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Status quo and prospects of beef production world-wide

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Status quo and prospects of beef production world-wide

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Summary

The purpose of this paper is to provide an idea about the market shares of important beef producers, to analyse the competitive situation of beef production on the farm-level and to assess the potential of beef production in a world-wide context.

The global players in beef production are North America, Brazil, Argentina, Australia and the EU-25. In value-terms, the main exporters are North America, Australia, Brazil and Argentina. Main importers are again North America, Japan and the Far East.

Within the framework of the International Farm Comparison Network (IFCN), and using harmonised methods for analysis, a total of 29 typical beef finishing farms in 15 important beef producing countries were analysed. The farms show significant differences in production systems and productivity levels. The highest cost of beef production is found in the EU-countries (US\$ 350–500 per 100 kg carcass weight), the lowest in Argentina, Uruguay and Pakistan (US\$ 100–130). In the case of trade liberalisation, farms with low cost of production have an incentive to export to markets with higher price levels.

The potential to increase production depends on numerous factors, amongst them the availability of additional land, the possibilities to intensify production and the competition with other land uses. The development of beef production in the EU is mainly determined by the impact of the latest CAP-reform. In many countries (like Brazil, the U.S., Canada and Australia) the main potential lays in intensification rather than making additional land resources available for beef production. In the next ten years, a world-wide increase of beef production as well as world trade can be expected. In some countries the increases of production are likely to be at least partially offset by consumption in the short term (China) or over the long term (Brazil).

Keywords: Beef production, international competitiveness

Zusammenfassung

Stand und Aussichten der Rindfleischproduktion weltweit

In diesem Beitrag wird ein Überblick über die Marktanteile wichtiger Rindfleischproduzenten vermittelt, die Wettbewerbsfähigkeit der Rindfleischproduktion auf Betriebsebene analysiert und eine Einschätzung über das Potential der Rindfleischproduktion im weltweiten Kontext gegeben.

Die führenden Rindfleischproduzenten sind Nordamerika, Brasilien, Argentinien, Australien und die EU-25. Gemessen am Handelswert sind Nordamerika, Australien, Brasilien und Argentinien die wichtigsten Exporteure. Hauptimporteure sind wiederum die USA, Japan und der Ferne Osten.

Im Rahmen des International Farm Comparison Network (IFCN) erfolgt unter Verwendung harmonisierter Methoden die Analyse von 29 typischen Rindermastbetrieben in 15 wichtigen rindfleischproduzierenden Ländern. Die Betriebe zeigen große Unterschiede in den Produktionssystemen und Produktivitätsniveaus. Die untersuchten EU-Staaten weisen mit 350–500 US\$ je 100 kg Schlachtgewicht (SG) die höchsten Produktionskosten auf, die niedrigsten Kosten zeigen die Betriebe in Argentinien, Uruguay und Pakistan (100–130 US\$). Bei weiterer Handelsliberalisierung haben die Betriebe mit niedrigen Produktionskosten einen Exportanreiz in Märkte mit höheren Preisniveaus.

Das Potential zur Produktionssteigerung hängt von einer Vielzahl von Faktoren ab, unter ihnen die Landverfügbarkeit, die Möglichkeiten zur Intensivierung und die Wettbewerbsstellung zu anderen Landnutzungsformen. Die Entwicklung der Rindfleischproduktion in der EU hängt vorwiegend von der Wirkung der aktuellen GAP-Reform ab. In vielen Ländern (beispielsweise in Brasilien, den USA, Kanada und Australien) liegt das Hauptpotential eher in der Intensivierung als in der Ausdehnung der Produktion in die Fläche. In den nächsten zehn Jahren ist von einem weltweiten Anstieg der Produktion und des Handels mit Rindfleisch auszugehen. In einigen Ländern werden die Produktionssteigerungen voraussichtlich zumindest teilweise kurzfristig (China) oder längerfristig (Brasilien) durch Erhöhungen des Inlandsverbrauchs kompensiert werden.

Schlüsselwörter: Rindfleischproduktion, Internationale Wettbewerbsfähigkeit

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1 Introduction

The present situation of the world beef markets can be characterised by a slight production increase in 2004 compared with 2003 and a reduced global trade due to higher prices and import-bans on products originating from North America. The resulting supply gaps can not be fully compensated by other suppliers like South America and Australia (FAO, 2004). This article aims to provide some answers to the following questions:

- What is the status quo of beef production and trade in a global context?
- What is the competitive situation of typical beef farms around the globe?
- What are the prospects of beef production in the upcoming ten years?

This contribution represents a selection of the results obtained within the beef branch of the International Farm Comparison Network (IFCN). More information on IFCN Beef as well as the full version of the economic analysis at the farm level presented here is available on the IFCN Homepage at www.ifcnnetwork.org.

2 A global perspective of beef production

2.1 Main producers and traders

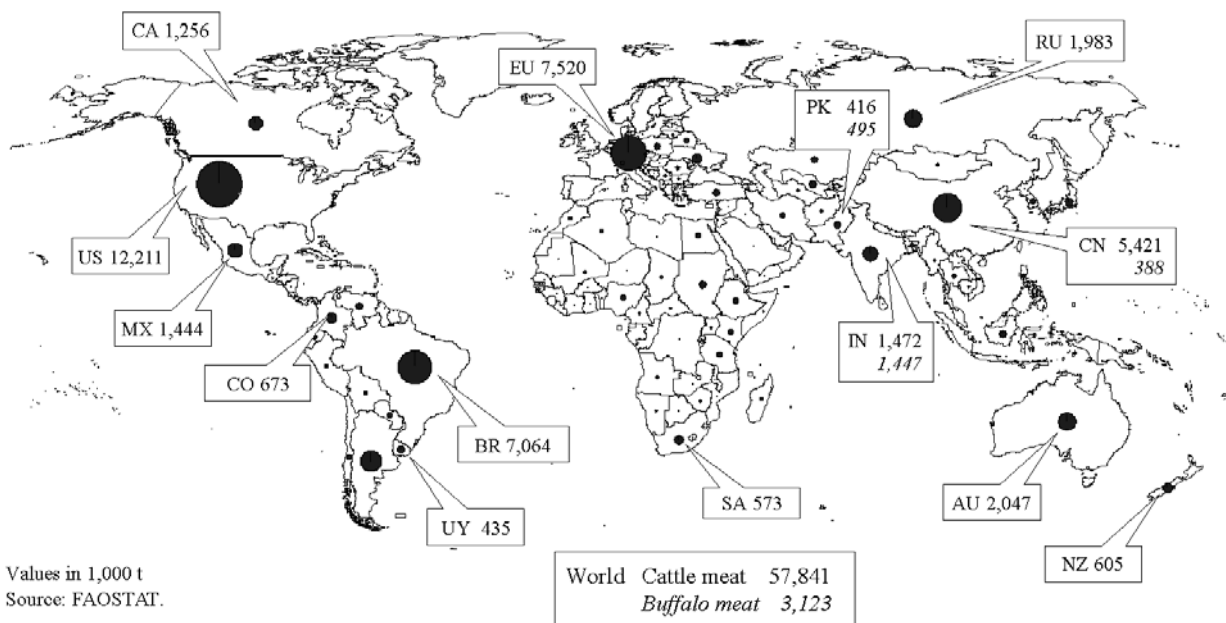
Fig. 1 provides an overview of the most important countries for beef and buffalo meat production, and Table 1 shows the importance of world regions for cattle inventories, production and trade. Approximately 60 percent of

Table 1:
Regional shares in cattle inventories, beef production and trade, averages of the years 2001-2003 (inventory and production) and 2000-2002 (export and import)

Region	Percentage share of the regions in ...			
	Inventory (mill. head)	Production (mill. tons)	Export (mill. US\$)	Import (mill. US\$)
EU-15	6	13	5	7
North America	8	23	42	27
South America	23	21	16	3
South Asia	20	3	1	-
Far East Asia	9	12	2	12
Japan	0	1	-	27
Oceania	3	5	27	-
Africa	17	7	2	3
Ex-USSR	4	7	2	5
Rest	10	8	3	16
World	100	100	100	100

Source: FAOSTAT

the world's cattle inventory can be found in South America, South Asia and Africa. On the other hand, almost 60 percent of the world beef production comes from North America, South America and the EU-15. These figures reveal the enormous productivity differences between North America and the EU-15 on the one side and the Asian and African states on the other side. The United States is by far the largest beef producer, followed by the EU-15 and Brazil, which in the meantime has caught up with the European Union.



Values in 1,000 t
Source: FAOSTAT.

Fig. 1:
World production of beef and buffalo meat, average of the years 2001-2003 in 1,000 t

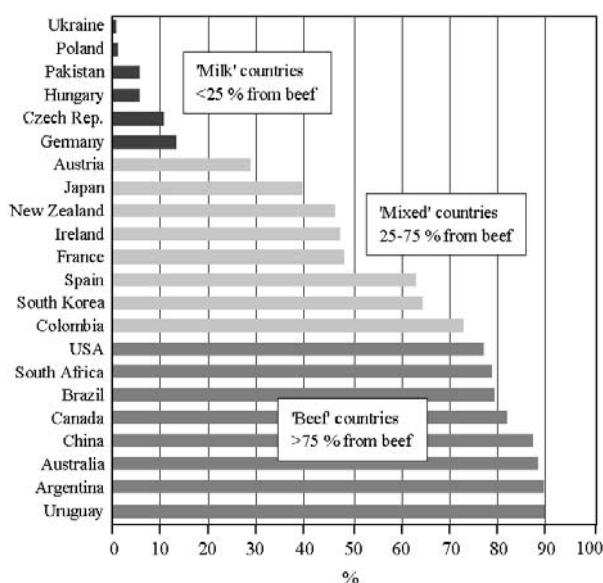
When it comes to trade, the concentration on a few regions becomes even more obvious. North America, South America and Australia/New Zealand combine approximately 85 percent of the total export value whereas imports are dominated by Japan and the U.S. at comparable levels, followed by the Far East (without Japan) with growing importance. The Extra-EU trade (i.e., the internal EU-trade is not reflected) has a share of only around 5 percent for both exports and imports. These shares changed in 2004 due the BSE-outbreaks in North America and the subsequent import-bans for U.S.-beef that are in force until November 2004.

2.2 Milk and beef countries

Cattle for finishing may come from dairy cows or from suckler cows. The countries can be grouped by their percentage of suckler cows into total cow numbers (see Fig. 2):

- 'Milk' countries' with a share of the suckler cows of < 25 percent of the total number of cows are Poland, Pakistan, Hungary, the Czech Republic and Germany.
- 'Mix countries' with a share of between 25 and 75 percent of the suckler cows in the total number of cows are New Zealand, Austria, France, Ireland and Spain.
- 'Beef countries' with > 75 percent of the suckler cows in the total number of cows are the U.S., Canada, Brazil, Australia, Argentina and Uruguay.

Due to different productivity levels of the suckler cow and the dairy cow herds, their share to total beef produc-



Source: USDA-FAS, national statistics.

Fig. 2: Share of suckler cows in total cow number

tion may differ from the cow-ratios but these figures provide at least an idea of the herd composition (for more details on selected countries see IFCN Beef Report 2003). This composition is relevant for an explanation of different production systems, meat quality and the impacts of agricultural policies if dairy and cow-calf farms are affected to different extents.

2.3 Slaughter composition

The slaughter composition in Table 2 shows the relative importance of different animal categories for the total beef production. The figures comprise both the cattle from the dairy herds as well as from the cow-calf herds and are for the year 2000 (pre-BSE). The following differentiation of markets takes the male animals as indicator.

- Austria, Germany, Spain, the Czech Republic and Poland (despite not being revealed in the figure) are bull markets where bulls have a share in total slaughter of between 46 and 54 percent.
- The markets in the USA, South America and Australia are dominated by steers with a share of between 47 and 60 percent of total slaughter weight. The main reason is that these countries are 'beef countries' where the calves come from pasture based cow-calf systems and male cattle are castrated to facilitate their management on pasture.
- France is an exception placing high importance of cows. In France, cull cows (and heifers) are usually not slaughtered immediately but taken to a short finishing period of about 90 days. Some of these cows are imported from other EU-countries, mainly from Germany.
- Further particularities with high shares of calves in slaughter are found in France, Poland and Pakistan.

It can be concluded that the markets for beef are dominated by different animal categories in the various coun-

Table 2: Composition of cattle and beef slaughter in selected countries 2000

	Share in total slaughter weight in %						
	Cows	Heifers	Bulls	Steers	Calves		
Austria	27	12	52	3	5		
Germany	34	14	46	1	4		
France	40	11	26	8	15		
Spain	14	27	54		6		
Czech Republic	37	10	49		4		
Poland	[88]		12		
USA	12	32	2	53	1		
Argentina	17	13	2	60	8		
Brazil	[42]	[58]	
Uruguay	40		2	56	2		
Australia	[45]	[47]	8
Pakistan	28		5	32	35		

Source: IFCN Beef Report 2003

tries. Furthermore, the beef markets are characterised by different cuts and consumer preferences. On the consumer level, this leads to different price levels for different cuts.

3 International comparison of typical beef finishing farms

3.1 Method and data

A total of 29 farms with beef finishing enterprises in 15 countries were selected and analysed within the framework of the International Farm Comparison Network (IFCN)³. Countries analysed were Austria, Germany, France, Ireland and Spain in the EU-15, the Czech Republic, Hungary and Poland for the New Member States of the EU, the U.S., Argentina, Brazil and Uruguay for the Americas, and Australia, Namibia and Pakistan.

The typical farms are located in the most important beef production regions in their countries and apply the prevailing production system in their country. The definition of the farms follows a distinct pattern using available statistics, bookkeeping data and the expert knowledge of advisors and farmers. A standard questionnaire is used in all countries allowing a very detailed specification of physical and financial farm and enterprise data. Data is generally collected on whole farm level and – where necessary – whole farm figures are allocated to single enterprises for cost and enterprise analysis.

Taking the abovementioned differences between animal categories, cuts and qualities into account, it should be clear that an international comparison of beef production systems will probably never be able to compare 100 percent identical products. However, an approximation can be made with the aim to a) compare as homogeneous products as possible and b) maintain the feasibility of the analysis. The types of animals compared within the IFCN are so far:

- (a) Animals finished for meat export, animals which can potentially be exported in the future or animals from which the meat is a domestic substitute for beef imports from other countries.
- (b) Final products, i.e., finished animals that go to slaughter. Intermediate products like weaners and feeders/backgrounders/stores are usually not traded on an international scale.
- (c) Heavy male animals (bulls or steers), as these categories can be better compared than males with females or even calves. The Spanish farm ES-950 is an exception. It exclusively produces heifers which have a share of approximately 30 percent in the Spanish production systems.

Once the farms' data are specified in a feedback process with local advisors and farmers, an annual analysis is performed, the focus of which is on analysis of returns, cost and profitability of the beef finishing enterprise.

3.2 Production systems and physical indicators

Table 3 gives an overview of the farms analysed and Table 4 provides an overview of the most important indicators of the production systems.

The *number and type of cattle* sold per year ranges from three buffalo bulls in Pakistan to 7,200 steers in the U.S.-feedlot. The farm names indicate the country and the total number of cattle finished per year. Some of the farms produce female cattle as well as male cattle. Female cattle are not shown in the comparison. The only exception is the Spanish farm ES-950 which exclusively produces heifers of around one year of age. Despite not being directly comparable with the male cattle they were taken into consideration as they form an important part of Spanish beef production. Other cases for producing animals other than male cattle are shown in the table.

The farms are located in main production areas for the products considered. Most farms are located either on plains or high plains. Exceptions are the Austrian AT-7 (hill region in the Alps), the French cow-calf farm FR-75 in the Limousin (edge of Massif Central) and the U.S. cow-calf farms US-240 in New Mexico and US-500 in Montana (rolling hills)

There is a group of specialised farms producing finished animals with the purchase of calves from outside of the farm or from their own weaners. All other farms combine beef finishing with cow-calf, arable crops, dairy or other enterprises. Finishing farms with dairy or cow-calf enterprises use their own calves for finishing, some of them buy additional calves or stores/backgrounders from outside the farm.

The prevailing *breeds* in Western Europe, Poland and Czech Republic are Holstein breeds and their crosses, Fleckvieh (Simmental) and the French beef breeds Limousin and Charolais. In Hungary, Ireland, the U.S. and the Southern Hemisphere, breeds of British origin (mainly Hereford, Angus and their crosses) dominate. Particular cases are Brazil (Nelore, coming from India) and Pakistan where the local buffalo breed is used for both milk and beef production.

With regard to the *main feed sources* for the male cattle, in general steer production is common in systems based on grass and/or with calves of cow-calf origin whereas bull production is found in the confined systems and/or origin from dairy. The two main systems are:

- Grass (pasture) based systems, mainly found in the Southern hemisphere, in the Austrian hills, Ireland and to some extent in Poland.

³ For more detailed information on IFCN see: www.ifcnnetwork.org

Table 3:
Overview of typical beef finishing farms in comparison

Name	Region	System	Location	No. & category of animals sold p.a.	Breeds	Origin finishing cattle		Other activities
						dairy cow-calf	own purchase	
(1)						(2)	(3)	(4)
AT-7 AT-30	Steiermark Niederösterreich	conv conv	Hill Plain	7 steers 30 bulls	Lim x Fleck Fleckvieh	cc d	o p	Cow-calf, Forestry Crops
DE-190	Bavaria	conv	Plain	120 bulls	Fleckvieh	d	p	Crops
DE-240 DE-280	Bavaria Northrhine- Westphalia	conv conv	Plain Plain	70 Feeder 240 bulls 280 bulls	Fleckvieh Fleckvieh	d d	p p	Crops/Forestry Crops
DE-360	Mecklenburg- Vorpommern	conv	Plain	282 bulls 80 steers 130 fem. weaner	Fleckvieh X/ Holstein	cc/d	o/p	Cow-calf, Crops
FR-45	Pays de la Loire		Plain	31 bulls 16 cows 2 breed. heifers	Charolais	cc	o	Cow-calf, Crops
FR-90A FR-90B	Brittany Brittany	conv conv	Plain Plain	90 bulls 90 bulls	Char/Lim Char x Dairy/ Normands	cc d	p p	Crops Crops/Poultry
ES-950 ES-6950	Catalunya Aragón		Plain Plain	950 heifers 3,808 bulls 3,128 heifers	Crossbreeds Crossbreeds	cc/d d/cc	p p	- -
IE-75	Connaught		Plain	75 steers	Continental X	cc	p	-
CZ-160 CZ-780	North-east Bohemia North-east Bohemia	conv conv	Plain Plain	160 bulls 780 bulls	Holstein Holstein	d d	o o/p	Crops/Dairy/Hogs & Sows Crops/Dairy/Hogs & Sows
HU-80	South Transdanubia	conv	Plain	80 bulls 61 breed. heif.	Hereford	cc	o	Cow-calf
HU-440	Central Transdanubia	conv	Plain	440 bulls	Holstein	d	o/p	Crops/Dairy
PL-12	Wielkopolskie		Plain	7 bulls 5 heifers	Black-white	d	o/p	Crops/Dairy
PL-30	Podlaskie		Plain	20 bulls 9 heifers	Black-white	d	o	Crops/Dairy
US-7200	Plains	conv	Plain	7,195 steers	British x Continent.	cc	p	-
AR-1300 AR-2700	Buenos Aires Buenos Aires	conv conv	Plain Plain	1,300 steers 2,061 steers 648 heifers	Angus/Heref./Zebu Angus	cc cc	p p	Crops Cow-Calf (breeding) Crops
AR-1000	Buenos Aires		Plain	1,000 steers 181 breed. heif.	Angus/Hereford	cc	o/p	Cow-calf
BR-180	Mato Grosso do Sul	conv	Savannah	180 steers 94 breed. heif.	Nelore	cc	o	Cow-calf, Legal Reserve
BR-500	Mato Grosso do Sul	conv	Savannah	500 steers 265 breed. heif.	Nelore	cc	o	Cow-calf, Legal Reserve
UY-880	Litoral Centro	conv	Plain	880 steers	Hereford X	cc	p	Crops
AU-1100	New South Wales	conv	Plain	922 steers 184 heifers 79 breed. heif.	Angus X	cc	o/p	Cow-calf, Crops
NA-125	Omaheke	conv	Plain	80 steers 44 heifers 16 breed. heif.	Brahman x Fleck	cc	o	Cow-calf
PK-3 PK-50	Layyah, Punjab Faisalabad, Punjab	conv conv	Plain Plain	3 bulls 50 bulls	Nilli Ravi (Buffalo) Nilli Ravi (Buffalo)	d d	o p	Dairy Crops

(1) Number refers to total finished cattle sold per year; (2) d= dairy; cc= cow-calf; (3) p= purchase; o= own; (4) Legal Reserve in Brazil: 20 % of the farm area may not be used, must be dedicated to existing natural vegetation or replanted with native species.

Source: IFCN Beef Report 2004.

Table 4:
Physical indicators of the production system

Farm name	No. & type of beef cattle sold per year	Main feed sources	Age at start (days)	Finishing period (days)	Daily weight gain (g / day)	Final weight (kg LW)	Dressing percentage (%)
AT-7	7 Steers	Pasture + grass silage	240	540	704	700	53
AT-30	30 Bulls	Maize silage + grains	100	403	1390	705	57
DE-190	120 Bulls	Maize silage + grains	50	437	1291	649	57
DE-240	70 Feeder		50	473	1255	673	58
DE-280	240 Bulls		60	514	1154	680	60
DE-360	282 Bulls 80 Steers	Grass & maize silage + grains	180	360 - 500	920 - 1236	620 - 685	52 - 57
FR-45	31 Bulls 16 Cows	Grass & maize silage + hay + grains Maize silage + grains	244	265	1566	695	59
FR-90A	90 Bulls		274	310 - 315	1250 - 1349	673 - 710	58 - 61
FR-90B	90 Bulls		7	547 - 557	1110 - 1122	667 - 685	54 - 56
ES-950	950 Heifers	Straw + concentrates + grains	35 - 135	212 - 283	1254 - 1368	430 - 470	54 - 56
ES-6950	3,808 Bulls 3,128 Heifers		20	313 - 323	1327 - 1428	497 - 528	54 - 55
IE-75	75 Steers	Pasture + grass silage + concentrates	563	365	548	675	54
CZ-160	160 Bulls	Grass & maize silage hay + grains	28	730	836	656	56
CZ-780	780 Bulls		28 - 345	365 - 612	805 - 922	620	54
HU-80	80 Bulls	Maize silage + grains	230	230	1304	525	56
HU-440	440 Bulls		95	429	933	520	53
PL-12	7 Bulls 5 Heifers	Pasture + grass silage + hay + grains	15	535	860	520	56
PL-30	20 Bulls 9 Heifers	Pasture + grass & maize silage + grains	15	535	879	530	54
US-7200	7,195 steers	Grains + alfalfa hay	265	191	1444	578	61
AR-1000	1,000 Steers	Pasture + hay Pasture + hay + maize stubble (+ grains)	180	463 - 546	540 - 549	400 - 450	58
AR-1300	1,300 Steers		210 - 255	365 - 450	549 - 603	390 - 425	59
AR-2700	2,061 Steers 648 Heifers		210	365 - 540	500 - 644	405 - 410	59 - 60
BR-180	180 Steers	Pasture	240	1095	319	490	53
BR-500	500 Steers		210	945	347	480	53
UY-880	880 Steers	Pasture + hay + maize stubble	210	527 - 645	450 - 550	440	54
AU-1100	922 Steers 184 Heifers	Pasture + grains	210	224	964	486	54
NA-125	80 Steers 44 Heifers	Pasture	240	690	355	530	57
PK-3	3 Bulls	Freshly cut green grains + cottonseed	120	330	463	300	50
PK-50	50 Bulls		Freshly cut green grains + concentrates	600 - 780	180	778	460

Note: Figures in the table are for the male cattle only; exception: ES-950 (exclusively heifer production).
Source: IFCN Beef Report 2004.

- Maize (silage)/grain/soybean based systems in the intensive conventional farms in Austria, Germany, France, the Czech Republic and Hungary. The Spanish farms and the U.S.-feedlot are special cases with no feed-producing land, buying all feed from outside the production site. The Spanish farms feed rations of straw, concentrates and grains, and the U.S.-feedlot has a ration of 85 percent grains (mainly corn), 12 percent alfalfa hay plus three percent minerals

The *age at start of finishing* mainly depends on whether the calves come from dairy herds (young calves) or from cow-calf herds (animals between seven and eight months). Some farms finish backgrounder cattle (CZ-780, IE-75, PK-50) with a significantly higher age at the start of finishing.

Finishing periods are determined by the age at start, the intensity of the finishing process and the final weights which again are influenced by the breeds chosen. Rather short periods of 200 - 300 days are found in the intensive feedlot-type of systems in Spain and the U.S. as well as in the Australian farm, where animals are either rather old at the start of finishing and/or rather young at the end of finishing. Periods of between 400 and 600 days are found for both the intensive maize silage/grain systems in Austria, Germany, France and the Czech Republic based on young dairy calves as well as for the pastoral systems in Argentina and Uruguay based on weaners from the cow-calf herd. Extreme values are revealed for Brazil where the combination of climatic conditions, rather poor forage resources and the use of the Nelore breed leads to rather high finishing periods of 2.6 to almost 3 years.

Daily weight gains are mainly determined by the intensity of the finishing process. Consequently, the highest

weight gains of 1.100 grams per day and more can be observed in the U.S.-feedlot, Spain, Germany, France and the small Hungarian farm. The opposite end is observed in the Brazilian and the Namibian farms where weight gains just reach between 300 and 350 grams per day.

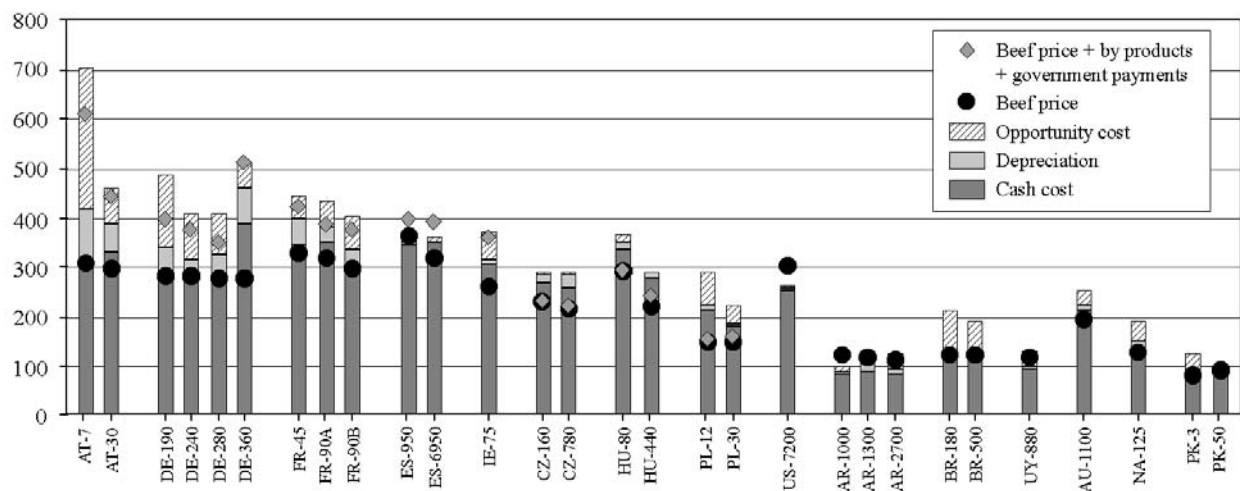
Final weights in most of the Western European countries and the Czech Republic are between 600 and 700 kg live weight (LW). Spain is an exception with rather low finishing weights due to the preference of the local consumers for light coloured meat from young animals. Weights in most of the Southern Hemisphere countries are between 400 and around 500 kg LW. This is mainly due to the smaller framed breeds used, the farming system applied and some (local) market preferences. In the small Pakistani farm, animals are sold at rather low weights before the bulls create management problems in the small-holder farms with no or inadequate confinement possibilities for the animals. They might be sold for slaughter or to another more specialised finisher like PK-50. The latter, however, is not yet very widespread.

Dressing percentages are calculated as carcass weight divided by live weight in percent. They lie between 50 percent in the Pakistani farms (buffalo), 57 percent and more in farms with Simmental-bulls in Germany and Austria and up to 61 percent in France (Charolais/Limousin) and the U.S.-feedlot.

3.3 Economic results for the year 2003

In the following, a summary of the economic analysis for the year 2003 is presented. Figures are stated in US\$ per 100 kg carcass weight (CW) of beef sold. Total costs in Fig. 3 are grouped into cash cost, depreciation and

US\$ per 100 kg carcass weight



Source: IFCN Beef Report 2004.

Fig. 3: Total returns, cost and profitability of beef production 2003

opportunity cost for production factors owned by the farmer and his family (labour, land, capital). Returns are stated as a) ‘beef returns’ on one side and b) ‘beef returns plus government payments’ on the other side. The difference between b) and a) are the government payments, if there are any. With the exception of ES-950, the analysis was made for the male cattle shown in Table 4.

Total cost went up in 2003 compared with 2002 due to the valuation of most national currencies against the US\$. Unlike in 2002, when production costs in Argentina were less than US\$ 100 per 100 kg CW, in 2003 none of the farms analysed managed to produce beef for less than US\$ 100. At the same time, the cost of the Western European countries jumped up approximately US\$ 80 per 100 kg CW compared to the previous year. The production costs in Western Europe are still 3.5 to four times higher than the cost of the low-cost producers in South America and Pakistan.

The total cost can be grouped as follows:

- Very high: > US\$ 400 per 100 kg CW for the farms in Austria, Germany and France with an extreme of US\$ 700 for the Austrian hill farm AT-7.
- High: US\$ 300–400 for the Irish and the Spanish farms and the small Hungarian farm
- Medium: US\$ 200–300 for the Czech farms, the large Hungarian farm, the Polish farms, the Brazilian, Australian and Namibian farms
- Low: US\$ 100–150 for the farms in Argentina, Uruguay and Pakistan

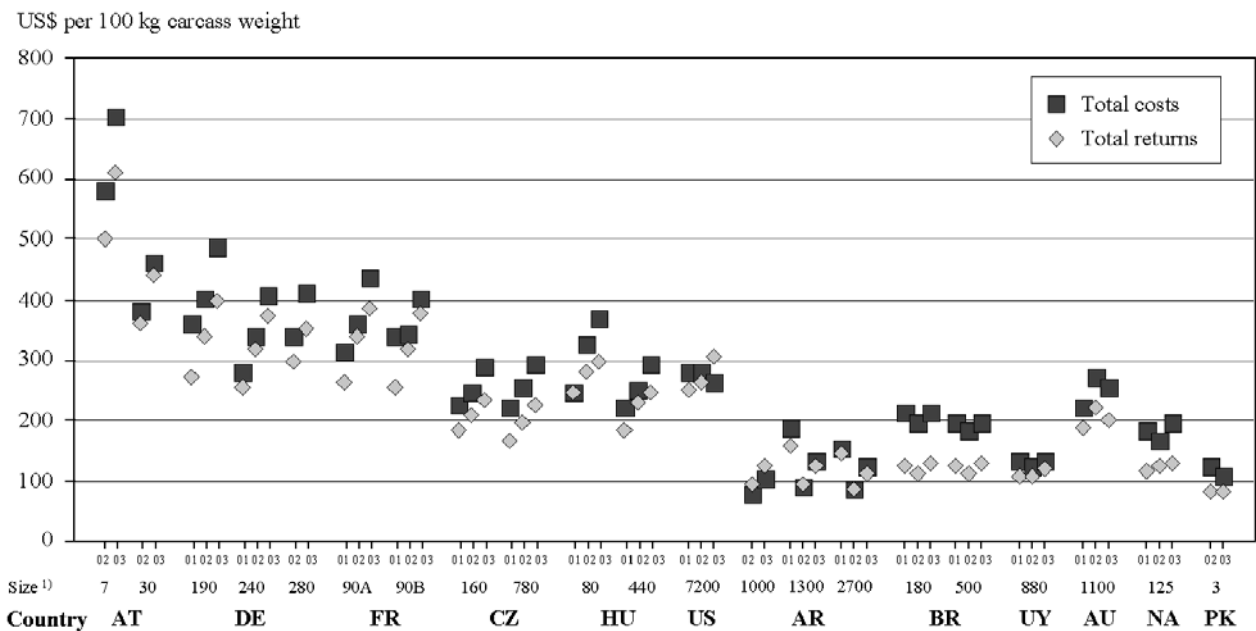
Profitability is grouped depending on the time period under consideration. For this purpose, total returns are compared with the following subgroups of cost: for a long-term consideration with total cost, for mid-term consideration with cash cost plus depreciation (cost from the profit and loss account), for short term consideration with cash cost. It should be noted that the assignment of the typical farms to this classification is not fixed and can change from year to year (see Chapter 3.4).

Long-term profitability

The following farms realise an entrepreneur’s profit, i.e., covering total cost with the beef price (plus government payments, if there are any): the Spanish farms, the U.S. feedlot (recovered from a heavy loss in last year’s comparison) and AR-1000.

Medium-term profitability

Other farms realise a profit from the profit and loss account, i.e., covering cash costs plus depreciation with the returns: all Western European farms except Spain (where farms even make an entrepreneur’s profit) – but only with the help of government payments – the Uruguayan farm, the two larger Argentinian farms and the specialised Pakistani farm PK-50, the latter with a very small profit.



1) The size indicates the total number of finished cattle sold per year.

Source: IFCN Beef Report 2002, 2003, 2004.

Fig. 4: Total returns, cost and profitability of beef production 2001-2003

Short-term profitability

These are farms that live at the expense of their depreciation, i.e., covering the cash costs but not the depreciation with the returns. In this year's comparison, only the Brazilian farms belong to this group.

Unprofitable

These farms do not even cover their cash costs with the returns: the farms in the Czech Republic, Hungary, Poland, Australia, Namibia and PK-3.

3.4 Comparison of identical farms 2001–2003

A subset of the farms analysed in the previous chapter has been compared for two or three subsequent years. Fig. 4 shows the total returns and the total cost for the farms expressed in US\$ per 100 kg carcass weight.

There are relatively large variations in costs and returns resulting from national price and cost developments as well as from changes in the exchange rate to the US\$. In the U.S.-feedlot a switch from an entirely unprofitable situation in 2001 and 2002 to a very profitable situation in 2003 can be observed. When comparing the Western European farms with most of the other countries, it becomes clear that the competitive situation (total costs) has gradually worsened from 2001 to 2003 due to the revaluation of the Euro against the US\$. The example of the Argentinian farms demonstrate the effect of the financial default in 2002 when cost and prices measured in US\$ dropped by more than 70 percent compared to the previous year. And finally, the Australian farm shows a decrease of cost and returns in 2003 despite the revaluation of the AU\$ against the US\$ which is a result of the drought that hit the country in 2003. These results underline the necessity of doing regular (annual) analysis within the framework of the IFCN.

3.5 Conclusions for competitiveness

Competitiveness is here defined as the '... sustained ability to profitably gain and maintain market shares' (Martin et al., 1991). Factors influencing profitability are costs and returns. Thus, the comparison of costs and returns of production in agriculture can provide an idea about the competitive situation.

In general, for countries characterised by comparably low costs on the farm level, there is an incentive to export to countries with high costs, if beef prices in the high-cost country are higher than in the low cost country. Low-cost countries would have a favourable competitive situation compared with high cost countries. This is for example the case when comparing the South American farms (low

cost, low price) with the Western European farms (high cost, high price).

Assumed that slaughtering and processing costs in all countries are identical, the transport cost from South America to Europe must be added to obtain a comparable cost level. The on-farm cost of production of Argentinian beef (cash cost plus depreciation) is approximately US\$ 90–100 per 100 kg CW in-bone. Transport costs on sea from Buenos Aires to Hamburg are between US\$ 30–34 per 100 kg carcass weight of de-boned chilled meat at 2003 exchange rates (Imke, 2004). Assuming a share of bones of around 14–16 percent in the carcass, the bone-in cost would be approximately US\$ 26–30 per 100 kg CW. This results in costs of US\$ 116–130 of Argentinian beef compared with costs of around US\$ 300 per 100 kg CW for beef (in-bone) produced in Germany (all figures for 2003). At the same time, price levels in Germany were around US\$ 290 per 100 kg CW.

At these price-cost relations and supposed the quality is comparable, there is a strong incentive for Argentina to export beef to Germany and to the European Union, respectively.

Similar observations can be made when comparing South America with the U.S., Australia with the European Union, or some Eastern European farms with Western European farms.

4 Future potential

4.1 Factors influencing competitiveness

A strong competitive cost advantage as shown above would suggest that production and exports in low cost countries should expand and in high cost countries should shrink very quickly. However, whether a country can explore its potential to produce and to increase net exports or not (which after all are relevant for the international beef trade) depends on the following conditions:

- World market price developments
- Market access to the countries of destination
- Domestic agricultural support, trade and tax policies
- Level and development of domestic consumption
- Competition of beef production with other enterprises
- Availability of land to expand production
- Development of the climatic situation and its management (droughts, flooding)
- Opportunities to intensify production (genetics, forage production, feeding)
- Opportunities to substitute domestic consumption by exports
- Disease status relevant for trade
- Quality and traceability requirements

Albeit incomplete, this list should make clear that the assessment of future production has to reflect numerous factors which are hard to predict.

4.2 FAPRI projections

In the agricultural outlook 2004 of FAPRI (2004), some of the conditions mentioned above were reflected. The future development of both production and consumption for the world beef market and selected countries was estimated for the period 2003 to 2013. It should be noted that the latest EU-CAP reform (mainly decoupling of direct payments) is basically reflected but further assumptions on future WTO-agreements are not included. Table 5 shows the results for the net surplus or deficit (production minus consumption) for selected countries in the year 2013 as compared with the year 2003. The figures are stated in '000 tonnes carcass weight' and a factor to provide an idea about both the absolute and relative changes.

There are some countries which have already been important exporters and are now projected to be able to increase their net exports. The highest relative growth is predicted for Canada and the biggest increase in total volume is projected for Australia. The low values for Brazil are somewhat surprising. The assumption behind it is that after the strong production growths in the last 6 years from 2006 onwards the consumption will grow at a faster rate than production, thus reducing the net surplus. The EU-15 and EU-25 are net importers of beef but the small deficit of 2003 is supposed to decrease until 2013. This assumption, however, depends heavily on the final impact of the CAP-reform. And finally, the U.S. are supposed to turn from a net importer to a net exporter.

On the other side, there are some countries which have already been important importers and are now projected to face a growing deficit. The highest relative growth is predicted for Indonesia and South Africa (but both coming from very low levels) and the biggest increase in volume is projected for Japan. China is supposed to turn a very

low surplus in 2003 into a low deficit in 2013. This projection must however be interpreted particularly carefully because a) China's overall production is very large (approx. 8.5 million tons) in relation to the net surplus calculated and b) the country's overall economic situation is difficult to predict.

According to FAPRI, the world beef trade is supposed to grow from 3.7 million tonnes in 2003 to 4.8 million tonnes in 2013. The additional demand will be mainly unfolded from the aggregated rest of the world not shown in the table.

4.3 IFCN expert assessments

Based on these projections, an expert-based assessment of the future of beef production until 2013 for the countries in the farm comparison shown in Chapter 3.3 was made during the IFCN Beef Conference 2004 (all information from partners presentations). Similar to the FAPRI-projections, the EU-CAP reform was reflected in the assessment but no changes in the WTO-regime beyond the Uruguay-round were assumed.

In the *European Union* countries, the most important factor for the mid-term future of beef production is the implementation of the CAP-reform, mainly the decoupling of government payments. The difficulty for making predictions is that the various member states did not opt for the same way of implementation of the reform. The main differences occur on two levels:

Full or partial decoupling: Some member states opted for full decoupling of all livestock payments, others opted for maintaining parts of the payments coupled. These are mainly livestock payments like the suckler cow premium and slaughter premiums.

Payment scheme: All payments are based on the historical annual average of the years 2000-2002 (reference period). Some member states opted for the so-called single farm payment (SFP) where the active farmer receives a payment based on the individual premiums received in the reference period. Other countries opted for a unified acreage-based payment which is independent from the individual farm payments in the reference period. It is calculated as total payments in the region divided by the acreage eligible for payments in the reference period. Finally, some countries opted for a hybrid model of both types, some of them phasing out the SFP component by replacing it by the acreage payment.

The impact on beef production will mainly depend on a) the development of beef prices on one side and calf prices on the other side and b) the reaction of dairy farmers to the dairy reform (mainly in 'milk' countries, see Chapter 2.2). For single countries, the following trends could be identified:

- *Austria* opted to maintain the full coupling of the suckler cow premium and slaughter premium for calves as

Table 5:
Net surplus or deficit for beef in 2013 compared with 2003

	Change in '000 tonnes	2013 as factor of 2003 value	Change in '000 tonnes	2013 as factor of 2003 value
Surplus increases			Deficit increases	
Argentina	292	1.92	Indonesia	-32
Australia	453	1.37	Japan	-307
Brazil	154	1.14	Mexico	-101
Canada	258	2.58	Philippines	-129
India	103	1.22	Russia	-53
New Zealand	7	1.01	South Africa	-18
			South Korea	-89
				1.22
Deficit decreases			Surplus decreases	
EU-15	95	-1.25	Poland	-16
EU-25	149	-1.47	Ukraine	-55
				0.65
				0.62
Deficit turns into surplus			Surplus turns into deficit	
USA	383		China	-287

Source: FAPRI (2004)

well as a partial coupling of the slaughter premium of male cattle. Austria will apply the payment scheme of the SFP. Despite the partial coupling, the production is estimated to drop between 11 and 14 percent until 2013. The decoupling of the special premium for male cattle, lack of land, low profitability of beef production and the animal protection legislation that requires huge investments in new barn fittings are the main reasons for that.

- *Germany* opted for a full decoupling of all livestock premiums and applies a hybrid model with phasing out of the SFP into acreage payments from 2009 to 2012. Research based on the representative farm data network of Germany indicates a change in dairy cow numbers between -1 and +4 percent, a reduction in suckler cow numbers of -30 to -40 percent, a reduction of finishing bulls between -17 and -26 percent and a reduction of beef production of between -9 and -15 percent (Kleinhanß et al., 2004).
- Like Austria, *France* opted to maintain the full coupling of the cow-calf premium given the importance of cow-calf production in the mountainous areas. The slaughter premium for calves is maintained at 100 percent and the slaughter premium for male cattle at 40 percent, whereas the special premium for male cattle has been fully decoupled. France will apply the payment scheme of the SFP. These measures will keep cow-calf farms in business but will not help beef finishers to cover production costs unless calf prices drop.
- *Ireland* opted for a full decoupling of all livestock premiums and for the SFP payment scheme. Until 2012, the following changes are predicted to occur in the scenario of full decoupling versus the baseline of no policy change: reduction of the suckler cow herd by -18 percent and an overall reduction in beef production of nearly 7 percent (Binfield et al., 2003). Furthermore, at farm level, an increase in part-time farming as well as sofa farming is predicted to occur, with part-time farming increasing by 10 per cent over the baseline of no policy change, and 'sofa farming' (i.e. farmers who stop producing cattle, maintain the land under conditions according to the cross-compliance regulations and receive the decoupled SFPs) to account for between 8 and 6 percent of beef farmers over the projection period until 2012 (Breen and Hennessy, 2003a+b).
- Like Ireland, *Spain* opted for full decoupling and the SFP payment scheme. At present, it is very difficult to say to which direction the production moves but it is likely that farms below 90 animals will gradually disappear in favour of bigger and more integrated systems. A growing consumption rising from a low level (16 kg per capita) would help to sustain domestic production on a very specific market characterised by a high share of rather young and female slaughter cattle. On the other hand, growing environmental problems and conflicts with local residents are likely to occur with ongoing

concentration of the prevailing feedlot-type finishing system.

The *New Member States* of the European Union faced more or less dramatic drops in cattle inventories and beef production during the period 1993-2003 (CZ: -50 percent, HU and PL: -40 percent). Furthermore, as the results in Chapters 3.3 and 3.4 suggest, beef production is apparently not a profitable business. In addition, the meat processing plants as well as the beef quality are still behind EU-15 levels (see also Hartmann and Schornberg, 2004). The implementation of the CAP-reform is much more homogeneous than in the EU-15 countries. The payment volumes available are based on the past production and were subject to pre-accession negotiations due to the decreases in animal production. In all countries, payments are fully decoupled and the acreage payment system is applied with relatively low start values per hectare which are increasing over time. Taking this background into account, the assessments for future production were as follows:

- *Czech Republic*: there are areas with a high share of presently underused marginal grassland. With the CAP-payments, the existing shift towards cow-calf and/or organic production – which appear the most profitable land use in these areas – is expected to strengthen. On the other hand, the dairy herd will shrink over time. The total beef production is expected to remain stable at low level.
- *Hungary*: as in the Czech Republic, a shift from dairy to beef cows is expected. Further, consumption could recover but coming from very low levels (less than 4 kg per capita and year), inducing higher domestic production.
- *Poland*: after accession in May 2004 there was a strong price increase for beef (mainly cows) and live animals (mainly calves) due to import demand from EU-15 countries. However, profitability did not increase due to higher feed costs, resulting from the bad harvest in 2003. For the future, it is expected that beef production will remain at a low but stable level with a higher export orientation than in the past. The rebuilding of the cattle inventories will need at least three years.

Despite BSE and subsequent import bans, the *United States* are presently characterised by historically high prices as a result of strong internal demand, mainly due to high-protein diets. The U.S.-market will be able to compensate for the export drop of almost 1 million tons in 2004. The cattle herd is projected to rebuild starting in 2007. Unless consumer confidence in beef dwindles, cattle prices are predicted to remain high for the next three years and then decline gradually. Production is supposed to grow 16 percent by 2013 (FAPRI, 2004).

The situation in the *South American* countries can be described as follows:

- *Argentina* has a large set of favourable conditions for beef production at its disposal. The main potential appears to be in the Northeast of the country, mainly via increases of the cow-calf productivity. However, even with more liberal trade conditions, an increase of beef production appears to be only gradually possible. Competition with other land uses, possible price increases in the domestic beef price with increasing exports, orientation toward traditional production systems, the reputation for natural beef and lack of capital for intensification set the limits for substantial expansion of exports and/or beef production (for more details see Deblitz and Ostrowski, 2004).
- *Brazil* is presently the growth country for agriculture and has shown a strong upward trend in both production and net exports in the last five years despite less land availability for beef production. It is expected that Brazil will maintain its rank among the Top 3 beef exporters in the future. The increase was mainly due to productivity gains in terms of genetics, higher extraction rates of the cow-calf herd, improved pastures and shorter finishing periods (see also Moura et al., 2004). Further increases can be expected as a result of further productivity gains and expansion of production to frontier regions in the North and the Center-West of the country.
- *Uruguay*: the country is characterised by a limited potential due to a) relatively low production and b) limited land availability. Similar to Argentina, production gains can mainly be expected via increased productivity, provided that beef prices remain high and credits for pasture improvement are available.

Australia is presently characterised by the rebuilding of the national cattle herd after the recent droughts. Special international market conditions are favouring a high demand for Australian beef. In 2005 a drop of exports is expected due to the reduced cattle supply and the return of the U.S. to world beef exports. From 2006 onwards, there are good prospects for increasing exports, mainly to Asia (Japan, South Korea) and USA. Over time it is expected that the importance of feedlots in total beef production will raise from the present share of approximately 30 per cent as a result of higher demand for grain beef from Japan and the domestic market (see also Weeks, 2004). However, as the recent experience showed, droughts are likely to create drawbacks in the future and land availability for cow-calf operations is limited.

Pakistan: The demand is expected to grow further at about twice the rate of population growth due to increasing per head consumption with an average positive income development. Live exports to Middle East countries are expected to grow provided that the disease status can be improved. The government supports these activities with various programmes, partly assisted by foreign development aid. Further, there are opportunities to fur-

ther improve the marketing of cattle leather. All these factors will most likely lead to an increase in beef production provided that enough additional feed can be made available.

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