GOYDER INSTITUTE MODEL METADATA TEMPLATE

METADATA REQUIRED	DETAILS
Model Name and version	Agricultural Production Systems Simulator (APSIM) version 7.5
Date of lodgement of Metadata Template. Name of Metadata Provider	Jan 15 2015 Bronya Alexander, Bronya.Alexander@sa.gov.au
Goyder Institute Project Number and Name	**GOYDER INSTITUTE FOR WATER RESEARCH Project No. C.1.1** Development of an agreed set of climate change projections for South Australia
Project Team	Project Leader Professor Simon Beecham, simon.beecham@unisa.edu.au Task 4 Leader Dr Graham Green, graham.green@sa.gov.au Project Team Members from SARDI: Dr Peter Hayman, Peter.hayman@sa.gov.au Ms Bronya Alexander, Bronya.alexander@sa.gov.au
Creator/Developer	The APSIM software is a modular modelling framework that has been developed by the APSIM Initiative and its predecessor the Agricultural Production Systems Research Unit (APSRU) in Australia. http://www.apsim.info/ APSIM has been applied for use in this project by Ms Bronya Alexander and Dr Peter Hayman.
Owner/Contact Person and contact details	SARDI Climate Applications group Ms Bronya Alexander, Bronya.alexander@sa.gov.au Mr Peter Hayman, Peter.hayman@sa.gov.au ***** SEE IP PERMISSION SECTION FOR ANY SPECIFIC REQUIREMENTS *****
Model Location	Output from APSIM runs created specifically for this project are archived on a shared folder that is backed up by PIRSA. Contact Bronya or Peter Hayman for details. APSIM is constantly being developed by the APSRU group. New versions and updates are available at http://www.apsim.info/
IP or other permission requirements	*********** REFER TO GOYDER AGREEMENT ********* *Are there any IP issues associated with the model and/or the dependencies that future users need to be aware of?* NO
Licences associated with model or dependencies	APSIM access is through approved licensing agreements with the APSIM Initiative http://www.apsim.info/Products/Licensing.aspx Historical climate data was sourced from the online SILO Patched Point Dataset https://www.longpaddock.qld.gov.au/silo/ for which SARDI pays an annual license

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Confidentiality agreements associated with model and/or dependencies	*Are there any confidentiality agreements associated with the model and/or the dependencies that future users need to be aware of?* NO
Brief outline of model	APSIM contains a suite of modules which enable the simulation of agricultural systems that cover a range of plant, animal, soil, climate and management interactions.
Area/region covered	APSIM is a point source model. For this project we focussed on Snowtown in the mid North of South Australia to represent cropping systems within a 10km radius.
Platform and language and version	APSIM Version 7.5 The .NET languages are used to write models for APSIM. Either C#.NET or VB.NET can be used. http://www.apsim.info/Documentation/TechnicalandDevelopment/WritingcodeforAPSIM.aspx APSIM has a very good Geographical User Interface through which most of the setup for this project was done.
Dependencies upon: i) other models and/or platforms (including version) and location ii) essential data and data sources and location	APSIM model (v 7.5) is available through the APSIM Initiative http://www.apsim.info/Products/Licensing.aspx Historical climate data was sourced from the online SILO Patched Point Dataset https://www.longpaddock.qld.gov.au/silo/ for which SARDI pays an annual license.

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How was model used	○ *Parameterisation/Validation* APSIM is a cropping systems model that uses daily time step weather data to simulate a soil water balance and crop growth. It has been widely parameterised and validated for soils and crops in dryland southern Australian farming systems. There is an option in the model to apply irrigation but the model has less validation for irrigated cropping in Southern Australia. There are developments whereby established viticulture models such as VineLogic developed by CSIRO can be run within the APSIM modelling software. Summarised in Goyder Institute Technical Report 15/2 ○ *Scenarios and outputs from various runs APSIM used a subset of the climate data* produced through the statistical downscaling model from Task 3 of the Goyder Institute Climate Change project (and reported in Goyder Institute Technical Report 15/1). Of the 15 global GCMs downscaled, we focussed on the 2 models GFDL-ESM2M and ACCESS1.0. APSIM output is stored at SARDI share drive is "G:\Climate Risk\Goyder Inst project APSIM backup" Contact Dr Peter Hayman, Leader Climate Applications Group Peter.Hayman@sa.gov.au, Further details in Goyder Institute Technical Report 15/2 ○ *Assumptions behind model* The soil moisture budget is a relatively simple tipping bucket approach with parameters to allow movements between soil layers and water that drains below the root zone. Summarised in Goyder Institute Technical Report 15/2 ○ *Limitations of model* Not all crops are included and some crops (eg wheat) have had more research and validation than newer crops (eg Field pea). As a point source model it is difficult to account for complexities of lateral movement of surface or subsurface water. Summarised in Goyder Institute Technical Report 15/2 ○ *Peer review process (if applicable)* Reviewed by two reviewers external to the project. ○ *Extensibility of model (can it be run for different time periods)* Yes – APSIM can be run with historical/hindcast met data (eg 1900-2006), or with projections data as done for this project (eg 2006-2100). Goyder Institute Technical Reports 15/1 and 15/2 are available at http://goyderinstitute.org/

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Specificity of data	*Was data sourced from local field sites or literature* Climate projections sourced from Task 3 downscaling as part of the Goyder Institute Climate Change project (and reported in Goyder Institute Technical Report 15/1), Data stored in CSIRO Data Access Portal (DAP): http://dx.doi.org/10.4225/08/54644D99C091A Historical climate data sourced from the online SILO Patched Point Dataset https://www.longpaddock.qld.gov.au/silo/ Hypothetical soils were used and created by Bronya Alexander and Peter Hayman.
Datasets/data products produced	*Include details of where datasets/products are located and contact details in the storage location* Datasets are summarised in Goyder Institute Technical Report 15/2 Available at http://goyderinstitute.org/ Datasets produced from APSIM are located with Ms Bronya Alexander at SARDI Bronya.alexander@sa.gov.au and are also stored on a shared folder that is backed up by PIRSA.
Other Information	
Publications (papers and technical reports)	Hayman, P.T. and Alexander, B.M. 2015, Application of downscaled climate data for South Australia using the cropping simulation model APSIM, Goyder Institute for Water Research Technical Report Series No. 15/2, Adelaide, South Australia.
Collaborations and acknowledgements	Acknowledgements to Dr Leon van der Linden from SA Water (also part of Task 4 of the Goyder Institute Climate Change project) for assistance in climate data formatting Leon.VanDerLinden@sawater.com.au
Keywords	APSIM, climate change, projections, downscaling, Snowtown