Background: The Agricultural Production Systems sIMulator (APSIM) is a farming systems modelling framework that is being actively developed by the APSIM Initiative.

It is comprised of

1. a set of biophysical models that capture the science and management of the system being modelled,
2. a software framework that allows these models to be coupled together to facilitate data exchange between the models,
3. a community of developers and users who work together, to share ideas, data and source code,
4. a data platform to enable this sharing and
5. a user interface to make it accessible to a broad range of users.

The literature contains numerous papers outlining the many uses of APSIM applied to diverse problem domains. In particular, Holzworth et al., 2014; Keating et al., 2003; McCown et al., 1996; McCown et al., 1995 have described earlier versions of APSIM in detail, outlining the key APSIM crop and soil process models and presented some examples of the capabilities of APSIM.

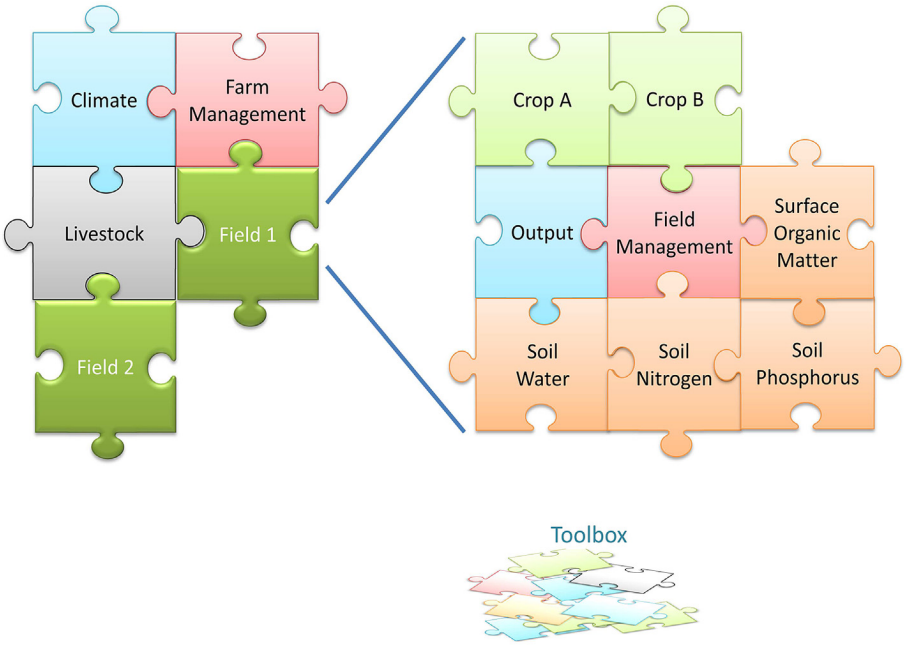

Figure: This conceptual representation of an APSIM simulation shows a "top level" farm (with climate, farm management and livestock) and two fields. The farm and each field are built from a combination of models found in the toolbox. The APSIM infrastructure connects all selected model pieces together to form a coherent simulation.

The APSIM Initiative has begun developing a next generation of APSIM (APSIM Next Generation) that is written from scratch and designed to run natively on Windows, LINUX and MAC OSX. The new framework incorporates the best of the APSIM 7.x framework with an improved supporting framework. The Plant Modelling Framework

(a generic collection of plant building blocks) was ported from the existing APSIM to bring a rapid development pathway for plant models. The user interface paradigm has been kept the same as the existing APSIM version, but completely rewritten to support new application domains and the newer Plant Modelling Framework. The ability to describe experiments has been added which can also be used for rapidly building factorials of simulations. The ability to write C# scripts to control farm and paddock management has been retained. Finally, all simulation outputs are written to an SQLite database to make it easier and quicker to query, filter and graph outputs.

The model described in this documentation is for APSIM Next Generation.

1 WholeFarm

A generic system that can have children

1.1 Resources

Manger for all resources available to the model

1.1.1 AnimalFoodStore

Store for all the food designated for animals to eat (eg. Forages and Supplements)

1.1.1.1 Lucerne

This stores the initialisation parameters for a fodder type.

1.1.2 Ruminants

Parent model of Ruminant Types.

1.1.2.1 Bos indicus

This stores the parameters for a ruminant Type

1.1.2.1.1 CalfF

This stores the initialisation parameters for a Cohort of a specific Ruminant Type.

1.1.2.1.2 CalfM

This stores the initialisation parameters for a Cohort of a specific Ruminant Type.

1.1.2.1.3 WeanerF

This stores the initialisation parameters for a Cohort of a specific Ruminant Type.

1.1.2.1.4 WeanerM

This stores the initialisation parameters for a Cohort of a specific Ruminant Type.

1.1.2.1.5 Female1_2

This stores the initialisation parameters for a Cohort of a specific Ruminant Type.

1.1.2.1.6 Female2_3

This stores the initialisation parameters for a Cohort of a specific Ruminant Type.

1.1.2.1.7 Female3_4

This stores the initialisation parameters for a Cohort of a specific Ruminant Type.

1.1.2.1.8 Female4_5

This stores the initialisation parameters for a Cohort of a specific Ruminant Type.

1.1.2.1.9 Female5_6

This stores the initialisation parameters for a Cohort of a specific Ruminant Type.

1.1.2.1.10 Female6_7

This stores the initialisation parameters for a Cohort of a specific Ruminant Type.

1.1.2.1.11 Female7_8

This stores the initialisation parameters for a Cohort of a specific Ruminant Type.

1.1.2.1.12 Female8_9

This stores the initialisation parameters for a Cohort of a specific Ruminant Type.

1.1.2.1.13 Female9_10

This stores the initialisation parameters for a Cohort of a specific Ruminant Type.

1.1.2.1.14 Male1_2

This stores the initialisation parameters for a Cohort of a specific Ruminant Type.

1.1.2.1.15 Male2_3

This stores the initialisation parameters for a Cohort of a specific Ruminant Type.

1.1.2.1.16 Male3_4

This stores the initialisation parameters for a Cohort of a specific Ruminant Type.

1.1.2.1.17 Breeding_sires

This stores the initialisation parameters for a Cohort of a specific Ruminant Type.

1.1.3 Land

Parent model of Land Types.

1.1.3.1 Sandy loam country

This stores the initialisation parameters for land

1.1.4 Pasture

Virtual store for all the pasture growing in the fields This acts like an AnimalFoodStore but in reality the pasture is in a field

1.1.4.1 NativePasture

This stores the parameters for a Pasture type and holds values in the store

1.2 Arbitrators

Manger for all arbitrators available to the model

1.2.1 Ruminant feed arbitrator

Ruminant feeding arbitrator Applies IAT/NABSA logic to supply feed to herd based on requests from feeding activities. This arbitrator modifies the Intake and DietDryMatterDigestability properties of the Ruminant cohort/individual

1.3 Activities

Manger for all activities available to the model

1.3.1 Manage paddock 1

Pasture management activity

1.3.2 Grow all ruminants

Ruminant growth activity

1.3.3 Feed female Bos indicus lucerne

Ruminant feed activity

1.3.3.1 FemaleBosIndicus

Contains a group of filters to identify individual ruminants

1.3.3.1.1 Filter[Breed=Bos indicus]

Individual filter term for ruminant group of filters to identify individul ruminants

1.3.3.1.2 Filter[Gender=Female]

Individual filter term for ruminant group of filters to identify individul ruminants

1.3.4 Muster Activity

Ruminant muster activity

1.3.4.1 BosIndicus to Paddock1

Contains a group of filters to identify individual ruminants to muster

1.3.4.1.1 Filter[Breed=Bos indicus]

Individual filter term for ruminant group of filters to identify individul ruminants

1.3.5 Graze all ruminants

Ruminant graze activity

1.4 Report

A report class for writing output to the data store.

2 Simulation

2.1 WholeFarm

3 References

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