Introducing the Enhanced Drought Information System Mark II
Finer, faster, farm-level Drought Monitoring

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NSW DPI Climate Branch Seasonal Conditions Team

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NSW Department of Primary Industries (DPI)

Did you know?
NSW DPI is ranked in the top 1% of research institutions in the fields of ag, plant and animal science

www.dpi.nsw.gov.au

600+
scientific and technical staff, along with 13,00ha of trial sites make DPI the largest rural research provider in Australia
DPI research and outreach

Pasture dieback:
- Know what to look for
- Minimise its spread
- Find out how from our website

Report suspect pasture dieback:
Exotic Plant Pest hotline
1800 084 881

Macadamia plant protection guide 2019–20

Innovative research on woody biomass crops for bioenergy in NSW

NSW DPI has the largest citrus research and development team in Australia
Visit NSW DPI showcasing NSW citrus
Hort Connections Melbourne 24-26 June

MACQUARIE MERINO LIFETIME PRODUCTIVITY FIELD DAY
Trangie Agricultural Research Centre
Wednesday 10 July 2019
DPI Climate Branch

Climate Research

- Carbon Farming
- Energy Efficiency
- Crop Varietal Resilience
- Adaptation and Mitigation Strategies
- (Projects aligned with $30M NSW CCRS)

Digital Agriculture

- Field Research
- Technology on Farms
  - AWS
  - Drones
  - Sensors
- Connectivity (LoRaWAN)
- Dashboards and Apps
- Adaptation Pilots
- etc.

Climate Applications

- Operational
- Seasonal Conditions and Drought Monitoring
- Data development and provision
The State Seasonal Update

• 2013 - Seasonal Conditions information provided as part of NSW role in 2013 Intergovernmental Agreement on National Drought Program Reform
• 2016 – Work begins on objective drought monitoring framework (Enhanced Drought Information System, EDIS)
• 2018 – EDIS Mark I launched
Enhanced Drought Information System (EDIS)

Daily Processing Methodology

DPI AgriMod

Remote Sensing

EDIS Mark I
AWAP tmax, tmin, rain, rad

Climate Data

Data Repository

Daily rainfall, plant growth, soil water are aggregated over 12 months and percentile-ranked.
Enhanced Drought Information System (EDIS)

Daily Processing Methodology

EDIS Mark I
AWAP $t_{\text{max}}$, $t_{\text{min}}$, rain, rad

Remote Sensing

Data Repository

DPI AgriMod

Individual Drought Indicators

Rainfall Index (meteorological)

Plant Growth Index (agronomic)

Soil Water Index (hydrologic)

Drought Direction Index (directional)
Enhanced Drought Information System (EDIS)

Daily Processing Methodology

Remote Sensing

EDIS Mark I
AWAP \( t_{\text{max}} \), \( t_{\text{min}} \), rain, rad

Climate Data

DPI AgriMod

Data Repository

Individual Drought Indicators

- Rainfall Index (meteorological)
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- Drought Direction Index (directional)

Combined Drought Indicator

Nectar Cloud Cluster with Intersect
Total processing time = 2 hours

Web Service
The Combined Drought Indicator (CDI)

**Combined Drought Indicator**

12 months to 31 October 2019

**Intense Drought**
- All < 5th percentile

**Drought**
- Any < 5th percentile

**Drought Affected (intensifying)**
- Any < 30th percentile, Negative rainfall trend

**Drought Affected (weakening)**
- Any < 30th percentile, Positive rainfall trend

**Recovering**
- All > 30th and < 50th percentile

**Non-Drought**
- Any > 50th percentile
From 5km to 1km

Central Tablelands EDIS Rainfall Index
(meteorological index)

EDIS Mark I
(AWAP, 5km)

EDIS Mark II
(ANUClimate, 1km)*
*Mike Hutchinson, Fenner, ANU
From 5km to 1km

Central Tablelands Rainfall Index (meteorological index)

EDIS Mark I (AWAP, 5km)
2 hours

EDIS Mark II (ANUClimate, 1km)
25 min
Demand for data

• Many bespoke requests, requiring new products to be developed
• Need for fast processing both daily workflow and product generation

EDIS Data Requests
March 2018 to November 2019

204,003 views of the drought maps
229 requests for data
425 Farm Tracker users
54,677 views of the State Seasonal Update
Drought Indicator Time Series

Orange Parish, Bathurst County (Central Tablelands LLS)

Data current to 27 August 2019

Indicator Value (0-100)

Figure produced by the NSW Government Climate Applications and Digital Agriculture Program

For more information on indices, data sources and the CDI process, see https://edis.dpi.nsw.gov.au/about

edis.spaceport.intersect.org.au
Summary and Upcoming Work
Finer, faster, farm-level Drought Monitoring

Summary
• Finer – 5k to 1k
• Faster – Embarrassingly parallel
• Realm of farm-level decision making

Priorities
• Improving vectorization and overall efficiency
• APIs
• (Rewriting everything in Python??)

Long-term
• Dashboard for exploring data
• Seasonal forecasting module
• NSW Drought Projections
Acknowledgements

DPI Climate Branch Seasonal Conditions Team

Anthony Clark
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Scott Wallace

Kim Broadfoot

Data Providers and Collaborators

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