Crop Maps – further information

Purpose

Cornwall is experienced changes in climate. While some of these are having an adverse impact on agriculture, they also create opportunities to grow new crops or expand the cultivation of existing crops that are only grown in small quantities. However, as many such crops originate from warmer regions, they require specific microclimatic conditions in which to grow. An important challenge for the Cornish agricultural industry is therefore to identify where these locations will be, so that any opportunities can be fully realised.

The ClimateHub project

The University of Exeter ClimateHub project, funded by EDRF-Agritech, has developed and applied a series of climate models and coupled these to state-crop growth models to predict and map crop yields under current and future climate conditions. Building on 15 years of expertise in microclimate modelling, we have modelled the climate across Cornwall at 100m resolution, thereby enabling farm and field-scale estimates of crop yields. The crop model used, 'WOFOST' (WOrld FOod Studies), is one of the key components of the European MARS crop yield forecasting system and underpins analyses in the Global Yield Gap Atlas.

What the maps show

Predicted yields are shown for the current period (2012-2017) and future climate (2042-2047), making the assumption that greenhouse gas emissions continue to rise over the next 50 years. Initial analysis focuses on fourteen crops listed below. These are a combination of crops currently grown and ones which could potentially be grown under future conditions. Of those that could potentially be grown, only subset predicted to reach maturity in the region are shown. Analyses are restricted to farmland and places where wind speeds do not regular exceed 35 knots. For each crop, you are able to toggle between maps of current and future yield projections. The spatial resolution of these maps is 100m.

Table 1: English name and primary geographic range of the crop species modelled using the WOFOST crop model

Crop name	Primary geographic region of variety shown
Spring barley	Europe
Chickpea	Tropical
Cowpea	Tropical
Faba bean	Europe
Grain maize	Southern Germany, Northern France
Maize	Sub-tropical varieties
Potato	Northern Europe
Oilseed rape	Central and Northern Europe
Soybean	Northern France
Sugarbeet	Northern Europe
Sunflower	France, Italy, Spain, Greece
Tobacco	Tropical
Millet	Tropical
Mungbean	Tropical

Further information

For more information about ClimateHub and other agricultural research projects please see the Agritech Cornwall website here https://www.agritechcornwall.co.uk/projects/climatehub/

For more information about novel crops please see WOFOST website. The R-software implantation of the model developed by the University of Exeter can be obtained from here. The microclimate modelling software can be obtained from here.

For more information on microclimate modelling and the microclimate research group please see www.microclim.org.uk