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Looking after the soil

Mark Moore
Editor, Today’s Farm

Franklin D Roosevelt once said that “the nation that destroys its soil destroys itself.” Fortunately, Irish soils are in relatively good repair but there are no grounds for complacency. Soil fertility has declined and soil compaction increased in recent years thanks to a lethal one-two of reduced profitability and unrelenting rainfall which reduces the ability of the soil to carry stock or machinery.

So, we focus heavily on soils in this edition. There is good news to talk about too. Noeleen McDonald and David Wall at Teagasc, Johnstown Castle, are aiming to identify and develop a more accurate system for predicting the natural release of nitrogen from individual soil types. The outcome should be lower costs for farmers and even better environmental protection. That’s what FDR would call a win, win.

Larger tyres can carry heavy loads at low ground pressures, but heavy loads can still cause deeper compaction. (Depth is measured in metres, pressure is measured in kPa.)

SOILS
Compaction: prevention is better than cure

>> 25

Cover caption | Piers Dennis and John Roche have pooled their resources in a dairy partnership in Wicklow which delivers economies of scale and benefits all-round.

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Ag tabhairt aire don ithir.
Tráth dá raibh dúirt Franklin D Roosevelt “scriosann an náisiún a scriosann an ithir é féin.”
Ar an dea-uar tá cuma sáith maith ar ithreach na hÉireann ach ní haon chúis bhogáis é sin. Tá torthúlacht ithreach meathlaithe agus balcadh ithreach méadaithe le blianta beag anuas a bhfuillochta leis an mbuille ar bhuille marfach de bhrabúacht agus an báisteach gan stao pharmacist ag laghdainn acmhainn na hítreach stoc nó innealra a lompar.

Dírímid go mór ar ithreacha dá réir sin san eagrán seo. Tá dea-sceal mar abhar cainte againth chomh maith. Tá Noeleen McDonald agus David Wall ag Teagasc, Caísléán Bhaile Sheáin, ag iarraidh córas níos cruine a aithint agus a chrobhú ar fhoireann chun scaoileadh Nádúrtha na nítrigine ó chineálacha ithreach aonair a bhfuar. Mar thoradh ba cheart go mbeadh costais níos fearr fós. Bua ar an dá thaobh a thabharfadh FDR ar a leithéid.

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upcoming events

NATIONAL TILLAGE CONFERENCE 2013

- Lyrath Hotel, Kilkenny, 31 January.
  - 9.30am: Registration/tea/coffee
  - 10.30am: Conference opening. Speaker: Professor Gerry Boyle.

Session 1
- 10.45am: The tillage sector development plan. Speaker: Andy Doyle.
- 11.00am: tillage sector development plan – panel response and discussion.
  - Panel: Andy Doyle (IFA), Noel Delany (IFA), Paddy Browne (Teagasc), Thomas Codd (farmer), Pat Ryan (Liffey Mills).
  - Chaired by: Professor Gerry Boyle

Session 2 - Chaired by John Spink.
- 11.30am: Machinery costs: Key factors. Speaker: Dermot Forristal.
- 12.00pm: Soil fertility management on tillage farms. Speakers: Mark Plunkett, Richie Hackett and David Wall.
- 12.30pm: Teagasc GM potato experiments. Speaker: Ewen Mullins.
- 12.45pm: Discussion.
- 13.00pm: Lunch.

Session 3 - Chaired by Matt Dempsey.
- 15.00pm: Fungicide sensitivity and disease control. Speaker: Steven Kildrea.
- 15.40pm: Discussion on disease control for the coming season.
- 16.00pm: Close – Tom Barry TD
- 16.15pm: Tea/coffee.

SHEEP CONFERENCE
- Wednesday, 6 February in Spring Hill Court Hotel, Kilkenny.
- Thursday, 7 February in The McWilliam Hotel, Claremorris, Co Mayo.

A Teagasc National Sheep Conference is back on the agenda this year. The conference will take place at two locations on Wednesday, 6 February in the Spring Hill Court Hotel, Kilkenny and on Thursday, 7 February in the McWilliam Hotel, Claremorris. There will be three sessions: Animal Health; Animal Nutrition; Policy and Marketing.

Speakers will include Professor Mike Taylor, Veterinary Consultant at the Food and Environment Research Agency, York, Britain; Dr Alistair Carson, AFBI, and representatives from Teagasc, UCD, IFA, Bord Bia.

SPRING TILLAGE SEMINARS NATIONWIDE

A series of spring tillage seminars will start in mid-January in the main tillage regions and will continue until mid-February. Topics for discussion will include; crops choice and margins for 2013; fertilizing to address changes in soil fertility; and recommended varieties for spring sowing.

Spring Tillage Seminars

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 January</td>
<td>Silver Springs Hotel, Cork</td>
</tr>
<tr>
<td>22 January</td>
<td>Mount Wolseley, Carlow</td>
</tr>
<tr>
<td>23 January</td>
<td>Teagasc Office, Kinsealy, Dublin</td>
</tr>
<tr>
<td>28 January</td>
<td>Teagasc Office, Navan, Co Meath</td>
</tr>
<tr>
<td>29 January</td>
<td>Teagasc Office, Dundalk, Co Louth</td>
</tr>
<tr>
<td>4 February</td>
<td>Bel Air Hotel, Ashford, Co Wicklow</td>
</tr>
<tr>
<td>5 February</td>
<td>Clanard Court Hotel, Athy, Co Kildare</td>
</tr>
<tr>
<td>19 February</td>
<td>Tullamore Court Hotel, Co Offaly</td>
</tr>
<tr>
<td>20 February</td>
<td>Teagasc Office, Letterkenny, Co Donegal</td>
</tr>
</tbody>
</table>
TEAGASC DAIRY MANUAL

A comprehensive source of practical advice for any dairy business.

- Why dairy farming?
- Business management
- Dairy facilities
- Dairy farming and the environment
- Milk quality
- Feeding dairy animals
- Dairy breeding
- Dairy animal health

These sections are further divided into a total of 49 chapters with titles such as: Creating a Business Plan, Winter Facilities, Feeding the Dairy Cow, Managing Your Grass, Replacement Heifer Management etc.

The information within each chapter is built on feedback from farmers and is laid out as Questions and Answers, How-to's, Key Performance Indicators, Key risks, etc., making the Manual extremely easy to read and use. The Manual will be of particular interest to anyone planning to expand over coming years.

A must for anyone with an interest in dairy farming the 310-page Manual is produced using tear-proof, water-proof paper for real world conditions.

The Teagasc Dairy Manual is available from your local Teagasc office (clients €25, non-clients €50). Alternatively contact Alison Maloney (059 9183409) who will send you a copy by post (p&p €7.50 extra).
upcoming events

SOIL FERTILITY WEEK

• Week commencing, 4 February.

Soil Fertility Week, to promote the importance of managing soils to optimise crop and grass output, will take place in the week commencing Monday, 4 February and will coincide with the annual conference of the Fertilizer Association of Ireland. Look out for Soil Fertility events in your local Teagasc office in early February.

AGRICULTURAL RESEARCH FORUM

• 11-12 March – Tullamore Court Hotel, Co Offaly

The Annual Agricultural Research Forum will take place on 11 to 12 March in Tullamore. The objective of the meeting is to provide an opportunity for the presentation and publication of new scientific information relating to the Sciences of Agriculture (including animal and crop science, molecular biology and biotechnology), environment, soil, food, agri-economics and forestry. The forum places emphasis on novel, high quality research and on the professional presentation of results. The forum will provide an opportunity for scientists, specialists, advisers and others working in the above areas to interact and exchange views.

IRISH SPORT HORSE YOUNG BREEDERS PROGRAMME 2013

The ISH Young Breeder’s programme is a joint programme between Horse Sport Ireland and Teagasc, partnered by Connolly’s Red Mills for 2013. It is aimed at those aged 14 to 25 years who are interested in assessing, exhibiting, and breeding performance horses. An avid interest and an eagerness to participate and learn is all that is required.

The National Championships will take place at Kildalton Agricultural College on 20 April and the World Championships are in Sweden in July. Training events will take place throughout February, March, and early April at various farms around the country. More information on the programme is available on both the Horse Sport Ireland and Teagasc websites or you can contact the Teagasc equine specialist advisers: Wendy Conlon 087 9879083/ Declan McArdle 087 688137. New participants are always welcome.

SPRING SHOW JUMPING BREEDING WORKSHOP

• 9 February

An interactive event focused on discussing all aspects surrounding breeding show jumpers will take place at Hotel Kilkenny on the afternoon of 9 February.

Come and join in the conversation with the Teagasc equine team and an accomplished panel, to include Clement McMahon, Jack Doyle, Peter Leonard, Tiernan Gill, Tom Holden, Greg Broderick, Barry O’Connor, Andrew Hughes and Tim Brennan MRCVS.

Red Mills are sponsoring the event and their equine nutritionists will participate in the discussion. Further information from Teagasc equine specialist advisers.
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Golden Maverick is Ireland’s best known and trusted brand of milk replacer.

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Dairying in the drumlin belt – Systems for profit

Tom O’Dwyer,
Head of Dairy Knowledge Transfer, Teagasc

Teagasc, with the support of Bank of Ireland, organised a seminar for dairy farmers in Ballyhaise College in mid-December. Teagasc Dairy Adviser and event organiser, David Colbourne said that the aim of the event was to “allow dairy farmers to learn more about the different systems of milk production and their relevance for the region.”

“While different systems exist, each individual must decide on the best way to make profit from dairying on their farm. Regardless of the system chosen, there are key principles – in relation to grassland management, breeding and cost control – which are vital to the long term sustainability of any system.”

This point was emphasised by all of the speakers – focus on getting the basic right, rather than on the merits of one system over another.

Choosing a system

High or low input? High milk yield or high milk solids? Spring calving, winter calving or all-year-round? Teagasc dairy specialist, Joe Patton, pointed out that whatever the opinion on different systems, the range in technical performance is highly significant.

High performance farms usually have a clearly defined and well-managed system in place which is focussed on the main drivers of farm profit. The optimum system for any dairy farm will be the most profitable and sustainable combination of cow type, calving pattern, stocking rate and feeding plan (see Figure 1).

Crucially, the system should be tailored to suit local conditions. The drumlin region is subject to local constraints and conditions; these need to be factored in when deciding the best combination of cow type, calving pattern, stocking rate and feeding system. However, the following should always be kept in mind:

• The system chosen should maximise grass eaten per hectare – our land’s ability to grow high yields of good quality grass is our key competitive advantage.

• The system chosen should keep cash costs low – by maintaining a high proportion of grazed grass in the milking diet and compact calving.

• As milk price changes at a greater pace than a system can be altered, the system should not require major adjustments in responses to price fluctuations (whether up or down).

• Do not allow unnecessary complications to interfere with the core objective of converting grazed grass into milk.

Lessons from over the six counties

According to Martin Mulholland, College of Agriculture Food and Rural Enterprise, there has been a large increase in herd size and yields since 2000 in Northern Ireland. Herd size is up by 26 cows to 80 cows in 2012 (+48%) and yield per cow is up by 1,320 litres to 7,322 litres per cow in 2012 (+ 22%).

In the same time period, the size of the grazing platform has remained unchanged. This has led to the adoption of different systems of milk production on Northern Ireland dairy farms, with a higher reliance on imported feed.

“The most important element in any system is the farmer,” he said. “Management is everything.”

He advised dairy farmers to: (1) look at the resources currently available before deciding on the best system for their farm; and (2) know their system and manage it well. He echoed Joe Patton’s point that extended calving intervals (and associated longer days in milk) tend to lead to higher lactation yields but lower annual yields (see Table 1).

His final point related to the importance of quality silage – good quality grass silage can be made but it requires careful planning and attention to detail. He highlighted the lack of reseeding, weather and contractor charging methods (per acre versus per

Table 1: Milk performance yield of two cows from one herd

<table>
<thead>
<tr>
<th>Cow</th>
<th>Age</th>
<th>No. lactations (completed)</th>
<th>Average calving interval (days)</th>
<th>Lactation yield (litres)</th>
<th>Annual yield (litres)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow #1</td>
<td>7y3m</td>
<td>4</td>
<td>374</td>
<td>7,984</td>
<td>7,786</td>
<td>98</td>
</tr>
<tr>
<td>Cow #2</td>
<td>6y5m</td>
<td>4</td>
<td>449</td>
<td>9,689</td>
<td>6,877</td>
<td>71</td>
</tr>
</tbody>
</table>

Source: Joe Patton
Perceptions of profit factors
Teagasc researcher, Donal Patton, reviewed the research work carried out at Ballyhaise College. He presented the perceptions and reality about four of the main factors affecting farm profit (see Table 2). Donal commented that there wasn’t a reserve of high quality fodder available on the College farm in 2012. But he now realises that such a feed reserve is necessary to reduce the risk associated with wet weather.

Dairy farmers on heavy soils must make as much high quality fodder in good years as possible to carry the farm through the wetter years. His advice was to aim for one to two high quality bales per cow in addition to normal winter feed requirements. Finally, he warned farmers that learning the skills of grassland management takes time, but that you should not be afraid to try things and to make mistakes.

Winning mentality
Liam Sheedy, former manager of the Tipperary senior hurling team, spoke about the ‘winning mentality’ – and he should know, having managed Tipperary to win the All-Ireland hurling title in 2010. While Liam Sheedy didn’t directly address dairy farming, his presentation highlighted the importance of having a winning mentality if success is to be achieved.

Planning for growth
Sean Farrell, Bank of Ireland, said farmers planning to grow their dairy business must know their costs of production at the outset and be able to benchmark their performance efficiency levels relative to others.

Table 2: Ballyhaise research: perceptions and reality

<table>
<thead>
<tr>
<th>Factor affecting profit</th>
<th>Perception</th>
<th>Reality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growing and grazing more grass</td>
<td>Inability to grow enough grass in drumlin area</td>
<td>Shorter growing season, higher peak growth, possible to grow 14t grass DM/Ha</td>
</tr>
<tr>
<td>Feed costs</td>
<td>Higher feed cost inevitable on heavier soil farms</td>
<td>Use purchased feed to manage grass – introduce when short of grass</td>
</tr>
<tr>
<td></td>
<td>Increased feed imports the best route to expansion</td>
<td>Need a robust system which can withstand external shocks</td>
</tr>
<tr>
<td>Farm fragmentation</td>
<td>Land is limiting expansion in drumlin area</td>
<td>Current stocking rate is low at 1.8 LU/Ha</td>
</tr>
<tr>
<td>Herd fertility</td>
<td>Higher feeding required to improve herd fertility</td>
<td>Use outside blocks for young-stock and winter feed</td>
</tr>
<tr>
<td></td>
<td>Impossible to achieve compact calving</td>
<td>Herd fertility has improved in the Ballyhaise herd – 74% six-week calving rate and 7% empty rate in 2012</td>
</tr>
</tbody>
</table>

Key messages

- Learn from the past but don’t live in it.
- It’s not where you are coming from, it is all about where you are going.
- To achieve what you want, you will have to commit yourself like never before – winning takes hard work.
- There is no secret formula for success – it really is a case of looking in the mirror and asking yourself if you are giving 100%.
- You have to challenge yourself all the time, to step out of your comfort zone.
- Look for constant improvement in your performance, aim to attain the next level all the time. Believe that you can improve. Think about opportunities and solutions, not problems. If you have a problem, understand it and move quickly on to finding, and implementing, the solution.
- We are constantly presented with choices, if you decide to take the opportunity then give it everything and see where it takes you.

Repayment capacity and both current and projected future business performance will be central to loan approval. A solid business plan is vital – the contents of which are understood by both the farmer and his/her bank manager.

When preparing your business plan, you must allow for unexpected costs by completing a number of ‘what if’ scenarios and include a contingency amount of 10% in your funds request. Finally, Sean alluded to the higher costs of 2012 and the requirement for increased working capital; the advice is to talk to your bank manager sooner rather than later.

Martin Mulholland, senior dairy technologist, DARD, Northern Ireland, Donal Patton, Teagasc Ballyhaise, Pat Shiels, Lakeland Dairies, Joe Patton, dairy specialist Teagasc and Sean Farrell, head of agri, Bank of Ireland.
Winter milk herds focus on fertility

Tommy Farrelly and Joe Patton, Teagasc, Grange

High-performing herds are currently reaping the reward for last year’s breeding management, they are meeting ambitious targets like 50% calved in the first three weeks and 75% in the first six weeks of the season. Tight control of calving pattern is often viewed as relevant only to spring calving herds on dry soils, rather than winter milk herds. Reasons given are that all-year-round production means calving date is not important, late calved cows can be milked through winter and infertile cows can be ‘recycled’ from one breeding period to the next. This ignores the huge hidden cost of lower annual milk sales, fewer calves born per year, higher feed and vet bills.

A recent Teagasc study estimated that annual profit is reduced by around €31,000 for a 100-cow liquid milk herd with low fertility (443-day calving interval), compared to high fertility (375-day calving interval). With an average calving interval of 435 days for herds in the sector, there is both scope and incentive for improvement.

David and Peter Farrell, Kilmessan, Co Meath, run 130 Holstein cows on a grazing platform of 33 hectares, supplying liquid contract milk to Glanbia. Milk sold per cow averages 6,800 litres (512kg solids) from 1,100kg purchased feed. Steady progress is being made on feed costs and pasture quality, but the most significant change over the last five years has been in terms of herd fertility.

Tackling calving interval
“Out herd calving interval in 2008 averaged 455 days,” said David. “Like most liquid herds, our focus was more on volume per cow. Fertility was less of an issue because our system was forgiving of the infertile animal.”

Examining their figures over time, David and Peter noticed that even though herd milk yield potential was rising, annual milk sold per cow was static. “The Teagasc Profit Monitor figure was a wake-up call,” notes Peter.

“On paper we had an 8,500-litre herd, but when we did the calculations our actual output per cow was closer to 6,500 litres. At first, I thought this was a problem with the numbers, but other farmers had seen the same. We had to accept the figure and move on.” Further analysis suggested fertility as a possible reason for lost milk revenue, though recycled cows were effectively part of the system. “Each year, around 35% of cows carried over from one breeding season to the next,” said David.

“We did not favour too many moving from spring to autumn, but there were always a few calving in August that had rolled over from April or May.”

“In the shorter term, recycling reduced culling rate seemed like a good idea. But it meant too many stale cows, long dry periods, too many cows calving in autumn and not enough in early spring. All these things increased costs and reduced income; calving interval had to be improved.” David and Peter designed a plan to reduce herd calving interval to 380 days by 2015. Peter explains: “We felt big improvements could be made quickly by changing things like culling and management of heifers. First, we moved to 24-month-old first calvers. Heifers now calve compactly at the start of season.”

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a challenge at first, but it’s needed to make progress,” said David.

“We were lucky to have a good number of heifers coming through. The quota issue in 2011 increased the rate of changes and with good cull cow prices at the time, the financial hit was not too severe. We have a young herd with a calving interval of 394 days to build on, but gaining the next 10 days and reducing culling rates will be the most difficult part of the process”.

Long calving intervals and recycled cows have never figured greatly for Gordon Foster, who milks 70 Friesian cows on the edge of Enfield village in south Co Meath. Around 35% of annual production is supplied as liquid milk to Glanbia, but, despite this, Gordon believes a simple grass-based system is the key to success.

The herd has an average EBI of €143, putting it in the top 1% for liquid milk herds in the Glanbia region. The herd has a strong genetic base for fertility, with a sub-index of 686. This potential comes through very well on the ground, with a herd calving interval of 376 days, a six-week calving rate of over 70%, for both spring and autumn, and a recycled rate of 11%.

“The right type of cow is important for good herd fertility,” insisted Gordon. “I don’t claim to do anything very complicated in my system in terms of feeding or management. I haven’t gone down the maize or diet feeder route because I want a simple one-man system with low cost. But the cows here do seem to work in terms of fertility.”

What is the genetic base of the herd?

“I have looked for bulls with good fertility and survival over the last 15 years or more,” said Gordon. “Most of the cows have New Zealand Friesian blood. I used a lot of straws from bulls like Dano, Hugo and Eamonn over the years. I have also been using high EBI Irish-bred AI bulls.”

These genetics are perhaps not typical of liquid milk herds in the region, which were traditionally bred for higher volumes. With an annual milk sale of 6,050 litres per cow, does Gordon feel that there is enough yield potential in his breeding for a winter milk system?

“Even though I supply liquid milk, I still only need to calve around 25% of the herd in winter,” he said.

“The great bulk of my milk is produced off grass, so I need a cow that will be efficient in the paddock too.

“In winter, milking cows get good baled silage and meal in the parlour, and it’s grass plus meal in the summer. Meal input is around 800kg per year so you don’t need very milky cows on in this case. On the other hand, I think you would get a good response to a higher-spec diet from this type of cow.”

Excellent fertility performance allows Gordon flexibility in terms of breeding decisions and stock sales. “Conception rates have not been a major problem so the calving pattern and culling rate are fine,” he said.

“This leaves me with surplus stock for sale each year. I am also looking to improve solids percentages and culling lower protein cows is also an option.”
The perfect partnership

The key challenges facing this dairy partnership are fertility improvement and financial planning.

Table 1: Farm infrastructure

<table>
<thead>
<tr>
<th></th>
<th>John</th>
<th>Piers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land (ha)</td>
<td>44 (18 leased)</td>
<td>85</td>
</tr>
<tr>
<td>Cows</td>
<td>60</td>
<td>70</td>
</tr>
<tr>
<td>Milk quota (lt)</td>
<td>300,000</td>
<td>592,000</td>
</tr>
<tr>
<td>Milking facilities</td>
<td>10 units</td>
<td>6 units</td>
</tr>
<tr>
<td>Accommodation</td>
<td>110hd straw/slats</td>
<td>132 cubicles</td>
</tr>
<tr>
<td>Calf housing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Challenges

1. The cow numbers at Fort Granite doubled overnight to 130. Currently there is a six-unit milking parlour. The plan is to build an 18-unit milking parlour by April 2013.
2. There is still more work to be done on the roadways.
3. The EBI of the herd is €40 and only €5 coming from fertility sub-index. The calves born in 2013 will have an EBI of €97 and fertility sub-index of €36. The fertility performance for spring 2012 was poor, with 17% empty after a 17 week breeding season. There are also too many cows milking over the winter period. The partnership is getting a bonus for 50% of milk supplied over the winter through the Liquid Milk and Winter Bonus Scheme.
4. "We want to halve the amount of milk supplied over the winter and produce more from grass," said John.

Managing disease

"This partnership involved the merging of two herds," said local Teagasc adviser Paul Keogh.
Ideally, herds would be kept ‘closed’ and new animals would not be brought into a herd.

If animals must be introduced to the herd:
1) Make sure they are disease free.
2) Make sure they receive all the treatments/vaccinations in the new herd.

Screening for infectious diseases in the herd is important to detect any change in the herd status, allowing effective control measures to be put in place.

These steps are just as important for any youngstock being moved, as well as the milking herd.

To make life easier and more economical for both of us we decided to pool our resources into a seven year partnership.

had been Bulk Milk Disease Screening, (and performing further individual animal tests) before the herds were put together, much was known about the disease status of the herds and, therefore, what control measures were required to mitigate the disease risks.

Because of this, the required control strategies (vaccinations/treatments) for applicable infectious diseases were put in place in advance of bringing the herd together.

Veterinary advice was sought by
Continued from page 11

John on disease control. This process started many months before the herds were to be amalgamated.

- Where possible, individual animals which were carriers of disease were identified in the source herds and these animals were then excluded from the new herd.
- No infectious disease (or any other animal health) issues have occurred since the herds have been brought together.

Financial Planning

Richard O’Brien, the Teagasc Glanbia Programme co-ordinator, stresses the need for careful financial planning for any expansion, partnerships in particular.

“In December 2011 a five-year financial plan was created for the farm,” he said. “The five-year cash flow projections showed cash flow under severe pressure for the first three years. After this, when the partnership is running efficiently with better use of grass and better herd fertility, cash flow would improve dramatically. It is important that partners are aware of the medium-term cash flow profile.”

The plan is to keep costs below 23 cent/litre. A base milk price of 30c/l was used. Gross output is projected at 33c/l, leaving a net profit of 10c/l or €100,000 on 1 million litres supplied from the dairy enterprise. (The above figures do not include Single Farm Payment, wages for John and Piers. Other hired labour is included.)

“We are clear about our medium term objectives,” said John:

1. Improve herd fertility.
2. Have no autumn calving cows.
3. Improve kg solids/cow.
5. Sell surplus replacements.

“Cash flow will continue be an issue for the next five to six years because a lot of heifers will have to be retained, but we are on the right track,” John concluded.

Benefits of a Partnership

- Opportunity to increase scale.
- Better quality of life.
- Better management decisions.
- Reduction in cost of hired labour.
- Improved skill mix.
- Security of labour.
- A partner may be able to take up off-farm employment.
- Time may be freed up to develop an on-farm business.
- Facilitates involvement of son/daughter in the management of the farm.
- Provide a career ladder for farm managers.

Tax incentives

- Enhanced stock relief at 100% for young trained farmers and 50% for all other partners subject to clearance from the European commission under state aid rules.
- Special provisions under income averaging and capital gains retirement relief.
- Concessions under capital allowances and there are provisions for expenses.

EU/DAFM incentives

- Every partner who is eligible to acquire milk quota can do so in his own right as a separate quota holder.
- The upper limit for EU/DAFM grant aid, e.g. AEOS and the Dairy Equipment Scheme, may be increased by up to three times of that available to farmers farming on their own.
- Priority selection under AEOS for farm partnerships.

Registered partnership

Ben Roche, Teagasc Partnerships Specialist, Rural Economy and Development Programme

Farm size in Ireland is small relative to many important food producing countries such as New Zealand, Australia, US, Holland and Denmark. The average number of cows on dairy farms in Ireland is 60, compared to 380 in New Zealand. Average farm size in Ireland is 32.8 hectares and with less than 0.5% of land offered for sale each year there is little scope for farmers to buy land.

Registered partnerships are a way to overcome this and their number has increased to a total of 640 representing 7% of milk quota holders in Ireland. This is still low compared to France where over 50% of all milk is produced in partnerships, or Norway where 25% of farmers work in partnership. Government policy is to support and encourage the formation of partnerships and remove all obstacles to the formation of partnerships. Non-dairy partnerships will be afforded the same benefits as milk production partnerships. The secret to having a successful partnership is to get the basics right:

- The partners must be able to get along at a business level.
- The partnership should be set up and run as a business.
- A written partnership agreement is important. It sets out the details of the business: how it is set up, how the business is to be operated and, eventually, how the business will be dissolved. It is important that prospective partners engage with one another in the drawing up of the written partnership agreement. They should clearly understand the agreement and take ownership of it. It is a mistake to leave all the work to professionals.

The agreement should be seen as a live document that details the business relationship between the partners. A specimen partnership agreement is available from Teagasc and most farmers now use this to design their own agreements.

- Like any good business, it is important to have a business plan in place.
- All partnership activities should be confined to the business itself and be kept separate from domestic issues. The farm office, where business records, meetings and transactions are carried out, should, where possible, be located in neutral territory such as in the farmyard.
Though much was left unchanged, this year’s budget follows a tough farming year and requires careful analysis.

After a year dealing with poor weather and rising farm costs, most people were apprehensive about Budget 2013, which was made public in December. While there was no single significant development, which will drastically reduce the after tax position for farm households, there were a number of small changes plus the introduction of a new tax which means people will have to budget for some increased payments to Revenue. Note that some of the changes outlined below could be subject to further amendments/clarification with the release of the Finance Bill in the next couple of months.

Taxes on farm income
The headline income tax rates of 20% and the higher rate of 41% have not been changed and the levels of income at which the higher rate of tax kicks in has also been kept the same as for 2012. The tax credits which are allowed as straight deductions against the total tax bill have also been left unchanged.

The other major taxes on income are also unchanged with both the rates of Universal Social Charge (USC) and PRSI for the self-employed (which includes farmers) remaining unchanged as outlined in Table 1.

A change was made affecting individuals over 70 years of age who could qualify for the USC at a maximum rate of 4%. For 2013, if these individuals have an annual income greater than €60,000, the normal USC rates as in Table 1 will apply. The Universal Social Charge is payable on gross income after allowing deductions for certain trading losses and capital allowances, but before relief for pension contributions.

Farmers, like other self-employed people, are expected to make annual Pay Related Social Insurance or PRSI payments under Class S PRSI calculated at a rate of 4% of their income. Farmers making Class S PRSI payments are entitled to the Contributory Old-Age Pension when they reach 66 provided they have met criteria on the number of PRSI contributions over their working life. The minimum PRSI contribution for these Class S contributors with annual income in excess of €5,000, which had been at €253 for a number of years, has been increased to €500 for 2013.

Stock relief
The existing arrangements for stock relief are being extended for a further three years with an extension in the definition of farm partnerships for the relief as set out in Table 2. This relief can be useful in reducing taxable profit in cases where a share of the profit is due to building up stock levels within the farm business. The relief can apply as a percentage of the lift in value of stock (which is calculated by subtracting the value of opening stock from the closing stock value).

*Continues next page*
This relief can be deducted from profits for the year to arrive at final taxable profit. The percentage stock relief applying to the various categories of farmers is set out in Table 2.

**VAT**

The farmer flat rate VAT addition (a compensation mechanism for VAT paid on farm inputs, which is calculated by adding a fixed percentage to the sales of livestock, milk and grain by non-VAT registered farmers) has changed from 1 January 2013. The flat rate addition has dropped from 5.2% to 4.6%. For each €100,000 of annual farm sales, this would mean a reduction of €400 in the VAT addition due to non-VAT registered farmers.

**Deposit interest**

There were some other changes which can affect income, notably Deposit Income Retention Tax (DIRT), which increased from 30% to 33%.

**Capital Gains Tax (CGT)**

Capital Gains Tax could potentially apply where farm assets such as land, buildings, milk quota and Single Payment Entitlements are sold or transferred.

The rate of Capital Gains Tax is being increased from 30% to 33% with effect from 6 December 2012.

A new relief from CGT was announced to reduce the tax applying where land disposals are carried out as part of a process of consolidating/restructuring a farm by purchasing or swapping land with another landowner to replace the land disposed of. The transactions must take place within 24 months of each other and the relief will be available until 31 December 2015. The full detail on this relief will be released in the Finance Bill which will be published early in the year.

There were no major changes to the extremely valuable CGT Retirement Relief announced in the 2013 budget. The previous year’s budget included some changes to the Retirement Relief, which have implications for people transferring assets where they have reached the age of 66 years after the end of 2013.

Retirement Relief normally applies if the person disposing of the assets is over 55 years (plus some additional conditions) but, from 31 December 2013, there will be an upper limit imposed on the total value of the assets that can qualify where the person transferring the assets is over the age of 66. This upper limit is €3m for transfers to family members (there was no cap on this previously) and €500,000 for transfers outside the family.
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Capital Acquisitions Tax (CAT)
This tax applies where assets are received via an inheritance or gift. The rate of CAT is increasing from 30% to 33% and the tax free thresholds that apply based on the relationship between the parties to the inheritance or gift are also being reduced as shown in Table 3. Both of these changes came into effect on 6 December 2012.

Stamp duty
There were no significant changes to stamp duty rates or relief announced. The Young Trained Farmer Relief from stamp duty for those farmers acquiring land when they are under 35 is to be retained for at least another year — again, the detail will be in the Finance Bill.

The Local Property Tax
The new Local Property Tax (LPT) will come into effect from 1 July 2013 and will be charged on all residential properties in the State. This in effect means a half-year charge for 2013. The collection of the tax will be carried out by Revenue and they will be writing to all property owners by March next year with full details on how the tax will operate.

Revenue will also provide guidance on how property will be valued for the purposes of calculating the tax at a rate of 0.18% of the value for properties up to a market value of €1m. The initial valuation imposed in 2013 will last until 2016. This new tax will replace the Household Charge (not liable in 2013) and the Second Home Tax or NPPR charge (will continue to be liable in 2013 but will be abolished for 2014).

Social welfare changes
There were no changes to the rates of the main social welfare payments, including the main social insurance and assistance payments.

Farm Assist
There were a couple of changes affecting the way that Farm Assist is calculated, which will affect the maximum payment entitlement. From 2013, the full income from farming is assessed by Revenue and they will be writing to all property owners by March next year with full details on how the tax will operate.

These two changes will have the effect of reducing the number of people that could potentially qualify for Farm Assist, as well as reducing the payment due for those that do qualify.

The payment rate for Farm Assist will remain unchanged as per Table 5. Child benefit rates are being reduced to the rates outlined in Table 5.

Table 1: USC rates and thresholds for 2013

<table>
<thead>
<tr>
<th>Income</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to €10,036.00</td>
<td>2%</td>
</tr>
<tr>
<td>from €10,036.01 to €16,016.00</td>
<td>4%</td>
</tr>
<tr>
<td>above €16,016.00</td>
<td>7%</td>
</tr>
</tbody>
</table>

Table 2: How stock relief rates are applied

<table>
<thead>
<tr>
<th>Stock relief rate</th>
<th>Category to which it applies</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>Majority of farmers who don’t fit the categories below</td>
</tr>
<tr>
<td>50%</td>
<td>Farmers who are in a registered farm partnership. This now applies to all types of partnerships, not just milk production partnerships.</td>
</tr>
<tr>
<td>100%</td>
<td>Young trained farmers aged under 35 years and who have the necessary qualifications.</td>
</tr>
</tbody>
</table>

Table 3: Changes in application of Capital Gains Tax

<table>
<thead>
<tr>
<th>Group</th>
<th>2013 threshold</th>
<th>Old threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Son/daughter, minor child of deceased child</td>
<td>€225,000</td>
</tr>
<tr>
<td>B</td>
<td>Lineal ancestor/descendent, brother sister, niece, nephew</td>
<td>€30,150</td>
</tr>
<tr>
<td>C</td>
<td>Any other person</td>
<td>€15,075</td>
</tr>
</tbody>
</table>

Table 4: Social welfare changes

<table>
<thead>
<tr>
<th>Social insurance and assistance payments</th>
<th>Weekly payments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributory pension (for under 80 years)</td>
<td>€230.30</td>
</tr>
<tr>
<td>Non-contributory pension</td>
<td>€219</td>
</tr>
<tr>
<td>Farm Assist</td>
<td>€188</td>
</tr>
</tbody>
</table>

Table 5: Child benefit rates

<table>
<thead>
<tr>
<th>First and second child</th>
<th>2013 rates (€/ month)</th>
<th>2012 rates (€/ month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First and second child</td>
<td>€130</td>
<td>€140</td>
</tr>
<tr>
<td>Third child</td>
<td>€130</td>
<td>€148</td>
</tr>
<tr>
<td>Fourth and subsequent child</td>
<td>€140</td>
<td>€160</td>
</tr>
</tbody>
</table>
Deirdre Hennessy
Teagasc, Animal and Grassland
Research and Innovation Centre,
Moorepark, Fermoy, Co Cork

What is the earliest date on which I should apply nitrogen?
The date of initial spring nitrogen application depends largely on location
and soil type.
A response of 16kg DM/kg N applied in mid-January has been measured
in early March at Moorepark, over three years. As a guideline, in the
Republic of Ireland the optimum date for initial spring nitrogen application
is mid-January, in the central part of Ireland it is early to mid-February
and in the northern region it is mid-to late-February.
In years with good winter grass growth and mild conditions, fertilizer
could be applied a week or two earlier in the central and northern regions
Teagasc recommends that the initial nitrogen fertilizer application should be:
half a bag of urea per acre in
mid-March.
Should I prioritise fields with high, medium or low covers?
Paddocks that have medium to low covers should receive fertilizer
nitrogen first. If practising early
turnout, graze the highest covers first
and then apply fertilizer nitrogen or
slurry.
Should I prioritise new leas or old pastures?
Perennial ryegrass has been shown
to be more responsive to, and more
efficient at utilising, fertilizer nitrogen
than other grass species. This is
particularly important in spring.
Older pastures tend to have a lower
perennial ryegrass content than
reseeded swards so new swards
are more responsive to
nitrogen than old permanent
pasture.
If reseeded swards have a
high cover, they should be
grazed off as early as pos-
sible, so that shading of tillers
from heavy covers will not result in
tiller death. Nitrogen fertilizer can
then be applied.
If new reseeds have a low cover,
they can receive fertilizer nitrogen
in the spring before grazing. Old
permanent pasture will likely have
a low cover in early spring; consider
applying slurry rather than chemi-
cal nitrogen fertilizer in January
(depending on soil type).
What temperature do I need to have, at what depth, for how long?
Soil temperatures of 5°C to 6°C at
10cm soil depth are required for grass
growth. Generally, once soil tem-
peratures reach 5°C to 6°C in spring,
they do not drop dramatically
below this. Soil temperatures
at 10cm soil depth at Moore-
park in November 2012 averaged 6.3°C, ranging from 2.2°C to 10.7°C, and in December, the average soil temperature was 5.2°C, ranging from 2.2°C to 8.9°C.

At Moorepark, average growth rates for this winter are expected to be in the range of 3kg to 5kg DM/ha/day. Once grass is actively growing, there will be a good response to fertilizer nitrogen.

Even if the temperature is lower than ideal, will I still get some growth?

Some grass growth will still occur at soil temperatures below 5°C to 6°C. Although the scientific evidence to support this is limited, work at Moorepark over the last number of years indicates that grass growth does occur.

If the ground is frozen, growth will stop. Water logged soils in cold weather will also have very low grass growth rates. Applying fertilizer nitrogen when grass is not actively growing is wasteful as the sward cannot make optimum use of the fertilizer.

Is urea preferable to CAN on cost grounds in early season?

Currently, quoted prices for urea are in the region of €470 to €490/tonne and for CAN €350 to €370/tonne, which is equivalent to €1.02 to €1.04/kg N for urea, and €1.27 to €1.35/kg N for CAN. Urea is therefore cheaper per kg N than CAN. Moist overcast conditions in spring are ideal for urea application. In warm sunny weather, such as April 2012, the N in urea can be volatilised, therefore in such conditions it is preferable to apply CAN.

Are there any risks with applying very early N, e.g. cows ingesting prills?

Unlikely. If N is applied as soon as it is permitted, by the time cows are turned out to grass, probably around 1 February at the earliest, the prills will have dissolved.

Even if spreading date and turnout date are closer, soil is damp/wet at this time of year and prills will have started to dissolve. If fertilizer is applied to very heavy covers and is sitting in the grass there is a possibility that some will be ingested, but as mentioned earlier, if possible graze off heavy covers before applying N.

What role does slurry have as a source of N in early spring?

Slurry is a valuable source of N for grass growth in spring. Chemical fertilizer is expensive and replacing some of the N required in spring with slurry is worth considering. Applying 3,000 gallons of cattle slurry per acre is the equivalent of half a bag of urea per acre. The response to N in slurry is best in early spring when damp cool conditions prevail.

Consider applying slurry to the last third of the ground that will be grazed in the spring instead of chemical N. Applying 3,000 gallons of cattle slurry per acre is the equivalent of half a bag of urea per acre. The response to N in slurry is best in early spring when damp cool conditions prevail.

Applying slurry to the last third of the ground that will be grazed in the spring instead of chemical N. These swards will have time for the slurry to have washed off and palatability will not be reduced.
Nitrogen (N) fertilizer recommendations for Irish grassland soils are largely based on a ‘one size fits all’ system. This doesn’t take into account the differences between soils in terms of their ability to release N. The result can be too much, or too little, nitrogen fertilizer being used; possibly poorer returns for the farmer; and unnecessary N losses to the environment.

Noeleen McDonald, Teagasc Walsh Fellowship Student of the Year 2012 & David Wall, Teagasc, Crops, Environment, and Land Use Programme, Johnstown Castle

Since 2010, researchers at the Teagasc, Environment Research Centre, Johnstown Castle have been investigating the soil N supply potential of 30 Irish grassland soils. Their aim is to investigate the potential to develop a reliable soil N testing system which would allow new, soil specific, N fertilizer recommendations for Irish grassland.

Because plant available forms of N can be readily lost from the soil, measuring plant available N alone in the soil will not give a good indication of the longer term soil N supply.

Can soil tests measure soil N supply potential?

Unlike for P and K, there are no soil N tests recommended to measure the supply of N from soil reserves. Because plant available forms of N can be readily lost from the soil, measuring plant available N alone in the soil will not give a good indication of the longer term soil N supply.

The work at Johnstown Castle is focusing on developing a soil based N testing system which measures N release from soil organic matter. The first stage of this research was to screen a range of soil N tests for their ability to accurately predict the soil N supply potential.

The Illinois soil N test (ISNT), which measures a component of the N in soil organic matter, was selected as the most suitable soil test to predict soil N supply potential across these 28 Irish grassland soils.

Effects of soil type on soil N release

Irish grassland soils can store large reserves of N in soil organic matter. Soils in this study had between 2,155kg/ha and 7,433kg/ha total N in the top 10cm. These soil reserves are released slowly over time and have the potential to contribute large quantities of N for grass growth.

To investigate the effect of soil type on soil N supply, a series of experiments were conducted in the laboratory and a controlled environment research facility at Johnstown Castle. The studies showed the large range in soil N supply potential of Irish grassland soils, ranging from 93kg up to 403kg/ha of nitrogen in the top 10cm of soil.

Some of the higher organic matter soils could consistently produce up to 2,696kg/ha grass DM over a five-week period with no N fertilizer applications, whereas sandier soils tended to produce much lower yields of N (1,322kg/ha grass DM).

Climatic effects on soil N supply

In the field, temperature and rainfall influence the soil N mineralisation process (which releases the N from organic matter), and the availability of mineral N for grass N uptake.
These effects were evaluated at two field sites with contrasting soil types at Teagasc, Moorepark and Johnstown Castle.

At these sites the soil N, grass N uptake, and grass DM yield were measured repeatedly over an entire growing season. These soils showed large soil N release potential and had an average annual grass DM yield of 8.53t/ha and 9.38t/ha respectively with no N fertilizer applied in 2012.

The annual grass DM yields at these sites produced with no N fertilizer are close to current average levels of farm production (with fertilizer!).

Soil N supply and grass DM yield increased gradually during the spring and early summer at both sites. The heavier soil type at Johnstown Castle released more N in late summer and into early autumn and produced higher grass yields during this period than the Moorepark soil.

As the soil temperature decreased with the onset of winter, soil N supply and grass growth decreased.

**Predicting soil N supply under field conditions**

The next step in this research is to develop a system to predict soil N supply for different soils under field conditions.

Early results from this work show that the soil N tests investigated can predict soil N supply from the soil. However, in years with poor grass growing conditions, such as in 2012, the ability of the grass to utilise this soil N may be somewhat limited leading to less efficient soil N utilisation.

Further field evaluation of the soil N tests is being conducted across Ireland. This research shows the potential for better soil N utilisation, leading to more efficient use of N fertilizer on farms with all of the associated financial and environmental benefits.
To maximise crop yield potential, aim to maintain soils at Index 3 for P and K. Once soils are at that level, use manure or artificial fertilizer to replace the P and K removed in grain and straw.

Mark Plunkett, Soils Specialist, Crops Environment and Land Use Programme, Teagasc, Johnstown Castle, Wexford

Regular soil testing and comparing current and past results will help ensure your fertilizer programme is doing the job. The amount of P and K removed by a cereal crop will depend on the crop type 'winter or spring' and the crop yield. Table 1 shows the level of P and K removed per tonne of grain yield for cereal and oilseed crops. For example, a crop of spring barley yielding 7.5t/ha will remove 28.5kg P/ha (7.5 x 3.8) and 86kg K/ha (7.5 x 11.4).

To convert kg/ha to units/ac multiply by 0.8 e.g. 28.5 x 0.8 = 22.8 units/ac.

Key messages from the Teagasc tillage BETTER farms

Soil fertility management is a key component of the Teagasc tillage BETTER farms programme. This programme has been running since 2009 in conjunction with three farms in Cork, Meath and Wexford. All three farms were intensively soil sampled in 2009, 2011 and 2012 to assess soil nutrient status and to evaluate the fertilizer application programmes in relation to the soil type and crop rotation on each farm.

Within the last decade, a number of changes in the mix of crops grown on Irish farms has taken place reflecting market demand. In many cases, this has led to differences in the crop requirements for specific nutrients and a re-think in the way we need to fertilise our soils for these new crop rotations. This has certainly been the experience on the Cork and Wexford BETTER farms, where sugar beet was a significant part of the crop rotation in the past.

On the Cork BETTER farm (John and Denis Crowley, Carrigoon) there has been a move to increased winter crops (wheat and barley) in large blocks of land to simplify crop management and reduce machinery transport costs. For example, winter barley is now grown continuously on the well-drained sandy loam soils on the farm and very high yields (8.9 to 10t/ha plus) have been achieved in recent years.

The fertilizer strategy over the past four growing seasons has been to apply 370kg/ha of 10-10-20. This fertilizer programme has delivered enough P to replace the P removals by the winter barley crop (grain and straw) but has left a large shortfall of 23kg/ha/year of K. When these soils were re-tested in 2011, there was an average decrease in soil P levels of 1.9mg/L and 31mg/L of soil K across the entire block. In 2012, additional K was applied (125kg/ha of 50% K) to halt the decline of soil K levels. In 2012, the winter barley crop yielded 8.9t/ha and removed 34kg P/ha and 87kg K/ha, which was a lower offtake compared with the previous three seasons.

Soil test results for 2012 indicate that the average soil P and K levels had recovered somewhat compared to the 2009 levels with soil P decline at 0.9mg/L and soil K decline at only 2.4mg/L. The main factor slowing the declines in soil P and K was lower crop yield in 2012 and the application of additional K fertilizer in the 2012 season.

On the Wexford BETTER farm (George and Ken Williamson, Duncromick), there has also been a change in the cropping programme to more winter cereals taking advantage of the yield potential of the heavy clay loam soil type on the farm. More even work load at sowing and harvest time is another benefit.

Soil test results show that soil P levels have remained relatively stable since 2009 as the slightly positive historic fertilizer P balance has supported the increased area of higher yielding winter cereal crops. Soil P levels change slowly on these relatively high clay content soils and they have a large capacity to supply and retain soil P in any one growing season.

Over the last two to three years, the fertilizer compounds have been changed to increase the P to K ratio applied. In the past, fertilizer compounds with a P:K ratio of 1:2 (e.g. N-P-K:18-6-12/10-10-20) were used and now compounds with a P:K ratio of 1:2.6 & 1:3.3 are used (e.g. N-P-K:11-9-22 and 13-6-20). The new fertilizer programme supplies a better P:K balance for winter and spring crops, respectively. For example, in 2009, an average of 33kg/ha P and 72kg/ha K was applied.
compared with average 37kg/ha P and 99kg/ha K in 2012. Table 2 shows a typical five-year crop rotation on the Williamson’s farm and the average annual crop P and K removals. This shows that the fertilizer programme must aim to supply, on average, 35kg P and 96kg K/ha to maintain soil fertility.

On the Meath BETTER farm, Joe O’Donoghue, Herberstown, operates a mainly continuous cereal rotation. Crops are selected to best match soil types and soil fertility levels. A proportion of the land on this farm is rented and the policy is to rent land on a long-term basis so issues such as soil fertility can be corrected over a number of years. Soil fertility levels have remained relatively stable despite any shortfalls in nutrient inputs in some years. This is because adequate nutrients are being supplied when appropriate over a longer term basis in each crop rotation.

On all three BETTER farms, there has been a long history of soils testing. This is a cost effective tool to manage soil fertility to maximise crop yield and profitability.

Table 1: P and K off takes in cereal/oilseed crops (kg/ha) per tonne of grain yield

<table>
<thead>
<tr>
<th>Crop</th>
<th>P</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Straw removed</td>
<td>Straw not removed</td>
</tr>
<tr>
<td>Winter wheat/barley</td>
<td>3.8</td>
<td>9.8</td>
</tr>
<tr>
<td>Spring wheat/barley</td>
<td>3.8</td>
<td>11.4</td>
</tr>
<tr>
<td>Oats</td>
<td>3.8</td>
<td>14.4</td>
</tr>
<tr>
<td>OSR</td>
<td>6.7</td>
<td>14.6</td>
</tr>
</tbody>
</table>

Table 2: Typical P & K removal over five-year crop rotation

<table>
<thead>
<tr>
<th>Crop rotation year</th>
<th>Crop</th>
<th>Crop yield potential t/ha</th>
<th>P kg/ha (units/ac)</th>
<th>K kg/ha (units/ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yr 1</td>
<td>Winter OSR</td>
<td>5.0</td>
<td>30 (24)</td>
<td>45 (36)</td>
</tr>
<tr>
<td>Yr 2</td>
<td>Winter wheat</td>
<td>10.0</td>
<td>38 (30)</td>
<td>98 (78)</td>
</tr>
<tr>
<td>Yr 3</td>
<td>Winter oats</td>
<td>9.0</td>
<td>34 (27)</td>
<td>130 (104)</td>
</tr>
<tr>
<td>Yr 4</td>
<td>Winter wheat</td>
<td>10.0</td>
<td>38 (30)</td>
<td>98 (78)</td>
</tr>
<tr>
<td>Yr 5</td>
<td>Winter barley</td>
<td>9.5</td>
<td>36 (29)</td>
<td>108 (86)</td>
</tr>
<tr>
<td>Average P and K removal (kg/ha)</td>
<td>35 (28)</td>
<td>96 (77)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**In summary**

- Regular soil testing is a must to manage soil fertility for high yields.
- Comparing old and new soil test reports will help tailor fertilizer programmes.
- The aim is to apply the correct level of P and K to balance the crop rotation.
- Match crops and balance nutrient applications to suit farm soil types.

*Continues next page*
SOIL FERTILITY: a growing concern according to analysis

Pat Murphy
Head of Environment Knowledge Transfer, Crops Environment and Land Use Programme

Analysis of 2012 data for soil samples submitted to Teagasc continues to show worrying declines in soil P levels while soil K levels seem to be stabilising. These results are not based on a random national sample but the decline in soil P and K sample results since 2008 highlights a potentially serious emerging problem.

Highlights
- The percentage of soils with Index 1 for P (Index 1 = very low nutrient status) has increased from 14% in 2007 to 30% in 2012 and continues to increase.
- The percentage of soils with Index 1 and 2 (very low and low) has increased from 40% in 2007 to 59% in 2012 (under the red arrow).
- It is very positive news that the percentage of soils with Index 4 for P has dropped from 32% to 18%. Index 4 = excess nutrient status posing a potential risk for loss to the environment.
- Soil K levels, which were dropping in line with P seem to have stabilised in 2012. However, ~53% of soils still remain at K Index 1 and 2 (very low and low).

These declines in soil nutrient levels will likely lead to reductions in crop and grass yields. For example, research has shown that the expected grass yield on an Index 1 soil is 1.5t/ha lower than at soil index 3.

Soil fertility problems, make the best use of the available nutrient resources on your farm, to calculate you fertilizer requirements for the year, to increase farm productivity and to save time and money in the long run.

To maximise these benefits, it is important that a plan is prepared early and on a field-by-field basis and followed throughout the year.
Healthy soil has lots of air pockets between its solid particles where moisture and plant roots can move freely. Compaction by machinery or livestock, particularly in wet conditions, can collapse the structure and soil layers may end up with the density of Christmas pudding rather than sponge cake. Yields of grain or grass can be dramatically reduced (Figure 1).

Although there is not the extreme summer weather of 2012, at least one year in three presents significant machinery challenges to field operations. Trafficability problems, where machines become stuck, are clear to see, as are surface poaching and rutting. But subsoil structure damage is usually not visible and can get worse year-on-year.

Compaction and yield

Where clear evidence of stunted growth by compaction is seen on field headlands etc., yield losses can be 50% or more. Research trials, where less severe traffic treatments have been evaluated, have shown crop yields to be reduced by up to 20% or even 50% depending on the crop.

While compaction is recognised as a serious threat to productivity on tillage soils, the most comprehensive Irish compaction research has been carried out on grassland sites in Kilmaley and Oak Park, where three levels of silage machinery traffic (conventional, low ground pressure, and zero traffic) were evaluated over a three-year period.

On the wetter Kilmaley site, the use of low ground pressure tyres for silage harvesting increased grass yield by 15% (Figure 1), whereas the response was 9% more grass on the drier Oak Park site.

With grass costing €54/tonne of DM to produce, the 9% and 15% yield losses above would cost between €60 and €100 per hectare per annum.

Even a modest 5% yield loss in a winter wheat crop costs €100/ha at today’s prices. While low ground pressure tyres can be expensive, when set against the area of land worked by the equipment, the payback period may be quite short.

Why the interest in compaction now?

The increase in machinery weight threatens the soil. Axle loads are many times that of when mechanisation became common and tyre sizes have not kept pace with machine weight.

Although its very small tyres, the 20 kW Ferguson 20 of the 1950s had much more tyre capacity for its weight than a 120 kW tractor of today (Table 1). Equally, the need for timeliness on tillage farms and extended grazing practices on grassland farms have increased the risk imposed by traffic on soils when the moisture content is high.

While corrective measures like sub-soiling may have a role to play, the clear consensus from compaction research is that ‘prevention is better than cure’.

Continued on page 26
than a cure’. The effects of compaction can be long-lasting and difficult to alleviate — traffic management on tillage and grassland must be the priority.

Avoiding compaction
Soil type, moisture content, the presence of a crop, machine weight and tyre size can all influence the risk of compaction. Of these, only reducing machine ground pressure and managing animal and machinery traffic are in our control.

The compaction risk from machines can be reduced by increasing tyre size to reduce ground pressure. Larger tyres can carry a load at lower inflation pressures, resulting in a large contact patch with the ground and lower ground pressures (Figure 3).

But while we can achieve low ground pressures, a larger axle or wheel load will tend to cause more, or deeper, damage than a smaller axle load with the same ground pressure. First, determine what the axle loads of your tractors and machines are and then select tyre sizes that allow this load to be carried at a reasonable pressure. The required pressure depends on the soil conditions and, to some extent, on traffic density. A range of possible target pressures would be:

- < 0.5 bar: Weak soils, LGR work
- 0.5 – 0.8 bar: Working on cultivated soil
- 0.8 – 1.0: Ploughing or work on wetter grassland
- 1.0 – 1.5: Field trailers, combines

Tillage machinery example
The move to five-furrow mounted reversible ploughs presents a particular axle load challenge. While the plough weighs 2.1t, its length results in a lot of weight transfer from the front tractor axle, giving an 8t rear axle load on the required 120kW tractor, such as that shown in the main photograph (see page 26-27).

The target for a ploughing operation would be less than 1.0 bar pressure, requiring a large tyre for this load. The 600/65R38 tyre frequently fitted to this size of tractor requires an inflation pressure of more than 1.6 bar for this load. A much larger tyre size of 710/70R 38 is needed to get below the 1.0 bar target inflation pressure. This tyre size is rarely fitted in practice. This approach can be applied to all tillage machine categories, with one-pass cultivation units, combines and grain trailers presenting significant challenges.

Grassland machinery example
There are many challenges with grassland machinery. If conditions are wet, even machines such as tractors and mounted fertilizer spreaders can cause damage.

The biggest loads are usually imposed when ‘drawing’ silage. A large tandem axle trailer will impose an axle load of more than 12t across the four wheels of its tandem axle. Standard wheels of 15R22.5 or 18R22.5 would require an inflation pressure of more than 3 bar with this load. A target pressure of 1.5 bar for dry conditions and 1.0 bar for wetter conditions should be aimed for.

Table 1: Tyre size and carrying capacity of modern tractor compared to 1950s tractor

<table>
<thead>
<tr>
<th>Ferguson TE20</th>
<th>JD 6920s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine power (kW)</td>
<td>19</td>
</tr>
<tr>
<td>Weight (t)</td>
<td>1.2</td>
</tr>
<tr>
<td>Rear axle load (t)</td>
<td>1.2</td>
</tr>
<tr>
<td>Tyre size</td>
<td>10-28</td>
</tr>
<tr>
<td>Tyre capacity index</td>
<td>100</td>
</tr>
</tbody>
</table>

1 load capacity of tyre relative to rear axle load

Figure 2
Compaction alters soil structure by compressing the soil aggregates and reducing pore space (lower diagram)
John O’Sullivan is milking just over 90 cows outside Castleisland Co. Kerry. His soil type is heavy with little or no drainage. The soil profile can be described as a silty clay loam with a 6-7 inch layer of topsoil.

John feels that heavy rainfall increases the likelihood of compaction. “We house stock early to avoid soil poaching,” said John. During the main grazing season of 2012, cows were housed for 30 days full time and 60 nights.

“I use a Fusion baler to take off heavy covers of grass to feed to stock while indoors. Even though I only carry one bale at a time in the baler, I reckon there’s still some soil damage.”

John normally cuts all his own silage with an 8ft mower, but due to difficult soil conditions he hired a local contractor to mow the grass for him into 20ft swaths so as to minimise traffic on heavy soils.

John’s local Teagasc adviser Gráinne Hurley adds that there is a fine line between continuation of on/off grazing and full-time housing of stock on heavy soil types. It is important to minimise soil damage but also to utilise as much grass as possible to reduce costs and increase production balance.

“We’re always trying to find that balance,” John concluded.

Figure 3
Larger tyres can carry heavy loads at low ground pressures, but heavy loads can still cause deeper compaction. (Depth is measured in metres, pressure is measured in kPa.)
fertilizers & soils

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A wide but low 560 40R 22.5, which is sometimes fitted as a lower pressure option, will still require high pressures of 2.4 bar. A much larger 650/55R22.5 would be needed to get below 1.5 bar pressure. This would require a change in axle position to accommodate the larger tyre.

Achieving low ground pressures with larger loads is difficult and expensive. In wetter conditions it is easier to reduce the ground pressure of low-axle load systems like baled silage. All machines in the system still need to be considered and most will need larger tyres but the very large axle loads are avoided.

Traffic management

Choosing tyres to reduce ground pressure is only one part of the approach to preventing soil damage. Choosing lighter machines and carefully managing the timing of machinery operations are also important measures. When tillage soils are drying in the spring, timeliness and soil moisture must be balanced. A useful check for machinery traffic is to dig with a spade to plough depth. If the soil crumbles easily in the hand and feels dry then it probably is safe to work with appropriately tyred equipment. But if it’s very damp there is a damage risk.

On grassland, particularly where contractors are used for silage, management can be difficult, but soil protection must be considered.

Grazing management is also important. While maximising grass in the animal’s diet is important, try to avoid poaching damage at the ‘shoulder’ grazing periods. Short grazing periods, coupled with housing/stand-off pads, good paddock design, and flexible management can all help.

Correcting/reducing soil damage

The first step is to determine whether there is a problem. Digging a number of small inspection holes with a spade to about 30-40 cm depth and examining the soil for compacted plate-like soil layers is best. Dig a similar hole in an uncompacted area in the same field for comparison.

In a tillage soil, any compact layer is usually found just below plough depth, whereas in grassland soils it can be shallower if caused by animal traffic, or deeper if caused by heavy machinery.

Where compaction is found it’s vital to avoid causing further compaction by attending to wheels/tyres, as outlined, and controlling machinery and animal traffic.

The options then are to allow the soil to recover by itself (through swelling and shrinking as the soil wets and dries) or to consider remedial action.

Deep loosening

Soil compaction can be tackled by loosening the soil at or below the depth of compaction. In practice, however, deep loosening or sub-soiling can have serious disadvantages.

To be effective, loosening needs to be carried out when the soil is dry at depth, to ensure that the compacted soil is shattered and not smeared. When loosened, the soil will tend to hold more moisture and is quite prone to recompaction by the next machinery operation, making subsequent management quite difficult.

Considering these risks and the energy required for the operation, sub-soiling should generally only be considered in extreme cases.

In tillage fields, sub-soiling is usually best reserved for compacted headlands, with efforts made to avoid recompacting.

In grassland, the further complications of drought effects following root damage, surface disruption and difficulties with stones also need to be considered. Sub-soiling should only be considered in extreme situations on grassland and possibly as part of a pasture renewal operation.

Shallow spiking of grassland can be beneficial where there is a definite compact layer within 10cm of the surface. However, research has shown this technique to be ineffective as a routine operation or where there is deeper compaction.

While maximising grass in the animal’s diet is important, try to avoid poaching damage at the ‘shoulder’ grazing periods.
BVD — the compulsory screening phase begins

BVD is costing beef producers and processors €102m each year. Compulsory screening is another step towards stamping it out.

Aidan Murray
Beef specialist,
Teagasc Animal & Grassland Research and Innovation Programme

Since the turn of the year, every newborn calf must be tagged and a tissue sample sent to an approved laboratory to test to see if the animal is persistently infected (PI) with BVD. Imported calves born after 1 January 2013 must also be tested within 20 days of arriving in the country. For the majority of herds, calves will come back negative but estimates suggest that between 0.6% and 0.9% of animals will test positive.

If you get a positive result...

Any calf with a positive result should be isolated from other animals immediately. You have an option to re-test the animal three to four weeks after the initial test. This will confirm whether the animal is a PI as opposed to an animal that was only Transiently Infected (TI).

The dam (mother) of the positive calf will be noted on the database (DAMPI) and will have to be tested. If the dam is found to be positive, the grand dam and any of the dam’s offspring (OFFPI) must also be tested.

Cattle born after 1 January 2013 or notified (DAMPI, OFFPI) require a negative test result to be moved except:

- Where being disposed of as animal by-product
- Going for slaughter
- By ministerial permit
- The animal has a compliance certificate

The results from the voluntary phase in 2012, suggested that only 10% of dams of PI calves are, in fact, PI themselves.

The PI calf
A confirmed PI calf will require some tough decisions.

- Some PI calves will be weak and will be prone to pneumonia and scours and will possibly die quite quickly.
- Other PI calves will appear very healthy and the suggestion of putting them down will be contrary to a farmer’s instincts.

But while they may be skipping around the pen they are like little virus factories, continually shedding virus to infect other animals in your herd. This can compromise the immune system of other calves, leaving them more open to scour and pneumonia, causing lack of thrive and increasing mortality. If they are running with your cows around mating time, fertility may be reduced and cows infected in the first trimester of pregnancy will themselves perpetuate the PI cycle.

- The key fact about PIs is that 80% will die before they reach 18 months of age. The risk of holding on to PI calves far outweighs any potential return by trying to hold these animals to finish and it will be virtually impossible to isolate these calves from the rest of your herd.

With older confirmed PI stock such as cows or animals close to finish these can be sent for slaughter in the normal way. But get rid of them as soon as you can after they have been confirmed as PIs.

The message is simple if you have a confirmed PI calf. You should take the hit and put it down.
Feed and fluke threaten flocks

A heavy parasite challenge and low winter forage quality are the two greatest challenges facing pregnant ewes this winter.

Michael Gottstein,
Head of sheep programme, Teagasc, Killarney, Co Kerry

From September last year, Teagasc advisers started to get calls from farmers who had sheep dropping dead with acute fluke disease. Unfortunately, these calls haven’t stopped and lots of sheep are still being lost due to liver fluke.

Now that ewes are entering the final third of pregnancy, careful management is needed to ensure that ewes are receiving adequate nutrition and that any unwanted passengers (fluke, etc.) are removed.

Nutrition

Adequate nutrition in late pregnancy is essential to maintain ewe body condition, produce lambs of adequate birth weight, produce sufficient colostrum and prevent metabolic diseases such as pregnancy toxoaemia (twin lamb disease). In a ‘normal’ year, a standard 18% CP ration fed for the last six or seven weeks would do the trick — but this is not a ‘normal’ year.

Forage quality is hugely variable this year. A Teagasc survey carried out in September of this year (Table 1) demonstrates the range. What is more important, however, is that a significant proportion of silages are in the low 60’s in terms of DMD and, in some cases, even in the 50s. Silages of this quality tend also to be very low in crude protein.

The first step is to have your winter forage analysed — don’t guess, get it tested. For less than €40 a test, you can accurately establish the feeding value of the silage and balance it with the appropriate concentrate type. This will ensure that ewes are adequately fed in late pregnancy and there won’t be any nasty surprises come lambing time.

Case study 1

Farmer A: Tipperary, feeding 200 ewes and has 100 tonnes of the following silage in the pit

- DM: 17.3%
- pH: 4.4
- Ammonia: 7%
- Ash: 8%
- DMD: 75.9%
- Cr protein: 15.8%

This is a top quality silage (very untypical for 2012) with a high digestibility and high crude protein content. Table 2 shows the proposed feeding programme for twin bearing ewes on this farm.

Case study 2

Farmer B: Waterford, feeding 320 ewes and has sufficient round bales for a three-month winter

- DM: 21.3%
- pH: 3.9
- Ammonia: 2.1%
- Ash: 5.9%
- DMD: 61.6%
- Cr protein: 8%

This is a typical silage as seen on
many farms this year. Low DMD and low crude protein will require significant additional concentrate supplementation. However, due to the quantity of concentrate being fed the crude protein level of the concentrate need not exceed 17%.

Table 3 shows the proposed feeding programme for twin bearing ewes on this farm.

Case study 3
Farmer C: Kerry, feeding 190 ewes and has sufficient round bales for a three-month winter
• DM: 41.4%
• pH: 4.9
• Ammonia: 7%
• DMD: 53%
• Cr protein: 8.4%
This is silage that was growing for over three months as the ground was too wet to allow harvesting to take place. It has an extremely low DMD and is marginally above the feeding value of good feeding straw. This silage will have to be supplemented with almost ad libitum concentrates in the final two weeks of pregnancy. However, due to the quantity of concentrate being fed, the crude protein level of the concentrate need not exceed 14%.

Table 4 shows the proposed feeding programme for twin bearing ewes on this farm.

Because of the huge variation in silage digestibility and protein levels, this is a year to forget about blueprints and what you have done in previous years. Every farm will need a nutrition programme that is designed specifically for their type of stock on hand and the quality of the roughages being fed.

Getting late pregnancy nutrition wrong can have far reaching effects not just at lambing time but also affecting lamb growth rate for the rest of the season. For mid-season winter forages analysed and formulate a late pregnancy diet.

Liver fluke control
Having formulated a nutrition programme, it is important that internal parasites do not prevent the sheep from getting access to the nutrients. For mature sheep, the biggest parasite challenge will come from liver fluke. Rumen fluke is a much lesser issue and should only be considered if there is evidence of infection — talk to your vet/adviser.

Correct treatment
One of the major problems being identified is that many farmers are treating their sheep with the wrong product type. There are only six different active ingredients licensed for the control of liver fluke in sheep.

In the late summer to winter period, sheep are actively picking up infective liver fluke larvae off the grass — therefore, the drugs used at this time of year need to be effective against immature fluke and not just the adults. Products that are effective against immature fluke are those containing the following active ingredients;

• Triclabendazole** (examples; Tri-bex, Fasi-nex, Fasi-free, etc.)
• Closantel (examples; Flukiver, Closamectin, Duetech, Supaverm etc.)
• Nitroxynil (TrodaX)
• Rafoxanide, (examples Ridafluke, Flukex, Curaflake, Triazole, etc.)

Products* that are effective against adult fluke only are not suitable for treating sheep that are actively picking up liver fluke. These products* are more suitable to remove egg laying adult fluke in spring/early summer. Active ingredients in this category are:

• Albendazole (examples; Albex, Endospec, Valbazen, etc.)
• Oxyclozanide (examples; Zanil, Levafas Diamond etc.)

*Note: Trade names are given for illustration purposes only and are not an exhaustive list, Teagasc does not promote the use of any particular product nor does the absence of a particular product indicate that it is inferior.

**Parasite resistance has been identified on some sheep farms this active ingredient.

It is important to remember that liver fluke do a lot damage to the livers of infected sheep so appropriate treatment is essential to avoid mortality and sheep with damaged livers that will fail to thrive.
In early December, Heinz Eggert re-calculated the silage demand for the remainder of the winter on Shepland’s Farm, near Naas. He simply multiplied the number of animals by the tonnes of silage needed per month by the number of months. The outcome was a demand for 799 tonnes of silage.

Supply
At that point in time, Shepland’s Farm had the equivalent of 650 tonnes of silage at 20% DM. Heinz also had 43 bales of straw (4x4) equating to 30 tonnes of silage. The silage quality was 22.6% DM, 67% DMD, 10.2% crude protein and good preservation. The shortfall was 799 - (650+30) = 119 tonnes of silage, somewhat less than expected. “With input from Christy (Watson, his Teagasc adviser) I considered the options,” says Heinz.

• Buying silage: Silage was retailing at €27/bale locally. Heinz had some bales analysed. Average silage DMD was estimated to be 65% DMD. At €27/bale, this represented value for money. But, if the quality had been poorer or the price higher than €28/bale, Heinz would have been better off buying meals to fill the gap.

• Buying meals: a good quality high energy (UFL =0.93) and 16% crude protein ration was costing €320/tonne. Ration is consistent in quality and allows predictable performance, relative to silage of dubious/unknown quality.

Buying straw: The table shows the diet of the different batches of cows on the farm. Cows in poor condition are getting 2kg meals plus 40kg silage and 1kg straw. Cows in adequate condition are on restricted silage and 2kg straw to maintain condition. “I don’t want their body condition to drop,” says Heinz. Straw is expensive to balance for energy and protein this year, so its usage was restricted.

• Buying wet feeds: Neither brewers

Table 1: Demand for silage on Shepland’s farm

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of animals</th>
<th>Silage needed per month (t)</th>
<th>Number of months</th>
<th>Tonnes at 20% DM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cows</td>
<td>76</td>
<td>1.4</td>
<td>4</td>
<td>425</td>
</tr>
<tr>
<td>In-calf heifers</td>
<td>19</td>
<td>1.3</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>Weanlings</td>
<td>80</td>
<td>0.7</td>
<td>4</td>
<td>224</td>
</tr>
<tr>
<td>Cull cows</td>
<td>5</td>
<td>1.4</td>
<td>4</td>
<td>28</td>
</tr>
<tr>
<td>Bulls</td>
<td>4</td>
<td>1.4</td>
<td>4</td>
<td>22</td>
</tr>
<tr>
<td>Total needed (T)</td>
<td></td>
<td></td>
<td></td>
<td>799</td>
</tr>
</tbody>
</table>

Table 2: Diet of cows on the farm

<table>
<thead>
<tr>
<th>Group</th>
<th>Animals</th>
<th>BCS/weight</th>
<th>Diet</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13 cows</td>
<td>1.5-2</td>
<td>40kg silage, 2kg meal and 1kg straw</td>
</tr>
<tr>
<td>2</td>
<td>44 cows</td>
<td>2-2.5</td>
<td>38kg silage + 2kg straw</td>
</tr>
<tr>
<td>3</td>
<td>19 cows</td>
<td>2.5+</td>
<td>36kg silage + 2kg straw</td>
</tr>
<tr>
<td>4</td>
<td>19 in-calf heifers</td>
<td>555kg</td>
<td>32kg silage + 3kg straw</td>
</tr>
<tr>
<td>5</td>
<td>Five cull cows</td>
<td>5kg meal plus ad lib silage</td>
<td></td>
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dealing with the fodder crisis

Chris McCarthy, who farms near Crookedwood, Co Westmeath, cut and harvested his main crop of silage on 30 July, a month later than normal. “Most of the silage fields had lodged and one field had a second growth coming up through the original sward,” says Chris. Silage analysis for the first cut was:

- DM percentage: 22.0
- pH: 4.0
- Ammonia % of N: 5.0
- DMD%: 59
- Crude protein: 8.0

Implications of poor quality in silage:

- Low DMD will reduce intake so keep fresh feed in front of animals at all times. Don’t force animals to clean out the feed trough. Feed them every day.
- Low-crude protein levels will mean protein supplements are needed for the dry cow (particularly in the last two months before calving) as well as young stock.
- Supplementation rates must be higher than normal by 1kg to 2kg, for both dry cows and weanlings.

I feed dry cows and weaning heifers for the winter,” says Chris. “Weaning bulls are sold in the autumn and weaning heifers will be sold as yearlings in the spring,” says Chris. “Paul Fox (Teagasc Tullamore) helped me to evaluate my choices.”

Dry cows

Most of the cows were housed as one group. Most of them had a body condition score of approximately 2.5. Condition is being monitored closely on the farm and any changes will be acted on. Protein level is very low in Chris’s silage at 8%. This means that he needs to feed some protein to the dry cows in the eighth and ninth months of pregnancy. Inadequate protein in late pregnancy can lead to problems with calving, weak calves, inadequate colostrum production and poor milk letdown.

Cows will start to calve in February and these early calving cows have been getting 0.3kg of soya bean meal since before Christmas. These animals are getting no additional meals but if cow condition begins to slip, they will get an additional 1kg to 2kg of the barley/soya hulls/beet pulp mix. Seven thinner cows have been pulled out and are being fed 1kg of a barley/soya hulls/beet pulp mix. All of the remaining cows are getting high specification dry cow minerals.

Weanlings

While all male weanlings have been sold, Chris will be selling his heifer weanlings in spring, so he won’t be able to take advantage of compensatory growth next grazing season. Weanling heifers are being offered to buy 10 DMD silage, plus 3kg of meals. Chris and Paul Fox weighed these animals after 50 days in the shed and average daily gain was just 0.26kg/day. The meal feeding rate has been increased to 3.5 kg and protein level in the meals has been increased to 18%.

Key messages

1. Keep a very close eye on cow condition coming up to calving. Where silage quality is below 60 DMD, all cows will require some supplementation, particularly thin cows.
2. Additional protein must be fed to cows where the protein in the silage is less than 9.5% to 10%.
3. For those who have stock going back to grass for a full grazing season, there is scope to reduce supplementation rates before turnout but only if silage intake is good, grassland management is good and performance at grass can be optimised; animals have achieved good performance in the early part of the winter period. If silage quality is very poor, reduce supplementation rates for one month pre-turnout but don’t remove concentrate feeding altogether.

A TEAGASC/IRISH FARMERS JOURNAL INITIATIVE, SUPPORTED BY INDUSTRY SPONSORS:

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When John English was a boy in east Galway, it was taken for granted that the shining silver salmon would return each winter to spawn in the Bunowen river. “I often stood at my elder brother’s side as he skillfully landed fish,” says John, who farms in this part of the Shannon catchment. “But numbers gradually dwindled. It would be great to see them back again.”

The Atlantic Aquatic Resource Conservation (AARC)* project aims to make that happen.

Damage to gravel spawning grounds, nutrient loss from farming and overfishing out at sea interrupted the salmon’s life cycle and the fish neared extinction on some tributaries like the Bunowen.

Today, thanks to the Farm Waste Management Scheme and great care by farmers, pristine waters flow in the river again. But few salmon call them home and, as is well known, salmon return to their place of birth to spawn. So scientists working on the AARC project are assisting salmon to rebuild their populations on this beautiful Shannon tributary.

Before the project began, Teagasc advisers, Inland Fisheries Ireland and UCC environmental and scientific staff held a series of public talks to inform local people what was going on. Farmers and landowners attended in great numbers and, like John English, were hugely enthusiastic about the project.

The AARC project

As part of the project, wild broodstock salmon from the Mulcair (Limerick), Feale (Kerry) and main Shannon (at Parteen) rivers were captured. The fish were kept at ESB’s hatchery facility in Parteen and staff there stripped the fish of eggs under strict bio-security and experimental conditions.

After this harmless process, the eggs were kept separate in the hatchery. Genetic information from the parent fish of all eggs was acquired during the egg collection. The origin of all eggs was known therefore, an important factor in deciding which of these introduced ‘populations’ would be best suited to the Bunowen and Shiven rivers.

When the salmon eggs reached the ‘eyed’ stage of development, roughly 375,000 were placed in artificial redds (salmon ‘nests’) in the upper stretches of the rivers in January 2011. Project staff liaised with landowners who were happy to provide access to the river through their lands to carry out the experimental work.

The eggs hatched out and by April 2011 had colonised the gravels in the river. Over the following months, these salmon ‘fry’ spread out and began to establish their own territories. In August 2011, ‘electro-fishing’ surveys were carried out to assess the survival characteristics of the various salmon populations. Once captured, a piece of fin was taken from the fish for genetic analysis, to establish which population the fish was from.

It usually takes two years in freshwater before salmon parr begin to migrate to sea as ‘smolts’ to feed. To capture this migration, rotary screw traps and a Passive Integrated Transponder (PIT) tag reader was installed at Clonbrock Demense on the River Bunowen.
The screw traps were used to capture a proportion of the smolts migrating downwards. Smolts trapped in the screw traps were again fin clipped and measured and released on their way. The PIT tag equipment involved inserting rows of antennae in the river bed at Clonbrock.

These antennae detected PIT tags which had been inserted into a proportion of salmon smolts. Each PIT tag has a unique code and as the fish pass over the antennae the code will equate to a specific fish, the genetics of which are known from the fin clip.

Surprisingly, the migration of the young salmon smolts took place after only one year in freshwater. This is due to the richness of the feeding grounds in these productive limestone rivers.

Though the project which is nearing completion has proven highly successful, it will certainly take many years before fishing of salmon is possible again on the Bunowen river.

Flooding
Following the flooding in winter 2009, which damaged key gravel beds, Inland Fisheries Ireland began rehabilitation works on the river by creating additional spawning grounds. Ten pools — about 0.5m deep and about one-third of the river wide (6m to 10m long) were created; rocks were added to ensure water was channelled through the pools, keeping them silt free.
**TEAGASC ADVICE**

Teagasc best practice advice to farmers on watercourse management:

- Access for animals and machinery across watercourses should be, as far as possible, by way of a bridge or suitable culverts.
- Do not allow herbicides, pesticides or chemical fertilizers within two metres of watercourses or waterbodies. Check product labels for buffer zones.
- Maintain buffer zones of at least 5m for any drains/streams for slurry, FYM and soiled water.
- When cleaning a channel, remove weeds from the channel bed and one side only. The other bank should be left untouched in that season and, if possible, permanently.
- In fish-bearing streams, cleaning should be kept to a minimum. Where it has to be done, it should be done between mid-May and mid-September to protect fish eggs and small salmonids. It is an offence under the Fisheries Acts to disturb the bed and gravel during the autumn or winter where fish may spawn or have already spawned.
- If, for any reason, you need to drain any permanently wet channel more than one metre wide during the autumn or winter, you must consult your local Inland Fisheries Board (see www.fisheriesireland.ie for more information).
- No cleaning works in the Fishery Closed Window which is October to May inclusive. Remove only necessary silt (do not remove stony material or gravel). Place spoil on bankfull line, and not on the bank slopes. Leave bank slopes intact with a margin of vegetation retained.

Some Irish salmon travel as far as Greenland and the Faroe Islands to feed. Adults then return to spawn in the same river stretches where they first hatched.
‘Planting trees? I’d never see any benefits other than the premium!’

John Casey
Teagasc forestry development officer, Mallow, Co Cork

Our headline is the view of many farmers but what they fail to realise is that trees in Ireland, particularly conifers, grow faster than almost anywhere else in Europe. Forestry crops are ready for thinning, the first harvest, in a relatively short period of time. A case in point is the farm forestry plantation of James O’Sullivan, Clara, Millstreet, Co Cork.

In 1989, James’ late father, Matthew, was part-time farming 34 hectares (ha) outside Millstreet, Cork, rearing beef cattle. James encouraged his father to plant 10.5ha of marginal agricultural land away from the farm. Matthew was wary due to the permanency of the land use change but felt, on balance, that land was “of no other use”. James admits that they were looking no further than the grant at the beginning when they planted the Sitka spruce crop.

With advice from the original forestry company, SWS Forestry, and Teagasc, James decided that the 1989 crop was fit for thinning in 2010. It was sold standing and bought by Grainger’s Sawmill of Enniskeane, Co Cork. Approximately 350 tonnes of thinnings were harvested at €11/tone.

There was already good access to the forest site, with a barrier in place. To control how much timber was leaving the site, James had the haulage contractor ring him 30 minutes in advance to open the barrier for each of the 14 loads. Leaving the site, James had the haulage contractor ring him 30 minutes in advance to open the barrier for each of the 14 loads. The successful and profitable thinning of his first crop prompted James to consider further planting. I walked his farm in 2010 and we went through the various planting options. The proposed new planting area was nearer the farmyard and James felt that he would prefer broadleaves close to the house and because of the higher premium attached to broadleaves.

James planted 5.6ha and 4.5ha of respectively. Collectively, the afforested land earns James in excess of €5,000 per year in premium. “My only regret is that I didn’t plant more 20 years ago,” he says.

Note: An afforestation grant is available to cover the establishment of the forest. Seventy-five per cent is payable after planting with the balance paid four years later. Grants range from €2,400/ha to a maximum of €5,500/ha, depending on species and land type. Premia for enclosed land range from €427/ha to a maximum of €615/ha dependent on tree species, land type, area planted and farmer status.

For further information, contact your local Teagasc forestry development officer or visit www.teagasc.ie/forestry

Ash dieback (Chalara)

On 12 October, the Department of Agriculture, Food and the Marine (DAFM) announced the first finding of Chalara fraxinea in Ireland. Ash dieback has spread rapidly across Europe. The disease can be fatal, particularly among younger trees. Spores from Chalara fraxinea are wind borne and are produced from June to September.

What does it look like?
Symptoms include:

• Foliage wilt: black/brown leaves may be retained;

• Shoot dieback with brownish to orange discolouration, often multiple shoots; and,

• Elongated angular stem lesions, often diamond-shaped.

Report (with photographs, if possible) any sites where you have concerns about unusual ill health in ash, to the Forest Service, Department of Agriculture, Food and the Marine: by email (forestprotection@agriculture.gov.ie); or, by phone (01-607 2651).

Do not remove any plant material from a site containing suspect trees.

Where the disease is suspected:

• Footwear: wash off all soil and plant debris from boots. Spray your boots with disinfectant and dispose of any used water onto an area where the water will not run into a watercourse;

• Clothing: check all clothing for any plant material; and,

• Tools and equipment: wash off all soil and plant debris, and disinfect and dispose of any used water onto an area where the water will not run into a watercourse.
Botanic Gardens

A career in horticulture?

If the science of plants and how they grow appeals to you, if you are creative and like hands-on practical application, then maybe you should consider a degree in horticultural science, writes Pat Leonard, Teagasc College of Amenity Horticulture.

The Teagasc College of Amenity Horticulture, based at the National Botanic Gardens, Glasnevin, Dublin, provides the widest range of horticultural training in the country offering courses at levels 4, 5, 6, 7, and 8 on the National Framework of Qualifications (NFQ).

Our classroom is not confined by four walls but includes the entire grounds and vast plant collection of this great garden. Students have been trained in Glasnevin since 1838 and facilities today are state-of-the-art. The college is expanding and upgrading teaching facilities which will benefit students applying now.

Horticulture encompasses topics as diverse as feeding a growing world population, protecting our natural environment and preventing loss of biodiversity. Production of fruit and vegetables is important for our health; creating gardens, parks, golf courses and football pitches is important for our leisure and recreation. Both are important for our well-being.

The college offers two separate degree programmes.

Bachelor of Science in Horticulture Level 7

This is a three-year, full-time programme offered in collaboration with Waterford Institute of Technology (WIT) but with all course work entirely based and delivered at the Botanic Gardens. Application is through CAO (the course code is WD047). This entry route includes both school leavers (210 Leaving Cert points in 2012), and those who have achieved a particular standard on a FETAC Level 5 horticulture course.

The Level 5 results can be ‘converted’ to points. The college also offers a one-year Level 6 Certificate in Horticulture course.

This ordinary level degree has become the standard entry requirement for the vast majority of horticultural technical and management occupations. The degree course combines scientific horticulture and business management. It offers elective subjects in both second and third year which allows students to tailor their degree towards their own interests or possible future career choices, especially when combined with their work placement period with a Teagasc approved host.

BSc in Horticulture (Bachelor Honours Degree) Level 8

The college and Dublin City University (DCU) have collaborated to offer this new, four-year, full-time Honours Degree in Horticulture. The course is held both on the DCU campus and at the nearby college at the National Botanic Gardens.

The aim is to combine the academic resources of DCU’s Faculty of Science and Health with the horticultural knowledge and expertise of the college and the extensive plant collections, research projects and worldwide network of contacts of the National Botanic Gardens.

Entry is through CAO with course code DC170 and 380 points were required last year.

Teagasc Kildalton College also offers both a Certificate in Horticulture Level 5 course and a Bachelor of Science in Horticulture Level 7 degree in association with WIT.

Further careers information may be found at the following URLs:

- Teagasc College of Amenity Horticulture: www.teagasc.ie/botanicgardens
- National Botanic Gardens: www.botanicgardens.ie
- Waterford Institute of Technology: www.wit.ie
- Dublin City University: www.dcu.ie

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