



# Weather and grass growth monitoring to improve grassland management

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• **DESCRIPTION:** Grass growth and weather forecast data are essential in providing farmers with a 7-to-14-day grass growth forecast which can allow farmers to better plan grazing rotations to improve grassland utilisation. These forecasts can also be vital during periods of more extreme weather such as drought to give farmers options to reduce the impact on animal performance and business performance.

• **RATIONALE:**

Improving forage utilisation has been targeted as a method of improving nutrient use efficiency and reducing the carbon footprint of farms. The Agri-Food and Biosciences Institute (AFBI) at Hillsborough in the Agri-Food and Biosciences Institute (AFBI) in Northern Ireland, has demonstrated that improving grassland utilisation by one tonne per hectare can be worth an additional annual profit of £441/ha (c. 500 euros/ha) for a dairy farm and £204/ha (c. 230 euros/ha) on a beef farm (Mayne, 2016). By regularly measuring grassland, it makes it possible to quantify the amount of grass grown on individual fields and paddocks, making it easier for farmers to target remediations like reseeding or lime application to fields that are performing poorly, increasing grassland utilisation.

• **MECHANISM OF ACTION:**

Grass growth and quality is typically monitored on a weekly basis through grass cover measuring on experimental plots across a network of pilot farms using GPS rising plate meters, with grass cover information entered onto a grass budgeting programme. Grass quality samples are taken fortnightly on pilot farms, which are then posted to a laboratory for analysis. Grass samples are typically tested for Dry Matter (DM), Metabolisable Energy (ME), Crude Protein (CP), Neutral Detergent Fibre (NDF) and Water-Soluble Carbohydrate (WSC). Weather stations can also be placed on pilot farms to monitor a wide range of meteorological data, such as air temperature, precipitation, wind speed and direction, solar energy, as well as soil temperature and moisture on individual farms.

Grass growth information submitted to the grass budgeting programme from pilot farms throughout the grazing season can then be compiled and analysed weekly, as well as the meteorological data submitted from weather stations. This information can be used to produce a weekly bulletin (as seen in Figure 1 below) and published in local agricultural press and social media pages. Such bulletins can also feature grass growth forecast data for the next 2 weeks, as well as an indication of milk production from grass per day for dairy farms and weight gain per animal per day for beef farms. Pilot farm location information can also allow viewers to pick out farmers in their locality to compare information against conditions they are experiencing.



- MEDITERRANEAN
- PANNONIAN
- BOREAL
- CONTINENTAL
- ALPINE
- ATLANTIC



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## POTENTIAL FOR APPLYING THE MANAGEMENT OPTION:

Grass monitoring networks can be applied in any region with productive grassland but is most applicable to farms in the Atlantic biogeographic region that have regular summer rainfall and occasional drought.

One example of such a grass monitoring network is the GrassCheck service provided by AgriSearch and AFBI in Northern Ireland. Originally established in 1999, the GrassCheck programme provides grass growth and quality information to assist farmers in rotation planning as part of grassland management decisions and support grassland utilisation on Northern Irish livestock farms.

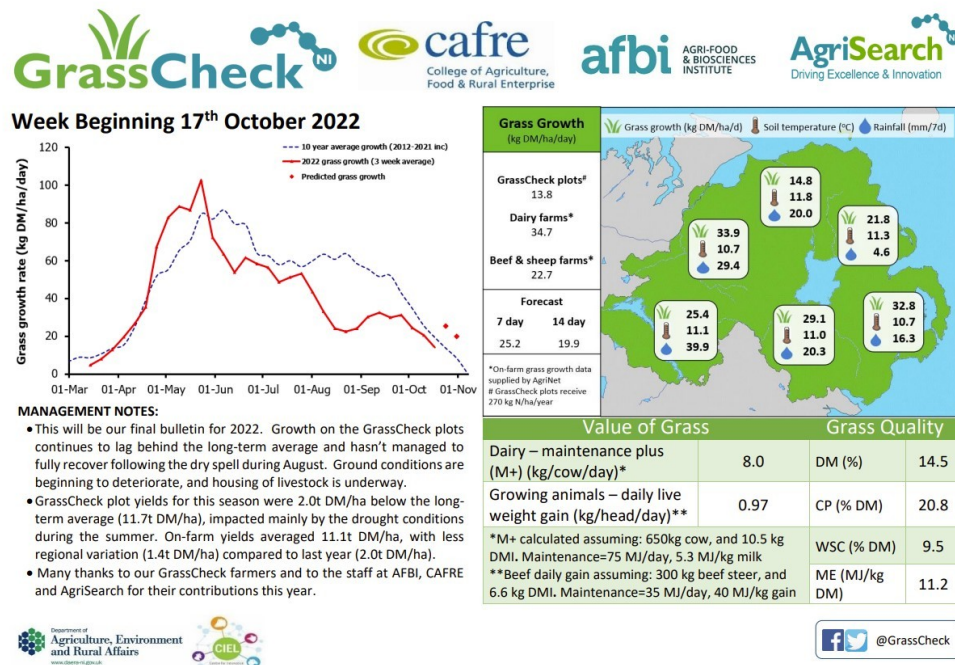


Fig.1: GrassCheck Bulletin

As shown in Figure 2 below, there was extreme variability in grass growth between 2017 and 2022, with very few trends that can be established, due to the variable weather conditions. There has been an increase in the number of extreme weather events (in particular periods of depressed growth / drought due to low rainfall as well as periods of intense rainfall), related to climate change and global warming (Figure 3). This further reinforces the requirement of grass growth monitoring initiatives to collect robust grass growth, quality and weather data to develop a robust grass growth forecast, and account for more extreme weather events.





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- PRACTICAL CONSIDERATION:**

The current ‘gold-standard’ technique for measuring grass covers is to clip a sample from a known area to weigh, dry and re-weigh to get an exact figure for the amount of dry matter (DM) available. By taking multiple clips across a paddock an average estimate of the DM cover can be generated (3-5 clips would be the very minimum recommended for estimation across a 1-day paddock).

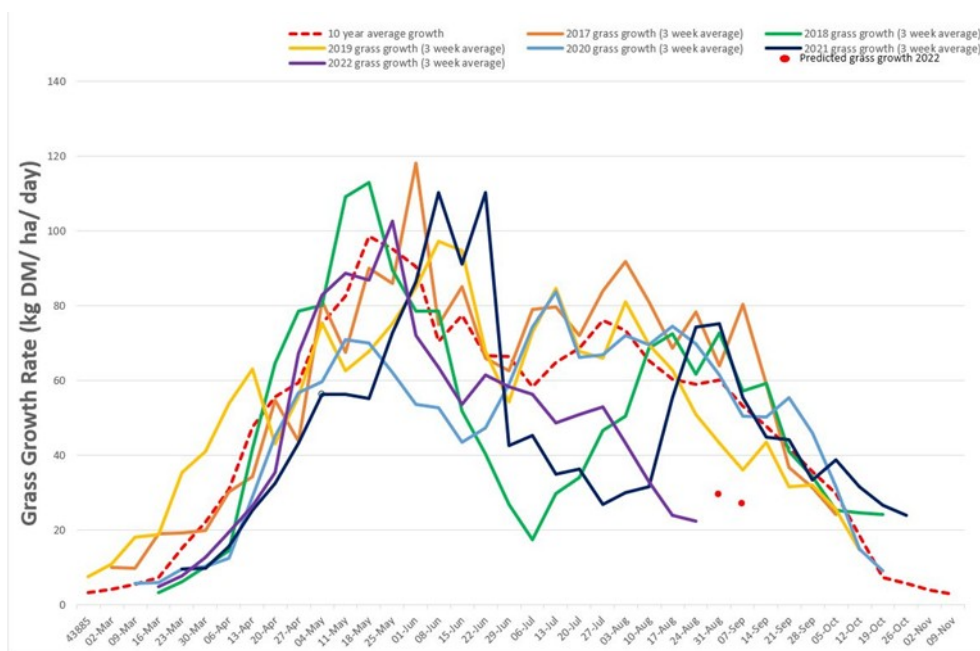


Fig.2: Grass growth rates across the grazing season between 2017-2022 compared to the average 10-year growth rate

Rising plate meters can also be used to measure grass covers, and reliable calibration equations have been developed to suit several sward types and climates in to convert the ‘compressed sward height’ measurement taken by the platemeter into an estimation of the biomass cover.

A major drawback to both these approaches is the time and labour required to conduct a walk of all the grazing paddocks to collect data, and then the time for accurate data recording. This reportedly, and understandably, puts a lot of farmers off regular grass measuring.



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Another barrier is the cost. While investment in technologies such as a smart platemeters would make data recording and interpretation simpler and faster, the investment needed is itself a barrier to adoption.

Furthermore, the use of rising platemeters to measure yield and NIRS to measure quality is limited to perennial ryegrass dominant swards. However, this can be overcome by using a clip and weigh system for measuring yield and the use of wet chemistry for measuring quality, although this is a costly and time demanding approach.

- **SUPPORT:**

Grass growth monitoring schemes usually require some funding to set up the initiative and to sustain it. For example, the GrassCheck Northern Ireland project is jointly financed by the Department of Agriculture, Environment and Rural Affairs and AgriSearch. A similar initiative in England, Scotland and Wales (GrassCheck GB) is funded by levy bodies and commercial sponsors.