Case Study Simulations

The following are suggestions for this section of the workshop.

The aim is to practice thinking through and achieving all the steps to build simulations of experiments, which could be hypothetical experiments, or a case study from your own experience. You might even have observed data to include for comparison and calibration.

Start with a very simple simulation, then add complexity towards achieving the overall aim of the case study.

Good resources for being reminded of simulation components and for copying all or parts of simulations can be found in:

- Examples: EucalyptusRotation, Factorial and Pinus
- Examples/Tutorial: Sensitivity_FactorialANOVA
- Management toolbox

1. Develop your own simulations of real-world or hypothetical plantation growth.

2. Multi-Site N-fertiliser Experiment

    1) Create a basic simulation that runs ok.
    2) Use this as a base in an experiment with permutations.
    3) Have one level of the permutation as 'Site' with several sites included as composite nodes.
    4) For each site, include a clock, met and soil.
    5) Run and graph variables of interest.
    6) Add another level to the premutation node called 'NRate' to do a simple 2-treatment fertiliser experiment at each site.

3. Fertiliser-by-Irrigation Experiment
    1) Choose a location and download the appropriate met and soil files
    2) Build an experiment with different fertiliser and irrigation treatments where the experimental factors are automatic irrigation (on or off) and N fertilisation at 2 years of age (0 or 200 kg/ha as urea).
    3) Include the appropriate tools (AutomaticIrrigation and Operations) in the base simulation
    4) Modify these tools at the factor level

4. Stocking Experiment
    1) Choose a location and download the appropriate met and soil files
    2) Build an experiment with different stocking levels where stocking is specified in the TreeManagement tool

5. Sensitivity Analysis of Soil parameters
    1) Choose a location and download the appropriate met and soil files
    2) Build an experiment that modifies soil C, C:N or another soil property within a reasonable range.

3) Extend the sensitivity analysis to two soil properties.

6. Simple Climate Change Analysis
   1) Choose a location and download the appropriate met and soil files
   2) Build an experiment with different levels of climate change (rainfall, max and min temperatures) using the ClimateController.