



SESSION 3

How can we redesign dairy living spaces to improve cow wellbeing?



What makes a happy cow?



Make a list of things that need to be thought about when planning for the **health** and **wellbeing** of dairy COWS.



Temperature
 Space
 Rest
 Bed
 Comfort
 Water
 Food
 Light
 Cleanliness
 Ventilation
 Air
 Grooming
 Socialise
 Freedom



How do we know cows are happy and healthy?

Hair or coat is smooth and shiny.

Breathing is smooth and regular.

Eyes are bright and alert.

No dribbling or saliva.



Walk easily and steadily with regular steps.

When lying down, can get up quickly.

Ears are upright, move to pick up sounds and flick off flies.

Alert and aware of surroundings.

Is this a happy and healthy cow?



Where do dairy cows spend their time?

Spring and summer in the fields.



Indoors in the autumn and winter.



- Why do you think that dairy cows live in different places in different seasons?
- How might living indoors be different for the cows compared with spending time in the fields?

How do we recognise a cow's normal behaviour?



An **experimental ethogram** is where scientists or vets make a **list** of all the known **behaviours or actions** for a species. They will make observations over time.



Make your own **ethogram** for dairy cows in a field.



Make a list of all the actions and behaviours you see.



Behavior	Description
Standing head down	Head level with or below brisket
Standing head up	Head above brisket
Standing stiff-tailed	Standing with tail held stiffly away from body
Lying sternal recumbency	Lying on sternum or partially on sternum with hind-quarters to one side
Lying lateral recumbency	Lying on side, fully-recumbent
Locomotion	Walking, trotting
Feeding	Taking hay into mouth and/or chewing hay and/or grazing and/or browsing
Drinking	Consuming water
Ruminating standing	Standing, generally with a relaxed posture with regular chewing and regurgitation movements
Ruminating lying	As above, but lying sternum
Licking standing/lying	Standing or lying on sternum, turning to lick or attempt to lick body (body region noted)
Rub/scratch	Rubbing/scratching head or body against an object
Vocalization	Bellow or low
Teeth-grinding	Grinding molars together
Shiver/tremble	Whole of body shivering, shaking or trembling
Butt	Butt or attempted butt directed at another animal
Charge	Charges at another animal and stops
Push	Pushes another animal out of the way
Chase	Chases another animal (pursuit continues for some seconds)
Retreat	Moves away from butt, charge, push or chase
Grooms another	Licks another animal
Receives grooming	Recipient of grooming

How does your ethogram compare?

- How many different behaviours or actions did you observe?
- Did this scientist observe behaviours/actions that you didn't see? Why might that be?
- What do you think cows spend most of their time doing?

What do cows spend most of their time doing?



Use your ethogram to make observations of cow behaviour over time.



Happy Cow Challenge

What's the farmer's problem?

"I need to house my small herd of 60 dairy cows over winter. I have an open barn that is 20m wide and 35m long but I want my cows to be as happy in the barn as they are out in the fields."

Available resources:

- Access to the internet for researching ideas
- Poster paper and post-it notes for thinking through ideas and planning
- Barn template for visualising your barn design

What is the design brief?

Create a 2D scaled floor plan of your barn design, using an A3 sheet of paper and a scale of 1cm per 1m. The dimensions of the barn are 20m x 35m. All areas should be clearly labelled and explained on the plan.

Include the following basic components:

- Resting areas
- Feeding trough
- Water stations

Consider how to enrich the cows' natural behaviour and well-being by allowing areas for:

- Socialising
- Exercising
- Grooming
- Play

The engineering design task

Can you design an environment for the farmer that will meet the cows' basic needs as well as stimulate their natural behaviour?

Cows need spacious homes with clean comfortable bedding particularly important in winter, when most cows stay in the barn as the basic needs of food, water and a space to lie down are considered. Farmers know that cows enjoy each other and barns should have designated areas for exercise and play.

Top tips to get started:

Think about the **barn layout**, ensuring enough space for all the cows.

- Will you have **loose housing**, where cows can move freely, or **bedded stalls** where they are restrained?

Think about the **basic needs** for the cows

- Where will the cows eat and drink? How will you ensure they are comfortable? How will you ensure they won't slip?

- How will the barn be kept clean to ensure the cows are comfortable?

Think about how will you enrich the life of the cows? Will they be able to carry out all the behaviours identified on the **ethogram**?

Background Information:



Non-slip floors could be textured concrete, rubber mats or any other surface that won't be slippery when wet.

Think about the space for moving around so that cows can get access to the water troughs, grooming brushes and other elements you have included for their comfort.



There are a huge variety of bedding choices to keep cows comfortable: mattresses, paper, compost, sand, sawdust or straw. As well as keeping cows warm, you might want to think about how to keep cows cool if temperatures increase.

Installation of cow brushes can help animals with their grooming. Creative ways that cows can access some of their food such as pinatas provide stimulation.

Research has shown that cows enjoy music and smells such as lavender. Visual enrichment can be provided with mirrors, colour (yellow, orange) and projectors with

Thinking about stalls?

- Stalls need to be 2.4m long and 1.2m wide to accommodate each cow.
- Stalls are normally organised in rows either double or single formation.
- The passage width between each set of rows should be 4m in between and 5m at the front and end of each row.

Glossary:

dairy barn - a building or part of a building used for the sole purpose of housing, feeding and milking cattle.

free stalls - a comfortable place for cows to lie down and rest. Cows are not restrained in the stalls and are able to enter and leave as they like.

trough - a long, narrow open container for animals to eat or drink out of.

manure robot - a device that automatically cleans the barn floor at times set by the user. This can be done by scraping or vacuuming the manure.

enrichment - the act or process of improving the quality or power of something by adding something else.

grooming - brushing and cleaning the cow.

Ethogram - a table of all the different kinds of behaviour observed in an animal.

hygiene - maintaining health and preventing disease through cleanliness.

More information and inspiration!

Take a virtual visit to a farm in Somerset to see how 1000 cows live in a **year-round housing**. You could **research the products** different engineering companies provide for barn design.

Explore this article about Creating an enriching life for cows

Want to take it further?

How could you adapt your design to monitor and maintain the health of the cows?

- You might monitor their temperature or their growth.
- What about maintaining hoof health or providing medicine?

How well did you do?

Success Criteria	Score /5
Enough space for all 60 cows to rest	
Cows can eat and drink whenever they want	
The cows will be comfortable	
The cows can demonstrate their natural behaviours.	
Cows will be kept clean and safe.	

Use the **Problem on a Page** handout to imagine and plan the ultimate indoor cow environment.



Example design for a dairy barn

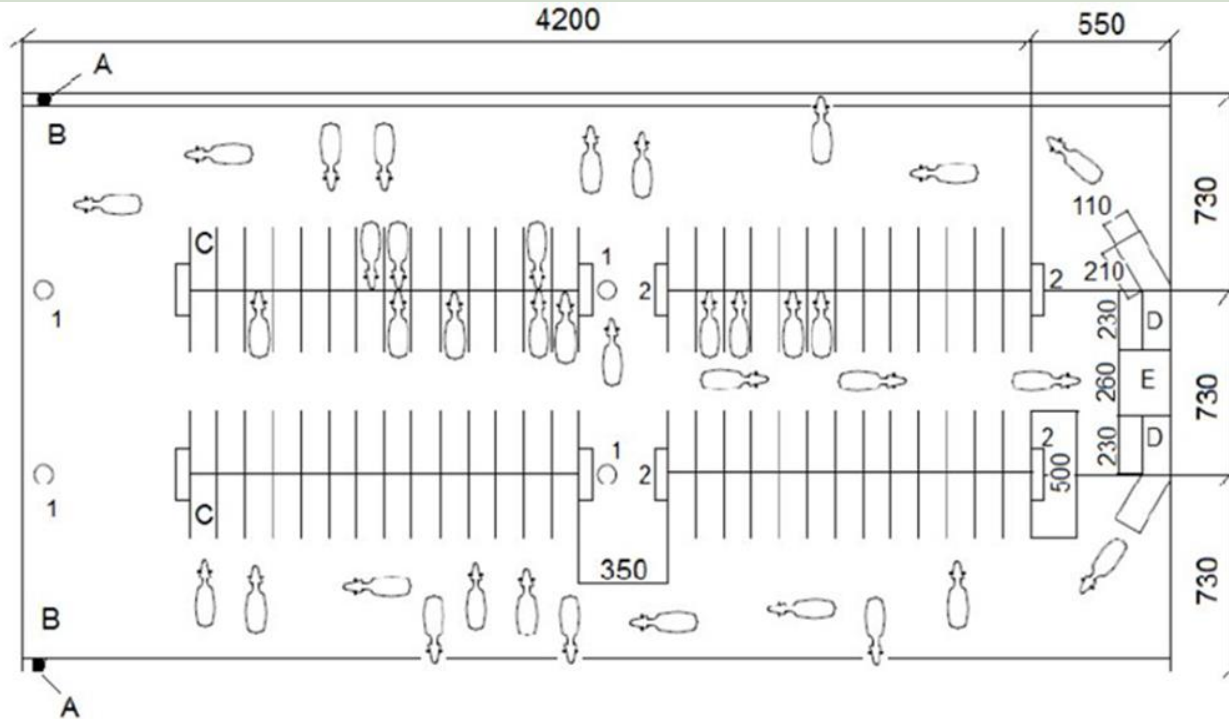


Fig. 1. Layout plan of the free-type barn where the experiments are carried out (the sizes are in centimeters): A – Forage line; B – Feeding area; C – Cubicles; D – Robots; E – Waiting area; 1 – Cow brushes; 2 – Troughs



Today we have been working like an engineer by **imagining and planning** possible solutions to the problem of maintaining the cows' wellbeing while living in the dairy barn.

