Beef, meat from cattle, is produced worldwide in an enormous variety of systems; by nomads in semi desert areas, to intensive dairy farmers who sell male calves for their meat and cull cows that no longer produce enough milk, as well as ranchers whose main aim is to produce meat.

The main aim of this Agrodok is to provide information on how to increase beef production in extensive and low-input systems, utilising existing conditions, but in a different way. This is a different form of intensification of production and requires a different look at the system, and probably a little more labour and specific inputs.

Agrodoks are a series of publications on small-scale agriculture. The booklets are aimed at people who work directly with small-scale farmers in the South. Each provides a theoretical background on a particular topic and then explains its practical applications extensively. All Agrodoks are published in English and French and many also in other languages. They can be ordered from Agromisa and CTA and are also available in PDF format.

Beef production
Beef production
Foreword

Beef, meat from cattle, is produced worldwide in an enormous variety of systems; by nomads in semi desert areas, to intensive dairy farmers who sell male calves for their meat and cull cows that no longer produce enough milk, as well as ranchers whose main aim is to produce meat.

The main aim of this Agrodok is to provide information on how to increase beef production in extensive and low-input systems, utilising existing conditions, but in a different way. This is a different form of intensification of production and requires a different look at the system, and probably a little more labour and specific inputs.

Much information is available about the nutrient requirements of pregnant and nursing cows and growing animals, but here we look at animals under grazing conditions where salt and minerals are the main supplement. This booklet focuses on the physiological and management aspects that are needed to increase the number of calves born per cow, without increasing undue stress to the cows. The management of these systems and the growth of the animals are the most important issues, and we devote most attention to these. In some special cases supplementation will be considered. The care and use of grazing areas, whether communal or private, and the strategies for different seasons are also looked at.

While we write in this Agrodok about the production of beef from cattle, many aspects apply similarly to other bovines such as buffalo, Bali cattle and the like. There are differences, such as the length of pregnancy, but most aspects, especially management, are applicable to the other species.

The author has over 50 years of experience in livestock production in Africa, Asia, Europe and Central and Latin America. I am very grateful to
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Gijs den Hertog
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1 Introduction

1.1 Meat production
Many animal species produce meat, but humans use only a few of these types of animals for the meat that they eat. These animal species, together called livestock, also vary greatly. And so the production systems that farmers have developed also vary in their intensity, use of resources, and time required to produce the final product: meat. The types of feed, housing and management vary, as do the efficiency of production and reproduction.

Here are a few examples that illustrate this variety in meat production:
• To produce chickens for their meat, put eggs in an incubator. After 3 weeks chicks will hatch and 6 weeks later the broilers will be ready for slaughter and for eating.
• To rear sheep, goats and pigs it takes about 1 to 1.5 years between the parent animal being serviced to the offspring being ready for slaughter.
• Cattle raised under extensive conditions take about 4 years between a cow being serviced and the offspring being fattened enough for slaughter.
• In countries or regions close to the sea, fishermen will go out almost every day to catch fish and thus produce that type of fish meat.
Also, there is a big variation in the number of offspring that different types of animal produce:

- Chickens can lay up to 150 eggs for reproduction per year.
- Sheep and goats usually have between 1 and 3 offspring per birth.
- Pigs have between 1 and 2 litters a year, with anywhere between 7 and 14 piglets per litter.
- Cows produce much fewer offspring: 1 calf per year in intensive systems, and in the tropics usually about 1 calf every 2 years.

### 1.2 Beef production

The meat from cattle is called beef. All systems in which cattle are kept produce beef, except where this is prohibited by the religion. Sometimes cattle are reared mainly for beef production, but far more often they are kept for other purposes and the meat is a by-product. Cattle are kept in all climatic zones of the world. Production systems include:

- Intensive dairy production on a farm, where cows are culled when they no longer produce milk and male calves are reared for their meat.
- Nomadic pastoralism, where people move with their cattle, using or selling their milk and its processed products, some also consuming the blood of live animals, some selling surplus bulls or steers/oxen for meat, or slaughtering them for meat when necessary (the animals can no longer keep moving).
- Cattle kept as draught animals, then slaughtered when no longer useful.
- One or two cows kept on a smallholding, for family consumption of the dairy products, eating crop residues, until finally they are slaughtered or sold for meat.
- Cattle may also be kept as a form of bank or savings account; they are a source of wealth.

This booklet focuses on extensive systems of cattle rearing, from nomadism and dairy farming (where beef is a by-product) to ranching, where beef is the sole product of the farming.
1.3 Production systems
Livestock production systems can be classified according to how they are organised in terms of how people are involved in them (social), how they generate income (economic) and how they deal with natural resources (environment). In terms of the environment, livestock systems are found in different climatic zones, such as the humid or dry tropics, and the seasonally humid or dry tropics. The purposes for which animals are kept and reared may differ between systems, but they also overlap.

Between all different systems there will be similarities and differences. However, each system has its own dynamics and changes over time, partly because of the expertise and skills of the farmer. Classification may help understand a system better, but the main point here is to understand the following questions:

• What are the production constraints?
• What are possible solutions?
• What ways of management can be used to overcome the constraints?

Figure 1: Typical cow-calf situation
On-farm production of beef varies from country to country and from region to region. However, much beef production throughout the world is done in low-potential areas, characterised by:

- poor soils
- long dry periods
- low levels of inputs
- infrequent outputs
- lack of infrastructure, such as roads and markets
- lack of processing opportunities

We have divided beef production systems into the following categories for this booklet:

A: ranches with breeding herds and fattening of steers kept until slaughter
B: ranches with breeding herds, selling immature or young stock to C
C: ranches with steer growing (C1) and fattening (C2), buying immature, sometimes castrated animals
D: dairy ranches

A: These are large ranches in very inaccessible areas. They produce stock that go for slaughter, mainly male animals, but also the non-productive cows. All age groups and both sexes are present, often separated into sub-herds:

- Cows with calves (200-250), with bulls present in the breeding season.
- Young stock, males and females kept separately in different locations.

B: Calf producers: these farmers produce calves that they sell to other farmers who keep them to grow (over a dry period), intending to fatten them later. They also sell young cattle soon after weaning to farmers who will fatten them. Male animals (castrated and not castrated) may be reared specifically for this purpose, or they may be the by-product of an extensive dairy production system. The ranches are often on poor soils where infrastructure, such as roads, is inadequate in some seasons.
Males are often castrated as this makes management easier, although some farmers prefer to fatten bulls. The farmer earns income from selling livestock for fattening and then slaughter, for their beef.

C1: Growers buy calves (nearly always castrated bull calves) that they grow to a certain weight and then sell to fatteners. These ranches are also often in remote areas, although conditions are sufficient for growing extensively: animals graze and at best are given some salt and minerals. Growth of the animals is low to moderate, especially as they are bought very soon after weaning and they are often not yet ruminating fully. If grazing is of sufficient quality, the growth potential of the animals will improve. Young male stock are kept for 1 to 2 years before they are sold to fatteners.

C2: Fatteners finish growing the animals before they are sent for slaughter. The ranches are on better soils, so in the good season the young bulls or steers grow faster (gaining up to 800-900 grams per day). The ranches are usually in a more accessible area than A and B. In the lean season, these farmers may use agricultural by-products or buy concentrates to supplement the animals’ diet so that they can achieve the desired body weight and/or condition. They may use the same inputs so the animals grow faster and can be slaughtered sooner. In some countries slaughter stock with a good weight will command a higher price per kg of live weight. Sometimes, however, animals may have a good weight, but with a little more time (often only a month) they would also have better body condition and carcass composition. This is important, especially where payment depends partly on carcass quality. Farmers need to be able to judge an animal’s potential if they are to obtain a better income.

**Economic returns on the different systems**

*The profit share in these different systems is very unequal. Calf producers (B) receive about 10% of the total profits earned; the growers (C1) receive about 30%; fatteners (C2) earn about 60% of the profits.*
D: Dairy ranching takes place on better soils and where there is sufficient infrastructure. Cows are generally milked only once a day, giving calves enough time with their mother so they grow and develop good condition. In this system the bull calves are a by-product: they are mostly sold to C for fattening.

The systems described here are the most common types, but often farms may have characteristics of more than one system. This book focuses on extensive beef cow-calf systems, but much of the information presented also applies to intermediate systems. All information will need to be adjusted to local conditions.

Figure 2: Small local cattle market