agri benchmark

Beef and Sheep Network

Claus Deblitz

Feedlots: A new tendency in global beef production?

Working Paper 2011/2

An international comparison presented by *agri benchmark* Beef and Sheep Network

1 Introduction

Analysis of the *agri benchmark* Beef and Sheep Network shows a recent growth in the contribution of feedlots systems to the global beef production. Countries like Argentina and Brazil in South America, as well as China and Indonesia in Asia, are examples of this growth. In this contribution, *agri benchmark* will describe the main features of these systems and their economic implications. Furthermore, a benchmark analysis of feedlots in different countries will also be presented.

Feedlotting is an intensive beef production system for the finishing of cattle. The finishing period only covers the last three to five months prior to slaughter and only part of the animals' life. This is in contrast to production systems which are based on young calves from dairy origin and which are often fattened in silage-based systems with rather long finishing periods; or other production systems such as the finishing of weaners based on grassland. These examples need to be kept in mind when looking at productivity and economic results presented hereafter.

2 Why is feedlotting attractive?

The size of feedlots allows for producing large volumes of homogeneous animals; the landless production and use of purchased grain and energy feed makes feedlots independent from seasons. The size also results in economies of scale on both the cost and return sides (better market position). The high energy content in the rations results in high weight gains and marbling (intramuscular fat), which is in demand by many consumers. Feedlots require dry locations with low population density and proximity to grain and feed supplies. Finally, in countries with feedlots, there is also a general acceptance by the population for such large scale production units.

3 What characterises feedlots?

The main characteristics of feedlots are summarised below:

Size: The size of feedlots can be measured with the One Time Capacity (OTC) and the total number of animals produced per year. In the US, there are 85,000 feedlots with an OTC of less than 1,000 cattle, which represent almost 98 percent of the feedlots but only 18.5 percent of total beef production. Feedlots with an OTC of more than 32,000 animals represent less than one percent of total feedlot numbers but 40 percent of total beef production. The largest feedlots have a capacity of more than 100,000 cattle; the largest feedlot of the Southern Hemisphere is located in South Africa and has an OTC of 125,000. Based on these OTCs and 2.5 to 3 cycles per year, the annual production of the largest feedlots is several hundred thousand cattle per year. The largest feedlot companies own more than one of these installations.

Feed purchase: Feedlots are typically landless systems which buy the majority of the feed from outside and often return the manure for grain production. In some cases they produce silage from corn or barley on their own land.

High energy rations: Feedlot rations are typically high in energy and would consist of various sorts of grain. A typical US ration in the past would have consisted of 85 percent corn, 12 percent alfalfa hay and 3 percent minerals and supplements. Since substantially more corn is used for ethanol production in the US now, part of the corn has been replaced by distillers grain (DDGS) (around 10-30 percent of the ration) and

sorghum (10-40 percent). In other parts of the world, corn is replaced by other feed grains and alfalfa hay is replaced by corn silage or residuals from processing. The Spanish straw-concentrate system is an example.

Short finishing periods: The final finishing character of feedlots and the restrictions of the ruminant physiology means that the typical finishing periods in feedlots are 100-150 days. The cattle come mainly from cow-calf production and are transferred to the feedlots as backgrounders/store cattle, with a live weight of 250kg or more.

Simple infrastructure: Feedlot infrastructure consists of uncovered pens for 100-500 cattle each with strong fences, a characteristic mound of approximately 1.50m height above pen level, feed bunks along the pens, a feed mill, lagoons to collect the effluent, a machinery shed/workshop and office buildings. In areas with strong sun radiation, sun roofs or simple sun panels are installed to cover part of the pens. The space available depends on the local climate and the design of the feedlot; it varies between 20 and 30 square meters per cow. A comparison: cattle in a typical silage system using a barn and slatted floors have less than 4 square meters at their disposal.

Fully mechanised: Feed supplies to the feedlot, storage, processing and distribution is fully mechanised and, where possible, computerised. Different feed rations are compiled and feeder wagons are used to distribute them two to four times per day as a Total Mixed Ration.

Custom feeding is a common practice in the feedlot industry. The cattle remain the property of the 'suppliers', payments are made based on a daily rate (so called hotel costs) which sometimes include conditions on daily weight gains and cattle performance. Usually, the feedlot provides the following services: infrastructure, veterinary and medical services, feed and weighing at the start and end.

4 Feedlots: where are they and how did they develop?

Over the last few years, the global importance of feedlots has increased. In countries like the US and Canada they have been established for many years and their proportion in the total beef production has not changed. In contrast, in other countries like Argentina and Brazil feedlots have been recently introduced and its proportion is increasing.

The drivers for the expansion of feedlots are predominantly – and at first sight paradoxically – the rising grain and feed prices. They result in a shortage of land because, with all other things being equal, it becomes profitable to grow crops on less productive land which was previously used as grassland. This development makes grassland scarce and pushes associated beef production – and sometimes cow-calf production – out of these areas. If a country does not have additional grassland resources available, then it is likely that at least a part of the cattle production is going to be finished in feedlots or in systems with similar feeding intensity.

Some examples are:

- Due to a multitude of reasons (land competition, policy, price developments) Argentina is probably the place with the most dynamic growth of feedlotting. We estimate that in 2011 approximately 50 percent of Argentine cattle were finished in feedlot-type of systems, mostly without huge capital investment. This is an amazing figure for a country which has been famous for grass-fed beef over decades.

- In Brazil, the proportion of feedlots in steer finishing was approximately five percent in 2010 and mainly took place in six states. At present, feedlots are used mainly for some months as a strategic tool to manage the summer droughts.
- The feedlot proportion in South Africa is approximately 80 percent of the formal market.
- Feedlotting in Australia makes only a third of total beef production. Grain beef from Australia goes to the high value markets in Japan and South Korea and, to some extent, the domestic market. The alternative to feedlotting in Australia is grass-finishing and the feedlot proportion varies with climatic conditions, availability of grass, grain prices and market situation.
- This is much less the case in Canada and the US where feedlotting is basically without alternative due to the design of the industry, consumer preferences and contractual arrangements in the beef value chain.
- Finally, in countries like China and Indonesia, the proportion of feedlots increased because the traditional production cannot satisfy the additional demand anymore.

5 How important are hormone growth promoters (HGP) for feedlots?

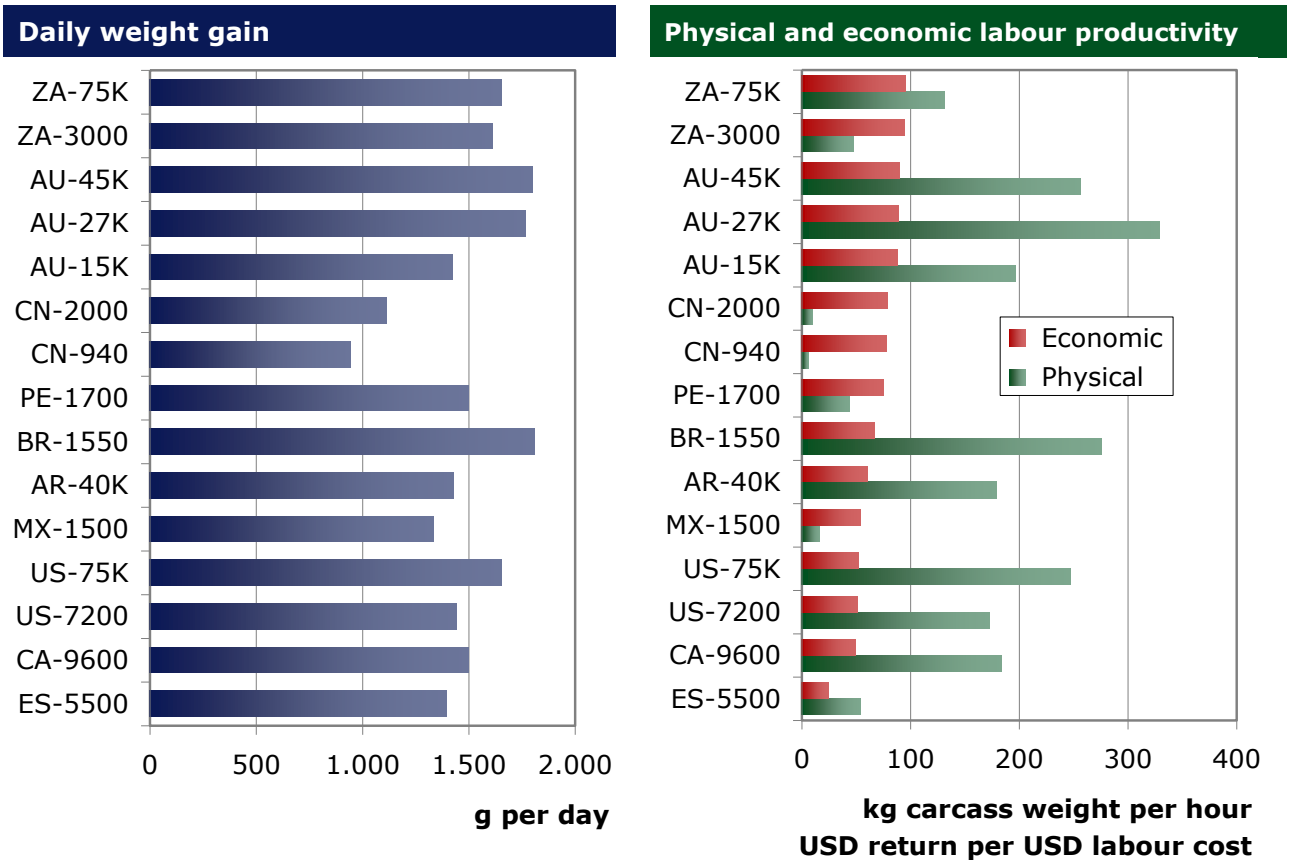
The use of hormones to increase weight gains and dressing percentage is common practice in North American feedlots, also in Australian and South African. The application is usually done via implants, which are administered on the day of feedlot arrival. In some cases, Beta2 agonists are used but not necessarily on all cattle. Among other effects, their administration to the cattle in the last 20-40 days of finishing results in a dressing percentage that is 0.5-1.0 percent higher. These measures, as well as the import of beef produced with the help of these substances, are banned in the EU; the meat imported to the EU must verifiably be produced without the use of HGP.

6 High productivity

Figure 1 shows the average daily weight gains (DWG) of feedlots analysed in the global comparison compiled annually by the *agri benchmark* Network. The daily weight gains are typically 1,400 grams and higher. In some, where DWG are even higher, compensatory growth plays a role, for example in the Brazilian and Australian feedlots, where animals come from extensive pasture systems with corresponding low DWG where they were backgrounded. Further analysis suggests that high DWG can be achieved with British, Continental and Zebu breeds (Brahman, Nelore).

The second part of the figure shows the physical and economic labour productivity of the feedlots considered. Physical labour productivity ranges from 6 kg beef sold per hour of total labour input in the Chinese feedlot (CN-940) to 329 kg in the Australian feedlot (AU-27K). To compare: the German silage farm in the comparison with total sales of 525 young bulls per year produces 44 kg beef per hour. Thus, the average performance of feedlots is well above that of other production systems. In some countries, relatively low physical productivity can be compensated by low wage levels. This is shown by the economic labour productivity which indicates how many dollars income can be generated with one dollar labour input. Due to the low wage levels, the feedlots in Mexico, China, and South Africa show a relatively high economic labour productivity whereas high wage countries have a relatively low economic labour productivity vs. physical labour productivity.

Fig. 1. *Selected productivity figures*



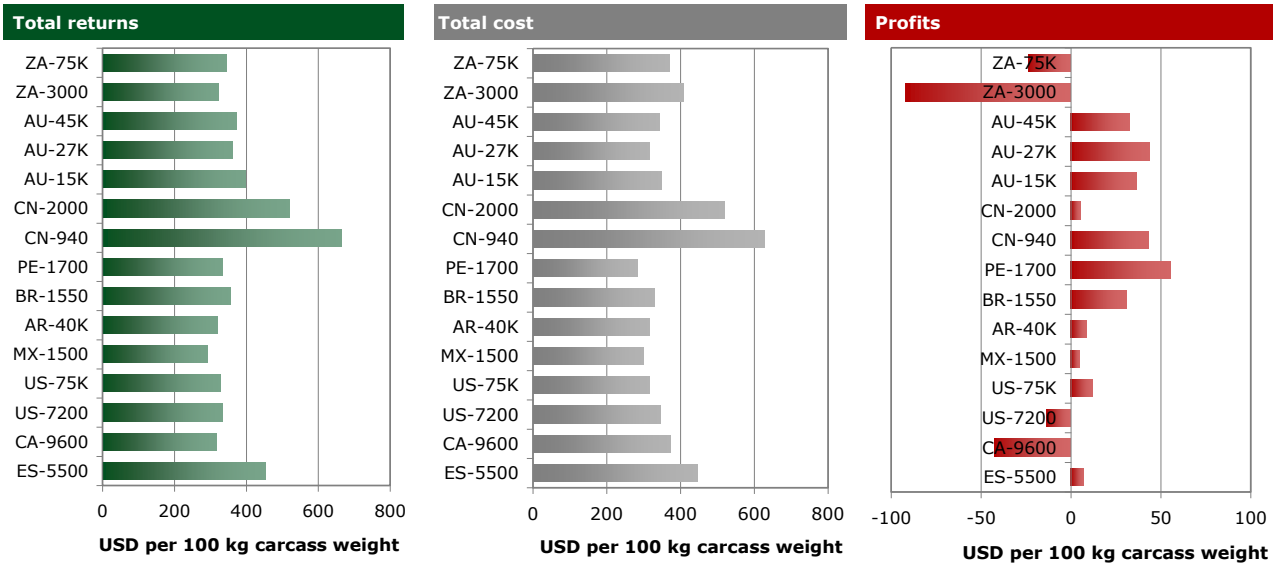
Feedlot names: Country abbreviation-number of animals sold per year. ES = Spain, CA = Canada, US = USA, MX = Mexico, AR = Argentina, BR = Brazil, PE = Peru, CN = China, AU = Australia, ZA = South Africa

Source: *agri benchmark* Beef and Sheep Report 2011

7 Returns, costs and profits

Figure 2 has three parts, showing the returns, costs and profits in the year 2010 of the feedlots selected. With the exception of the Spanish, Chinese and one Australian feedlot, the returns (beef prices) are relatively close to each other at a level of approximately USD 300 per 100 kg carcass weight. The price level in Spain is much higher (USD 450) and even higher in China (> USD 500). On the contrary, total costs are between USD 280 per 100 kg CW in Peru and USD 630 in China. This resulted in a profit or loss for the farms, from USD –92 in ZA-3000 and USD 55 in PE-1700.

Fig. 2. *Costs, returns and profitabiilty in 2010*
Selected countries and operations (USD per 100kg carcass weight)

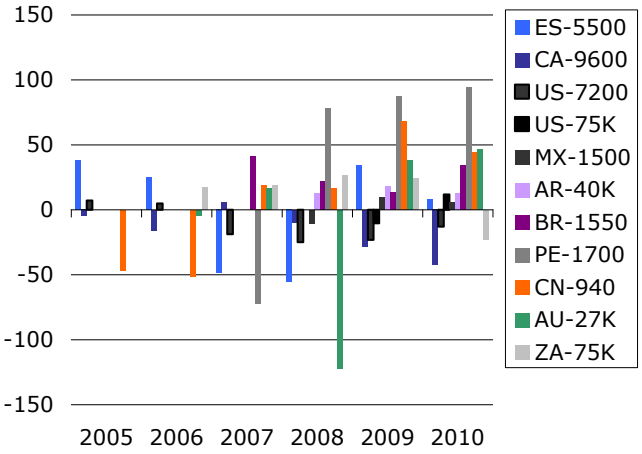


For explanation of farm names see Figure 1

Source: *agri benchmark* Beef and Sheep Report 2011

The results for the year 2010 should, however, not disguise the fact that the profitability is highly variable over the years and within particular years. Figure 3 shows the profitability of selected feedlots from 2005-2010. Figure 4 adds to this with monthly profitability figures of Kansas feedlots from 2000-2011. While 2009 was a year of massive losses, they were making profits again in 2010. Both figures illustrate the significant variations of profits, which are mainly based on the composed effects of beef, livestock and feed price developments.

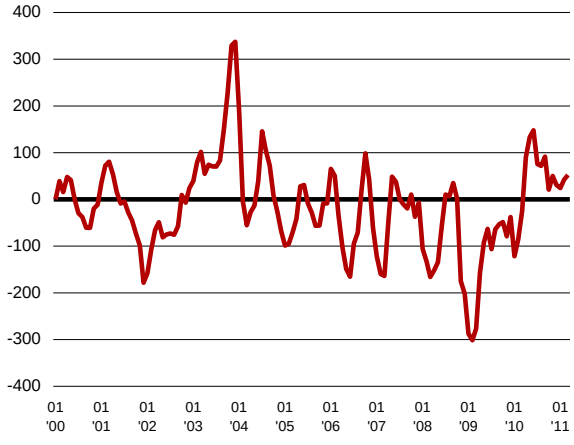
Fig. 3. *Profitability of selected feedlots in international comparison 2005-2010*



For explanation of farm names see Figure 1

Source: *agri benchmark* Beef and Sheep Report 2011

Fig. 4. *Profitability of Kansas feedlots January 2000-February 2011*



Source: Kansas State University

8 What will the future bring?

Approximately 85-90 percent of total costs in feedlots are animal and feed purchases. Thus, feedlots are a cash business which reacts short–term to price variations. The reasons are that: a) all production factors and inputs are purchased, b) there is little storage capacity for feed and c) finishing periods are rather short, with a number of cycles per year. With rising grain prices and resulting land shortage, the proportion of animals that will be finished in intensive systems like feedlots will have to increase if production is to be maintained or even increased. Feed and beef prices will then rise accordingly. The (remaining) grassland is likely to be used for production of weaners from suckler-cows than for grass-fed finishing.

However, it can be assumed that new grassland areas will be used for milk production – wherever possible – and that beef production will just be a side product. At present, only in Brazil and parts of Colombia are additional grassland areas potentially available. Due to the lack of infrastructure in remote areas and environmental restrictions on the cultivation of land that is covered with savannah vegetation and wood, a quick expansion of grassland areas cannot be expected. It is, therefore, more likely that overall beef production is going to be intensified.

Most of the facts mentioned above have been presented and discussed in the last *agri benchmark* Beef and Sheep conference (Austria, June 2011). On the same lines as this contribution, the beef experts concluded that factors such as land competition and environmental effects associated with beef production could trigger the intensification of beef production on grassland for both systems: cow-calf and finishing. Feedlots will most likely play an important role under these new conditions.