

Evaluating Drought Indices for Early Warning in East and Southern Africa

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Introduction

- ▶ Sparsely populated regions of east and southern Africa often have little ground based data to monitor drought, crops, and water resources.
- ▶ The Regional Hydrologic Extremes Assessment System (RHEAS) is a NASA supported data assimilation framework that combines both a hydrologic and crop model, which provide another monitoring approach.
- ▶ RHEAS can also be run in forecast mode, providing outlook on drought and crop yield

Methodology

- ▶ Run RHEAS from 2000 - present
- ▶ Evaluate outputs, compare soil moisture to Soil Moisture Active Passive (SMAP) satellite observations
- ▶ Compare modeled crop yield to observed yield, select appropriate cultivars
- ▶ Analyze progression of crop yield forecasts throughout the 2019 growing season

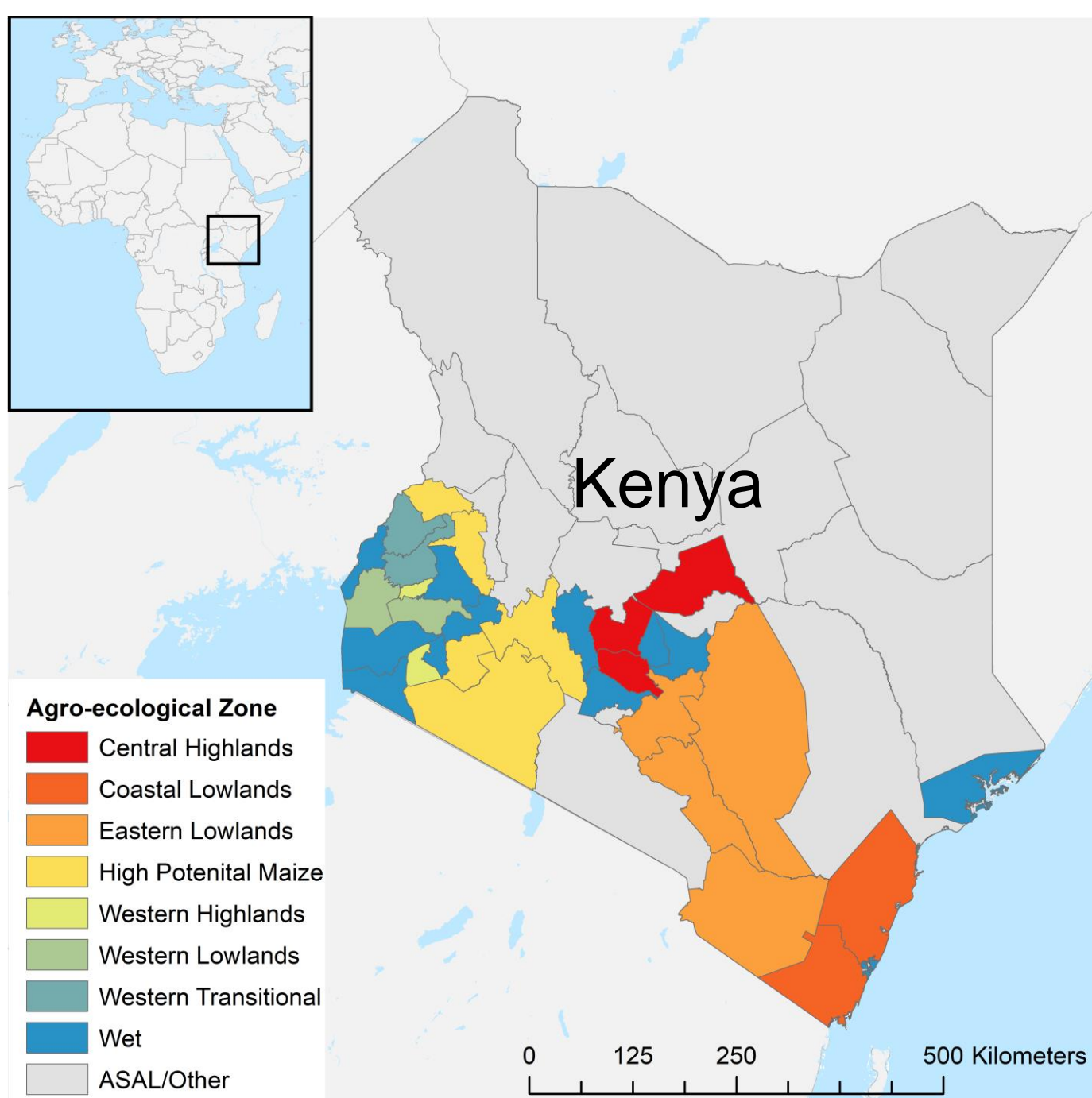


Figure 1. Study area showing agricultural counties of Kenya where the crop model was run

Results

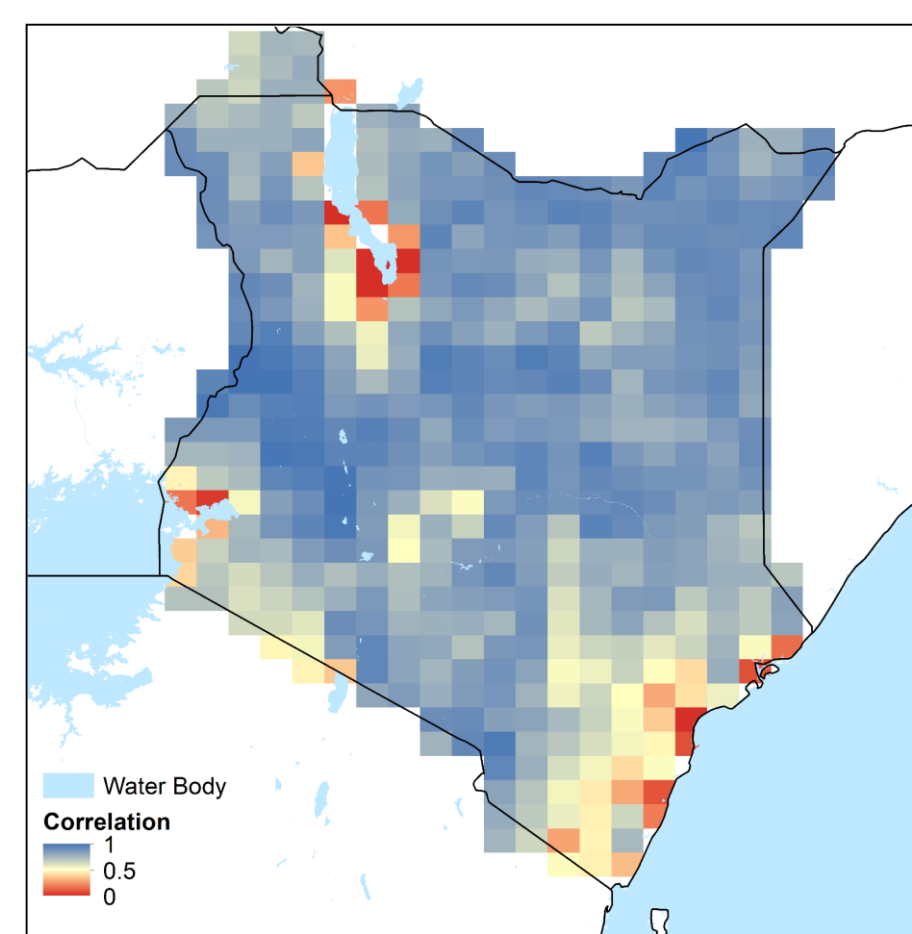


Figure 2. Correlation (r) between SMAP and RHEAS soil moisture

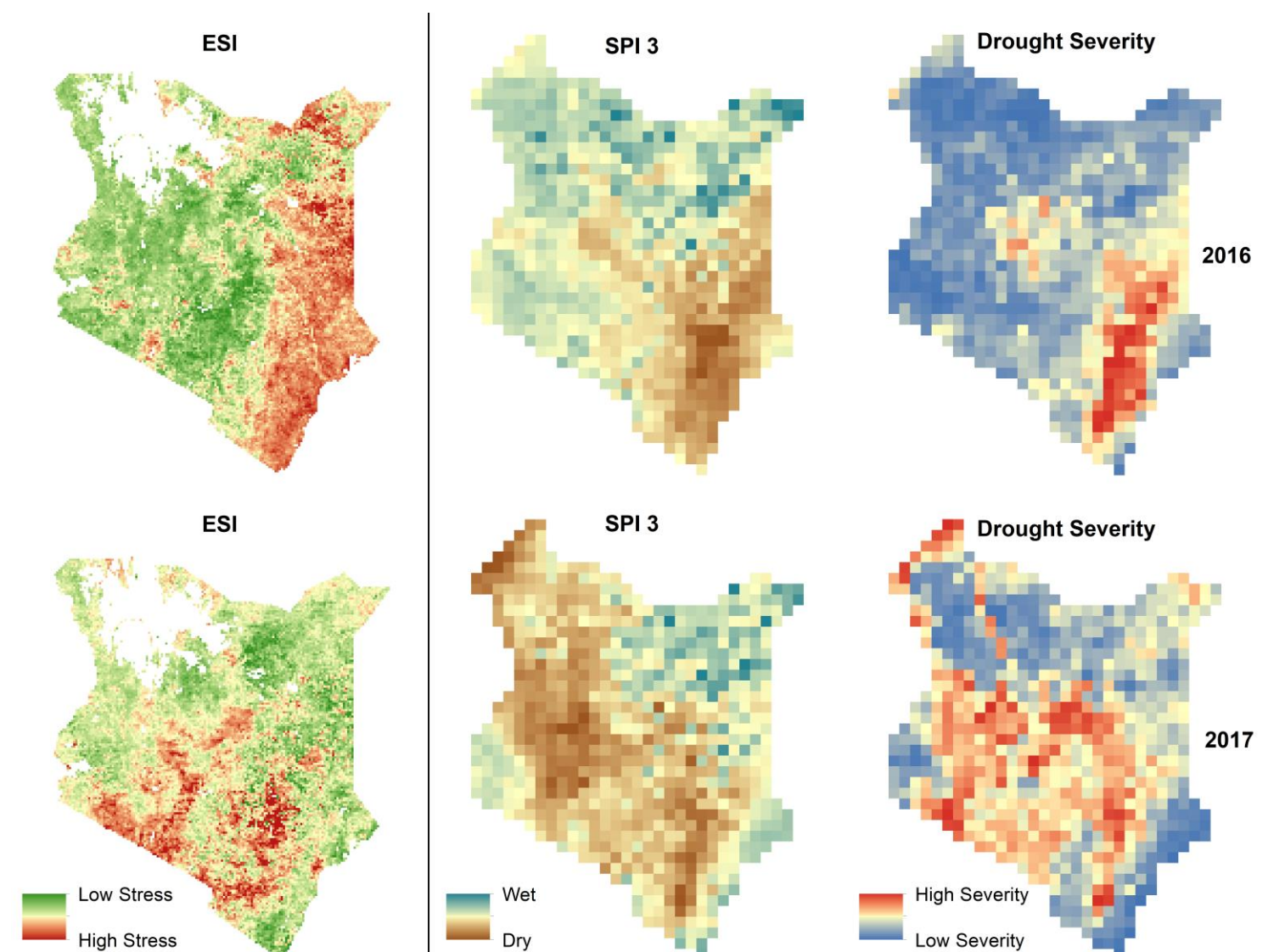


Figure 3. Comparison of evaporative stress index (left) with RHEAS outputs (right)

Figure 4. Comparison of DSSAT modeled to observed yield after selection of cultivars

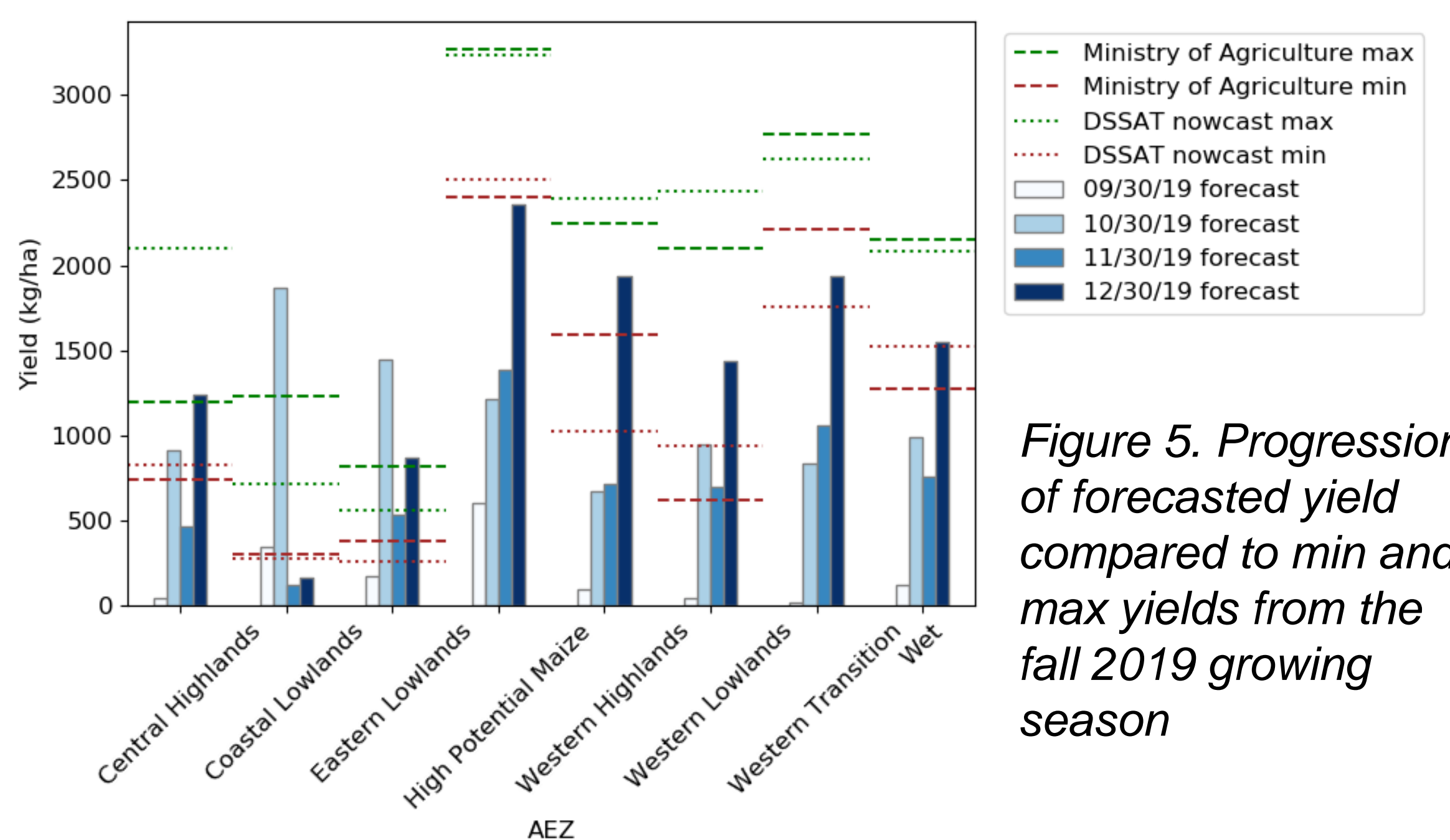
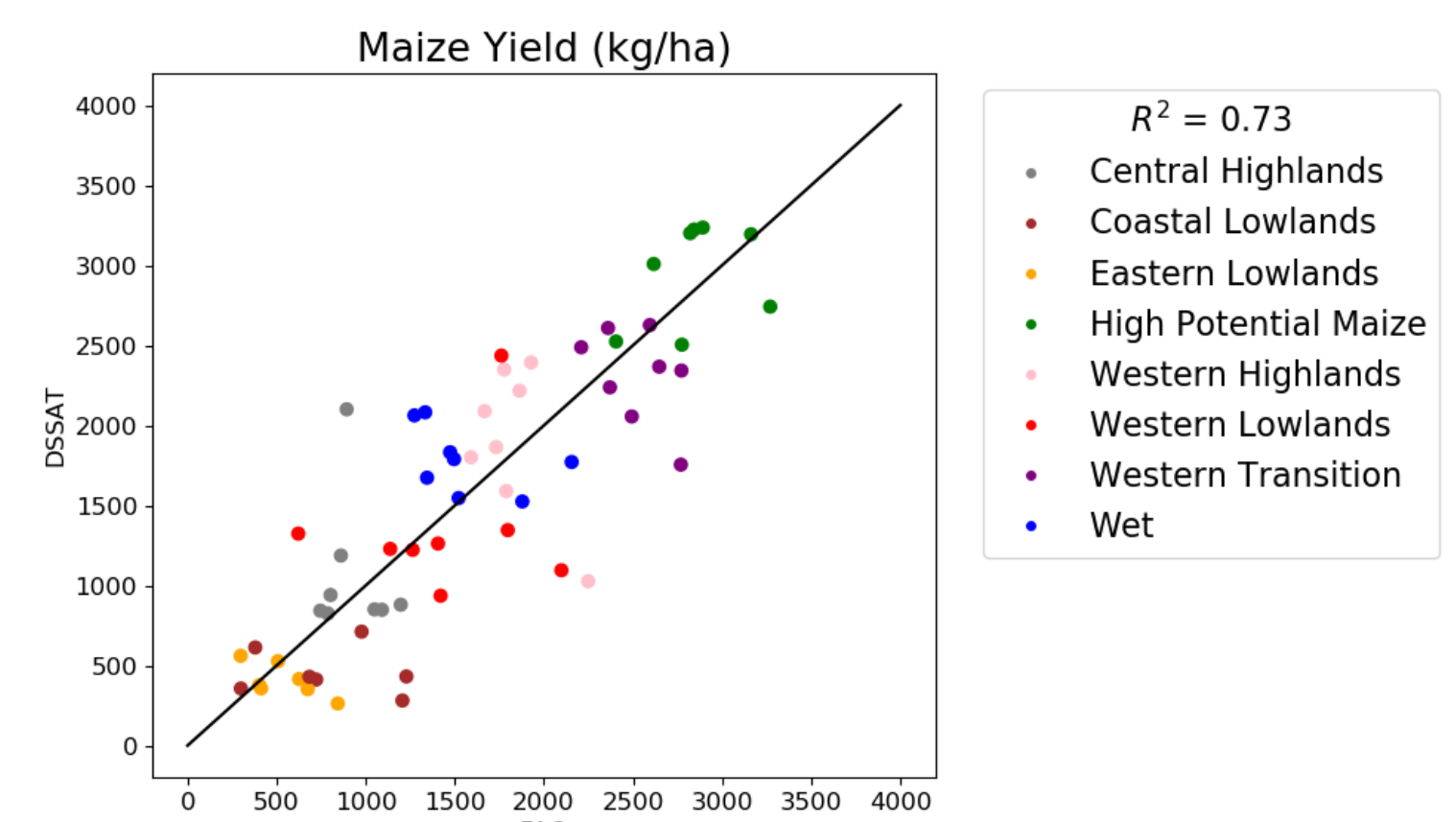


Figure 5. Progression of forecasted yield compared to min and max yields from the fall 2019 growing season

Conclusions and Future Work

- ▶ Outputs from RHEAS can enhance understanding and add to current drought monitoring efforts in the region by the National Drought Management Authority
- ▶ Yield forecasts may be useful near the end of the season, but uncertainty in weather forecasts are challenging
- ▶ Other weather forecasts will be incorporated in the future to test their usefulness

Acknowledgements

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