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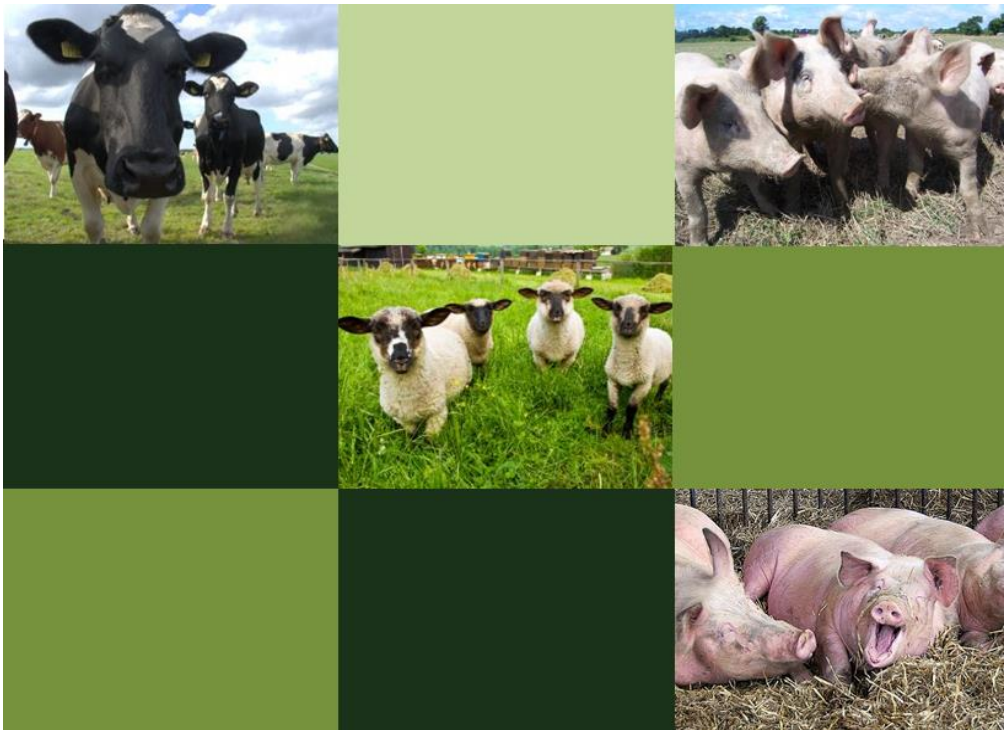

Impact in the EU and third countries of EU measures on animal cloning for food production

Revised Interim Report

16 August 2012

ANNEXES

Annex 1 Terms of reference....3
Annex 2 Measures....11
Annex 3 Stakeholders consulted....12
Annex 4 References....14
Annex 5 Obligations & associated cost categories triggered by policy packages 18
Annex 6 Baseline....21
Annex 7 Description of stages in animal product supply chains: meat and dairy 43
Annex 8 Supplemental information 49

Annex 1 Terms of reference

ANNEX B

Date: 24/10/2011

STANDARD FORMAT FOR TERMS OF REFERENCE (TOR)

Full title: Impact in the EU and third countries of measures on animal cloning for food production in the EU.

Lead Official/s & Unit [redacted] and [redacted]

DG Co-chef de file

(Refer also to unit 02 and unit 01) [redacted]

1. PURPOSE OF THE CONTRACT

IA study/ex-ante evaluation.

1.1 Context of the study work

In January 2008, the Commission tabled a legislative proposal for the revision of Novel Food Regulation (EC) n° 258/97 to streamline the authorisation procedure while maintaining the principle of a pre market approval for novel foods. The use of the cloning technique as such emerged in the inter-institutional discussions on this proposal. At first and second EP reading, all the Member States in Council were in favour of the inclusion of food from the offspring of clones (1st generation) in the Novel Food scope while the Commission was of the opinion that it should only cover food from clones as it is the case under current regime.

Following its Resolution of January 2008 on cloning, the European Parliament was against the principle of a possible authorisation of food from clones and their offspring under the Novel Food Regulation. The EP was in favour of a total ban of the use of the cloning technique in the EU and the placing on the market of food from clones themselves and their offspring (first and subsequent generations).

In view of a final agreement on the Novel Food revision, the Commission adopted in October 2010 a report to the EP and the Council on animal cloning for food production which suggested a number of possible measures on cloning:
(i) temporary suspension of the use of the cloning technique in the EU for the reproduction of all food producing animals; the use of clones for food production; the import of clones and the marketing of food from clones.
(ii) Setting up of a mandatory traceability system for the imports of semen and embryos from clones to allow farmers and industry to set up data bank(s) of offspring in the EU.

Following the lack of inter-institutional agreement at second reading, a Conciliation procedure was triggered. In spite of the efforts made and intensive negotiations, a final

agreement could not found on the cloning issue and the Ordinary Legislative Procedure was stopped by end of March 2011.

1.2 Objectives and general approach of the study

This study would primarily address the economic, social and ethical considerations and environmental impact linked to the ban of the cloning technique and the setting up of traceability and labelling systems to allow market information on products from clones, their offspring and their descendants.

For these purposes detailed data needs to be collected concerning, for all involved species (bovine, porcine, ovine, caprine and domestic solipeds): the economic, social and ethical considerations and environmental impacts of:

- the suspension of the cloning technique,
- the setting up of traceability mechanisms for semen and embryos from clones, for live offspring; and,
- the labelling of food derived from offspring and their descendants.

A feasibility study and the potential impact on trade of traceability and labelling requirements for all foods (un-processed and processed) needs also to be done.

1.3 User of the contract

Unit SANCO E6 Innovation and sustainability in cooperation with A2 Legal affairs, G2 Animal health, G3 animal welfare, G6 Multilateral international relation, G7 Bilateral international relations, 02 Innovation for health and consumers and the Impact Assessment Steering Group (IASG).

2. TASK TO BE PERFORMED BY THE CONTRACTOR

2.1 Scope of the study

The contractor needs to assess:
-The operational feasibility for putting in place the traceability and labelling requirements for foods derived from cloned animals, their offspring and descendants, both for EU products and third country imported products.

-The socio-economic and environmental impacts of the different measures regarding cloning for food production on the EU farming sector (including breeders and reproductive material centres), the EU food industry and retail/distribution sector and on international trade (imports and exports).

The social impact refers to the potential lost of activity and employment in the farming sector and meat and milk industry which may result from the adoption of the cloning measures. The environmental impact refers to the potential consequences on biodiversity. The economic impact is further detailed under point 2.3 task 2.

This initiative is limited to cloning for food production and is not covering the use of the cloning technique for all other purposes such as research, production of pharmaceuticals or the conservation of endangered species or breeds.

The following issues are covered:

1. Data collection processing and analysis concerning:
- the use in the EU and main third countries: of clones themselves; of reproductive materials from clones; and of live offspring from clones.
- the trade (EU imports and exports) of meat and milk, of meat and milk products and of some derived processed products (such as gelatine, caseins …).
2. Assessment of the technical/operational feasibility of the various cloning measures (ban of the cloning technique, traceability of reproductive materials and of live offspring, traceability of food from offspring and their descendants)
3. Qualitative and quantitative assessment of the economic, social and environmental impact of the measures mentioned in point 2.

This study, taking into account the cloning developments, should cover all species (bovine, porcine, ovine, caprine and domestic solipeds). However the extent of expected work would differ between the different species as the cloning technique for food production is up to now only developed for bovine and porcine species.

2.1.1 Time frame

The data from the period 2006- 2010 (up to last data available) will be covered by the study.

2.1.2. Geographical coverage

EU countries and main third countries trading partners (USA, Brazil, Argentina, Paraguay, Uruguay, Canada, New Zealand, India, Australia and China).

2.1.3 Sectors concerned

The study will analyse the impact on the following sectors:
- EU farmers including breeders and reproductive material centres.
- Meat industry (slaughterhouses, cutting plants and meat processors)
- Milk and milk products industry
- Butchers and retail/distribution sector
- Traders (imports and exports)
- National Competent Authorities (administrative burden and costs)

2.1.4 Actors

Professional organisations and industry representatives from the farming and food sectors of some EU Member States (a representative sample) and main third country partners (USA, Brazil, Argentina, Paraguay, Uruguay, Canada, New Zealand, Australia and China). Companies of cloning in Europe and third countries. National Competent Authorities in EU Member States (A representative sample).

2.2 Study Themes

2.2.1 Theme 1: Economic, social and environmental impact at EU and international level of a temporary or permanent SUSPENSION of

1. the cloning technique in the EU for all food production animals and the use of clones
2. the marketing of food from clones
3. the marketing of reproductive materials of clones (semen, embryos and ova) from third countries or generated in the EU
4. the marketing of live offspring from clones (first generation) i) imported and ii) produced in the EU.
5. the marketing of live offspring from clones of all generations i) imported and ii) produced in the EU.
6. the marketing of food from offspring from clones first generation i) imported and ii) produced in the EU.
7. the marketing of food from offspring from clones all generations i) imported and ii) produced in the EU.

2.2.2 Theme 2: Economic, social and environmental impact of a TRACEABILITY systems for

1. lives clones i) imported and ii) produced in the EU.
2. food from clones i) imported and ii) produced in the EU.
3. reproductive materials of clones (semen, embryos and ova) i) imported and ii) produced in the EU.
4. live offspring from clones first generation imported i) imported and ii) produced in the EU.
5. live offspring from clones all generations i) imported and ii) produced in the EU.
6. food from offspring from clones first generation i) imported and ii) produced in the EU.
7. food from offspring from clones all generations i) imported and ii) produced in the EU.

2.2.3 Theme 3: Economic, social and environmental impact of a LABELLING systems for

1. food from clones i) imported and ii) produced in the EU.
2. food from offspring from clones first generation i) imported and ii) produced in the EU.
3. food from offspring from clones all generations i) imported and ii) produced in the EU.

The data should be presented so that the impact on imported products and products produced in the EU can be assessed separately and as a whole.

2.3.Tasks

The contractor is required to provide the Commission with the necessary quantitative data, as well as analytical and descriptive inputs on economic, social and environmental impacts, as identified in the specific request below. These inputs shall be consistent with the policy requirements, quality and standards necessary to conform to the Commission's Guidelines on Impact Assessment.

The external contractor will be responsible for the collection and collation of the required data taking into account the data provided by the Commission services on statistics and trade figures (TRACES, COMEXT). To this end, the contractor should also consult with all relevant stakeholders, including industry and professional organisations.

Task 1: Observing

Data collection and processing should be performed drawing from desk research, but supported by IT-based expert survey, telephone or face-to-face interviews (as found suitable within the data collection agenda), and broad consultations within the respective Member States and third countries.

Task 2: Analysing

First step is to establish a baseline model of the current situation as regards cloning based on the EU production and trade of live clones and reproductive materials, and an estimate of live offspring and their products on the EU market.

A dynamic economic model based on several scenarios should quantify future direct and indirect economic impacts that are likely to occur (both intended and unintended ones) as a consequence of implementing the three elements (suspension/liberalisation, traceability, labelling); long term general forecast, cost of production, retail prices and market quantities.

Drawing from this model, a qualitative analysis according to several scenarios should be elaborated, taking into account the possible development and use of cloning, the use of offspring and other products, their commercialisation (trade, processing, consumption) based on forecast figures of meat and milk market developments in both the EU and third countries, notably EU export markets and third countries already active in cloning.

Task 3: Overall assessment

Drawing on above quantitative and qualitative analysis, the results of the assessment are to be brought together in a consistent format to allow for assessment of the technical feasibility and the economic, social and environmental impacts of the measures proposed in themes 1, 2 and 3. Conclusions on the advantages and disadvantages of the above measures to be established based on comparison with the baseline scenario.

2.4 Description of the technical requirements and required profiles

2.4.1 Experience required

The following experience is required i) the economic know-how (economic social and environmental impact) and ii) the operational feasibility of information systems (traceability and labelling) for the whole food chain (from farm to table approach).

2.4.2 Specific skills

The external contractor should be aware of and, where relevant, make use of economic modelling systems to establish projections on market prices and trade flows.

2.5. Additional information

A list of annexes with specific information on the main legislation (animal welfare, traceability of live animals and products and labelling of food) and statistical data on import and export in the EU for reproductive material, live animals and food products will be provided to the contractor.
Other Commission services also have relevant data for this study (such as economic data from DG AGRICULTURE and TRADE).
In addition, European Food Safety Authority Opinions, European Group of Ethics report, Eurobarometer and the Commission report of 2010 on cloning will be also provided.

Other measures taken by the Commission:

-European Food Safety Authority (EFSA) was asked to assess the animal health and animal welfare issues, as well as environmental and food safety aspects. EFSA in July 2008 adopted an opinion in which no indication of any difference in food safety for meat and milk of clones and their progeny compared with conventionally bred animals. In 2009 and 2010 EFSA published two statements confirming the validity of the conclusions and recommendations of the 2008 EFSA opinion.
-The European Group of Ethics (EGE) was asked to present an opinion on the ethical problems raised by the use of animal cloning. EGE in its report of 2008 expressed doubts on the ethical justification on cloning animal for food production purposes, "considering the current level of suffering and health problems of surrogate dams and animal clones". EGE also concluded that did " not see convincing arguments to justify the production of food from clones and their offspring".
-An Eurobarometer was made by the Commission in 2010 in order to know consumer's attitudes and views on such new technology. The Eurobarometer survey in 2010 has shown expectations form the EU citizens to also adopt additional measures as labelling for offsprings.

Animal welfare:
The available EFSA opinion associates animal welfare problems with the current state of the application of the cloning technique. Cloning presents severe welfare challenges for clones arising directly from its use and also through possible exacerbation of the problems caused by selective breeding. These animal welfare concerns do not apply for the production of offspring from clones and their descendants which are obtained through standard reproduction techniques. EFSA opinion provides scientific support for the view that there are adverse animal health/welfare consequences, to which a non-discriminatory and proportionate response could be justified.

Consumer's choice:
In the Eurobarometer of 2010 a majority of EU citizens have concerns about animal cloning and a majority is not willing to accept animal cloning for food production purposes. Furthermore, if food products from the offspring of clones animals become available they would require them to be labelled. The above mentioned food labelling requirements will imply to develop reliable and sofisticated systems of animal identification and traceability in the EU. Developing those systems may have an impact on EU stakeholders (e.g. farmers, industry, etc) which may need to be carefully assessed.

Food safety:
As EFSA did not identify any risks for human health, a definitive restriction on the marketing of cloned products (whether food, semen, embryo etc) in the EU would probably be difficult to justify. Cloned animals cannot be distinguished from conventionally bred animals through any existing method. The same applies to foods from offspring from cloned animals and from conventionally bred ones, which is exactly similar in composition and nutritional value.

Ethical considerations:
The basic ethical issue raised by EGE concerns the moral status that people attribute to animals. The position of society on this issue has broadly evolved along two lines: either animals were seen as mere possessions by their owners and available to them for any purposes that they saw fit, or animals were given respect in varying degrees. These attitudes were influenced strongly by cultural and religious traditions.

2.6 REPORTING AND DELIVERABLES

Inception report.
The evaluator must provide the Commission services with an inception report on the detailed planning of the study, including methodology, and data sources to be used. This document will present in detail how the method proposed is going to be implemented and in particular how the method will assess each element required and provide a judgement. This document will provide the Commission desk-officers with the opportunity to make a final check of the feasibility of the method proposed and the extent to which it corresponds with the information needs outlined in the terms of reference.
The inception report will be submitted at the latest 6 weeks after the signature of the contract.

Intermediate results and progress report
The evaluator must provide the Commission services with a written and oral presentation of the intermediate results of the study including a summary of the main findings for each element to be considered. This progress report will provide the inter-Service steering group with the opportunity to check whether the study is on schedule and whether the preparatory work has actually focused on the specified information needs.
This task will be carried out 3 months after the signing of the contract at latest.

Draft final report and final report

a) Draft final report:
The evaluator must provide the Commission services with a written and oral presentation on the draft final results. The draft final report will provide the conclusions of the evaluator in respect to the elements to be assessed as included in the terms of reference. These conclusions will be clearly based on evidence generated through the analysis. Judgements provided should be clear, objective and explicit. This document will also contain recommendations developed on the basis of the conclusions reached by the evaluator. The structure of the draft final report will respect the structure set up by common standards and include an executive summary (synthesis of main analyses and conclusions, added value of each element), main report (presenting in full the results of the analyses, conclusions and recommendations), technical annexes, and a one-page summary on the Key Messages of the analysis carried out.

The draft final report will be submitted at the latest 5 months after the signature of the contract.

b) Final report
The evaluator must provide the Commission services with a written and oral presentation on the final results at the latest 6 months after the signature of the contract. The final report will take into account the results of the internal quality assessment about the draft final report insofar as they do not interfere with the autonomy of the evaluators in respect to their conclusions. The final executive summary and Key Messages page will be part of it.
The reports and presentations will be provided in English under electronic format compatible with Commission's software. Each deliverable will be followed by a presentation in Commission's office in Brussels.
Deliverables will be submitted to the Commission experts, which may ask for complementary information or propose adjustments in order to redirect the work when necessary.
Deliverables must be accepted by the Commission. With work progressing and in the light of new findings, revisions of deliverables already approved may be necessary.
Deliverables shall be drafted in a concise and easily understandable language. The presentation of the texts, tables and graphs has to be clear and complete and correspond to commonly recognised standards for studies to be published.
The volume of final deliverable text will not exceed 200 pages (Times New Roman 12 or equivalent, excluding annexes). The core text has to be concentrated on the assessment of the main study items. An executive summary of not more than five pages should be included in the final report. Background information should be presented in annexes.

2.7. Organisation and timetable

The analysis will be performed within 6 months from the date of signature of the contract.
The contractor is expected to start working immediately after the contract has been signed.
The contract involves regular meetings in Brussels between the commission desk officers and the contractor in accordance with the programme set up in the following table. Deadlines of the table refer to the date of delivery by the contractor to the Commission. Oral presentation should take place in Brussels in Commission's offices within two weeks after the delivery.

Timetable and deliverables

Deliverables	Deadline after signature
Kick off meeting	15 days
Inception report	6 weeks
Electronic presentation intermediate results + progress report	3 months
Draft final report	5 months
Final report	6 months

3.5. Budget
Maximum price: 125,000 €
Administrative Budget line: 170102110004

Annex 2 Measures

Table A2.1 Suspension measures

Measure description
Suspension of the cloning technique for all food production animals and use of clones
Suspension of the marketing of food from clones
Suspension of the marketing of reproductive materials of clones
Suspension of the marketing of live offspring (1st generation)
Suspension of the marketing of live descendants of clones (2nd and subsequent generations)
Suspension of the marketing of food from offspring of clones (1st generation)
Suspension of the marketing of food from descendants of clones (2nd and subsequent generations)

Table A2.2 Traceability measures

Measure description
Traceability for live clones
Traceability for food from clones
Traceability for reproductive materials of clones
Traceability for live offspring of clones (1st generation)
Traceability for live descendants of clones (2nd and subsequent generations)
Traceability for food from offspring of clones (1st generation)
Food from descendants of clones (2nd and subsequent generations)

Table A2.3 Labelling measures

Measure description
Labelling with traceability for food from clones
Labelling with traceability for food from offspring of clones (1st generation)
Labelling with traceability for food from descendants of clones (2nd and subsequent generations)

Table A2.4 Premarket approval measures

Measure description
Premarket approval with traceability and labelling for the food derived from clones
Premarket approval with traceability and labelling for the food derived from offspring of clones (1st generation)
Premarket approval with traceability and labelling for the food derived from descendants of clones (2nd and subsequent generations)

Annex 3 Stakeholders consulted

Table 1.1 Organisations interviewed

Sector	Organisation type	Organisation name	Country/level of operation
Trade (Bovine)	Company Embryo and livestock importer/exporter	ALH Genetics	Netherlands
Trade (Bovine (dairy))	Company Semen importer	Alta Genetics	UK
Trade (Bovine)	Company Embryo and semen importer/exporter	Diamond Genetics	Netherlands
Trade (Bovine)	Company RM importer	Eggs-Port	UK
Trade (Bovine)	Company Semen importer	Semex France	France
Trade (Bovine)	Company Semen importer/retailer	UK Sire Services Ltd	UK
Trade (Bovine)	Company Embryo and semen importer/exporter	World Wide Sires Germany	Germany
Trade (DNA identification)	Company, DNA identification	Identigen	Ireland
Trade (Bovine)	Company, cloning and assisted reproductive technologies	Trans Ova Genetics	USA
Trade	Trade association, biotechnology	Biotechnology Industry Association	USA
Breeding (Bovine)	Breed society	Holstein UK	UK
Breeding (Bovine)	Breeding and AI representative association	German Cattle Breeders Federation	Germany
Breeding and trade (Bovine)	Breeding and AI company	Genes Diffusion	France
Breeding and trade (Bovine)	Breeding company and embryo and semen importer/exporter	German Wagyu Academy	Germany
Breeding and trade (Bovine)	Breeding company and RM importer	Stabiliser Cattle Company	UK
Breeding and trade (Bovine)	Company Breeding selection and semen importer/exporter	Triangle Holstein	Spain
Breeding (Porcine)	AI Company Breeding and semen importer/exporter	JSR Genetics	UK
Breeding and trade (Porcine)	Company Breeding selection and semen exporter	Institute of Pig Genetics	Netherlands
Bovine	Research Institute	Agri-food and Bioscience Institute (AFBINI)	UK
Bovine, Porcine, Ovine, Equine	Government	DEFRA	UK
Bovine	Government	Department for Rural Affairs Northern Ireland (cattle identification unit)	UK
Breeding (Bovine, porcine, ovine and caprine, equine)	Trade association, animal breeders	European Forum of Farm Animal Breeders	EU
Breeding (Bovine,	Company, AI and breeding	Genus	Global

Sector	Organisation type	Organisation name	Country/level of operation
porcine)	selection and semen exporter/importer		
Breeding (equine)	Company, breeding, selection and cloning.	Cryozootech	France
Dairy producers and manufacturers	Industry association	European Dairy Association	EU
Dairy traders	Industry association	EUCOLAIT	EU
Food manufacturing	Industry association	Food and Drink Federation	UK
Breeding industry	Industry association	European Forum of Farm Animal Breeder	Europe
Meat slaughter, cutting, trade, markets	Industry association	UECBV	Europe

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Annex 5 Obligations & associated cost categories triggered by policy packages

A5.1 Suspension

Table A5.1 Suspension approach: obligations

Operators	Packages of measures						
	S-A (Suspension of technique)	S-B (S-A + marketing reproductive materials from 3rd countries)	S-C (S-B + marketing of offspring)	S-D (S-C + marketing of descendants)	S-E (S-D + marketing of food from clones)	S-F (S-E + marketing food from offspring)	S-G (S-F + marketing food from descendants)
Breeding companies	Observe regulations banning **cloning technique**	S-A + observe regulations banning **marketing of reproductive materials**	As S-B	As S-B	As S-B	As S-B	As S-B
Multipliers	Observe regulations banning use of **clones**	As S-A	As S-A + Observe regulations banning **marketing of offspring of clones**	As S-C + observe regulations banning **marketing of descendants of clones**	As S-D	As S-D	As S-D
Producers	Observe regulations banning use of **clones**	As S-A	As S-A + Observe regulations banning **marketing of offspring of clones**	As S-C + observe regulations banning **marketing of descendants of clones**	As S-D	As S-D	As S-D
Slaughterhouses + cutting plants	n/a	n/a	n/a	n/a	Observe regulations banning **marketing of food from clones**.	As S-E + observe regulations banning **marketing of food from offspring of clones.**	As S-F + observe regulations banning **marketing of food from descendants of clones.**

Processing / packaging	n/a	n/a	n/a	n/a	Observe regulations banning **marketing of food from clones.**	As S-E + observe regulations banning **marketing of food from offspring of clones.**	As S-F + observe regulations banning **marketing of food from descendants of clones.**
Wholesale / distribution	n/a	n/a	n/a	n/a	Observe regulations banning **marketing of food from clones.**	As S-E + observe regulations banning **marketing of food from offspring of clones.**	As S-F + observe regulations banning **marketing of food from descendants of clones.**
Retailers	n/a	n/a	n/a	n/a	Observe regulations banning **marketing of food from clones.**	As S-E + observe regulations banning **marketing of food from offspring of clones.**	As S-F + observe regulations banning **marketing of food from descendants of clones**.
Importers of reproductive materials	n/a	Observe regulations banning **marketing of reproductive materials**	As S-B	As S-B	As S-B	As S-B	As S-B
Importers of live animals	n/a	n/a	Observe regulations banning marketing of offspring of clones	As S-C + observe regulations banning marketing of descendants of clones	As S-D	As S-D	As S-D
Importers of meat food products	n/a	n/a	n/a	n/a	Observe regulations banning marketing of food from clones.	Observe regulations banning marketing of food from offspring of clones.	Observe regulations banning marketing of food from descendants of clones.
Public/private intermediaries (EU)	n/a	n/a	n/a	n/a	n/a		

Competent authorities	Monitoring and enforcement	As S-A + additional monitoring and enforcement	As S-B + additional monitoring and enforcement	As S-C + additional monitoring and enforcement	As S-D + additional monitoring and enforcement	As S-E + additional monitoring and enforcement	As S-F + additional monitoring and enforcement

A5.2 Traceability

Table A5.1 Requirements of Theme 2: Traceability

Operators	**Packages of measures**						
	T-A (reproductive materials)	**T-B (TA + clones)**	**T-C (T-B + offspring)**	**T-D (T-C + descendants)**	**T-E (T-D + food from clones)**	**T-F (T-E + food from offspring)**	**T-G (T-F + food from descendants)**
Breeding companies	Register clones and DNA of clones and reproductive materials of clones.	As T-A + pass info on clones to other breeders, multipliers, producers, and/or importers / exporters of live animals	As T-B + register offspring of clones + pass info on offspring of clones	As T-C + register DNA of offspring of clones + register descendants of clones and DNA of descendants (Dx-1) + pass info on descendants	As T-C	As T-C	As T-C
Multipliers	n/a	n/a	Pass info to producers	As T-C	As T-C	As T-C	As T-C
Producers	n/a	n/a	Pass info to slaughter/cutting	As T-C	As T-C	As T-C	As T-C
Slaughterhouses + cutting plants	n/a	n/a	Record info from producers on clone status of animals	As T-C	As T-D + pass info to processing / packaging, wholesale / distributors, retailers identifying food from clones	As T-E + identify food from offspring of clones	As T-F + identify food from descendants of clones

Annex 6 Baseline

This section provides the results of research on the current scale and distribution of commercial cloning activity for the species of interest, and the likely development of that activity in the period out to 2020.

Details of commercial cloning activity identified for each of the species assessed in this study are set out below in sections A6.2 to A6.5 along with the baseline data on the breeding sector, domestic food production, trade activity, and traceability systems to support the assessment of costs to implement the policy packages.

A6.1.1 Current and projected cloning activity

Research for this study suggests that in Europe there are currently no commercial cloning activities focused on food production. One company based in France produces equine clones and their offspring for sporting purposes (DG SANCO 2012; interviews with stakeholders contacted by ICF GHK for this study confirmed the responses reported in the DG SANCO survey).

A JRC survey undertaken in 2007 identified 35 companies worldwide working with cloned (and/or genetically modified) animals (Bruce et al. 2007). The 2007 study represents the most recent comprehensive assessment of the extent of cloning activity internationally. Only 15 per cent of the identified companies were working in food production, while 40 per cent were working in the production of pharmaceuticals.

In 2007, most cloning companies conducting cloning activities for all purposes were based in North America (63 per cent), followed by Europe (14 per cent) and Asia (11 per cent) (Bruce et al. 2007). Interviews undertaken for this study indicate that commercial cloning activity is growing in South America, particularly in Argentina, where companies have been identified working with livestock and sport horses. Existing data show that a fairly small number of cloning companies or groups of companies currently provide Somatic Cell Nuclear Transfer (SCNT) services at commercial scale (see species-specific sections below for details).

Cloning services may also be provided by research centres or research universities. While more precise information is not available, Bruce et al. (2007: 20) suggest 'the magnitude of this activity is likely to be comparatively low'. A recent survey by DG SANCO, European Commission, found that a small number of research centres or universities are conducting cloning-related research throughout Europe, but that their activities are entirely dedicated to basic research and not commercial cloning (DG SANCO 2012). Comparative information for third countries is not available, but interviews conducted for this study suggest that the extent of cloning activity for food production in research centres and universities in third countries is relatively small. Further research is being undertaken for this study to gather additional information from third countries, particularly the US, New Zealand and Argentina.

The OECD estimate that more than 4,000 cattle clones and 1,500 pig clones had been produced worldwide as at 2007, both through research organisations and commercial enterprises (OECD 2007). Organisations interviewed for this study suggest that the main barrier to further development and use of the cloning technique in Europe is consumer acceptability. In addition, the technique is not yet efficient enough to justify the high costs associated with producing commercial clones.

A6.2 Baseline – Bovine animals

A6.2.1 Current cloning activity

Commercial cloning activity for food production is best developed in bovine animals. Cloning technology is being applied to cattle in the US, Canada, Argentina and Australia (DG SANCO 2012). It may also be undertaken in Brazil, New Zealand, Chile, China and Uruguay based on the presence of cattle cloning companies in these countries (Table A6.1). No commercial cloning activity for bovine animals is undertaken in the EU (Ibid; industry interviews conducted by ICF GHK for this study support the responses reported in the DG SANCO survey).

A6.2.1.1 Size and structure of the industry

The JRC study (2007) found that of the 35 companies undertaking cloning activity worldwide, nine of these applied cloning technology to cattle. Four of these companies are represented in the EU, although their commercial activities in Europe are not thought to include use of the cloning technique (0).

Table A6.1 Identified cattle cloning companies in the EU and their main offices

Company Name	Head Office	Europe Offices	# Employees	Revenue
AltaGenetics	Canada	Netherlands	Balzac, Alberta, Canada: 5-10 US: 50-100	Balzac, Alberta, Canada: $500,000 US: $10-$25m
CRV	Netherlands	Belgium, Czech Republic, Germany, Luxembourg, Spain	2000+	€135,206,000
Genus/ Bovec/ ABS	UK	Italy, Germany, France, Ireland	1000-5000	€309.9m
Viking Genetics	Denmark	Finland, Sweden	3000+	

Source: The list of companies is based on desk-based research of company websites and business directories. The industry dynamics in this sector are rapidly changing and this table should not be considered either definitive or fully up to date.

Profiles of the main cattle livestock genetics companies

ABS Global, US, is the largest global bovine genetics company. Founded in 1941, ABS became part of **Genus plc** in 2005. In 2005 ABS contributed 49% of Genus' annual turnover of €399.7 million (Genus, 2005 cited in Gura, 2007). The ABS Global sales volume is around 10 million doses of semen, marketed in more than 70 countries. Genus has animals in bovine studs in the USA, Canada, Brazil, the UK, Italy, Australia and China.

Alta Genetics Inc., Canada, operates in over 60 countries, with breeding programs in the US, Europe and Canada. In 2000, Alta Genetics was incorporated into the **Koepon Holding** in the Netherlands. Koepon owns six dairy farms with nucleus herds, over 3,200 cows and companies offering breeding services in the Netherlands[1]. A nucleus herd approach was added to the traditional selection approach following the merger. For fear of epidemics, they are kept in the Netherlands, Germany, Scotland, Poland and Canada, in areas with low cattle density. With sales totalling over 10 million doses of semen and an annual growth of 10% or higher, Alta is a leader in dairy genetics, and is also an important player in beef breeding.

Viking Genetics, Denmark, was formed in 2008 following a merger between **Svensk Avel** and **Dansire International**, the former Swedish and Danish Artificial Insemination Centres, respectively. Viking supplies semen and embryos to more than 50 countries and tests 500 bulls of several dairy and beef breeds every year. It covers over 70 per cent of Danish dairy cattle.

Sources: company websites, annual reports and Gura (2007)

A6.2.1.2 Third countries

The main offices of these companies in third countries and the size of these firms are presented in Table A6.1.

Table A6.1 Identified cattle cloning companies in third countries and their main offices

Company Name	Head Office	# Employees	Revenue	Europe Offices	Presence in key third countries

[1] http://www.koepon.nl/holding/index.htm, cited in Gura (2007), accessed 5 November 2006

AltaGenetics	Canada	Canada: 5-10 US: 50-100	Canada: $500,000 US: $10-$25m	NL	Uruguay, Argentina, Chile, US
Celentis	NZ	Celentis: 50-100 AgResearch: 780	Celentis: $10-$25m AgResearch: 157.7m		
CRV	NL	2000+	135,206,000 (Euro)	BE, CZ, DE, LU, ES	Brazil, New Zealand
Cyagara/ Goyaike*	US	1001-5000			Brazil, Argentina
Genus/ Bovec/ ABS	UK	1000-5000	309.9m (Euro)	IT, DE, FR, IE	US, Canada, Brazil, Argentina, Australia, Chile
Minitube (Intl Centre for Biotechnology)	US	400+	US: $10-$25m		Asia, Australia, North American, South America
TransOva	US	50-100	$10-$25m		
Viagen	US	50-100	$1-$15m		
Yangling Keyuan cloning co.	China	50+	2-3m (RMB)		

Source: Cloning company websites

A6.2.2 Cloning projected activity to 2020

Suk et al 2007 estimated that the offspring of cloned cattle would likely enter the food chain somewhere in the world before 2010. The industry view at that time suggested that the estimated timeline for commercialisation of cloned animal food products was:

- 2005 – 2010: semen and offspring from cloned cattle and milk, meat and derivatives from offspring of cloned cattle
- 2010 - 2015: cloned cattle and milk, beef and derivatives from cloned cattle would enter the food chain

Offspring from cloned cattle did enter the food chain in the UK in 2010 through the slaughter of two sires for dairy cattle. No other such activity has been reported in the EU, although the EU does not currently regulate the import of reproductive material from clones. It is possible that additional offspring of clones have been produced elsewhere in the EU. No clones are known to have entered the food chain in Europe to date as no pre-market approval requests have been submitted under the Novel Foods Regulation.

Due to the high cost of cloning and low success rates from SCNT techniques, cloning is currently seen as potentially useful as 'insurance' whereby breeders may seek to protect themselves from the premature injury or death of highly valuable animals by creating and storing somatic cell lines of those animals. Clones of elite animals could thus be used as sires for multiplication of beef cattle and dairy cattle with desirable characteristics.

Currently, the cost to produce a clone in third countries is thought to be €12,000-15,000 (COPA-COGECA interview). These animals can sell for more than €50,000. Breeding auctions in the EU sell good quality heifers for between €1,500-1,800 and bulls for €8,000-12,000, placing clones well above the top end of the range. Auctions in the United States have reported sale prices for the embryos of cloned bovine animals at a competitive price (USD 10,000-20,000), similar to the price of a 'conventionally bred' high-value line (Ibid). Thus the milk and meat from the progeny of cloned animals are the products most likely to enter human food chains in the near future.

A6.2.2.1 Breeding structure

The processes related to cattle breeding are less formalised and hierarchical than in other sectors such as pig breeding. Cattle breeding typically occurs on-farm; the principal tiers of cattle production are:

- Nucleus herds: elite breeders producing breeding stock, particularly male animals.
- Multiplier herds: improved breeding stock is removed from the nucleus herds to create a larger number of animals for sale to the tier below.
  - Purebred multipliers produce greater numbers of purebred animals, particularly males, for sale to the tiers below.
  - Crossbred multipliers producing crossbred animals, particularly females, for use in the commercial tier.
- Commercial herds: animals primarily involved in the production of milk and meat. These animals have little or no involvement in selling stock for further breeding.

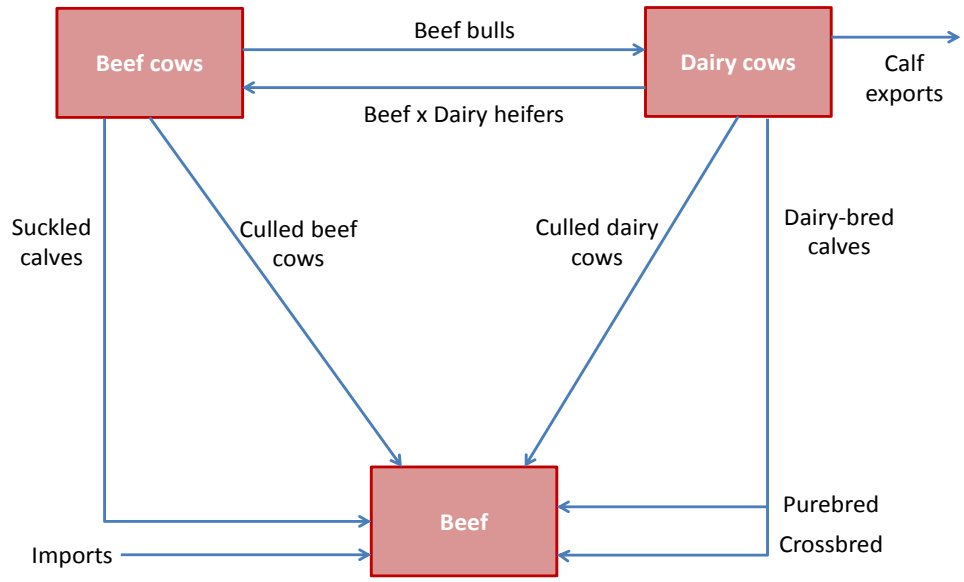
More than one tier may be present on a single farm. There are small differences between the breeding arrangements for beef and dairy cattle. Examples of cattle enterprises in various tiers of the breeding pyramid are presented in Table A8.1

Cattle's limited reproductive output means that a large number of breeding units (on farms) are needed in order to disseminate desired characteristics from elite animals at the top of the breeding pyramid. Dairy farmers typically obtain reproductive materials from breeding companies, either by hiring a bull for natural service or purchasing reproductive materials for use in artificial insemination (AI).

The utilisation of AI enables commercial herds to have direct access to elite animals in the nucleus herds. This has had a significant impact on the dairy breeding pyramid, effectively removing the middle tier (multiplier herds) from the breeding pyramid; (Simm 1998). Obtaining reproductive materials from off-farm sources is less common in beef cattle breeding; bulls for breeding are typically kept on-farm by beef farmers and are used for natural service. The differences between the breeding pyramids for dairy and beef cattle are described in Figure A8.1 and Figure A8.2, respectively.

Table A8.1 describes some of the links that exist between dairy and beef cattle breeding herds. For the EU as a whole, some two thirds of the beef produced is derived directly or indirectly from dairy herds. Figure A6.1 below provides an overview of the links between the two animal populations; both dairy and beef breeding cattle enter the food supply chain as meat products.

Figure A6.1 The dairy and beef cattle industries are often closely interlinked



Source: ICF GHK (2012)

A6.2.2.2 Size of breeding industry

The trend towards industrial livestock production and the implementation of AI techniques has led to a progressive loss of domestic animal biodiversity. In the EU and other industrialised countries high yielding single purpose breeds have increased in importance since the 1970s. The animal breeding sector is a highly knowledge based sector. Organisations spend up to 10% of their annual turnover on R&D (EFFAB 2012).

Nowadays, large-scale breeding schemes for cattle have been developed by many countries aided by population genetics. The goal is to maximize economically important characteristics by a more accurate identification of the true genetic merit of an animal. In this context, AI has had a remarkable impact on the cattle industry during the 20th century, lessoning the need for small producers to keep bulls on farm, and substantially increasing the number of cows mated to one bull. As a consequence fewer bulls are retained for mating, thus allowing more stringent selection, and as such the best bulls are made available to an ever broader group of recipients.

In the EU, dairy and beef cattle breeding is organised by national breeding companies. The companies are responsible for the planning, establishment and coordination of the breeding programmes. For each breed an individual programme is implemented aiming at the systematic genetic improvement of the local breeding population (Laister, Winckler & Lever, no date). While farmers' cooperatives still dominate the cattle breeding organisations in many EU countries, within the last 10 to 15 years, an increasing number of privately owned breeding organisations have entered Member State markets such as ABS/Genus, Viking Genetics and Alta Genetics.

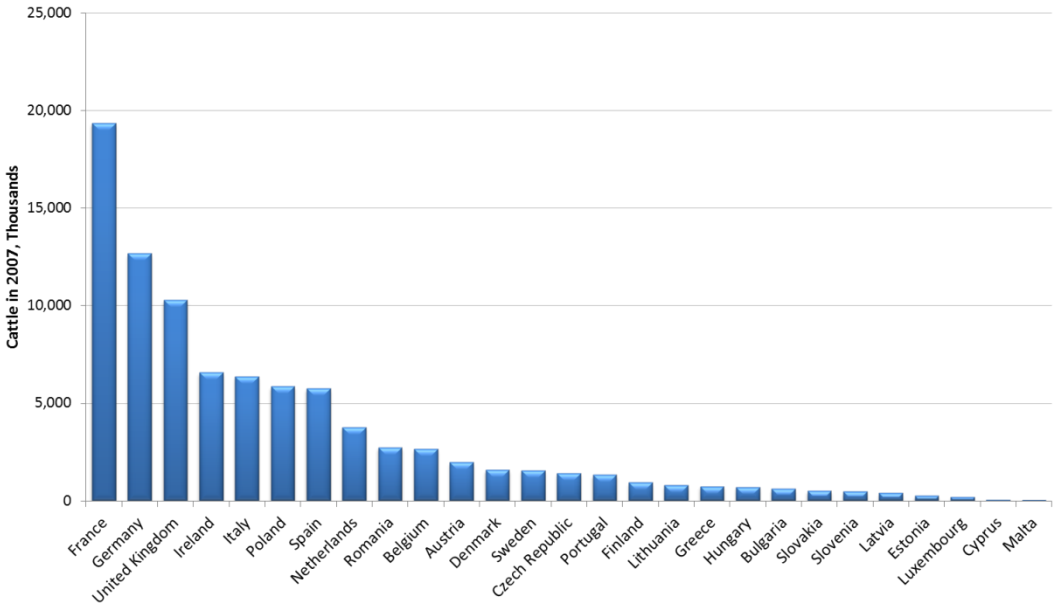
Many breeding organisations (esp cattle, pigs) are jointly farmers´ owned (cooperatives). The size of the animal breeding sector is relatively small compared to its impact. EFFAB estimate that globally the industry is worth approximately €2 billion per annum, primarily working on cattle and pig improvement. Europe represents approximately half of the global breeding market for cattle and for pigs. The breeding sector in Europe is estimated to provide a permanent, cumulative economic gain of approximately €1,89 billion per year, €500 million of which is estimated to come from dairy cattle breeding (€430 million) and beef cattle breeding (€70 million) (FABRE-TP 2011). The total value of animal production in the EU is currently estimated at €140 billion, creating employment for around 30 million people.

A6.2.3 Domestic production

A6.2.3.1 Geographic distribution of beef and dairy cattle

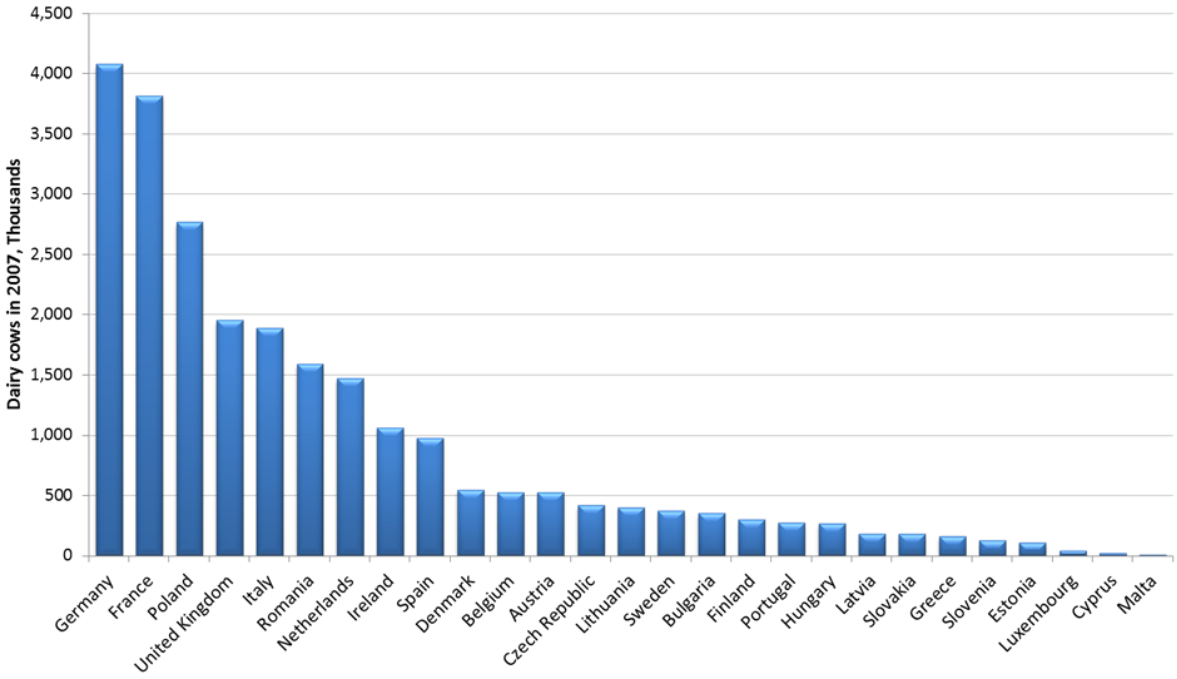
EU cattle production is concentrated in a relatively small number of Member States. In 2010, almost half of all EU cattle production was concentrated in three Member States: France, Germany and Ireland (Figure A6.1). Dairy cow production is similar: almost half are produced in four Member States: Germany, France, the UK and Italy. Eleven per cent are produced in Poland (Figure A6.2).

Figure A6.1 **In 2007 over 84 per cent of the beef cattle in Europe were located in just 10 Member States, and 38 per cent of the European herd was located in France and Germany**



Source: Eurostat (2012)

Figure A6.2 **In 2007 over 83 per cent of the dairy cows in Europe were located in just 10 Member States, and 32 per cent of the European herd was located in France and Germany**



Source: Eurostat (2012)

A6.2.3.2 Overview of beef and veal meat production in the EU

Domestic livestock production for human consumption in the EU is most effectively measured by the volume of meat produced in the country (gross indigenous production, abbreviated as GIP—that is, excluding the animals exported live, but including those imported live). Since 2008, the overall pattern of GIP of red meat in the EU as a whole has remained relatively consistent, ranging between 31 and

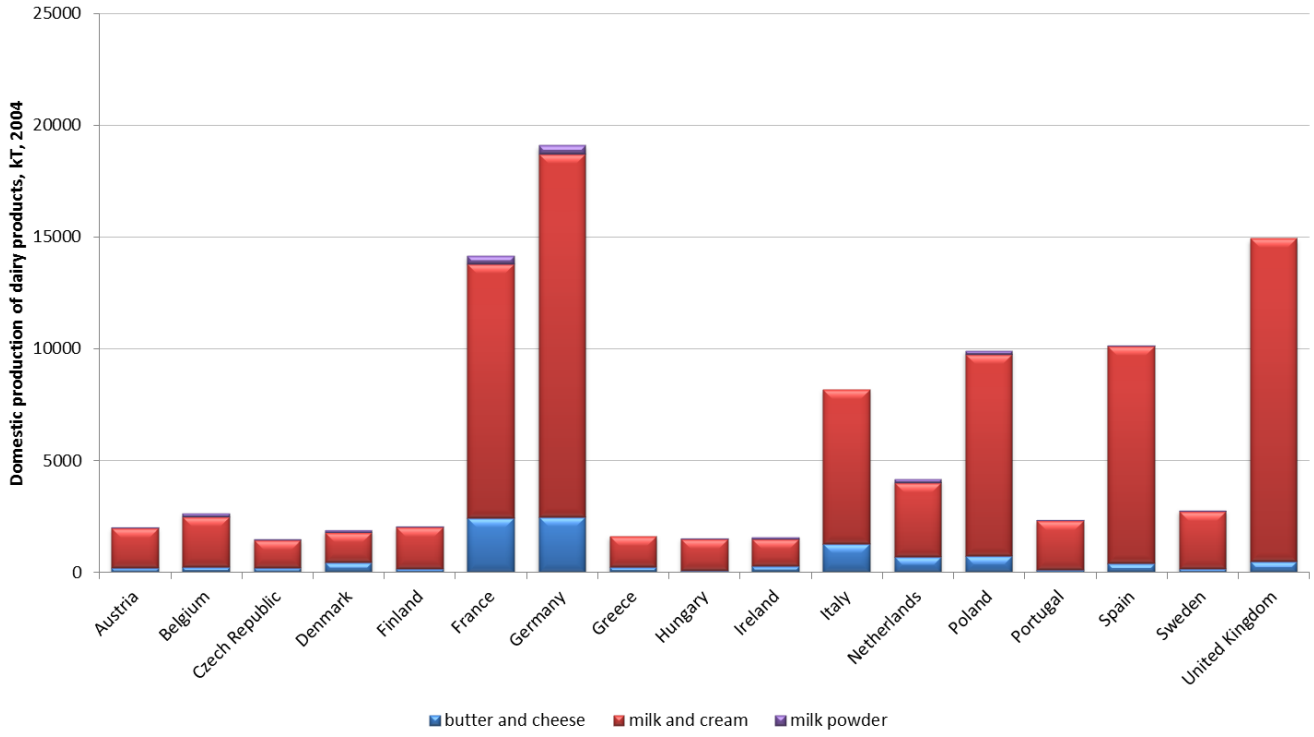
32 million tonnes annually. Beef and veal products account for 25 per cent of total EU red meat production.

A6.2.3.3 Overview of dairy production in the EU

In 2010, 97.8 per cent of milk collected in the EU was from dairy cows. As with milk, the vast majority (95 per cent) of the total volume of cheese produced is derived from dairy cows. In the latest year for which full data is available (2004), usable dairy production was concentrated in six Member States: Germany, France, the UK, Spain, Poland and Italy. Together these six Member States produced more than 76 million tonnes of dairy products (Figure A6.1).

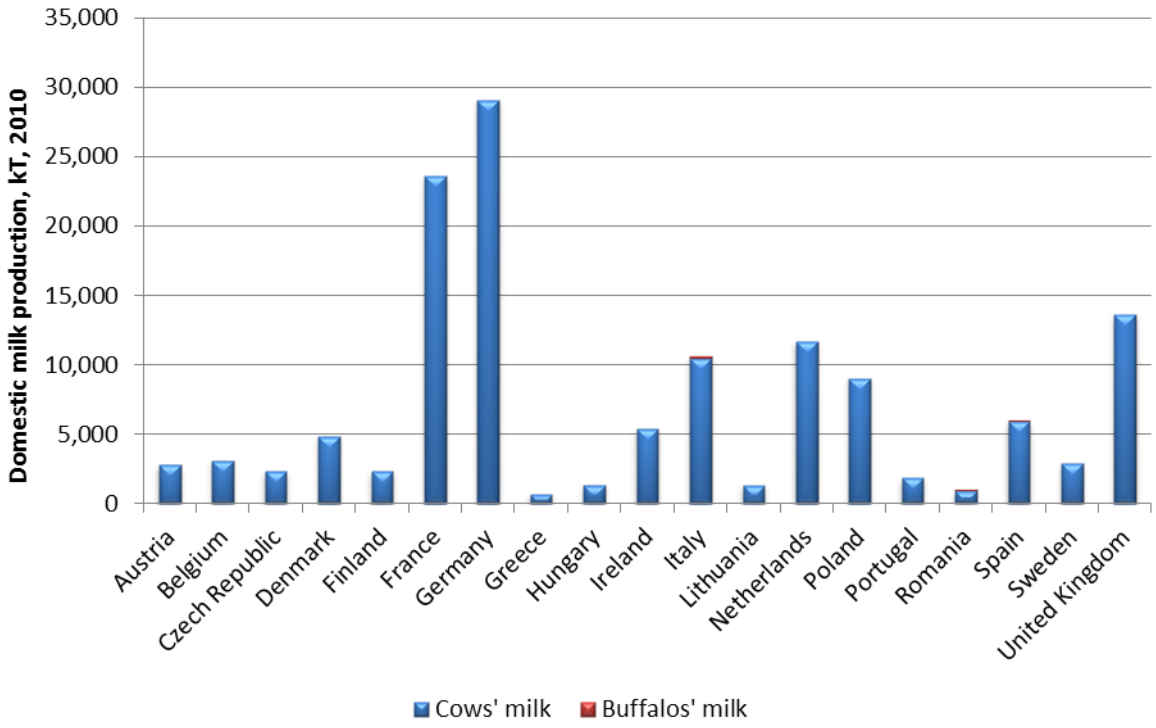
The main EU milk producers in order of total volume of production are: Germany, France, the UK, the Netherlands, Italy, Poland and Spain (Figure A6.2). Together these six Member States accounted for almost three quarters of EU milk production from cows in 2010.

Figure A6.1 Six Member States accounted for three quarters of total usable dairy production in 2004



Source: Eurostat (2012)

Figure A6.2 France, Germany and the UK are the three main producers of milk in the EU

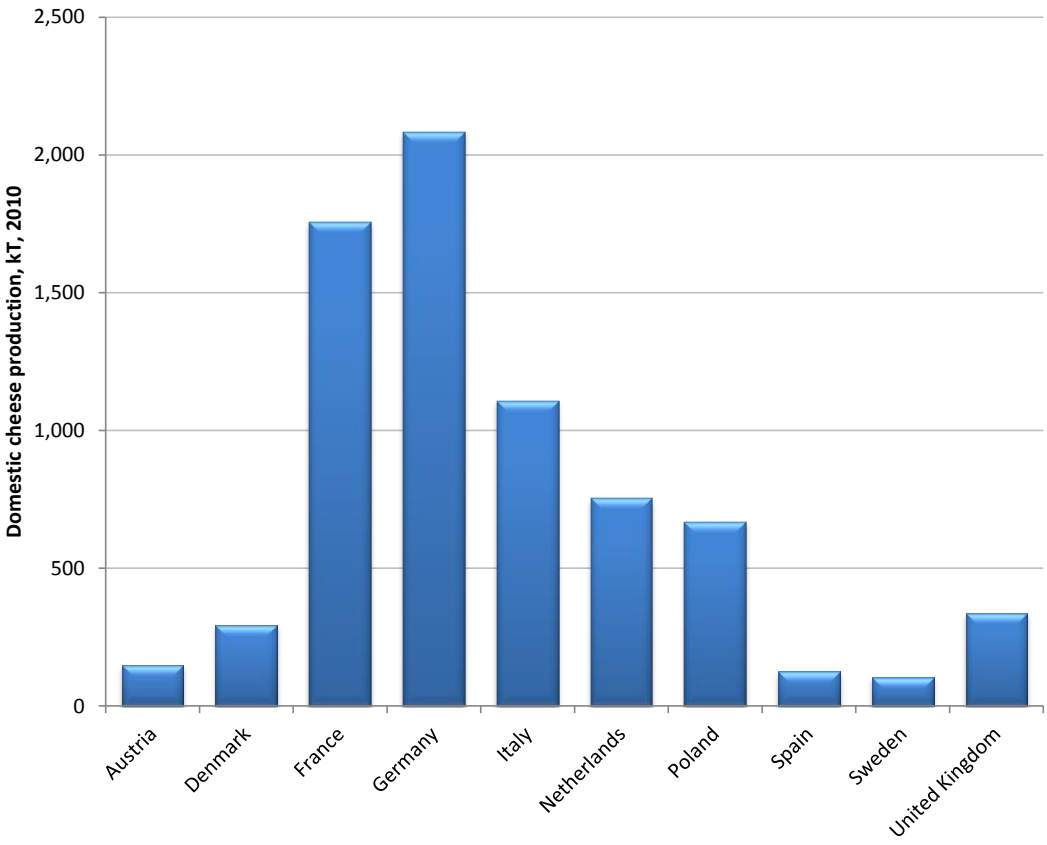


Source: Eurostat (2012)

The second major dairy product produced in the EU is cheese, 92 per cent of which is derived from cows' milk[2]. The five Member States that produce the majority of EU cow's milk cheese are France, Germany, Italy, the Netherlands and Poland, which together accounted for 74 per cent of total domestic cheese production in 2010 (Figure A6.3).

[2] Eurostat data available for Germany in 2010 does not differentiate the sources of cheese. Based on 2004 and 2005 data for Germany, 100 per cent cows' milk production is assumed.

Figure A6.3 The main EU producers of cows' cheese are based in France, Germany, Italy, the Netherlands and Poland



** Data for Italy includes cheese made from buffalos' milk, Source: Eurostat (2012),*

A6.2.4 Trade

A6.2.4.1 EU live bovine animals and reproductive materials imports

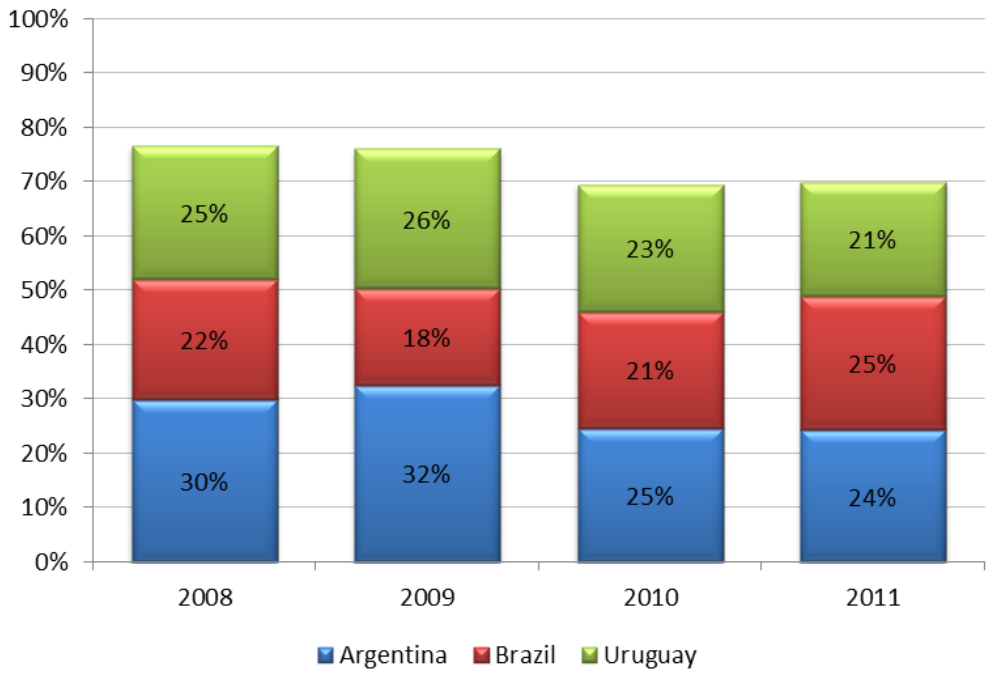
Imports of live bovines are much less common than trade in their meat and other derived products. In 2011, only 45 live bovines were imported from countries beyond EU jurisdiction worth under €1 million. Of these 45 animals, 42 were sourced from Canada and three from New Zealand (Table A8.15).

Since 2008, the US and Canada together have been responsible for approximately 99 per cent of the 1.8 million units of bovine semen imported into the EU (Table A8.11), though the proportion of cloned materials is unknown (EC 2010). In terms of the size and value of these key markets, US and Canadian exports of bovine semen are worth $124m and CAN$75m respectively. A 2008 USDA report indicates that 'the largest U.S. export in livestock genetics is bovine semen' suggesting that the market value of international trade in livestock genetics as a whole is relatively small (FAS, 2008).

A6.2.4.2 EU beef imports

The EU is a major net importer of beef and veal, and its imports of beef are forecast to increase to 2020, with a resulting net trade imbalance of minus 500,000 tonnes in this year (Table A8.8). In 2010, approximately 200,000 tonnes of bovine meat including fresh, frozen and chilled products were imported into the EU from partner countries, worth just under €3 billion. More than 95 per cent of these imports came from eight partner countries, and imports from Argentina, Brazil and Uruguay alone represented more than 75 per cent of the total trade volume in 2010 (Figure A6.1).

Figure A6.1 Top 3 partners for EU bovine product imports as a share of the total trade volume, 2008-10



Source: Eurostat, data extracted on 03/11/11, supporting data available in Table A8.5

In recent years, Paraguay, Botswana, Namibia and the US experienced year-on-year growth in exports of bovine products to the EU, and by 2010 these four countries together accounted for 19 per cent of total trade, up from a 2006 share of three per cent (Table A8.5). If this trend continues, it could lead to a greater diversification of sources of bovine products imported into the EU in the near future.

EU beef and veal imports are forecast to increase to over 636,000 tonnes of carcass weight (cwe) by 2020 up from OECD-FAO (2011) estimated 2010 levels of 413,000 tonnes. Globally, the EU is the third largest importer of beef and veal behind Russia and Japan (see Table A8.2). In 2012, the USDA forecasts EU imports of beef to be limited by elevated 'South American prices, traceability restrictions on Brazilian supplies, exchange rates and weak demand' (USDA, 2011: 5).

A6.2.4.3 EU dairy products import

The EU is a major consumer of dairy products, but only a small share of local demand is met through international trade (Dairy Australia 2012). The EU is a net exporter for dairy products. As with the US however, the EU still imports considerable quantities of cheese from third countries and, to a lesser extent, butter. These two product groups accounted for almost 90 per cent of the total €3 billion value of EU dairy imports from 2006-2011 (see Table A8.1 below).

The vast majority of EU cheese imports were of Swiss origin. In fact, from 2006-2011 over half of all EU imports of cheese were purchased from Switzerland, representing 70 per cent of the total value of EU cheese imports (€1.79 billion). In this period, a further 150 kT tonnes of cheese, worth €348 million were shipped to the EU from New Zealand (see Table A8.9). In the same period, New Zealand was also the source of 88 per cent of all EU butter imports (Table A8.10), at the average annual cost of €110 million from 2006-2011.

Not all dairy products that enter the EU are consumed there. Under special import arrangements dairy products can enter the EU for further processing and re-export. In practice this system is only used for the export of cheese (EC, 2006).

A6.2.5 Traceability

The EU introduced the TRAde Control and Expert System (TRACES) in April 2004 to enable the traceability of animals across borders. TRACES is a system to manage animal movements and prevent the spread of animal diseases including a central database for tracking the movement of

animals both within the EU and from third countries. All bovine animals are individually tracked through TRACES. Details on the EU bovine animal traceability system are provided in A8.1.5.

A6.2.5.1 Traceability in third countries (EU competitors/trade partners)

In Australia (National Livestock Identification System), Uruguay (System of the Direccion de Controlar de Semovients) and Japan, individual traceability systems are implemented nationally, using mostly RFID and central databases (Brester et al 2011; Schroeder and Tonsor 2011). In Brazil, animals destined for export are individually identified through the System of Identification and Certification of Origin for Bovine and Buffalo. In Argentina, an animal traceability system was launched in 2007 and is expected to be fully implemented in 2017. New Zealand is unable to consistently and accurately trace animals from their place of birth through the production system. In the United States a new animal identification system will apply from 2013 to animals crossing state lines (the previous National Animal Identification System was voluntary and not very broadly implemented).

Table A6.1 provides an overview of major meat exporters and importers and the beef identification and traceability systems in place for each. Most of these countries have adopted animal traceability systems which enable individual cattle identification, movement tracking and tracing to the holding of origin. Motivations to implement such systems were mainly animal health management, export market access, food safety assurances and producer profitability (Schroeder and Tonsor, 2011). The United States is the only major exporter which cannot provide the consumer with such information.

Table A6.1 Summary of cattle traceability systems in third countries as of June 2011

Country	Launch date	Mandatory	National Individual Animal ID	Trace to Origin	Animal Movement Tracking	Animal Age Verification	Motivation
Major exporters							
Brazil	2002	For export animals, unclear for rest	Yes	Yes	Yes	Yes	Control FMD and Market access to EU
Australia	1999 mandate 2005	Yes	Yes	Yes	Yes	Tag issue Date	Market access, food safety, animal disease
United States	2013	Cattle crossing state lines only	No	No	No	No	Control diseases for animals crossing states
New Zealand	2006	Yes begin in 2011	Yes	Yes	Yes	Yes	Market access and animal health (TB)
Canada	2002	Yes	Yes	Yes	Yes	Voluntary	Market access accelerate with BSE
Argentina	2007	Yes for young animals	Yes	Yes	Yes	Yes	Control FMD and market access
Uruguay	2006 mandatory	Yes	Yes	Yes	Yes	Yes	Control FMD and market access

Prepared by GHK, adapted from Schroeder and Tonsor (2011)

A6.3 Baseline – Porcine animals

A6.3.1 Cloning activity

Consultations undertaken with stakeholders in the EU pig breeding sector suggest that no commercial cloning activity is currently being undertaken for pigs in the EU. Consultation with the US cloning industry suggests that there is some commercial cloning for pigs in that country and that it is becoming more common. It may also be undertaken in New Zealand and China based on the presence of pig cloning companies in these countries.

A6.3.1.1 Size and structure of industry

The JRC study (2007) found that of the 35 companies undertaking cloning activity worldwide, five of these applied cloning technology to pig livestock. Only one of these five companies is represented in the EU. The remaining four companies are represented in the US (two companies), China and New Zealand.

A6.3.1.2 EU

PIC provides a variety of genetic improvement services to the pig industry; it does not specialise in cloning activities and is not known to undertake any such activities in the EU.

Table A6.1 Identified pig cloning companies in the EU and their main offices

Company Name	Head Office	Europe Offices	Revenue	Presence in key third countries
PIC	US	UK	1997: $358m	Canada

Source: Cloning company websites. The industry dynamics in this sector are rapidly changing and this table should not be considered either definitive or fully up to date.

A6.3.1.3 Third countries

The main offices and size of the five companies known to conduct commercial cloning on pigs in third countries are highlighted in the table below.

Table A6.1 Identified pig cloning companies in third countries and their main offices

Company Name	Livestock	Head Office	Europe Offices	# Employees	Revenue
Celentis	Livestock	NZ		Celentis: 50-100 AgResearch: 780	Celentis: $10-$25m AgResearch: 157.7m
Minitube (Intl Centre for Biotechnology)	Cattle, pigs	US		400+	US: $10-$25m
PIC	Pigs	US	UK		1997: $358m
ViaGen	Pigs	US		50-100	$1-$15m
Yangling Keyuan cloning co.	Livestock	China		50+	2-3m (RMB)

Source: Cloning company websites. The industry dynamics in this sector are rapidly changing and this table should not be considered either definitive or fully up to date

A6.3.1.4 Cloning projected activity to 2020

The use of AI is becoming more commonplace in commercial pig production but there is a relatively low supply of semen from high-merit boars because semen from pigs cannot be diluted to the same extent as cattle semen (Suk et al 2007). Consequently, boars in a commercial AI stud farm may be from the top 10–20 per cent of the breeding population, as compared to the top one per cent or better

possible through cloning. Calculations by Suk et al indicate that cloning offers a good potential return on investment to pig producers.

A6.3.2 Breeding profile

A6.3.2.1 Breeding structure

Pig breeding programmes can be separated into two parts based on the methods of genetic selection employed. In the non-organised sector genetic selection is managed within each herd by associations or cooperative companies in which pig farmers are involved. Breeding animals are selected from grown pigs (gilts), or boars are purchased and used for natural service. In the more organised sector, specialised breeding animals are produced by companies that apply a thorough selection scheme based on a three-tier pyramidal structure (Figure A8.1). At the peak of the pyramid are the *nucleus* breeding herds that conduct specific mating or crossbreeding for the production of large numbers of females. These females are subsequently sold to *commercial producers* for *piglet production* and *finishing* to produce market pigs that are sent to slaughterhouses to produce pork for human consumption. The tiers of the pyramid may be vertically integrated, or they may be separate, for example separate operations for piglet production and finishing, piglet production with own multiplication, multiplication with a nucleus models, etc.

The nucleus herds conduct breeding and selection for the genetic improvement of specific breeds or lines. The objective of the pig breeding industry is the genetic improvement of animals to meet the demands of customers, pork producers and processors. These demands may include, for example, animal welfare concerns, efficient conversion of feed to weight gain and uniformity of size. This process involves the dissemination of genetic changes from the nucleus breeding farms down to the multiplier and commercial farms. This process takes time and there is typically a lag of 3 – 5 years to disseminate genetic variations from nucleus to commercial herds. The genetic lag can be minimised by increasing the transfer between genetic levels, for example though the use of artificial insemination (AI).

A6.3.2.2 Organisations involved in pig production

Pig breeding used to be dominated by herd books and breed societies but pig breeding companies are playing an increasingly important role. Herd books have been traditionally used by organisations to keep a record of the genetic pedigree of livestock animals. They are typically maintained by co-operative organisations with the objective of improving the genetic quality of livestock animals over time.

Breeding societies maintain the herd book and breed characteristics of specific breeds or a number of breeds. They define the breed characteristics and maintain pedigree records and the rules of entry of animals into the herd book, playing an important role in genetic improvement through national improvement programmes in their respective countries.

Pig breeding companies are increasingly involved in the production and maintenance of specific genetic lines. In addition to supplying breeding animals, breeding companies also provide a range of services from breeding and multiplication to production.

Pig livestock genetics companies

Pig Improvement Company (PIC), UK, markets approximately two million breeding animals with a volume of sales approaching US $400million a year. PIC is the world's largest pig breeding company, and has substantial market share in North America and Europe. The company is represented in around thirty countries and has more than 1,500 employees. PIC owns nine pure-bred pig lines which it develops in its two nucleus herds, located in the US and Canada. These animals are crossed and then multiplied in around 170 predominantly sub-contracted multiplication units located around the world. Each year 1.6 million breeding sows are sold, raised on some 40 farms (Genus, 2012).

Hypor, the world's second largest pig breeding company, is a subsidiary of Nutreco, based in the Netherlands, which is Europe's largest animal compound feed producer. Hypor forms one part of Nutreco's breeding subsidiary, Hendrix Genetics. Total turnover of Hypor is approximately €35 million. Hypor has around 250 employees and is strongly represented in Canada, Spain and Belgium, with a market share between 20 and 24%. It also holds substantial market share in the Netherlands, Italy, Germany, Poland, Japan, Mexico and the

Philippines (Hypor, 2012).

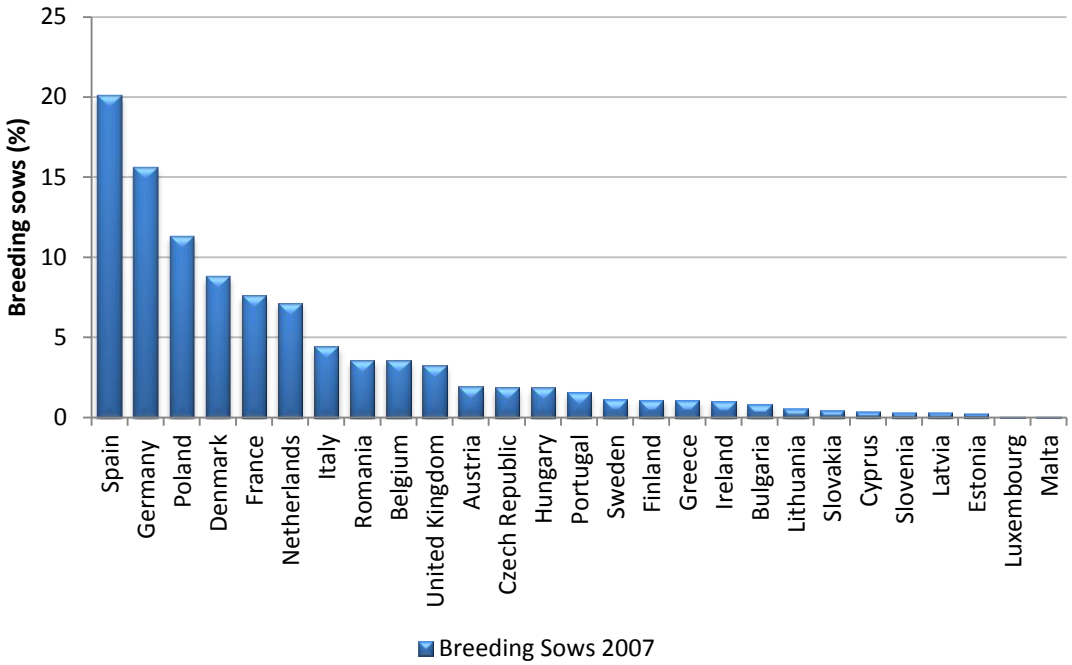
The Dutch cooperative **Topigs** is globally the third largest pig breeding organization, producing almost 850,000 gilts per year. Topigs is a subsidiary of the Pigture Group Pig Breeders Co-operative which is owned by 3,000 pig farmers in the Netherlands. Pigture Group Pig Breeders Co-operative owns 77.5% of Topigs; Vion Food Group, Europe's largest fresh-meat processor, owns 22.5%. Pigture Group has around 400 employees and a turnover of €103 million. In the Netherlands, Topigs has a market share of over 80%, and with a line well suited for Parma ham, it leads the Italian market. In 2006 it opened nucleus farms in Russia and Croatia. Production and distribution of the breeding material is based on a franchise system (Topigs, 2012).

While national breeding programmes are still important in many European countries, over the past decade there has been a consolidation of the pig breeding industry (Dekkers et al 2011). The number of breeders has declined while the total number of breeding pigs remained relatively stable, with the result that larger pig breeding companies have acquired larger market share. Table A8.1 provides estimates of the relative market share of the main breeding companies and breed societies. It shows the importance of breeding companies in Europe, followed by those in North America, and the diminished role of breed societies and herd book organisations.

A6.3.3 Geographic distribution of pig production

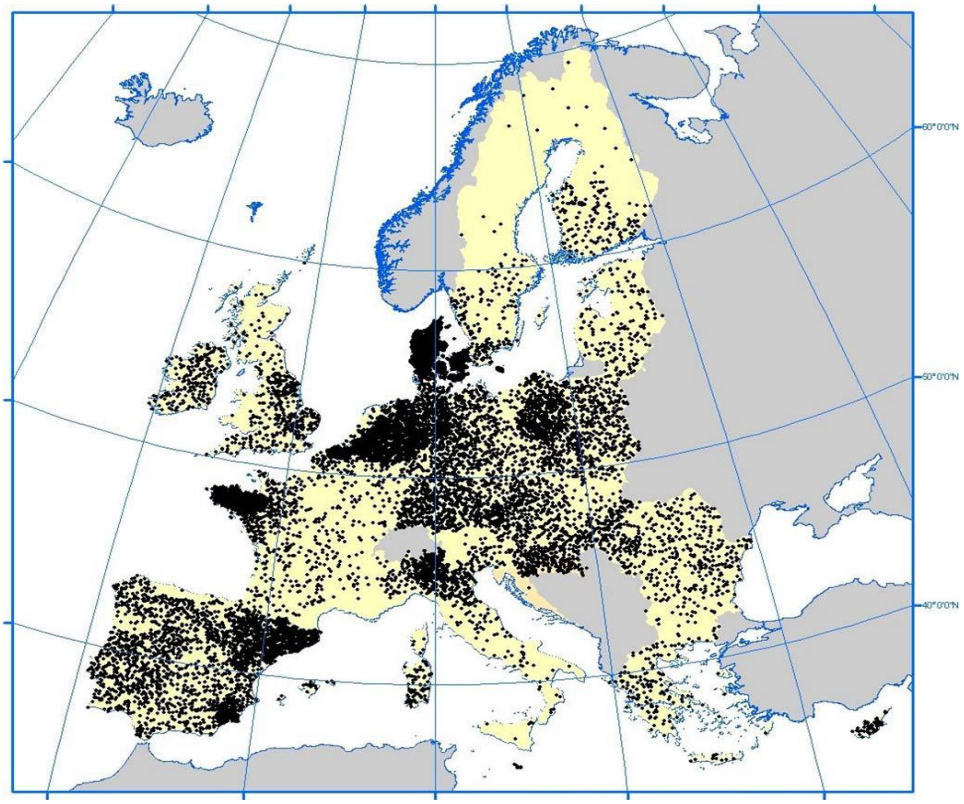
More than two thirds of the breeding pigs produced in Europe are produced by six countries: Denmark, Germany, Spain, France, the Netherlands and Poland (Figure A6.1). Within these countries, there is a significant concentration of pigs in certain regions. Half of all breeding pigs in Europe are concentrated in 11 (NUTS1) regions (all of which are located in these six countries). Figure A6.2 displays the major zones of pig production in Europe. The most important regions, extending from Denmark to Flanders (Belgium), account for 30 per cent of all sows produced in the EU. Other important regions include Catalonia (Spain), Murcia (Spain), Lombardy (Italy), Brittany (France) and some areas of central Poland.

Figure A6.1 Pig production and breeding in Europe is concentrated in six countries: Spain, Germany, Poland, Denmark, France and the Netherlands



Source: Eurostat (2012)

Figure A6.2 Number of sows by region (2008)

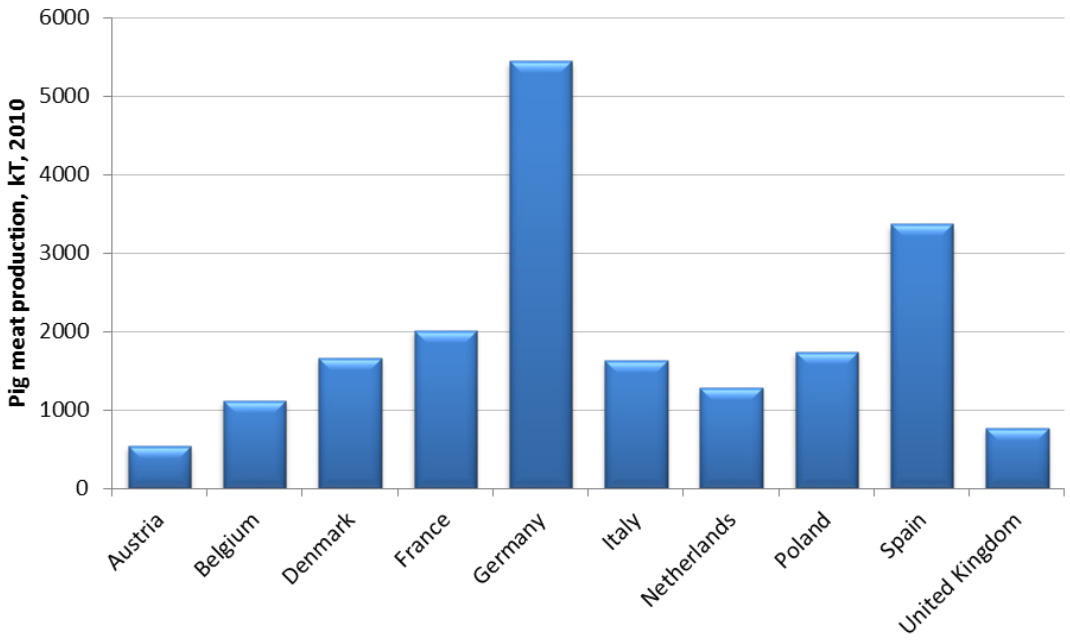


Source: Eurostat 1 dot = 1000 sows, http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-SF-10-008/EN/KS-SF-10-008-EN.PDF

A6.3.3.2 Geographical distribution of pig meat production

The EU produced more than 22 million tonnes of pig meat in 2010, of which almost half came from just three countries: Germany, Spain and France. The top ten producer countries account for 89 per cent of total pig meat production (Figure A6.1). The overall distribution of pig meat production across the Member States has been relatively static over time: the ten main pig meat producers in 2010 were also the same as those in 2004. This constancy notwithstanding, the concentration of pig meat production in Germany has intensified over this period with production increasing by over a million tonnes from 2004 to 2011.

Figure A6.1 Germany, Spain and France account for almost half of all EU pig meat production



Source: Eurostat (2012), supporting data provided in Table A8.5

A6.3.3.3 EU porcine imports

The EU is self-sufficient in pig meat and consequently imports relatively little (c. 30 to 40 kT per year), representing less than one per cent of global imports. In 2011, the EU imported just 14kT of pig meat and offal at a total value of €61 million of pig meat and pig offal (Table A8.3). While 99.9 per cent of pig offal was imported from Switzerland, over 80 per cent of imported pig meat came from the US and Chile (see Table A8.4).

The US and Canada are dominant in the markets for genetic materials of porcine animals, accounting for over 99 per cent of the 245 units of porcine semen imported by the EU (Table A8.12). In 2011, all of the 845 live pigs imported into the EU were sourced from Canada (Table A8.16).

A6.3.4 Traceability

Council Directives 2008/71/EC and 2000/678/EC contain rules governing the identification and registration of porcine animals. Porcine animals are the only animal species under consideration in this study that does not have individual animal traceability in place in the EU. Details on the EU porcine animal traceability system are provided in A8.1.5.

A6.3.4.1 Cost of a traceability system in the pig industry

Tracing porcine animals through slaughter and processing is very complex, since each carcass may be broken into hundreds of items through several different production lines. Hams, loins and wieners may each be manufactured at different plants. Both the pathway and the technology are complicated in a high speed and often-dirty environment. A Canadian study estimated that in the Canadian pork industry, the cost to a high-speed slaughter plant of introducing full traceability could be as high as $15 million dollars with a further $4 million development costs, resulting in a $4.50 extra cost per carcass (Webb, 2003).

A6.3.4.2 Cost of a DNA traceability system in the pig industry (Maple Leaf system)

Maple leaf Foods in Canada uses mitochondrial SNP technologies to identify pigs. In this system, reference samples are taken from the parent stock and then stored in a computer database. The test samples are analysed and the resultant genotypes are compared to those in the database in order to identify the parent of the individual from which the test sample originates. DNA tracking can link meat back to the farm of origin, bypassing the expensive step of tracking through the plant (Webb, 2003).

In 2003, the cost of DNA typing a single mother or meat sample was expected to be around $35.00. If a sow produces 50 market pigs in her lifetime, the cost is around 70 cents per carcass. Allowing for collection and overheads, the total cost is less than $1.00 per carcass. If gilts are typed on entry to the herd, their first progeny will be slaughtered more than eight months later. In view of the long lead-time, large batches of blood samples can be accumulated to take advantage of economies of scale for DNA typing (Webb, 2003).

The largest cost comes at the start of the scheme when the existing sow population is DNA typed for the first time. After that, only herd replacements are typed, so annual testing costs fall to around 40 per cent of the start-up cost. For example it would cost around $40 million to type all the 1.2 million sows in Canada, but the annual cost thereafter would be only $16 million. Typing all of the AI boars in Canada may reduce the number of SNPs required to discriminate among dams, and therefore lower the total overall cost. A 2003 study projected that within five years the cost of high speed SNP typing was expected to come down to around $10.00 per dam, or around 20 cents per carcass (Webb, 2003).

A6.4 Baseline – Ovine and caprine animals

A6.4.1 Cloning activity

A6.4.1.1 EU

Consultation with industry stakeholders in the EU and a survey undertaken by DG SANCO of Member State Competent Authorities indicate that there is no commercial livestock cloning activity currently being conducted in the EU for ovine or caprine animals.

A6.4.1.2 Third countries

Consultation with industry stakeholders in the EU and a survey undertaken by DG SANCO of third country Competent Authorities indicate that there is limited or no commercial livestock cloning activity currently being conducted outside the EU for ovine or caprine animals. Some commercial cloning of these animals is ongoing in the US, but to a very limited extent. Argentina is the only other country for which commercial cloning on ovine animals was reported, but this has not be verified.

A6.4.1.3 Cloning projected activity to 2020

Furthermore, consultations with industry suggest that the projected commercial cloning activity for ovine and caprine animals in the EU is likely to be limited or non-existent. This is due to the high costs of cloning and the low margins on ovine and caprine animal production, coupled with what is considered by industry to be high consumer opposition to the use of the technique for food production.

A6.4.2 Domestic production

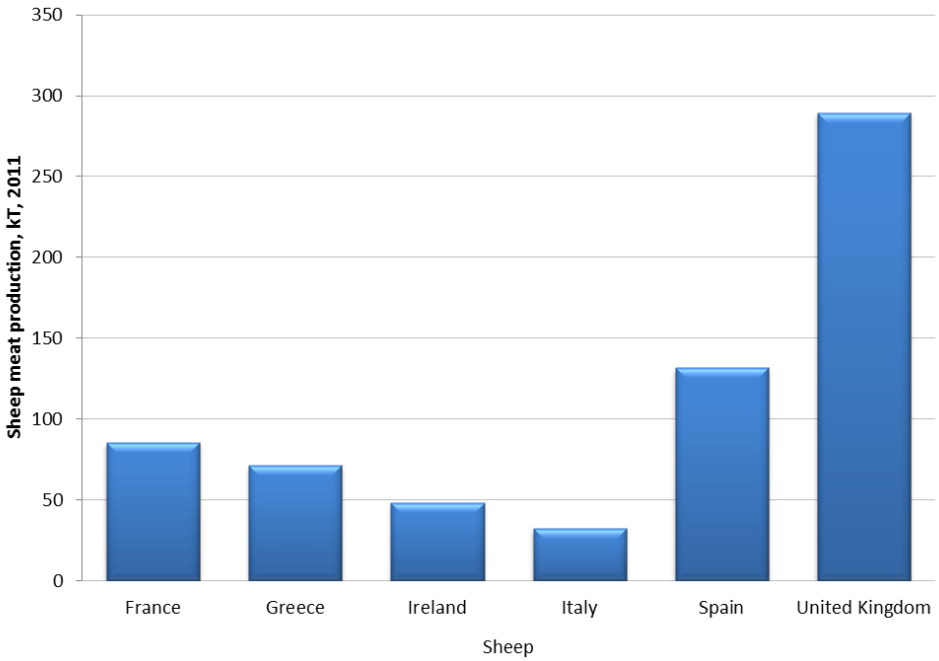
A6.4.2.1 Overview of ovine and caprine meat production in the EU

Since 2008, the overall pattern of gross indigenous production (GIP) of red meat in the EU as a whole has remained relatively consistent at between 31 and 32 million tonnes annually. Of this total volume, ovine and caprine meat production accounts for less than three per cent (see Table A8.1). In 2010, just one per cent of sheep meat produced in the EU was exported to third countries (see Table A8.2).

A6.4.2.2 Geographical distribution of sheep and goat meat production

Sheep and goat meat production is highly concentrated in the EU. In 2010, 725 thousand tonnes of sheep meat was produced in the EU, of which more than 90 per cent came from six countries (the UK, Spain, France, Greece, Ireland and Italy). Almost 40 per cent came from the UK alone. The pattern of domestic Member State sheep production in 2010 is almost identical in each of the preceding years from 2004 to 2009 with the largest volumes of production concentrated in the same six Member States.

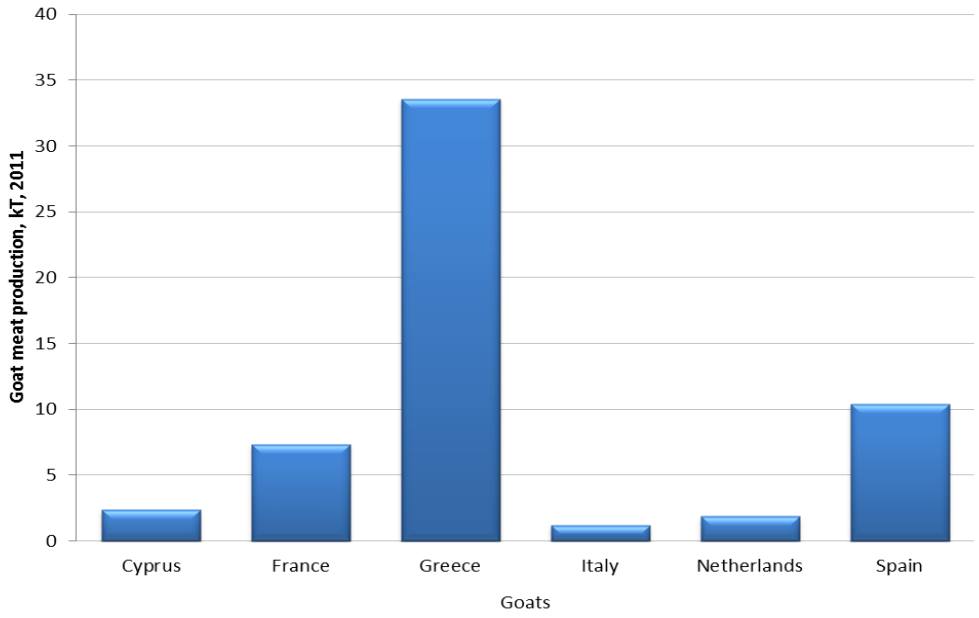
Figure A6.1 The UK is the main producer of sheep meat in the EU, accounting for 39 per cent of total EU sheep production in 2011



Source: Eurostat (2012), supporting data provided in Table A8.3

In 2011, Greece alone accounted for 57 per cent of the 58,845 tonnes of goat meat produced in the EU. Spain and France produced a further 30 per cent of total EU goat meat production in 2011.

Figure A6.2 Greece was responsible for more than half of the 59 kilotonnes of goat meat produced in the EU in 2011



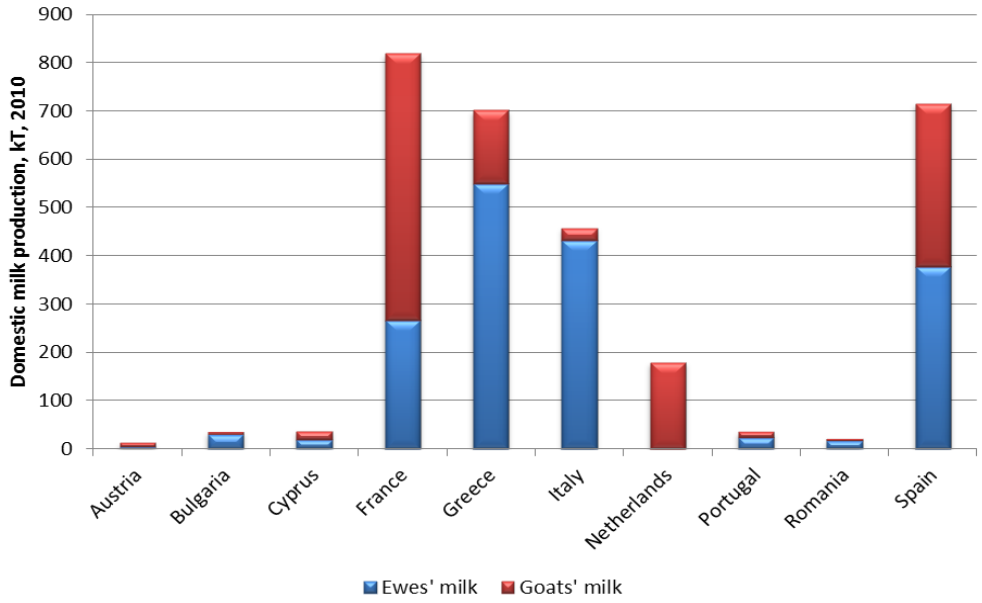
Source: Eurostat (2012), supporting data provided in Table A8.3

A6.4.2.3 Overview of sheep and goat dairy production in the EU

The main EU producers of milk from ewes and goats, in order of total volume of production, include: France, Spain, Greece and Italy (Figure A6.1). Together these four MS produced accounted for more than 90 per cent of EU sheep and goat milk production in 2010. These volumes are very small

compared to those of cow's milk (sheep and goat milk together represent no more than 2.1 per cent of the total EU milk production). Greece is the only Member State in which dairy cows are not the major source of milk production.

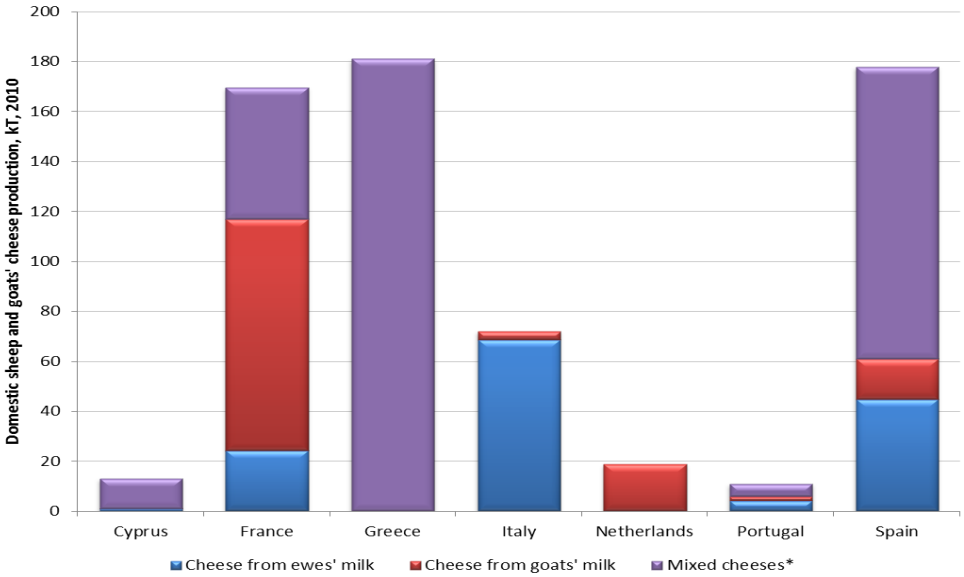
Figure A6.1 France, Spain, Greece and Italy are the four main producers of sheep and goat milk in the EU



Source: Eurostat (2012)

Sheep and goat cheese is also produced in the EU. The four main domestic goat and sheep cheese producers in the EU are France, Italy, Spain and the Netherlands.[3] The volume of sheep and goat cheese produced in the EU is similar to that of milk, representing approximately eight per cent of the total volume of cheese produced.

Figure A6.2 The main EU producers of sheep and goat cheese are based in France, Italy, Spain and the Netherlands



** Mixed cheeses are derived from a mixture of cows', ewes' and goats' milk at ratios dependent on the individual cheese product and its production process. Source: Eurostat (2012)*

[3] Excluding Germany for which there is missing data

A6.4.2.4 EU ovine and caprine imports

In each year from 2006-2011, EU imports of sheep meat of approximately 200,000 tonnes were valued at just over €1 billion (Table A8.2). Of the total volume imported into the EU over this period, 85 per cent of total sheep meat imported was supplied by New Zealand at an average of 178 kT each year. A further eight per cent of EU sheep meat imports were sourced from Australia (Table A8.6). Though these figures are relatively low, it is notable that the volume of imported sheep meat is equivalent to over a quarter of domestic EU production (see Table A8.2).

The US and Canada are dominant in the markets for genetic materials of ovine and caprine animals, representing 82 per cent of the 1,441 units ovine and caprine semen imported in 2011 (Table A8.13). A small number of sheep (29) and goats (11) were imported into the EU in 2011; the majority came from New Zealand (five goats came from Croatia) (Table A8.17 and Table A8.18).

A6.4.3 Traceability

Regulation EC/21/2004 contains rules governing the identification and registration of both ovine and caprine animals. All ovine and caprine animals must be individually identified in the EU. Details on the EU ovine and caprine animal traceability system are provided in section A8.3.3.

A6.5 Baseline – Equine animals

A6.5.1 Cloning activity

Use of the cloning technique is advanced for sport horses, although no cloning for food production is known to occur anywhere in the world. This is primarily due to the very high cost of cloning horses—some reports indicate that the price to have a horse cloned is approximately $400,000, plus a patent royalty fee of 15 per cent based on the number of clones produced and their estimated value (MNT 2005). Argentinian auction prices from 2010 show a clone was sold for $800,000 (£490,000).

A6.5.1.1 EU

Consultation with industry stakeholders in the EU and a survey undertaken by DG SANCO of Member State Competent Authorities indicate that there is no commercial livestock cloning activity currently being conducted in the EU for equine animals for food production.

There is one commercial cloning company focused on sport horses in France and consultation with stakeholders suggest there may be commercial equine cloning in Italy as well, although this has not been confirmed. In France, the company Cryozootech produces and markets horse clones and their offspring and saves equine genes on behalf of horse owners.

Cryozootech has produced 20 cloned sport horses to date. Fresh and frozen clone semen can be purchased for approximately €450-700 per dose; it takes several doses to produce an offspring (Interview with Cryozootech and company website: www.cryozootech.com). Two of the clones have begun to perform as stallions: one Arab horse for the endurance market and one stud horse for the jumping market. The Arab has produced 25 offspring and the stud has produced 6-7 offspring. One descendant of a foal was born in 2012 (Cryozootech interview).

A6.5.1.2 Third countries

Consultation with industry stakeholders in the EU and a survey undertaken by DG SANCO of third country Competent Authorities indicate that there is no commercial livestock cloning activity currently being conducted outside the EU for equine animals. Sport cloning is being undertaken in North and South America. The first cloned horse in Latin America was produced by Bio Sidus in 2010. By 2015, cloned foals are expected to be ready for competition in Argentina (Carroll 2011). Companies are producing cloned sport horses in the United States (ViaGen), Brazil and South Korea.

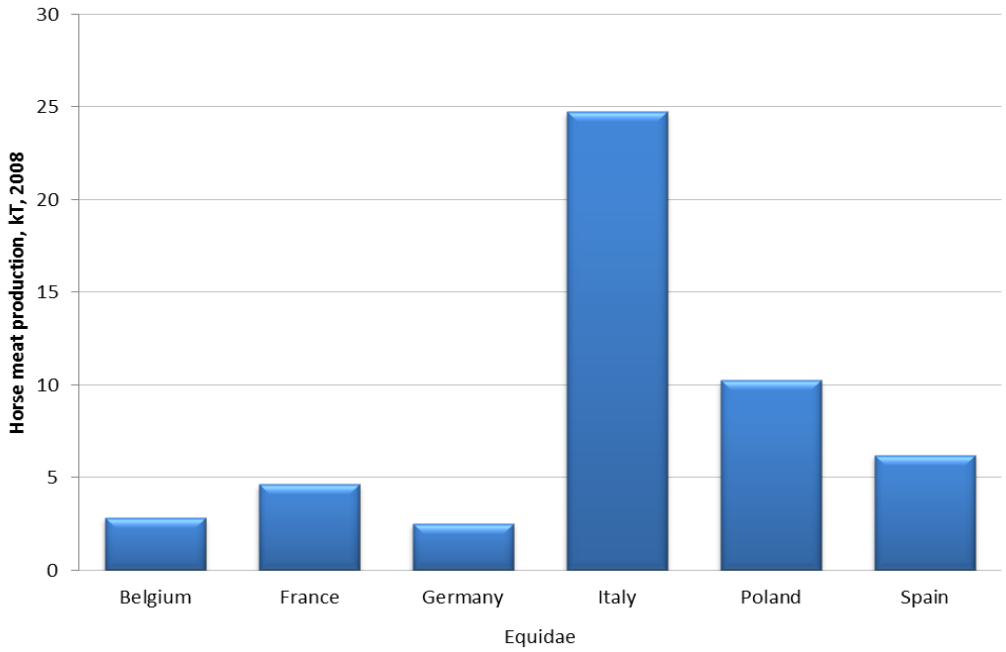
A6.5.1.3 Cloning projected activity to 2020

Use of the cloning technique for sport horses is expected to remain low, producing small numbers of cloned animals due to the high cost of producing the clones (Cryozootech interview). The technique will only be used in special cases when a horse has an exceptionally high value and is unable to reproduce (e.g. due to sterility or castration).

A6.5.2 Domestic production

The production of meat from equidae is particularly concentrated in the EU. In 2008, Italy accounted for 46 per cent of the 50,000 tonnes of horse meat produced for human consumption in the EU25.[4]

Figure A1.2 Italy is the main producer of horse meat in the EU, responsible for nearly half of total horse meat production in 2008



Source: Eurostat (2012), supporting data available in Table A8.1

A6.5.2.1 EU equine imports

In 2011 the EU imported 28,000 tonnes of horse meat, valued at €94 million. The volume of imported horse meat is equivalent to over half of domestic EU production (Table A8.2). From 2006-2011, the EU imported a total of €592 million of horse meat, 71 per cent of which was sourced from Latin America and a further 27 per cent from Canada and the US (Table A8.2 and Table A8.3).

The US alone is responsible for over 99 per cent of EU imports of equine semen, a market which appears to ebb and flow with peaks of over 175 and 260 thousand units in 2007 and 2011, respectively (Table A8.14). Trade in equine semen is however considered to be typically for the purposes of racing and other recreational purposes.

While the EU markets for live cattle, pigs, sheep and goats are relatively small, the EU market for live equine imports is however more substantial, with 10,766 equine animals being imported into the EU in 2011 (Table A8.19). This market is also extremely valuable with the cost of each horse on average estimated to be valued at approximately €10,000.[5] As with trade in equine semen, the import is above all for racing and other recreational purposes. Cloned horses are currently imported by Cryozootech, which are born in the US and imported as foals (Cryozootech interview). In the next five to ten years, cloned horses may also enter the EU from South America.

A6.5.3 Traceability

Commission regulation (EC) 504/2008 contains rules governing the identification and registration of equidae. All equine animals must be individually identifiable in the EU. Details on the EU equine animal traceability system are provided in section A8.4.2.

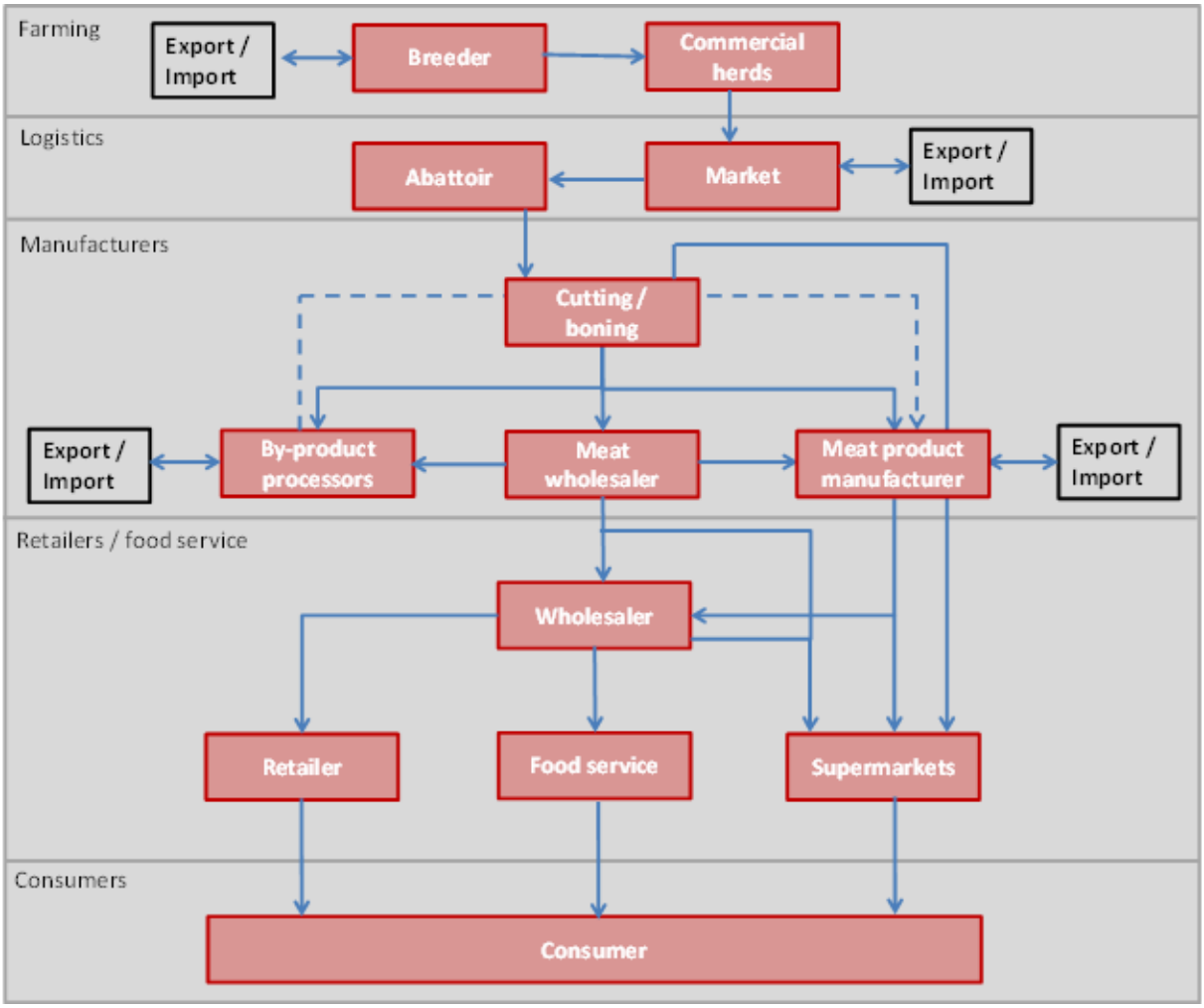
[4] Eurostat data for horse meat production is missing for Bulgaria and Romania

[5] This figure is arrived at by dividing the total value of EU imports of live equine from COMEXT (excluding Switzerland) by the number of equine imports recorded in the TRACES database.

Animals cloned for sport do not enter the food chain due to current rules under the Novel Foods Regulation. Offspring from clones may enter the food chain but are not known to have done so to date. The high cost and sentimental value of sport horses to their owners means they are not often slaughtered for food. A typical slaughter animal fetches approximately €400 versus a sport horse which may have cost half a million euro.

Annex 7 Description of stages in animal product supply chains: meat and dairy

Figure A7.1 Bovine animal supply chain



A7.1.2 Porcine animal value chain

Pork sold in retail outlets is the output of a long value chain involving multiple organisations performing a myriad of functions. The chain includes genetic suppliers and pig producers, slaughterhouses and processors, retail outlets, transport companies and feed suppliers. The extent of integration of the value chain varies; in some countries the partners in the supply chain work together to improve the competiveness of the pork industry (e.g. Spain), while in other countries this function is performed by individual companies (e.g. Denmark). In highly integrated value chains, breeding, production and processing are all conducted by one organisation. In less integrated value chains, individual breeders and breeding companies operate and interact with their partners separately. The pork value chain is underpinned by the quality of its breeding stock (Dekkers et al. 2011). The first link in the value chain is genetics as it is the mechanism by which quality breeding stock is translated into benefits for value chain partners.

Figure A1.3 Porcine animal supply chain

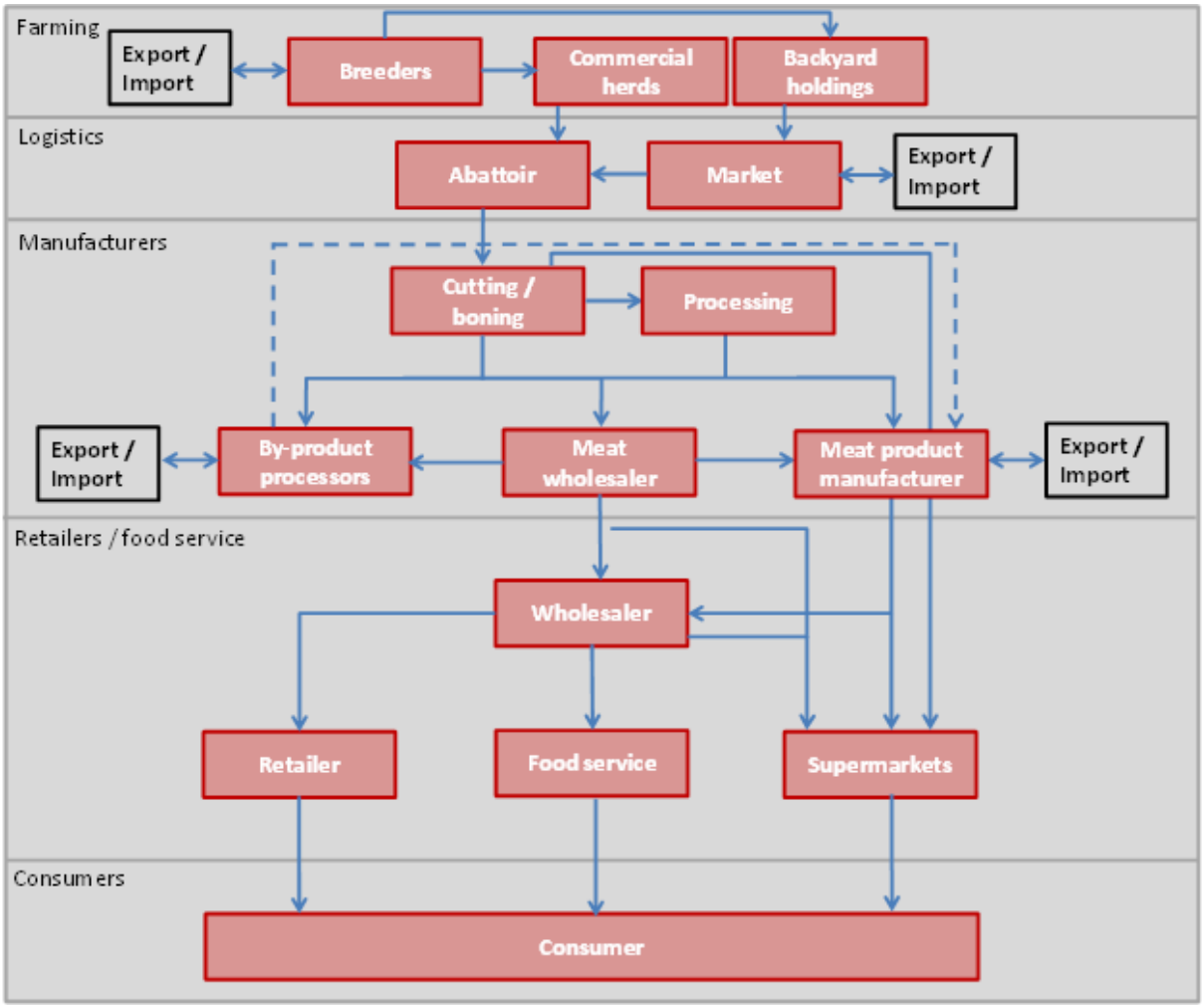


Figure A7.1 Ovine and Caprine animal supply chain

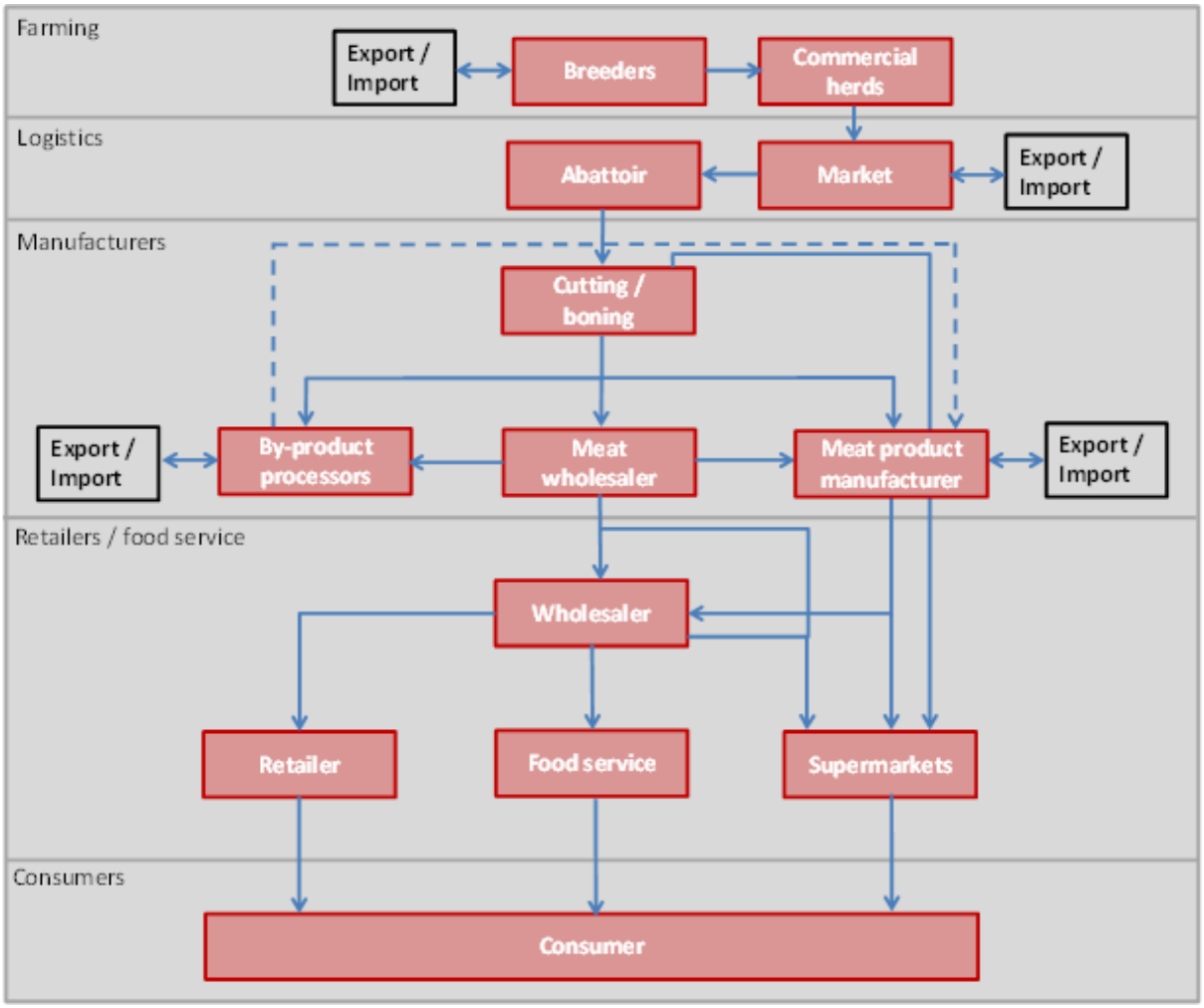


Table A7.2 Animal product supply chain: meat

FBO	Note
Breeders	Breeders supply animals, and reproductive material of animals, of high value / good genetic quality to commercial producers. These animals are used to propagate commercial animals for slaughter. Animals may be exported / imported at this point.
Commercial herds	Commercial herds supply animals for slaughter.
Backyard holdings	Backyard holdings typically contain a small number of animals. They are more common in easern
Logistics	
Markets	Animals are sold from commercial herds by farmers to meat dealers at animal markets. Herds / animals may be mixed together at this point. Animals may be exported / imported at this point.
Abattoirs	Animals are slaughtered at abattoirs. Carcasses may be cut into half carcases, quarters, or other large wholesale cuts.
Cutting / boning plants	Large wholesale cuts are sent to cutting / boning plants where bones are removed from primal cuts. Activities may include cutting, boning, trimming, slicing and dicing. Meat from different animals / sources may be mixed at this stage.
Processing	Conversion of pork into bacon.
Meat wholesaler	Meat wholesalers purchase cuts from cutting / boning plants and aggregate for sale to third parties.
By-product processors	By-products from abattoirs and cutting / boning plants are collected and processed for use in other products. Outputs of by-product processing include, for example; Non-food: ■ Tallow. ■ Paint. ■ Cosmetics. ■ Cleaners. ■ Polishes. ■ Glue. ■ Soap. ■ Ink. Food: ■ Meat & Bone Meal. ■ Gelatine. ■ Animal feed. Meat by-products, raw and processed, may be imported or exported.
Meat product manufacturers	Manufacturers of products containing meat. For example, meat pies, convenience foods, and pet food. Meat from different animals / sources may be mixed at this stage. Meat products may be imported or exported.

FBO	Note
Retailers	
Wholesalers	Purchase and aggregate food products for sale to third parties.
Retailers	Sell meat / meat products direct to consumers.
Food service	Caterers / restaurants selling hot / prepared food to consumers.
Supermarkets	Large retail organisations may by-pass wholesalers to purchase meat directly from cutting / boning plants, and meat products directly from the manufacturers. Supermarkets may also have supply arrangements with farmers / producers for the provision of specific herds / animals. These closed and controlled supply chains may utilise FBOs for the processing of carcasses and the delivery of meat / meat products.

Table A1.2 Animal product supply chain: dairy

FBO	Note
Commercial dairy farms	Produce liquid milk. May organise in cooperatives. Size of holdings likely to differ considerably between, and potentially within, Member States.
Logistics	
Bulk collection	Liquid milk is collected directly from farms in large tanks. Liquid milk from multiple dairy farms may be mixed together at this stage.
Manufacturers	
Milk purchasers	Milk purchaser organises the purchase of milk from dairy farms. May also be responsible for bulk collection of liquid milk.
Milk processors	Pasteurise liquid milk and process it into multiple products. For example: ■ Cheese. ■ Powders. ■ Condensed milk. ■ Milk. ■ Butter cream. ■ Cream. ■ Whey. Liquid milk from multiple dairy farms may be mixed together during processing.
Traders	Purchase processed dairy products from milk processors for supply to secondary dairy processors and dairy product factories. Dairy product traders may also import and export processed dairy products.
Dairy product factories	Manufacture dairy products for use in other food products. For example whey powder and butter. Both of these dairy products are found in a large number of food products.
Secondary dairy processors	Use processed dairy products to manufacture dairy products such as butter, ice-cream and milk surrogates (e.g. infant formula).
Food product manufacturers	Manufacture food products utilising processed dairy products. For example, baked goods, convenience meals and chocolate.

FBO	Note
	Food product manufactures may also import and export processed dairy products.
Retailers	
Wholesalers	Bulk purchase food products, dairy products, and secondary dairy products for supply to third parties.
Retailers	Sell dairy products / food containing processed dairy products direct to consumers.
Food service	Caterers / restaurants selling hot / prepared food to consumers.
Supermarkets	Large retail organisations may by-pass wholesalers to purchase liquid milk and dairy products directly from milk processors, food products direct from manufactures and secondary dairy products direct from processors. Supermarkets may also have supply arrangements with dairy farms for the provision of liquid milk. These closed and controlled supply chains may utilise FBOs for the collection and processing of liquid milk carcasses and the manufacture of dairy products.

Annex 8 Supplemental information

A8.1 Bovine animals

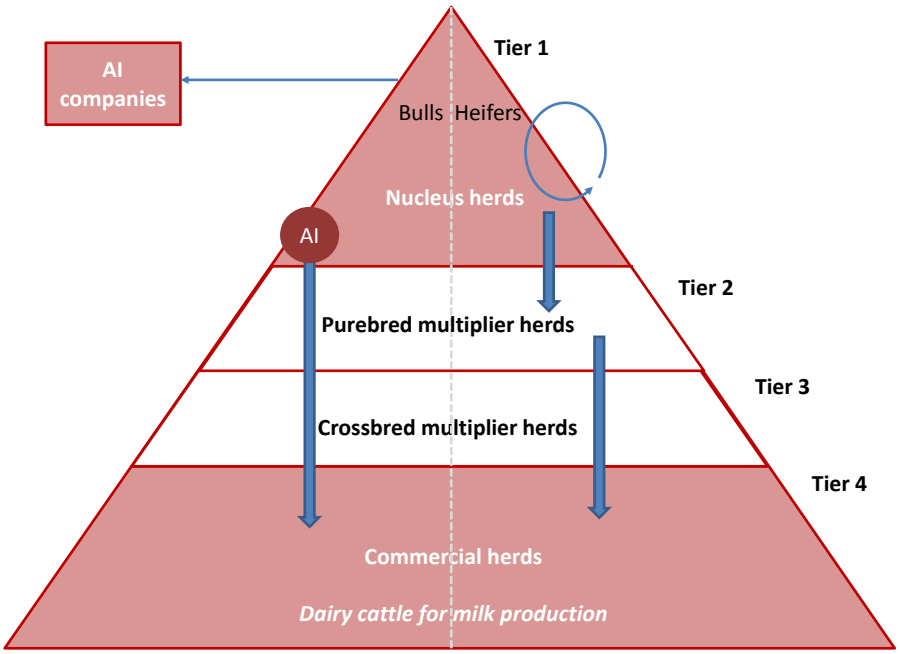
A8.1.1 Breeding profile

Table A8.1 There are small but important differences between the dairy and cattle breeding pyramid tiers

Tier	Dairy cattle	Beef cattle
1. Nucleus herds	■ Pedigree breeders selling young bulls to artificial insemination companies for progeny testing, or privately testing young bulls. ■ Pedigree breeders selling heifers to other breeders in this tier, or to tier 2.	■ Pedigree beef breeders selling bulls to other elite pedigree herds in tier 1. ■ Pedigree beef breeders selling bulls to purebred multiplier herds (tier 2).
2. Purebred multiplier herds	■ Pedigree or other breeders producing heifers for sale to commercial herds (tier 4).	■ Pedigree herds buying bulls from tier 1. ■ Pedigree herds selling bulls for crossing in commercial herds (tier 4).
3. Crossbred multiplier herds		■ Selling beef bulls from tier 2, or beef semen from tier 1 or 2, to dairy herds. ■ Buying beef x dairy heifers from dairy herds for suckler herds in tier 4. ■ Pure beef herds crossing to another beef breed, and selling crossbred heifers to suckler herds in tier 4.
4. Commercial herds	■ Purebred dairy herds using AI with semen from bulls in tier 1.	■ Crossbred suckler cow herds buying replacement females from tier 3 and bulls from tier 2.

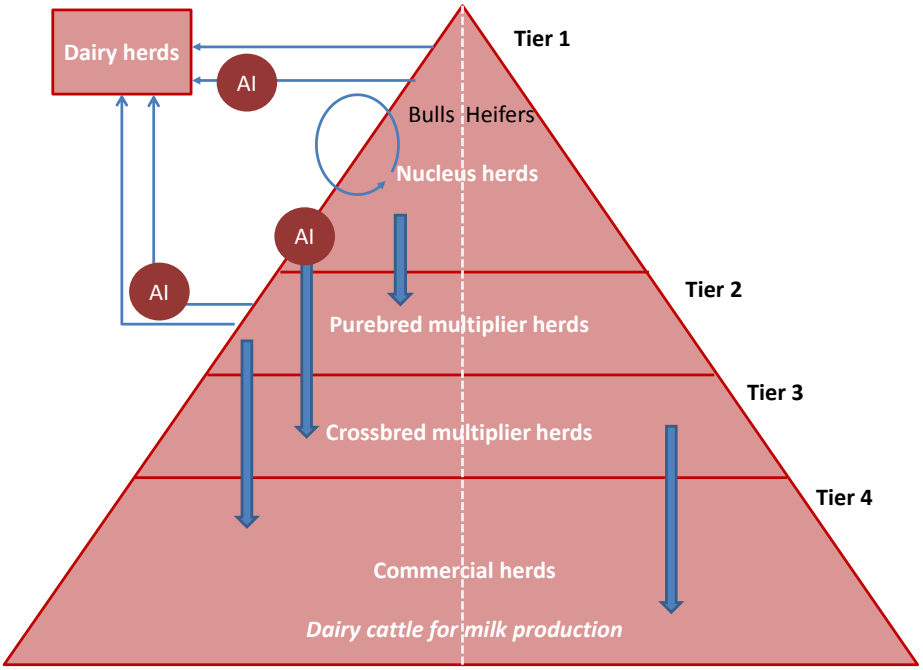
Source: adapted from Simm (1998)

Figure A8.1 AI has enabled the transfer of genetic traits directly from tier 1 to tier 4, bypassing the need for multiplier herds



Source: adapted from Simm (1998)

Figure A8.2 The beef cattle breeding pyramid relies less on AI than the dairy pyramid; multiplier herds remain important

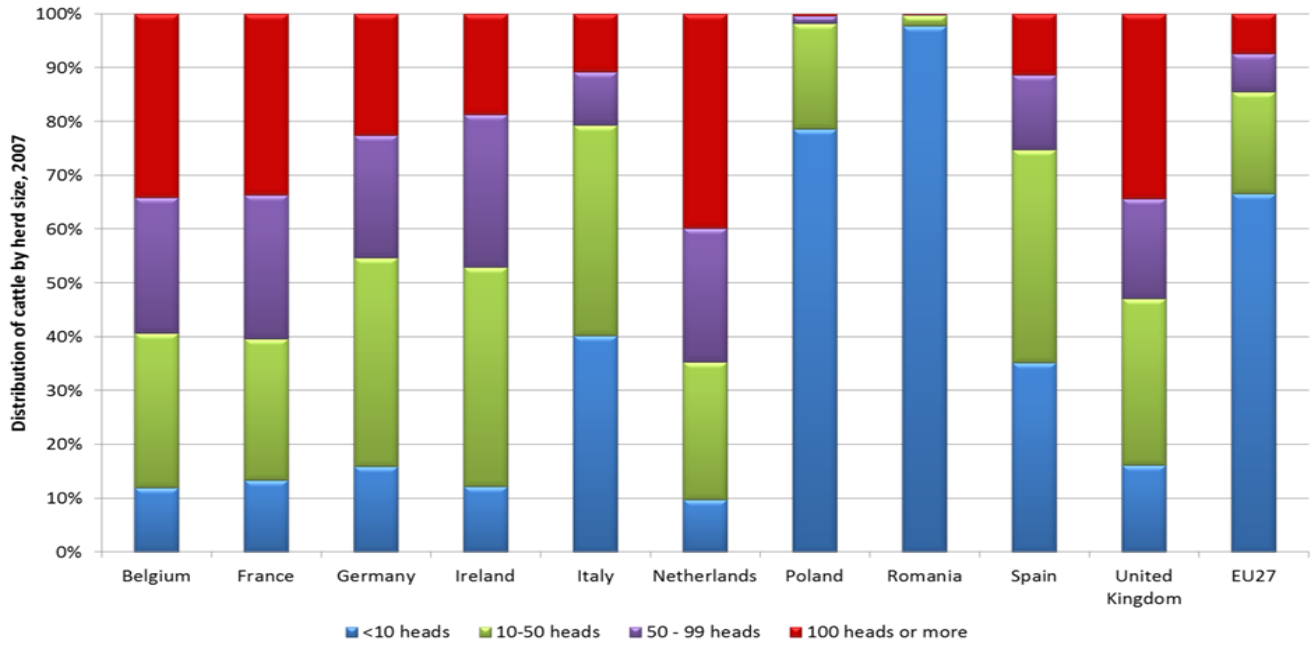


Source: adapted from Simm (1998)

A8.1.2 Distribution of cattle holdings

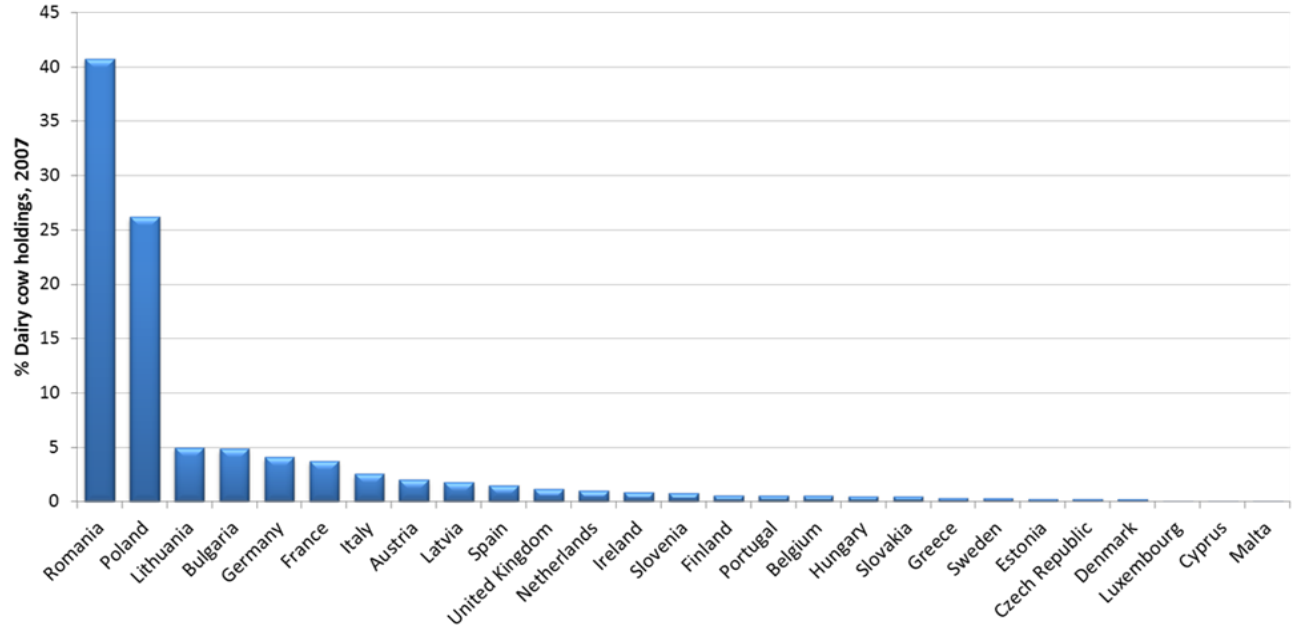
The distribution of cattle holdings follows a different pattern to the distribution of the cattle population. More than half of European cattle holdings are located in Romania and Poland (Figure A8.1). The majority of holdings in Poland and Romania are of between 1 – 9 heads (79 per cent and 98 per cent respectively). By comparison, a large proportion of the holdings in Germany and France are of 50 heads or more (45 per cent and 60 per cent, respectively). The distribution of dairy cow herds follows a similar pattern: there are a larger number of dairy cow holdings in central and eastern European countries, the majority of which are small holdings. In contrast, dairy cow holdings in Northern and Western Europe are typically fewer in number but larger in size.

Figure A8.1 Production tends to be dominated by larger holdings in Northern Europe while cattle farms in Southern and Eastern Member States tend to be smaller holdings



Source: Eurostat (2012)

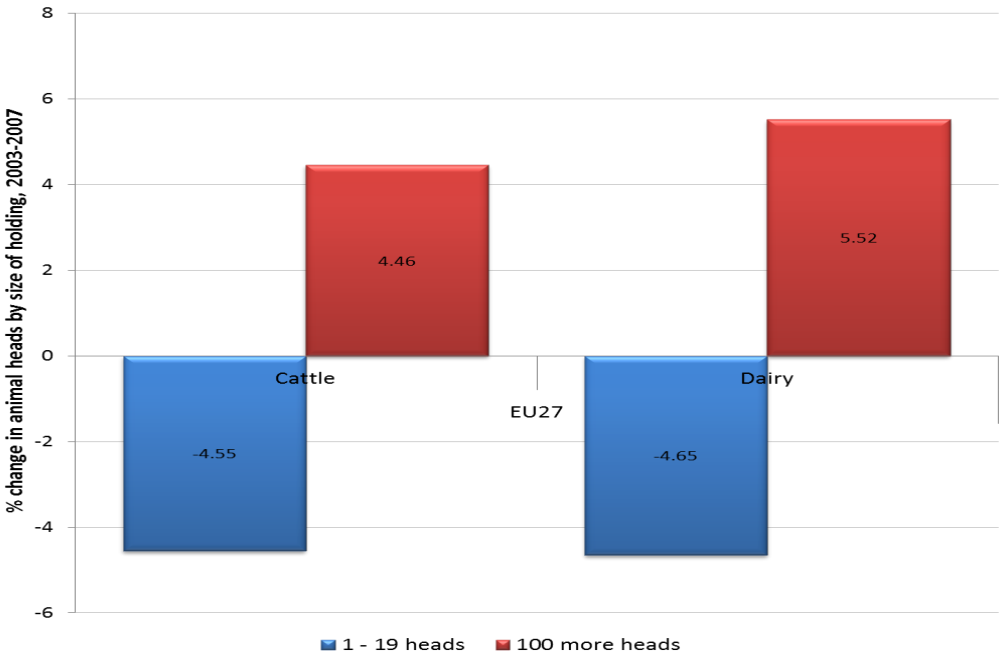
Figure A8.2 Distribution of dairy cow holdings in Member States, 2007



Source: Eurostat (2012)

Member States with the largest cattle and dairy cow populations represent the majority of holdings of over 100 heads in number. In contrast, in new Member States, the majority of cattle and dairy cows are kept on small holdings of nine animals or fewer. From 2003 to 2007 there was an overall decrease in the number of cattle heads and dairy cows by approximately 5.5 per cent (3.9 per cent and 7.9 per cent respectively). During the same period, there was a change in the number and size of holdings across the EU27: the proportion of animals held on small holdings decreased while the number of animals held on large holdings increased. This trend occurred across the EU27 (Figure A8.3).

Figure A8.3 Between 2003 to 2007 the number of animal heads on small holdings decreased while the number of animal heads on large holdings increased

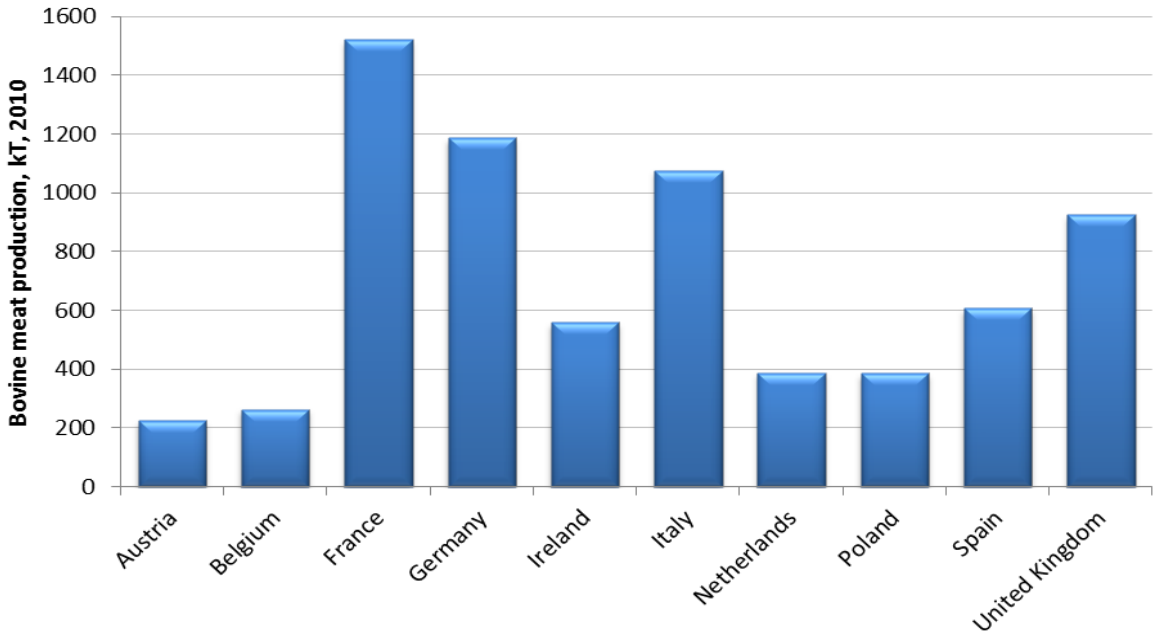


Source: Eurostat (2012), supporting data is available in Table A8.1

A8.1.3 Geographical distribution of beef and veal meat production

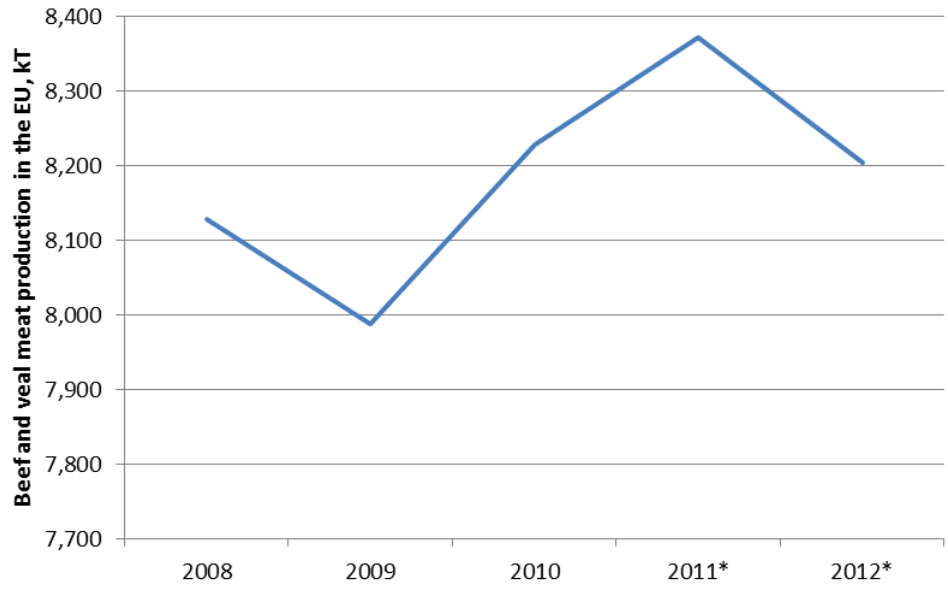
The EU produced 7,900 thousand tonnes (kT) of bovine meat for the purpose of food production in 2010. More than 59 per cent came from four countries (France, Germany, Italy and the UK). This balance of domestic EU production has changed little over time: the same four countries accounting for 57 per cent of bovine meat production in 2004. The volumes of beef production from the ten main EU producers accounting for 90 per cent of total beef production are shown in Figure A8.1.

Figure A8.1 Beef production in Europe is concentrated in four countries: France, Germany, Italy and UK



Source: Eurostat (2012), supporting data provided in Table A8.4

Figure A8.2 Domestic beef and veal meat production in the EU, kT, 2008-2012



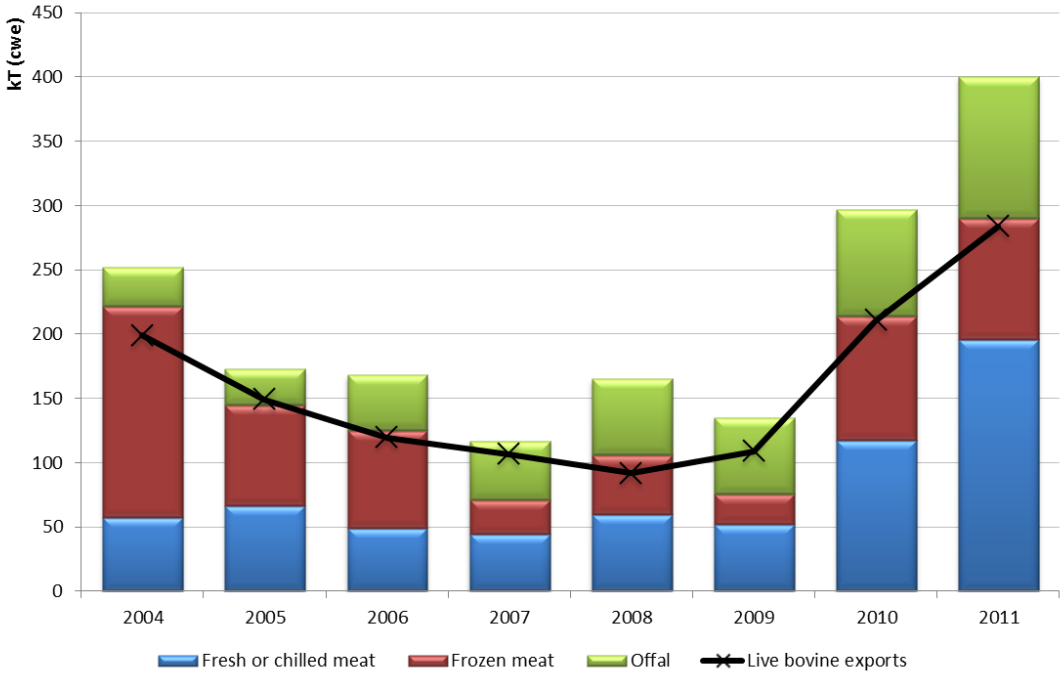
Source: DG Agri (2011), supported by data of the Table A8.2

A8.1.4 Bovine exports by volume and value

Bovine exports declined in 2004 and stabilised thereafter. But in 2010 EU bovine exports increased in volume by 125 per cent from 2009 levels (see Figure A8.1). Particularly marked increases occurred in the trade of fresh, chilled and frozen bovine meats as well as in the trade of live bovines. From 2004-2010, the relatively stable EU exports in bovine offal represented 24 per cent of total bovine meat and meat product.

As a result of such rapid growth, the total value of EU exports of live bovines and bovine meat in 2010 was worth in excess of €1.1 billion – doubling in size in a single calendar year (see Table A8.1).

Figure A8.1 EU exports of bovine meat and live bovines showed signs of resurgence in 2010



Source: Eurostat COMEXT, supporting data is available in Table A8.3

A8.1.4.2 Bovine export markets

More than four fifths of the recent growth in EU bovine meat exports is accounted for by substantial growth of bovine exports to Russia and the development of a Turkish export market. These two markets alone increased by €177 million and €338 million, respectively. In 2011, these markets represented more than 62 per cent of the total EU bovine meat exports by value and volume (Table A8.4).

Past trends suggest that even when the EU bovine meat export market is relatively unchanged in total terms, the destination of these exports shifts year-on-year. DG AGRI (2011) attributes these shifting markets to the natural changes in relative prices across markets.

The recent upsurge in EU exports of live bovine animals is driven by increased exports to five countries of the Southern Mediterranean: Algeria, Lebanon, Morocco, Syria and Turkey. These five markets alone represent 62 per cent of the volume of EU bovines (see Table A8.6 and Figure A8.10) and were valued at €280 million in 2010. Other significant EU markets for live bovine animals are Croatia and Russia, which in 2010 were worth €64 and €50 million, respectively. Live cattle can be directly exported beyond EU borders for the purposes of slaughter, breeding or dairy production.

Besides the EU, South East Asia and Oceania are the main destination of US cattle embryo exports, though even for the US the world market for cattle embryo exports is worth just $8 million. No equivalent data was available on the export of porcine genetic materials, since this is not collected. Globally, however it is noted that little porcine semen is traded since freezing results in 'significant losses' (USDA, 2008).

Globally, the main markets for trade in bovine semen are the EU, the US, Canada and Latin America. In 2011, taking the US[6] and Canadian[7] import data, the EU exported $7.5m worth of bovine semen to the US, and CAN$1.5m to Canada, representing 21 and 23 per cent of the total value of these respective markets.

A8.1.4.3 Future prospects and main competitors

Following the sharp increase in beef exports in 2010 and in 2011, in the short term, live bovine exports are expected to decrease by five per cent and meat exports by 30 per cent in 2012 (DG AGRI 2011). OECD-FAO Agricultural Outlook forecasts EU exports in beef and veal to fall steadily year-on-year until 2020 down to 138,000 tonnes from estimated 2010 levels of 234,000 tonnes.

Major third country beef exporters include Australia, Canada, India, the US, and the South American countries of Brazil, Argentina and Uruguay. EU beef accounts for only three per cent of global beef and veal exports. The marginal role of the EU in these markets is expected to continue to 2020 (see Table A8.7). Furthermore, the US Department of Agriculture (2011) anticipate the decline in US beef and veal production in 2012 to be offset by gains for India, Brazil and Argentina, with EU bovine meat exports remaining 'relatively stagnant'. Brazil, Uruguay and Australia are also major global suppliers of live bovine animals, exporting to the EU's main markets in North Africa and the Middle East.

The relatively small size of EU beef export markets is presently supported by trade to neighbouring countries to the South and East. Of these, only the Russian market is substantial in terms of the sheer volume of imports – though this market is forecast to shrink by over 100,000 tonnes from 2010-2020. The Turkish market is also expected to remain static over this period.

EU exports are predicted to increase in Africa and the Middle East by 32 per cent in 2020 from 2010 levels (see Table A8.7). It should be noted that emerging African and Middle Eastern markets may also be driven by a shift to importing greater quantities of bovine meat as opposed to live bovine animals.

A8.1.4.4 Dairy products by volume and value

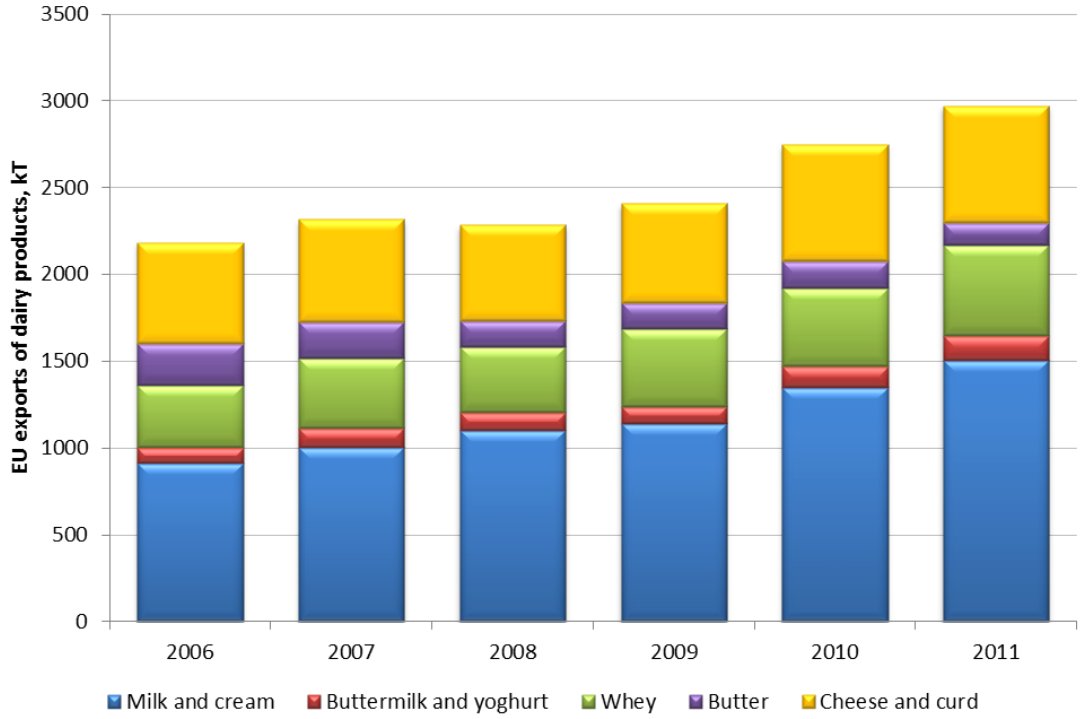
Total volumes of EU exports of milk and milk product steadily increased over the period 2006-2011, experiencing average year-on-year growth of 1.5 per cent. By 2011, exports of milk and cream

[6] http://www.fas.usda.gov/gats/default.aspx

[7] http://www5.statcan.gc.ca/cimt-cicm/

accounted for over half of total dairy exports, with cheese and curd accounting for a further quarter (674 kT).

Figure A8.1 Growth in milk and cheese exports saw EU dairy exports exceed 2.7 million tonnes in 2010



Source: Eurostat, for supporting data see Table A8.1

While representing a relatively smaller share of the volume of total EU dairy trade, EU cheeses are still the most valuable dairy export product due to their high added value (see Table A8.1). In total, the export of milk and dairy products was worth over €8 billion in 2011, up €3 billion from 2009 levels. In terms of both value and volumes, the EU export markets for dairy-based buttermilk and yoghurt products are relatively minor.

It is also worth noting that, for the European Union as a whole, it is reported that some two thirds of the beef produced is derived from dairy herds, directly or indirectly.[8]

A8.1.4.5 Main dairy export markets

Major markets for EU dairy product are Russia, the Middle East, North Africa, and South East Asia. Of these, South East Asia and Russia markets have exhibited the strongest growth in recent years. The size of these main EU export markets varies considerably for different individual products (see Figure A8.1).

For milk and cream, the majority of EU exports are purchased by North Africa and the Middle East – in 2008, these markets accounted for 49 per cent of total volumes, a share which had declined to 40 per cent by 2011 following relatively more rapid growth in other regions (see Table A8.4). In particular, Russia began to import EU milk and cream on a major scale to become the third single largest importer in terms of volume, and fourth in terms of value following Algeria, Nigeria and Saudi Arabia.

Russia and Iran are the two major importers of EU butter, responsible for importing 58 kT worth €132m and €66m respectively. Middle East and North Africa as a whole, account for two fifths of all EU butter exports from 2008-2011.

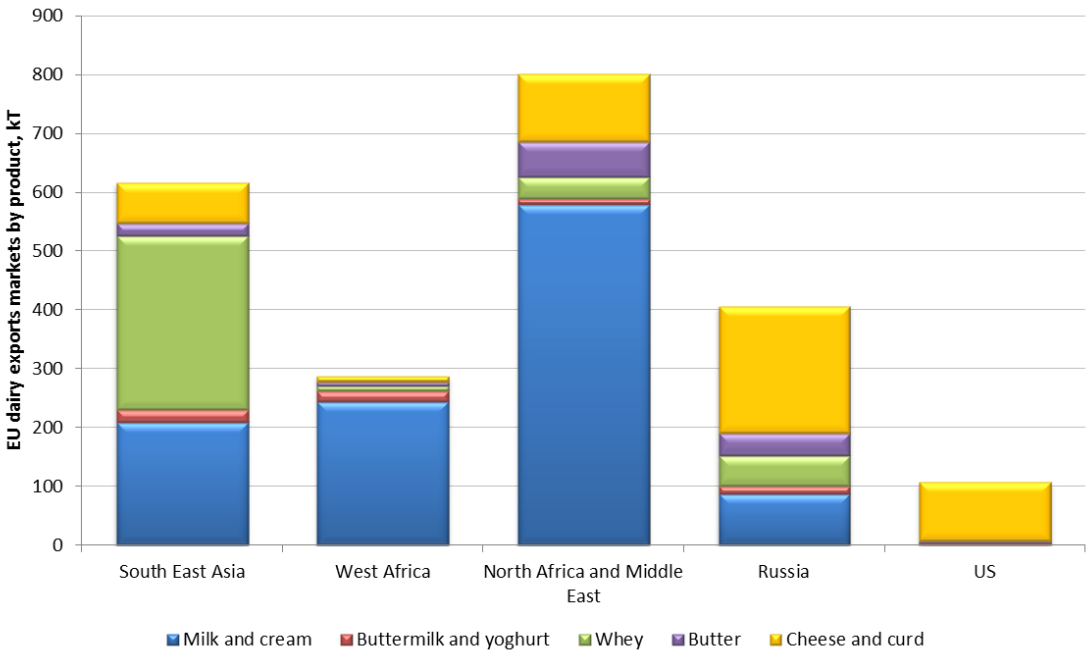
In 2011, over 30 per cent of all EU exports of cheese and curd (over 200 kT) were purchased by Russia – trade which valued over €780 million, up from €462 million in 2009. The next major importers

[8] http://ec.europa.eu/agriculture/markets/beef/index_en.htm

of EU cheese and curd are the US, Switzerland and Japan, markets which together are worth over €1 billion. Further key markets for EU cheese are in North Africa and the Middle East, responsible for importing 17 per cent of EU cheese exports (103 kT) in 2011.

The market for whey is instead more geographically concentrated, with more than two thirds of EU exports consumed in South East Asia from 2009-2011. Here, China is the single largest importer, buying over 140 kT in 2011 with a market value of €204 million.

Figure A8.1 There are considerable variations in the export flows for individual products across countries, reflecting demand and the short life of many dairy products



Source: Eurostat, supporting data is available in Table A8.4

A8.1.4.6 Future prospects and main competitors

The EU is a major player on international dairy markets, responsible for a significant share of world dairy exports, accounting for 24-30 per cent of total dairy exports from 2005-2010. The big four dairy producers in order of their market share: New Zealand, the EU, Australia and the US, together account for 80 per cent of the total volume of dairy exports (Table A8.4).

While the global market situation has recently been favourable, DG Agri (2011) reports that expectations for the next two years depend on the extent of increased milk production both in the EU and in the main supplying countries (New Zealand, Australia, the US, etc.) and the sustainability of strong demand on the world market led by China and other countries of South-East Asia as well as by the Near and Middle East.

In OECD-FAO (2011) projections, global import demand for dairy produce is forecast to rise by a million tonnes from 2010-2020 (see Table A8.7). As well as foreseeing continued strong demand from the key South East Asian markets for milk and whey, growing import demand for dairy produce is also foreseen in Africa and the Middle East – key EU markets for the export of butter, milk and whey. Notwithstanding this forecast growth, the EU market share of global dairy products is forecast to fall below 20 per cent in this period, largely as a result of competitive pressure from New Zealand. EU exports of milk and cheese are worth roughly 75-80 per cent of total EU dairy exports. This share is forecast to increase to over 92 per cent by 2020 (Table A8.5) with the markets for butter and whey having increasingly less overall significance.

Focusing then on EU markets for milk and cheese, DG Agri (2011) and OECD-FAO (2011) provide a positive export forecast, based on sustained demand from the main three cheese importers (Russia, the US and Japan) as well as growing demand in Central and South America (Table A8.8).

The short-term outlook for EU exports of milk powder is however less positive. This outlook sees EU whole milk powder exports steadily decline despite growing world demand, led by China and South East Asia, since exports from New Zealand and Australia are seen to remain more competitive. EU exports of skim milk powder are meanwhile seen as only being competitive in Russia (DG AGRI, 2011). In the medium-term, stronger demand for whole milk powder in the major EU markets across the Mediterranean in North and Sub-Saharan Africa may arrest this decline. Import demand in these markets is seen to increase from 2010-2020 by 56,000 tonnes and 110,000 tonnes respectively (OECD-FAO 2011).

A8.1.5 Traceability

A8.1.5.1 Identification and registration

Regulation (EC) 1760/00 sets out bovine traceability rules in the EU. The identification and registration system for bovine animals comprises the following elements:

- Animal passports;
- Ear tags to identify animals individually;
- Computerised databases; and
- Individual registers kept on each holding.

A8.1.5.2 Animal passport

A passport is generated for each bovine animal to track movements and is issued by the Competent Authority of each EU Member State. Passports carry information including the animal's individual (unique) identification number, date of birth, breed, sex, and mother's individual identification information. Passports accompany bovine animals during transportation and are updated by each new owner of a bovine animal until the passports are surrendered to the CA by the abattoir after animals are harvested.

A8.1.5.3 Ear tags

Each bovine animal must be individually identified with two ear tags that have a country code, a bar code (used to enter information by scanning the bar-code number into a database), and a 12 digit number. The first 2 digits of the number identify the region of the country, followed by a five-digit herd identification number (the EU premises identification), and finally by a five-digit individual animal identification number.

A8.1.5.4 Traceability

Food business operators are required to keep reliable traceability systems in place including details of who they received a product from and to whom they supplied (i.e. 'one-up'one-down traceability). The principles of one-up-one-down traceability are as follows:

- Food and feed business operators must be able to identify the person from whom they received raw ingredients and/or products and equally, the person who they supplied with a food, feed, food producing animal or substance incorporated into a food or feed.
- The Regulation applies to all stages of production, processing and distribution of food and feed.
- Operators must have systems and procedures in place which allow the information to be made available to the authorities on demand.
- Food or feed must be adequately labelled or identified to facilitate traceability.
- The authorities will lay down measurers and penalties applicable to infringements of the food law. The penalties shall be effective, proportionate and dissuasive.

A8.1.5.5 Genetic material

In addition to requirements for the movement of live animals and products of animal origin, Council Directive 92/65/EEC stipulates that the movement of genetic material from bovine animals must be

accompanied by health certificates which identify the animal and holding they originate from additional to the health status of these animals.

A8.1.5.6 Harvest (Slaughterhouse)

Passports are surrendered to the CA by abattoir after animals are harvested. A carcass label is attached to each quarter which contains information such as:

- Carcass number,
- Ear tag number,
- Farmer's name and address,
- Country of origin,
- Date of birth,
- Factory of slaughterhouse,
- Slaughter date,
- Sex and grade, and
- Cold weight.

A8.1.5.7 Computer database

A computer database must be kept holding the information of all animals, their locations and the type of production system they are kept under. The database must be updated with any movements undertaken, including the information recorded on the movement documents to allow for traceability of individual animals.

A8.1.5.8 Labelling and Documentation Rules

Regulation (EC) 1760/2000 lays down the requirements for the labelling of fresh, frozen and minced beef. The information required under Regulation (EC) 1760/2000 should be applied to or attached to individual pieces of meat or to their packaging material. Where beef is unwrapped, the information must be provided in a form written and visible to the consumer at the point of sale.

The Regulation requires a mandatory traceability system for all EU bovine animals from farms to slaughterhouses and a mandatory system of traceability and origin labelling for beef from slaughterhouse to end consumers. The Regulation applies to all fresh or frozen beef including carcasses, de-boned meat, cut meat or minced meat, which is marketed in the EU.

The Regulation requires operators to label beef with specific information at all stages of marketing up to and including the point of sale to the consumer. For beef sold unpackaged (e.g. in a butcher's shop), all the information shown below must be provided in written and visible form to the consumer at the point of sale. Beef pre-packed or packed in-store must be labelled with the following information:

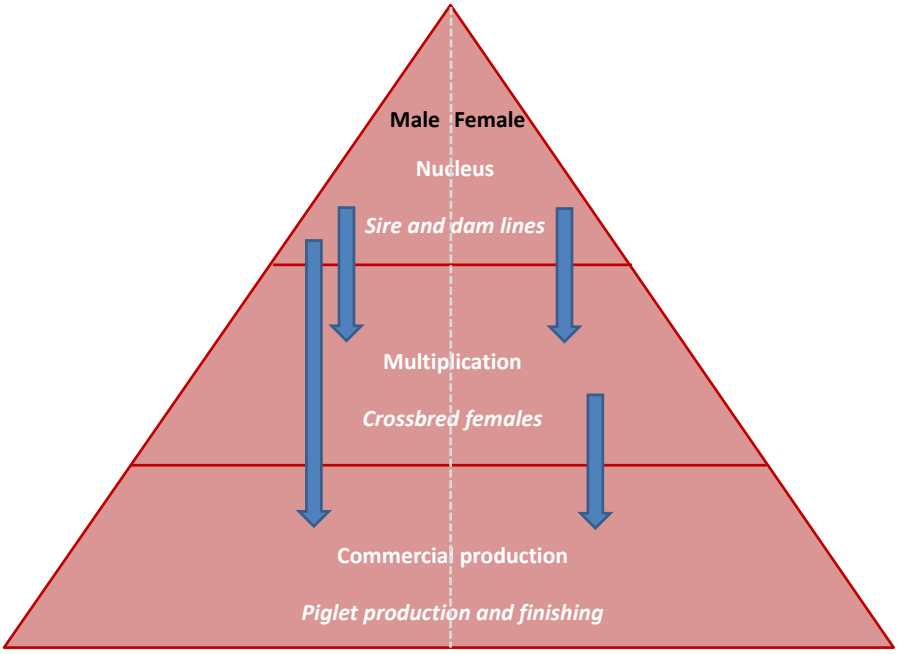
- Reference/Traceability Code or Batch Number, which must ensure a link between the meat and the animal or group of animals concerned.
- Approval Number of the Slaughterhouse at which the animal or group of animals was slaughtered and the Member State or third country in which the slaughterhouse is established.
- Approval Number of the Cutting Hall that performed the cutting operation on the carcass/carcases and the Member State or third country in which the hall is established.
- Origin of the beef. If the beef is derived from animals born, raised and slaughtered in the same Member State/third country, the name of the Member State/third country is sufficient. If, however, the beef is derived from animals from different Member States/third countries the label must show the Member State/third country of birth, all Member States/third countries where fattening took place and the Member State/third country where slaughter took place.

The Regulation also contains provisions for a voluntary labelling system, which covers labelling descriptions other than those that can be verified at the point of sale.

A8.2 Porcine animals

A8.2.1 Breeding structure

Figure A8.1 Pig breeding pyramid



Source: Dekkers et al (2011)

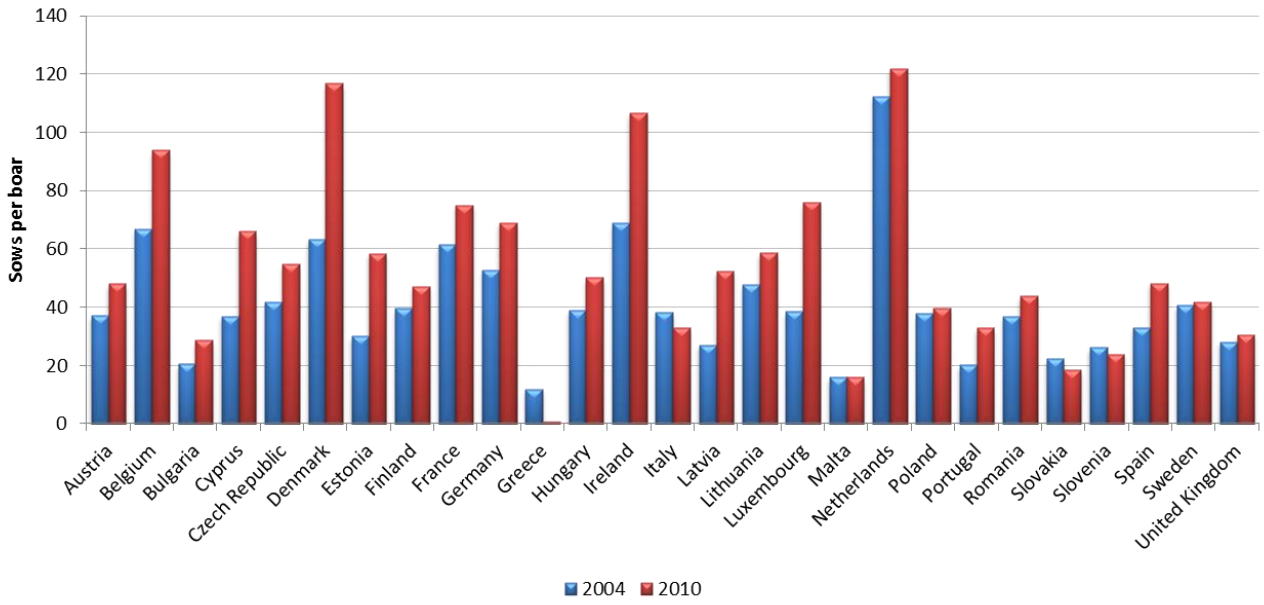
The nucleus herds conduct breeding and selection for the genetic improvement of specific breeds or lines. The objective of the pig breeding industry is the genetic improvement of animals to meet the demands of customers, pork producers and processors. These demands may include, for example, animal welfare concerns, efficient conversion of feed to weight gain and uniformity of size. This process involves the dissemination of genetic changes from the nucleus breeding farms down to the multiplier and commercial farms. This process takes time and there is typically a lag of 3 – 5 years to disseminate genetic variations from nucleus to commercial herds. The genetic lag can be minimised by increasing the transfer between genetic levels, for example though the use of artificial insemination (AI).

A8.2.2 Reproductive technologies

Assisted reproductive technologies (ART) play an important role in progressing genetic improvement in pig production. One of the most important and widely used of these technologies has been AI as it simplifies dissemination of superior genetics over a wider population base, from nucleus to commercial herds, with lower risk of disease transmission and a reduced genetic lag. AI is especially important for the transmission of genetics between countries because it avoids potential problems related to the transport of live animals. AI makes a significant contribution to across-herd genetic evaluation and selection in national and multinational breeding programmes (Knap et al. 2001 in Dekkers et al. 2011).

The number of boars per sow reflects the frequency of artificial insemination; the higher the ratio of sows per boar the higher the frequency of artificial insemination as multiple sows are inseminated with a limited number of boars. The frequency of artificial insemination indicates the relative importance of the herds in natural service; where AI is high the relative importance of herds in natural service will be low. The balance between the two, artificial insemination and natural service, determines the speed of genetic progress. For example, on average one boar covers more than 100 sows in Denmark, Ireland and the Netherlands, whereas in 2010 boars actually outnumbered sows in Greece. With the exception of Greece and Italy, from 2004 to 2010, all Member States saw a fall in the number of boars relative to the number of sows, suggesting increased frequency of AI and/or other artificial breeding techniques. This suggests that the pace of improvement in the genetic quality of pigs is increasing.

Figure A8.1 The frequency of artificial insemination reflected in the number of sows per boar reveals wide disparities in pig breeding practices across Europe



The increasing use of artificial insemination has brought about a rapid spread and increase of genetic pig breeds. European and US breeding companies currently dominate the industry, exporting pig genetics worldwide. These companies work continuously on the genetic improvement of pig stock in order to supply producers with male and female herd replacements (Whittemore, 2006). Former national breeding companies like the Pig Improvement Company (PIC) in the UK are now large, privately owned international players in the breeding sector. Vertical integration of product line from genetics to pork products is high in North America, and fast growing in many European countries (Gura, 2007).

A8.2.3 Pig breeding organisations

Table A8.1 Pig breeding organisations worldwide

Organisation	Developed countries (%)	Worldwide (%)
EU-based organisations		
Breeding companies: ■ PIC (=Genus), UK ■ TOPIGS, Netherlands ■ Danbred, Denmark ■ Hypor-Genex, Netherlands[a] ■ JSR, UK ■ Seghers Rattlerow, Belgium-UK (incl. Newsham, USA) ■ ACMC, UK ■ BHZP, Germany ■ France Hybrides, France	49	24
Herd books: ■ Herds books / Nucleus,	11	4.5

Organisation	Developed countries (%)	Worldwide (%)
France ■ Herdbook, Poland ■ Herdbooks, Italy ■ Herdbooks, Germany ■ Herdbooks, Eastern EU		
Total of EU based organisations	**60**	**28.5**
Non-EU based organisations		
Breeding companies ▪ Monsanto, USA[b] ▪ Smithfield Genetics, USA ▪ Geneticporc, Canada ■ National Swine Registry, USA ■ Canadian National Breeders, Canada	21	8
Total of non-EU based organisations	**21**	**8**

[a] *Hendrix Genetics acquired the pig breeding part of Nutreco (Euribrid: Hypor-Genex) in June 2007*

[b] *Newsham (USA) acquired the pig breeding part of Monsanto in September 2007*

Source: FABRE TP (2008) in Dekkers et al (2011)

A8.2.4 Geographic distribution

The majority of pigs in Europe are produced on large holdings. There are a large number of pig holdings in Romania, Poland, Hungary and Bulgaria which together account for almost 80 per cent of all holdings in Europe. These holdings are typically small, however, consisting of between 1 – 2 animals each in 77 per cent of holdings in Bulgaria, 67 per cent of holdings in Hungary, 52 per of holdings in Romania and 26 per cent of holdings in Poland. Holdings in the largest pig-producing countries tend to be slightly larger and the relative proportion of larger holdings is typically higher compared to the new Member States.

A8.2.5 Structural differences in pig production across EU Member States

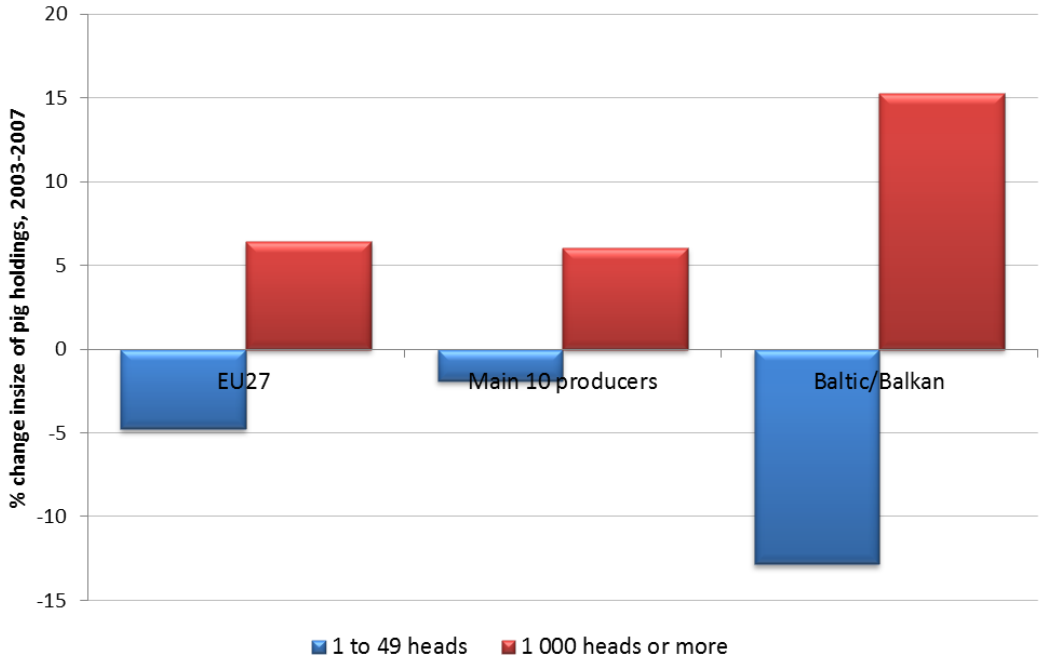
The number of pigs raised in Europe decreased by approximately 6.5 per cent from 2003 to 2007. During this period there was a consolidation from smaller to larger pig holdings. The number and proportion of pigs raised on small holdings decreased while the number and proportion raised on large holdings (>1000 heads) increased.

This shift away from small holdings (1 to 49 heads) towards large holdings was consistent across the EU-27 Member States. This shift was however less pronounced in the ten main EU producers of pigs[9] than it was in the Member States of the Baltic and Balkan regions[10](Figure A8.1).

[9] Austria, Belgium, Denmark, France, Germany, Italy, the Netherlands, Poland, Spain and the UK

[10] Bulgaria, Estonia, Finland, Latvia, Lithuania and Romania

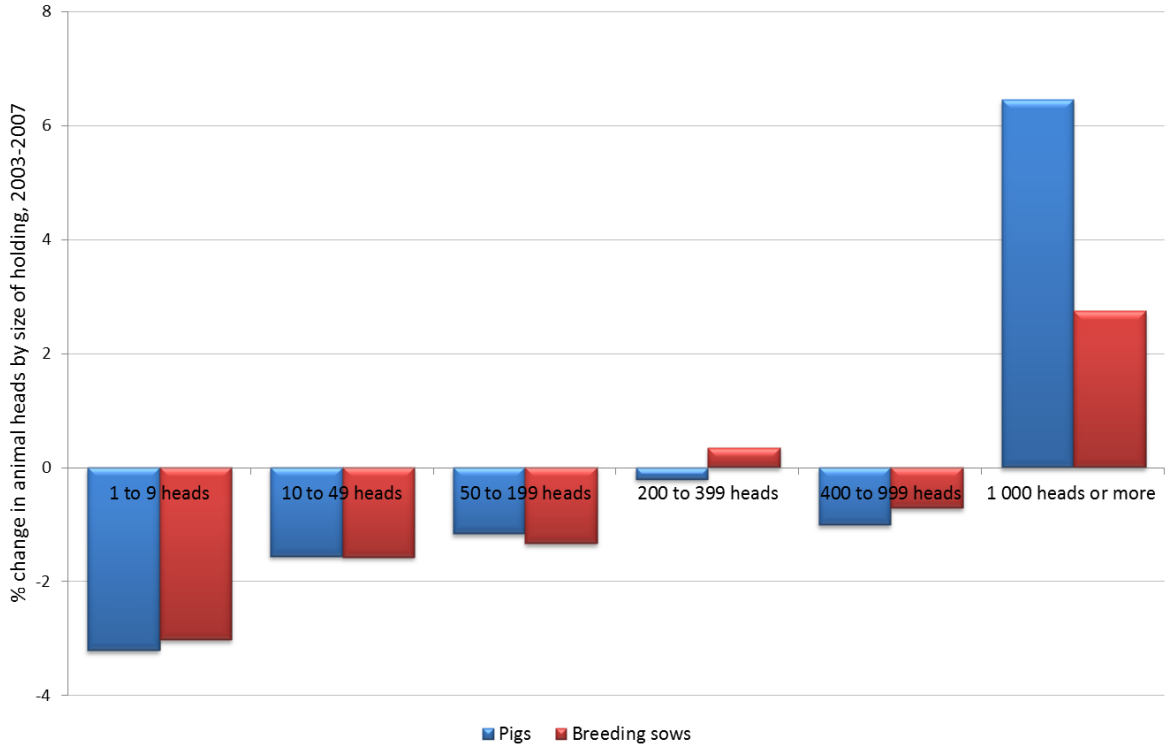
Figure A8.1 From 2003 to 2007 there was a pronounced shift towards larger pig holdings across the EU. This was particularly pronounced in the Baltic and Balkan regions



Source: Eurostat (2012), supporting data is available in Table A8.1

A similar pattern was observed for breeding sows, where the number raised in Europe decreased by more than eight per cent during 2003 – 2007. During this period there was a similar trend away from smaller holdings to more industrial holdings of more than 1,000 sows Figure A8.2).

Figure A8.2 The number of breeding sows on small holdings also decreased across the EU, albeit at a slower rate than the general shift in domestic pig production

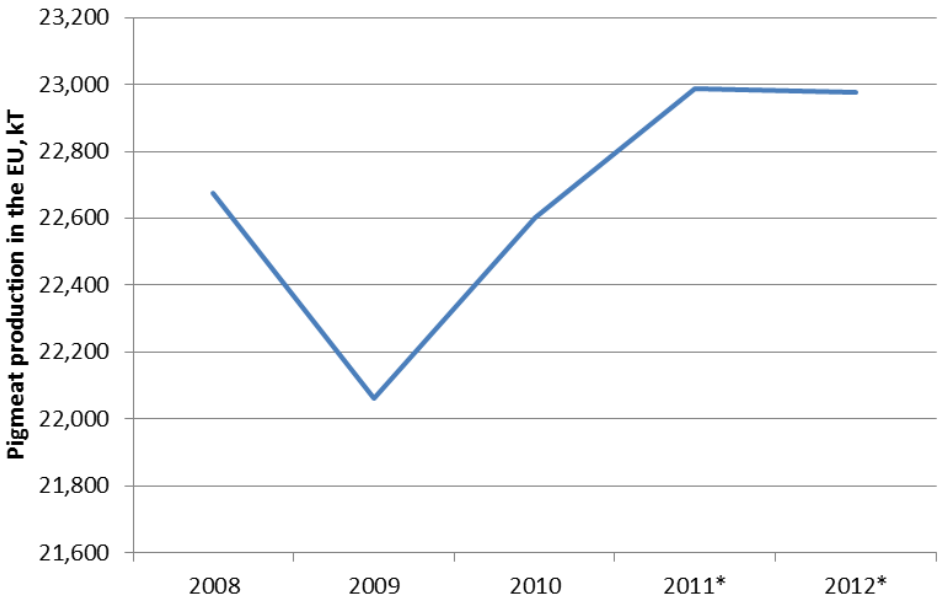


Source: Eurostat (2012), supporting data is available in Table A8.2

A8.2.6 Domestic production

Domestic livestock production for human consumption in the European Union (EU) is most effectively measured by the volume of meat produced in the country (gross indigenous production, abbreviated as GIP), that is, excluding live animal exports and including live animal imports. From 2008 to 2012, the overall pattern of red meat GIP in the EU as a whole has remained relatively consistent at between 31 and 32 million tonnes annually. Of this total volume, production is dominated by pig meat which accounts for 70 per cent of total EU red meat production .

Figure A8.1 Domestic production of pig meat in the EU between 2008 and 2012, kT



Source: DG Agri (2011), supported by data in Annex Table A8.3.

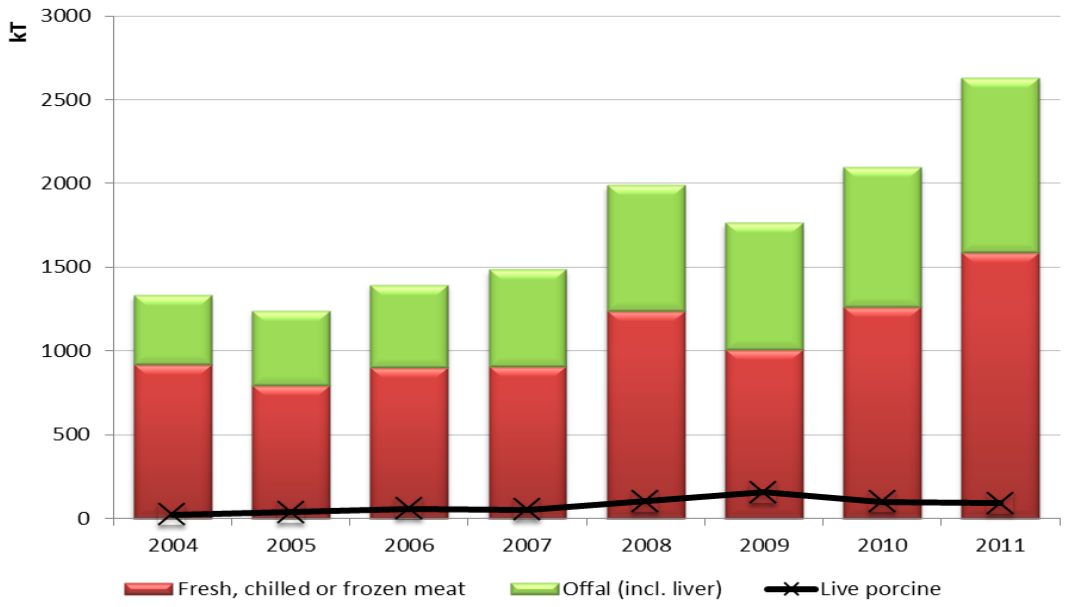
Of the total meat production, the EU pig meat market is the most export-oriented. In 2010, eight per cent of the pig meat produced in the EU was exported to third countries (see Table A8.4).

A8.2.7 Trade

A8.2.7.1 Porcine exports by volume and value

EU porcine exports experienced average year-on-year growth of 11.3 per cent from 2004-2011, and as a result the EU exported more than 2.5 million tonnes of (mainly frozen) porcine meat in 2011. Over this period, exports of pig offal represented roughly 35-40 per cent of total porcine product exports in each year. Export volumes of live pigs, on the other hand, are relatively small, amounting to 150 kT worth €225 million at its 2009 peak.

Figure A8.1 EU exports of both pig meat and pig offal have steadily grown in recent years



Source: Eurostat COMEXT, supporting data is available in Table A8.4.

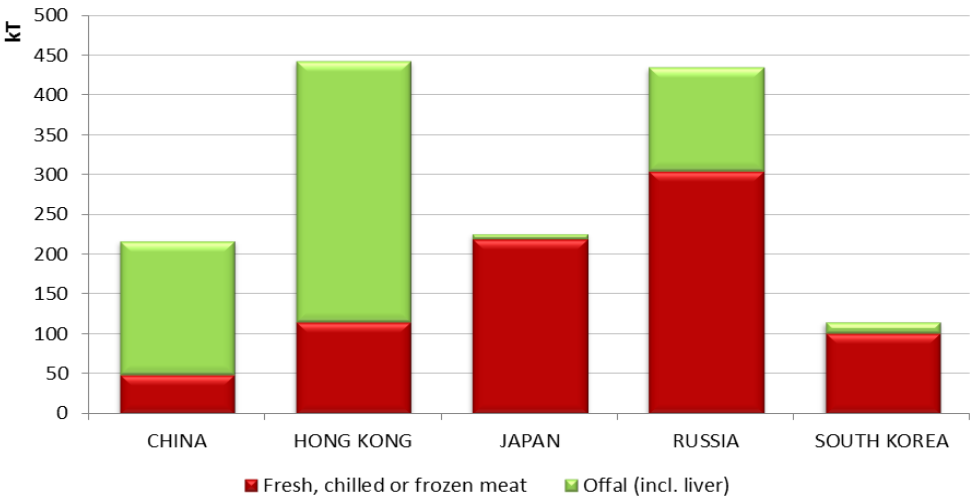
The total value of EU porcine meat exports rose from €2.5bnto €4.7bn from 2006-2011. Trade in pig meat accounted for the majority of such trade in each year, though the value of pig offal exports grew by 239 per cent over the six year period.

A8.2.7.2 Main porcine export markets

In recent years, more than half of all EU pig meat and offal exports have been to the Far East, most of which goes to just three countries: China, Japan, and South Korea. Russia is the destination of an additional 20 per cent of EU pig meat and offal exports, and these patterns have been relatively stable over time (see Figure A8.1).

Mainland China and the special administrative region of Hong Kong account for roughly three quarters of these imports in the form of pig offal, which is considered a delicacy. The EU porcine product export markets in South Korea and Japan are almost wholly concerned with pig meat (88% and 97%, respectively) (Figure A8.1).

Figure A8.1 The type of porcine product exported by the EU varies considerably according to the preferences of the partner country, 2010



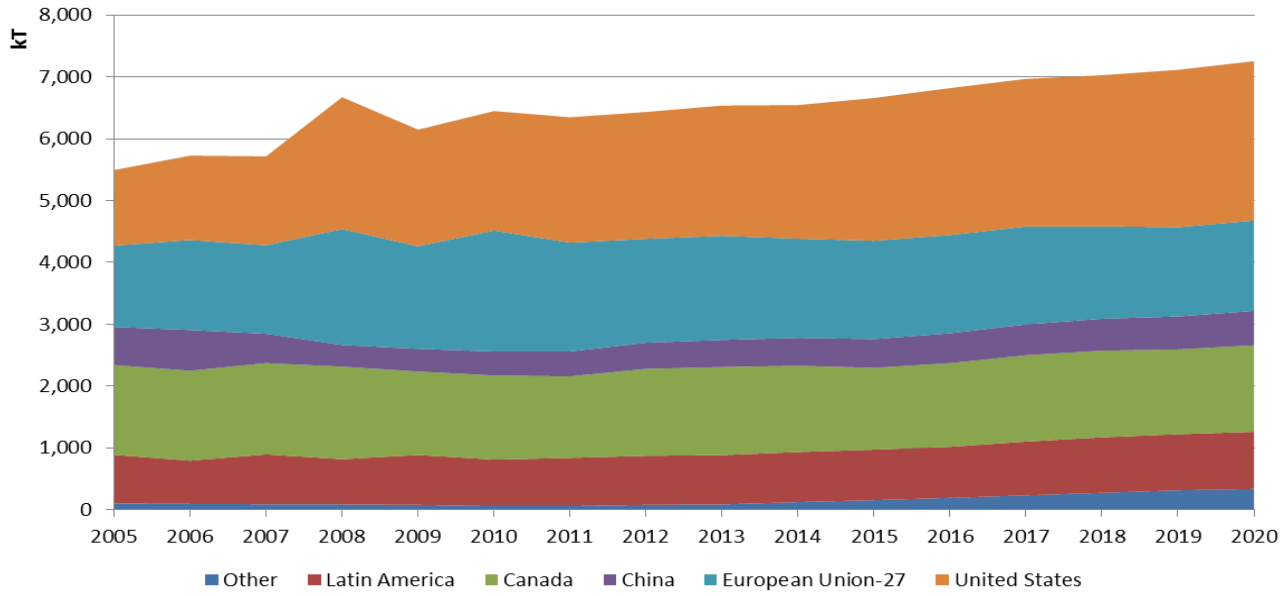
Source: Eurostat COMEXT

A8.2.7.3 Future prospects and main competitors

As Figure A8.1 shows, EU pork exports represent the most significant EU export of red meat. In the short term, DG AGRI foresees 2012 pig meat exports declining by two per cent following what was considered an 'exceptionally good year' for pig meat exports in 2011 (DG AGRI, 2012: 4). In particular, exports to South Korea, China and Hong Kong performed well. USDA is less optimistic and forecasts a five per cent fall in 2012, attributing the decline to recovering domestic supplies in South Korea and China following their respective foot and mouth and swine disease outbreaks. A 30 per cent reduction in Russian import quotas is also expected to dim prospects of EU export growth in 2012 (USDA, 2011: 11).

Globally, EU pig meat accounted for roughly a quarter of total world pig meat exports from 2005-2010. Pork exports from the US and Canada accounted for a further quarter each in this period; Brazil is the fourth largest pork exporter (see Figure A8.1).

Figure A8.1 The EU is one of three major pig meat exporters, though its share of global pig meat export markets is forecast to gradually decline in the years ahead



Source: OECD-FAO (2011), supporting data is available in Table A8.5

Looking ahead to 2020, EU pig meat exports are forecast to decline year on year, seeing its share of the market fall to 20 per cent (OECD-FAO 2011). This decline is likely to occur in the context of global growth in the volume of pig meat exports, which is forecast to be mostly captured by US pig exporters.

Global growth in pig meat exports is likely to be sustained by demand in the world's two largest pig meat importers, Japan and Russia, and increased import demand in the other major South East Asian markets of China, Hong Kong and South Korea and in Ukraine (see Table A8.6). Growing import demand for pig meat in markets where EU exports currently have less market presence such as in Mexico, the US and Australia are also notable.

A8.2.8 Traceability

In the EU, TRACES tracks porcine animals.

- All food, feed, and food producing animal or substance are to be traceable at all times
- Food and feed business operators must be able to identify their suppliers and the businesses they have supplied with product and be willing to provide that information to the authorities if asked.
- Food and feed that is on the market or is likely to be on the market should be labelled or identified in a traceable way.

A8.2.8.1 Identification and registration

Council directives 2008/71/EC and 2000/678/EC contain rules governing the identification and registration of porcine animals and states that the system for the identification and registration of animals shall comprise the following elements:

- Identification by an ear tag or tattoo identifying the holding of origin (batch-identification);
- A holding register;
- A movement register;
- Movement documentation; and
- Computerised databases.

A8.2.8.2 Identification: ear tag / mark

Porcine animals must be identifiable as soon as possible but at least before they leave their holding of birth. The means of identification to be used is either an ear tag or a tattoo which should identify the holding the animal originates from, with animals therefore being identified at a group-level.

A8.2.8.3 Holding register

The holding register is kept on each holding and must contain at least the following information concerning porcine animals:

- The country code and the identification number consisting of not more than 12 figures (apart from the country code);
- Address of the holding;
- Name and address of the person responsible for the animals;
- The geographic co-ordinates or equivalent geographic indication of the holding; and
- A data field where it is possible for the Competent Authority to enter sanitary information, for example restrictions on movement, status or other relevant information in the context of Community or national programmes.

In addition to the information above, the holding register may contain the following information on each holding with porcine animals:

- Type of production;
- Capacity;
- Name and address of the owner of the holding;
- Name and address of the person responsible for sanitary measurers; and
- Other information deemed necessary by the competent authority.

A8.2.8.4 Movement register

An up-to-date record of animal movements must be held as part of the holding register. This register contains information at least on an aggregate level with information on the number of animals involved, the holding of origin, the animals' destination and the dates of the moves.

A8.2.8.5 Movement documentation

Transport of animals to a slaughterhouse must be recorded as a move to a 'new' holding and therefore movement documentation must accompany animals and their holding identification information checked and recorded as at arrival onto the premises.

A8.2.8.6 Computer database

A computer database must be kept containing information for all animals, their locations and the type of production system they are kept under. The database must be updated with any moves undertaken subsequent to the information recorded on the holding and movement registers.

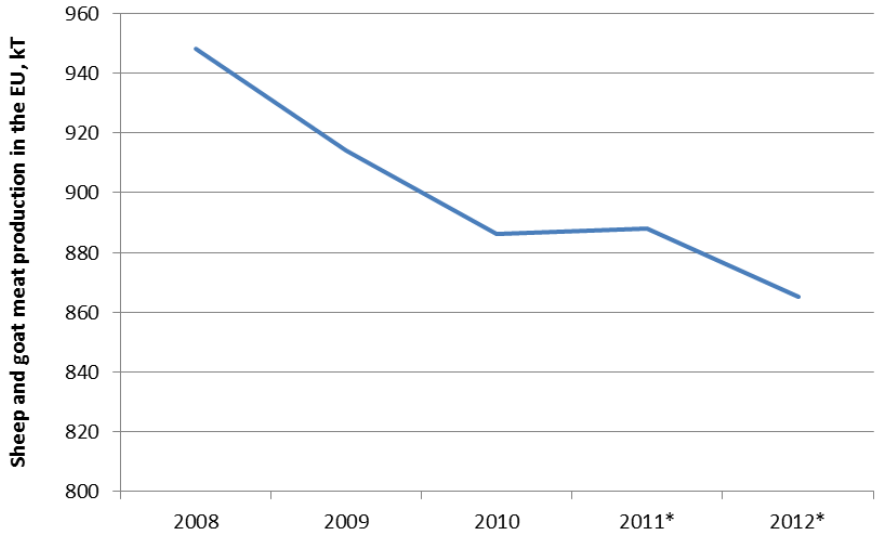
A8.2.8.7 Labelling and Documentation Rules

Current legislation does not provide mandatory labelling requirements across EU allowing individual traceability of products of porcine origin following harvesting, although copies of health certificates travel with the products to allow for batch identification. Regulation (EU) 1169/2011 proposes changes to the labelling of meat and meat products including those originating from porcine animals which will be applied from 13 December 2014. These new rules will require the country of origin to be stated on the label of such products, although considerations are to be made to also include place of birth, place of rearing and place of slaughter for individual animals. Some individual Member States may already have systems in place to allow product traceability following harvest but these measures are applied at a national level and are not harmonised across the EU.

A8.3 Ovine and Caprine animals

A8.3.1 Domestic production

Figure A8.1 Domestic production of ovine and caprine meat in the EU between 2008 and 2012, kT



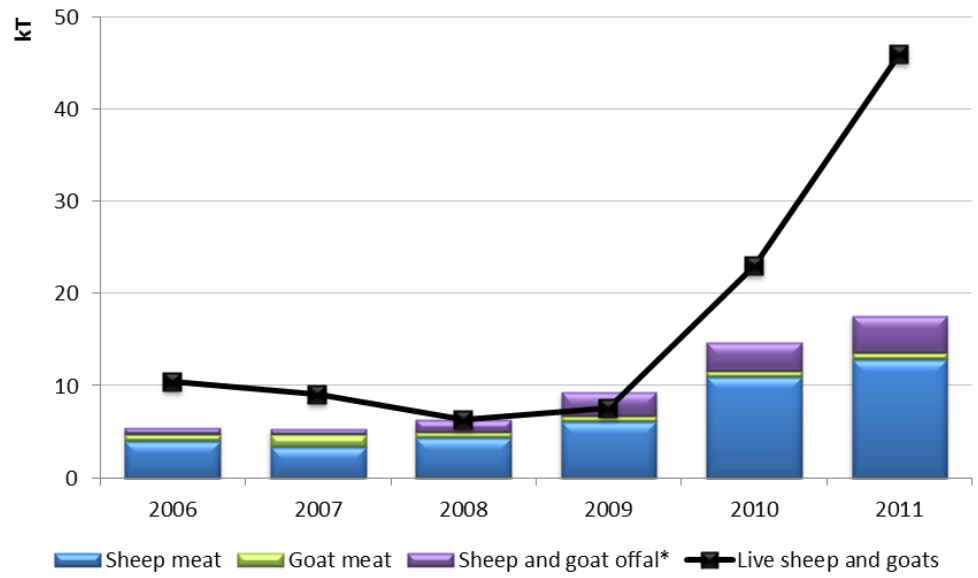
Source: DG Agri (2011), supported by data of the Table A8.1

A8.3.2 Trade

A8.3.2.1 EU ovine and caprine exports

EU exports of sheep and goat meat are relatively minor, and the volumes of trade are dwarfed by that of exports of bovine and porcine meat and meat products. In 2011, the EU exported 13kT of sheep meat valued at €99 million. In 2011, although exports of live sheep doubled to 46 kT from 2010 levels, of which 83 per cent of the annual growth can be attributed to increased demand for live sheep from Turkey. Given the low value of live sheep, this export market in 2011 was valued at only €100 million. The value of total exports across the two species of all types of product is presented in Table A8.1. The corresponding volume of this trade is provided in Table A8.3.

Figure A8.1 EU exports of sheep and goat meat have steadily risen each year from 2006 to 2011



A8.3.2.2 Future prospects, main competitors and imports

Looking ahead to 2020, EU exports of sheep meat are forecast to increase to 24,000 tonnes but will still account for just two per cent of global sheep meat exports (OECD-FAO 2011). Australia and New Zealand together account for over three quarters of this trade (see Table A8.4). The EU is the world's biggest importer of sheep meat representing 25 per cent of global sheep imports in 2010. Saudi Arabia, the US and China are the next biggest markets for sheep imports. The volume of EU imports of sheep meat is forecast to decline by 22 per cent from estimated 2010 levels (see Table A8.5).

A8.3.3 Traceability

In the EU, TRACES tracks ovine and caprine animals. All ovine and caprine animals are individually identified in the EU.

A8.3.3.1 Identification and registration

Regulation EC/21/2004 contains rules governing the identification and registration of both ovine and caprine animals and states that the system for the identification and registration of animals shall comprise the following elements:

- One means to identify each animal individually for caprine animals and two for ovine animals;
- Individual registers on each holding;
- Movement documents; and
- Computer databases.

A8.3.3.2 Animal identification

All ovine and caprine animals must be identified with an eartag. The second means of identification may be another eartag, a readable electronic transponder (ear tag or ruminal bolus), a mark on the pastern for caprine animals or, if animals are not to be subject to intra-Community trade, a tattoo. All identification means must contain characters which demonstrate the unique country-code, to identify the Member State of origin, followed by an individual code up to a maximum of 13 digits. As of 1 January 2008, mandatory electronic identification of all animals was implemented, unless the animals are from a MS with a total ovine and caprine population of 600,000 or fewer and are not to be subject to intra-Community trade.

A8.3.3.3 Holding register

Registers of animals are to be kept on all holdings. From 9 July 2005, the minimum information to be kept on this register includes:

- Holding identification code;
- Address of the holding with indication of geographical location;
- Holding production type;
- Date of the last animal inventory and the results;
- Name and address of the keeper;
- Information on any replacement of animal identification;
- If animals are moving to another holding, the name of the transporter, registration number of the means of animal transport, and identification of holding of destination with departure date or a certified copy of the movement document are to be recorded;
- If animals are moving to a slaughterhouse, the name of the transporter, registration number of the means of animal transport, and identification of the slaughterhouse with date of departure or a certified copy of the movement document are to be recorded;
- If animals have moved onto a holding, identification of holding of origin and date of arrival are to be recorded.

For animals born after 1 January 2008, the register is to record the following information:

- Unique animal identification code;
- Year of birth and date of identification;
- Month and year of death of the animal on the holding;
- Race and, if known, the genotype.

A8.3.3.4 Movement document

Records of animal movements are to be kept for any animal movements, whether this is for transhumance, to another holding or to a slaughterhouse. Information should be recorded on these documents giving information on the animals being moved, the date of the move and the destination.

A8.3.3.5 Harvesting (slaughterhouse)

Transport of animals to a slaughterhouse is to be recorded as a move to a 'new' holding. Movement documentation must accompany animals and their unique identification information checked and recorded as at arrival onto the premises.

A8.3.3.6 Computer database

A computer database must be kept holding the information of all animals, their locations and the type of production system they are kept under and must be updated with any moves undertaken. The information recorded on the movement documents is to allow for individual animal traceability.

A8.3.3.7 Labelling and Documentation Rules

Current legislation does not provide mandatory labelling requirements across the EU for individual traceability of products of ovine or caprine origin following harvesting, although copies of health certificates travel with the products to allow for batch identification. Regulation (EU) 1169/2011 proposes changes to the labelling of meat and meat products including those originating from ovine and caprine animals which will be applied from 13 December 2014. These new rules will require the country of origin to be stated on the label of such products, although consideration will be given to also include place of birth, place of rearing and place of slaughter for individual animals. Some individual Member States may already have systems in place to allow traceability of products following harvest but these measures are applied at national level and are not harmonised across the EU.

A8.4 Equine animals

A8.4.1 Overview of horse meat production in the EU

EU exports of horse meat are relatively minor, and the volumes of trade here are dwarfed by that of exports of bovine and porcine meat and meat products. The volume of total exports is presented in Table A8.3. The corresponding value of this trade is provided in Table A8.1.

A8.4.2 Traceability

A8.4.2.1 Identification and registration

Commission regulation (EC) 504/2008 contains rules governing the identification and registration of equidae. The system for the identification of equine animals comprises the following elements:

A8.4.2.2 Electronic identification

All equidae are to be marked with an electronic transponder with contains a Universal Equine Life Number (UELN). This number to contain 15 digits, 6 of which are 1 UELN-compatible identification code for the database and 9 of which are an individual number assigned to the animal. Any animals not identified with a transponder are to be accompanied with a smart card which holds the following information:

- issuing body;
- UELN;
- name;
- sex;
- colour;
- photo of the equine animal.

A8.4.2.3 Passport

All equidae born in the Community are to be identified by means of a single identification document or passport and must be identified before the 31 December of the year of their birth.

All equidae imported into the Community must have single identification documents applied for, by the keeper importing, within 30 days of completion of the customs procedure.

The identification document should include information on the UELN of the animal, the registered owner and health status of the animal. The passport must accompany the animal at all times, including for purposes of breeding, production and slaughter.

A8.4.2.4 Harvesting (slaughterhouse)

Transport of animals to a slaughterhouse is to be recorded as a move to a “new” holding and therefore movement documentation is to accompany animals and their unique identification information checked and recorded as an arrival onto the premises.

A8.4.2.5 Computer database

A computer database must be kept holding the information of all animals, their UELN, any relevant movement details and the production system the animal is kept under for all non-feral equidae within a MS to allow for traceability of individual animals.

A8.4.2.6 Labelling and Documentation Rules

Current legislation does not provide mandatory labelling requirements across EU allowing individual traceability of products of equine origin following harvesting, although copies of health certificates travel with the products to allow for batch identification. Some individual MSs may already have systems in place to allow traceability of products following harvesting but these measures are applied at a national level and are not harmonised Union.

A8.5 Supporting data

A8.5.1 Breeding profile supporting data

A8.5.2 Pigs

Table A8.1 Statistics on the pig population in the EU27, 2010

	Total pig population	Sows	Sows per boar	Sows out of total pig population
	1000 heads	1000 heads	#	%
Austria	3,134	279	48	9
Belgium	6,176	507	94	8
Bulgaria	664	66	29	10
Cyprus	464	46	66	10
Czech Rep	1,846	176	55	10
Denmark	12,293	1,286	117	10
Estonia	372	35	59	9
Finland	1,340	146	47	11
France	13,922	1,127	75	8
Germany	26,901	2,233	69	8
Greece	1,087	151	0.9	14
Hungary	3,169	301	50	9
Ireland	1,500	150	107	10
Italy	9,321	717	33	8
Latvia	390	53	53	13
Lithuania	929	82	59	9
Luxembourg	89	8	76	9
Malta	69	6	16	9
Netherlands	12,206	1,098	122	9
Poland	14,776	1,328	40	9
Portugal	1,917	241	33	13
Romania	5,428	356	44	7
Slovakia	687	55	18	8
Slovenia	396	34	24	8
Spain	25,704	2,408	48	9
Sweden	1,607	155	42	10
UK	4,385	491	31	11
EU27	**150,773**	**13,534**	**33**	**9**

Source: Eurostat (2012)

A8.6 Domestic production supporting data

A8.6.1 Aggregate meat production in the EU[11]

Table A8.1 Overall meat production in the European Union by Member State, kT, 2008-2011

Member State	2008	2009	2010	2011
Austria	755	765	775	769
Belgium	1,328	1,338	1,390	1,383
Bulgaria	82	49	46	56
Cyprus	71	68	66	65
Czech Republic	418	362	350	335
Denmark	1,837	1,711	1,799	1,853
Estonia	55	41	41	39
Finland	301	287	286	285
France	3,917	3,561	3,622	3,650
Germany	6,366	6,436	6,650	6,779
Greece	286	283	279	279
Hungary	494	419	443	413
Ireland	798	765	821	829
Italy	2,750	2,684	2,745	2,613
Latvia	63	44	41	41
Lithuania	124	85	98	100
Luxembourg	20	18	19	18
Malta	10	9	8	8
Netherlands	1,711	1,692	1,691	1,743
Poland	2,281	1,994	2,128	2,191
Portugal	502	487	489	491
Romania	711	248	267	285
Slovakia	124	87	83	69
Slovenia	69	59	61	59
Spain	4,315	4,022	4,117	4,227
Sweden	405	416	417	409
United Kingdom	1,928	1,873	1,980	2,032
EU27	**31,591**	**29,744**	**30,653**	**31,023**

Source: Eurostat, extracted on 21/06/12

[11] Aggregate meat production from bovine, porcine, ovine, caprine and equine species

A8.6.2 Bovine production

Table A8.1 Percentage change in bovine animal heads by size of holding in the EU27, 2003-2007

	Cattle	Dairy
1 or 2 heads	-1.79	-1.76
From 3 to 9 heads	-2.32	-2.28
From 10 to 19 heads	-0.45	-0.62
From 20 to 29 heads	-0.11	-0.31
From 30 to 49 heads	0.01	-0.04
From 50 to 99 heads	0.19	-0.50
100 heads or more	4.46	5.52
Total	-3.29	-7.91

Table A8.2 Domestic beef and veal meat production in the EU, kT (cwe), 2008-2012

Product	2008	2009	2010	2011*	2012*
Gross indigenous production[12]	8,127	7,988	8,228	8,371	8,203
Net production[13]	8,077	7,929	8,113	8,222	8,061
Trade balance in live animals	-50	-59	-115	-149	-142

**forecasts, Source: DG AGRI (2011): Short-term outlook for arable crop, meat and dairy products*

Table A8.3 The role of trade in beef and veal meat markets in the EU, kT (cwe)

	Imports	Share of net production	Exports	Share of net production
2010	319	4%	255	3%

Source: Derived by ICF GHK from DG AGRI (2011)

Table A8.4 Bovine meat production in the European Union by Member State, kT, 2008-2011

Member State	2008	2009	2010	2011
Austria	221	224	225	217
Belgium	267	255	263	272
Bulgaria	15	5	5	5
Cyprus	4	4	4	5
Czech Republic	80	77	74	72

[12] Gross indigenous production (GIP) relates to the carcass weight (cwe) of all animals produced in the EU

[13] Net production adds the total live animal imports and subtracts live exports. The difference between GIP and net production gives the trade balance in live animals.

Denmark	128	126	131	133
Estonia	15	10	9	8
Finland	83	81	82	83
France	1,518	1,467	1,521	1,559
Germany	1,210	1,174	1,187	1,159
Greece	57	57	58	59
Hungary	32	30	27	26
Ireland	537	514	559	547
Italy	1,059	1,055	1,075	1,009
Latvia	21	19	18	17
Lithuania	48	44	43	41
Luxembourg	10	9	10	9
Malta	1	2	1	1
Netherlands	378	402	389	382
Poland	381	385	386	380
Portugal	109	103	94	96
Romania	190	25	28	28
Slovakia	20	16	14	11
Slovenia	37	35	36	36
Spain	658	598	607	606
Sweden	129	150	148	148
United Kingdom	862	850	925	937
EU27	**8,072**	**7,717**	**7,918**	**7,844**

Source: Eurostat, extracted on 21/06/12

A8.6.3 Porcine production

Table A8.1 Percentage change in the number of pigs by size of holding, 2003-2007

	1 to 49 heads	1 000 heads or more
EU27	-4.77%	6.45%
Austria	-4.62	1.31
Belgium	-0.32	5.63
Bulgaria	-12.14	17.03
Cyprus	0.37	2.62
Czech Republic	-0.28	4.45
Denmark	-0.29	17.71
Estonia	-4.24	11.38
Finland	-5.91	10.71

France	0.15	3.96
Germany	-3.55	6.91
Greece	-2.52	6.13
Hungary	-8.84	9.73
Ireland	0.18	4.14
Italy	-2.19	5.64
Latvia	-14.80	19.26
Lithuania	-19.44	26.62
Luxembourg	-2.82	-0.81
Malta	-1.68	-29.93
Netherlands	-1.73	8.28
Poland	2.81	-0.76
Portugal	-6.83	3.62
Romania	-24.33	12.24
Slovakia	-5.69	9.60
Slovenia	-8.84	2.58
Spain	-1.08	6.79
Sweden	-1.80	8.62
United Kingdom	1.53	0.59
EU27	-4.77	6.45
Main 10	-1.89	6.04
Baltic/Balkan	-13.48	16.21

Table A8.2 Percentage change in porcine animal heads by size of holding in the EU27, 2003-2007

	Change in animal heads by size of holding (%)	
	Pigs	**Breeding sows**
1 to 9 heads	-3.22	-3.02
10 to 49 heads	-1.56	-1.58
50 to 199 heads	-1.16	-1.34
200 to 399 heads	-0.21	0.35
400 to 999 heads	-1.01	-0.72
1 000 heads or more	6.45	2.75
Total	-6.45	-8.02

Table A8.3 Domestic pig meat production in the EU, kT (cwe), 2008-2012

Product	2008	2009	2010	2011*	2012*
Gross indigenous production	22,676	22,063	22,603	22,986	22,976
Net production	22,599	21,944	22,525	22,907	22,911
Trade balance in live animals	-77	-119	-78	-79	-65

**forecasts, Source: DG AGRI (2011)*

Table A8.4 The role of trade in pigmeat markets in the EU, kT (cwe)

	Imports	Share of net production	Exports	Share of net production
2010	29	0.1%	1,876	8%

Source: Derived by ICF GHK from DG AGRI (2011)

Table A8.5 Pig meat production in the European Union by Member State, kT

Member State	2008	2009	2010	2011
Austria	526	533	542	544
Belgium	1,056	1,082	1,124	1,108
Bulgaria	47	38	37	48
Cyprus	59	58	57	55
Czech Republic	336	285	276	263
Denmark	1,707	1,583	1,666	1,718
Estonia	40	31	32	31
Finland	217	206	203	202
France	2,277	2,004	2,010	1,998
Germany	5,114	5,241	5,443	5,598
Greece	119	118	114	115
Hungary	460	389	416	387
Ireland	202	196	214	234
Italy	1,606	1,588	1,633	1,570
Latvia	41	25	23	23
Lithuania	76	41	55	59
Luxembourg	10	9	10	10
Malta	9	7	7	7

Netherlands	1,318	1,275	1,288	1,347
Poland	1,888	1,608	1,741	1,811
Portugal	381	373	384	384
Romania	455	222	234	254
Slovakia	102	70	69	57
Slovenia	31	24	25	23
Spain	3,484	3,291	3,369	3,479
Sweden	271	261	263	256
United Kingdom	740	720	774	806
EU27	**22,574**	**21,279**	**22,011**	**22,388**

Source: Eurostat, extracted on 21/06/12

A8.6.4 Ovine and caprine production

Table A8.1 Domestic sheep and goat meat production in the EU, kT (cwe)

	2008	2009	2010	2011*	2012*
Gross indigenous production	948	914	886	888	865
Net production	945	910	875	868	847
Trade balance in live animals	-3	-4	-11	-20	-18

**forecasts, Source: DG AGRI (2011)*

Table A8.2 The role of trade in sheep and goat meat markets in the EU, kT (cwe), 2010

	Imports	Share of net production	Exports	Share of net production
Sheep and goat	239	27%	13	1%

Source: Derived by ICF GHK from DG Agri (2011)

Table A8.3 Sheep meat production in the European Union by Member State, kT (cwe)

Member State	2008	2009	2010	2011
Austria	8	7	7	8
Belgium	1	1	3	2
Bulgaria	15	6	4	2
Cyprus	3	3	3	3
Czech Republic	2	0	0	0
Denmark	2	2	2	2

Estonia	0	0	0	0
Finland	1	1	1	1
France	110	83	83	85
Germany	39	20	20	22
Greece	73	72	71	71
Hungary	1	0	0	0
Ireland	59	55	48	48
Italy	57	40	36	33
Latvia	1	0	0	0
Lithuania	1	0	0	0
Luxembourg	0	0	0	0
Malta	0	0	0	0
Netherlands	14	14	13	13
Poland	1	1	1	1
Portugal	11	9	10	10
Romania	58	1	4	4
Slovakia	1	1	1	1
Slovenia	0	0	0	0
Spain	157	124	131	132
Sweden	5	5	5	5
United Kingdom	326	303	281	289
EU27	**945**	**748**	**725**	**732**

Source: Eurostat, extracted on 21/06/12

Table A8.4 Goat meat production in the European Union by Member State, kT (cwe)

Member State	2008	2009	2010	2011
Austria	1	1	1	1
Belgium	0	0	0	0
Bulgaria	5	0	0	0
Cyprus	4	3	2	2
Czech Republic	0	0	0	0
Denmark	0	0	0	0
Estonia	0	0	0	0
Finland	0	0	0	0

France	7	6	7	7
Germany	0	0	0	0
Greece	38	37	36	34
Hungary	0	0	0	0
Ireland	0	0	0	0
Italy	2	1	1	1
Latvia	0	0	0	0
Lithuania	0	0	0	0
Luxembourg	0	0	0	0
Malta	0	0	0	0
Netherlands	1	1	1	2
Poland	0	0	0	0
Portugal	1	1	1	1
Romania	7	0	0	0
Slovakia	0	0	0	0
Slovenia	0	0	0	0
Spain	9	9	11	10
Sweden	0	0	0	0
United Kingdom	0	0	0	0
EU27	**77**	**60**	**61**	**59**

A8.6.5 Equine production

Table A8.1 Domestic horse meat production, kT (cwe), 2008

	2008	2009	2010	2011
Total domestic production	53	:	:	:
Net trade balance in live horses	1	2	3	3

Source: Eurostat COMEXT, extracted on 20/06/12

Table A8.2 The role of trade in equine meat product markets, kT (cwe) 2008

	Imports	Share of production	Exports	Share of production
Horse	46	86%	0.3	0.6%

Source: Eurostat COMEXT, extracted on 20/06/12

Table A8.3 Horse meat production in the European Union by Member State, kT (cwe)

Member State	2005	2006	2007	2008
Austria	0	0	0	0
Belgium	3	3	3	3
Bulgaria	:	0	0	0
Cyprus	0	0	0	:
Czech Republic	0	0	0	0
Denmark	0	0	0	0
Estonia	0	0	0	0
Finland	0	0	0	0
France	6	6	5	5
Germany	3	3	3	3
Greece	0	0	0	:
Hungary	0	0	0	0
Ireland	0	0	0	:
Italy	33	41	25	25
Latvia	0	0	0	0
Lithuania	0	0	0	:
Luxembourg	0	0	0	0
Malta	0	0	0	0
Netherlands	0	0	1	0
Poland	11	10	12	10
Portugal	0	0	0	0
Romania	0	:	:	:
Slovakia	0	0	0	:
Slovenia	0	0	0	0
Spain	5	5	5	6
Sweden	1	1	1	1
United Kingdom	0	0	0	0
EU27*	**64**	**70**	**56**	**53**

** Assuming missing values ~ 0 based on observed years, Source: Eurostat, extracted on 20/02/12*

A8.6.6 Dairy production

Table A8.1 Domestic dairy production in the EU by product type, kT, 2008-2012

	2008	2009	2010	2011*	2012*
Milk and cream	46,351	46,056	46,592	46,918	47,265
Wholemilk powder	808	762	757	756	756
Skimmed milk powder	835	941	904	983	1,023
Butter	2,198	2,137	2,078	2,103	2,124
Cheese	8,934	8,926	8,947	9,036	9,130

** forecasts, Source: DG AGRI (2011)*

Table A8.2 The role of trade in EU dairy markets by product type, kT, 2010

	Imports	Share of production	Exports	Share of production
Milk and cream	12	0.0%	318	1%
Wholemilk powder	2	0.2%	442	58%
Skimmed milk powder	4	0.5%	378	42%
Butter	34	1.5%	157	8%
Cheese	84	0.9%	676	8%
Total dairy	136	0.2%	1,971	3%

Source: Derived by ICF GHK from DG AGRI (2011)

A8.7 Trade supporting data

A8.7.1 Bovine

Table A8.1 Value of EU exports of bovine meat and live bovines by product, Mio €

	2006	2007	2008	2009	2010	2011	Total
Fresh or chilled meat	123	122	183	164	392	670	1,655
Frozen Meat	136	51	105	57	229	253	830
Offal[14]	36	35	51	51	81	124	377
Live bovines	247	261	233	270	484	816	2,312
Total value	543	469	571	542	1,186	1,863	5,174

Source: Eurostat COMEXT, extracted on 20/06/12

[14] Fresh, chilled or frozen offal from bovine animals, including tongue and liver

Table A8.2 Value of EU imports of bovine meat products and live bovines, Mio €

	2006	2007	2008	2009	2010	2011	Total
Fresh or chilled meat	986	1,125	897	767	909	1,018	5,702
Frozen meat	515	442	393	439	398	438	2,624
Offal	9	5	6	5	5	5	35
Live bovines	5	7	6	7	1	1	27
Total value	1,506	1,574	1,295	1,213	1,308	1,457	8,353

Source: Eurostat COMEXT, extracted on 20/06/12

Table A8.3 Volume of EU exports of bovine meat and live bovines by product, 100kg

	2004	2005	2006	2007	2008	2009	2010	2011
Fresh or chilled meat	58	66	49	44	60	52	117	196
Frozen meat	164	78	76	27	46	24	96	94
Offal*	2	2	2	3	2	5	7	11
Total (meat products)	28	25	30	30	42	42	56	73
Live bovine	30	28	43	46	59	60	83	110

Source: Eurostat COMEXT, data extracted on 20/06/12

Table A8.4 Growth of EU bovine meat exports to Russia and Turkey, 2009-2011

	Volume (kT)				Value (Mio €)			
	2009	2010	2011	Δ 2009-11	2009	2010	2011	Δ 2009-11
Russia	20	81	75	55	52	198	229	177
Turkey	0	58	112	111	1	195	339	338
% All	27%	65%	64%		24%	63%	62%	

Source: Eurostat COMEXT, data extracted on 20/06/12

Table A8.5 Volume of EU imports of bovine meat by country of origin, 100kg

	2006	2007	2008	2009	2010	2011
Africa	114,520	185,054	162,842	184,838	226,210	76,825
Argentina	559,071	575,967	561,681	735,694	501,633	447,790
Australia	81,254	63,101	89,521	107,733	95,560	124,785
Brazil	2,630,370	1,815,936	419,503	404,493	435,766	453,904
Europe (non EU)	4,194	2,349	31,735	22,852	24,761	24,353

New Zealand	26,976	25,920	78,698	104,733	96,070	111,686
Rest Of World	23,585	30,080	27,248	48,041	61,265	55,588
United States	6,476	20,655	49,431	73,752	117,452	161,713
Uruguay	263,760	252,524	464,413	582,881	475,384	390,015
Total	**3,710,392**	**2,975,817**	**1,885,690**	**2,265,044**	**2,034,295**	**1,846,941**

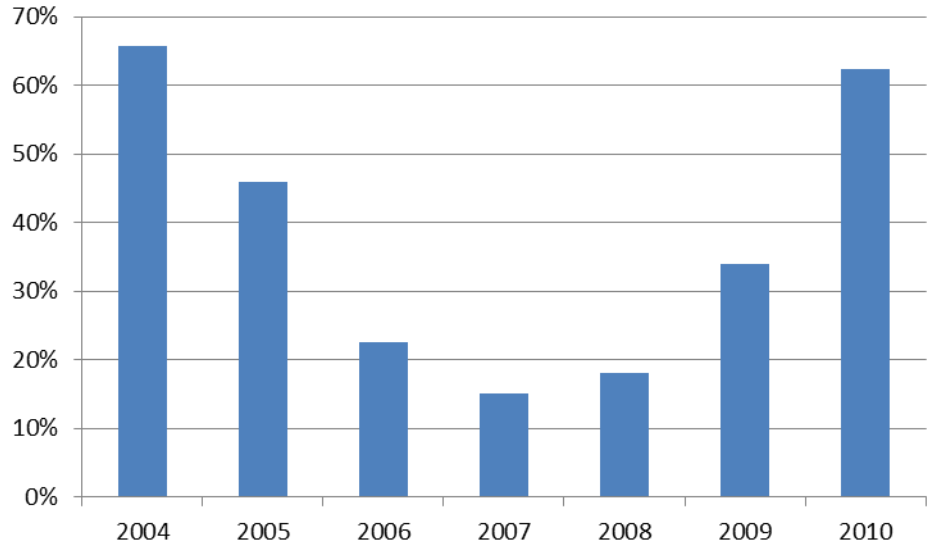
Source: Eurostat COMEXT, data extracted on 17/02/2012

Table A8.6 Volume of EU exports of live bovine by main destination, 100kg

	2006	2007	2008	2009	2010
Albania	112,073	105,465	102,986	100,763	71,580
Algeria	70,950	14,753	19,022	108,232	194,810
Bosnia and Herzegovina	97,961	34,595	56,188	56,633	48,537
Croatia	311,556	268,702	279,692	253,455	269,680
Egypt	5,007	35,781	11,888	6,564	39,021
Israel	28,116	25,059	27,427	19,779	48,050
Jordan	:	10,840	626	10,152	27,589
Kosovo	5,377	5,434	13,752	7,838	13,638
Lebanon	64,218	46,516	75,689	122,148	564,041
Libya	23,182	6,236	25,833	19,833	39,824
Morocco	60,353	46,401	44,818	77,508	165,910
Russia	157,671	322,628	143,813	138,289	130,313
Switzerland	15,137	15,231	17,368	17,231	18,882
Syria	76,332	55,387	27,321	63,258	140,024
Tunisia	5,021	1,601	2,042	32,604	43,920
Turkey	1,457	:	389	195	253,714
Total	**1,194,422**	**1,063,891**	**918,504**	**1,087,074**	**2,108,636**

Source: Eurostat COMEXT, data extracted on 17/02/2012

Figure A8.1 The share in volume of EU live bovine exports to the five main Muslim destinations[15] mirrors the overall trend



Source: Eurostat COMEXT, data extracted on 17/02/2012

Table A8.7 Forecast of the main worldwide exporters of beef and veal, 2010-2020, kT (carcass weight)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Argentina	335	306	341	362	372	389	408	436	457	485	506
Australia	1,472	1,427	1,450	1,468	1,487	1,516	1,534	1,539	1,543	1,559	1,564
Brazil	1,860	1,883	1,893	1,894	1,923	1,990	2,045	2,204	2,304	2,397	2,531
Canada	886	915	765	811	853	901	902	860	841	870	913
EU	234	222	204	190	173	170	163	162	154	147	138
India	700	733	750	777	791	778	758	752	733	719	684
Mexico	203	192	195	194	196	193	193	194	194	194	197
New Zealand	527	511	512	517	523	527	535	539	546	551	555
Sub Saharan Africa	171	194	218	211	219	229	239	229	232	242	215
United States	1,025	1,098	1,081	1,201	1,239	1,305	1,334	1,342	1,366	1,390	1,444
Uruguay	447	502	520	529	538	550	562	576	587	600	608
Others	992	983	1,036	1,045	1,071	1,061	1,069	1,071	1,093	1,102	1,103
World	8,852	8,965	8,966	9,201	9,384	9,608	9,744	9,905	10,051	10,254	10,457

Source: OECD-FAO Agricultural Outlook 2011-2020, based on AGLINK-COSIMO projections

[15] Algeria, Lebanon, Morocco, Syria and Turkey

Table A8.8 Forecast of the main worldwide importers of beef and veal, 2010-2020, kT (carcass weight)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Africa/ Middle East	917	915	902	937	963	1,034	1,054	1,119	1,150	1,185	1,213
Canada	326	334	334	343	344	357	362	366	372	378	377
EU	413	443	506	550	612	598	619	611	614	629	636
Japan	711	711	719	730	737	747	752	752	758	767	770
Korea	315	310	305	313	317	336	351	363	374	391	404
Mexico	214	225	217	213	222	225	215	212	209	221	232
Russia	900	890	902	915	910	882	861	846	826	807	790
US	1,667	1,657	1,593	1,656	1,680	1,760	1,790	1,793	1,803	1,845	1,897
Others	2,805	2,896	2,903	2,959	3,014	3,086	3,157	3,260	3,361	3,446	3,554
World	8,268	8,382	8,382	8,617	8,800	9,025	9,160	9,321	9,468	9,671	9,873

Source: OECD-FAO Agricultural Outlook 2011-2020, based on AGLINK-COSIMO projections

Table A8.9 Number of EU imports of live bovine animals by country of origin

	2006	2007	2008	2009	2010	2011
Canada					10	42
New Zealand						3
Croatia			4	15	14	
Bulgaria	3076					
Romania	66,475					
Switzerland	3,964	3,884	3,517			
Total	73,515	3,884	3,521	15	24	45

Source: TRACES, extracted by DG SANCO

Table A8.10 Imports of bovine semen, number of units

Country of origin	2006	2007	2008	2009	2010	2011
Africa		11				
Australia	7,384	5,832	11,897	7,395	11,311	2,225
Canada	81,963	172,686	478,279	557,304	661,156	898,107
Latin America	49,856		780	2		
New Zealand	18,549	297	14	1,418	664	803
Europe (non EU)	3,808	299	9743	51	1,000	84
South East Asia		37,730	64,025			
United States	115,537	171,256	724,156	716,299	817,718	977,402

Grand Total	277,097	388,162	1,288,895	1,282,469	1,491,823	1,878,621

Source: TRACES, extracted by DG SANCO

A8.7.2 Porcine

Table A8.1 Volume of extra–EU exports of pig meat, kT, 2010

	Exports	Share of total production
Pigmeat	1,876	8%

Source: Derived by ICF GHK from DG AGRI (2011)

Table A8.2 Value of EU exports of pig meat, offal and live pigs, Mio €

	2006	2007	2008	2009	2010	2011	Total
Pig meat	2,056	1,994	2,521	2,075	2,613	3,460	14,719
Pig offal	324	420	650	639	703	1,098	3,833
Live pigs	102	94	166	225	153	169	909
Total value	2,482	2,508	3,337	2,938	3,468	4,727	19,460

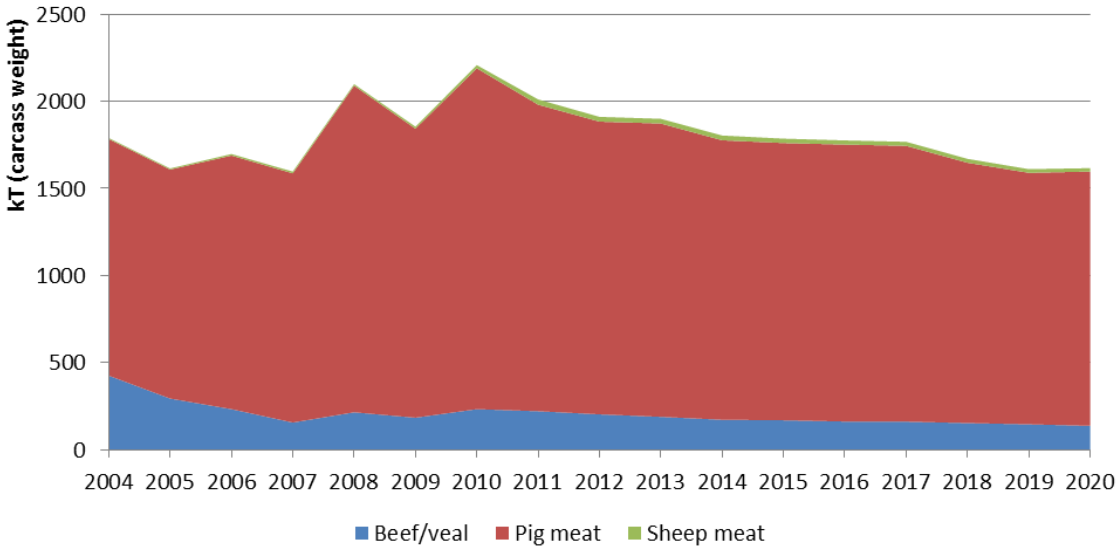
Source: Eurostat COMEXT, extracted on 20/06/12

Table A8.3 Value of EU imports of pig meat, offal and live pigs, Mio €

	2006	2007	2008	2009	2010	2011	Total
Pig meat	176	73	115	72	56	53	545
Pig offal	3	2	4	5	5	8	26
Live pigs	1	1	1	1	1	1	7
Total value	177	74	116	73	57	54	551

Source: Eurostat COMEXT, extracted on 20/06/12

Figure A8.1 The overwhelming majority of EU red meat exports are derived from pigs and this pattern is forecast to continue in the years to come



Source: OECD-FAO (2011)

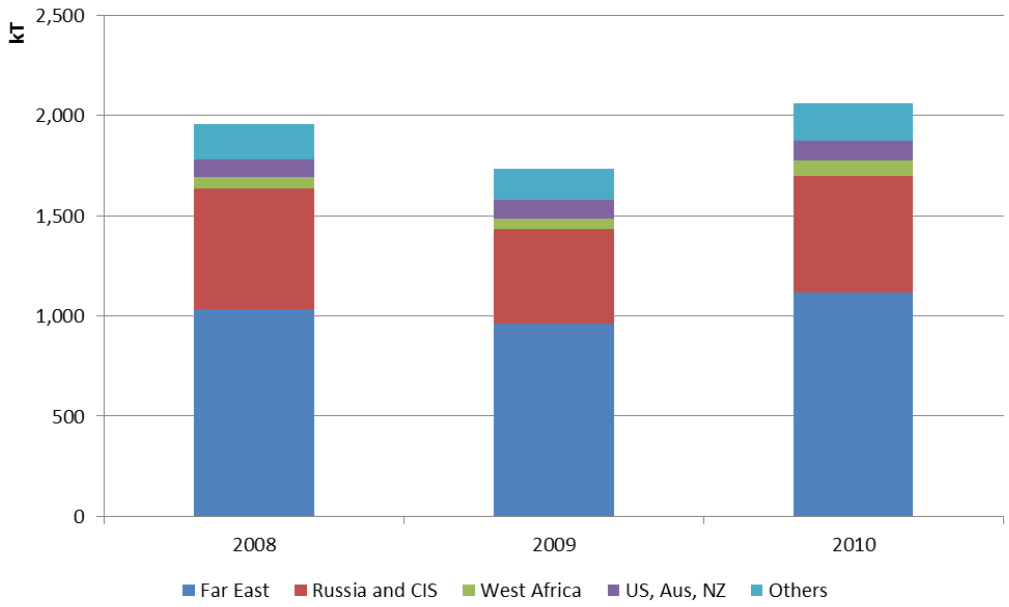
Table A8.4 Volume and share of total EU exports of porcine meat and offal by destination, 2008-2010

	Volume (100kg)			Share (%)		
	2008	2009	2010	2008	2009	2010
Angola	189,182	175,893	212,773	1.0%	1.0%	1.0%
Australia	428,037	450,321	489,832	2.2%	2.6%	2.4%
Belarus	474,285	230,286	721,711	2.4%	1.3%	3.5%
China	1,475,156	1,849,459	2,167,469	7.5%	10.7%	10.5%
Congo	104,751	131,118	206,653	0.5%	0.8%	1.0%
Cote D'Ivoire	199,674	208,635	268,083	1.0%	1.2%	1.3%
Croatia	382,852	386,875	380,786	2.0%	2.2%	1.8%
Hong Kong	4,719,214	4,286,698	4,428,668	24.2%	24.7%	21.5%
Japan	2,280,018	1,789,147	2,255,162	11.7%	10.3%	11.0%
Montenegro	162,596	165,168	162,642	0.8%	1.0%	0.8%
New Zealand	40,037	61,447	77,042	0.2%	0.4%	0.4%
Philippines	273,580	192,611	663,643	1.4%	1.1%	3.2%
Russia	4,153,193	3,643,296	4,352,360	21.3%	21.0%	21.1%
Singapore	134,888	169,574	231,517	0.7%	1.0%	1.1%
South Africa	143,141	150,252	269,480	0.7%	0.9%	1.3%
South Korea	1,203,867	987,044	1,151,147	6.2%	5.7%	5.6%

Taiwan	54,938	44,368	144,562	0.3%	0.3%	0.7%
Thailand	48,684	57,895	79,743	0.2%	0.3%	0.4%
Ukraine	1,402,644	851,278	737,720	7.2%	4.9%	3.6%
US	445,749	394,939	428,976	2.3%	2.3%	2.1%
Vietnam	145,416	226,872	43,757	0.7%	1.3%	0.2%
Grand Total	19,541,240	17,328,572	20,588,561	94.5%	94.9%	94.6%

Source: Eurostat COMEXT, data extracted on 17/02/2012

Figure A8.1 Patterns of EU pig meat product exports by destination, 2008-10



Source: Eurostat, supporting data is available in Table A8.4.

Table A8.5 Forecast of the main worldwide exporters of pig meat, 2010-2020, kT (carcass weight)

	2010	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*
Argentina	7	8	9	11	13	15	16	19	20	23	24
Australia	37	38	58	64	64	60	62	67	72	76	81
Brazil	549	565	567	562	568	574	580	611	626	628	641
Canada	1,360	1,319	1,406	1,426	1,396	1,324	1,353	1,397	1,402	1,373	1,399
Chile	143	150	159	162	166	164	164	172	183	186	188
China	388	404	423	437	451	463	483	498	517	532	558
EU-27	1,956	1,759	1,680	1,683	1,604	1,591	1,589	1,583	1,494	1,443	1,459
Mexico	55	56	58	60	63	64	66	68	69	70	71
Russia	0	0	0	0	33	67	100	133	167	200	217
United States	1,932	2,028	2,050	2,107	2,160	2,308	2,375	2,388	2,443	2,545	2,578

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Argentina	7	8	9	11	13	15	16	19	20	23	24
Australia	37	38	58	64	64	60	62	67	72	76	81
Brazil	549	565	567	562	568	574	580	611	626	628	641
Canada	1,360	1,319	1,406	1,426	1,396	1,324	1,353	1,397	1,402	1,373	1,399
Chile	143	150	159	162	166	164	164	172	183	186	188
China	388	404	423	437	451	463	483	498	517	532	558
EU-27	1,956	1,759	1,680	1,683	1,604	1,591	1,589	1,583	1,494	1,443	1,459
Mexico	55	56	58	60	63	64	66	68	69	70	71
Russia	0	0	0	0	33	67	100	133	167	200	217
United States	1,932	2,028	2,050	2,107	2,160	2,308	2,375	2,388	2,443	2,545	2,578
Grand Total	6,447	6,347	6,432	6,536	6,544	6,659	6,819	6,967	7,026	7,114	7,254

Source: OECD-FAO Agricultural Outlook 2011-2020, based on AGLINK-COSIMO projections

Table A8.6 Forecast of the main worldwide importers of pig meat, 2010-2020, kT (carcass weight)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Australia	302	308	312	314	322	325	330	342	349	357	365
Canada	186	181	207	215	207	177	192	222	232	215	206
China	190	193	213	224	233	243	240	251	268	259	277
EU	33	33	38	38	39	37	38	37	38	37	37
Japan	1,110	1,071	1,092	1,162	1,164	1,160	1,152	1,141	1,130	1,122	1,114
Korea	371	482	464	436	418	417	429	448	469	495	514
Mexico	483	484	484	481	491	514	517	520	551	550	560
Russia	900	758	755	754	759	786	798	803	805	814	803
Sub Saharan Africa	140	128	117	124	114	113	120	131	128	136	140
Ukraine	167	182	188	183	201	204	207	220	233	240	248
United States	589	622	644	619	621	669	710	713	687	674	696
Grand Total	6,344	6,259	6,344	6,441	6,464	6,581	6,732	6,874	6,939	7,025	7,151

Source: OECD-FAO Agricultural Outlook 2011-2020, based on AGLINK-COSIMO projections

Table A8.7 Number of EU imports of live swine by country of origin

	2006	2007	2008	2009	2010	2011
Canada	254	324	611	727	551	845
Bulgaria	887					
Switzerland	52	90	4			
Total	1,193	414	615	727	551	845

Source: TRACES, extracted by DG SANCO and provided to GHK by Jose Luis

Table A8.8 Imports of porcine semen by country of origin, number of units

	2006	2007	2008	2009	2010	2011
Africa			73			
Australia	127	126		16		
Canada	9	210	373	200	782	176
New Zealand	10,414					
United States	280	517	5	75	173	59
Grand Total	10,830	853	451	291	955	235

Source: TRACES, extracted by DG SANCO

A8.7.3 Ovine and caprine

Table A8.1 Value of EU exports of ovine and caprine products and live animals, €Mio

	2006	2007	2008	2009	2010	2011	Sum
Sheep meat	23	17	13	16	39	99	207
Goat meat	4	4	3	3	4	5	23
Sheep and goat offal*	1	1	1	2	3	5	13
Live sheep	24	17	13	16	39	100	210
Live goats	1	0	1	1	1	2	6

** Includes offal from equine species; Source: Eurostat COMEXT extracted on 20/06/12*

Table A8.2 Value of EU imports of ovine and caprine products and live animals, Mio €

	2006	2007	2008	2009	2010	2011	Sum
Sheep meat	995	966	988	989	993	1,188	6,118
Goat meat	3	3	3	3	5	5	21
Sheep and goat offal*	15	19	19	25	26	24	128
Live sheep	0	0	0	0	0	1	1
Live goats	0	0	0	0	0	0	0

** Includes offal from equine species; Source: Eurostat COMEXT, extracted on 20/06/12*

Table A8.3 Ovine and caprine exports by volume, 100kg

	2006	2007	2008	2009	2010	2011
Sheep meat	40,658	33,712	43,656	61,184	109,464	128,328
Goat meat	7,206	13,283	6,327	6,404	6,705	7,467
Sheep and goat offal*	7,249	6,526	13,748	25,764	31,352	40,254

Live sheep	102,968	90,100	60,774	75,401	227,813	456,129
Live goats	1,503	903	2,329	759	2,089	3,321

** Includes offal from equine species; Source: Eurostat COMEXT, extracted on 20/06/12*

Table A8.4 Forecast of the main worldwide exporters of sheep meat, 2010-2020, kT (carcass weight)

	2010	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*
Africa and Middle East	90	93	98	99	110	97	99	96	96	96	96
Australia	413	423	429	438	444	455	463	470	477	483	489
Asia	43	41	37	42	48	47	47	51	47	52	54
EU	18	30	27	27	27	25	24	23	22	21	20
Latin America	32	23	19	16	16	16	16	16	16	15	15
New Zealand	465	441	452	455	464	471	472	472	473	473	473
Other Europe	15	15	15	15	15	15	15	15	15	15	15
US and Canada	15	15	15	15	15	15	15	15	15	15	15

Source: OECD-FAO Agricultural Outlook 2011-2020, based on AGLINK-COSIMO projections

Table A8.5 Forecast of the main worldwide importers of sheep meat, 2010-2020, kT (carcass weight)

	2010	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*
Canada	26	27	27	27	28	30	31	32	33	35	38
EU	264	256	253	249	241	237	228	223	215	212	207
China	75	75	75	76	78	79	80	81	82	82	84
Japan	31	40	39	38	38	37	36	35	35	34	34
Mexico	34	33	32	32	31	30	29	29	27	26	25
Saudi Arabia	107	103	102	102	118	107	113	108	110	111	111
Sub Saharan Africa	38	39	38	40	43	46	49	51	54	57	59
United States	77	77	80	80	79	81	81	82	83	83	83
World	1,068	1,059	1,071	1,085	1,118	1,119	1,130	1,135	1,139	1,149	1,157

Source: OECD-FAO Agricultural Outlook 2011-2020, based on AGLINK-COSIMO projections

Table A8.6 Volume of EU imports of sheep and goat meat by country of origin, 100kg

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**Sum**	**Share**
Australia	180,989	169,196	180,569	176,449	145,856	166,375	1,019,434	8%
Europe (non-EU)	5,140	5,228	8,431	14,071	18,889	12,219	63,978	1%

New Zealand	1,907,322	1,916,932	1,894,317	1,851,735	1,643,473	1,492,218	10,705,997	85%
South America	149,694	127,605	117,810	147,627	131,098	117,430	791,264	6%
World	2,243,345	2,218,961	2,201,137	2,189,894	1,939,354	1,788,504	12,581,195	100%

Source: Eurostat COMEXT, data extracted on 20/06/12

Table A8.7 Number of EU imports of live sheep by country of origin

	2006	2007	2008	2009	2010	2011
New Zealand		2	21		22	29
Croatia					510	
Canada				11	9	
Bulgaria	19,148					
Iceland	2,100	8				
Romania	956,877					
Switzerland	146	98	140			
Total	978,271	108	161	11	541	29

Source: TRACES, extracted by DG SANCO

Table A8.8 Number of EU imports of live goats by country of origin

	2006	2007	2008	2009	2011
New Zealand					6
Croatia				4	5
Chile				3	
Canada	23	16		1	
Bulgaria	2,845				
Romania	191				
Switzerland	385	141	209		
Total	3,444	157	209	8	11

Source: TRACES, extracted by DG SANCO

Table A8.9 Imports of ovine and caprine semen, number of units

Country of origin	2006	2007	2008	2009	2010	2011
New Zealand	83	18	23	1,763	14	14
Canada	79	7	82	128	317	267

United States	469	1,685	535	385	572	912
Australia	312	586	265	63	177	242
South Africa			29	51	28	
Europe (non EU)	24	30		1		
Brazil		1				
Far East	1		2	22	210	6
Grand Total	968	2,327	936	2,413	1,317	1,441

Source: TRACES, extracted by DG SANCO

A8.7.4 Equine

Table A8.1 Value of EU exports of equine products and live animals, €Mio

	2006	2007	2008	2009	2010	2011	Sum
Horse meat[16]	2	2	2	2	4	9	22
Live horses	451	485	430	396	375	465	2,602

Source: Eurostat COMEXT, extracted on 20/06/12

Table A8.2 Value of EU imports of equine products and live animals, Mio €

	2006	2007	2008	2009	2010	2011	Sum
Horse meat	127	124	127	115	98	94	686
Live horses	496	365	256	200	191	118	1,627

Source: Eurostat COMEXT, extracted on 20/06/12

Table A8.3 Volume of EU imports of horse meat by country of origin, 100kg

	2006	2007	2008	2009	2010	2011	Sum	Share
Argentina	153,755	164,136	132,767	87,666	119,209	73,000	730,533	30%
Australia	6,425	5,416	4,067	3,237	13,050	1,203	33,398	1%
Brazil	140,199	116,355	84,491	27,739	84,636	16,021	469,441	19%
Canada	40,647	74,422	137,274	91,260	101,135	88,735	533,473	22%
Mexico	12,991	43,273	67,584	74,041	70,370	54,301	322,560	13%
United States	95,901	39,829	7	2,112	0	20,377	158,226	7%
Uruguay	19,722	27,851	29,568	24,216	30,344	28,840	160,541	7%
Grand Total	472,567	472,831	457,465	312,036	420,360	283,189	2,418,448	100%

Source: Eurostat COMEXT, data extracted on 20/06/12

[16] Meat from horses, asses, mules and hinnies

Table A8.4 Number of EU imports of live horses, asses, mules and hinnies by country of origin

	2006	2007	2008	2009	2010	2011
Argentina	2,472	2,615	2,594	1,604	1,409	904
Australia	187	168	198	165	106	47
Canada	298	369	339	257	194	138
Europe (non-EU)*	25,185	5,229	3,978	2,806	2,280	1,657
Far East	61	14,562	100	317	44	199
Middle East and Africa	1,006	1,047	999	885	911	896
New Zealand	142	154	110	41	66	95
Other Latin America	151	141	235	98	169	90
Russian Federation	122	156	192	112	229	141
United States	2,407	3,094	2,896	2,364	1,986	6,530
Uruguay	320	425	482	421	301	69
Grand Total	32,351	27,960	12,123	9,070	7,695	10,766

** Data for 2006 includes Bulgaria and Romania*

Source: TRACES, extracted by DG SANCO

Table A8.5 Imports of equine semen, number of units

Country of origin	2006	2007	2008	2009	2010	2011
Africa			1	30		1
Australia		27		67	11	3
Canada	523	1,442	2,895	99	42	286
Latin America	15	30	18	13		80
New Zealand					2	2
Other Europe	1	8	1			
Middle East				19	1	
United States	725	174,479	5,898	3,119	7,427	260,772
Grand Total	1,264	175,986	8,813	3,347	7,484	261,145

Source: TRACES, extracted by DG SANCO

A8.7.5 Dairy production

Table A8.1 Value of EU exports of dairy products, Mio €

	2006	2007	2008	2009	2010	2011	Total
Milk[17]	1,571	2,192	2,554	1,882	2,820	3,334	10,757
Buttermilk[18]	126	186	169	136	196	260	835
Whey[19]	376	604	455	414	555	734	2,523
Butter[20]	477	513	505	365	572	552	2,426
Cheese and curd	2,190	2,406	2,535	2,339	2,948	3,171	12,533
Total dairy	4,741	5,901	6,218	5,136	7,090	8,051	29,075

Source: Eurostat COMEXT, extracted on 20/06/12

Table A8.2 Value of EU imports of dairy products, Mio €

	2006	2007	2008	2009	2010	2011	Sum
Milk and cream	56	43	37	31	31	24	198
Buttermilk/ yoghurt	15	17	17	14	15	14	77
Whey	18	24	22	12	17	20	93
Butter	137	164	146	89	104	148	640
Cheese and curd	409	409	440	401	410	412	2,068
Total dairy	634	656	663	547	577	618	3,077

Source: Eurostat COMEXT, extracted on 20/06/12

Table A8.3 Volume of EU exports of dairy by product, kT

	2004	2005	2006	2007	2008	2009	2010	2011
Milk	914	1,004	1,099	1,137	1,349	1,505	914	1,004
Buttermilk	89	113	104	100	120	141	89	113
Whey	358	399	377	450	450	524	358	399
Butter	241	212	154	149	156	126	241	212
Cheese	580	589	549	572	670	674	580	589
Total dairy	2,182	2,316	2,282	2,408	2,744	2,971	2,182	2,316

Source: Eurostat COMEXT, extracted on 20/06/12

[17] Milk and cream whether or not concentrated or containing added sugar or other sweetening matter

[18] Butter milk, curdled milk and cream, yoghurt, kephir and other fermented or acidified milk and cream whether or not concentrated or flavoured or containing added sugar or other sweetening matter, fruits, nuts and cocoa

[19] Whey whether or not concentrated or containing added sugar or other sweetening matter

[20] Butter, including dehydrated butter and ghee and other fats and oils derived from milk; dairy spreads

Table A8.4 EU dairy product exports in 2010 by destination, 100kg

	Milk and cream	Buttermilk/ yoghurt	Whey	Butter	Cheese and curd	Grand Total
North Africa and Middle East	5,979,000	106,859	355,648	425,710	1,027,913	7,895,130
Russia	450,403	196,231	293,953	262,495	2,071,345	3,274,427
South East Asia	3,234,668	267,182	267,190	3,835,871	745,883	8,350,794
West Africa	2,996,065	211,452	60,404	91,262	101,694	3,460,877
US	25,414	21,326	33,442	4,106	1,087,559	1,171,847
Europe (non-EU)	1,281,241	463,883	131,145	270,719	965,550	3,112,538
World	15,054,918	1,412,911	1,258,305	5,237,773	6,741,160	29,705,067

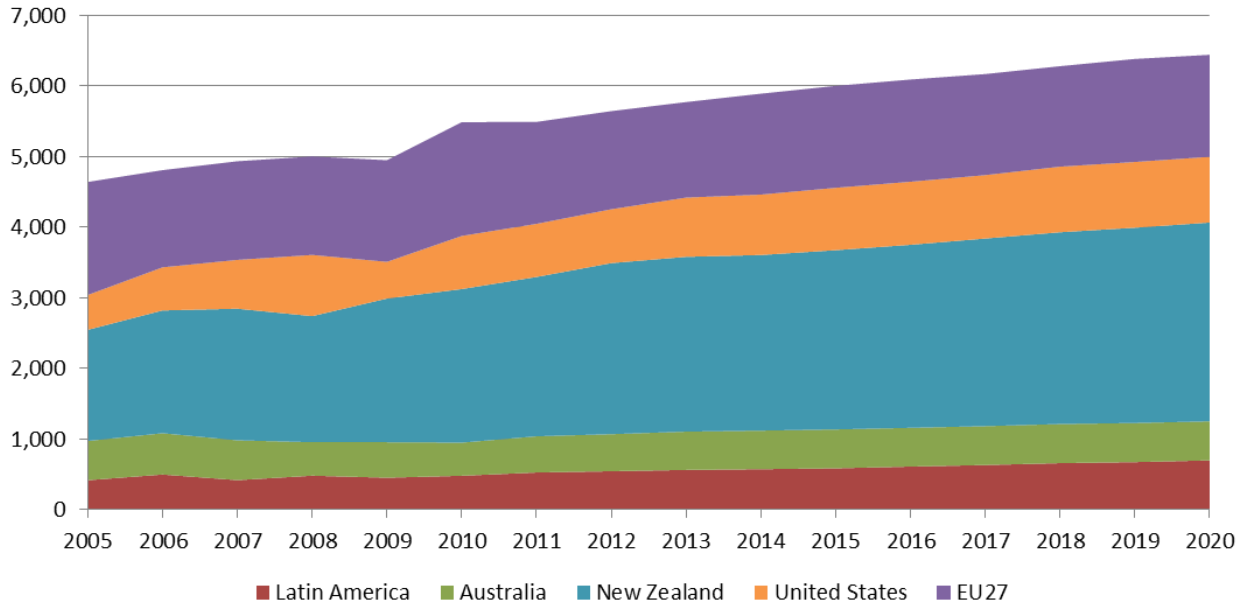
Source: Eurostat COMEXT, extracted on 20/06/12

Table A8.5 Forecast of the main worldwide exporters of dairy products, kT (product weight)

	2010	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*
Australia	469	512	525	542	547	549	548	551	553	553	552
CIS	136	125	134	153	165	161	144	126	127	146	177
EU	1,611	1,442	1,389	1,351	1,428	1,442	1,447	1,430	1,422	1,458	1,444
Latin America	481	528	545	564	574	587	611	633	660	675	700
New Zealand	2,173	2,254	2,421	2,473	2,485	2,537	2,591	2,656	2,714	2,764	2,813
North Africa and Middle East	338	330	299	284	276	269	277	287	296	300	308
South East Asia	94	106	106	115	136	138	146	151	119	123	133
United States	752	752	762	839	855	883	892	898	928	930	930
World	6,146	6,168	6,312	6,457	6,606	6,709	6,809	6,894	6,995	7,133	7,251

Source: OECD-FAO Agricultural Outlook 2011-2020, based on AGLINK-COSIMO projections

Table A8.6 Trends in global dairy exports by main exporter country, kT (product weight)



Source: OECD-FAO Agricultural Outlook 2011-2020, based on AGLINK-COSIMO projections

Table A8.7 Forecast of the main worldwide importers of dairy produce, 2010-2020, kT (product weight)

	2010	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*
CIS	754	711	679	676	693	703	712	721	723	740	745
EU	133	124	131	119	113	125	119	114	118	116	122
Latin America	460	474	488	495	514	524	536	546	557	571	584
North Africa and Middle East	832	808	836	854	871	885	887	888	891	896	898
South East Asia	1,396	1,465	1,467	1,450	1,445	1,434	1,455	1,482	1,509	1,546	1,572
Sub-Saharan Africa	403	387	401	429	457	474	491	508	525	544	563
United States	220	214	229	235	241	244	255	265	274	284	301
World	6,913	6,855	6,982	7,101	7,240	7,339	7,439	7,530	7,638	7,776	7,903

Source: OECD-FAO Agricultural Outlook 2011-2020, based on AGLINK-COSIMO projections

Table A8.8 Forecast of the main worldwide importers of cheese, 2010-2020, kT (product weight)

	2010	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*
EU	83	72	78	66	62	74	68	64	68	68	73
Japan	193	193	196	195	201	203	206	209	211	214	217
Latin America	121	120	126	129	137	138	143	144	149	154	159
North Africa and Middle East	204	204	207	210	212	214	215	214	213	214	214
Russia	350	341	332	342	355	362	365	366	370	380	386

United States	100	97	112	118	124	126	136	146	155	165	183
World	2,192	2,164	2,200	2,243	2,298	2,346	2,389	2,420	2,468	2,524	2,580

Source: OECD-FAO Agricultural Outlook 2011-2020, based on AGLINK-COSIMO projections

Table A8.9 Volume of EU cheese imports by country of origin, 100kg

	2006	2007	2008	2009	2010	2011	Total	Share
Australia	116,195	110,318	91,305	61,393	33,712	26,585	439,508	8%
Canada	41,037	42,629	42,244	28,431	10,504	258	165,103	3%
New Zealand	375,198	283,744	175,879	239,939	265,638	154,624	1,495,022	29%
Norway	44,496	29,257	28,615	21,704	24,429	29,349	177,850	3%
Switzerland	410,486	442,563	449,737	479,160	475,436	499,490	2,756,872	53%
United States	8,358	31,731	52,734	3,631	7,791	16,849	121,094	2%
Grand Total	1,004,639	941,607	842,885	836,022	820,351	734,178	5,179,682	100%

Source: Eurostat COMEXT, data extracted on 20/06/2012

Table A8.10 Volume of EU butter imports by country of origin, 100 kg

	2006	2007	2008	2009	2010	2011	Total	Share
Australia	8,169	11,973	5,148	6,832	400	0	32,522	1%
Europe (non-EU)	2,422	19,608	17104	18270	21962	61,169	73,350	1%
New Zealand	887,606	798,705	538,595	592,096	340,230	329,040	3,486,272	88%
United States	3,032	81,949	75,648	1,969	31,210	77,408	271,216	7%
Grand Total	903,439	914,180	636939	619354	398523	468,677	3,941,112	100%

Source: Eurostat COMEXT, extracted on 20/06/2012

Table A8.11 Number of units of bovine semen imported into the EU27, 2007-2011

Country of origin	2007	2008	2009	2010	2011
Africa	11				
Australia	5,832	11,897	7,395	11,311	2,225
Canada	172,686	478,279	557,304	661,156	898,107
Latin America		780	2		
New Zealand	297	14	1,418	664	803
Europe (non EU)	299	9743	51	1,000	84
South East Asia	37,730	64,025			
United States	171,256	724,156	716,299	817,718	977,402
Grand Total	388,162	1,288,895	1,282,469	1,491,823	1,878,621

Source: TRACES, extracted by DG SANCO

Table A8.12 Number of units of porcine semen imported into the EU27, 2007-2011

Country of origin	2007	2008	2009	2010	2011
Africa		73			
Australia	126		16		
Canada	210	373	200	782	176
New Zealand					
United States	517	5	75	173	59
Grand Total	853	451	291	955	235

Source: TRACES, extracted by DG SANCO

Table A8.13 Number of units of ovine and caprine semen imported into the EU27, 2007-2011

Country of origin	2007	2008	2009	2010	2011
New Zealand	18	23	1,763	14	14
Canada	7	82	128	317	267
United States	1,685	535	385	572	912
Australia	586	265	63	177	242
South Africa		29	51	28	
Europe (non EU)	30		1		
Brazil	1				
Far East		2	22	210	6
Grand Total	2,327	936	2,413	1,317	1,441

Source: TRACES, extracted by DG SANCO

Table A8.14 Number of units of equine semen imported into the EU27, 2007-2011

Country of origin	2007	2008	2009	2010	2011
Africa		1	30		1
Australia	27		67	11	3
Canada	1,442	2,895	99	42	286
Latin America	30	18	13		80
New Zealand				2	2
Other Europe	8	1			
Middle East			19	1	
United States	174,479	5,898	3,119	7,427	260,772
Grand Total	175,986	8,813	3,347	7,484	261,145

Source: TRACES, extracted by DG SANCO

Table A8.15 Number of EU imports of live bovine animals by country of origin, 2007-2011

	2007	2008	2009	2010	2011
Canada				10	42
New Zealand					3
Croatia		4	15	14	
Switzerland	3,884	3,517			
Total	3,884	3,521	15	24	45

Source: TRACES, extracted by DG SANCO

Table A8.16 Number of EU imports of live swine by country of origin, 2007-2011

	2007	2008	2009	2010	2011
Canada	324	611	727	551	845
Switzerland	90	4			
Total	414	615	727	551	845

Source: TRACES, extracted by DG SANCO

Table A8.17 Number of EU imports of live sheep by country of origin, 2007-2011

	2007	2008	2009	2010	2011
New Zealand	2	21		22	29
Croatia				510	
Canada			11	9	
Iceland	8				
Switzerland	98	140			
Total	108	161	11	541	29

Source: TRACES, extracted by DG SANCO

Table A8.18 Number of EU imports of live goats by country of origin

	2007	2008	2009	2011
New Zealand				6
Croatia			4	5
Chile			3	
Canada	16		1	
Switzerland	141	209		
Total	157	209	8	11

Source: TRACES, extracted by DG SANCO

Table A8.19 Number of EU imports of live horses, asses, mules and hinnies by country of origin

	2007	2008	2009	2010	2011
Argentina	2,615	2,594	1,604	1,409	904
Australia	168	198	165	106	47
Canada	369	339	257	194	138
Europe (non-EU)	5,229	3,978	2,806	2,280	1,657
Far East	14,562	100	317	44	199
Middle East and Africa	1,047	999	885	911	896
New Zealand	154	110	41	66	95
Other Latin America	141	235	98	169	90
Russian Federation	156	192	112	229	141
United States	3,094	2,896	2,364	1,986	6,530
Uruguay	425	482	421	301	69
Grand Total	27,960	12,123	9,070	7,695	10,766

Source: TRACES, extracted by DG SANCO