

# Potential of precision technology to improve grass growth and utilisation

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# Precision technology - a changing world

- Emergence of a data-sharing world:
  - 700% growth in internet data between 2012 and 2020
    - By 2050 there will be 6.6 devices per capita

### Number of connected devices worldwide from 2012 to 2020 (in billions)



Source: CISCO, 2016



# Precision technology in agriculture

- Ability to understand complex biological systems - perfectly suited to agriculture
- + Efficient use of resources:
  - + Labour
  - + Feeding
  - + Nutrient management
- + Management of individual units:
  - + Field
  - + Animal





- Grassland agriculture will be pivotal to ensuring sustainable N.I. dairy, beef and sheep industries
  - Significant volatility in price and availability of imported feedstuffs
  - Environmental and social concerns



Significant financial benefit to improving grass growth and utilisation





+£204/ha



(Mayne and Bailey, 2016)

Challenges:

1. Improve chemical and physical structure of grassland soils







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- 1. Improve chemical and physical structure of grassland soils
- 2. Increase quantity and quality of grass grown



**Estimated grass utilisation on NI farms** (Mayne and Bailey, 2016)



Challenges:

- Improve chemical and physical structure of grassland soils
- 2. Increase quantity and quality of grass grown
- 3. Improve milk production from forage



# **Opportunities for new technologies**



# **AFBI Precision Grassland Platform**

 High-tech research platform which enables the collection of detailed information on soil, plant and animals







Wide variation in grass growth within and between fields

|                   | DM yield t/ha |            |
|-------------------|---------------|------------|
|                   | Mean          | Range      |
| First cut silage  | 3.7           | 1.1 - 6.3  |
| Second cut silage | 4.1           | 2.3 - 5.4  |
| Third cut silage  | 2.4           | 1.1 - 4.0  |
| Total yield       | 10.2          | 6.8 - 13.2 |

(SRUC, 2013)



Identify underlying causes of variation in grassland productivity



Identify underlying causes of variation in grassland productivity



| Traffic Movement | Annual silage<br>production (t DM/ha) |
|------------------|---------------------------------------|
| Random           | 11.29                                 |
| Controlled       | 12.15                                 |
|                  | +0.86                                 |
|                  | (SRUC, 2013)                          |



# New technologies in grass management

- Weekly grass growth and quality monitoring at:
  - AFBI Hillsborough
  - Greenmount campus
- 7 and 14 day grass growth rate forecasts using GrazeGro model
- Strong correlations between forecast and actual growth





2016 GrassCheck grass growth curve



#### GrassCheck 2017: Using precision data to identify grass growth potential of NI livestock farms

 New technologies provide opportunity to obtain more detailed grass measurement information





#### GrassCheck 2017: Using precision data to identify grass growth potential of NI livestock farms

- Providing information more localised to regions across the Province
  - Weekly data:
    - Grass growth
    - Grass quality
    - Latest weather
- agrisearch.org/grasscheck



#### New technologies in grass management

- Limited regular grassland measurement activity undertaken on N.I. farms
- New technologies offer scope to assess grass yield and pasture quality:
  - Reduce time requirement
  - More detailed data











Significant opportunities for agriculture to build on technology developments in other industries

(Bewley, 2016)

- Developments in technology allowing animal measurement at pasture not just indoors
- Collection of real-time data remains a challenge but is improving





#### Animal positioning

- Understanding and manipulating animal grazing behaviour key to driving grass utilisation
- Positioning being used for a range of applications:
  - Productivity of pasture
  - Animal herding
  - Manipulating pasture intake



# Average paddock 'sheep yield "26kg/ha/v

#### Data integration

- Farms are becoming huge repositories of data
- True value of PT is bring this data together
- Can we combine data to better manage cows at pasture:
  - Pasture yield and quality
  - Grazing behaviour e.g. Rumination/positioning
  - Milk yield and quality
- Potential opportunities to move towards measurement of individual DMI and targeted supplementation strategies





# Summary

- Technology development is moving rapidly across all industries and agriculture will benefit from this through development of on-farm technologies and the ability to better understand complex biological situations
  - There are huge opportunities to drive grass productivity and utilisation across N.I. and there are many technologies currently being developed which will help contribute to this improvement.







# AFBI SCIENCE IS SHAPING LIVESTOCK FARMING FOR 2030



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