

Studentship Project: Annual Project Report October 2020 to September 2021

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Project Title:	An empirical, data-driven, model for wheat cultivars and optimisation for future climate scenarios		
Lead Partner:	University of Sussex		
Supervisor:	Seb Oliver		
Start Date:	01 October 2020	End Date:	30 April 2025

1. Project aims and objectives

This project uses data from AHDB UK wheat trial sites, including associated temperature and precipitation information, to identify relationships (assuming management practices are consistent).

In particular, the study aims to better understand expected wheat yields under future climate scenarios.

It builds on a similar study that looked at maize in the US.

2. Key messages emerging from the project

Data modelling for UK wheat is different to US maize – there is not a clear relationship using the existing methodology.

This is for three main reasons:

1. The variability of the trial sites in the UK
2. The climate differences as related to the optimum growing conditions for the respective crops
3. The nature of the data used.

Additionally, adding sunshine or humidity data does not appear to improve the model and adds complexity to it.

Using temperature and precipitation as an annual accumulation/average is an oversimplification and masks the variability that may influence the growth of the crop.

We now use monthly data.

The results described in this summary report are interim and relate to one year. In all cases, the reports refer to projects that extend over a number of years.

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3. Summary of results from the reporting year

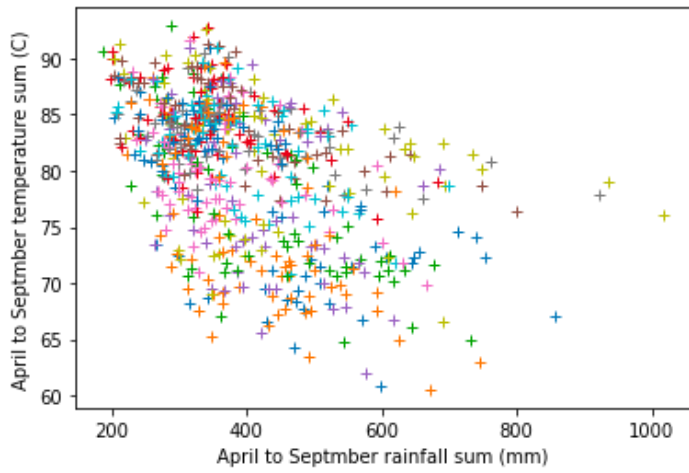


Figure 1. Correlation between summer temperature and rainfall

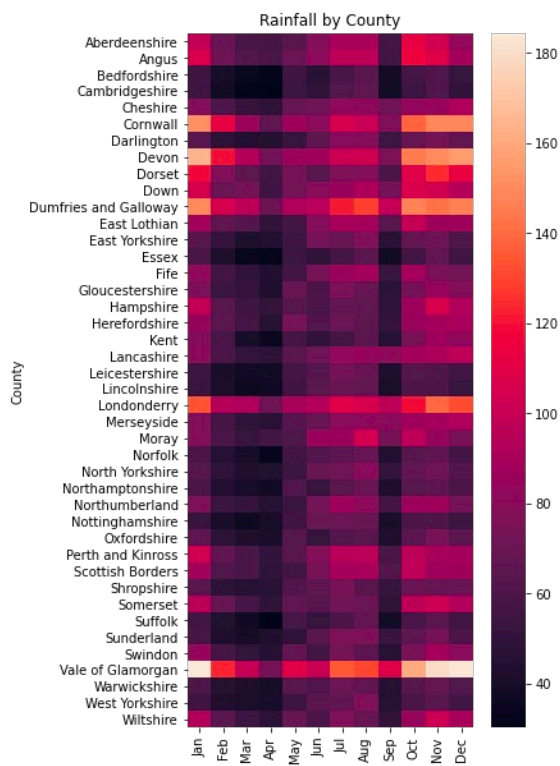


Figure 2. Monthly rainfall values by county

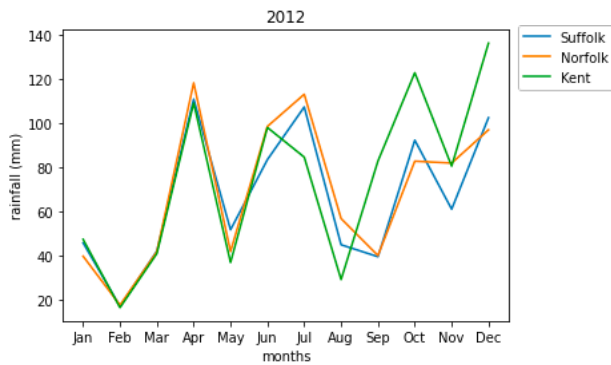


Figure 3. Rainfall for a single year (by month) for three counties

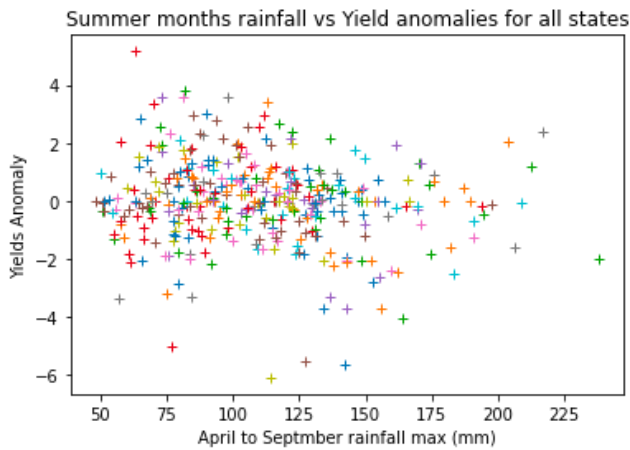


Figure 4. The relationship (or lack of it) between yield anomalies and rainfall (April to September)

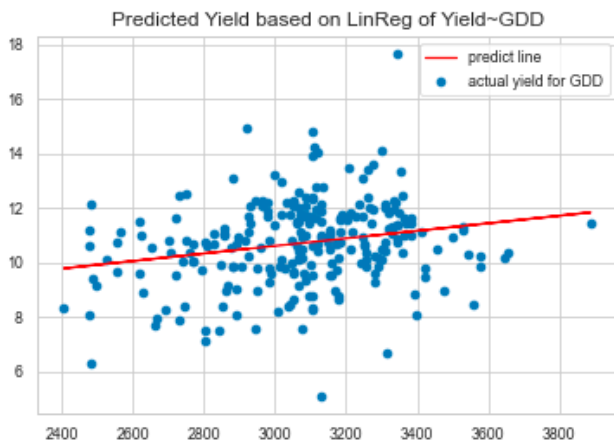


Figure 5. Using a linear regression to predict the yield with the annual accumulation of GDD units.

The temperature values do not vary much from year to year when looking at the whole-year profile from county to county, but the rainfall has much variability (which is why the total value was originally used).

4. Key issues to be addressed in the next year

What additional questions need to be asked to complete this study?
 Will looking at a different methodology be fruitful?
 Can separating (either by parentage or groups) the data be helpful?

5. Outputs relating to the project

(events, press articles, conference posters or presentations, scientific papers):

Output	Detail
National Conference	Peterborough – Dec 2021
Regional Conferences	South East (Maidstone), South West (Swindon) and East (Newmarket) 2022

6. Partners (if applicable)

Scientific partners	University of Reading
Industry partners	Quant Foundry and the Met Office
Government sponsor	