agri benchmark

2013
Beef and Sheep Report

understanding agriculture worldwide

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Global Supporting Partner

John Deere

Institutional Partner

International Meat Secretariat

1.1 Beef and Sheep Report 2013 – Foreword from the editor

The 2013 season again showed an increasing interest in the global analysis of **production systems**, their **economics, drivers** and **perspectives**. In this context, we have managed to increase and professionalise our visibility and activities towards a more client and output orientation. However, further effort is required to make full use of the unique features the network has to offer.

This Report provides data and analyses covering the global market situation (Chapter 2), country-specific time series on beef production and trade (3), farm level analysis for cow-calf and beef finishing (4), country-specific time series on sheep production and trade (5) as well as farm level analysis for sheep production (6).

The 2013 **Beef and Sheep Conference** was held in York, England and hosted by our UK-partner EBLEX / AHDB. We owe **Mark Topliff, Carol Davis, Alex Mobbs** and their supporters a great "thank you" for the marvellous organisation, contributions and even unusually fantastic weather! Topics addressed over the year and in workshops during the Conference were options to increase productivity in beef and sheep production, land scarcity, overgrazing and desertification, classification of sheep production systems, small farm analysis and risk management. A summary of results from these workshops is found in Chapters 4 and 6 of this Report.

In the international arena, *agri benchmark* was elected to chair the Focus Area 1 'Closing the efficiency gap' within the FAO **Global Agenda of Action for Sustainable Livestock**. Workshops were held in Braunschweig (April 2013) and in Rome (September 2013) to define efficiency indicators and to identify pilot projects for the implementation phase.

The network's data were used to conduct a study dealing with the competitiveness of US vs. EU beef production. A report is available on our website in the beef and sheep section. Another EU-project analyses the assessment of the compliance costs with legislation in the field of environment, animal welfare and food safety.

We are happy to welcome **new** or returning **partners** and countries: **China** (sheep), **Ireland** (beef and sheep), **Lesotho** (sheep) **Namibia** (beef and sheep), **Uruguay** (beef and sheep) and a new partner for the sheep network in **Western Australia**. The Beef Network now has 29 countries with 56 farms in the cow-calf and 71 farms in the beef finishing comparison. The **Sheep** Network is now managed by our partners **Ernesto Reyes** and **Lola Izquierdo** and has grown to 15 countries and 30 farms. The *agri benchmark* Beef and Sheep Team has also grown: **Barbara Wildegger** is working for the Network since the beginning of this year and **Barbara Siwirska** completed a 9-month internship. The list of partners in Chapter 1.4 gives details on institutions and individuals.

In the middle of the year, a **new website** was launched under the existing domain

www.agribenchmark.org

which now covers all branches under the auspices of *agri benchmark*. Apart from a more modern appearance and easier navigation, important new features are the separation of the public and the member parts, the introduction of a frequently updated series of easily digestible facts from our branches in '**Did you know?**', and a more regular update of 'News and Results'.

With the new *agri benchmark* branches emerging and the need to harmonise and extend analysis within one technical solution, a new, web-based database **tool** for farm data collection and communication between the Centre and the Partners is under development and scheduled to be operational in the 2014 season.

The 2014 Conference is planned to be held in Italy at the beginning of June. At this stage, we envisage the following topics and activities for the 2014 season:

a) backward indexing of new farms: this will serve to create historical time series from new farm data sets
b) the introduction of environmental indicators in our new tool and first analysis
c) a project on forage costs with a number of selected countries
d) the continuation and deepening of our work in emerging and developing countries

Persistence is the name of the game. Let's keep going!

Claus Deblitz

Coordinator
agri benchmark Beef and Sheep

Table of contents 1.2

1.2 Table of contents

1.3 Testimonials

New Zealand, Tony Rhodes

It was an excellent opportunity that enabled me to expand my understanding of the issues and dynamics prevailing in a mix of international sheep meat production systems and their markets. Being able to link with others with first-hand understanding of their local environment was invaluable.

Russia, Daniil Khotko

It was unbelievable days with experts and professionals of beef and sheep sector. I left York conference with a great experience, useful knowledge and full of impressions. I am looking forward to participating in *agri benchmark* conference in the next year.

Australia, Lucy Anderton

Thank you so much for your kind support, and sense of humour at the conference in York – I felt very welcome and I am thrilled to be part of the network. The conference was fantastic, I learnt heaps, met some fantastic people and was very impressed with the professional yet fun atmosphere the organising committee achieved with what was obviously a great deal of work.

Czech Republic, Iveta Bosková

The conference is an opportunity to find an understanding of farmers in different production environment and pass the information to farmers in our country. It is a unique board to discuss strategies, competitiveness and perspectives of beef and sheep production worldwide. We didn´t lose any minute, all the moments we spent at the conference were interesting and full of getting knowledge.

United Kingdom, Carol Davis

A stimulating week learning about the strengths and challenges of countries around the world when producing beef and sheep. The workshops enable open discussion and debate to take place identifying uniqueness and similarities amongst the members. A marvellous way to enhance better understanding and in such good company. Looking forward to next year.

Spain, Ernesto Reyes

I think the Beef and Sheep Conference is, as always, a unique opportunity to share information, methodologies and conceptual issues related with beef and sheep production and economics in a worldwide sense.

Ireland, Anne Kinsella

The conference, workshops and field trips provide an ideal environment for exchanging knowledge and experience of beef and sheep production in diverse countries. The hectic work schedule is most professionally organised but also provides ample opportunity for interacting with new colleagues.

USA, Kevin Dhuyvetter

The 2013 *agri benchmark* Beef & Sheep Conference was the third conference I have attended and as with previous conferences it was a great experience. Attending the conference allowed me to see and learn about livestock production in the UK, but just as importantly, to interact with people from all over the world. Being part of this international network has been a very rewarding experience for me both personally and professionally.

1.4 Partners

Participants of the *agri benchmark* Beef and Sheep Conference 2013

Beef and Sheep Report editors

Claus Deblitz

In references to the Beef and Sheep Report please cite: Deblitz (ed.) (2013): Beef and Sheep Report 2013. TI Braunschweig.

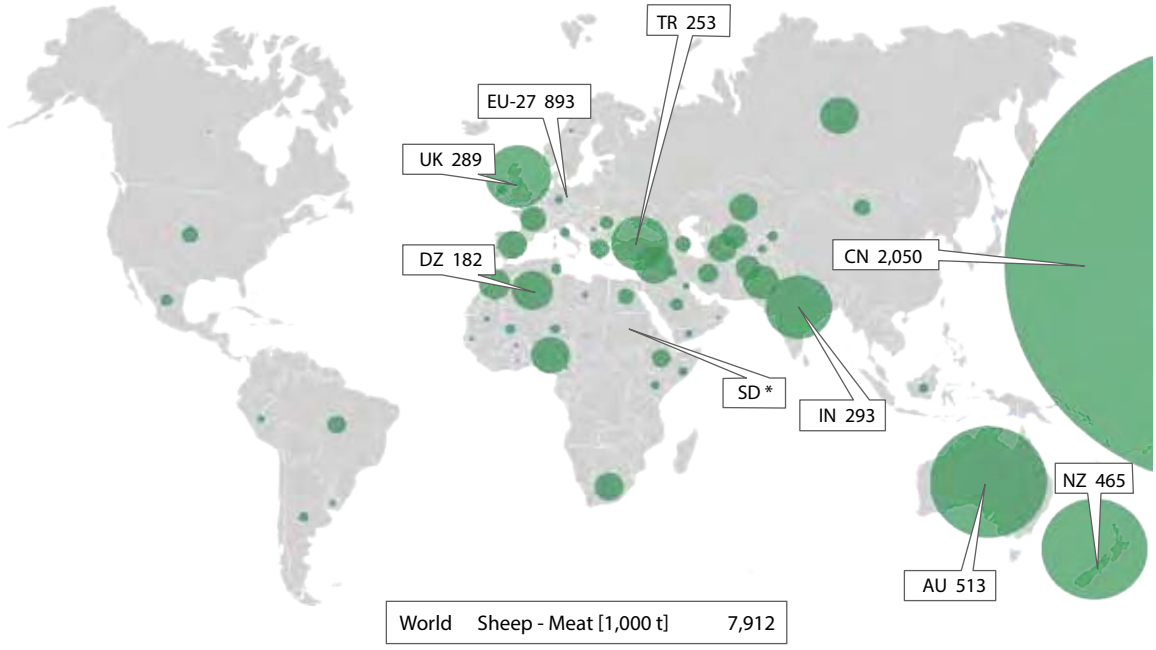
agri benchmark – understanding agriculture worldwide

agri benchmark is a global, non-profit network of agricultural economists, advisors, producers and specialists in key sectors of agricultural value chains. We use internationally standardised methods to analyse farms, production systems and their profitability. Our farm-level knowledge is combined with analysis of international commodity markets and value chains. In this way we are able to provide scientifically consistent and soundly based answers on strategic issues to decision-makers in policy, agriculture and agribusiness.

	Algeria		Chérif Omari	Ecole Nationale Supérieure d'Agronomie, Algiers
			Fathi Abdellatif Belhouadjeb	Institut National de la Recherche Agronomique d'Algérie, (INRAA) Algiers
	Argentina		Bernardo Ostrowski	Cátedra de Administración Rural, Facultad de Agronomía, Universidad de Buenos Aires (UBA), Buenos Aires
			Cristina Ras	
	Australia		Lloyd Davies	Department of Primary Industries (DPI), Armidale, Paterson, NSW
			Tim McRae	Meat & Livestock Australia (MLA), (Sponsoring) Sydney, NSW
			Karl Behrendt	Charles Sturt University (CSU), Orange, NSW
			Peter Weeks	Weeks Consulting Services Pty Ltd, St Ives, NSW
			Lucy Anderton	Department of Agriculture and Food, Albany, Western Australia
	Austria		Johannes Minihuber	ARGE Rind, Linz Agrarmarkt Austria (Sponsoring), Vienna
	Brazil		Sergio de Zen	Fundação de Estudos Agrários Luiz de Queiroz (FEALQ) CEPEA, ESALQ, University of São Paulo, Piracicaba, SP
			Mariane Crespolini dos Santos	Confederação da Agricultura e Pecuária do Brasil (CNA), (Sponsoring) Brasília - DF
			Paulo Mustefaga	

2 Global overview

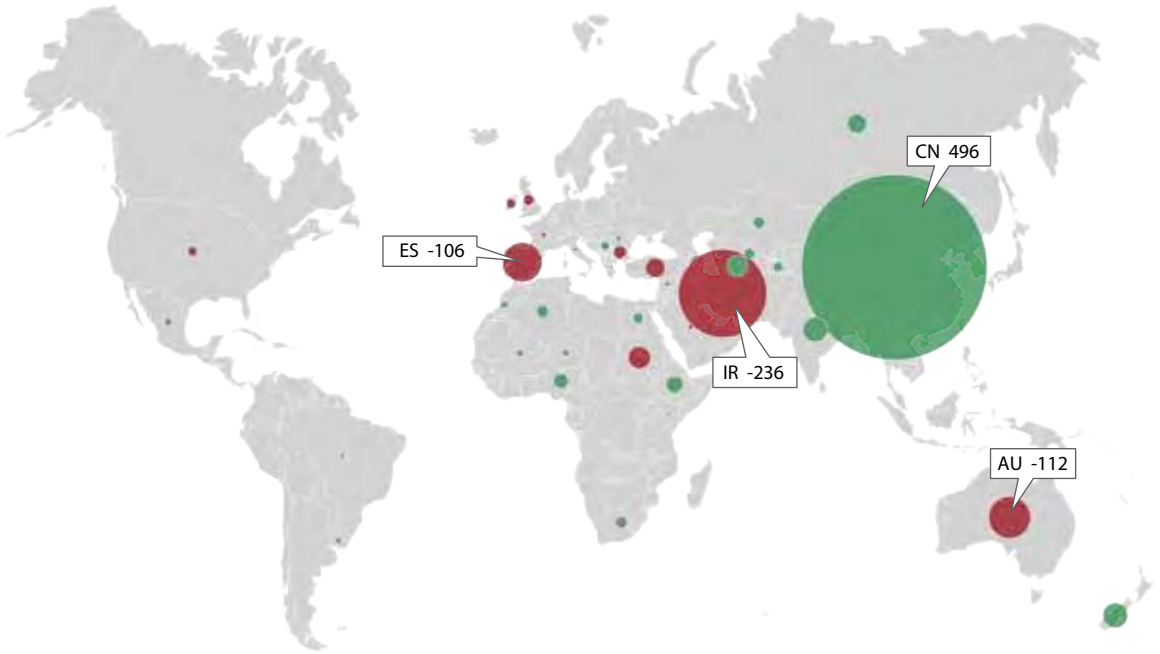
Global sheep meat production 2011 ('000 t)



* Data for Sudan in the year 2011 were not available at the time of editing. The value for 2010 was 323.

Source: FAOStat (2013)

Change in global sheep meat production 2009-2011 vs. 2000-2002 ('000 t)

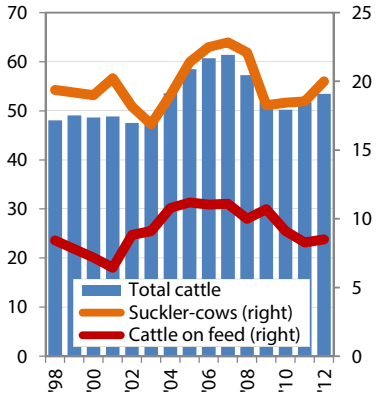


Source: FAOStat (2013), own calculations

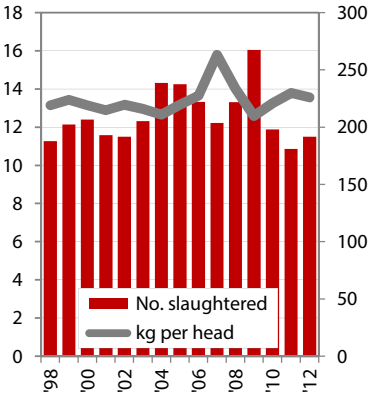
3 Latest developments in global beef production

Production and consumption

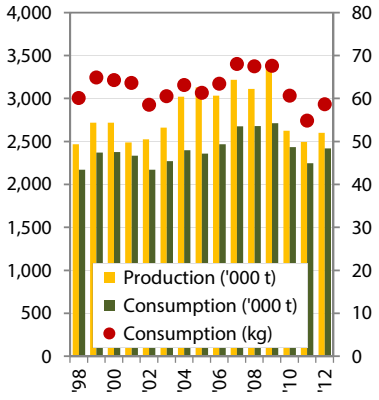
Inventories



Production and weight



Production and consumption



Source: National statistics

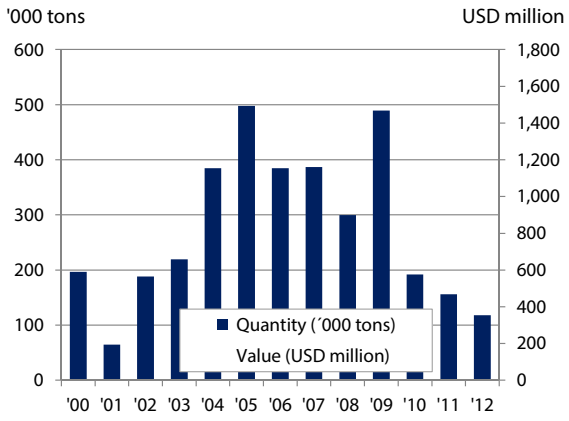
Prices (national currencies and USD)

National currency																	'07	'12
Animal category	**Unit**	**'98**	**'99**	**'00**	**'01**	**'02**	**'03**	**'04**	**'05**	**'06**	**'07**	**'08**	**'09**	**'10**	**'11**	**'12**	**vs. '03**	**vs. '07**
Steers (british)	ARS per kg LW	1.06	0.79	0.87	0.77	1.54	1.88	1.99	2.31	2.43	2.88	3.44	3.45	6.47	8.29	9.78	1.53	3.40
Heifer, slaughter	ARS per kg LW	1.09	0.83	0.89	0.82	1.50	1.89	1.98	2.31	2.46	2.67	3.12	3.32	6.36	8.30	8.94	1.41	3.35
Male weaner	ARS per kg LW	1.34	1.02	1.03	0.96	1.63	2.01	2.24	2.89	2.83	2.94	3.41	3.68	8.45	11.43	11.73	1.46	3.99
Female weaner	ARS per kg LW	1.24	0.97	0.96	0.89	1.48	1.89	1.99	2.56	2.53	2.67	3.26	3.52	6.22	10.20	10.92	1.41	4.09
Weaners (Zebu)	ARS per kg LW	1.16	0.96	0.97	0.91	1.52	1.94	2.14	2.72	2.67	2.82	3.13	3.34	7.60	10.44	10.88	1.46	3.86
Heifer, breeding	ARS per head	434	363	346	338	597	858	818	1,058	964	1,004	1,216	1,241	2,860	4,355	4,075	1.17	4.06
Exchange rate	**ARS per USD**	**1.00**	**1.00**	**1.00**	**1.00**	**3.11**	**2.99**	**2.96**	**2.93**	**3.09**	**3.12**	**3.15**	**3.71**	**3.90**	**4.12**	**4.55**	**1.04**	**1.46**

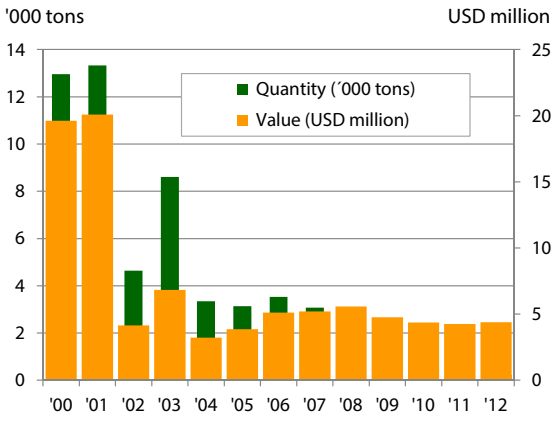
USD																	'07	'12
Animal category	**Unit**	**'98**	**'99**	**'00**	**'01**	**'02**	**'03**	**'04**	**'05**	**'06**	**'07**	**'08**	**'09**	**'10**	**'11**	**'12**	**vs. '03**	**vs. '07**
Steers (british)	USD per kg LW	1.06	0.79	0.87	0.77	0.49	0.63	0.67	0.79	0.79	0.92	1.09	0.93	1.66	2.01	2.15	1.47	2.33
Heifer, slaughter	USD per kg LW	1.09	0.83	0.89	0.82	0.48	0.63	0.67	0.79	0.79	0.85	0.99	0.89	1.63	2.01	1.96	1.35	2.30
Male weaner	USD per kg LW	1.34	1.02	1.03	0.96	0.52	0.67	0.76	0.99	0.91	0.94	1.08	0.99	2.17	2.77	2.58	1.41	2.73
Female weaner	USD per kg LW	1.24	0.97	0.96	0.89	0.47	0.63	0.67	0.87	0.82	0.85	1.04	0.95	1.59	2.48	2.40	1.36	2.81
Weaners (Zebu)	USD per kg LW	1.16	0.96	0.97	0.91	0.49	0.65	0.72	0.93	0.86	0.90	1.00	0.90	1.95	2.53	2.39	1.40	2.65
Heifer, breeding	USD per head	434	363	346	338	192	286	277	361	312	322	386	334	733	1,057	896	1.12	2.79

Source: National statistics

Export quantities and values



Import quantities and values

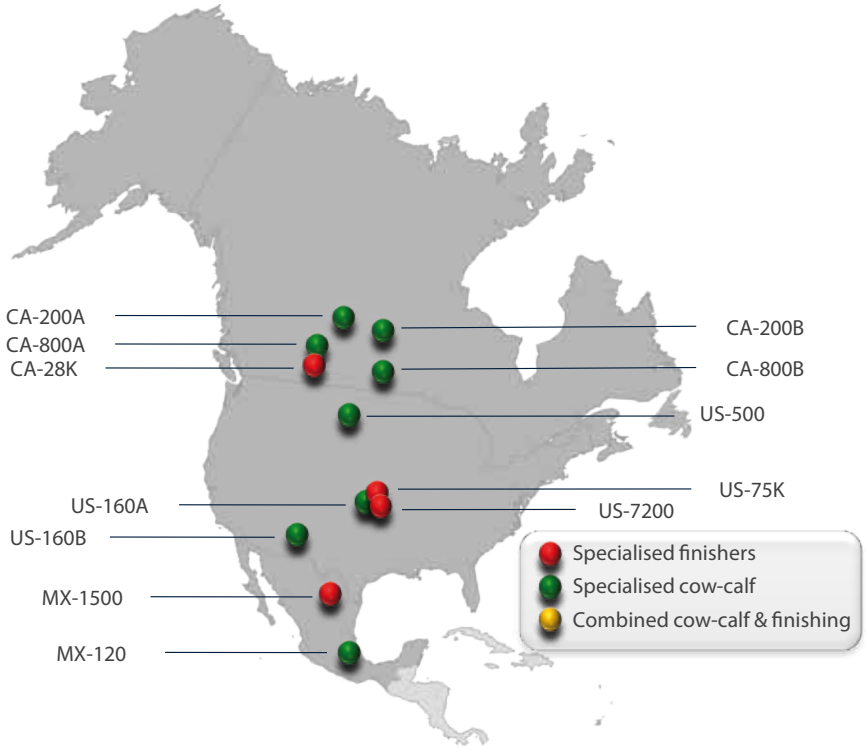


Source: UN comtrade

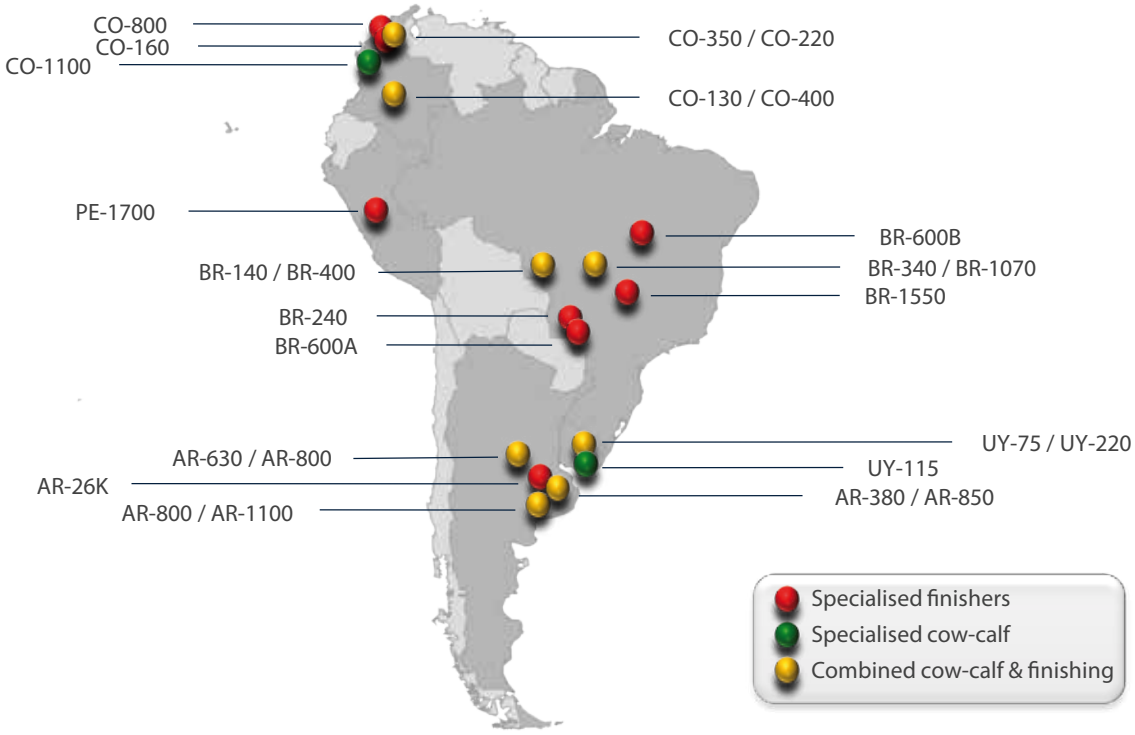
4 International comparison of beef production

4.1 Location of cow-calf and finishing farms

Type and location of typical farms in North America



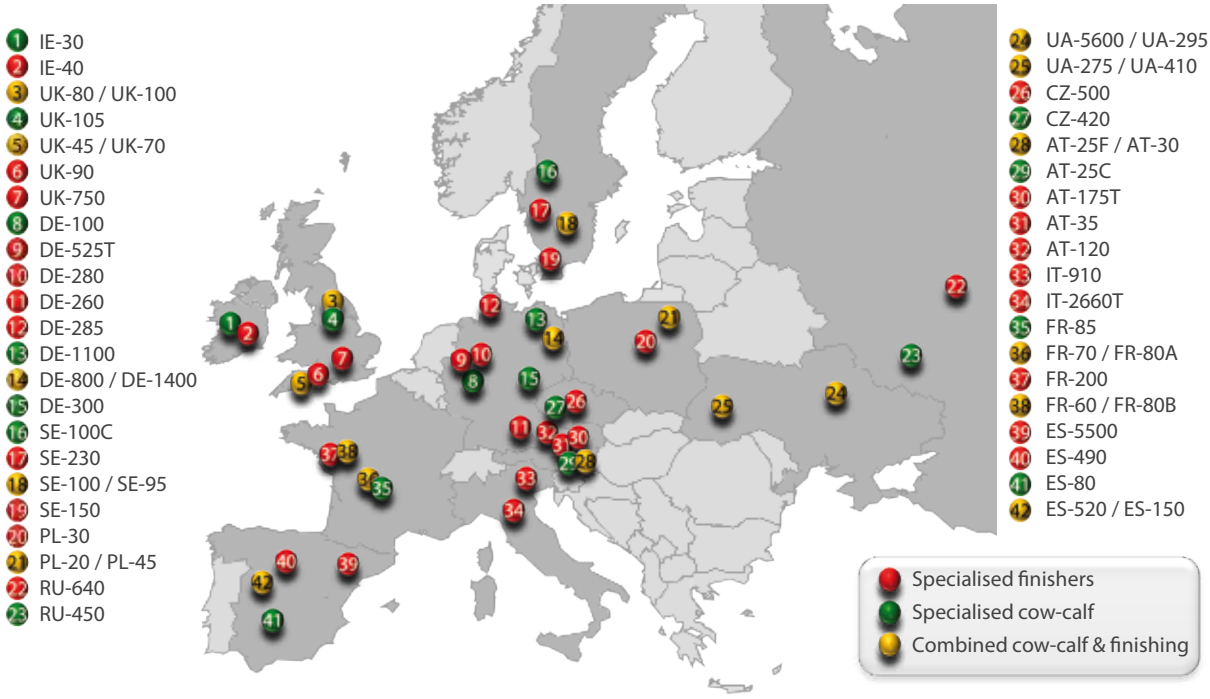
Type and location of typical farms in South America



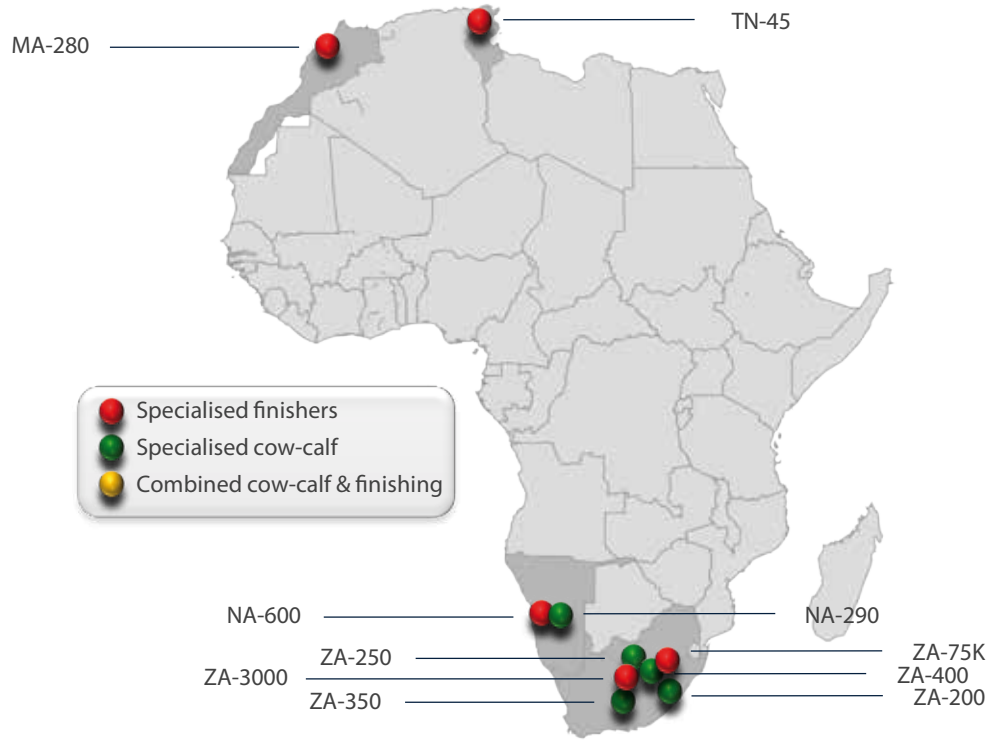
Legend

The first (or only) number indicates the total number of cattle sold per year, the second (or only) number the total number of suckler-cows. The type of farm is indicated by the colour of the dots. The suffixes behind the animal numbers have the following meaning: 'C' indicates the cow-calf enterprise and 'F' indicates the finishing enterprise, if cattle numbers in finishing and cow-calf farms of one country are the same. 'A'/'B' differentiate farms with identical numbers of animals. 'T' means this farm is classified as a top management farm according to the Standard Operating Procedure. 'K' = kilo / thousand.

Type and location of typical farms in Europe



Type and location of typical farms in Africa

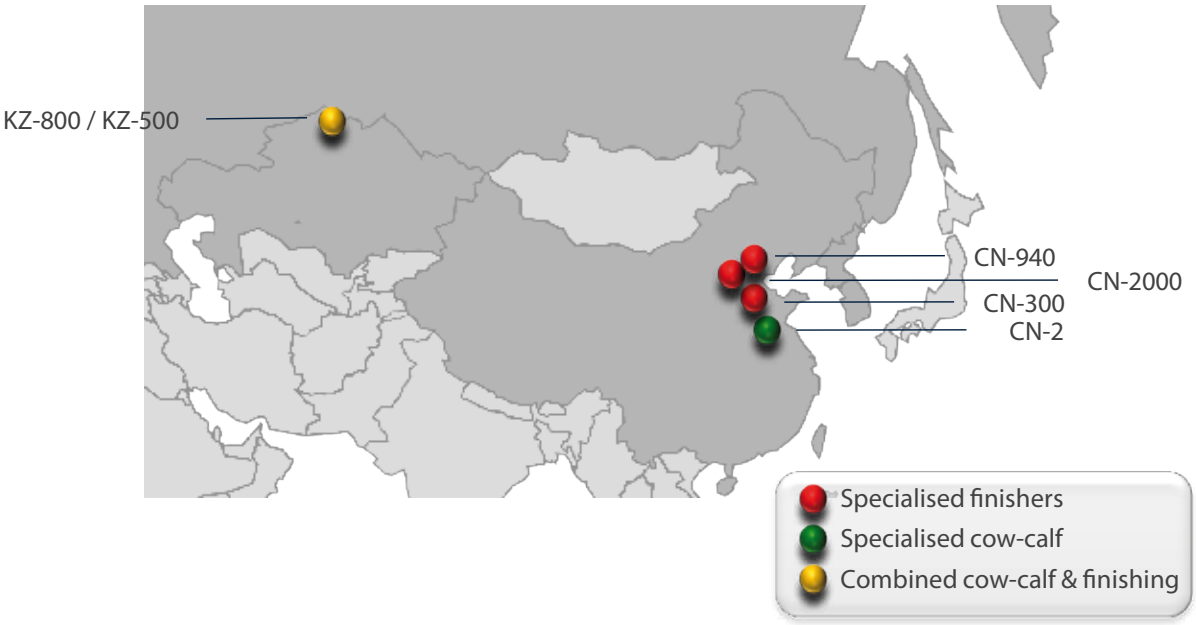


Legend

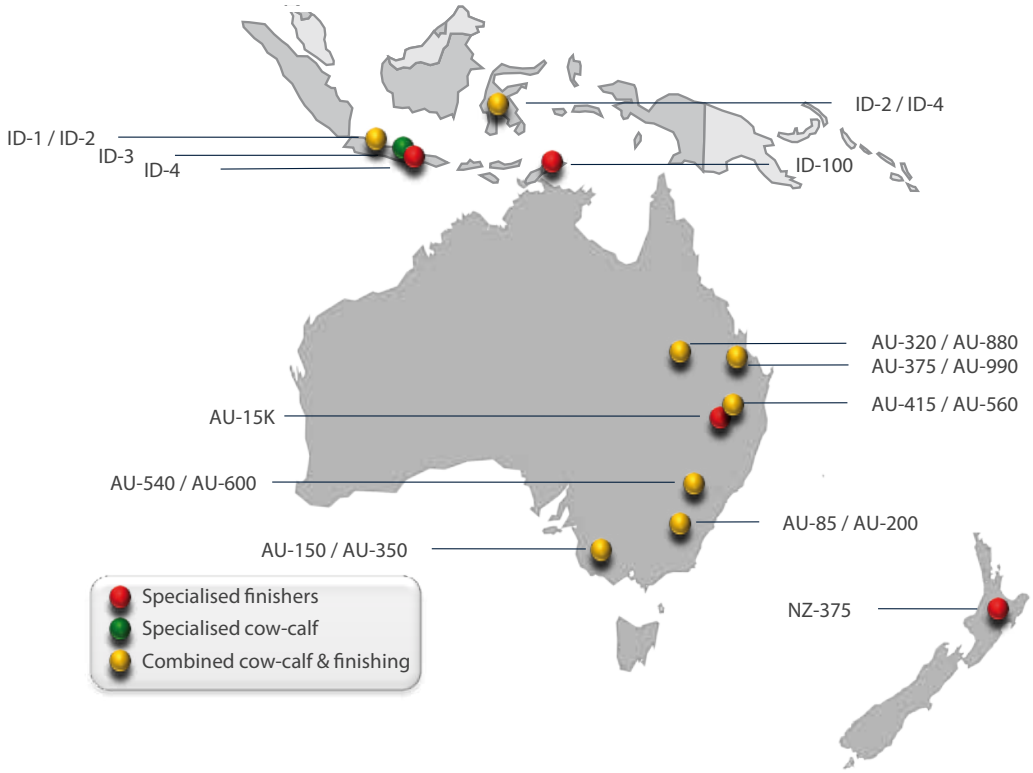
AT-25C: Cow-calf farm with 25 cows in Austria
AT-25F: Finishing farm with 25 sold cattle p.a. in Austria
IT-2660T: Top finishing farm in Italy
CA-200A: Cow-calf farm with 200 cows in Alberta (Canada)
CA-200B: Cow-calf farm with 200 cows in Saskatchewan (Canada)
US-75K: Feedlot (finisher) with 75,000 finished animals p.a. in the US

4.1 Location of cow-calf and finishing farms

Type and location of typical farms in Asia (except Indonesia)



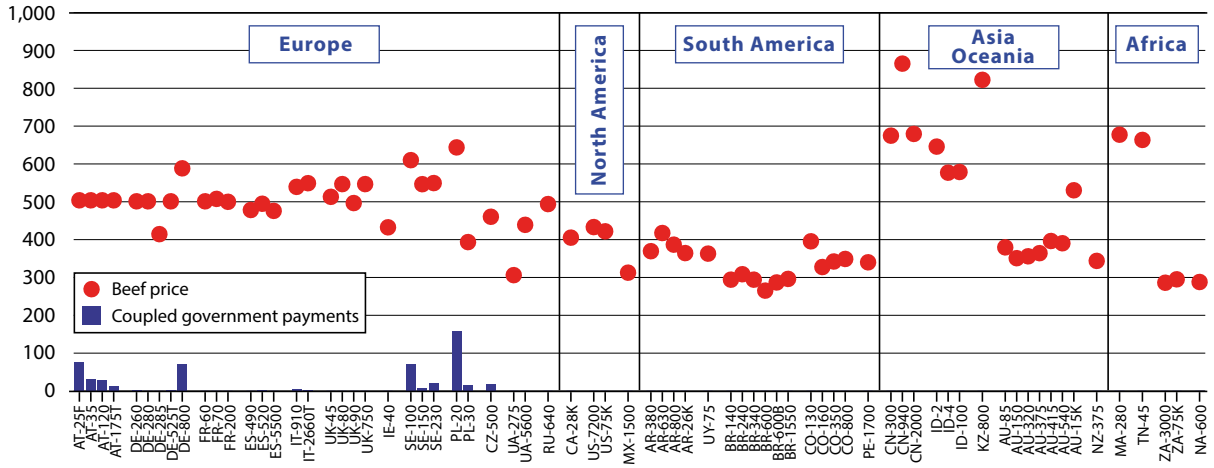
Type and location of typical farms in Oceania and Indonesia



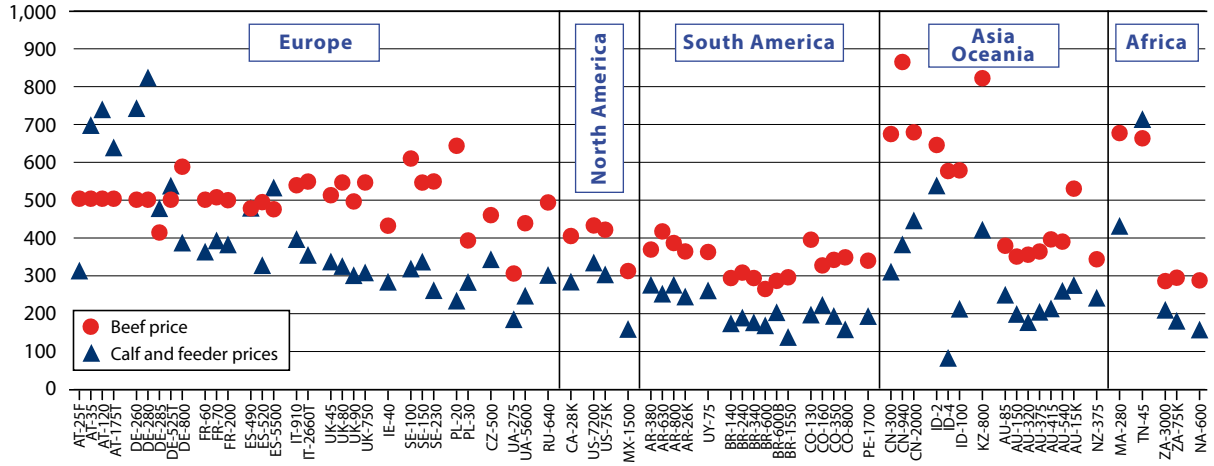
Legend

See pages 62-63.

Beef prices and coupled government payments (USD per 100 kg carcass weight)



Beef, calf and feeder prices (USD per 100 kg carcass weight / live weight)



Key findings Chapter 4.3.5

- Beef prices are highest in China, Indonesia, Kazakhstan and North Africa, followed by the European Union. Canadian and US-prices are at the lower end of the EU-prices.
- Lowest prices are still found in Mexico, South America, Australia (with the exception of the feedlot delivering oxen to the Japanese market) and South Africa.
- Contrary to the cow-calf enterprises, coupled government payments are basically irrelevant in the beef finishing enterprises.
- On a per kg live weight basis, livestock prices show a similar pattern as the beef prices. However, as could be shown in Chapter 4.2.5, price levels for weaners are very similar between the EU, Canada and the US.
- Exception to the pattern are prices for Fleckvieh (Simmental) calves in Austria and Germany which are in high demand from beef finishers and receive high prices at purchase with around two months of age.

4.4.2 Cow-calf farm – CO-1100

Cow-calf farm

Farm overview

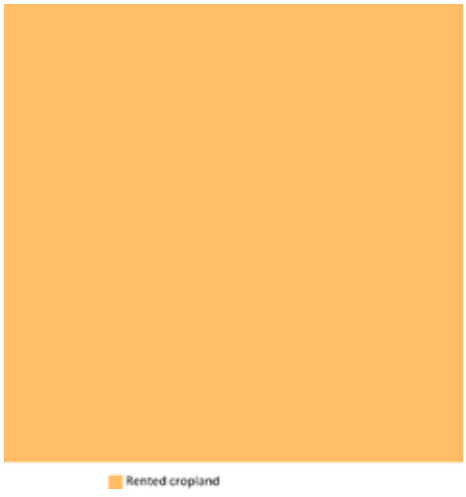
Farm overview CO-1100	
Legal status	Privat
Production system	–
Breed	Brahman * Zebu, Brahman * Angus
Beef cattle on the farm	0
Beef cattle sold per year	0
Cows on the farm	1,107
Weaner production	178
Number of livestock units	–
Stocking rate	0.00
Family labour (h)	0
Hired labour (h)	33,052,800
Other activities	–

Location

Natural conditions

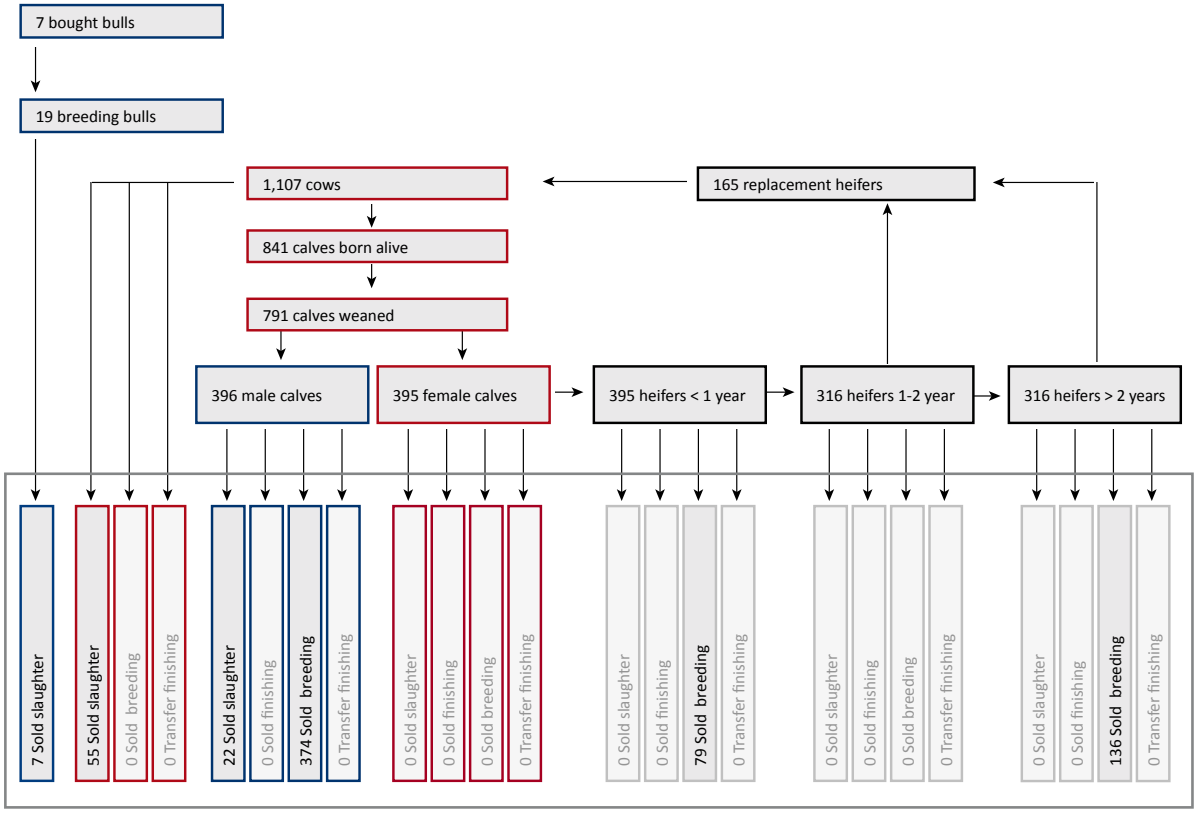
Natural conditions CO-1100	
Country	Colombia
Region	Urabá, Apartado, Antioquia
Relief	Plains
Elevation (m above sea level)	200
Soil composition	Sandy clay loam
Climate	Af – Tropical wet
Main growing season	June – December
Average annual temperature	28.0
Average annual precipitation	2,000
Precipitation distribution	Two rain seasons

Land tenure



The cow-calf enterprise – Animal performance

Animal performance



Explanations:
Sold slaughter: cull animals (bulls, cows, heifers), calves for slaughter
Sold finishing: animals sold to other farm for further finishing
Sold breeding: animals sold to other farm for breeding
Transfer finishing: animals transferred to the finishing enterprise on the own farm

Physical performance

Indicator CO-1100	Unit	Physical performance
Calving period		Seasonal
Age at first calving	months	37.5
Replacement rate	%	9
Losses cows	%	4
Losses calves	%	6
Weaned calves per cow	calves/year	0.71
Age at weaning (male)	days	261
Age at weaning (female)	days	267
Weight at weaning (male)	kg LW	208
Weight at weaning (female)	kg LW	195

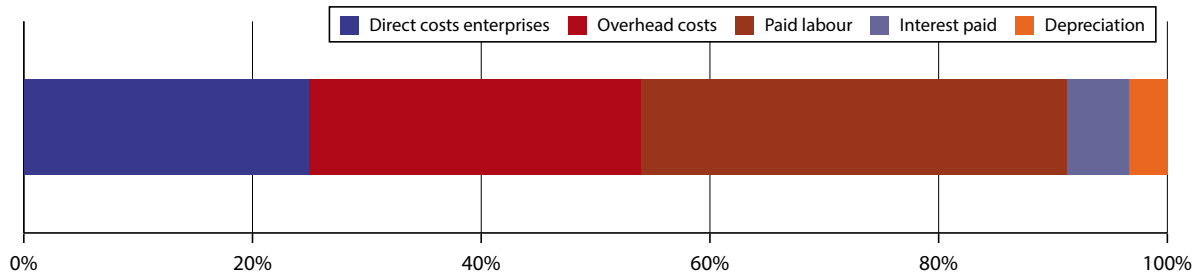
Particularities

- This private farm is based in Uraba located on the coast of Colombia, close to the connection of the continent to the Isthmus of Panama
- Labour to operate this farm is supplied by 7 full time workers
- The farm rears a herd of 1,107 suckler-cows. 76 % of calves are alive after one day
- The total live weight sold per cow and year is 175 kg
- The average weaning age is around 9 months with weaning weight of 195 (female) and 208 (male) kg
- Feed ration is based on pasture with small addition of mineral nutrients
- The strategy of the farm is a constant production

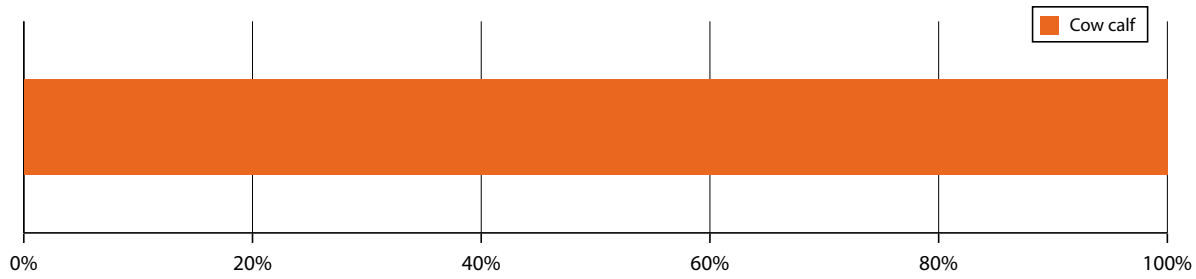
4.4.2 Cow-calf farm – CO-1100

Economic situation of the whole farm

Total returns



Total costs



Economic situation of the whole farm

Returns: Farm CO-1100		%
Markets receipt	337,792 USD	100.00 %
Cow-calf market receipt	337,792 USD	
Total farm returns	337,792 USD	

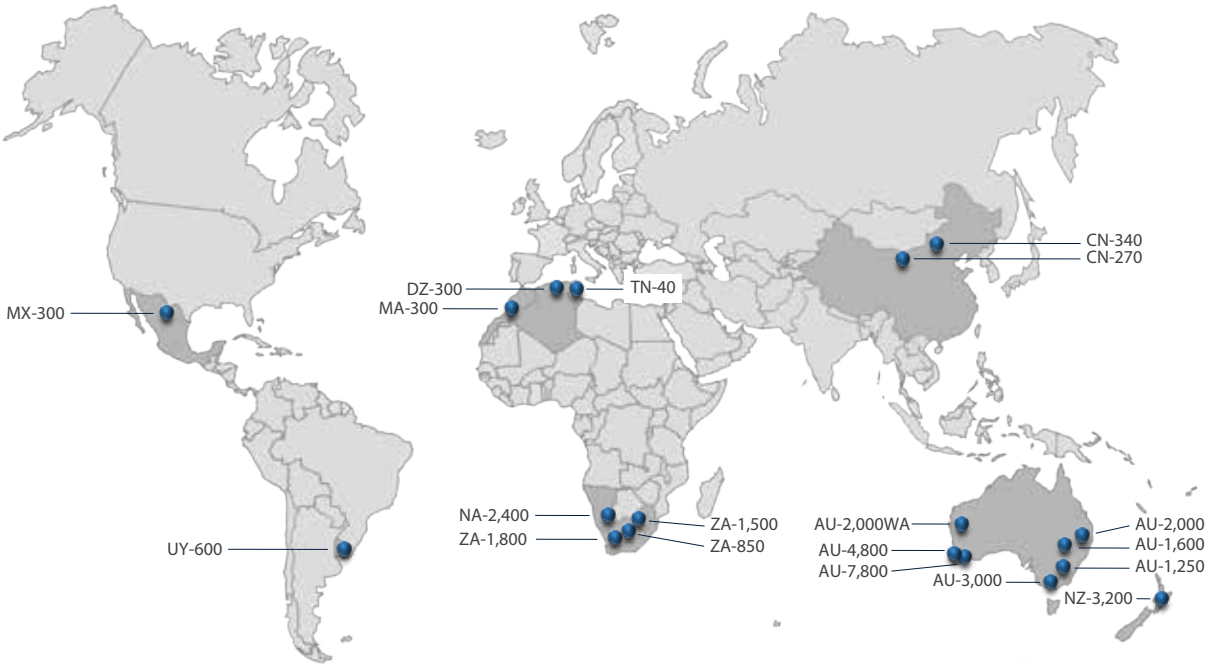
Costs: Farm CO-1100		%
Expenses crop	16,832 USD	5 %
Expenses cow-calf	59,635 USD	19 %
Animals	22,134 USD	
Feed costs	9,178 USD	
Other fixed and var. costs	28,322 USD	
Fixed expenses	8,9343 USD	29 %
Labour expenses	11,4484 USD	37 %
Land rents	0 USD	0 %
Interest on liabilities	16,761 USD	5 %
Farm depreciation	10,255 USD	3 %
Total input	307,310 USD	
Net income	30,482 USD	

5 Latest developments in global sheep production

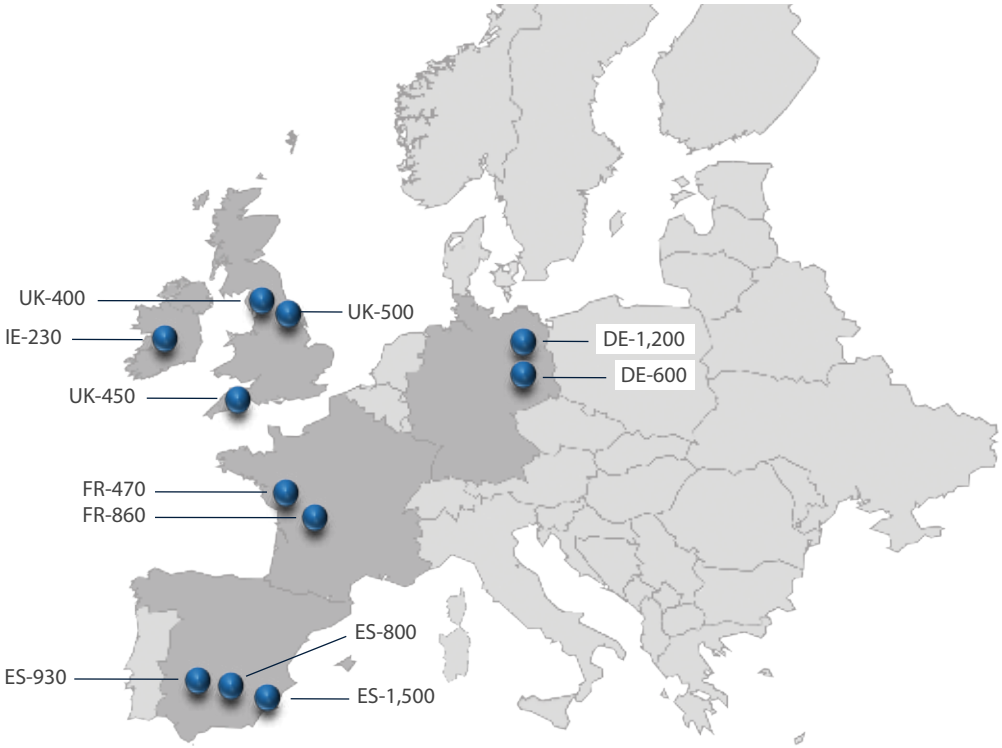
6 International comparison of sheep production

6.1 Location of the sheep farms

Type and location of typical farms in the World



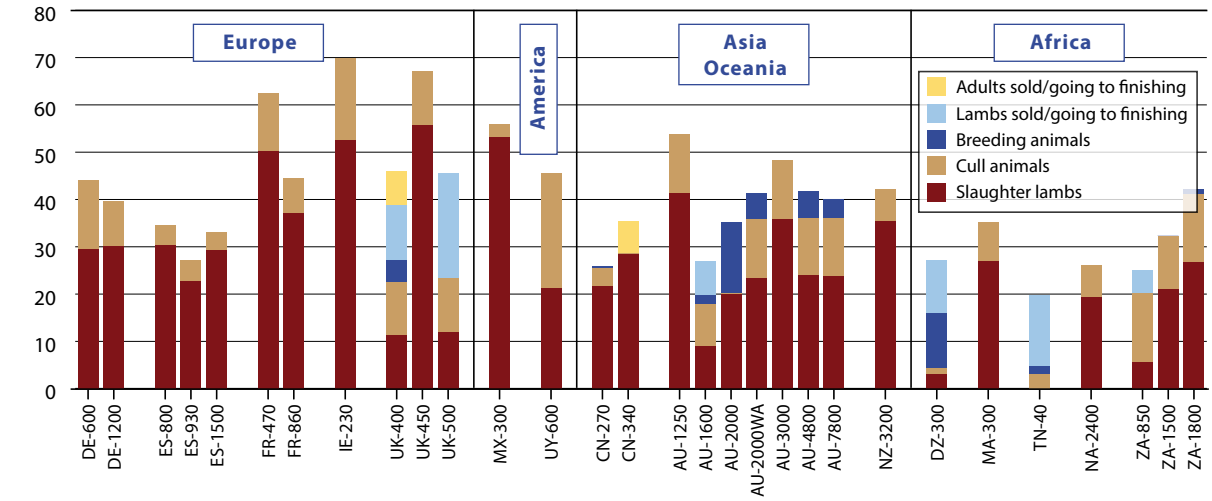
Type and location of typical farms in Europe



Legend

The number indicates the total number of ewes (mother sheep).

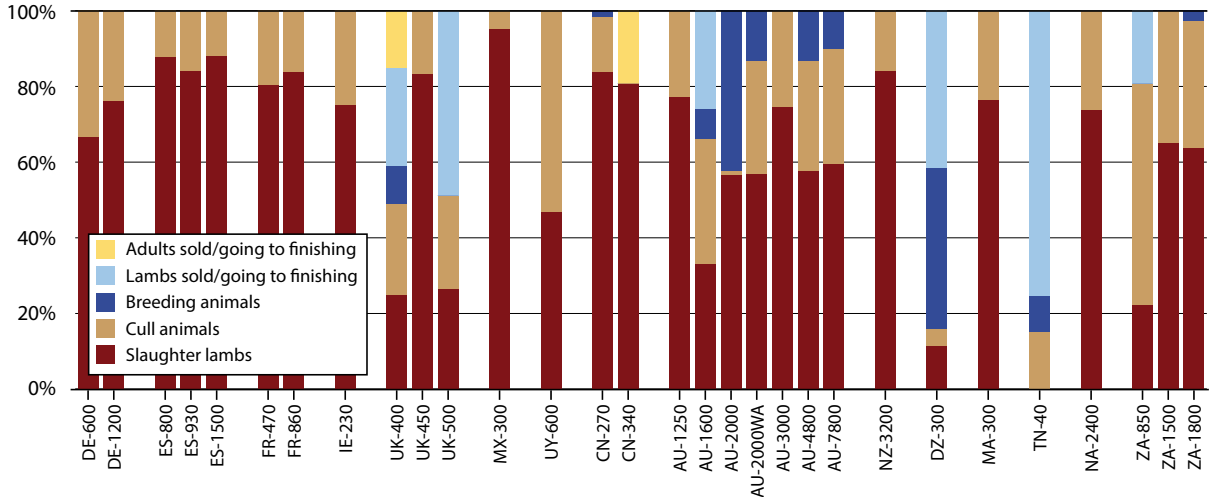
Total live weight sold per ewe (kg live weight per ewe)



Key findings

- The farms present considerable variation regarding the total live weight sold per ewe and its composition, reflecting the different production systems.
- Some farms produce stores for finishing which are a) sold to other farms or b) transferred to the own finishing unit:
  - Two UK farms, both located in hills and uplands of England's North, sell their store lambs to farms in the lowlands for finishing. These farms form part of the stratification system of the sheep industry in the country (for details see Beef and Sheep Report 2011, Chapter 5.3).
  - The farms in Algeria and Tunisia transfer their lambs to the own finishing unit to get heavier animals demanded in the local markets.
  - ZA-850 sells 50 percent of its lambs as stores to lamb finishing feedlots which are rather common in South Africa.
  - AU-1600 transfers some of the castrated male lambs (wethers) to the own finishing enterprise, where the wethers are kept between one and two years for wool production before being slaughtered.
- In the remaining farms the share of slaughter lambs in total live weight sold varies between 50 and 90 percent.

Total live weight sold per ewe (percentage composition)



A Annex

A.3 Conceptual background information

Introduction

This section provides a basic description of concepts and methods used by *agri benchmark*. For details please refer to our website or contact us directly.

Cow-calf and beef finishing

We compare both cow-calf (suckler-cow) and beef finishing production systems. The data base consists of **typical** farms (see below).

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

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

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

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

Which animal categories are compared in the beef finishing comparison?

The following types of animals are compared:

- 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.
- **Final products**, i.e., finished animals that go to slaughter (not backgrounders).
- **Heavy male animals** (bulls or steers), as these categories can be better compared than males with females or even with calves.

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

How do we define a typical farm?

A **typical farm** is defined as

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

The typical farms are never averages of survey data because averages do not provide consistent production system data sets. They are the result of a **panel** meeting with 4-6 farmers and an advisor, where each figure is obtained in a consensus **or** are based on individual farms which were '**typified**' by replacing farm individual particularities by prevailing characteristics, figures, technologies and procedures.

How is the typical farm data collected?

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

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

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

Collection of data on whole-farm level

All data of typical farms are collected on **whole farm** level and for **all enterprises** present. Thus, our data sets provide much more than just enterprise budgets. Examples are:

- A combination of **cash crop** production and **beef finishing** (like in many European countries)
- A combination of **cow-calf** production and **finishing** (like in Argentina and Brazil)
- A combination of **cash crops, dairy** and **beef finishing** (like in the Ukraine)

How do we calculate cost of production?

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

Some costs can be collected on a per animal or per ha basis (for example variable costs per animal or per ha). Other costs are typically available and collected on the whole farm level and need subsequently be **allocated (assigned)** to the enterprises analysed. These are machines and buildings, labour (hired and family labour), land (rented and own) and overhead costs.

Allocation of whole farm cost to enterprises

At present, all whole farm items that can not be allocated 100 percent to the cow-calf and beef finishing enterprise or other enterprises are allocated by the **share** of the respective **enterprise in total returns** (if used by all enterprises) or in **livestock returns** (if used by livestock).

The following table shows the **allocation codes** and resulting **return shares** presently used. The subsequent examples consider the beef finishing enterprise as example. The cow-calf procedure is equivalent.

Allocation codes and allocation factors

1 = Item used for all enterprises Share of beef finishing in total farm returns	
2 = Crop and forage production	
3 = Livestock production general	
5 = Forage production only Share of beef finishing in total livestock returns * share of livestock in total farm returns	
4 = Cash crop production only	0 % to beef finishing
6 = Dairy only	0 % to beef finishing
7 = Cow-calf only	0 % to beef finishing
8 = Beef finishing only	100 % to beef finishing

Examples for **items** that go **100 percent** to the beef finishing enterprise:

- Variable cost of land only used by the beef finishing enterprise (e.g., corn for silage)
- Buildings exclusively used by the beef finishing enterprise (e.g., stables for bulls)
- Staff wages exclusively used by the beef finishing enterprise (e.g., cattlemen)

Examples for **items** that are **allocated** by share in returns:

- All overhead costs on the whole farm level (e.g., accounting, office expenses, fees, farm taxes)
- Machinery maintenance and depreciation used for all livestock enterprises (e.g., grass mower)
- Maintenance and depreciation for buildings / installations used for all enterprises (e.g., machinery hall)
- Staff wages used for all enterprises (e.g., farm manager)

Labour (per worker's group), land (per crop), machines (per machine) and buildings (per building) can be allocated by inserting the allocation codes shown on the left hand side.

The following presents an example of calculating machinery depreciation for the beef finishing enterprise, using enterprise codes and obtaining return shares as allocation factors.

Total depreciation machinery:	
USD 10,000	

Share of beef finishing	
in total returns	**50 %**
in livestock returns	**70 %**

Depreciation matrix (% of total depreciation):	
All enterprises	**35 %**
Crop and forage production	**20 %**
Livestock in general	**30 %**
Beef finishing only	**10 %**
Cow-calf only	**5 %**

Machinery depreciation of the beef finishing enterprise						
All enterprises	USD 10,000 *	**35 %**	* **50 %**	= USD	1,750
Crop and forage production	USD 10,000 *	**20 %**	* **50 %**	= USD	1,000
Livestock in general	USD 10,000 *	**30 %**	* **70 %**	= USD	2,100
Beef finishing only	USD 10,000 *	**10 %**		= USD	1,000
Cow-calf only	USD 10,000 *	**5 %**	* **0 %**	= USD	0
Total				= USD	**5,850**

From enterprise level to groups

Once the whole farm costs are allocated to the cow-calf and beef finishing enterprise, further allocation is required. The herd simulation in cow-calf can cover two different groups (mobs) with separate, individual parameters for each. In beef finishing, up to five finishing groups can be simulated. Any combination of finishing groups and cow-calf mobs can be selected for cost and income analysis. If, for example, a farm has three groups with steers and two with heifers for finishing, the steer groups are selected for comparison.

The costs are treated as follows:

- Whole-farm costs are allocated to each mob / group by share in total weight produced per year. Alternatively, the share in animal numbers or the return shares of each mob / group can be used as allocation factors.
- Annual and lot-wise cost figures are recalculated in daily figures and multiplied with the number of days/year each group stays on the farm.

A.4 Glossary of terms

Whole farm level (to be continued on next page)

Area	Name of variable	Explanation / definition
Assumptions		
	Harvest years / agricultural years	They usually comprise two calendar years, e.g. July 2000 - June 2001.
	TIPI-CAL year	The model calculates on a calendar year basis (January – December).
	Year used for calculation	"The year of the last month of the harvest / agricultural year is used to determine the *agri benchmark* calendar year used in TIPI-CAL as calendar year. Example: Agricultural year July 2000 to June 2001 is defined as calendar year 2001 in TIPI-CAL and for all results."
	Value addded tax (VAT)	All values in the *agri benchmark* analysis are without VAT.
	"Calves or feeder cattle for fattening from own dairy or cow calf herd"	"If there is a market price for these calves, this price less transport and marketing cost is used for pricing the calves. If there is no market price, they are priced with the total cost of their production on a per head basis."
	Grains and forage from own production	"Grains and forage produced on the farm are priced with their total cost of production and allocated to the beef / cow-calf enterprise according to the land use of these enterprises."
	Allocated and overhead cost	Cost on whole farm level (fixed cost) that are allocated to the enterprises for cost analysis.
Non-market incomes		
	Coupled government payments	"Crop (acreage) payments, livestock payments, organic and environmental payments and whole farm payments (for example for Less Favoured Areas, diesel subsidy) which can be assigned to the finishing enterprise."
	Decoupled payments	All payments which are not linked to the production of goods and paid irrespective of producing goods or not.
	Side returns	"Beef side products like hide and skin, manure for sale if not included in meat price and every kind of payments from the government (cattle and beef payments, acreage payments, fuel subsidies, less favoured area payments, disaster payments (USA), etc.)."
	Off-farm income	"Income from outside the farm which is not using farm resources. Examples: earnings of wife working outside the farm, income from renting out land if not included in farm acreage, income of husband working as farm manager for other farms, profit from forest if it is calculated separately from any farm activities, major capital income from outside."
	Other farm income	Returns from activities which use farm resources like horse keeping, forestry, machinery services for third parties.
	Return structure	Composition of whole-farm returns.
Profitability figures		
	Whole-farm returns	Market returns (+ coupled payments) (+ decoupled payments).
	Whole-farm costs	Direct costs enterprises, overhead costs, paid labour, paid rents, paid interest, depreciation.
	Whole-farm profitability	Market returns (+ coupled payments) (+ decoupled payments) – whole-farm costs +/– changes in inventory +/– capital gains / losses.
	Net cash farm income NCFI	Whole farm profitability + depreciation + changes in inventory + capital gains / losses.
	Short-term profitability	Total returns minus cash costs.
	Mid-term profitability	Total returns minus (cash costs + depreciation).
	Long-term profitability	Total returns minus (cash costs + depreciation + opportunity cost).
	Income structure	Income (mid-term profit) from agriculture and non-agricultural activities (off farm investments, salary of family members).
	Profit margin	Family farm income divided by total returns.
The following costs for production factors (labour, land, capital) are calculated similarly for all enterprises based on the enterprise-specific cost allocation applied. As a consequence, the results of factor cost analysis are displayed here despite the fact that they are usually presented on enterprise level.		
Labour		
	Hours worked	For hired as well as for family labour the hours worked per person are taken from the accounting information or are estimated during the panel. The general formula for each person is average hours worked per day * working days per year (i.e. 365 days less holidays less off-days less sickness days). Less working hours on specific week days like Saturdays or Sundays are reflected as well as additional hours worked during e.g. harvest or calving season. The hours worked per day exclude lunch breaks but include minor breaks, talks, tea drinking and other social events during work as they can affect productivity both positively and negatively. For orientation, standard hours for employees wand hired labour are 2,400 hours per year and 2,700 hours per year for a full family person, respectively.
	Wages paid	Gross salary + social fees (insurance, taxes, etc.) the employer has to cover for permanent and casual employees.
	Opportunity cost labour	Calculated wage for family labour; either off-farm salary or farm manager salary.
	Average wages on the farm	This figure represents the gross salary plus social fees (insurance, taxes, etc.) the employer has to cover. Calculation: Total labour cost (wages paid plus opportunity cost) divided by the total hours worked. To calculate it, the number of hours worked by the employees and the family have been calculated with the assistance of advisors and farmers.
	Labour cost	Wages paid (cost for hired labour) + calculated wages for family labour (opportunity cost).
	Physical labour productivity	Kilogram of live weight or carcass weight produced per hour labour input (employed / paid labour plus family labour).
	Economic labour productivity	USD returns per USD labour cost.
	Return to labour	Entrepreneurs profit plus labour cost (wages paid plus opportunity cost) divided by total labour input.
Land		
	Land use	The relative proportion of land use by the beef enterprise. The total amount of land used for feed production on the farm is 100 %. Please note that purchased concentrates are not included.
	Land rents paid	Rental price per ha for existing contracts.
	Opportunity cost land	These are land rents for new contracts in case that the farm would rent out own land. They reflect the future cost of renting land.
	Land cost	Rents paid + calculated land rents for own land (opportunity cost).
	Physical land productivity	Kilogram live weight or carcass weight produced per ha land input (hired and owned).
	Economic land productivity	Total returns in USD per USD land cost (paid and calculated).
Capital		
	Liabilities	Sum of current loan value of short, medium and long term loans as well as operating loans.
	Own capital (equity)	Total assets excluding land, quota and cash on hand plus circulating capital less total liabilities as defined above (min=0).
	Interest rate paid	The interest paid, differentiated in short-term, mid-term, long-term interest as well as interest on operating loans.
	Opportunity cost capital	Interest rate for long-term government bonds * equity without land (values of machines, buildings, livestock, circulating capital less total loans).
	Capital cost	Interest paid + opportunity cost.
	Capital productivity	Kilograms live weight or carcass weight produced per USD 1,000 capital assets.

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