



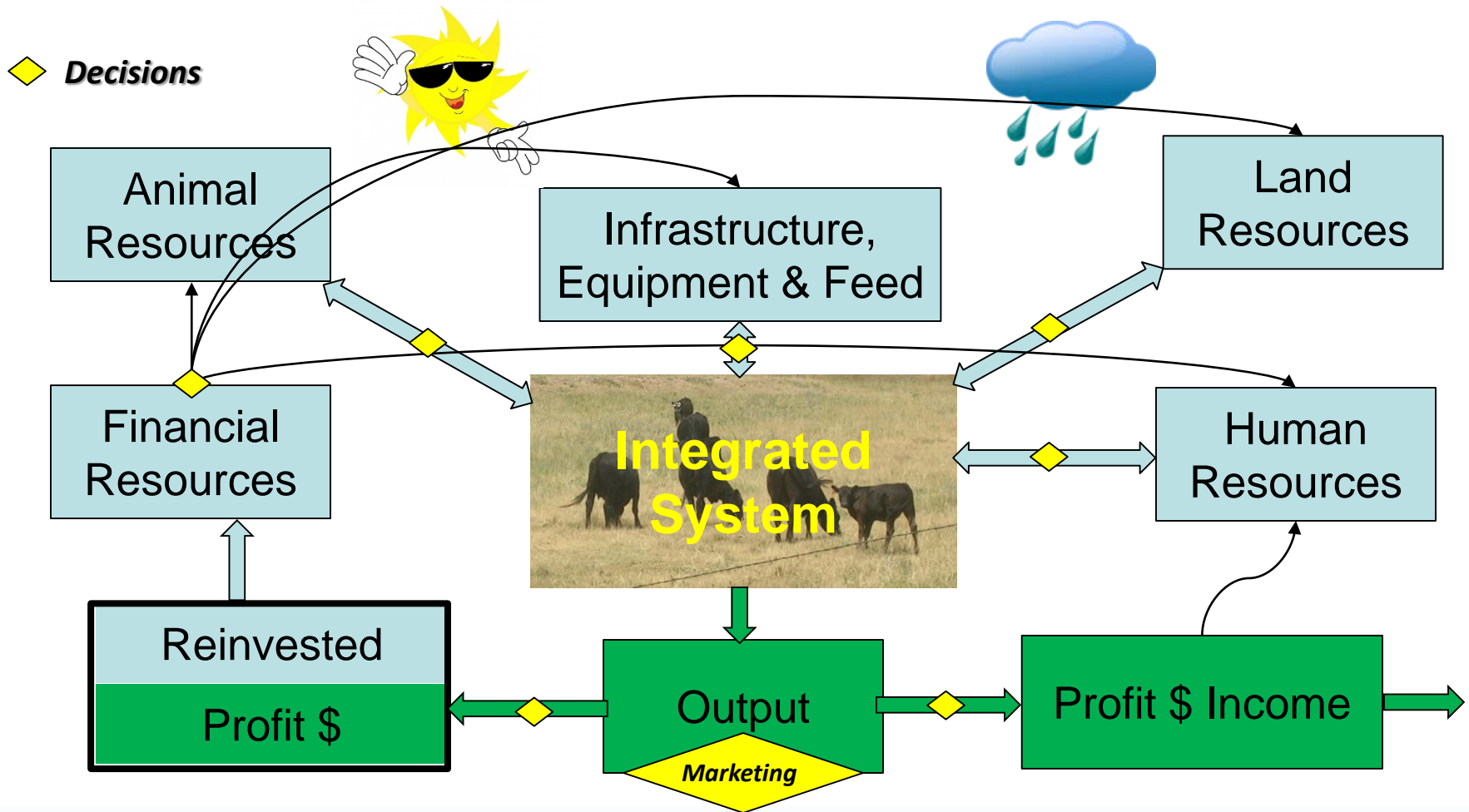
A Systems Approach to Production

2015 Nebraska Ranch Practicum
Gudmundson Sandhills Laboratory
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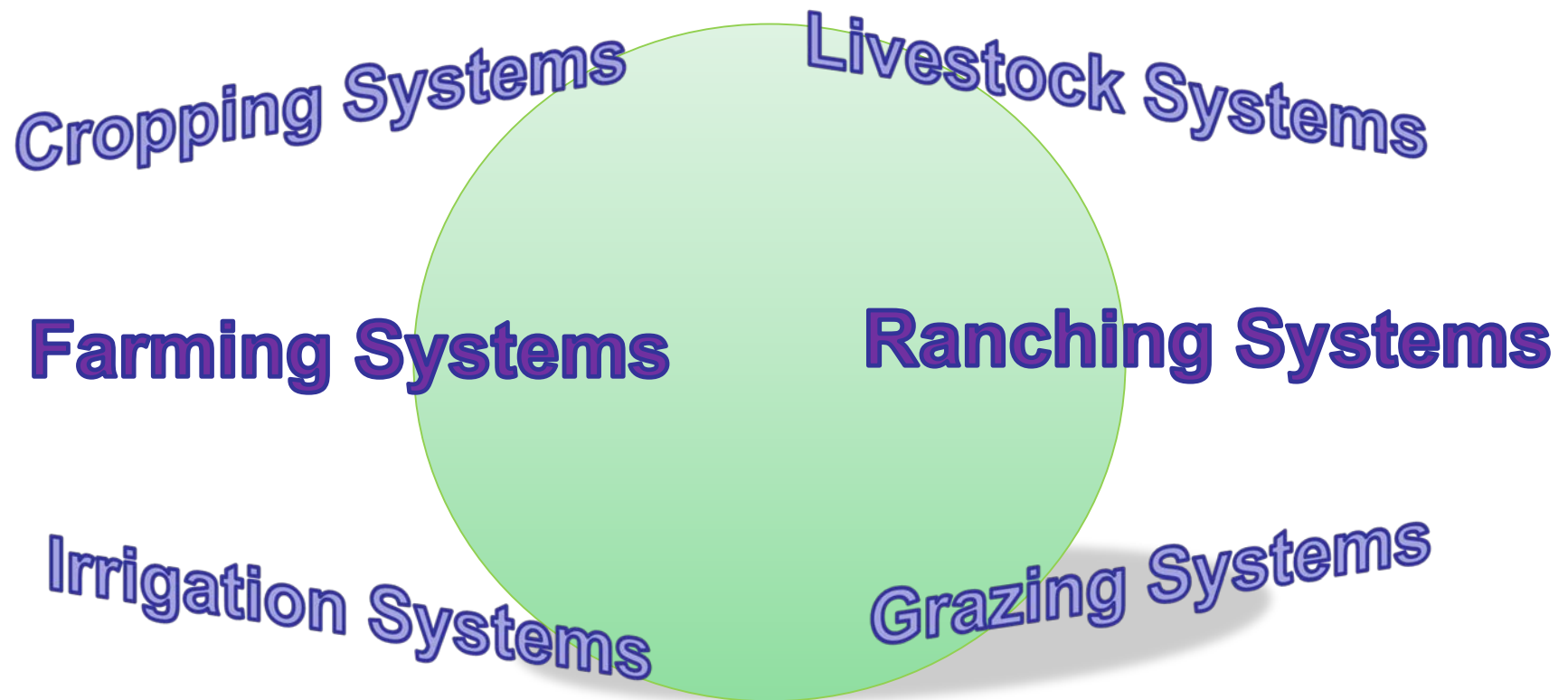
Integrated Production System



General Systems Theory

- Biologist Ludwig von Bertalanffy is recognized as the founder and principal author of general systems theory.
- First proposed in the 1940's.
- Further developed in the 1950's and 60's.
- Describe “a whole of elements in interrelation, connection with one another.”

Agricultural Systems



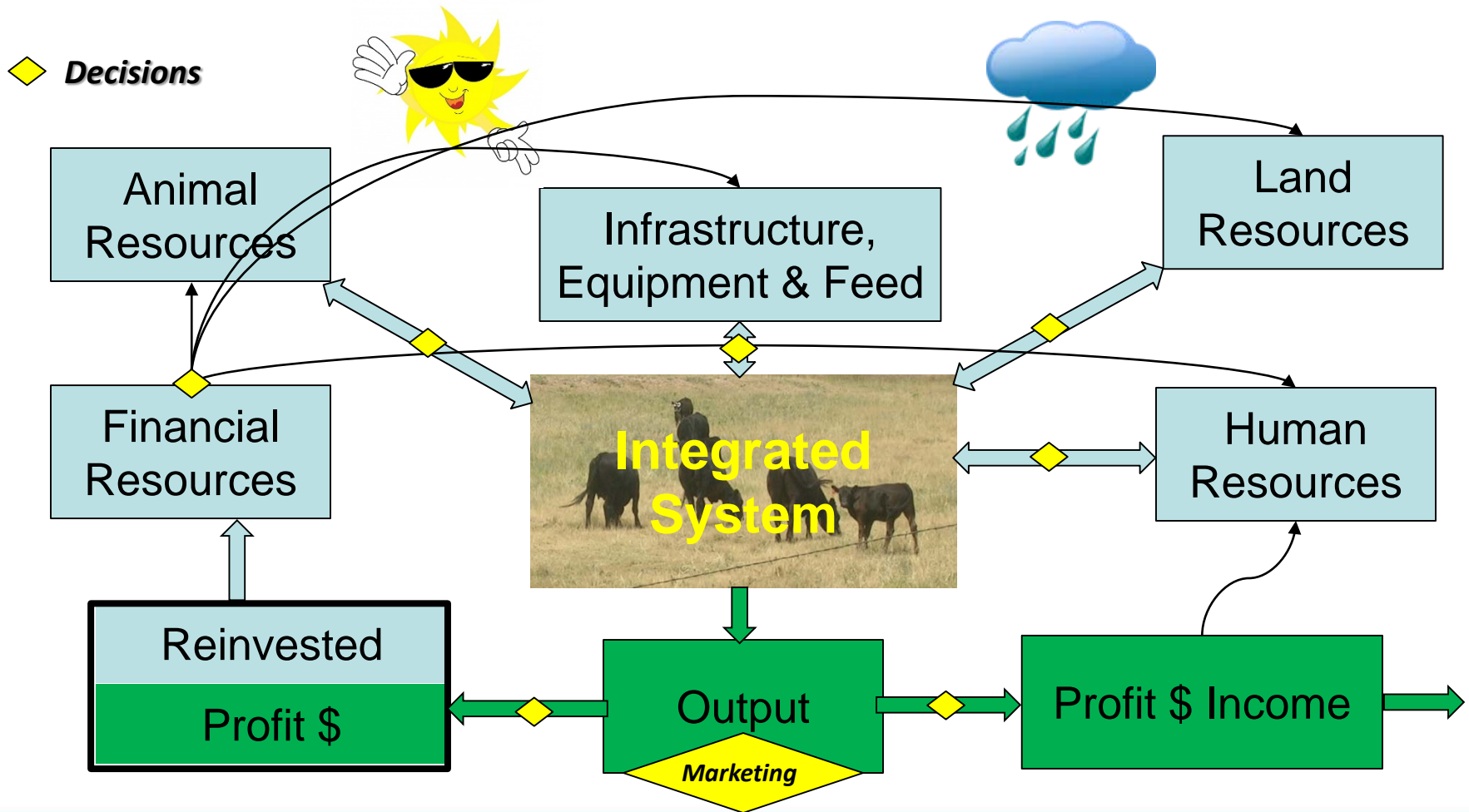
A Systems Approach to Production Agriculture

- In a true sense, a systems approach didn't appear in the agricultural sciences until the 1960's.
- Two major tendencies appeared in work:
 - Systems approach used to handle technical problems of production (i.e. biological relationships).
 - Systems approach used to investigate management and control (i.e. mathematical methods applied to economic based decision-making).
- The term “agricultural system” has no generally accepted definition.

Agricultural Production Systems

- The simplest form of agricultural systems
- The producer's system of producing a product
- Includes man-machine-plant-soil-animal sub-systems within it
- Aggregates up to other agricultural systems:
 - whole farm/ranch systems producing multiple products
 - regional and national systems
 - international and global systems

Integrated Production System



Agricultural Production Systems

- Biological Level
 - Plants
 - Soil
 - Animals

- Human Level
 - People
 - Machines

- Economic Level
 - Prices
 - Valuation

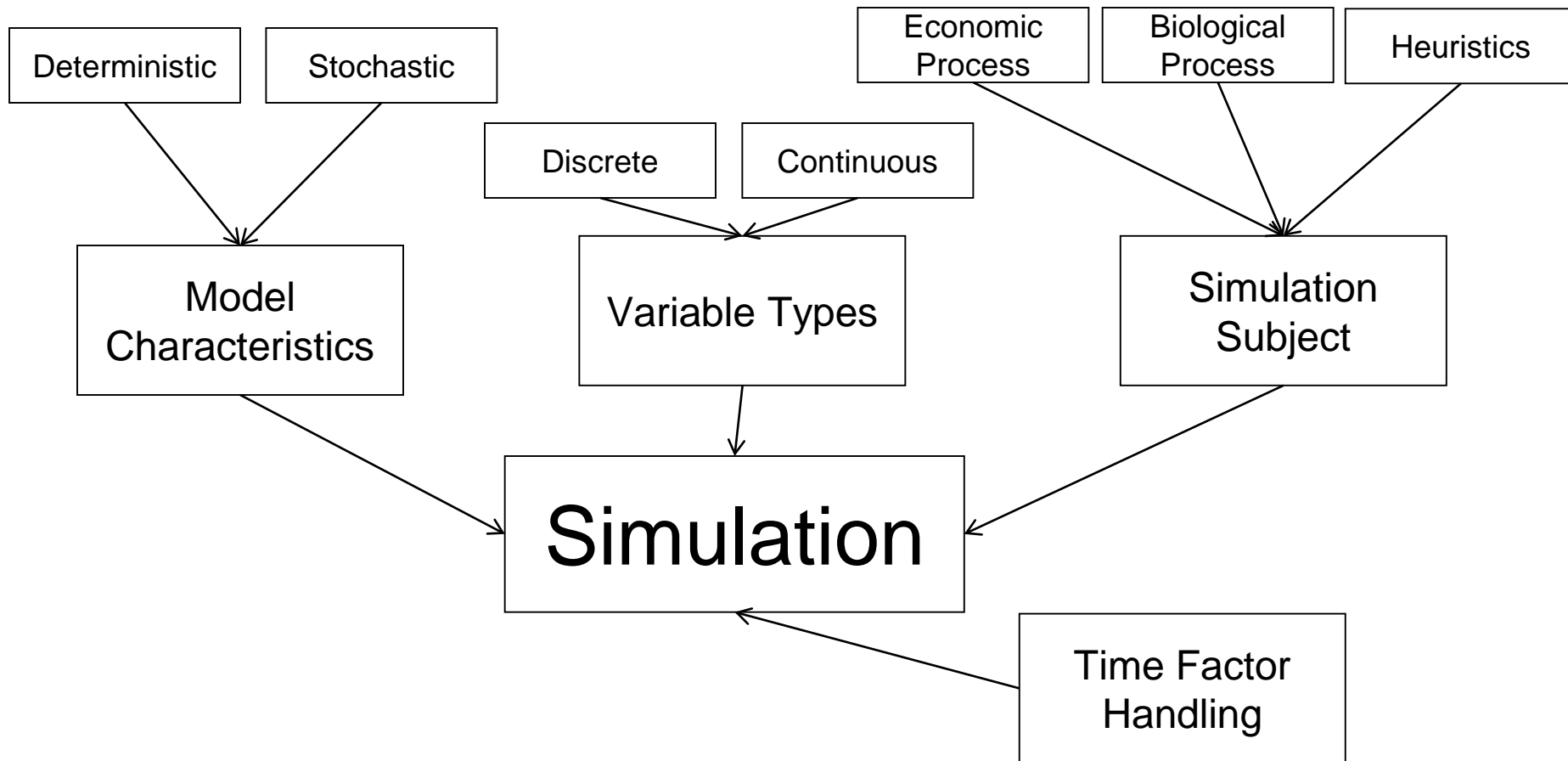
Agricultural Production Systems

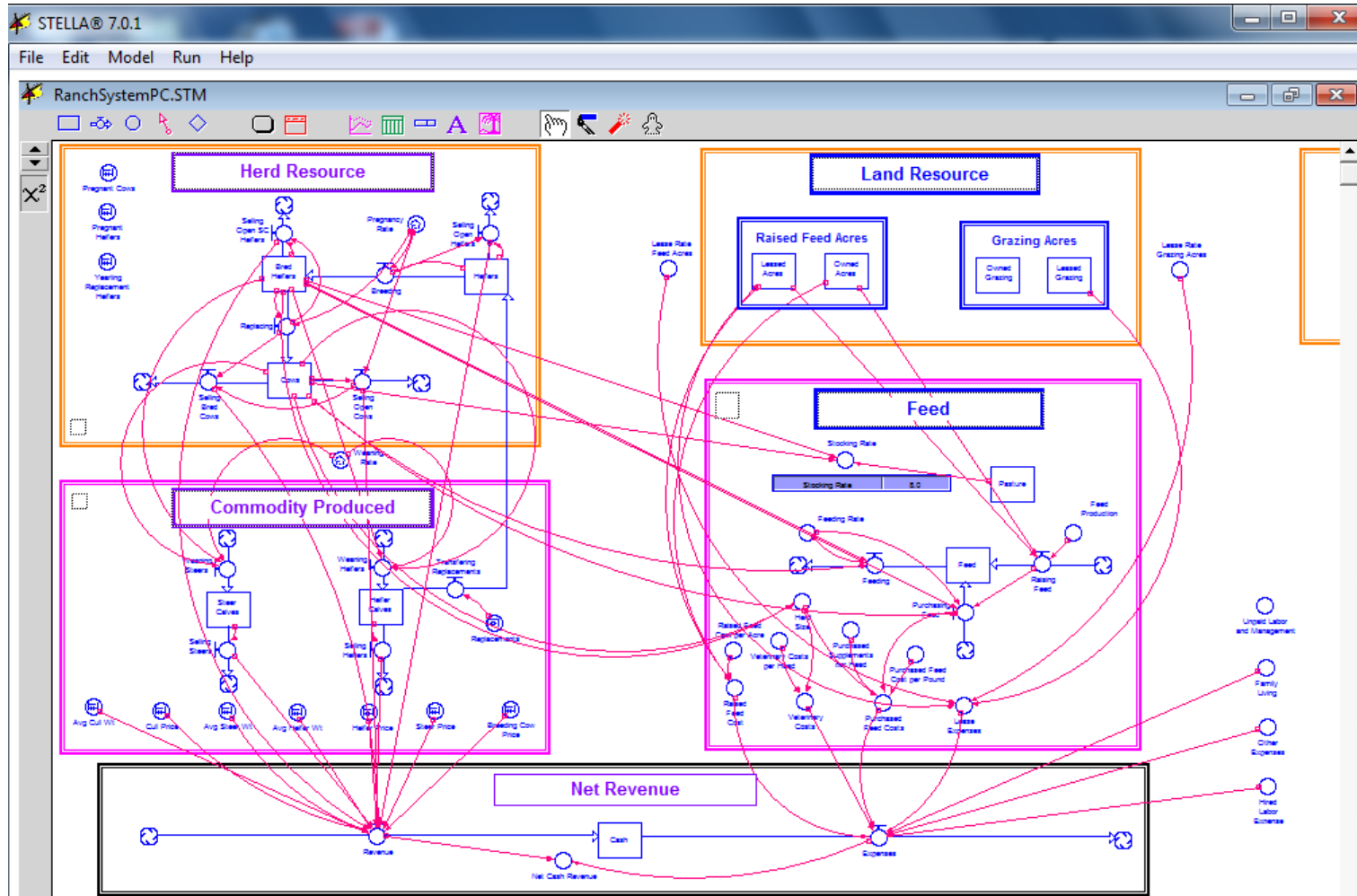
- Agricultural systems are distinguished from other economic systems on two main fronts:
 - 1) Risk and uncertainty
 - Weather conditions are a big source of uncertainty.
 - The necessity of food combines with production uncertainty and uncertain political events to produce very uncertain economic conditions for agricultural systems.
 - 2) Time/Planning horizons
 - The biological rhythm of food production and consumption is slow (or impossible) to change.
 - Dynamic treatment of agricultural processes is required to handle long periods of time in agricultural systems.

Simulations

- Purpose
 - Usually Descriptive
 - Describing what is happening or what will happen under certain conditions.
 - Prescriptive (or Normative)
 - Finding what ought to be in order to be optimal
 - Optimization challenges
 - Risk and uncertainty
 - Multiple objectives

Simulation Types





Integrated Production Systems