agri benchmark

Beef Report 2007

Benchmarking
Farming Systems Worldwide

1.1 Beef Report 2007 - Foreword from the editor

World beef developments in 2007

The overall prospects for beef were **positive** in 2007. Global beef production in 2007 is expected to increase gradually. Global beef prices continued to rise. Global beef exports rose slowly after reduced incidence of animal diseases, growing demand in developing countries and lifting of trade restrictions. On the other hand, rising feed prices, driven by expansion of bio-energy and overall demand, contribute to lower profitability but also to higher meat prices.

The question of producing **food** or **energy** will be crucial in many countries. Qualified expert knowledge and quantified and comparable information on the international level are going to be essential to address these issues.

In light of these developments, it is my great pleasure to introduce the Beef Report 2007, the fifth issue since our start in 2002.

agri benchmark developments in 2007

The 2007 ***agri benchmark*** season was another successful year with the following main outcomes:

- **New countries** and **partners** joined from Australia, South Africa and India, the latter not yet with farm data.
- The **Beef Conference 2007** was successfully held in Braunschweig with participation from 18 countries. This year's invited speaker came from McDonald's Europe, providing an insight view into their beef supply chain.
- The **strategic partnership** between the FAL and the German Agricultural Society (DLG) is fully operational.
- The new **website** *www.agribenchmark.org* has been successfully launched, is highly frequented and will host more and more attractive information for the public and ***agri benchmark*** partners.

Acknowledgements

I would like to express my sincere thanks to everyone who made a contribution to the Beef Report 2007 and the related activities. A special thanks goes to the scientific partners in their countries who managed to provide an important contribution with regard to content and funding to the network, complementing the investment made by the coordination centre FAL/DLG.

Further, I would like to thank the government institutions, the associations and the companies which make the ***agri benchmark*** activity possible through their financial contributions.

Activities scheduled for 2008

The 2008 ***agri benchmark*** season is going to be another exciting exercise. The main following top-ics and changes are on the agenda:

- **Emission** benchmark – farm level data to be extended by information on emissions per kg carcass weight or live weight produced.
- **Quarterly price** information – website to be amended by information about quarterly beef and livestock prices.
- **Trade profiles** – analysis of export destinations and import origins by type of product to be continued.
- **Beef Conference 2008** – to be held outside Germany for the first time.
- **Bio-energy** and beef production – a Phd-study was started to investigate the issue comparing the U.S. and Germany.

Invitation to join our network

We now have **17 countries** included in the Beef Report. Canada, USA, Brazil, Argentina, Australia, South Africa, India and China represent important producers and traders on the world market. Ten further countries are located in the EU-25. These countries represent more than 80 percent of the EU beef production.

Further countries are most **welcome** to participate. Participation is available with low input at high quality and quantity output.

Claus Deblitz
agri benchmark Beef Network

1.2 Table of contents

1.3 Participants

Participants of the *agri benchmark* Beef Conference 2007

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Claus Deblitz

In references to the Beef Report please cite: Deblitz et al. (2007): Beef Report 2007. FAL Braunschweig.




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1.4 Conceptual background information

Introduction

This section provides a basic description of concepts and methods used by ***agri benchmark***. For details please refer to our website and to the chapters of the Beef Report quoted hereafter.

Beef finishing and cow-calf

We compare both beef finishing (Chapter 2) and cow-calf (suckler-cow) production systems (Chapter 3). The data base consists of **typical farms**. For more details, see below and on our website.

The **cow-calf** enterprise starts with the birth of the calf and ends with the day of weaning. The output of the cow-calf enterprise is measured in *total live weight sold* and comprises weaner calves and adult animals for finishing, cull animals and breeding animals.

The **beef finishing** enterprise (also called beef enterprise) starts

- when dairy or weaner calves or feeder cattle (backgrounder, stores) are **bought** from outside the farm,
- when dairy or weaner calves or adult animals are **transferred** from the dairy or cow-calf enterprise to the beef finishing enterprise in the same farm.

The output of the beef finishing enterprise is measured in *carcass weight sold* and comprises all animals which are **exclusively** reared **for slaughter:** bulls, steers, heifers, calves or cows. It does not include cull animals from a dairy or a cow-calf enterprise on the same farm.

Which animal categories are compared in the beef finishing comparison?

The following types of animals are compared:

(a) Animals finished for meat **export**, animals which can potentially be exported in the future or animals from which the meat is a do-mestic substitute for beef imports from other countries.

(b) **Final products**, i.e., finished animals that go to slaughter.

(c) **Heavy male animals** (bulls or steers), as these categories can be better compared than males with females or even with calves. One Spanish farm is an exception (see Table 2.2.2).

In the future, with more farms and more production systems, **subgroups** could be formed for a comparison of specific meat products like heifer meat (see also Chapter 4.4).

How do we define a typical farm?

A **typical farm** is defined as

- being an existing farm or a data set describing a farm,
- being in a specific region which represents a major share of output for the product considered,
- running the prevailing production system for the product considered,
- reflecting the prevailing combination of enterprises as well as land and capital resources,
- as well as the prevailing type of labour organisation.

The typical farms are never averages of survey data because averages do not provide consistent production system data sets. They are the result of a **panel** meeting with four - six farmers and an advisor where each figure is obtained in a consensus or they are based on individual farms which were **'typified'** by replacing farm individual particularities by prevailing characteristics, figures, technologies and procedures.

How is the typical farm data collected?

A **Standard Operating Procedure** (SOP) exists to define typical farms in different countries and regions. Basically, the following procedure is applied:

- Select regions and locations
- Identify the prevailing production systems
- Identify the relevant farm population
- Define the size and management level of the typical farms
- Collect, cross-check and update data

Farm data are always collected on **whole farm** level and overhead costs are assigned (allocated) to the enterprises. A paper on the SOP as well as a description of each farm is available on our web-site.

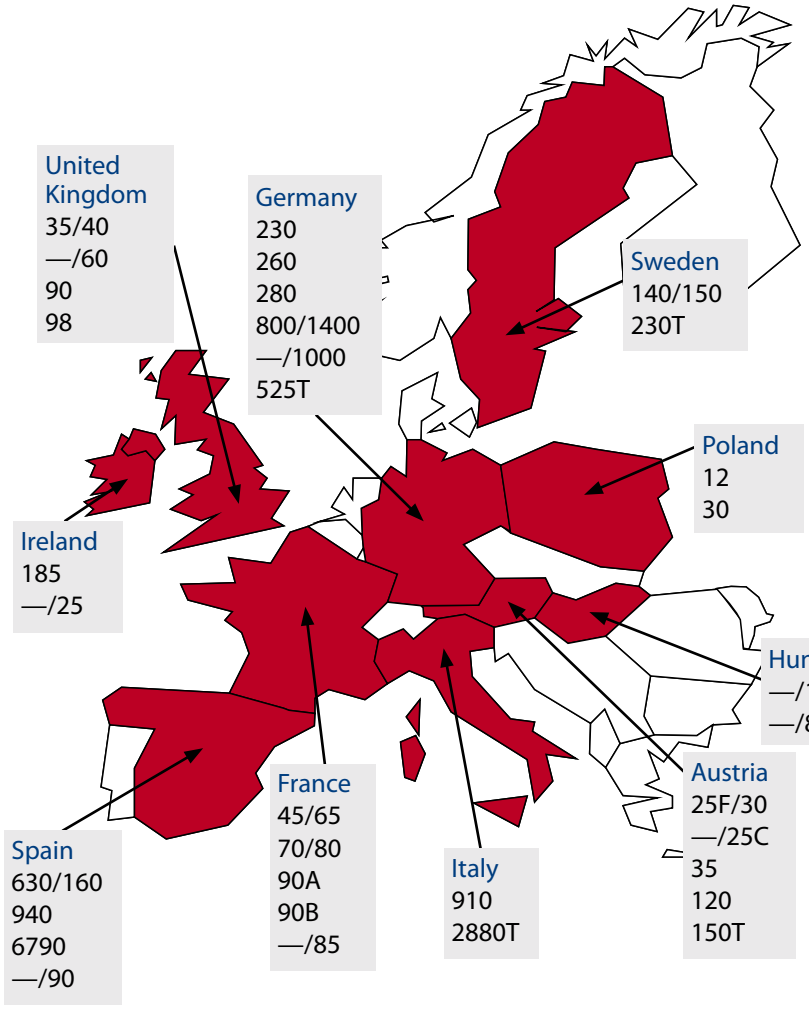
How do we calculate cost of production?

Once data are collected they are processed with the Excel spreadsheet tools available. As data are collected on the whole farm level, they are broken down to **enterprise** and **animal** level when performing a unit cost analysis (for example cost per kilogram beef produced).

Details on our procedure to **assign (allocate)** costs from whole farm level to the enterprises, and from the enterprise level to groups of animals are described in Annex 3.

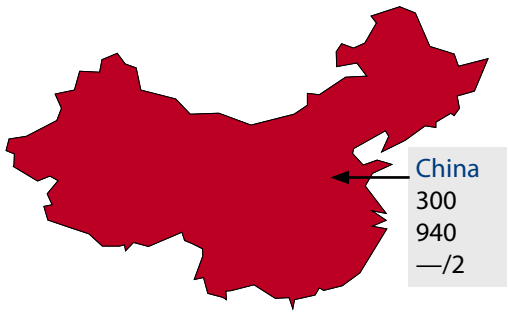
1.5 Maps with countries and typical farms

Europe (Legend see bottom of next page)

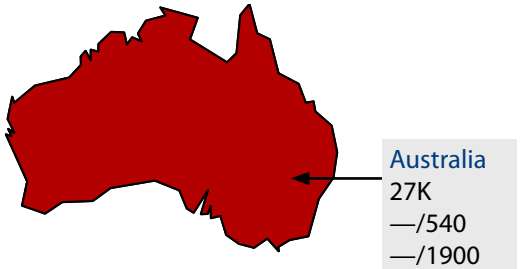


(Seifert, 2006)

Asia

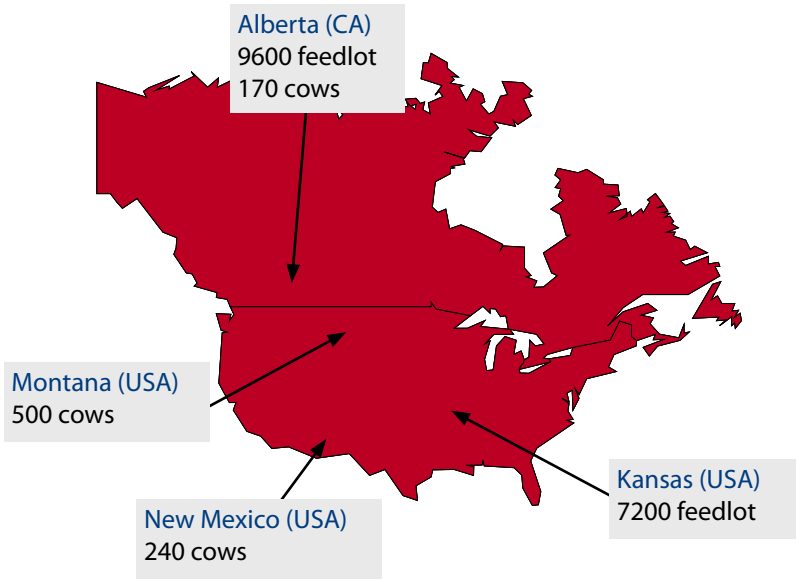


Australia

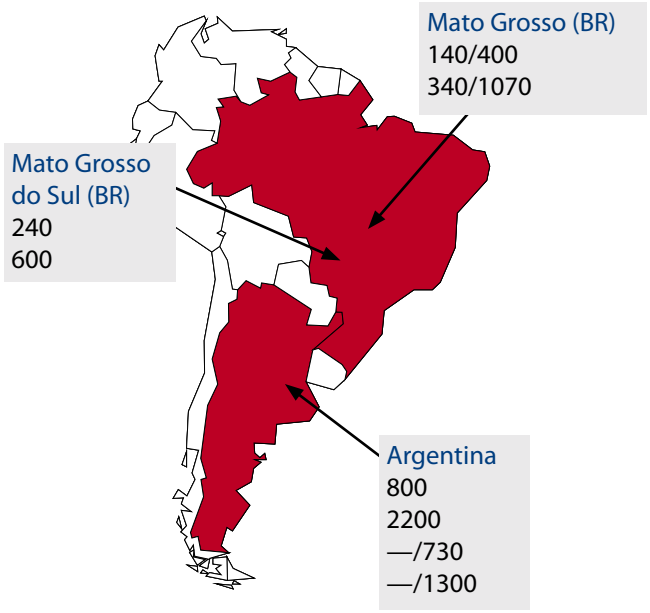


1.5 Maps with countries and typical farms

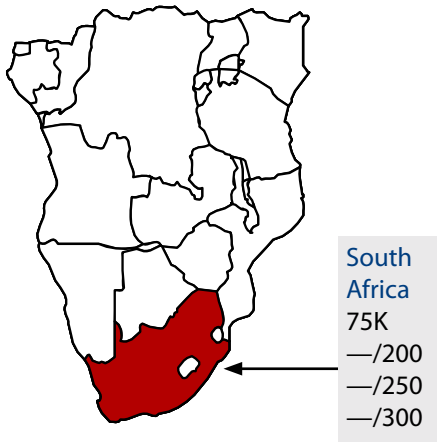
North America



South America



Africa



Legend

The first (or only) number indicates the total number of cattle sold per year, the second (or only) number the total number of suckler-cows. The suffixes 'F' and 'C' behind the numbers indicate the finishing (F) and the cow-calf (C) enterprises if cattle numbers in finishing and cow-calf farms of one country are the same. The suffix 'T' means this farm is classified as a top management farm according to the Standard Operating Procedure (see Chapter 1.4).

Examples:

'230' in Germany	the farm sells 230 animals per year
'45/65' in France	the farm sells 45 finished cattle per year, it keeps 65 suckler-cows
'—/90' in Spain	the farm sells no finished cattle, it keeps 90 suckler-cows
'25F/30' and '—/25C in Austria	the first farm sells 25 finished cattle and keeps 30 suckler-cows, the second farm keeps 25 suckler-cows

U.S. feedlot from top

Bonsmara steers in feedlot in South Africa

2 Comparison of typical beef finishing farms in 2006

Steers grazing summer pasture in Australia

Fleckvieh bulls on corn silage in Germany

Holstein bulls in Poland

Working cattle in Argentina

2.3 Production systems and physical indicators

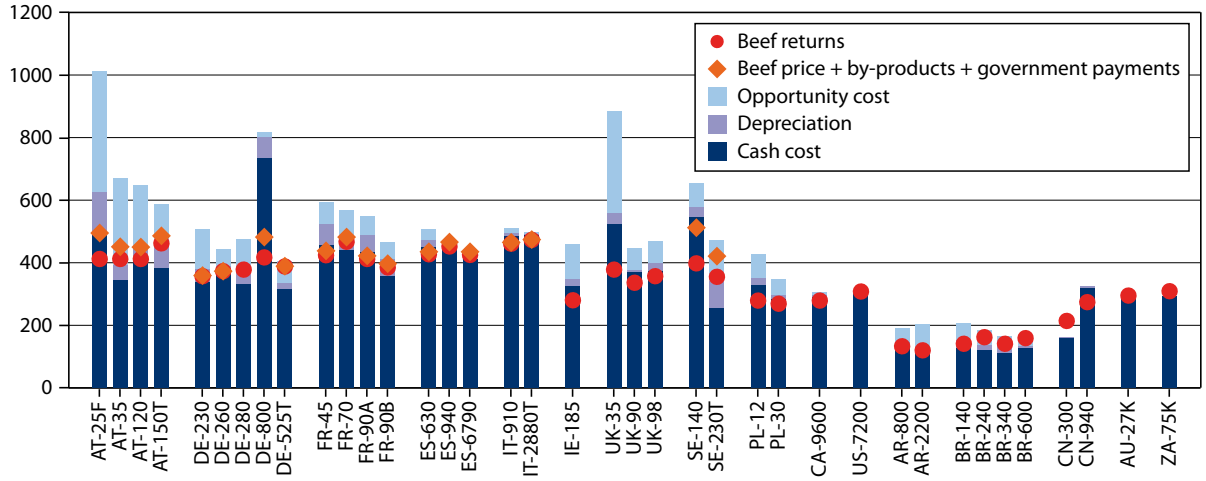
Farm name (1)	Size Mgmt Origin (2)	No. & type of beef cattle sold per year	Main feed sources	Age at start (days)	Finishing period (days)	Age at end (days)	Weight at start (kg LW)	Daily weight gain (g / day)	Final weight (kg LW)	Dressing percentage (%)
AT-25F	A / A / I	12 bulls, 12 heifers	Maize & grass silage, + grains + hay	275	228	503	400	1311	699	56
AT-35	A / A / I	35 bulls	Maize & grass silage + grains, soybean, hay	50	490	540	98	1253	712	56
AT-120	L / A / I	120 bulls	Maize & grass silage + grains, soybean, hay	50	457	507	97	1315	698	56
AT-150T	L / T / I	150 bulls	Maize silage + grains, rapeseed meal	40	453	493	91	1351	703	57
DE-230	L / A / F	228 bulls	Maize silage + grains	50	483	533	81	1265	692	57
DE-260	L / A / I	263 Rosé-calves	Maize silage + concentrates	14	273	287	47	1227	382	52
DE-280	L / A / P	280 bulls	Maize silage + concentrates	60	514	574	87	1154	680	60
DE-800	L / A / I	671 bulls, 132 heifers	Maize & grass silage + grains	260	266	526	280	1203	600	55
DE-525T	L / T / I	525 bulls	Maize silage, concentrates, by-products	137	427	564	188	1251	722	60
FR-45	L / A / P	30 bulls, 15 cows	Maize & grass silage + grains, soybean, hay	220	289	509	283	1426	695	59
FR-70	L / A / P	37 bulls, 22 heifers, 14 cows	Maize silage + grains, soybean, hay	252	220	472	320	1273	600	62
FR-90A	L / A / P	90 bulls	Maize silage + grains	274	310 - 315	584 - 589	285	1250 - 1349	673 - 710	58-61
FR-90B	L / A / P	90 bulls	Maize silage + grains	7	547 - 557	554 - 564	60	1110 - 1122	667 - 685	54-56
ES-630	L / A / I	242 heifers, 291 bulls, 98 cows	Straw + concentrates + grains	195	215	410	260	1488	580	57
ES-940	L / A / P	942 heifers	Straw + concentrates + grains	180	165	345	250	1212	450	54
ES-6790	L / A / P	6791 bulls	Straw + concentrates + grains	20	284 - 304	304 - 324	70 - 94	1243 - 1480	448 - 511	53-56
IT-910	L / A / I	910 bulls	Maize silage + grains + concentrates, straw	330	208	538	412	1466	717	60-61
IT-2880T	L / T / I	2,884 bulls	Maize silage + concentrates	355	175	530	452	1520	718	60-61
IE-185	L / A / P	186 steers	Pasture + grass silage + concentrates	590	350	940	475	643	700	54
UK-35	A / A / I	21 steers, 15 heifers	Pasture, grass silage + grains	235	194	429	332	1149	555	55
UK-90	L / A / P	47 bulls, 46 heifers	Maize silage + grass silage + concentrates	42	558	600	100	871	586	54
UK-98	L / A / I	20 steers, 30 heifers, 46 bulls	Grass silage, maize silage, barley, wheat	42 - 187	288 - 437	474 - 479	150 - 268	1089 - 1220	620 - 626	54-55
SE-140	L / A / I	99 bulls, 37 heifers	Grass silage + concentrates	200	293	493	300	1232	661	55
SE-230T	L / T / I	119 bulls, 114 calves	Grass silage + concentrates	14	466 - 550	480 - 564	52	1009 - 1191	607	53
PL-12	A / A / I	7 bulls, 5 heifers	Grass silage + grains	15	535	550	60	860	520	56
PL-30	L / A / I	21 bulls, 9 heifers	Maize & grass silage + grains, concentr.	15	535	550	60	879	530	49-54
CA-9600	L / A / P	6,362 steers, 3,180 heifers	Feed barley grain + barley silage	310	150	460	380	1500	605	60
US-7200	L / A / P	7,195 steers	Grains + soybean meal + alfalfa hay	265	191	456	303	1444	578	60
AR-800	A / A / P	800 steers	Pasture + maize silage + corn	210	558	768	175	495	451	58
AR-2200	L / A / P	1,603 steers, 599 heifers	Pasture + hay + maize stubble	123 - 169	576 - 684	745 - 807	125 - 140	436 - 491	423	58
BR-140	A / A / F	144 steers	Pasture	244	730	974	200	397	490	52
BR-240	A / A / F	245 steers	Pasture	212	730	942	180	452	510	52
BR-340	A / A / F	343 steers	Pasture	244	730	974	200	404	495	53
BR-600	L / A / F	600 steers	Pasture	244	854	1098	190	363	500	53
CN-300	A / A / I	300 bulls	Maize silage + wheat straw	210	120	330	270	1250	420	58
CN-940	L / A / I	640 bulls, 294 cows	Maize silage, corn, cotton seed, hay	540	180	720	400	944	570	56
AU-27K	L / A / I	24,005 steers, 3,000 heifers	Grain + maize silage	420 - 540	91 - 150	511 - 690	367 - 440	1633 - 1900	520 - 685	53-55
ZA-75K	L / A / I	45,000 steers, 30,000 heifers	Corn, hay + concentrates	210	115	325	230	1652	420	58

Note: Figures in the table are for the male cattle only; exception: ES-940 (exclusively heifer production)

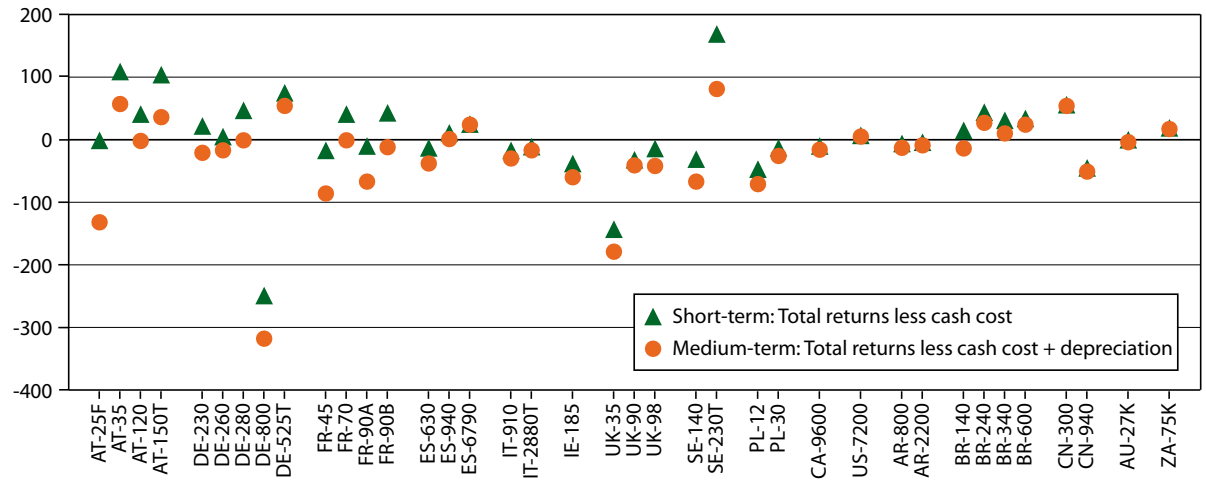
(1) Number refers to total finished cattle sold per year

(2) Size (**A**verage, **L**arge) / Management (**A**verage, **T**op) / Origin (**I**ndividual, **P**re-Panel, **F**ull Panel) (see Chapter 4.4 for details)

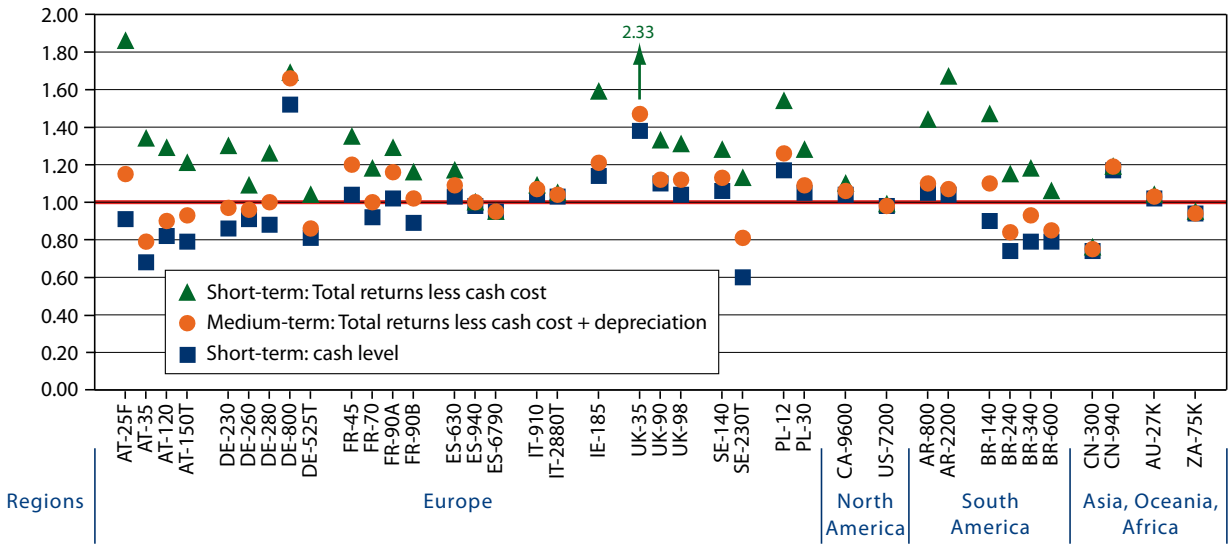
2.9.1 Total returns, costs and profitability by cash and non-cash costs (US$ per 100 kg carcass weight)



2.9.2 Short and medium-term profitability (US$ per 100 kg carcass weight)



2.9.3 Price changes required for break even (Factor of original price)



Supplying water to suckler-cows in Andalucía, Spain

Chinese yellow cattle cow-calf

3 Comparison of typical cow-calf farms in 2006

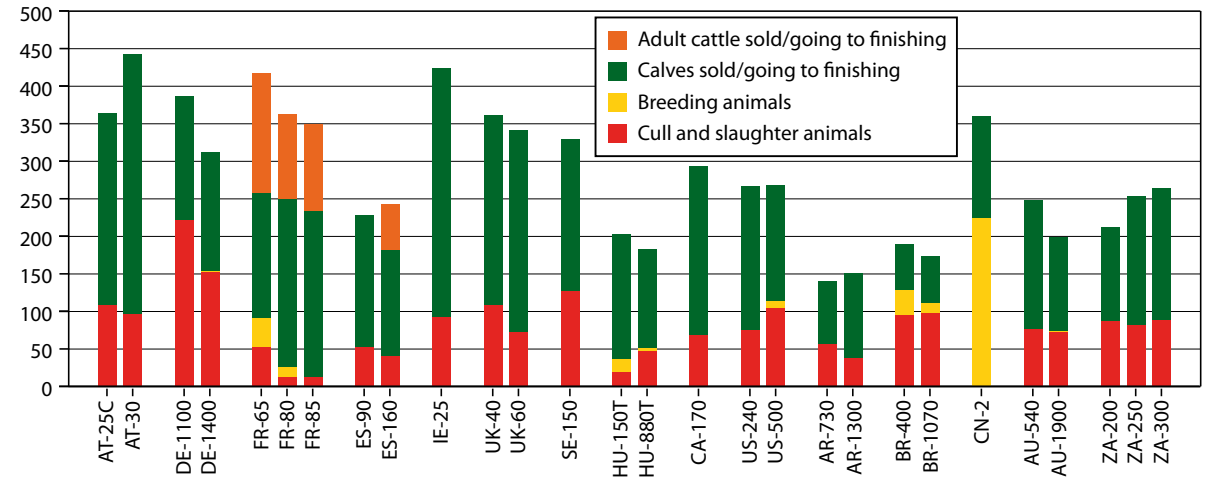
Suckler-cows resting in the UK

Nelore cows in Brazil

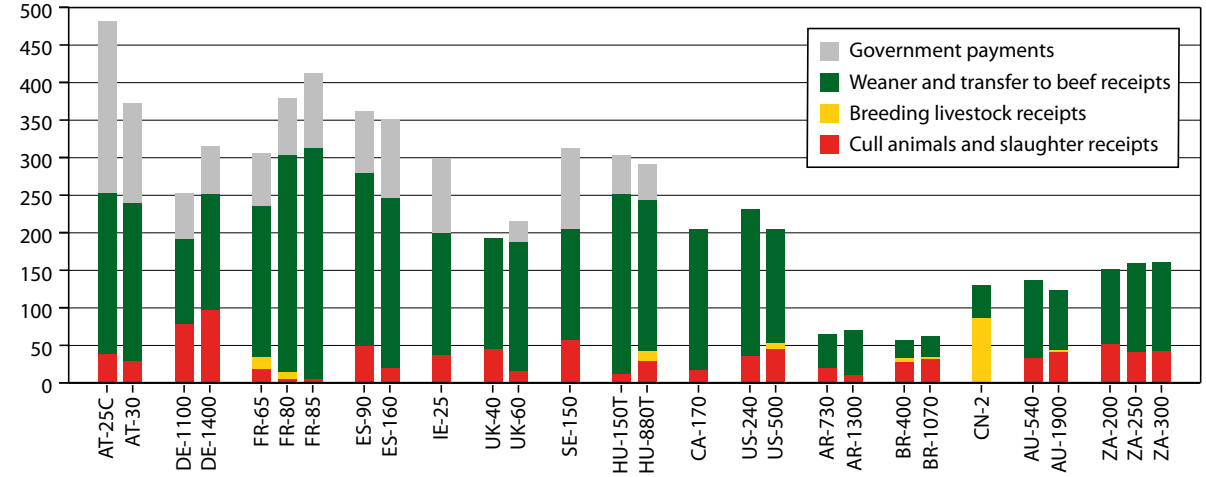
Winter-housing of suckler-cows in Austria

Tuli cows and calves in South Africa

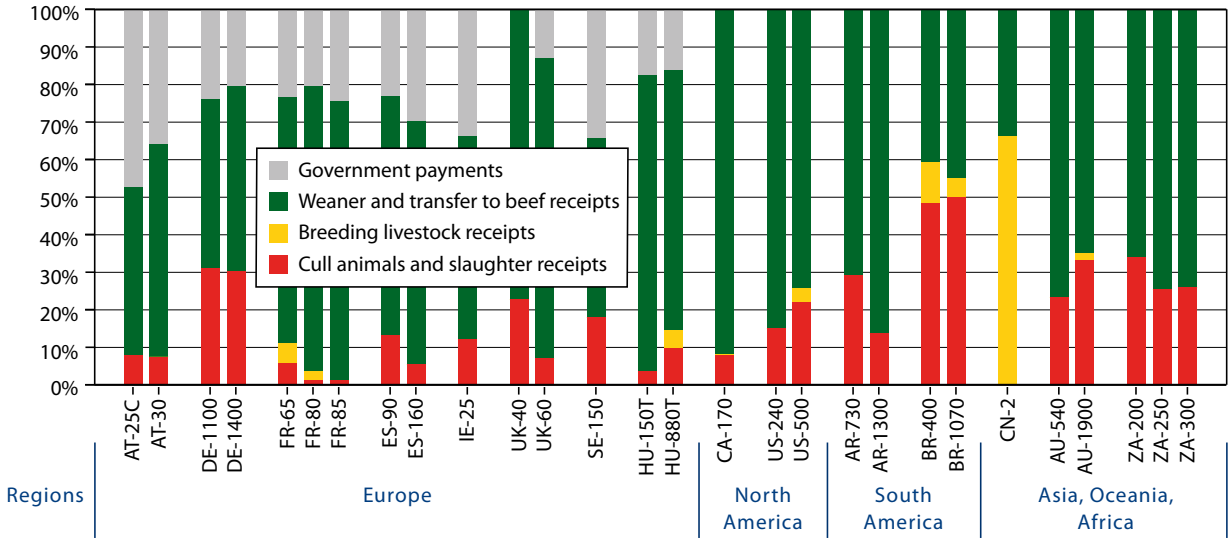
3.5.1 Composition of total live weight sold (kg live weight sold per cow and year)



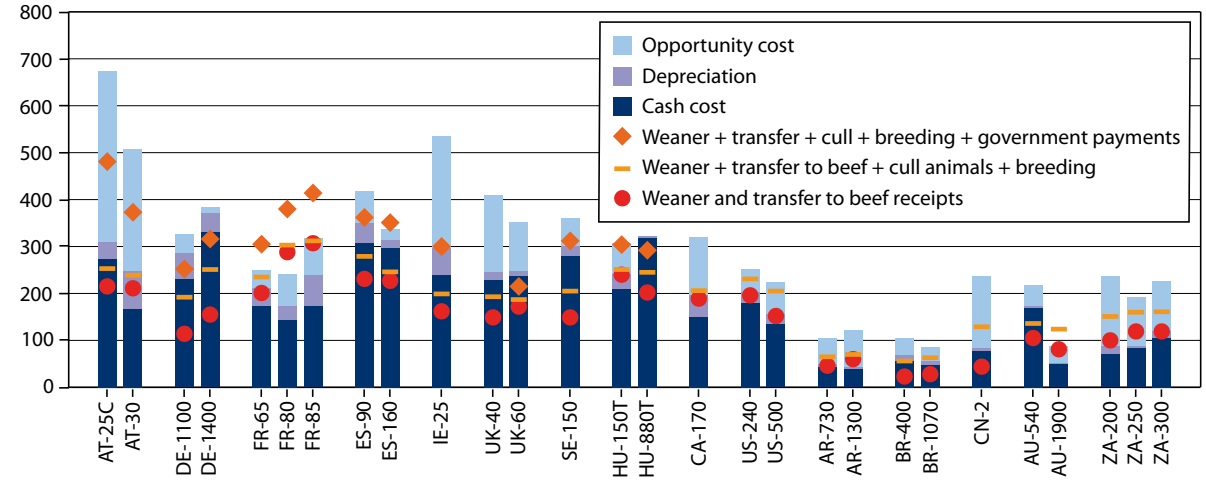
3.5.2 Total returns (US$ per 100 kg live weight sold)



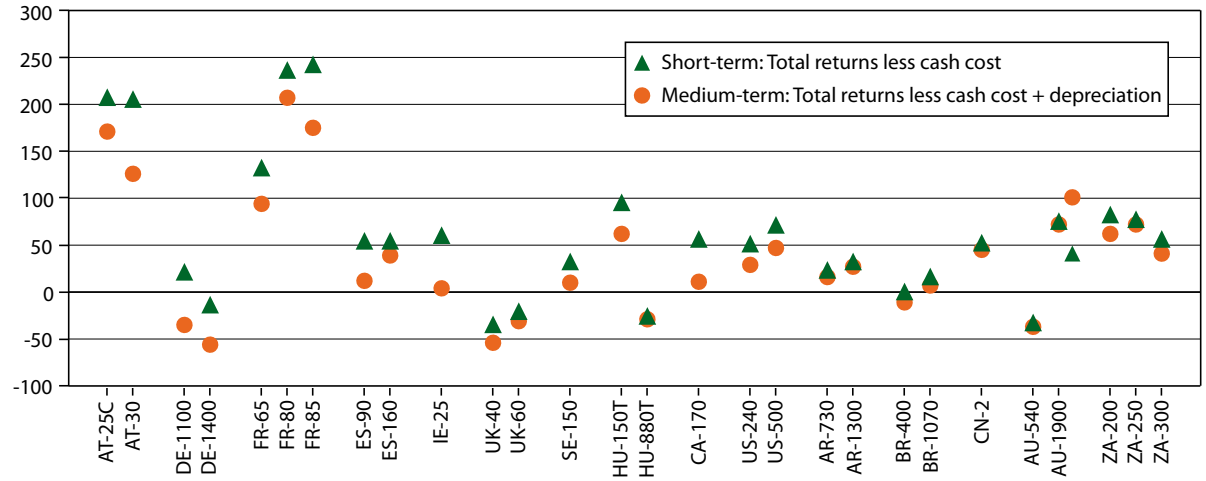
3.5.3 Total returns (percentage composition)



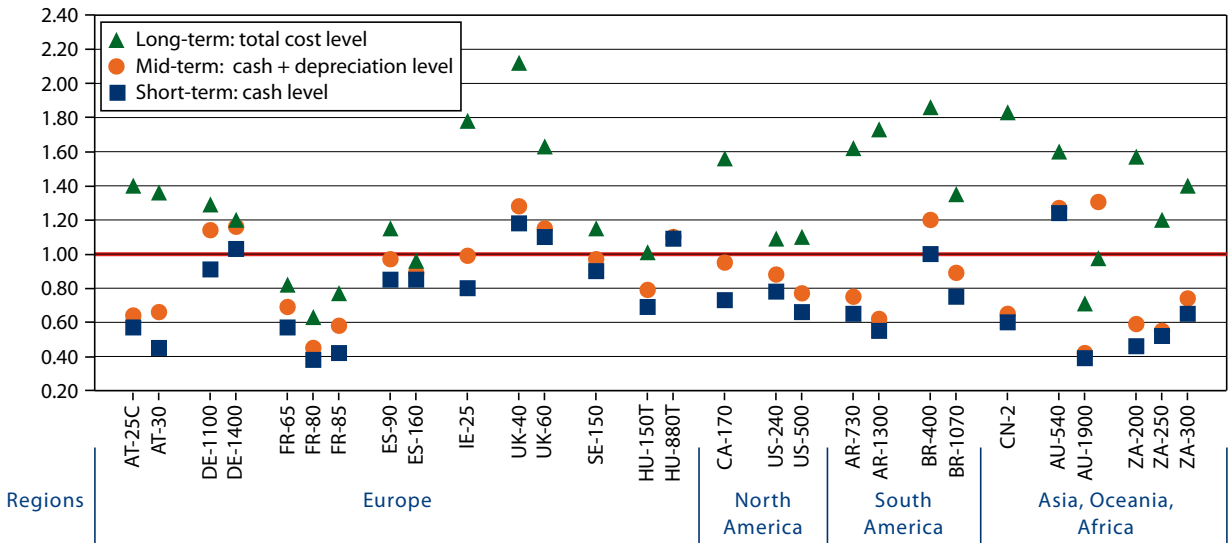
3.8.1 Total returns and costs by cash and non-cash costs (US$ per 100 kg live weight sold)



3.8.2 Short- and medium-term profitability (US$ per 100 kg live weight sold)



3.8.3 Total return changes required for break even (Factor of original returns)



4 Tools and additional analysis

Introduction

This chapter is to highlight **tools** for **additional analysis** as well as results provided to scientific partners, branch partners, and sponsors. Access to these items is via the member section of our website. Most of the tools are in Excel and/or Power Point format.

The focus in this chapter is on **two new tools** developed in the 2007 season, whereas existing tools are briefly summarised. Details on the existing tools are provided in Chapter 4 of the Beef Report 2006 (see also the free download of the Beef Report 2006 extract on *www.agribenchmark.org*).

Trade profiles NEW

Figures on quantities and values of beef and beef products traded world-wide are an excellent addition to the farm level analysis. A tool was developed to easily display trade relations between different countries in charts and tables. For details on the tool see **Chapter 4.2**.

Time series of typical farms NEW

With the ongoing annual analysis, a time series of farm data is accumulated. A tool was developed to analyse developments and differences of data between years for identical farms. For details on the tool and for results see **Chapter 4.6**.

Result Data Base (RDB)

The Result Data Base (RDB) for beef finishing and cow-calf production systems is the core result of the farm comparison activity and provides the data basis for further analysis tools. In the 2007 exercise, the RDB comprises almost **400 variables** for beef finishing and more than 350 variables for cow-calf for each farm. Each of the two RDBs reveals the following features:

- A comprehensive set of **physical** and **economic** data on enterprise and whole farm level.
- A set of approximately 75 **standard charts** illustrating the data (see charts in Chapters 2 and 3).
- A tool to create **individual charts** for each variable from the data set.
- Options to switch to per head **reference units**.
- Options to display values and charts in different **currencies** and **languages**.
- A tool to **rank** farms by different variables (from low to high) and to **correlate** variables.
- A table **classifying** the farms based on selected variables and on user-defined quantiles.

Benchmark tool

The benchmark tool is based on the Result Data Base. It enables the user to select any set of variables from the Result Data Base and run a direct comparison of these variables between a user defined set of farms. There are different ways to select farms:

- One farm vs. one farm
- One farm vs. ***n*** farms (***n*** comparisons)
- One farm vs. average of ***n*** farms
- Average of ***n*** farms vs. average of ***n*** farms

Differences between the farms compared are expressed in relative terms. **Example**: Total returns for one farm are US$ 100,000 and for a second farm are US$ 120,000. A factor of 1.2 is displayed indicating that the returns of the second farm are 1.2 times higher then the returns of the first farm.

When comparing more than one farm, a factor is calculated for each single comparison and for each variable selected. Out of this, an **average** factor as well as a **minimum** and **maximum** factor is displayed.

Beef and livestock price time series

Price time series data start in 1996 and are updated annually. With an easy-to-handle tool, charts with price time series for the countries selected can be generated in both national currencies and in US$-terms. Beginning with the 2008 season, beef and livestock prices will be available from the ***agri benchmark*** website. Updates are planned on a quarterly basis.

World, regional and country maps

Numerous maps are available to generate a world-wide overview of the **beef sector** in an easily accessible way. The maps are mainly related to **production**, **trade** as well as to **policy**, and comprise status quo analysis, changes over time and projections into the future. Most of the maps are provided in animated Power Point slides to be integrated into own presentations.

Farm simulation reflecting risk

The model environment used within the ***agri benchmark*** allows the projection of farm data sets for a period of 10 years into the future. Analysis can be done in a **deterministic** mode as well as in a **stochastic** mode using the SIMETAR© Excel add-in developed at Texas A&M University. The stochastic mode allows the inclusion of production, weather and market risk in policy and farm strategy analysis.

4.2 Tools – Trade profiles

Introduction

Trade of beef is undergoing dynamic changes, driven by market developments as well as by disease-related trade restrictions. Since ***agri benchmark*** is a global project, it was always found to be useful to add trade information to the farm analysis and relate it to our own findings on the farm-level.

Source and characteristics of the trade data

The **UNComtrade** database with a world-wide coverage, (http://comtrade.un.org), was used to analyse trade flows. The data display the following characteristics:

- Differentiation into **seven beef product groups** (see Figure 4.2.1).
- **Bilateral trade** figures between any country selected from the data base.
- **Time series** data starting in 1992.
- Figures in **quantities** (kg) and **values** (US$).
- Figures for **exports, imports** and re-exports.

Own tools were developed to efficiently analyse the raw data obtained from the data base and to transform them into useful output formats.

Presentation of results

The output is created by an Excel-tool and displayed in three different types of charts and data:

1. For a user-defined **time-series**, top 5 export **destinations** and import **origins** (quantities and values) for the sum of the beef products (Figures 4.2.2a, b and 4.2.3).
2. For a user-defined time-series, export and import quantities and values, broken down by user-defined groups of the beef products (Figure 4.2.4).
3. For one **selected year**, top 5 export **destinations** and import **origins** (quantity and value), broken down by user-defined groups of **beef products** (Figure 4.2.5).

The tool shows all values mentioned above in **absolute** terms and in **percentage** composition.

Examples

All examples show absolute **quantities** of beef trade, i.e., values (US$) and percentages are not shown here.

Argentina: A sharp drop can be observed due to FMD in 2001, recovering in the period 2002 to 2005 when exports increased 2.5 times. Brazil vanished as an important export destination. In 2005, only about 60 percent of total exports can be explained by the Top 5 export destinations. The top 5 countries in 2005 were Russia, Chile, Germany, Italy and Israel.

Japan depends on very few suppliers from North America and Oceania, mainly due to hygiene and disease restrictions. Thus, the BSE-related drop out of the U.S. supply lead to significantly reduced beef imports which could not be compensated by the higher imports from Australia and New Zealand.

USA: Beef exports dropped 80 percent in 2004 coming from a very high level in 2003 due to the detection of one BSE case in late 2003. Main exports consist of fresh and frozen meat as well as frozen offals and meat preparations.

Australia: The two main export products are fresh and frozen meat. Fresh meat is clearly dominated by Japan, mainly consisting of high value cuts. Frozen meat exports are led by the U.S. and mainly consist of minced meat for hamburgers. Offals play a minor role, are more diversified and also directed to other locations like Indonesia and Russia.

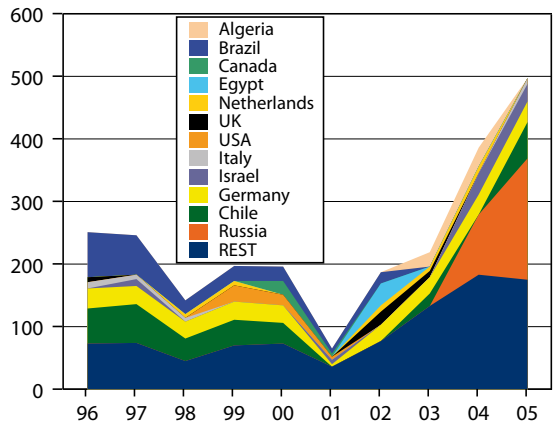
4.2.1 List of products analysed (UNComtrade HS 1992)

No.	Codes	Group	Subgroup (if applicable)	
1.	201	Meat of bovine animals, fresh or chilled	20110	Carcasses/half-carcasses of bovine animals, fresh/chilled
			20120	Meat of bovine animals, fresh/chilled (excl. 020110), bone-in
			20130	Meat of bovine animals, fresh/chilled, boneless
2.	202	Meat of bovine animals, frozen	20210	Carcasses/half-carcasses of bovine animals, frozen
			20220	Meat of bovine animals, frozen (excl. of 020210), bone-in
			20230	Meat of bovine animals, frozen, boneless
3.	20610	Edible offal of bovine animals, fresh/chilled		
4.	20621	Tongues of bovine animals, frozen		In Figure 4.1.4 and 4.1.5 these items are summarised into 'Other offals and meat preparations'.
5.	20622	Livers of bovine animals, frozen		
6.	20629	Edible offal of bovine animals (excl. tongues & livers), frozen		
7.	21020	Meat of bovine animals, salted/in brine/dried/smoked		

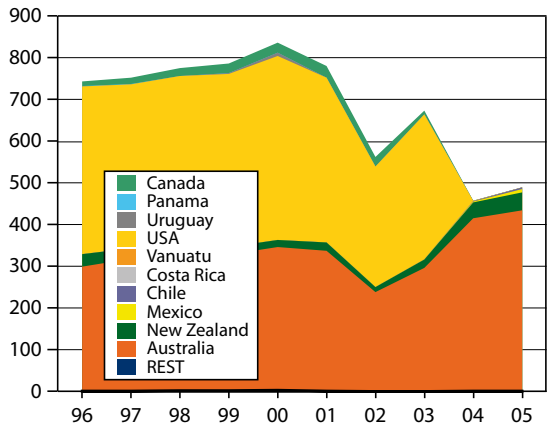
4.2.2a Argentina: top 5 export destinations - table ('000 tons product weight 1996-2005)

	96	97	98	99	00	01	02	03	04	05
REST	73	74	45	70	73	36	77	133	183	175
Russia									96	194
Chile	56	62	36	41	33			20		58
Germany	32	29	27	29	28	4	26	26	32	33
Israel		11				7			34	28
Italy	10	7	6							9
USA				26	17	5				
UK	8						21	10		
Netherlands			6	7			10	7	11	
Egypt							35			
Canada					22	5				
Brazil	72	63	22	24	23	8	18			
Algeria								23	30	
Total	**251**	**245**	**142**	**198**	**196**	**65**	**188**	**219**	**385**	**498**

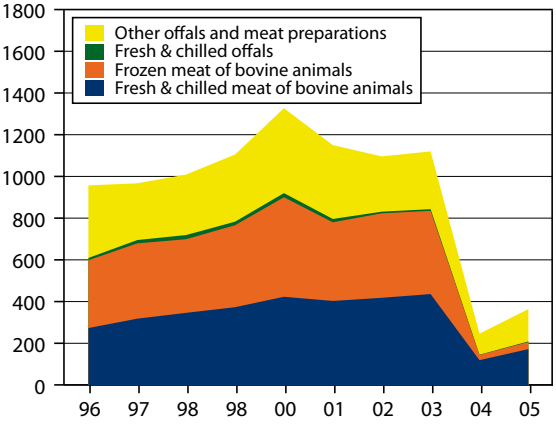
4.2.2b Argentina: top 5 export destinations
('000 tons product weight 1996-2005)



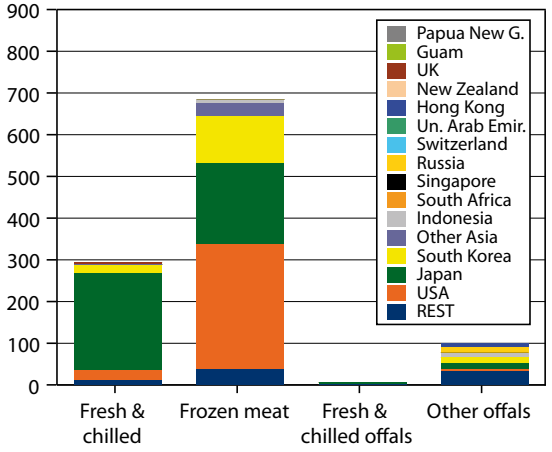
4.2.3 Japan: top 5 import origins
('000 tons product weight 1996-2005)



4.2.4 USA: composition of exports
('000 tons product weight 1996-2005)



4.2.5 Australia: export destination by product
('000 tons product weight 1996-2005)



4.6 Time series analysis

Introduction

With the new time series tool developed, an analysis comparing the results for the years **2006** and **2005** for **identical farms** was performed. A total of **32 farms** out of the beef finishing sample of 38 farms could be analysed. The tool is also available for **cow-calf**.

Method

Using the annual Result Data Bases, time series analysis for identical farms can be performed with a newly developed tool. The tool basically selects **any farm** and **variable** from the RDB and displays results in tables and charts. Data from upcoming years can be easily added to the tool, thereby increasing the time series.

Relatively few changes between years

Figure 4.6.1 shows the total returns and their differences between 2006 and 2005. Total returns went up for most of the farms. Particularities are:

- The decoupling of payments in France and Spain lead to significantly reduced returns.
- In Argentina the decrease in returns was a combined national and exchange rate effect.
- Changes are no more than US$ 60 per 100 kg carcass weight, equivalent to ± 10 percent.

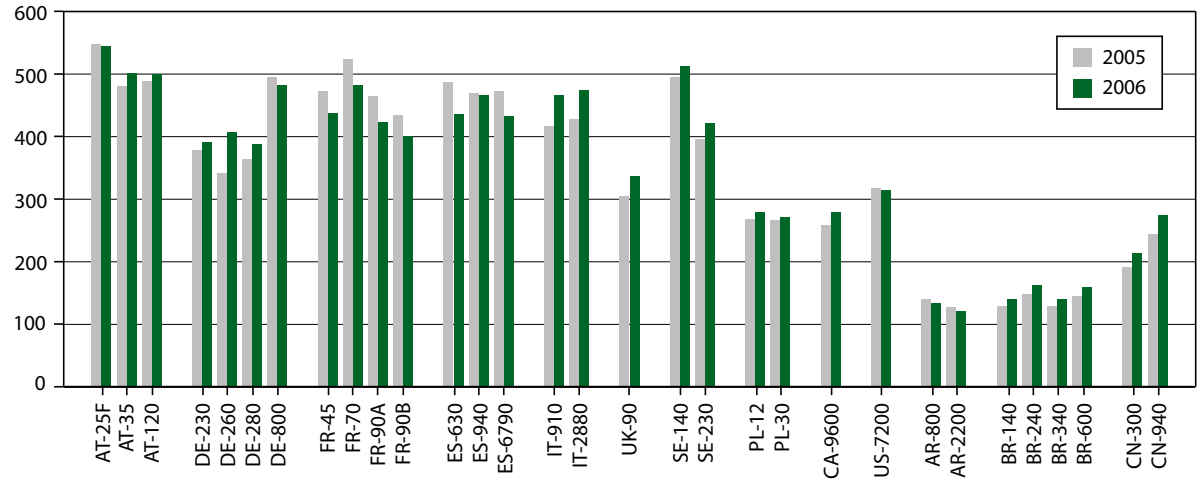
Figure 4.6.2 differentiates the difference shown in Figure 4.6.1 into an exchange rate impact and a national price and/or productivity impact:

- Most of the changes are a result of **national changes** in returns as the devaluation of the US$ against other currencies in 2006 was relatively small compared with the years before.
- The **positive national changes** are due to beef price increases, the **negative national changes** in France and Spain are due to the decoupling of the payments (not appearing anymore in the beef enterprise) and in Argentina and Brazil due to beef price decreases.
- The changes in the small Austrian and the large German farm are due to changes in the data structure.
- **Argentina** was the only country with a **devaluation** of its currency against the US$.

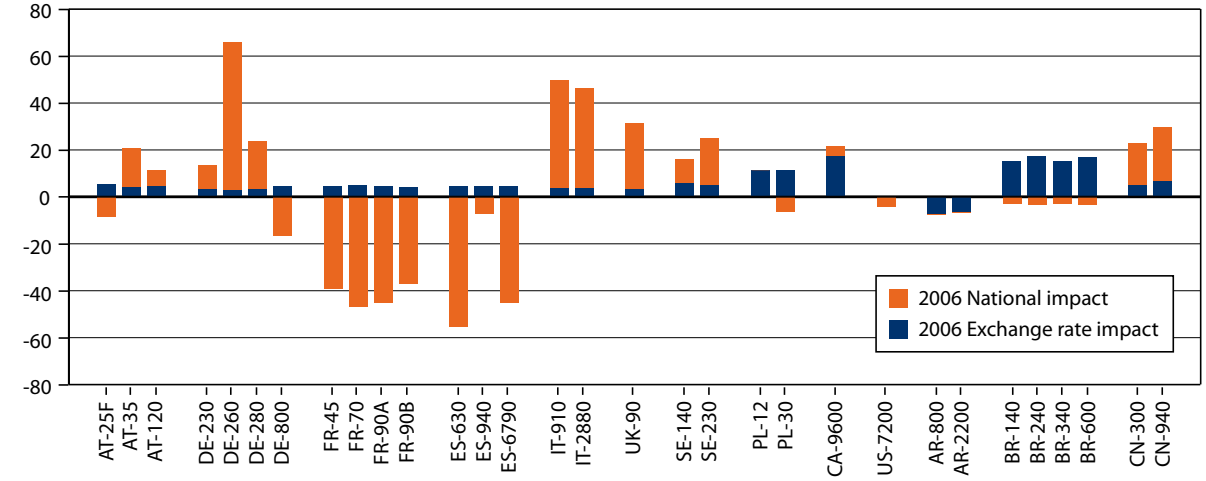
Changes in **cost of production** were similar to those in returns. Particular cases are:

- Rises in purchase feed costs are the main reason for the high cost increase in the **DE-260**.
- **FR-90B:** Poultry returns went up significantly. Thus, the return share of beef and the associated cost went down, but less than five percent.
- **Spain:** Calves and feed were the main cost drivers. A special case is the ES-6790 where due to the specific legal construction of the farm (investor model with paid barns and labour in different locations) a transfer of the formerly coupled direct payments from the investor to the farmers appeared in the variable cost which is no longer relevant after decoupling.
- **Sweden:** Main drivers were livestock prices, feed and energy.

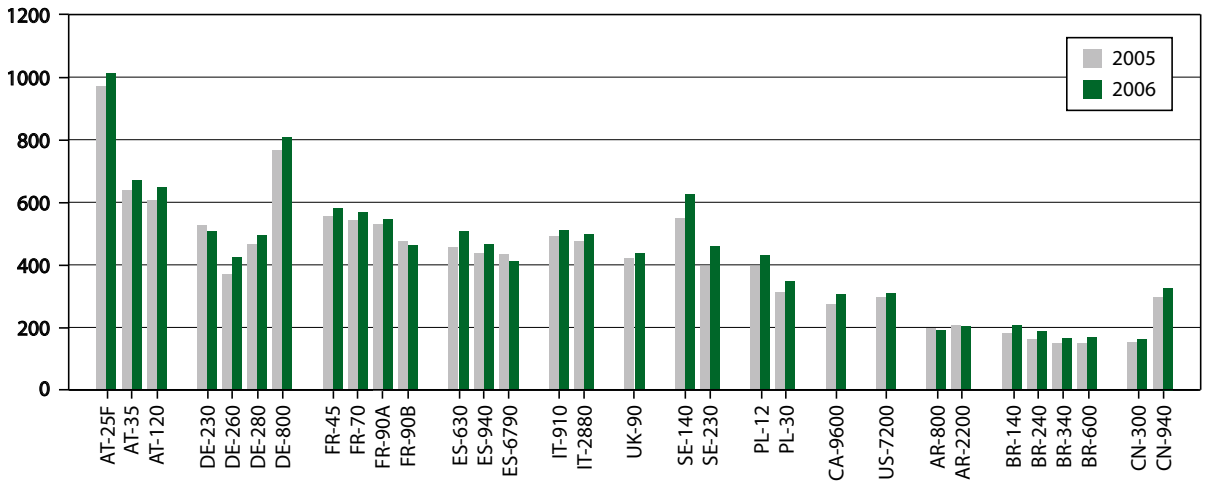
4.6.1 Total returns of identical beef finishing farms in 2005 and 2006 (US$ per 100 kg carcass weight)



4.6.2 Differentiation of return difference 2006 vs. 2005 into exchange rate and national impact (US$ per 100 kg carcass weight)



4.6.3 Total cost of identical beef finishing farms in 2005 and 2006 (US$ per 100 kg carcass weight)



4.6.4 Differentiation of cost difference 2006 vs. 2005 into exchange rate and national impact (US$ per 100 kg carcass weight)