Cover Crops/Green Manures
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Green Manures – Should we be interested?

- Broadly defined as crops grown for the benefit of the soil
- Some farmers already use (especially organic)
- CAP Greening Regulations
  - permanent grassland
  - crop diversification (3-crop rule)
  - ecological focus areas (EFAs)

- CAP Ecological Focus Areas:
  - Fallow
  - Margins
  - Agro-forestry
  - Hedges
  - Nitrogen-fixing crops*
  - Catch crop*
  - Green cover*
Distribution of farm businesses required to meet Ecological Focus Area (EFA) rules

- based on 2014 SAF data
- affects 77% of national arable area
- 5% of each eligible business's arable area must be EFA
- BUT - nearly all businesses must meet both Crop Diversification and EFA requirements
- options that can help deliver both may be favoured = Nitrogen-Fixing Crops

[Map showing Ecological Focus Area Requirement]

Green manures – Fertility Building Crops

Advantages to green manures:

- Add organic matter to soil
- Increase biological activity
- Improve soil structure
- Increase soil nutrients
- Reduce leaching losses
- Suppress weeds
- Reduce pest and disease problems

In addition, N-fixing green manures:

- Increase soil N levels
- Decrease the need for bagged fertiliser (cost and pollution savings)
Green manures – Fertility Building Crops

Disadvantages to green manures:

• Cost of seed and extra cultivations
• Lost opportunities for cash cropping
• Extra work at busiest times of year
• Exacerbated pest and disease problems ("green bridge" effect)
• Potential for green manures to become weeds themselves
• Fixed N might not be available when crops need it (may become pollutant)
CAP Ecological Focus Areas N-fixing Crops

You must:

• grow two or more of the following N-fixing crops: alfalfa, beans, birdsfoot trefoil, chickpea, red & white clover, lentil, lupin, peas, vetch

• ensure that all your claimed EFA nitrogen-fixing crops are surrounded by a claimed EFA field margin

• grow at least two crops from the list, that can be mixtures

• no more than 75% of the total area as one crop

You must not:

• harvest or use plant protection products on the crop before 1 August in order to protect ground-nesting birds

https://www.ruralpayments.org/publicsite/futures/topics/all-schemes/basic-payment-scheme/greening-guidance/greening-guidance-2018/efa-ecological-focus-areas/#124931

New for 2018
Drivers for SRUC work on green manures

• CAP reform – greening regulations in place but do they deliver the intended benefits?
• Scottish Government RESAS core programme 2016-2020
• Track record of intercropping/mixtures/organic/biodiversity work
Research Aims

- Assess agronomic, environmental and economic performance of a wide range of cover crop species at two sites (Aberdeenshire and Midlothian) in replicated trials over multiple years
- Assessment of multi-functionality
- Practical recommendations
- Inform Scottish Government policy
CAP N-fixing Crops

- Straights of all on list (except lentil & chickpea)
- Five, 3-way mixtures of above
- Mixtures contrast genetic and functional diversity
  e.g. Three clover species and clover:beans:vetch
Why Grow Mixtures?

• Mixtures of crops typically yield 20-40% higher than monocrops
• Built-in redundancy if one crop fails, improving stability and resilience to adverse conditions
• May be better suited for some purposes (e.g. high-protein silage)
• Potential to provide greater biodiversity benefits (e.g. longer flowering period)
N-fixing crops growth 2016

**Chart: First Cut Yield (t/ha DM)**

- **Green**: single legume species
- **Orange**: 3-component mixtures
- **Purple**: ryegrass/clover

+Grain legumes
Increase in Pre-plough Soil Mineral Nitrogen the Year After Growing N-fixing Crops Greatest in Mixtures
Summary

- N-fixing crops offer a good route to meeting CAP greening rules as they can tick the boxes for EFA and diversification.
- A wide range of N-fixing crops can be grown successfully on much of Scotland’s arable land.
- From 2018, mixtures may provide additional or greater benefits, such as greater soil mineral nitrogen levels the following spring.
- Ongoing work is assessing the impact of EFA N-fixing crops on following cereal crops.
Thank you

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