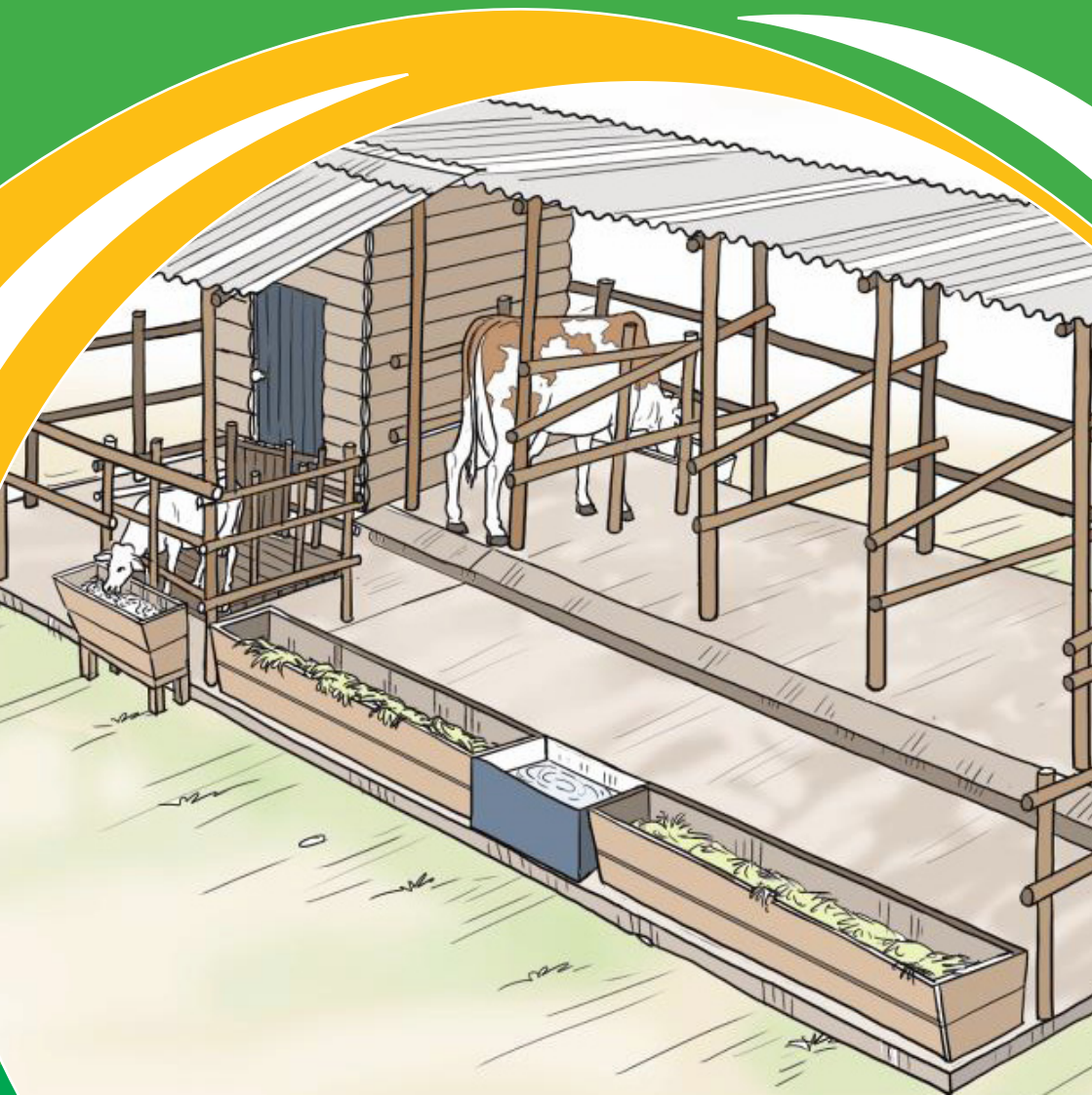




REPUBLIC OF KENYA



# ZERO GRAZING UNIT



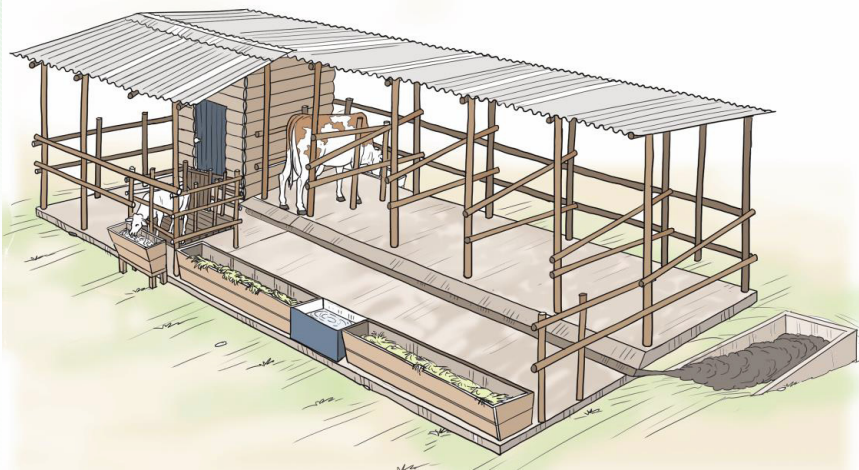
## What is Zero grazing?

Zero grazing is an agricultural practice in livestock farming where animals are kept in confinement or restricted to a specific area rather than being allowed to graze freely in open fields. Zero grazing can be practiced part-time, involving cows grazing outside for half the day and being housed in feeding stalls in the evening. In Kenya, many small dairy farmers adopt this system due to issues such as limited grazing land, low milk production, poor feed quality, and diseases. Zero grazing becomes necessary when additional feed is needed during grass shortages, leading to improved grass utilization compared to free grazing. The system results in increased milk production due to enhanced feed utilization and reduced animal movements, saving energy for milk production.

The zero grazing unit should be as close as possible to the source of forage to reduce the labor costs of carrying the cut fodder daily. Proximity to the homestead, in relation to the biogas plant, is also an important consideration.

## Parts of a Zero Grazing Unit

Basic (Essential) parts:	Basic (Optional) Parts
1. The cubicles	7. The store
2. The walking area	8. The manure storage
3. The feed and water troughs	9. Fodder cutter
4. The milking place	10. Roof water catchment
5. The calf pen	11. Water tank
6. The fodder chopping area	12. A holding crush



***Figure 1: A Zero Grazing Unit Complete with a Sun Shade Structure***

### **The resting and sleeping compartment**

Each animal has its designated sleeping compartment, separated by wooden rails or posts. The house floor can be made from farm soil, a cost-effective and comfortable alternative to concrete or stones, and can be easily replaced if dirty or worn. The sleeping place floor is elevated 25cm above the walking and manuring passage.

The recommended dimensions for the cubicle are a standard width of 4ft or 120cm and a standard length of 7ft or 210cm. It is crucial to avoid excessive length or width to prevent the floor from getting dirty. The cubicle is considered appropriate when droppings fall on the walking and manuring passage, not on the resting and sleeping compartment floor. For heifers, adjust the cow cubicle dimensions by moving the neck control posts and adding another side wall.

Install a roof over the resting and sleeping compartment to provide shade and protect against wet and dirty conditions.



**Table 1: Number of Cubicles in a Zero Grazing Unit**

<b>Number of cows</b>	<b>Number of Cubicles</b>
1	2
2	3
3	5
4	6
5	7
6	9

### **The cattle walking or manure places**

This should be constructed solidly with concrete because the area is heavily used by animals. Mix cement, sand, and ballast in the ratio of 1:2:3. The floor should slope towards the end of the building where manure is stored in a pit located about 3 m from the stable.

### **The feeding and watering place**

Construct troughs for feeding and drinking water on the opposite side of the sleeping and resting compartment along the manuring passage. Use wood, stones, or concrete to construct feed troughs that are 2.5 - 3ft long per cow. Place a water trough between the cow and young stock section, using either concrete or a water drum.

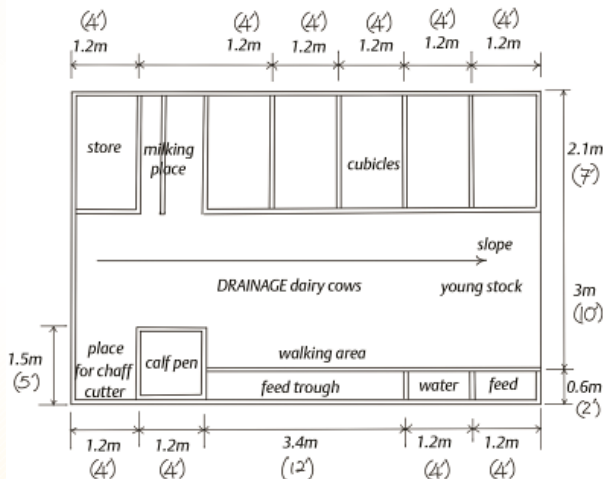
As the number of cows increases, the young stock place is shifted further towards the end of the cubicles. The young stock space should be adjustable as the number of calves keep changing from time to time

### **Sun Shade**

When constructing a shade structure, it should allow 2.5 to 3 m per animal, providing the minimum desirable protection for cattle, whether it is for one animal belonging to a small holder or more. The roof should have a minimum height of 3m to facilitate air movement. If financially feasible, all areas that will be under shade for certain periods of the day should be paved with good quality concrete.

In deciding on the orientation for construction, the following factors need to be considered:

1. With the east-west orientation, feed and water troughs can be placed under the shade, allowing cows to eat and drink in shade at any time of the day. However, the shaded area should be increased to 3 to 4m<sup>2</sup> per cow. Locating the feed and water in the shade not only encourages feed consumption but also results in more manure being dropped in the shaded area, making it easier to clean the unit.
2. In the north-south orientation, the sun will strike every part of the floor area under and on either side of the roof at some point during the day, helping to keep the floored area dry. A shaded area of 2.5 to 3m<sup>2</sup> per cow is adequate if feed and water troughs are placed away from the shaded area.
3. If paving is considered too costly, the north-south orientation is the best choice to keep the area as dry as possible.
4. In regions where temperatures average 30°C or more for up to five hours per day during some periods of the year, the east-west orientation is most beneficial.



**Figure 2: Layout of a Zero Grazing Unit for five cows with no water tank**

## Material requirement

The amount of materials given is an estimate guide and would vary in prices depending on what is locally available.

**Table 2: Estimated material requirements for fifteen cows zero grazing unit.**

S/ No.	Item description	Units	No. Units	Price/ Unit	Total KES
1	Cedar posts	Nos.	120		
2	Timber 3"x3 "	Running meters	135		
3	Timber 3"x2"	Running meters	120		
4	Timber 2"x2"	Running meters	105		
6	Off cuts	No.	500		
7	Corrugated iron sheets	No.	80		
8	Hard core 7 ton lorry	No.	3		
9	Ballast lorries	No.	3		
10	'Sand lorries	No.	3		
11	Cement	Bags	65		

## Raised Calf Pen

Proper housing for calves is crucial for effective calf management, providing protection from adverse weather conditions, predators, and internal and external parasites. The described calf pen is ideal for new-born calves in a zero-grazing unit, situated within the roofed and walled section of the facility.





**Figure 3: Raised Calf Pen**

A calf pen should be constructed, where possible, from locally available materials, and it should be:

- Approximately 1.2 X 1.5m space per calf
- Well drained or bedded
- Well lighted (artificial or natural).
- Ventilated well
- Strong to stand predator invasion.

Calves can be housed permanently indoors until weaning time when they are turned to pasture or semi-indoor where they are housed only at night. The calf house can be permanent or temporary and movable. Permanent houses should be constructed such that they are easy to clean when a new calf is introduced. Temporary houses are moved from one location to another when new calf moves in.

The calf house floor can be ground-level or raised. Ground-level floors should be made of easily cleanable materials, such as concrete, and bedded with straw or sawdust. The sides can be constructed with concrete or wood. Raised pens should have a slatted floor made of timber spaced at 1 inch to allow urine and faeces to fall to the ground. The house should be at least 1 foot above the ground.

The required minimum internal dimensions for an individual calf pen are 1200mm by 800mm for a pen where the calf is kept up to two weeks of age, 1200 by 1000 mm where the calf is kept up to 6 to 8 weeks of age and 1500 by 1200 mm where the calf is kept from 6 to 14 weeks of age. Three sides of the pens should be tight to prevent contact with other calves and to prevent draught. Draughts through the slatted floor may be prevented by covering the floor with litter until the calf is at least one month of age.

The front of the pen should be made in such a way that the calf can be fed milk, concentrates and water easily from buckets or a trough fixed to the outside of the pen and so that the calf can be moved out of the pen without lifting.

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