

## Beef production in Germany - production systems and their spatial distribution

Claus Deblitz\*, Julia Brömmer\*\* and Daniel Brüggemann\*\*\*

### Summary

This paper provides an overview of the spatial distribution of cattle, based on regional statistics as well as a systematic analysis of beef finishing systems in Germany and their spatial distribution, based on own expert surveys.

Total cattle numbers have gone down in the last 15 years, mainly due to the decline of dairy cows. The most important regions for dairy cows, in both absolute terms and cow density, are Bavaria, Lower Saxony and North-rhine-Westphalia. The regions with the highest density of suckler-cows appear complementary to the dairy regions. This holds especially true for Bavaria and East Germany. Only 13 percent of the total cow numbers are suckler-cows. This means that most of the beef produced in Germany originates from dairy herds.

The main beef finishing system in Germany is bull finishing based on Holstein and Fleckvieh animals of different ages at start - calves, starters, store cattle (all from dairy cows) and weaners (from suckler-cows). Animals are typically kept in cubicle sheds with slatted floors, fed on a corn and/or grass silage basis and supplemented with concentrates, grains, soybean meal as well as by-products of the food industry. Thus, many systems are located in areas where corn growing is profitable. The highest density of finishing bulls and the production systems mentioned are found in a band throughout Centre-South Bavaria and in the Northwest of Germany.

Finishing of steers and heifers only exists in isolated cases and areas and is usually linked to a specific marketing programme to be profitable. Further meat types produced are rosé calves and veal from calves, both of which are rather restricted to specific areas in North and West Germany and one county in East Germany.

The paper could not close all information gaps, especially about the spatial distribution of the systems. The present changes in framework conditions (policy, prices, bio-energy) make an update in due time reasonable.

*Keywords: Germany, Beef production, Production systems, spatial distribution*

### Zusammenfassung

#### Rindfleischproduktion in Deutschland - Produktionssysteme und räumliche Verteilung

Dieser Beitrag gibt auf der Basis von Regionalstatistiken einen Überblick über die räumliche Verteilung der Rinderbestände sowie auf der Basis von Expertenbefragungen eine systematische Analyse von Produktionssystemen der Rindermast und ihrer räumlichen Verteilung in Deutschland.

Der Rinderbestand ist in den letzten 15 Jahren vorwiegend aufgrund des Rückgangs der Zahl der Milchkühe gesunken. Die Regionen mit der höchsten Zahl und der höchsten Dichte an Milchkühen sind Bayern, Niedersachsen und Nordrhein-Westfalen. Die Regionen mit der größten Mutterkuhdichte sind zu den Milchregionen größtenteils komplementär, vor allem in Bayern und Ostdeutschland. Nur 13 Prozent der Kühe in Deutschland sind Mutterkühe, d.h. dass der überwiegende Teil der Rindfleischproduktion aus der Milchviehhaltung stammt.

Bullenmast ist das wichtigste Produktionssystem in Deutschland und basiert auf den Rassen Holstein und Fleckvieh, die als Kälber, Starter, Fresser (aus der Milchviehhaltung) und Absetzer (aus der Mutterkuhhaltung) aufgestellt werden. Die Tiere werden typischerweise in Laufställen auf Spaltenboden gehalten und mit Mais- und/oder Grassilage plus Kraftfutter, Getreide, Sojaschrot sowie Nebenprodukten der Nahrungsmittelindustrie gemästet. Daher befinden sich viele dieser Systeme in Gebieten, in denen der Anbau von Mais rentabel ist. Die größte Dichte von Mastbullen befindet sich in einem Band im Zentrum Bayerns sowie im Nordwesten Deutschlands.

Ochsen- und Färsenmast wird nur vereinzelt und regional eingeschränkt betrieben und ist normalerweise mit einem speziellen Vermarktungsprogramm kombiniert. Weitere Fleischarten sind die Rosékälber sowie weißes Kalbfleisch. Beide Produktionssysteme sind räumlich auf den Norden und Westen Deutschlands und einen Kreis in Ostdeutschland beschränkt.

Der Beitrag kann nicht alle Informationslücken schließen, insbesondere hinsichtlich der räumlichen Verteilung der Systeme. Dies und die Änderung der Rahmenbedingungen (Politik, Preise, Bioenergie) lassen eine Aktualisierung in absehbarer Zeit sinnvoll erscheinen.

*Schlüsselwörter: Deutschland, Rindfleischproduktion, Produktionssysteme, räumliche Verteilung*

\* Asian Agribusiness Research Centre, Charles Sturt University, Orange, 2800 NSW/Australia; Email: claus.deblitz@vti.bund.de

\*\* Osterstraße 55, 30159 Hannover/Germany

\*\*\* Johann Heinrich von Thünen-Institut, Federal Research Institute for Rural Areas, Forestry and Fisheries (vTI), Institute of Farm Economics, Bundesallee 50, 38116 Braunschweig/Germany

## 1 Introduction

### 1.1 Situation and objectives

With framework conditions for agriculture changing significantly, changes in production systems as well as regional shifts of livestock production are likely to occur in the future. As far as beef production systems are concerned, literature analysis and initial expert interviews revealed that analysis of beef production systems and their spatial distribution in Germany was rather limited and scattered. Most of the information available came from regional or state-wide extension services, breeding or cattle marketing organisations or from textbooks referring to beef production (Wiedenmann et al., 1999; Matzke et al., 1995; Pflaum et al., 1992; Geissler et al., 1984; Bogner, 1978). Consequently, it was decided to carry out an initial project to address this issue and close existing information gaps. Due to the lack of literature and statistics, it very soon became clear that an expert-based approach would best serve the needs and at the same time reflecting the time and financial constraints.

The goals of this paper are to:

- analyse the spatial distribution of different cattle categories and the herd structures in Germany,
- define and describe the prevailing production systems of beef in Germany, and
- to analyse the spatial distribution of these production systems in Germany.

### 1.2 Data base and methods

Statistics available from the 2003 livestock survey (Vieh-zählung) of the German Statistical Office were used to analyse the development and the spatial distribution of cattle in Germany as well as the herd size structure presented in Chapter 2. They are the latest data available to the degree of detail required. Whenever more up-to-date figures of single data were available, they were included in the analysis.

The classification and analysis of the production systems in this paper stem from the diploma thesis written by Brömmer (2005). They follow the concept of typical farms and production systems applied in the **agri bench-mark** project and described in detail by Deblitz and Zimmer (2005). The main reason for choosing the typical farm concept is that a representative survey of individual farms was impossible to carry out within the scope of the study and its time and financial limitations.

Instead, an expert survey was carried out to obtain the required production system information, addressing staff

from extension, regional agricultural administrations as well as researchers. The approach and procedure of the survey can be summarised as follows:

- Regions were defined as administrative regions such as the German federal states or the next lower administrative units, district and county. All German federal states except the city-states Hamburg, Bremen and Berlin were covered, adding up to a total of 13 regions.
- The regional experts were asked to provide the data and information characterising typical beef finishing systems in their region. For this purpose, a number of existing production systems were defined and specified together with the experts (see Chapter 3).
- For the subsequent survey, a standardised questionnaire was used after being pretested with a selected group of experts. The experts were then advised personally or per telephone on how to fill the questionnaire.
- In a first step, the experts were asked to specify the dominating/prevaling systems in the region, measured by their share in total beef production. A quantitative definition of a minimum share in total production was, however, not provided, for example a share of at least 20 percent in regional beef production for a specific system. The reasons were a) a lack of regionalized and production system related data (which was one reason to conduct the study) and b) the authors did not want to jeopardise the success of the survey nor significantly reduce its output by imposing an additional task of assessment on the experts.
- It was clear from the beginning that some of the production systems would probably not reach a significant share in total production in any of the regions (for example steer production). Consequently, in the second step it was asked how important these systems were in a national comparison. Taking steer production as an example, the question was to estimate the share of the regional steer production in the total German production. If experts assessed this system to be relevant for the national production, it was specified. Again, no quantitative thresholds were set for the reasons quoted above.
- Once the production systems were specified, the experts were asked to assign each production system to the administrative regions (counties or districts). As production systems typically do not change in line with administrative borders, the experts were additionally asked to refer the production systems identified to natural regions.
- The selection of production systems and their assignment to regions reveal a certain weakness which, however, was found acceptable in this first step. In further surveys, more refined approaches might be taken (see also Chapter 5).

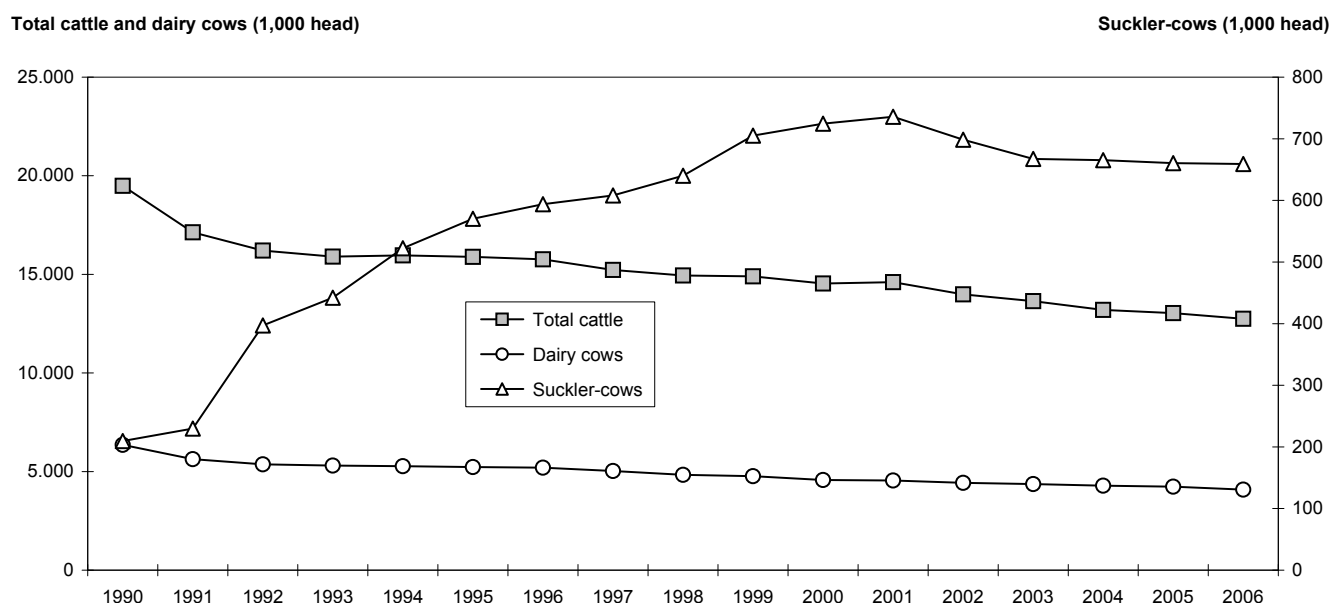


Figure 1:

Development of the cattle and cow numbers in Germany 1990 - 2006 (1,000 head) (Statistisches Bundesamt, 2003)

### 1.3 Working steps

Chapter 2 provides an overview about the development and the spatial distribution of cattle inventories in Germany. The definition of production systems used in this paper is provided in Chapter 3. Chapter 4 presents the main characteristics of the production systems in Germany as well as an overview of their spatial distribution. Chapter 5 eventually draws some conclusions on the findings and further steps.

## 2 Development and spatial distribution of cattle inventories in Germany

The following chapter provides an overview about the development of the cattle numbers in Germany since the reunification, as well as their spatial distribution and average cattle numbers per farm based on the livestock census from the year 2003. The overview starts with total cattle, followed by dairy and suckler- and nurse-cows<sup>1</sup>, male cattle of > 1 year (finishing bulls), and is completed with calves.

### 2.1 Total cattle

Figure 1 shows the development of the cattle and cow numbers in Germany from 1990 to 2006. All years re-

flect Germany East and West after the reunification. The suckler-cow numbers are reflected on the second y-axis, displayed at the right hand side of the chart.

The figure shows that from 1990 to 2006, the cattle numbers decreased by almost one third with a particularly sharp drop in the first years after the reunification, when many farms in East Germany gave up dairy and beef production. The decline is mainly caused by the decline in dairy cows and the corresponding downturn in female progeny and finishing bulls coming from the dairy herd. The increase in suckler-cow numbers could not stop this trend as it came from a very low basis and has now reached approximately 13 percent of the total cow numbers. With the present policy settings, it can not be expected that suckler-cow numbers increase medium-term.

Corresponding to the decrease of the cattle numbers, beef production fell from more than 1.8 million tons in the beginning of the nineties to 1.2 million tons in 2006 (ZMP, 2007). The latest developments in inventories and beef production were mainly caused by the CAP-reform 2003 implemented starting in 2005, resulting in a drop of cattle numbers.

Table 1 shows the spatial distribution of the total cattle numbers to the federal states as well as the average farm sizes of farms with cattle. It should be noted that these farm sizes are larger now according to the structural change taking place. The total cattle numbers in 2003 were approximately 13.6 million head (down to 12.8 million in 2006). Of these, West Germany has more than 80 percent and Bavaria as the biggest cattle producing region, Lower Saxony and Northrhine-Westphalia together kept almost

<sup>1</sup> Nurse-cows are cows raising more than one calf. Due to their small number, and the fact that statistics often do not state them separately, suckler- and nurse-cows are further referred to as suckler-cows

Table 1:

Total cattle, number of farms and average inventory per farm by federal state 2003 (Statistisches Bundesamt, 2003)

	Animals		Farms		Average Inventory
	Number	Share in %	Number	Share in %	
Schleswig-Holstein	1,236,647	9.1	10,228	5.2	121
Hamburg	7,129	0.1	145	0.1	49
Lower Saxony	2,661,117	19.5	28,805	14.5	92
Bremen	11,283	0.1	129	0.1	87
Northrhine-Westphalia	1,418,812	10.4	22,865	11.5	62
Hesse	504,770	3.7	12,081	6.1	42
Rhineland-Palatinate	410,455	3.0	7,196	3.6	57
Baden-Wuerttemberg	1,138,310	8.3	26,351	13.3	43
Bavaria	3,763,833	27.6	74,685	37.7	50
Saarland	58,460	0.4	930	0.5	63
<i>West Germany</i>	<i>11,210,816</i>	<i>82.2</i>	<i>183,415</i>	<i>92.6</i>	<i>61</i>
Berlin	405	0.0	9	0.0	45
Brandenburg	614,337	4.5	3,084	1.6	199
Mecklenburg-W. Pomerania	565,079	4.1	2,480	1.3	228
Saxony	521,603	3.8	4,496	2.3	116
Saxony-Anhalt	364,581	2.7	1,962	1.0	186
Thuringia	366,882	2.7	2,620	1.3	140
<i>East Germany</i>	<i>2,432,887</i>	<i>17.8</i>	<i>14,651</i>	<i>7.4</i>	<i>166</i>
<b>Germany</b>	<b>13,643,703</b>	<b>100.0</b>	<b>198,066</b>	<b>100.0</b>	<b>69</b>

Table 2:

Dairy cows, number of farms and average inventory per farm by federal state 2003 (Statistisches Bundesamt, 2003)

	Animals		Farms		Average Inventory
	Number	Share in %	Number	Share in %	
Schleswig-Holstein	357,733	8.2	6,268	5.2	57
Hamburg	1,087	0.0	29	0.0	37
Lower Saxony	748,056	17.1	17,218	14.2	43
Bremen	3,384	0.1	70	0.1	48
Northrhine-Westphalia	391,607	9.0	10,497	8.6	37
Hesse	161,561	3.7	5,610	4.6	29
Rhineland-Palatinate	126,587	2.9	3,255	2.7	39
Baden-Wuerttemberg	398,290	9.1	16,388	13.5	24
Bavaria	1,326,612	30.3	56,717	46.7	23
Saarland	14,801	0.3	337	0.3	44
<i>West Germany</i>	<i>3,529,718</i>	<i>80.7</i>	<i>116,389</i>	<i>95.8</i>	<i>30</i>
Berlin	123	0.0	3	0.0	41
Brandenburg	181,472	4.2	899	0.7	202
Mecklenburg-W. Pomerania	182,210	4.2	1,019	0.8	179
Saxony	208,582	4.8	1,510	1.2	138
Saxony-Anhalt	142,891	3.3	854	0.7	167
Thuringia	126,962	2.9	850	0.7	149
<i>East Germany</i>	<i>842,240</i>	<i>19.3</i>	<i>5,135</i>	<i>4.2</i>	<i>164</i>
<b>Germany</b>	<b>4,371,958</b>	<b>100.0</b>	<b>121,524</b>	<b>100.0</b>	<b>36</b>

58 percent of Germany's total cattle.

In 2003 there were almost 200,000 farms keeping cattle in Germany, of which less than 10 percent could be found in East Germany. Approximately 121,500 of these farms kept dairy cows (see Table 2) and 50,500 kept suckler-cows.

Average herd size was 69 (and up to 74 in 2006), ranging from 43 in Baden-Wuerttemberg to 228 in Mecklenburg-Western Pomerania. There is a clear North-South and West-East divide in herd sizes and the two biggest regional herd sizes in West Germany (Schleswig-Holstein and Lower Saxony) are still smaller than herd sizes in most of the

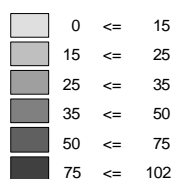
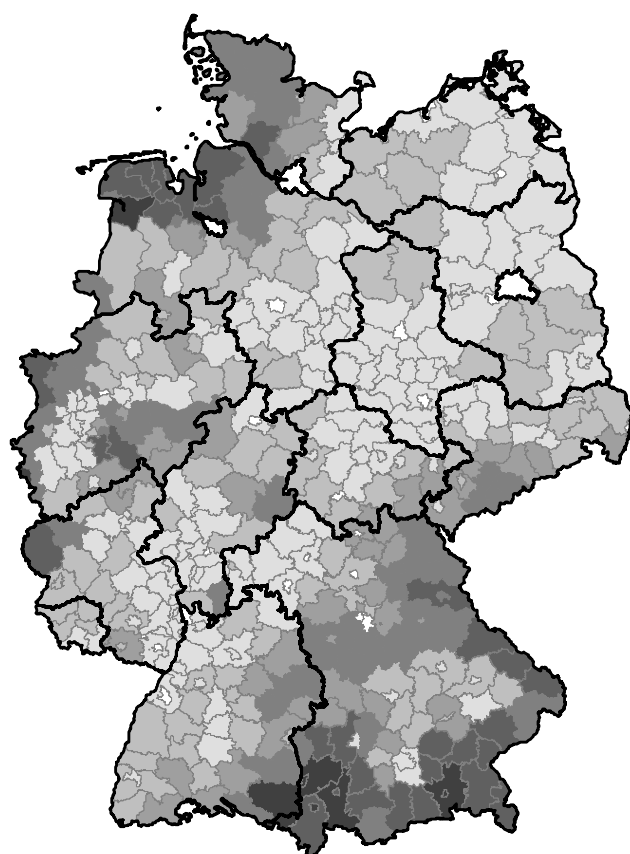
East German federal states. Compared to these figures, in 1998 average herd sizes were smaller: 53 cattle in West Germany and 106 cattle in East Germany (Wiedenmann, 1999). According to Statistisches Bundesamt (German Statistics Office) (2007), in 2005 approximately 60 percent of the total cattle (and 21 percent of the farms) could be found in herd sizes above 100 cattle.

## 2.2 Dairy cows and suckler-cows

In 2003, the total number of **dairy cows** in Germany was almost 4.4 million head. In 2007, this number has decreased to 4.08 million (ZMP, 2007). Bavaria clearly leads the list with more than 1.3 million dairy cows, more than all of East Germany, representing around 30 percent of all dairy cows. In East Germany, approximately 20 percent of the German dairy cows are found on less than five percent of the farms.

The average herd size was just 36 dairy cows (and up to 40 cows in 2006), again revealing significant North-South and West-East differences. Average herd sizes in East Germany were more than five times higher than in West Germany and around three times higher than in Schleswig-Holstein which has the highest average herd sizes in West Germany. On the other hand, Bavaria and Baden-Wuerttemberg had average herd sizes of less than 25 cows. According to Statistisches Bundesamt (2007), in 2005 approximately 26 percent of the dairy cows (and 4.5 percent of the farms) could be found in herd sizes above 100 cows.

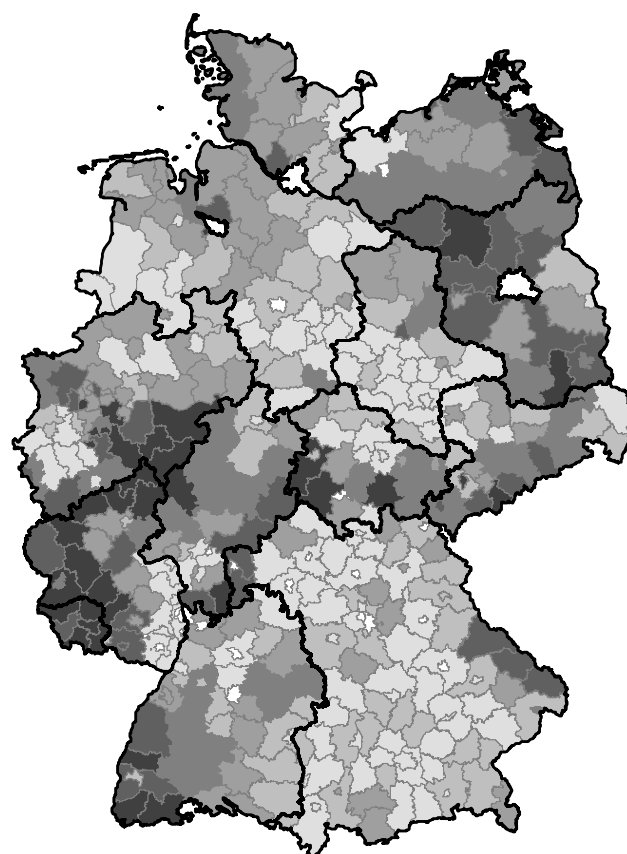
Map 1 shows the regional dairy cow density in Germany, measured in *number of dairy cows per 100 ha agricultural area (AA)*. This reference unit has been taken for all animal categories analysed here as a) it makes counties of different size comparable and b) it yields basically the



Source: Statistisches Bundesamt, 2003

Map 1:

Dairy cows per 100 ha agricultural area 2003



Source: Statistisches Bundesamt, 2003

Map 2:

Suckler-cows per 100 ha agricultural area 2003

Table 3:

Suckler cows, number of farms and average inventory per farm by federal state 2003 (Statistisches Bundesamt, 2003)

	Animals		Farms		Average Inventory
	Number	Share in %	Number	Share in %	
Schleswig-Holstein	42,374	6.3	2,677	5.3	16
Hamburg	1,117	0.2	74	0.1	15
Lower Saxony	73,508	10.8	5,809	11.5	13
Bremen	703	0.1	41	0.1	17
Northrhine-Westphalia	68,148	10.1	6,445	12.8	11
Hesse	41,339	6.1	4,549	9.0	9
Rhineland-Palatinate	48,161	7.1	3,479	6.9	14
Baden-Wuerttemberg	63,219	9.3	7,905	15.6	8
Bavaria	74,214	10.9	10,941	21.7	7
Saarland	8,363	1.2	539	1.1	16
<i>West Germany</i>	<i>421,146</i>	<i>62.1</i>	<i>42,459</i>	<i>84.0</i>	<i>10</i>
Berlin	69	0.0	5	0.0	14
Brandenburg	91,676	13.5	1,823	3.6	50
Mecklenburg-W. Pomerania	67,639	10.0	1,268	2.5	53
Saxony	36,169	5.3	2,556	5.1	14
Saxony-Anhalt	24,661	3.6	931	1.8	26
Thuringia	36,519	5.4	1,488	2.9	25
<i>East Germany</i>	<i>256,733</i>	<i>37.9</i>	<i>8,071</i>	<i>16.0</i>	<i>32</i>
<b>Germany</b>	<b>677,879</b>	<b>100.0</b>	<b>50,530</b>	<b>100.0</b>	<b>13</b>

same results as referring the animal numbers to the total land area.

The map clearly shows the concentration of dairy cows in areas with a relatively high share of productive/intensive grassland as well as in regions with good growing conditions for corn silage. These regions are found in the Allgaeu, pre-alpine lowland areas, Bavarian Forest and the North West German (coastal) marshlands. In some of these areas the dairy cow density reaches more than 75 cows per 100 ha AA.

Table 3 shows the distribution of the **suckler-cow** numbers by the federal states and Map 2 provides the picture of the suckler-cow density on county level.

The total suckler-cow number in Germany is well below 700,000 head, in other words, the proportion of suckler-cows in total cow numbers is approximately 13 percent. Germany can therefore be classified as a 'dairy country' where most of the beef produced is of dairy origin.

Approximately two thirds of the suckler-cows and 85 percent of the farms keeping suckler-cows can be found in West Germany. Similar to dairy, Bavaria, Lower Saxony, Northrhine-Westphalia and Baden-Wuerttemberg have the highest inventories of between 63,000 to 74,000 animals, albeit with Bavaria being significantly less dominant. Furthermore, and contrary to dairy, the relative importance of East Germany is much higher for suckler-cows. East Germany represents one third of the cows and 16 percent of the farms keeping suckler-cows. This is also reflected in the fact that Brandenburg is the region with the high-

est number of suckler-cows in Germany, and Mecklenburg can be found in the top group of suckler-cow inventories.

A view on the farm sizes reveals differences between the average herd sizes in East (32 suckler-cows) and West Germany (10 suckler-cows). Surprisingly, the East-West difference is much smaller compared to the dairy farms. The reason is likely to be that also in East Germany many smaller farms with marginal grassland decided to keep suckler-cows at times when the additional suckler-cow quota allocated to East Germany was not yet exhausted. The highest average herd sizes, with around 50 suckler-cows, are found in Mecklenburg and Brandenburg. The smallest average herd sizes with less than 10 suckler-cows are found in Bavaria and Baden-Wuerttemberg. According to the Statistisches Bundesamt (2007), in 2005 approximately 23 percent of the total cattle (and 1.2 percent of the farms) could be found in herd sizes above 100 suckler-cows. This is a very high concentration of suckler-cows in a few farms. One reason is that the three biggest suckler-cow farms in Europe are located in East Germany (Brömmmer, 2005).

Further analysis showed that the average herd size in Germany remains unchanged at around 13 cows per farm when comparing 1999 and 2003. In some parts of the country (Bavaria, Thuringia) the average herd size even went down slightly (by two animals per farm), whereas in most of the East German farms, herd sizes went up between six and 14 animals per farm (Statistisches Bundesamt, 1999, 2003)



When it comes to the suckler-cow density per 100 ha agricultural land, Map 2 shows that the distribution of suckler-cows in many areas is basically complementary to the dairy cow distribution. This means that suckler-cows are mainly kept in areas where grassland is not yielding enough to feed dairy cows and vice versa. This holds particularly true for the South and the East of the country, mainly in the Northeast and very East of Germany where light soils prevail. Areas where both the density of dairy cows and suckler-cows are low are mainly the cash crop regions in Lower Saxony, Brandenburg, Northwest Bavaria and the Cologne-Aachen basin in the very West of the country.

## 2.4 Male cattle > 1 year

Male cattle > 1 year is the only statistical indicator found in the German statistics that provides an insight into the number of cattle on feed or kept for finishing. The reasons are that a) the majority of the animals kept for the purpose of finishing are bulls (and not heifers), b) at the age of more than 1 year male *calves* (for veal production) can be excluded from the figure, c) the majority of the bulls come from the dairy herd and d) breeding bulls are negligible in the dairy herd which mainly operates with artificial insemination. Consequently, male cattle > 1 year provide a reasonable indicator for the spatial distribution of beef finishing in Germany.

In 2003, there was a total of approximately 1.3 million male cattle > 1 year in Germany. Out of these, ten percent were more than two years old. Table 4 shows that 90 percent of these animals live in West Germany. This figure is even higher than the share of dairy cows in West Germany because male cattle are transferred from East Germany to West Germany for finishing. Lower Saxony has the highest share in the total of these cattle (27 percent), followed by Bavaria, Northrhine-Westphalia and Schleswig-Holstein.

The data related to the farm numbers are from the year 1999 because after this the data was only available from the Statistical Office at prohibitively high cost. This means that for calculation of average farm sizes both the livestock and the farm numbers from the year 1999 are displayed. We estimate that the average farm sizes are currently 20 percent higher.

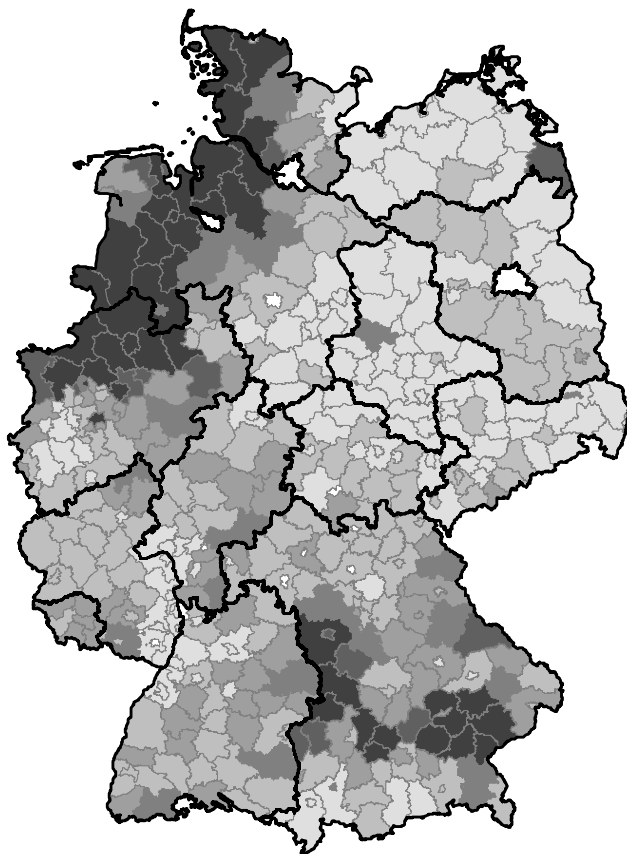
When comparing the average herd sizes, similar to the suckler-cow inventories, there is hardly any difference between West (10 cattle) and East Germany (17 cattle). 20 bulls per farm is the maximum number found (in Brandenburg and Saxony Anhalt). Further analysis showed that the regions with a high density of finishing bulls coincide with above average farm sizes, reaching between 2 and 5 times the regional averages.

Map 3 additionally shows that measured in terms of cattle density, the finishing business has clear foci in Germany. These are in the West and Centre-South of Bavaria, the North West of Northrhine-Westphalia and in a band reaching throughout the West of Lower Saxony and

Table 4:

Male cattle > 1 year, number of farms and average inventory per farm by federal state 2003 (Statistisches Bundesamt, 2003)  
Note: Farm and herd size numbers are from 1999 (explanations see text)

	Animals		Farms		Average Inventory
	Number	Share in %	Number	Share in %	
Schleswig-Holstein	134,300	10.1	8,078	6.6	17
Hamburg	1,435	0.1	96	0.1	13
Lower Saxony	365,183	27.4	20,971	17.2	17
Bremen	1,212	0.1	95	0.1	15
Northrhine-Westphalia	207,564	15.6	15,109	12.4	15
Hesse	42,462	3.2	7,977	6.5	6
Rhineland-Palatinate	30,151	2.3	5,534	4.5	6
Baden-Wuerttemberg	91,029	6.8	17,370	14.3	6
Bavaria	311,858	23.4	37,117	30.5	9
Saarland	5,337	0.4	772	0.6	8
<i>West Germany</i>	<i>1,190,531</i>	<i>89.2</i>	<i>113,119</i>	<i>92.9</i>	<i>11</i>
Berlin	28	0.0	7	0.0	7
Brandenburg	39,537	3.0	2,303	1.9	20
Mecklenburg-W. Pomerania	37,040	2.8	1,650	1.4	19
Saxony	22,176	1.7	2,307	1.9	11
Saxony-Anhalt	21,965	1.6	1,103	0.9	20
Thuringia	22,695	1.7	1,310	1.1	18
<i>East Germany</i>	<i>143,441</i>	<i>10.8</i>	<i>8,680</i>	<i>7.1</i>	<i>17</i>
<b>Germany</b>	<b>1,333,972</b>	<b>100.0</b>	<b>121,799</b>	<b>100.0</b>	<b>12</b>



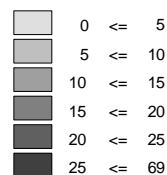
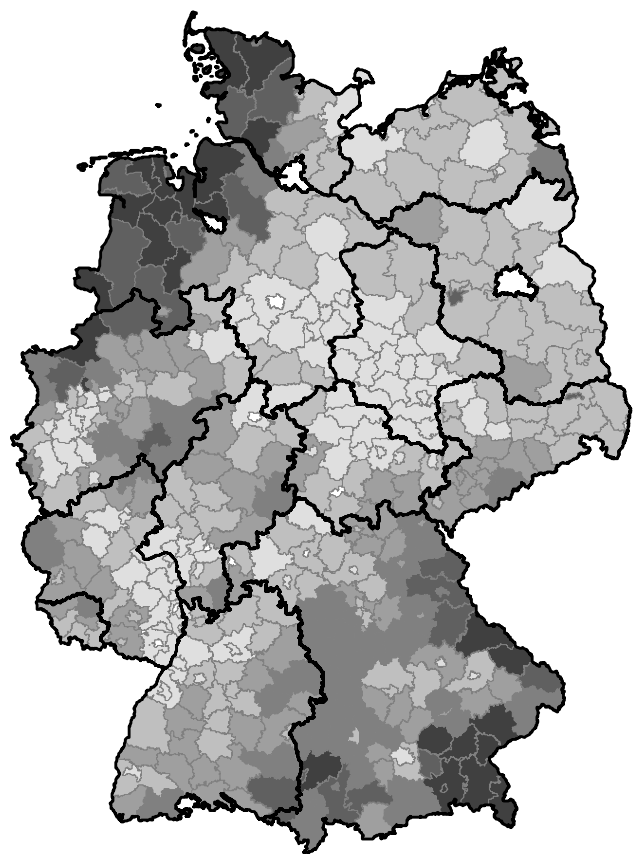
Source: Statistisches Bundesamt, 2003

Map 3:

Male cattle > 1 year per 100 ha agricultural area 2003

Schleswig-Holstein. In these areas, cattle density goes beyond 15 cattle per 100 ha. This figure seems to be relatively high but is still low when compared with the highest dairy cow densities shown in Map 1.

In East Germany, there are two counties displaying a relatively high cattle density. These are the Boerdekreis at the Western border of Saxony-Anhalt with Lower Saxony and the county Uecker-Randow in the very Northeast bordering Poland. In both counties one single huge feedlot operation stands behind these figures. In the meantime, the feedlot in the Boerdekreis was converted into a pig production unit when direct payments for cattle were decoupled in 2005, whereas the feedlot in the Northeast is still operational, finishing approximately 15,000 bulls and 20,000 calves per year.



Source: Statistisches Bundesamt, 2003

Map 4:

Calves < 6 months per 100 ha agricultural area 2003

## 2.5 Calves

In 2003, there were approximately 2.1 million calves of less than 6 months of age registered. With the decrease in dairy cow numbers, this figure should be approximately 7 percent lower in 2006.

Map 4 shows the density of calves (below 6 months) per 100 ha agricultural area. High calf densities are found in regions with the following characteristics:

- regions where many dairy cows are found and replacement heifers are needed, for example Schleswig-Holstein, North of Lower Saxony and Bavaria.
- regions where calf finishing is common and where calves are 'imported' from other regions (see also Chapter 4). These regions are mainly the Southwest of Lower



Saxony as well as the North East county Uecker-Randow (see Chapter 2.4).

### 3 Definition and specification of production systems

A finishing production system was defined a system in which animals are **exclusively** kept for producing an animal for slaughter. This definition excludes cull cows, heifers and bulls from the dairy and suckler-cow herds.

Based on a literature survey and interviews with selected advisors, short names for the production systems were defined using the final product (for example bulls, heifers, calves) plus the age of the animals at the start of finishing. The result is for example 'Bulls from calves'. Details are provided in Chapter 4.

Based on these short names, the set of variables to describe each production system comprises:

- *Location*: Allocates the production system to a county (Kreis) as well as to a natural region.
- *Combination with other enterprises*: Average number of animals and the typical combination with other enterprises, for example milk or cash crop production.
- *Animals*: Breeds used, origin of animals from dairy or suckler-cows and percentage shares of purchase and own raising of animals entering the finishing production.

- *Performance data*: Duration of finishing period, ages and weights at start and end of finishing, daily weight gain, carcass weight, stocking rates.
- *Husbandry system*: Pasture and/or confined systems, type of barn, manure system and size of finishing groups.
- *Feeding*: Forage base, own produced and purchase feed.
- *Sale channels*: Animals for slaughter or further finishing, domestic market or export.
- *Other*: Special remarks on production systems, general situation of beef finishing in the regions.

The finishing period is the time between start and end of finishing and is defined as follows:

- *Start of finishing*: For purchase animals, the day of purchase is the first day of finishing. For animals from the own dairy herd, the finishing period starts at day 14, for animals from the own suckler-cow herd at the day of weaning.
- *End of finishing*: This is the day of sale.

### 4 Characteristics of production systems

Table 5 shows the production systems identified and the main indicators used for identification. The two most important characteristics to distinguish the different systems

Table 5:  
Indicators of beef finishing systems in Germany (Brömmer, 2005)

			Age at start days	Weight at start kg live weight	Age at end days	Weight at end kg live weight
1	Bulls from calves	Core values	14 - 21	55 - 70	545 - 640	590 - 670
		Full range		(45 - 70)	(480 - 700)	(540 - 710)
2	Bulls from starters	Core values	40 - 80	80 - 105	525 - 590	675 - 700
		Full range	(28 - 90)	(65 - 120)	(495 - 620)	(650 - 720)
3	Bulls from stores/backgrounders	Core values	135 - 155	190 - 200	595 - 670	615 - 695
		Full range	(120 - 165)	(180 - 210)	(540 - 750)	(570 - 740)
4	Bulls from weaners	Core values	220 - 290	245 - 350	530 - 665	615 - 695
		Full range	(180 - 330)	(200 - 400)	(475 - 720)	(610 - 720)
5	Steers	Core values	260 - 280	290 - 300	680 - 700	590 - 600
		Full range	(240 - 300)	(290 - 300)	(660 - 720)	(580 - 660)
6	Stores/backgrounders production	Core values	35	80	120 - 150	190 - 200
		Full range	(28 - 56)	(65 - 95)	(100 - 165)	(180 - 210)
7	Rosé calves from calves/starters	Core values	35 - 65	65 - 100	280 - 290	390 - 410
		Full range	(14 - 85)	(45 - 120)	(270 - 300)	(380 - 420)
8	Calf production (white veal meat)	Core values	14	45 - 50	170	245 - 250
		Full range			(165 - 175)	
9	Bulls from pasture	Core values	14	45	300 - 335	385 - 405
		Full range			(270 - 360)	(365 - 425)
10	Bulls concentrate finishing	Core values	85 - 240	110 - 185	555 - 560	695 - 710
		Full range	(40 - 210)		(540 - 570)	(680 - 720)

are the final product and the age of the animals at the begin of the finishing period<sup>2</sup>. Under these headers, different characteristics and variations in production parameters could be found which are explained in the following.

Data shown here may differ from those used and recommended in extension service. The reason is that figures here are intended to reflect typical (real) situations instead of ideal situations. For each indicator, two ranges of figures are provided: a) the core values represent the range in which the majority of the figures for each production system can typically be found; b) the figures in brackets below the core values show the full range of all figures obtained for this production system. Further, the core values are rounded to the next five. The following text refers to the core values only.

The table shows that the majority of the finishing systems produce bulls as the final product. Steers, rosé-calves and white veal calves are the other finished products. Store/backgrounder cattle were included in this list despite the fact that they do not produce the final product (meat) but because they are part of the fattening/finishing process. Unlike for example in France, cow and heifer finishing can not be considered as a separate enterprise in the German beef industry. Heifers are typically taken straight from the cow herds as cull animals to slaughter.

Bulls are the major animal category in Germany's beef finishing industry. According to the individual farm conditions, the finishing is undertaken more or less intensively. Farms with corn silage, beef breeds and/or Fleckvieh (also referred to as Simmental) feed the animals with ad libitum corn silage plus concentrates, grains and soybean meal to achieve high daily weight gains. Farms having breeds with less growth potential (like Holstein cattle) usually feed less concentrates and a higher share of forage, consisting not just of corn silage, but also of grass silage and hay. Higher proportions of concentrates and grains are only given at the end of the finishing period.

#### 4.1 Bulls from (dairy) calves

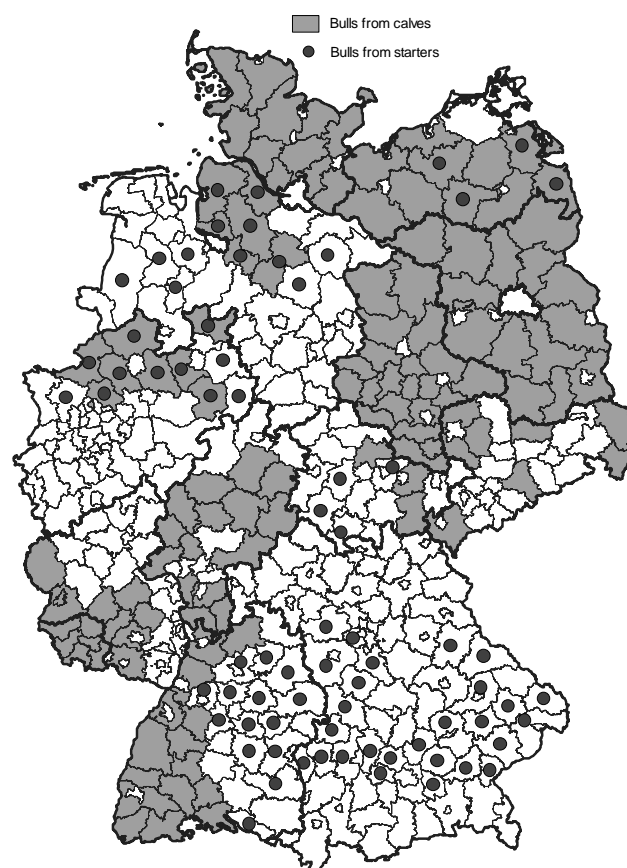
This system is characterised by a relatively low age at start which is on average 14 days. The system has the longest finishing period. Bulls from calves clearly demonstrate the link between milk production and beef finishing in Germany. In 12 out of 13 regions analysed, bulls from calves are the most important production system. The majority of these systems are found in dairy farms.

*Regions:* Map 5 shows the spatial distribution of the systems. Main areas are the lowlands of Lower Saxony,

Northrhine-Westphalia and Thuringia, as well as the river landscapes of Brandenburg, and, like in Saxony-Anhalt, the fens. The systems are also found in the rolling hills and highlands of Schleswig-Holstein, Baden-Wuerttemberg, Hesse, Rhineland-Palatinate, Saxony-Anhalt and Saxony.

*Animals:* Breeds used are typically Holstein and are usually recruited from the own dairy herd on the same farm. Exceptions are Northrhine-Westphalia and Saxony, where purchase of crosses by specialised finishers is common. Further, German Red Holstein calves are used in the South West and in Schleswig-Holstein, typically on a purchase basis to fill existing barn space on dairy farms.

*Performance:* There is wide variation in this group. The final age of these animals is between 595 and 700 days, corresponding to a finishing period of 525 - 625 days. Start weights are between 55 and 70 kg live weight (LW) and final weights vary between 590 and 690 kg LW. Accordingly, daily weight gains range between 840 and 1,170 g. Dressing percentages vary from breed to breed and size of animal and are between 52 and 60 percent.



Note: Highlighted regions indicate the existence of certain production systems, **not** the density

Map 5:

Spatial distribution of bull finishing from calves and starters (Brömmer, 2005)

<sup>2</sup> More indicators as well as information on the spatial distribution of the production systems are found in the full (German) version of Brömmer (2005), available on the **agri benchmark** website.

*Feed:* Grass silage and corn silage (wherever possible to grow) are the main forages, complemented by home-grown grains, purchased concentrates (pellets) and soybean meal. Depending on the local proximity to food processing plants, brewers grain, distillers grain, pressed exhausted beet slices and potato pulp are found in the rations.

*Other:* Animals are typically kept in groups on slatted floors in cubicle sheds. In some old buildings animals are kept on straw. Group sizes vary from 5 to 10 animals.

#### 4.2 Bulls from (dairy) starters

The production system 'Bulls from starters' is found in six of the federal states. The main difference to 'Bulls from calves' are a) the higher age and weight at start (40 - 80 days, 80 - 105 kg LW) and b) the predominant use of Fleckvieh calves. Bulls from starters are the predominant form of finishing with specialised finishers. Apart from better performance of Fleckvieh, another main reason is the availability of relatively large groups of starters from auctions or marketing organisations from South Germany. This way, transaction and management costs are reduced, and few larger groups show fewer health problems than many small groups.

*Regions:* Map 5 shows that this system is mainly located in a West-East band through Baden-Wuerttemberg and Bavaria and in the North of Northrhine-Westphalia. Other areas where this system is found are parts of Lower Saxony, Mecklenburg-Vorpommern and Thuringia. Main natural locations are low land plains with exceptions found in rolling hills in Bavaria, Thuringia as well as highlands in Baden-Wuerttemberg.

*Animals:* The main breed is Fleckvieh and its crosses. In the Northern States all animals are purchased from the South. In Baden-Wuerttemberg, an estimated 30 percent of the bulls are finished in the State whereas in Bavaria this percentage is 60 percent. Further breeds are Brown Cattle in Lower Saxony and Holstein in Northrhine-Westphalia.

*Performance:* The age and weight at start varies from 40 - 80 days and 80 - 105 kg. Final age and weights are between 525 and 590 days and 675 - 700 kg LW. Resulting daily weight gains vary from 1,040 - 1,380 g. The dressing percentages are relatively high with an average of 58.5 percent, ranging from 57 - 62 percent.

*Feed:* The feed base is corn silage and grass silage with a clear dominance of corn silage plus concentrate pellets and/or soybean meal, the latter of which are bought in. Additional feedstuffs are identical to the ones listed in Chapter 4.1.

*Other:* These systems are mainly combined with a cash crop enterprise where grains are either sold or fed to the

bulls. Dairy is another enterprise typically combined with the bull finishing in Southern Germany. Combination with pigs is common in Lower Saxony and Northrhine-Westphalia. Animals are typically kept in cubicle sheds with slatted floors. Group sizes are typically six (adult) animals but can go up to 25.

#### 4.3 Bulls from stores/backgrounders

The main characteristics of this system are that the animals have undergone a pre-finishing phase before they are bought. Animals are typically between 135 - 155 days old. The finishing farms can buy the animals as ruminants and do not need to feed the calves with milk supplements anymore, saving labour. Consequently, this type of bull finishing is the least labour-intensive.

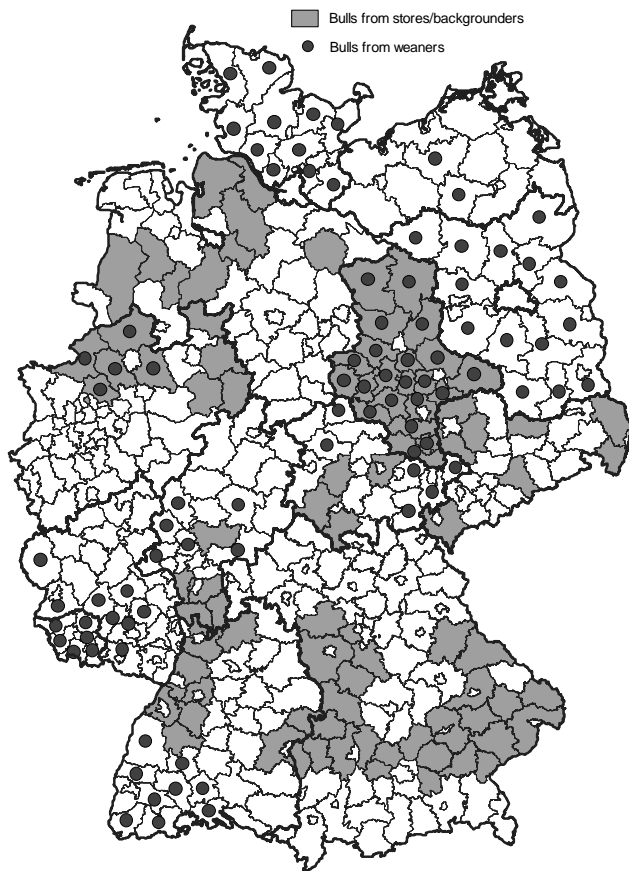
*Regions:* This system is operated to a greater extent in eight out of the 13 regions analysed. Map 6 indicates that main regions representing this system are West and East Bavaria (coinciding with regions finishing bulls from starters) and East Baden-Wuerttemberg (Alb), West Baden-Wuerttemberg (coinciding with bulls from calves), North of Northrhine-Westphalia and the West and Centre of Lower Saxony. Further, in Saxony-Anhalt, the system is rather common and it is found in isolated cases in some parts of Thuringia, Hesse and Saxony.

*Animals:* The main breed used here is again Fleckvieh. In Saxony-Anhalt an estimated 50 percent of Holstein are used, some of which come from Poland and Romania. In Baden-Wuerttemberg and Lower Saxony, Charolais and Limousin stores are finished, mostly coming from France. The vast majority of the Fleckvieh stores originate from South Germany.

*Performance:* The relatively high ages at start correspond with weights of between 190 - 200 kg LW. With a final age between 595 - 670 days, the finishing period is only 440 - 540 days. Final weights are between 615 and 695 kg LW with a dressing percentage of 57.5 percent (56 - 59), resulting in carcass weights of 365 - 410 kg. Daily weight gains are between 1,050 and almost 1,400 g.

*Feed:* Like in the other production systems, corn and grass silage are the main forages. It seems, however, that the extent of their use varies significantly between the regions. Farms in Bavaria, Northrhine-Westphalia and Saxony hardly use any grass silage at all whereas in the other regions, grass silage has a much higher share in the ration. In some farms in Lower Saxony and Northrhine-Westphalia, 10 - 15 percent of the forage is bought in if they are located in arable regions. The concentrate, grain and supplementary ingredients are similar to the ones explained in the previous chapters.

*Other:* A cash crop enterprise is typically found in the farms finishing store cattle. The combination with dairy



Note: Highlighted regions indicate the existence of certain production systems, **not** the density

Map 6:  
Spatial distribution of bull finishing from weaners and store cattle (Brömmer, 2005)

is frequently found in Bavaria, Lower Saxony and Saxony-Anhalt. The animals are kept in groups of 6 - 10 animals in cubicle sheds with slatted floors. In some cases in Bavaria animals are kept on straw. Group sizes can reach 70 animals if on straw.

#### 4.4 Bulls from (suckler-cow) weaners

Contrary to the other systems analysed so far, the animals for this system originate from the suckler-cow herd.

*Regions:* Map 6 illustrates the spatial distribution of the production system. A certain overlapping with the spatial distribution of suckler-cows shown in Map 2 can be observed in the very Southwest of Germany, Mecklenburg, Brandenburg, Rhineland-Palatinate, the Saarland as well as Schleswig-Holstein, all regions where both grassland and arable land are found in adjacent locations. It also seems to have a certain importance in the finishing regions of Northern Northrhine-Westphalia and in the state of Saxony-Anhalt. Consequently, except Northrhine-Westphalia,

farms would often finish their own weaners produced from their suckler-cow herd with additional purchase of weaners from other farms of up to 50 percent.

*Animals:* The animals mainly come from beef breeds. Most common are Charolais, Limousin, Fleckvieh and their crosses. Fleckvieh is often used as the dam and the French breeds mentioned (plus Belgian Blue and Blonde d'Aquitaine) are used as sires to produce a crossbred terminal product.

*Performance:* The finishing period of weaners starts at the day of weaning when they leave the suckler-cow herd. The ages at weaning (and start of finishing) vary significantly but the majority of the weaners are between 220 and 290 days old. Depending on the age at weaning, the breed and the nutritional status, calves weigh between 245 and 350 kg at the start of finishing. Ages at the end of finishing are between 530 and 665 days and the final weights vary between 615 and 695 kg LW. Daily weight gains tend to be on a higher level as a result of the genetic potential. With dressing percentages between 57 and 64 percent (due to the use of beef breeds) carcass weights are slightly higher than in the other systems analysed) and vary between 350 and 420 kg.

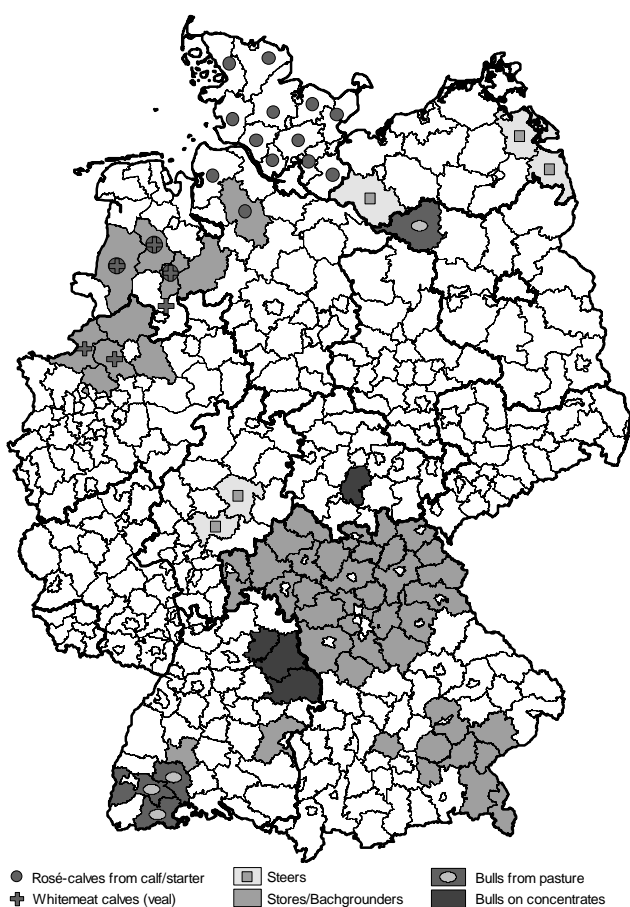
*Feed:* Similar to the other production systems, main forages are grass silage and corn silage, the latter almost exclusively in Schleswig-Holstein, Mecklenburg and Thuringia, supplemented by up to 35 percent of concentrates, soybean meal and grains in the ration. In the other regions, a mixture between grass silage and corn silage is fed with lower levels of supplementary feed. Similar to the other systems and depending on the proximity to food processing plants, food and feed production residuals are fed.

*Other:* Similar to the other systems, animals are kept in groups of around 6 animals in cubicle barns with slatted floors. Barns with straw base can hold groups of up to 60 animals. In some farms in Thuringia, heifers are finished in addition to the male animals.

#### 4.5 Steers

Steer production is of minor importance in Germany and has a share of just one percent in total beef production (ZMP, 2007). Steers' daily weight gains are between 10 and 15 percent less than those of bulls. Further, feed conversion is about 10 percent lower than bulls. This results in longer finishing periods to achieve a given weight and a lower classification of the carcass than bulls. Finally, steers tend to put fat on more easily when grown beyond a certain weight than bulls, and the German processing industry prefers large carcasses of up to 430 kg. Consequently, despite the better marbling and tenderness, steers only receive lower per kg prices than bulls (ZMP, 2007). Thus, without a special marketing activity like direct marketing,





Note: Highlighted regions indicate the existence of certain production systems, **not** the density

Map 7:

Spatial distribution of other finishing systems (Brömmer, 2005)

steer production is not profitable (Wiedenmann, 1999). This statement holds especially true after the decoupling of the payments (see also conclusions in Chapter 5).

**Regions:** Mecklenburg and Hesse were the two regions where steer production still has a certain significance (Map7). Especially in Mecklenburg, animals are produced as organic, mainly coming from the own suckler-cow herd. Main locations are lowland areas with light soils (Mecklenburg) and highlands (Hesse).

**Animals:** Most of the animals are Fleckvieh crosses. In Mecklenburg, about 90 percent of the steers are weaners from cow-calf and 10 percent from dairy (Holstein). In Hesse, animals are typically from the cow herd and are composed of the breeds Fleckvieh, German Red Holstein and Holstein.

**Performance:** Animals entering the finishing as weaners are typically between 260 and 280 days of age and 290 and 300 kg LW. The final age is at 680 - 700 days, reaching a final weight of 590 - 600 kg.

**Other:** Animals in Mecklenburg are mostly kept outside all year round. Similar to Hesse, this principle may be changed during the winter (if the location is too wet to allow outside keeping) or for the final finishing period.

**Feed:** Pasture is the exclusive forage source in this system in summer. Animals which are kept outside during winter time receive 1 - 2 kg per day supplement feed in terms of grains or concentrates. In case of indoor keeping the animals receive grass silage and hay plus grains or concentrates, if necessary.

#### 4.6 Stores/backgrounders

Store/backgrounder cattle were included in this list despite the fact that they do not produce the final product (meat) but because they are part of the fattening/finishing process. They are often produced in farms with limited land (and forage) availability for beef finishing. Farmers producing store cattle need a sound knowledge of raising calves and barns must be well suited to the calves' needs. The stores produced by these farms are typically sold to finishers who do not want to get involved in raising calves for lack of labour, knowledge or suitable buildings. When sold, stores should have the following characteristics: they should be completely weaned from milk, should be used to take in silage in the required amounts, dehorned, vaccinated and healthy. Groups of store cattle for sale should show a high degree of conformity (Wiedenmann, 1999).

**Regions:** Store production takes place only in four regions to a significant extent. These are mainly the North and the South of Bavaria, the North of Northrhine-Westphalia and in parts of Lower-Saxony. They are mainly located in arable regions (see Map 7).

**Animals:** Store production mainly takes place with Fleckvieh-starters and to a lesser extent with Brown Cattle. In Lower-Saxony most of the animals come from Baden-Wuerttemberg (among them some Brown Cattle) whereas in Northrhine-Westphalia the majority are Fleckvieh from Bavaria.

**Performance:** Starters are about 35 days old and weigh about 80 kg when store production starts. Final ages are between 120 - 150 days and the transfer weight to the finishers is about 190 - 200 kg LW. Daily weight gains are between 1000 and 1,200 g. The objective is to have 3 production cycles per year.

**Feed:** Given the low age of the animals, they receive milk substitute and special calf starter feed for more than 50 percent of their time. After this period, they are fed with corn silage and varying amounts and composition of concentrates and soybean meal as well as straw and hay in low quantities.

**Other:** Cash crop production is typically combined with store cattle production. In Baden-Wuerttemberg and

Northrhine-Westphalia pig production is often found in combination with the stores. Milk production only appears a common combination in Northrhine-Westphalia, as many farms in Baden-Wuerttemberg, Lower-Saxony and Bavaria have specialised in store cattle production. Between 10 - 30 percent of store producers are also bull finishers. Depending on price relations, these farms can sell their animals as stores or finish them as bulls. Further, they can finish those stores which do not meet the market requirements themselves to maintain high price levels throughout the entire groups sold. Stores are kept on straw at the beginning and later on slatted floors in groups of 7 to 70 animals.

#### 4.7 Rosé calves from calves/starters

The origin of this type of finishing is Schleswig-Holstein. Animals are almost exclusively sold to the Netherlands where this type of meat is in high demand. Apart from the market that had to be there, the incentive for German producers was the possibility to receive the special premium for male cattle under the old Agenda 2000 policy regime for animals of 9 months and older irrespective of their weight. With approximately 1.3 cycles per year, producers could thus maximise their subsidy income producing Rosé calves. It is estimated that in Schleswig-Holstein a share of 10 percent of all male Holstein cattle are turned into Rosé-calves and in Lower Saxony about five percent.

*Regions:* Main regions are Schleswig-Holstein and Lower Saxony, producing 16,000 and 21,000 Rosé calves in 2004. A further 15,000 calves are produced in East Germany but are not specified here due to the lack of information (see Map 7).

*Animals:* Mainly Holstein calves are used to produce Rosé meat, in Schleswig-Holstein also Angeln. These milk breeds are significantly cheaper than dual purpose or beef breeds. Further, they achieve higher daily weight gains in the first months than the other breeds mentioned. The share of calves and starters at the beginning of the finishing is 50/50. Due to the bigger farm sizes in Lower-Saxony, they tend to buy a higher share of animals (about 80 percent) than in Schleswig-Holstein (only 20 percent) where most of the animals come from the own dairy herd.

*Performance:* Animals entering the system are calves or starters. The final age is 280 - 290 days and weights are 390 - 410 kg LW. With dressing percentages of just 52.5 percent, this provides the required carcass weights of 190 - 210 kg. Daily weight gains are relatively high between 1,270 and 1,390 g.

*Feed:* Feeding has to be special to achieve the pink meat colour. This is achieved by not feeding feed high in crude fibre. The rearing ration consists of milk substitutes and starter feed for calves. The finishing ration of

the Rosé calves consists of equal parts of corn silage and concentrate pellets (in dry matter). In some farms hay and chopped straw is provided for better rumen-forming and feed intake. Depending on the price relations, farms also feed potatoes, brewer's grain and pressed exhausted beet slices.

*Other:* Combination with cash crops and dairy is most common, the latter mainly in Schleswig-Holstein. Many farms also combine Rosé calves with bull finishing for the option to switch between both systems depending on the market. In the rearing phase animals are kept on straw, later on slatted floors. About 70 percent of the animals are sold live to the Netherlands and are slaughtered there, the remainder is killed locally and the meat transported to the Netherlands.

#### 4.8 Calf production (white veal)

The white veal calf production (further referred to as veal production) is characterised by the highest degree of vertical integration of the German beef and veal supply chain. About 70 percent of the producers are integrated under three companies. The veal production goes back to the years 1953/54 when milk powder was abundant and converted into milk substitute, depressing soybean prices as a substitute. As a reaction, the soybean and grain traders affected started to produce veal with the milk substitute. They hired barns and made contractual - custom feeding - agreements with the veal producers, providing the animals and the feed. Veal production is a labour and capital intensive, highly specialised, high risk (diseases) and low margin business (Krämer, 2005).

There are 420,000 calves annually produced in Germany, out of which 85 percent are slaughtered in Lower Saxony and Northrhine-Westphalia. The rest of the animals are slaughtered in the Netherlands. The calf production of other main EU-producers is: Netherlands: 1.2 million; France: 1.6 million; Italy: 1 million.

In Germany, there are presently 200 calf producing farms with sizes varying from a few hundred up to 6,000 calves one-time-capacity.

*Regions:* Lower Saxony (Weser-Ems district) and two counties in the North of Northrhine-Westphalia are the main locations for calf production (see Map 7).

*Animals:* Exclusively Holstein cattle, which possess a better growth- and gain potential in the first months of their lives, are used for veal production. Calves are typically bought into the specialised farms from all around Germany.

*Performance:* Due to the high degree of integration, the performances are very similar between the farms. With start values of 14 days and 45 kg LW, animals are finished after 170 days and 245 - 250 kg, corresponding to daily



weight gains of 1,260 g. A dressing percentage of 57 percent provides a carcass weight of 140 kg.

*Feed:* To achieve the consumer-preferred white colour of the animals, a low-iron diet is required. This is realised by feeding milk substitute representing 90 percent of the dry matter. To comply with animal welfare legislation, at least 10 percent and 100 g per day of the feed must be rich in fibre, a requirement that is typically met by feeding corn silage which is often purchased.

*Other:* Farms are usually specialised, sometimes landless operations buying most to all of their feed. Typical enterprise combinations are cash crops. Calves are usually kept in individual animal boxes for the first 8 weeks and after that in groups of 6 animals on slatted floors.

#### 4.9 Young bulls from pasture - a special case

This specific and organic system tries to meet the specific consumer demand for animal and environmentally friendly beef production. It is a combined suckler-cow and young bull production with animals being less than 12 months old at slaughter. Animals that are heavy enough are slaughtered directly after weaning.

*Regions:* The Southwest of Baden-Wuerttemberg and the Northwest of Brandenburg are the two main regions for this system (see Map 7).

*Animals:* Animals are typically Charolais, Limousin and Fleckvieh. In Brandenburg, Salers are found as well, and in Baden-Wuerttemberg, Hinterwälder. The nature of the system is such that animals come exclusively from the own suckler-cow herd and no animals are purchased from outside.

*Performance:* As regards the performance data, the system is comparable with the Rosé calf production. However, it should be said that the low figures for age (14 days) and weight (45 kg) at start of finishing might be confusing as the calves are with the suckler-cows until weaning at around 8 months of age. Animals weigh 385 - 405 kg LW at slaughter. With dressing percentages of 55 - 57 percent, carcass weights are around 200 - 242 kg. These weights are usually achieved by grass-grain finishing the animals after weaning and an age at slaughter of 300 - 335 days.

*Feed:* In Brandenburg animals are kept outside all year round. 20 percent of the ration is organic concentrates or grains. In Baden-Wuerttemberg, animals are typically kept in barns during the winter period from October/November to April. Feed in this period consists of grass silage, hay and 20 percent organic grains.

*Other:* The marketing of the animals in Brandenburg is done via a marketing association and an own brand. The same applies to about 50 percent of the cattle produced in Baden-Wuerttemberg whereas the other 50 percent are sold directly to the final consumers.

#### 4.10 Bulls from concentrate finishing - a special case

Concentrate finishing is defined as a production system where more than 50 percent of the feed comes from concentrates. This means that the Rosé calf production described in Chapter 4.7 can be considered as concentrate finishing. The bull finishing from concentrates is a special case in Germany. Spain is the only country in the EU where this system is of significant importance.

*Regions:* The system is only relevant in Thuringia and the Northeast of Baden-Wuerttemberg (see Map 7).

*Animals:* Animals in Thuringia are typically Fleckvieh stores from Baden-Wuerttemberg and Bavaria. In Baden-Wuerttemberg, Fleckvieh starter as well as stores are used. This explains the wide variation in the start age and weight figures shown in Table 5.

*Performance:* Animals are bought with 40 - 70 days (starter) and 180 - 210 days (stores) and are finished after 500 days (starter) and 360 days (stores). Daily weight gains are around 1,300 g, resulting in final weights of 695 - 710 kg, transforming into carcass weights of 400 - 420 kg at a dressing percentage of around 60 percent.

*Feed:* The feed composition provides the name for this production system where 80 percent of the rations consist of concentrates (Thuringia) and 75 percent consist of grains in Baden-Wuerttemberg. In both regions straw is used to provide the necessary fibre at low cost. Concentrates and straw are usually mixed with molasses into a total mixed ration.

*Other:* The non-use of forages like grass and corn silage usually leads to a combination with a cash crop enterprise that provides the straw for feeding and bedding if the system is straw-based. Very often the animals are kept in cubicle sheds on slatted floors.

## 5 Conclusions

The paper is a first step in creating a systematic overview on beef production systems in Germany. Given the limited time and financial resources of the project, it does not claim to be, nor is it representative or complete. It should, however, provide a good idea about the prevailing beef production systems in Germany.

Improvements could be made on the information of the spatial distribution, for example, by introducing quantified thresholds from where onwards a system in a region is of relevance. Further, the different production systems could be further specified and detailed in terms of feeding, handling and housing the animals.

The systems were analysed before the decoupling of the payments was implemented in 2005. After this change, it can be expected that steer production will be reduced further as it has lost approximately € 500 per head in direct

payments compared with € 200 - 300 for bulls. Further, pressure on bull production in areas with a high importance of corn production has increased due to the financial support to biogas production using corn silage, too.

In conclusion, the present changes in framework conditions (policy, prices, bio-energy) make an update in due time reasonable.

## Acknowledgement

The authors would like to thank the experts from extension services, regional administrations and research institutions all around Germany who generously contributed their knowledge and expertise to this paper. Their contributions allowed us to create an almost complete regional coverage of production systems of beef finishing in Germany. A full list of collaborators as well as the full German version of the thesis forming the basis of this paper (Brömmer, 2005) can be downloaded from the **agri benchmark** website at [http://www.agribenchmark.org/beef\\_results\\_project\\_list.html](http://www.agribenchmark.org/beef_results_project_list.html).

## References

- Bogner H (1978) Rindfleischproduktion. Stuttgart : Ulmer, 485 p
- Brömmer J (2005) Produktionssysteme, räumliche Verteilung und Struktur der Rindermast in Deutschland – eine expertengestützte Analyse. Osnabrück : Univ, [Diplomarbeit]. Zu finden in < [http://www.agribenchmark.org/beef\\_results\\_project\\_list.html](http://www.agribenchmark.org/beef_results_project_list.html)>
- Deblitz C, Zimmer Y (2005) A standard operating procedure to define typical farms [online]. Zu finden in <[http://www.agribenchmark.org/methods\\_typical\\_farms.html](http://www.agribenchmark.org/methods_typical_farms.html)> [zitiert am 01.04.08]
- Geissler B, Günzler D, Hammer K, Hampel G, Rosenberger E, Spann B (1984) Mutterkuhhaltung. München : Landw. Bildberatung
- Matzke P, Graser U, Putz M, Röhrmoser G, Schlichting M, Spann B, Stark G, Stockinger C (1995) Wirtschaftliche Milchviehhaltung und Rindermast. Frankfurt a M : DLG-Verl, 363 p
- Pflaum J, Hollwich W, Röhrmoser G, Spann B, Süß M (1992) Rindermast. Stuttgart : Ulmer, 122 p
- Statistisches Bundesamt (Jahrgänge 1990-2003) Land- und Forstwirtschaft, Fischerei; Fachserie 3, Reihe 4: Viehbestand und tierische Erzeugung 1990 – 2003. Stuttgart : Metzler-Poeschel
- Statistisches Bundesamt (2003) Sonderauswertung Landwirtschaftszählung 2003. Bonn: BMVEL
- Wiedenmann F, Spann B, Fleischmann A, Wittkowski G, Averdunk G, Stockinger C (1999) Die Landwirtschaft – Tierische Erzeugung. München : BLV Verlagsges
- ZMP Zentrale Markt- und Preisberichtsstelle (2007) ZMP-Marktbilanz : Vieh und Fleisch