DAIRY COW
Welfare Outcomes

Welfare outcomes are an animal-based method of assessing factors that contribute to an animal's quality of welfare. Whilst provision of certain resources (inputs) in the environment is necessary to increase the welfare potential of a system, measuring animal-based outcomes indicate the animals' welfare state. Regularly scoring appropriate outcome measures can identify welfare problems and be used to set targets or benchmark for improvements through an active programme. Below is a selection of the main measures recommended.

MOBILITY

WHAT: Assess prevalence and severity of lameness, at least four times a year.
WHY: Lameness is caused by multiple factors and is a serious, painful disease which is a major cause of culling. Early detection increases the chances of recovery. Farmers typically recognise only one in four cases.
HOW: *DairyCo* mobility scoring: www.dairyco.org.uk/resources-library/technical-information/health-welfare/mobility-score-instructions/.

- Observe cows walking one at a time in a straight line, on a flat surface.
- Assign score of 0 (good mobility), 1 (imperfect mobility), 2 (impaired mobility), 3 (severely impaired mobility).

TARGET: Average <5% herd score 2 or above, or step improvement plan when much higher.

CULLING

WHAT: Record the number and identity of cows that leave the herd and the cause.
WHY: Cows are culled primarily due to infertility, mastitis, and lameness, associated with intense genetic selection for high yield, poor feeding and suboptimal environmental conditions. Replacing culled cows adds significant cost to the enterprise.
HOW: Record numbers: dying on farm, euthanised, sent for slaughter and reason.
Record replacement rate and average number of lactations per cow.
TARGET: Annual replacement rate of 15% or less, average 5 or more lactations per cow.

COMFORT

WHAT: Observation of cow behaviour to assess the comfort of lying areas in housing.
WHY: Comfort is important to the dairy cow, as a heavy animal, to avoid injuries such as hock and knee lesions, and fractures to the ribs; comfort also ensures they lie long enough to rest and ruminate.
HOW: Knee test (can comfortably drop to your knees on the bed) and cow signals.
TARGET: Sufficient bed spaces for the entire herd to lie comfortably and simultaneously.

MASTITIS

WHAT: Record, monitor and reduce mastitis incidence at the individual cow level.
WHY: Mastitis is the inflammation of the udder tissue and mammary glands due to bacterial infection, and is a highly painful condition, leading to loss of the milk produced. It is the most common and costly disease affecting dairy cows.
HOW: Monitor bulk and individual (if possible) somatic cell count (SCC). Record cases of clinical and subclinical mastitis with cow ID number. The *California Milk Test* can identify an infected individual and the *Bactoscan Test* can identify the source of infection.
TARGET: Incidence <10/100 cows per year, reoccurrence <10% per year, Bulk SCC 100-199.

BODY CONDITION

WHAT: Assess and monitor body fat reserves (condition) changes of individuals in the herd, throughout the production cycle.
WHY: Good body condition is required for successful reproduction/lactation. Monitoring indicates the cow's energy balance, and informs feeding and management decisions to prevent excessive weight gain/loss.
HOW: *Penn State University* scoring: www.dairyco.org.uk/resources-library/technical-information/health-welfare/body-condition-scoring/.

- Assign score of 1 (severely underweight) to 5 (severely overweight), to the nearest 0.5.

TARGET: Score 2.5-3 (at calving), 2-2.5 (60 days post calving), 2.5-3 (100 days before dry off) 2.5-3 (dry off). Individuals should not lose more than 0.5 of a score.

HERD BEHAVIOUR

WHAT: Measure the avoidance distance of people by cattle.
WHY: To give an indication of the human-animal relationship and fear levels towards people. Flighty cows indicate poor stockmanship, and suboptimal environmental conditions.
HOW: *Welfare Quality* flight distance scoring http://edepot.wur.nl/233467 p90-91.

- Measure the distance a person can approach a cow before they turn away.
- Calmer cattle allow a person to approach them closer (also affected by temperament).

TARGET: Most of herd allow a person to approach them to within 50cm.

COW SIGNALS (Hulsen 2007, Bont Publishers/Vet Vice)

Positive behaviour	Negative behaviour	Signs of comfort
Grooming	Headbutting	Lying and rising smoothly, without hesitation/ touching partitions
Mutual Licking	Displacing at the feed bunker	Lying straight, on side and able to stretch head/ leg forward
Lying	Chasing	Can fit all four feet in a stall
Horning (cows rub heads with no clear winner)	Fighting	Grooming standing on three legs in alleyways (indicating good grip)
Approaching stockperson and willingly approached	Avoiding stockperson, shying, visible eye whites	Clean udder and hind legs. No hock or knee abrasions

OTHER MEASURES: Cleanliness, Broken tails, Cows needing further care, Calf/heifer survival, Swellings, Hairloss/ Lesions.

PROCESS: Measure outcomes > identify risk factors (causes of poor outcomes) > assess performance (benchmark against other farms or suppliers) > adjust management practices (to improve welfare outcomes, using incentives or penalties for compliance with targets).