

KEY PERFORMANCE INDICATORS (KPIs) FOR MONITORING HEALTH STATUS OF DAIRY HERD (Level 3)

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9.2	Health signals
9.3	Biosecurity of dairy farms
9.4	Tick born diseases (Prevention and treatment)
9.5	Worm infections (Prevention and treatment)
9.6	Vaccination schedule and planning
9.7	Mastitis prevention and treatment
9.8	California Mastitis Test
9.9	Usage and storage of veterinary medicines on dairy farms
9.10	Administering of medicines to dairy cows
9.11	Instruction use of injectors into teat canal
9.12	Key performance indicators (KPIs) for monitoring health status of dairy herd



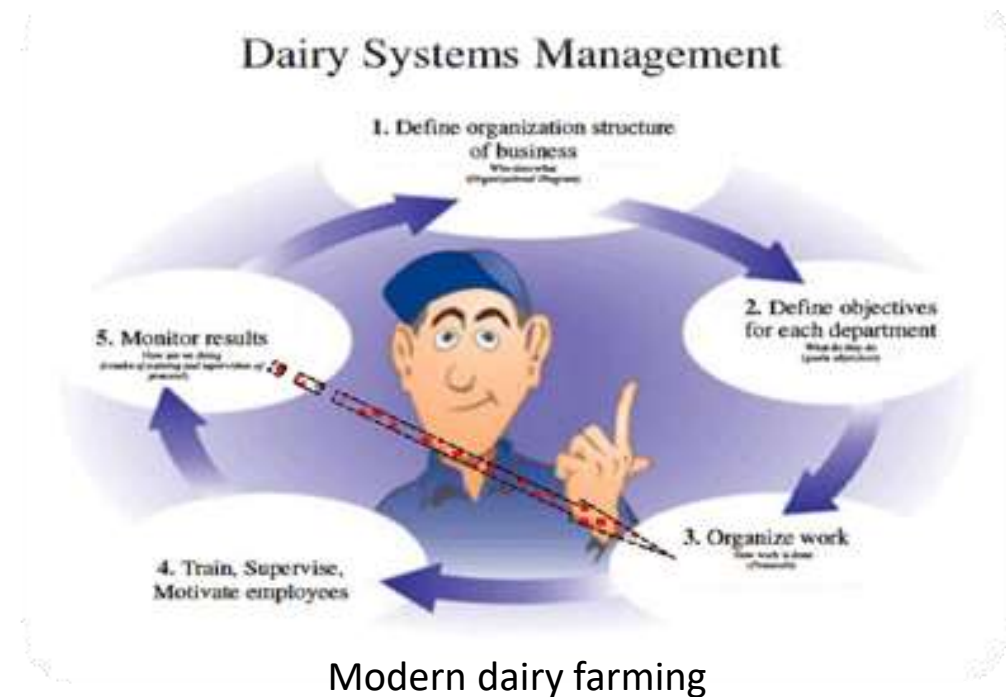
1. You will learn about (learning objectives):

- ❑ Key Performance Indicators (KPIs) and why we need them.
- ❑ How to determine KPI's.
- ❑ The importance of record keeping and ear tagging.



2. Introduction

- Key performance indicators (KPIs) are used in all kind of businesses and organizations worldwide.
- They help businesses to keep track and monitor their targets.
- Targets are made by prioritizing issues which are important for the business (KEY).
- If businesses become more complex and develop further, some issues demand more attention than others.
- So, to set a strategy, they choose to work on KPI's.



Healthy cattle in Uganda

3. What are KPIs?

- KPIs are a set of quantifiable measures that a dairy farm uses to gauge its performance; in this case, concerning dairy herd health status over time.
- KPIs are a way of measuring the effectiveness of the dairy farm and its progress towards achieving its goals.
- In other words, a parameter which tells you something about the health of your herd.

The average daily milk amount per cow is a key performance indicator. It tells you something about the level of milk production.

Is this specific for health? No.

- It tells more about how you feed and how much money you will earn. Of course you need healthy cattle for this.



4. KPIs are a tool

- A Key Performance Indicator is a management tool.
- It is a number, what gives the farmer and its advisors (veterinarian and extensionist) an indication on how the farm is performing on a certain goal.
- Following the number on time gives information if changes on management had an effect; and if the goal will be reached.
- So, in combination with farm management it is also an analysis tool.

Example:

A farmer wants to reduce the number of mastitis cases (the KPI) from 30 cases per month to 5 cases per month. He stops milking on muddy parlours. The number of cases go down to 20 per month. So it has effect but he or she needs to take further action to achieve the goal.



4.1 KPIs are a tool Cont'd...

Example extended:

A dairy farmer has 30 cases of mastitis per month.

He decides with the veterinarian that this KPI be less than 5 cases per month to be achieved in 6 months.

He takes actions as follows;

- Starts milking on a clean floor.
- Uses clean dry cloths for udder cleaning.
- Starts teat dipping.

He monitors this each month and if the number of cases do not go down quick enough he takes more action.



4.2 KPIs are a tool Cont'd...

Key Performance Indicators are not the **holey grail**, but can give strong management support.

- When dairy farming develops, improves and innovates, more and more issues have to be taken care of.
- Record files are hard to analyse and to interpret.
- KPI's give clear figures about the level the dairy farm works.
- It also gives the possibly to compare with other dairy farms or with benchmark figures.



5. KPIs do it together

- A dairy farmer has to run the farm by him or herself, but can acquire knowledge and advice from many experts (extension workers, veterinarians, contractors, neighbours).
- KPI's can help in monitoring progress.
- KPI's keep the discussion ongoing.
- KPI's forces one to look and work on solutions.



6. Why does a farmer need KPIs?

To set development targets and monitor progress in achieving them.

For instance: A farmer has problems with cattle dying from East Coast Fever (ECF).

- Every month, 5 cattle die or get sick.
- The farmer targets to have only 1 or no case per month.
- By slowly introducing the 10 golden rules on prevention tick borne diseases, he or she can monitor effectiveness or progress on the taken measures.
- It helps to make good decisions.



7. How to determine KPIs

- A Dairy Farmer should aim at how to improve the farm in future. This can be on different items for instance:
 - Farm economics
 - Young stock growth
 - Fodder production
 - Milk production
 - Water availability
 - Or as for this presentation, health status of the herd.

If the item is picked, the farmer (with help of an advisor expert) looks for a specific target.



For instance improving young stock growth could be a target.

7.1 How to determine KPIs Cont'd...

- In animal health there can be specific targets a dairy farmer can look for.
- Often, items with issues on the farm hampers profitability. For instance;
 - Tick borne diseases
 - Mastitis
 - Fertility
 - Calf scours etc.



Due to mastitis on the farm, milk production will decrease and also the veterinary cost will increase. This can be a reason for a farmer to try to reduce the number of mastitis cases.

7.2 Important factors that determine KPIs

S Specific
M Measurable
A Achievable
R Realistic
T Timeline



- In case of mastitis, milk volumes go down. Using milk volumes as a KPI will not help, the parameter is not **specific**. Number of mastitis cases per month are **specific**.
- Exact money loss due to mastitis would be a great KPI, but unfortunately it is not **measurable**.
- No cases of mastitis on the farm would be great, but unfortunately not **achievable**.
- To have all cattle pregnant after one service or insemination is not **realistic**.
- Changes take time, make a realistic **timeline**.

7.3 SMART Cont'd...

Specific	Measureable	Achieveable	Realistic	Timeline
S	M	A	R	T
G	O	A	L	S
What is the Result	How will you know when you achieved	Is it in your power to accomplish	Can you realistically achieve it	When exactly will it be accomplished

7.4 How to determine KPIs Cont'd...

- If the animal health issue to improve is determined, a parameter has to be picked, which expresses the level of the issue.

Possible parameters are;

- Number of cases of mastitis
- Percentage of sub-clinical mastitis
- Cost of mastitis medicines
- Amount of milk what has to be withdrawn.

Ear nr.	Name cow	RF	RB	LB	LF
1	Ntendegyere	+		++	+
2	Ngabo ya Mpuga	-	-	-	+
3	Shamitu	-	-	+	-
4	Ihinda ya moses	-	-	+	+
5	Kirembe	-	-	-	-
6	Mayenje	-	-	+	+
7	Kyasha	+	-	+	-
8	Nshara	+	+	++	++
9	Mpuga	-	-	-	+
10	Ibara	+	-	-	++

The level of positive scoring quarters in the Californian Mastitis Test gives a good indication for the udder health status of the dairy herd.

8. Why record Animal health figures

- If asking a farmer what kind of animal health issues he/she has, the answers can vary hugely;
 - Cost of acaracides is too high
 - Many cattle die of ECF
 - Too much problems with mastitis
- When asking to quantify the problem, the answer is often less clear.
- When not knowing how many cattle died, how high the acaracide cost are or how many cattle have mastitis, the level of the problem is difficult to judge.

Acaracides are considered to be expensive.

When asking how expensive?

Most farmers will know the price of a bottle, but the actual real cost for using them is often unknown.



8.1 Example why recording is feasible

A farmer records its acaracide cost.

One month he uses Amitraz, the next month he uses Duodip.

- Amitraz costs 60,000 UGX per bottle.
- Duo dip costs 110,000 UGX per bottle.
- The farmer uses the acaracides according to the medicine label.
- To his surprise he sees that during the month he uses amitraz he pays twice as much more for acaracides then the month he uses Duodip.
- Then he starts to calculate and finds out that he needs much more Amitraz then Duodip.
 - Amitraz has to be sprayed twice a week and also it requires 40 ml per jerry-can instead of 20 ml, like for Duodip.

By recording and analysing, he gets insight how to save money!



Recording makes the problem quantifiable and analysis of the figures gives the tools how to improve.

8.2 How to make Animal health records

What kind of numbers can a dairy farmer write down to get more insights on the health of the herd?

- Book keeping is a possibility. By writing down all the costs incurred on veterinary (medicines and treatment), the issue can be quantified.
 - **Advantage:** It gives insights on the finance situation.
 - **Disadvantage:** Indirect costs like loss of production or dying animals are not included.
- Writing down disease cases and medicine use. So, the farmer writes down dates which animals are treated, with the specific quantity of medicine.
 - **Advantage:** The health history of the farm becomes visible.
 - **Disadvantage:** It requires discipline to do it.



Keep in mind:

- Low veterinary cost is not always good.
- Cost of preventive medicines like acaracides, vaccination and dry cow treatment are done to protect the herd and eventually to save money.
- Cost of treatment should be as low as possible.

9. Ear tagging

- To make records for cattle, identification of the animal is crucial.
- This way not only the farmer's all the information on the head, but when written down it can be shared with extension officers and veterinarians.
- Also, the chance on memory loss and flaws will be less.



10. Calculating KPIs from the herd book

From the herd book possible KPI's can be calculated;

- Number of cattle (number of cattle in different age groups or in lactation).
- Number of calves born.
- Number of cattle that died.
- Number of calves that died.

To make the figures comparable, percentages can be calculated.

- Mortality (percentage of cattle or calves) dying in a certain period).
- Percentage of cattle in lactation.
- Percentage of youngstock.



In a high producing herd, about 80% of the adult cattle are in lactation. If this number less, milk production will be lower and therefore income.

In many farms in Uganda, this figure is around 50%. Working to increase this figure will be profitable then. Therefore it can be a good KPI.

11. Mortality/number of cattle dying

- Unfortunately in some dairy farms many cattle die. Tick borne disease control is often a challenge.
- In order to monitor improvement, the number of cattle dying or mortality rates can give insights.
- The advantage of calculating mortality rates in percentage makes it possible to compare with other dairy farms.
- The impact of 5 cattle dying at a farm with 20 cattle is much higher than at a farm with 100 cattle.
- When just looking at one farm, the number will do.



Monitoring KPI's just for record keeping makes no sense. The farmer must be willing to work (invest, change management) to improve the KPI.



11.1 Mortality/number of cattle dying Cont'd...

- When there is a specific problem on the farm, for instance a lot of young calves dying, the KPI can be made more specific.
- So instead of looking at the mortality of the whole herd, you can calculate the mortality of the non-weaned calves or just for the calves still drinking milk.
- The causes of calf mortality are also different most of the times than the death of milking cattle. So tackling of the problem will require a different approach.



- Scour is the most common health problem for young calves.
- Solutions are found in colostrum management and hygiene measures.
- Changes in management can become visible by monitoring KPI's.

12. How to make Animal health records: Fertility

- Fertility figures are worldwide recorded on dairy farms in many different ways. Especially in high producing dairy herds, fertility status of the herd is often an issue.
- Writing down fertility figures can start very simple by just writing down the calving dates.
- From these figures you can already calculate some very valuable information, like the birth rate or the calving interval.



13. Fertility records

- After the introduction of artificial insemination in farms, the fertility status changed and the urge to keep figures became more imminent.
- Farmers started to write down more parameters. Scholars and veterinarians also developed more and more fertility parameters.
- These parameters are often used as KPI's. Some will be discussed now;
 - i. Birth rate
 - ii. Calving interval
 - iii. Age at first calving
 - iv. Insemination rate
 - v. Conception rate
 - vi. Pregnancy rate

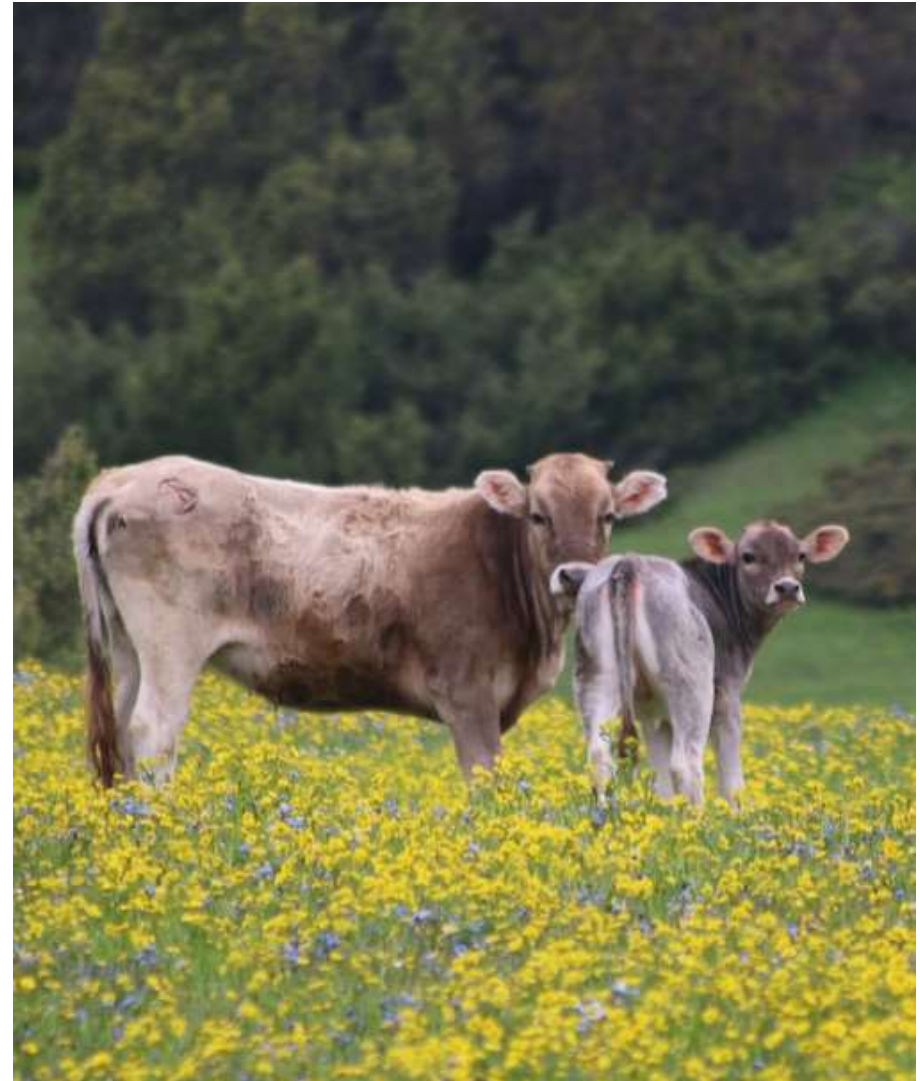


13.1 Birth rate

- Birth rate gives you the percentage of your cattle calving down in one year.
- When writing down all calving dates in one year, you can count how many cattle calved down in one year.
- When dividing this figure with the number of adult milking cattle on the farm and multiplying it with 100, you will get the birth rate.

Example: There were 40 calving's in one year and the farm has 50 milking cattle, the birth rate is $40/50 \times 100\% = 80\%$.

- When all milking cattle calve down once a year and also pregnant heifers calve down, the percentage can be over 100%.



13.2 Average Calving Interval

- Calving interval is the period of time between two calvings, calculated in days.
- In an ideal situation, a cow calves down once a year. So the calving interval is 365 days.
- After checking the fertility records one can calculate the time between two calving's of each cow in the herd.
- Calculating the average of it will give you the calving interval.
- The closer to 365 days, the better the performance.
- If the figure is over 450 days there is a serious fertility problem on the farm.

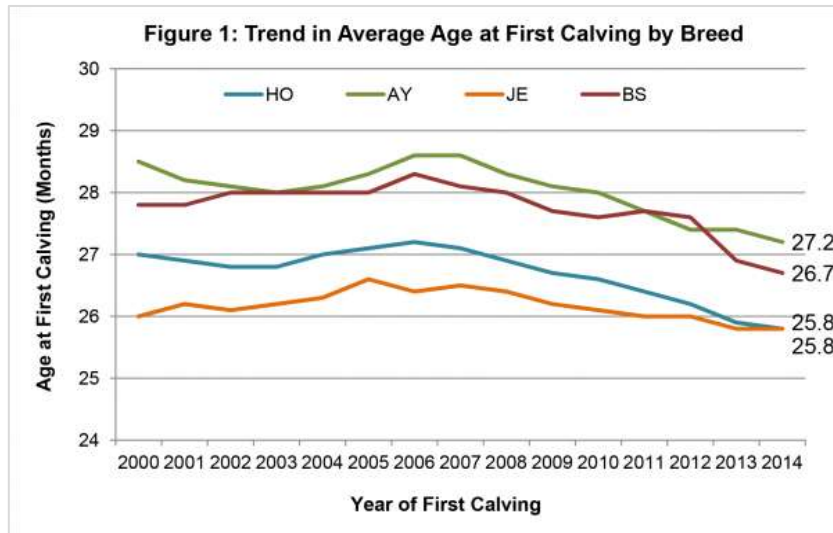


Example of monitoring the calving interval at a farm over many years.

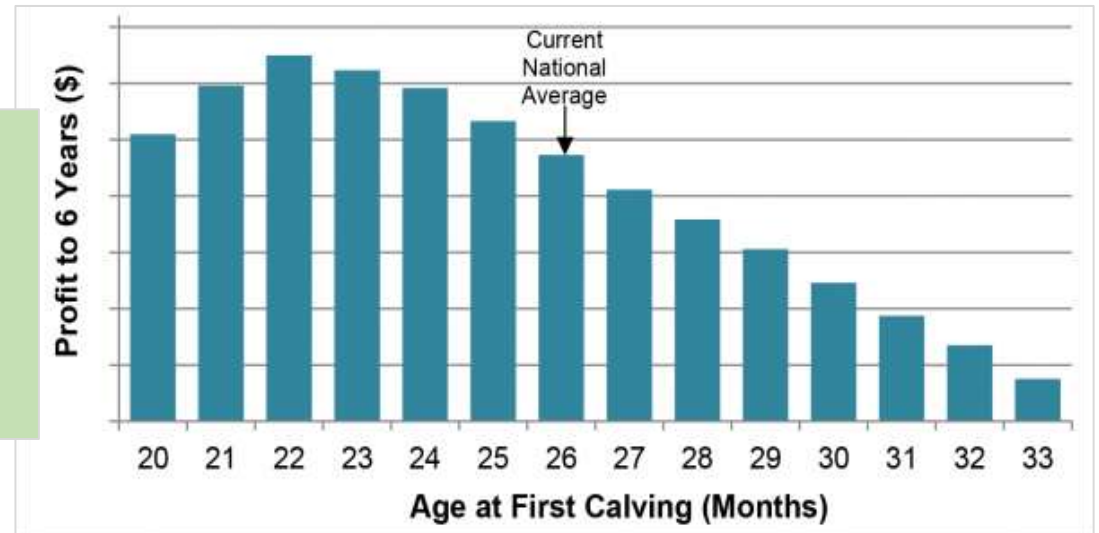


13.3 Average Calving Interval Cont'd...

- When female dairy youngstock grow quickly without any problems, they will be able to be served or inseminated at an age of around 15 months, so the age of first calving will be around 2 years of age.
- When female youngstock growth hampers, service or insemination will be much later and average age of first calving will be around three years of age.
- In this case the farmer has to take care of the animal one year more without getting any benefits for her. On the contrary he/she has to feed and buy medicines for the animal for one year extra.
- So, a low age at first calving can be a good KPI to monitor youngstock management.

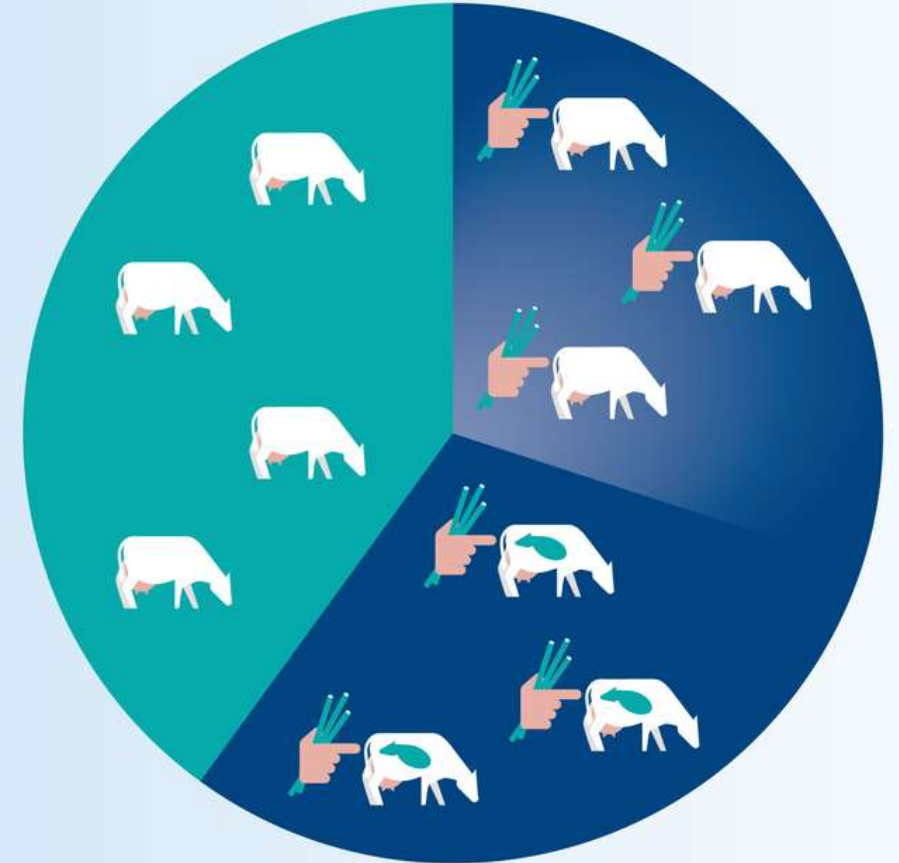
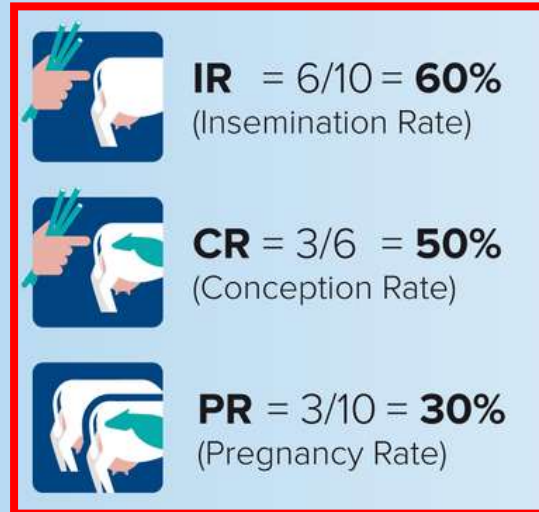


Some Canadian figures related to age at first calving.



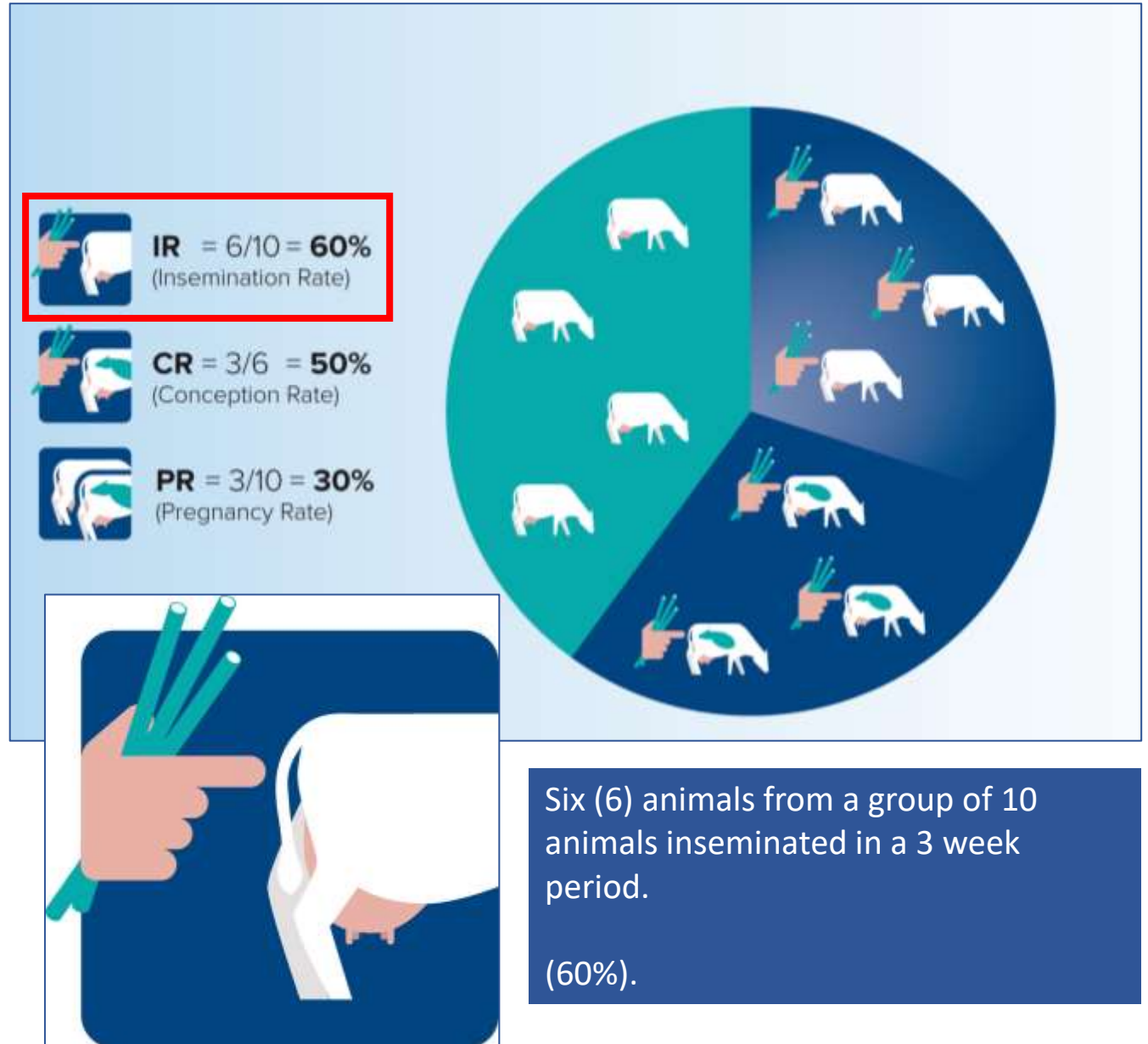
13.4 Fertility Index figures

- An American way of dealing with fertility figures is the following (The system is recently copied in Europe).
- It uses three parameters:
 - i. Insemination rate
 - ii. Conception rate
 - iii. Pregnancy rate



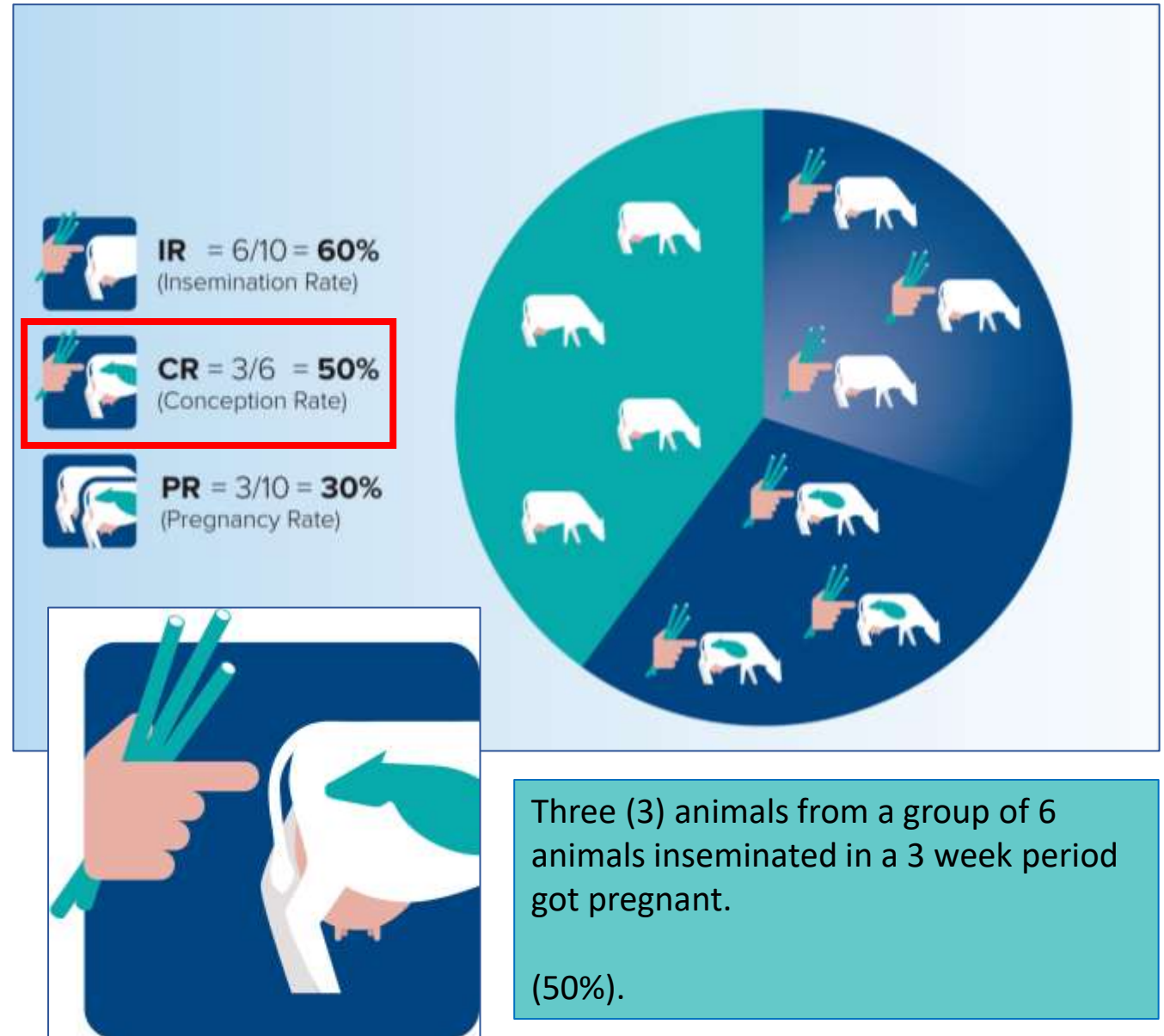
13.5 Insemination rate

- The insemination rate (the percentage of animals inseminated) is calculated by dividing the number of animals inseminated in a three-week period by the total number of animals that could have been inseminated during this period.
- This takes into account a waiting period after calving, the length of which is determined by the farmer himself.
- The insemination rate indicates how well the cows are on heat and how well the farmer signals the heat.



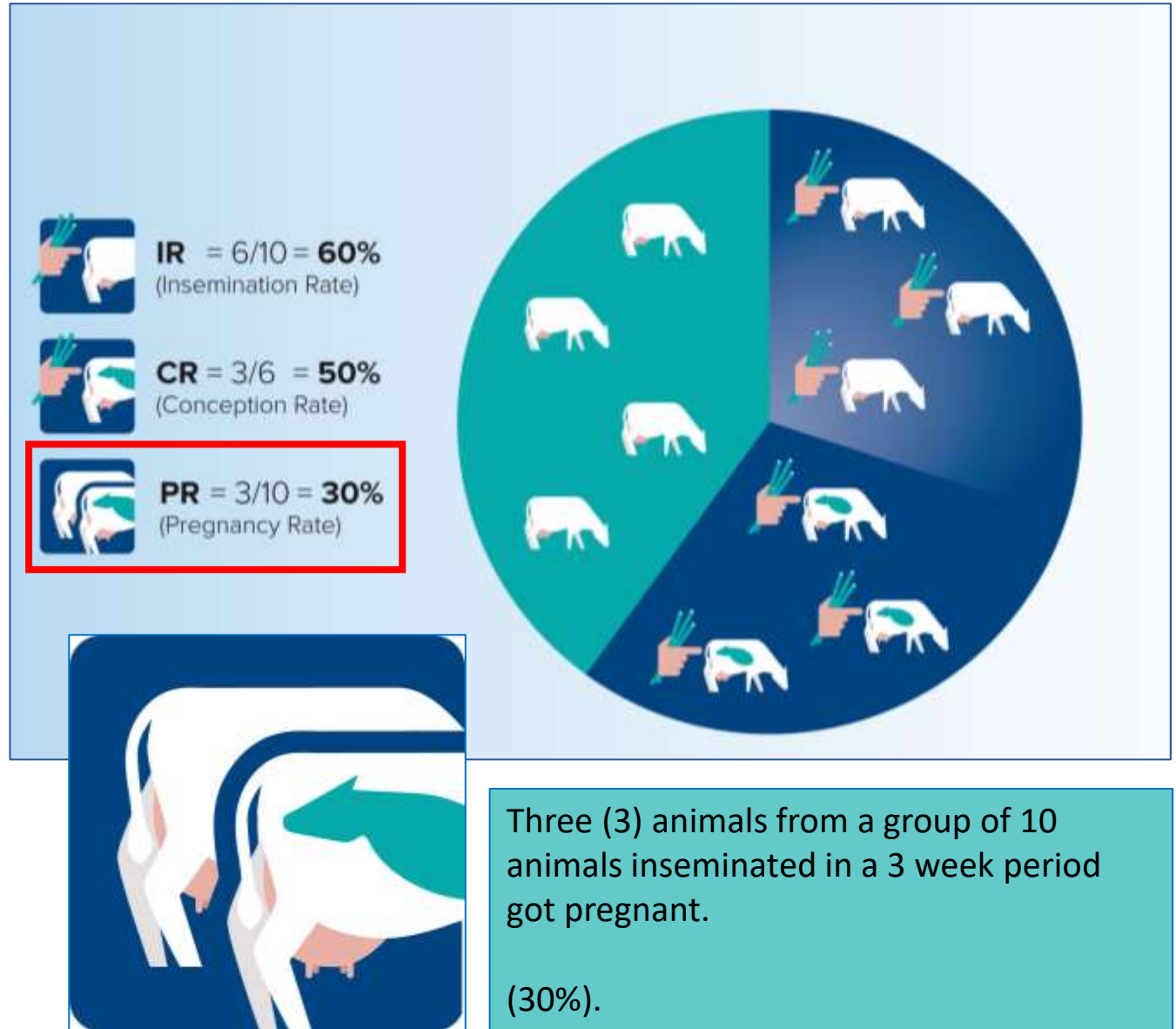
13.6 Conception rate

- The conception rate (percentage of successful inseminations) is the number of inseminated animals in a three-week period that became pregnant, divided by the total number of inseminated animals in this period.
- Animals are considered pregnant if they are reported pregnant by the farmer within 63 days of insemination or have not been re-inseminated within 56 days of insemination.
- The conception rate indicates how well the cows are getting pregnant.



13.7 Pregnancy rate

- The pregnancy rate (percentage of animals that have become pregnant) is calculated by multiplying the insemination rate by the conception rate.
- It is the percentage of cows that became pregnant in a period of three weeks compared to the cows that could have been inseminated during this period.
- The pregnancy rate provides insights into the general status of the fertility of a herd of cows.



14. More Fertility KPIs*

Include;

- Days open (60 days)
- Reproductive culling rate (<5%)
- % abortions (<5%)
- % estruses detected (>60%)
- Number of services per pregnancy
- For all cows (<1.9)
- For pregnant cows (<1.5)
- First service conception rate (>60%)
- Inseminations per cow (<1.9)

* These are just examples. Obtaining, interpretation and analysis often needs good fertility records and skilled interpretation.



Also leg problems will have a negative effect on fertility.
E.g. cow not coming on heat, not showing heat signs etc.

Womb infections are having a negative effect on fertility. Cattle will need more services and the calving interval will go up. Also, often they will come on heat later. This will influence a lot of the KPI's.



