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Introduction

Weather and climate strongly impact coffee yield (Bunn et al., 2015). A data-driven approach is used here to identify how sensitive Robusta coffee is to weather, during which key moments weather is most influential for yield, & how long before harvest yield could potentially be forecasted. We focused on the 19-year coffee yield of the leading Robusta coffee-producing provinces of Vietnam, where 40% of global Robusta is produced.

Materials

- Yield anomaly data
- Weather data (precipitation & temperature - ERA5 Land).

Methods

- Linear regression
- Regularization techniques (input selection, PCA)
- Leave-one-out approach: to assess model quality

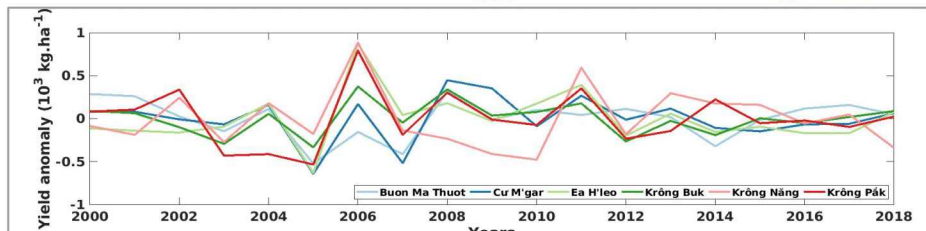


Figure 1: The coffee yield anomalies time series of study districts in Dak Lak (Vietnam).

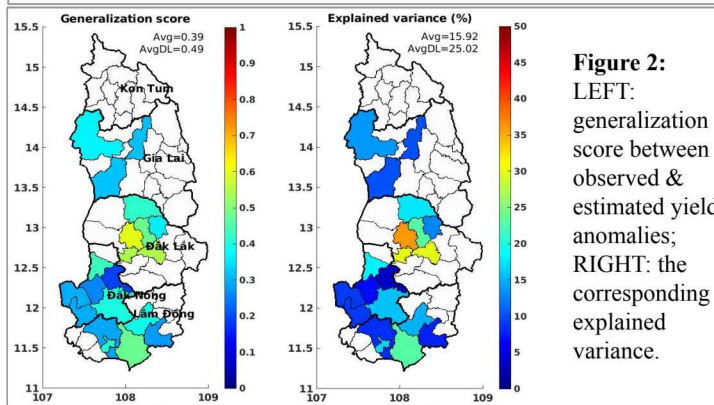


Figure 2:

LEFT: generalization score between observed & estimated yield anomalies; RIGHT: the corresponding explained variance.



Results/Discussion

- Weather explains 16 - 25% of the Robusta yield anomalies.
- Robusta coffee is most sensitive to the vegetative growth & bean formation stages.
- The model forecasts the yield anomalies with 3-6 months anticipation.

Conclusion/Perspectives

- Main difficulty of statistical model is the data limitation.
- Using regularization strategies and applying good quality assessment diagnostics are required.
- In perspectives: Using more sophisticated models that combine data from multiple locations, extending the coffee yield database.

References:

- Bunn et al., 2015 Climate Change DOI:10.1007/s10584-014-1306-x