Description of beef production

Deliverable 2.1

Authors : Jimmy Balouzat, Adrien Vaudaux, Pauline Madrange

Co-Authors : Raphaelle Botreau, Emilie Braun, James Breen, Wolfgang Britz, Philippe Dimon, Maëva Guillier, Sylvain Hennart, Miriam Iacurto, Lennart Kokemohr, Louise Legein, Michel Lherm, Annick Melchior, Claire Mosnier, Edward O'Riordan, Christoph Pahmeyer, Giacomo Pirlo, Eduard Reding, Didier Stilmant, Patrick Veysset, Rienne Wilts

This research was made possible by funding from **SusAn**, an ERA-Net co-funded under European Union's Horizon 2020 research and innovation programme (www.era-SusAn.eu), under Grant Agreement n°696231

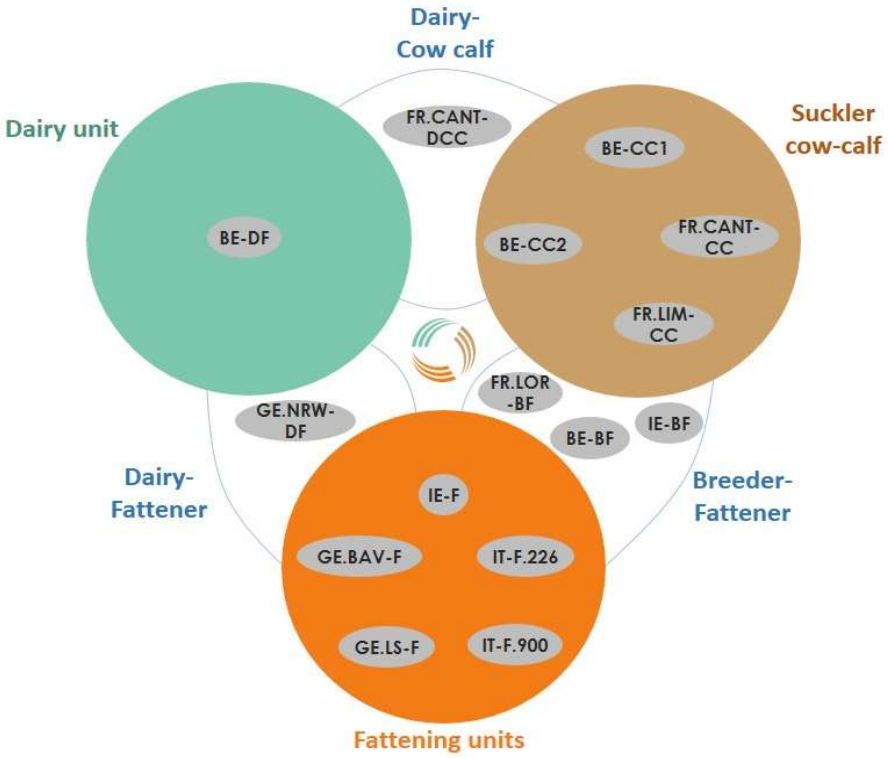
TABLE OF CONTENT

INTRODUCTION

The aim of this document is to describe beef production in the five partner countries involved in Sustainbeef project: Belgium, France, Germany, Ireland and Italy.

Fifteen case studies are presented in this document. They represent fifteen different farm types which were selected in order to show the diversity of farming systems producing beef in Europe. Therefore, these case studies are part of six different systems:

- Suckler cow-calf systems : 4 case studies
- Breeder-Fattener systems : 3 cs
- Fattening specialised systems : 5 cs
- Dairy-Fattener systems : 1 cs
- Dairy specialised systems : 1 cs
- Mixt dairy and suckler systems (twofold herd) : 1 cs



They are representative of nine production areas :

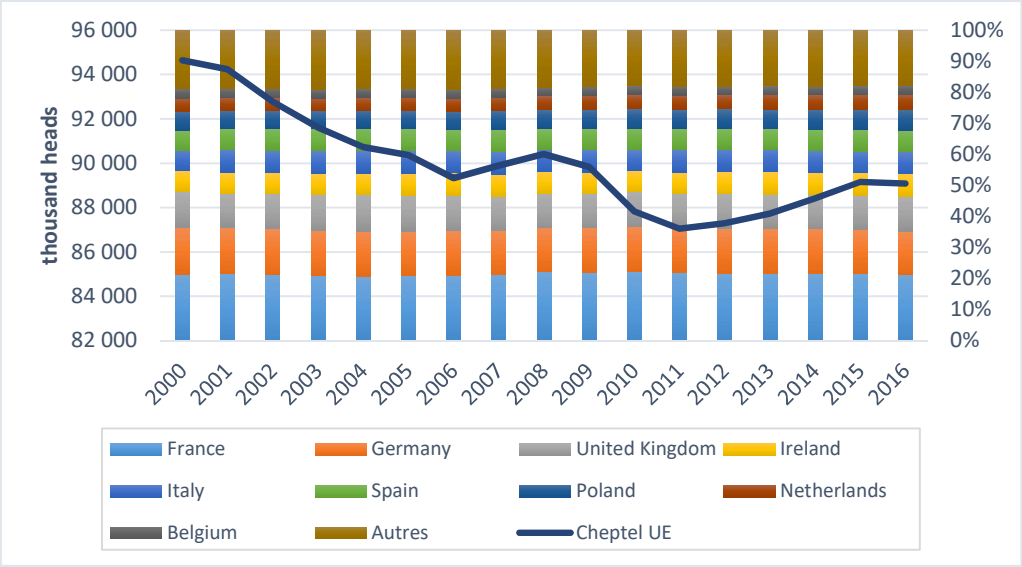
- In Belgium : *Wallonia* (4 case studies)
- In France : *Massif Central* (3 cs) and *Lorraine* (1 cs)
- In Germany : *Bavaria* (1 cs), *North Rhine Westphalia* (1 cs) and *Lower Saxony* (1 cs)
- In Ireland : *North West* (1 cs) and *South East* (1 cs)
- In Italy : *Veneto* (2 cs)

Quantitative and qualitative data describing these fifteen case studies were collected, pooled and standardized, providing a full understanding of the technical and economical functioning of the case studies. The description form includes six sections:

- General information : Name, localisation of the case study, reference year of the data
- Structure : Labour, land endowments, herd size, livestock buildings, other buildings and equipments
- Crops and grassland : Fertilisation, phytosanitary treatments, harvest
- Herd composition : Annual purchases and sales of animals, performance indicators
- Growth & diet : Daily and annual diets of different groups of animals
- Economic results : Ouput, expenses, capital

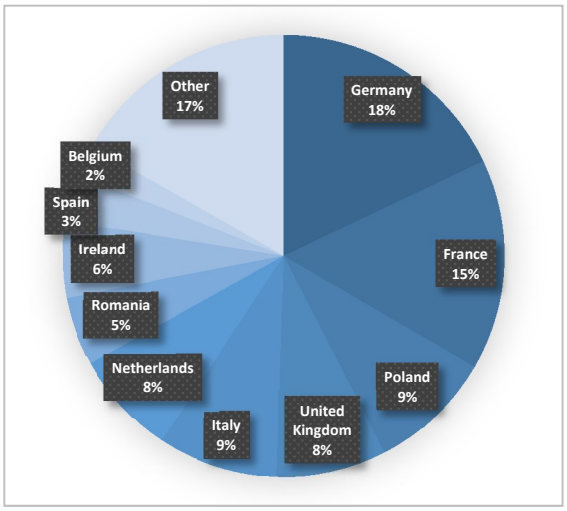
This deliverable includes fact sheets providing an overview for each case study. Full data are available in the form of Excel files.

Figure 1: Evolution of the European cattle since 2000 (*1000 heads)



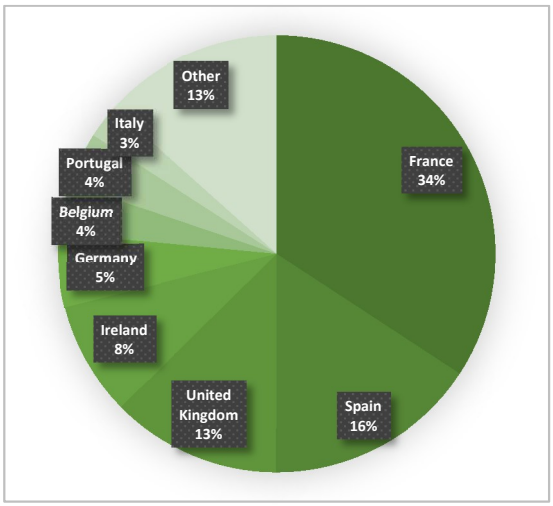
Source : Inra, by Eurostat

Figure 2: Repartition of the European dairy cow herd in 2016



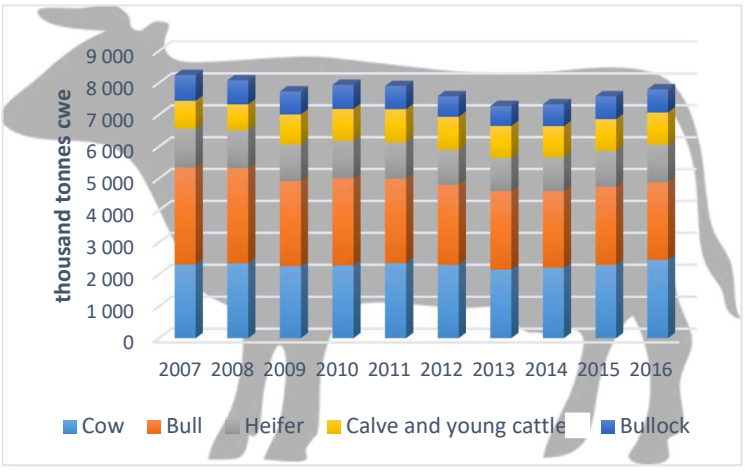
Source : Inra, by Eurostat

Figure 3: Repartition of the European suckling cow herd in 2016



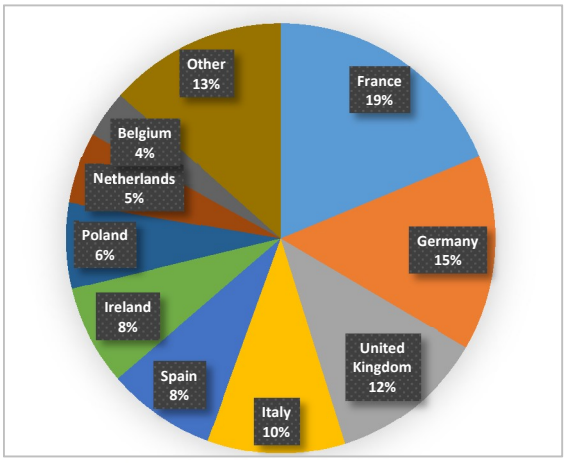
Source : Inra, by Eurostat

Figure 4: Evolution of European beef production and type of animal produced



Source : Inra, by Eurostat

Figure 5: Repartition of the European beef production in 2016



Source : Inra, by Eurostat

BEEF PRODUCTION IN THE EUROPEAN UNION

Thanks to its temperate climate, the heterogeneity of its territories and the agronomic wealth of its soil, the European Union is a diversified area for agricultural production. Animal production represents, on average, 40% of the final agricultural production. However, the last decade has seen an increasing concentration of livestock production in the most competitive areas and in larger farms (Roguet et al. 2015).

THE EUROPEAN HERD

5th largest cattle population in the world in 2016, the EU has 89 million head, with 5 countries (France, Germany, the UK, Ireland and Italy) accounting for more than 60% (Figure 1). EU cattle has decreased by 6% since 2000 due to the decapitalization in the dairy herd. In 2016, the EU had 23.5 million dairy cows and 12.3 million beef cows (Eurostat 2017).

The EU dairy cattle is mainly concentrated in 6 countries accounting for 67% of the European dairy cows: Germany, France, Poland, Italy, the UK and the Netherlands, while the 4 main countries with suckler cows (France, Spain, the UK and Ireland) held 71% of EU beef cattle (Figure 2 & 3), mainly valorizing less favored zones such as the Massif central in France, dry mountains in Spain or Scottish Hills in the UK (Lherm et al. 2017).

EUROPEAN BEEF PRODUCTION

In 2016, the EU was the third largest beef production area in the world, behind the USA and Brazil. With 7.8 million CWE (from 26.6 million heads), the EU has produced 11.5% of the global beef production.

The EU produced mainly beef from culled cows and young bulls with differences between milk oriented countries and countries with specialized herd for beef production. Cull cows in milk producing herds are the main type of meat from females while males are either fattened as calves (mainly in Spain, France or the Netherlands) and young bull or steers (Ireland, the UK). In specialized herds, the main products are cull cows, young bull and heifers (Figure 4 & 5).

TRADE IN THE EUROPEAN UNION

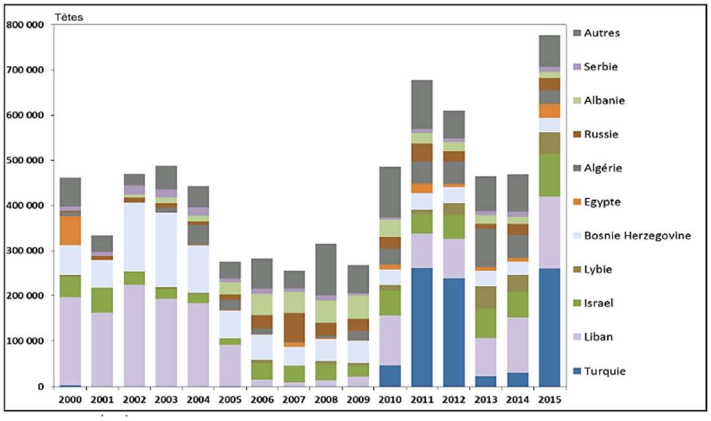
The EU account for only 2% of world beef exports and 3% of world beef import, excluding intra-EU trade (Chatellier 2016).

In 2015, the EU has exported 622 700 heads of live cattle (excluding animals for breeding) mainly to Lebanon, Turkey, Libya, the Maghreb and Egypt (Figure 6). Exports have increased by 78% compared to 2014 due to the Turkish market (GEB-Idele 2016a). Trade markets for European live cattle are uncertain mainly for geopolitical issues and market protection rules (Chatellier 2017).

EU export of fresh and frozen meat have reached 239 000 T CWE in 2015. Main clients for EU meat are the Balkans, South-East & Central Asia and North Africa. Compared to 2000, they have reduced by half due to the foreclosure of Russia market to European meat (Figure 7).

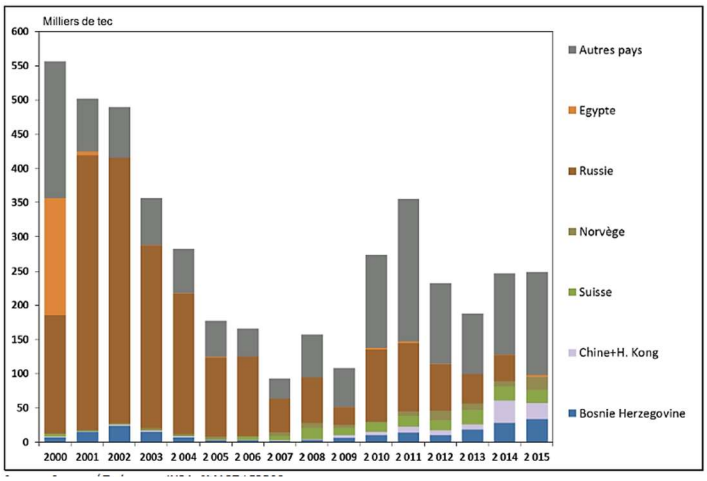
EU have imported 320 000 T CWE of beef in 2015, those imports have dropped by 40% compared to 2007 and are similar to volumes imported in 2000 (Figure 8). This is mainly explained by the decreased of importations from Brazil following the modification of the European health regulations (Chatellier 2017).

Figure 6: Exports of live cattle from the European Union (number of heads)



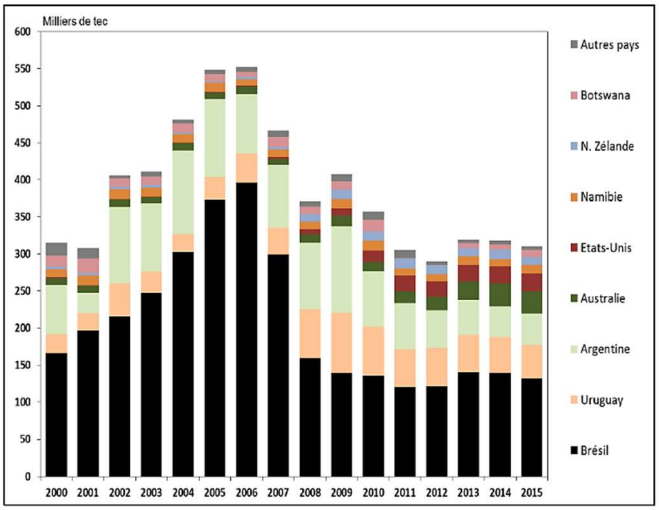
Source : Comext / Traitement Inra, SMART-LERECO

Figure 7: fresh and frozen beef exports from European Union (*1000 T cwe)



Source : Comext / Traitement Inra, SMART-LERECO

Figure 8: Beef imports of the European Union (*1000 T cwe)



Source : Comext / Traitement Inra, SMART-LERECO

Figure 9: Evolution of Belgian beef production

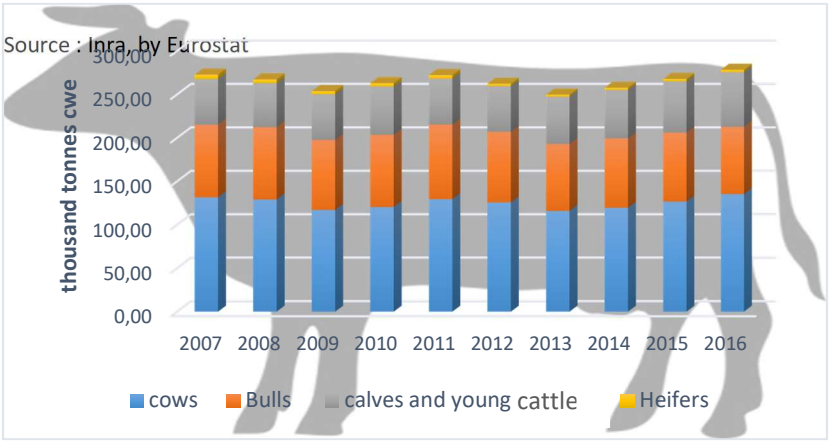
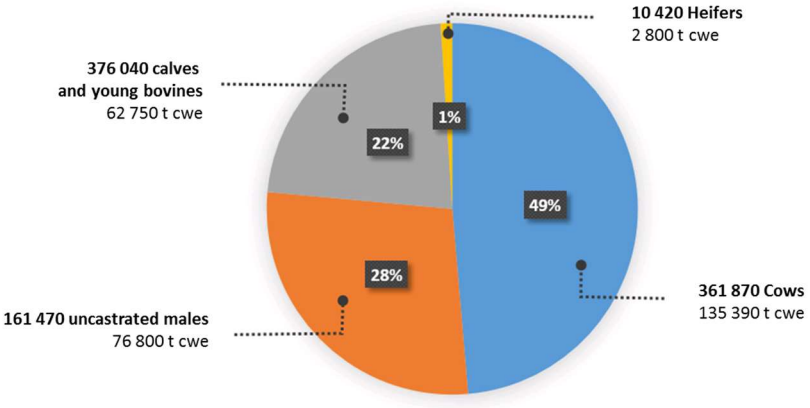
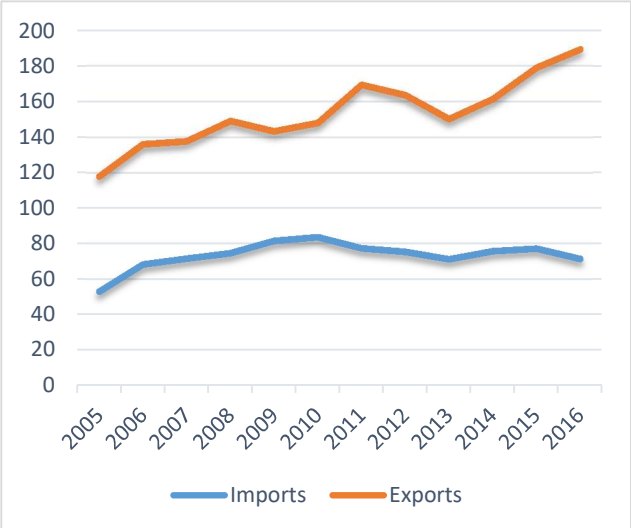


Figure 10: Type of animals produced in Belgium in 2016



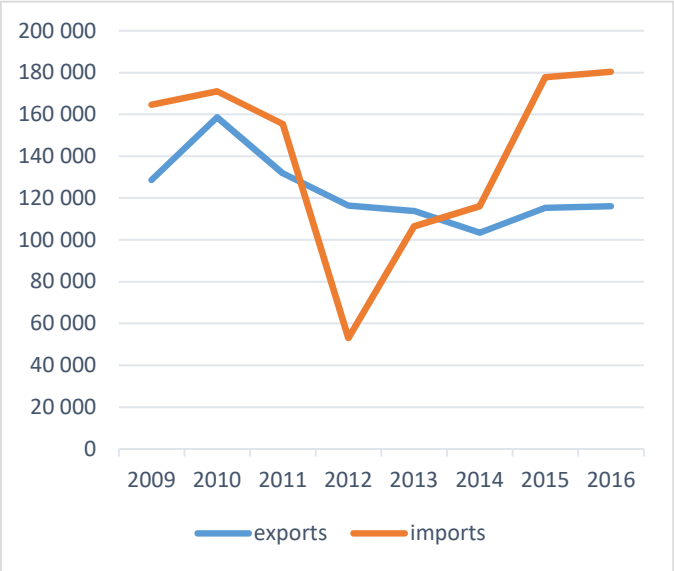
Source : Inra, by Eurostat

Figure 11: Evolution of beef foreign exchange in Belgium (x1000 T cwe)



Source : Inra, by DG Statistiques - Statistics Belgium

Figure 12: Evolution of Belgian live cattle foreign exchange (number of heads)



Source : Inra, d'après FranceAgriMer

BELGIUM

GENERAL ELEMENTS

Belgium has 1.3 million ha of useful agricultural area. With 278 thousand T cwe produced from 911 000 heads in 2016, beef production is an important part of Belgium agricultural production (figure 9). This production has decreased by 8% in volume since the 1980s and has remained stable since the 2000s. Beef production comes mainly from dairy culled cows and fattened young bulls (figure 10).

Belgian beef consumption is decreasing (-26% in the last 10 years) and reached 14.2 kg cwe par inhabitant in 2016. Belgium exports its large surplus of production (DG statistique – Statistics Belgium 2017).

FOREIGN EXCHANGES IN BELGIUM

BEEF EXCHANGES

In 2016, Belgium has exported 189 thousand T cwe of beef, accounting for 68% of its production. Exports have increased by 60% since 2005 (figure 11) and mainly consist of fresh meat. Belgium main markets are the Netherlands, France, Italy and Germany, those 4 countries accounting for 85% of Belgian exports. The Netherlands mainly import veal from Belgium while France favour cuts for processed meat. The remaining meat is exported to Middle-East, South Africa and Eastern Europe (Sogepa 2015).

Belgium imports have remain relatively stable since 2007 between 70 and 80 thousands T cwe of beef, mainly from the Netherlands, France, the United Kingdom and Ireland (Sogepa 2015).

EXCHANGES IN LIVE ANIMALS

In 2016, Belgium has exported 116 thousand live animals (-27% since 2010) towards mainly the Netherlands (75%) and Italy (10%) (Figure 12) and has imported 180 thousand live animals (x2.4 since 2012) from The Netherlands (72%), Germany (17.5%) and France (9%).

TYPOLOGY OF THE BELGIUM HERD

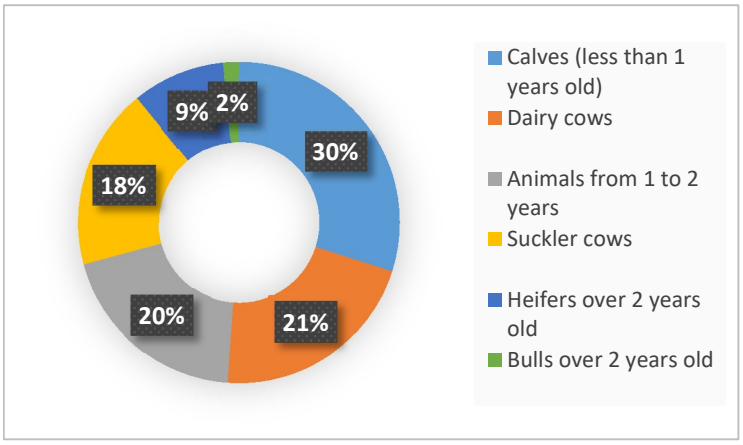
Belgium is divided in two main regions: Wallonia and Flanders. In 2014, there was 21 thousand bovine farms in Belgium. The Belgian herd had 2.5 million heads in 2016 (-17% since 2000) with 531 thousands dairy cows and 457 thousand suckling cows (Figure 13). Since the 1980s, the dairy herd has decreased by 47%, compensated by the increased of the suckling herd which has been multiplied by 2.5.

Cattle population is distributed equally between Flanders and Wallonia. The wallon herd is mainly a suckling herd while the flanders' herd is mainly a dairy herd (SPF Economie 2013).

BEEF PRODUCTION IN WALLONIA

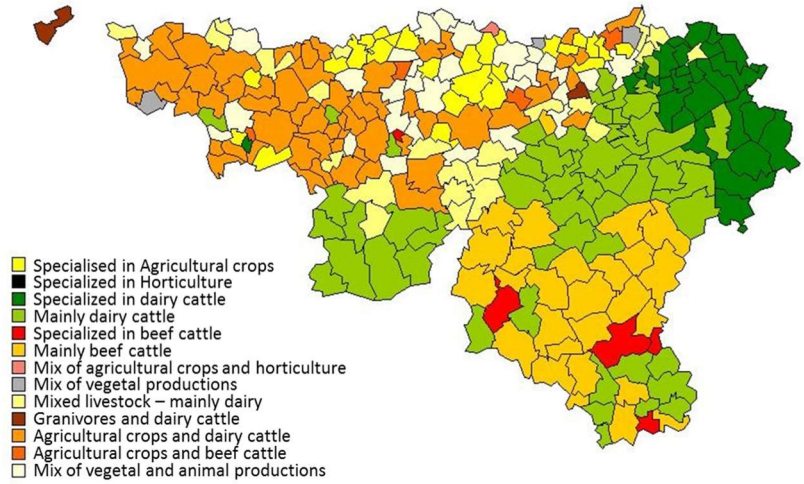
The agricultural production in Wallonia is dominated by livestock productions and more specifically beef production. There was 1.18 million heads in Wallonia in 2014 (-23% since 1990) (SPW-DGARNE 2015) with 275 thousands suckling cows and 209 thousands dairy cows (respectively 60% and 40% of Belgium herds) (BCZ-CBL 2017).

Figure 13 : Type of animals held in farms in Belgium in 2016



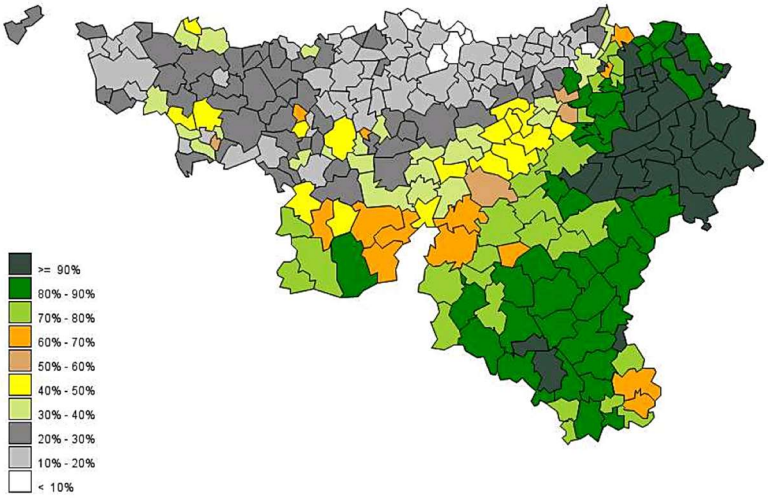
Source : Inra, d'après Eurostat

Figure 14: Repartition of cattle systems' in Wallonia



Source : CRA-W

Figure 15: Part of grasslands in the UAA in Wallonia in 2015



Source : SPW, DGARNE, Direction de l'Analyse économique agricole et SPF Economie, Direction générale Statistique

Beef production is mainly located in the south of Wallonia in the Luxembourg region (figure 14). 90% of the production is based on the Belgian Blue breed characterized by well-conformed and lean animals (CRA-W 2012). Dairy production is mainly located in eastern Wallonia in the Liège region, rich in grasslands and in the north-west of Wallonia (Figure 14 & 15). It is mainly based on the Holstein breed.

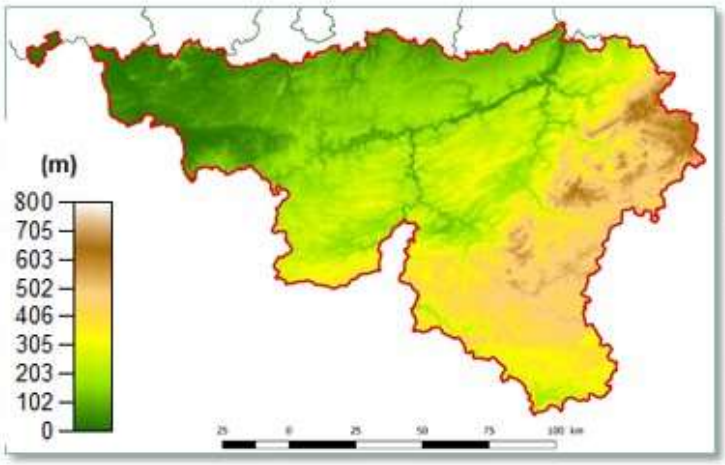
In 2014, there was almost 9 thousand bovine farms in Wallonia 5.5 thousand owning dairy cows and 7.2 thousands owning suckling cows. Bovine production, both dairy and beef, are getting more and more specialized with fewer yet larger farms with an average of 133 heads per farm in 2015 (vs. 95 in 2000). Moreover, indoor breeding has developed over the last few years (SPW-DGARNE 2015).

Specialized dairy farms have on average 71 dairy cows with only 10% of the farms owning more than 120 cows. On average 68% of the UAA is in permanent grasslands (Cellule d'information lait 2017).

Most suckling farms in Wallonia are cow-calf holdings, the fattening being less and less done on the farm of origin. Lean animals (either cows, heifers, calves or young bovines) are fattened in specialized farms (SPF Economie 2013)

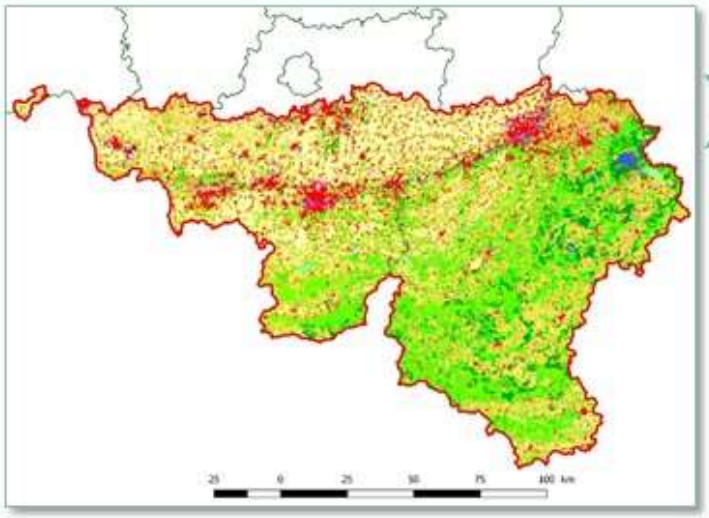
Wallonie

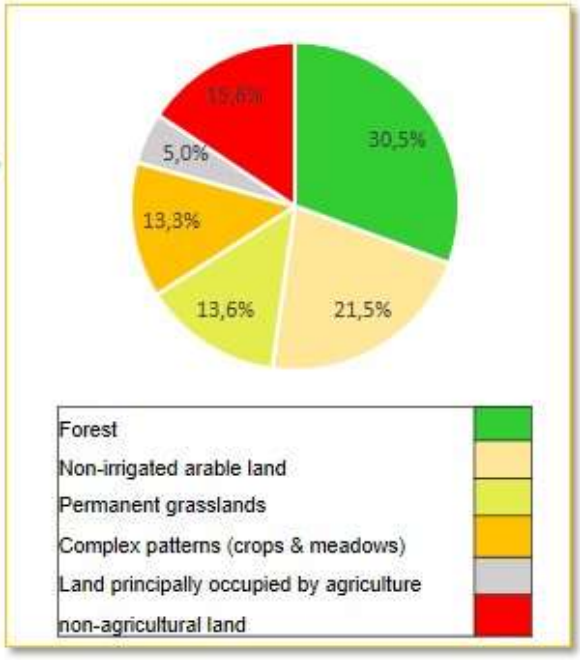
Belgium



The Walloon country is made of low open plateaus, hills and steep-sided valleys which, starting from a gently sloping northern bank, extend to the Ardennes massif.

ZONE	Wallonie
AREA (km²)	16844
ALTITUDE (m)	
min	7
max	694
mean	253



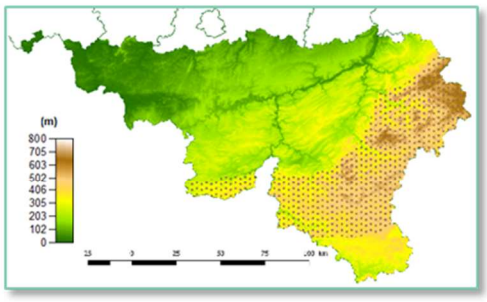


Based on the Corine Land Cover (CLC) 2012

Maps were edited on QGis 2.14.22

BE-CC1
Wallonia, Belgium

Extensive suckling system
82 cows Belgian Blue
Production of weanlings



localization of the case-study

- This system represents suckler cow farms from the highlands of the Ardenne region based on the breed Belgian Blue White (BBB). Given the predominance of grassland and more specifically permanent grassland, agricultural holdings are mainly oriented toward the production of herbivores and more specifically cattle.
- The production system is mainly oriented towards the sale of grazers less than one year old, which are sold in order to be fattened on other territories.
- This is an extensive system exclusively based on grass, and especially permanent grassland.

72 Calvings
138 Livestock Units (LU)

1 family workers
0 employees

134 ha UAA

Sales

- 35 store weanlings
- 2 heifers
- 34 culled cows

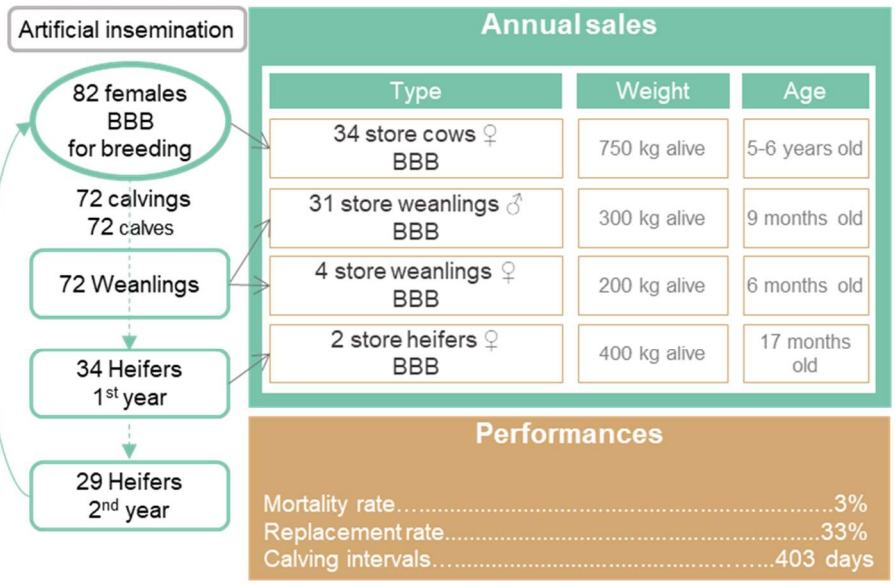
1,13 LU / ha Main Forage Area

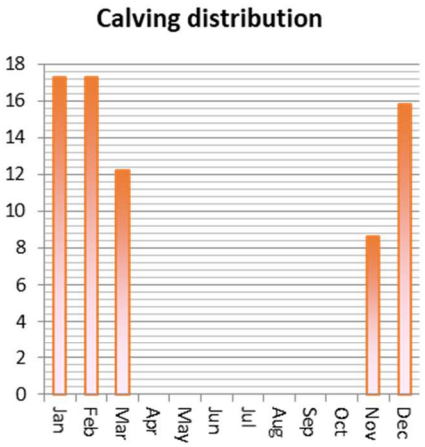
Cropping system :

- **122 ha grassland**
  - 39 ha temporary
  - 83 ha permanent
- **12 ha barley**

Livestock

BE-CC1





Gross Meat Production :
37 025kg alive

- The herd is quite small with a livestock rate around 1,13 LU/Ha of forage area. The calving is done by caesarean. This practice explains the low mortality rate and the high replacement rate. Indeed according to veterinary aspect, only three caesareans are possible for the cow.
- The male calves are generally sold after weanling for fattening in other farms outside the region, mainly in Flanders or Italy.

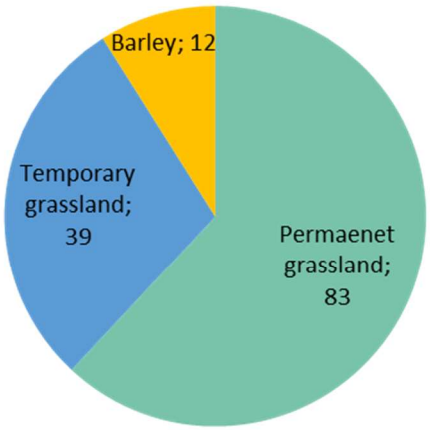
		Forage supplies (kg dry matter / animal / year)				
		Grazing	Hay	Grass silage	Concentrate	Cereals
Females	0-6 m.o.	Yes	2		0,75	
	6-12 m.o.	Yes		4	0,75	
	12-24 m.o.	Yes		9		
	24-33 m.o.	Yes		10		
	Cow up to 78 m.o.	Yes		10		1
Males	0-6 m.o.	Yes	2		0,75	
	6-12 m.o.	Yes		4,5	0,75	

Crops & grassland

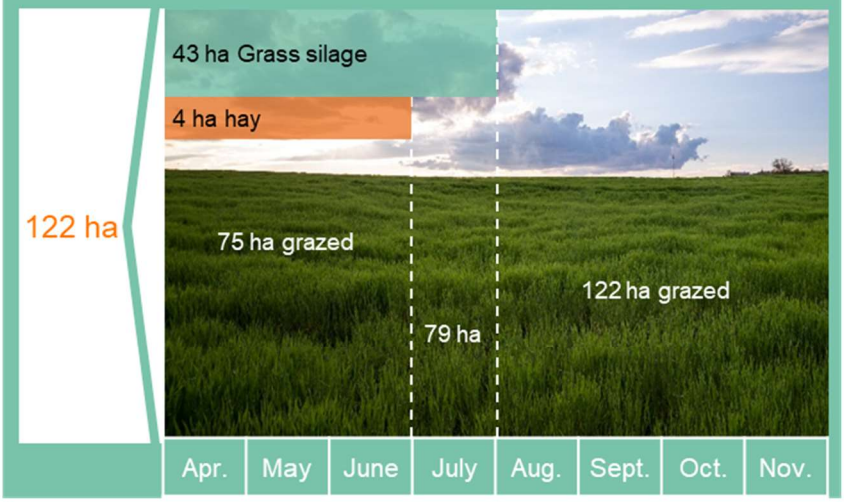
BE-CC1

Sustainbeef

UAA : 134 ha



Fodder system



Fertilisation

	Block	ha	Mineral fertiliser (U/ha) N	P_2O_5	K_2O	Organic fertiliser
Grassland	Only grazed	64	33	10	10	Compact manure : 20 T/ha
Grassland	Hay + grazed	4	33	10	10	
Grassland	Silage+ grazed	54	33	10	10	
Annual crops	Barley	12	25	12	25	

Harvest

		ha	Yield Ton DM / ha	Total Ton DM	Sold Ton DM
Grassland	Hay	4	3,5	15	0
Grassland	Grass silage (two cuts)	54	6	297	0
Annual crops	Barley	12	2,2	26,5	0

- The main production is grass. During the summer the herd is on pasture. Grass is the only diet of the herd. During winter, the diet is composed by conserved grass, silage or wrapped. Young animals receive hay before grass silage or wrapped grass after one year.
- Grasslands are fertilised with nitrate 27: one time at the end of winter/beginning of spring with 100-150kg of fertiliser. Grasslands are cut one to three times per year to insure a sufficient amount of forage for the winter period.

Production vs. Needs

(Tons)	Total needs	Total production	Quantity purchased
Hay	15	15	0
Grass silage	232	236	0
Barley	15	51,6	0
Straw	56	48	8

Buildings	Main equipments
Deep litter with concrete area 160 p.	1 Tractor 100-99 hp + 1 Tractor 150-199 hp
	Plough
	Manure spreader
	Mower & Windrower

Economic results (2016)

BE-CC1

Sustainbeef

Total gross output	142 558€
Sales of Livestock & Livestock products	90 260€
- Purchases of Livestock	0 €
Total gross output / livestock	**52 765 €**
Crops :	
Sales of crop products	6 584€
Farm use of crop products	0 €
Total gross ouput / Crops	**6 584€**
Not-coupled aid :	
Coupled support	22 364€
Single farm payments (DPU)	15 688 €
Compensatory Allowances for Natural Handicaps (CANH)	5 808€
Other aids (except for investment)	1 855 €
Total aid	**45 714€**

Total expenses	56 093 €
Operating expenses	**28 706 €**
Purchases of straw	
Purchases of feed and minerals	12 274 €
Self- consumption of cereals	
Veterinary costs	10 346 €
Other specific livestock costs	1 431 €
Operating expenses / Livestock	**24 051 €**
Purchases of seeds and seedlings	2 164 €
Fertilisers and soil improvers	2 258 €
Crop protection products	233 €
Other specific crop costs	
Operating expenses / Crops and grassland	**4 655 €**
Structural expenses	**27 387 €**
Machinery & building maintenance costs (except depreciations)	5 780 €
Energy (fuel)	4 821 €
Contract work	5 666 €
Other expenses : water, insurance, accountability…	11 120 €

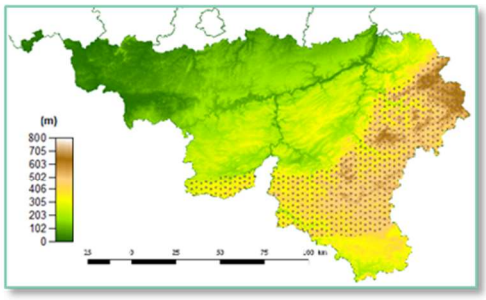
Wages and social insurance	Na €
Rental charges	**13 380 €**
Depreciations	**4 255 €**
Interests and Financial expenses	**23 133 €**

Non-land total assets	852 987 €
Capital : Livestock	230 685 €
Physical Capital : Equipment	11 579 €
Physical Capital : Buildings and Facilities	610 723 €
Physical Capital : Stocks	Na

Based on the data from AWE & DAEA 2016

BE-CC2
Wallonia, Belgium

Intensive suckling system
133 cows Belgian Blue
Production of weanlings



localization of the case-study

- This system represents suckler cow farms based on the breed Belgian Blue White (BBB). Given the predominance of grassland and more specifically permanent grassland, agricultural holdings are mainly oriented toward the production of herbivores and more specifically cattle.
- The production system is mainly oriented towards the sale of grazers less than one year old, which are sold in order to be fattened on other territories.
- The presence of a load greater than 2 LU/ha underlines a certain level of intensification of production that limits their feed self-sufficiency and makes them dependent on inputs such as fertilizers or food supplements

180 Calvings
250 Livestock Units (LU)

2 associate workers
0 employees

118 ha UAA

Sales

- 92 store weanlings
- 62 culled cows

3,40 LU / ha Main Forage Area

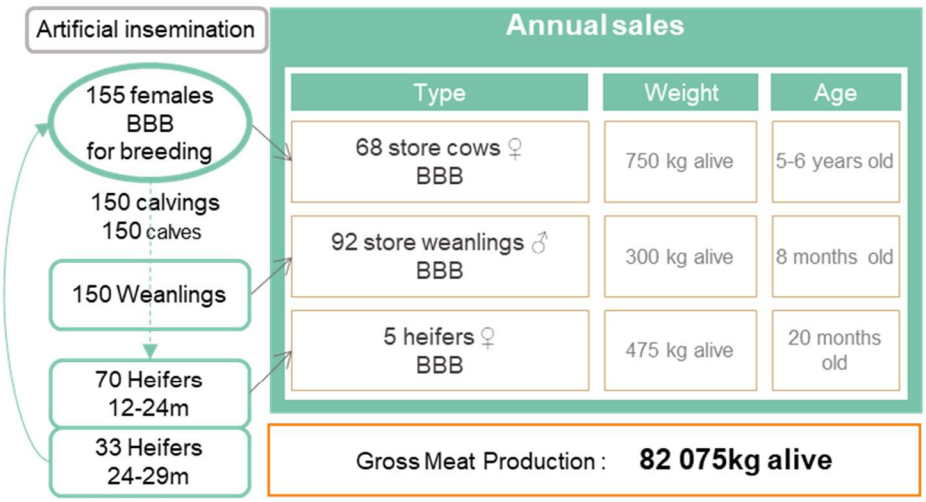
Cropping system :

- 64 ha permanent grassland
- 9,2 ha maize silage
- 28,6 ha wheat
- 8 ha Barley
- 7,7 ha sugar beet

Livestock

BE-CC2

Sustainbeef

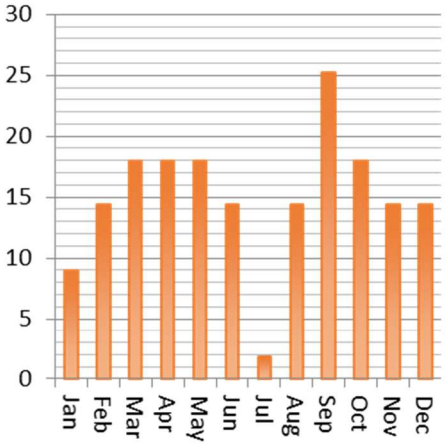


Annual sales

Type	Weight	Age
68 store cows ♀ BBB	750 kg alive	5-6 years old
92 store weanlings ♂ BBB	300 kg alive	8 months old
5 heifers ♀ BBB	475 kg alive	20 months old

Gross Meat Production : **82 075kg alive**

Calving distribution



- The herd is quite big with a livestock rate around 3,4LU/Ha of forage area. Calvings are done by caesarean and during the all year. This practice explains the low mortality rate and the high replacement rate. Indeed, according to veterinary aspect, only three caesareans are practiced on the cow.
- Male calves are generally sold after weanling for fattening in others farms outside of the region, mainly in Flanders or Italy. Some young bulls stay on the farm and are sold around 18-20 months to propose a fatless and tender meat.
- The diet is grass based. During the summer the herd is on pasture. During the winter, the diet is composed by conserved grass, silage or wrapped. The young animals receive hay before grass silage or wrapped grass after one year.

Performances

Mortality rate…..4%
Replacement rate.....43%
Calving intervals……..389 days

Forage supplies (kg dry matter / animal / year)

		Grazing	Grass silage	Maize silage	Straw	Concen-trates	Rapeseed meal
Females	6-12 m.o.	Yes	4				
	12-24 m.o.	Yes	3	2	1	2	2
	24-29 m.o.	Yes	5	3	1		3
	Cow up to 68 m.o.	Yes	5	3	1		3
Males	6-10 m.o.	Yes	4			2	

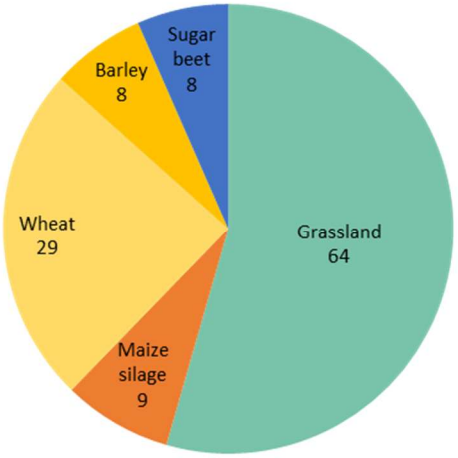
Buildings	Main equipments
Deep litter with concrete area 400 p.	2 Tractor 100-149 hp + 1 Tractor 150-199 hp
	Plough + Harrow + seeder
	Manure spreader
	Mower & Windrower

Crops & grassland

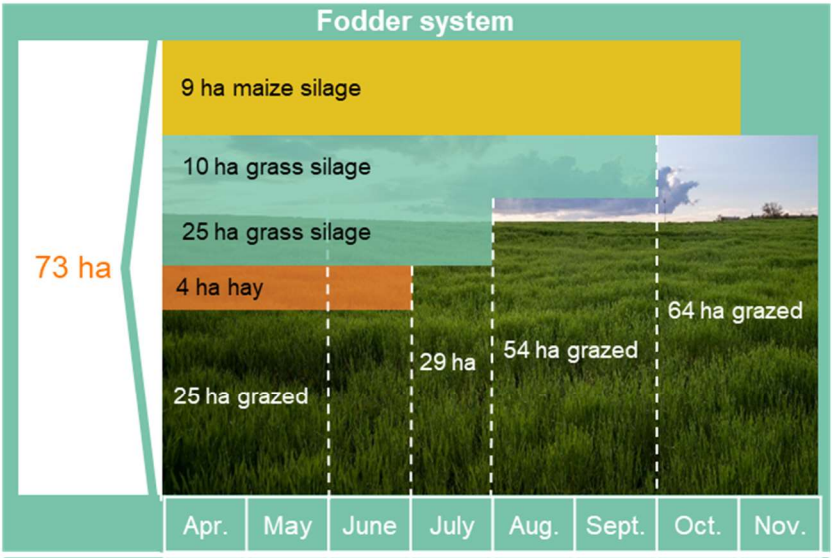
BE-CC2

Sustainbeef

UAA : 118 ha



Fodder system



Fertilisation

		ha	Mineral fertiliser (U/ha) N	P_2O_5	K_2O	Organic fertiliser : Compact manure
Grassland	Only grazed	18	118	1	1	Manure 25 T/ha
	Hay + grazed	4	118	1	1	
	Silage	42	118	1	1	
Annual crops	Maize silage	9,2	147	87	0	Manure 15T/ha
	Barley	8	189	24	0	-
	Wheat	28,6	176	24	0	
	Sugar beet	7,7	93	24	0	Manure 20T/ha

Harvest

		ha	Yield Ton DM / ha	Total Ton DM	Sold Ton DM
Grassland	Hay	4	3,5	14	0
	Grass silage	60	7,5	251	0
Annual crops	Maize silage	9,2	14	129	0
	Barley	8	9,2	75	75
	Wheat	28,6	9,3	263	263
	Sugar beet	7,7	51	394	394

- Grasslands are fertilised with nitrate 27: one time at the end of winter/beginning of spring with 100-150kg of fertiliser and a second time after the cut (100kg). Grasslands are cut between one to three times per year to insure a sufficient amount of forage to go through winter period.

Production vs. Needs

(Tons)	Total needs	Total production	Quantity purchased
Hay	14	14	0
Grass silage	209	213	0
Concentrates	94	0	94
Maize silage	113	121	0
Straw	37	220	0
Sugar beet pulp	121	0	121

Economic results (2016)

BE-CC2

Total gross output	407 540 €
Sales of Livestock & Livestock products	299 636 €
Farmhouse consumption of Livestock	0 €
Total gross output / livestock	**299 636 €**
Crops :	
Sales of crop products	67 784 €
Farm use of crop products	- €
Total gross ouput / Crops	**67 784 €**
Not-coupled aid :	
Coupled support	11 381 €
Single farm payments (DPU)	32 041 €
Compensatory Allowances for Natural Handicaps (CANH)	
Other aids (except for investment)	
Total aid	**43 422 €**

- In general, the young animals leave the farm quite soon after weanling to be fattened. The Belgian consumer likes fatless and tender meat. So the market is oriented to young meat and the Belgian Blue answer to this demand.
- In Belgium, suckler cows are still subsided through coupled support.
- The maize crops are generally done by contractor: seeding, harvesting and silaging.

Total expenses	258 386 €
Operating expenses	**227 276 €**
Purchases of straw	
Purchases of feed and minerals	101 336 €
Self- consumption of cereals	
Veterinary costs	30 901 €
Other specific livestock costs	40 143 €
Operating expenses / Livestock	**172 380 €**
Purchases of seeds and seedlings	6 693 €
Fertilisers and soil improvers	17 491 €
Crop protection products	13 483 €
Other specific crop costs	17 229 €
Operating expenses / Crops and grassland	**54 896 €**
Structural expenses	**31 110 €**
Machinery & building maintenance costs (except depreciations)	8 548 €
Energy (fuel)	7 051 €
Contract work	
Other expenses : water, insurance, accountability…	15 511 €

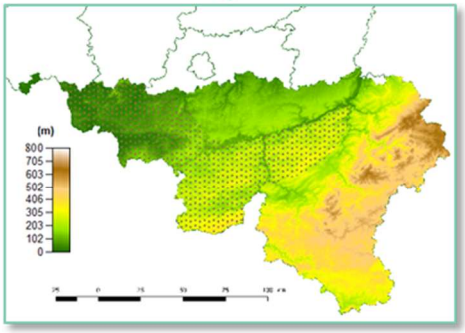
Wages and social insurance	95 630 €
Rental charges	**11866 €**
Depreciations	**40 277 €**
Interests and Financial expenses	**5 148 €**

Non-land total assets	645 557 €
Capital : Livestock	490 279 €
Physical Capital : Equipment	33 483 €
Physical Capital : Buildings and Facilities	120 214 €
Physical Capital : Stocks	1 581 €

Based on the data from AWE & DAEA 2016

BE-CCF
Wallonia, Belgium

Breeder + Fattener + Crop production
118 cows Belgian Blue
Production of young bulls



localization of the case-study

- This system represents mixed suckling and crop systems from the area of highlands and hills of Hainaut/Condroz.
- The herd is composed by cows and their calves with weaned males purchased for fattening. This system fattens young bulls up to 20 months old on average.
- The agricultural area includes grasslands, maize, cereals, and the farm can also produce cash crops such as potatoes or sugar root for example.

115 Calvings
208 Livestock Units (LU)

1 family workers
0 employee

124 ha UAA

Sales

- 43 finished young bulls
- 42 culled cows

3,36 LU / ha Main Forage Area

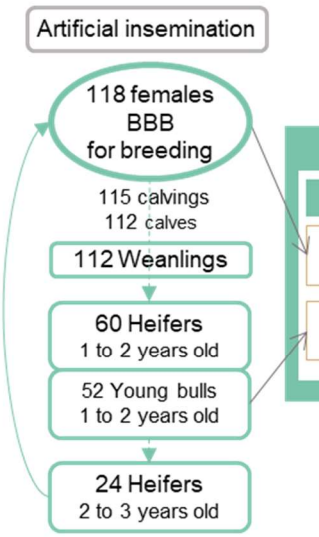
Cropping system :

- 48 ha grassland
  - 42 ha permanent
  - 6 ha temporary grassland
- 14 ha maize silage
- 36 ha wheat
- 14 ha barley
- 2 ha sugar root
- 7 ha spelt
- 3 ha oat

Livestock

BE-CCF

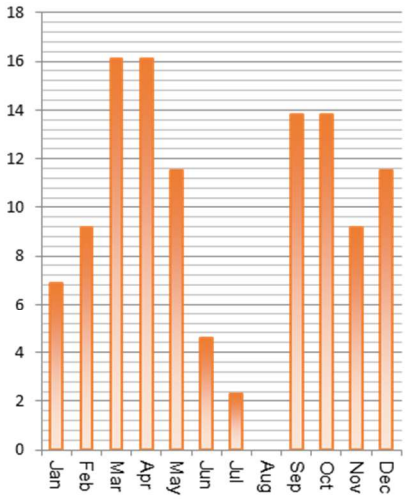
Sustainbeef



Annual sales

Type	Weight	Age
42 store cows ♀ BBB	740 kg alive	5 years old
43 young bulls ♂ BBB	600 kg alive	20 months old

Calving distribution



- Young are sold between 18 and 20 months after a short fattening period, during which cereals constitute the main part of the diet (up to 10kg/day) to propose a tender and fatless meat for the consumer. The calving is done by caesarean. This practice explains the low mortality rate and the high replacement rate. Indeed according to veterinary aspect, only three caesareans are practiced on the cow.

Performances

Mortality rate…..3%
Replacement rate.....33%
Calving intervals……..429 days

Gross Meat Production :
56 880kg alive

- The diet is grass and maize based. During the summer the herd is on pasture. During the winter, the diet is composed by maize silage and conserved grass, silage or wrapped. The young animals receive hay before one year old, and grass silage or wrapped grass after.

Forage supplies (kg dry matter / animal / year)

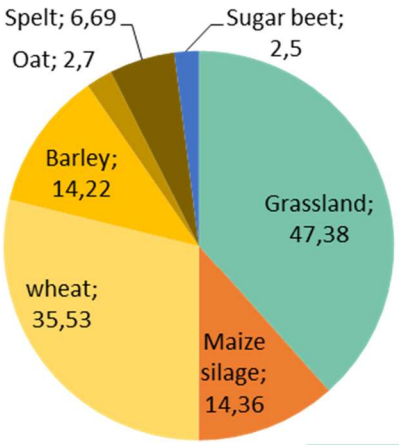
		Grazing	Hay	Grass silage	Maize silage	Straw	Concentrate (cereals)	Rapeseed meal
Females	6-12 m.o.	Yes	2	4	1	1		
	12-24 m.o.	Yes		4	3	1	1	2
	Cow up to 72 m.o.	Yes		4,5	3	1	1	2,5
Males	6-12 m.o.	Yes	2	4	1			
	12-18 m.o.	Yes		4	3			
	Finishing to 20 m.o.	No			2		9	

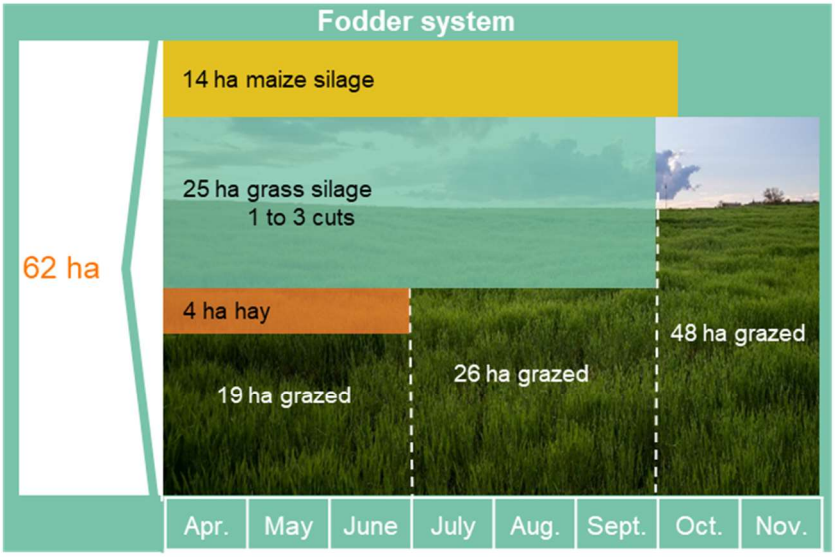
Crops & grassland

BE-CCF

Sustainbeef

UAA : 124 ha





		Fertilisation					Harvest		
	Block	ha	Mineral fertiliser (U/ha)			Organic fertiliser : Compost Manure	Yield Ton DM / ha	Total Ton DM	Sold Ton DM
			N	P_2O_5	K_2O				
Grassland	Only grazed	12	90	7	4	25 t/ha			
	Silage (1 cut) + grazed	7	90	7	4	25 t/ha	3,5	24,5	0
	Silage (2-3 cuts) + grazed	25	90	7	4	25 t/ha	6,5	174	0
	Hay + grazed	3	90	7	4	25 t/ha	3,5	14	0
Annual crops	Maize silage	14	97	11	7	20 t/ha	14	201	75
	Barley	14	162			-	9,4	134	134
	Wheat	36	181	5	5	-	7,7	276	276
	Spelt	7	162			-	9,4	55	15
	Oat	3	108			-	5,5	15	0
	Sugar beet	3	108			20 t/ha	75	189	189

- Grasslands are fertilized with nitrate 27: one time at the end of winter/beginning of spring with 100-150kg of fertiliser and after the cut (100kg) and composted manure (25t/ha). The grasslands are cut between one to three times per year to insure a sufficient amount of forage to go through winter period.
- The cereals are only used to “finish” the young bulls at 18-20 months old. The cereals are generally sold to a feeder who transformed and mixt the feed before sent it to the farm.

Production vs. Needs

(Tons)	Total needs	Total production	Quantity purchased
Hay	13	13	0
Grass silage	145	151	0
Maize silage	115	201	0

Buildings	Main equipments
Suckler cows : free stall barn with straw bedding 342 p.	2 Tractor 100-149 hp, 1 Tractor 150-199 hp
	Mower, tedder, manure spreader
	Plough, seeder, Harrow

Economic results (2016)

BE-CCF

Sustainbeef

Total gross output	325 650 €
Sales of Livestock & Livestock products	207 332 €
Farmhouse consumption of Livestock	0 €
- Purchases of Livestock	0 €
Total gross output / livestock	**207 332 €**
Crops :	
Sales of crop products	67 549 €
Farm use of crop products	0 €
Total gross ouput / Crops	**67 549 €**
Not-coupled aid :	
Coupled support	20 921 €
Single farm payments (DPU)	29 848 €
Compensatory Allowances for Natural Handicaps (CANH)	
Other aids (except for investment)	
Total aid	**50 769 €**

- In Belgium, suckling cows are still subsided through coupled support. The veterinary costs are expensive due to the caesarean strategy.
- Some works of cash crops and maize are generally done by contractor: seeding, harvesting and silaging depending of the mechanics available of the farm.

Total expenses	202 550 €
Operating expenses	**176 637 €**
Purchases of straw	
Purchases of feed and minerals	71 533 €
Self- consumption of cereals	
Veterinary costs	34 798 €
Other specific livestock costs	12 502 €
Operating expenses / Livestock	**118 833 €**
Purchases of seeds and seedlings	9 263 €
Fertilisers and soil improvers	18 515 €
Crop protection products	15 155 €
Other specific crop costs	14 871 €
Operating expenses / Crops and grassland	**57 804 €**
Structural expenses	**25 913 €**
Machinery & building maintenance costs (except depreciations)	9 363 €
Energy (fuel)	6 386 €
Contract work	
Other expenses : water, insurance, accountability…	10 164 €

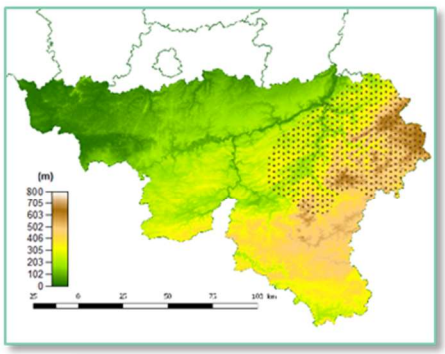
Wages and social insurance	4 528 €
Rental charges	**15 350 €**
Depreciations	**44 677 €**
Interests and Financial expenses	**15 676 €**

Non-land total assets	712 254 €
Capital : Livestock	450 767 €
Physical Capital : Equipment	112 760 €
Physical Capital : Buildings and Facilities	136 837 €
Physical Capital : Stocks	11 890 €

Based on the data from AWE & DAEA 2016

BE-D
Wallonia, Belgium

Dairy farm in grassland areas
70 cows Holstein - production of milk and a few heifers



localization of the case-study

- This system represents dairy cow farms from the grassland area of the Liege region, based on the Holstein breed, with a stocking rate around 2 LU/ha of main forage area.
- The production system is mainly oriented towards the production of milk. The milk production is around 7000kg milk per cow per year, and up to 10 000kg for the most productive system.

52 Calvings
109 Livestock Units (LU)

1,5 family workers
0,5 employees

54 ha UAA

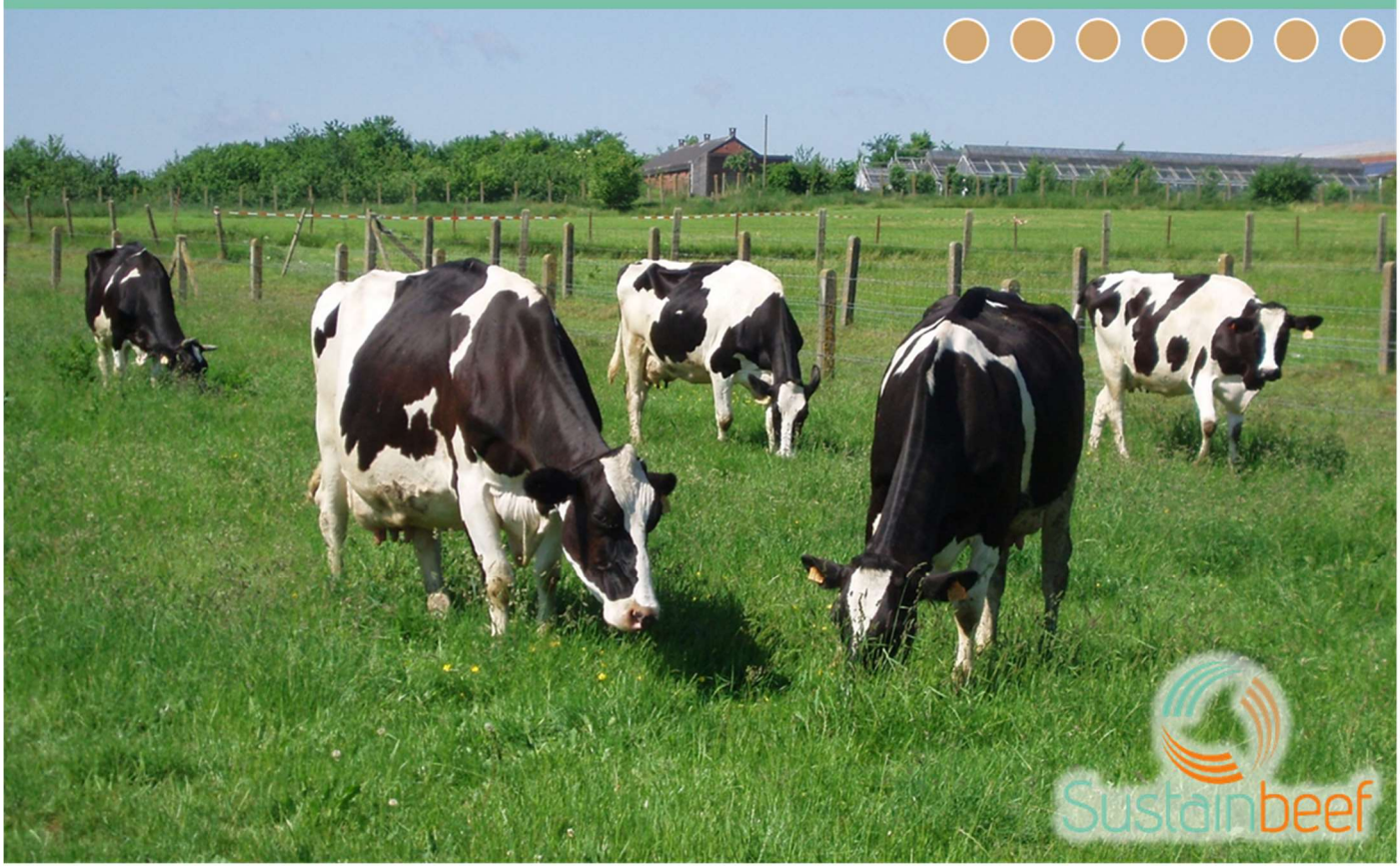
2 LU / ha Main Forage Area

Sales

- **488 823 L milk** sold
- 2 store heifers
- 18 culled cows and 32 calves

Cropping system :

- **54 ha temporary grassland**



Livestock

BE-D

Sustainbeef

Dairy herd

Artificial insemination

70 females Holstein for breeding

59 calvings
52 calves
26♂ & 26♀

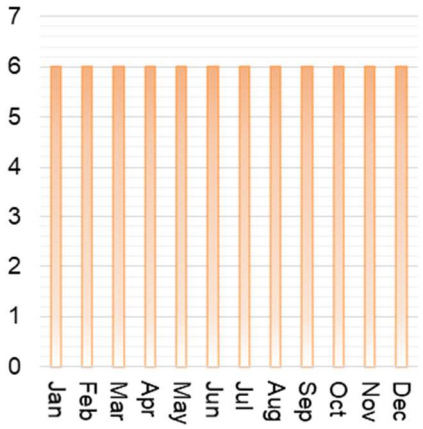
20 Heifers 1st year

18 Heifers 2nd year

Annual sales

Type	Weight	Age
18 store cows ♀ Holstein	650 kg alive	5-6 years old
26 ♂ newborn calves Holstein	80 kg alive	3 weeks old
6 ♀ newborn calves Holstein	80 kg alive	3 weeks old
2 store heifers ♀ Holstein	400 kg alive	18 m.o.

Calving distribution



- The cows receive on average 3 kg of concentrate per day according to their level of production. The number of heifers depends of the replacement rate. The additional heifers are sold at 3-4 weeks.
- Calvings are generally spread throughout the year. Calves are sold at the age of 3 weeks for white calves' production. Calving interval is quite long, upper than 400 days, due to a long milking period. So there is less than one calf per cows per year.

Performances

Production per cow.....7 141 L
Concentrates per cow.....1 240 kg
Mortality rate.....6%
Calving intervals.....419 days
Replacement rate.....25%

Milk Production : 509 191 L

Milk Sold : **488 823 L**

Forage supplies (kg dry matter / animal / year)

	Grazing Period	Hay	Grass silage	Maize silage	Straw	Cow Concentrate	Calves Concentrate	Young cattle Concentrate	Cereals	Rapeseed meal	Milk powder
Cows	1st April – 30th October		1320	825	165	600			560	80	
Heifers < 1 y.o.	-	600					100				51
Heifers 1 to 2 y.o.	1st April – 30th October	800						88			
Heifers 2 to 3 y.o.	1st April – 30th October		540	340	70				240	30	
New born calves							12				15

Crops & grassland

BE-D

Sustainbeef

UAA : 54 ha

Land use

Fodder system

Fertilisation

	Block	ha	Mineral fertiliser (U/ha) N	Mineral fertiliser (U/ha) P_2O_5	Mineral fertiliser (U/ha) K_2O	Organic fertiliser
Grassland	Temporary grassland	54	101	0	20	Slurry : 14 m3 / ha Compact manure : 1,6 t / ha

Harvest

		ha	Yield Ton DM / ha	Total Ton DM	Sold Ton DM
Grassland	Hay	10	3	30	0
	Silage	15	7	105	0

- The only production is grass. During the summer, the herd is on pasture with complementation during the milking time. During the winter, the diet is composed by conserved grass, silage or wrapped, and maize silage. Heifers receive hay before grass silage or wrapped grass after one year.
- Grasslands are fertilized with nitrate 27: from two to four times per year. Slurry is spread from one to three times on grassland depending of the number of cuts. Grasslands are cut between one and four times per year to insure a sufficient amount of forage to go through winter period. All maize silage is bought.

Production vs. Needs

(Tons)	Total needs	Total production	Quantity purchased
Hay	29,6	30	0
Grass silage	102	105	0
Maize silage	63,9	0	63,9
Cow concentrates	42	0	42
Straw	12,8	0	12,8
Milk powder	1,8	0	1,8
Cereals	43,5	0	43,5
Soja or rapeseed meal	6,1	0	6,1
Calves concentrate	2,6	0	2,6
Young cattle concentrate	1,8	0	1,8

Buildings	Main equipments
Free stall barn with straw bedding (70 + 50p)	1 Tractor 50-99 hp + Tractor 150-199 hp
	Liquid manure tank
	Hay mower, tedder
	Milking parlour

Economic results (2011)

BE-D

Total gross output	207 673 €
Dairy unit :	
Sales of Livestock & Livestock products	184 471 €
Including milk	*162 259 €*
- Purchases of Livestock	0 €
Total gross output / Dairy livestock	**184 471 €**
Crops :	
Sales of crop products	0 €
Farm use of crop products	0 €
Total gross ouput / Crops	**0 €**
Not-coupled aid :	
Coupled support (mountain milk)	0 €
Coupled support (suckler production)	0 €
Single farm payments (DPU)	17 084 €
Compensatory Allowances for Natural Handicaps (CANH)	4 346 €
Other aids (except for investment)	1 772 €
Total aid	**23 202 €**

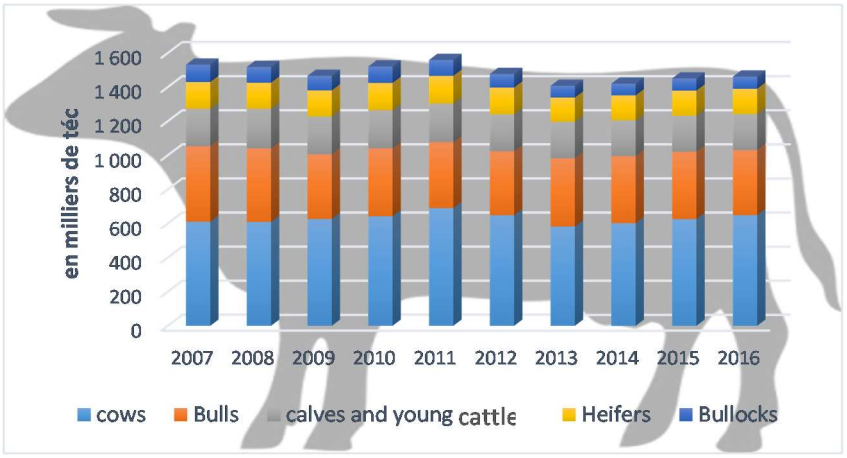
Total expenses	84 311 €
Operating expenses	**60 106 €**
Purchases of straw	923 €
Purchases of feed and minerals	40 819 €
Self- consumption of cereals	0 €
Veterinary costs	7 804 €
Other specific livestock costs	4 270 €
Operating expenses / Livestock	**53 816 €**
Purchases of seeds and seedlings	41 €
Fertilisers and soil improvers	5 223 €
Crop protection products	41 €
Other specific crop costs	985 €
Operating expenses / Crops and grassland	**6 290 €**
Structural expenses	**24 205 €**
Machinery & building maintenance costs (except depreciations)	10 300 €
Energy (fuel)	5 100 €
Contract work	2 018 €
Other expenses : water, insurance, accountability…	6 787 €

Wages and social insurance	94 000 €
Rental charges	**6 646 €**
Depreciations	**22 504 €**
Interests and Financial expenses	**980 €**

Non-land total assets	483 400 €
Capital : Livestock	97 100 €
Physical Capital : Equipment	76 600 €
Physical Capital : Buildings and Facilities	308 000 €
Physical Capital : Stocks	1 700 €

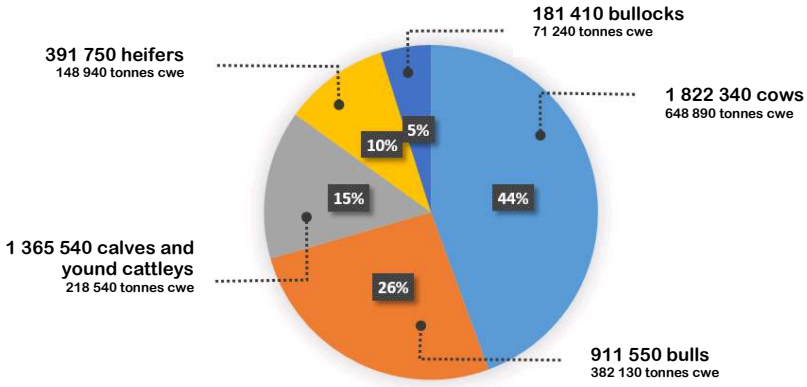
Based on the data from the project Dairyman

Figure 16: Evolution of the French beef production



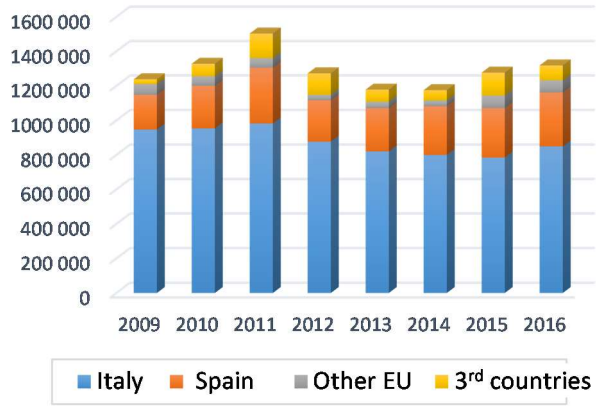
Source : Inra, by Eurostat

Figure 17: French beef production in 2016



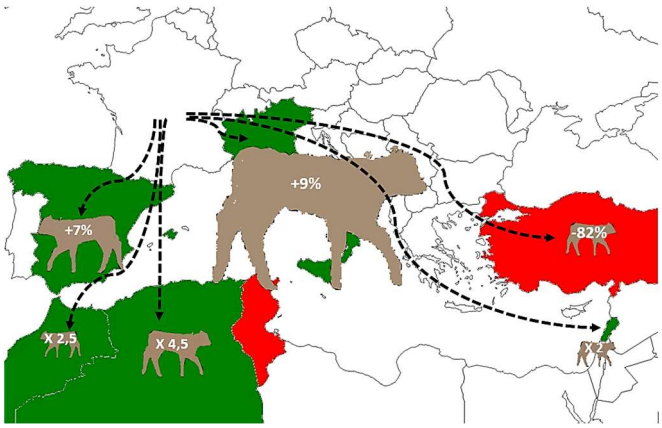
Source : Inra, by Eurostat

Figure 18: Evolution of French cattle foreign exchanges (heads)



Source : Inra, by Eurostat

Figure 19: Main flows of French calves in 2016



Source : GEB-Institut de l'Elevage, by FranceAgriMer, Douanes Française, change by Inra

FRANCE: THE FIRST EUROPEAN PRODUCER

GENERAL ELEMENTS

In 2016, France produced 1.46 million Tonnes CWE with 4.7 million slaughtered animals, from a total herd of 19 million heads. Although the cattle production has declined by 20.5% since 1980, and by 4.5% since 2007 (figure 16), France still ranks first in terms of beef production in Europe. The herd is composed of 3.63 million dairy cows and 4.22 million suckler cows, respectively 15.4% and 34.2% of the European Union livestock.

In 2016, France slaughters stand for 18.7% of the EU total, mainly from cows (44%), young bulls (26%) and calves (15%) (figure 17). Culled cows come from the dairy and suckler herds in equal shares. Young bulls and heifers slaughtered mainly originate from suckler farms. These animals are raised up to 18 to 24 months old. Calves intended for slaughter are mostly from dairy cattle, to produce veal.

However, the suckler herd contributes two thirds of the beef tonnage produced in France, and to the export of many animals.

FOREIGN EXCHANGES IN FRANCE

EXCHANGES IN LIVE ANIMALS

In 2016, France exported 1.32 million live animals. It is the first live animals' exporter, accounting for almost 40% of the European total, ahead of Germany (10%), Holland (8%) and Spain (6%) (Chatellier, 2016).

Animals for export represent a significant part of the French herd. Indeed, French suckler farms are mainly oriented towards the production of heifers and young bulls (or 'grazers') often destined to be fattened abroad, particularly in Italy (64.4%) and Spain (23.7%). In 2016, 85% of exported animals were heifers and young males. Live cattle exportations have increased since 2014, after a relative decline of 22% between 2011 and 2013 due to a fall in exports to Italy and Spain because of the economic crisis (figure 18). In France, the lean livestock market (young cattle destined to be fattened) is very important as it stands for 95% of exported animals. In 2016, 1 074 225 heads of lean cattle were exported, mainly for the Italian (819 919 heads) and Spanish (135 654 heads) markets, but also to third countries such as Algeria, Marocco, Turkey and Lebanon, a relatively unstable market, but accounting for only 6.6% of the exports of young bulls (Figure 19).

France imports few live animals. These imports have dropped by 68% since 2010, to reach 44 225 heads in 2016, mainly from Holland and Belgium (61%). In 2015, animals imported alive were mainly calves (61%) and cattle for slaughter (17%) or fattening (22%) (Interbev 2016).

BEEF EXCHANGES

France exports 16% of its beef production, primarily within the European market: only 6.5% out of the 235.8 thousand T CWE exported are sold to third countries. 80% of the exports of France are fresh and chilled beef products, sold to Italy (34%), Greece (20%) and Germany (20%). Nevertheless, after a peak in 2011, exports dropped down by 25% in 5 years (Table 20).

Table 20: Evolution of French beef exportations

BEEF 1000 TONNES CWE	2009	2010	2011	2012	2013	2014	2015	2016	EVOLUTION 2016/2009
EXPORTATIONS	**269,9**	**285,2**	**315**	**267**	**239,3**	**229**	**235,6**	**235,8**	**-12,6%**
FRESH BEEF	**234,9**	**247,7**	**275,5**	**232,6**	**209,7**	**192,3**	**195,1**	**194,2**	**-17,3%**
UE	232,9	242,1	251	228,1	206,3	190,7	192	191	**-18,0%**
ITALY	90,9	92,2	93,7	93,9	88,3	83,4	79,2	76,8	**-15,5%**
GREECE	77,5	74,2	71,9	62,3	55,9	51,2	44,7	46,7	**-39,7%**
GERMANY	36,4	40,9	47,6	39,7	38,1	36,3	44,8	44,7	**22,8%**
FROZEN BEEF	**28,9**	**27,4**	**25**	**18,1**	**17,8**	**22,5**	**22,8**	**24,9**	**-13,8%**
UE	22,8	22,2	18,6	14	13,5	16,9	17,4	19,2	**-15,8%**
THIRD COUNTRIES	3,1	5,1	6,4	4,1	4,4	5,6	5,4	5,3	**71,0%**
PROCESSED BEEF	**9,2**	**10,1**	**14,4**	**16,2**	**11,7**	**14,2**	**17,6**	**16,7**	**81,5%**

Source : Inra, by FranceAgriMer et Douanes françaises

Table 21: Evolution of French beef importations

BEEF 1000 TONNES CWE	2009	2010	2011	2012	2013	2014	2015	2016	EVOLUTION 2016/2009
IMPORTATIONS	**407,3**	**406,8**	**370,8**	**381,8**	**377,5**	**363**	**345**	**321,1**	**-21,2%**
FRESH BEEF	**300,3**	**301,7**	**270,7**	**269,5**	**271,8**	**256,4**	**236**	**212,6**	**-29,2%**
UE	298,7	301,7	270,7	268,8	271,1	255,4	234,3	210,4	**-29,6%**
NETHERLANDS	85,2	83,2	77,6	74,2	80,5	74,9	73	68,6	**-19,5%**
GERMANY	72,2	70,1	56,8	54,1	51,2	46,7	41	37,4	**-48,2%**
IRELAND	42,3	44	40	36,3	33,8	36,9	32,6	29,1	**-31,2%**
FROZEN BEEF	**87,9**	**86,2**	**83**	**94,7**	**88,9**	**89,2**	**91,6**	**90,8**	**3,3%**
PROCESSED BEEF	**19**	**18,9**	**17,1**	**17,6**	**16,9**	**17,4**	**17,3**	**17,8**	**-6,3%**

Source : Inra, by FranceAgriMer et Douanes françaises

Figure 22: Distribution of dairy cows in 2016

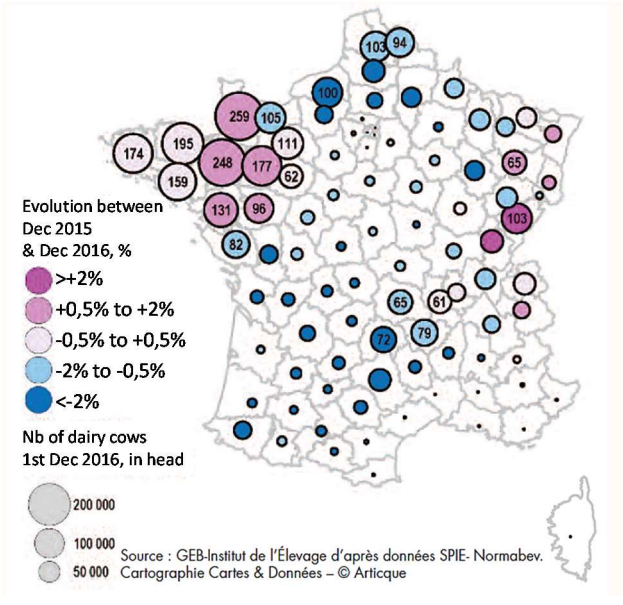
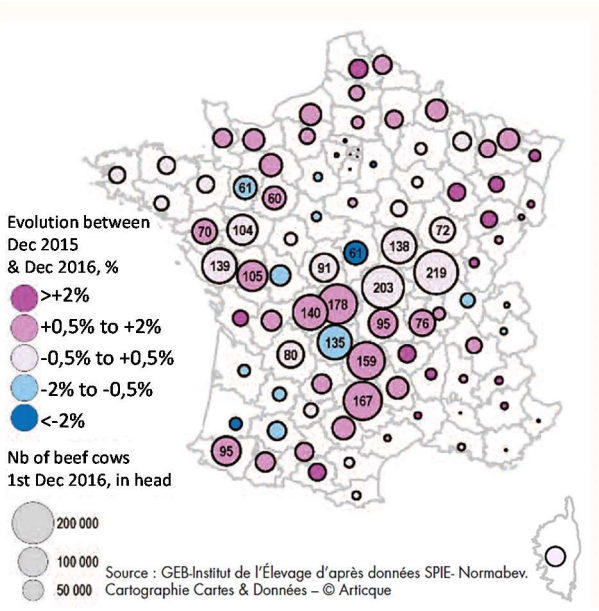


Figure 23: Distribution of suckler cows in 2016



French imports of beef are higher than exports. They account for 321.1 thousand tonnes cwe in 2016. The main suppliers of France are the Netherlands (21%), Germany (12%), Ireland (9%), where the dairy production is predominant (Table 21). Imports mainly concern fresh beef (66.1%) but also frozen meat (28.3%).

Thus, France has a deficit in beef and veal, but a large surplus in live cattle. This explains why France's trade balance is negative in volumes but positive in monetary terms. Furthermore, consumer habits are changing in France like in other EU countries, in a way that affects beef production. Although French beef consumption is still the highest in the European Union with 23.5 kg cwe per capita per year in 2015, it has been down by almost 12% for ten years. In 2015, 35% of the beef consumed in France came from the dairy sector, and 65% from the suckler sector. The demand is more and more concentrated on minced beef (Lherm & al, 2017).

TYPOLOGY OF THE FRENCH HERD

France has the largest suckler herd in Europe and the second largest dairy herd after Germany in 2016.

French cattle population has remained quite stable since the 2000s. However, the French dairy herd was almost divided in two since the 1980s, due to progress in zootechnical performances and the establishment of quotas within the EU. In the same time, its suckler herd has increased, partly thanks to the Common Agricultural Policy reforms in the last 40 years: it has almost doubled since the 1980s, partially offsetting the decline in the dairy herd. In 2016, the French bovine herd is composed of 40% cows, 27% animals less than one year old, 19% animals between 1 and 2 years old, 11% heifers older than 2 years old and 2% of males older than 2 years old (Eurostat 2017).

Cattle breeding is present throughout France, except in the cereal plains and the wine regions, but with a very variable density according to the region considered. Dairy production is mainly found in the north, north-east and north-west of France, called the "croissant laitier" (Figure 22), while suckler production is mainly concentrated in central France: Massif Central, Pays de la Loire and north of the Deux Sèvres, Pyrenean (Figure 23).

The French national herd is divided into 199 000 farms ; this number has dropped by a third since 2005 (GEB-Idele 2016c). France counts 121,200 suckler farms and 77,000 dairy farms according to the latest general agricultural census (RA 2010). However, 19,600 farms are mixed dairy-suckler. As with dairy farms, suckler farms' size is variable. They have 34.8 cows on average, and almost half of the farms have more than 20 suckler cows. The latter account for nearly 80% of suckler cows. Thus, close to three quarters of the suckler farms are specialized in this production. The last quarter has an associated breeding activity: dairy cows, sheep or goats. Indeed, 19,600 dairy farms own nearly 450,000 suckler cows, or 11% of the livestock. Finally, very small farms representing 8% of suckler cows account for only 0.6% of the livestock (Institut de l'Elevage 2014).

Dairy farms have an average of 47.1 cows per farm and are highly specialized (Figure 24). Nearly half of them have between 30 and 70 dairy cows, 16% between 70 and 100, and 8% more than 100 cows. Farms between 30 and 70 cows own almost 50% of the livestock (GEB-Idele 2016c).

The 24% of farms which have more than 70 dairy cows represent more than 40% of the livestock. Finally, small farms of less than 30 dairy cows represent almost 25% of the farms, but concentrate only 8% of the dairy cows (GEB-Idele 2016c).

Figure 24: Typology of dairy farms and mixed farms in 2015 (threshold of visibility 100 farms)

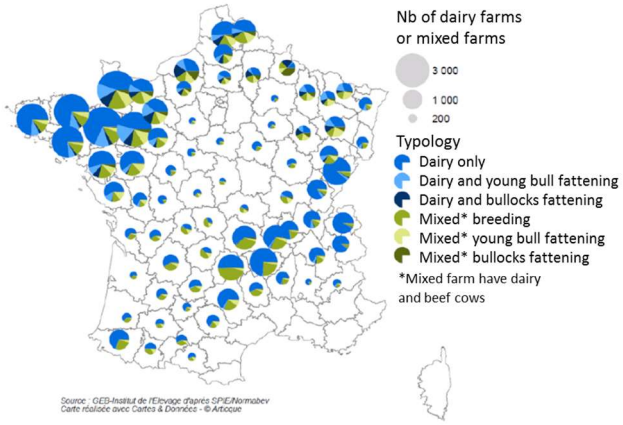


Figure 25: Typology of suckler farms of at least 20 cows (threshold of visibility 100 farms)

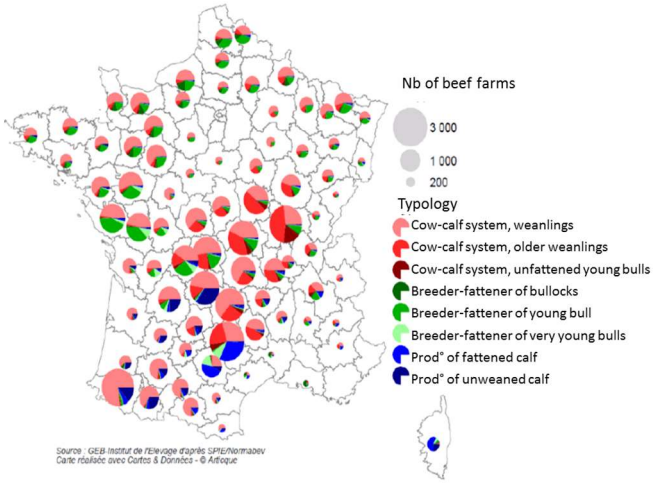
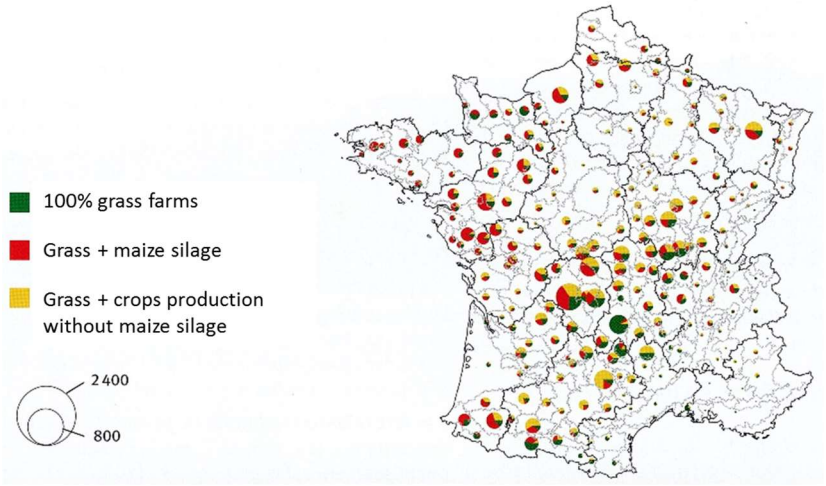
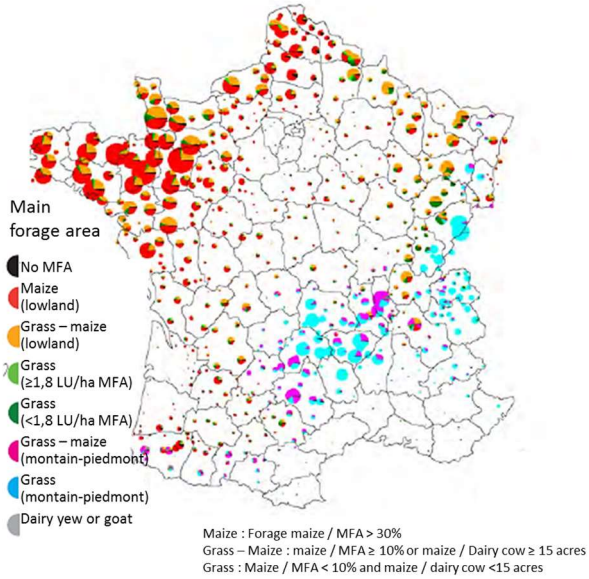


Figure 26: Distribution of suckler farms over 20 cows (no dairy cows) depending on the presence or absence of silage corn and crops, depending on grassland areas



Source : Agreste, recensement agricole 2010 – Traitement Institut de l'Elevage 2014

Figure 27: Distribution of dairy farms according to the fodder system



Source : Agreste, RA 2010, traitement Idele

Concerning veal calves, the production is divided into 2940 farms. They are located mainly in the north-west and south-west of France. 85% of the production is concentrated in only 8 regions out of 21 (Interbev 2016).

Whether associated with another production or not, beef systems can be characterized by combinations of the categories of males and females marketed (Figure 25):

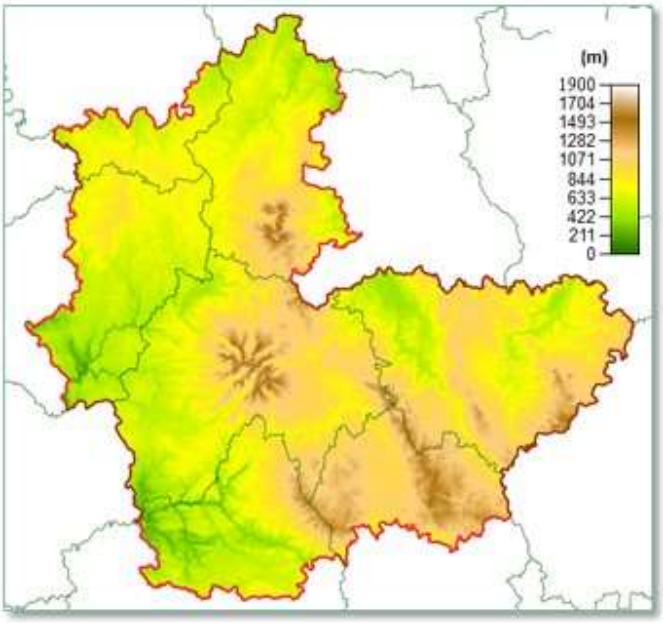
- Systems with the production of young bulls or heifers, fattened or not
- Systems with production of young bulls heavier feeders, and females fattened or not
- Systems with production of young bulls and heifers fattened
- Systems with production of veal from suckled calves, and heavy calves
- Systems with production of steers and heifers fattened
- Specialized fattening systems

Among the suckler farms with more than 20 cows, 21% have only grassland and no crops, and 37% have maize silage. The largest proportions of farms with maize silage occur in the Atlantic Arc and northern regions of France (Figure 26 and 27). Finally, 43% of the farms combine grassland and crops (without corn silage) in unequal proportions (Institut de l'Elevage 2014), particularly in the north-east and south-west.

In the end, suckler systems mainly use grassland and preserved fodder (hay, silage, wrapped grass), valuing grassland less-favoured areas, where the share of grassland in the agricultural land is high, while dairy farms are more based on maize silage systems, or using dry feed rations, concentrates, and sometimes grassland (especially in mountain and piedmont areas).

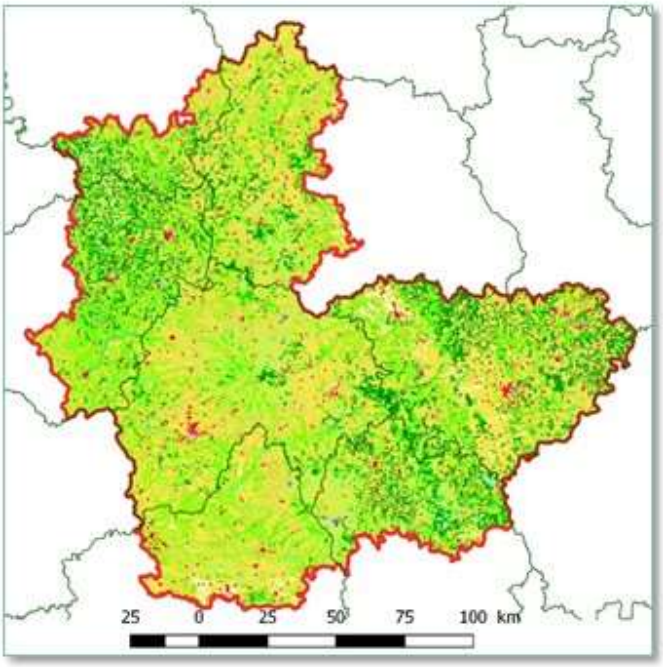
Massif Central

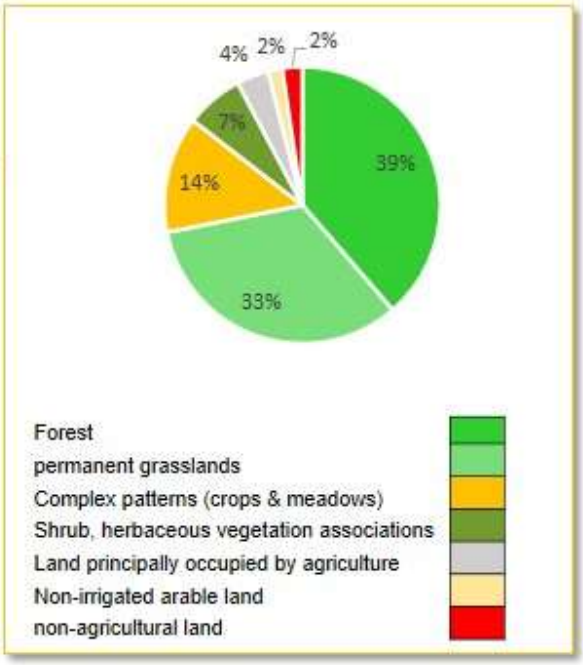
France



This territory refers to the south-western part of Massif Central, are more precisely to the areas which are classified as « mountain areas ». This territory includes 7 French departments : 2 totally and 5 partially.

ZONE	Massif Central
AREA (km²)	24182
ALTITUDE (m)	
min	143
max	1885
mean	817



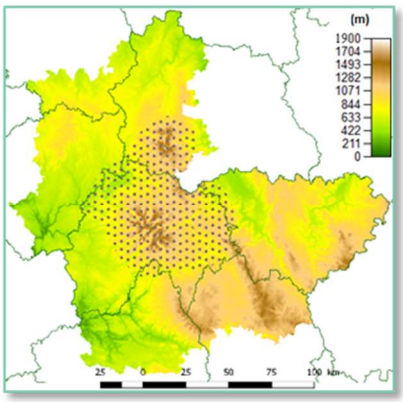


Based on the Corine Land Cover (CLC) 2012

Maps were edited on QGis 2.14.22

FR.CANT – CC
South-West of the Massif Central, France

Salers cow-calf system with 65% cross-breeding
Grass calves sold at 10 months old



- Representative of the suckler cow farms from the grassy mountains of Cantal based on the breed Salers. They practice self-renewal, and 2/3 of the cows are mated with a Charolais bull. Calvings take place from January to May.
- The males weighted on mother's milk (without weanling) and the crossbred females are the main products. Both are for the export market. A few crossbred heifers are also raised for meat.
- This is an extensive system exclusively based on grass, and especially permanent grassland. The productive potential of the land in this volcanic area is good and it allows the system to be self-sufficient on roughage up to 1 LU/ha, sometimes without mineral fertilisation.

localization of the case-study

73 Calvings
96 Livestock Units (LU)

1,5 family workers

96 ha UAA

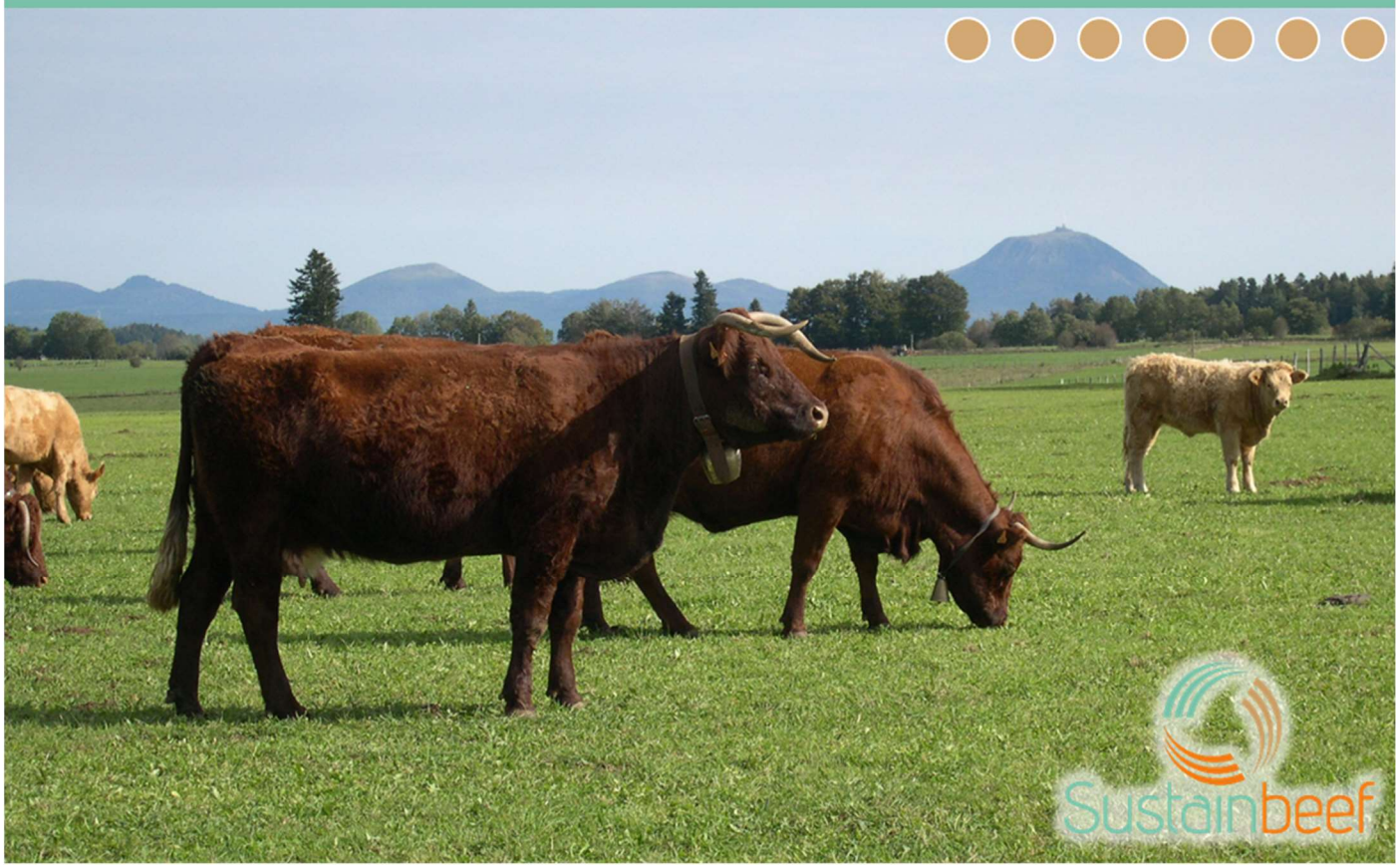
Sales

- **40 crossbred calves** 9-10 months old
- **15 Salers calves** 9-10 m.o.
- **6 heifers** >30 m.o.
- **cull animals :** 6 store cows, 3 finished cows, 1 bull

1 LU / ha Main Forage Area

Cropping system :

- **96 ha permanent grassland**



Livestock

FR.CANT-CC

Sustainbeef

79 females for breeding

73 calvings
74 calves

71 weanlings

6 heifers (Sal*Ch)

10 heifers (Salers)

3 bulls (Salers & Char.)

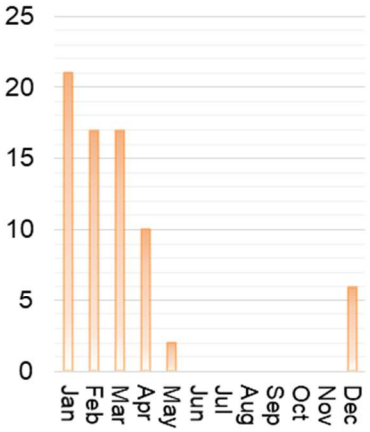
Annual sales

Type	Weight	Age
6 store cows ♀ Salers (+ 1 lost)	250 (1) to 310 (5) kg c.	10-12 y.o.
3 finished cows ♀ Salers	410 kg c.	10-12 y.o.
23 heavy calves ♂ Sal*Ch	390 kg alive	10 m.o.
17 calves ♀ Sal*Ch	340 kg alive	9 m.o.
12 heavy calves ♂ Salers	380 kg alive	10 m.o.
3 calves ♀ Salers	280 kg alive	9 m.o.
6 finished heifers ♀ Sal*Ch	440 kg carc.	>30 m.o.
1 bull ♂ Salers or Charolais	550 kg c.	3,5 y.o.

Annual purchases

Type	Weight	Age
1 bull ♂ Salers or Charolais	550 kg c.	3,5 y.o.

Calving distribution



Performances

Pregnancy rate.....96%
Mortality rate.....4,1%
Replacement rate.....14%

Gross Meat Production :

31 247 kg alive

- The herd is 100% on natural mating with 1/3 pure-bred in order to have Salers replacement heifers. Calvings are mainly in winter.
- A few females are selected and bred up to 3 years old, for slaughter. The other females (pure not chosen for replacement and crossbred) are sold at weaning, and males are bred longer without being weaned. They stay with their mothers, with a few concentrate. They are sold to be fattened, mainly in Italy and Spain.
- The herd mainly spends the winter in a tie-stall barn and is fed on hay. Replacement heifers and a few cows are loose-housed on straw bedding. They receive a few concentrate every day after calving.

	Forage supplies (kg dry matter / animal / day)					Concentrates Kg GM / animal / year
	Period (days)	Hay (1st cut)	Hay (cut after early grazing)	Hay (2nd cut)	Total kg dry matter / day	
Cows and bulls	170	9,5	2	0,5	12	225
Heifers 1-2 y/o	150	8			8	149
Heifers > 2 y/o	50	8,5	2	0,5	11	66
Starters 10 m/o	80	4			4	238
Calves ♀	150	4	1,5		5,5	77
Heifers Sal*Ch 1 y/o	160	5,5			5,5	200
Heifers Sal*Ch 2 y/o	170	8,5			8,5	160
Heifers Sal*Ch 3 y/o	120	8,5			11,5	380
TOTAL NEEDS	(tons/year)	**158 t**	**27 t**	**8 t**		**36 t GM**

	Cow concentrate 18% protein	Starters concentrate	Bought cereals	Fattening concentrate 18% protein	Minerals
TOTAL NEEDS	**22 t GM 18,7 t DM**	**10 t GM 8,5 t DM**	**0,42 t GM 0,36 t DM**	**4 t GM 3,4 t DM**	**1,85 t DM**

Details of the concentrates

Tons / year

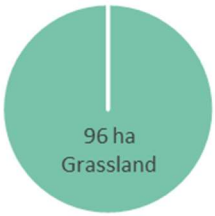
Crops & grassland

FR.CANT-CC

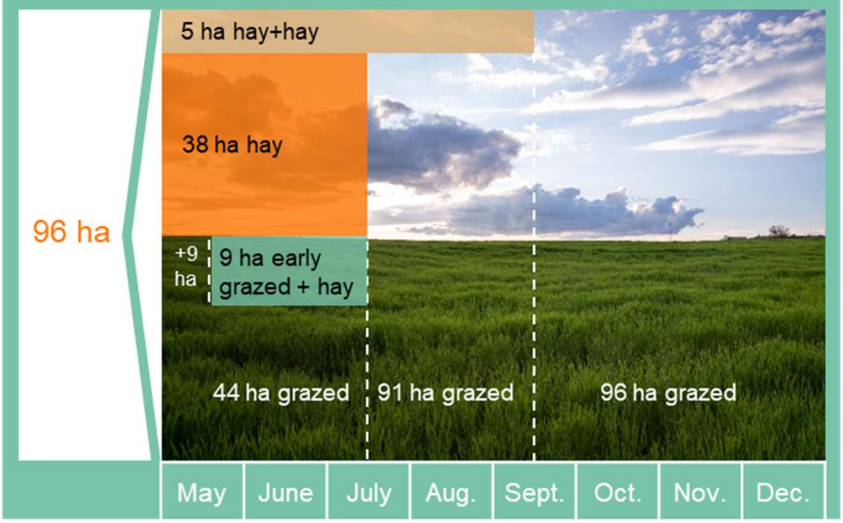
Sustainbeef

UAA : 96 ha

Land use



Fodder system



Fertilisation

	Block	ha	Mineral fertiliser (U/ha)			Organic fertiliser
			N	P_2O_5	K_2O	
Grassland	Grazing area	44	20	0	0	Manure & Slurry
	Hay + Grazing	38	0	0	0	Manure
	Early grazing + Hay + Grazing	9	0	0	0	Manure & Slurry
	Hay + Hay + Grazing	5	20	0	40	Slurry

Harvest

		ha	Yield Ton DM / ha	Total Ton DM	Sold Ton DM
Hay	Hay 1st cut	43	4	172	0
	Hay cut after early grazing	9	3,6	32,4	0
	Hay 2nd cut (regrowth)	5	1,4	7	0

- The fodder system is exclusively based on grass : natural grassland and hay harvest. In this volcanic area, the soil quality allows a good grass growth. In some cases, no mineral fertilisation is needed up to 1 LU/ha. The manure is firstly spread on hayfields.
- Except climatic accident or pest issue (such as water vole), these systems are self-sufficient in roughages.

Production vs. Needs

(Tons)	Total needs	Total production	Quantity purchased
Hay	193	211	0
Concentrates	36	0	36
Straw	30	0	30

Buildings	Equipments
For cows : tie-stall and free hoosing systems	Tractor 66-75 hp
For heifers : converted old stable	Tractor 96-105 hp
Equipment hangar	Harrow 5-6 m
	Fertilizer drill

Economic results (2017)

FR.CANT-CC

Total gross output	113 310 €
Sales of Livestock & Livestock products	71 695 €
- Purchases of Livestock	2 000 €
Total gross output / Livestock	**69 695 €**
Single farm payments (DPU)	19 061 €
Coupled support	11 003 €
Compensatory Allowances for Natural Handicaps (CANH)	13 524 €
Other aids (except for investment)	27 €
Total Aid	**43 615 €**

Total expenses	44 954 €
Operating expenses	**25 991 €**
Purchases of straw	2 400 €
Purchases of feed and minerals	11 441 €
Self-consumption of cereals	0 €
Veterinary costs	6 164 €
Other specific livestock costs	3 512 €
Operating expenses / Livestock	**23 517 €**
Purchases of seeds and seedlings	0 €
Fertilisers and soil improvers	2 100 €
Crop protection products	0 €
Other specific crop costs	374 €
Operating expenses / Crops and grassland	**2 474 €**
Structural expenses	**18 963 €**
Machinery & building maintenance costs (except depreciations)	5 408 €
Energy (fuel)	4 784 €
Contract work	0 €
Other expenses : water, insurance, accountability…	8 771 €

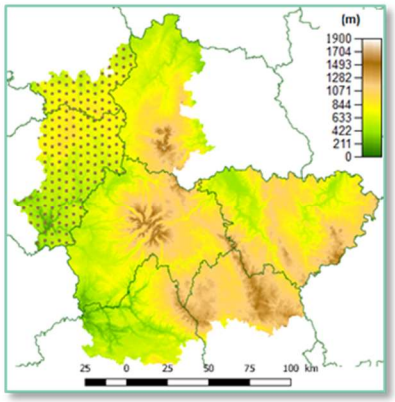
Wages and social insurance	10 513 €
Rental charges	**8 978 €**
Depreciations	**15 545 €**
Interests and Financial expenses	**2 903 €**

Non-land total assets	290 262 €
Capital : Livestock	128 710 €
Physical Capital : Equipment	90 381 €
Physical Capital : Buildings and Facilities	52 792 €
Physical Capital : Stocks	18 379 €

Based on the data from Inosys – Réseaux d'Elevages

FR.LIM – CC
South-West of the Massif Central (Limousin), France

Cow-calf system with fattening of heifers Limousin breed



- This system represents farmers who sell their store male weanlings and who commercialize their heifers in different markets. Grasslands are completely valorized thanks to the fattening of heifers. Some of the females are sold as "Lyon heifers" (23 months old).
- Heaviest heifers, sold after 2 grazing seasons, are sold on traditional butchery markets under official quality signs.
- Males are sold as weanlings/grazers at 8,5 m.o., on Southern European markets (Spain, Italy).

localization of the case-study

75 Calvings
113 Livestock Units (LU)

1,5 family workers

95 ha UAA

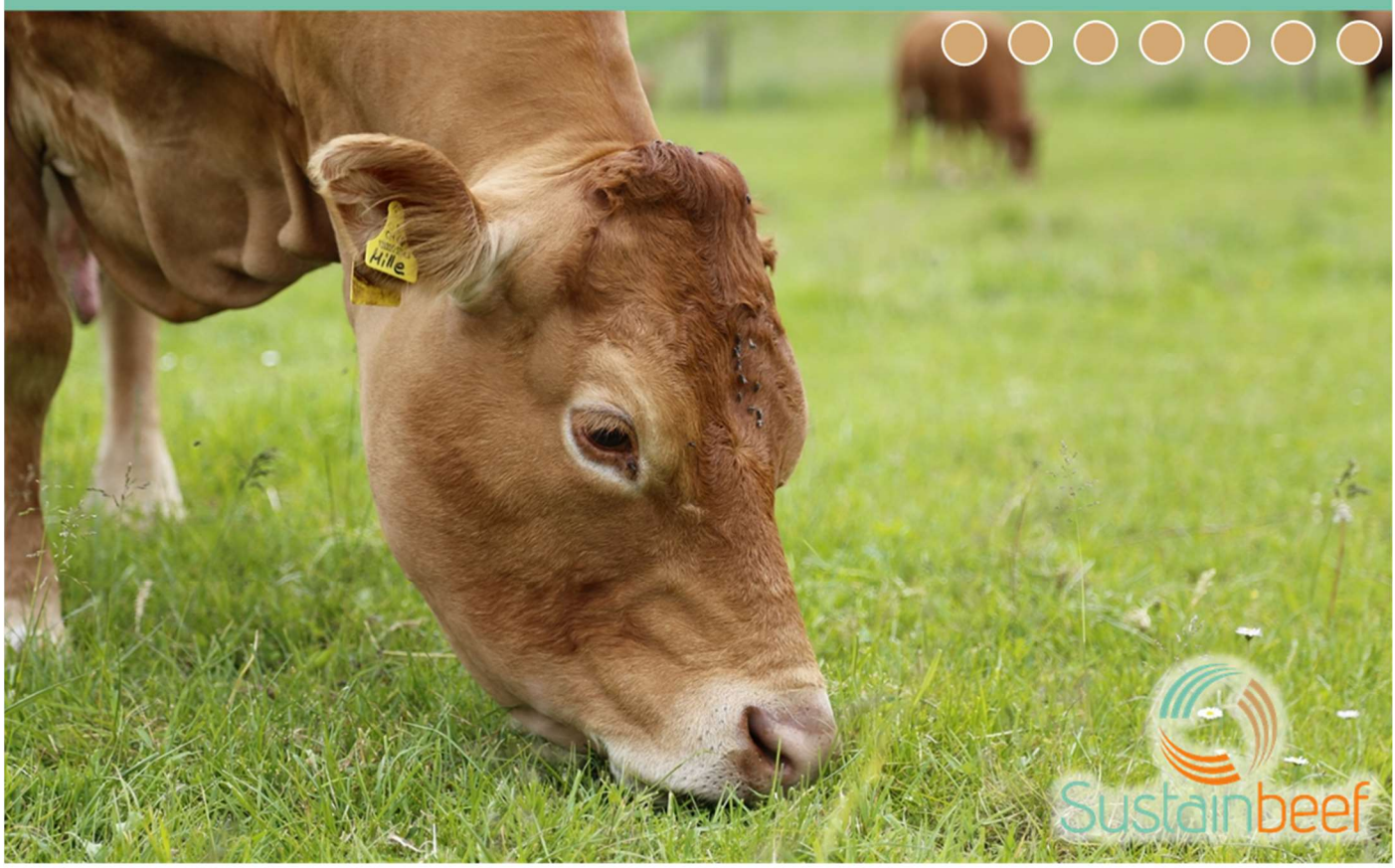
Sales

- **39 wealings** 8-9 months old
- **7 heifers** ~24 m.o.
- **10 heifers** >30 m.o.
- **cull animals** : 14 finished cows, 1 bull

1,27 LU / ha Main Forage Area

Cropping system :

- 43 ha permanent grassland
- 46 ha temporary grassland
- 6 ha wheat



Livestock

FR.LIM-CC

Sustainbeef

78 females for breeding

75 calvings
71 calves

71 weanlings
36 ♂ and 35 ♀

32 heifers (Lim.)

4 bulls (Limousin)

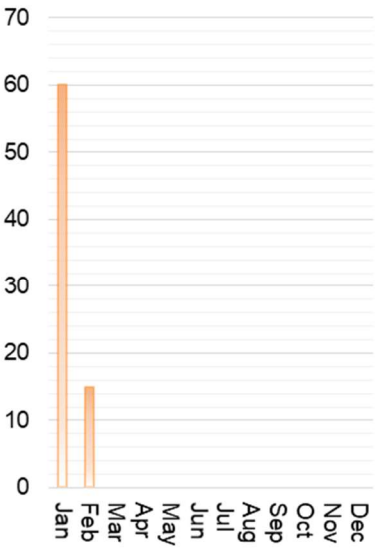
Annual sales

Type	Weight	Age
14 fattened cows ♀ Lim. (+ 1 lost)	400 kg carc.	7-8 y.o.
36 store weanlings ♂ Limousin	315 kg alive	8-9 m.o.
3 store weanlings ♀ Limousin	280 kg alive	8-9 m.o.
7 finished heifers ♀ Limousin	300 kg carc.	23 m.o.
10 finished heifers ♀ Limousin	370 kg carc.	32 m.o.
1 bull ♂ Limousin	620 kg c.	5 y.o.

Annual purchases

Type	Weight	Age
1 bull ♂ Limousin	450 kg alive	10,5 months old.

Calving distribution



Performances

Pregnancy rate……..96%
Mortality rate…….5%
Replacement rate……19%

- Grazing period goes from April to November.
- Animals are divided into 4 groups for grazing : 3 groups of cows and 2 groups of heifers.
- Rotational grazing : in spring, each group does a rotation over 3 blocks of grassland at least.

Gross Meat Production :
33 029 kg alive

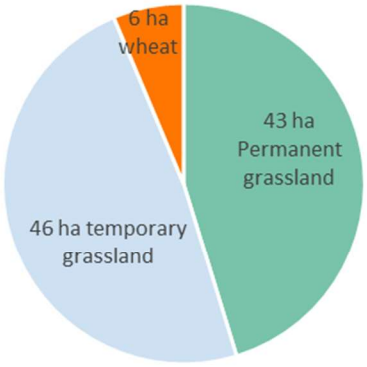
		Forage supplies (kg dry matter / animal / day)			Concentrates Kg GM/ animal / year		
		Period (days)	Hay	Wrapped grass	Cereals	Fattening concentrates	Weanlings concentrates
Cows	Before calving	60	11	-	-	-	-
	After calving	75	7	11	-	-	-
	Fattening	110	8,5	-	6	0,9	-
Heifers	1 year old	135	2,5	5	0,5	0,2	-
	2 years old	135	7,5	0	1	-	-
	Before 1st calving	45	9	-	1,4	0,3	-
	After 1st calving	90	5,5	10	1	0,3	-
	Fattening (23 m.o.)	120	6,5	-	3	1	-
	Fattening (32 m.o.)	105	7	-	3,8	1,3	-
Calves ♂ and ♀	Before weanling	100	-	-	-	-	2
Bulls	Wintering	135	9	-	2	0,3	-
	TOTAL NEEDS	(tons/year)	**144 t DM**	**41 t DM**	**24,8 t GM 21 t DM**	**5,2 t GM 4,42 t DM**	**14,2 t GM 12,07 t G%**

Crops & grassland

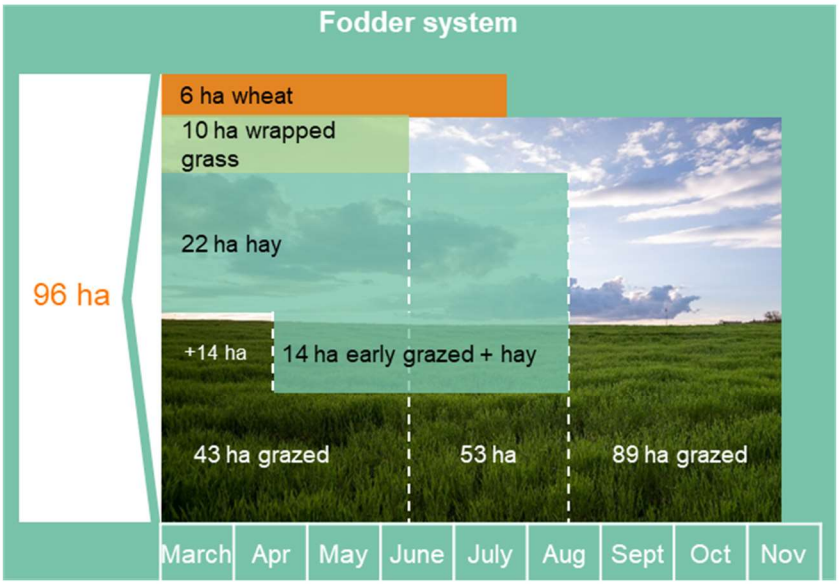
FR.LIM-CC

Sustainbeef

UAA : 95 ha



Fodder system



Fertilisation

	Block	ha	Mineral fertiliser (U/ha) N	P_2O_5	K_2O	Organic fertiliser
Grassland	Grazing area	43 (7 ha fertilised)	30	0	0	-
	Hay + Grazing	22	40	0	0	Manure : 10 T / ha / year
	Early grazing + Hay + Grazing	14	40	0	0	
	Wrapped grass + Grazing	10	50	10	20	
Crops	Wheat	6	85	45	105	-

Harvest

		ha	Yield Ton DM / ha	Total Ton DM	Sold Ton DM
Hay	Hay 1st cut	22	4,2	92	
	Hay cut after early grazing	14	4,2	59	
	Wrapped grass	10	4,2	42	
Crops	Wheat	6	4,2	25,2	

- The production of forages and cereals reaches the requirements of the herd.
- The farm only needs to buy concentrates and straw
- Every year, 15 ha are ploughed :
  - 6 ha for cereals
  - 9 ha of temporary grassland

Production vs. Needs

(Tons)	Total needs	Total production	Quantity purchased
Hay	144	151	0
Cereals	24,8	25,2	0
Straw	NA	NA	38

Buildings	Equipments
For cows : free hoosing system with straw bedding	Tractor 100 hp, 75 hp & 45 hp.
	Plough, seeder
	Fertilizer drill, sprayer
	Round baler, mower, tedder, windrower, straw blower

Economic results (2017)

FR.LIM-CC

Sustainbeef

Total gross output	127 535 €
Sales of Livestock & Livestock products	88 275 €
- Purchases of Livestock	2 450 €
Total gross output / Livestock	**85 825 €**
Farmhouse consumption of crops products	4 160 €
Total gross output / Crops	**4 160 €**
Single farm payments (DPU)	17 585 €
Coupled support	11 565 €
Compensatory Allowances for Natural Handicaps (CANH)	8 400 €
Other aids (except for investment)	0 €
Total Aid	**37 550 €**

Total expenses	53 920 €
Operating expenses	**29 935 €**
Purchases of straw	2 470 €
Purchases of feed and minerals	6 550 €
Self-consumption of cereals	4 160 €
Veterinary costs	5 870 €
Other specific livestock costs	3 525 €
Operating expenses / Livestock	**22 575 €**
Purchases of seeds and seedlings	1 590 €
Fertilisers and soil improvers	4 070 €
Crop protection products	390 €
Other specific crop costs	1 310 €
Operating expenses / Crops and grassland	**7 360 €**
Structural expenses	**23 985 €**
Machinery & building maintenance costs (except depreciations)	4 980 €
Energy (fuel)	4 660 €
Contract work	4 215 €
Other expenses : water, insurance, accountability…	10 130 €

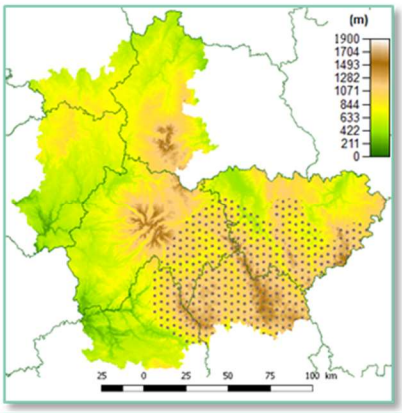
Wages and social insurance	7 315 €
Rental charges	**6 265 €**
Depreciations	**23 195 €**
Interests and Financial expenses	**3 295 €**

Non-land total assets	373 600 €
Capital : Livestock	198 200 €
Physical Capital : Equipment	74 800 €
Physical Capital : Buildings and Facilities	67 300 €
Physical Capital : Stocks	33 300 €

Based on the data from Inosys – Réseaux d'Elevages

FR.CANT – DCC
South-West of the Massif Central, France

Combined system : dairy and suckler herds Production of milk and calves sold at 10 months old



- This system is compounded of a dairy herd (49 cows Montbeliardes) for the production of milk in the PDOs Cantal and Bleu d'Auvergne (and potentially Fourme d'Ambert), and a suckler herd (40 cows Aubrac) for the production of calves sold at 10-12 months for the export market.
- This system is usually efficient in economic terms. The two herds are complementary regarding the land occupation and the forage valorization. However, it is particularly labour-intensive and requires a substantial investment in buildings and milking equipment (stationary and mobile).

localization of the case-study

49 + 43 Calvings
128 Livestock Units (LU)

2 family workers
0,1 employees

113 ha UAA

Sales

Dairy herd
- **300 000 L milk** sold
- 12 culled cows and 32 calves

Suckler herd
- **34 calves** (10-12 m.o.)
- 7 culled cows and 1 bull

1,2 LU / ha Main Forage Area

Cropping system :
- **108 ha grassland**
- **5 ha cereals (triticale)**

Livestock

FR.CANT-DCC

Sustainbeef

Dairy herd

Artificial insemination
14 with Charolais

49 females
Montbeliarde
for breeding

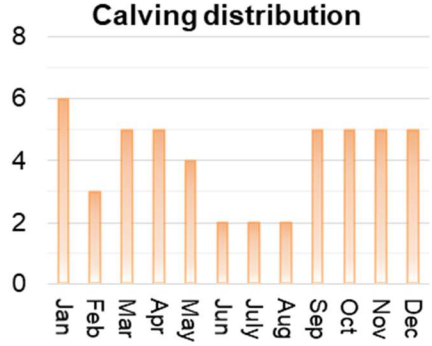
49 calvings
46 calves

14 heifers

Annual sales

Type	Weight	Age
12 finished cows ♀ (+ 2 lost) Montbeliarde	620 kg alive	6-7 y.o.
14 newborn calves Montbeliarde*Charolais	85 kg alive	5 weeks old
18 newborn calves Montbeliarde	55 kg alive	3 w.o.

Calving distribution



- Calvings are spread over the year, with a peak in autumn. A majority of the females are inseminated in pure breed for the herd renewal. Others are crossbred with Charolais.
- Dairy cows graze from May to October. Heifers generally go out 10 days earlier than cows, and graze until November 15th. Given the patchwork parcels, this is possible thanks to the mobile milking parlour.
- During the winter, animals are fed on grass silage (or wrapped grass) and hay. Cows are in cubicles with slatted floor.

Performances

Production per cow.....6 400 L
Concentrates per cow.....1 500 kg
Mortality rate.....4,1%
Replacement rate.....29%

Milk Production : 314 592 L

Milk Sold : **300 000 L**

Suckler herd

50 females
Aubrac
for breeding

43 calvings
42 calves

42 weanlings

8 heifers (Aubrac)

2 bulls (Aubrac)

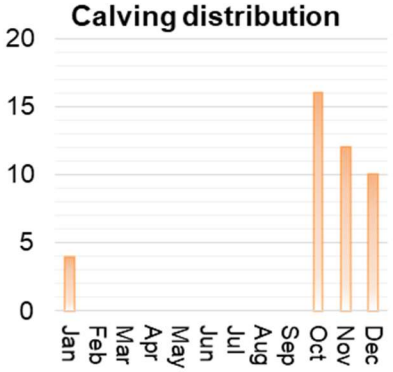
Annual sales

Type	Weight	Age
3 store cows ♀ Aubrac (+ 1 lost)	540 kg alive	8-9 y.o.
4 finished cows ♀ Aubrac (label)	740 kg alive	8-9 y.o.
21 heavy calves Aubrac	430 kg alive	12 m.o.
13 calves Aubrac	295 kg alive	10 m.o.
1 bull ♂ Aubrac	800 kg alive	25,5 m.o.

Annual purchases

Type	Weight	Age
1 bull ♂ Aubrac	500 kg alive	13,5 m.o.

Calving distribution



Performances

Pregnancy rate.....94%
Mortality rate.....4,6%
Replacement rate.....19%

Gross Meat Production :

17 746 kg alive

- The suckler herd is based on pure-bred breeding. These animals can use and valorise blocks of parcels which are out of reach for dairy cows.
- Calves are raised on grass and are sold between 10 and 12 months old. Culled animals are also fattened before being sold.
- During the winter, animals are fed on grass silage (or wrapped grass) and hay. Cows are in a tie-stall barn and heifers in a loose housing barn.

Livestock feed

FR.CANT-DCC

Sustainbeef

			Forage supplies (kg dry matter / animal / day)					Concentrates
			Period	Grazing ?	Hay (1st cut)	Hay (2nd cut)	Grass silage	
Dairy	Cows	*Spring*	1st May – 30th Jun	Yes		1	0,5	Cereals + Concentrate 18% + Soya
		Summer	30th Jun – 20th Aug	Yes				
		Autumn	20th Aug – 1st Nov	Yes		2	3	
		Winter	1st Nov – 30th Apr	No	3	2	9	
	Heifers 1 y.o.	*Winter*	15th Nov – 15th Jun	No	4			-
	Heifers 2 y.o.	*Winter*	15th Nov – 20th Apr	No	6			-
	Heifers 3 y.o.	*Winter*	15th Nov – 20th Apr	No	4		5	Cereals + Soya
Suckler	Bull	*Winter*	15th Nov – 5th May	No	12			Cereals
	Cows	*Winter*	15th Nov – 5th May	No	6	1	5	Concentrate
	Heifers	*Winter*	15th Nov – 5th May	No	14			Cereals + soya
	Heavy calves	*Before sale*	15th Jun – 15th Sept	Yes	4,5	1		Concentrate
	TOTAL NEEDS		(tons/year)		**136 t**	**37 t**	**154 t**	**97 t GM**

	Cow concentrate 18% protein	Starters concentrate	Triticale	Concentrate before calving	Soja
TOTAL NEEDS	**50 t GM 42,5 t DM**	**17 t GM 14,5 t DM**	**22 t GM 18,7 t DM**	**1 t GM 0,85 t DM**	**7 t GM 5,95 t DM**

Details of the concentrates

Tons / year

Crops & grassland

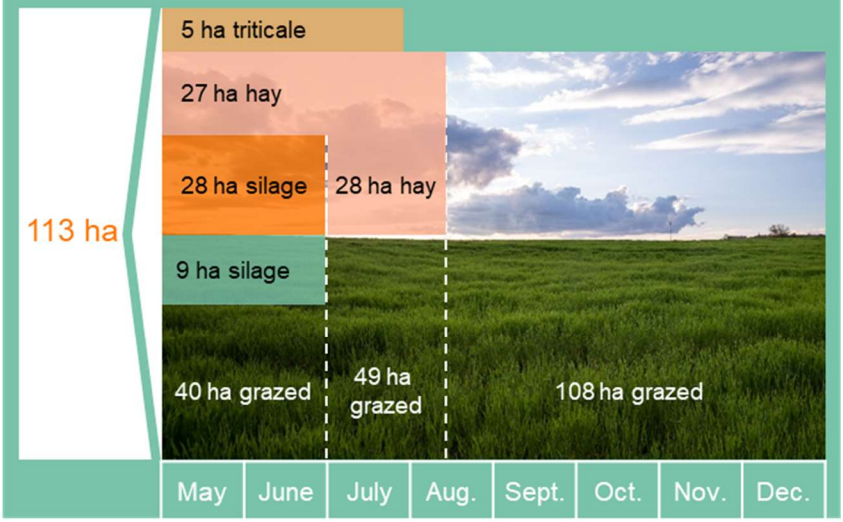
FR.CANT-DCC

Sustainbeef

UAA : 113 ha

Land use

Fodder system



Fertilisation

	Block	ha	Mineral fertiliser (U/ha)			Organic fertiliser
			N	P_2O_5	K_2O	
Grassland	Grazing area	40	50	0	20	Manure
	Silage + Hay + Grazing	28	80	0	50	Manure & Slurry
	Hay + Grazing	27	0	0	0	Manure & Slurry
	Silage + Grazing	13	50	0	0	Slurry
Crops	Triticale	5	70	0	0	Manure

Harvest

		ha	Yield Ton DM / ha	Total Ton DM	Sold Ton DM
Grassland	Hay 1st cut	27	4,6	124	0
	Hay cut after silage	28	1,8	50	0
	Silage	41	4,1	168	0
Crops	Triticale	5	4,5	22,5 T (not DM)	0

- The grass silage (or wrapped grass) is harvested on the temporary grasslands. It contributes to fill the pasture shortage which is usual in summer.
- The temporary pastures alternate in the crop rotation with the cereals. Sometimes, alfalfa enters the rotation in dry years.
- Most of the equipment is the property of the farm. However, the harvest of the cereals and the grass silage is done by a contractor.

Production vs. Needs

(Tons)	Total needs	Total production	Quantity purchased
Hay	174	174	0
Grass silage	154	168	0
Concentrates	97	22	75
Straw	35	15	20

Buildings	Equipments
Dairy cows : cubicles with slatted floor	2 Tractors 50-99 hp
Dairy : tie-stall system	Tractor 100-149 hp
Suckler cows : tie-stall system	Hay mower, rake and baler
Suckler heifers : loose-housing barn	Seed drill
Equipment hangar	Silo unloader-distributor
Bunker silo, grain bin	

Economic results (2017) FR.CANT-DCC

Total gross output	233 352 €
Dairy unit :	
Sales of Livestock & Livestock products *Including milk*	128 906 € *110 622 €*
- Purchases of Livestock	0 €
Total gross output / Dairy livestock	**128 906 €**
Suckler unit :	
Sales of Livestock & Livestock products	43 085 €
- Purchases of Livestock	1 700 €
Total gross output / Suckler livestock	**41 385 €**
Crops :	
Sales of crop products	0 €
Farm use of crop products	3 129 €
Total gross ouput / Crops	**3 129 €**
Not-coupled aid :	
Coupled support (mountain milk)	3 984 €
Coupled support (suckler production)	7 300 €
Single farm payments (DPU)	24 837 €
Compensatory Allowances for Natural Handicaps (CANH)	23 811 €
Other aids (except for investment)	0 €
Total aid	**59 932 €**

Total expenses	104 684 €
Operating expenses	**65 630 €**
Purchases of straw	1 600 €
Purchases of feed and minerals	26 489 €
Self- consumption of cereals	3 129 €
Veterinary costs	8 792 €
Other specific livestock costs	13 259 €
Operating expenses / Livestock	**53 268 €**
Purchases of seeds and seedlings	2 302 €
Fertilisers and soil improvers	5 780 €
Crop protection products	1 615 €
Other specific crop costs	2 664 €
Operating expenses / Crops and grassland	**12 361 €**
Structural expenses	**39 054 €**
Machinery & building maintenance costs (except depreciations)	12 119 €
Energy (fuel)	6 827 €
Contract work	5 845 €
Other expenses : water, insurance, accountability…	14 263 €

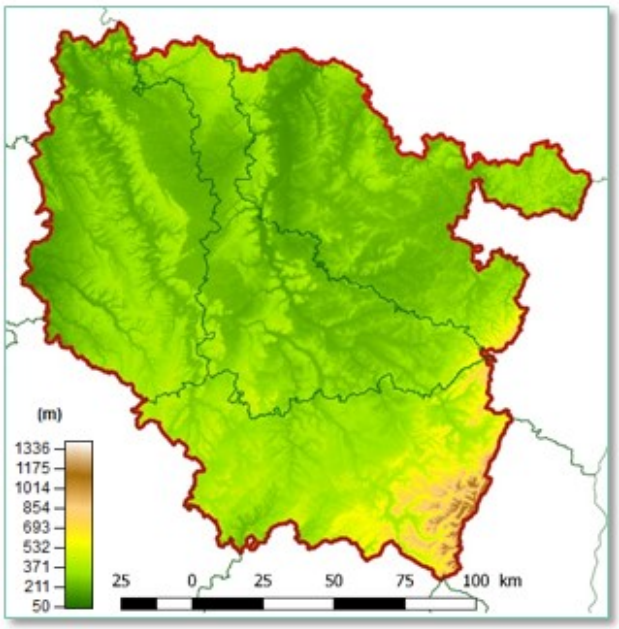
Wages and social insurance	18 389 €
Rental charges	**9 999 €**
Depreciations	**40 114 €**
Interests and Financial expenses	**6 963 €**

Non-land total assets	561 527 €
Capital : Livestock	157 223 €
Physical Capital : Equipment	157 872 €
Physical Capital : Buildings and Facilities	215 862 €
Physical Capital : Stocks	30 570 €

Based on the data from Inosys – Réseaux d'Elevages

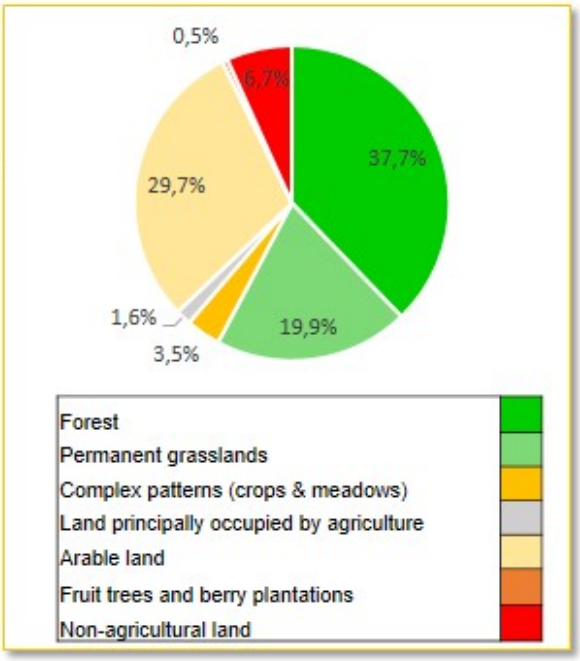
Lorraine

France



This territory refers to the former French administrative region of Lorraine, now included in the Grand-Est.

ZONE	Lorraine
AREA (km²)	23547
ALTITUDE (m)	
min	115
max	1364
mean	314

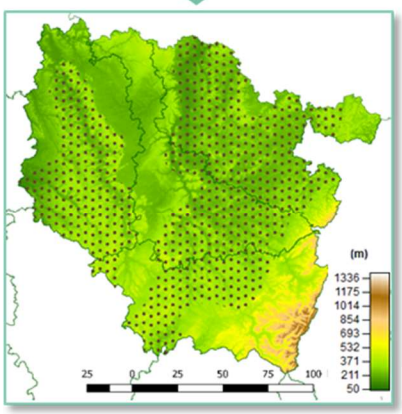


Based on the Corine Land Cover (CLC) 2012

Maps were edited on QGis 2.14.22

FR.LOR – BF : Grand-Est, France

Crop-livestock farming : cereals + cow-calf + fattening units, production of young bulls Charolais



- In this mixt crop-livestock system, the animals (mainly Charolais) valorize unploughable wet grasslands. Forage lands are intensively managed comparatively to other farms in this region: fertilization, grass silage harvest and maize allow the farm to reach high stocking rates (around 1,5 LU/ha). Fattening is an opportunity for these farmers thanks to the presence of maize crops. The production cycle is short : young males are sold at 16 months, before May.
- The farm size and the combination of different units make the work organization more flexible.
- These big holdings are located in the areas favorable to the production of cash crops (Barrois and Lorraine plateau, Wet Champagne).

localization of the case-study

60 Calvings
113 Livestock Units (LU)

2 associate workers
0 employees

250 ha UAA

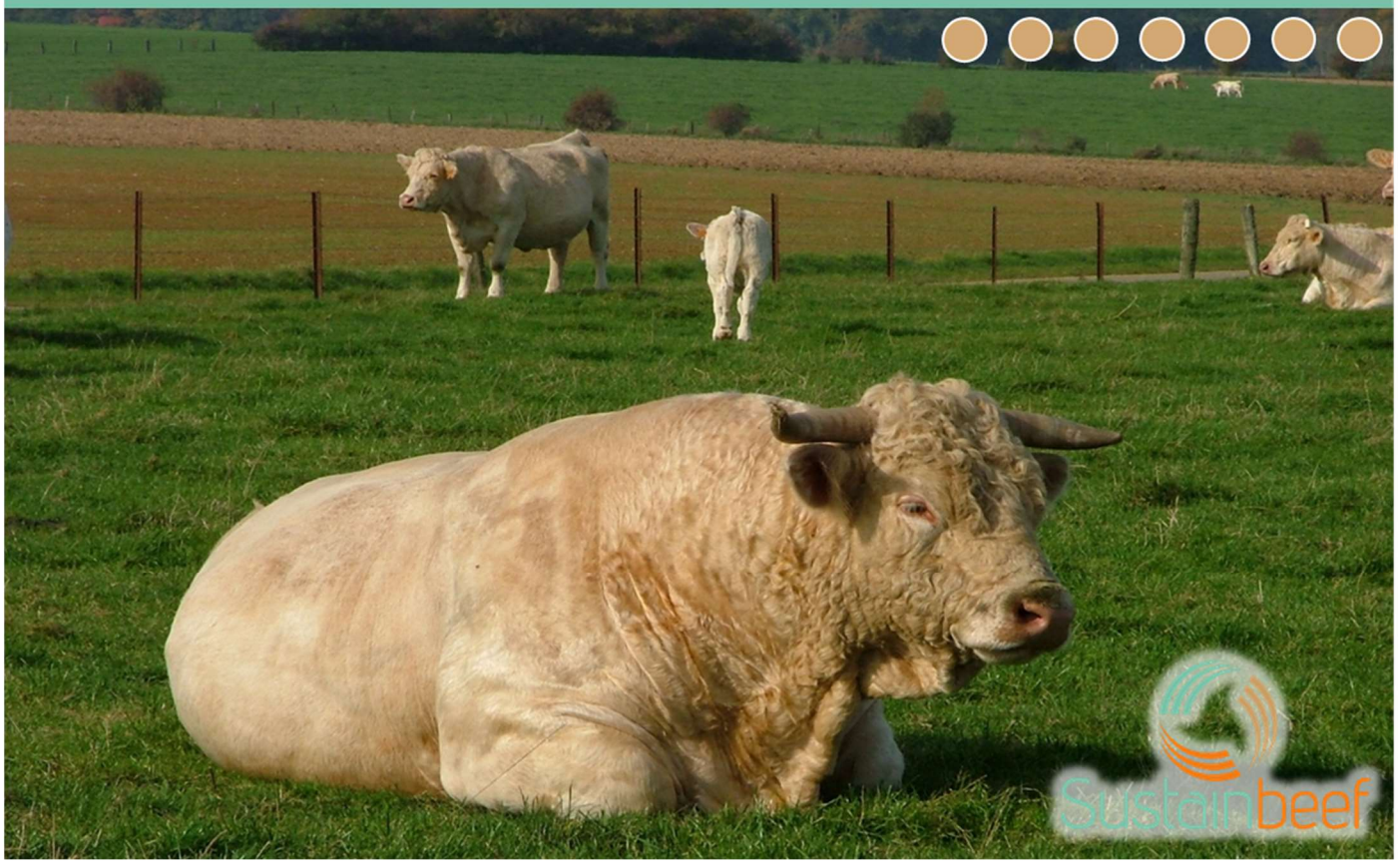
Sales

- **29 young bulls**
- **15 heifers** (31 months old)
- 13 culled cows
- 1 bull

1,5 LU / ha Main Forage Area

Cropping system :

- **60 ha permanent grassland**
- **174 ha cash crops**
- **5 ha alfalfa**
- **10 ha maïze silage**



Livestock

FR.LOR-BF

Sustainbeef

60 cows Charolais

60 calvings
62 calves

58 weanlings

29 young bulls

29 heifers

2 bulls Charolais

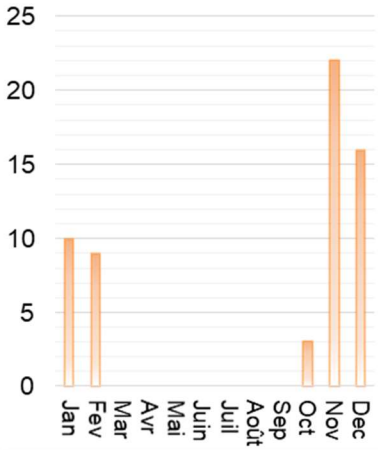
Annual sales

Type	Weight	Age
13 finished cows ♀ Charolais (+ 1 lost)	420 kg c.	7-8 y.o.
29 young bulls ♂ Charolais	420 kg c.	16 m.o.
15 heifers ♀ Charolais	380 kg c.	31 m.o.
1 bull ♂ Charolais	650 kg c.	-

Annual purchases

Type	Weight	Age
1 bull ♂ Charolais	750 kg alive	-

Calving distribution



Performances

Pregnancy rate.....92%
Mortality rate.....7%
Replacement rate.....23%

Gross Meat Production :

41 205 kg alive

- Calvings occur from November to February. 60% of the females are artificially inseminated. The rest of the cows is breeded by natural service, with bulls evaluated on station. Breedy type bulls are prefered, in order to ensure easy calvings, good dairy performance of replacement heifers and high carcass weights of males.
- The good condition of the herd (genetics, an early calving season and a judicious dietary supplementation) leads to the obtention of heavy weanlings, and allow the consitution of homogenous batches for fattening : the first males to be weaned are set to wait with a dry feed ration until maize silage is available. Thanks to calvings occurring in early winter and to the production of young bulls (16 months), all animals are out of buildings when cows start grazing.
- Culled cows and fattened indoor during 2 months, for being sold in November.

	Forage supplies (kg dry matter / animal / day)							Concentrates Kg GM / animal / year
	Period (days)	Hay	Maize silage	Grass silage	Alfalfa	Straw	Total kg dry matter / day	
25 Cows before calving	39	3	3,7	2,8	1,5	1	12	8
35 Cows before calving	92	6,3	2	1,3	1	1,2	11,8	
60 Cows after calving	112	3	4	3	2	1	13	
2 Bulls	166	3	4	3	2	1	13	5
60 Calves	56	1					1	28
12 grazers ♀ <1 y/o	68				2		2	90
29 Heifers 1 - 2 y/o	197		4		2,5		6,5	10
29 Heifers 2 - 3 y/o	152			7,5		1,5	9	120 (fattened on grass)
12 grazers ♂ <1 y/o	62					2,5	2,5	319
29 young bulls 1 – 2 y/o	210		5			0,5	5,5	1 187
13 culled cows	85		8		4		12	
TOTAL NEEDS	(tons/year)	**45 t**	**96 t**	**59 t**	**37 t**	**22 t**		**44,9 t GM**

	Cereals	Soya	concentrate 18% protein	Beet pulp	Minerals
TOTAL NEEDS	**28 t GM 23,8 t DM**	**10 t GM 8,5 t DM**	**4,4 t GM 3,74 t DM**	**0,7 t GM 0,6 t DM**	**1,8 t GM**

Details of the concentrates

Tons / year

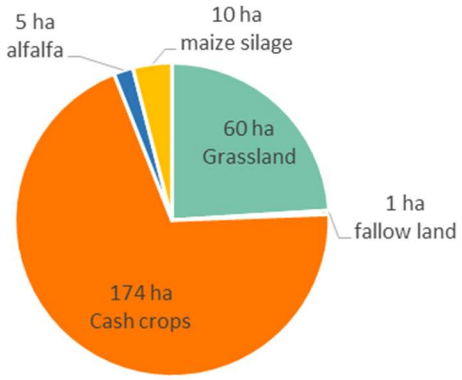
Crops & grassland

FR.LOR-BF

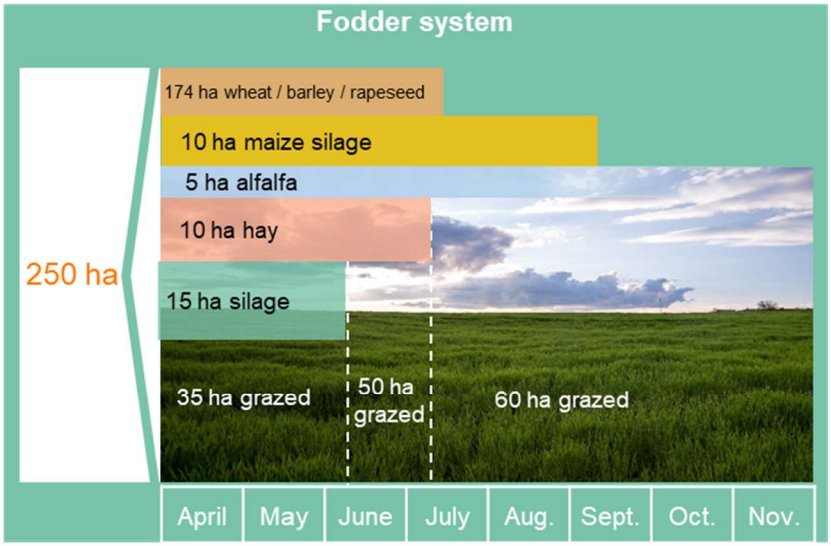
Sustainbeef

UAA : 250 ha

Land use



Fodder system



	Block	ha	Fertilisation: Mineral fertiliser (U/ha) N	P_2O_5	K_2O	Fertilisation: Organic fertiliser	Harvest: Yield Ton DM / ha	Total Ton DM	Sold Ton DM
Grassland	Grazing area	35	70	20	30	-			
	Silage (+ Grazing)	15	100	40	90	-	4	60	0
	Hay (+ Grazing)	10	50	20	60	-	4,5	45	0
	alfalfa	5	0	100	200	-	8,1	40,5	0
Crops	Maize silage	10	100	-	-	Manure 25 T/ha	10	100	0
	Wheat	65,5	172	23	2,3	-	7	459	430,5
	Rapeseed	53,5	158,5	28,5	17,1	Manure 11 T/ha	3,5	187	187
	Winter barley	37	135	45	17	-	6,5	240,5	240
	Spring barley	18	110	40	40	-	5	90	90

- Parcels are quite scattered due to the enlargement of the farm. It causes constraints for the management of the forage area. Rapeseed is the main starter crop of the farm. Sometimes, a part of the rapeseed can be replaced by maize grain. The farm produces a surplus of straw.

- The forage system mainly relies on the valorisation of grasslands. The stocking rate reaches 1,5 LU/ha of grasslands thanks to :
  - The presence of maize silage, which balances the forage intake, ensures fattening of young bulls and secures the diet in case of forage deficit.
  - A high grazing pressure in spring (34 ares/UGB in May) because of the 6-months-old calves, born in early winter.
  - The harvest of 40% of the grasslands (half are used for grass silage).
  - 2 nitrogen applications.

- This management requires a rigorous monitoring of plots in order to avoid grass waste or shortage.
- Cows are divided in 2 or 3 batches.
- Males are supplemented with concentrates (1,5 kg/day) during 2 months before weanling, while they graze.

Production vs. Needs

(Tons)	Total needs	Total production	Quantity purchased
Hay	45	45	0
Grass silage	59	60	0
Maize silage	96	100	0
Concentrates	46	28	18
Straw	187	362	0

Building	Equipments
Free-stall barn with straw bedding	Crops and hay harvests

Economic results (2017)

FR.LOR-BF

Sustainbeef

Total gross output	327 849 €
Sales of Livestock & Livestock products	85 614 €
- Purchases of Livestock	1 667 €
Total gross output / Livestock	**83 947 €**
Sales of Crops products	175 208 €
Farm use of Crops products	4 103 €
Total gross output / Livestock	**179 311 €**
Single farm payments (DPU)	53 584 €
Coupled support	11 007 €
Compensatory Allowances for Natural Handicaps (CANH)	0 €
Other aids (except for investment)	0 €
Total Aid	**64 591 €**

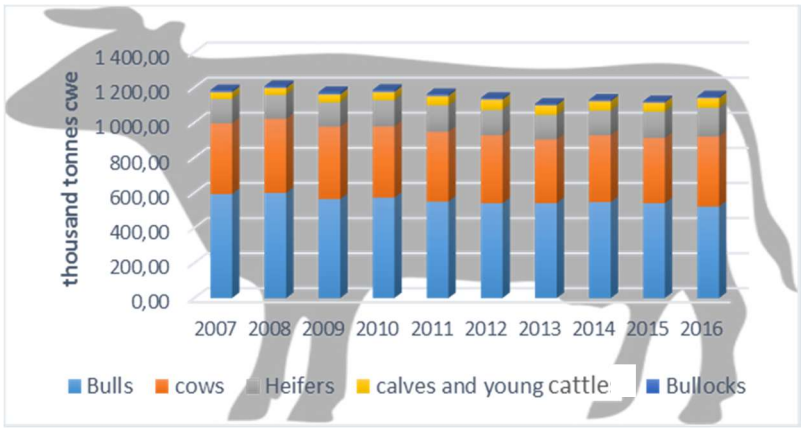
Total expenses	152 138 €
Operating expenses	**94 140 €**
Purchases of straw	0 €
Purchases of feed and minerals	6 524 €
Self-consumption of cereals	4 103 €
Veterinary costs	6 790 €
Other specific livestock costs	4 672 €
Operating expenses / Livestock	**22 079 €**
Purchases of seeds and seedlings	11 180 €
Fertilisers and soil improvers	31 244 €
Crop protection products	25 458 €
Other specific crop costs	4 179 €
Operating expenses / Crops and grassland	**72 061 €**
Structural expenses	**57 998 €**
Machinery & building maintenance costs (except depreciations)	16 858 €
Energy (fuel)	17 246 €
Contract work	3 876 €
Other expenses : water, insurance, accountability…	20 018 €

Wages and social insurance	16 736 €
Rental charges	**28 395 €**
Depreciations	**54 000 €**
Interests and Financial expenses	**9 835 €**

Non-land total assets	675 000 €
Capital : Livestock	168 750 €
Physical Capital : Equipment	168 750 €
Physical Capital : Buildings and Facilities	101 250 €
Physical Capital : Stocks	236 250 €

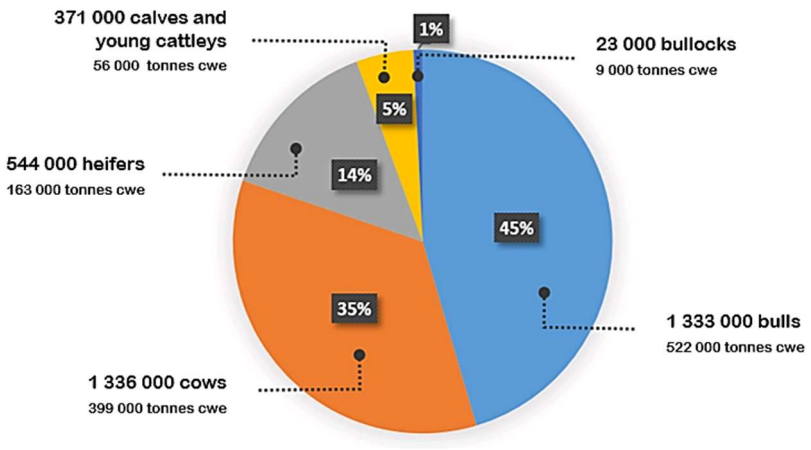
Based on the data from Inosys – Réseaux d'Elevages

Figure 28: Evolution of German beef production



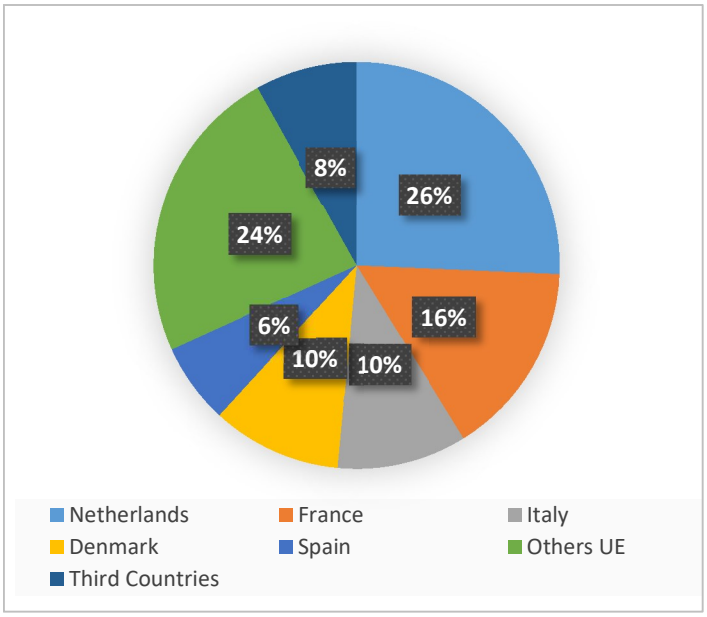
Source : Inra, by Eurostat

Figure 29: Type of bovine animal produced in Germany in 2016



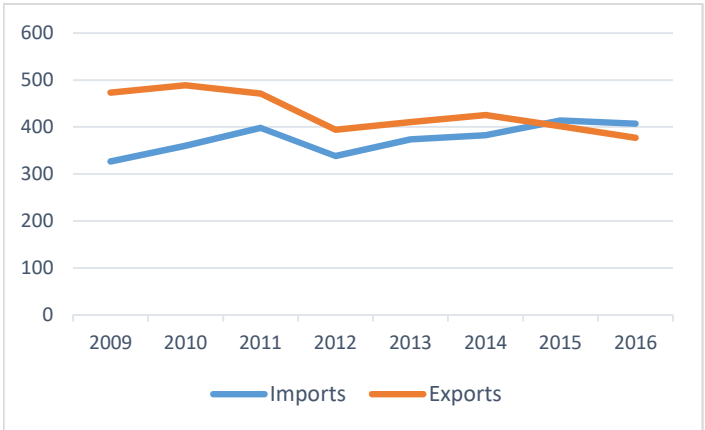
Source : Inra, by Eurostat

Figure 30: Main customers of German meat in 2016



Source : Inra, by FranceAgriMer

Figure 31: Evolution of German beef foreign exchange (*1000 T cwe)



Source : Inra, by FranceAgriMer

GENERAL ELEMENTS

Germany is the largest dairy producer in the EU and after France, the 2nd largest beef producer, with 1.15 million T cwe from 3.6 million heads (14.7% of the EU production). Even if the production has known a drop by 27% since the 1980s, it has stayed relatively stable the last 10 years (figure 28).

In 2001, with the BSE crisis, beef consumption in Germany have experiences a drop by 30% compared to 2000. Since then, consumption is slightly increasing due to changes in eating habits (Thünen-Institut 2017a) and has reached 14.3 kg cwe per inhabitant in 2016 (GEB-IDELE 2016b).

Beef production in Germany is characterized by 2 types of animals: 45% of the beef produced (in T cwe) is from young bulls and 35% is from culled cows, both from dairy and suckling cattle (figure 29). The cattle herd hold 4.2 million dairy cows and 670 thousand suckling cows. Therefore, beef production is highly influences by the dairy sector with calves and cattle not required for the dairy production fatten to produce meat (Deblits et al. 2008).

FOREIGN EXCHANGES IN GERMANY

BEEF EXCHANGES

German exports have declines in recent years (-20% since 2009), stabilizing at 377.1 thousand T cwe (i.e. 33% of its production) in 2016 making Germany the 3rd largest European exporter after Ireland and Poland (figure 30). Germany main clients are the Netherlands, France, Italy and Denmark (figure 31). In contrast, imports have increased by 25% since 2009, with 406.9 thousands t cwe imported in 2016 mainly from the Netherlands, France, Poland and third countries such as Argentina, Uruguay and Brazil (figure 32). Due to different consumption habits, Germany import meat from young cattle and export meat from culled cows (Thünen-Institut 2017a).

EXCHANGES IN LIVE ANIMALS

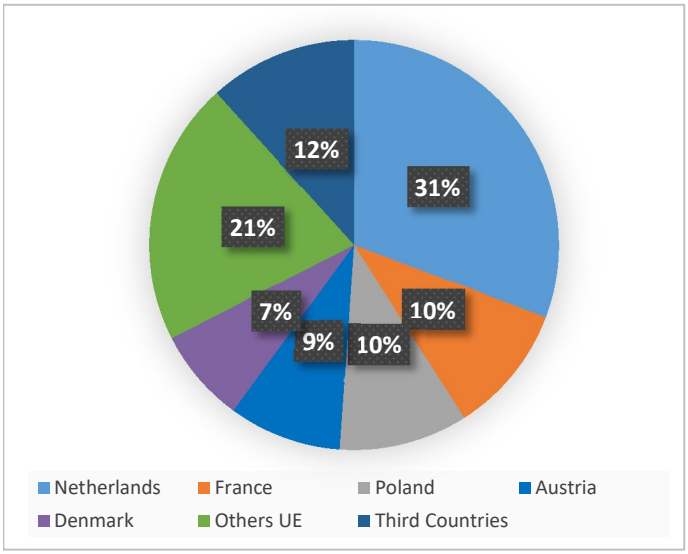
In 2016, Germany has exported around 706 thousands heads (+22% since 2009) mainly towards the Netherlands (80%) and Spain (10%). 94% of its exports concern dairy calves for slaughter.

Importation of live animals have known a significant decreased since 2009 (almost -60%) and stabilized at 63.3 thousand heads in 2016 (figure 33).

TYPOLOGY OF THE GERMAN HERD

With 12.5 million heads in 2016, Germany held the 2nd biggest cattle herd in the EU. It is mainly composed from dairy animals (4.2 million dairy cows vs. 670 thousand suckling cows) (figure 34). The cattle herd has declined by 15% since 2000 due to the decapitalization in the dairy sector.

Figure 32: German main suppliers of beef in 2016

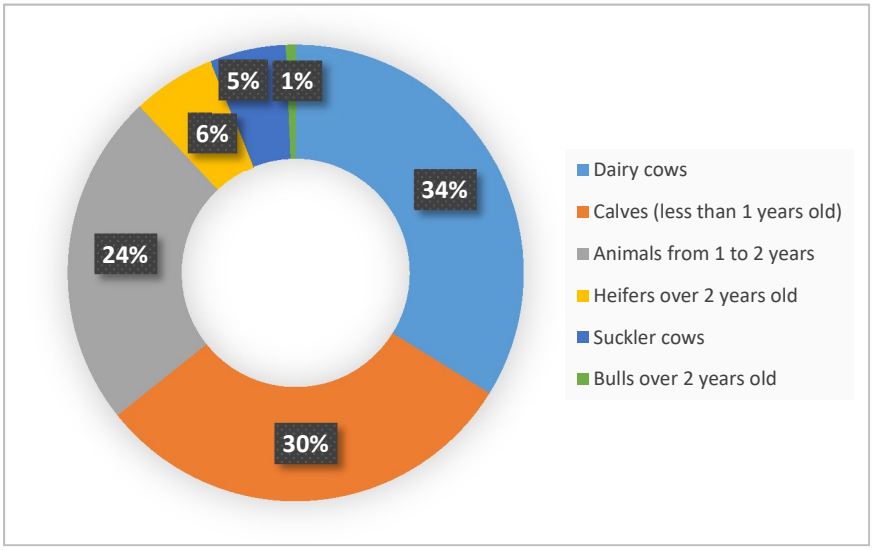


Source : Inra, d'après FranceAgriMer

Figure 33: Evolution of German live cattle foreign exchange (number of heads)

Source : Inra, d'après FranceAgriMer

Figure 34: Type of animals held in farms in Germany in 2016



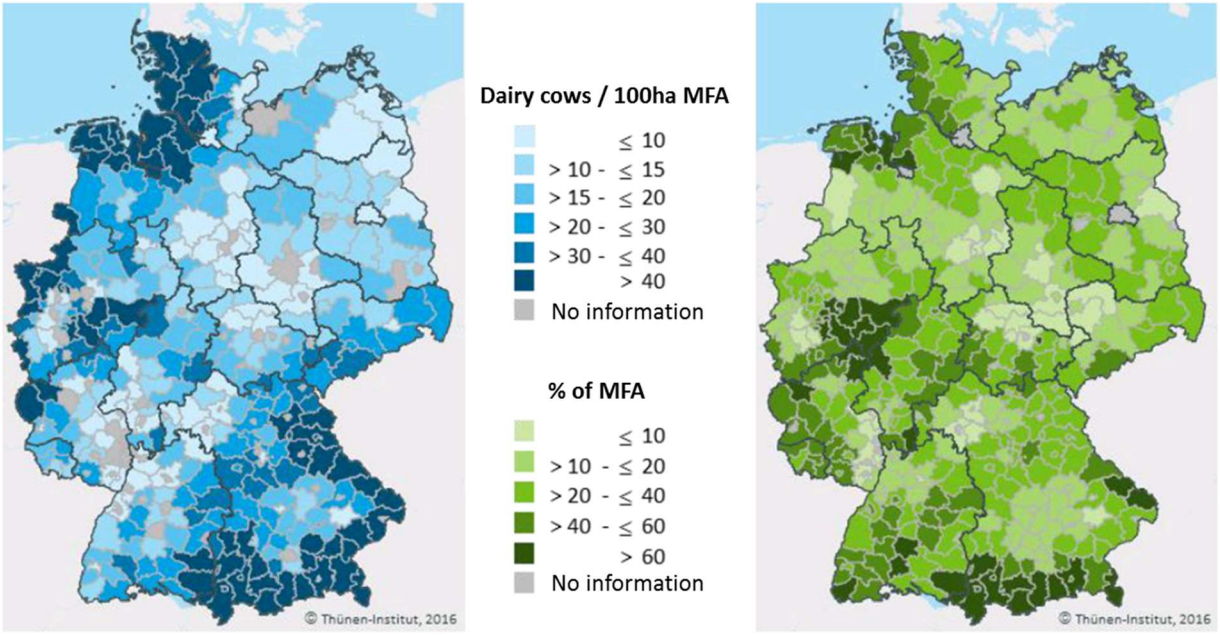
Source : Inra, d'après Eurostat

Thus, the dairy herd has declined by 12% since 1990 due to the milk quotas and the increased in milk production but has stayed relatively stable since 2008. In 2016, there was 71,000 dairy farms in Germany, half of it located in the Bavaria state and 50% of the dairy cows held either in the Bavaria state or the Lower Saxony state (Figure 35). There is a high variability in herd size, with a quarter of the German's farms owning at least one dairy cow (Thünen-Institut 2017b). The largest herds can be found in the former East Germany with 188 dairy cows per farm on average while in the former West Germany, the average dairy herd is 54 cows per farm. Nevertheless, the 15% of farms with more than 100 cows accounts for 50% of the German dairy herd. The suckling herd is composed mainly of cow-calf specialized farms. The 51,000 farms held on average 14 cows in 2014 (Stolz 2014), larger farm can be found in the former East Germany than in the former West Germany (32 vs. 10 cows/farm on average) (Delblitz et al. 2008). Between 1990 and 2000 the specialized suckling herd has been multiplied by 2.7 and has reached 820 thousand cows, yet since 2000, it has declined by 20%.

In 2015, Germany had 82 thousands farm with a fattening activity, 85% of those were located in the western part of Germany. 72% of the farms have less than 10 young bull and account for only 16% of the number of animal fattened in Germany. Young bulls are mostly fattened in specialized farms with 28% fattened in farms with more than 100 heads and 20% in farms with 20 to 99 heads. Those systems represent 6% of the total of farms with a fattening activity (Eurostat 2017). Most of the young bulls are fattened in the Lower Saxony state (Figure 36).

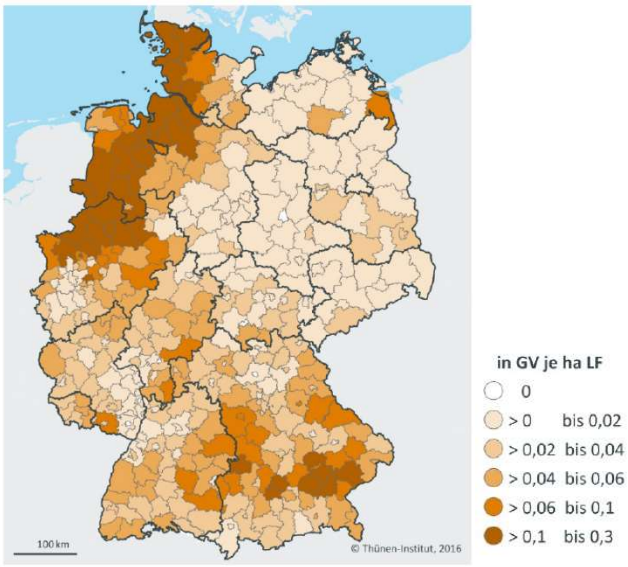
Young bulls are, for the main part, allotted and fattened indoors with a highly concentrated diet based on maize silage. Calves from dairy cattle are mainly sold to a fattening system at 14 days of age for the Holstein breed and 2 month of age for the Fleckvieh and Braunvieh breeds but some fattening farms prefer buying weaned animals (between 4 and 6 mo). Holstein bulls are slaughtered between 18 and 21 mo while Fleckvieh and Braunvieh bulls are slaughtered between 17 and 19 mo with an 'objective' live weight from 680 and 750 kg. Young bulls from specialized beef breed or crossed breed are bought by fattening farms at 6 to 9 mo (Thünen-Institut 2017b).

Figure 35: Regional distribution of dairy cows on German territory in 2016 (left) and share of grasslands within each region in 2010 (right)



Source: Statistisches Bundesamt, Fachserie 3, Reihe 4, Viehbestand und tierische Erzeugung (2016)

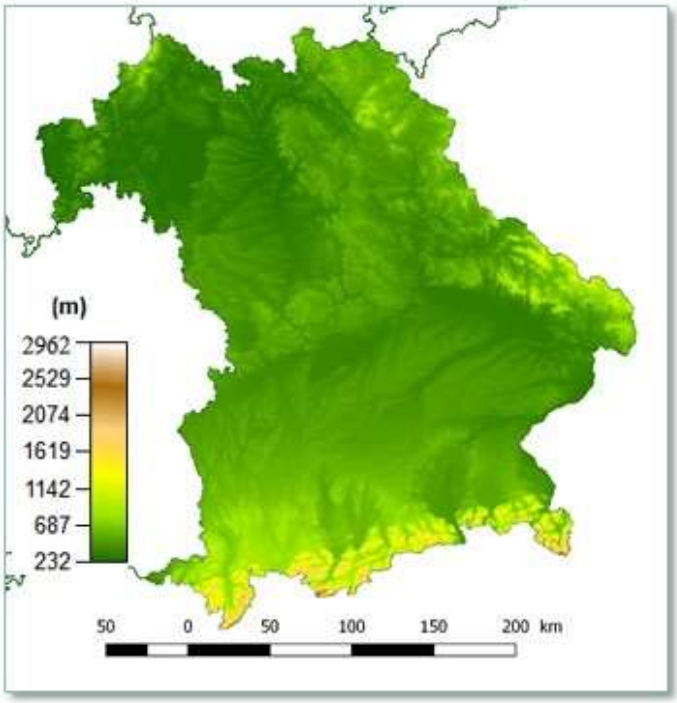
Figure 36: Regional distribution of young bulls in Germany in 2010



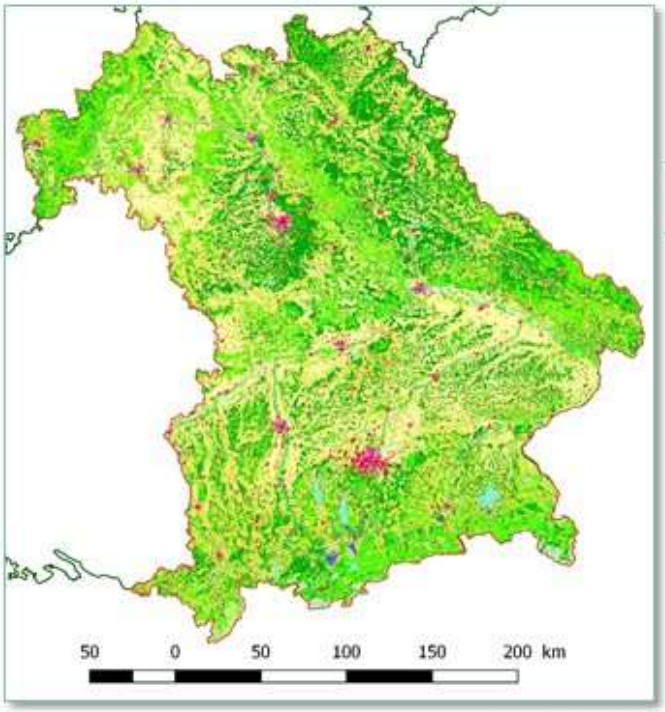
Source : Thünen-Institut, 2016

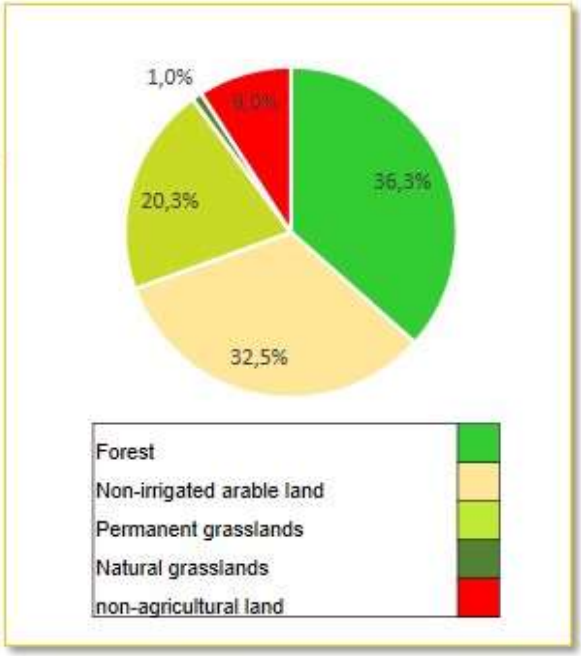
Bavaria

Germany



ZONE	Bavaria
AREA (km²)	70552
ALTITUDE (m)	
min	82
max	2962
mean	511



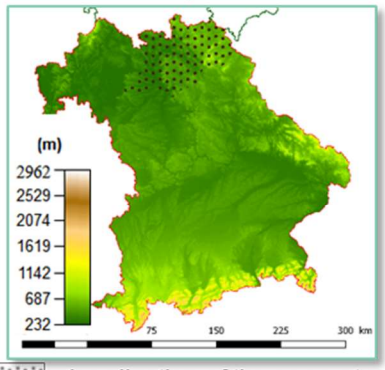


Based on the Corine Land Cover (CLC) 2012

Maps were edited on QGis 2.14.22

GE.BAV-F
Bavaria, Germany

Production of starters from dairy farms, raised from 1 to 9 months old
Production of bulls



localization of the case-study

- This case study represent a typical farm specialized in producing starters. Male calves are bought from dairy farms at around 5 weeks old, and raised up to 200 kg, ~140 days, to be sold to specialized beef fattening farms (mainly in the North-West of Germany).
- The farm is endowed with little arable land on a marginal production area.

480 animals per year
113 Livestock Units (LU)

2 family workers
0 employees

63 ha UAA

Sales :

- **410 starters** 9 months old
- **64 bulls** 18 months old
- Cereals : wheat & barley

4 LU / ha Main Forage Area

Cropping system :

- 23 ha maize silage
- 20 ha wheat + 15 ha barley
- 5 ha permanent grassland

Sustainbeef

Livestock

GE.BAV-F

Sustainbeef

Annual purchases

Type	Weight	Age
480 males ♂ Simmental	80 kg alive	5-6 weeks old

Annual sales

Type	Weight	Age
64 bulls ♂ fattened Simmental	715 kg alive	18 m.o.
410 store calves ♂ Simmental	215 kg alive	9 m.o.

In 2017 :

Store starter calves sale price / kg alive.....3,59 €
Bull sale price / kg alive.....2,29 €
Mortality rate.....1,3%

Gross Meat Production :

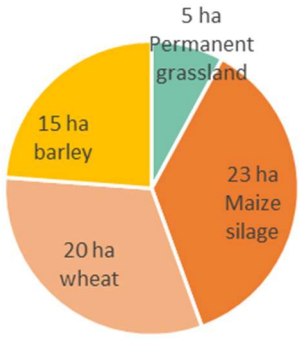
95 574 kg alive

Daily diet (kg dry matter / animal / day)

	Grazing ?	Maize silage	Grass silage	Hay	Fattening concentrate	Soja or Rapeseed	Milk replacer	Total kg dry matter / day
For starters	No	0,4 ↗ 7,4		0,27	0,6 ↗ 1,8	0,2	0,7 ↘ 0	2 to 10
For bulls	No	9 ↗ 21	1,7 ↗ 2,5		1,5	1,34		
TOTAL NEEDS (tons/year)		**210**	**17,3**	**11,3**	**32**	**35,4**	**11,9**	

Crops

UAA : 63 ha



Fertilisation

	Ha	Mineral fertiliser (U/ha) N	P_2O_5	K_2O	Organic fertiliser
Maïze silage	18	123	34	143	Slurry 20 m3/ha/year
Wheat	20	75	13	-	
Barley	15	27	7	-	
Grass silage	5	124	44	221	

Harvest

	Ha	Yield Ton DM / ha	Total Ton DM	Sold Ton DM
Maïze silage	23	15	343	127
Wheat	20	7	141	139
Barley	15	6	90	88
Grass silage	5	8,5	42,5	25

Production vs. Needs

	Total needs	Quantity purchased
Maïze silage	215	0
Grass silage	17,3	0

Buildings	Main equipments
loose housing barn with slatted floor	1 Tractor >50 hp, 1 Tractor >100 hp
	Tillage and seeding equipment : plough, seeder, cultivator, harrow, fertilizer spreader, manure spreader, liquid manure tank …
	Hay making done by contractor

Economic results (2017)

GE.BAV-F

Sustainbeef

Total gross output	290 159 €
Sales of Livestock & Livestock products	421 356 €
- Purchases of Livestock	220 032 €
Total gross output / Livestock	**201 324 €**
Sales of Crops products	54 163 €
Farm use of Crops products	18 456 €
Total gross output / Livestock	**72 618 €**
Single farm payments (DPU)	16 216 €
Coupled support	0 €
Compensatory Allowances for Natural Handicaps (CANH)	0 €
Other aids (except for investment)	0 €
Total Aid	**16 216 €**

Total expenses	173 027 €
Operating expenses	**151 946 €**
Purchases of straw	0 €
Purchases of feed and minerals	71 354 €
Farm use of Crops products	18 456 €
Veterinary costs	11 286 €
Other specific livestock costs	7 622 €
Operating expenses / Livestock	**108 718 €**
Purchases of seeds and seedlings	8 398 €
Crop protection products	9 626 €
Fertilisers and soil improvers	25 204 €
Other specific crop costs	0 €
Operating expenses / Crops and grassland	**43 228 €**
Structural expenses	**21 081 €**
Machinery & building maintenance costs (except depreciations)	8 127 €
Energy (fuel)	8 783 €
Other expenses : water, insurance, accountability…	0 €
Contract work	12 954 €

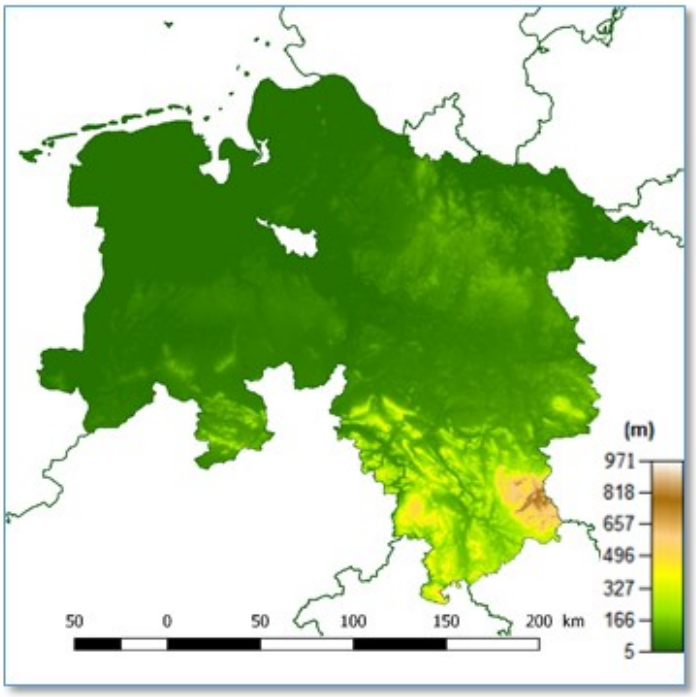
Wages and social insurance	9 131 €
Rental charges	**399 €**
Depreciations	**14 699 €**
Interests and Financial expenses	**NA €**

Non-land total assets	NA
Capital : Livestock	NA
Physical Capital : Equipment	NA
Physical Capital : Buildings and Facilities	NA
Physical Capital : Stocks	NA

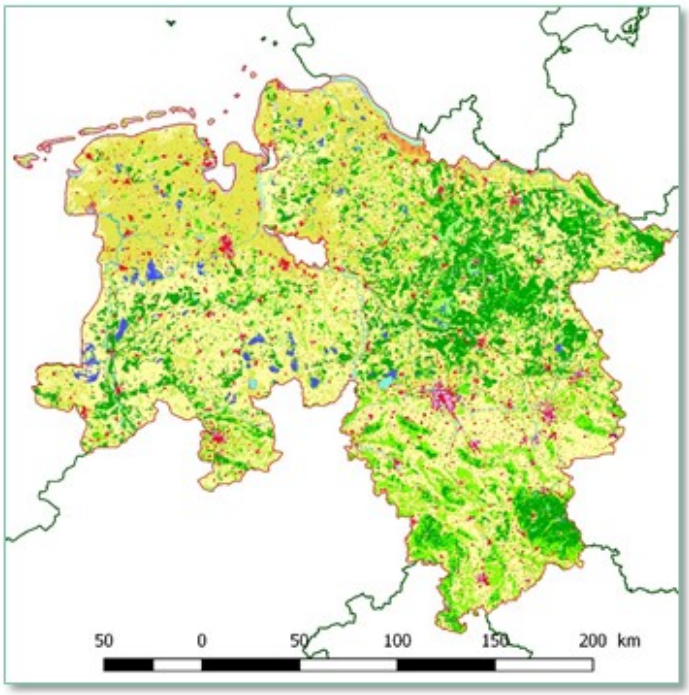
Based on interviews with farmers

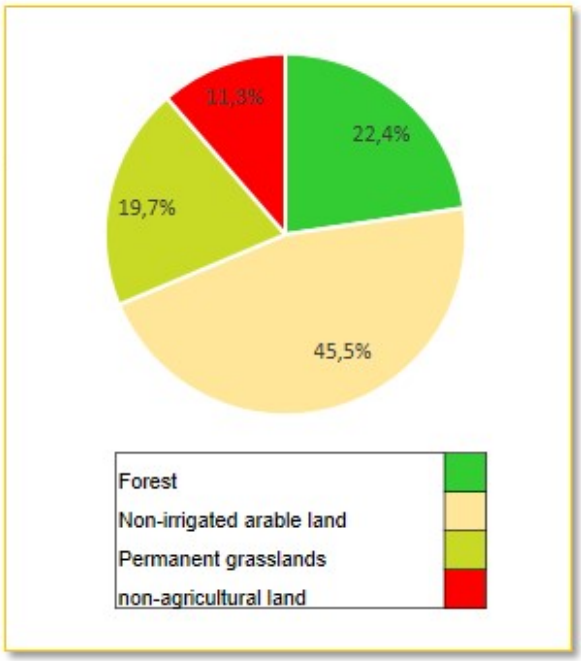
Lower Saxony

Germany



ZONE	Lower Saxony
AREA (km²)	47624
ALTITUDE (m)	
min	5
max	971
mean	70



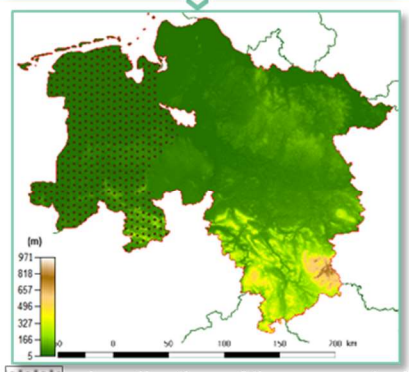


Based on the Corine Land Cover (CLC) 2012

Maps were edited on QGis 2.14.22

GE.LS-F
Lower-Saxony, Germany

Intensive, large-scale beef fattening system
Production of 107 bulls per year



localization of the case-study

- This case study is often found in the north-western production region of Germany. Simmental calves are bought at the age of 2 months old, from auctions or marketing organisations from South Germany (mainly Bavaria). Thus, transaction and management costs are reduced.
- Bulls are sold when they reach 685 kg (alive), at around 22 months old.

107 animals per year
192 Livestock Units (LU)

2 family workers
0 employees

45 ha UAA

Sales :

- **107 bulls** 22 months old

4,3 LU / ha Main Forage Area

Cropping system :

- 42 ha maize silage
- 3 ha permanent grassland

Sustainbeef

Livestock

GE.LS-F

Sustainbeef

Annual purchases

Type	Weight	Age
115 males ♂ Simmental	80 kg alive	2 months old

Annual sales

Type	Weight	Age
107 bulls ♂ fattened Simmental	685 kg alive	22 m.o.

In 2017 :

Bull sale price / kg alive.....2,29 €

Gross Meat Production :

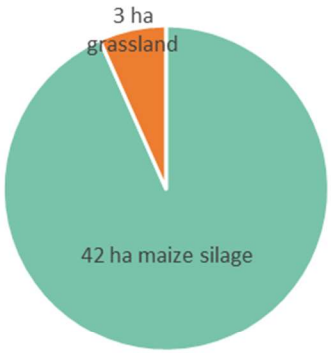
64 095 kg alive

Daily diet (kg dry matter / animal / day)

	Grazing ?	Maize silage	Grass silage	Hay	Fattening concentrate	Soja or Rapeseed	Milk replacer
2 to 6 m.o.	No	1 ↗ 4,7		0,2 ↗ 3,8	1,8	0,2	0,7 ↘ 0
6 to 22 m.o.	No	6,2 ↗ 15	2,1 ↗ 4,9	4,5 ↗ 5,4	1,2	1,3	
TOTAL NEEDS (tons/year)		**195**	**51**	**199**	**59,5**	**47**	**3,2**

Crops

UAA : 45 ha



Fertilisation

	Ha	Mineral fertiliser (U/ha) N	P_2O_5	K_2O	Organic fertiliser
Maïze silage	42	120	30	140	Slurry 20 m3/ha/year
Grass silage	3	124	44	221	

Harvest

	Ha	Yield Ton DM / ha	Total Ton DM	Sold Ton DM
Maïze silage	42	15	626	NA
Grass silage	3	8,5	25,5	0

Production vs. Needs

	Total needs	Quantity purchased
Maïze silage	195	0
Grass silage	51	0

Buildings	Main equipments
loose housing barn with straw-bedded pen	1 Tractor >150 hp
	mower, tedder, silage harvester : by contractor

Economic results (2016)

GE.LS-F

Sustainbeef

Total gross output	258 474 €
Sales of Livestock & Livestock products	167 783 €
- Purchases of Livestock	52 716 €
Total gross output / Livestock	**115 067 €**
Sales of Crops products	129 936 €
Farm use of Crops products	0 €
Total gross output / Livestock	**129 936 €**
Single farm payments (DPU)	13 471 €
Coupled support	0 €
Compensatory Allowances for Natural Handicaps (CANH)	0 €
Other aids (except for investment)	0 €
Total Aid	**13 471 €**

Total expenses	140 726 €
Operating expenses	**118 684 €**
Purchases of straw	0 €
Purchases of feed and minerals	70 788 €
Farm use of Crops products	0 €
Veterinary costs	4 495 €
Other specific livestock costs	3 565 €
Operating expenses / Livestock	**78 848 €**
Purchases of seeds and seedlings	9 575 €
Crop protection products	5 789 €
Fertilisers and soil improvers	24 473 €
Other specific crop costs	0 €
Operating expenses / Crops and grassland	**39 837 €**
Structural expenses	**22 042 €**
Machinery & building maintenance costs (except depreciations)	5 418 €
Energy (fuel)	9 269 €
Other expenses : water, insurance, accountability…	958 €
Contract work	15 666 €

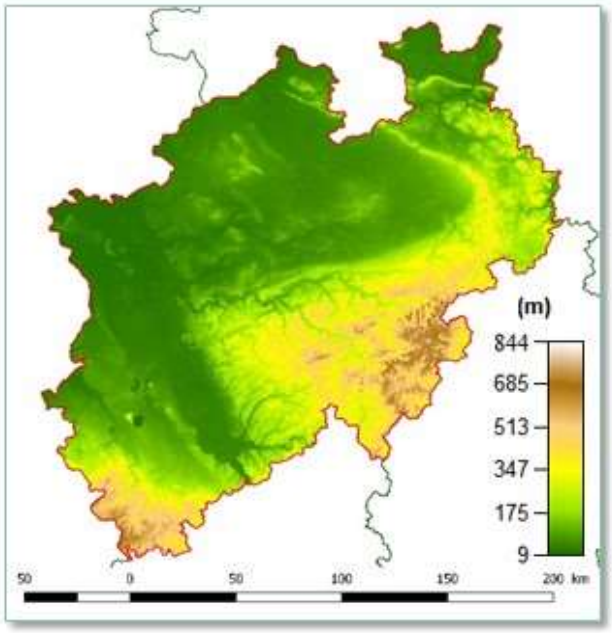
Wages and social insurance	31 343 €
Rental charges	**520 €**
Depreciations	**19 109 €**
Interests and Financial expenses	**NA €**

Non-land total assets	NA
Capital : Livestock	NA
Physical Capital : Equipment	NA
Physical Capital : Buildings and Facilities	NA
Physical Capital : Stocks	NA

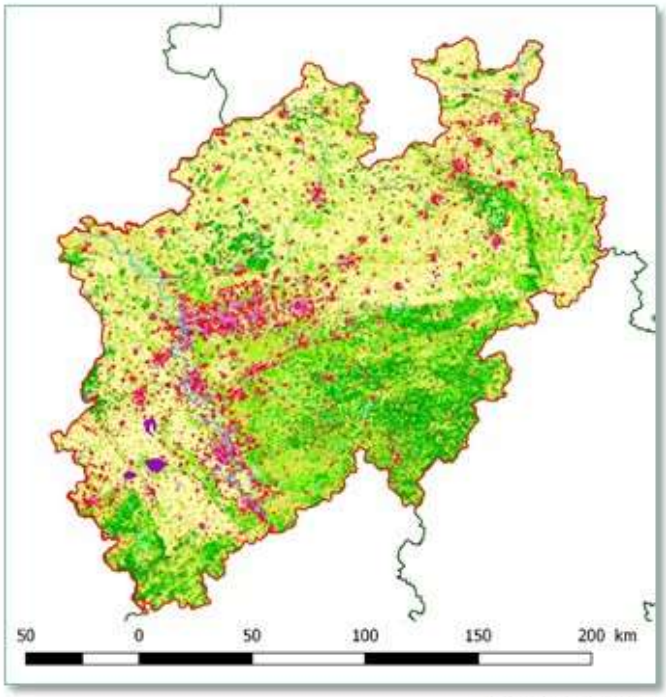
Based on interviews with farmers

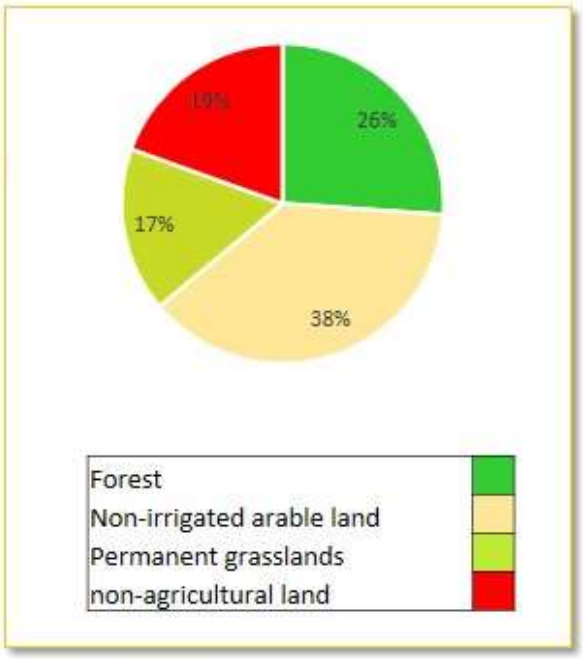
North Rhine Westphalia

Germany



ZONE	North Rhine Westphalia
AREA (km²)	34084
ALTITUDE (m)	
min	9
max	844
mean	175



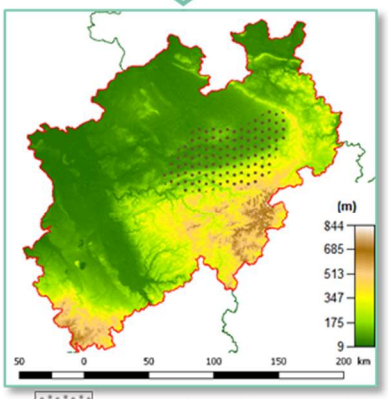


Based on the Corine Land Cover (CLC) 2012

Maps were edited on QGis 2.14.22

GE.NRW - DF
North Rhine-Westphalia, Germany

Dairy farm : 130 Holstein cows
Fattening of 60 bulls



localization of the case-study

- This case-study represents a dairy farm with fattening of bulls . Bulls are sold at 22 months old, when they reach 400 kg carcass. Female calves which are not kept for replacement of the cows are sold at 4 months old.
- Mainly located in Westfalen-Lippe and Soester Börde.

129 Calvings
165 Livestock Units (LU)

1 family workers
3 employees

225 ha UAA

Sales

Dairy herd

- **967 000 L milk** sold
- **65 bulls**
- 15 ♀ calves
- 45 culled cows

1,6 LU / ha Main Forage Area

Cropping system :

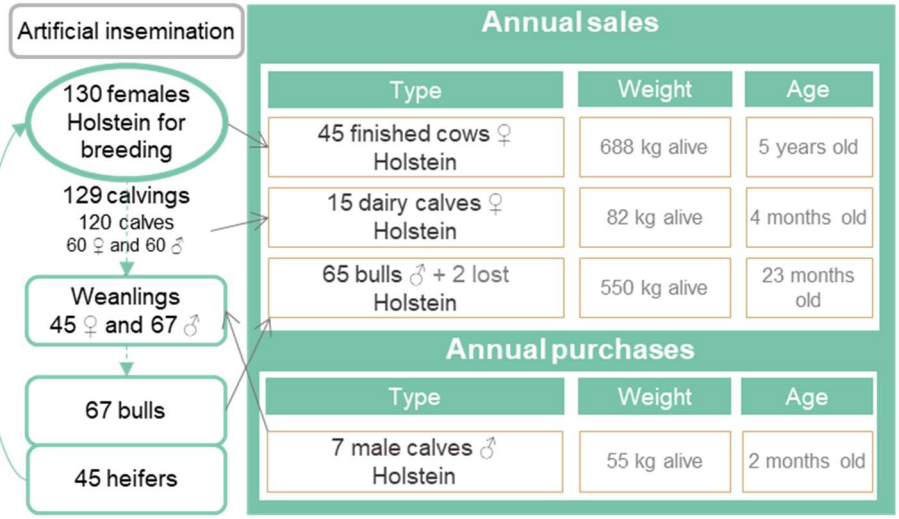
- **27 ha grassland**
- **103,5 ha cereals**
- **76,5 ha maize silage**
- **18 ha sugarbeet**

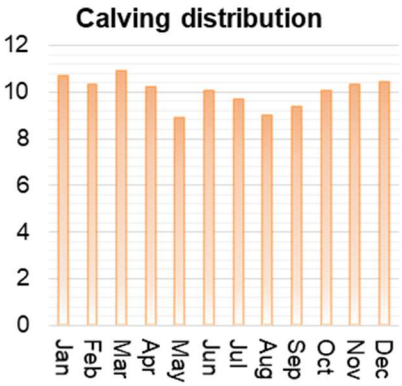
Sustainbeef

Livestock

GE.NRW-DF

Sustainbeef





Performances

Production per cow.....7 435 L
Mortality rate.....7%
Replacement rate.....34%

Milk Production : 967 000 L

Milk Sold : **967000 L**

- Calvings are spread over the year
- The cattle is never driven on grasslands.

		Forage supplies (kg dry matter / animal / day)							Concentrates
		Hay (1st cut)	Grass silage	Maize silage	Soja or Rapeseed	Bought cereals	Milk	Milk replacer	
Cows	*Dry*	0,4	19,7	13	0,8				-
	Lactating	0,5	17	16	1				-
	Fattening	0,5	18	16	2				-
Heifers	*0 – 1 m.o.*						Yes	Yes	-
	1 – 6 m.o.				0,75	1,5			-
	6 – 12 m.o.	4,5	12,8	4,15	1	1,26			2
	12 – 29 m.o.	4,5	15 to 19	4,3	1	1,26			1,3
Bulls	*0 – 12 m.o.*	0,2 to 3,8		1 to 4,7	0,2			0,6 to 0	1,8
	12 - 23 m.o.	4,5 to 5,4	14	4,7 to 5,5	1,3				1,2
	TOTAL NEEDS	**124 t**	**245 t**	**118 t**	**67 t**	**15 t**	**NA**	**NA**	**89 t**

Crops & grassland

GE.NRW-DF

Sustainbeef

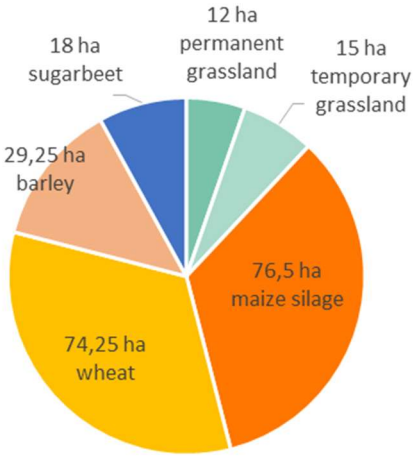
Fertilisation

Block		ha	Mineral fertiliser (U/ha)			Organic fertiliser
			N	P_2O_5	K_2O	
Grassland	Grass silage	27	124	44	221	Slurry : 20 T / ha
Crops	Maize silage	76,5	123	34	143	
	Wheat	74,25	75	13	-	
	Barley	29,25	27	7	-	
	Sugarbeet	18	76	42	161	

Harvest

Block		ha	Yield Ton DM / ha	Total Ton DM	Sold Ton DM
Grassland	Grass silage	27	8,5	230	0
Crops	Maize silage	76,5	16,2	1240	975,6
	Wheat	74,25	6,8	505	505
	Barley	29,25	6,4	187	106,7
	Sugarbeet	18	9,2	166	166

UAA : 225 ha



Production vs. Needs

(Tons)	Total needs	Total production	Quantity purchased
Hay	0	NA	0
Grass silage	206,4	230	0
Maize silage	864,4	1240	0
Concentrates	54,6	0	54,6
Bought cereals	80,3	187	0
Rapeseed meal	61,2	0	61,2

This farm owns a methanisor which can valorise all the extra maize produced on the farm.

Buildings	Equipments
Free-stall barn 120p.	1 Tractor 150-199 hp
Loose housing barn with straw-bedded pen 50p.	2 Tractors 100-149 hp
Methanisor 250 kW	Plough, Cultivator, Harrow, Seeder
Milking parlour <11p.	Fertilizer drill, sprayer
Manure pit 540 m3	Haymaking : by contractor

Economic results (2016)

GE.NRW-DF

Sustainbeef

Total gross output	1 133 383 €
Dairy unit :	
Sales of Livestock & Livestock products *Including milk*	541 339 € *396 328 €*
- Purchases of Livestock	920 €
Total gross output / Dairy livestock	**540 419 €**
Crops :	
Sales of crop products	483 305 €
Farm use of crop products	46 310 €
Total gross ouput / Crops	**529 616 €**
Not-coupled aid :	
Coupled support	0 €
Single farm payments (DPU)	63 348 €
Compensatory Allowances for Natural Handicaps (CANH)	0 €
Other aids (except for investment)	0 €
Total aid	**63 348 €**

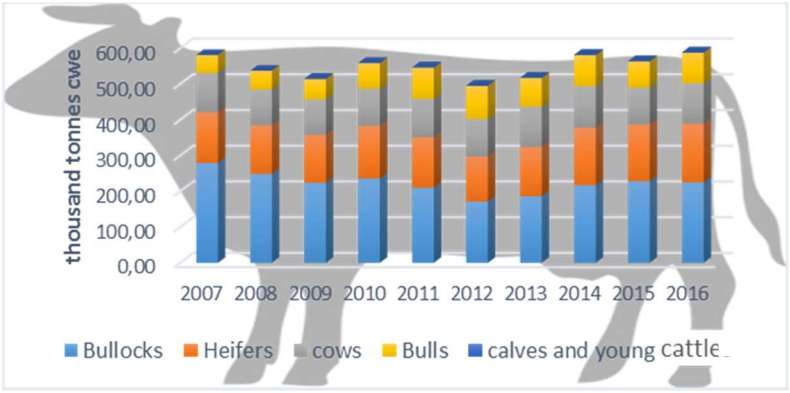
Total expenses	414 903 €
Operating expenses	**329 597 €**
Purchases of straw	0 €
Purchases of feed and minerals	89 850 €
Self- consumption of cereals	46 310 €
Veterinary costs	13 150 €
Other specific livestock costs	20 312 €
Operating expenses / Livestock	**169 622 €**
Purchases of seeds and seedlings	32 509 €
Fertilisers and soil improvers	95 463 €
Crop protection products	32 002 €
Other specific crop costs	0 €
Operating expenses / Crops and grassland	**159 974 €**
Structural expenses	**85 306 €**
Machinery & building maintenance costs (except depreciations)	38 622 €
Energy (fuel)	24 156 €
Contract work	41 472 €
Other expenses : water, insurance, accountability…	5 212 €

Wages and social insurance	103 161 €
Rental charges	**546 €**
Depreciations	**15 618 €**
Interests and Financial expenses	**NA €**

Non-land total assets	
Capital : Livestock	
Physical Capital : Equipment	
Physical Capital : Buildings and Facilities	
Physical Capital : Stocks	

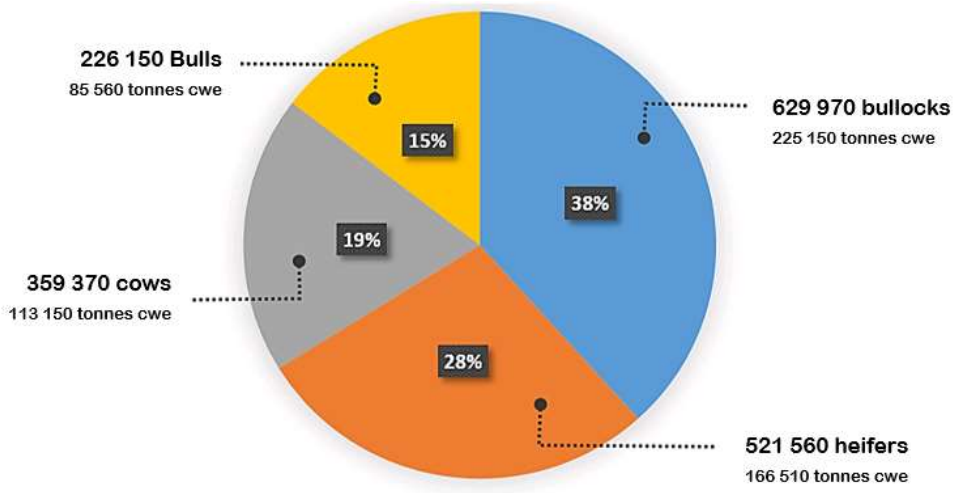
Based on interviews with farmers

Figure 4 : Evolution of Irish beef production



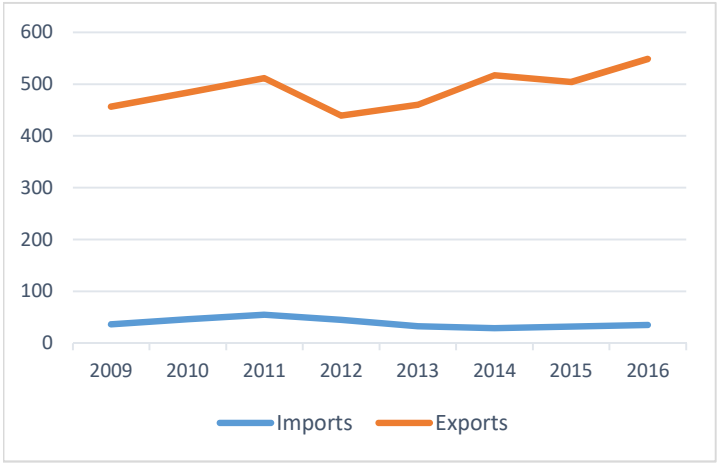
Source : Inra, by Eurostat

Figure 3 : Type of animal produced in Ireland in 2016



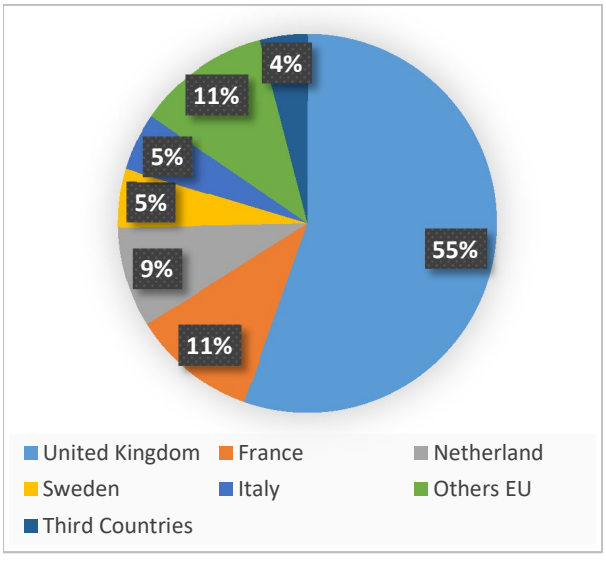
Source : Inra, by Eurostat

Figure 2 : Evolution of Irish beef foreign trade (x1000 T cwe)



Source : Inra, by FranceAgriMer

Figure 1 : Main customers of Irish beef prodcuts in 2016



Source : Inra, by FranceAgriMer

IRELAND: FIRST EUROPEAN PRODUCER

GENERAL ELEMENTS

Agriculture, and more specifically cattle breeding, is important for the Irish economy. Ireland was the 6th European producer with 588.4 thousand T cwe of beef in 2016. It is one of the few European countries (alongside Spain and Poland) with an upward trend in beef production since 1980 (+30%). The production increased mostly between the 1980s and 2000s and has only increased by 2% since 2000 (figure 37).

Ireland produced 7.54% of the EU beef production in 2016. Steers, slaughtered between 24 and 30 month old (GEB-IDELE 2013b), remains the main production in 2016 despite a decreased by 25% since 2000 (steers accounted for 53% of slaughters in 2000 vs. 38% in 2016) (figure 38). It has gradually been replaced by young bulls (3.8% of slaughters in 2000 vs. 15% in 2016) (Eurostat 2017). Young bulls have a better profitability due to a shorter cycle of production (young bulls being slaughtered at 18mo) and a fattening diet based on pasture grass with concentrate complementation. The share of females in slaughters has remained stable with 28% of heifers and 19% of cull cows. Heifers are fattened on diets based on pasture grass without complementation.

FOREIGN EXCHANGES IN IRELAND

The 4.8 million inhabitant of Ireland in 2016 consumed 19 kg cwe each (FranceAgriMer 2017). Thus, most of the Irish beef production is exported: in 2016, it represented 93% of the production with 548.6 T cwe (+20% since 2009) (figure 39) mainly towards the United Kingdom (55%, France (11%) and the Netherlands (9%) (figure 40). Therefore, Ireland is the first European exporter (before Poland and Germany) and the 5th largest exporter in the world.

The increase in exports can be linked to the Irish government's plans: *Food Harvest 2020* and *Food Wise 2025*.Irish agricultural strategy now focus on "high quality" meat on the EU beef market with grass based production from Anglo-Saxon breeds, as intended by the *Origin Green* program. All those programs aims to increasing Irish agricultural productions and exports and to promoting Irish products worldwide as well as ensuring farms durability (economic, environmental,…).

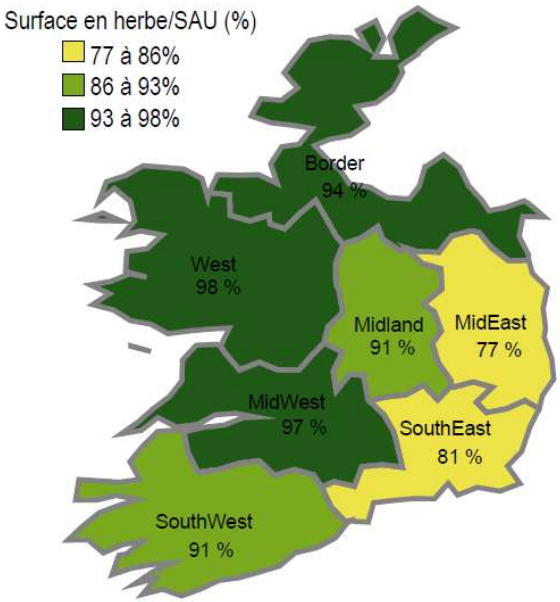
Live exports is marginal in Ireland with 91 500 heads exported in 2016, excluding animals for breeding, and has experienced a decreased by 60% since 2010.

Irish imports are very low with only 32.5 thousands T cwe of beef and 5,600 live animals in 2016 (FranceAgriMer 2017).

TYPOLOGY OF THE IRISH HERD

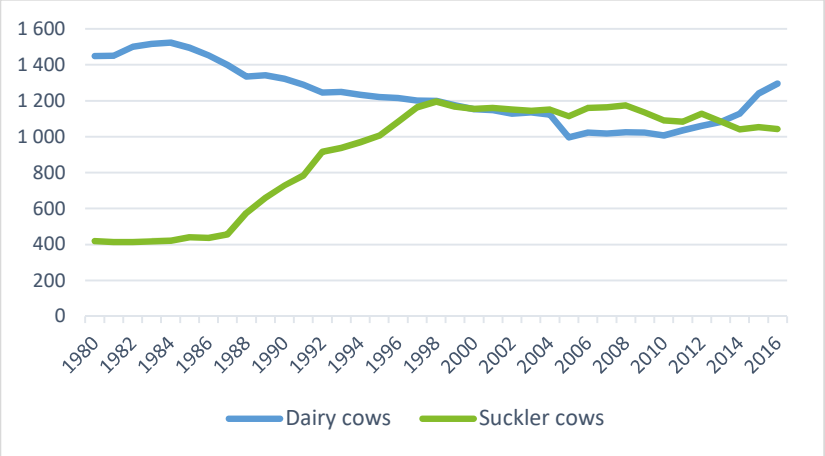
Ireland benefits from its oceanic climate and plentiful precipitation throughout the year allowing for a long grass-growing season from February to the end of November with on average 15 T of dry matter per hectare (vs. 11 T of dry matter on average in the EU). As grass accounts for 80% of the Irish utilized agricultural area (vs. 40% in average in the EU), its production systems diet are grass based (Walsh 2016) (Figure 41).

Figure 7 : Proportion of grassland in the UAA in 2009 (in %)



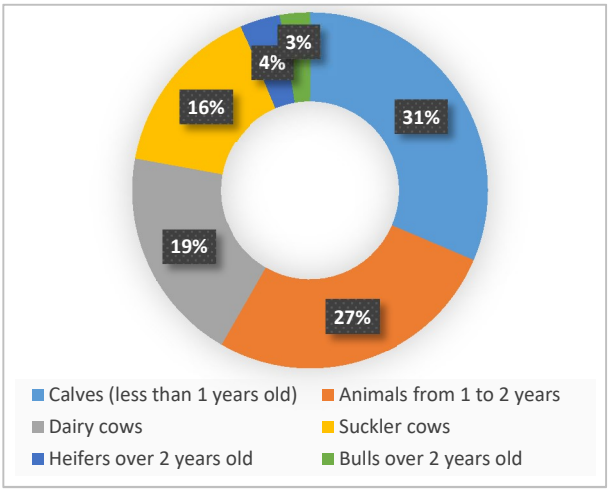
Source : GEB – Institut de l'Elevage, by CSA
Cartographie : Cartes et Données 6.0 Articque

Figure 5 : Evolution of Irish Dairy and suckling cows (*1000 heads)



Source : Inra, by Eurostat

Figure 6 : Type of animals held on Irish farms in 2016



Source : Inra, by Eurostat

With 6.6 million heads (+13.5% since 1980), Ireland owns the 4th European cattle herd (figure 42). The dairy herd held almost 1.3 million dairy cows while the suckling herd has slightly more than 1 million beef cows. The specialized beef herd has been multiplied by 2.6% between 1980s and 1990s but has decreased by 13% since the late 1990s.

The dairy herd has experienced a structural decreased until 2010. The government driven rise of 30% since 2010 was in anticipation of the 2015 ending of milk quotas. The dairy cattle herd is mainly located in the south (70%) while the suckling herd is located in the north-west with less favorable climatic conditions (figure 44 and 45).

Almost 90% of the 18 000 Irish dairy farms are specialized for milk production and 75% of dairy cows are owned by farms with more than 50 cows. Calving occurs at the end of winter, beginning of spring in order to take advantage of the grass growth during early lactation. In 2013, 95% of the dairy cows were from Holstein breeds. Yet, cross-breeding is frequent with almost 1/3 of the dairy cows inseminated with beef breads (GEB-IDELE 2013b).

78,000 of the 79,000 beef farms are specialized and held 79% of the suckling cows as well as 61% of males between 1 and 2 yo and 72% of males over 2 yo. In 2013, the average farm owned 31 LU on 28 ha, with 46% of the farms owning less than 20 ha and only 12% with more than 50 ha (GEB-IDELE 2013b).

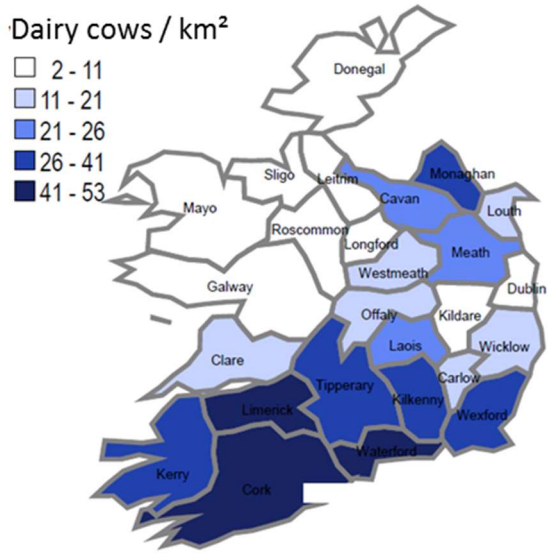
According to the Animal Identification and Movement (AIM) base, 25% of replacement heifers for the suckling herd are beef / dairy crossbreeds from dairy farms. Among the remaining replacement heifers, 61% are crossbreeds between different beef breeds.

Different types of production systems from the suckling herd were classified by Walsh (2016):

- Cow-calf systems producing weanlings sold at 8mo;
- Cow-calf systems producing weanlings sold at 1.5yo;
- Breeder – fattener systems;
- Fatteners;
- Mixed systems;
- Meat producers from dairy herds.

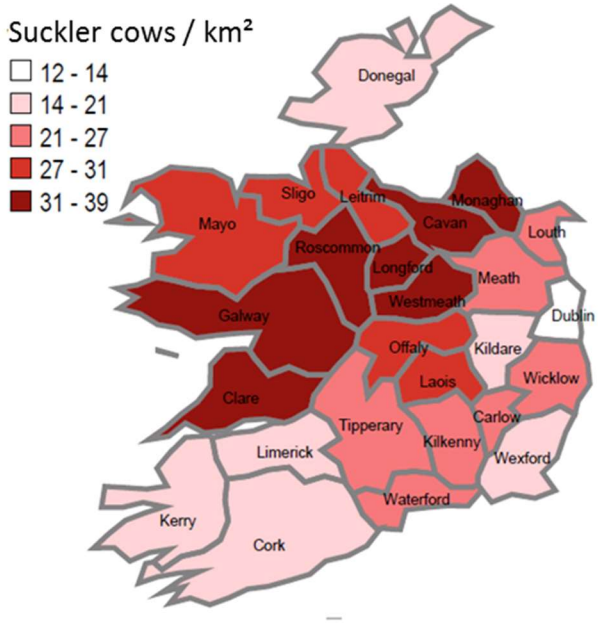
The 5 main breed used for the suckling herd are: Charolaise, Angus, Limousine, Hereford and Simmental (Walsh 2016).

Figure 8 : Distribution of dairy cows in Ireland in 2010 (number of heads / km²)



Sources : GEB – Institut de l'Elevage, by CSA
Cartographie : Cartes et Données 6.0 Articque

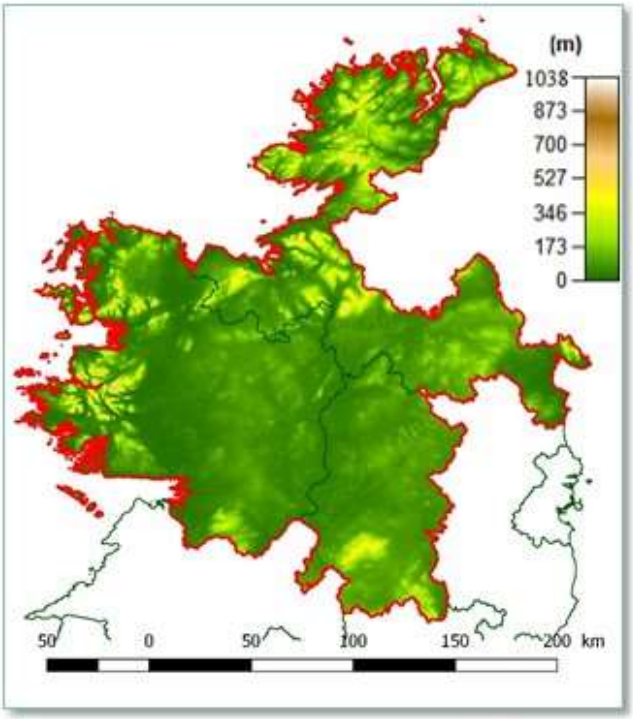
Figure 9 : Distribution of suckling cows in Ireland in 2010 (number of heads / km²)



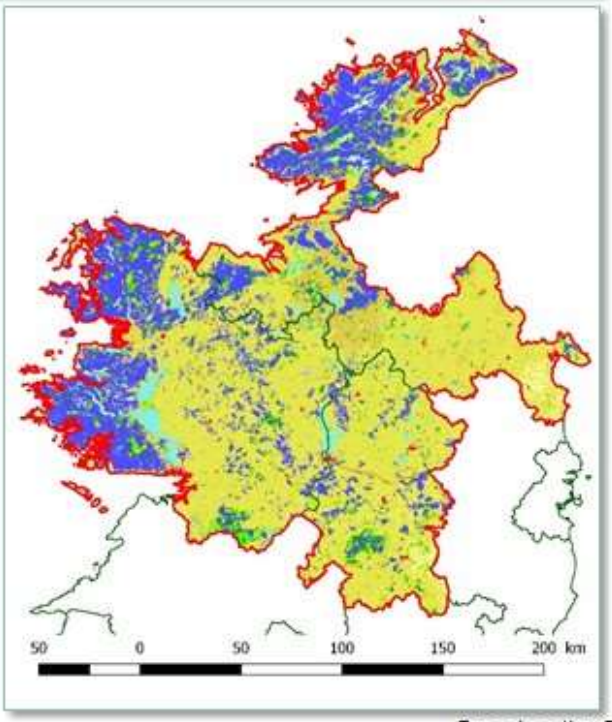
Source : GEB – Institut de l'Elevage, by CSA
Cartographie : Cartes et Données 6.0 Articque

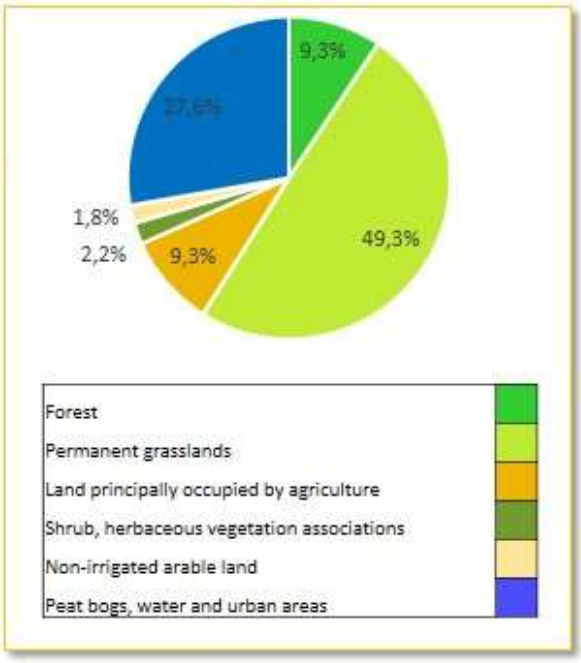
North West

Ireland



ZONE	North West
AREA (km²)	33787
ALTITUDE (m)	
min	0
max	755
mean	94



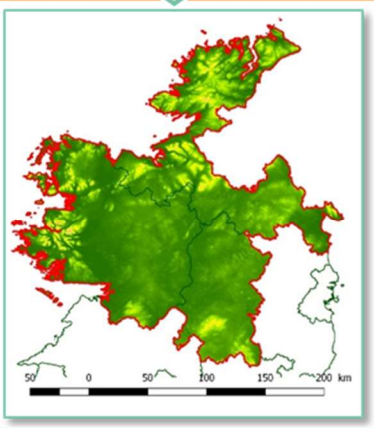


Based on the Corine Land Cover (CLC) 2012

Maps were edited on QGis 2.14.22

IR.BMW-CC
Border, midlands & western regional assembly, Ireland

Single Suckler calf to weanling System



- Approximately 9,500 or 12% of NFS population are single suckling calf-to-weanling farmers in the BMW region
- Largely grass based system
- Cows calving in the spring-time February through April onto grass
- Weanlings typically sold in October
- Very low levels of concentrate supplementation

localization of the case-study

21 Calvings
34 Livestock Units (LU)

0,5 family workers

32 ha UAA

Sales

- **10 store wealing bulls 8** months old
- **9 store weanling heifers 8 months old**
- **0.25 Stock Bull 72 months old**.
- **5** store cows 96 months old

1,12 LU / ha Main Forage Area

Cropping system :

- **30 ha grasslands**

Sustainbeef

Livestock

IR.BMW-CC

Sustainbeef

22 females for breeding

21 calvings
20 calves

19 weanlings

1 Stock bulls (Charolais)

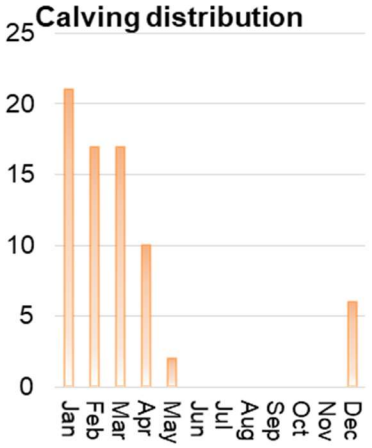
Annual sales

Type	Weight	Age
5 finished cows ♀ Limousin	400 kg c.	8 y.o.
10 weanling store bulls ♂ Ch*Lm	320 kg alive	8 m.o.
9 weanling store heifers ♀ Ch*Lm	2900 kg alive	8 m.o.
0.25 bull ♂ Charolais	850 kg alive	6 y.o.

Annual purchases

Type	Weight	Age
0,25 bull ♂ Salers or Charolais	750 kg alive	1,5 y.o.
5 heifers ♀ Limousin	500 kg alive	2 y.o.

Calving distribution



Performances

Pregnancy rate……..95%
Mortality rate…….5%
Replacement rate……20%

The herd operates a single suckling calf to weanling system, typical of most farms in the area. Each year, 22 females go for breeding to produce 19 weanlings. The herd is spring calving (5 calvings Feb, 10 calvings March & 5 calvings April) with weanling sold the subsequent autumn prior to housing. One stock bull is used on the farm and is replaced every 4 year. There is a 20% replacement rate of breeding females on the farm.

	Forage supplies (kg dry matter / animal / day)					Concentrates Kg / animal / year
	Grazing Period (days)	Grazed Pasture	Grass Silage (1st cut)	Wrapped Bale Silage (2nd cut)	Total kg dry matter / day	
Cows	230	3000	650	650	11.78	25
Weanling Heifers 8m	250	700	0	0	2.8	50
Weanling Bulls 8m	250	700	0	0	2.8	50
Stock Bull	90	1100	1600	1600	11.78	0
Purchased Heifers Lm 2 y/o	200	1800	550	550	7.94	0
TOTAL NEEDS	(tons/year)	**74 t**	**15.4 t**	**15.4 t**		**2,34 t DM**

	Cow concentrate 18% protein	Weanling concentrate	Bought cereals	Minerals
TOTAL NEEDS	**0,36 t DM**	**0,81 t DM**	**1,17 t DM**	**0 t**

Details of the concentrates

1,24 Tons DM / year

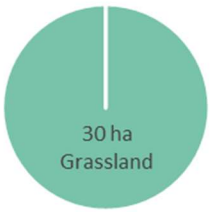
Crops & grassland

IR.BMW-CC

Sustainbeef

UAA : 32 ha

Land use



Fodder system

Fertilisation

	Block	ha	Mineral fertiliser (U/ha)			Organic fertiliser
			N	P_2O_5	K_2O	
Grassland	Grazing area	44	50	7	30	Manure & Slurry
	Wrapped bale silage + Grazing	38	125	20	85	Manure & Slurry
	Silage + Grazing	9	125	20	85	Manure & Slurry

Harvest

	Ha	Yield Ton DM / ha	Total Ton DM	Sold Ton DM
Silage cut after early grazing	5	3,6	27.5	0
Wrapped Silage 2nd cut (regrowth)	5	1,4	27.5	0

- The fodder system is exclusively based on grass : natural grassland and silage harvest. In this volcanic area, the soil quality allows a good grass growth. In some cases, no mineral fertilisation is needed up to 1 LU/ha. The manure is firstly spread on silage fields.

Production vs. Needs

(Tons)	Total needs	Total production	Quantity purchased
Slage	30.8	55	0
Concentrates	1.375	0	1.375
Straw	3.1	0	3.1

Buildings	Equipments
Free stall barn	Tractor 50-99 hp
Nursery	Topper
	Tedder
	Fertilizer Spreader

Economic results (2017)

IR.BMW-CC

Sustainbeef

Total gross output	€34 212
Sales of Livestock & Livestock products	€21 825
- Purchases of Livestock	€6 250
Total gross output / Livestock	**€15 575**
Single farm payments (DPU)	€11 520
Coupled support	€1 917
Compensatory Allowances for Natural Handicaps (CANH)	€3 200
Other aids (except for investment)	€2 000
Total Aid	**€18 637**

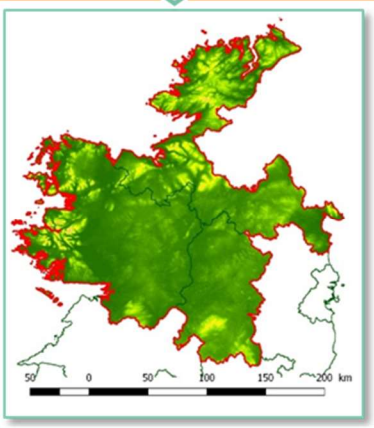
Total expenses	€18 145
Operating expenses	**€7 445**
Purchases of straw	€400
Purchases of feed and minerals	€750
Self-consumption of cereals	€0
Veterinary costs	€1058
Other specific livestock costs	€437
Operating expenses / Livestock	**€2 645**
Purchases of seeds and seedlings	€500
Fertilisers and soil improvers	€4000
Crop protection products	€0
Other specific crop costs	€300
Operating expenses / Crops and grassland	**€4800**
Structural expenses	**€10 700**
Machinery & building maintenance costs (except depreciations)	€6 200
Energy (fuel)	€500
Contract work	€2 400
Other expenses : water, insurance, accountability…	€1600

Wages and social insurance	€0
Rental charges	**€0**
Depreciations	**€2 000**
Interests and Financial expenses	**€2 200**

Non-land total assets	€134 050
Capital : Livestock	€54 050
Physical Capital : Equipment	€20 000
Physical Capital : Buildings and Facilities	€60 000
Physical Capital : Stocks	€0

IR.BMW-CCF
Border, midlands & western regional assembly, Ireland

Cow-calf and fattening system



- Explain the representativity of this system
- Explain general fonctionnement of the system

localization of the case-study

32 Calvings
61 Livestock Units (LU)

0,5 family worker

40 ha UAA

Sales

- **10 Stears 24** months old
- **9 Finished heifers 24 months old**
- **5** Finished cows 5 years old

1,53 LU / ha Main Forage Area

Cropping system :

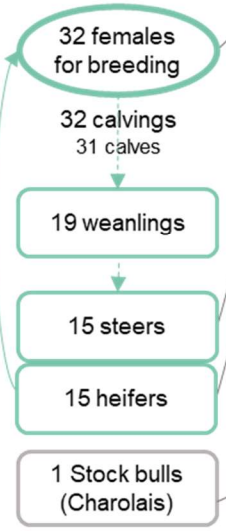
- **40 ha grasslands**

Sustainbeef

Livestock

IR.BMW-CCF

Sustainbeef



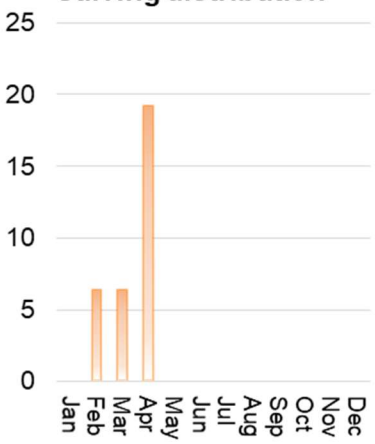
Annual sales

Type	Weight	Age
5 finished cows ♀ Limousin	360 kg c.	5 y.o.
15 steers ♂ Ch*Lim	392 kg c.	24 m.o.
9 finished heifers ♀ Ch*Lim	326 kg c.	24 m.o.
0.25 bull ♂ Charolais	850 kg c.	6 y.o.

Annual purchases

Type	Weight	Age
0,25 bull ♂ Charolais	750 kg alive	18 m.o.

Calving distribution



Performances

Pregnancy rate……..??%
Mortality rate…….5%
Replacement rate……21%

	Forage supplies (kg dry matter / animal / day)					Concentrates Kg / animal / year
	Grazing Period (days)	Grazed Pasture	Grass Silage	Wrapped Bale Silage (2nd cut)	Total kg dry matter / day	
Cows	230	3,6	3,5			25
Weanling Heifers 8m	250	1,9	0,8			150
Weanling Bulls 8m	250	1,9	0,8			150
Steers 12 – 24m	210	4,1	4,1			150
Steers 24 – 36m	120	4,1	1,4			150
Heifers 12 – 24m	180	4,1	2,7			500
Bulls	365	3				
TOTAL NEEDS	(tons/year)	**184,5**	**95,6**			**17,3**

	Cow concentrate 18% protein	Weanling concentrate
TOTAL NEEDS	**0,8 t DM**	**16,5 t DM**

Details of the concentrates

17,3 Tons / year

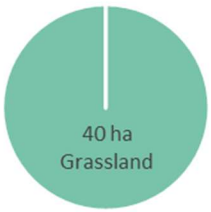
Crops & grassland

IR.BMW-CCF

Sustainbeef

UAA : 30 ha

Land use



Fodder system

Fertilisation

	Block	ha	Mineral fertiliser (U/ha) N	P_2O_5	K_2O	Organic fertiliser
Grassland	Grazing area	23	50	7	30	
	Wrapped bale silage + Grazing	8	125	20	85	Manure & Slurry
	Silage + Grazing	9	125	20	85	Manure & Slurry

Harvest

	Ha	Yield Ton DM / ha	Total Ton DM	Sold Ton DM
Silage cut after early grazing	9	5	45	0
Wrapped Silage	8	5,6	45	0

Production vs. Needs

(Tons)	Total needs	Total production	Quantity purchased
Silage	30.8	55	0
Concentrates	1.375	0	1.375
Straw	3.1	0	3.1

Buildings	Equipments
Free stall barn	Tractor 50-99 hp
Nursery	Topper
	Tedder
	Fertilizer Spreader

Economic results (2019)

IR.BMW-CCF

Sustainbeef

Total gross output	€64 084
Sales of Livestock & Livestock products	€40 714
- Purchases of Livestock	€0
Total gross output / Livestock	**€40 714**
Single farm payments (DPU)	€14 400
Coupled support	€2 970
Compensatory Allowances for Natural Handicaps (CANH)	€4 000
Other aids (except for investment)	€2 000
Total Aid	**€23 370**

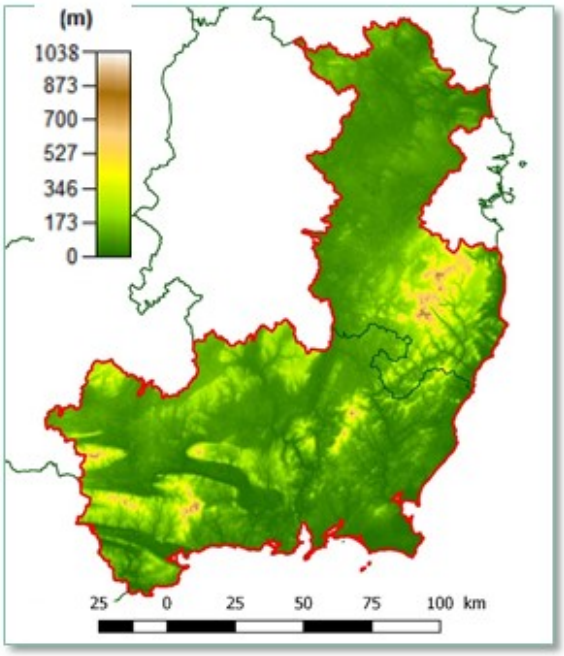
Total expenses	€31 150
Operating expenses	**€11 350**
Purchases of straw	€650
Purchases of feed and minerals	€4100
Self-consumption of cereals	€0
Veterinary costs	€1300
Other specific livestock costs	€900
Operating expenses / Livestock	**€2 645**
Purchases of seeds and seedlings	€500
Fertilisers and soil improvers	€3600
Crop protection products	€0
Other specific crop costs	€300
Operating expenses / Crops and grassland	**€4400**
Structural expenses	**€19 800**
Machinery & building maintenance costs (except depreciations)	€2000
Energy (fuel)	€3000
Contract work	€9000
Other expenses : water, insurance, accountability…	€5800

Wages and social insurance	€0
Rental charges	**€0**
Depreciations	**€5 100**
Interests and Financial expenses	**€3 800**

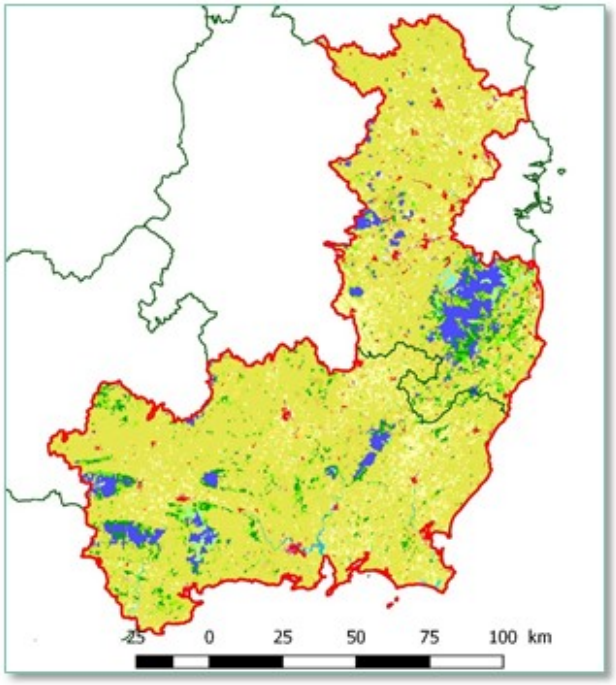
Non-land total assets	€199 000
Capital : Livestock	€114 000
Physical Capital : Equipment	€20 000
Physical Capital : Buildings and Facilities	€65 000
Physical Capital : Stocks	€0

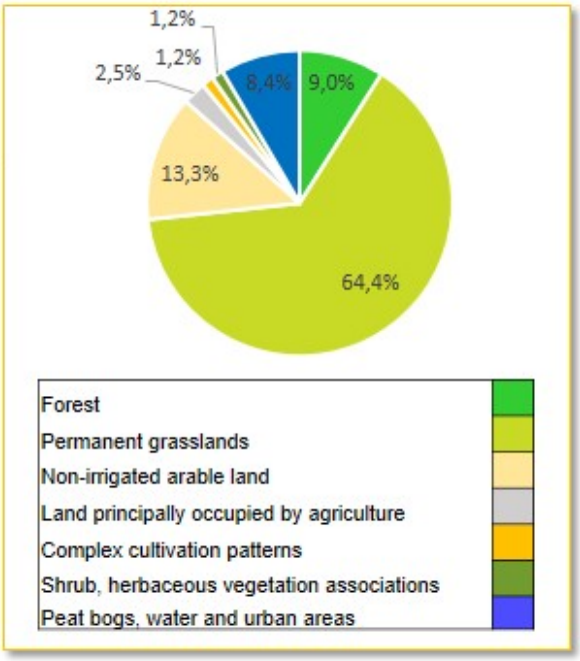
South East

Ireland



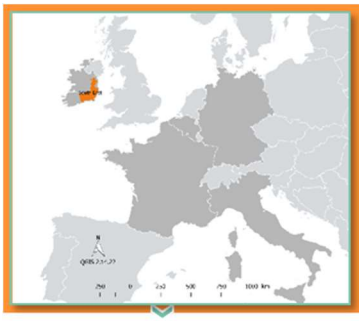
ZONE	South East
AREA (km²)	15683
ALTITUDE (m)	
min	0
max	1038
mean	119



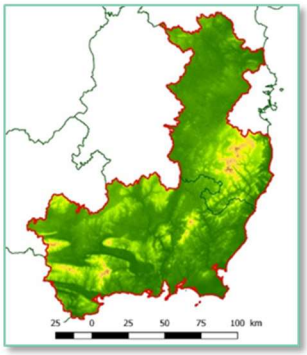


Based on the Corine Land Cover (CLC) 2012

Maps were edited on QGis 2.14.22



IR.SE - F
South East of Ireland
Store to finish



- Largely grass based system
- Stores purchased in the spring-time from February through April and turned straight out straight to grass pasture
- Animals slaughtered the following spring at 24 months of age
- High levels of concentrate supplementation

localization of the case-study

64 Livestock Units (LU) › 0,5 family workers › 43 ha UAA

Sales

- 89 steers slaughtered at 24 months old

1.59 LU/ ha

Cropping system :

- **43 ha grasslands**

Sustainbeef

Livestock

IR.SE - F

- Steers are purchased at 12 months of age during the spring time weighing 400 kg liveweight. They are kept for 12, receiving a mixed diet of grass pasture, grass silage and concentrates. After spending 12 months on the farm steers are slaughtered at 24 months of age with a target liveweight of 680kg to produce a 400 kg carcass.

	Forage supplies (kg dry matter / animal / day)				Concentrates Kg GM / animal / year
	Grazing Period (days)	Grazed Pasture	Silage (cut after early grazing)	Total kg dry matter / day	
Steers 1-2 y/o	210	2000	1000		1000
TOTAL NEEDS	(tons/year)	**180 tDM**	**90 tDM**		**90 tGM / 76,5 tDM**

	Fattening concentrate 18% protein	Minerals
TOTAL NEEDS	**90 t GM**	**0 t**

Details of the concentrates

Tons / year

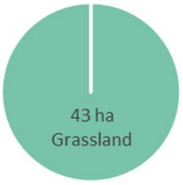
Crops & grassland

IR.SE - F

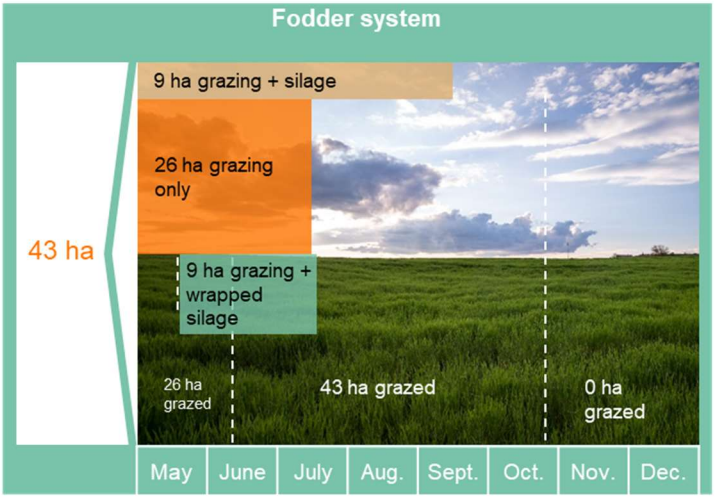
Sustainbeef

UAA : 43 ha

Land use



Fodder system



Fertilisation

	Block	ha	Mineral fertiliser (U/ha)			Organic fertiliser
			N	P_2O_5	K_2O	
Grassland	Grazing area	26	50	7	30	Manure & Slurry
	Grazing + silage	9	125	20	85	Manure & Slurry
	Grazing + wrapped silage	9	125	20	85	Manure & Slurry

Harvest

		ha	Yield Ton DM / ha	Total Ton DM	Sold Ton DM
Silage	Silage 1st cut	9	3.8	34	0
	Wrapped Silage	9	3.8	34	0

The fodder system is exclusively based on grass: natural grassland and silage harvest. In this area, favourable weather conditions allows for early turnout of cattle to pasture as well as good grass growth.

Production vs. Needs

(Tons)	Total needs	Total production	Quantity purchased
Silage	90	68	22
Concentrates	90	0	90
Straw	1.55	0	1.55

Buildings	Equipments
Loose housing barn with straw beeded pens	Tractor 50-99 hp
Slatted shed floor with underground slurry storage facilities	Tedder
	Diet Feeder
	Fertilizer spreader
	Topper

Economic results (2017) IR.SE - F

Sustainbeef

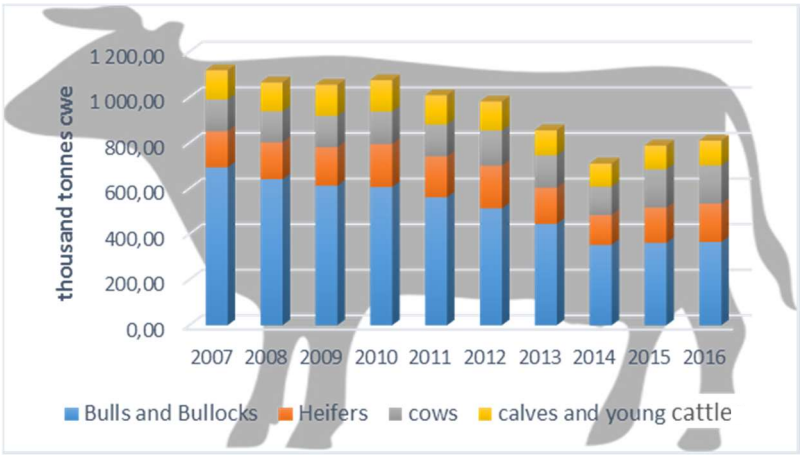
Total gross output	€150 716
Sales of Livestock & Livestock products	€150 716
Purchases of Livestock	€90 000
Total gross output / Livestock	**€60 716**
Single farm payments (DPU)	€16 000
Coupled support	€0
Compensatory Allowances for Natural Handicaps (CANH)	€0
Other aids (except for investment)	€0
Total Aid	**€16 000**

Total expenses	€51 105
Operating expenses	**€32 730**
Purchases of straw	€200
Purchases of feed and minerals	€21 660
Self-consumption of cereals	€0
Veterinary costs	€1 900
Other specific livestock costs	€2 670
Operating expenses / Livestock	**€26 430**
Purchases of seeds and seedlings	€656
Fertilisers and soil improvers	€5 250
Crop protection products	€0
Other specific crop costs	€394
Operating expenses / Crops and grassland	**€6 300**
Structural expenses	**€18 375**
Machinery & building maintenance costs (except depreciations)	€8 138
Energy (fuel)	€656
Contract work	€7 481
Other expenses : water, insurance, accountability…	€2 100

Wages and social insurance	€0
Rental charges	**€0**
Depreciations	**€3500**
Interests and Financial expenses	**€2200**

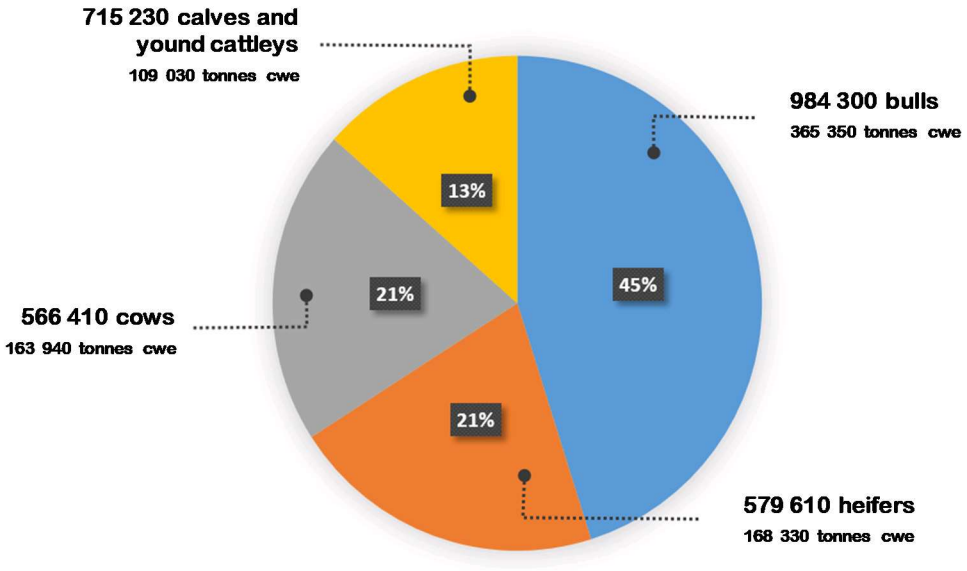
Non-land total assets	€255 000
Capital : Livestock	€117 000
Physical Capital : Equipment	€28 000
Physical Capital : Buildings and Facilities	€110 000
Physical Capital : Stocks	€0

Figure 46: Evolution of Italian beef production



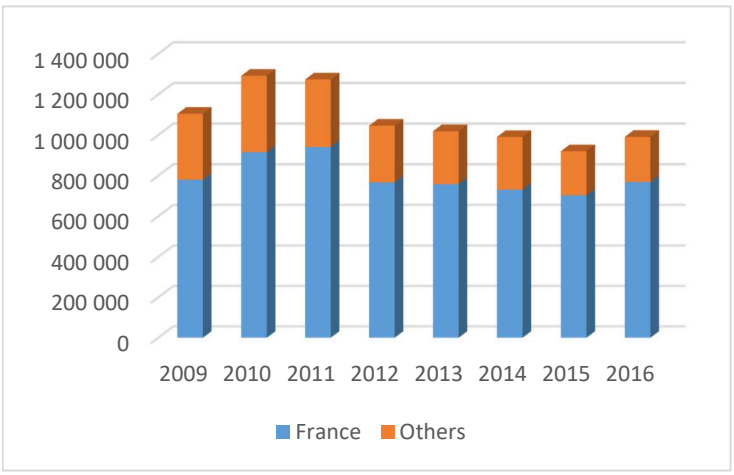
Source : Inra, by Eurostat

Figure 47: Type of bovine animal produced in Italy in 2016



Source : Inra, by Eurostat

Figure 48: Evolution of live cattle Italian imports (excluding animals for breeding) (number of heads



Source : Inra, by FranceAgriMer

ITALY: A FATTENING COUNTRY

GENERAL ELEMENTS

Beef represents 50% of the meat tonnage consumed in the country (GEB-IDELE 2011). As the 4th largest beef producer in Europe, Italy produced 809,600 T CWE in 2016 (from 2.85 million heads), accounting for 10.4% of the EU production. In 2012, 40% of its slaughtered animals came from import of lean cattle, fattened in Italy (GEB-IDELE 2013a).

Italy has experienced a structural decreased of beef consumption: in the last 10 years it has reduced by 25%, from 25 kg cwe per inhabitant in 2006 to 19 kg cwe in 2016.

Between 1980 and the economic crisis of 2010, there was a decreased by 25% of animals slaughtered partially compensated by the increase in carcass weight (increase share of French young bulls in the supplies, genetic progress) limiting the decreased in tonnage by 6%. However, since 2010, production has decreased by 25% both in tonnage and slaughter (figure 46). Slaughtering has slightly increased again between 2014 and 2016 by 14%. Consumers are preferring cheaper meat due to a lower purchasing power and changing lifestyles resulting in increased volume of minced meat consumed (GEB-IDELE 2011).

Italian consumers have a preference for tender and light colored meat corresponding to a production of young cattle (male and female) slaughtered between 16 and 22 month old, called *vitelloni*, and accounting for 66% of the Italian production in 2016. Culled cows accounts for 21% of the beef produced and veal for 13% (figure 47). Italian reproductive herd is for 87% a dairy herd, that's why cows slaughtered in Italy are mainly culled dairy cows. Heifers for dairy cattle are intended to restock caw herd. Half of the male calves from dairy herds produced veal, the remaining can be crossed breed and fattened to produce young bulls (GEB-IDELE 2011). However, according to the ISMEA in 2011, 54% of young bulls slaughtered in Italy were from specialized suckling breeds, including imported animals.

FOREIGN EXCHANGES IN ITALY

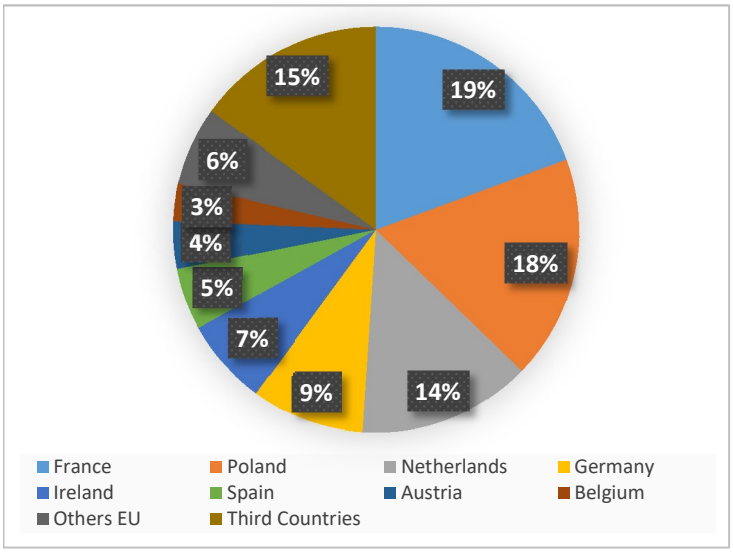
EXCHANGES IN LIVE ANIMALS

To satisfy its need of young animal for its market, Italy import live cattle ("*broutards*") to be fattened mainly in the Pô valley in northern Italy. With almost 992 000 heads imported in 2016, Italy is the largest cattle importer in EU. France is Italy's main supplier of cattle for fattening and for slaughter with respectively 77.6% and 73.3% of the market share in 2016 (Figure 48). Austria, the second supplier only accounts for 6% of Italian live imports (FranceAgriMer 2017).

The decline in Italian consumption has been reflected in a decreased of live imports for fattening farms reaching 921 000 heads imported in 2015 (vs. 1.28 million heads in 2010).

Italian live exports, with a little less than 37 000 heads in 2016, are low compared to imports. Until 2015, exports where towards Spain and the Netherlands and shifted to Spain, Poland and Turkey afterwards (FranceAgriMer 2017).

Figure 49: Main Italian suppliers of beef meat in 2016

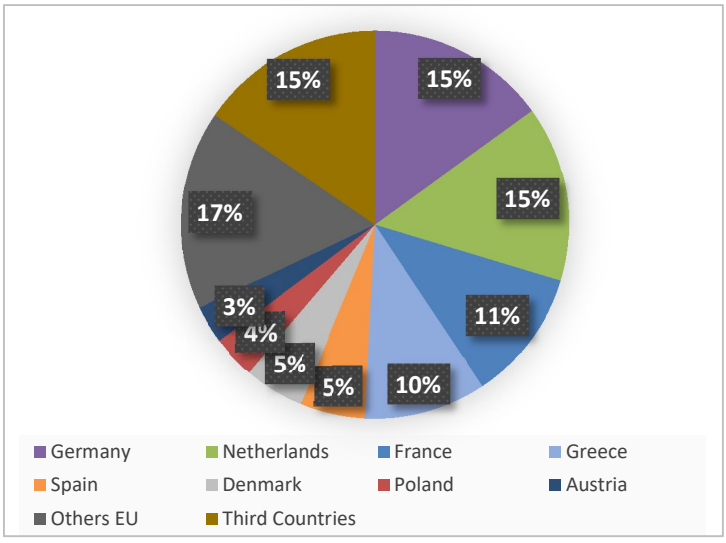


Source : Inra, d'après FranceAgriMer

Figure 50: Evolution of Italian beef foreign exchange (x1000 tonnes cwe)

Source : Inra, by FranceAgriMer

Figure 51: Main Italian customers of beef meat in 2016



Source : Inra, by FranceAgriMer

BEEF EXCHANGES

With declining imports of live cattle, Italian production has decreased more quickly the decreased of consumption creating a deficit in the beef market. It was compensated by an increasing volume of fresh and frozen meat importation. With 430.4 thousand T cwe imported in 2016 (mainly from France – 19%, Poland – 18%, Netherland – 14%), Italy is the first EU importer (figure 49).

Between 1990 and 2010, imports have increased by 31% and exports have been multiplied by 2.1 (GEB-IDELE2011). Between 2010 and 2013, the decreased in national consumption and meat availability in EU have led to a loss of 13% of beef meat importation in Italy (GEB-IDELE 2013a). (Figure 50)

The competition on Italian imported beef market have increased. France was the first supplier of Italy in 2016 but has been losing market share in favor of Poland. This shift in supplier translate a change in the type of meat imported: since 2010, the share of frozen meat have increased at the expense of fresh meat. Moreover, imported meat accounted for 40% of the consumption in 2016 versus only 35% in 2011, and 26% in 1995 (GEB-IDELE 2013a).

Italy has exported 169.5 thousand T cwe in 2016, mainly from culled cows toward France for hindquarters and the EU for forequarters, mostly already minced (figure 50 & 51).

TYPOLOGY OF THE ITALIAN HERD

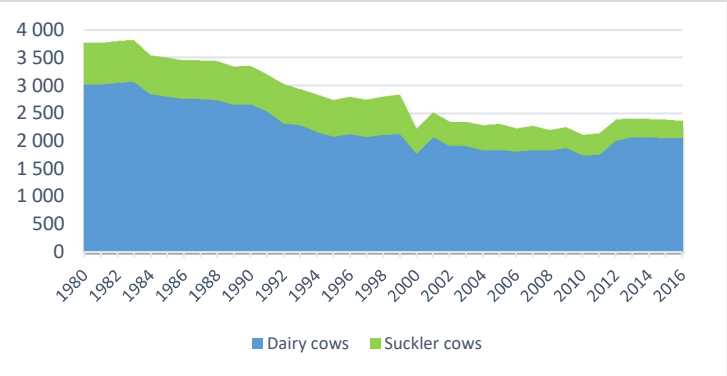
With 6.3 million heads, Italy currently has the 5th largest cattle herd in the EU, with the 4th dairy herd and the 7th suckling herd. The cattle herd has remained relatively stable since 2000, fluctuating between 6 and 7 million heads but has declined by 29% compared to the 1980s. It is due to a significant drop by 43% of the suckling herd between the 1990s and today (figure 52) and a decline by 30% of the dairy herd between 1980 and 1995. The dairy herd has remained stable since. In 2016, the Italian cattle herd is composed mainly by dairy cows (33%) and young animals (under 2yo) (figure 53)

The Italian cattle herd is mainly a specialized dairy herd. It is mainly localized in the north of Italy, in Veneto, Piedmont, Lombardy and Emilia-Romagna (figure 54). In 2016, There was 50 000 dairy farms for 2.06 thousand dairy cows. The suckling herd accounted for almost 605,000 suckling cows in 2016 (figure 55). Piedmont, Sardegna and Sicilia are the 3 main territories for the suckling herd with respectively 29%, 14% and 9% of the total Italian suckling cows. The remaining suckling cows are located along the Appenini mountain range which cross Italy from north to south (GEB-IDELE 2011).

Farm size are variable from one region to another. In the 3 main dairy region, almost half of the dairy farms held from 100 to 500 cows. On the contrary, 72% of the 84,000 specialized suckling farms only held less the 19 cows in 2015 and 15% held from 20 to 49 cows (De Roest & Montanari 2015).

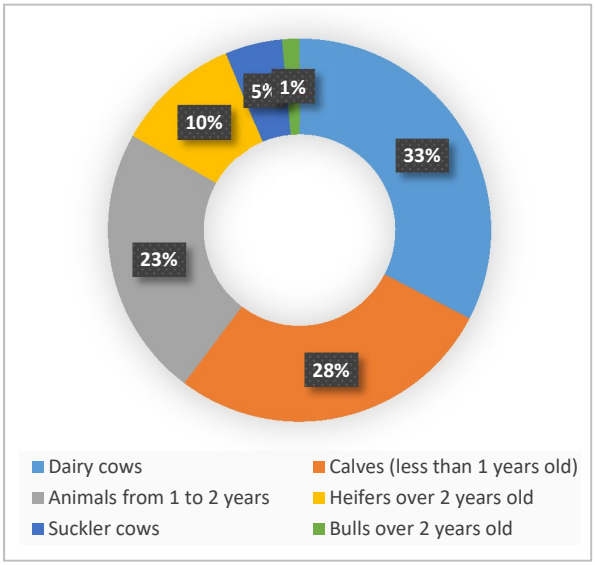
The 4 regions constituting the Pô valley held half of the 55,000 farms with young males from 1 to 2 yo but account for 75% of this population (figure 56), with 9% of the farms (i.e. 5000 farms with more the 100 LU) in 2011 detaining 60% of the fattening places (GEB-IDELE 2011).

Figure 52: Evolution of the Italian cattle herd (x1000 heads)



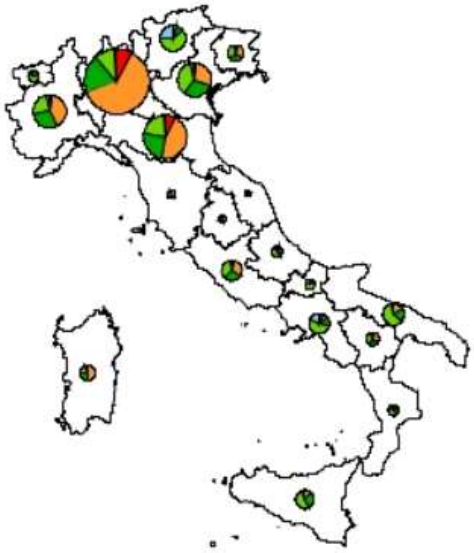
Source : Inra, by Eurostat

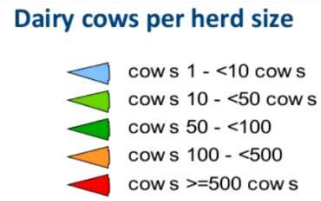
Figure 53: Type of animals held in farms in Italy in 2016



Source : Inra, d'après Eurostat

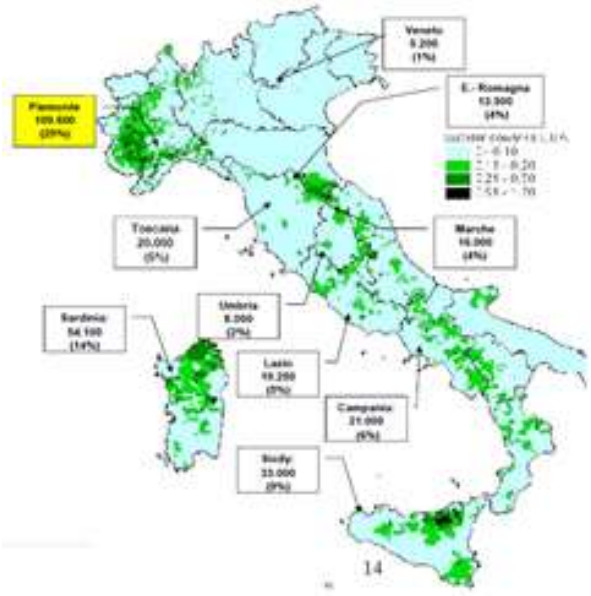
Figure 54: Distribution of Italian dairy farms in 2014





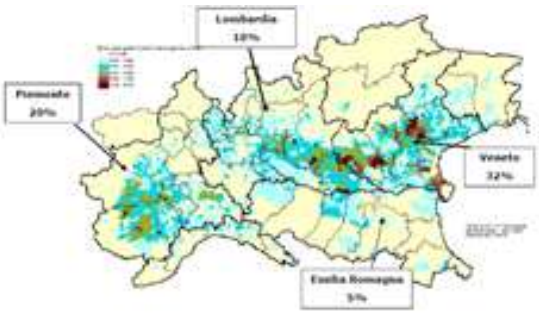
Source : CRPA, 2014

Figure 55: Distribution of Italian suckling farms in 2014



Source : CRPA, by ISTAT et ANABIC

Figure 56: Distribution of young cattle in the Pô Valley in 2014



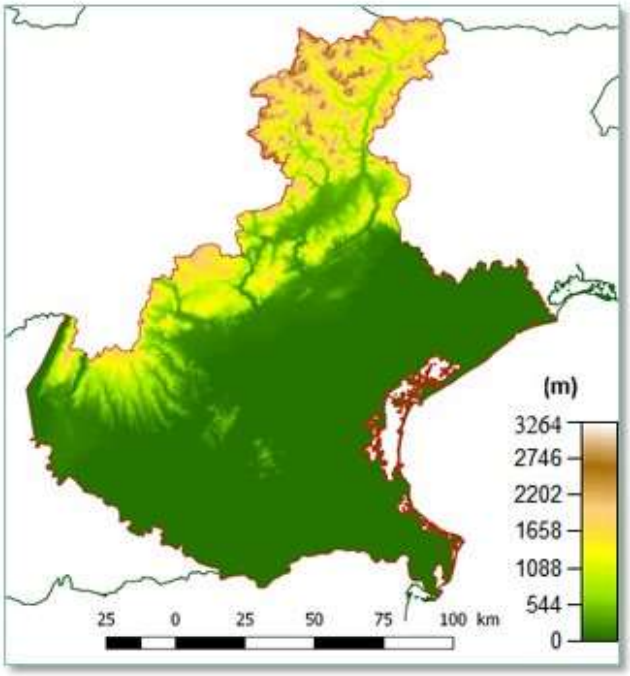
Source : CRPA, by ISTAT

Emilia-Romagna and Lombardia are specialized in dairy production, thus fattened mainly calves from dairy farms to produce veal and some of the young cattle imported from Eastern Europe (IDELE 2011). Veneto is specialized in fattening *broutards* imported mainly from France and from Charolais or Limousin breeds. The region accounted for 35% of the young bulls produced in 2011. Piedmont is partly a breeder-fattening region using a local breed, the Piedmontese and partly a fattening region from French broutards from the Blonde d'Aquitaine breed qualitatively close to the local breed. This region accounts for 18% of the country fattening places (GEB-IDELE 2011). The rest of the country represent a marginal part of the beef production in the country.

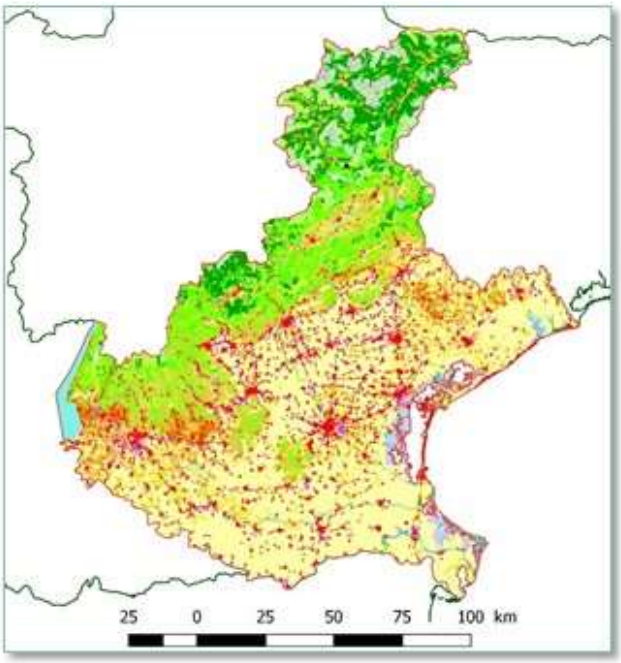
In fattening farms, young bull and heifers are allotted to be fattened for 5 to 7 months with a highly concentrated diet allowing for a high weight gain. Diets are mainly based on corn silage or flour completed with co-products, soybean meals and straw (GEB-IDELE 2011).

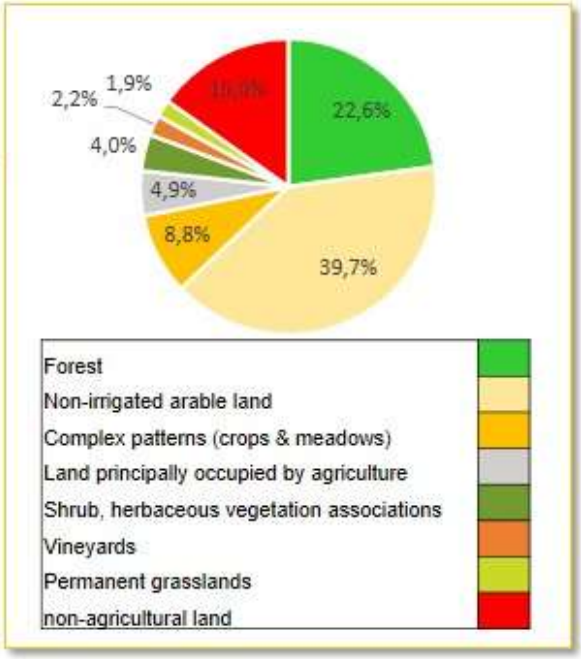
Veneto

Italy



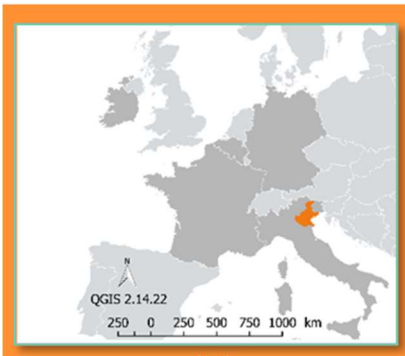
ZONE	Veneto
AREA (km²)	18399
ALTITUDE (m)	
min	0
max	3264
mean	415





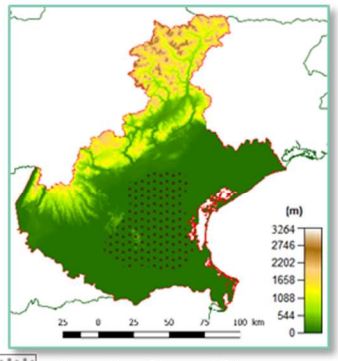
Based on the Corine Land Cover (CLC) 2012

Maps were edited on QGis 2.14.22



IT-F.900
Veneto, Italy

Intensive fattening system : 56% Salers - 31% cross-breed – 13% other breeds
Cattle raised from 11 to 18 months old



localization of the case-study

- Typical maize-based beef farm, rearing stokers from France. Maize is the only crop in this farm. Thus, ensiled maize is the only on-farm-produced feed, concentrates and forages are purchased.
- 56% Salers – 31% cross breed – 13% other French breeds : Aubrac, Charolais, Limousine. Variability depends on the availability of the stockers in France but also on the customer requirements.
- The owner and two employees manage the farm, thanks to the specialization of this production system and the high mechanization level.
- This farm-type is based on the fattening unit of a farm (260 ha) producing also crops sold and use to valorized the manure of the fattening unit.

913 animals fattened every year
387 Livestock Units (LU)

1 family workers
2 employees

7,5 ha MFA

Sales :

- **719 bulls** 18 months old
- **194 heifers** 18 months old

53 LU / ha Main Forage Area
1,5 LU / ha (considering the whole farm)

Main forage area system :

- **7,5 ha maize**

Livestock

IT-F900

Sustainbeef

Annual purchases

Type	Weight	Age
719 bulls ♂ Salers and cross-breed	420 kg alive	11 m.o.
194 heifers ♀ Salers and cross-breed	420 kg alive	11 m.o.

Annual sales

Type	Weight	Age
719 bulls ♂ Salers and cross-breed	687 kg alive On average	18 m.o.
194 heifers ♀ Salers and cross-breed		

In 2016 :

♂ sale price / kg alive.....2,48 €
♀ sale price / kg alive.....2,56 €

Gross Meat Production :

243 771 kg alive

Daily diet (kg / animal / day)

	Period (days)	Maize silage	Straw	Fattening concentrate	Bought cereals	Beet pulp	Soja or Rapeseed	Maize grain	Total / day
Males	210	12 kg GM 4,2 kg DM	0,8 kgGM	1,2 kg GM 1,08 kg DM	0,75 kg GM 0,68 kg DM	0,75 kg GM 0,65 kg DM	1,25 kg GM 1,13 kg DM	4,05 kg GM 3,85 kg DM	20,8 kg GM 12,39 kg DM
Females	210	8,5 kg GM 2,98 kg DM	1 kg GM	1 kg GM 0,9 kg DM	1,5 kg GM 1,35 kg DM	1,25 kg GM 1,08 kg DM	0,65 kg GM 0,59 kg DM	1,4 kg GM 1,26 kg DM	15,3 kg GM 8,16 kg DM
TOTAL NEEDS (tons DM/year)		863	160	226	166	153	215	709	

Forage Crops

MFA : 7,5 ha

Land use

Fertilisation

	Ha	Mineral fertiliser (U/ha)			Organic fertiliser : slurry*
		N	P_2O_5	K_2O	
Maïze silage	7,5	115	15	15	2,73 m3/ha/year

*Part of the manure is exported on a surface not linked with the fattening system

Harvest

Production vs. Needs

	ha	Yield Ton DM / ha	Total Ton DM	Sold Ton DM	Total needs	Total production	Quantity purchased
Maïze silage	7,5	19,3	145	0	963	145	818

Buildings	Main equipments
loose housing barn with straw-bedded pen	1 Tractor >50 hp, 1 Tractor >100 hp, 1 Tractor >150 hp
	Tillage and seeding equipment : plough, seeder, cultivator, harrow, weeder ...
	Mix wagon
	Manure pit, liquid manure tank

Economic results (2016)

IT-F900

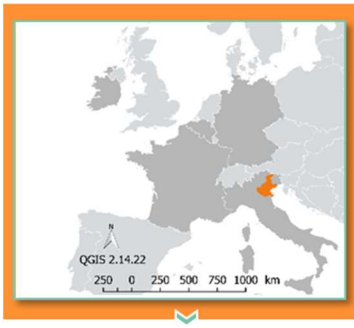
Total gross output	609 458 €
Sales of Livestock & Livestock products	1 566 195 €
Purchases of Livestock	1 024 653 €
Total gross output / Livestock	**541 542 €**
Support for crops	4 463 €
Support for slaughters	63 453 €
Compensatory Allowances for Natural Handicaps (CANH)	0 €
Other aids (except for investment)	0 €
Total Aid	**67 916 €**

Total expenses	560 926 €
Operating expenses	**506 458 €**
Purchases of straw	9 240 €
Purchases of feed and minerals	471 812 €
Veterinary costs	4 500 €
Other specific livestock costs	18 000 €
Operating expenses / Livestock	**503 552 €**
Fertilisers and soil improvers	731 €
Purchase of seeds and seedlings	1 575 €
Crop protection products	600 €
Operating expenses / Crops and grassland	**2 906 €**
Structural expenses	**54 468 €**
Machinery & building maintenance costs (except depreciations)	7 500 €
Energy (fuel)	9 700 €
Other expenses : water, insurance, accountability…	33 518 €
Contract work	3 750 €

Wages and social insurance	71 904 €
Rental charges	**0 €**
Depreciations	**10 000 €**
Interests and Financial expenses	**2 200 €**

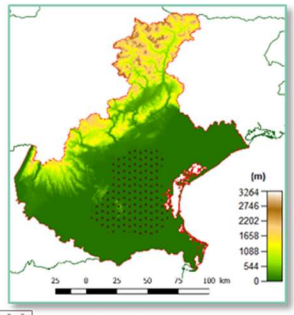
Non-land total assets	1 458 948 €
Capital : Livestock	868 684 €
Physical Capital : Equipment	140 000 €
Physical Capital : Buildings and Facilities	450 000 €
Physical Capital : Stocks	264 €

Based on interviews with farmers



IT-F.226
Veneto, Italy

Crossbreed intensive fattening system : Bulls raised from 7 to 17 months old



localization of the case-study

- Typical maize-based beef farm, rearing stokers from France. The crops are maize and sorghum silage, and temporary grassland (legumes and grass). The farms also purchase a large amount of protein feeds and cereals on the market.
- Maize meets very favorable conditions to grow and this represents one of the reasons why Veneto is an important area for beef production in Italy. Long growing season and availability of water allow high yields.
- Stokers are French cross-bred calves purchased at 7 months and sold around 17 months.
- The farm is managed by the owner only, thanks to the simplicity of the crops and fattening systems. The production is highly market oriented, which usually requires lean meat for domestic consumption.

351 animals fattened every year
129 Livestock Units (LU)

1 family workers
0 employee

33,5 ha UAA

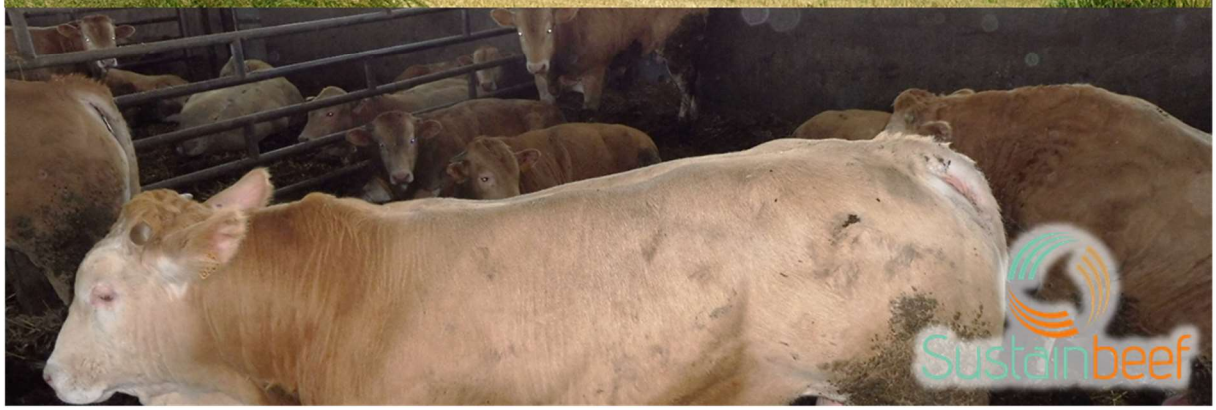
Sales :

- **351 bulls** 17 months old

3,85 LU / ha Main Forage Area

Cropping system :

- **27,8 ha maize silage**
- **5,7 ha sorghum silage**



Livestock

IT-F226

Sustainbeef

Annual purchases

Type	Weight	Age
226 males ♂ cross-breed	220 kg alive	7 m.o.

Annual sales

Type	Weight	Age
226 males ♂ cross-breed	520 kg alive	17 m.o.

In 2016 :

♂ sale price / kg alive.....2,48 €

Gross Meat Production :

105 300 kg alive

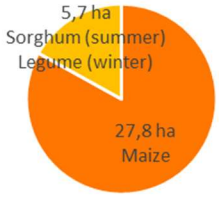
Daily diet (kg dry matter / animal / day)

	Period (days)	High-moisture corn	Hay	Fattening concentrate	Molasses	Beet pulp	Sorghum silage	Total kg dry matter / day
Males	365	3,45	0,87	0,9	0,45	0,96	0,53	7,16
TOTAL NEEDS (tons/year)		285	72	74	37	79	43	

Crops

UAA : 33,5 ha

Land use



Fertilisation

	Ha	Mineral fertiliser (U/ha) N	P_2O_5	K_2O	Organic fertiliser
Maïze silage	27,8	129	-	-	Slurry : 33 m3/ha/year
Sorghum silage	5,7	46	-	-	Manure : 20,5 T/ha/year
Legume hay	5,7	-	-	-	

Harvest / Production vs. Needs

	ha	Yield Ton DM / ha	Total Ton DM	Sold Ton DM	Total needs	Total production	Quantity purchased
High-moisture corn	27,8	10,6	295	0	285	295	0
Sorghum silage	5,7	8	45,6	0	43	45	0
Legume hay	5,7	15,6	89	0	72	89	0

Buildings	Main equipments
loose housing barn with straw-bedded pen	2 Tractor >50 hp, 2 Tractor >100 hp, 1 Tractor >150 hp
	Tillage and seeding equipment : plough, seeder, cultivator, harrow, fertilizer spreader …
	Mix wagon
	Manure spreader, manure pit, liquid manure tank

Economic results (2016)

IT-F226

Sustainbeef

Total gross output	359 204 €
Sales of Livestock & Livestock products	452 650 €
Purchases of Livestock	206 177 €
Total gross output / Livestock	**246 473 €**
Single farm payments (DPU)	112 731 €
Coupled support	
Compensatory Allowances for Natural Handicaps (CANH)	0 €
Other aids (except for investment)	0 €
Total Aid	**112 731 €**

Total expenses	119 675 €
Operating expenses	**75 375 €**
Purchases of straw	4 860 €
Purchases of feed and minerals	55 185 €
Veterinary costs	4 000 €
Other specific livestock costs	0 €
Operating expenses / Livestock	**64 045 €**
Purchases of seeds and seedlings	7 412 €
Crop protection products	1 407 €
Fertilisers and soil improvers	2 511 €
Other specific crop costs	0 €
Operating expenses / Crops and grassland	**11 330 €**
Structural expenses	**44 300 €**
Machinery & building maintenance costs (except depreciations)	10 700 €
Energy (fuel)	22 600 €
Contract work	11 000 €

Wages and social insurance	14 400 €
Rental charges	**0 €**
Depreciations	**10 000 €**
Interests and Financial expenses	**1 500 €**

Non-land total assets	2 204 203 €
Capital : Livestock	214 903 €
Physical Capital : Equipment	310 000 €
Physical Capital : Buildings and Facilities	1 675 000 €
Physical Capital : Stocks	4 300 €

Based on interviews with farmers

BIBLIOGRAPHY

BCZ-CBL, 2017. *Rapport annuel 2017* [en ligne]. 2017. Disponible à l'adresse : http://www.bcz-cbl.be/media/193416/jaarverslag-bcz-2017_fr.pdf

CELLULE D'INFORMATION LAIT, 2017. 2017. [Consulté le 19 août 2017]. Disponible à l'adresse : http://www.celluleinfolait.be/le-lait-en-wallonnie/lait-de-vache/

CHATELLIER, Vincent, 2016. *Le commerce extérieur de la France dans le secteur bovin*. 2016.

CHATELLIER, Vincent, 2017. *Les échanges de bovins vivants et de viande bovine dans le monde et dans l'UE: trajectoires productives et commerciales des principaux pays impliqués* [en ligne]. auto-saisine. [Consulté le 19 septembre 2017]. Disponible à l'adresse : https://hal.archives-ouvertes.fr/hal-01581604/

CRA-W, 2012. *Les systèmes d'élevage en Wallonie*. 2012.

DE ROEST, Kees et MONTANARI, Claudio, 2015. *Emploi dans la filière viande bovine italienne* [en ligne]. 2015. Disponible à l'adresse : http://www.interbev.fr/wp-content/uploads/2015/12/4-Italy-INTERBEV_8_Nov_2015-fr.pdf

DEBLITZ, Claus, BRÖMMER, Julia, BRÜGGEMANN, Daniel et BRÜGGEMANN, 2008. *Beef production in germany - production systems and their spatial distribution*. 2008.

DG STATISTIQUE - STATISTICS BELGIUM, 2017. *Bilan d'approvisionnement viande (2000-2016)*. 2017.

EUROSTAT, 2017. Base de données. [en ligne]. 2017. [Consulté le 1 juillet 2017]. Disponible à l'adresse : http://ec.europa.eu/eurostat/fr/data/database

FAO et OCDE, 2016. *Perspectives agricoles de l'OCDE et de la FAO 2016-2025* [en ligne]. Éditions OCDE. [Consulté le 15 septembre 2017]. Perspectives agricoles de l'OCDE et de la FAO. ISBN 978-92-64-25903-4. Disponible à l'adresse : http://www.oecd-ilibrary.org/agriculture-and-food/perspectives-agricoles-de-l-ocde-et-de-la-fao-2016-2025_agr_outlook-2016-fr

FRANCEAGRIMER, 2017. Données économiques agricoles et alimentaires VisioNet. [en ligne]. 2017. [Consulté le 7 juillet 2017]. Disponible à l'adresse : https://visionet.franceagrimer.fr/Pages/DonneesInteractivesComExt.aspx?menuurl=DonneesInteractives/commerce%20ext%C3%A9rieur/VISIOTrade

GARNETT, Tara, 2009. Environmental Science & Policy. . 2009. Vol. 12, pp. 491-503.

GEB-IDELE, 2011. Le marché de la viande bovine en Italie. *Dossier mensuel Economie de l'Elevage*. juin 2011. N° 414, pp. 48.

GEB-IDELE, 2013a. Quel avenir pour l'engraissement en Italie? *Dossier mensuel Economie de l'Elevage*. octobre 2013. N° 439, pp. 31.

GEB-IDELE, 2013b. L'élevage irlandais et ses filières. *Dossier mensuel Economie de l'Elevage*. juin 2013. N° 436.

GEB-IDELE, 2016a. Le marché mondial de la viande bovine. Dans la tourmente de l'économie globale. *Dossier Bovins viande - Dossier Economie de l'Elevage*. mai 2016. N° 468, pp. 37.

GEB-IDELE, 2016b. Conjoncture de crises en 2016. Incertitudes geopolitique en 2017. *Dossier Bovins viande - Dossier Economie de l'Elevage*. 2016. N° 475, pp. 41.

GEB-IDELE, 2016c. *Chiffres clés 2016 - Production bovine lait et viande*. 2016.

HÖNIGOVÁ, Iva, VAČKÁŘ, David, LORENCOVÁ, Eliška, MELICHAR, Jan, GÖTZL, Martin, SONDEREGGER, Gabriele, OUŠKOVÁ, Veronika, HOŠEK, Michael et CHOBOT, Karel, 2012. Survey on grassland ecosystem services. *Report to the EEA–European Topic Centre on Biological Diversity. Prague: Nature Conservation Agency of the Czech Republic*. 2012. pp. 78.

INSTITUT DE L'ELEVAGE, 2014. *Guide de l'alimentation du troupeau bovin allaitant: vaches, veaux et génisses de renouvellement*. Paris : Institut de l'élevage. ISBN 978-2-36343-527-9.

INTERBEV, 2016. *L'essentiel de la filière viande bovine française 2016*. 2016.

LHERM, Michel, AGABRIEL, J et DEVUN, J, 2017. Etat des lieux et évolutions de la production bovine allaitante en France et dans 3 pays européens. *INRA Productions Animales*. 2017. Vol. 30, n° 2, pp. 93-106.

ROGUET, C, GAINÉ, C, CHATELLIER, Vincent, CARIOU, S, CARLIER, M, CHENUT, R, DANIEL, K et PERROT, C, 2015. Spécialisation territoriale et concentration des productions animales européennes : état des lieux et facteurs explicatifs. *INRA Productions Animales*. 2015. Vol. 28, n° 1, pp. 5-22.

SOGEPA, 2015. *Le secteur de la viande en Wallonie* [en ligne]. 2015. [Consulté le 19 septembre 2017]. Disponible à l'adresse : http://www.sogepa.be/assets/72be2827-a9b9-4365-b5dc-948725c5415d/sogepa-etudeviande-bd.pdf

SPF ECONOMIE, 2013. *Mise à jour de l'étude sur la filière bovine* [en ligne]. 2013. [Consulté le 19 septembre 2017]. Disponible à l'adresse : http://statbel.fgov.be/fr/binaries/Etude_filiere_bovine_Observatoire_des_prix_mise_a_jour_tcm326-238824.pdf

SPW-DGARNE, 2015. *evolution de l'économie agricole et horticole de la wallonne 2014-2015* [en ligne]. 2015. Disponible à l'adresse : https://agriculture.wallonie.be/documents/20182/21858/rapport-2014-economie-agricole-wallone.pdf/ebccf808-5ce9-405b-98ef-88a46b0fe45d

STEINFELD, Henning, GERBER, Pierre, WASSENAAR, T. D., CASTEL, Vincent, ROSALES M., Mauricio et HAAN, Cees de, 2006. *Livestock's long shadow: environmental issues and options*. Rome : Food and Agriculture Organization of the United Nations. ISBN 978-92-5-105571-7. SF140.E25 S744 2006

STOLZ, Linda, 2014. *Cow-calf production in Germany - status quo and perspectives in the European context*. 2014.

THORNTON, P. K., 2010. Livestock production: recent trends, future prospects. *Philosophical Transactions of the Royal Society B: Biological Sciences*. 27 septembre 2010. Vol. 365, n° 1554, pp. 2853-2867. DOI 10.1098/rstb.2010.0134.

THÜNEN-INSTITUT, 2017a. *Steckbriefe zur Tierhaltung in Deutschland: Mastrinder* [en ligne]. 2017. [Consulté le 15 septembre 2017]. Disponible à l'adresse : https://www.thuenen.de/media/ti-themenfelder/Nutztierhaltung_und_Aquakultur/Nutztierhaltung_und_Fleischproduktion/Rindermast/Steckbrief_Mastrinder.pdf

THÜNEN-INSTITUT, 2017b. *Steckbriefe zur Tierhaltung in Deutschland: Milchkühe* [en ligne]. 2017. [Consulté le 15 septembre 2017]. Disponible à l'adresse : https://www.thuenen.de/media/ti-themenfelder/Nutztierhaltung_und_Aquakultur/Nutztierhaltung_und_Fleischproduktion/Milchviehhaltung/Steckbrief_Milchkuehe.pdf

VERBEKE, Wim, PÉREZ-CUETO, Federico J.A., BARCELLOS, Marcia D. de, KRYSTALLIS, Athanasios et GRUNERT, Klaus G., 2010. European citizen and consumer attitudes and preferences regarding beef and pork. *Meat Science*. février 2010. Vol. 84, n° 2, pp. 284-292. DOI 10.1016/j.meatsci.2009.05.001.

WALSH, Karl, 2016. *Le secteur bovin en Irlande*. 2016.

WILKINSON, J. M., 2011. Re-defining efficiency of feed use by livestock. *Animal*. Mai 2011. Vol. 5, n° 07, pp. 1014-1022. DOI 10.1017/S175173111100005X.

“Inosys - Réseaux d’élevage.” Accessed January 3, 2019. http://idele.fr/reseaux-et-partenariats/inosys-reseaux-delevage.html.

“ASTER GDEM” Accessed January 3, 2019. https://search.earthdata.nasa.gov/search. ASTER GDEM is a product of METI and NASA

European Union – SOeS, CORINE Land Cover, 2012