



MacKillop Farm Management Group

2008-09 Caring For Country Precision Ag Project

“Increasing Precision Agricultural Awareness and Adoption in South East South Australia”

Precision Agriculture (Precision Ag) is a concept that relies on the existence of variability across farms & fields. The benefits from implementing Precision Ag Techniques depends on the amount of variability that exist within a farm/field & also the ability to utilise this variation to obtain some economic outcomes.

The MFMG PA 2008-09 Project aimed to increase the understanding and awareness of how spatial measurement tools (EM38 mapping, Imagery data, RTK Elevation Data & Yield Mapping) can be utilised to identify variations in soil capabilities & to then demonstrate how management can potentially be changed over these areas & the economics of implementing these changes. 4 of the 6 sites were looking at changes in Nitrogen management over the demonstration paddocks, another site focussed on varying rates of gypsum & the final site looked at seeding rates, varieties & trace-element applications in broad beans.

All sites were surveyed in Feb/March 2009 with an **EM38** machine which measured changes in the conductivity of the soil. The figure that was recorded is a relative figure that was then calibrated using site specific soil coring.

The EM38 soil surveys carried out at the sites at Coonawarra, Conmurra & Padthaway showed a strong correlation between the EM38 reading and the physical properties of the soil (depth to either calcrete layer/limestone). This has potential implications on the drainage of water, total water holding capacity & trace-element nutrition of the crop.

The EM38 soil surveys at Frances, Bordertown & Apsley were more strongly correlated to chemical properties of the soil, with factors like ESP (Exchangeable Sodium percentage), Boron content and Calcium:Magnesium ratios driving the EM38 readings. These chemical factors can affect the structural stability of the soil & also the ability of the plant to extract water (particularly under drier conditions).

The sites were then measured with a “**Greenseeker**” – a machine that measures the NDVI (Greenness) of the crop. The Greenseeker machine can also automatically generate a recommended rate for Nitrogen application based on the “greenness” relative to crop growth. This map was used to determine variable rate applications that were applied in Canola at Padthaway & in wheat at Coonawarra. At other sites,



varying rates across different soil types were compared with standard farmer practice.

Yield data from farmer / contractors yield monitors will be collected post-harvest & analyses carried out to measure the economic response of varying management practices across different soil zones.

These results will be placed on the website as they become available & also will be included in the 2009 MFMG Trial Results Book.

Key Findings to date at some of the sites:

- Frances: EM38 Survey was strongly linked to moisture that hadn't been utilised by the crop in 2008. The soils that were extremely high in moisture (& high in EM) were the loamy soils with the impenetrable hard-setting layer. These are the soils that are targeted for deep-ripping. *The potential exists to utilise EM38 surveys in determining where deep ripping is required within a paddock.*
- Apsley: Standard gypsum application across the paddock spread at 2.5T/ha; Test strips applied at 5T/ha & 10T/ha. The 5T/ha strips were consistently higher in the Greenseeker NDVI ("greenness") than the standard 2.5T/ha application, suggesting increased plant vigour at the higher gypsum rate.
- Coonawarra: Relationship between EM38 & Greenseeker NDVI data was very strong ie. the deeper the soil, the greater the plant growth.
- Padthaway: Elevation was found to be very important in combination with the EM38 in determining soil types across the paddock (very flat pdk; elevation only changed by 1.4m across the whole paddock).

For further information, please contact
Felicity Turner
Mobile 0400 299 087
mf.turner@bigpond.com