# Effects of projected climate change on quantity and quality of soybean yield under different emission scenarios

## ABSTRACT

Soybean is one of the most important oilseed crops in the world. Its economic value is based on the concentration of protein and oil produced in the seeds. However, in climate change studies, a crop simulation model like AquaCrop is unable to predict the qualitative yield of crops. Therefore, this study aims to simulate qualitative soybean yield based on regression models between observed dry grain yield (Yd) from 12 treatments as independent variables with their corresponding observed values for oil and protein contents as dependent variables. The P-value ($<0.05$) and R2 value of the linear regression model showed that oil content was positively regressed with yield, whereas protein content was negatively regressed with yield. On the other hand, predicted values of Yd from the calibrated AquaCrop model over general circulation models based on weighted multi-model ensemble means of five emission scenarios have been used for simulation of soybean oil and protein contents in the future. The results obtained by comparing historical period (1985–2010) to the future period (2020–2039) centred on the 2030s, showed that soybean oil content increased similarly as yield increased in the future period while protein content decreased inversely with yield. Overall, statistical indicators showed that the linear regression model performed well to predict the soybean oil and protein content when AquaCrop model not able to simulate the qualitative yield.