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**STUDY REGARDING THE SPECIFIC CONDITIONS FOR THE LOCATION AND  
CONSTRUCTION OF CATTLE FARMS FOR MILK PRODUCTION**

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***Abstract:** Analyzing the structure of a cattle farm exploited for milk production, it is found that it must include three elements: to take into account the location and grouping of farm buildings, to determine the location of alleys and roads and to divide the farm land into lots, all this being done taking into account factors of economic importance: the availability of capital, the use of labor-saving devices, other feed resources outside the pasture, the density of animals and their feeding policy, etc. Regarding the selection of the location of the cattle farm exploited for milk production, the following factors must first be considered: accessibility, access to electricity, sustainability, elevation, surroundings, natural light, labor force, characteristics of the market, protection against wind, soil characteristics, etc.*

**Key words:** cattle, farm, milk, production

## **INTRODUCTION**

The structure of a cattle farm for milk production must include the following three elements [4,9,12,14,15]:

- location and grouping of farm buildings ;
- location of alleys and roads;
- the division of the farm land into lots.

In structuring a cattle farm for milk production, several economically important factors must be taken into account:

- other fodder resources other than pasture [1,5,8,13];
- preservation of feed;
- animal density and feeding policy;
- herd size and level of milk production;
- availability of capital [6,7];
- the strength of the herd in relation to the lands cultivated with fodder plants;
- efficient farm supervision [2,3];
- type of agricultural buildings;
- topography of the land;
- use saving devices of labor force.

Thus, a land with an area of 40 ha can be divided as follows:

- 1.60 ha - land cultivated for commercial purposes;
- 3.20 ha - land with permanent pasture;
- 3.20 ha - land under buildings, paddocks and roads;
- 32.00 ha - land cultivated with fodder plants.

## **MATERIAL AND METHOD**

In order to carry out this scientific work, we analyzed the special conditions regarding the location of a cattle farm exploited for milk production, namely the grouping of the farm buildings, the location of the alleys but also of the farm roads. We also undertook studies on some factors of major importance to set up such a farm: respectively accessibility, access to electricity, elevation, human resources, the market where production will be capitalized.

**RESEARCH RESULTS**

The selection of the place where the cattle farm for milk production will be located must take into account the factors mentioned in Table 1 [10].

**Table 1.**

**Determining factors in choosing the location of the dairy farm**

Factors	Desired features	Motivation
Availability	Near a main road	<ul style="list-style-type: none"> <li>- Quick removal of unnecessary ones</li> <li>- Minimize transportation costs</li> <li>- Fast procurement of the necessary ones</li> </ul>
Access to electricity	In sufficient quantity and delivered continuously	<ul style="list-style-type: none"> <li>- Accelerate the work pace</li> <li>- Increasing the efficiency of physical work and machines</li> <li>- Increase security at night</li> <li>- Quiet and non-polluting operation of machines</li> <li>- Beautifying the farm</li> </ul>
Sustainability	A longer life and landscape	<ul style="list-style-type: none"> <li>- Cleanliness</li> <li>- Low maintenance</li> <li>- A better look</li> <li>- Long life</li> </ul>
Elevation	Bigger than the surroundings	<ul style="list-style-type: none"> <li>- Efficient drainage</li> <li>- Avoid unpleasant odors</li> <li>- Clean surroundings</li> </ul>
Surroundings	Safe and clean	<ul style="list-style-type: none"> <li>- Theft prevention</li> <li>- Prevention of economic losses</li> <li>- Protection of wild animals</li> </ul>
Natural light	Exposure of floors to the sun	<ul style="list-style-type: none"> <li>- Beneficial for animals</li> <li>- Controls the growth of germs</li> <li>- Moisture removal</li> <li>- Keep the floors dry</li> <li>- It makes work easier</li> </ul>
Workforce	Qualified, reliable, cheap, regular, sufficient, honest and hardworking	<ul style="list-style-type: none"> <li>- Economic</li> <li>- Better efficiency</li> <li>- Better care of animals</li> <li>- Better quality work</li> <li>- Higher profit</li> <li>- Longer life of cars</li> </ul>
Market	Close	<ul style="list-style-type: none"> <li>- Easy and cheap availability of raw materials</li> <li>- Easy shipping of products</li> <li>- Reducing storage and refrigeration costs</li> <li>- Price stabilization</li> </ul>
Wind protection	Without hot or cold direct currents	<ul style="list-style-type: none"> <li>- Avoid contamination during milking</li> <li>- Avoiding negative effects on the body of animals</li> <li>- Prevention of temperature fluctuations</li> </ul>
<b>The ground</b>		
The kind	Lut sand	<ul style="list-style-type: none"> <li>- Avoid cracks near the foundation</li> <li>- Keep the surroundings clean and dry by adequate drainage</li> </ul>
Mood	Not too dry or too wet	<ul style="list-style-type: none"> <li>- Hygiene</li> <li>- Longer life for buildings</li> </ul>
Type	Fertile	<ul style="list-style-type: none"> <li>- Allocation of infructuous land for buildings</li> <li>- Good fodder crops</li> </ul>
Topography	As smooth as possible	Lower land leveling costs
Other	Banks, Shopping Centers, Post Offices, Schools, etc.	<ul style="list-style-type: none"> <li>- Employee welfare</li> <li>- Contact with the public and patronage</li> <li>- Safer transactions</li> </ul>

The alleys and roads of a cattle farm for milk production must be designed as follows:  
 - the alleys must connect each building with the cattle pen, offices, residential areas, etc.;  
 - the roads must be designed in such a way as to occupy a minimum of land;

- roads must be well paved to allow fast transport;
  - the roads must be straight to allow the economic transport of goods.
- Pasture and land cultivated with fodder plants must meet the following requirements:
- activities specific to the farm must be easy to do and economical;
  - the number and size of plots must be in accordance with the crop rotation plan;
  - the structure of the plots must allow easy irrigation without soil erosion;
  - all plots must be well connected to roads and irrigation canals.

The structure of the cattle farm for milk production must comprise three categories of buildings:

- shelters for dairy cows: face to face, tail to tail, infant calves, calves, calves, dairy cows, bulls, calving pens, isolator, water trough;
- other farm buildings: milk measuring room, food ration room, feed storage, concentrate storage, tool shed, silo pit and tower, compost pit, veterinary dispensary, offices, workers 'sector, manager's/managers' sector;
- building reserved for primary milk processing: milk receiving room, milk storage room, washing and sterilization room, boiler and engine room, cold storage, pasteurization and milk bottle filling room, butter preparation room (possibly), office building reserved for primary milk processing, store (possibly), water pump.
- other farm buildings: milk measuring room, food ration room, feed storage, concentrate storage, tool shed, silo hollow and tower, compost hollow, veterinary dispensary, offices, workers 'sector, manager's sector;
- building reserved for primary milk processing: milk receiving room, milk storage room, washing and sterilization room, boiler and engine room, cold storage, pasteurization and milk bottle filling room, butter preparation room (possibly), office building reserved for primary milk processing, store (possibly), water pump.

These buildings must meet the following criteria:

- the animal shelters are located 30 m from the main road and the house/houses from the farm;

- calf shelters should be located near paddocks;
- the farm house/houses and offices/buildings to be located next to the main road;
- the farm buildings to be located according to the farm house/houses, roads, pastures

and lands cultivated with fodder plants;

- the isolator to be located away from animal shelters and near the dispensary;
- the silos, the measuring chamber, the calving boxes and the feeding chamber are

located next to the shelters.

Regarding the number of animals on a dairy farm for milk production, it should be, for a number of 100 dairy cows, as follows:

- 75 dairy cows (approximately  $\frac{3}{4}$  from the total number of cows);
- cows without milk but pregnant ( $\frac{1}{3}$  from lactating cows);
- 20 pregnant cows (2-3 years) ( $\frac{1}{5}$  of the cows must be selectively slaughtered);
- 25 breeding cows (1-2 years);
- 30 cows under 1 year;
- 40 calves under 6 months;
- 2 bulls
- 8 bulls,

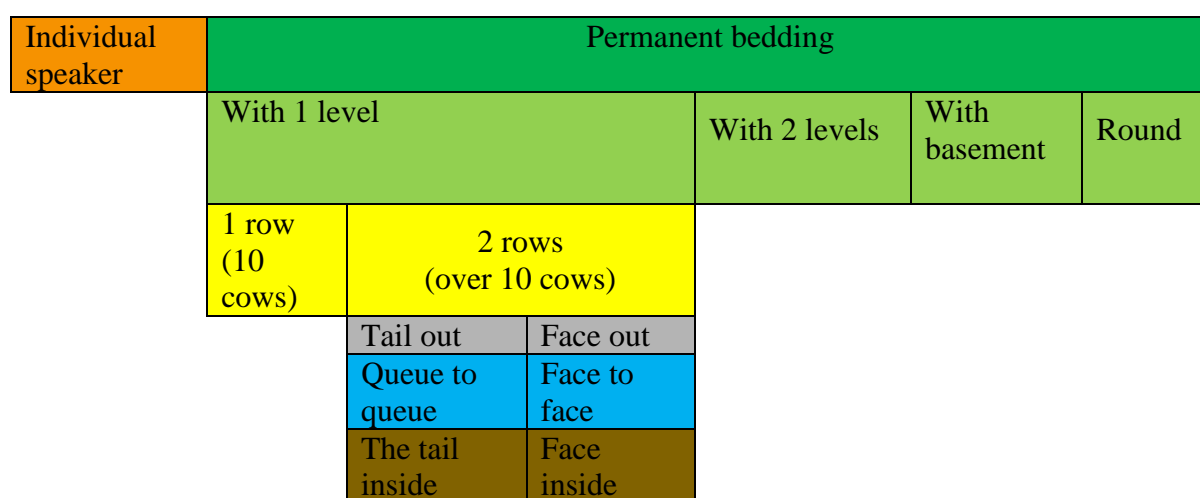
These categories of animals have different space needs (table 2).

**Table 2.**

**The space necessary by categories of animals on a cattle farm for milk production**

Age group	Manger (m2)	Covered area (m2)	Open area (m2)
4-6 months	0.2-0.3	0.8-1.0	3.0-4.0
6-12 months	0.3-0.4	1.2-1.6	5.0-6.0
1-2 years	0.4-0.5	1.6-1.8	6.0-8.0
cows	0.8-1.0	1.8-2.0	11.0-12.0
Pregnant cows	1.0-1.2	8.5-10.0	15.0-22.0
bulls	1.0-1.2	9.0-11.0	20.0-22.0

There are two types of shelters for dairy cows - in individual boxes and on permanent bedding (Figure 1).



**Figure 1. Types of shelters for dairy cows**

These five sub-types of dairy cows have special characteristics:

- "individual storage" of shelter type:
  - it consists of an area of 3 m covered for animal feed and protection against adverse weather events, such as hot sun, etc.;
  - is one of the sheltered housing systems;
  - allows animals to move freely;
- the shelter with a level with permanent bedding:
  - ensures sufficient light and ventilation;
  - it is a standard beam shelter;
  - allows saving workforce;
  - meets frequently;
- the two-level shelter with permanent bedding:
  - the lower level is used to house dairy cows;
  - the upper level is used for storage of feed, concentrates and bedding materials;
- basement shelter with permanent bedding:
  - it is made after cutting the base of a hill or a rock in hilly areas;
- round shelter with permanent bedding:
  - consists of a silo tower in the center and a manger around it (animals stand around the manger facing the silo tower).

Table 3 compares these five sub-types of dairy cows.

**Table 3.**

**Advantages and disadvantages of different types of shelters for dairy cows [11]**

Characteristics	Individual speaker	Shelter with 1 level bedding	Shed with 2-level bedding	Shelter with basement	Shed with round bedding
Comfort	more	less	less	the least	and less
Contamination during milk production	more	less	more	more	less
Construction costs	and less	more	less	and less	the least
Space saving	the least	less	more	and less	maximum
Freedom	more	less	less	the least	and less
Light and ventilation	maximum	more	poverty	poverty	less
Protection against cold and heat	not	Yes	Yes	Yes	Yes
Floor space	more	less	less	and less	the least
Moisture	the least	less	more	more	and less
Ease of cleaning cribs and gutters	maximum	more	more	less	the least
Ease of tying / untying cows	maximum	more	more	less	the least

In the case of a permanent shelter with one level and two rows of animals, there are advantages and disadvantages in terms of the orientation of cows' tail to tail and face to face (Table 4).

The "individual speaker" system consists of four categories of units:

- feeding and storage area for fodder:

- it is usually covered if the cows are fed dry food such as hay; the silo can also be offered here but is often offered outside on the porches of the courtyard with the floor;
- it must have a manger with a necessary space per cow of 50-60 cm;
- it must have a manger built in such a way that the hay cannot be pulled back to the floor;
- it must have a floor with a slope of 3.0 cm/m from the manger to the back of the floor area;
- it must be close and convenient for the milking parlor as it can serve as a waiting area for cows during milking;

- bedding area, storage space and bedding storage space:

- ensures the necessary health conditions for cows;
- provides comfort and keeps cows clean;
- must provide 5.6 m<sup>2</sup> per cow;
- must provide approximately 5.5-6 kg of bedding/cow/day;
- it must be located at the end of the building opposite the milking parlor;

**Table 4.**

**Advantages and disadvantages of placing dairy cows tail to tail and face to face [10]**

Parameters	The two-row system	
	Tail to tail	Face to face
Easier access to cows in the boxes	No	Yes
Fresh air and direct sunlight		
- for the milkman	less	more
- for animals	more	less
The appearance of animals at a glance	good	better
The cost of construction	more	less
Gutters cleaning	easy	tough
Detection of wounds on the legs from behind	easy	tough
Food distribution	tough	easy
Gutters exposed to the sun and kept dry	less	more
The walls are sprinkled with urine and dung		
Danger of disease spread	less	more
Possibility to steal milk at milking time	hard	Easy
Withdrawing the feed trolley	needed	unnecessary
Animal health safety	Yes	not
Space on the floor	more	less
Milking supervision	easy	tough

- floor area:

- is the place where cows enjoy fresh air and sun;
- it must have a 10 cm concrete slab on a 15 cm gravel layer;
- can be provided with a row of trees to provide shade and stop the wind;
- must have a slope of 3 cm at a distance of 10 m from the buildings;
- must provide 9.3 m<sup>2</sup>/cow;

- milking area, which includes the milking room, room with milk, concentrate storage and utilities room:

- it is preferable for cows to be milked in a continuous operation, rather than in groups;
- it is better to provide concentrates in the bunker baskets above ground level while the cows are milked;
- allows the cows to sit in the boxes and be milked by an operator who is at the same level: the cows can go through the boxes or can be released from the boxes and can withdraw depending on the arrangement;
- can contain 2-8 or even more stands depending on the size of the herd;
- it must have a partially covered floor area right in front of the milking room to keep the milking cows separate from the rest of the herd;

These types of shelters for dairy cows have advantages and disadvantages (Table 5:

Table 5.

**Individual box vs. permanent bedding [10]**

Parameter	Individual speaker	Permanent bedding
Labor economy	Bigger	Smaller
Housing costs	Smaller	Bigger
The degree of comfort of the cows	Bigger	Smaller
Animal health	Better	Hi
Detection of estrus in cows	Light	Less easy
The benefits of natural light for cows	Bigger	Smaller
Cleaner cows	Not	Yes
The benefits of movement	Yes	Not
Extension	Lightweight and less expensive	Hard and more expensive
Efficiency and profitability	Bigger	Smaller
Milk quality	Hi	Better

**CONCLUSIONS**

Regarding the exploitation of cattle for milk production we can speak of five sub-types of shelters each type having certain characteristics: the shelter type "individual box", which allows animals to move freely, with an area of 3 m covered for animal feeding and protection against adverse weather events, the shelter with one level and permanent bedding provides adequate light and ventilation, the two-level shelter with permanent bedding, the basement shelter with permanent bedding, made after cutting the base of a hill or rock in hilly areas or round shelter with permanent bedding consisting of a silo tower in the center and a manger around it (animals stand around the manger facing the silo tower).

Analyzing some types of shelters for dairy cows have, namely the individual box and the permanent bedding we can see that either of them has both advantages and disadvantages, so that the labor economy is higher in the case of individual boxes, housing costs are higher in the case of maintenance on permanent bedding, the degree of comfort of the cows is higher in the case of individual boxes, the same being found in the case of efficiency and profitability of the farm.

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