

AGRICULTURAL MODELLING 2

Modelling Techniques

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When interpreting data, any agricultural enterprise must be viewed as a single integrated system. Mathematical models provide the only tool that allows us to assess our ideas in terms of the results from quantitative experiments. The aim of this module is to introduce the fundamental ideas of modelling, including when and how to attempt to express ideas mathematically, how to solve the resulting mathematical model and compare its predictions to experimental data.

OUTLINE

Building a Model:

- 1 Continuous Analytical models
A review of Differential equations; Lotka-Volterra models
- 2 Discrete models
Discrete Logistic Growth - Chaos & Fractals
- 3 Stochastic models
Monte Carlo Simulations - Random Walks & Ruminant Grazing

Solutions using computer methods & Modelling Software:

- 1 Maple
- 2 STELLA

Testing & Evaluation of Models

Calibration and Validation

TEXT

There is no assigned text. Your course notes will be supplemented by handouts, photocopied readings & library holdings.

ASSESSMENT

Class members will be assessed on work assigned during the module

- 1 Exercises(10-20%)
These are designed to encourage critical thinking, such as choice of variables, choice of input/output data etc
- 2 Problems (30-50%)
These are designed to improve analytical problem solving.
- 3 Review Paper (30-50%)
An exposition, analysis and critique of an existing model relevant to agriculture.

Each class member can choose their own weighting scheme within the ranges shown