agri benchmark

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Supported by JOHN DEERE DLG

Intensification – a strategy to address demand changes, land scarcity and climate change?

agri benchmark Beef and Sheep Conference, Pilanesberg
June 21, 2012

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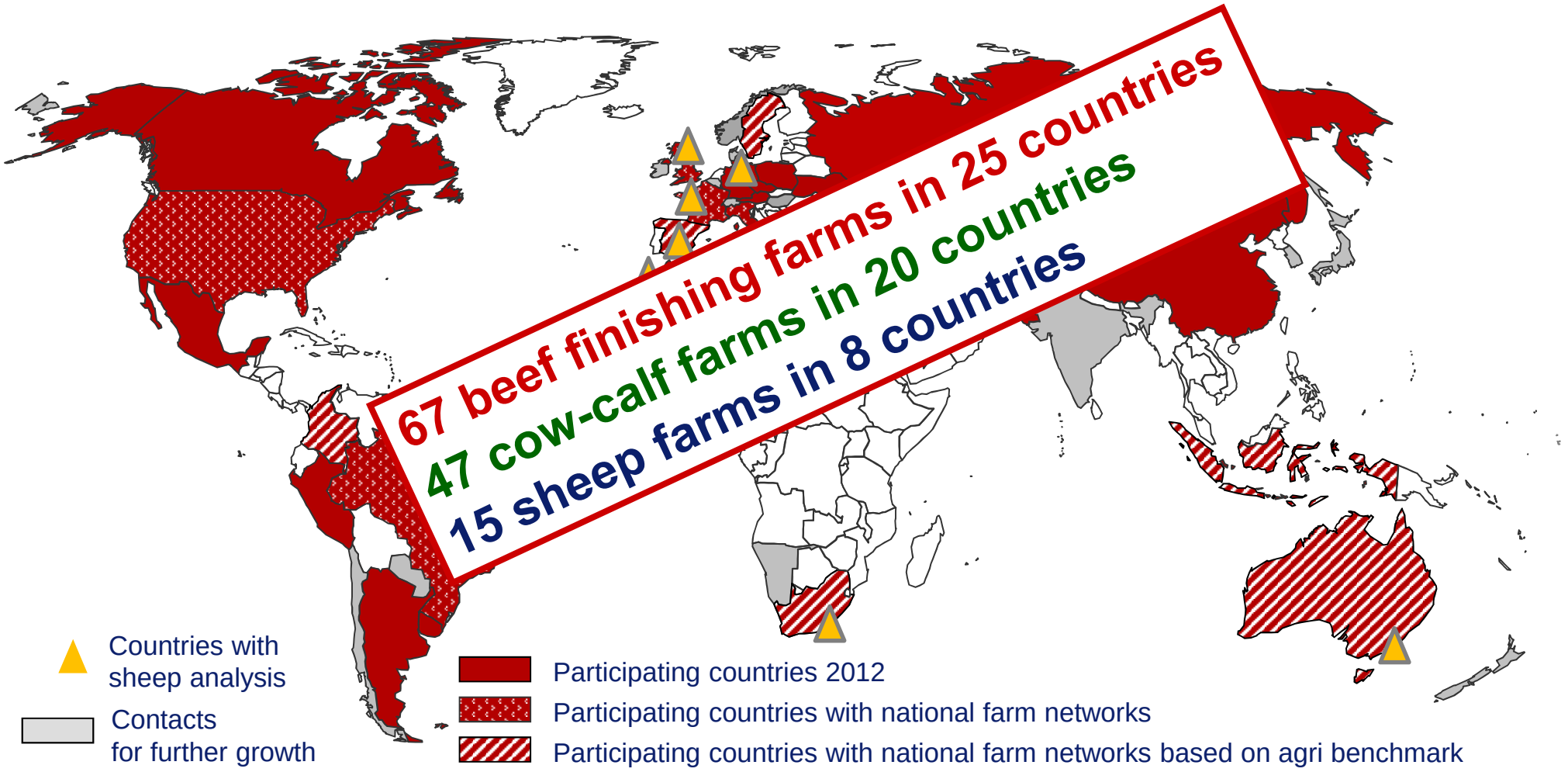
What is *agri benchmark* Beef and Sheep?

agri benchmark – understanding agriculture worldwide

- **Our core competence:**
  Production systems and their economics
- **An expert network which started in 2002 >>> more than just data**
- **Global, non-profit, independent >>> credibility**
- **Standardised methods >>> global comparability**
- **Reflecting framework conditions and drivers >>> comprehensiveness**

Countries in the *agri benchmark* Beef & Sheep Network



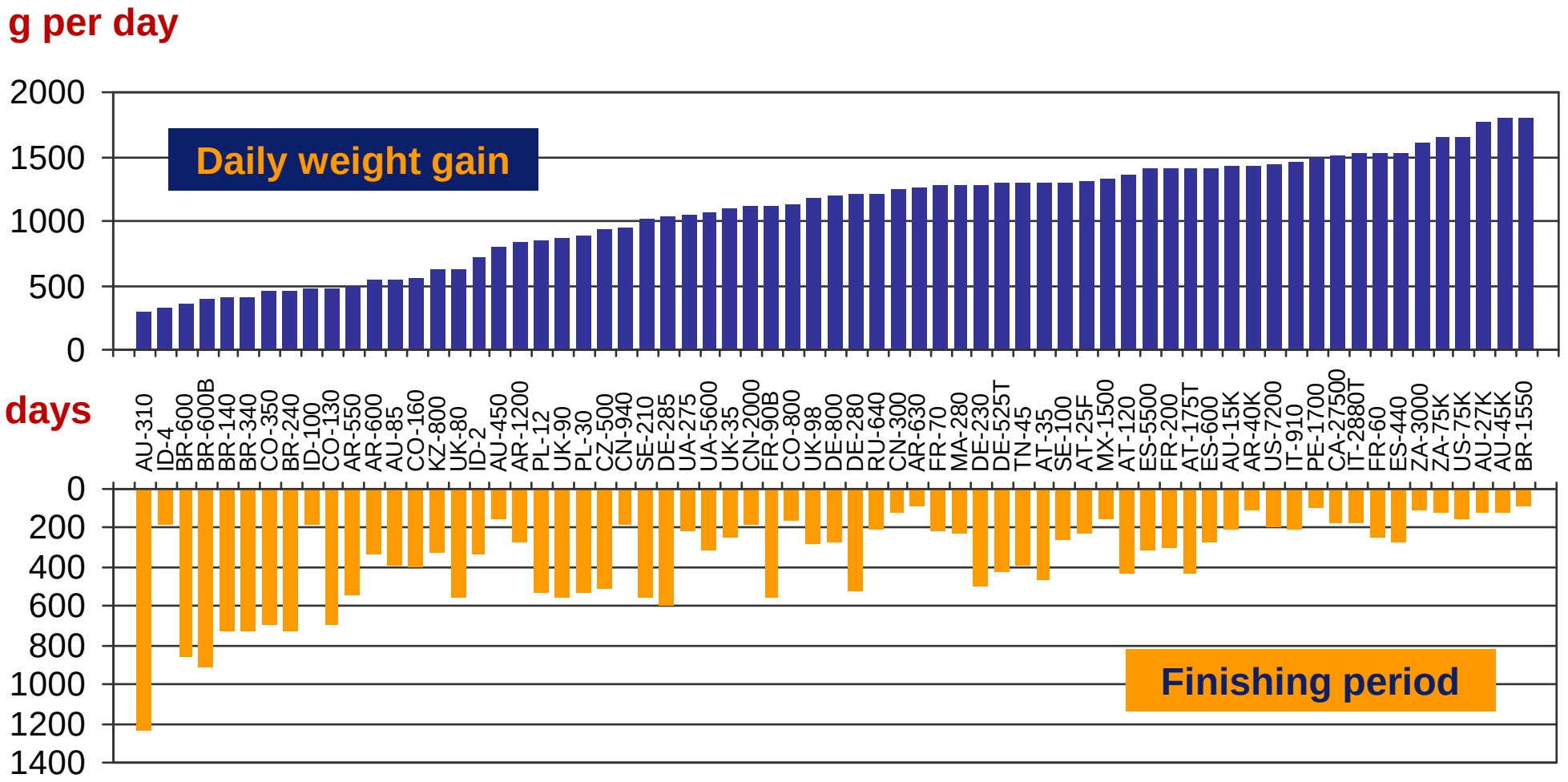
What is the usefulness of the data and results?

- Put your country in and get the world back – **low input, high output**
- See where your farms are in **international comparison**

- **Data** and **reports** >>> Beef and Sheep Report, Result Data Bases …
- **Production systems information**
- **Cost** of production, **returns** and **profits** of beef production
- **Policy** analysis >>> EU-COM, OECD, German Ministry, EBLEX …
- Farm **strategy** analysis >>> what can producers do under changing conditions?

- **National networks** for domestic analysis
- **Capacity** building and training
- **Exchange** with other experts and meet at annual Conferences

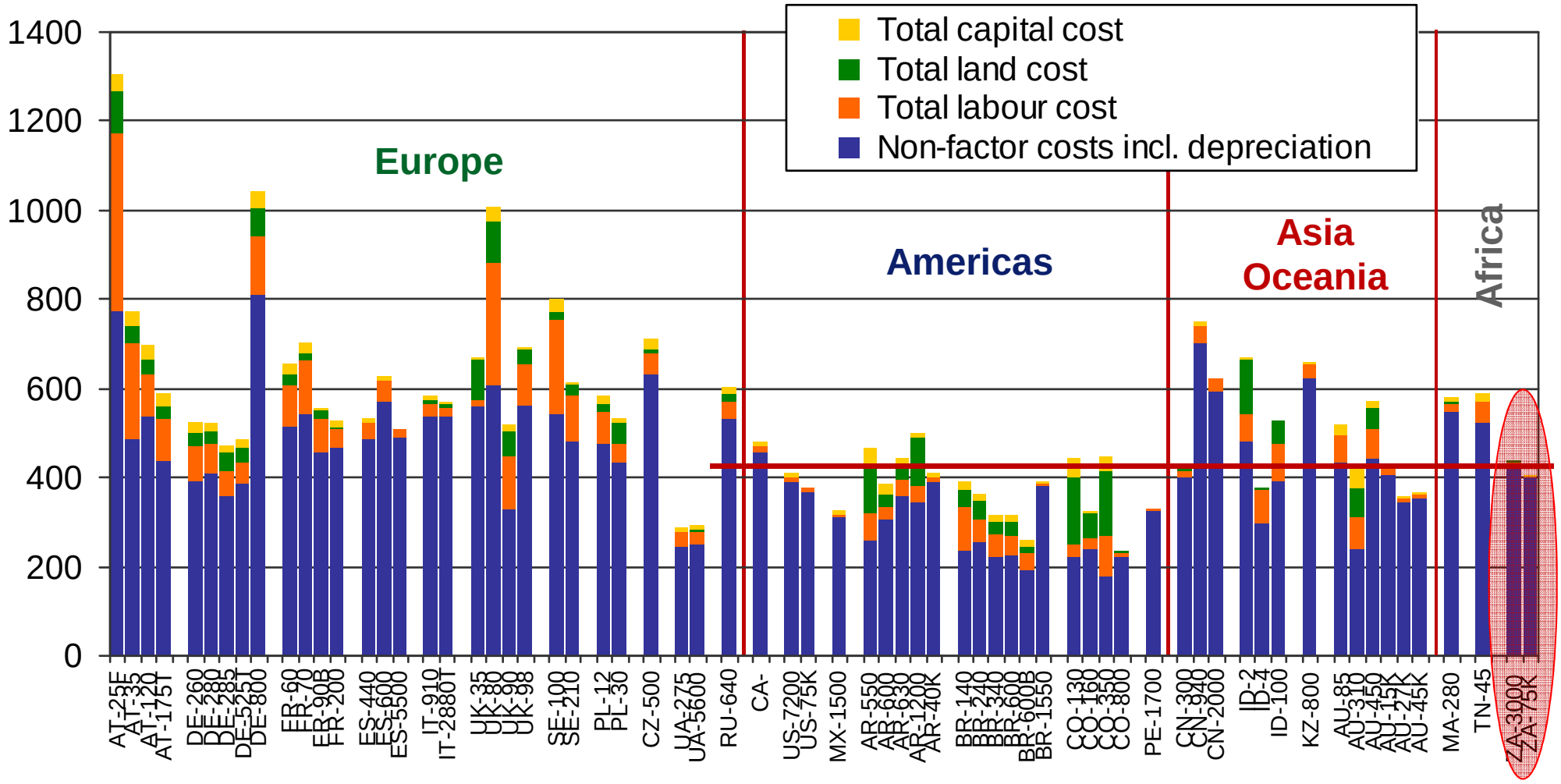
Daily weight gain and finishing period



Source: Own calculations

Total cost by countries 2011

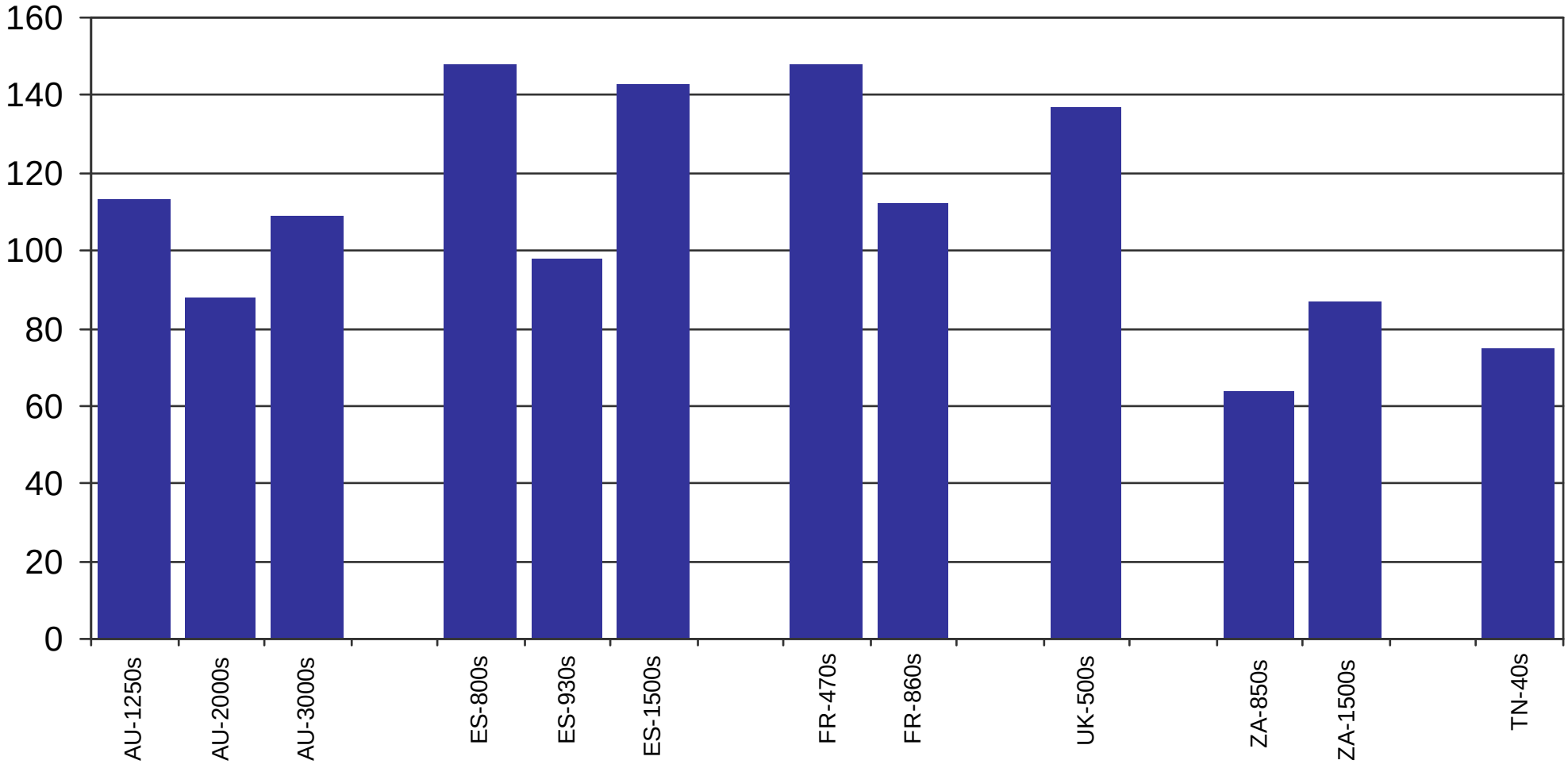
US$ per 100 kg carcass weight sold



Source: agri benchmark

ZA: Low lamb weaning percentage (2011)

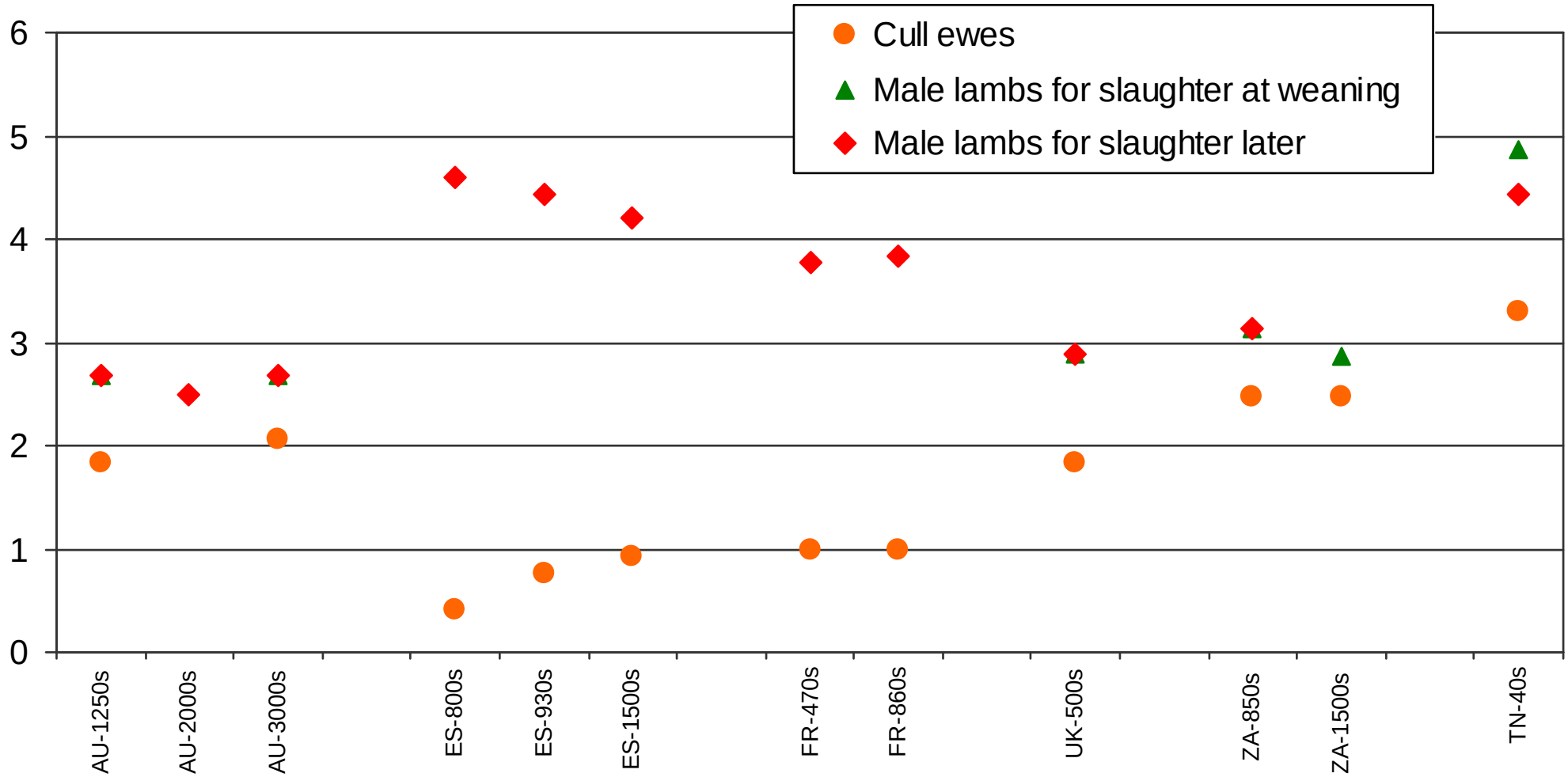
Weaned lambs per 100 ewes and year



Source: agri benchmark

ZA: Reasonably high lamb and mutton prices (2011)

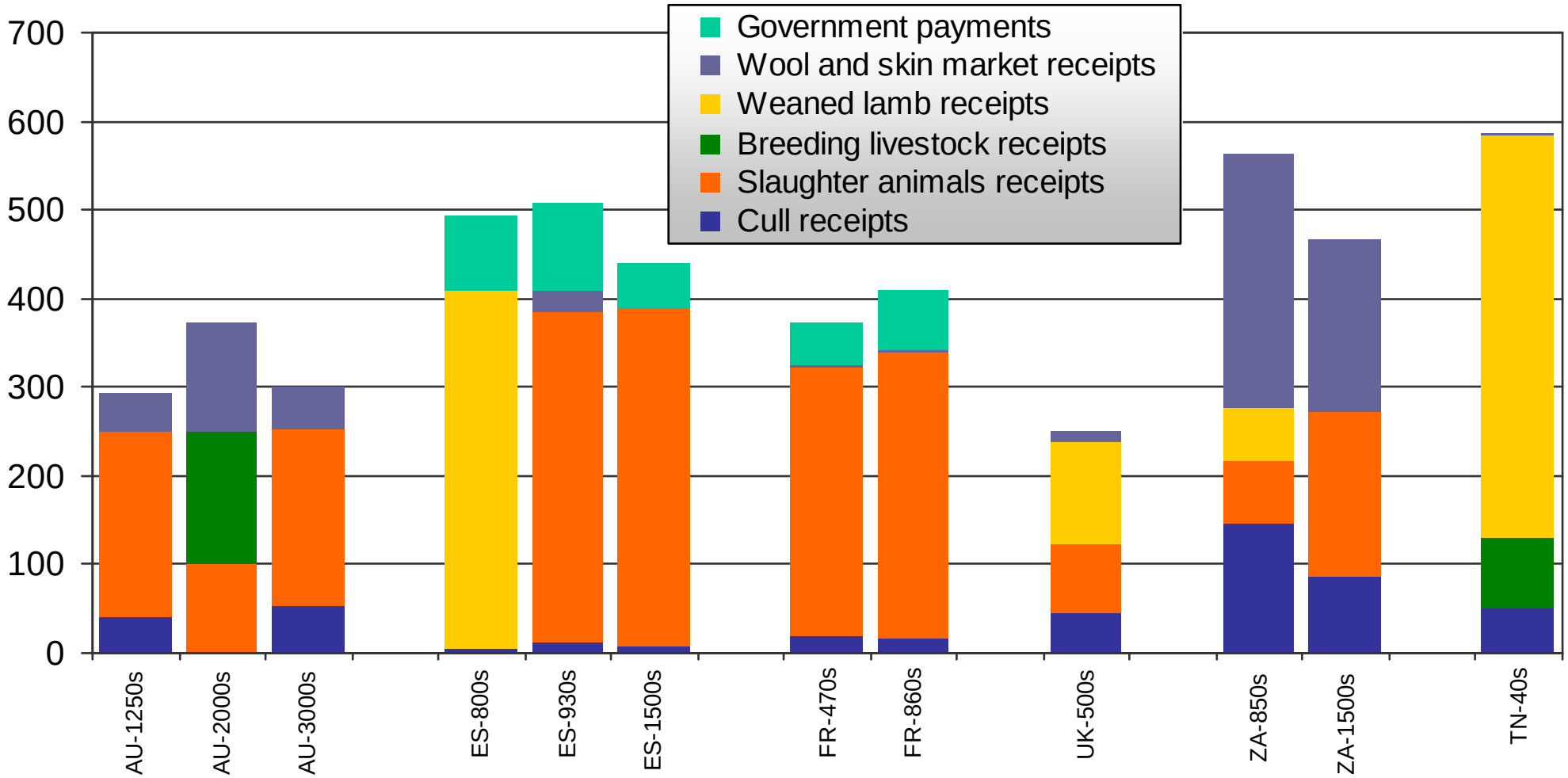
USD per kg live weight



Source: agri benchmark

Huge variation in return composition

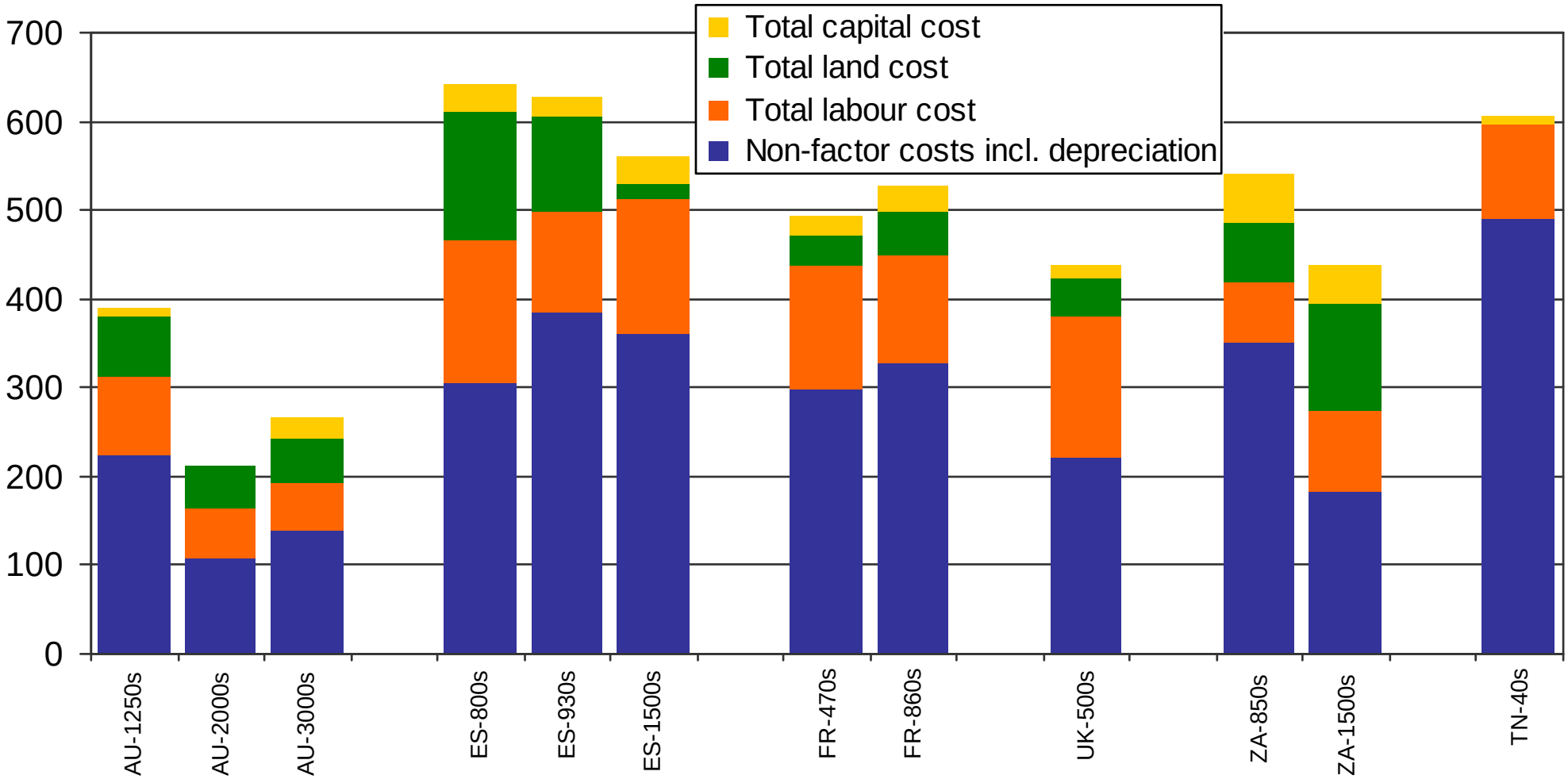
USD per 100 kg live weight sold



Source: agri benchmark

ZA on EU cost-level but higher than Australia

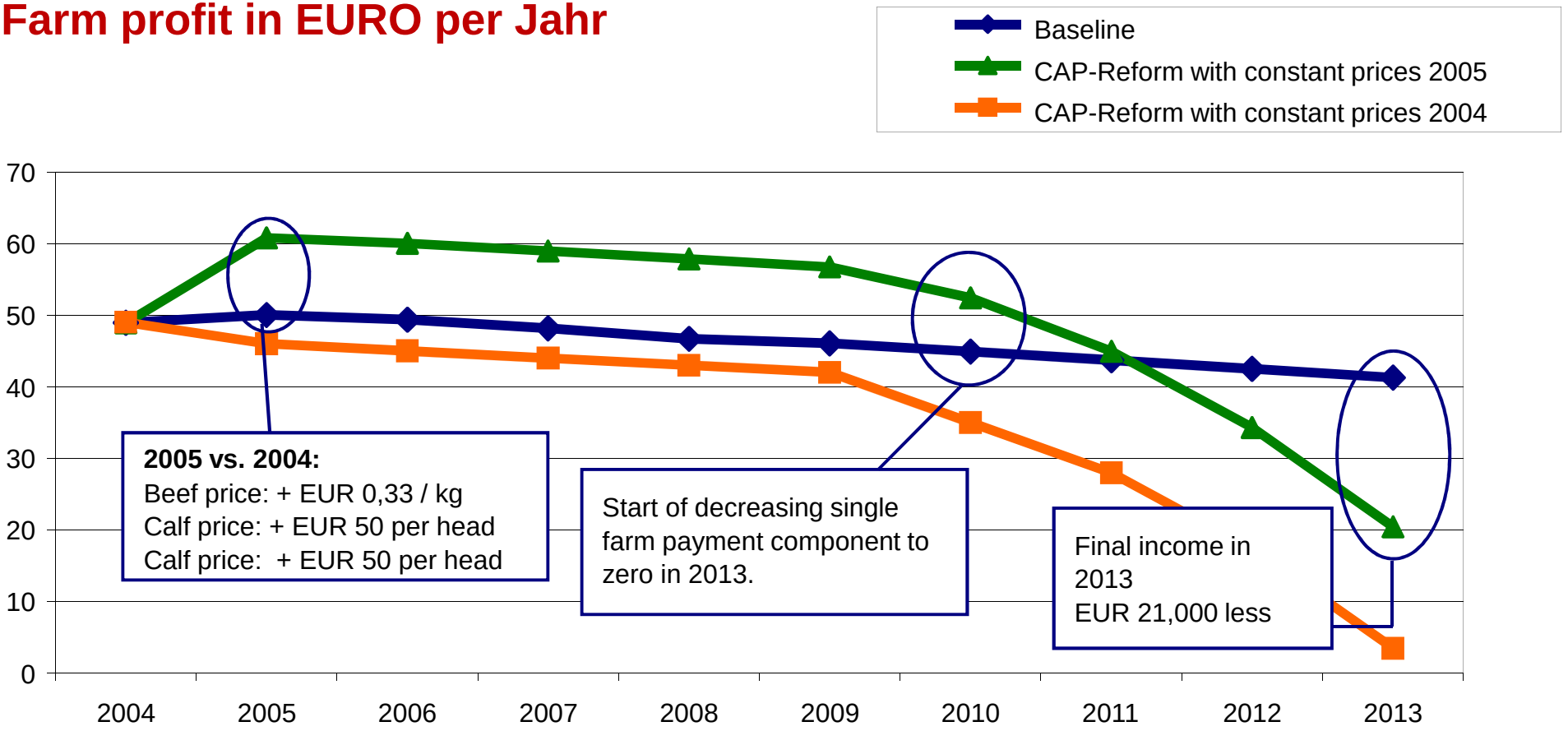
USD per 100 kg live weight sold



Source: agri benchmark

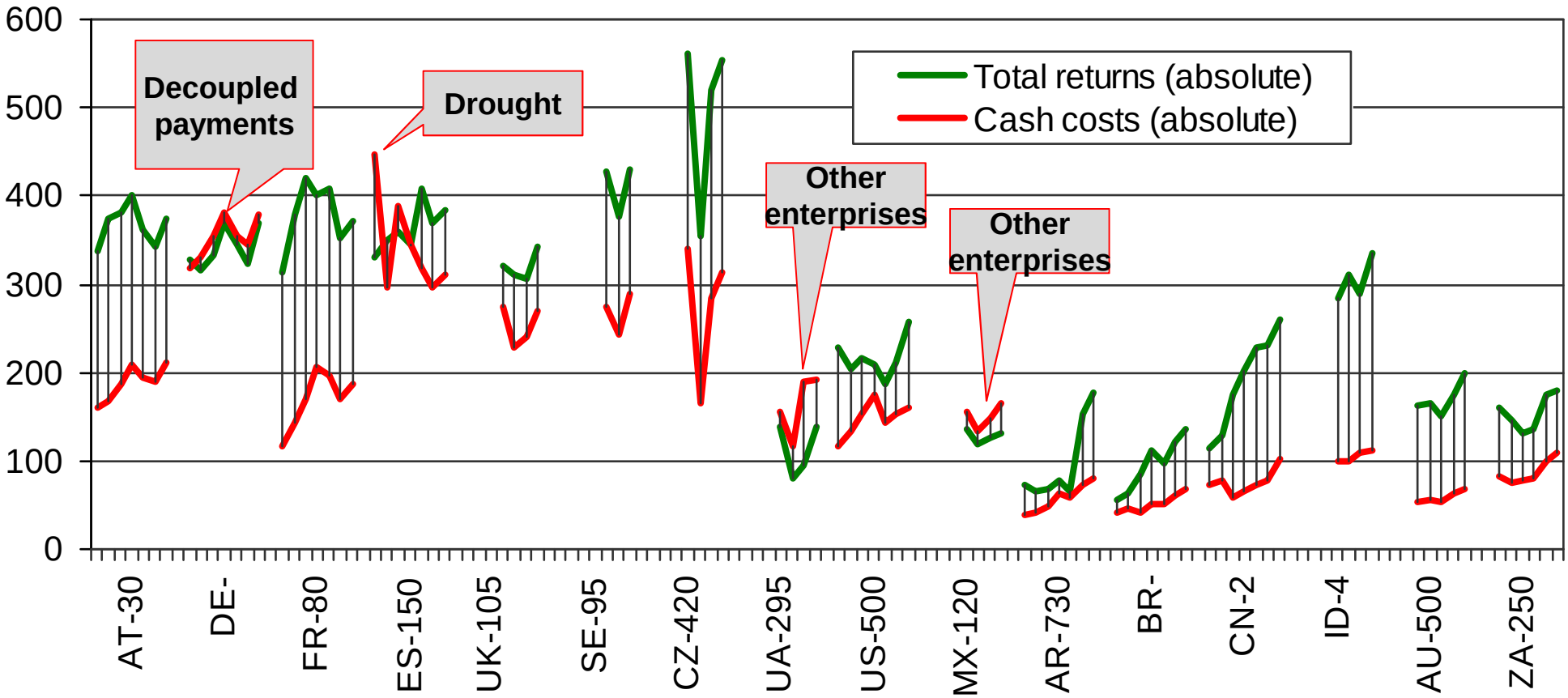
Impact of decoupling of payments on German beef finisher

Farm profit in EURO per Jahr



Margin over cash costs in cow-calf 2005-2011

USD per 100 kg life weight



Impact on price changes on cost of production and profitability – two examples

Feed costs are 25 % of total costs (for example pasture, feedlot)

		Feed costs (price)						
		%	110%	130%	150%	170%	190%	200%
Beef returns (price)	USD	100	110	130	150	170	190	200
%	450	**350**	**340**	**320**	**300**	**280**	**260**	**250**
110%	495	395	385	365	**345**	**325**	**305**	**295**
130%	585	485	475	455	435	415	395	385
150%	675	575	565	545	525	505	485	475
170%	765	665	655	635	615	595	575	565
190%	855	755	745	725	705	685	665	655
200%	900	800	790	770	750	730	710	700

USD figures

Percentage of original price

Situation worse than before

Situation better than before

Source: FAOStat

Why is there a discussion about intensification?

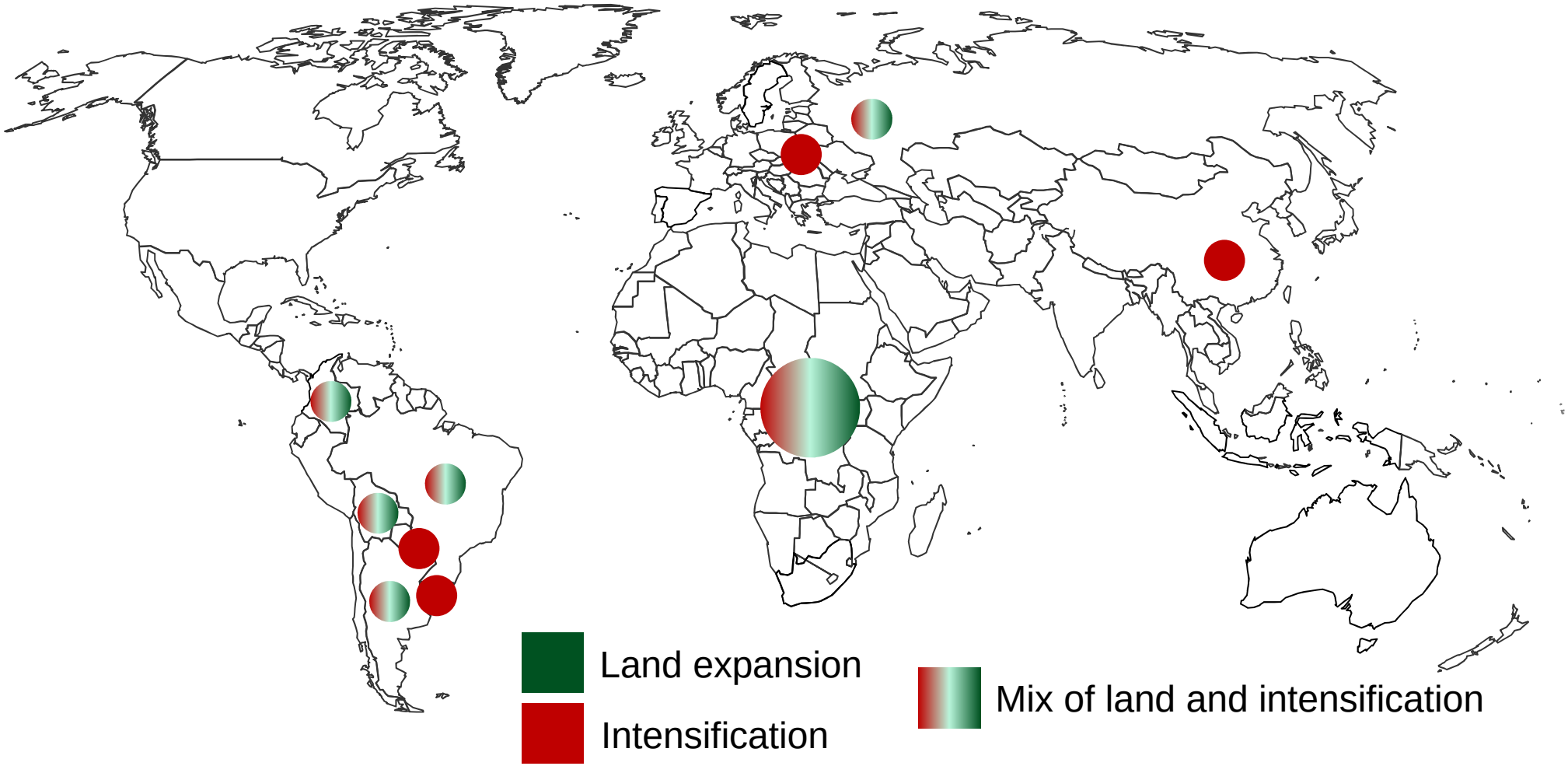
Markets
The global markets seem to turn from surplus to deficit

Prices
Grain and cereal prices peaked in 2008 and are on the rise again

Land scarcity
Grassland is turned into cropland where profitable

Food safety and development
There seems to be huge potential in developing and emerging countries

Hot spots of land expansion and productivity increases in crop production



Source: agri benchmark Cash Crop Conference 2012

Some definitions – production systems

	Feed % in dry matter	Management/ Housing	Extent of purchase feed
Pasture 	> 30% pasture	Outdoor year round or part of the year	Low
Silage 	> 30% silage and other forages	Closed or semi-open barns with slatted floors and/or straw bedding	Medium
Feedlot 	> 50% grains and other energy feed	Confined, large, open pens, partially with sun-covers	High
Cut & Carry 	> 30% freshly cut grass & other vegetation	Mix of pens and grazing of paths and paddies	Low

Some more definitions

1. ***Intensity*** – measures the relation between two production factors
   – N-fertiliser per ha
   – hectares per cow, stocking rate
2. ***Productivity*** – measures output related to input
   – Labour productivity: kg beef produced per hour labour input

Is the feedlot a low intensity system?

Indicator	Unit	BR 140	DE 280	US 75,000
Land intensity	Hectares per head	High	Medium	Low
Labour intensity	Hours per head	Medium	Medium	Low
Capital intensity	USD per head	Medium	High	Low
Land productivity	kg beef per ha	130	2.765	nr
Labour productivity	kg beef per hour	11	35	247
Capital productivity	kg beef per 1,000 USD	165	185	6.064

Conclusion: the focus should be on productivity

Options to increase productivity of beef production

Calf / weaner production

- Dairy origin
- Cow-calf origin

Backgrounding (store cattle)

Optional and depending on

- **Climatic conditions**
- **Prices**

Finishing

- Pasture
- Silage
- Feedlot
- Cut & Carry

Source: agri benchmark

Options to increase productivity of beef production

Increasing productivity in the pasture system

More calves per cow

- Genetics
- Reproduction management
- Reduction of mortality

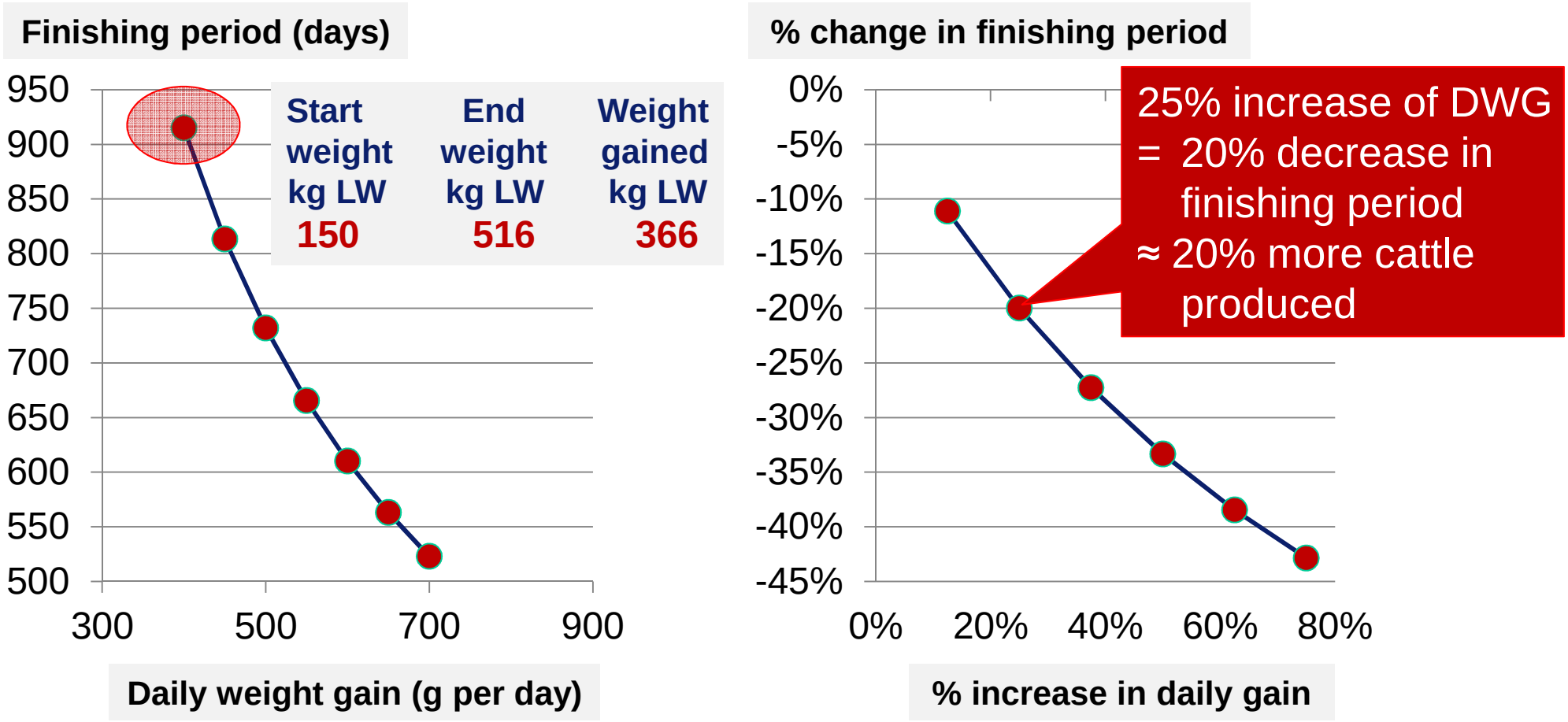
Improved pasture management

- New pasture varieties
- Subdivision / fencing
- Rotational grazing
- Fertilisation

>> more cows and calves per ha
>> higher weight gains
>> more weight per ha

Source: agri benchmark

How productivity increase leads to more production



Source: agri benchmark

Productivity increase in NZ sheep farming

kindly provided by Tony Rhodes, PGG Wrightson

	1990-91	2011-12e	
Lambing Percentage (ewe)	100.4	119.3	**+19 %**
Hogget lambs as % all lambs	-	4.3%	
Average Lamb carcass wgt (kg)	14.35	17.98	**+25%**
Lamb sold kg/ewe	9.76	17.37	**+78%**
Wool Sold kg/head	4.59	5.34	**+16%**

Source: Beef + Lamb New Zealand Sheep & Beef Farm Survey

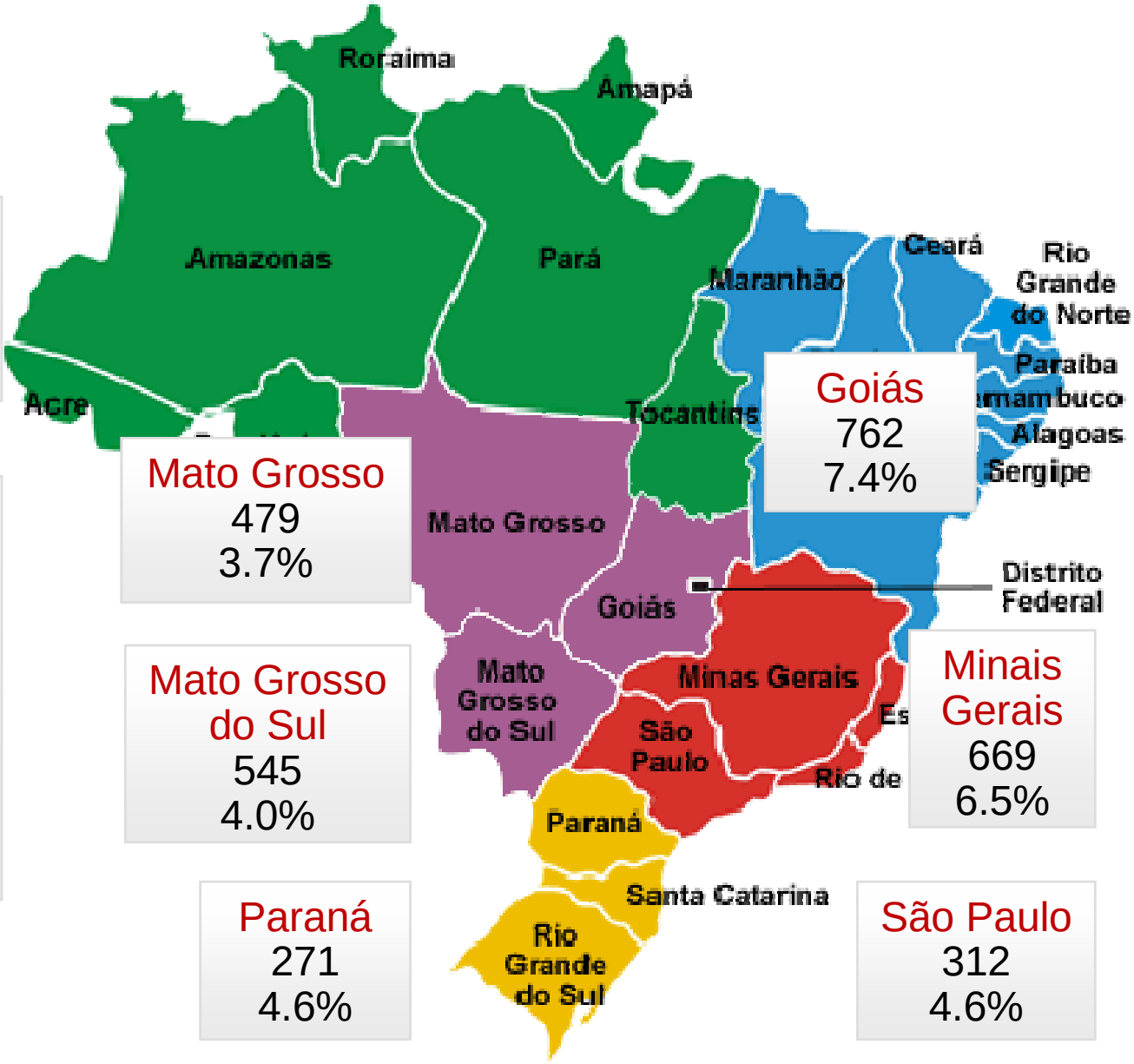
Move to feedlots is already reality

Argentina
An estimated 40% of beef is feedlot finished (Ostrowski, 2011)

Cattle in feedlots – Brazil

	'000 head	%
Steers	3,039	5.1%
Other cattle	426	1.4%
Total	3,465	3.8%

Source: CEPEA, ASSOCON and IBGE



Moving finishing from pasture to feedlot

Move cattle from pasture to feedlot

- **Seasonal (Brazil)**
- **Generally (Argentina)**
- **90-150 days**

>> less land required for finishing
>> more cows/calves can be kept on remaining grassland
>> higher carcass weights
>> consistency of carcasses
>> improved beef quality?
>> environmental issues?

Source: agri benchmark

The result of moving cattle form pasture to feedlot

	Pasture	Feedlot	Mix	Mix vs. Pasture
Weight at start (kg LW)	190	414	190	
Weight at end (kg LW)	495	577	577	
Finishing period (days)	730	100	**636**	**- 13 %**
Daily weight gain (g/day)	418	1630	**609**	**+ 45 %**
Dressing %	53%	57%	**57%**	**+ 8%**
Carcass weight (kg)	262	329	**329**	**+ 25 %**

Source: agri benchmark

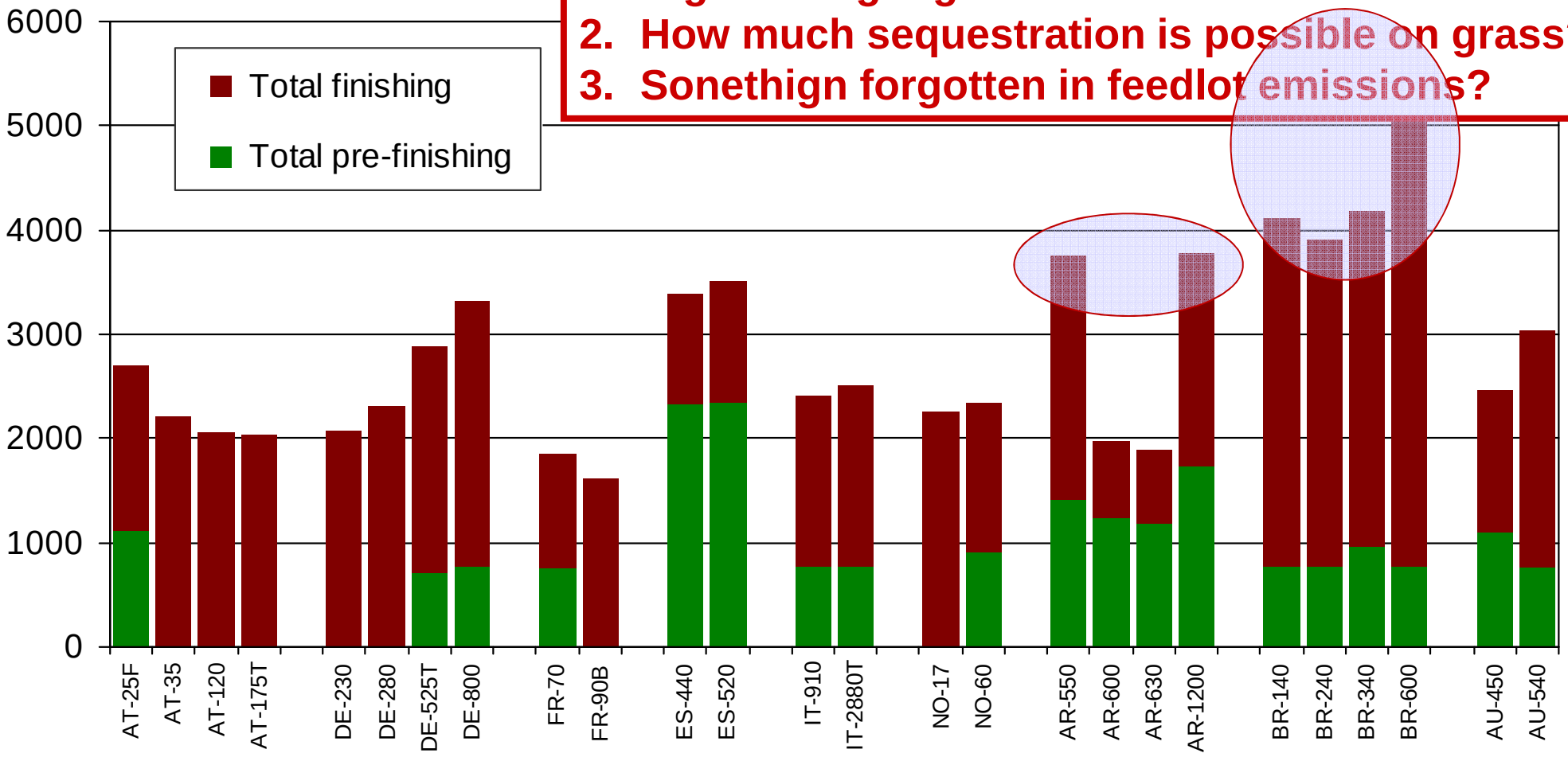
Conclusions

- **Most important: knowledge and management skills**
- **Where possible, grassland will be converted into cropland**
- **Cattle finishing will move to feedlot-like systems (temp.?)**
- **Remaining grassland used rather for cow-calf production**
- **Pasture production will be intensified**
- **Policy on land use can slow down the process**
- **Higher weight gains can reduce emissions but sequestration potential is yet unclear**
- ***agri benchmark* can make a contribution**

CO_2 equivalent emissions per 100 kg carcass weight sold - birth to slaughter (estimation of pre-finishing figures based on cow-calf)

kg per 100 kg live weight sold

1. Higher weight gains – lower emissions
2. How much sequestration is possible on grass?
3. Sonethign forgotten in feedlot emissions?



Source: Own calculations

agri benchmark

agri benchmark
- passionate about facts

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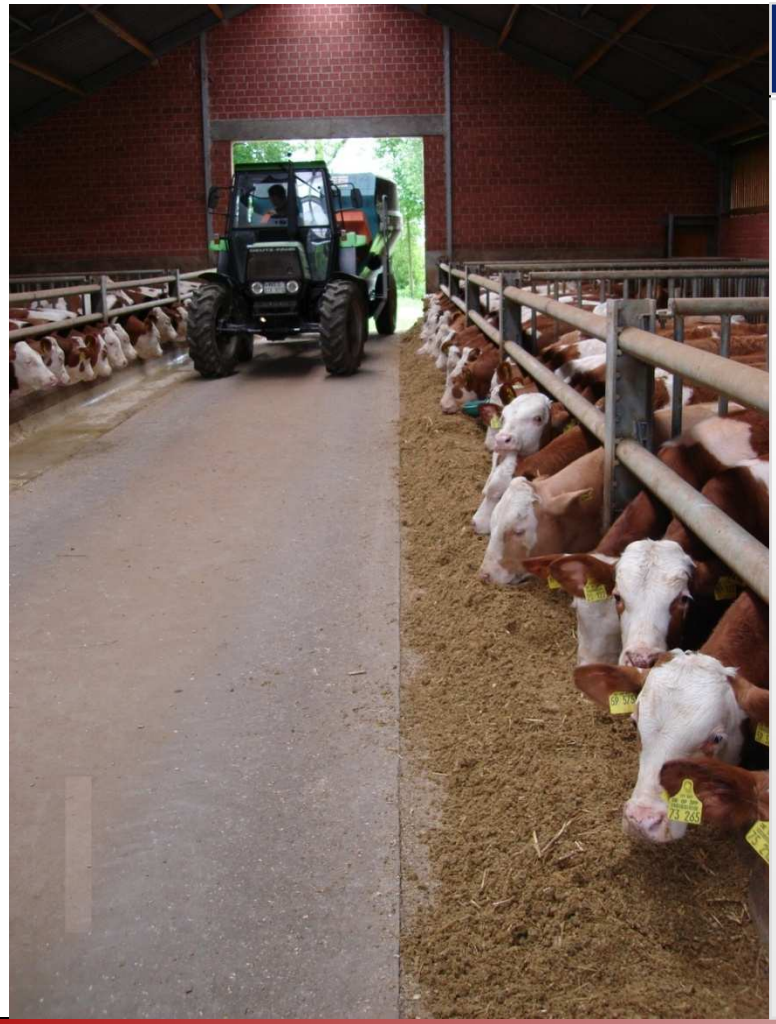
Beef finishing production systems II – feeding and housing

Pasture

- **> 30 % of dry matter (DM) from grazing**
- **Can use marginal land w/o alternative**
- **Long finishing periods of up to three years**
- **Usually low daily weight gains of less than 500 g per day**
- **Fences can be major cost**
- **High methane emissions per kg beef produced**
- **Steers and heifers**

Source: agri benchmark

Beef finishing production systems II – feeding and housing



Silage

- **> 30% of dry matter silage and other forages**
- **Closed or semi-open barns with (slatted) concrete floors or straw beddings**
- **High capital input in machines**
- **Mainly own produced feed**
- **High animal productivity (weight gains > 1200 g/day)**
- **Mainly bulls**

Source: agri benchmark

Beef finishing production systems II – feeding and housing

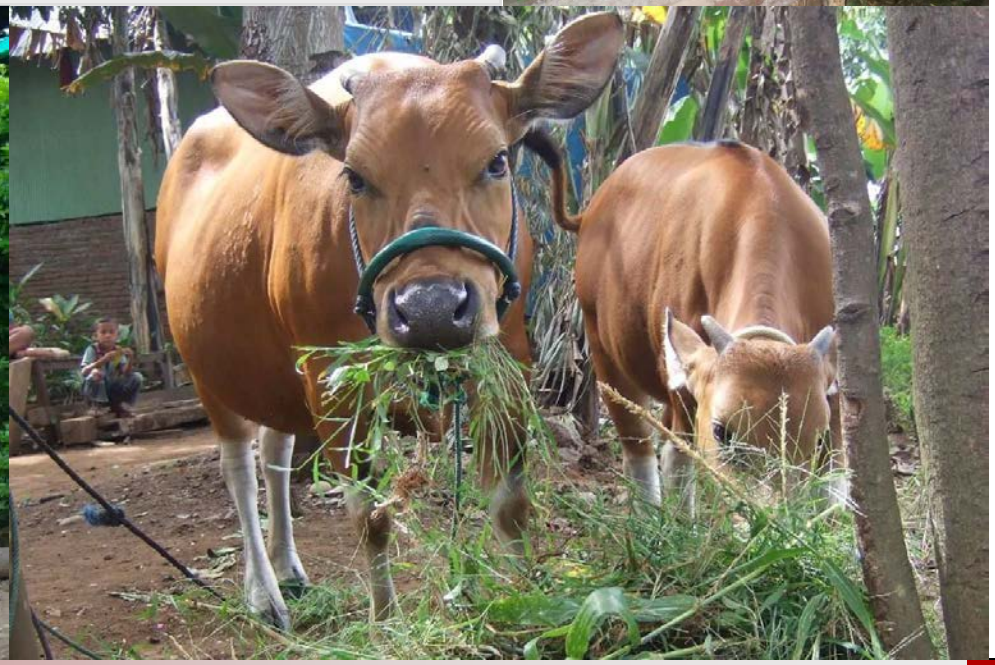
Feedlot

- > 50 % grains and other energy feed
- Short finishing periods of 3-5 months
- Large operations with 10,000-100,000 capacity dominate industry
- High proportion of purchase feed
- Very high daily weight gains > 1400 g per day
- Mainly steers and heifers

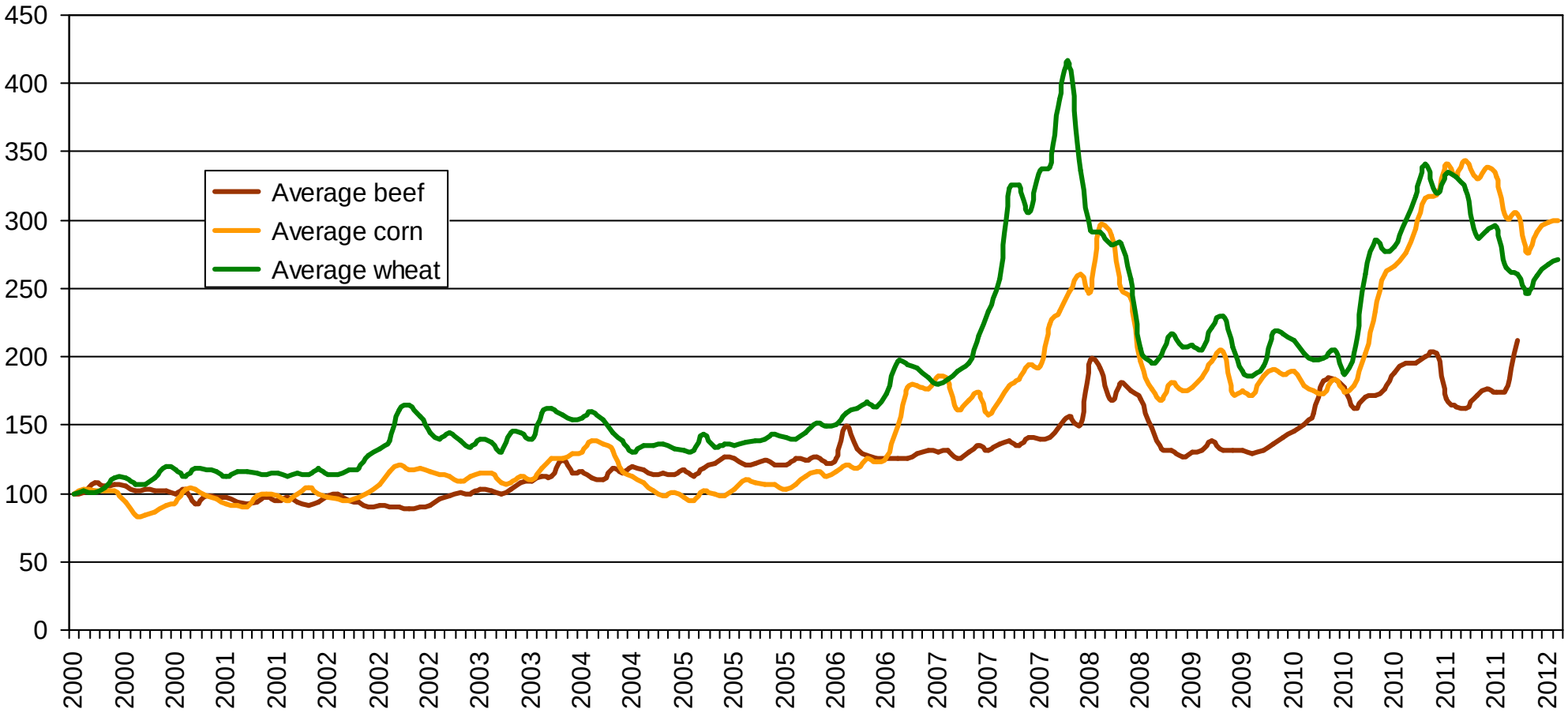
Beef finishing production systems II – feeding and housing

Cut & Carry

- > 30 % of DM from freshly cut vegetation
- Mainly smallholder farms in Africa and Asia
- Mix of pens and grazing of paths and paddies
- Low extent of purchase feed
- Labour intensive, mainly bulls



Corn and wheat prices with higher increases and higher volatility than beef prices (Index January 2000 = 100)



Source: FAOStat

Production systems I – animal origins

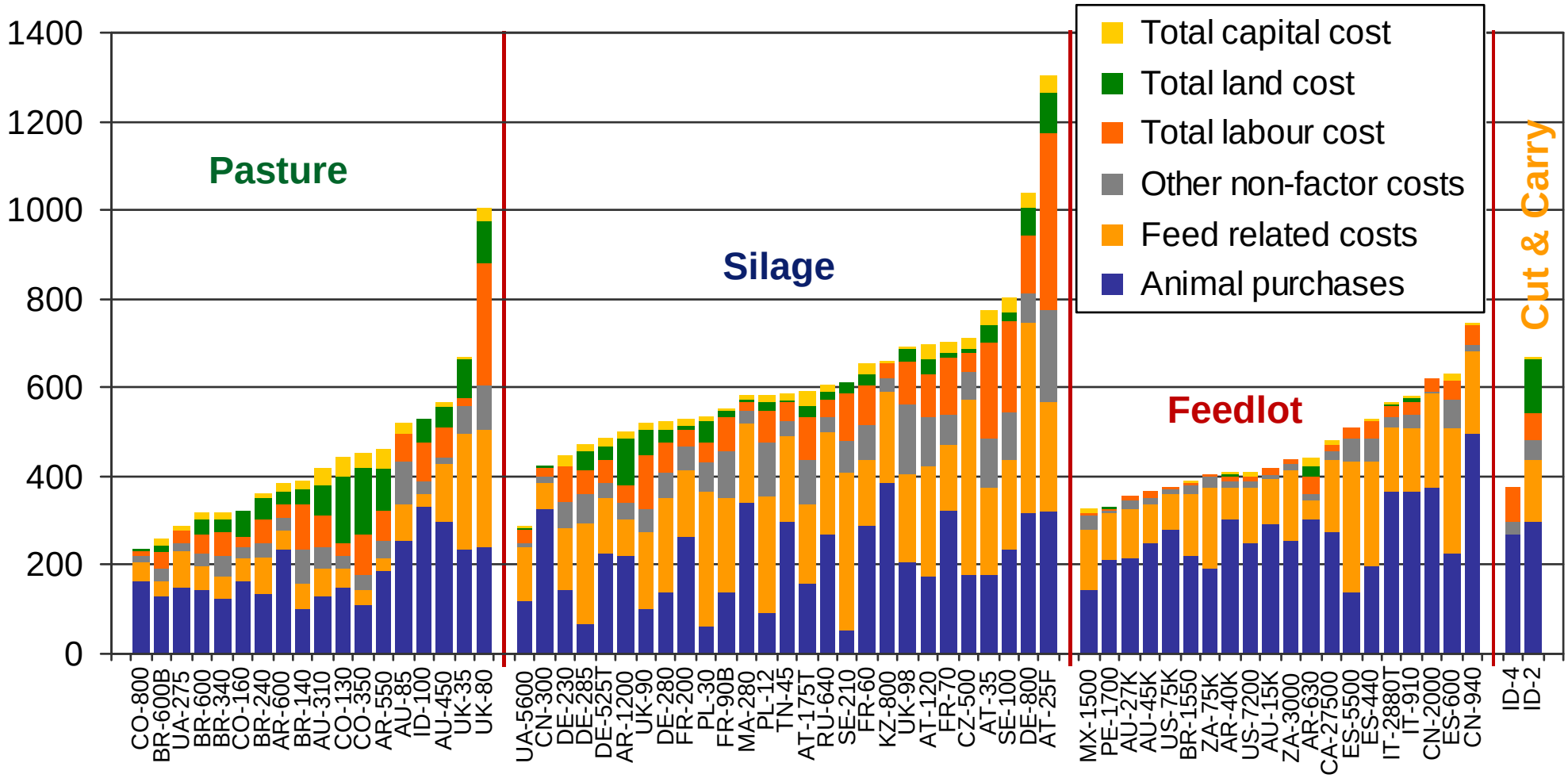
	Dairy origin		Cow-calf origin
Animal type *Young animals (calves, weaners)*	▪ Calves ▪ 7 days Holstein	▪ 'Starter' ▪ 2 months Simmental	▪ Weaners 6-9 months ▪ Beef breeds and crosses
Animal type *Pre-finished backgrounders/ stockers/stores*	▪ Back-grounders ▪ 6-7 months ▪ 190 kg	▪ Back-grounders ▪ 5-6 months ▪ 190-200 kg	▪ Backgrounders ▪ 11-12 months ▪ 320-360 kg
Animal type *Finished slaughter cattle*	▪ Bulls ▪ 18-19 months ▪ 600-690 kg	▪ Bulls ▪ 17-18 months ▪ 650-720 kg	▪ Steers ▪ 15-16 months ▪ 550-610 kg

	 Pasture	 Silage	 Feedlot	 Cut & Carry
Feed % in dry matter	> 30% pasture	> 30% silage and other forages	> 50% grains and other energy feed	> 30% freshly cut grass & other vegetation
Management/ Housing System	Outdoor year round or part of the year	Closed or semi-open barns with slatted floors and/or straw bedding	Confined, large, open pens, partially with sun-covers	Mix of pens and grazing of paths and paddies
Extent of purchase feed	Low	Medium	High	Low
Type of animal	Mainly steers (and heifers)	Mainly bulls (and heifers)	Mainly steers (and heifers)	Mainly bulls (and heifers)
Main locations	Southern Hemisphere, Ireland, UK	Europe, China, increasingly South America	North America, Australia, Italy, Spain, South Africa, incr. South America	Asia and Africa
Farm sizes	Small to large	Medium	Large 1,000-50,000 head one time capacity	Small

Source: agri benchmark

Total cost by production systems

US$ per 100 kg carcass weight sold



Source: agri benchmark

Impact on price changes on cost of production and profitability – two examples

Feed costs are 25 % of total costs (for example pasture, feedlot)

Example 1		
Feed costs are	25%	of total costs
Beef price	450	USD per 100 kg CW
Total cost	400	USD per 100 kg CW
Feed costs	100	USD per 100 kg CW
Difference	350	USD per 100 kg CW

Feed costs are 50 % of total costs (for example silage)

Example 2		
Feed costs are	50%	of total costs
Beef price	450	USD per 100 kg CW
Total cost	400	USD per 100 kg CW
Feed costs	200	USD per 100 kg CW
Difference	250	USD per 100 kg CW

Source: FAOStat

Impact on price changes on cost of production and profitability – two examples

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200%	900	700	680	640	600	560	520	500

USD figures

Percentage of original price

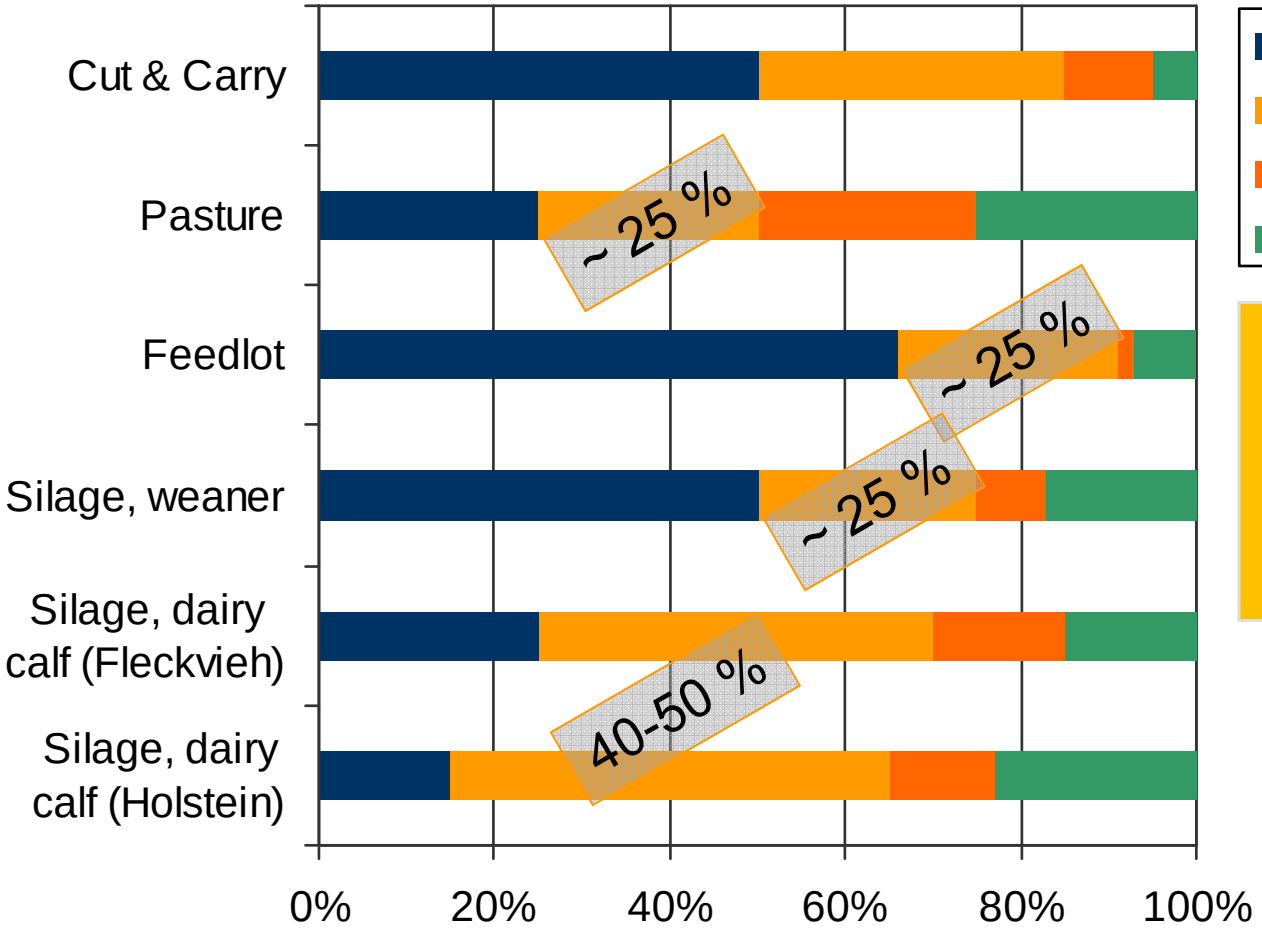
Situation worse than before

Situation better than before

Source: FAOStat

Proportion of feed related costs in total costs

Proportion in total costs



Feed related costs

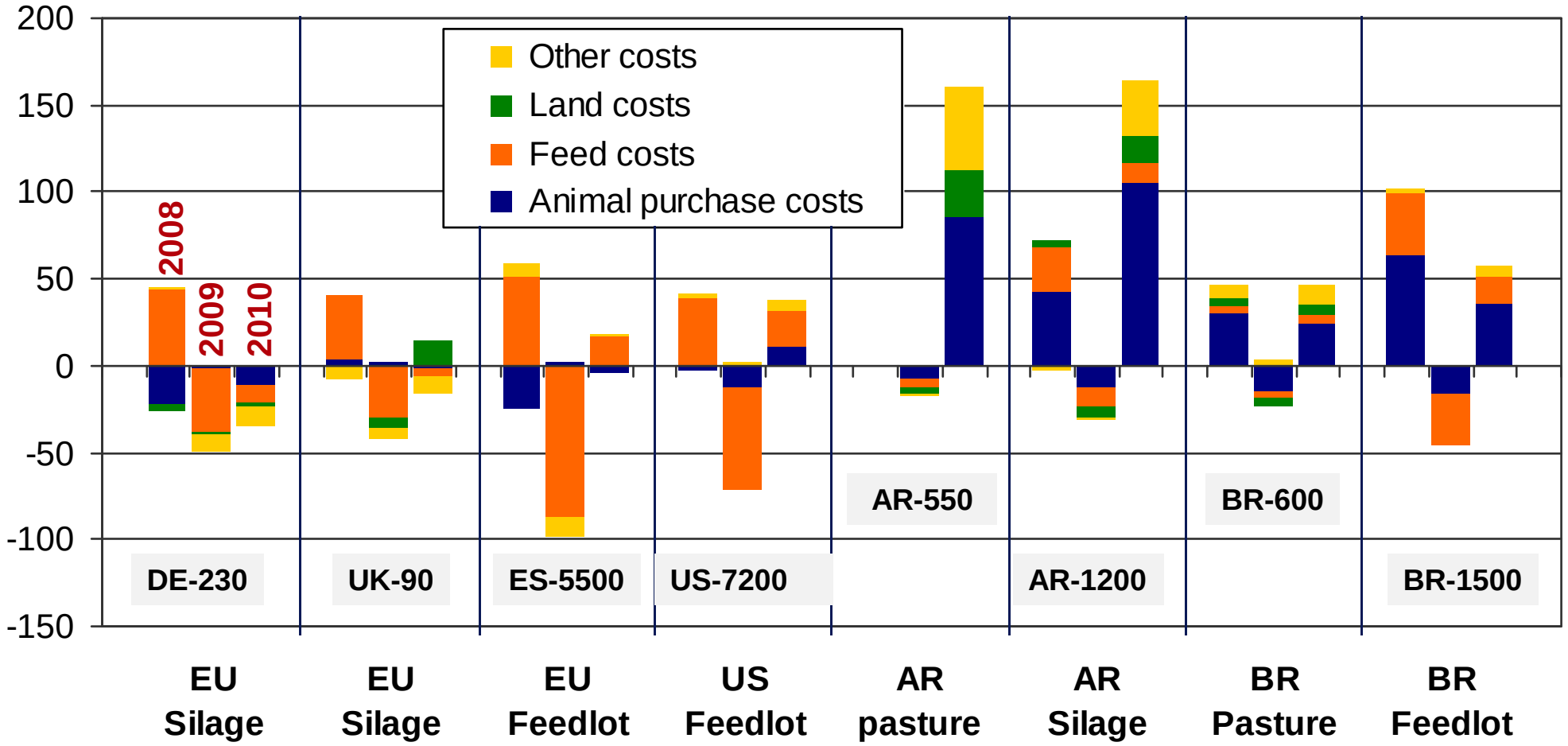
- Purchase feed
- Seed, fertiliser, pesticides
- Machinery depreciation & maintenance
- Fuel and energy
- Land

Source: agri benchmark

Finishing: Cost drivers for selected farms

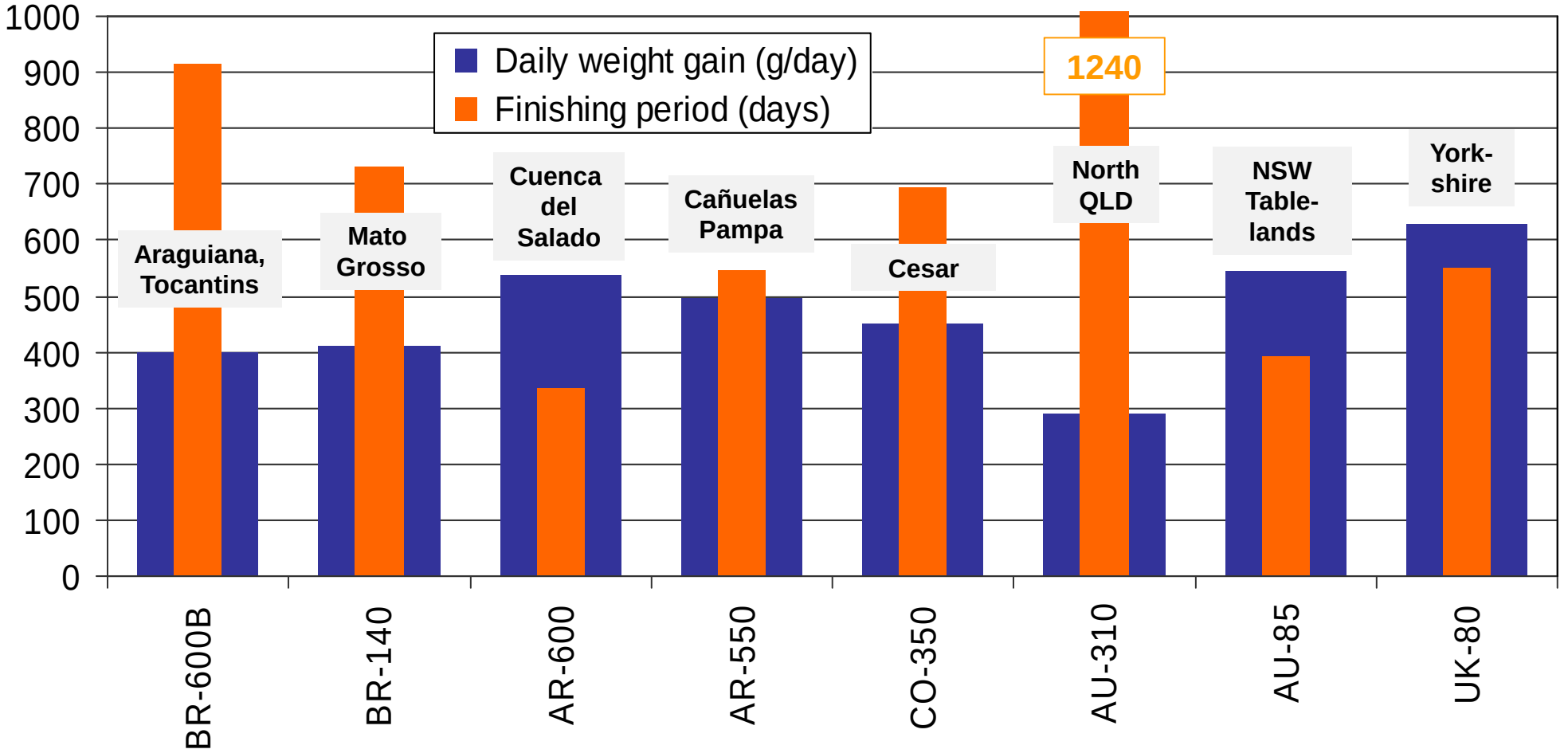
Changes to previous year 2008 – 2010

US$ per 100 kg carcass weight



Source: agri benchmark

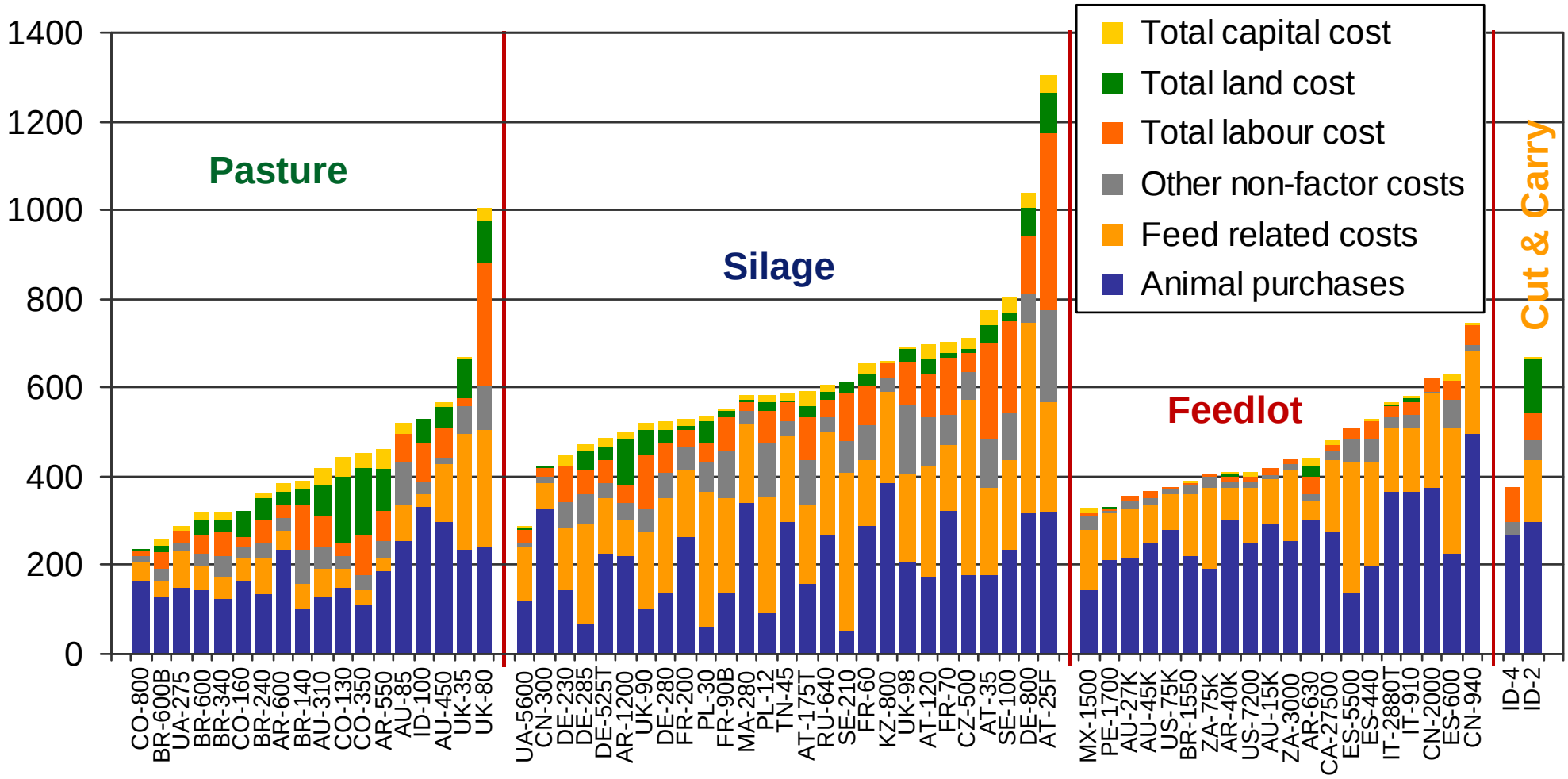
Increasing productivity in the pasture system



Source: agri benchmark

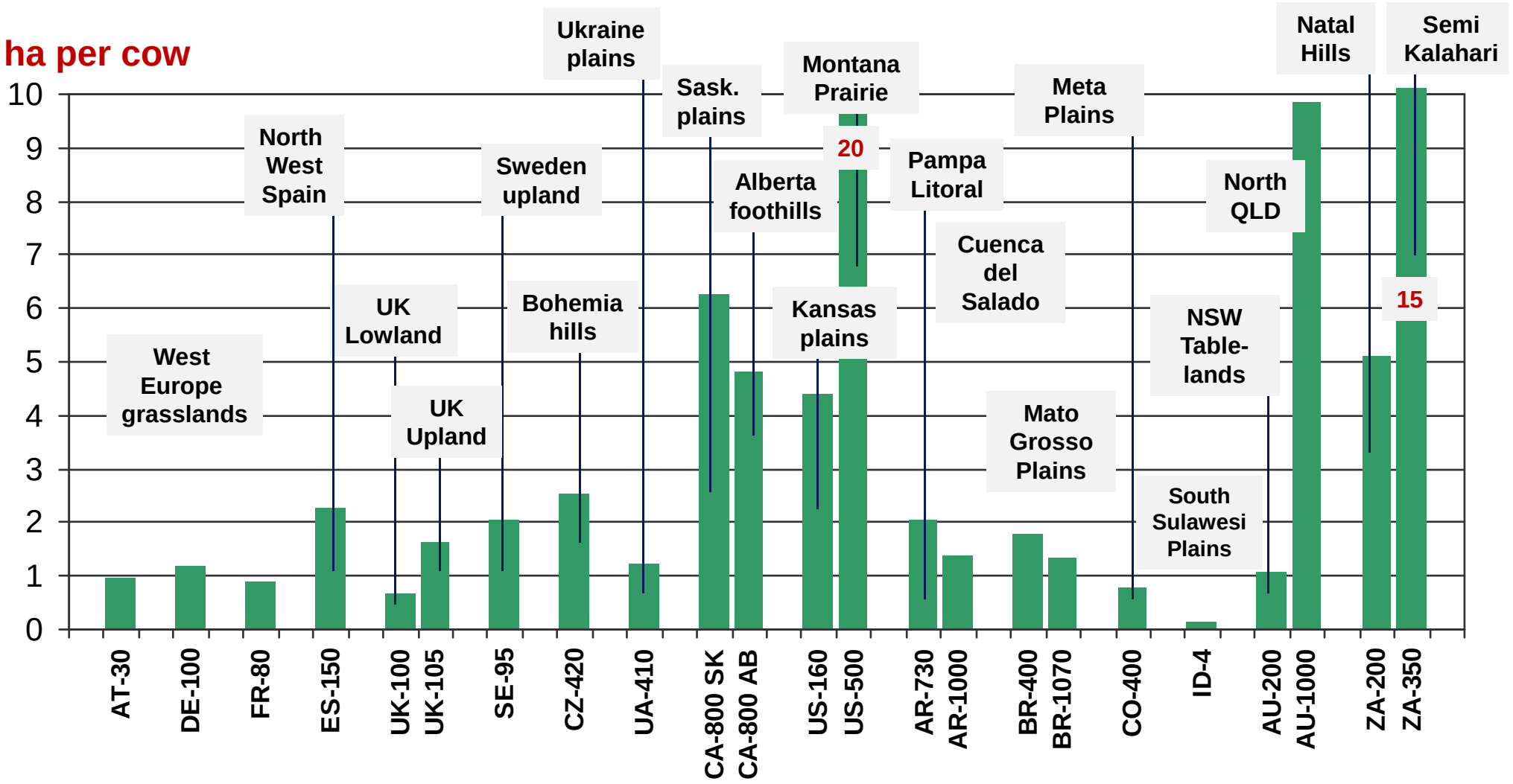
Total cost by production systems 2011

US$ per 100 kg carcass weight sold



Source: agri benchmark

Land intensity in cow-calf farms

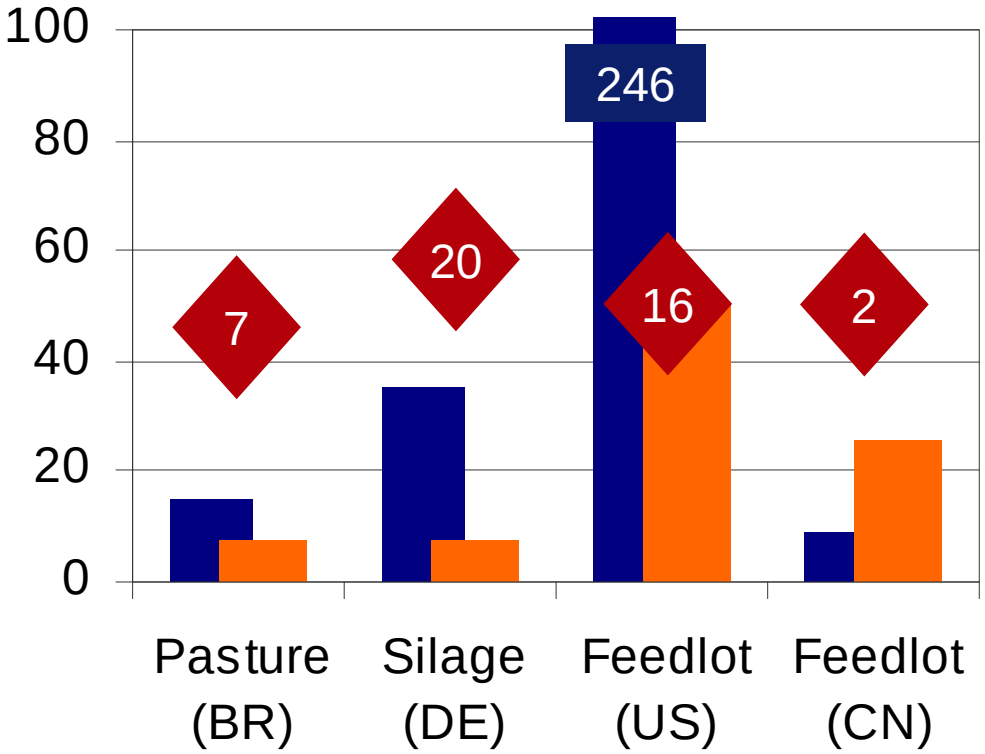


Source: agri benchmark

Labour productivity in beef finishing farms

Physical / economic labour productivity

kg CW per hour[1)] USD returns per USD labour cost[2)]



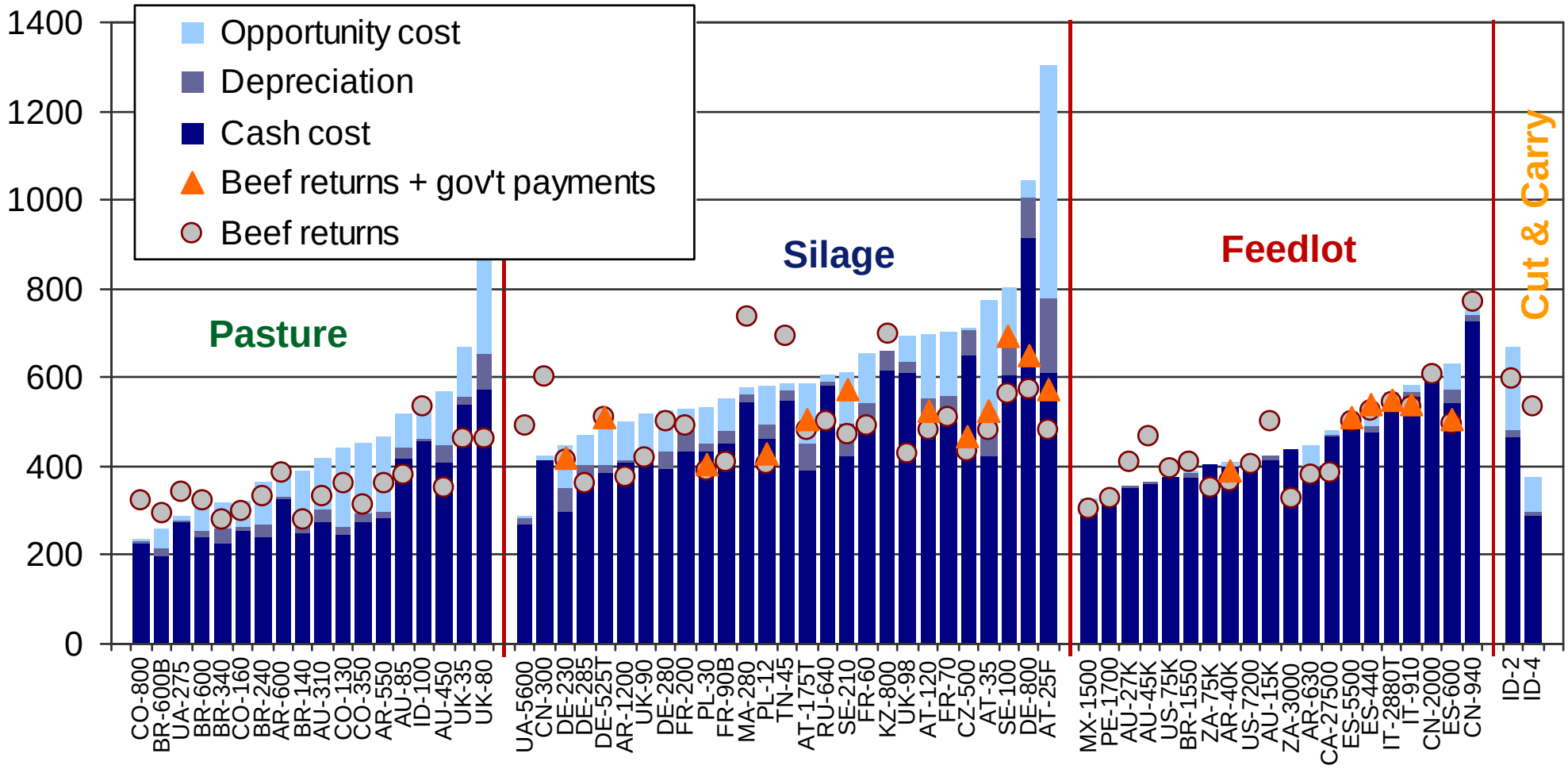
Physical labour productivity:
Carcass weight (CW) sold / Total hours worked

Economic labour productivity:
USD returns per kg CW / USD labour costs per kg CW

7 **Regional wage level**

Total cost and returns by production systems

US$ per 100 kg carcass weight sold



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