

Input Descriptions

This document contains descriptions of inputs used in the “Investment Analysis of Heat Detection Technologies” decision support tool. Descriptions are organized by tab and then alphabetically.

The decision support tool can be found at: <http://afsdairy.ca.uky.edu/HeatDetectionTechnologies>

Current Herd Information

Herd Information

Age at first calving: Average age (in months) that heifers calve for the first time. This can be found using DHIA records.

Cull cow value: Price you would receive for selling a cull cow at market in dollars per pound.

Culling rate: Percent of cows removed from the herd each year. This can be found using DHIA records.

Current conception rate: Current first service conception rate on the operation. This can be found using DHIA records.

Current heat detection rate: Current rate of heat detection on the operation. This can be found using DHIA records.

Days in milk do not breed: Point in lactation (in days) where you decide to stop trying to get a cow pregnant and plan to sell her at the end of her lactation. This cow would be classified as a reproductive cull.

Feed cost: Cost of milking ration per 100 pounds of dry matter.

Herd size: Number of milking cows in the herd.

Mature cow live weight: Average weight of a cow in the herd.

Milk Price: Price received per hundred-weight of milk sold.

Replacement cost: Cost to buy or raise a replacement animal.

Rolling herd average milk production: Annual milk production of the herd. This can be found using DHIA records.

Veterinary costs: Average veterinary associated costs per cow per year.

Voluntary waiting period: Length of time after calving you wait before breeding a cow.

Reproductive Management

Annual cost of maintaining a bull: Annual costs associated with maintaining a bull as part of the reproductive management program (feed, housing, etc.).

Average cost of semen: Average price of semen used for insemination.

Cost per cow breeding: How much does the breeding service charge per cow breeding?

Cost per bottle of GnRH: What is the cost of one bottle of the GnRH product you use?

Cost per bottle of PGF: What is the cost of one bottle of the PGF product you use?

Cost per pregnancy diagnosis: What is the cost to pregnancy check one cow? This can be calculated by dividing the price per hour of pregnancy diagnosis by the average number of cows checked per hour.

Cost per visual detection aid: What is the price per visual detection aid (Kamar, Estroject, etc.) used?

Doses of GnRH per bottle: How many doses are included in the bottle of GnRH purchased?

Doses of PGF per bottle: How many doses are included in the bottle of PGF purchased?

Hourly cost of labor: Dollars per hour paid for labor dedicated to reproductive management.

Hours of labor required: Weekly hours of labor required to run the current reproductive management program.

Number of GnRH shots per insemination: How many GnRH shots are used in the synchronization protocol, on average, before an insemination occurs (this includes resynch protocols)?

Number of PGF shots per insemination: How many PGF shots are used in the synchronization protocol, on average, before an insemination occurs (this includes resynch protocols)?

Number of visual detection aids used per pregnancy: On average, how many visual detection aids will be used on a cow before she becomes pregnant?

Other weekly costs (from reproductive management tab): On average, how much do other inputs associated with this method of reproductive management cost per week?

Target days open: What is the goal average days open for the herd?

Potential Technology Information

Discount rate: Accounts for the money that could be made using time and land elsewhere. A typical value would be 8%.

Length of investment: How long is the potential heat detection technology expected to last? A typical value would be between 3 and 7 years.

Maintenance cost: Yearly maintenance costs are generally charged by the manufacturing company each year to cover support and upkeep of the technology. As the potential technology manufacturer for this information.

New conception rate: If use of this technology results in a change in conception rate, insert that change here. If you leave this cell blank, the calculations will use the original conception rate that was input under "Herd Information."

New heat detection rate: What is the estimated heat detection rate of this technology? To find this you can talk to the manufacturing company. Additionally, look at research results from independent studies that used the specific technology you are considering.

Number of cows to have tags: Number of cows that will use the technology at a time (i.e. will have a tag or collar on). This may be all of the cows or just a portion of them.

Start-up cost: Cost of basic start-up package for the automated estrus detection system. This should not include the cost of individual cow units.

Total initial cost: The total initial cost accounts for the start-up cost and the number of cow units that will be purchased.

Unit cost: Cost of each individual cow-monitoring unit. Monitoring systems generally use either an ankle bracelet or a neck collar for each animal.

Units to replace per year: A certain percentage of individual cow monitors will need to be replaced each year. Approximately what percentage does the manufacturing company estimate this to be?

Weekly hours of labor required: The expected weekly hours of labor required for reproductive management when the potential heat detection technology is used.

Yearly variable costs: Accounts for the labor, maintenance, and replacement unit costs associated with the potential heat detection technology.

Results

Current estimated days open: Expected days open given the inputs entered in the “Current Herd Information” section. Compare this to the expected days open when investing in the three potential technologies (also found on the “Results” tab).

Current estimated reproductive culls: Expected reproductive cull percent given the inputs entered in the “Current Herd Information” section. Compare this to the expected reproductive cull percent when investing in the three potential technologies (also found on the “Results” tab).

Estimated net present value: Net present value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows. A NPV of 0 means all costs are covered. A NPV = 0 or > 0 is considered a profitable investment. The analysis assumes that the system has no value at the end of the investment period (defined by “Length of investment” in the “Potential Technology Information” tab).

Expected days open: Days open, or non-pregnant, will be reduced when reproductive management improves. Minimal days open is ideal for bringing a cow back to the beginning, more productive part of her lactation sooner. Days open was calculated using equations developed by Karmella Dolecheck and Jeffrey Bewley.

Expected reproductive culls: Reproductive culls will be reduced when reproductive management improves. Minimizing reproductive culls is ideal because it allows for more selective culling in other areas of the herd (increases voluntary culling and decreases involuntary culling).

Expected years to break even: Amount of time before income equals invested costs, resulting in neither profit nor loss. Beyond this point, profitability can occur.