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A better way to build plant models

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Abstract: The plant modelling framework (PMF) in the next generation of APSIM enables plant models to be constructed in a novel, more reliable and robust manner. It provides a library of small processes that can be aggregated into bigger processes which in turn can be combined into larger constructs, ultimately forming a plant model. The user interface supports a workflow that allows the model builder to collate and store experimental data, construct the model (by process aggregation), create and run simulations of the experimental data and graphically view the performance of the model. The model builder can then iteratively modify the model, re-run the simulations and examine model performance. When new process building blocks are required, they are coded in C# and added to the process library. Once the model builder is satisfied with the performance of the model, the model undergoes peer-review (akin to a journal paper review) and ultimately is included in the APSIM release. When the model is completed, documentation is auto-generated and uploaded to the web site. The documentation is created from the experimental data, source code (via code inspection/reflection) and simulation configuration. The resulting PDF contains a complete description of the model and graphs of its performance. APSIM Next Generation is an open source product, available on GitHub (https://github.com/APSIMInitiative/ApsimX) and freely available for non-commercial use. Binary installations can be downloaded from www.apsim.info.

Keywords*:* plant modelling framework; PMF; crop model; APSIM