## Extending Agriculture Simulator Capabilities with R

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The Agricultural Production Simulator (APSIM) is a widely used, powerful and highly complex computer program. Based on information about weather, soil properties, farming practices and land use, APSIM can predict crop and environmental outcomes such as crop yield, nitrogen runoff and sediment loss as a function of time and space. Recent increased interest in additionally quantifying and reducing uncertainty about APSIM predictions has made the short comings of the current APSIM interface more apparent. In particular, only basic visualization and summary techniques are available within APSIM; this leads researchers to use a second program, such as R, in order to better understand the results. Additionally, running APSIM for a variety of input values is not straight forward and interested researchers need to write their own scripts to automate repeated APSIM runs. We introduce the apsimr package, which aims to extend APSIM by adding advanced analytic measures and to ease the pain of learning APSIM by researchers in other fields. The apsimr package includes function to allow the user to create, alter and run APSIM simulations individually or in large batches. The results can then be visualized and summarized using standard or advanced analytics. Sensitivity and uncertainty analysis can require several hundred APSIM runs, therefore apsimr links to the APSIMBatch package to run APSIM on high performance computers. In this talk we will demonstrate the use of **apsimr** and discuss the problems that arose in its creation, most of which stem from the unique structure of the input and output files expected and produced by APSIM.