

Modeling of the breeding activity - Sukler herd farm - Massive Central Meat

A farmer in the Massif Central raises meat cows (Aubrac breed). It has 100 ha and 2000 working hours per year.

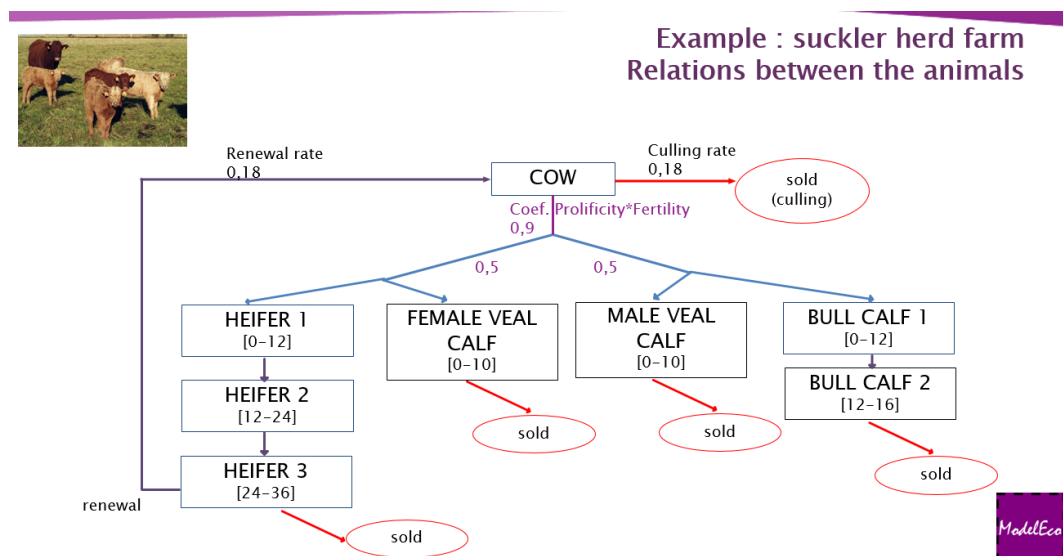
1) Different breeding systems can coexist on the farm. Thus the farmer can combine or choose to specialize in one of these activities:

- Sale of heavy calves (10 months)
- Sale of bulls (16 months)
- Sale of pregnant heifers (3 years old)

In any case, he must keep part of his heifers for the renewal of the herd. The renewal rate, which is equal to the reform rate, is 18%.

With a prolific birth rate of 0.9 live-born calves per cow, 0.45 male and 0.45 female calves are born each year.

The graph below represents the demographics of the herd



2) The herd's diet is based on feed produced on the farm

The farmer can divide his land between barley crops to be fed as grain to animals, temporary grasslands to produce hay and grasslands to be grazed. He can also sell the barley he produces for 100 euros per tonne.

The table below gives the yield and cost characteristics of these different crop production activities.



	Yield (k/ha)	Cost (Euros/ha)	Working time requirement (hours per ha and per year)
BARLEY	6000	380	20
GRASS	2000 (in kg dry matter)	50	8
HAY	3000 (in kg dry matter)	100	10

The feeding requirements of the animals were calculated on the basis of weight and growth rate. The estimated energy requirements in Forage Units made it possible to determine a standard ration for each animal category.

	Diet in quantities (in kg)
Cow	661 kg barley 1543 kg dm hay 1187 kg dm grass
Heavy calf	119 kg barley 474 kg dm hay 365 kg dm grass
Heifer 1	143 kg barley 570 kg dm hay 438 kg dm grass
Heifer 2	204 kg barley 818 kg dm hay 629 kg dm grass
Heifer 3	234 kg barley 934 kg dm hay 718 kg dm grass
Bull 1	1044 kg barley 1392 kg dm hay
Bull 2	204 kg barley 818 kg dm hay

3) The working time required for the farming activity has been estimated by animal category

	Working time requirement (hours per ha and per year)
Cow	10
Heavy calf	4
Bull 1	6
Bull 2	3
Heifer 1	4
Heifer 2	6
Heifer 3	8



Finally, the sales prices of the different categories of animals are as follows (euros per animal):

Cull cow 1000 €, Male calf 650€, Female calf 695 €, 16 months bull 929 €, 3 year old full calf 1200€.

The model should allow us to determine the distribution of land between the different crops and the number of animals raised and sold for each category, knowing that the farmer wants to maximize his profit.