List of definitions of traits to assess sustainability at herd level

ICAR Task Force Sustainability

May 2023

Number	Trait and category	Formula
1	Age at slaughter (beef cattle)	$\overline{AAS} = \frac{\sum_{i=1}^{n}(slaughter\ date - date\ of\ birth)_i}{n}$
	Feeding and Production	The average age at slaughter (AAS) is calculated as the slaughter date minus the date of birth of all animals that are slaughtered during the past 365 days. To be expressed in days or months (days/(365.25/12)). Date of slaughter and date of birth needs to be known.
2	Average Days in Milk	$\overline{DIM} = \frac{\sum_{i=1}^{n}\sum_{j=1}^{m}(DIM_{ij})}{\sum_{i=1}^{n}\sum_{j=1}^{m}(cow_{ij})}$
	Feeding and Production	Days in milk is defined as date of test day minus date of calving. N = number of test days in the past 365 days. M = number of cows in the milking herd each test day. The annual average days in milk (DIM) is calculated in two steps. Step 1: calculate per test day the average DIM and the number of cows in the milking herd [excluding dry cows]. Step 2: take the total of all test days of number of cows * average DIM on each test day and divide this by the sum of all cows on all test days in the past 365 days.
3	Body weight	$\overline{Body\ weight} = \frac{\sum_{i=1}^{365}\sum_{j=1}^{m}(Body\ weight_{ij})}{\sum_{i=1}^{365}\sum_{j=1}^{m}(cow_{ij})}$
	Feeding and Production	The average body weight (BW) is the sum of the BW per day of all cows in the milking herd on each day during the past 365 days divided by the sum of all cows in the milk herd on each day in that herd during the past 365 days.

4	Daily gain	$\overline{Daily\ gain} = \frac{\sum_{i=1}^{n} (\frac{(weight\ at\ slaughter\ (kg) - weight\ at\ start\ or\ at\ calving\ (kg))}{(date\ of\ slaughter - date\ of\ birth\ or\ calving)\ (days)})_i}{n}$
	Feeding and Production	Average daily gain is the average of the slaughter weight minus the start weight divided by the age at slaughter for young animals. Start weight is either measured or a certain standard (breed specific) value is taken. For lactating animals it is defined as the weight at slaughter minus the weight at calving divided by the date at slaughter minus the date of calving.
5	Dry Matter Intake	$\overline{Dry\ Matter\ Intake} = \frac{\sum_{i=1}^{365} \sum_{j=1}^{m} (Dry\ Matter\ Intake\ (kg)_{ij})}{\sum_{i=1}^{365} \sum_{j=1}^{m} (cow_{ij})}$
	Feeding and Production	The average Dry Matter Intake (DMI) is the sum of the DMI in kg per day of all cows in the milking herd on each day during the past 365 days divided by the sum of all cows in the milking herd on each day in that herd during the past 365 days. If Dry Matter Intake cannot be measured, prediction equations can be used (see Appendix 1). To note: If information to calculate energy intake (or protein intake) is available, this should be considered (see Appendix 1).
6	Energy Corrected Milk	$\overline{ECM} = \frac{\sum_{i=1}^{n} \sum_{j=1}^{m} ((ECM_{milk\ recording}\ (kg))_{ij})}{\sum_{i=1}^{n} \sum_{j=1}^{m} (cows_{ij})}$
	Feeding and Production	N = number of test days in the past 365 days. M = number of cows in the milking herd each test day. The average Energy Corrected Milk (ECM) is calculated in two steps. Step 1: calculate per test day the average ECM and the number of cows in the milking herd [excluding dry cows]. Step 2: take the total of all test days of number of cows * average ECM on each test day and divide this by the sum of all cows on all test days in the past 365 days. Formula's to calculate energy corrected milk can be found in Section 2 of the ICAR guidelines.

7	Feed efficiency	$\overline{Feed\ efficiency} = \frac{\sum_{i=1}^{365}\sum_{j=1}^{m}(ECM\ (kg)_{ij})}{\sum_{i=1}^{365}\sum_{j=1}^{m}(feed\ intake\ (kg)_{ij})}$
	Feeding and Production	The average feed efficiency is the sum of the energy corrected milk of m cows in the milking herd on each day during the past 365 days divided by the sum of the feed intake of m cows in the milking herd on each day during the past 365 days. Data should be adjusted for stage of lactation (to the same stage of lactation across herds, e.g. 150 days) of the cow. To note: If information on feeding ration is available, this should be included to increase the prediction (see Appendix 1).
8	Methane Emissions	$\overline{Methane\ emissions} = \frac{\sum_{i=1}^{365}\sum_{j=1}^{m}(Methane\ emissions_{ij})}{\sum_{i=1}^{365}\sum_{j=1}^{m}(cow_{ij})}$
	Feeding and Production	Average methane emissions are the sum of the methane emissions of m cows in the milking herd on each day during the past 365 days divided by the numbers of cows (m) in the milking herd on each day during the past 365 days. If methane emission cannot be measured, prediction equations can be used (see Appendix 1).
9	MUN /Urea rates in milk	$\overline{MUN_{rate}} = \frac{\sum_{i=1}^{n}\sum_{j=1}^{m}((MUN_{rate} * milk\ yield\ (kg))_{ij})}{\sum_{i=1}^{n}\sum_{j=1}^{m}(milk\ yield\ (kg)_{ij})}$
	Feeding and Production	N = number of test days in the past 365 days. M = number of cows in the milking herd each test day. The average MUN rate is calculated in two steps. Step 1: calculate per test day the average MUN rate and the number of cows in the milking herd [excluding dry cows]. Step 2: take the total of all test days of number of cows * average MUN rate on each test day and divide this by the sum of all cows on all test days in the past 365 days.
10	% Cows with functional BCS	$\%\ \text{cows with functional BCS} = \frac{\sum_{i=1}^{n} cows\ within\ desirable\ range\ (between\ 2\ and\ 4)}{\sum_{i=1}^{n} cows\ with\ BCS\ scored} * 100$

	Feeding and Production	The percentage cows with functional BCS is calculated as the number of cows with BCS within a desirable range (between 2 and 4 on 1-5 scale) scored during the past 365 days divided by the number of cows with BCS scored during the past 365 days. Cows can be included multiple times.
11	Apparent Pregnancy Loss Rate	$Apparent\ PLR = \frac{\sum_{i=1}^{n}(cows\ with \geq 2\ breedings\ and\ 2^{nd}\ breeding \geq 65\ days\ after\ previous\ breeding)_i}{\sum_{i=1}^{n}(cows\ with\ first\ breeding > 65\ and \leq (365+65)\ days\ ago))_i} * 100$
	Fertility	Apparent pregnancy loss rate (PLR) is defined as the number of cows with two or more breedings and the second or later breeding at least 65 days after the previous breeding [where second breeding occurred in the last 365 days] divided by the number of cows that had their first breeding in the period of > 65 and ≤ 365+65 days ago. The assumption is that the cow became pregnant on first breeding and then lost it within that 65 day period and was rebred.
12	Average Days Open	$\overline{DO} = \frac{\sum_{i=1}^{n}\sum_{j=1}^{m}((DO)_{ij})}{\sum_{i=1}^{n}\sum_{j=1}^{m}(cows_{ij})}$
	Fertility	Days open (DO) is the date of last insemination minus calving date. It is optional to include cows that have not been bred and past voluntary waiting period (VWP). Exclude cows with DO NOT BREED code. It is assumed that the average DO is calculated each test day. N = number of test days in the past 365 days. M = number of cows that are included in the calculation each test day. The average DO is calculated in two steps. Step 1: calculate per test day the average DO and the number of cows in the calculation. Step 2: take the total of all test days of number of cows * average DO on each test day and divide this by the sum of all cows that were included in calculating DO on all test days in the past 365 days. The traits Average Calving Interval and Average Days Open are highly related to each other and should therefore be regarded as alternatives for each other.
13	Average Calving Interval	$\overline{CI} = \frac{\sum_{i=1}^{n}(calving\ date - previous\ calving\ date)_i}{n}$
	Fertility	Calving Interval (CI) is the date of calving for the current lactation minus the calving date of the previous lactation. It can only be calculated for cows with two consecutive calvings (lactations). The average CI is calculated as the sum of the CI of all animals that in the past 365 days have calved for at least the second time divided by the number of animals that in the past 365 days have calved for at least the second time. The traits Average Calving Interval and Average Days Open are highly related to each other and should therefore be regarded as alternatives for each other.

14a	Non-Return Rate 56 days	$NR56 = \frac{\sum_{i=1}^{n}(animals\ with\ 1^{st}\ ins. > 56\ and \leq (365+56)\ days\ ago\ and\ no\ re-ins.)_i}{\sum_{i=1}^{n}(animals\ with\ 1^{st}\ ins. > 56\ and \leq (365+56)\ days\ ago)_i}$
	Fertility	The non-return rate 56 days (NR56) is calculated as the number of animals with their first insemination (ins.) > 56 and ≤ 56+365 days ago and no re-insemination within 56 days after 1st insemination divided by the number of animals with their first insemination > 56 and ≤ 56+365 days ago. The main difference between NR56 (14a) and FSCR (14b) is that NR56 is calculated based on re-insemination or not and FSCR is calculated based on pregnancy confirmation.
14b	1st Service Conception Rate	$FSCR = \frac{\sum_{i=1}^{n}(animals\ with\ 1^{st}\ ins. > 56\ and \leq (365+56)\ days\ ago\ and\ confirmed\ pregnancy)_i}{\sum_{i=1}^{n}(animals\ with\ 1^{st}\ ins. > 56\ and \leq (365+56)\ days\ ago)_i}$
	Fertility	The 1st service conception rate (FSCR) is calculated as the number of animals with their first insemination (ins.) > 56 and ≤ 56+365 days ago and confirmed pregnancy after 56 days divided by the number of animals with their first insemination > 56 and ≤ 56+365 days ago.
15	Pregnancy Rate	$Pregnancy\ rate = \frac{\sum_{i=1}^{n}(cows\ pregnant\ and\ reported\ open > 42\ and \leq 63\ days\ ago\ and\ beyond\ VWP)_i}{\sum_{i=1}^{n}(cows\ reported\ open > 42\ and \leq 63\ days\ ago\ and\ beyond\ VWP)_i}$
	Fertility	Pregnancy rate can be defined as the percentage of cows reported pregnant and reported open in period > 42 days and ≤ 63 days ago from calculation divided by the number of cows reported open > 42 and ≤ 63 days ago and beyond VWP (i.e. eligible to be bred). The annual pregnancy rate is calculated as the total number of cows confirmed pregnant divided by the number of cows eligible to be bred over the past 365 days. Usually the pregnancy rate is calculated once per week or per 3 weeks.
16	% Cows culled due to reproductive problems	$\%\ cows\ culled_{repro} = \frac{\sum_{i=1}^{n} cows\ culled_{repro}}{\frac{\sum_{i=1}^{365}\sum_{j=1}^{m}(cows\ present\ (dry+producing)_{ij})}{365}} * 100$
	Fertility	The percentage of cows culled due to reproductive problems is calculated as the number of cows culled in the past 365 days with main culling reason reproductive problems divided by the average number of cows with at least one calving (dry and producing) present in the past 365 days. In case of more than one culling reason, reproductive problems should be at least one of the reasons.

17	% Cows with fertility disorders	$\%\ cows_{fertility\ disorder} = \frac{\sum_{i=1}^{n} cows_{fertility\ disorder}}{\frac{\sum_{i=1}^{365}\sum_{j=1}^{m}(cows\ present\ (dry + producing)_{ij})}{365}} * 100$
	Fertility	The percentage of cows having fertility disorders (e.g. silent heat, cysts, metritis, rep ..) is calculated as the number of cows having fertility disorders in the past 365 days divided by the average number of cows with at least one calving (dry and producing) present in the past 365 days.
18	Average Somatic Cell Count	$\overline{SCC} = \frac{\sum_{i=1}^{n}\sum_{j=1}^{m}((SCC * milk\ yield\ (kg))_{ij})}{\sum_{i=1}^{n}\sum_{j=1}^{m}(milk\ yield\ (kg)_{ij})}$
	Health	N = number of test days in the past 365 days. M = number of cows in the milking herd each test day. The average somatic cell count (SCC) is calculated in two steps. Step 1: calculate per test day the average SCC and the number of cows with SCC available. Step 2: take the total of all test days of number of cows * average SCC on each test day and divide this by the sum of all cows on all test days in the past 365 days.
19	Chronic infection rate	$\text{Chronic infection rate } (\%) = \frac{\sum_{i=1}^{n}\sum_{j=1}^{m}(cows\ with\ two\ consecutive\ test{-}days\ within\ lacation\ SCC > 200.000_{ij})}{\sum_{i=1}^{n}\sum_{j=1}^{m}(cows\ with\ two\ consecutive\ test{-}days\ within\ lacation_{ij})} * 100$
	Health	A chronic infection is defined as cows having in the same lactation two consecutive test days with SCC ≥ 200.000. N = number of test days in the past 365 days. M = number of cows with two consecutive test days in the same lactation. The chronic infection rate is calculated in two steps. Step 1: calculate per test day the number of cows with a chronic infection and the number of cows with two consecutive test days in the same lactation. Step 2: take the total of all test days of number of cows with chronic infection and divide this by the sum of all cows with two consecutive test days in the same lactation on all test days in the past 365 days.

20	Dry Cow Cure Rate	$\text{Dry cow CR (\%)} = \frac{\sum_{i=1}^{n}\sum_{j=1}^{m}(cows\ with\ SCC \geq 200.000_{last\ td\ prev\ lac} and\ with\ SCC < 200.000_{first\ td\ cur\ lac})_{ij}}{\sum_{i=1}^{n}\sum_{j=1}^{m}(cows\ with\ SCC \geq 200.000_{last\ td\ prev\ lac} and\ with\ SCC_{first\ td\ cur\ lac})_{ij}}$
	Health	A dry cow cured is defined as cows having a SCC ≥ 200.000 on the last test day of the previous lactation and a SCC < 200.000 on the first test day of the current lactation. N = number of test days in the past 365 days. M = number of cows having their first test day of a lactation on the particular test day and having a last test day in the previous lactation. The dry cow cure rate (CR) is calculated in two steps. Step 1: calculate per test day both the number of cured cows and the total number of cows with their first test day of a lactation on that test day and having a last test day in the previous lactation. Step 2: take the total of all test days of number of dry cows cured and divide this by the sum of all cows with two consecutive test days in the same lactation on all test days in the past 365 days.
21	Fresh Cow Infection Rate	$\text{Fresh Cow Infection Rate (\%)} = \frac{\sum_{i=1}^{n}\sum_{j=1}^{m}(cows\ with\ SCC \geq 200.000_{first\ test\ day\ of lactation})_{ij}}{\sum_{i=1}^{n}\sum_{j=1}^{m}(cows\ that\ have\ calved\ since\ previous\ test\ day)_{ij}} * 100$
	Health	A fresh cow infected is defined as cows having a SCC ≥ 200.000 on the first test day of the current lactation. N = number of test days in the past 365 days. M = number of cows having their first test day of a lactation. The fresh cow infection rate is calculated in two steps. Step 1: calculate per test day both the number of fresh cows infected and the total number of fresh cows (with their first test day of a lactation on that test day). Step 2: take the total of all test days of number of fresh cows infected and divide this by the sum of all cows that have calved since the previous test day on all test days in the past 365 days.
22	Selective Dry Cow Therapy Rate	$\text{Selective Dry Cow Therapy Rate (\%)} = \frac{\sum_{i=1}^{n} cows_{dried\ off\ without\ antibiotics}}{\sum_{i=1}^{n} cows\ dried\ off_{past\ 365\ days}} * 100$
	Health	The Selective Dry Cow Therapy Rate is calculated as the number of cows that were dried off without antibiotics during the past 365 days divided by the total number of cows that were dried off during the past 365 days.

23	% Cows culled due to udder health	$\%\ cows\ culled_{mast} = \frac{\sum_{i=1}^{n} cows\ culled_{mast}}{\sum_{i=1}^{365}\sum_{j=1}^{m}(cows\ present\ (dry + producing)_{ij})} * 100$
	Health	The percentage of cows culled due to udder health is calculated as the number of cows culled in the past 365 days with main culling reason mastitis divided by the average number of cows with at least one calving (dry and producing) present in the past 365 days. In case of more than one culling reason, mastitis should be at least one of the reasons.
24	% Cows culled due to lameness	$\%\ cows\ culled_{lameness} = \frac{\sum_{i=1}^{n} cows\ culled_{lameness}}{\frac{\sum_{i=1}^{365}\sum_{j=1}^{m}(cows\ present\ (dry + producing)_{ij})}{365}} * 100$
	Health	The percentage of cows culled due to lameness or other claw health reasons is calculated as the number of cows culled in the past 365 days with main culling reason lameness divided by the average number of cows with at least one calving (dry and producing) present in the past 365 days. In case of more than one culling reason, lameness should be at least one of the reasons.
25	% Cows culled due to other disorders/diseases	$\%\ cows\ culled_{other\ disorders/diseases} = \frac{\sum_{i=1}^{n} cows\ culled_{other\ disorders/diseases}}{\frac{\sum_{i=1}^{365}\sum_{j=1}^{m}(cows\ present\ (dry + producing)_{ij})}{365}} * 100$
	Health	The percentage of cows culled due to other disorders/diseases (e.g. Pneumonia, Scour, etc.) is calculated as the number of cows culled in the past 365 days with main culling reason other disorders/diseases divided by the average number of cows with at least one calving (dry and producing) present in the past 365 days. In case of more than one culling reason, due to other disorders/diseases should be at least one of the reasons.
26	% Cows with FPR < 1 at first test day	$\%\ \text{cows with}\ \frac{Fat}{Protein} < 1_{first\ td\ cur\_lac} = \frac{\sum_{i=1}^{n} cows\ with\ \frac{F}{P} < 1_{first\ td\ cur\_lac}}{\sum_{i=1}^{n} cows\ with\ available\ \frac{F}{P}_{first\ td\ cur\_lac}} * 100$

	Health	This is calculated as the number of cows that have calved in the past 365 days and with a fat-protein ratio <1 during the first test day in that lactation divided by the number of cows that have calved in the past 365 days and a first test day in that lactation.
27	% Cows with FPR >1.3/1.5 at first test day	% cows with $\frac{Fat}{Protein} > 1.3/1.5_{first\ td\ cur\_lac} = \frac{\sum_{i=1}^{n} cows\ with \frac{F}{P} > 1.3/1.5_{first\ td\ cur\_lact}}{\sum_{i=1}^{n} cows\ with\ available \frac{F}{P}_{first\ td\ cur\_lact}} * 100$
	Health	This is calculated as the number of cows that have calved in the past 365 days and with a fat-protein ration >1.3 or 1.5 during the first test day in that lactation divided by the number of cows that have calved in the past 365 days and a first test day in that lactation. The threshold of 1.3 or 1.5 is breed specific (1.3 for Holstein recommended).
28	% Cows with lameness	$\%\ cows_{lameness} = \frac{\sum_{i=1}^{n} cows_{lameness}}{\frac{\sum_{i=1}^{365}\sum_{j=1}^{m}(cows\ present\ (dry + producing)_{ij})}{365}} * 100$
	Health	The percentage of cows with lameness is calculated as the number of cows with at least one case of lameness in the past 365 days divided by the average number of cows with at least one calving (dry and producing) present in the past 365 days.
29	% Cows with mastitis	$\%\ cows_{mast} = \frac{\sum_{i=1}^{n} cows_{mast}}{\frac{\sum_{i=1}^{365}\sum_{j=1}^{m}(cows\ present\ (dry + producing)_{ij})}{365}} * 100$
	Health	The percentage of cows with mastitis is calculated as the number of cows with at least one case of mastitis in the past 365 days divided by the average number of cows with at least one calving (dry and producing) present in the past 365 days.
30	% Cows with subclinical metabolic issue	$\%\ cows_{subcl.meta.issue} = \frac{\sum_{i=1}^{n} cows_{subclinical\ metabolic\ issue}}{\frac{\sum_{i=1}^{365}\sum_{j=1}^{m}(cows\ present\ (dry + producing)_{ij})}{365}} * 100$
	Health	The percentage of cows with a subclinical metabolic issue (ketosis, acidosis, displaced abomasum etc.) is calculated as the number of cows with at least one case of subclinical metabolic issue in the past 365 days divided by the average number of cows with at least one calving (dry and producing) present in the past 365 days.

31	Age at culling (dairy cattle)	$\overline{AAC\ (days)} = \frac{\sum_{i=1}^{n}(date\ of\ culling_i - \ date\ of\ birth_i)}{n}$
	Longevity	Age at culling (AAC) is calculated as the date of culling minus the date of birth. The average AAC is calculated as the sum of AAC of animals that were culled in the past 365 days divided by the number of animals that were culled in the past 365 days. If the date of culling is unknown, the last date of milk recording could be used as alternative.
32	Average Daily Production of culled animals	$\overline{ADP} = \frac{\sum_{i=1}^{n}\left(\frac{lifetime\ milk\ production\ (ECM)}{(date\ of\ culling - date\ of\ birth)}\right)_i}{n}$
	Longevity	Average daily production (ADP) of culled animals is defined as the lifetime milk production expressed in ECM divided by the age at culling (date of culling minus date of birth). The ADP is calculated in two steps. Step 1: calculate the sum of lifetime milk production expressed in ECM divided by the age at culling of all animals that were culled in the past 365 days. Step 2: divide the results of step 1 by the number of animals that were culled in the past 365 days.
33	Average Lactation Number	$\overline{LN} = \frac{\sum_{i=1}^{n}\sum_{j=1}^{m}(LN_{ij})}{\sum_{i=1}^{n}\sum_{j=1}^{m}(cow_{ij})}$
	Longevity	N = number of test days in the past 365 days. M = number of cows present (both cows in milk and dry cows) in the herd each test day. The annual average lactation number (LN) is calculated in two steps. Step 1: calculate per test day the average LN and the number of cows in the herd. Step 2: take the total of all test days * average LN on each test day and divide this by the sum of all cows on all test days in the past 365 days.
34	Average Lifetime Production of culled animals	$\overline{LTP} = \frac{\sum_{i=1}^{n} lifetime\ milk\ production\ (ECM)_i}{n}$
	Longevity	The average lifetime production (LTP) is defined as the sum of the lifetime milk production expressed in ECM of all animals that were culled in the past 365 days divided by the number of animals that were culled in the past 365 days.
35	% Cows died ≤ 60 days in milk	$\%\ cows\ died \leq 60\ days\ in\ milk = \frac{\sum_{i=1}^{n}(number\ of\ cows\ died \leq 60\ days\ in\ milk)_i}{(number\ of\ cows\ that\ calved \geq 60\ and \leq (60+365)\ days\ ago)}$
	Longevity	The percentage cows that died ≤ 60 days in milk is calculated as the number of cows that died ≤ 60 days in milk in the past 60 to (365+60) days divided by the number of cows that calved > 60 and ≤ 60+365 days ago.

36	Age at first calving	$\overline{AFC} = \frac{\sum_{i=1}^{n}(date\ of\ 1^{st} calving_i - \ date\ of\ birth_i)}{n}$
	Young stock	Age at calving (AFC) is defined as the date of first calving minus the date of birth. The average AFC is calculated as the sum of AFC of all animals that calved for the first time in the past 365 days divided by the number of animals that calved for the first time in the past 365 days. Exclude animals with unknown birth date or unknown first calving date.
37	Young stock EBV ranking	Ranking of female young stock in the herd on the national genetic index relative to all other herds in the country (e.g. 0-100 scale).
	Young stock	GI is any (national) Genetic Index describing the Total Genetic Performance of all animal present in the herd at the moment of calculation. Only young stock (all animals without first calving yet) should be included, as lactating animals are already included in other performance traits.
38	Young stock sire EBV ranking	Ranking of female young stock in the herd on the national genetic index of the sire relative to all other herds in the country (e.g. 0-100 scale).
	Young stock	SI is any (national) Index of the sire of the animal describing the Total Genetic Performance of the sire of all animals present in the herd at the moment of calculation. Only young stock (all animals without first calving yet) should be included, as lactating animals are already included in other performance traits. SI should only be used if the Genetic Index of the animal itself is not available.
39	% Female young stock involuntary culled	$young\ stock\ involuntary\ culled = \frac{\sum_{i=1}^{n}(young\ stock\ inv.culled(> 90\ days\ of\ age)\ )_i}{\frac{\sum_{i=1}^{365} young\ stock\ present(> 90\ days\ of\ age)\ _{day}}{365}}$
	Young stock	The percentage female young stock involuntary culled after 90 days of age is calculated as the number of female young stock animals that is involuntary culled (for any other reason than anticipated low production) after 90 days of age in the past 365 days divided by the average number of female young stock (older than 90 days of age) present in the herd in the past 365 days.
40	% Calves born dead	$\%\ CBD = \frac{\sum_{i=1}^{n} CBD_i}{\sum_{i=1}^{n} calves\ born} \times 100$
	Young stock	Calves born dead is defined as calves born dead including calves that died within 24 hours. Calves include both male and female calves. The percentage of calves born dead (CBD) is calculated as the number of calves born dead in the past 365 days divided by the number of calves born in the past 365 days.

41	% Female calves with diarrhea	$\%\ calves\ with\ diarrhea = \frac{\sum_{i=1}^{n}(calves\ with\ diarrhea\ (\leq 90\ days\ of\ age)\ \&\ born > 90\ and \leq 455\ days\ ago)_i}{\sum_{i=1}^{n}(calves\ born > 90\ and \leq\ 455\ days\ ago)_i}$
	Young stock	The percentage of female calves with diarrhea is calculated as the number of female calves that had diarrhea ≤ 90 days of age and that were born > 90 and ≤ 455 (365+90) days ago divided by all female calves that were born > 90 and ≤ 455 days ago.
42	% Female calves with respiratory diseases	$\%\ calves\ with\ resp.dis. = \frac{\sum_{i=1}^{n}(calves\ with\ resp.dis.\ (\leq 90\ days\ of\ age)\ \&\ born > 90\ and \leq 455\ days\ ago)_i}{\sum_{i=1}^{n}(calves\ born > 90\ and \leq\ 455\ days\ ago)_i}$
	Young stock	The percentage of female calves with respiratory diseases is calculated as the number of female calves that had a respiratory disease ≤ 90 days of age and were born > 90 and ≤ 455 (365+90) days ago divided by all female calves that were born > 90 and ≤ 455 days ago.
43	% Mortality of female calves until 90 days	$\%\ mortitality \leq 90\ days = \frac{\sum_{i=1}^{n}(calves\ died\ (\leq 90\ days\ of\ age)\ \&\ born > 90\ and \leq\ 455\ days\ ago)_i}{\sum_{i=1}^{n}(calves\ born\ > 90\ and \leq 455\ days\ ago)_i}$
	Young stock	The percentage mortality of female calves until 90 days is calculated as the number of female calves born alive that died ≤ 90 days of age and that were born > 90 and ≤ 455 (365+90) days ago divided by all female calves that were born > 90 and ≤ 455 days ago. Percentage mortality does not include stillbirth.