

QUALITY MANAGEMENT IN ECOLOGICAL BEEF PRODUCTION

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Abstract: Producing high quality beef asks for the implementation of a performing management of raising cattle ecologically. The main ways of improving beef quality management have a technical nature: sustainable grazing management to conserve floral diversity and to obtain ecological beef and rational distribution of the cattle over the grassland to facilitate vegetation recovery and to avoid the setting of invasive species. Implementing a sustainable management of the resources in the neighborhood of animal farms has beneficial effects on beef quality, brings good economic income through the practice of best beef quality management, protects the environment long-term, and reduces infrastructure expenses thus avoiding the risks of meat contamination.

Keywords: cattle, meat quality management, sustainable management, exploitation system

1. INTRODUCTION

Some researchers claim that there are several ways to reduce the impact of beef production on the environment [2, 4, 5 and 6]. Surprisingly, these ways are also **ways of improving beef production management**. We present below a few solutions applicable in Romania: proper setting and building of meat cattle farms, maintaining the vegetal cover, avoiding overgrazing, protecting neighboring areas, reducing the amount of vegetal and animal waste and removing the waste with the least negative impact, reducing the use of chemicals and of antibiotics, reducing the amount and quality of waste water, and reducing soil compaction [1,7-8].

All these desiderata can be reached if we observe a few basic principles: adjusting production needs to natural resources, improving forage conversion no matter what their source was, producing and marketing cattle with more meat and less fat, and integrating beef production in other activities to increase general production capacity and productivity [3, 8].

2. MATERIAL AND METHOD

The present scientific approach aims at

developing a few risk management strategies in the design of successful management systems to be used in the extensive production of beef. Associating the biological type of beef with the proper environment is important in risk management and in ensuring optimal performance levels in the cattle given natural resource limitations. In extensive beef production systems, the managerial challenge of optimising production in a very variable environment (which implies high risk) is, therefore, extraordinary.

3. RESULTS AND DISCUSSION

In order to improve beef production management, we suggest the implementation of the following solutions:

3.1 Setting and building meat cattle farms

The location chosen for a cattle farm is, sometimes, the only important factor from an environmental perspective. The main sources of environmental pollution are in the neighborhood of the watering and feeding sites and along the fences and rest places where the cattle tend to gather when grazed. Such animal concentrations tend to reduce the vegetal cover and can compact

the soil – which makes soil erosion more probable and reduces water percolation [3]. There are **several ways of organizing the activity on a cattle farm to reduce the negative impact on the environment**: placing supplementary feed and mineral supplements at reasonable distances (30 m) from the places affected by the floods in case of storm, from water course, from sewages, from ponds, from marsh areas, from drills and from holes produced by land glides. Alternative water sources can also be places far from water sources, from drainage canals and from lakes.

Cattle can also compact the soil. A way to avoid this kind of problem is to use mobile places for water, feed, and mineral supplements. Rotation grazing is another way to avoid long-term soil compaction. Some farmers use mobile electric fences or care-takers to prevent the cattle from compact of the soil in key-areas. Some heavier soils (clayish ones) are more susceptible to compaction: when the grasslands are located on

such soils, we need to make every possible effort to move the animals to a lighter soil in case the rains are abundant [2].

3.2 Avoiding over-grazing

There are several ways to control grazing and avoid a negative impact on the environment. **Controlled grazing** or **intensely managed grazing** or **rotation grazing** can be adopted to control unlimited access of the cattle to the grassland and to manage grasslands more efficiently. **The practices of sustainable grazing management that can reduce the effects of over-grazing include the following** (Figure 1):

- alternative forage;
- resource management;
- balance between the proper forage and the number of cattle;
- proper breed selection [4].

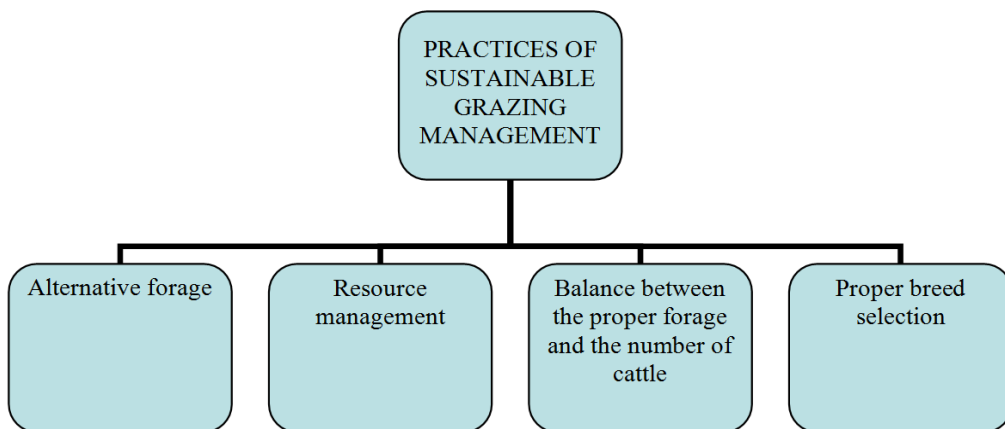


Figure 1: Practices of sustainable management grazing

Properly managed grazing can be beneficial. Animal wastes fertilize the grassland; in addition, grazing can encourage the recovery of pastoral flora and can prevent the spreading of the weeds. In some parts of the world, farmers have found out that grass germinates the best along the paths established by the fattening cattle. The explanation is that, if the soil is not stepped by the cattle nails, the seeds cannot penetrate the soil crust and germinate. The farmers who have used this system of grazing have doubled their capacity of producing green fodder. The same farmers have also obtained a higher percentage of perennial

grasses that produce more biomass as vegetal cover than the lands exploited conventionally.

Well managed grazing keeps the vegetation healthy, which helps filtering pollutants in water drains, reduces the speed of water drains, and controls soil erosion. **Best management practices** maintaining the vegetal cover include the following (Figure 2):

- proper cattle distribution to avoid over-grazing;
- facilitation of vegetation recovery after grazing.

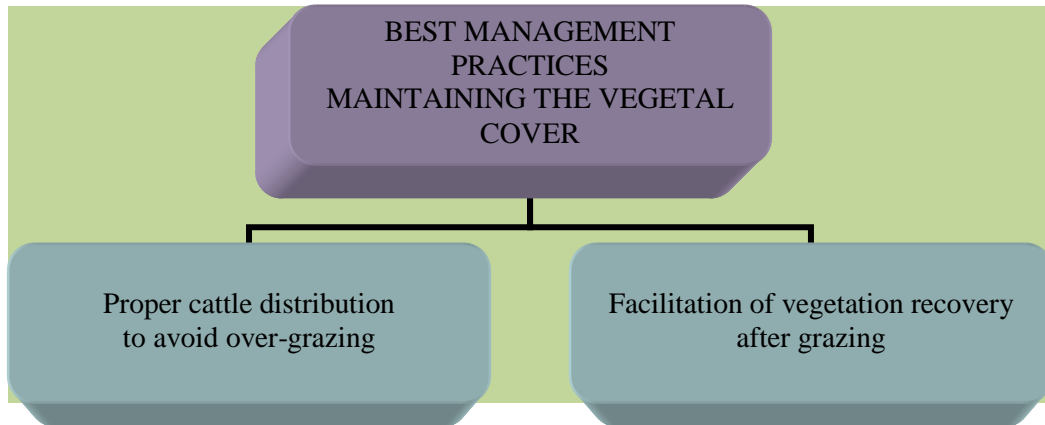


Figure 2: Best management practices to maintain vegetation cover

The use of grazing systems can reduce the negative impact of grazing. Adjusting the number of cattle depending on the season, particularly in areas susceptible of water quality issues, can also reduce this kind of impact.

3.3 Protecting near-by areas

Cattle farms operators should prevent the cattle from grazing the natural vegetation along water courses because this vegetation prevents soil erosion and the leakage of nutrients into the water and, therefore, their pollution. Water courses can be protected by:

- bridge building;
- supplying alternative water sources;
- setting fences;
- monitoring the grazing;
- planting vegetation curtains.

Sustainable resource management in near-by areas: it brings in economic profits, it protects the environment long-term, and it reduces infrastructure expenses (Figure 3).

3.4 Improving waste management to conserve biodiversity

Water carries natural and chemical pollutants from cattle farms. Though it is always in their own interest to reduce animal wastes and to manage them properly, farmers need to monitor and regulate these sources of pollution. In many parts of the world, cattle farms are the most important source of pollution. Therefore, developing and

implementing environmental laws and regulations to monitor and check the proper removal of animal wastes from animal farms is an important factor in reducing pollution caused by cattle farms.

We consider that these regulations should:

- start by establishing exactly the size and geographical distribution of cattle farms based on hydrographic basin or eco-region capacity of absorbing nutrients from animal wastes;
- encourage the development of technologies for the treatment, use, and removal of animal manure, particularly in the areas where animals are more numerous (sheds, farms) and where there is enough equipment for the treatment of animal wastes;
- establish standards for waste processing and for waste use to produce biogas.

It is obvious that all these regulations mean nothing if they are not enforced and observed. Besides laws and regulations, there are also management practices that beef producers can adopt to reduce both volume and concentration of nutrients in farm wastes. To do so, we have developed a code of good managerial practices that can be implemented in any meat cattle farm (Figure 4):

- farm plan and location selection;
- collecting, storing, and using liquid wastes;
- removing carcasses and garbage from the farm;
- managing near-by areas;
- using animal wastes as natural fertilizer;
- protecting the soil.

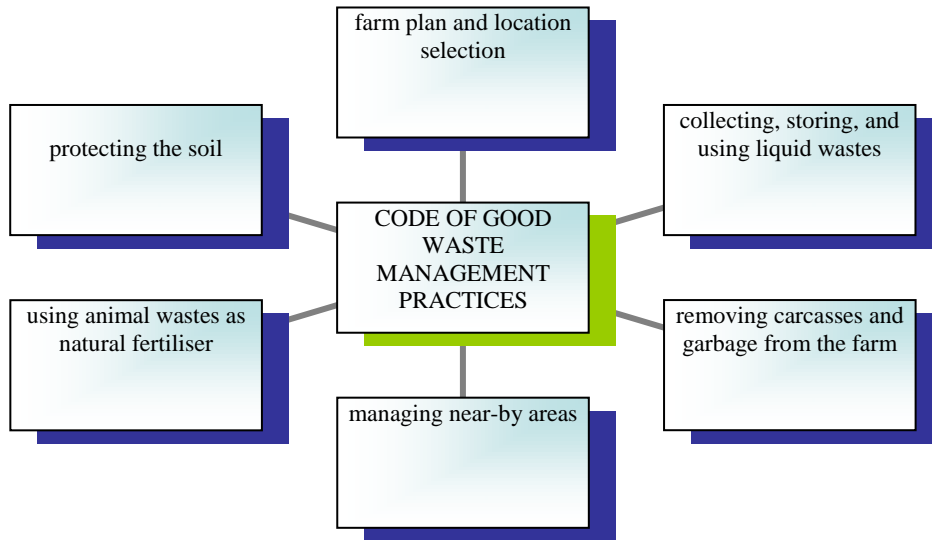


Figure 3: Code of best waste management practices

3.5 Correlating production requirements with natural resources

Management changes allow the farmers to take advantage of the free of charge, natural, and seasonal nutrients. This is how we can reduce total costs and maintaining production all over the year or when it does not follow natural ecosystem productivity. These management changes are as follows:

- coordinating weight gain and grassland maximum productivity;
- applying genetic engineering in animals;
- scheduling farrowing;
- stimulating lactation.

A good way to manage natural resources and beef production is to correlate nutrition requirements and natural processes through genetic engineering. No matter the goal – meat production – genetic engineering can correlate cattle needs with environmental productivity. Some breeds accumulate weight by simply ingesting grass: if the farmers wish to produce beef from animals fed on grasses, then they should focus on cattle breed genetics. If the farmers wish to avoid finishing cattle in close farms and to produce quality carcasses, they should choose precocious breeds that finish on the grassland. Ideally, beef produced by grass-fed cattle should be slaughtered before the second winter: late maturity cattle breeds, “weak”, continental, or

European, are not equally fit for grass feeding as late maturity and “fat” cattle breeds (Angus).

Seasonal productivity can contribute to the increase of incomes and to the reduction of the negative impact on the environment. Avoiding artificial insemination during the hot summer months increases conception rate with 15-20%. In areas with temperate climate, farrowing in late spring and in summer combined with early weaning reduce the need for feed because it allows the cows to winter using most of their own body reserves and consuming hay, silo, and concentrated feeds. In many areas, late farrowing ensures the best correlation between nutrition requirements during the production cycle and natural fodder. Such a correlation can result in an economy of 2 RON/kg of beef, which is due to a better management of forage distribution along the year and of real costs resulting from management changes compared to producing and purchasing fodder extra-seasonally. This is the only way farmers can increase beef production and reduce total production costs [5].

In both Europe and Romania, aligning beef production and natural processes suppose the following **farm management**:

- interdiction of using hormones, implants, or artificial growth stimuli;
- limitation of total grain consumption to 250 kg per animal;
- summer grazing.

3.6 Reducing chemical and antibiotic levels in meat

On many cattle farms, they use antibiotics regularly. This is done in two cases:

- when the animals are moved to finishing farms;
- at different times during the finishing.

We think that the prophylactic use of antibiotics should be legally banned because:

- it can have a broader impact on the environment bodies;
- it tends to reduce animal resistance.

Medicine use and cost can be reduced by applying an **improved management** that focuses rather on prevention than on curing. This can be done by closely monitoring the animals. Here are the **best management practices** to achieve these desiderata:

- removing as quickly as possible the animals to the grassland;
- avoiding the contact between highly stressed animal caretakers and animals.

Adopting these very simple managerial practices can reduce death rate among animals with about 1% and medicine costs with over 10% [6]. We should also bear in mind that medicines were more efficient than vaccines on stressed animals or than repeated vaccines.

3.7 Protecting and/or improving water quality

An improved control of the way in which inputs are used and of efficiency can reduce pollutants and, therefore, can improve water quality. Pollutants come from the following sources:

- fuels;
- animal manure;
- fertilizers;
- organic matters;
- pesticides;
- chemicals.

If we store, apply, and remove these materials properly, there are few chances that they reach the environment. **Developing management plans for nutrients can reduce nutrient leakage.** Tests concerning nutrients allowing the producers to determine the best time for fertilizer application and the fittest amounts of fertilizers can reduce

inputs and, therefore, input expenses, thus reducing nutrient content of leakage. Fertilizers and pesticides should not be applied close to water courses, to stagnant waters, or to ditches before abundant rainfalls.

An important strategy of reducing the negative impact of applying pesticides on grasslands is to compare total pesticide toxicity. In general, farmers do not have information allowing them to select less toxic pesticides with less negative effects on water quality. In addition, information concerning the most recommended pesticides in certain situations and the risks associated with them would allow the farmers to make decisions to reduce pesticide negative impact. The factors that should be taken into account in pesticide selection include:

- pesticide mobility;
- pesticide persistence;
- soil features;
- pesticide toxicity from the perspective of:
 - wild animals;
 - humans;
 - wild plants;
 - aquatic animal species;
 - aquatic plant species.

Selecting the proper pesticides reduces the risk of contaminating ground and surface waters (e.g., certain combinations of soil, pesticides, and meteorological conditions can be a true menace of water pollution) [9].

4. CONCLUSION

To reduce the impact of beef production on the environment, we need to implement ways of improving meat production management aiming at producing high quality meat that meets the principles of meat quality management with low costs.

The best solutions for Romania are: good practices in environmental protection in areas with cattle farms, proper location and building of meat cattle farms, avoiding over-grazing, reducing vegetal and animal waste amounts, discharging wastes in the least damaging way possible, reducing the amount of water used and improving the quality of the wastewater, and reducing soil compaction [10].

Through the improvement of the extensive

beef production systems, we encourage the inclusion of different risk management strategies in the design of successful quality management systems to be applied in extensive beef production; the increase of the number of animals is the main factor affecting the relative success of

any grazing management strategy since increasing cattle numbers determines the amount of forage available per capita; the extraordinary managerial challenge of optimizing production in a very variable environment.

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