

# Where do models fit into agricultural research?



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RPS  
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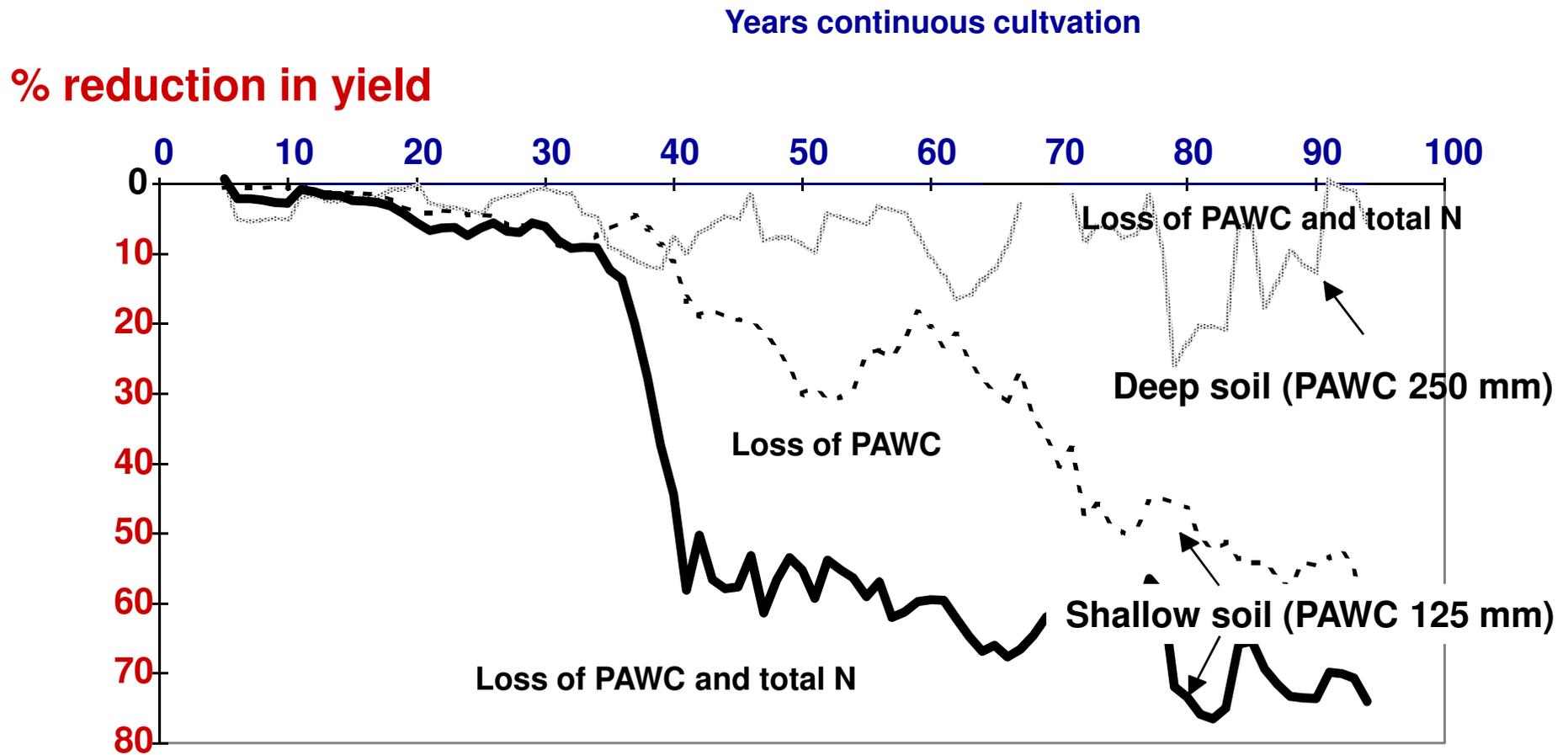
# Why Model?

- **Deal with variability that confounds most field experimentation – stretch short “sample” of time**
- **Bring knowledge from far and wide to bear on the issue of the day**
- **Explore and postulate the many options**

**While all the time**

**-requiring good empirical evidence**

# Where one modelling initiative began: - assessing impacts of erosion on productivity (1985)



And recently:

- the impact of agriculture on water quality reaching the Great Barrier Reef lagoon

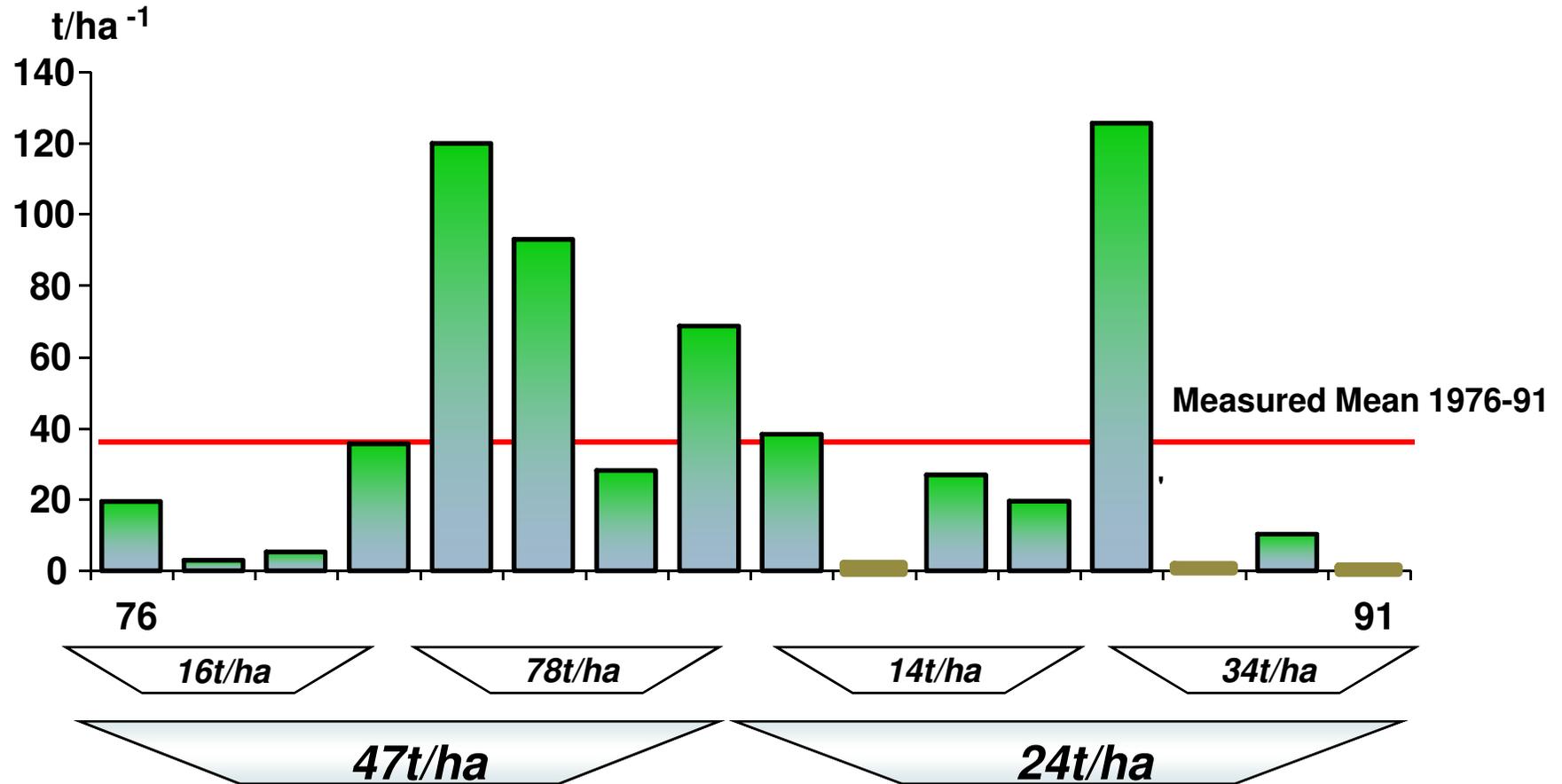


# Make sense of experimental data

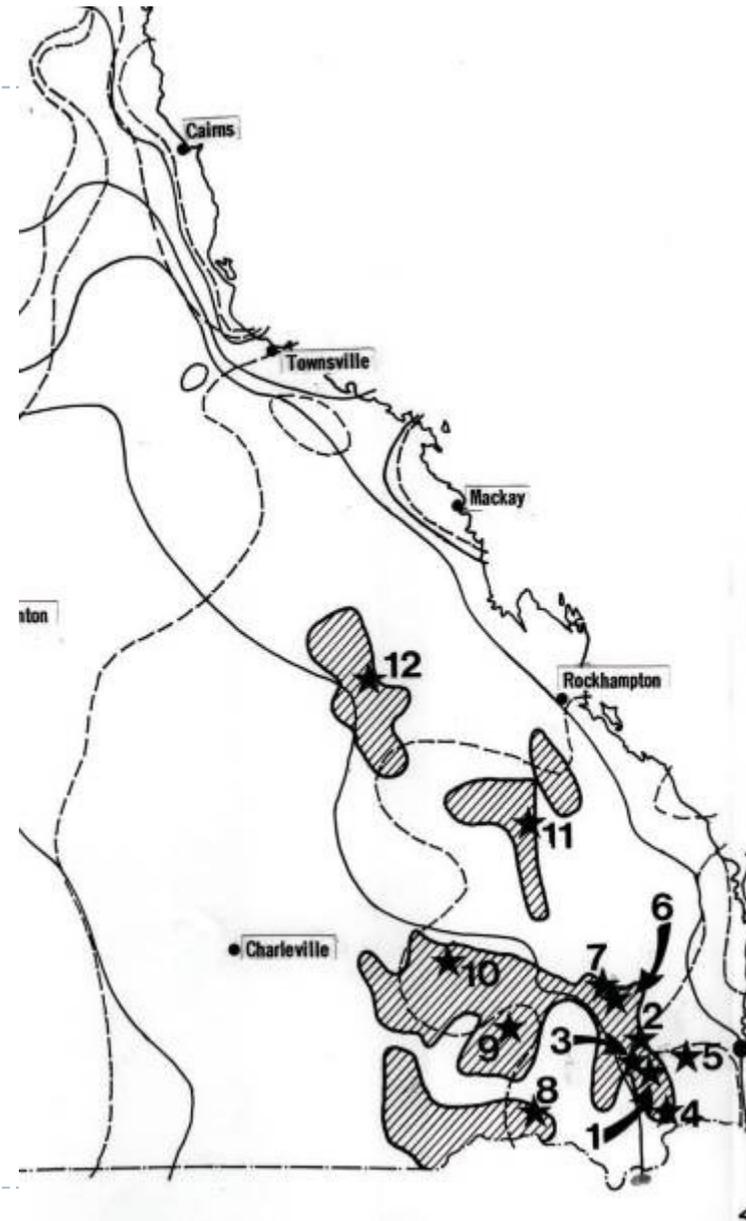
**1976**

**Black earth - Greenmount**

**1991**

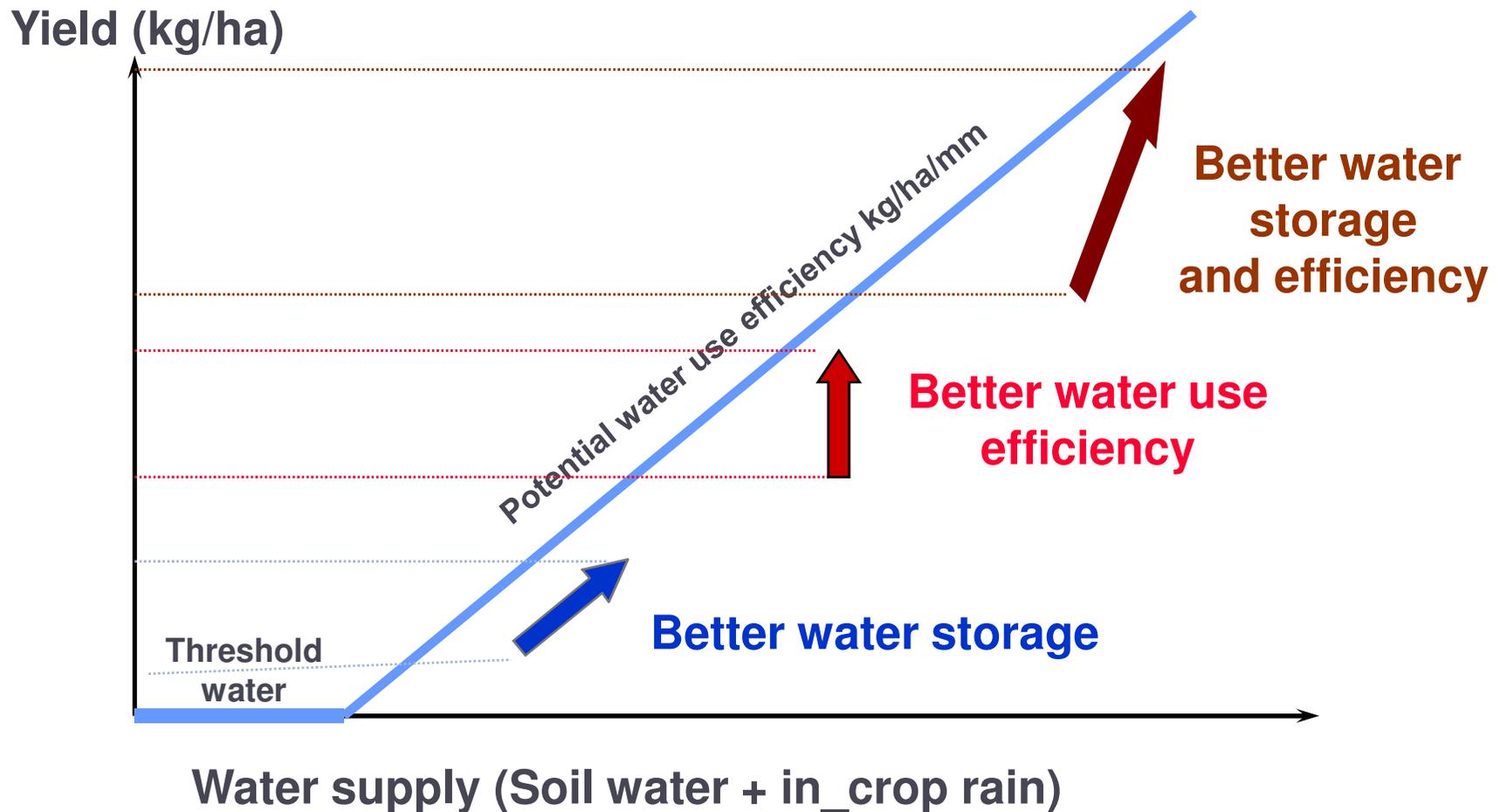


Filling in the gaps  
-few studies, many  
environments



What is a model?

# A simple crop model -converting water to yield

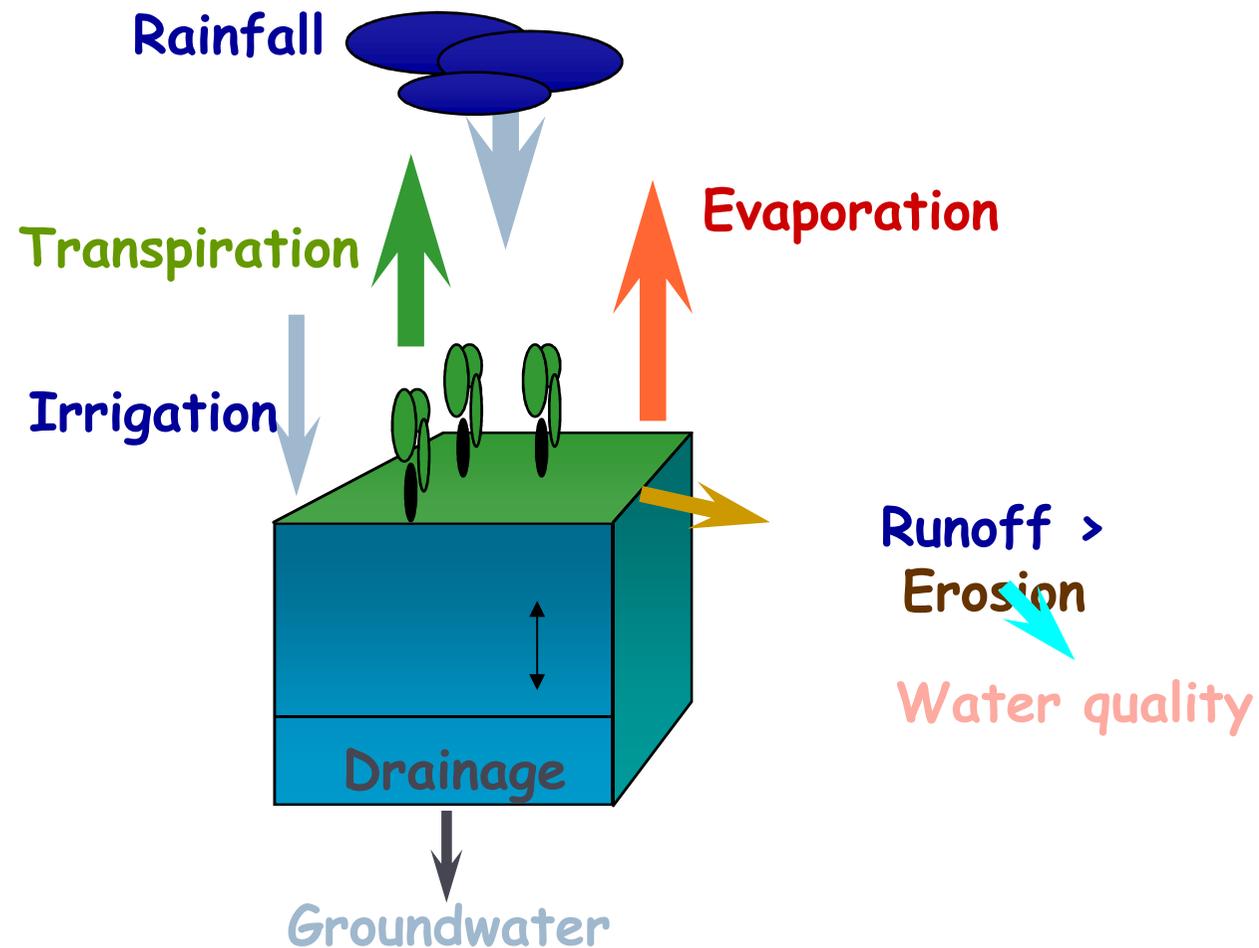


# Model of a storm – rainfall simulator



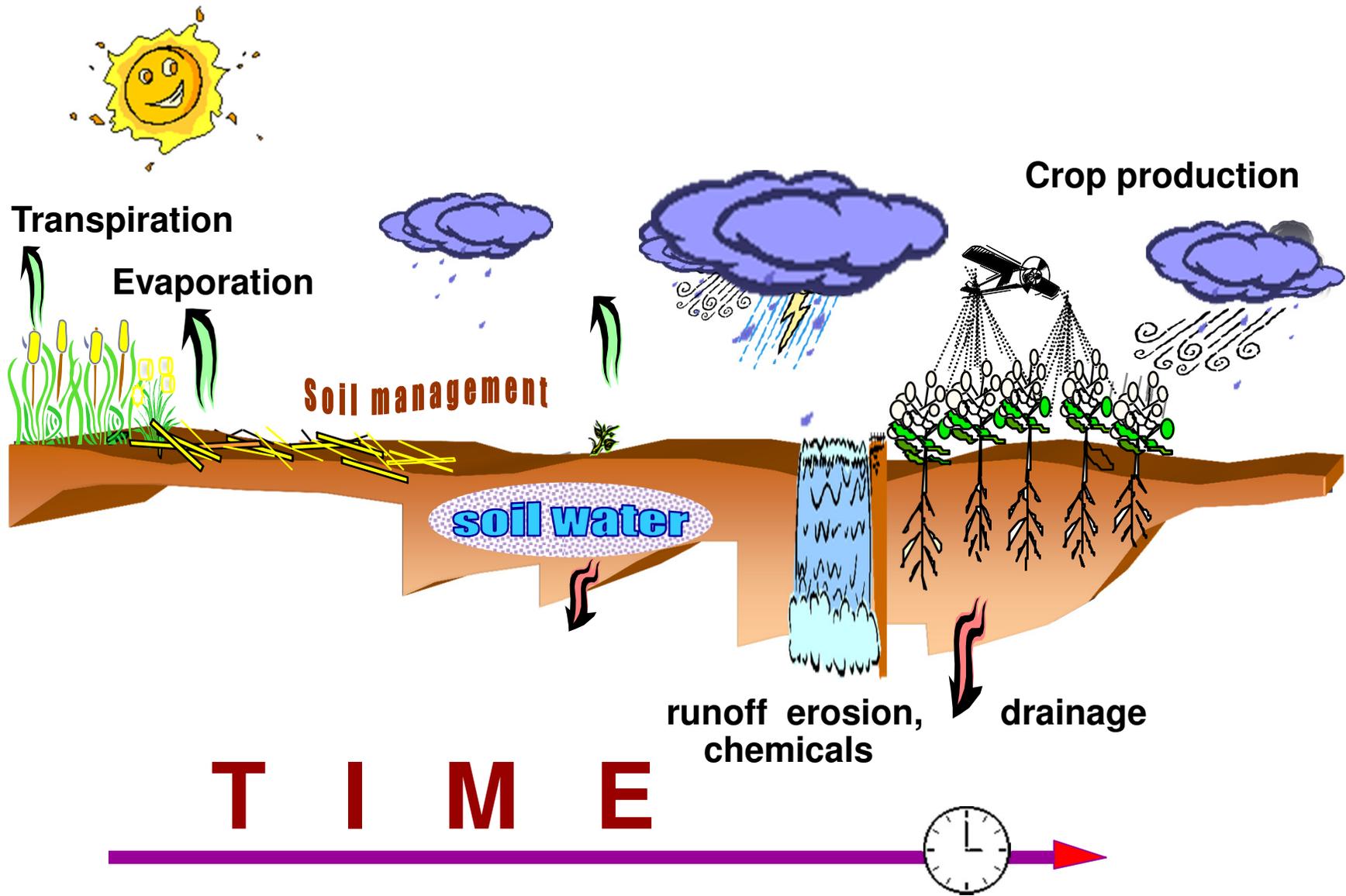
# Water balance model -conceptual

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- ▶-integrates climate, soil management and land use info

# Model of a cropping system



Models:

**Represent a simplified view of reality**

Usually contain a mixture of mathematical relationships and decision rules

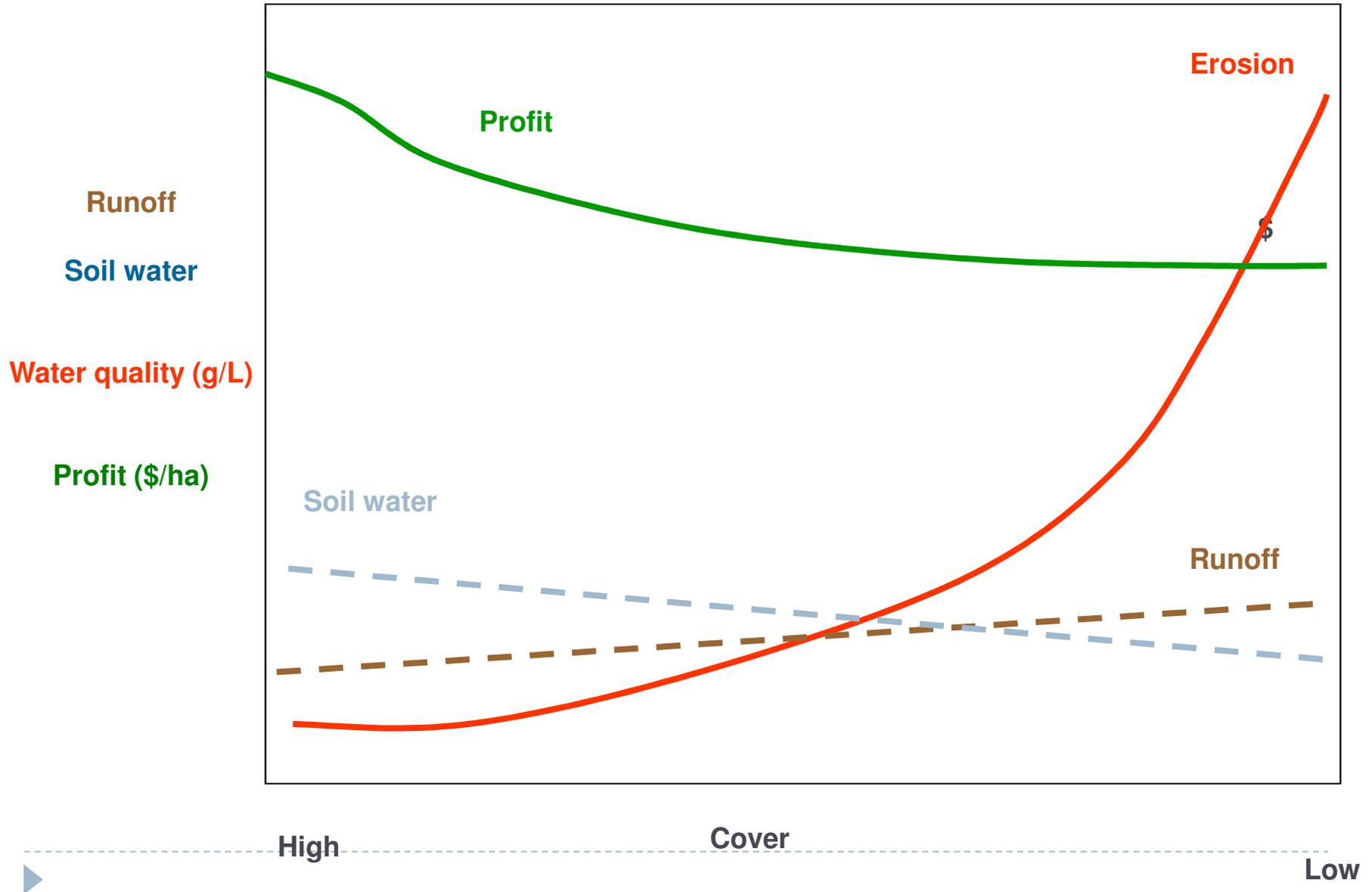
**Processes that are considered of lessor importance are often ignored**

Less important signals are often ignored to enable the model developer to see responses from a system as a whole

**Emphasise and gives prominence to particular features of a system**

Contains subjectivity

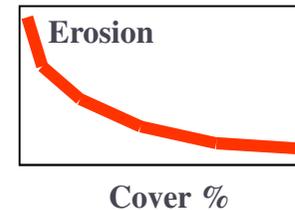
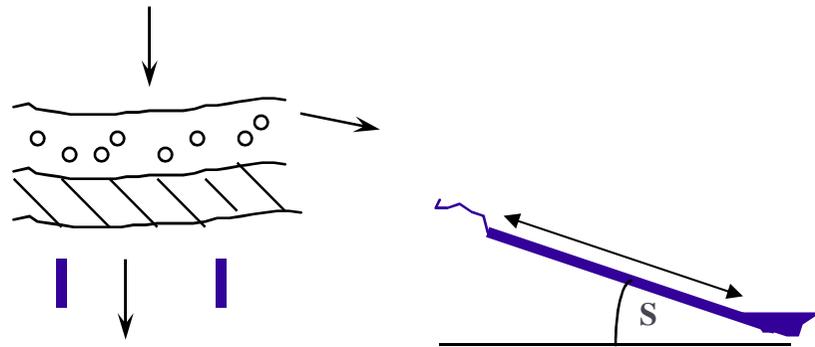
# Conceptual model -cropping



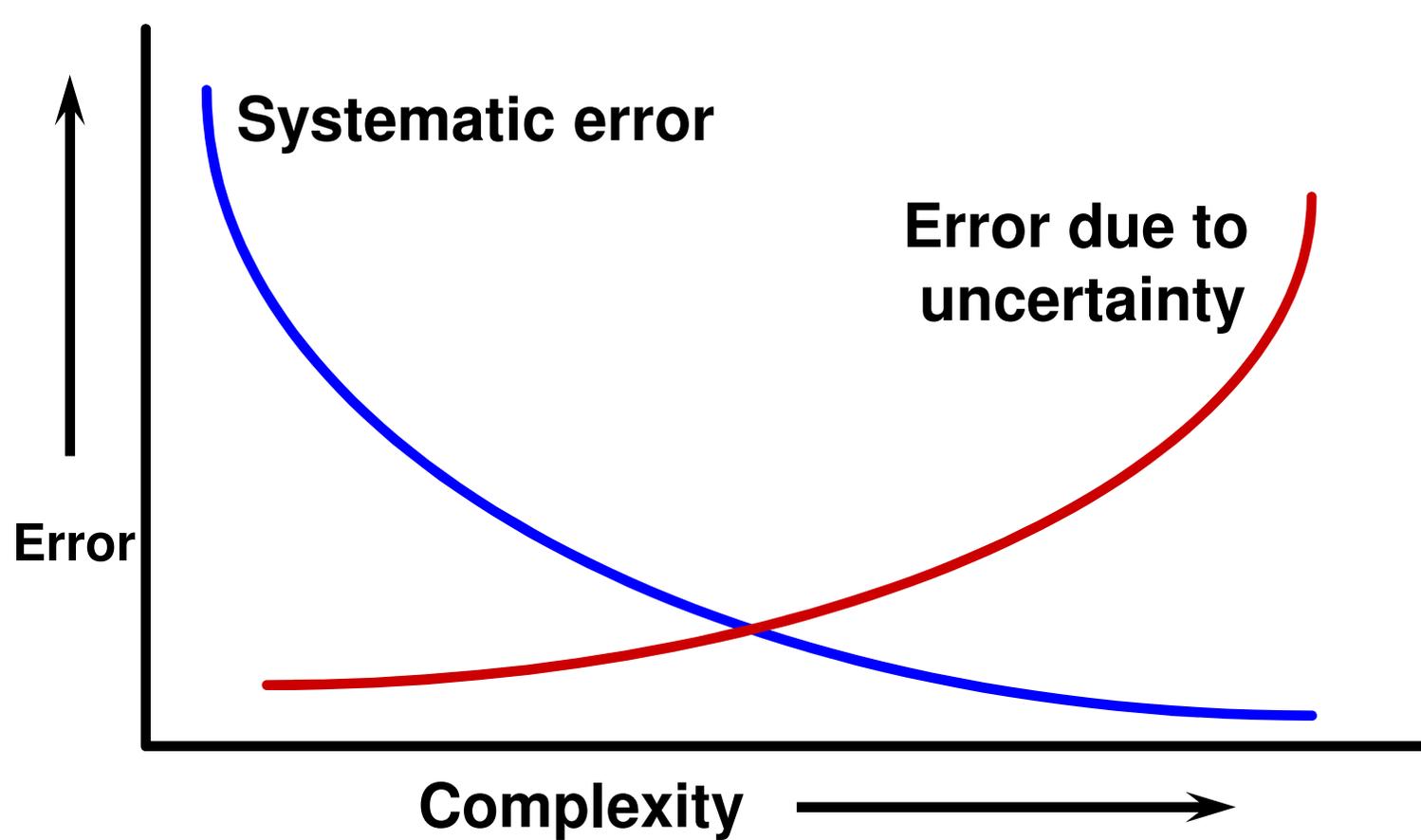
# Conceptual model

– water quality at paddock scale

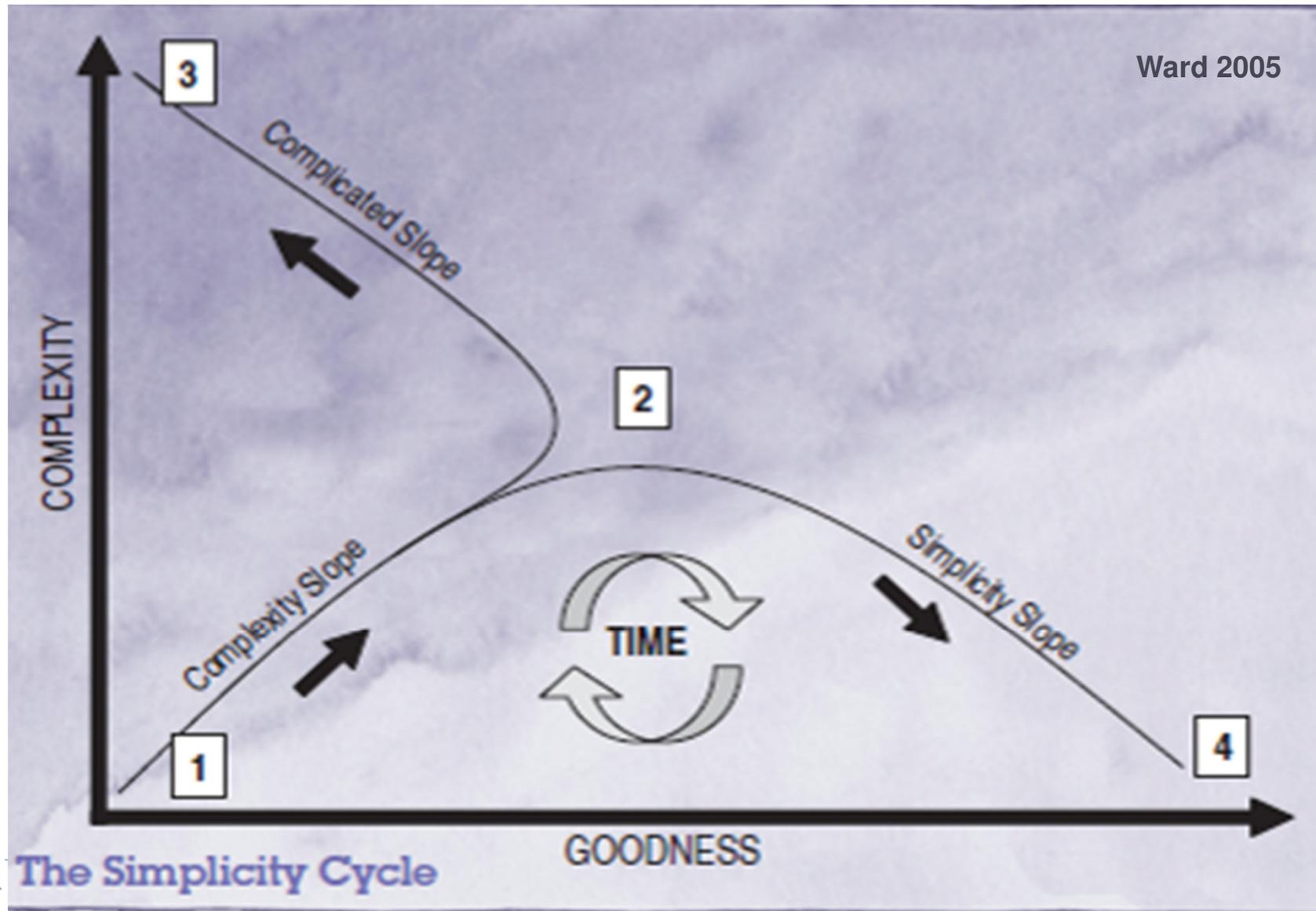
$$WQ = f(\text{runoff, slope, cover, cohesion, concentration})$$



# Tradeoffs in modelling



# The simplicity cycle



## More observations

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- ▶ Poor connection between measurers and modelers
- ▶ Some exaggerated claims of models
  - ▶ >> polarisation and misunderstanding
  - ▶ >> greater hindrance than model capability
- ▶ Elegant simplicity will rule the day
- ▶ No models are accurate or reliable but they can be useful
- ▶ There is no substitute for good experimental data, regardless of end use
  - ▶ >> the next issue – data legacies