PASTURES FROM SPACE – INTRODUCTION TO THE TECHNOLOGY ON FARM

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Efficient use of feed resources is a major driver of profitability in the livestock industries of Australia. The ability of producers to realise this benefit is being restricted by the lack of information on which to base production decisions from 1 season or year to the next. The Pastures from Space project aims to deliver near real time information at the whole farm and within paddock level that will underpin tactical and strategic decision making for Australian agricultural businesses. Two products form the basis of the project, PGR™ estimates pasture growth rate (kg DM/ha/day) and FOO™ estimates feed on offer (kg DM/ha), to provide quantitative estimates of green biomass and its rate of growth (Edirisinghe *et al*. 2000). This is the first in a series of papers describing progress in the technology, validation processes, and producers' perception of the technology along with its application and value.

A consortium of CSIRO Livestock Industries, the Departments of Agriculture (DAWA) and Land Information (DLI) of Western Australia manages the project. The CSIRO leads the development of the algorithms, DLI undertakes acquisition and processing of satellite data for inputting into the models, and DAWA evaluates on-farm application and captures field data for validation. About 50 producers in the south-west of Western Australia actively collaborated with this project. They are receiving estimates of near real time PGR weekly, and FOO monthly, and they provide feedback on the technology to the consortium.

The product, PGR™, is a deterministic model using normalised difference vegetation index (NDVI) derived from satellite spectral bands and climate data (rainfall, temperature and solar radiation) from the Australian Bureau of Meteorology to produce a weekly estimate of growth rate. The PGR™ was developed using NDVI data from the NOAA AVHRR satellite with a pixel resolution of 1100 m^2, but since 2002, NDVI has been obtained daily and composited weekly from the MODIS sensor in the Terra satellite, with a pixel size of 250 m^2 increasing the accuracy of prediction (Donald *et al*. 2004). The product, FOO™, is an empirical model based on developed relationships between NDVI and actual feed on offer. Satellite data for calculating NDVI is derived from the higher resolution satellites, Landsat and SPOT, with a pixel size of 30 m^2. Changes to the algorithms and the methodology for groundtruthing with spatial consideration have ensured a high level of accuracy in FOO™ predictions over time (Edirisinghe *et al*. 2004a). In addition, Edirisinghe *et al*. (2004b) describe the development of predictive equations for crude protein, digestibility and chlorophyll content using hyperspectral sensors in pastures and a range of crops. Delivery of PGR™ and FOO™ data to producers has been evaluated using email, password-protected internet access and direct download from an FTP site to a stand-alone PC software package developed to display PGR™ and FOO™ over the season. Sneddon and Gherardi (2004) evaluated producers' perceptions of the technology for decision-making. Anderton *et al*. (2004) analysed the application of the technology and will present an economic analysis demonstrating its value to producers.

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