PROJECT 4.12 | INVESTIGATION OF CORRELATIONS BETWEEN MULTI-TEMPORAL INDICES AND BIOMASS

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Objectives
Objectives of this project will include

- Develop a ground data collection protocol for calibration, validation purposes
- Achieve accurate direct assessment of biomass at paddock scale using remotely sensed indices
- Adjustment of a dynamic model that predicts plant growth rate utilizing input data from remote sensing

Outcomes
Development of tools to improve biomass estimation and provide pastoralists in northern Australia with a web viewing tool for pasture growth rates.

Project Outline

Western Australia covers approximately one third of the total land mass of Australia. Given the size and remoteness of pastoral leases, satellite remote sensing can be used as an aid in assessing and mapping of total standing biomass and plant growth rates. The project aims to focus on assessing total standing biomass and pasture growth to enable optimised stocking rates on a paddock or land-system basis for rangeland stations in northern western Australia. The study area is Liveringa station, a pastoral lease, which is approximately 263,000 hectares in size.

Study area

1: Development of a ground truthing protocol

The spatial heterogeneity of rangelands poses challenges in sampling methodologies demanding a large number of replicate measurements that are expensive and labour demanding. The protocol was based on a combination of quadrat cuts (1) visual estimates, crop circle NDVI (2) and disk plate meter recordings (3). A combination of these measurements in a multivariate regression provided an accurate alternative to quadrat cuts while reducing the number of quadrat cuts required.

2: Development of multi-temporal indices correlations and biomass

Above ground biomass consists of dead and green material, that may not be characterised well with a snapshot image or vegetation index. The hypothesis is that metrics derived from time-series of MODIS vegetation indices are better able than traditional vegetation indices to characterise seasonal growth and biomass accumulation.

The figure show examples of an Enhanced Vegetation Index (EVI) time trace in 2011 using fitted seasonal metrics from MODIS satellite data. Ultimately, selected metrics will be used in combination with a model to simulate vegetation growth and predict standing biomass.