Demonstration Site Project

Soil mapping to enable more precise land management

Demonstration Site: PANTYDERI

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Project Title: Soil mapping to enable more precise land management

Introduction to project:

Making precision farming efficiencies by using variable rate nutrient application relies on having accurate soil nutrient knowledge across the span of the growing area.

Historically, soil sampling involved taking one representative sample in a W pattern across a field, or more recently, grid sampling fields according to GPS points.

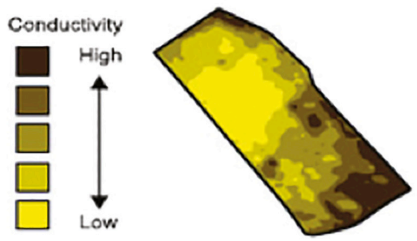
It is now possible to sample using Electrical Conductivity (EC) scanning techniques to map precisely how different soil properties vary across a field and then to divide the field into management zones, based on varying soil type. Strategic soil sampling of these management zones will then create a picture of variable nutrient data which can be used to inform variable rate fertiliser applications. This helps to even-up crop yields across a field, provides for more efficient nutrient use and is more environmentally friendly.

To quantify variation in soil texture and depth, fields are scanned at two soil depths- shallow (0-30cm) and deep (30-90cm). This information is then used to create management zones. Within these zones, the physical, chemical and biological properties of the soil can be examined and more precisely managed. Once these zones are established, they are permanent and can be used for crop management throughout the year and for many years to come.

Step 1:
Survey the field using an EC scanner

Source: SoilQuest

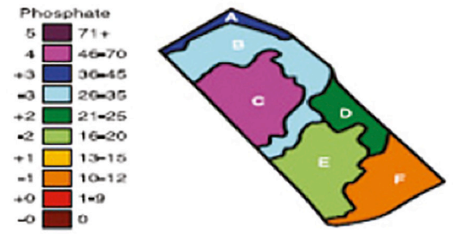
Step 2:
Create a soil map



Step 3:
Create management zones

Step 4:
Analyse a representative soil sample from each management zone

Step 5:
Create soil analysis maps



Step 6:
Optimise fertiliser application by applying variable rates across the zones

Project Objectives:

- To explore the use of soil mapping to provide the basis for improved efficiency of input use on arable land growing cereals
- To explore the use of soil mapping to provide improved efficiency of use of N, P, K and lime on grassland
- To provide knowledge on the tractor and machinery technology investment required to deliver more precise land management
- To provide knowledge on data management plus software and hardware requirements to enable precision land management

Key Performance Indicators set:

The following outputs will be defined with crop yields (per field) recorded and analysed:

1. Nutrient input changes indicated across a field
2. Any changes in total amount of nutrients and inputs used (using zone application v single soil sample analysis)
3. Any changes in cereal yields and uniformity and quality of crop
4. Any changes in silage yields and uniformity of crop across a field
5. Cost to the farm of implementing the technology

Alongside the above, an important objective of the project is to provide guidance on the tractor and machinery requirements to undertake variable rate nutrient application on their farm.

The usefulness of the APS software in keeping Nutrient Management Planning records more efficiently will also be a valuable focus.

https://businesswales.gov.wales/farmingconnect/our-farms