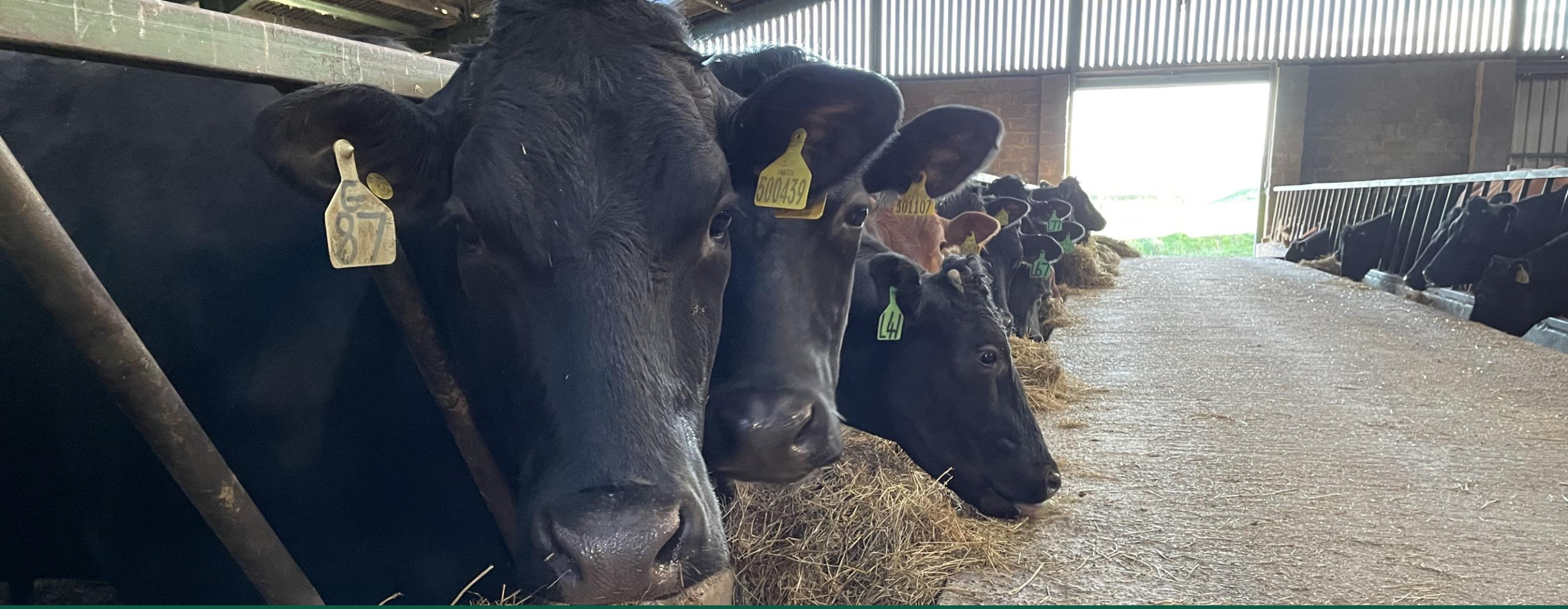

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QMS Dumfries Monitor Farm – Forage and Feed Budgeting Workshop

Lorna Shaw – 27th November 23

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Silage Analysis

Feeding Value

Determination	Result	Units	Low — High
# Dry Matter	348	g/kg	
# D Value	73.9	%	
ME	11.8	MJ/kg DM	
# Crude Protein	143	g/kg DM	
# NDF	394	g/kg DM	
# SIP	113	gDM/kgLW^0.75	
Sugars	80	g/kg DM	
Ash	92	g/kg DM	
Oil	34	g/kg DM	

Fermentation Characteristics

Lactic Acid	88.2	g/kg DM	
*VFA	24.3	g/kg DM	
PAL	795	Meq/kg DM	
pH	4.1		

*graph as a proportion of total acid

Degradability Characteristics

	s	a	b	c
Dry Matter	0.31	0.31	0.69	0.038
Nitrogen	0.66	0.69	0.26	0.084

The above silage results were produced using the Forage Assurance Analysis Models on fresh silage material.

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Other Examples…

Sample Details

Lab Reference:	FRG1402887	Description:	HOME FARM CLAMP GRASS	Date Cut:	10/06/2015
Sample Type:	Silage - Grass Clamp	Cut Number:		Sample Received:	04/02/2014

Energy		Analysis	Low	Standard	High
D Value	%	76	64	72	80
ME	(MJ/kg)	12.1	10.3	11.6	12.9
FME	(MJ/kg)	8.7	7.5	8.5	9.5
NDF	(g/kg)	468	450	550	650
ADF	(g/kg)	315	300	400	500
Ash	(g/kg)	67	50	100	150
Dry Matter Solubility (S)		0.27	0.13	0.36	0.49
(a)		0.34	0.13	0.41	0.54
(b)		0.57	0.12	0.55	0.67
(c)	(per hour)	0.035	0.020	0.061	0.078

Intake Characteristics		Analysis	Low	Standard	High
Dry Matter	(g/kg)	248	250	350	450
Potential Intake (FiM)	(g/kgW 0.75)	112	70	110	130
pH		4.0	3.7	4.2	4.7
Ammonia N	(% of total N)	7.6	4.0	7.0	10.0
Pot. Acid Loading (FiM)	(meq/kg)	1097	750	900	1200

Protein		Analysis	Low	Standard	High
Crude Protein	(g/kg)	134	110	150	190

Analysis (Dry Matter)	Unit	Result	Low	High
Dry Matter	%	65.3		
Protein	%	11.3		
D Value	%	65.4		
ME	MJ/kg	10.5		
pH		5.5		
Ammonia N as % Total N	%	2.1		
Sugars	%	9.7		
Ash	%	6.9		
NDF	%	47.8		
ADF	%	29.8		
Oil B	%	3.5		

Crude Fibre: 24.4%; Lignin: 23.0g/kg

FiM Metabolisable Protein

MPB	g/kg	18.4	
MPN	g/kg	75.1	
MPE	g/kg	85.9	

Protein: s= 0.66; a= 0.69; b= 0.26; c=0.084 Dry Matter: s= 0.31; a= 0.31; b= 0.69; c=0.038

Fermentation Characteristics

VFA's	g/kg	14.3	
Lactic Acid	g/kg	5.0	
Intake	g/kg	136.1	
Rumen Stability Value		321.6	
FiMPAL	meq/kd	449.9	

Comments: 2nd Cut

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Estimating Dry matter %

- Liquid easily squeezed out by hand <20%DM
- Liquid squeezed out but takes more effort 20–25%DM
- Very hard to get any liquid out but hands feel wet >25%DM
- Can you form a ball with it, how does it hold it's shape?
- How spikey is it in your hand – rougher it is the lower the energy

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Visual Assessment

Fermentation	Visual Signs
Very good	Yellowish / khaki colour, nice vinegary/acidic smell, firm texture
Butyric	Dark green – black colour, putrefactive (ammonia) smell, wet slimy texture
Over heated	Dark brown – black colour, burnt caramel to tobacco smell, dry disintegrating texture
Mouldy	Dark brown with white patches, musty smell, dry disintegrating texture

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Dealing with mouldy silage

- Keep pit face clean using shear grab
- Move across the pit every 2-3 days ideally
- Clostridia bacteria
- Bacillus Licheniformis
- Listeria bacteria
- Establish worse affected bales and avoid feeding to pregnant or lactating animals
- Dilute with better forage if it must be used
- Don’t feed mouldy silage
- Remove refused silage to avoid build up of spoiled material

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Forage Digestibility

1 MJ = 240kcal = 1 Cadburys Dairy Milk Bar!

High ME silage
= 11.5-12 x

Average hay
= 9 x

Straw
= 6 x

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Forage Assessment Exercise

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What is feed budgeting?

A feed budget allows you to quantify exactly how much forage and feed you have available on the farm against feed requirements for stock.

What you need to feed budget:

- Forage analysis
- Pit Dimensions (w, b, h) or Bales Numbers
- Record of stock needing fed.
- Rations

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Why is it important to feed budget?

1. Peace of mind that on-farm supply meets demand.

2. Allows early detection of potential pinch points allowing early intervention.

3. Reduces the risk of sudden diet change, shortage or expensive feed purchased later in the season.

4. Allows you to make the best use of on-farm resources; i.e. Forage, cereals, forage crops etc.

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How do I feed Budget: Pit

Step 1: Calculate Clamp Volume

Pit: (pit length × pit breadth × pit height) = Total Volume (m^3)

– don't forget to add a ramp if there ((l×b×h)/2))

Step 2: Calculate Fresh Weight Available

Volume × Density / 1000 = FW (kg)

Step 3: Calculate Dry Matter Available

FW (kg) × Dry Matter (%) / 100

Step 4: Calculate Demand

No of stock × DM Consumption × Days Feeding

Step 5: Calculate Shortfall or Surplus

DM Available – DM Demand

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Pit Density

*Density Table (tonnes fresh weight per cubic metre)

DM (%)	Clamp height (m)			
	2	**2.5**	**3**	**4**
20	790	840	890	950
25	690	730	780	830
30	620	660	690	740
35	570	600	630	670
40+	520	550	570	610

Note – Crop bulk density is similar for grass, wholecrop and maize silage. Bulk densities are a guide, which also depends on level of silage compaction, chop length and fibre content.

Source: Farm Advisory Service

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How do I feed Budget: Bales

Step 1: Calculate Fresh Weight Available

Number of Bales × Bale Weight (kg) = Total FW (kg)

Step 2: Calculate Dry Matter Available

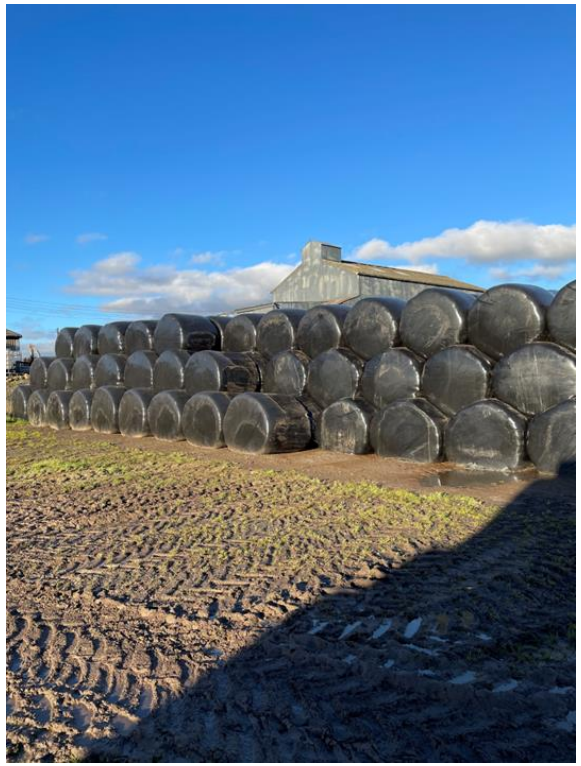
FW (kg) × Dry Matter (%) / 100

Step 3: Calculate Demand

No of stock × DM Consumption × Days Feeding

Step 4: Calculate Shortfall or Surplus

DM Available – DM Demand



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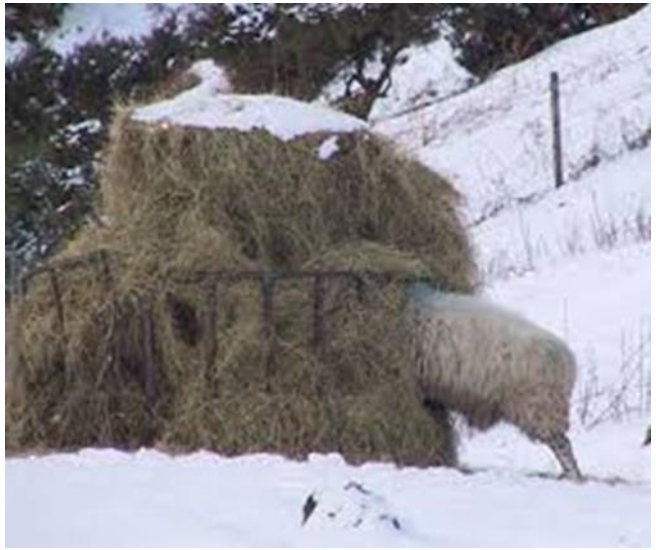
Consider Forage Wastage

Silage waste can limit DM available on farm wastage is predicted to be around:

- 10% while housed
- 20-30% while grazing with ring feeders



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Options to consider if short

1. Can additional forage be harvested without compromising grazing availability?

2. Source alternative feed or forage.

3. Can Youngstock be finished quicker or sold store before housing?

4. Sell any passengers: breeding not being kept as a replacement? or cows not meeting performance goals.

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Targeting forage

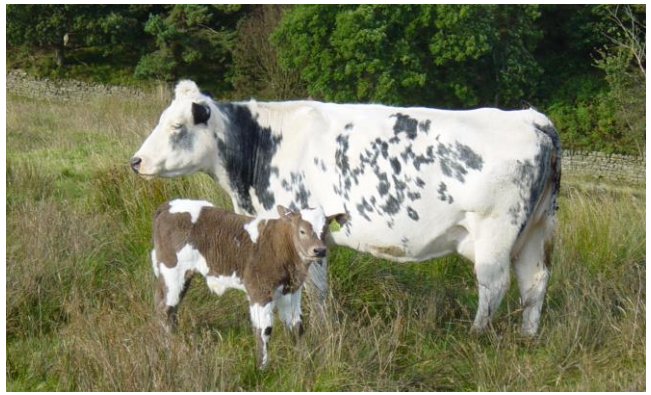
Match what you've got to what animals need

Best stuff should go to

- suckling cows (autumn 1st, then spring)
- replacement heifers & 1st calvers
- finishing stock
- weaned calves or stores

Lower quality stuff can go to

- dry spring calvers (esp. fat ones)
- other stock



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Predicting Intakes

Stock Class	Dry Matter Allocation (% body weight)
Dry, mid pregnancy	1.5
Lactating suckler cows	2-2.5
Growing cattle/heifer replacements	2.5
Finishing cattle	2

Example:

700kg dry suckler cow
=10.5kg DMI

700kg Lactating cow
=14kg DMI

550kg Finisher
= 11kg DMI

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Energy Requirements – Rules of thumb for cattle

- Energy for maintenance = 10% of bodyweight + 10MJ

- For example:
- 650 kg suckler cow = 75 MJ
- 700kg suckler cow = 80 MJ

- Pregnancy +15MJ in last 8 weeks
- Lactation 5MJ per litre of milk
- Growth around 45 MJ per 1kg/day

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Meeting Requirements

- Depending on quality of forage:

Fed adlib:

- High quality silage will provide around **110MJ**
- Poor quality silage will provide around **80MJ**
- Average Hay **80MJ**
- Straw **50-60MJ** (needs protein to go along with it – adlib straw cannot be fed alone)

- In lactation, poor forages will need supplementing with concentrates (quantity depends on the forage) average silage 1-2kg, poorer silage 3-4kg

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Protein requirements for suckler cows

- Spring calvers 9% CP when dry
- Autumn calvers 12% CP when suckling
- Many grass or silage-based diets will supply this with minimal supplementation – very poor silages won't and some rough hill grazing won't - check what cows are telling you (BCS, dung, behavior)
- Be careful when adding in straw to the mix….

Example work out – quick and easy check

700kg cow

8wks from calving (assume 90MJ required)

Silage and straw fed

25kg silage 3kg straw (silage is 25% DM, 110g/kgDM crude protein and 10MJ/kgDM ME.

Dry matter

25kg x 0.25 = 6.25kg DM of silage

3kg x 0.86 = 2.58kg DM of straw

8.83kgDM (slightly on low side – aim 1.4-1.5% of body weight when dry)

Energy (6.25kg x 10ME = 62.5MJ) + (2.58kg x 6ME = 15.48MJ)

Total = 77.98MJ (low side are cows fit? – discuss condition)

Protein (6.25kg x 110g = 687.5g) + (2.58kg x 30g = 77.4g)

Total = g protein (divide by kg of dry matter intake (8.83kg) = 86.6g/kgDM (8.66%)

Minimum advised is 9% CP

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Growing and finishing cattle

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Stores and Finishers

Requirements are for **maintenance** and **growth** of lean (protein) and fat:

- Stores: maintenance + 0.7 to 0.9kg/d
- Finishers: maintenance + 1 to 1.4kg/d
- Intensive beef: maintenance + 1.5kg/d

Required lifetime daily liveweight gain depending on target slaughter age

Target Age at Slaughter (Months)	Required Daily Live Weight Gain (Lifetime)*
12	1.6 kg
13	1.5 kg
14	1.4 kg
16	1.2 kg
18	1.1 kg
21	0.9 kg
26	0.7 kg

*Assuming birthweight at 40kg and slaughter weight at 625kg.

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Youngstock rules of thumb

- Diet should have a minimum of 40% of dry matter as long forage for rumen function unless they are on an intensive ration
- A maximum of 0.5kg/100kg LW of starchy feed should be fed per meal
- Keep crude protein of the ration 140g/kgDM (14% in the dry matter) for a few weeks post weaning (good quality protein) then can reduce to minimum of 120g/kgDM (12% in DM)
- Know the quality of the forage, weight of animal and liveweight gain target expected to work out how much concentrates to give – feeding system will also come into this as well

Rule of thumb:- maintenance is around 10% of LW + 10MJ and to gain 1kg LW needs around 45MJ energy

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Predicting Intakes For Ewes

- Predicted ewe dry matter intake

	% of body weight	For 70kg ewe (kg/day)
Dry, post weaning, early/mid pregnancy	1.50	1.05
Late pregnancy	2.00 - 2.50	1.45 - 1.75
Early lactation	3.50+	2.45

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Estimating DMI from Forage

Forage	Forage ME (MJ/kg DM)	Pre-lambing week 12-3 (% LW)	Pre-lambing week 3-0 (% LW)	Lactation week 0 – 3 (% LW)
Straw	6.5	1.0	0.8	n/a
Average hay	8.5	1.5	1.1	1.2
Good hay	9.5	1.8	1.4	1.5
Poor silage	9.5	1.4	1.2	1.3
Good silage	10.5	1.6	1.4	1.6
Very good silage	11.5	1.8	1.7	1.8

AHDB Feeding the Ewe, Table 3, Pg 11.

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Current Lamb DM Intakes Predictions

- Course Diets (Diets containing long or chopped forage)

= 2.4% BW

- Fine Diets (concentrate or ground and pelleted forage)

= 3.9% BW

- Silage only

= 2% BW

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"The Pit is full!"

Dry Matter (%)	25	27	29	31	33	35
Kg Dry Matter in 1m³ (kg)	165	173	181	189	197	205
Energy ME in 1m³ (MJ)	1733	1817	1901	1985	2069	2153
Crude Protein in 1m³ (kg)	19.8	20.8	21.7	22.7	23.6	24.6
Animals Fed/ m³ (300kg Steer)	40.7	42.7	44.7	46.7	48.6	50.6

Note: Silage Analysis ME = 10.5 MJ/kg DM, CP 120g/kg DM. Assuming 60% DMI from forage in the ration. (based on a 300kg steer eating 4.05kg DM/day from forage and 2.7kg DM from concentrate to achieve 1kg/day LWG).

When looking at the number of animals fed per cubic meter of forage, we can see that for every 1% increase in dry matter, we gain an extra animal fed/day. Intakes may vary depending on silage quality with poor-quality forage reducing intake.

Just because "the pits are full" doesn't necessarily mean there is the same amount of feed as last year.

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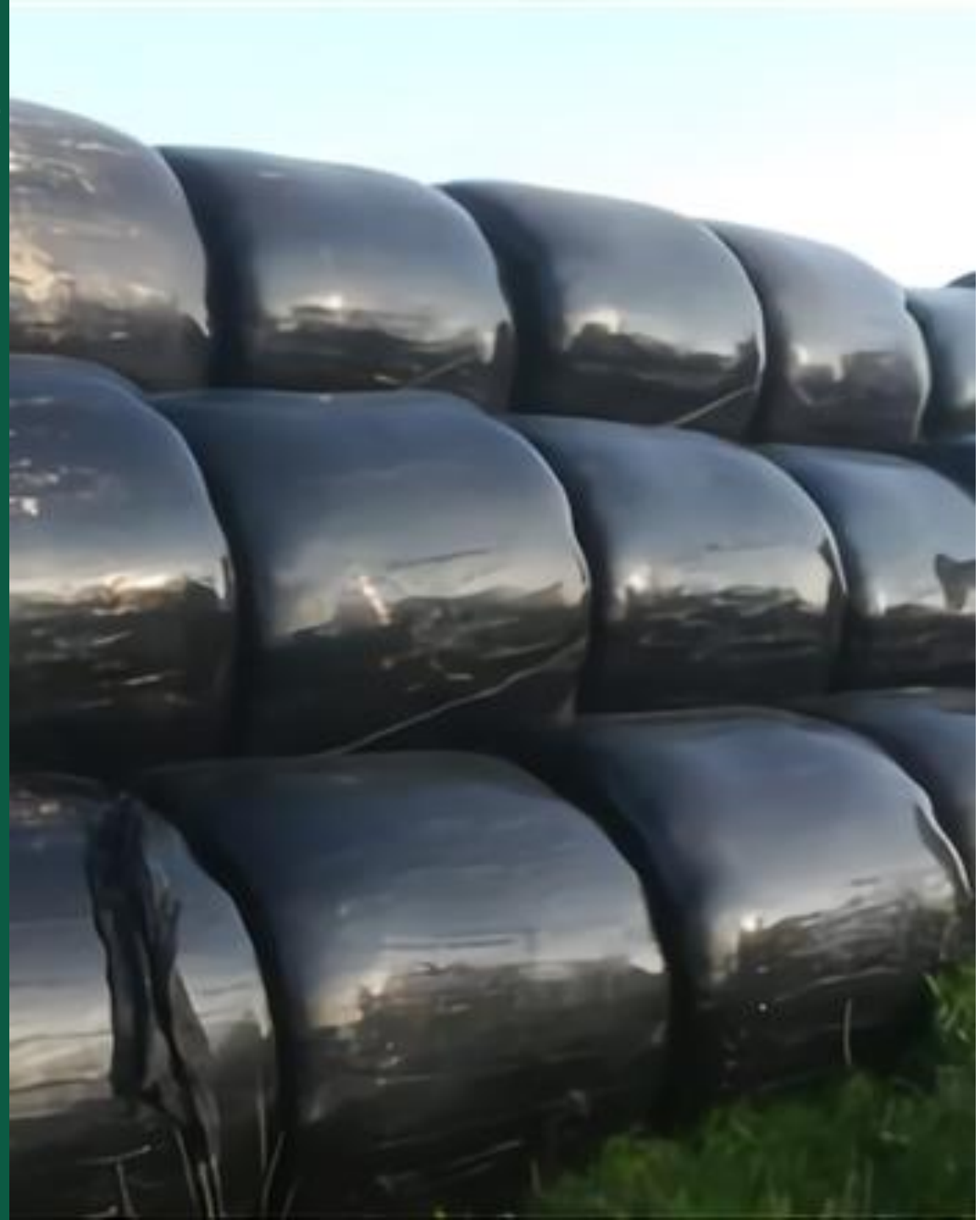

Feed Budgeting Exercise

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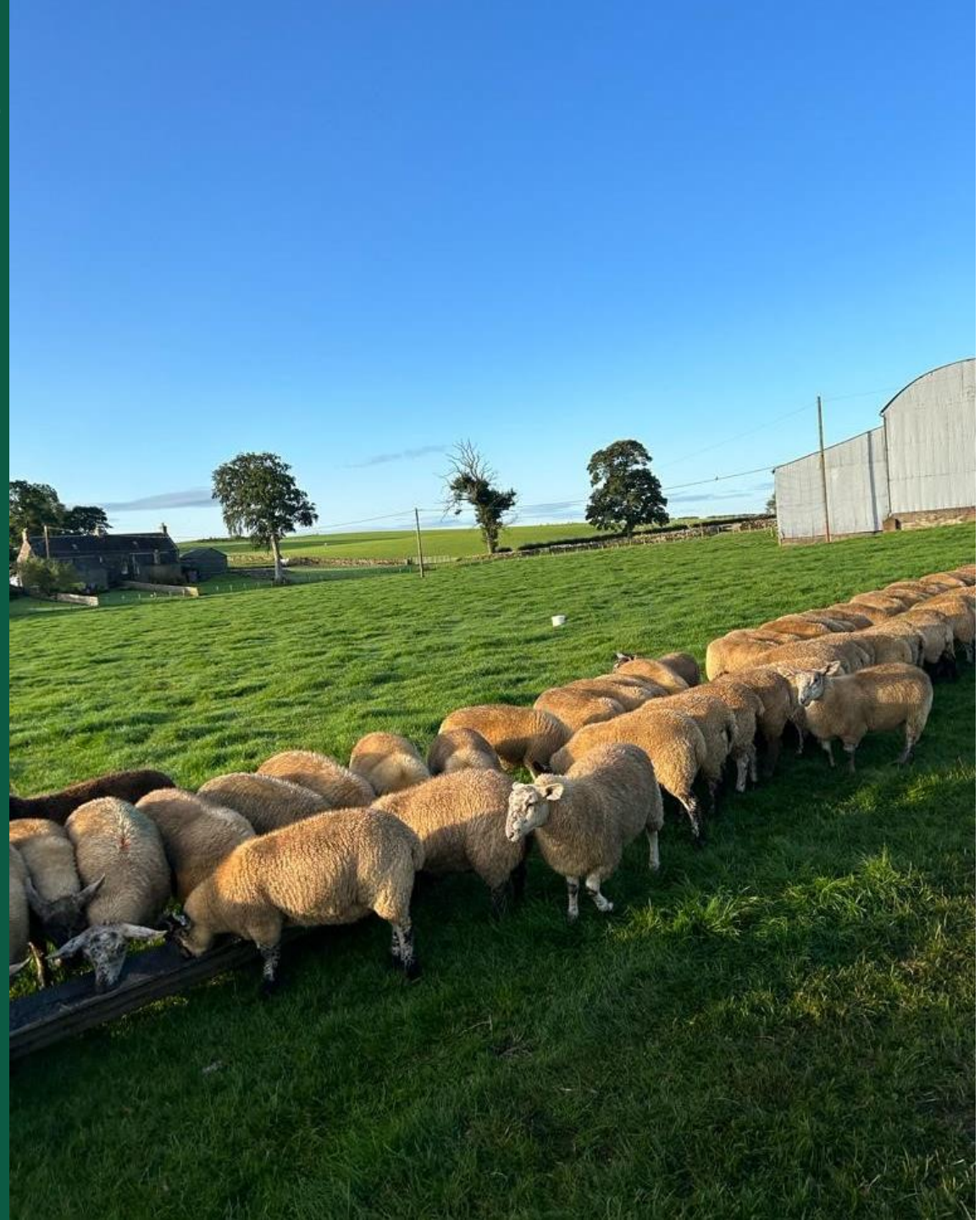

Thankyou – Any Questions?

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