

# Linking Epidemic & Economic Modeling An Economic Perspective

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# Forest and Agricultural Sector Model (FASOM / ASM)

- The Agricultural Sector Model (ASM), which is part of the Forestry and Agricultural Sector Optimization Model (FASOM)

- Contains budgets for

Beef

Dairy

Hogs

Sheep

Broilers

Turkeys

Egg layers

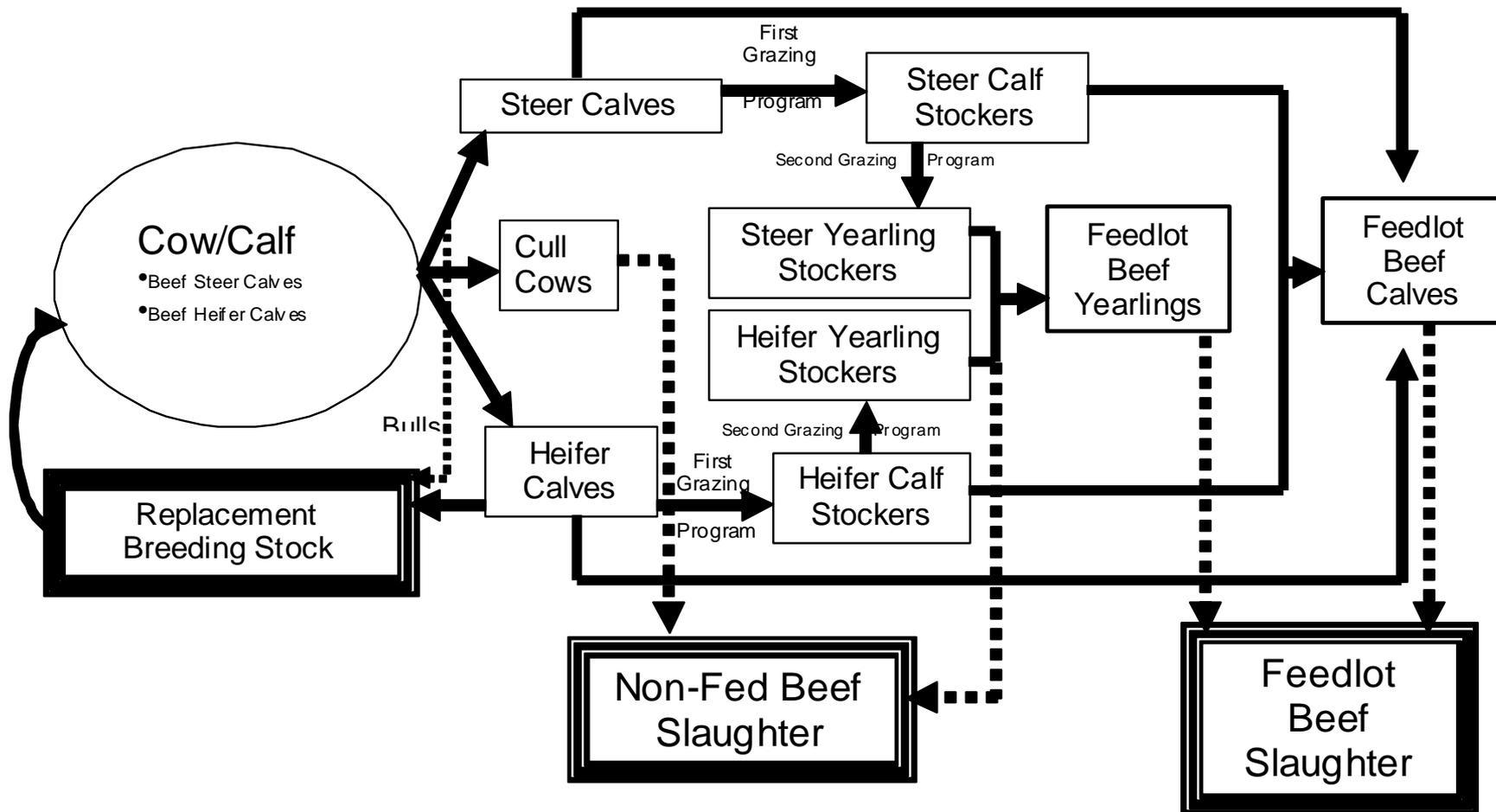
Horses

Within the beef and hog operations a number of intermediate budgets are represented separating out important stages of production.

# Commodity Budgets

- Budgets are defined on a per unit of output basis
  - i.e. output of eggs per laying hen per year, feed input requirement per feeder pig per year
- Budgets are individual to production stages
- Define final products
  - i.e. lamb/mutton, wool, replacement lambs, cull ewes for the sheep category
- Define inputs for production
  - i.e. feed, pasture, labor

# Forest and Agricultural Sector Model (FASOM / ASM) Beef



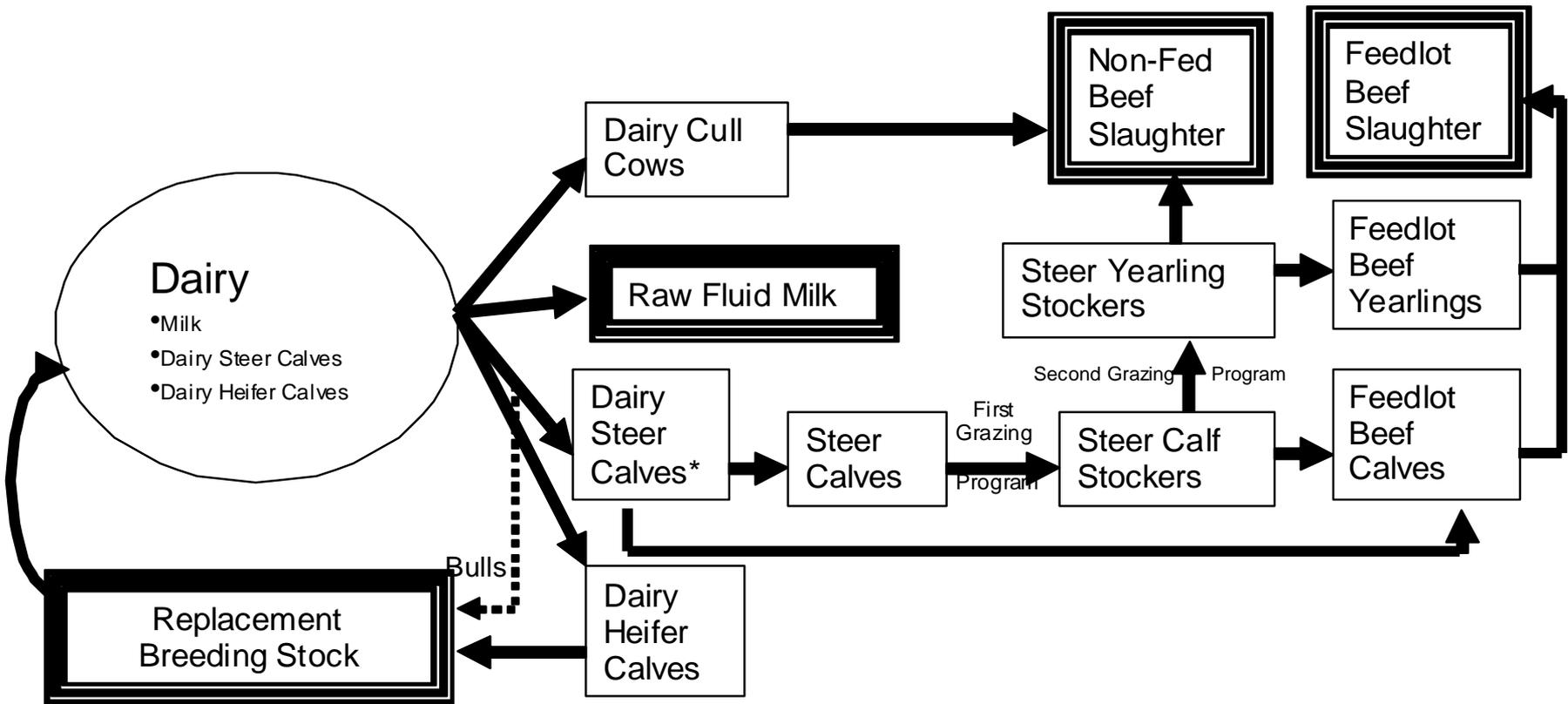
# Forest and Agricultural Sector Model (FASOM / ASM) Beef

- Cow/calf operations,
- Steer and heifer calves in stocker operations,
- Steer and heifer yearlings in stocker operations,
- Beef yearlings in feedlots, and
- Beef calves in feedlots.

The budgets for this portrayal depict several major categories of items

- production of beef or intermediate animals in cwt – net of usage of animals for replacements
- use of intermediate animals (negative sign in table) in cwt
- use of feed in cwt
- use of pasture in acres
- use of aum grazing in animal unit months
- use of other inputs in \$
- use of cost in \$
- greenhouse gas emissions in metric tonnes

# Forest and Agricultural Sector Model (FASOM / ASM) Dairy



\*Dairy Steer Calves merge in with the Steer Calves in the Beef Cattle Flow

# Forest and Agricultural Sector Model (FASOM / ASM) Dairy

- Dairy operations,

The budgets for this portrayal depict several major categories of items

- production of milk or intermediate animals in cwt – net of usage of animals for replacements
- use of feed in cwt
- use of pasture in acres
- use of aum grazing in animal unit months
- use of other inputs in \$
- use of cost in \$
- greenhouse gas emissions in metric tonnes



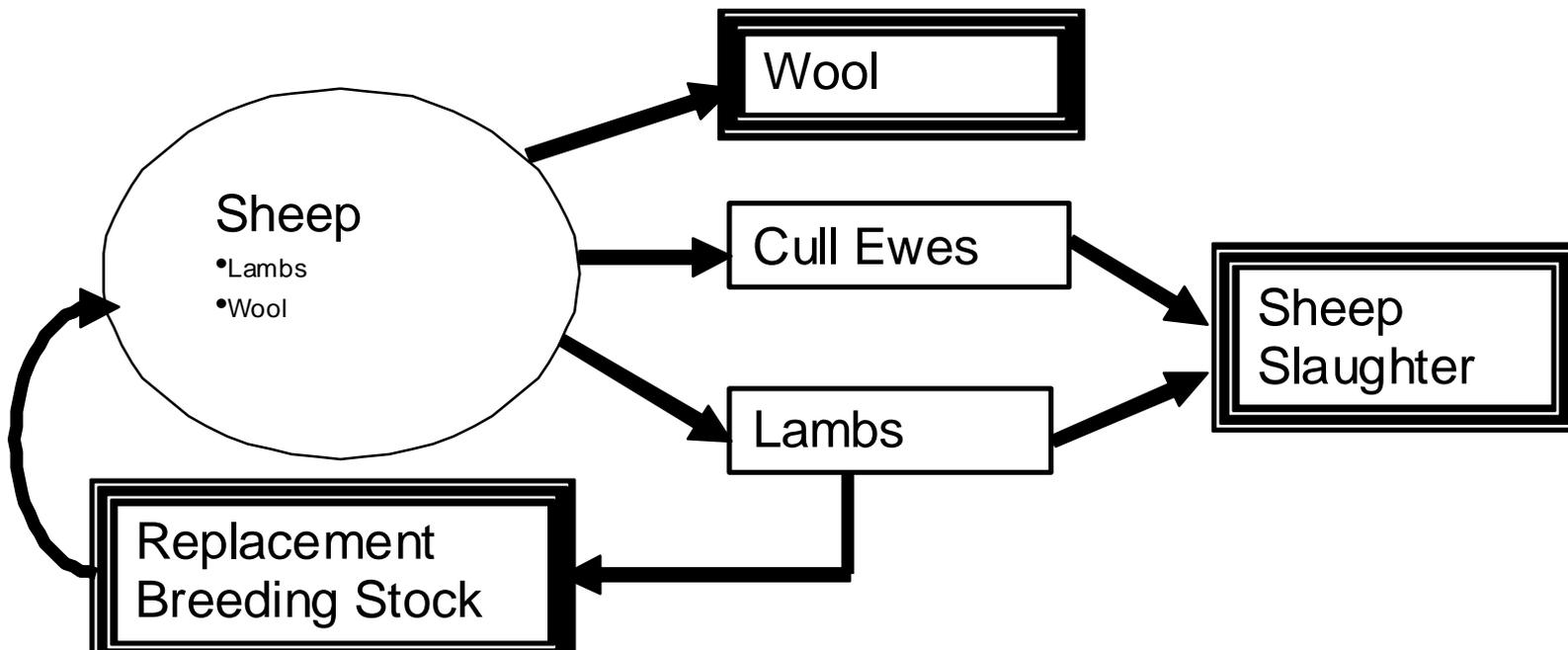
# Forest and Agricultural Sector Model (FASOM / ASM) Hogs

- farrowing
- finishing and
- farrow to finish

The budgets for this portrayal depict several major categories of items

- production of fed hogs or intermediate animals in cwt – net of usage of animals for replacements
- use of intermediate animals (negative sign in table) in cwt
- use of feed in cwt
- use of pasture in acres
- use of aum grazing in animal unit months
- use of other inputs in \$
- use of cost in \$
- greenhouse gas emissions in metric tonnes

# Forest and Agricultural Sector Model (FASOM / ASM) **Sheep**



# Forest and Agricultural Sector Model (FASOM / ASM)

- 11 Regions, 63 Sub-regions
- 70-100 year time period



# International Trade

- Imports

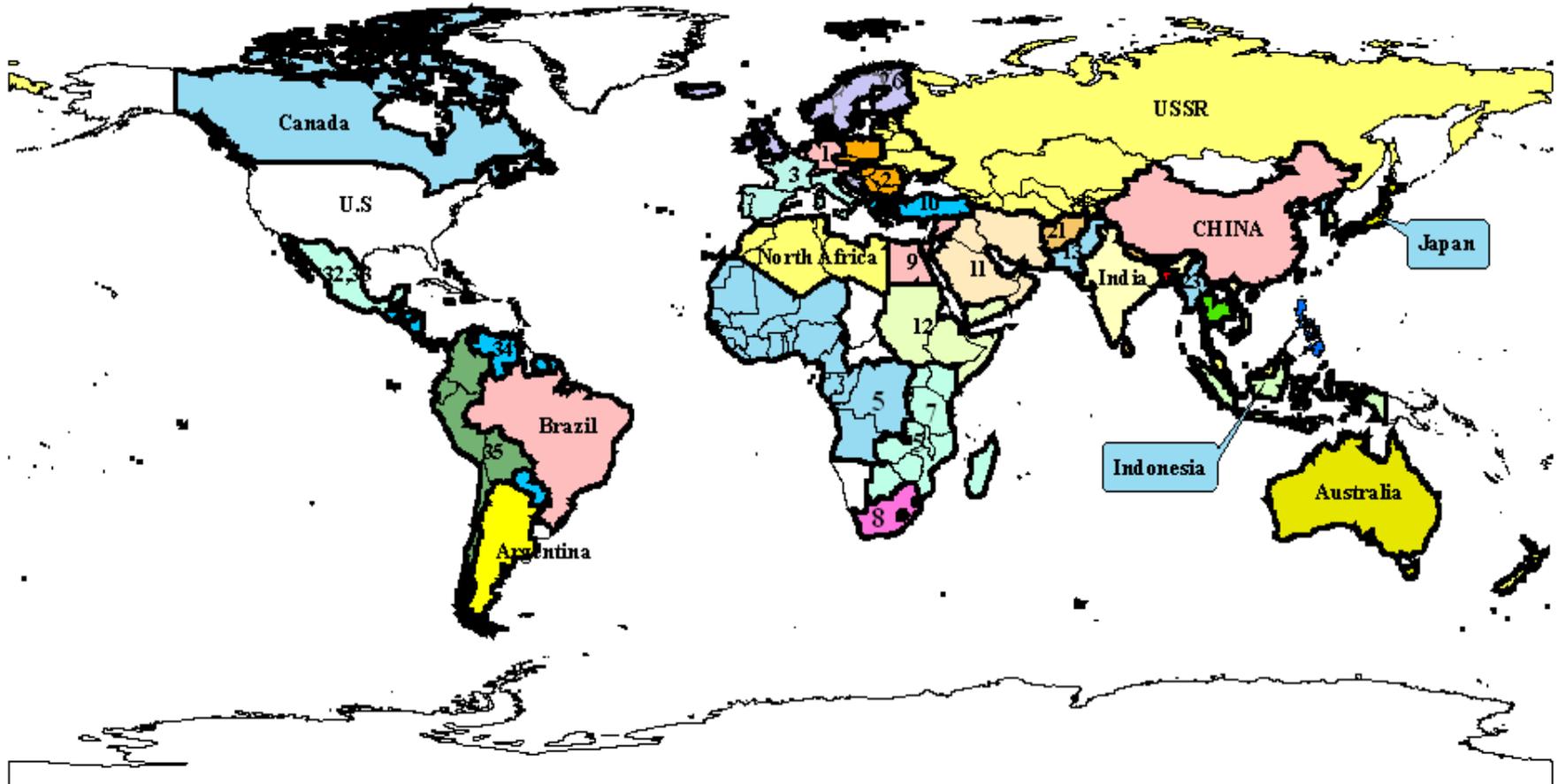
- Eggs
- Wool
- Non-fed beef
- Fed beef
- Pork
- Secondary dairy
- Live cattle

- Exports

- Eggs
- Fed beef
- Wool
- Pork
- Secondary Dairy Products
- Chicken
- Turkey

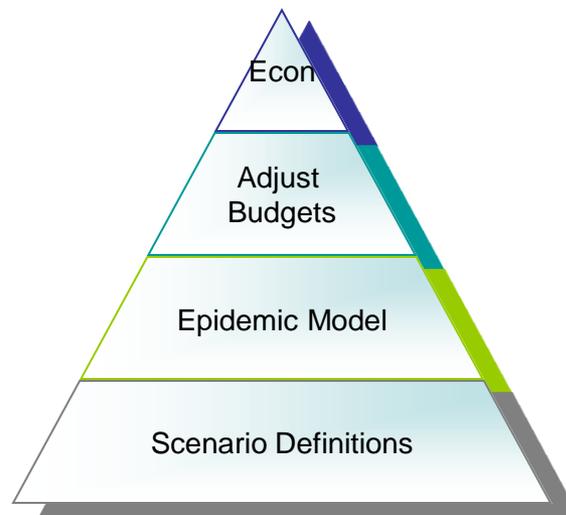
# International Trade Regions

- 37 International Trade Regions



# Modeling Disease Outbreak in ASM

1. Define Common Scenarios
2. Epidemic Model
3. Adjust Affected Commodity Budgets
4. Fix some animal and other numbers
5. Economic Model Output



# Epidemic Model

Provides Inputs for the  
Economic Model

- Animal Mortality
- Infected Animals or Herds
- Treatment Activity levels

Rift Valley Example

- Young-Infected
- Young-Dead
- Abortions
- Pregnant-Dead
- Pregnant-Infected
- Adult-Infected
- Adult-Dead

# Adjust Affected Commodity Budgets

- Define Scenarios
- Define per herd/animal costs
- Split epidemic model results into herd types
  - i.e. backyard, large feedlots, small dairies, etc.
- Split epidemic model into herd components
  - i.e. number of infected cattle into number of infected calves, cows, stocker steers, stocker heifers, etc.

# Adjust Affected Commodity Budgets

- Identify what happens to each of the herd components
  - i.e. for quarantined cows what percentage are slaughtered for welfare reasons, what percentage are culled, etc.
- Calculate economic model outputs
- Run a scenario loop to generate impacts for each scenario

# Economic Model Output

- Direct Cost of Lost Animals
- Direct Cost of Treatment and Response Activities
- Value of Lost Production Revenue
- Forgone Income from Shutdown
- Welfare Effects

# High Plains Study

- Phase 1
  - Done
  - Report to Cattle feeders
  - Draft professional report(s)
- Extensions
  - More approaches
  - Balance and robustness
  - Java Epidemic model
  - ASM
  - National unification

# DADS Study

- Memos set to Tim in November and December and yesterday
- Awaiting response
- National study idea

# RVF Study

- Extension?
- Treatment methods
- Writing?

# Other activities

- Robustness
- BSE and trade
- AI and trade
- Carcass disposal costing
- RAW/DSS interface