



# Grass Challenge

for dairy farmers

## Challenge Note 2A - Grass Budgeting

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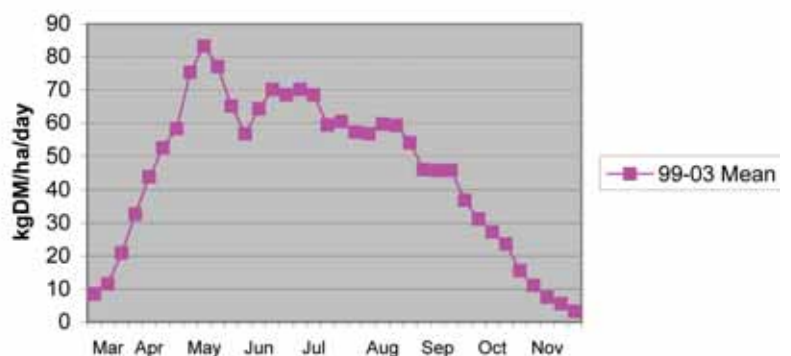
#### Why manage your grazing area?

Grass growth varies throughout the growing season. This makes it essential that you regularly assess how much grass is available for grazing. From this you can allocate grass to maintain the supply and quality of grass throughout the growing season. Regularly assessing growth means walking the fields at least once a week.

#### 1. Grass Growth Rates

Since grass growth rates vary throughout the year there will be periods when the grass supply will not equal the herds' grass demand (See Figure 1). Budgeting will help you to plan ahead to identify periods of grass surpluses or shortages, so preventative action can be taken at an early stage.

Grass Check Growth Data



Source: Agrisearch Grass Check

Figure 1: Pattern of grass growth throughout the growing season-5 year average



## 2. Grass Covers

Grass growth rates and grass cover is measured in kilograms of dry matter per ha (kg DM/ha), but what does this figure really mean? **The kilograms of dry matter per ha is the total yield of grass minus the water content of the grass.** For example, if grass is growing at 40 kg DM/ha/day this is the same as 286kgs of fresh grass/ha at a DM of 14%. Table 1 illustrates typical grass growth rates during the year.

### Factors influencing grass growth rate

- Sunlight, temperature and water can all have an effect on grass growth and usually ensure best grass growth in May and June.
- Nutrient supply - the best response to applied fertiliser is during April - June

- Interval between harvesting - grass grows more rapidly the longer the harvesting interval for example, 21 day rotation or greater. For very long rotations there can be high losses as there is more dead or decaying material in a sward with a heavy grass cover. There is more leaf material available for photosynthesis under rotational grazing compared to continuous grazing (**It takes grass to grow grass**).
- If there is a grass shortage, speeding up the grazing rotation makes the problem worse by reducing grass growth rates further. It is essential to increase the rotation length to give grass more time to grow.
- Regrowth is slow immediately after grazing, particularly after removal of a heavy cover.
- If swards are damaged during grazing, regrowth will be slower.

**Table 1:** Typical daily grass growth rates (kg DM/ha/day)

Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
3-5	5-10	10-15	20-50	60-100	50-80	50-70	50-60	25-45	15-25	10	5

Source: ARINI

Note: There can be a large variation in growth rates during and between seasons hence it is important to regularly walk the swards to monitor grass growth.

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## 3. Assessing the Amount of Grass Available

Grass cover is the average quantity of grass on an area of land, and includes the grass available for grazing and that which will be left after grazing.

A number of methods have been developed to assess the grass cover:

- a) Visual assessment by walking the pastures;
- b) Sward assessment using a rising plate meter.

### a) Visual assessment by walking the pastures

When visually assessing swards, sward height and density must be considered. Dense swards for example, a ryegrass/clover sward will contain a greater amount of herbage than an erect open sward. Assessing the sward height alone is not a true reflection of herbage yield.

Estimating a field grass cover can be difficult when swards are grazed unevenly as a result of poaching, spoilage and/or contamination with urine or faeces, but with experience an overall average can be assigned to the field.

Rather than attempting to gauge the actual sward DM/ha directly, the boot guide attached will help you to visualise what the grass covers actually look like.

### b) Sward assessment using a rising plate meter

A rising plate meter can be used to calibrate visual assessments of grass covers or until sufficient experience is gained at reading pasture by visual assessment

Full details of how to use a rising plate meter are included in **Fact sheet 1**.

## 4. Calculating the Grass Supply

To calculate how much grass is available to the herd the quantity of grass left after grazing (post-grazing) must be subtracted from the total amount of grass in the field before grazing (pre-grazing). This is explained in the following calculation.

$$\text{Grass Supply or "Available grass cover"} = \text{Pre-grazing cover} - \text{Post-grazing cover}$$

## 5. Target Grass Covers before and after Grazing

In order to maintain high grass quality it is important to ensure cows are entering and leaving the field at the target grass covers (as in Table 2)

Table 2: Target pre-grazing & post-grazing grass covers kg DM/ha

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Target grass cover before grazing	2100	2300	2900	3700	3700	3700	3900	3900	3300	3300
Target grass cover after grazing	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700



**Note:**

- The target grass cover before grazing for months May, June and July stays at 3700kg DM/ha. This is to ensure that during these months of peak growth, the sward doesn't get stemmy. If the sward reaches maturity then the percentage leaf decreases and the percentage stem increases, which has an overall effect of reducing quality and ultimately production.
- During August and September, peak reproductive growth has passed and the regrowth has higher leaf content at high grass covers.

This allows for grass covers to be increased over this period so that a grass wedge can be built up, to allow for extended grazing in the autumn time.

- Grass covers after grazing should remain constant at a level of 1700kg DM/ha as at this level there is sufficient leaf material available to allow for rapid re-growth and so reduces the quantity of grass being wasted.
- However with high yielding cows grazing swards down to a cover of 1700kg DM/ha may hinder performance, in such cases a posting grazing cover of 1900kg DM/ha may be more appropriate.

## 6. Allocation of Land Areas for Grazing and Silage

A grass budget can be used to set target stocking densities for grazing throughout the grazing season. These are based on estimates of the amount of grass that:

- a) can be grown;
- b) can be consumed by the herd during the grazing season.

### Example

A farmer wants to calculate the stocking density for his 80-cow winter (Dec - Feb) calving herd so that he can plan grazing and silage areas.

	<b>May</b>
Estimated daily grass DM intake (kg DM per cow) (A) see Table 3	15
Number of cows (B)	80
Herd grass demand (kg DM) (AxB) = (C)	1200
Estimated grass growth rate (kg DM/ha/day) (D)	90
Total grazing area required (ha) (C÷D) = (E)	<b>13.5</b>
Grazing Stocking rate (cows/ha) (B ÷ E) = (F)	<b>6.0</b>



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## December - February Calving Herd

	Mar / Apr	May / Jun	Jul / Aug	Sep / Oct
Approximate stocking rates	3.0	4 - 6	5 – 3.5	2.5

## Spring Calving Herd (Mar-May)

	Mar / Apr	May / Jun	Jul / Aug	Sep / Oct
Approximate stocking rates	3.0	4 - 5.5	5 – 3.5	3.0

**Note:** Stocking rate figures are only a guide, and they will be affected by a whole range of factors:

- Yield potential of cow, will affect herbage intake;
- Grazing and climatic conditions will also affect intake;
- Level of concentrate supplementation which will substitute for herbage;
- Herbage growth rate affected by season, fertiliser, management and location;
- Area available for grazing (within walking distance).

**Table 3:** *Typical daily grass dry matter intakes (kg DM/cow/day)*

Month of Calving	Apr	May	Jun	July	Aug	Sep
Mar - May	15	16	15	14	13	12
Dec - Feb	16	15	15	14	14	14
Sept - Nov	14	14	13	12	12	12

**Note:** These figures are typical for high yielding cows offered three - four kg of concentrates/day or medium yielding cows with little or no supplementation. If grazing conditions are poor these intakes will be reduced.



## 7. Turnout Management

At turnout milk production levels may rise or fall for a few days. This is only to be expected as cows adjust to the substantial change involved in switching part of their DM intake from conserved to fresh forage. It is important to have the confidence to stick with the grazing strategy even if milk production initially falls.

Provided adequate grazing is available any drop in milk production will only be short term. **A gradual transition to full time grazing over two-three weeks will help minimise any negative effects by enabling a more gradual change in diet.**

### Preparing for turnout

The first essential for success at the start of grazing is to achieve the average farm cover target of 2000–2200kg DM/ha (see boot guide) at turnout. This ensures the cows have access to sufficient good quality grazing from the outset.

See Section 8 on how to work out the average farm cover.

Ahead of turnout it is also important to:

- Decide which fields to graze first;
- Ensure fences, gates, roadways, tracks and pipes are in good condition and water troughs are clean;
- Check electric fencing is working well.

### Turnout tips

- The aim in turning cows out early is to establish a grazing cycle with a range of covers, this will help to maintain sward quality later in the season.
- Cows should be turned out with an edge to their appetite (although not in the first day).
- Graze the cows for a limited period initially (for example, two hours) then increase gradually.
- A good leafy sward will encourage intake. Start grazing cows close to the yard wherever possible.

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## 8. How to Calculate the Average Farm Cover

Example: Average farm cover in late March

- Multiply the grass cover in kg DM/ha by the paddock size.
- Add the grass covers for each paddock on the farm.
- Divide the total farm grass cover by the total area.

Paddock number	Size (ha)	Cover (kg DM/ha)	Total
1	1.3	2400	3120
2	1.2	2300	2760
3	1.9	1900	3610
4	1.7	2400	4080
5	1.7	2200	3740
6	1.4	1800	2520
7	1.6	1700	2720
<b>Total grazing area</b>	<b>10.8</b>		<b>22550</b>

$$\begin{aligned} \text{Average cover} &= \frac{\text{Total cover}}{\text{Total grazing area}} \\ &= \frac{22550}{10.8} \end{aligned}$$

With an average farm grass cover of 2087kg DM/ha there is enough grass cover to turnout cows

## 9. How to Calculate the Daily Grazing Area Required?

Step 1. Calculating the grass supply.

**Grass Supply or "Available grass cover" = Pre-grazing cover - Post grazing cover**

Step 2. Calculating the herd's grass demand.

**Total herd grass demand per day (kg DM) = Daily grass dry matter intake per cow (kg DM/cow) X No. of cows**

The herds average grass dry matter intake can be calculated using tables of standard figures.

**Table 3:** *Typical daily grass dry matter intakes (kg DM/cow/day)*

Month of Calving	Apr	May	Jun	July	Aug	Sep
Mar - May	15	16	15	14	13	12
Dec - Feb	16	15	15	14	14	14
Sept - Nov	14	14	13	12	12	12

**Note:** These figures are typical for high yielding cows offered three - four kg of concentrates/day or medium yielding cows with little or no supplementation. If grazing conditions are poor these intakes will be reduced.

If cows are also receiving silage, then grass intakes will be reduced. For example, in March or April when cows are still being housed and only grazed for part of the day, the above estimates of grass dry matter should be reduced accordingly. Table 4 indicates the proportion of grazed grass in the diet depending on the length of time spent grazing.

If high levels of concentrates are being fed during the summer, grass intakes will be further reduced.

**Table 4:** *Proportion of cow's forage diet as grazed grass.*

Grazing time	% forage as grazed grass
Grazing day & night with silage at 1 milking.	80
Grazing during the day with silage at night	60
Grazing for 4 hours with silage remainder of time	30



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## Example:

In early May, a farmer lets his cows out to graze for four hours each morning. The cows are housed the remainder of the time with access to silage. The cows are all winter calving. He estimates a winter calving cow's daily forage dry matter intake is 15kg DM. Since his cows are only out for four hours each day, only 30% of his cow's forage diet is estimated to be in the form of grazed grass. Therefore he estimates that his cows are consuming 4.5kg DM of grass every day (i.e. 15 X 30%).

Step 3. Calculating the daily grazing area required

Divide the herds grass demand by the available grass cover

**Area required by herd / day (ha) = Total grass demand ÷ Available grass cover**

### Example of how to calculate the daily grass area

In the month of June, a farmer wants to work out how much of a 1.5ha field of grass he should give his 80 cows every day. He estimates the grass supply by visually assessing the grass cover of the field.

Step 1. Calculate Grass Supply

Visual assessment of Grass cover = 3800 kg DM / ha  
**Available grass cover = Pre-grazing cover - Target post-grazing cover**  
Available grass cover = 3800 – 1700

(1700kg DM/ha is a standard figure taken for target post grazing cover with this amount of residual grass cover enough leaf material is left to allow optimum re-growth and minimise the level of grass wasted.)

**Available grass cover = 2100kg DM/ha**

Step 2. Estimate Grass Demand

Since the cows are mainly winter calving, he estimates that his cows will have a daily grass DM intake of 15kg DM /ha per cow (refer to Table 3).

**Daily herd grass demand (kg DM) = Daily grass dry matter intake per cow (kg DM/cow) X No. of cows**

Daily herd grass demand (kg DM) = 15kg DM/cow/day X 80 cows

**Daily herd grass demand = 1200kg DM**

Step 3. Calculate the daily grazing area required

**Area required by herd / day (ha) = Daily herd grass demand ÷ Available grass cover**

Area required by herd / day (ha) = 1200kg DM ÷ 2100 kg DM/ha

**Area required by herd per day = 0.6 ha**



## 10. Is there a Grass Surplus or Shortage on the Grazing Area?

The aim of good grassland management is to maintain a supply of high quality grass throughout the grazing season. The key is to ensure cows are entering and leaving fields at the target grass covers (see Table 2).

**Table 2:** *Target pre-grazing & post-grazing grass covers kg DM/ha*

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
<b>Target grass cover before grazing</b>	2100	2300	2900	3700	3700	3700	3900	3900	3300	3300
<b>Target grass cover after grazing</b>	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700

A grazing rotation should be flexible: Paddocks with the heaviest grass covers should be grazed first.

### **Assessing the grass supply mid-point in the grazing rotation.**

This method can be used to estimate if you will have too much or too little grass in one or two weeks time. Take a field mid-point in the rotation and measure its grass cover. By estimating the grass growth rate for the next 10 days, calculate what grass cover that field will expect to have in 10 days time. If the grass cover for that field is above the maximum pre-grazing target then it is very probable that you will have too much grass cover on your grazing area. A decision will then have to be taken as to whether or not to remove a field from the rotation to reduce the grass supply.



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## Example

A farmer wants to know if he will have enough or too much grass in 10 days time. He has a 21 day rotation with seven fields in the rotation. He works out that field four is where he would be grazing in 10 days.

1. The farmer calculates the grass cover of field four to be 3000kg DM/ha.
2. He predicts that the daily growth rate will remain at the current 80kg DM/ha (see Table 1) for the next 10 days.
3. 800kg DM/ha will be added to the current grass cover value of field four.
4. This would leave field four with a predicted grass cover of 3800kg DM/ha when grazed in 10 days time.
5. If this is compared to the target maximum pre-grazing cover for the month of June (3700kg DM/ha)(see Table 2) then he estimates that he will have too much grass in 10 days time.
6. To graze that field below the maximum pre-grazing cover of 3700 kg DM/ha he will have to be grazing it in 8 days time.  
(3000kg DM/ha + (8 days X 80kg DM/ha/day) = 3640kg DM/ha).

Therefore 2 days grazing area will have to be removed over the rotation to control his grass supply.

**Be aware of the consequences of removing paddocks from the rotation that is, if growth rate slowed down due to poor weather then there may be a grass shortage (see Challenge Note 2C).**

Grass regrowth will be slower after fields have been cut or if cows were grazing heavy grass covers.

## Summary:

- Swards need to be walked at least once per week.
- Visual assessment of swards or a rising plate meter can be used to assess grass cover.
- Target grass cover before grazing in mid season: Ideally 3700kg DM/ha.
- Target grass cover after grazing: 1700kg DM/ha.
- Turn cows out to grass when the average farm grass cover reaches 2000-2200kg DM/ha and ground conditions permit.
- Always look ahead to identify periods when there will be periods of grass surpluses or shortages.