



SPATIAL INFORMATION DAY 2010

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Spatial Information Day 2010 Abstract

Title: Can we scale up grain yield estimates at the meter scale to South Australia using remote sensing?

Session: 2 – Agriculture

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Abstract:

Climate change may severely impact the grain growing areas of Australia in several ways. Yield may change due to a different biophysical regime but external drivers such as a price paid for carbon may influence the future adoption of alternative land uses. To make these decisions, growers will need robust data to compare the financial prospects of current and potential farming activities.

Land holders are increasingly using precision agriculture information as they appreciate the merits of high resolution data for on farm decisions but adoption of precision agriculture has been limited. The value of precision agriculture information increases substantially with the length of the time period for which information is available. The spatial resolution of LANDSAT imagery is comparable to that of yield maps and because of the inherent relationship between NDVI, green biomass and yield it should be theoretically possible to increase access to yield maps within farms and regions using remote sensing.

In this research we test the generality of yield prediction from satellite imagery. We use 640 paddocks across South Australia to calibrate NDVI-Yield relationships. We evaluate the prediction models using district level PIRSA yield statistics. We test under which conditions an extrapolation of the models in time and/or space is possible without increasing the error.

The results show that broad scale yield pattern are predictable from a small spatial sample of high resolution yield data. The models successfully capture the variability of the regional yield potential with a model efficiency (Nash Sutcliffe) of up to 0.65 even when extrapolating in time.

The analysis provides evidence that it is possible to scale up from fine-scale yield mapping to the entire SA cropping region and that the relationships hold between years. NDVI pattern from LANDSAT imagery can be used to generate high resolution yield maps at a large regional extent with models derived from precision yield mapping.

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