EBI with intensive grass-based production systems. It will also enhance our ability to develop the EBI further and provide a potential nucleus herd to supply genomically selected young bulls for the national breeding programme.

The study

The Next Generation Herd was assembled during 2012, with the purchase of maiden heifers, in-calf heifers and heifer calves from commercial dairy herds around the country, as well as animals from within Teagasc dairy herds. The first

animals (all heifers) calved in the spring of 2013. In 2014, 33% parity one cows (heifers) were introduced. The herd is situated at the Dairygold Research Farm in Kilworth.

There are two distinct EBI groups: 90 elite (extremely high EBI; €249) and 45 national average EBI (NA; €133 EBI) females. To avoid entangling EBI and the effects of hybrid vigour or specific sire lines, the herd is exclusively Holstein-Friesian and genetic diversity (sire lines) has been maximised. Of the 90 elite heifers assembled for the trial in 2012, 40

sires, 83 grandsires and 27 maternal grandsires are represented. The elite females, with an average EBI of €249, are firmly inside the top 1% in the country on EBI.

Prior to purchase, all animals were subjected to genomic testing and rigorous health screening. Our priority was to assemble a minimal-disease herd, negative for the common infectious diseases: IBR, BVD, salmonella, neospora, Johne's and leptospirosis. Best practices in disease screening, biocontainment and biosecurity have been implemented.



Conclusions to date

The preliminary results of this study are very positive, indicating that the EBI is working to identify more profitable dairy genetics. Post-quota removal Irish dairy farmers must focus to continue this genetic progress.



Preview continued on p18

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New traits for breeding

Donagh Berry

Teagasc Animal & Grassland Research and Innovation Programme

Milk quality, feed intake and environmental load are not explicitly included in the Irish national dairy cow breeding objective – the EBI – animal health is also poorly represented there. Our reliance on exporting, especially as we strive to enter higher value markets and generate more value-added products, means milk quality will become ever-more important. Milk quality parameters currently under investigation, with a view to generating genetic evaluations for Irish animals, include milk fatty acid profile (eg saturated fatty acid content), milk protein profile (eg casein fractions) and milk coagulation properties.

“ The EBI is profit based and, therefore, must include all traits likely to affect future profit on Irish farms

Considerable genetic variation has already been shown to exist, with heritability estimates of approximately 30% to 50%.

Feed efficiency is partly already included in the EBI through the simultaneous inclusion of both milk solids production and liveweight. Several initiatives are underway to replace liveweight (which is used as a proxy for feed intake) in the EBI with actual feed intake measures. There is considerable genetic variation in grass dry matter intake, with heritability estimates of approximately 35%. Therefore, the remaining gap in our knowledge is how to routinely measure cow feed intake in a very large population of Irish animals to generate high reliability genetic evaluations.

Unique research at Moorepark has proven that feed intake predicted from the mid-infrared spectroscopy (MIRS) of milk is strongly genetically correlated with actual feed intake measures of cows at grass. MIRS of milk is the standard international method of quantifying milk composition in individual cow and bulk milk tank samples and is readily available.

Research is also underway on using other measures (eg activity) to quantify feed intake. Collaboration with international colleagues in eight other countries has shown that collation of international data,



Donagh Berry.

supplemented with DNA information (ie genomic selection), can also be used to augment the reliability of genetic evaluations for feed intake. Improving feed efficiency, while also improving cow reproductive performance and survival, will benefit the environmental footprint of the Irish dairy sector.

As reproductive performance improves, as a direct consequence of selection on EBI, arguably the next limiting factor to cows expressing their full genetic potential for milk solids production will be compromised health.

Although udder health and lameness are currently included in the EBI, genetic susceptibility to other diseases (infectious or otherwise) is

not. This is despite the proven large genetic variation in susceptibility to common diseases in Irish cattle. For example, the heritability of susceptibility to tuberculosis in Irish cattle is approximately 11%.

Again using tuberculosis as an example, 96% of the daughters of one bull across several herds succumbed to tuberculosis, while daughters of other bulls on the farms did not. Incidentally, this bull had the worst genetic evaluation for somatic cell count of all 3,856 bulls born since 1985, with AI codes available in Ireland.

The EBI is profit based and, therefore, must include all traits likely to affect future profit on Irish farms.

» Preview continued on page 20

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Herd health

Riona Sayers

Teagasc Animal & Grassland Research and Innovation Programme

The World Organisation for Animal Health (OIE) estimates that approximately one-fifth of animal production is lost due to illness. On Irish farms, disease reduces profits and, importantly, the well-being of animals.

Ill-health in animals can be caused by infectious agents, such as salmonella species, BVD, Johne's disease and the like, or by poor management, which can result in mastitis, lameness and other production-related diseases. Recent Teagasc research has highlighted that the presence of salmonella carriers in a herd can result in annual losses of €11,000 in an unvaccinated 100-cow spring-calving dairy herd.

Vaccinating has a significant role to play against salmonella and many other diseases. Teagasc has compiled a vaccination and dosing booklet, which allows farmers to strategically plan vaccination and dosing programmes using appropriate products.

Administration procedures for each product have been summarised in the booklet to improve vaccination protocols at farm level – many products are



Kathriona Devereux and Riona Sayers, pictured on *The Science Squad*.

currently being inappropriately or incorrectly administered. Biosecurity and diagnostic testing are of equal, if not greater, importance in preventing disease introduction.

New diagnostic tools are continuing to be developed to yield greater access to test results, in order to allow informed decision-making with regard to herd health. Combining biosecurity, vaccination and diagnostic testing provides a pathway to disease prevention.

Logical implementation of these strategies (specific technical documentation available at www.animalhealthireland.ie) will yield the most comprehensive approach to disease control at farm level.

Antibiotic resistance has been recognised globally as a threat to all of

society and dairy farmers can lead the way in prudently reducing antibiotic use. Optimum hygiene and management can prevent production of diseases and combined disease control strategies for infectious diseases, as outlined above. It is likely that within the next decade antibiotic use will be restricted on livestock farms. Keeping your herd healthy by other means is becoming increasingly important.

Teagasc, in conjunction with various research partners, both nationally and internationally, will continue to generate innovative ways for Irish dairy farmers to maintain the health of their herds. This will not only contribute to the global requirement for reduced antibiotic use, but will also improve overall farm profitability and livestock welfare.

High productivity from pasture; 10-tonne utilisation

Michael O'Donovan

Teagasc Animal & Grassland Research and Innovation Programme

Maintaining a low cost base is our best defence against the coming milk price volatility. Key to that is grass dry matter (DM) production and utilisation on farms. But nationally the level of grass production is unacceptably low, many dairy farms in Ireland are growing less than half of their capacity. Our research has shown that every tonne of grass utilised increases net profit by €161/ha. Greater focus on grass production and grazing management is needed on farms.

Results from PastureBase Ireland show that grass DM production on farms that are regularly measuring grass (more than 35 farm measurements per year) was 12.2t DM/ha in 2013. Of the total, 10.2t was allocated



Nicky Byrne uses a point quadrat to estimate tiller numbers.

to the grazing herd and 6.2 grazings were achieved on the grazing platform. In 2014, these farms grew 13.9t DM/ha, with 11.4t DM allocated to the grazing herd. Close to seven grazings were achieved on the grazing platform.

This level of grazing can be increased even further. On some farms, on average 12 grazings are being achieved from all paddocks. Other farms struggle to achieve six. This difference has a direct impact on the level of grass utilised across farms and on farm profitability.

The grass utilisation target must be 80%. Therefore, increasing the level of utilisation achieved on farms is really important. It is worth noting that the highest grass producing farms in PastureBase Ireland have a consistent grass growth of between 15.5t DM/ha and 16.5t DM/ha annually.

Improving grass production and utilisation rests on a number of key principles:

- i) Increased focus on grazing management and regular measurement.
- ii) Applying new grazing technologies (making key decisions with the measurements).
- iii) Management of soil fertility.
- iv) Identifying poorly performing paddocks and reseeded them.
- v) Benchmarking the performance of more efficient farms.

All of the principles will be discussed in depth at the open day.

The benefits of white clover

Deirdre Hennessy

Teagasc Animal & Grassland Research and Innovation Programme

The role of clover in intensive grass-based milk production systems is being examined in a number of experiments at Moorepark and Clonakilty Agricultural College. At Moorepark, a farm system experiment is comparing herbage and milk production from a perennial ryegrass sward receiving 250kg N/ha/year, and a perennial ryegrass clover sward receiving 250kg or 150kg N/ha/year.

Each treatment is stocked 2.74 livestock units (LU)/ha. Results are available for 2013 and 2014. Herbage production was similar across treatments – 14.3t DM/ha. Sward clover content was 27% and 24% on the clover 150kg and 250kg N/ha treatments respectively. Production of milk solids was greater on the clover treatments (485kg MS/cow and 489kg MS/cow on the clover 150kg and 250kg N/ha treatments respectively) than on the grass-only treatment (454kg MS/cow). The clover treatments produced an additional 85kg to 96kg MS/ha compared with the grass-only treatment.

An experiment at Clonakilty is examining the effect of tetraploid and diploid swards sown with and without clover, on the productivity of spring milk production systems stocked at 2.75 LU/ha. The 2014 results show that grass clover swards had an average clover content of 40% and grew an additional 2.5t DM/ha compared with the grass-only swards. Similar to Moorepark, milk solids production was greater on the grass clover swards (464kg MS/cow) than on the grass-only swards (409kg MS/cow).

Clover can contribute to the sustainability of grass-based systems. Grass clover systems at Solohead produced 33% less nitrous oxide emissions and 16% less total greenhouse gas emissions compared with a conventional fertilized system. Nitrogen fixation rates of up to 170kg N/ha/year have been measured in grass clover swards at Moorepark and Solohead. Nitrogen fixation rates generally increase as sward white clover content increases. Incorporating clover into N fertilized perennial ryegrass swards may allow a reduction in N fertilizer, particularly in the late summer period.

Poor clover persistence in N fertilized swards is one of the main reasons why clover is not widely used on dairy farms. However, good grazing management (18- to 21-day rotations mid-season, 4-4.5cm post-grazing sward height) is likely to benefit clover persistence.



Deirdre Hennessy.



The 2014 results show that grass clover swards had an average clover content of 40% and grew an additional 2.5t DM/ha compared with the grass-only swards



Preview continued on p22

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Justin McDonagh demonstrating a grazing trial of perennial ryegrass varieties sown with white clover.

Sustainable expansion

Laurence Shalloo

Teagasc Animal & Grassland Research and Innovation Programme

Now that milk quotas are gone, sustainability, in particular environmental sustainability, is taking centre stage. Sustainable is the word used to describe the overall wellbeing of an industry and tends to be subdivided into three areas: a) economic, b) environmental and c) social.

There are strong linkages between the interacting components and for farmers there is scope to increase the overall sustainability of the business through expansion, if the business remains focussed on a number of key principles.

Economic, environment and social sustainability have many common threads, including optimum nutrient management, maximising grass growth, optimum herd genetics and simple low cost facilities that are labour efficient.

Investment in grazing infrastructure will maximise the economic returns while increasing animal welfare, reducing labour requirements per cow. Reducing the environmental footprint of Irish product is also key.

The environmental footprint of Irish product is one of the lowest in the world and higher market share would

reduce the global footprint. The key focus within sustainable expansion must be on developing a plan for the process which encompasses personal and business goals, and building the business around these goals. While it appears most farmers have decided to expand their dairy herds, very few have a plan for the process.

It is only possible to achieve a goal once you know what it is that is trying to be achieved. Once the goals are set, the development of an expansion plan is the next step.

“ The potential to use debt to expand more quickly and with less strain should be part of the expansion process

The key focus here should be on the potential of the expansion process to increase the farm profitability, the returns achieved from any investments made, the cashflow implications throughout the expansion process and the overall level of debt in the business.

Expanding using the surplus cash generated alone will put significant

strain on the business. Therefore, the potential to use debt to expand more quickly and with less strain should be part of the expansion process.

The plans should be realistic and stress-tested against milk price volatility, interest rate movements and farm productivity associated issues.

A risk management plan should be put in place against the key financial risks. These strategies may centre on creating a sink fund, having a significant over draft facility, alternative enterprise, etc.

The strategy should not attempt to deal with all risks, but should certainly cover the issues which could put the business at serious risk.

For any capital development work planned, there should be a contingency component built into the process for both time and money.

Once developed, the plan should be used to benchmark performance over time as well as being updated if there is a dramatic change in direction.

The expansion process puts pressure on the farmer as there is generally increased borrowings, increased cows to be handled, etc. Facilities may take some time to catch up with the cow numbers on farm.

Dealing with the increased levels of stress will be a key component of sustainable expansion. A well thought out long-term plan will provide reassurance in stressful periods.

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Getting to grips with good

Relatively simple changes have led to greater output and reduced costs on this Wexford farm

Ciaran Lynch & Martina Harrington
Teagasc BETTER farm sheep programme

There's seldom a quiet time on John Doyle's farm in Ballindaggin, Co Wexford. But with lambing complete, there is now time to get on top of management issues on the farm. John runs a mixed sheep, beef and tillage enterprise and also operates a contracting business. "We have 52ha of grassland, 8.5ha in spring barley, 5.5ha under winter barley," says John. A further 2ha is sown with stubble turnips and a portion of the ground used for barley is sown with rape after harvesting. The turnip are used to outwinter some of the sheep.

"In the past, we had 230 ewes lambing from January. Output was modest at 1.2 lambs weaned per ewe joined and we used a lot of concentrates. Since joining the BETTER farm programme in 2012, our focus for the flock has been on increasing output per ewe, increasing stocking rate but reducing costs through better grassland management."

Sheep flock

Since joining the programme, John has increased ewe numbers, with 300 mature ewes and 80 ewe lambs put to the ram last autumn. John has split his flock into two groups. Last August, 146 ewes were synchronised using a progestin sponge and PMSG. The ewes were batched into two groups for mating with a two-week gap between them. A repeat mating was allowed on the first group. These ewes were served with Suffolk and Texel rams. All lambs produced were sent to the factory.

A further 172 ewes and 28 repeats from the early lamb flock were put to the ram in October and started lambing from the first of March. The ewes were mated to Belclare, Suffolk rams as this component of the flock produces all of the ewe lamb replacements.

All of the male lambs and surplus females are finished for slaughter from this sub-flock.



John Doyle runs a mixed sheep, beef and tillage enterprise near the Wexford-Carlow border.

grazing management

"To increase flock output and reduce the cost of maintaining replacements we also join ewe lamb replacements," says John.

"This year, 80 ewe lambs were joined with Charolais rams for three weeks, 67 became pregnant (84%) and they started lambing two weeks after the main flock. All lambs produced ended up in the factory."

Ewe productivity has increased as well as ewe numbers. Last season, both the early and mid-season flocks weaned 1.6 lambs per ewe to the ram with the ewe lambs weaning a respectable 0.8 lambs reared per ewe joined. With higher scanning results this year, John's flock is on course to exceed this.

Grassland

With the increase in stocking rate and flock productivity, there is a far greater emphasis placed on increasing performance through better grassland management.

"In the past, we relied heavily on concentrates to improve lamb performance but now we are more likely to

apply extra fertilizer," says John.

The changes on John's farm focused on a number of key areas:

1) Soil fertility

After joining the programme in 2012 John soil sampled, applied lime, and addressed any P and K deficiencies. This helped to increase production and improve N utilisation on the farm.

This season, all fields were given 23 units of N (28.3kg/ha) as urea in mid-February.

In mid-March, a compound, 18.6.12, was applied. Each field received 27, nine and 18 units of N, P and K, respectively, per acre (33kg, 11kg and 22kg/ha) as a maintenance application.

John's third application in mid-April was 27.5 units (33.5kg/ha) of N in the form of CAN.

"The amount of fertilizer might seem high to drystock farmers," says John, "but it's important to capitalise on growing conditions and get the most out of pasture and flock in spring and early summer."



Key messages

- To increase flock output and reduce the cost of maintaining replacements, John Doyle joins ewe lamb replacements.
- The changes on John's farm focused on a number of key areas: soil fertility, reseedling, field divisions and grazing management.
- With the increase in stocking rate and flock productivity, there is a greater emphasis placed on increasing performance through better grassland management.
- Improving grassland management has helped to increase productivity and reduce costs, according to John.



Continued
on p26

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» From page 25

John has silage ground which was dropped out from early April. He will harvest this in late May to produce high DMD silage.

2) Reseeding

Grass demand in early spring is high on the farm. John has implemented an annual reseed programme in recent seasons. To date, 12 acres were reseeded in 2012, 18 in 2013 and four in 2014, with a plan to reseed a further eight acres this autumn. Some paddocks were old permanent pasture located close to the housing yard, while others were rotated out from the tillage enterprise. "We get more grass early and late in the year and there's a noticeably better response to fertilizer in the spring," he says.

3) Field divisions

Growing more grass is one thing but managing it is another challenge. John has added a number of new permanent divisions to his grazing areas over the past two grazing seasons to gain more control of the grazing areas. "Temporary electric fencing is really useful as the grazing season progresses," says John. "I never realised the benefits you could gain from putting in simple divisions in terms of managing grass and getting lambs to thrive."

4) Grazing management

The sheep have access to two main

grazing blocks. The grazing plan for the farm starts each autumn, 10ha of grazing is closed up for the early lamb flock in late September/early autumn (approximately one acre per six ewes). This rest period allows covers to accumulate for the flock to be turned out in late January/early February. The 10ha combined with one paddock beside the lambing shed is the total allowance for this sub-flock up to mid-March.

To make best use of the available pasture in this early part of the year, the lambs are weaned early, at approximately eight weeks post-lambing. Following this, lambs are grazed ahead of the ewe flock at all times until sold.

"The mid-season ewes are grazed in two batches based on lambing date," says John. "The yearling ewes are kept as a separate group. The target is to have a minimum of five grazing divisions in the rotation for each grazing group."

The cattle are co-grazed with the mid-season or yearling ewes on an on-off basis and work effectively to balance out grass supplies for the various groups.

The dry ewes from the early lamb group are used as a cleaner-upper group and follow the main batch of ewes.

"Improving our grassland management has definitely helped improve productivity and reduce costs," says John. "The changes were relatively straightforward but each had a dramatic effect on our farming system."

Changes to John Doyle's farming system have resulted in him having over 300 more lambs to wean this season than when he started three years ago. Central to all this has been a change in approach to grassland management.



To make best use of the available pasture in this early part of the year, the lambs are weaned early, at eight weeks post-lambing

You can't beat having a plan

Karen Dukelow, Teagasc Animal and Grassland Research and Innovation Programme and leader of the SuperValu Sustainable Farming Programme, highlights the benefits of a plan

The SuperValu Sustainable Farming programme, which began in 2013, is designed to provide a link between food producers and retail a "farm to fork" approach. There are 10 farmers in the current phase of the programme based throughout the country.



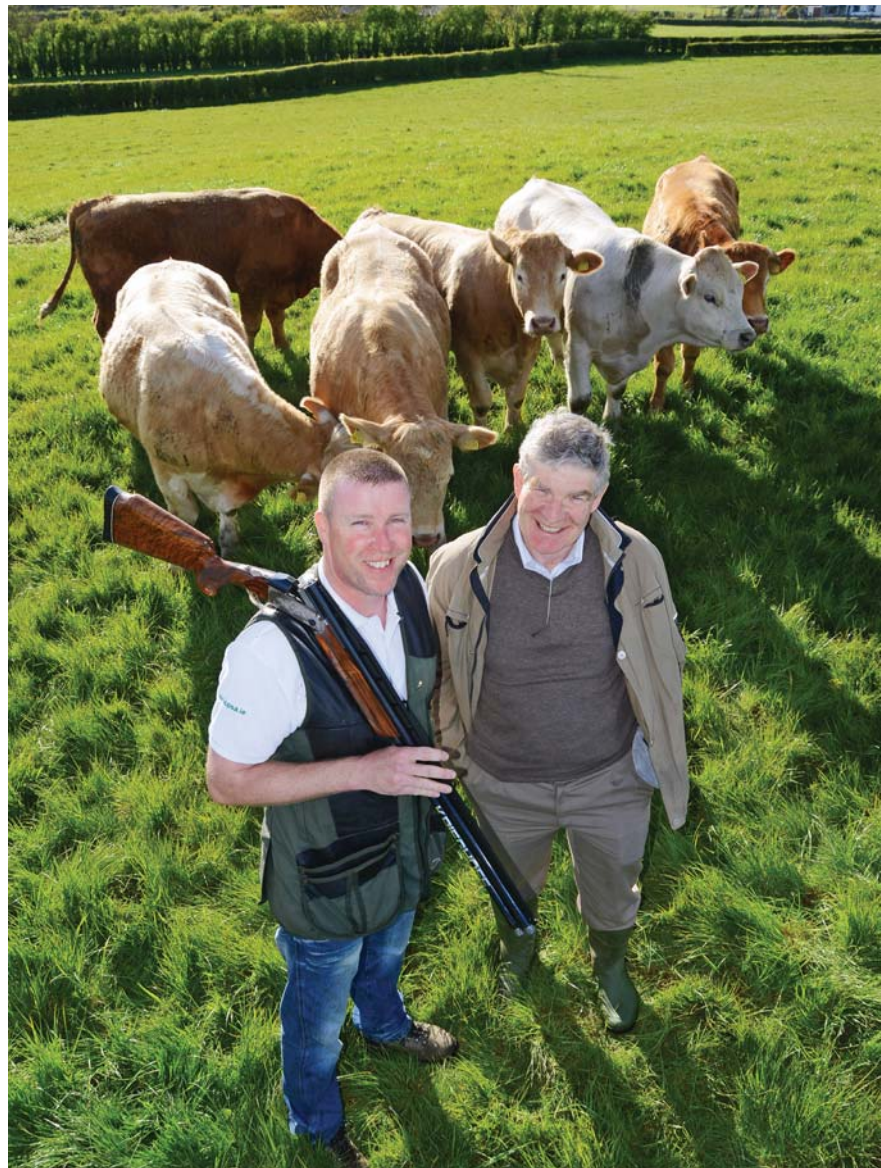
Each farmer has worked closely with their local Teagasc adviser to draw up a plan to identify areas which, if improved, would enhance profitability or lifestyle on the farm.

The measures chosen could be quite simple, such as boosting soil fertility or increasing the number of paddocks on the farm. The key was to select one or two measures that were important and focus on these. The same could be done for any farm in the country, so how are farm plans put to work under the SuperValu Sustainable Farm Programme?

Where to start

Doing a Teagasc eProfit Monitor is the first step. It will establish key performance parameters:

- What farming system/systems are involved?
- What is the liveweight produced per livestock unit and per hectare?
- What are the variable costs as a percentage of output?
- What is the gross margin/hectare?



Cathal McDonald and his Teagasc adviser Pat O'Gorman (see profile on page 28).

Next steps

With the calving report available from HerdPlus, (ICBF) weaknesses and strengths can be identified. Under the SuperValu Sustainable Farming Programme, advisers and farmers sit down together and decide what changes to focus on. For many farm-

ers, finding ways to improve profitability is the main focus. For others, it is about finding ways of reducing the labour requirement on the farm. Again, it is important to identify one or two key areas and focus on these.

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The participants

Michael Beausang	Ballymacoda, Co Cork	Dairy and beef farmer (calf to beef)	Adviser: Ruth Fennell
Michael Barrett	Banteer, Co Cork	Dairy and beef (calf to beef) farmer	Adviser: Jimmy Lyons
John McCarville	Ballymore, Co Kildare	Sheep farmer (mid-season lamb)	Adviser: Christy Watson
Cathal McDonald	Belmont, Co Offaly	Beef farmer (weanling to beef)	Adviser: Pat O'Gorman
Fergal O'Brien	Lobinstown, Co Meath	Beef farmer (suckling to beef)	Adviser: Ned Heffernan
Donal Kenny	Mullingar, Co Westmeath	Beef, sheep and tillage farmer	Adviser: David Webster
Kevin Farrell	Ballymahon, Co Longford	Sheep and beef farmer (calf to beef)	Adviser: Michael Conroy
David and Giles Aughmuty	Roscommon, Co Roscommon	Beef, sheep and tillage farmer	Adviser: Brian Daly
Gerard Coyle	Athleague, Co Roscommon	Sheep (mid-season lamb) and beef farmer	Adviser: James Kelly
Ken Davis	Glenamaddy, Co Galway	Sheep and beef farmer (calf to beef)	Adviser: Gabriel Trayors

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Key areas

There is a variety of farms in the programme in terms of size and system type. However, there are a number of key areas focused on:

- Grassland management.
- Breeding/animal performance.
- Animal health.
- Carbon footprint awareness.
- Market specification.

Grassland management

Good grassland management addresses both growing and utilising grass. To grow grass efficiently, soil deficiencies for lime, P and K need to be corrected. All farms entering the programme are soil tested. Based on the results, a farm nutrient management plan is drawn up.

Simple measures are used, where suitable, to increase the number of days at grass and to improve grass quality, for example increasing the number of paddocks on the farm. Measurement and management is matched to the season.

Breeding/animal performance

HerdPlus reports and weighings are used to monitor and improve breeding and performance. Take your own HerdPlus reports and check to see if you are meeting these targets on your farm:

- 365-day calving interval.



All farms on the programme were soil tested.

- 12-week calving spread.
 - 0.95 calf/cow/year.
 - Less than 2.5% mortality at birth.
 - Less than 5% mortality at 28 days.
 - 60% of cows calved in first month.
 - 80% of cows calved in two months.
- Weanling weights will also indicate whether cows have adequate milk.

Weighings at the start of the finishing period allow finishing performance to be assessed.

Animal health

A farm plan that does not have a strategic plan for animal health can fall flat on its face if there are underlying disease issues on the farm. A vet has been made available to participants in the programme. This is an area that is often neglected at farm level. A proactive approach to animal health is far better than reacting to disease outbreaks.

Carbon footprint awareness

The Bord Bia Carbon Navigator was completed for all participants. This online facility (which can be completed for any farm once it's in the Beef Quality Assurance Scheme) outlines areas that can be improved to reduce the farm's carbon footprint. Many measures that improve the overall efficiency on the farm will also reduce the carbon footprint, e.g. increasing the number of days at grass, improving the number of calves/cow per year, etc.

Market specification

Throughout the programme, participants have been made aware of the market specification requirements. It is something that needs to be worked on, on every farm. There is no point in producing a product that the market does not require.

FARMER FOCUS
Farmer: Cathal McDonald
Adviser: Pat O'Gorman

Cathal farms full-time near Belmont, Co Offaly, and is married with two young children. Any spare time Cathal has is spent participating in competitive clay pigeon shooting and he has represented Ireland in the world championships.

Farming 78ha in four blocks, Cathal grows 6ha of spring barley with the rest in beef. He purchases approximately 80 continental weanlings in autumn to finish as steers at 30 months and some bulls at 20 months.

"The main focus in my plan is to increase daily liveweight gain," says Cathal. "The aim is to reduce the number of days on the farm to produce the same carcass weight."

ADG has increased from 0.54kg/day to 0.56kg/day. This may seem like

a small increase but it has meant that the number of days on the farm has reduced from 740 to 700.

This extra performance has been achieved in a sustainable manner by targeting performance at grass and supplementing with the correct level of meal to match silage quality for the housing periods (through silage analysis). "Variable costs have reduced from €1.30/kg LW to €0.94/kg LW and gross margin has increased by €120/ha," says Cathal.

To further improve profitability, Cathal is aiming for better liveweight performance. Weighing cattle is a key component of the programme and by weighing cattle in November and March, gain on grass and over the first winter can be targeted. The goal is to increase daily liveweight gain on the farm to 0.7kg/day and reduce the time on the farm to 600 days.

Improved grassland management will be key. Potash levels need to be improved and more paddocks are required to better manage grass. More can be made out of grass on the farm with a target of February/early March for turnout for the weanlings. Silage fields will be grazed to make better use out of grass in the spring and to improve silage quality (target 72 DMD silage).

The target is to reseed 10% of the grassland each year. With improved performance, it should be possible to finish up to 100 cattle each year.

"I've enjoyed participating in the SuperValu Sustainable Farming Programme," says Cathal. "I've benefited from working closely with Pat. I also enjoy the social aspect of the technical days, where participants met to discuss topics such as grassland management and meeting market specification."



Suckler farmer Pat Cassidy, Rannagh, Carron, Co Clare, with Teagasc adviser Martin Feerick walking through a cashel, an archaeological site ideal for the GLAS option of managing vegetation around a visible archaeological monument in an eligible grassland parcel. In this case, the vegetation will be managed by appropriate livestock grazing.

GLAS – don't forget the birds and the bees

Traditional orchards and archaeological sites are also worth supporting

Catherine Keena

Countryside Management Specialist,
Teagasc Crops Environment and Land
Use Programme

Up to 50,000 farmers are expected to join GLAS, the new agri-environment scheme. Extensive grassland, watercourses, tillage and hedging options are popular among farmers, but there are a number of others which should not be overlooked.

Bird boxes, bat boxes, bee boxes and sand habitats for bees, traditional Irish orchards and the protection of archaeological sites are worth considering. While the money is modest, they are well-funded for the work involved and won't interfere with farming operations.

I spoke to experts on each of these options to get their opinion and advice.

Bat boxes

I asked Tina Aughney, Bat Conservation Ireland, why farmers should consider putting up bat boxes in GLAS. She says: "Bats are an important element of Ireland's natural environment and, as insect eaters, they help to control many problematic insect species, such as midges and mosqui-

toes. Putting up bat boxes or providing spaces for them to roost encourages these natural predators.

"All nine species of bat resident in Ireland eat insects, which is not only helpful for keeping mosquitoes and other annoying insects at bay, but it also has economic importance.

"The tiny common pipistrelle bat can eat over 3,000 insects in a single night.

"Bats are among the most overlooked, yet economically important, non-domesticated animal groups in Europe and the world. Their conservation is important for the integrity of eco-systems and a healthy bat population indicates a healthy natural environment."

» Continued on next page

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Species of solitary bees in Ireland



Experience has shown that archaeological remains can survive below the surface, despite having been ploughed many times

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Because bats have low reproductive rates, populations are susceptible to changes in their roosting sites, foraging areas and commuting routes.

Scientists are concerned about the conservation status of bats around the world as many species of bats are increasingly affected by suspicion, lack of awareness, pesticide poisoning, roost destruction and closure, habitat loss, over-exploitation and extermination as pests.

Bat Conservation Ireland has produced a guide for farmers in relation to bat boxes and bats on the farm. Email info@batconservationireland.org to receive a copy.

Bee boxes

Our national bee experts in the Biodiversity Data Centre, Tomas Murray and Una Fitzpatrick, highlighted that in order to survive and thrive, bees require two things: somewhere to feed and somewhere to nest. The “somewhere to feed” factor means areas of wildflower, including scrub areas, hedgerows and roadside verges. Ideally, wild bees prefer areas where there is a diversity of flowering plants that bloom and provide them with food throughout spring, summer and autumn. In parallel, they need somewhere to nest but, for many bees, this is even harder to find.

Ireland has 20 species of bumblebee and 76 species of solitary bee. Bumblebees nest on the surface of the ground or just underneath, often in long grass, bracken or at the base of a hedgerow. Most solitary bees in Ireland are mining bees and make their nests in bare ground or in south- or west-facing hedgerow banks where there is stable soil, clay or sand into which to burrow.



The remaining solitary bees are cavity nesters and nest in hollowed twigs or holes in wood or masonry. Bee boxes can provide these cavity-nesting solitary bees with somewhere to live.

Early flowering traditional Irish apple tree – widow's friend – in a traditional orchard.

Sand habitat for bees

John Breen, of the University of Limerick, suggested to DAFM to include the option of sand habitats for bees in GLAS. These need to be in sunny places that don't get overgrown, but pure sand should not attract too much growth. It will need to become aged and a bit consolidated, so nesting is not expected for about two years.

Once mosses appear, it becomes a useful nesting habitat for a few species of solitary bees and also solitary wasps, depending what is in the locality. As with existing habitats such as earth banks, these sand habitats should be managed so that they don't

BIRDBOXES

Putting up bird nestboxes is a wonderful way of learning more about the small birds on your farm that may use them. People speak of the great enjoyment they have observing the differing behaviours of different species.

One such person, Denis Lahiff from Curraghmore, Co Kilkenny, reported a sparrow taking up residence within 24 hours of a nestbox being erected and going on to display no inhibitions or fear. By contrast, an open-fronted box remained empty for three years until a willie or pied wagtail (our smallest walking bird) moved in and successfully bred, returning this spring, displaying differing shy and cautious behaviour, never appearing when people are around. When putting up new boxes, Denis recommends putting a handful of straw into the box to give the birds a start.





become clogged by tall vegetation. Use a strimmer, not chemical weed-killers.

Traditional orchards

Eoin Keane, of the Irish Seed Savers Association, loves to see farmers planting a traditional orchard.

Traditionally, apple trees were grown as vigorous “standard” trees – the type a child could climb into and build a tree house in. This type of large tree is also a great habitat for many types of birds, bats and insects.

The blossoms and fruit also provide much food for wildlife. Flowers provide food for many pollinating insects, such as bees, flies and moths. The fruit buds are a favourite food for small birds, such as the bull finch, and many mammals, including foxes, hares and hedgehogs, love to eat apples. Farm animals such as poultry, horses, sheep, pigs and cattle are

happy to dine on apples too.

By choosing to plant “traditional” or “heritage” varieties, Irish farmers are contributing to what’s called “on-farm conservation”. This is the most powerful type of conservation because it distributes the varieties around the country and helps to maintain and improve fruit-growing skills in local communities.

A traditional orchard, if well established, can last for well over a century. Therefore, this option is a decision that should contribute to biodiversity and food-growing for many generations. It is very pleasing to work with fruit trees. They are an attractive landscape feature and it can be rewarding to use the produce for the fruit bowl and home-cooking.

Archaeological sites

A farm with an archaeological site has a direct link to our ancestors who farmed our fields many thousands of years ago. There is an onus on us to maintain the evidence of the past for future generations.

As we pass through, it would be nice to leave a positive legacy – GLAS can help farmers to take care of archaeological sites.

Hugh Carey, an archaeologist with the Department of Arts, Heritage and the Gaeltacht, told me why farmers should establish a buffer margin around archaeological sites. “A buffer margin is a well-established, simple but effective way to prevent damage to monuments from machine movements and from nearby ground disturbance,” he said.

“It allows for the possibility that sub-surface remains or features associated with the monument will survive in its immediate vicinity.

“Experience has shown that archaeological remains can survive below the surface, despite having been ploughed many times.”

Rate for payment for GLAS options

Option	Rate of payment each year	Minimum	Maximum
Bird boxes	€6 per box	1	15
Bat boxes	€13 per box	3	15
Bee boxes	€6 per box	1	5
Sand habitat for bees	€45 per habitat	1	2
Traditional orchard	€23.50 per tree	0.05ha/10 trees	0.05ha/10 trees

Archaeological sites

Tillage	€146 per monument	1	20
Grassland	€120/monument	1	

Why manage vegetation around monuments in grassland?

Unwanted vegetation on monuments obscures the monument, making it impossible to see it in detail. Root action damages sub-surface remains and the structure of the monument. Dense vegetation attracts burrowing animals, which also damage sub-surface remains and the structure of the monument. Shelter provided encourages livestock to congregate near monuments, causing a great deal of wear at those places.

Reducing unwanted vegetation will enable livestock to graze monuments, which, if done to a degree that will not cause damage, is to be encouraged, as it keeps unwanted vegetation at bay. The reference in GLAS to preventing access to the interior of monuments is meant to refer to masonry structures, not earthen monuments.

“The shelter provided by vegetation encourages livestock to congregate near monuments, causing a great deal of wear at those places

Selective removal of large trees should be considered, because windthrow or the collapse of dead or unstable trees, can cause damage to monuments. The root ball will take a large piece of the monument away when the tree falls.

With regard to masonry structures, such as castles or cashels, the removal of recently established and easily removed saplings or other vegetation, growing on walls and in the immediate vicinity of the structure, will prevent them from causing an even bigger problem in the future.

Contact

For further information and advice on archaeological sites, contact the National Monuments Service on 01-8882178/8882169 or email nationalmonuments@ahg.gov.ie

Disease control key for barley

In the longer term, crop rotation and soil structure also underpin yields

Tim O'Donovan
Crop Specialist, Teagasc Crops
Environment and Land Use Programme

In the recently published *Teagasc Spring Barley Guide* which summarises Teagasc spring barley research since the 1990s, a key finding is that the main contributor to high yields in spring barley is high grain number. In order to maximise the yield of spring barley, growers should aim to maximise the number of grains per unit area. They can achieve this by ensuring the crop ends up with 900 to 1,000 ears/m² and has all it needs to produce and fill a high grain number per ear.

The first step to achieve high spring barley (and winter barley) yields is to establish about 300 plants/m²; there is no benefit in going higher. Once the plants are established, you must ensure the crop has no impediment and can produce strong, viable tillers with plenty of grains per ear.

The tillering capacity of the variety has an influence here, but more important are fertility, weed control and soil structure. The weather is also im-



Teagasc tillage adviser Dick O'Shea, Hugh Hutchinson and Tim O'Donovan.

portant, but that you can't control! If any of these factors are adverse, tiller production may be restricted or there could be greater loss of tillers or you might have fewer grains per ear.

Grain number

One of the more recent Teagasc research findings is just how critical early season disease control is for grain number. Very simply, if barley is under attack from disease, it will lose tillers and reduce its grain numbers, as it anticipates that it may not

have the resources to fill grains. This is why early disease control is critical – it helps prevent tiller losses. Later disease reduces the green leaf area of the crop and hence grain fill.

The *Teagasc Spring Barley Guide* is available free to clients from local offices or to download from www.teagasc.ie/publications.

There are a few basic lessons from the fungicide experiments in barley over the past 10 years:

- A programme of two well-timed fungicide applications on spring barley

Timings and products

T1

Timing: mid-late tillering (gs 25 - 29)
½ rate Triazole (Proline, Rubric, etc)
+
SDHI or Strob
+/-
Corbel/Tern @ ½ rate
(if mildew present)
Use higher rates if disease pressure is high

T2

Timing: Flag Leaf to awns visible (gs 37 - 49)

Chlorothalonil 1.0 L

+

½ - ¾ rate **SDHI/triazole mix**
(Adexar, Bontima, Ceriax, Vertisan+triazole, Siltra, etc)

OR

Chlorothalonil 1.0 L

+

½ - ¾ rate Triazole (Proline, Strand etc.)

+

½ rate SDHI (Imtrex/Vertisan/Zulu) or Strobilurin (Amistar, Galileo, Modem)

(Pre-formulated mixtures of the above and other actives are widely available e.g. Amistar Opti, Credo, Deuce/Diamant, Fandango, Lumen, Jenton, Treoris etc.)

Note: Flusilazole products e.g. Punch/Lyric/Sanction were de-registered in 2014 and cannot be sprayed in 2015.

Case study

Hugh Hutchinson

Hugh Hutchinson farms about 100ha of arable land near Kells, Co Kilkenny. The soil type is mainly free-draining loam over limestone and is capable of growing high-yielding crops, but there are a proportion of fields with high silt/clay content. Hugh has been min-tilling his land over the past 12 years. The system means he can do the work himself, and in good time. He has some part-time labour, but this is kept to a minimum. A proportion of the land is rotationally ploughed for sterile brome and volunteer control between spring and winter barley crops. "I will consider ploughing as a tool to help with weed control," says Hugh.

Hugh places great emphasis on soil structure and health when planning his cropping programme. His rotation is oilseed rape, winter wheat, barley (winter or spring), oats, winter wheat and back to barley again. Spring oats are grown on contract for equine consumption and also to reduce the effects of oat mosaic virus.

The rotation spreads the workload at sowing and harvest, but also helps keep pests, weeds and diseases at bay. Sterile Brome can be prevalent on farms practising min-till, however Hugh does not seem to have a problem with it. "Sterile Brome is more of a rotation problem than a cultivation problem," said Hugh. "Brome mainly germinates in the autumn, so spring crops allow stale seedbeds, while rape allows good, alternative chemical control options, not available in cereal crops." As for any crop disorder, it is not one magic bullet, but a number of small things that keep problems at a manageable level.

As a result of his experiences with brome control, Hugh feels that there should be some allowance by DAFM on the issue of green cover and use of stale seedbeds for cultural pest

control. This could be done on a proportion of a grower's land or on a rotational basis.

As well as keeping soils 'fresh' by rotation, Hugh is also mindful of axle loads, tyre selection and carrying out fieldwork in appropriate conditions – all to reduce soil compaction in his fields. Hugh has put large 540-45-22.5 tyres on the rear of his combine to help reduce compaction. These have made a big difference to the combine, especially in a wet season like 2012. Hugh has 800-65-32 on the front of the combine, which are switched over to the tractor when drilling crops.

Hugh likes to keep tyre pressures low, appropriate to the load and job in hand. When drilling with his trailed Vaderstad drill (3m wide), Hugh reduces the back tyre pressure to 10 or 11psi. He also finds that chopping headland straw improves the soil structure and subsequent cultivations.

The farm has been all arable for over 30 years, but in recent years, Hugh takes in cattle slurry which is min-tilled. He finds this works better than ploughed down cattle slurry. Straw is given in return.

More recently, cover crops have been trialled on the farm. In the main picture, you can see desiccated oats that were broadcast last autumn after a crop of winter barley. This is being cultivated ahead of drilling spring barley. Experiments from Teagasc and abroad have concluded that cover crops significantly reduce nitrogen leaching compared with leaving the ground bare over winter.

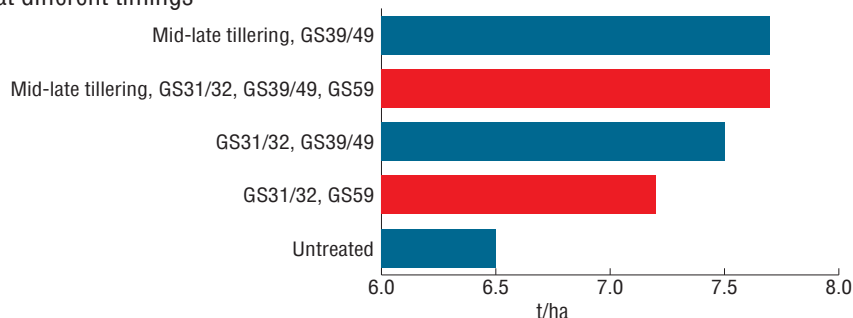
However, the benefits of retaining that nitrogen are hard to see in the following crop. What is also hard to quantify is the soil structure benefits. You only get a very small increase in measured organic matter from cover crops. However, anecdotally, growers report that cover crops help soil structure, especially when cultivating. Hugh finds that the soil is more alive after a cover crop (he has experience with brassicas also) than leaving it bare over winter.

gives the best return.

- Monitor crops during tillering. Apply the first fungicide at mid to late tillering to reduce tiller death and maintain yield potential. Don't delay if you see disease.
- Apply the second fungicide from when you see the awns emerging, but before the head is fully emerged. The later this spray is applied, the greater the risk you will lose yield (trials have shown losses of up to 0.5t/ha by delaying the fungicide until the head is emerged).

Figure 1

Teagasc spring barley disease control timing trial 2012-2014 – yield response at different timings



Dick O'Shea and Hugh Hutchinson check the crop's growth stage.

Co-ops the key to rural development

Larry O'Loughlin
Teagasc Regional Manager and
Chairman of the Vita Programme
Committee



The potato is the perfect food, and one of the very few that can sustain life on its own

Helato Hama farms in Chencha county, Ethiopia. He lives in a village called Kebele in the parish of Doko Danbo, which is about the same size as an average parish in Ireland. That, however, is where the comparisons end. Helato is a potato, vegetable and livestock farmer, with a relatively large farm of 3ha and farms with his wife and four children ranging in age from two to 12.

In Ethiopia, as indeed in most of Africa, the average farm is less than 2ha. The country is twice the size of France and has a population of 96 million, many of whom are small farmers like Helato.

He is one of 3,000 farmers who are benefitting from a potato development programme implemented by the Irish NGO, Vita, with funds from Irish Aid (the Irish Government's overseas aid agency) and the Irish people through direct donations. Irish farmers, in particular, have been overwhelmingly supportive.

But why should Helato grow potatoes, and not mangos or wheat? The crop is the fourth most important food in the world. It provides high nutrition, uses very little water despite this high nutritional output, can grow in a wide range of climates and soil types and provides more food per unit area than any other major staple, including wheat and rice. In fact, the potato is the perfect food, and one of the very few that can sustain life on its own.

The Vita Potato Programme is an innovative collaboration involving Vita, Teagasc and Wageningen University in The Netherlands. Teagasc and Wageningen provide technical information, education and mentoring to the farmers. On the ground, there are three PhD students and a masters' level student, attached to the university in nearby Arba Minch, who are all studying different aspects of potato production.

In three years, Helato, who is a member of the local co-op, increased

his production of potatoes from 4t/ha to 9t/ha using improved seed varieties and better management. Of the 9t he produced last year, he was able to sell 7t, which realised an income of 49,000 Ethiopian Birr (€200). This has allowed him to build a new galvanised roof home and educate his children as well as assist his brothers and sisters.

Vita grant-aided a diffused light system (DLS) storage shed for his surplus potatoes and this allows him to keep seed potatoes for next year and sell the ware potatoes.

The benefits do not stop there. This is where the co-operative structure becomes integral to Helato's success, and that of his fellow farmers. One of the biggest problems in development of farms in Ethiopia is the missed opportunity to sell farm produce due to a lack of storage facilities, poor road infrastructure and unavailability of market opportunities. The Vita programme has prioritised the development of the co-op structure to aid marketing and ensure a supply of good quality seed to farmers. Helato is one of 80 potato farmers who are members of his local co-operative.

President Michael D. Higgins

After opening the photographic exhibition: The Potato Farmers of East Africa at Dublin Airport, President Michael D. Higgins highlighted the work of the Irish Potato Coalition, which was established by Vita.

"The Irish Potato Coalition is a great example of a sophisticated collaborative model that brings together responsible scientific research aimed at sustainability, agribusiness and international development practitioners, for the benefit of potato farmers across six African countries and in close co-operation with local agricultural support services," said President Higgins, specifically referencing the pioneering Chencha initiative.

The president alluded to possible comparisons with the increased usage of potatoes leading to the Irish famine. He pointed to the unique circumstances which led to the Irish famine and the important role for scientific input and, in particular, the respon-





MAIN PICTURE: The potato market in Chenchä.
BELOW: Helato with a local extension officer outside his new potato store in Chenchä.
BOTTOM LEFT: New improved potato v traditional type on sale in the local market.



sible production and use of seed potatoes in sustainable production.

Vita, working with local partners, strongly promotes crop rotation and farmers grow crops such as highland maize, a wide range of vegetables and have recently received high-genetic merit apple seedlings from Germany.

Storage

Through Vita and partners providing storage facilities for seed and potatoes and technical/marketing training to co-op members, the Chenchä farmers are in a much better position to market their potatoes and provide seed for other growers. This opportunity to store and market their produce within the co-op structure is a key development in achieving long-term and real progress in potato production in the region. The local co-ops are in turn linked to the Union of Co-Operatives (Gamo Gofa Fruit and Vegetable Marketing Co-Operative Union), which has also been helped by Vita to develop regional storage centres, provide improved quality seed and technical assistance to small farm co-op members. The co-op provides transport from farm to storage centres and to markets.

The growth of the co-op structure in the region has been spectacular. The Co-Operative Union was established in 2005, with seven primary co-operatives involved.

By 2014, this had grown to 26 primary co-ops with a total farmer membership of 4,102 farmers, 633 of whom are female. This included the 3,000 farmers who participate in the Vita programme.

While there are problems – unlicensed traders, insufficient storage, disease control – the potential of this programme to secure the long-term livelihood and future wellbeing of the participants is immense. This is because the potato development programme is implemented on the basis of collaboration between key partners – Vita, Irish Aid, CIP (the international potato federation), Teagasc and the co-operatives, all of whom are working with the farmers to improve and develop their farms. This is an Irish-led potato coalition, and as a model is a wonderful example of how Irish agricultural expertise, development expertise and goodwill are having a real and tangible effect on poor rural farm families in Africa.

Helato and 3,000 fellow farmers in the potato programme are providing a sustainable livelihood for over 20,000 family members in a small part of rural Ethiopia. The success of the International Potato Coalition programme will hopefully be replicated in other parts of Africa from where we will report in future editions.

LTWO sets new boundaries for forest owner groups

One of Ireland's most successful forest owner groups is the Limerick and Tipperary Woodland Owners (LTWO) set up in November 2010

Michael Somers

Forestry Development Officer,
Teagasc Crops, Environment and
Land Use Programme

Astonishingly, half of private woodlands are either not being thinned on time or, in some cases, not at all. Worse, many who wish to sell timber fail entirely, or struggle to get a good deal. Yet, there are plenty of timber buyers out there and timber prices are good.

Forest owner, or producer, groups have been set up to address this "market failure". Relatively new in Ireland, they are common on the continent. The problem is scale. The average farm forest size in Ireland is just 8ha. Significant for the grower but too small for economies of scale in harvesting or processing.

One of Ireland's most successful forest owner groups is the Limerick and Tipperary Woodland Owners (LTWO). Set up in November 2010, it has approximately 150 members, who together have more than 3,000ha of forest. The group's primary focus is

on knowledge transfer and they hold many meetings, field days, education days and forest walks. The group produces a newsletter and has a website www.limerickandtipperarywoodlandowners.ie.

The LTWO consists of 10 individual clusters, dotted around the two counties. Each cluster has a committee member. The current chairman of LTWO is Limerick-based John Rioridan. John has been involved with the group from the start. Starting a group is hard. "There were few members and less money," he says. But through hard work, membership has risen steadily. This year's AGM was attended by 120 people and was addressed by Tom Hayes TD, the Agriculture Junior Minister with responsibility for forestry.

Former chairman Michael Ryan has completed a number of timber sales. He says: "Growers must realise that the timber processing industry operates in an environment where sawnwood is sold across a range of lengths and other dimensions according to demand. They need to have the flexibility to match their customers' demand to the availability of timber assortments. Prices paid to the producer reflect the flexibility within the market."

LTWO recently held a technical day on the grading of logs. What is sawlog? What degrades it to pallet? These are important questions and private owners are really in unknown territory. Another recent focus of the group was on hurley plank recovery from ash butts. These are new areas for private growers but are extremely important because it's the dynamics in which timber is sold.

The current vice-chairman of the group is Clonmel-based Con Little. Con is a forester with extensive experience in buying timber. He has pioneered the idea of farmers or groups of farmers using their own equipment to harvest wood. These systems involve putting a "stroke harvesting head" on tractor systems. Con and a

number of group members visited the Sykotec Oy plant in Vassa, Finland, to look at how stroke harvesting heads could be used in Irish conditions. This harvesting system can work off the three-point linkage of typical farm tractors. It's already set up to work on 6t to 8t excavators.

An essential requirement for such a machine is lightweight and a low demand on the base machine, such as a farm tractor. A harvesting head weighing below 300kg and which can work properly with oil flows of just over 40l/min is the stroke harvester. Basic stroke head models cost approximately €15,000.

Harvester heads are either "roller feed" or "stroke feed". A roller head works with speed (typically 3m/s



Thomas Byrne and Michael Somers.



Thomas Byrne, Michael Somers, Damian Byrne, Michael Ryan, Con Little and Paddy Stokes view a stroke header.

to 6m/s) as it hits branches. To gain speed, it requires oil flow of no less than 120l/min, which puts a heavy requirement on the base machine. A stroke head again uses force from steady pressure. It works more slowly (around 1m/s) but uses high delimbing force (1.5t to 3.5t). Stroke heads are also less complicated with fewer parts requiring maintenance.

Installation

To install a stroke head on an excavator requires at least a hydraulic pressure line (1/2in) and a tank line with free flow (3/4in). Depending on the availability of redundant hydraulic circuits, the stroke head will be equipped with either one or two additional control valves (for tilt and

rotator). To extend the reach of the head, the excavator boom is equipped with an extension jib (1.2m to 2m in length).

Con says that the production rates for stroke heads depend on the size of trees and ground conditions. A good estimate is to assume a rate of one tree per minute. The resulting yield depends on tree size but for a 0.08m tree would be 4m³ to 6m³ per hour.

Another farmer who has purchased a bio-jack harvesting head for an 8t track machine is Tom Byrne. Tom hails from Ballinderry in north Tipperary. He is primarily a tillage farmer with some forestry. "There are a lot of broadleaves in north Tipperary," he says. The bio-jack is mainly used for broadleaves. It can delimb the

branches from the tree before cutting. The bio-jack shears the tree from the stump rather than cutting it. This model allows the branch material to be bundled and sold as boiler fuel.

The LTWO is not moving away from conventional contracting either. This year, the group hopes to sell 55,000m³ of timber. These farmers have been clustered together to achieve one big timber sale, which suits the contractors and the buyers. They work closely with a number of different foresters and sawmills. While the road has been tricky with a lot of turns, groups are now at production phase. Forestry is more than growing trees. It's analysing problems and coming up with solutions. The new chapter of forestry in Ireland has opened.

Plant propagation by layering

Paul Fitters

Lecturer at the Teagasc College
in the National Botanic Gardens

Sexual reproduction is the most common method used by plants to multiply. It results in seeds with new gene combinations which, in evolutionary terms, increases a plant species' chances of adapting to a changing environment.

But many plants can also reproduce by producing copies of themselves in the form of runners, suckers, stolons, bulbils or corms. Some can simply separate off parts which are capable of rooting and becoming independent plants. Tulips and other bulbous plants separate naturally each year.

The nursery trade makes extensive use of this capacity of plants to multiply. Seed sowing and taking cuttings are the methods of choice when it

“ Layering is where a portion of a stem is stimulated to grow roots, while still attached to the parent plant. The rooted stem is subsequently severed from the mother to form an independent plant



Cryptomeria japonica Elegans in Kilmacurragh Botanical Garden in Wicklow.

comes to cheap and easy reproduction but the next favourite is the division of clumps for herbaceous plant species that separate easily. In the past, another propagation method was also quite common – layering.

Layering is where a portion of a stem is stimulated to grow roots, while still attached to the parent plant. The rooted stem is subsequently severed from the mother to form an independent plant. Layering happens naturally when branches of trees hang down and touch the ground and get covered in organic material and then root.

Brambles are a good example. The plant grows long shoots that eventually bend over and ‘tip’ roots when

it touches the ground. Conifers are another example where one plant can, over time, become a miniature forest of layered stems. This can be seen in the picture of the one plant of *Cryptomeria japonica* “Elegans” in Kilmacurragh Botanical Garden in Wicklow. In either case, the rooting process may take from several weeks to a year, or more.

This layering process can be forced to happen by pulling down branches of shrubs, pinning these down and covering them with soil (see sidebar). If this is done around now, the layered stems should have rooted by autumn and can then be cut off from the parent plant to start their independent life.



Methods of layering

There are different methods of layering, such as tip-, simple-, French-, trench-air-and stool-layering, depending on the plant to be propagated. All methods have a few things in common. In order for layered stem to root, light needs to be excluded, the stem needs to be covered by a medium that is moist and well oxygenated and rooting works best on more juvenile (younger) stem material.

Layering is more complicated than taking cuttings, but has the advantage that the propagated portion continues to receive water and nutrients from the

parent plant while it is forming roots. This is important for plants that form roots slowly, or for propagating large sections.

In the past, difficult-to-root subjects were often propagated by layering in the nursery industry. But with improved environmental controls and propagation methods, such as mist units for rooting cuttings, layering has almost ceased to be used in the trade.

Layering, however, can be used very effectively in gardens at home if only one or two new plants are needed and space is not an issue.





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