

## Climate change: be part of the solution

### Focus on: Precision technology

What is precision technology?

Typically, it is electronic equipment used to improve the precision of farming operations. This in turn can help optimise the use of many of a farm's resources and inputs and tackle some of the variability that farmers encounter.

How can precision technology be part of the climate change solution?

- Lower fuel and energy use will mean less carbon dioxide is produced
- Optimising nitrogen fertiliser use will help reduce the amount of nitrous oxide released from the soil
- By locating and correcting local soil structural damage, crop performance and yield can be optimised, maximising efficient use of inputs
- By reducing waste
- Improving productivity can reduce the greenhouse gas emissions per kg grain, milk or meat produced
- By being better prepared for climate change, for example by using water more efficiently or improving soil structure





## Examples of precision technology in action

### For arable farmers

#### 1. Machine control and automation

- Using GPS (Global Positioning System) guidance
  - on the tractor, reducing overlapping on cultivations and more efficient field work
  - on the combine, keeping a full cut thus maximising output
  - on the sprayer, using auto section control to minimise overlapping
  - combined with auto-steer, these benefits are enhanced with the added bonus of reducing operator fatigue
- Many new tractors and combines have performance monitoring, including fuel use, which can help improve the cost effectiveness of operations and alert the driver to inefficient fuel use. Telemetry can relay this information to a specialist who can give immediate guidance on how to improve harvest efficiency
- Controlled traffic farming, using guidance techniques to create permanent wheelings, which reduces compaction and the cultivations needed to remediate them

#### 2. Managing within-field variation

- Soil mapping. Most fields will exhibit variation in soil type and nutrient status. Equipment and software are available to map these changes and to vary seed and fertiliser appropriately. This better targets inputs and often lowers the amount applied
- Yield mapping shows yield variation within a field and can be used to investigate areas of poor performance or to vary fertiliser input in proportion to crop nutrient offtake
- Canopy sensing measures properties of the crop canopy. In wheat this can be used to target nitrogen fertiliser rates on the move

#### Other examples include

- Decision support systems, for example systems recording the effectiveness or costs of practices like different spraying dates or different pesticide doses

#### For livestock farmers

- Whole body CT scanning can improve the accuracy of estimating carcass composition and muscularity

- Automatic feeding systems can provide feed rations of exactly the right quantity and blend of ingredients for a particular animal in a particular feed place
- Monitoring worm egg counts to decide whether to use anthelmintics for the sustainable control of parasites in sheep

#### For horticulture

- Imaging and crop row tracking technology has been successfully used on cultivation equipment for improved inter-row mechanical weed control
- Decision support systems can help forecast pest and disease outbreaks, to predict crop maturity or to make recommendations about fertiliser use

#### For protected crops

- Use computer controlled glasshouses so that the aerial environment can be precisely controlled

#### Opportunities

- More efficient production systems by making better use of resources
- Cost savings through optimising and targeting inputs
- Improved soil condition through controlled traffic and reduced cultivations
- Improved profitability
- More targeted applications, particularly with nitrogen, will mean the fertiliser is being used optimally and can lead to reductions in nitrous oxide emissions
- Automatic downloading of data in an easily manipulated format reduces time spent recording information.

#### Risks

- Investment in equipment could fail to show a return
- Little variation may be present in fields or variation does not significantly affect yield
- Operations are already carried out with good accuracy and the improvement is small
- Inadequate training or understanding can mean techniques are poorly applied. It is essential to understand how the measurement is made and the degree of accuracy it has. For example, a spot or patch treatment of a pest or disease may fail to control the perimeter of a problem if sampling resolution is poor



- There may be insufficient fundamental research to properly inform agronomic decisions about variable rate strategies

It is important to remember that you can be smart by deciding that technology is not for you. Assessment of the costs and benefits is critical and, in the absence of accurate figures, can be intuitive. Precision technology is not a substitute for the farmer's experience.

## Where to get more information?

- HGCA's Be PRECISE (Precision for efficiency, savings and the environment) initiative includes workshops, publications and resources that provide information about precision farming of arable crops. [www.hgca.com/beprecise](http://www.hgca.com/beprecise)
- Using permanent tramlines in a controlled traffic farming system, <http://www.controlledtrafficfarming.com/content/default.aspx>
- Decision Support System for Arable farmers e.g. DESSAC <http://www.dessac.rothamsted.ac.uk/>
- CT scanning for sheep <http://www.sac.ac.uk/research/sls/about/services/ctscanning/benefits/>
- MANNER - a decision support system to help understand the fertiliser value of organic manures <http://www.adas.co.uk/manner/frameset.html>
- PLANET – a quick and easy way of obtaining fertiliser recommendations for arable, horticultural or grassland crops <http://www.planet4farmers.co.uk/content/aboutus.html>
- Warwick HRI <http://www2.warwick.ac.uk/fac/sci/whri/research/>
- Watch a short Farming Futures video about precision technology in action <http://www.farmingfutures.co.uk/x526.xml>



# FARMING FUTURES

For news, events, and links to stories about how other farmers are managing climate change on their farms, please visit: [www.farmingfutures.org.uk](http://www.farmingfutures.org.uk)

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