



agriculture & rural development

Department:
agriculture
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PROVINCE OF KWAZULU-NATAL

Beef Production: The Basics

Feedlotting Cattle

Growth and Fattening in Cattle

A beef carcass comprises muscle, fat and bone. At birth, there is very little fat in a carcass and initial development is mainly bone and muscle growth. As the animal matures and gains mass, a stage is reached when fat deposition accelerates. Once an acceptable level of carcass fat is reached, an animal is said to be finished and can be slaughtered. The live mass and fat content considered acceptable for slaughter should be decided by market demand.

Feeding cattle in order to obtain the right amount of fat on and in the muscle, and a higher carcass mass, can be done in many ways. In South Africa the most common practices include:

1. Grazing on veld. Usually steers have to remain on the veld until they are two years or older before a suitable carcass fat content is reached. Cows are frequently fattened on good summer veld and achieve good finish in a reasonably short period of time.
2. Planted pastures can be used for fattening and growing out animals and the growth rates achieved are better than on veld. The most common practice is the use of annual ryegrass, where weaners go on to the pasture at weaning in autumn and are ready for market by Christmas. Although summer pasture e.g. kikuyu can be used, this practice is often not successful because feeding starts in spring when the price of feeders is relatively high and finished animals are only ready in autumn, when beef prices are relatively low.
3. The majority of cattle marketed through abattoirs come from feedlots. These include:
 1. On-farm feedlots. Many farmers fatten animals in pens or large paddocks, using bought-in or home-grown feeds. The livestock can be home produced or purchased animals.
 2. Commercial feedlots are probably the major method of finishing livestock. The feedlotter, often a speculator, buys animals for the feedlot. Ownership of the animal, and therefore the risk associated with feeding, are the responsibility of the feedlot owner. There are also custom feedlots, where the feedlot operator does not buy animals, but the owner of the animal sends them to be fattened. In the latter case, risk usually remains with the owner of the animal.

Profit Margins in Feedlotting

Factors affecting the profit margin of a feedlot operation include the price margin, feed margin, management, cost of feed, buying price of feeders and selling price, which is usually quoted as a carcass price.

Price margin

The profit or loss which the feedlotter makes as a result of an increase or decrease in price from the time the animal is bought (the cost price) to the time the animal is sold (sale price), is called the price margin and is calculated as follows:

Price margin = Initial live mass X (sale price/kg - cost price/kg)

Price margin includes the difference between purchase price and selling price resulting from beef price fluctuations as well as improvement in carcass quality due to feeding. The feedlotter cannot control price fluctuations and must therefore rely on a prediction of what prices will be when stock are sold at a future date. Making use of a positive price margin is what is commonly called speculation. Although profits are potentially high, risk is high and people lacking experience often lose money with speculation.

When buying livestock, most feedlotter's make use of the price per kg live mass for their calculations. They must therefore know the dressing percentage of the animal. Dressing percentage, varies and feedlotter's base the value they use on experience and a knowledge of the type of animal and its body condition. Lean animals have a dressing percentage of 49%, which increases to as much as 60% at a high level of finish. However, at a fat score of 2 to 3, the mean dressing percentage varies from 54 to 56%.

Feed margin

The profit or loss a feedlotter makes as a result of live mass gain in relation to cost of feed consumed, is called the feed margin and is calculated as follows:

Feed margin = Live mass gain X (sale price/kg - cost/kg gained)

A feedlotter can influence feed margin by ensuring, through good management, that optimal growth rates are achieved and by taking steps to obtain the best feed at the best price.

Other expenses

Other expenses incurred by feedlotting include the following:

- agents commission,
- slaughtering costs,
- carcass condemnations,
- transport,
- interest on capital,
- salaries of management and labour,
- machinery costs,
- mortalities and veterinary costs (disease control, medicines, vaccinations, veterinarian) and pretreatment (growth stimulants, dipping, dosing, vaccination).

Feedlotter's can improve production profit by manipulating some expenses, but others, *e.g.* agent's commission, are fixed. Mortalities must be monitored carefully to ensure that a high loss rate does not severely limit profits. A mortality rate of 1% to 2% is accepted as normal.

Feedlot profit

The feedlot profit margin is a function of price margin, feed margin and other expenses. Adding these three together, indicates profit or loss for the period of time over which the calculation is made. Feedlot managers need to keep a close watch on feedlot profit, which is a very sensitive measure of the efficiency of management.

Feedlot Management

The price paid for feedlot cattle or their initial value (cost/kg), is a critical factor affecting the profitability of a feedlot enterprise, especially when a small or negative feed margin exists. A positive feed margin can only be realized with high mass gains and a relatively low cost of feed. The cost of the feedlot ration relative to the beef price and live mass gain thus exerts a major influence on the cost of gain.

Because of the high proportion of energy required to ensure good feedlot performance, the cost of carbohydrate, which is usually included in most feedlot rations in the form of maize, hominy chop or one of the other grains, in relation to the beef price, is a significant factor deciding profitability of a feedlot enterprise. This is usually expressed by the ratio beef:maize price, which experience has shown must be more than 13:1 for feedlotting to be profitable. Feedlotters can make substantial profits when the beef to feed cost price ratio is favourable. Some of this profit must be held over to tide the enterprise over in a subsequent period, which is sure to come, when profit margins are negative.

Because average daily gain declines toward the end of the feeding period, where animals are fed for too long a period of time (are over-finished), a negative feed margin resulting in reduced profit margins is likely.

It can therefore be stated that management will have a major influence on the profitability of a feedlot enterprise. Management aspects that are important include:

1. Ensuring that the right type of animal is bought at the right price and at the right time. In some larger feedlots, feedlot managers rely on the services of experienced buyers.
2. The feedlot ration must be balanced in respect of nutrient content, must be matched to the type of animal fed and should be the most cost effective ration available at the time of feeding. In most feedlots the manager achieves these goals by keeping records of animal performance and monitoring results. A nutritionist is usually employed to do the ration balancing because this is a highly specialized task requiring a great deal of time monitoring feed quality and costs of ingredients.
3. The daily running of a feedlot is the major task of the feedlot manager. This includes care that feed bins are full all the time, that fresh water is available to the livestock continuously, that animals are processed and adapted on arrival and that animals are marketed when ready.
4. Diseases can be a problem in a feedlot. The services of a veterinarian to advise on disease prevention and the treatment of sick animals is a cost well justified. The adage "prevention is better than the cure" is very true in feedlotting.

Type of Animal

Breed

Cattle can be classified according to their maturity type. Early maturing types start depositing fat at an earlier age and can be market ready at a live mass of 380 to 400 kg. Late maturing types can reach market readiness at a live mass of 500kg or more.

As a general rule, dual purpose breeds are late maturing types with high growth rates and require a longer feeding period. The British beef breeds, excluding the Sussex which is medium to late maturing, are generally early maturing and although their growth rates are

relatively lower, they need a shorter feeding period to reach a good carcass finish. Indicus cattle can do well in feedlots, but temperament and problems with laminitis can occur.

Table 14. Maturity types of different breeds of cattle.

Frame Score	Maturity Type	Breed	Range in frame scores
1	Early 1 - 2	Dexter	1 to 2
		Nguni	1 to 2
		Angus	1 to 3
		Potfontein Rooies	1 to 3
		Afrikaner	1 to 3
2		Herefords	2 to 4
		Rietvlei Reds	2 to 4
		Shorthorn	2 to 4
		Sussex	3 to 5
3	Medium 3 - 5	Symons	3 to 5
		Smythe	3 to 5
		Bonsmara	3 to 5
		Bongihlati	3 to 5
		Brangus	3 to 5
		Brahman	3 to 5
		Braford	3 to 5
4		Tauricus	3 to 5
		Beefmaster	3 to 5
		Limousin	4 to 6
		Drakensberger	4 to 6
5		Santa Gertrudis	4 to 6
		Simbra	4 to 6
		South Devon	4 to 6
		Simmentaler	4 to 6
6	Late 6 - 7	Gelbvieh	4 to 6
		Pinzgauer	5 to 7
		Charolais	5 to 7

A problem encountered in practice is that, especially in Natal, most cattle entering feedlots are crossbreeds and maturity type does not always follow as a mean of the breeds crossed. In addition, there has been a trend to breed larger cattle, resulting in late maturing types within breeds traditionally known as early maturing. Fortunately, experienced stockmen can judge maturity type with reasonable accuracy.

Sex

Females are earlier maturing than steers and steers in turn are earlier maturing than bulls. Bulls can do well in feedlots, but often cause problems by fighting. Females can do well in feedlots, but often have poor growth rates partly because they reach carcass finish at an earlier age and there is a tendency to be tardy in sending them for slaughter. Disruptions caused by females coming on heat could be a contributory factor.

Age

Animals can be placed in the feedlot at any age, usually after weaning. In practice animals tend to arrive at feedlots shortly after weaning (7 to 9 months of age), as yearlings (12 to 18 months of age) or at two and a half years of age. In most feedlots there is no differentiation in feeding regime between animals of different ages and it has been found that irrespective of the age, animals tend to gain about 150 kg and are then ready for slaughter. Cattle placed on high energy rations at an early age tend to deposit fat more rapidly than if they are kept on low energy diets for a time before being placed on a high energy ration.

In cases of emergency caused by food shortages e.g. drought, a question often asked is whether cows and calves should be separated before entry to the feedlot. The best practice is to place the cow in the feedlot with her calf. As the cow reaches carcass finish, the calf will have started eating concentrate. The dam can be removed from the feedlot and the calf remain until it in turn is ready for slaughter.

Irrespective of breed, sex or age, a proportion of animals (usually about 10%) do not adapt to feedlotting. It is best to cull these animals as soon as possible. They can be identified by their poor performance in the initial stages of feeding.

Feeding System

Many feedlotters mix their own ration, usually a complete feed, using the most readily available ingredients at the best price they can bargain for. Where home-produced feeds are available at low cost e.g. silage, the profitability of a feedlot can be improved.

Other feeding systems, include:

1. Buying in a complete feed. If large volumes of feed are bought, a better price can be negotiated. This option must always be investigated, especially when beef prices are good and ingredients are difficult to obtain. Cost of transport often offsets gains made on the feed price.
2. Cafeteria feeding systems have been developed and have the advantage that the animal selects an increasingly concentrated diet over time, which leads to greater efficiency of feed utilization. The two cafeteria systems commonly used are the finisher feed system and the PRAM (protein-roughage-additive-mineral) system.

To ensure profitability, many feedlots employ a nutritionist who reformulates the ration or feeding system continuously. Taking care that adaptation to new feeds is not a problem, a nutritionist can buy in ingredients and formulate the cheapest ration in relation to animal performance by monitoring markets continuously.

Adaptation and Processing

Ruminants must always be adapted to a new feeding regime. Adaptation allows the microflora in the rumen to adapt to the new substrate they must grow on. This usually takes up to three weeks. When adapting livestock to high concentrate diets, this process is best done by a gradual increase in energy content of a diet. This is called an adaptation ration. With modern additives, such as the ionophores, the adaptation period is not as critical as it used to be. However, although most feedlotter no longer make use of an adaptation ration, a good practice is to place animals on hay for a day or two before supplying the high energy ration. Initially the intake of the concentrate is best limited to 1 to 2 kg per day before animals are allowed free access. This also assists animals to overcome the stress related to transportation to the feedlot.

On arrival at the feedlot animals must be processed. Processing varies from feedlot to feedlot, but usually includes:

1. Dose and dip. Dipping is essential, but many people question the need to de-worm animals arriving at a feedlot. A positive response to dosing is often not seen, possibly because many farmers dose their animals before selling them.
2. Vaccinate all animals against botulism, anthrax, quarter evil, IBR and any other diseases the veterinarian considers essential in the area where the feedlot is situated.
3. Administer growth promotents. These have been shown to be highly cost effective. Injecting Vitamin A is usually worth the nominal cost involved.
4. Identify and number the animals for record keeping purposes.
5. On arrival at a feedlot it is good practice to group animals according to size and sex. Large animals tend to bully smaller animals and keep them away from feed troughs.
6. The initial weight of animals should be recorded, preferably after 7 to 10 days in the feedlot. At this time, careful observation can identify poor performers and these can, at a next weighing which ideally takes place two to three weeks later, be culled if the mass gains confirm the earlier observations.
7. Horned animals are a problem. Dehorning sets an animal back a great deal. Leaving animals with horns can lead to severe losses resulting from damage to other animals and bruising. It is best to refrain from buying in animals that have not been properly dehorned.

Filling the Feedlot

Feedlot managers must be aware of the fact that keeping a feedlot enterprise running, a continuous income is needed. The only way this can be achieved is by having livestock to sell all the time. This is a difficult part of feedlotting, because animals remain in a feedlot for 90 to 120 days. The feedlotter must therefore predict market demand, and consequently predict selling price at least three months ahead. A continuous source of feeders is needed, but not always available.

Livestock can be obtained directly from farmers or be bought by private treaty through an agent or at livestock auctions. Where a buy-in feedlot system is used, buyers must be experienced in evaluating the potential for fattening of different types of animal (maturity type, age, gender) in relation to the market demand (price) of different grades of carcass. Funds to buy in animals must be available at all times. A lack of funds to buy in animals when prices are favourable could lose an opportunity to make a profit.

Transport

Feedlot owners obtain a large proportion of income from cattle transport as well as speculation.

Size of Feedlot

There is not an optimal size for a feedlot. Even a farmer feeding a single animal can make a profit. However, feedlotting often runs at a loss and a small operator can not absorb such losses for any length of time. On the other hand, in the case of a large enterprise where its sole source of income is the feedlot, the feedlot must be large enough to pay for running costs such as salaries, transport, cost of equipment and so on. At present costs and salaries, a feedlot producing less than 1000 head of cattle per month (i.e. has 3000 to 4000 head of cattle in the feedlot at any time), can not produce enough money to cover overhead costs.

Deaths and Condemnations

Although deaths occur in feedlots, where losses exceed 2% prompt action must be taken to find and eliminate the cause(s) of the mortalities in order to minimize losses.

Slurry Disposal

Slurry disposal is a major issue in most feedlots and warrants attention. Waste can be wet or solid and, if not properly taken care of, can result in a fly and insect problem. Flies and insects must be combatted in a feedlot because they worry animals and increase stress. Stress has a negative effect on growth rate.

Disease

A feature of crowded accommodation is the rapid spread of disease. Apart from the better known cattle diseases that can appear in feedlots, there are a number of diseases associated with feedlotting. These are better studied in more detailed publications or are left to the veterinary profession to manage. A feedlot manager needs to be aware of the potential danger of these diseases, especially infective diseases such as IBR which can spread through a feedlot at a very rapid rate and even if mortalities are relatively low, profits are eroded by depressed animal performance.