Smart Farming

A Guide to Help Improve Farm Returns with Better Resource Management

Feed costs are the biggest cost on livestock farms. These top tips will assist you get the best from your feed and help deliver higher returns.

Keep Livestock on Grass Longer - It's the Cheapest Feed!

€ Each extra day at grass can reduce milk production costs by 0.16c/l[1] and is worth €1.54 per suckler cow/day[2]

Feeding good quality grazed grass is almost four times cheaper than concentrates

Table 1: Cost of Feedstuff Types[3]

Feedstuff	Cost (c/kg utilisable Dry Matter)
Concentrates	30+
2nd cut silage	17.4
1st cut silage	16.5
Kale	17
Maize silage	15
Grazed grass	8

Grass growth and use is largely dictated by prevailing weather conditions, therefore cost savings will vary with soil conditions and rainfall. However, in general feeding good quality grazed grass is almost four times cheaper than concentrates.

Suitable soil conditions may allow you to consider extended grazing.

Reseed – It Increases Grass Yield and Performance!

€ Reseeding 10% of the farm each year will increase net profit by 1.2c/l[4]

Perennial ryegrass delivers highest yields across all soil types. Aim for 65% perennial ryegrass in swards. Grass breed selection and yields are impacted by soil conditions. Correct soil fertility and pH levels are essential for good sward establishment. The optimum range for soil pH levels for perennial ryegrass is 6.2 to 6.7.

Know your silage quality – Poor silage means higher meal bills!

€ Concentrate feed costs for in-lamb ewes increases by 8% for each 1% fall in silage DMD[6]

€ Concentrate feed requirements for dairy cows increase by 4% for each 1% decline in silage DMD

Increased DMD increases the amount of energy available from silage and leads to improved animal performance in terms of milk yield and body weight gain.

Table 2: Comparison of the value per tonne of DM of silages of varying quality

Silage	Dry matter digestibility %	Net energy value per kg dry matter (UFL)[7]	Value per tonne DM
Grass silage	78	0.87	216
Grass silage	72	0.81	175
Grass silage	70	0.78	155
Grass silage	68	0.75	140
Grass silage	60	0.66	100

Adapted from S. Kavanagh 2012[8]

A silage analysis costs approximately €35. This is equivalent to approximately 95 kg of concentrates[9]. Poor silage quality is characterised by low DMD. Delayed harvesting has a major influence on silage quality. While there will be increased yield it will result in more of the silage passing through the animal undigested.

Each 1 unit increase in silage dry matter digestibility will increase carcass gain by 24g per day in finishing beef cattle[10]. For example, increasing your silage DMD from 60% to 70% will increase carcass gain by 250g/day

Know Your Ration

High protein does not mean high energy

The protein value of any feedstuff is best measured by the quantity of protein that is absorbed by the animal, not what the animal consumes

The cheapest ration does not mean the best value.

Rations should be bought firstly on the basis of their energy content, next protein, then minerals and finally fibre. If livestock are not performing well, (losing body condition or low milk proteins), then the problem is usually a lack of energy. This is generally the most limiting nutrient in grass based livestock diets.

Ingredients in rations are listed in order of decreasing inclusion level although the quantities included are not listed. Anything listed below molasses is making a minimal contribution to the ration.

Good Energy Sources in Rations

Top quality energy sources include barley, wheat, distillers grains, maize and beet pulp.

Know the energy value in feedstuff by looking at the net energy value which is expressed in terms of feed units (UF). In most feeding systems the net energy value is known as UFL, for intensive finishing cattle it is UFV. Barley is the standard feed in this system and all other feeds are given values relative to barley, which has UFL of 1.0 on a fresh weight basis. [11]

Good Protein Sources in Rations

Top quality protein ingredients include soyabean meal (the best protein source) distillers, rapeseed meal and more limited availability ingredients like peas and beans.

The protein value of any feedstuff is best measured by the quantity of protein that is absorbed by the animal, not what the animal consumes. Protein that is absorbed into the animal comes from bacterial protein in the rumen and protein that passes through the rumen undegraded. Each feed you purchase will have two protein values PDIN and PDIE.[12] The lower of the two values is the actual protein value of the feed.

Table 3: Energy and Protein values of Dry Feeds

	Energy	Protein		
Dry Feeds	**UFL (per kg DM)**	**CP g/kg**	**PDIN g/kg**	**PDIE g/kg**
Barley	1.0	98	64	89
Distillers grains	1.02	266	178	119
Rapeseed meal	0.91	338	219	130
Citrus pulp	1.0	60	40	80
Wheat Feed	0.76	87	101	79
Sunflower	0.56	246	159	89
Palm Kernel	0.80	171	136	148
Soya	1.01	481	342	232
Soya hulls	0.92	105	68	94
Maize	1.05	87	71	103
Beet pulp	1.00	88	56	97
Maize gluten	0.90	203	137	108

Buying rations containing feedstuffs with the highest UFL represents better value per tonne. You are buying more energy. Ask your feed merchant for a list of the feedstuffs and the quantity of each per tonne.

Remember the cheapest ration does not always represent the best value.

Correct Mineral Deficiency

Severe mineral deficiency will reduce animal performance.

Reduced fertility and increased disease incidence can also occur.

Step 1: Identify Mineral Deficiency

While the identification of a mineral deficiency can be quite difficult and often symptoms overlap between different minerals, items to consider include:

1. History of the farm – Have deficiencies occurred in the past?
2. Clinical signs – These may include reduced growth, infertility, drop in milk yield, and reduced litter size.
3. Soil test – Are mineral levels in the soil low or does the soil contain high levels of antagonists which bind to a mineral making it unavailable to the animal?
4. Feed test – This is the source of minerals for your animals.
5. Blood or tissue tests – Should only be used in combination with the above approaches.

Step 2: Select Correct Supplementation Option

The second step is to decide the best supplementation option for your farm?

1. Top dressing pasture
2. Supplementation through the water system
3. Top dressing silage
4. Incorporation into concentrate feeds
5. Injectables, drenches and boluses
6. Free access mineral supplements

When developing a mineral supplementation programme, obtain independent expert advice and consider the cost, ease of use and uniformity of supplementation.

Prepare a Feed Budget

A feed budget is an essential management tool on livestock farms.

During the grazing season budgets can change on a weekly basis due to the dynamic nature of grass growth. Weekly grass measurements and grass budgets should be considered in order to assess the quantity of feed available on the farm. This will allow you to make decisions in advance of periods of deficit or surplus.

Fodder planning - Estimate your winter feed requirements against your winter feed supply[13]

STEP 1 – Calculate winter fodder required

Pit silage

Stock Type	No. of animals (a)	No. of winter months (b)	Pit silage needed/ month (c)	Total tonnes (a x b x c)
Dairy cows (dry)			1.3 – 1.4	
Dairy cows (milking)			1.6	
Dairy in-calf heifers			1.3	
Suckler cows			1.4	
Store (500kg)			1.3	
Weanling			0.7	
Ewe			0.17	
Other				

A = tonnes of pit silage required

Bale silage

Stock Type	No. of animals (a)	No. of winter months (b)	No. of bales/month (c)	Total no. bales (a x b x c)
Suckler cows			2	
Finishing beef			1.7	
Store (500kg)			1.9	
Weanling			1.1	
Ewe			0.2	
Other				
Total no. of bales				

B = Tonnes of bale silage required = no. of bales X 0.61 [14]

Total fodder required (tonnes) = A+B

STEP 2 – Assess the quantity of fodder available

This requires calculating the quantity of silage in the pits and in bales. Remember to include bales of hay, straw and any other fodder you have on the farm.

Measure all silage pits in metres – multiply the length X breath X average settled height = volume of silage in m^3. To convert from volume in m^3 to tonnes apply the conversion factors in the table below.

No. of silage pits	Length (metres) (a)	Breath (metres) (b)	Average height (metres) (c)	Volume m^3 = a x b x c	Convert m^3 to tonnes x by 0.77 @20% DM x by 0.69 @ 22% DM x by 0.68 @ 25% DM x by 0.61 @ 30% DM	Tonnes corrected to tonnes of grass silage at 20% DM[15]
Silage Pit 1						
Silage Pit 2						
Silage Pit 3						
C = Total tonnes of pit silage (corrected to tonnes of silage equivalent at 20% DM) =						

Other fodders such as hay and straw can be converted from bales to tonnes of silage equivalent (@20% DM) to determine your total fodder supply in tonnes.

Bales 4x4	No. of bales (a)	Weight per bale tonnes (b)	Factor used to convert to the equivalent tonnes of grass silage at 20% DM (c)	Total feed supply (equivalent to grass silage at 20% DM) = (a x b x c)
Grass silage @ 30%DM		0.6	1.5	
Grass silage @ 25%DM		0.7	1.35	
Hay bales @ 82% DM		0.24	4.1	
Straw bales @ 88% DM		0.15	4.4	
D = Total tonnes of bales corrected to tonnes of silage equivalent @20% DM =				

Total fodder available = C + D	

STEP 3 - Calculate fodder surplus or deficit

To determine if you have a surplus of deficit of fodder, subtract your tonnes of fodder required calculated in STEP 1 from your tonnes of fodder available calculated in STEP 2.

Deficit/Surplus = (A+B) – (C+D) =	**Tonnes**

Footnotes

1. Läpple, D., Hennessy, T. and O'Donovan, M. Extended grazing: A detailed analysis of Irish Dairy farms. Journal of Dairy Science, 95:188–195.
2. O'Donovan, M., Hennessy, D. and O'Riordan, E. 2011. Potential of Grass for production and Cost Savings. Proceedings of Teagasc National Beef Conference 2011.
3. Teagasc Grange 2013, Grange Feeding Cost Model (GFCM).
4. Shalloo, L., Creighton, P. And O'Donovan, M. 2011. The economics of reseeding on a dairy farm. Irish Journal of Agricultural and Food Research, 50: 113-122.
5. Keady, T.W.J, Hanrahan, J.P., Marley, C. And Scollan, N.D. 2013. Production and utilization of ensiled forages by beef cattle, dairy cows, pregnant ewes and finishing lambs. A review. Agriculture and Food Science, 22:70-92.
6. DMD = dry matter digestibility.
7. Barley is the standard feed in the net energy system adopted in Ireland and all other feeds are given values relative to Barley. Standard barley has a net energy value of 1 UFL or 1UFV per kg fresh weight.
8. Kavanagh, S. 2012. Facing the Fodder Challenge 2012. http://www.teagasc.ie/publications/2012/1581/LMC_SKavanagh.pdf
9. At a cost of €410 per tonne.
10. Keady, T.W.J, Hanrahan, J.P., Marley, C. and Scollan, N.D. 2013. Production and utilization of ensiled forages by beef cattle, dairy cows, pregnant ewes and finishing lambs. A review. Agriculture and Food Science, 22:70-92.
11. S. Kavanagh and J. Murphy. 2000. Winter Feeding for Spring and Autumn Herds. National Dairy Conference Teagasc.
12. PDIN and PDIE, the quantity of protein made by bacteria in the rumen or first stomach is dependent upon the supply of nitrogen and energy. If there is a limited supply of nitrogen the protein value is called PDIN. If there is a limited supply of energy the protein value is called PDIE.
13. Based on Teagasc Advisory Fodder Shortage Worksheet 2012 by Siobhan Kavanagh.
14. Average weight of a silage bale taken at 600kg/bale.
15. To convert tonnes of silage to tonnes of silage equivalent at 20% DM where you have differing silage dry matter you need to multiply by the following conversion factors –
    Silage DM @ 20% multiply by tonnes by 1.0;
    Silage DM @ 22% multiply tonnes by 1.1;
    Silage DM @ 25% multiply tonnes by 1.25; and
    Silage at 30% DM multiply tonnes by 1.5.