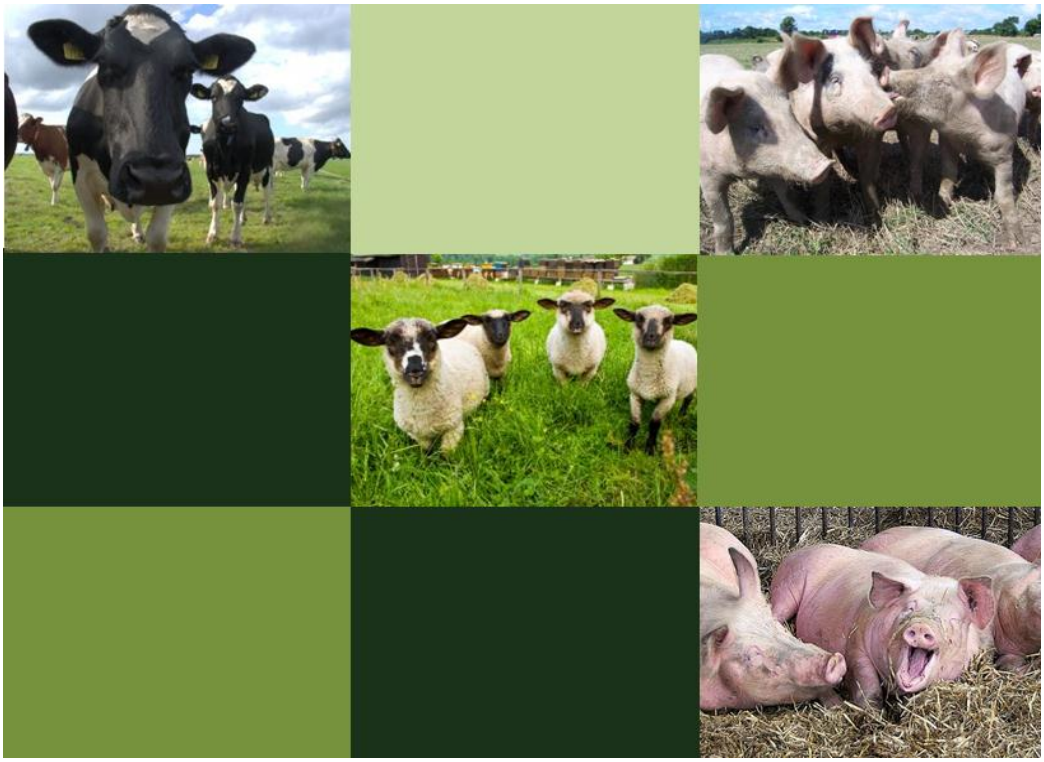

Impact in the EU and third countries of EU measures on animal cloning for food production

Final report to DG SANCO: Annexes

6 December 2012

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

Final report to DG SANCO

Annexes

A report submitted by ICF GHK

Date: 06 December 2012

Job Number 30258973

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Contents

Table of Tables

Table of Figures

Annex 1 Terms of reference

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

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 loss 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.

Annex 2 List of EU legislation relevant to animal cloning for livestock animals

Animal welfare
Council Directive 98/58/EC of 20 July 1998 concerning the protection of animals kept for farming purposes (OJ L 211, 08. 08. 1998, p. 0023-0027).
Council Directive 1999/74/EC of 19 July 1999 laying down minimum standards for the protection of laying hens (OJ L 203, 3.8.1999, p. 53–57)
Council Directive 2008/119/EC of 18 December 2008 laying down minimum standards for the protection of calves (Codified version) (OJ L 10, 15.1.2009, p. 7–13)
Council Directive 2001/88/EC of 23 October 2001 amending Directive 91/630/EEC laying down minimum standards for the protection of pigs (OJ L 316, 1.12.2001, p. 1–4)
Food labelling
Regulation (EC) No. 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety.
Directive 2000/13/EC of the European Parliament and of the Council of 20 March 2000 on the approximation of the laws of the Member States relating to the labelling, presentation and advertising of foodstuffs. (OJ L 109 of 6.5. 2000).
Council Directive 90/496/EEC of 24 September 1990 on nutrition labelling rules of foodstuffs (OJ L 276 of 6.10.1990).
Regulation (EC) 1924/2006 of the European Parliament and of the Council of 20 December 2006 on nutrition and health claims made on foods. (OJ L 404 of 30. 12. 2006, p. 9).
Commission Directive 87/250/EEC of 15 April 1987 on the indication of alcoholic strength by volume in the labelling of alcoholic beverages for sale to the ultimate consumer. (OJ L 113. 30. 4. 1987, p. 57-58).
Commission Directive 94/54/EC of 18 November 1994 concerning the compulsory indication on the labelling of certain foodstuffs of particulars other than those provided for in Council Directive 79/112/EEC (OJ L 300, 13.11.1994 p. 0014-0015).
Commission Directive 2002/67/EC of 18 July 2002 on the labelling of foodstuffs containing quinine, and of foodstuffs containing caffeine (Text with EEA relevance) (OJ L 191, 19.7.2002, p. 20-21).
Commission Directive 2004/77/EC of 29 April 2004 amending Directive 94/54/EC as regards the labelling of certain foods containing glycyrrhizinic acid and its ammonium salt (Text with EEA relevance) (OJ L 162, 30.4.2004, p. 76-77).
Commission Regulations (EC) 608/2004 of 31 March 2004 concerning the labelling of foods ingredients with added phytosterols, phytosterol esters, phytostanols and/or phytostanol esters (text with EEA relevance).
Council Directive 89/396/EEC of 14 June 1989 on indications or marks identifying the lot to which a foodstuff belongs (*OJ L 186, 30.6.1989, p. 21–22 (ES, DA, DE, EL, EN, FR, IT, NL, PT).*
Reproductive materials
Council Directive 88/407/EEC of 14 June 1988 laying down the animal health requirements applicable to intra-Community trade in and imports of semen of domestic animals of the bovine species. (OJ L 194, 22.7.1988, p.10).
Council Directive 89/556/EEC of 25 September 1989 on animal health conditions governing intra-Community trade in and importation from third countries of embryos of domestic animals of the bovine species. (OJ L 302, 19. 10.1989, p.1).
Council Directive 90/429/EEC of 26 June 1990 laying down the animal health requirements applicable to intra-Community trade in and imports of semen of domestic animals of the porcine species. (OJ L 224, 18.8.1990, p.62).
Council Directive 92/65/EEC of 13 July 1992 laying down animal health requirements governing trade in and imports into the Community of animals, semen, ova and embryos not subject to animal health requirements laid down in specific Community rules referred to in Annex A(I) to Directive 90/425/EEC. (OJ L 49, 20.2.2009, p.48).

Commission Decision 2010/470/EU of 26 August 2010 laying down model health certificates for trade within the Union in semen, ova and embryos of animals of the equine, ovine and caprine species and in ova and embryos of animals of the porcine species. (OJ L 228, 31.8.2010, p.15).
Commission Decision 2006/168/EC of 4 January 2006 establishing the animal health and veterinary certification requirements for imports into the Community of bovine embryos and repealing Decision 2005/217/EC. (OJ L 57, 28.2.2006, p.19).
Commission Decision 2009/893/EC of 30 November 2009 on importation of semen of domestic animals of the porcine species into the Community as regards lists of third countries and of semen collection centres, and certification requirements. (OJ L 320, 5.12.2009, p.12).
Commission Decision 2010/471/EU of 26 August 2010 on imports into the Union of semen, ova and embryos of animals of the equine species as regards lists of semen collection and storage centres and embryo collection and production teams and certification requirements. (OJ L 228, 31.8.2010, p.52).
Commission Decision 2010/472/EU of 26 August 2010 on imports of semen, ova and embryos of animals of the ovine and caprine species into the Union. (OJ L 228, 31.8.2010, p.74).
Commission Decision 2011/630/EU of 20 September 2011 on imports into the Union of semen of domestic animals of the bovine species. (OJ L 247, 24.9.2011, p.32).
Traceability of animals
Regulation of the European Parliament and of the Council of 17 July 2000 establishing a system for the identification and registration of bovine animals and regarding the labelling of beef and beef products and repealing Council Regulation (EC) 820/97 (OJ L 204, 11.08.2000, p.1).
Council Regulation (EC) 21/2004 of 17 December 2003 establishing a system for the identification and registration of ovine and caprine animals and amending Regulation (EC) 1782/2003 and Directives 92/102/EEC and 64/432/EEC (OJ L 5, 9.1.2004, p.8).
Commission Regulation (EC) 504/2008 of 6 June 2008 implementing Council Directives 90/426/EEC and 90/427/EEC as regards methods for the identification of equidae.
Council Directive 2008/71/EC of 15 July 2008 on the identification and registration of pigs (Codified version)

Annex 3 Measures

This annex lists the measures that are specified in the terms of reference and evaluated in the assessment.

Table A3.1 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 A3.2 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)
Traceability for food from descendants of clones (2nd and subsequent generations)

Table A3.3 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 A3.4 Premarket approval measures

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

Annex 4 Specification of suspension packages

A4.1 Suspension measures and packages

The suspension measures examined in the study are defined in Table A3.1 and their relationship to different parts of the supply chain shown in Figure A4.1.

Table A4.1 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)

A4.1.2 Package S-A

Package S-A involves suspension of the cloning technique in the EU for all food production animals and the use of clones. Breeding and cloning companies would not be allowed to use the technique for food production animals. Competent authorities would have to monitor breeding and cloning companies to ensure they comply with relevant regulations.

This package should stop the direct supply of EU-produced clones to the production sector and thus of food products derived from such animals, their offspring or descendants. Package S-A would be also expected to halt EU exports of clones (and by extension reproductive materials of clones), if and where they exist, except if re-exported from the EU having been previously imported from a third country.

The package would be expected to halt any imports of clones for production (as opposed to research) purposes on the basis that their use is prohibited and they would not have any market value.

The direct imprint of package S-A on the supply chain is thus expected to be limited to the breeding and cloning companies and the competent authorities charged with oversight of the suspension.

A4.1.3 Package S-B

Package S-B involves suspension of the cloning technique in the EU for all food production animals and the use of clones, as well as suspending the marketing of reproductive materials of clones, whether generated in the EU or imported from third countries.

Breeding companies would therefore not be allowed to use the technique for food production animals. In addition, importers of reproductive materials would not be allowed to sell reproductive materials of clones. Suspending the use of reproductive materials, by extension, means that offspring and descendants of clones will not be produced in the EU.

The direct imprint of package S-B on the supply chain within the EU is expected to be concentrated on the breeding and cloning companies, any EU firms importing clones and clone reproductive material (CRM) to the EU and the competent authorities charged with oversight of the suspension.

A4.1.4 Package S-C

Package S-C involves suspension of the cloning technique in the EU for all food production animals and the use of clones, as well as suspending the marketing of reproductive materials of clones (whether from third countries or generated in the EU) and the marketing of live offspring from clones (both imported and EU-bred).

The system design issues match those of package S-B above, but with the additional issue that importers of live animals would not be allowed to import offspring of clones. Competent Authorities would have to monitor breeding companies, importers of reproductive materials, importers of live animals, multipliers and producers to ensure they are complying with relevant regulations.

A4.1.5 Package S-D

Package S-D involves the same measures as S-C plus suspension of marketing live descendants from clones of all generations, both imported and produced in the EU. In effect, this package attempts to exclude clone animal descendants from the EU multiplication and production sectors.

Breeders, multipliers and producers would not be allowed to market live offspring of clones / descendants of clones. Competent authorities would have to monitor breeding and cloning companies, importers of reproductive materials, importers of live animals, multipliers and producers to ensure they comply with relevant regulations.

A4.1.6 Package S-E

Package S-E involves a prohibition on marketing of food from clones in addition to suspension of the cloning technique in the EU for all food production animals and the use of clones under package S-A. Use of the cloning technique for all food production animals would be banned under this package of measures. Breeding companies would not be allowed to use the technique for food production animals.

In addition it would be illegal to market food from clones, either produced in the EU or imported. This would require that food importers certify that food is not from clones. Competent authorities would have to monitor breeding and cloning companies, importers of live animals, as well as operators selling meat products, to ensure they comply with relevant regulations.

A4.1.7 Package S-F

Package S-F involves the same measures as S-C as well as a prohibition on marketing of food from the offspring of clones. Competent authorities would have to monitor breeding and cloning companies, importers of reproductive materials, importers of live animals, multipliers and producers, as well as operators selling meat products, to ensure they are complying with relevant regulations.

A4.1.8 Package S-G

Package S-G involves the same measures as S-D as well as a prohibition on marketing of food from the descendants of clones. Importers of live animals would not be able to place on the market descendants of clones. Competent authorities would have to monitor breeding and cloning companies, importers of reproductive materials, importers of live animals, multipliers and producers, as well as operators selling meat products, to ensure they are complying with relevant regulations.

A4.1.9 Summary table of suspension packages – measures and affected sectors

Table A4.2 shows which business sectors are potentially affected by the suspension packages.

Figure A4.1 Scope of individual suspension measures S1-S7

		Cloning activity	Reproductive material from clones [imported]	Reproductive material from clones [EU]	Live offspring from clones (first generation) [imported]	Live offspring from clones (first generation) [EU bred]	Live descendants from clones (all generations) [imported]	Live descendants from clones (all generations) [EU bred]	Food from clones [EU material]	Food from clones [imported material]	Food derived from offspring from clones (first generation) (i) imported	Food derived from offspring from clones (first generation) (ii) EU bred	Food derived from descendants from clones (all generations) (i) imported	Food derived from descendants from clones (all generations) (ii) EU bred
S1	Suspension of cloning technique for all food production animals and use of clones													
S2	Suspension of the marketing of food from clones													
S3	The marketing of reproductive materials of clones from 3rd countries or generated in the EU													
S4	Marketing of live offspring from 1st generation clones													
S5	Marketing of live descendants from clones of all generations													
S6	Marketing of food from offspring from clones from 1st generation													
S7	Marketing of food from descendants of food from all generations													

Activity/marketing of animal or product suspended

No new control applies

N.B. S4 also includes suspension of marketing of reproductive materials of clone offspring; S5 also includes suspension of marketing of reproductive materials of clone descendants.

Table A4.2 Overview of sectors affected by suspension packages

Package	Measures	Affected operators					
		Breeding & cloning companies (EU)	Multipliers & producers (EU)	Importers of reproductive materials	Importers of live animals	Importers of food products	FBOs selling food products
S-A	Suspension of cloning technique for all food production animals and use of clones	✓					
S-B	S-A + suspension of the marketing of reproductive materials of clones	✓	✓	✓			
S-C	S-B + suspension of the marketing of live offspring	✓	✓	✓	✓		
S-D	S-C + suspension of the marketing of live descendants of clones	✓	✓	✓	✓		
S-E	S-A + suspension of the marketing of food from clones	✓					
S-F	S-C + suspension of the marketing of food from offspring of clones	✓	✓	✓	✓	✓	✓
S-G	S-D + suspension of the marketing of food from descendants of clones	✓	✓	✓	✓	✓	✓

Areas highlighted with a tick mark (✓) indicate sectors affected by the suspension packages.

**** It is assumed here that a pragmatic solution reached to exclude clones from food chain avoids need to engage operators downstream of the companies that would produce such animals.*

A4.2 Suspension

Table A4.3 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-A + marketing of food from clones)	S-F (S-C + marketing food from offspring)	S-G (S-D + marketing food from descendants)
Companies that could conduct cloning activities in the EU	Observe regulations suspending **cloning technique**	S-A + observe regulations suspending **marketing of reproductive materials**	S-B + observe regulations suspending **marketing of offspring of clones**	S-C + observe regulations suspending **marketing of descendants of clones**	As S-A	As S-C	As S-D
AI companies	n/a	Observe regulations suspending **marketing of reproductive materials**	S-B + observe regulations suspending **marketing of reproductive materials from offspring of clones**	S-C + observe regulations suspending **marketing of reproductive materials from descendants of clones**	As S-A	As S-C	As S-D
Breeders/ holdings	n/a	n/a	S-B + observe regulations suspending **marketing of offspring of clones**	S-C + observe regulations suspending **marketing of descendants of clones**	As S-A	As S-C	As S-D
Slaughterhouses + cutting plants	n/a	n/a	n/a	n/a	S-A + observe regulations suspending **marketing of food from clones**	As S-C + observe regulations banning **marketing of food from offspring of clones.**	As S-D + observe regulations banning **marketing of food from descendants of clones.**
Processing / packaging	n/a	n/a	n/a	n/a	S-A + observe regulations suspending **marketing of food from clones**	As S-C + observe regulations banning **marketing of food from offspring of clones.**	As S-D + observe regulations banning **marketing of food from descendants of clones.**

Wholesale / distribution	n/a	n/a	n/a	n/a	S-A + observe regulations suspending **marketing of food from clones**	As S-C + observe regulations banning **marketing of food from offspring of clones.**	As S-D + observe regulations banning **marketing of food from descendants of clones.**
Retailers	n/a	n/a	n/a	n/a	S-A + observe regulations suspending **marketing of food from clones**	As S-C+ observe regulations banning **marketing of food from offspring of clones.**	As S-D + observe regulations banning **marketing of food from descendants of clones**.
Importers of reproductive materials	n/a	Observe regulations suspending **marketing of reproductive materials**	S-B + observe regulations suspending **marketing of reproductive materials from offspring of clones**	S-C + observe regulations suspending **marketing of reproductive materials from descendants of clones**	As S-B	As S-B	As S-B
Importers of live animals	Observe regulations suspending **marketing of clones**	n/a	Observe regulations suspending **marketing of offspring of clones**	S-C + observe regulations suspending **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 suspending **marketing of food from clones.**	Observe regulations suspending **marketing of food from offspring of clones.**	Observe regulations suspending **marketing of food from descendants of clones.**
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-A + additional monitoring and enforcement	As S-C + additional monitoring and enforcement	As S-D + additional monitoring and enforcement

Annex 5 Specification of traceability packages

A5.1 Traceability measures and packages

The traceability measures examined in the study are defined in Table A5.1 and their relationship to different parts of the supply chain in Table A5.2.

Table A5.1 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) & their reproductive materials
Traceability for live descendants of clones (2nd and subsequent generations) & their reproductive materials
Traceability for food from offspring of clones (1st generation)
Traceability for food from descendants of clones (2nd and subsequent generations)

A5.1.2 Package T-A

Package T-A involves traceability for livestock clones in the EU (domestically produced and imported). Breeding and cloning companies (including live animal importers) would be required to identify and trace these animals in the supply chain. Competent Authorities would have to monitor breeding and cloning companies (and live animal importers) to ensure they comply with relevant regulations.

This package will focus primarily on a small number of operators in the EU that work with high value breeding animals, as these would be too expensive to use in commercial slaughter operations.

The direct imprint of package T-A on the supply chain is thus expected to be limited to the breeding and cloning companies and the competent authorities charged with oversight of the traceability requirements.

A5.1.3 Package T-B

Package T-B involves traceability in the EU for all clone livestock animals, as well as their reproductive materials, whether generated in the EU or imported from third countries.

The direct imprint of package T-B on the supply chain within the EU is expected to be concentrated on the breeding and cloning companies, any EU firms importing clones and reproductive material from clones to the EU and the competent authorities charged with oversight of the traceability requirements.

A5.1.4 Package T-C

Package T-C involves traceability in the EU for all clone livestock animals, as well as their reproductive materials, and the live offspring from clones and their reproductive materials (domestically produced and imported).

The direct imprint of package T-C matches that of package T-B above, but with the additional issue that EU companies and importers of live animals and reproductive materials would need to be able to trace offspring of clones and their reproductive materials as well. Competent Authorities would have to monitor breeding companies, importers of reproductive materials, importers of live animals, and at least some multipliers and producers to ensure they are complying with relevant regulations.

A5.1.5 Package T-D

Package T-D involves traceability in the EU for all clone livestock animals, as well as their reproductive materials, and the live offspring and descendants (all generations) from clones and their reproductive materials (domestically produced and imported).

The direct imprint of package T-D matches that of package T-C above, but with the additional issue that EU companies and importers of live animals and reproductive materials would need to be able to trace descendants of clones and their reproductive materials (all generations) as well. Competent Authorities would have to monitor breeding companies, importers of reproductive materials, importers of live animals, and at least some multipliers and producers to ensure they are complying with relevant regulations.

A5.1.6 Package T-E

Package T-E involves the same traceability requirements as under package T-A, but with the additional requirement that food products derived from cloned livestock animals would also require traceability.

The direct imprint of package T-E matches that of package T-A above. This package will focus primarily on a small number of operators in the EU that work with high value breeding animals, as these would be too expensive to use in commercial slaughter operations.

The direct imprint of package T-E on the supply chain is thus expected to be limited to the breeding and cloning companies and the competent authorities charged with oversight of the traceability requirements.

A5.1.7 Package T-F

Package T-F involves the same traceability requirements as under package T-C, but with the additional requirement that food products derived from the offspring of cloned livestock animals would also require traceability.

The direct imprint of package T-F matches that of package T-C above, but also requires downstream operators engaged food production activities to trace food products derived from the offspring of clones. Competent authorities would need to monitor all of these operators to ensure that they are complying with the relevant regulations.

A5.1.8 Package T-G

Package T-G involves the same traceability requirements as under package T-D, but with the additional requirement that food products derived from the descendants of cloned livestock animals (all generations) would also require traceability.

The direct imprint of package T-G matches that of package T-D above, but also requires downstream operators engaged food production activities to trace food products derived from the descendants of clones. Competent authorities would need to monitor all of these operators to ensure that they are complying with the relevant regulations.

Figure A5.1 Scope of individual traceability measures T1-T7

		Reproductive material from clones (imported)	Reproductive material from clones (EU)	Live clones (imported)	Live clones (from EU)	Live offspring from clones (first generation) [imported]	Live offspring from clones (first generation) [EU bred]	Live descendants from clones (all generations) [imported]	Live descendants from clones (all generations) [EU bred]	Food from clones [imported material]	Food from clones [EU material]	Food derived from offspring from clones (first generation) (i) imported	Food derived from offspring from clones (first generation) (ii) EU bred	Food derived from descendants from clones (all generations) (i) imported	Food derived from descendants from clones (all generations) (ii)
T1	Live clones														
T2	Food from clones		`												
T3	Reproductive materials of clones														
T4	Live offspring from clones 1st generation														
T5	Live offspring from clones all generations														
T6	Food from descendants from clones 1st generation														
T7	Food from descendants from clones all generations														

Indicates control specified in the measure

Indicates where 'upstream' traceability required

Indicates where no control applies

Table A5.2 Traceability approach: obligations

Operators	Packages of measures						
	T-A (clones)	T-B (T-A + RM from clones)	T-C (T-B + offspring)	T-D (T-C + descendants)	T-E (T-A + food from clones)	T-F (T-C + food from offspring)	T-G (T-D + food from descendants)
Companies that could conduct cloning activities in the EU	Register animal status and parentage information	As T-A + pass info on clones to other breeders, and/or importers / exporters of live animals (1 up 1 down model)	As T-B + register offspring of clones and parentage + pass info on offspring of clones (1 up 1 down model)	As T-C + register descendants of clones and parentage + pass info on descendants (1 up 1 down model)	n/a	n/a	n/a
AI companies	n/a	Register status of RM and parentage information	As T-B + pass info to breeders (1 up 1 down model)	As T-C	n/a	n/a	n/a
Breeders/ holdings	n/a	n/a	Register animal status and parentage of offspring	Register animal status and parentage of descendants	As T-A + pass info on to slaughterhouses (1 up 1 down model)	As T-C + pass info on to slaughterhouses (1 up 1 down model)	As T-D + pass info on to slaughterhouses (1 up 1 down model)
Slaughterhouses + cutting plants	n/a	n/a	n/a	n/a	Clones excluded from the supply chain to avoid engagement of downstream operators	Record info from producers on animal status and parentage + separate slaughter lines, where required + pass info to downstream operators (1 up 1 down model)	Record info from producers on animal status and parentage + separate slaughter lines, where required + pass info to downstream operators (1 up 1 down model)
Processing / packaging	n/a	n/a	n/a	n/a	Clones excluded from the supply chain to avoid engagement of downstream operators	Record info from slaughter/cutting + separate lines for dairy from offspring of clones + pass info to downstream operators (1 up 1 down model)	Record info from slaughter/cutting + separate lines for dairy from descendants of clones + pass info to downstream operators (1 up 1 down model)

Wholesale / distribution	n/a	n/a	n/a	n/a	Clones excluded from the supply chain to avoid engagement of downstream operators	Record info and pass info to retailers (1 up 1 down model) on products derived from clones	Record info and pass info to retailers (1 up 1 down model) on products derived from clones
Retailers	n/a	n/a	n/a	n/a	Record info on products derived from clones	Record info on products derived from clones	Record info on products derived from clones
Importers of reproductive materials		Register status of RM and parentage information	As T-B + register offspring of clones and parentage + pass info on descendants (1 up 1 down model)	As T-C + register descendants of clones and parentage + pass info on descendants (1 up 1 down model)	n/a	n/a	n/a
Importers of live animals	Record animal status and parentage information + pass info on clones to breeders (1 up 1 down model)	n/a	As T-B + register offspring of clones and parentage + pass info on offspring of clones (1 up 1 down model)	As T-C + register descendants of clones and parentage + pass info on descendants of clones (1 up 1 down model)	n/a	n/a	n/a
Importers of meat food products	n/a	n/a	n/a	n/a	Clones excluded from the supply chain to avoid engagement of downstream operators	Record info and pass info to downstream operators (1 up 1 down model)	Record info and pass info to downstream operators (1 up 1 down model)
Public/private intermediaries	Establish traceability system for RM + maintain system	As T-A + establish traceability system for clones + maintain system	As T-B + establish traceability system for offspring of clones	As T-C + establish traceability system for descendants of clones	As T-A + pragmatic agreement to exclude clones from supply chain	As T-C + extend traceability system to cover food products derived from offspring of clones	As T-D + extend traceability system to cover food products derived from descendants of clones
Competent authorities	Monitoring & enforcement activity	As T-A + additional monitoring + enforcement activity	As T-B + additional monitoring + enforcement activity	As T-C + additional monitoring + enforcement activity	As T-A + additional monitoring + enforcement activity	As T-C + additional monitoring + enforcement activity	As T-D + additional monitoring + enforcement activity

Annex 6 Specification of labelling packages

A6.1 Labelling measures and packages

The labelling measures examined in the study are defined in Table A6.1.

Table A6.1 Labelling measures

Traceability + labelling for food products derived from clones
Traceability + labelling for food products derived from offspring of clones
Traceability + labelling for food products derived from descendants of clones

A6.1.2 Package L-A

Package L-A involves labelling, in addition to traceability, for food products derived from clones in the EU (domestically produced and imported).

The direct imprint of package L-A extends through the supply chain and includes downstream operators engaged in all aspects of food production, including slaughterhouses, markets and assembly centres, manufacturers, processors and retailers as well as importers of food products. Competent authorities would need to monitor all of these operators to ensure that they are complying with the relevant regulations.

A6.1.3 Package L-B

Package L-B involves the same labelling requirements as under package L-A, but with the additional requirement that food products derived from the offspring of cloned livestock animals would also require traceability and labelling.

The direct imprint of package L-B matches that of package L-A above, but also requires downstream operators engaged in food production activities to trace and label food products derived from the offspring of clones. Competent authorities would need to monitor all of these operators to ensure that they are complying with the relevant regulations.

A6.1.4 Package L-C

Package L-C involves the same labelling requirements as under package L-B, but with the additional requirement that food products derived from the descendants of cloned livestock animals would also require traceability and labelling.

The direct imprint of package L-C matches that of package L-B above, but also requires downstream operators engaged food production activities to trace food products derived from the descendants of clones. Competent authorities would need to monitor all of these operators to ensure that they are complying with the relevant regulations.

Figure A6.1 Scope of individual labelling measures

		Marketing of live clones (imported)	Marketing of live clones (from EU)	Marketing of reproductive material from clones (imported)	Marketing of reproductive material from clones (EU)	Marketing of live offspring from clones (first generation) [imported]	Marketing of live offspring from clones (first generation) [EU bred]	Marketing of live descendants from clones (all generations) [imported]	Marketing of live descendants from clones (all generations) [EU bred]	Marketing of food from clones [EU material]	Marketing of food from clones [imported material]	Marketing of food derived from offspring from clones (first generation) (i) imported	Marketing of food derived from offspring from clones (first generation) (ii) EU bred	Marketing of food derived from descendants from clones (all generations) (i) imported	Marketing of food derived from descendants from clones (all generations) (ii) EU bred
L1	Food from clones														
L2	Food from offspring from clones first generation														
L3	Food from descendants from clones all generations														

Indicates where 'upstream' traceability required

Indicates where labelling applies

Indicates where no control applies

Annex 7 Specification of premarket approval packages

A7.1 Premarket approval measures and packages

The premarket approval measures examined in the study are defined in Table A7.1.

Table A7.1 Premarket approval measures

Traceability + premarket approval for food products derived from clones
Traceability + premarket approval for food products derived from offspring of clones
Traceability + premarket approval for food products derived from descendants of clones

A7.1.2 Package P-A

Package P-A involves premarket approval, in addition to traceability, for food products derived from clones in the EU (domestically produced and imported).

A7.1.3 Package P-B

Package P-B involves the same premarket approval requirements as under package P-A, but with the additional requirement that food products derived from the offspring of cloned livestock animals would also require traceability and premarket approval.

A7.1.4 Package P-C

Package P-C involves the same premarket approval requirements as under package P-B, but with the additional requirement that food products derived from the descendants of cloned livestock animals would also require traceability and premarket approval.

Figure A7.1 Scope of individual premarket approval measures

		Marketing of live clones (imported)	Marketing of live clones (from EU)	Marketing of reproductive material from clones (imported)	Marketing of reproductive material from clones (EU)	Marketing of live offspring from clones (first generation) [imported]	Marketing of live offspring from clones (first generation) [EU bred]	Marketing of live descendants from clones (all generations) [imported]	Marketing of live descendants from clones (all generations) [EU bred]	Marketing of food from clones [EU material]	Marketing of food from clones [imported material]	Marketing of food derived from offspring from clones (first generation) (i) imported	Food derived from offspring from clones (first generation) (ii) EU bred	Marketing of food derived from descendants from clones (all generations) (i) imported	Marketing of food derived from descendants from clones (all generations) (ii) EU bred
P1	Food from clones														
P2	Food from offspring from clones first generation														
P3	Food from descendants from clones all generations														

Indicates where 'upstream' traceability required

Indicates where PMA applies

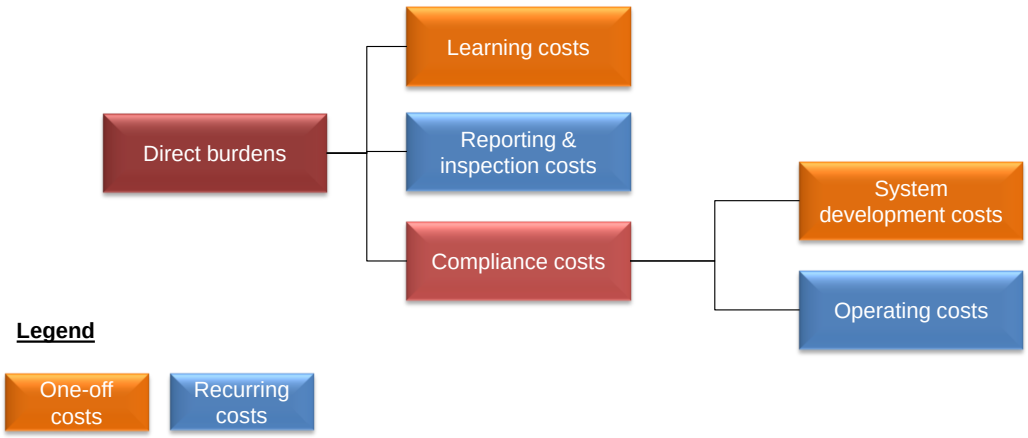
Indicates where no control applies

Annex 8 Cost model

A8.1 Introduction

This annex provides details of the method and approach used to estimate the costs associated with the four approaches for regulating the use of cloned animals for food production. Direct burdens involved the learning costs, reporting and inspection costs and compliance costs associated with the four measures (Figure A8.1).

Figure A8.1 Schematic representation of the categories of direct burdens potentially created by the legislation



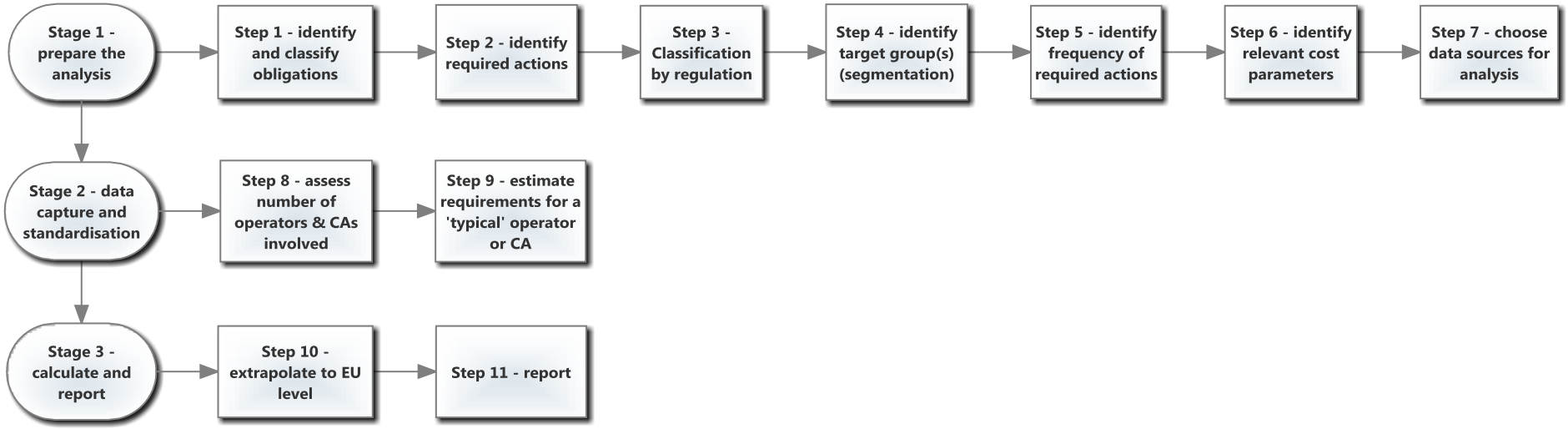
The direct burden includes the expected costs that may be incurred by operators, public authorities, and consumers to meet their legal obligations. This includes providing information either to public authorities or private parties (SANCO Smart Tool, ABR 2012). Obligations include costs for activities such as labelling, reporting, monitoring and assessment, certification and registration, and they cover all activities required to collect, process and deliver the necessary information.

A8.2 Approach to the regulatory cost model

The approach to the regulatory cost model is set out in Annex 10 of the European Commission's Impact Assessment Guidelines.[1] There are 11 steps involved in developing the model, and these are illustrated in Figure A8.2. The remainder of this annex sets out the details of the study team's approach to developing the model, including the data sources and assumptions used.

[1] Commission Impact Assessment Guidelines (2009), 'Part III: Annexes to Impact Assessment Guidelines', available at: http://ec.europa.eu/governance/impact/commission_guidelines/commission_guidelines_en.htm.

Figure A8.2 Steps required to develop the regulatory cost model for the suspension and traceability approaches



A8.3 Stage 1 – Prepare the regulatory cost analysis

The first stage of the cost analysis requires identifying the obligations that would be required under the four approaches (i.e. suspension, traceability, traceability + labelling and traceability + premarket approval). Associated activities required by operators and competent authorities were then assigned based on those obligations. The cost parameters and associated data sources were determined and the frequency of each action was estimated.

A8.3.1 Identify obligations and required actions

The first step in developing the regulatory cost model involved identifying the obligations that are likely to arise from the four approaches and associated activities that will need to be undertaken to comply. All four approaches will require general activities including preparatory actions to learn about the new legislation and reporting and inspection activities. Additional information obligations will arise under the traceability, traceability + labelling and traceability + premarket approval approaches. Figure A8.1 lists the obligation categories and activities required under each, as well as indicating where an activity is specific to a particular species and the approach to which each activity applies.

Table A8.1 Administrative burdens – activities and estimated resource requirements

Obligation	Activity	Species-specific requirements	Suspension	Traceability	Traceability + labelling	Traceability + PMA
Comply with legislation (general)	Preparatory actions – learning about new legislation / obligations	All	✓	✓	✓	✓
	Reporting and inspection- cooperation with audits & inspections by public authorities	All	✓	✓	✓	✓
Comply with traceability requirement	Information – record status and parentage	All		✓	✓	✓
	Amendments to existing traceability systems	Bovine, ovine/caprine		✓	✓	✓
	New traceability systems	Porcine		✓	✓	✓
Comply with labelling requirement	Label change or redesign	All			✓	
Comply with premarket approval requirement	Application for PMA	All				✓

A8.3.2 Identify the regulatory origin of the information obligations

The regulatory origin of the information obligations may arise from either an authority that specifically states the way in which the obligation must be met, or may require transposition by another authority. The four approaches assessed in this study will originate at EU level, but the extent to which the obligations may be specifically stated at EU level or require transposition at national level is unknown.

A8.3.3 Identify target groups (segmentation)

Different packages and approaches will target different groups of operators. Some packages affect operators throughout the supply chain. Other packages affect only a subset of operators. Table A8.2 indicates the operators that are most likely to be affected by each approach, with an indication of the package of measures directly affecting each group.

Table A8.2 Sectors affected by the four approaches

Sector	Suspension					Traceability					Labelling	PMA
	S-A	S-B	S-C S-D	S-E	S-F S-G	T-A	T-B	T-C T-D	T-E*	T-F T-G	L-A L-B L-C	P-A P-B P-C
Companies that could conduct cloning activities in the EU	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
AI companies		✓	✓	✓	✓		✓	✓		✓	✓	✓
Holdings/breeders								✓		✓	✓	✓
Markets & assembly centres										✓	✓	✓
Slaughterhouses										✓	✓	✓
Processing / manufacture of meat and dairy											✓	✓
Wholesale of live animals, meat and dairy product										✓	✓	✓
Retailers of food and specialist retailers of meat and meat product										✓	✓	✓
Importers: live animals	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Importers: reproductive materials		✓	✓	✓	✓		✓	✓		✓	✓	✓
Importers: meat food products				✓	✓					✓	✓	✓

** It is assumed here that a pragmatic solution reached to exclude clones from food chain avoids need to engage slaughterhouses, processors and manufacturers.*

A8.3.4 Identify expected frequency of activities and cost parameters

The frequency of activities is related to the number of times per year that an action is required. Cost parameters include the labour costs associated with a particular action as well as any equipment or supplies required. Table A8.3 assigns a frequency to the required actions and the estimated resource requirements expected to arise from each activity.

Table A8.3 Direct costs and administrative burdens – activities and estimated resource requirements

Obligation	Activity	Approach	Frequency	Description / explanation
Comply with legislation (general)	Preparatory actions – learning about new legislation / obligations	All	One-time	This is a one-off cost to learn about the new regulation and determine the obligations that may be required as a result
	Reporting and inspection	All	Recurring	Reporting requirement frequency over the period to 2020 is unknown, but will recur over time
Comply with traceability requirement	Information – record status & parentage (where required)	Traceability	Recurring	Recording information on each animal, batch of animals, and batch of reproductive materials as required by package and strategy adopted
	Amendments to existing traceability systems or new systems	Traceability	One-time	Adjustments to existing traceability systems to record and transmit information as required by package and strategy adopted
	Other compliance costs	Traceability	Recurring	Time required to transfer information between MS for internal trade, tags to identify animals where required and time to tag animals where required
Comply with labelling requirement	Label change or redesign	Traceability + labelling	One-time	Adapting or redesigning a product label for each operator, where required
Comply with premarket approval requirement	Tier 1 application	Traceability + PMA	One-time	Submission of a dossier, administrative procedures, and toxicology testing, per product, where required

A8.3.5 Identify data sources for analysis

Data sources used to develop the cost model include Eurostat, TRACES, consultancy studies, stakeholder consultation and expert assessment. The data sources used for each element of the model are referenced with the related data in the sections that follow.

A8.4 Stage 2 – Data capture and standardisation

A8.4.1 Assess the number of entities concerned

Data were gathered on the numbers of economic operators in each of the potentially affected sectors for the different approaches, and broken down by species where possible. These data were primarily sourced from Eurostat and TRACES.

Robust data on the total number of markets and assembly centres and slaughterhouses are not available. A 2009 study on the impacts of introducing bovine EID estimated the number of bovine markets and assembly centres and slaughterhouses, but information on the other species is not available. Although the European Commission publishes a list of approved markets and assembly centres, these are only for intra-EU trade; the number of such operators at MS level exceeds the number authorised for trade purposes and these data are not available. Additionally, the number of holdings/breeders of equine animals for food production is unknown.

Importers are considered separately from other companies. It should be noted, however, that:

- AI companies, breeders and producers may all be involved directly in the import of reproductive materials and live animals.
- Manufacturers and wholesalers of meat are often directly involved in the import of meat.
- Specialist import/export trading companies also exist for reproductive materials and food products.

Table A8.4 Economic operators by sector and species (*indicative*)

Sector	All species	Bovine	Porcine	Ovine	Caprine	Equine
Companies that could conduct cloning activities in the EU	7	*4*	*1*	*0*	*0*	*2*
AI companies	294	*150*	*50*	*10*	*5*	*79 studs*
Holdings/breeders	7,852,710[2]	*3,334,210*	*2,662,310*	*1,189,480*	*666,710*	*Unknown*
Markets & assembly centres	-	*5,644**				
Slaughterhouses	-	*9,847**				
Processing / manufacture of meat and dairy	81,993	-	-	-	-	-
Of meat:	*59,794*	-	-	-	-	-
Of dairy:	*23,196*	-	-	-	-	-
Wholesale of live animals, meat and dairy product	82,801	-	-	-	-	-
Of live animals:	*16,823*	-	-	-	-	-
Of meat specialists:	*22,715*	-	-	-	-	-
Of dairy [and egg] specialists:	*14,464*	-	-	-	-	-
Retailers of food and specialist retailers of meat and meat product	623,812	-	-	-	-	-
Of meat and meat product specialists:	*110,693*	-	-	-	-	-
Importers: reproductive materials**	120	53	12	2	2	51
Importers: live animals	1667	3	12	5	2	1645
Importers: meat	715	280	40	374 (ovine & caprine)		21

Sources: Eurostat Structural Business Statistics (2009), extracted on 18/07/12; and TRACES data provided by DG SANCO

**FCEC (2009), pp. 71, Slaughterhouses (9,847); Markets and Assembly Centres (5,644)*

*** NB: only embryos are imported for bovine animals; and only semen is imported for the other species*

A8.4.2 Assess the resources required for each entity to conduct the require activity

Normal, efficient durations were estimated for an 'average' operator to conduct the required activities. The activities, associated resource requirements and a description/explanation of the estimated

[2] Does not include equine holdings/breeders

requirement are set out in 0. These figures are provided on a 'best estimate' basis since the specific requirements are not yet defined. Table A8.5 sets out the estimated hourly labour cost for each of the sectors potentially affected by the four approaches. The associated staff category and assumptions are also provided.

Table A8.5 Regulatory cost model parameters – staff hourly labour costs

Sector	Estimated hourly labour cost	Staff category	Assumptions
Companies that could conduct cloning activities in the EU AI companies Importers of reproductive materials	€52	Rate for 'managers' – 'professional, scientific and technical activities' (M)	Average (€26.18) based on available data for 21 MS Employee compensation = 50-60% of labour costs. Hourly rate doubled to estimate hourly labour cost.
Markets & assembly centres Slaughterhouses Processing/manufacture of meat & dairy Importers of live animals	€46	Rate for 'managers' – 'Manufacturing' (C)	Average (€23.09) based on available data for 21 MS Employee compensation = 50-60% of labour costs. Hourly rate doubled to estimate hourly labour cost.
Wholesale of live animals, meat & dairy products Food retailers Importers of meat, dairy and related food products	€43	Rate for 'managers' – 'Wholesale and retail trade' (K)	Average (€21.69) based on available data for 21 MS Employee compensation = 50-60% of labour costs. Hourly rate doubled to estimate hourly labour cost.
Holdings/breeders	€16	Rate for 'skilled agricultural workers' – 'Business economy' (B-N)	Average (€8.01) based on available data for 21 MS Employee compensation = 50-60% of labour costs. Hourly rate doubled to estimate hourly labour cost.

Eurostat, structure of earnings survey, 2010; hourly earnings data are limited to enterprises with 10 employees or more

The hourly labour rate to be used for livestock farmers is contestable. Many livestock farms are family businesses employing the farmer's own labour, that is, wage costs are not observable. Also, in some sectors direct payments can form a substantial part of total farm income. A review of other studies prepared for the Commission in recent years show a variety of approaches (and cost rates) have been used, including wage data with an uplift for overheads, and use of "Technicians and associate professionals" information from data in the International Standard Classification of Occupations.

A8.5 Stage 3 – Calculate and report

The main report contains detailed tables presenting the calculations for learning, reporting and inspection and administrative costs by approach, strategy and sub-strategy and species.

Table A8.6 Direct burdens – activities and estimated resource requirements

Obligation	Activity	Resource requirements – estimated hours	Description / explanation
Comply with legislation (general)	Preparatory actions – learning about new legislation / obligations	70 hours – upstream operators 1 hour – downstream operators under Strategy 1 5 hours – downstream operators under Strategy 2	Upstream operators bear responsibility for the introduction of clones and their reproductive materials into the supply chain. These operators will need considerable time to learn about the new requirements. 70 hours provides time for operators to review the new obligations and determine what that means for their business and consider potential impacts. Downstream operators will require less time to learn about new obligations as they will bear responsibility only for passing on information, where required
	Reporting and inspection	8 hours per action – upstream operators under the Suspension approach 2 hours per action – upstream operators under the Traceability approach 2 hours per action – breeders/holdings under Strategy 1 4 hours per action – breeders/holdings under Strategy 2 1 hour per action – downstream operators	Upstream operators bear responsibility for the introduction of clones and their reproductive materials into the supply chain and will likely have more burdensome reporting requirements as a result Breeders/holdings for porcine, ovine, caprine, and equine animals under Strategy 2 will have many more animals to ID and trace than under Strategy 1 and will therefore require more time for reporting/compliance activities; breeders/holdings will require more time for compliance activities than downstream operators because of the potential introduction of offspring/descendants of clones and their reproductive materials at this stage in the supply chain Downstream operators for food products will have the least burdensome reporting requirements because they will be primarily recording and reporting on information provided by other operators
Comply with traceability requirement	Information – record status & parentage (where required)	1 minute per action – breeders/holdings per animal or batch	Approximately one minute per action is estimated for each instance of recording the status of an animal or batch of animals or reproductive materials and of recording the parentage of an animal or reproductive materials

Annex 9 The scope for use of DNA databases in verification

Physical verification of claims made for imports would be possible if samples from the exported products could be compared to a DNA database. This would require a record of the DNA of the clones (and offspring and descendants under some policy packages) as well as standard administrative data (registration number, etc.). This would allow testing of samples from animals to determine if they were present on the registry. It would not be possible to confirm that an animal has clone heritage if its parent was not on the database.

In practice, use of DNA testing is limited depending on the type of food products covered (e.g. meat or milk) and the stage of the food supply chain controls where testing is used. These issues are discussed below.

A9.1 There are some products for which DNA databases cannot provide verification

DNA databases cannot be relied upon for verification of products where DNA has been destroyed (such as highly purified therapeutic proteins or fats (Loftus, 2005)). It also cannot be used for dairy products or mixed meat products as discussed below.

Milk and its derivatives: DNA testing cannot be used to determine if dairy products are from cloned animals. While trace DNA may be present in milk this would not provide a reliable basis for verification testing. This, together with the fact that milk from different animals is mixed from the milking parlour onwards, suggests that segregated supply chains would be needed to provide DNA-based traceability for food products derived from clones, clone offspring and/or clone descendants.

It is difficult to extract DNA from products obtained by processing milk. In particular, hard paste and long ripening cheese present challenges to obtaining DNA of sufficient quality to conduct traceability analysis. Some techniques have been reported which describe the isolation of genomic DNA from somatic cells of bovine milk (Lipkin et al., 1998) and from epithelial cells of caprine and bovine milk (Amills et al., 1997). None of these methods are suitable for large scale genotyping projects because consistent quantifiable amounts of good quality genomic DNA cannot be obtained (Murphy et al., 2002).

Furthermore, it is not possible to provide traceability at the level of an individual animal for milk and its derivatives because both marketed milk and dairy-cheese products are obtained by mass production. The only information which can be extracted from DNA analysis concerns the animal's breed, which is of no interest for identifying individual clones, their offspring or descendants (Blasi, 2004).

Mixed meat products: Manufactured products such as 'ready meals', sausages, and minced meat present another challenge for meat traceability using DNA testing. Determining the number of contributors to a DNA mixture of randomly selected animals is not feasible when the mixture contains DNA from more than five or six individuals and where pre-selection is not feasible (which would enable identification of only a few potential animals which contributed to the product) (Dodds and Shackell, 2004). Individual identification is even more difficult.

In these situations, testing can only identify whether an individual *may* have contributed to the mixture. This is so because mixed samples have a DNA profile showing many alleles at each marker (individual DNA profiles show one or a maximum of two alleles at each DNA marker). Therefore, DNA profiling cannot be used to identify individual animals in compound meat products (Raymer, 2005).

A9.2 There are also practical factors that reduce reliability of DNA verification

There are practical factors that reduce the utility and reliability of DNA databases as verification tools for claims made about clone heritage. This is particularly the case:

- Where the clone and the original animal are in the food chain at the same time, and equally where reproductive materials, offspring, descendants and products derived from a clone are in the food chain at the same time as equivalents produced from the original animal; and
- When the parentage of young animals is incorrectly recorded.

Simultaneous presence: The clone and its parent have the same DNA; in this case, it is not possible to tell whether a product originates from the former or the latter. DNA-traceability systems would therefore need to be coupled with another traceability system to differentiate between the clone's parent (and its offspring and descendants) and the clone (and offspring and descendants).

A second traceability system could be developed to operate alongside DNA traceability, which would identify the animal or its carcass (i.e. by adding the date and time slot when the animal was born or other pieces of information within the second traceability system to differentiate the clone from the original animal). The second system may include Radio Frequency Identification (RFID) or ear tagging.

Incorrect attribution of parentage: The full traceability of clone descendants across generations would require individual animal identification and recording details of both parents, plus submissions of DNA samples. Research and consultation advice suggests that the parentage of young animals is not always recorded correctly on farm. In an upland sheep farm setting, for example, lambs may easily be attributed to the wrong dam. One peer-reviewed research paper refers to several studies that suggest between 6 and 18 per cent of lambs can be 'stolen' from the dam by another ewe, which would result in misidentification of the dam and potentially also the sire (Kilgour and Dalton 1984). This could result in animals incorrectly being tagged as having clone heritage, and clone descendants being tagged as 'normal'. Such errors could be picked up by parentage tests done on each sample submitted but that would add another layer of burdens on operators.

Verification of controls on animal cloning in the food chain and the potential role of DNA testing

Verifying whether reproductive materials, animals and food products derived from animals have 'clone' heritage presents certain challenges because the cloning process leaves no physical or genetic marker. The challenge for cloning measures is to verify the lineage of individual animals whereas in other systems such as for organic products, the information in traceability systems can be matched with tests on the presence of prohibited products in the production process at any point along the supply chain, and through checks on the production process on farm.

Clone heritage can be positively identified by comparison of the genetic profile of the animal or sample with the genome of animals known to be clones or of reproductive material derived from clones. Documents and registration numbers can be used to track offspring of clones and their descendants but where provenance is in doubt regulators would need to look to DNA testing as a means of determining the origin of animal and meat products.

In order to function correctly, DNA testing requires that there be a DNA register against which a tested product can be compared. For example, if the goal of a DNA testing regime is to establish whether a meat product is derived from a clone, then it would be necessary to establish a DNA register of clones. In this example it is important to note that performing a DNA test would determine if the product included meat from a clone on the DNA register. It can only provide positive identification with reference to **known** animals. It could not identify whether the meat was derived from a clone not on the register.

DNA testing can be used for verification purposes within the system to check the identification of animals (and derived products) if the DNA profiles of those animals, or their parents, are held on a database (registry).

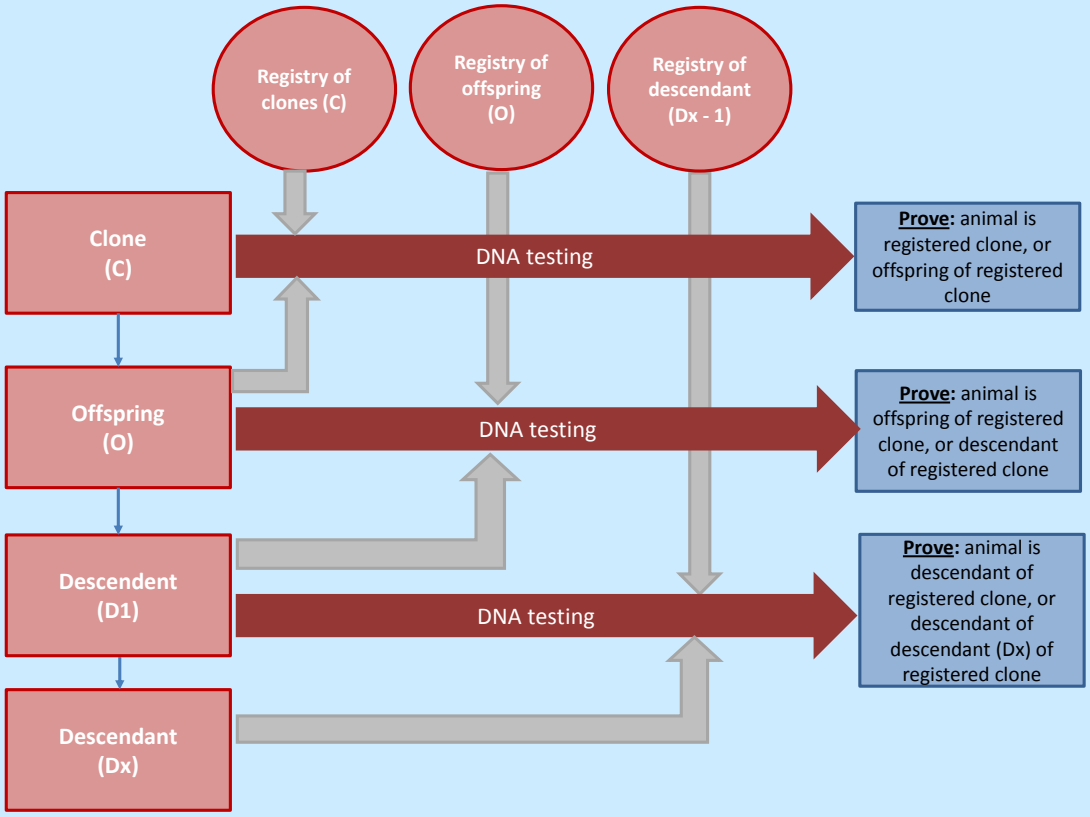
Consultations with industry suggest that DNA testing can reliably be used to identify an individual animal or its offspring but technological limitations mean that it cannot be used to identify with confidence second generation descendants of the parent animal. Second generation descendants of clones could, however, be identified by reference to a register of first generation offspring. Consultations indicate that with investment in supporting systems, DNA testing could be used to:

- Identify *clones* when the *DNA of clones* is registered on a database;
- Identify *offspring* of clones when the *DNA of clones* is registered on a database;
- Identify *descendants* of clones when the *DNA of offspring* of clones is registered on a database;
- Identify *all generations* of descendants of clones when the *DNA of the preceding generation* of descendants of clones (Dx-1) is registered on a database;
- Identify *food from clones* when *DNA of clones* is registered on a database (but not where the inputs include meat from more than one animal);

- Identify *food from offspring* of clones when *DNA of clones* is registered on a database (but not where the inputs include meat from more than one animal);
- Identify *food from descendants* of clones when the *DNA of offspring* of clones is registered on a database; and
- Identify *food from all generations* of descendants of clones when the *DNA of the preceding generation of descendants* of clones (D_{x-1}) is registered on a database (but not where the inputs include meat from more than one animal).

It cannot identify clones, reproductive materials, offspring, or descendants that are not on the register.

The potential application of DNA testing in verification of controls on animal cloning in the food chain



DNA testing can confirm (with a specified level of confidence) that the sample came from an animal whose DNA is held on a database of DNA profiles. **It cannot, however, prove that a sample is not derived from an animal with clone heritage**.

The test compares the sample with those held on the database. If there is uncertainty about whether the database holds details of all the animals that are of interest then there is going to be uncertainty about whether the test result equates to confirmation that the sample is not from an animal with clone heritage. If there are clones, clone offspring and clone descendants in the market that are not registered, then DNA testing cannot identify reproductive material, offspring, descendants or products derived from them. The test can 'prove' the positive (i.e. that the sample is from an animal known to have clone heritage, but not the 'negative' (that it is not).

Annex 10 Supplementary information on livestock sectors

A10.1 Bovine animals

This section provides some background on the bovine sector, covering the structure of the breeding industry, the distribution of holdings and production, information on exports

A10.1.1 Breeding profile

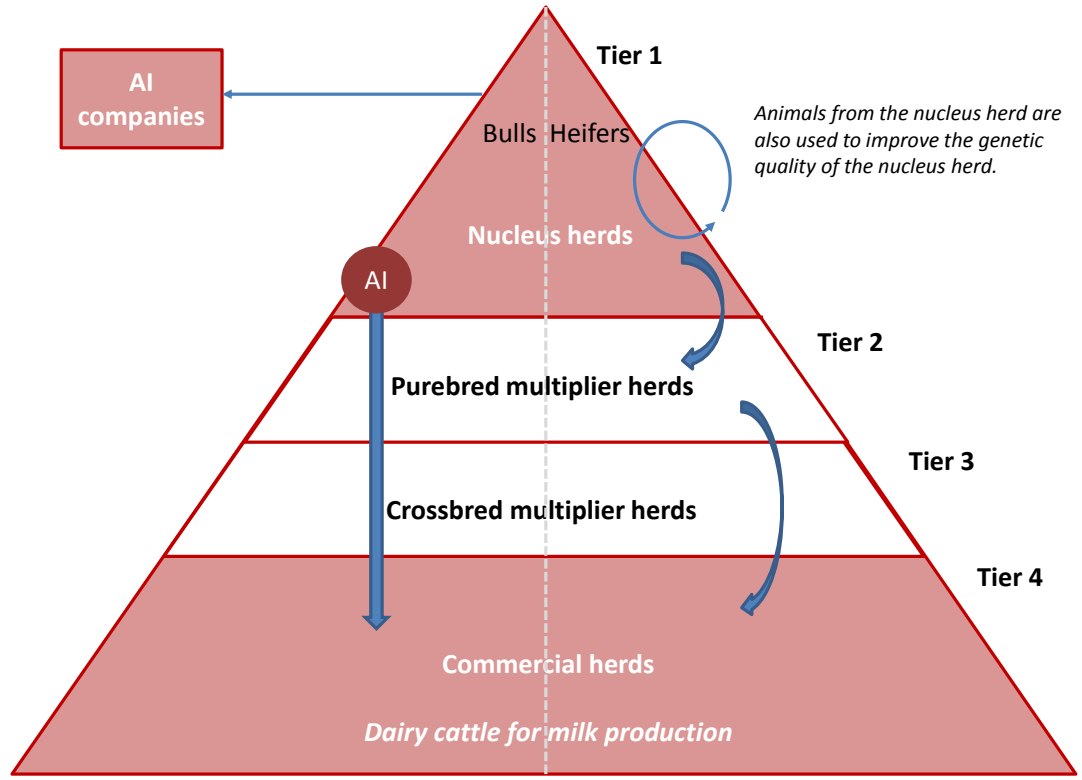
The industry can be considered as a pyramid in which commercial herds are connected to breeders developing new traits and better performance via multipliers (Figure A10.1). Points in the breeding process where artificial insemination is commonly used in the breeding of beef and dairy animals are identified with 'AI' in Figure A10.1 and Figure A10.2. The use of artificial insemination enables faster transmission of genetic traits from high performing animals in nucleus herds to commercial herds, bypassing the multipliers. This trend is more advanced in dairy than in beef production. Cloning could accelerate the transmission process further by enabling a larger production of reproductive materials of a given genotype. Increased availability of the very best genetics would be expected to have negative effects on demand for reproductive materials from less high performing animals.

Table A10.1 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.

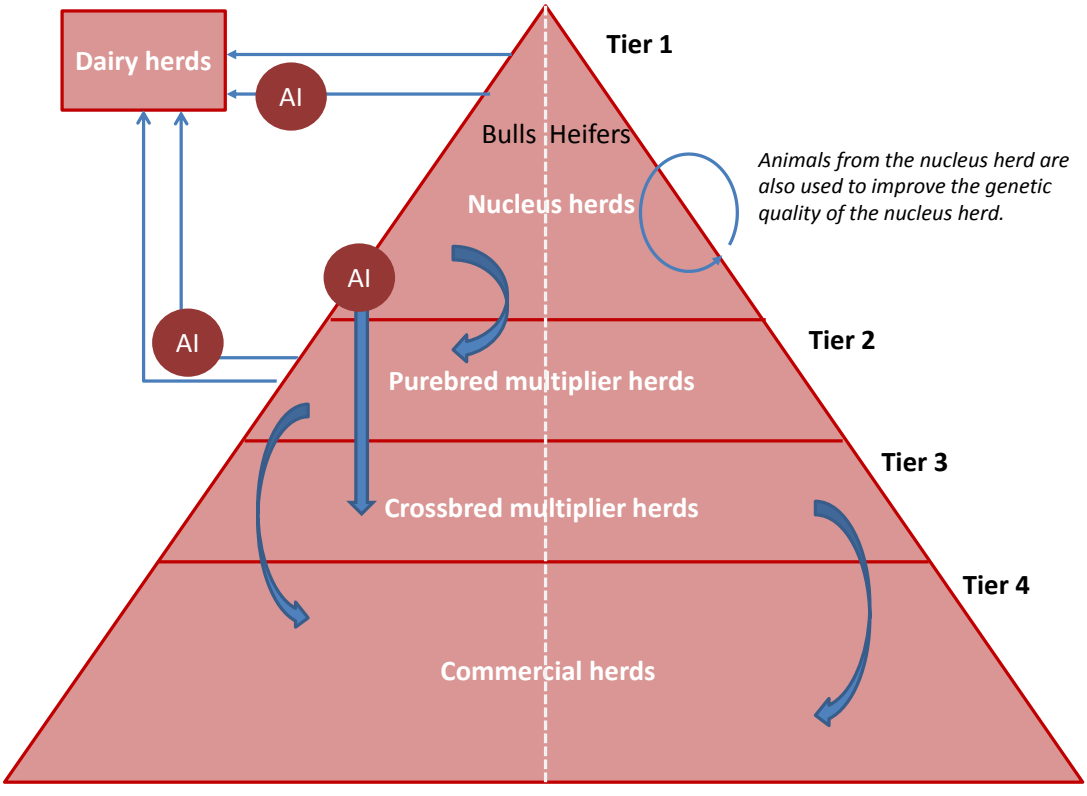
Source: adapted from Simm (1998)

Figure A10.1 AI has enabled the transfer of genetic traits directly from tier 1 to tier 4, bypassing the need for multiplier herds. The blue arrows denote the transfer of genetic traits between herds.



Source: adapted from Simm (1998)

Figure A10.2 The beef cattle breeding pyramid relies less on AI than the dairy pyramid; multiplier herds remain important. The blue arrows denote the transfer of genetic traits between herds.

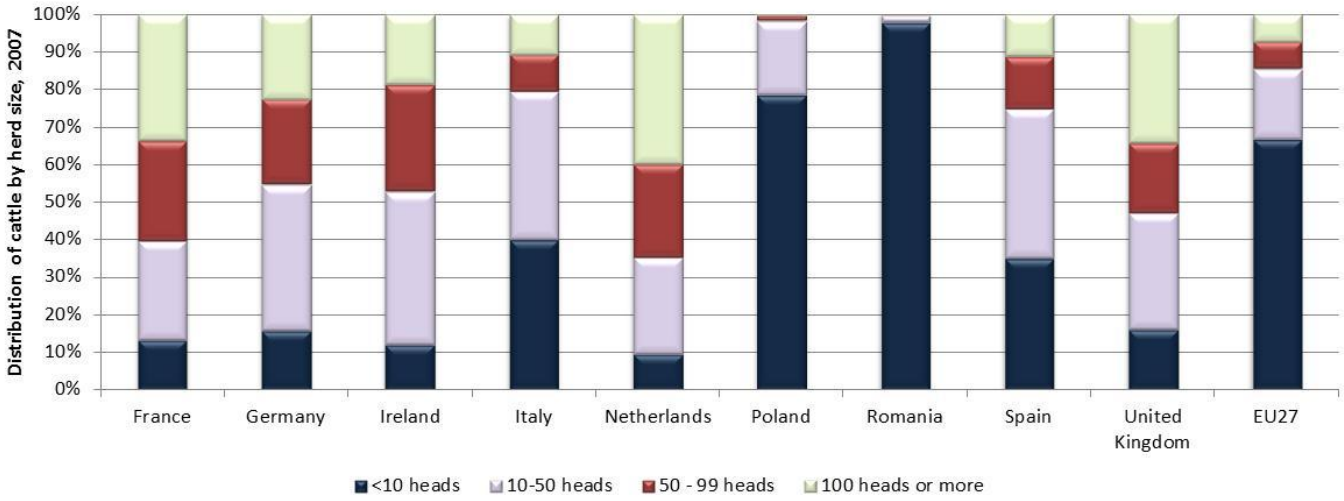


Source: adapted from Simm (1998)

A10.1.2 Distribution of cattle holdings

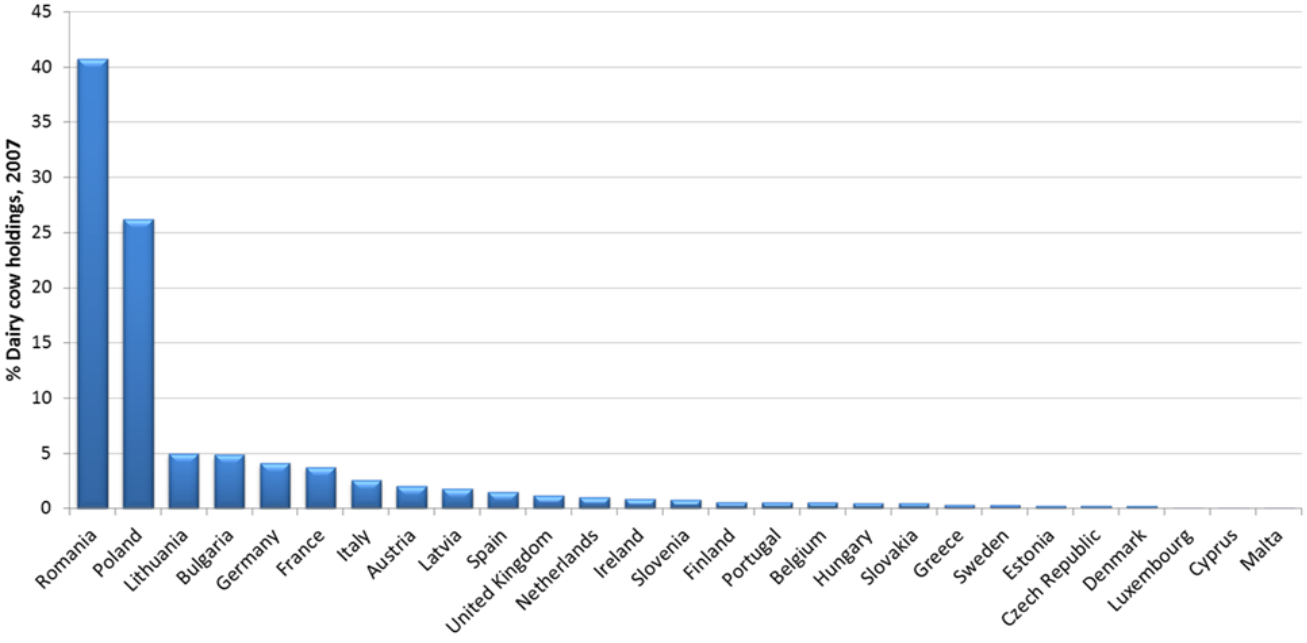
The distribution of cattle holdings follows a different pattern to the distribution of the cattle population. More than half of European cattle holdings are located in Romania and Poland (Figure A10.3). The majority of holdings in Poland and Romania (79 per cent and 98 per cent respectively) have between 1 and 9 animals. By comparison, a large proportion of the holdings in Germany and France (45 per cent and 60 per cent, respectively) are of 50 heads or more. 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. Dairy cow holdings in Northern and Western Europe are typically fewer in number but larger in size.

Figure A10.3 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 A10.4 Distribution of dairy cow holdings in Member States, 2007

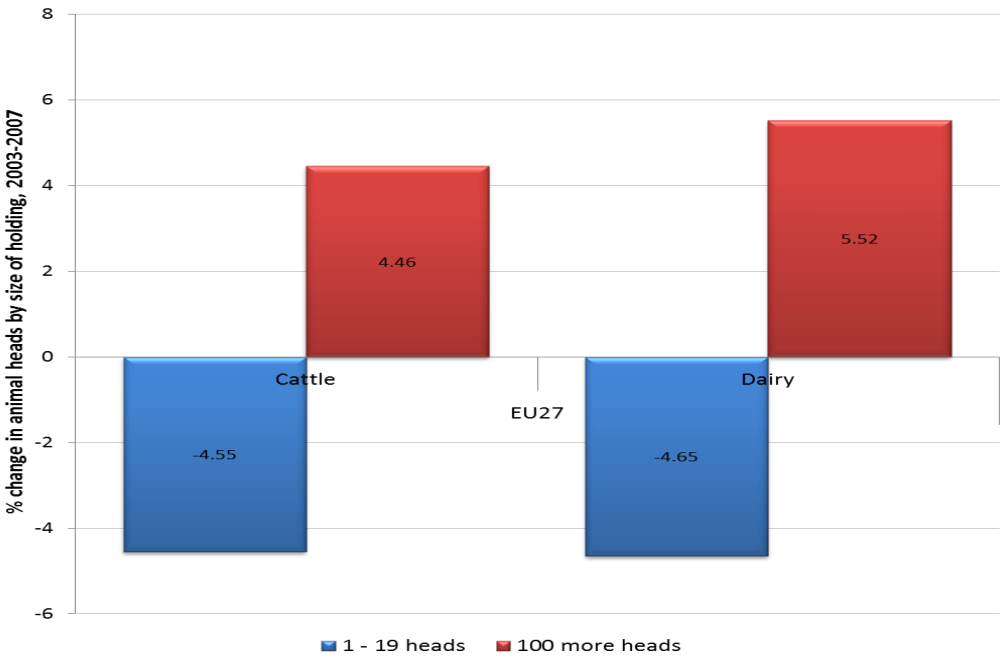


Source: Eurostat (2012)

The EU's cattle and dairy cow populations are concentrated in Member States where the majority of holdings each have more than 100 animals. In new Member States, the majority of cattle and dairy cows are kept on small holdings of nine animals or fewer.

There was a decrease in the number of cattle and dairy cows of approximately 5.5 per cent between 2003 and 2007 (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 A10.5).

Figure A10.5 Between 2003 to 2007 the number of animal heads on small holdings decreased while the number of animal heads on large holdings increased

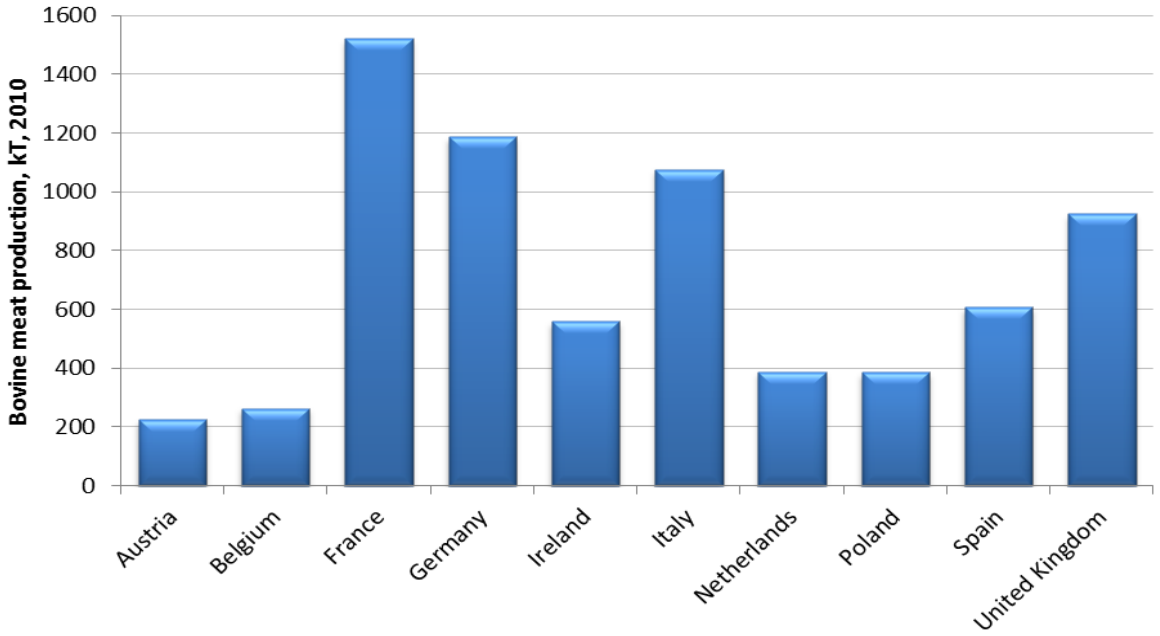


Source: Eurostat (2012), supporting data are provided in Table A11.3

A10.1.3 Geographical distribution of beef and veal meat production

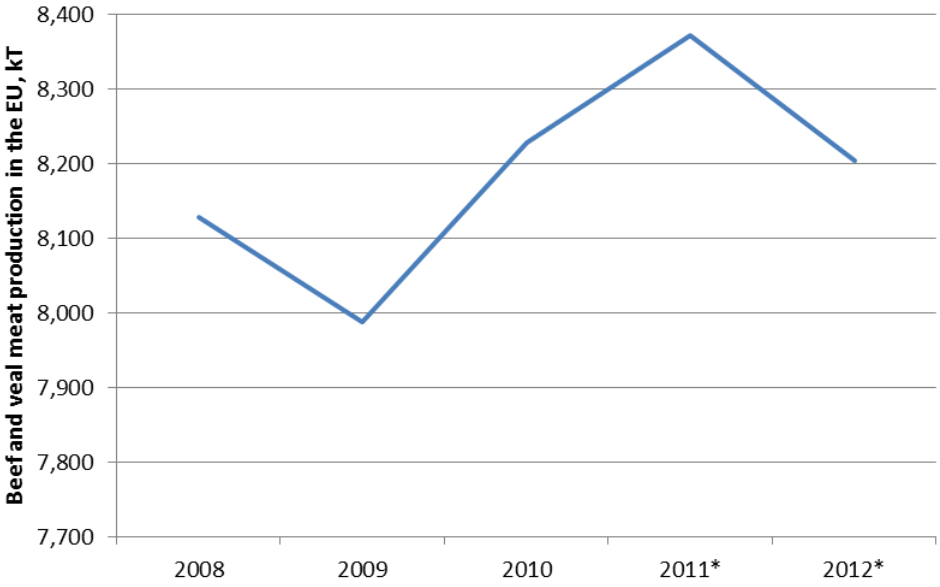
The EU produced 7,900 thousand tonnes (kT) of bovine meat for the purpose of food production in 2010. More than 59 per cent came from four countries (France, Germany, Italy and the UK). The structure of EU production has changed little over time: the same four countries accounting for 57 per cent of bovine meat production in 2004. Beef production from the ten EU producers that account for 90 per cent of total output are shown in Figure A10.6.

Figure A10.6 Beef production in Europe is concentrated in four countries: France, Germany, Italy and UK



Source: Eurostat (2012), supporting data provided in Table A11.6

Figure A10.7 Domestic beef and veal meat production in the EU, kT, 2008-2012



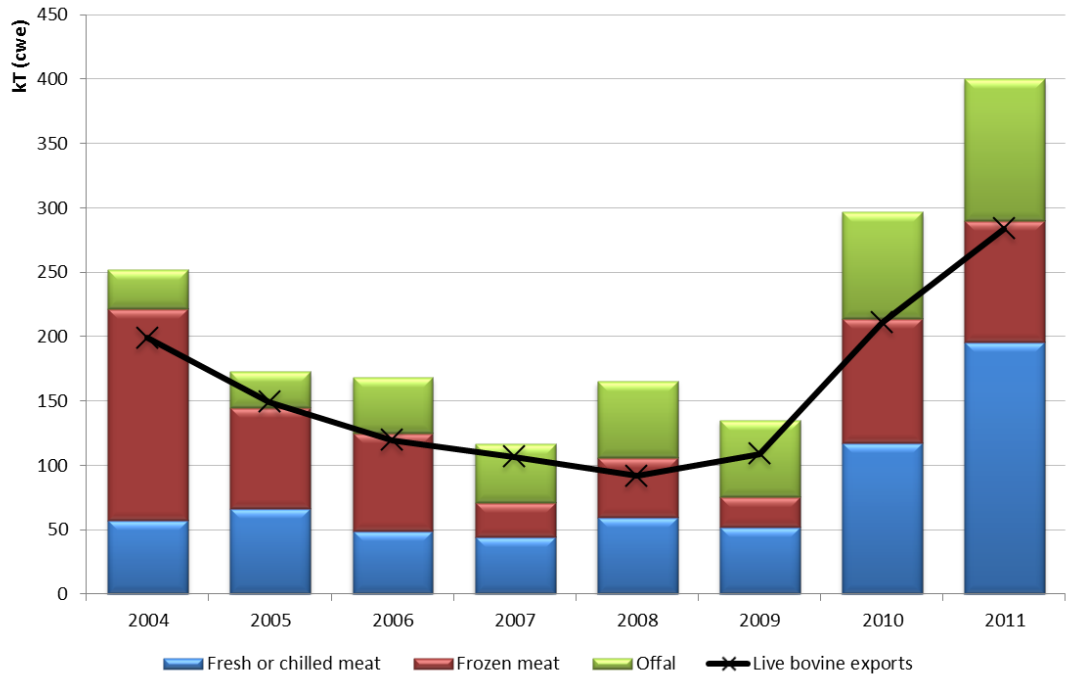
Source: DG Agri (2011), supported by data of the Table A11.4

A10.1.4 Bovine exports by volume and value

Bovine exports declined in 2004 and stabilised thereafter. In 2010 EU bovine exports increased in volume by 125 per cent from 2009 levels (see Figure A10.8). Particularly marked increases occurred in the trade of fresh, chilled and frozen bovine meats as well as in the trade of live bovines. From 2004-2011, the relatively stable EU exports in bovine offal represented 25 per cent of total bovine meat and meat product exports.

As a result of such rapid growth, the total value of EU exports of live bovines and bovine meat in 2011 was worth in excess of €1.7 billion. Exports doubled in size in a single calendar year from 2009 to 2010 (see Table A11.21).

Figure A10.8 EU exports of bovine meat and live bovines showed signs of resurgence in 2010



Source: Eurostat COMEXT, supporting data is available in Table A11.23

A10.1.4.2 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 increased by €177 million and €338 million respectively and in 2011 they represented more than 62 per cent of the total EU bovine meat exports by value and volume (Table A11.24).

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 Short Term Outlook (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 A11.26 and Figure A11.1Figure A11.1) 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 were available on exports of porcine genetic materials. Porcine semen is not traded extensively 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. On average, based on 2006-2011 COMEXT data, the EU exports €25 million of bovine semen each year. EU exports of bovine semen to the US, Canada and Latin America, however represents less than half of this total export value from 2006-2011. A further quarter of this trade is to neighbouring countries, particularly Turkey and Switzerland, while more modest amounts are exported to Australia, China and Japan. In 2011, based on US[3] and Canadian[4] import data, EU exports to these respective markets represented 21 per cent and 23 per cent of the total value of their imports of bovine semen.

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

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

A10.1.4.3 Future prospects and main competitors

There were sharp increases in beef exports in 2010 and in 2011 but the OECD-FAO Agricultural Outlook forecasts EU exports in beef and veal to fall steadily year-on-year from 2010-20, by an estimated total of 41 per cent.

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 A11.27). 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.

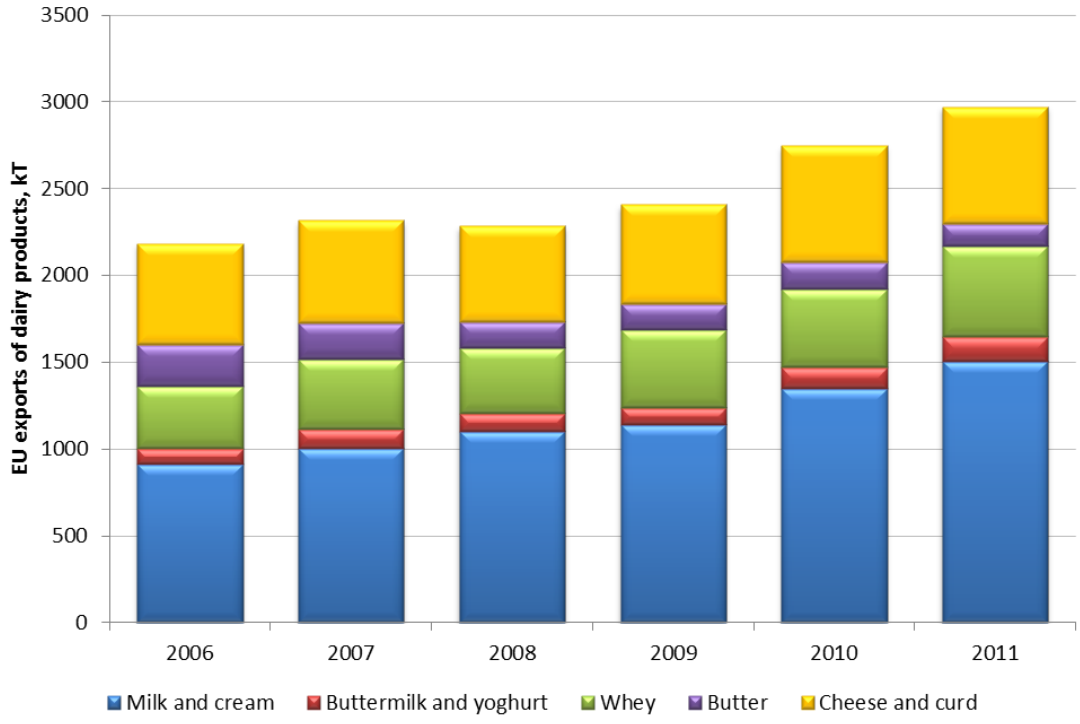
Many of the EU's beef exports are destined for neighbouring countries to the south and east of the EU. Of these, only the Russian market is substantial in terms of import volume, though this market is forecast to shrink by 11 per cent between 2010 and 2020. The Turkish market is also expected to remain 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 A11.27). 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.

A10.1.4.4 Dairy products by volume and value

The total volume of EU exports of milk and milk product steadily increased over the period 2006 to 2011, with average year-on-year growth of 1.5 per cent. By 2011, exports of milk and cream accounted for over half of total dairy exports, with cheese and curd accounting for a further quarter (674 kT).

Figure A10.9 Growth in milk and cheese exports saw EU dairy exports exceed 2.7 million tonnes in 2010



Source: Eurostat, for supporting data see Table A11.55

Cheese accounts for a relatively smaller share of the volume of total EU dairy trade, but is still the most valuable dairy export product due to its high added value (see Table A11.55). In total, exports of milk and dairy products were worth over €8 billion in 2011, up €3 billion from 2009 levels. The EU export markets for dairy-based buttermilk and yoghurt products are relatively minor in terms of both value and volumes.

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.[5]

A10.1.4.5 Main dairy export markets

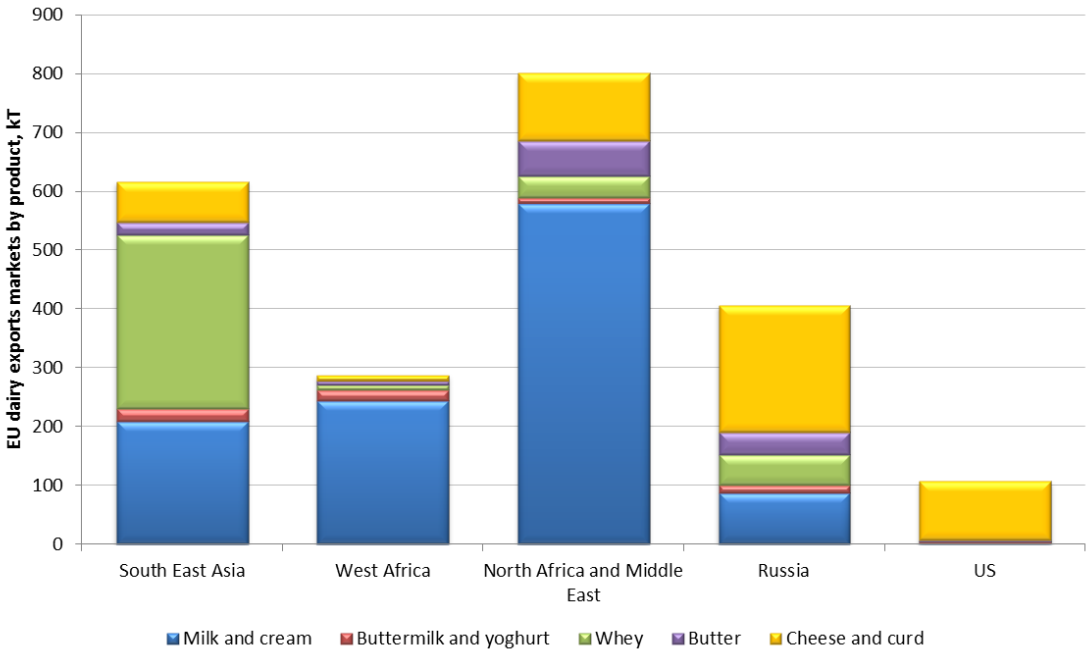
The major export markets for EU dairy products are Russia, the Middle East, North Africa, and South East Asia. Of these, South East Asia and Russia markets have seen the strongest growth in recent years. The size of these main EU export markets varies considerably for different individual products (Figure A10.10).

The majority of EU milk and cream exports are purchased by North African and Middle Eastern countries. 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 (Table A11.58). 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, worth €97m and €33m per year over the period 2006 to 2011 respectively. Over this period, these two markets together imported an average of 50,000 tonnes of EU butter per year, representing roughly a third of total EU butter exports.

In 2011, over 30 per cent of all EU exports of cheese and curd (over 200,000 tonnes) were purchased by Russia – trade which valued over €780 million, up from €462 million in 2009. The next major importers 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 (103,000 tonnes) in 2011.

Figure A10.10 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 A11.58

The market for whey is instead more geographically concentrated, with more than two thirds of EU exports consumed in South East Asia from 2009 to 2011. China is the single largest importer, buying over 140,000 tonnes in 2011 with a market value of €204 million.

EU export markets for milk proteins and caseinates were worth €394 million per year from 2006 to 2011. The main markets for EU milk proteins are based in North America and South East Asia. The US market is the most valuable overall, worth €140 million annually.

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

A10.1.4.6 Future prospects and main competitors

The EU is a major player in international dairy markets. It accounted for 24-30 per cent of total dairy exports from 2005 to 2010. The big four dairy producers, in order of their market share, are: New Zealand, the EU, Australia and the US. Together these account for 80 per cent of the total volume of dairy exports (Table A11.58).

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 milk production increase in both the EU and in the main supplying countries (New Zealand, Australia, the US, etc.) and the sustainability of the demand on the world market led by China and other countries of South-East Asia, and supported by the Near and Middle East.

In the OECD-FAO's 2011 projections, global import demand for dairy produce were forecast to rise by a million tonnes from 2010 to 2020 (Table A11.60). As well as continued strong demand from the key South East Asian markets for milk and whey, growing import demand for dairy produce was 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 was 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 represent roughly 75-80 per cent of total EU dairy exports. This share is forecast to increase to over 92 per cent by 2020 (Table A11.59) with the markets for butter and whey becoming less significant.

DG AGRI (2011) and OECD-FAO (2011) provided positive export forecasts for EU cheese 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 A11.61).

The short-term outlook for EU exports of milk powder is however less positive. Projections are for EU whole milk powder exports to decline steadily despite growing world demand, led by China and South East Asia, as exports from New Zealand and Australia are expected to remain more competitive. EU exports of skim milk powder are seen as being competitive only in Russia (DG AGRI Short Term Outlook, 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 expected to increase from 2010-2020 by 56,000 tonnes and 110,000 tonnes respectively (OECD-FAO 2011).

A10.1.5 Traceability

A10.1.5.1 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.

A10.1.5.2 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.

A10.1.5.3 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.

A10.1.5.4 Traceability

Food business operators are required to keep reliable traceability systems in place including details of who they received a product from and who they supplied (i.e. 'one-up'one-down traceability). The Regulation applies to all stages of production, processing and distribution of food and feed.

The principles of one-up-one-down traceability are as follows:

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

A10.1.5.5 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, in addition to information on the health status of these animals.

A10.1.5.6 Harvest (Slaughterhouse)

Passports are surrendered to the CA by abattoir after animals are harvested. A carcass label is attached to each quarter. The label 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.

A10.1.5.7 Computer database

A computer database must be kept. It must hold information on 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.

A10.1.5.8 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.

A10.2 Porcine animals

A10.2.1 Breeding structure

The figure below shows the structure of the pig breeding pyramid. Breeding and selection for the genetic improvement of specific breeds or lines is conducted at the nucleus herd level.

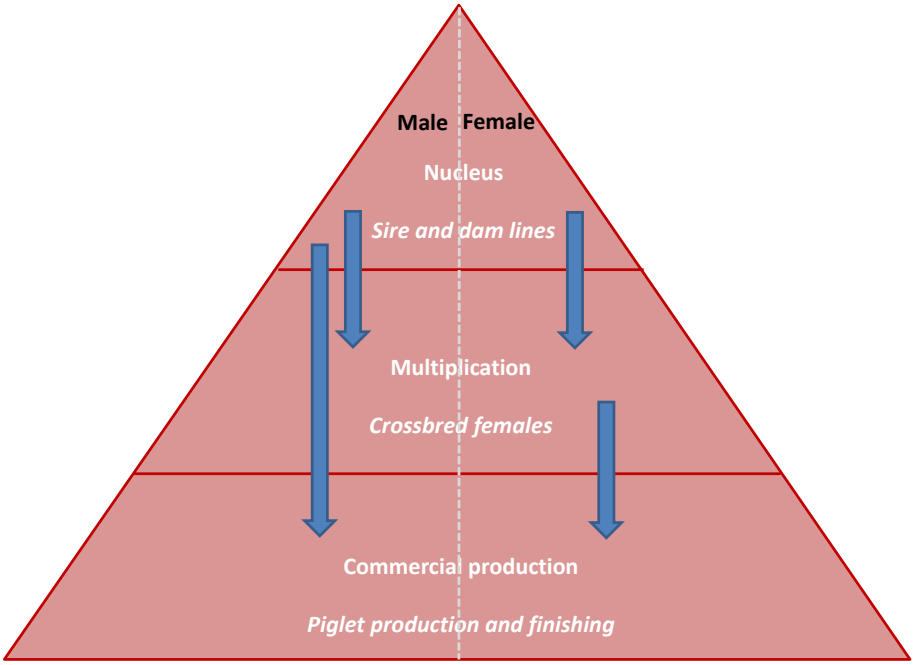
The objective of the pig breeding industry is the genetic improvement of animals to meet the demands of customers, pork producers and processors. These demands may include, for example, animal welfare concerns, efficient conversion of feed to weight gain and uniformity of size. This process involves the dissemination of genetic changes from the nucleus breeding farms down to the multiplier and commercial farms. This process takes time and it typically takes 3 – 5 years for genetic variations to be disseminated 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).

A10.2.2 Reproductive technologies

Assisted reproductive technologies (ARTs) 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 cross-herd genetic evaluation and selection in national and multinational breeding programmes (Knap et al. 2001 in Dekkers Mathue and Knol, 2011).

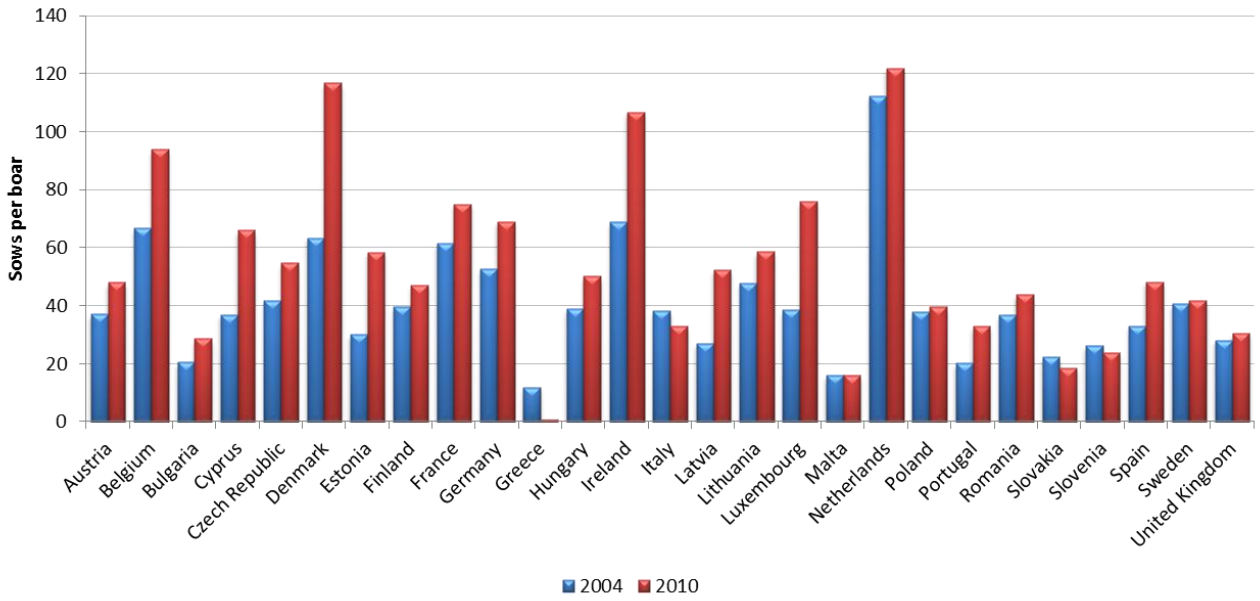
The number of boars per sow reflects the frequency of artificial insemination; the higher the ratio of sows per boar the higher the frequency of artificial insemination as multiple sows are inseminated with a limited number of boars. The frequency of artificial insemination indicates the relative importance 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 A10.11 Pig breeding pyramid



Source: Dekkers, Mathue and Knol (2011)

Figure A10.12 The frequency of artificial insemination, as 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. They export 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).

A10.2.3 Pig breeding organisations

Table A10.2 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, France ■ Herdbook, Poland ■ Herdbooks, Italy ■ Herdbooks, Germany ■ Herdbooks, Eastern EU	11	4.5
Total 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 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, Mathue and Knol (2011)

A10.2.4 Geographic distribution

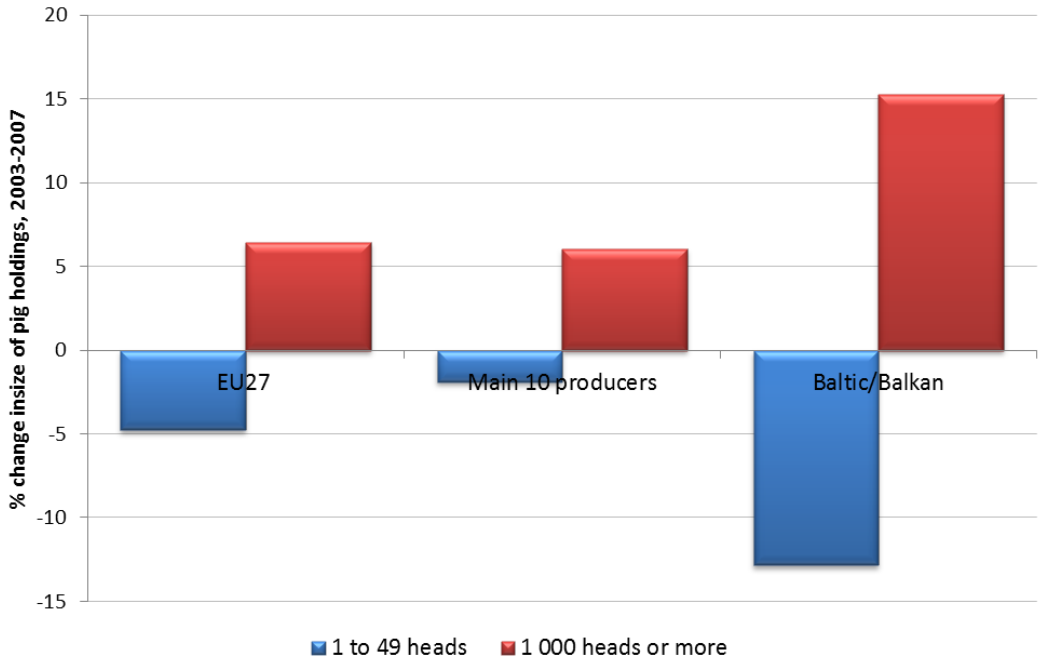
The majority of pigs in Europe are produced on large holdings. There are a large number of pig holdings in Romania, Poland, Hungary and Bulgaria which together account for almost 80 per cent of all holdings in Europe. These holdings are typically small, with 1 – 2 animals each in 77 per cent of holdings 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.

A10.2.5 Structural differences in pig production across EU Member States

The number of pigs raised in Europe each year fell 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. The shift was less pronounced in the ten main EU producers of pigs[6] than it was in the Member States of the Baltic and Balkan regions (Figure A10.13).[7]

Figure A10.13 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



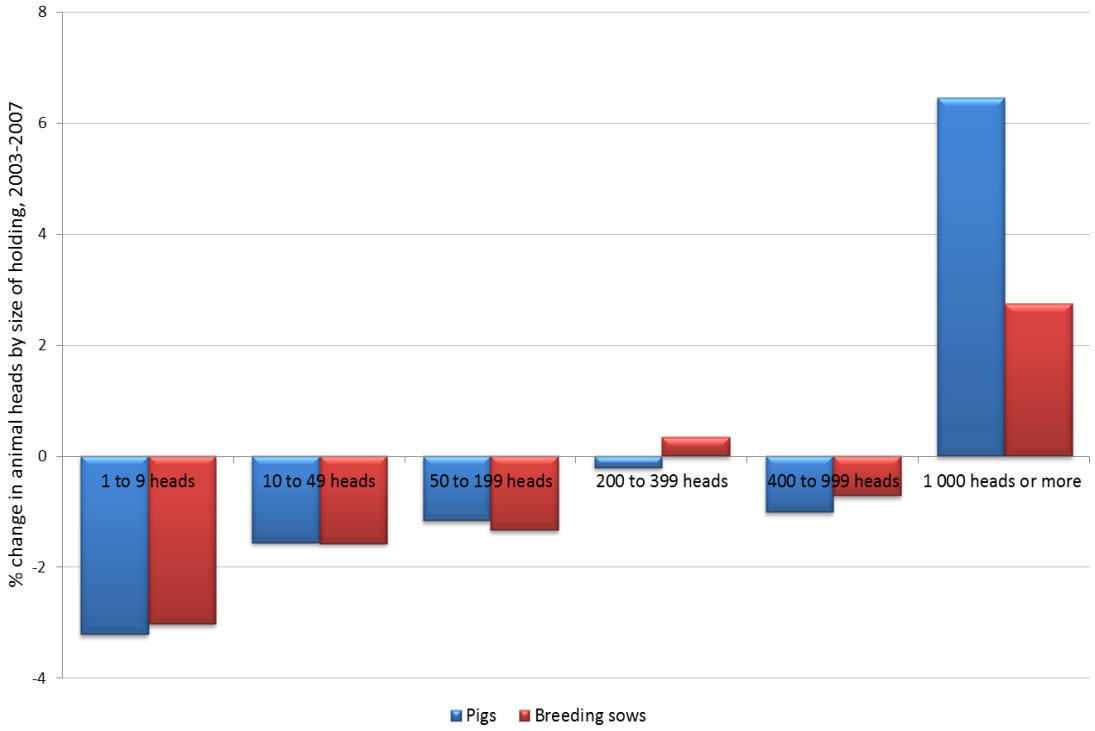
Source: Eurostat (2012), supporting data is available in Table A11.7

A similar pattern was seen 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 A10.14).

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

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

Figure A10.14 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

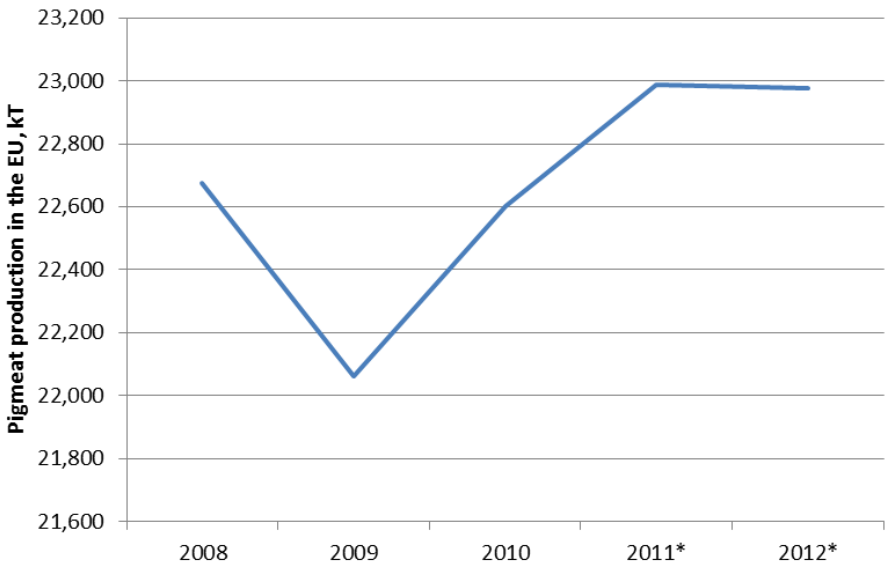


Source: Eurostat (2012), supporting data is available in Table A11.8

A10.2.6 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 A10.15 Domestic production of pig meat in the EU between 2008 and 2012, kT



Source: DG Agri (2011), supported by data in Annex Table A11.9.

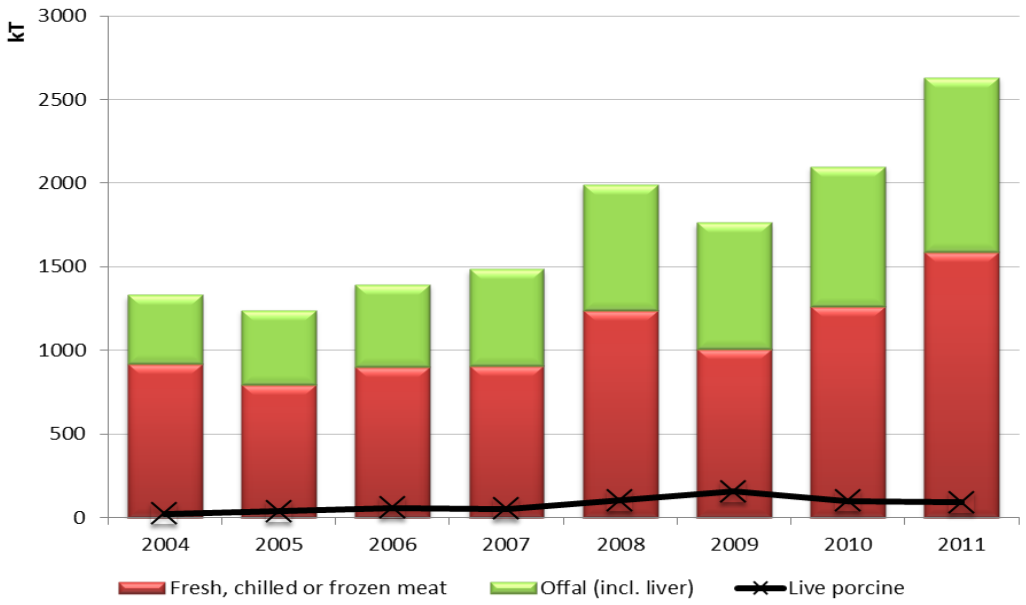
The EU pig meat market is the most export-oriented of the EU's meat production sectors. In 2010, eight per cent of the pig meat produced in the EU was exported to third countries (see Table A11.10).

A10.2.7 Trade

A10.2.7.1 Porcine exports by volume and value

EU porcine exports experienced average year-on-year growth of 11.3 per cent from 2004 to 2011. The EU exported more than 2.7 million tonnes of (mainly frozen) porcine meat in 2011. Over the 2004-2011 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 150,000tonnes (worth €225 million) at their 2009 peak.

Figure A10.16 EU exports of both pig meat and pig offal have steadily grown in recent years



Source: Eurostat COMEXT, supporting data is available in Table A11.36.

The total value of EU porcine meat exports rose from €2.9 billion to €5.3 billion between 2006 and 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.

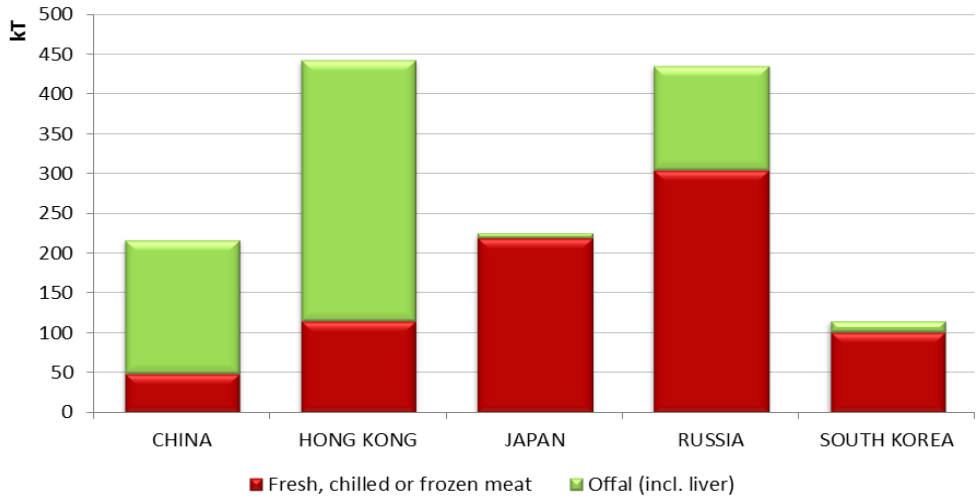
A10.2.7.2 Main porcine export markets

In recent years, more than half of all EU pig meat and offal exports have gone to the Far East. Most are destined for just three countries: China, Japan, and South Korea. Russia takes an additional 20 per cent of EU pig meat and offal exports. These patterns have been relatively stable over time (Figure A11.3).

About three quarters of exports, in the form of pig offal, go to Mainland China and Hong Kong (where it is considered to be 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 A10.17).

The EU exports approximately 28,000 tonnes of gelatine derived from pigs each year. These exports were worth approximately €131 million each year over the period 2006 to 2011. The US, Japan and Switzerland are the three major importers of EU gelatine, and together took 58 per cent of total EU gelatine exports from 2006 to 2011.

Figure A10.17 The type of porcine product exported by the EU varies considerably according to the preferences of the partner country, 2010

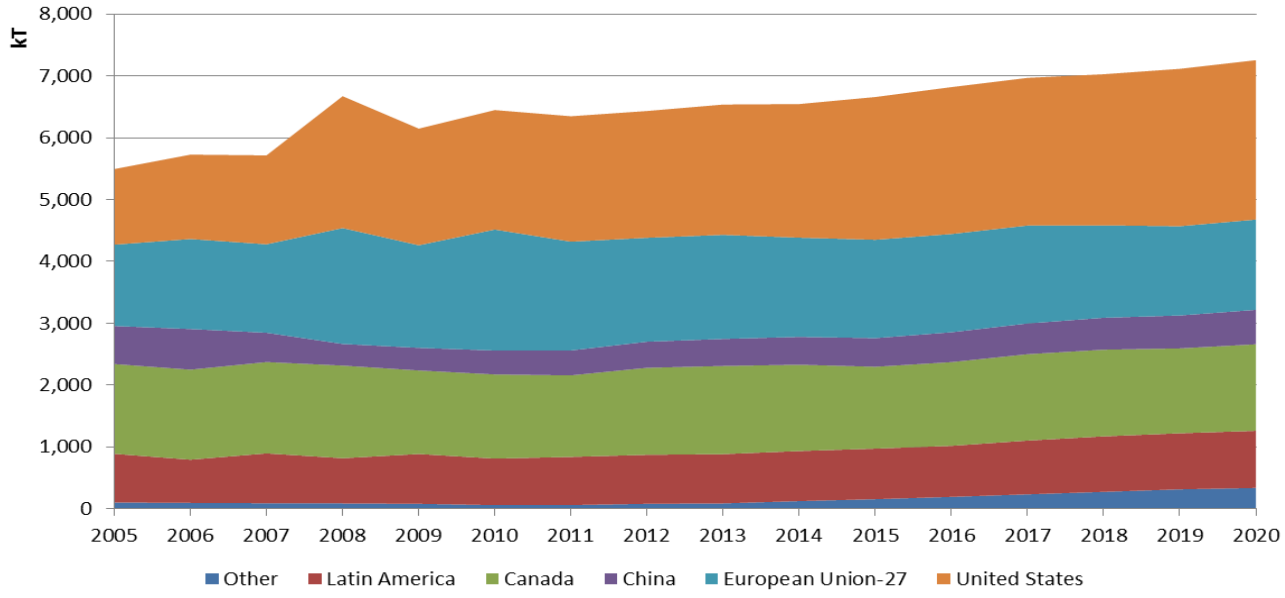


Source: Eurostat COMEXT

A10.2.7.3 Future prospects and main competitors

As Figure A10.18 shows, EU pork exports are globally significant. EU pig meat accounted for approximately a quarter of total world pig meat exports from 2005 to 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 A10.18).

Figure A10.18 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 A11.37

Looking ahead to 2020, EU pig meat exports are forecast to decline year on year. The EU's share of the market was expected fall to 20 per cent by OECD-FAO in the 2011 projections. This decline is likely to occur in the context of global growth in the volume of pig meat exports. This growth is expected to be captured mostly 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 A11.38). 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.

A10.2.8 Traceability

In the EU, TRACES is used to track 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.

A10.2.8.1 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.

A10.2.8.2 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.

A10.2.8.3 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.

A10.2.8.4 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.

A10.2.8.5 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.

A10.2.8.6 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.

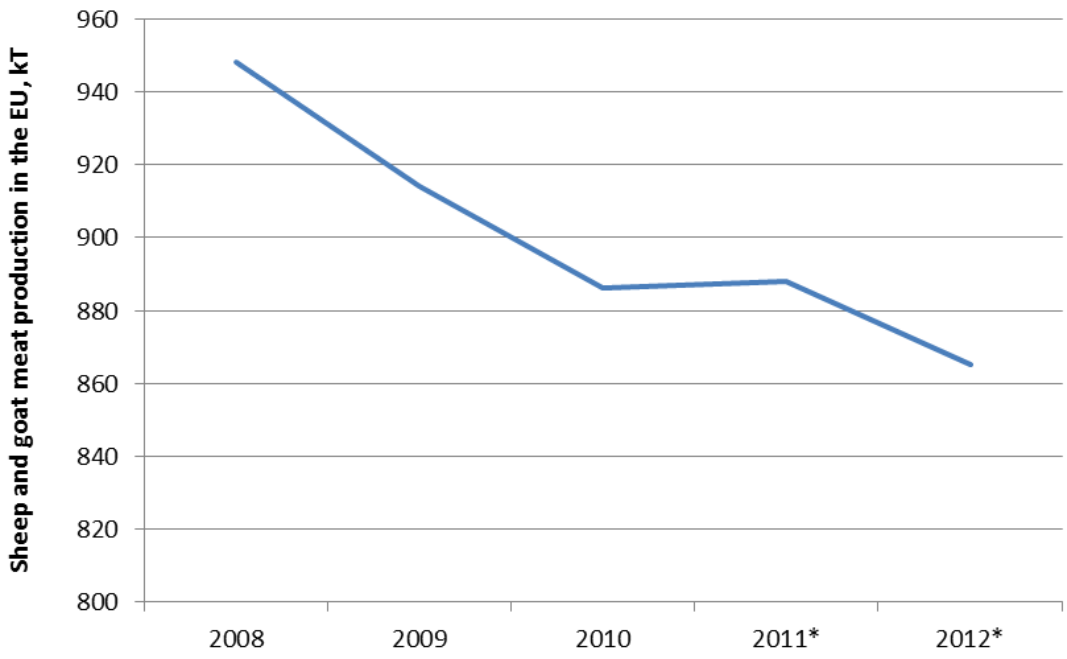
A10.2.8.7 Labelling and Documentation Rules

Current legislation does not require labelling 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.

A10.3 Ovine and Caprine animals

A10.3.1 Domestic production

Figure A10.19 Domestic production of ovine and caprine meat in the EU between 2008 and 2012, kT



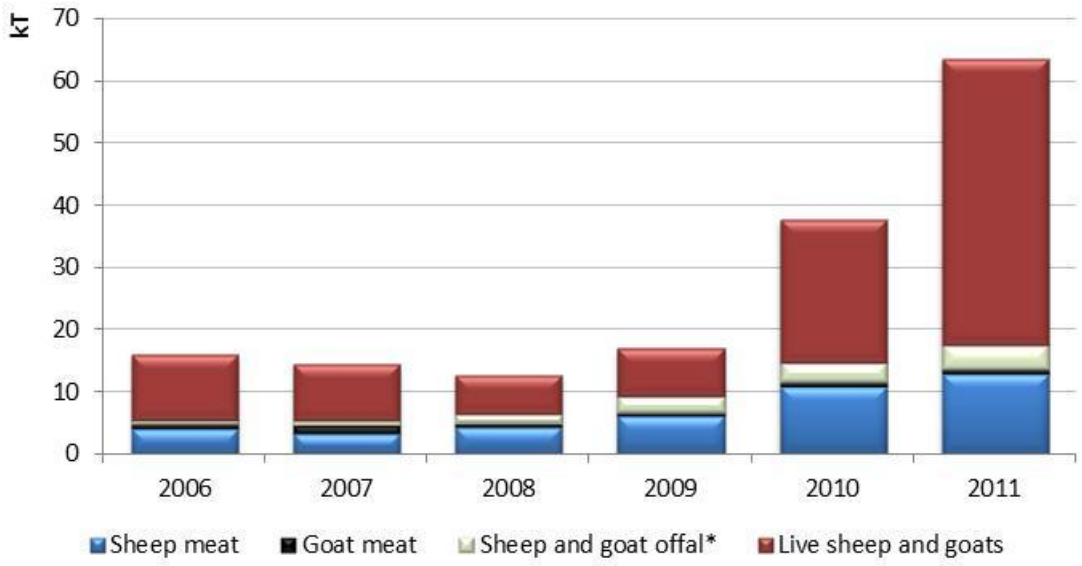
Source: DG Agri (2011), supported by data of the Table A11.12

A10.3.2 Trade

A10.3.2.1 EU ovine and caprine exports

EU exports of sheep and goat meat are relatively small. The trade volumes are dwarfed by exports of bovine and porcine meat and meat products. In 2011, the EU exported 13kT of sheep meat valued at €99 million. In 2011 exports of live sheep doubled from 2010 levels to 46 kT. 83 per cent of that 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 A11.41. The corresponding volume of this trade is provided in Table A11.43.

Figure A10.20 EU exports of sheep and goat meat have steadily risen each year from 2006 to 2011



A10.3.2.2 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 A11.44). 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 A11.45).

A10.3.3 Traceability

In the EU, TRACES tracks ovine and caprine animals. Ovine and caprine animals are individually identified in the EU, except where derogations provide for batch identification of young animals sent straight to slaughter and for Member States with small populations of these animals.

A10.3.3.1 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.

A10.3.3.2 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.

A10.3.3.3 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.

A10.3.3.4 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.

A10.3.3.5 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.

A10.3.3.6 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.

A10.3.3.7 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.

A10.4 Equine animals

A10.4.1 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 A11.52. The corresponding value of this trade is provided in Table A11.50.

A10.4.2 Traceability

A10.4.2.1 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:

A10.4.2.2 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; and
- photo of the equine animal.

A10.4.2.3 Passport

All equidae born in the EU 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.

A10.4.2.4 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.

A10.4.2.5 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.

A10.4.2.6 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.

Annex 11 Supporting data

A11.1 Breeding profile supporting data

A11.1.1 Pigs

Table A11.1 Statistics on the pig population in the EU27, 2010

	Total pig population	Sows	Sows per boar	Sows per 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)

A11.2 Domestic production supporting data

A11.2.1 Aggregate meat production in the EU[8]

Table A11.2 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

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

A11.2.2 Bovine production

Table A11.3 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 A11.4 Domestic beef and veal meat production in the EU, kT (cwe), 2008-2012

Product	2008	2009	2010	2011*	2012*
Gross indigenous production[9]	8,127	7,988	8,228	8,371	8,203
Net production[10]	8,077	7,929	8,113	8,222	8,061
Trade balance in live animals	-50	-59	-115	-149	-142

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

Table A11.5 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 Short Term Outlook (2011)

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

[10] 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.

Table A11.6 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
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

A11.2.3 Porcine production

Table A11.7 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 A11.8 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 A11.9 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 Short Term Outlook (2011)*

Table A11.10 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 Short Term Outlook (2011)

Table A11.11 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

A11.2.4 Ovine and caprine production

Table A11.12 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 Short Term Outlook (2011)*

Table A11.13 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 Short Term Outlook (2011)

Table A11.14 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 A11.15 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**

A11.2.5 Equine production

Table A11.16 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 A11.17 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 A11.18 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*

A11.2.6 Dairy production

Table A11.19 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 Short Term Outlook (2011)*

Table A11.20 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 Short Term Outlook (2011)

A11.3 Trade supporting data

A11.3.1 Bovine

Table A11.21 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	36	35	51	51	81	124	377
Prepared meat products	36	37	49	41	41	54	257
Gelatine*	14	13	9	15	17	20	87
Live bovines	247	261	233	270	484	816	2,312

** Approximately 10 per cent of the raw materials for gelatine is derived from cattle and other bovines according to the Gelatine Manufacturers of Europe, http://www.gelatine.org/en/metanavigation/top/faq.html, accessed on 28/08/2012; Data Source: Eurostat COMEXT, extracted on 20/06/12*

Table A11.22 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
Gelatine	9	7	8	9	9	**8**	42
Live bovines	5	7	6	7	1	1	27

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

Table A11.23 Volume of EU exports of bovine meat and live bovines by product, kT

	2006	2007	2008	2009	2010	2011
Fresh or chilled meat	49	44	60	52	117	196
Frozen meat	76	27	46	24	96	94
Offal	2	3	2	5	7	11
Prepared meat products	22	20	29	22	18	20
Gelatine	32	30	22	29	35	40
Live bovines	43	46	59	60	83	110

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

Table A11.24 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
% Total exports	27%	65%	64%		24%	63%	62%	

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

Table A11.25 Volume of EU imports of bovine meat by country of origin, kT

	2006	2007	2008	2009	2010	2011
Africa	11.5	18.5	16.3	18.5	22.6	7.7
Argentina	55.9	57.6	56.2	73.6	50.2	44.8
Australia	8.1	6.3	9.0	10.8	9.6	12.5
Brazil	263.0	181.6	42.0	40.4	43.6	45.4
Europe (non EU)	0.4	0.2	3.2	2.3	2.5	2.4
New Zealand	2.7	2.6	7.9	10.5	9.6	11.2
Rest Of World	2.4	3.0	2.7	4.8	6.1	5.6
United States	0.6	2.1	4.9	7.4	11.7	16.2
Uruguay	26.4	25.3	46.4	58.3	47.5	39.0
Grand Total	371.0	297.6	188.6	226.5	203.4	184.7

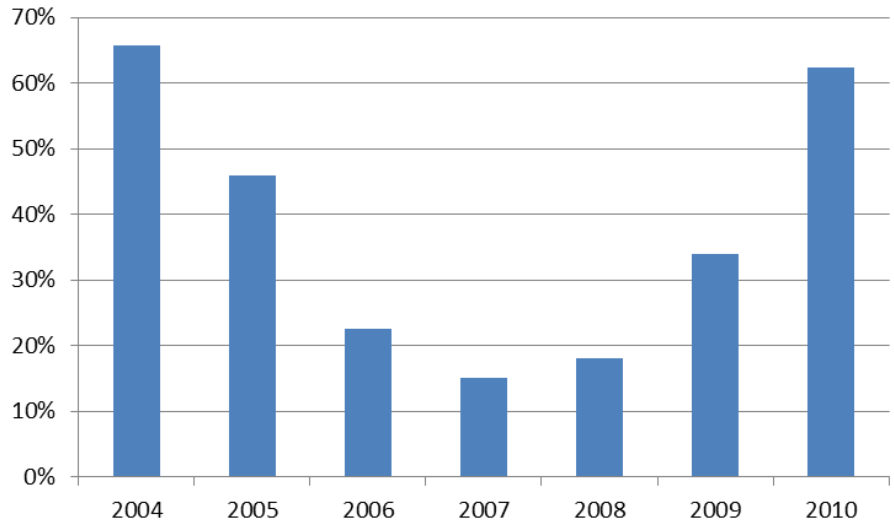
Source: Eurostat COMEXT, data extracted on 17/02/2012

Table A11.26 Volume of EU exports of live bovine by main destination, kT

	2006	2007	2008	2009	2010
Albania	11.2	10.5	10.3	10.1	7.2
Algeria	7.1	1.5	1.9	10.8	19.5
Bosnia and Herzegovina	9.8	3.5	5.6	5.7	4.9
Croatia	31.2	26.9	28.0	25.3	27.0
Egypt	0.5	3.6	1.2	0.7	3.9
Israel	2.8	2.5	2.7	2.0	4.8
Jordan	:	1.1	0.1	1.0	2.8
Kosovo	0.5	0.5	1.4	0.8	1.4
Lebanon	6.4	4.7	7.6	12.2	56.4
Libya	2.3	0.6	2.6	2.0	4.0
Morocco	6.0	4.6	4.5	7.8	16.6
Russia	15.8	32.3	14.4	13.8	13.0
Switzerland	1.5	1.5	1.7	1.7	1.9
Syria	7.6	5.5	2.7	6.3	14.0
Tunisia	0.5	0.2	0.2	3.3	4.4
Turkey	0.1	:	0.0	0.0	25.4
Grand Total	119.4	106.4	91.9	108.7	210.9

Source: Eurostat COMEXT, data extracted on 20/06/2012, NB: missing data for 2011

Figure A11.1 The share in volume of EU live bovine exports to five of the main destinations[11] mirrors the overall trend



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

Table A11.27 Forecast of the main worldwide exporters of beef and veal, 2010-2020, kT (carcass weight)[12]

	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

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

[12] The carcass weight equivalent does not correspond to the weight of edible meat, since the removal of types of waste (bones, fat, etc.) is necessary. In the EU, the carcass weight is generally considered 30 per cent greater than that of boneless meat (i.e. a conversion rate of 1.3 is typically adopted). This will vary according to the breed and type of animal. *Source: Centre d'Information des Viandes,* http://www.civ-viande.org/ebn.ebn?pid=153&good=glossaire&nodoctype=0*, accessed on 19/09/12*

Table A11.28 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 A11.29 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, data extracted on 24/07/12

Table A11.30 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, data extracted on 24/07/12

Table A11.31 Value of extra-EU imports of bovine semen, Mio €

Country of origin	2006	2007	2008	2009	2010	2011
US	18.8	18.1	21.6	20.0	23.2	23.4
Canada	15.5	16.0	16.1	13.1	19.7	21.6
Switzerland	0.6	0.9	0.9	0.9	0.9	0.8
Norway	0.1	0.2	0.3	0.3	0.6	0.8
New Zealand	0.1	0.1	0.0	0.4	0.7	0.7
Australia	0.9	0.3	0.6	0.3	0.2	0.2
Total	36.1	35.5	39.6	35.0	45.5	47.6

Source: Eurostat COMEXT, extracted on 18/09/12

Table A11.32 Value of EU exports of bovine semen by region, Mio €

	2006	2007	2008	2009	2010	2011
Australia	1.2	0.7	1.7	1.1	1.2	1.9
Brazil	1.5	1.2	2.9	2.1	2.3	2.8
Canada	0.4	0.4	1.1	1.2	0.9	0.9
Chile	0.5	0.8	3.5	0.6	0.6	1.2
China	0.2	0.8	0.9	3.9	1.4	1.7
Europe (non-EU)	2.8	3.1	4.3	4.3	5.0	5.0
Japan	0.7	0.5	1.3	0.7	0.7	0.7
Mexico	2.6	1.8	2.2	2.0	1.8	1.9
Turkey	1.5	2.2	1.2	2.6	3.6	4.1
United States	3.4	1.9	4.1	2.1	3.2	5.3
Grand Total	18.7	18.2	27.8	25.4	28.0	32.2

Source: Eurostat COMEXT, extracted on 18/09/12

A11.3.2 Porcine

Table A11.33 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 Short Term Outlook (2011)

Table A11.34 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
Prepared meat product	403	425	445	434	470	564	2,741
Gelatine*	130	113	79	132	151	182	786
Live pigs	102	94	166	225	153	169	909

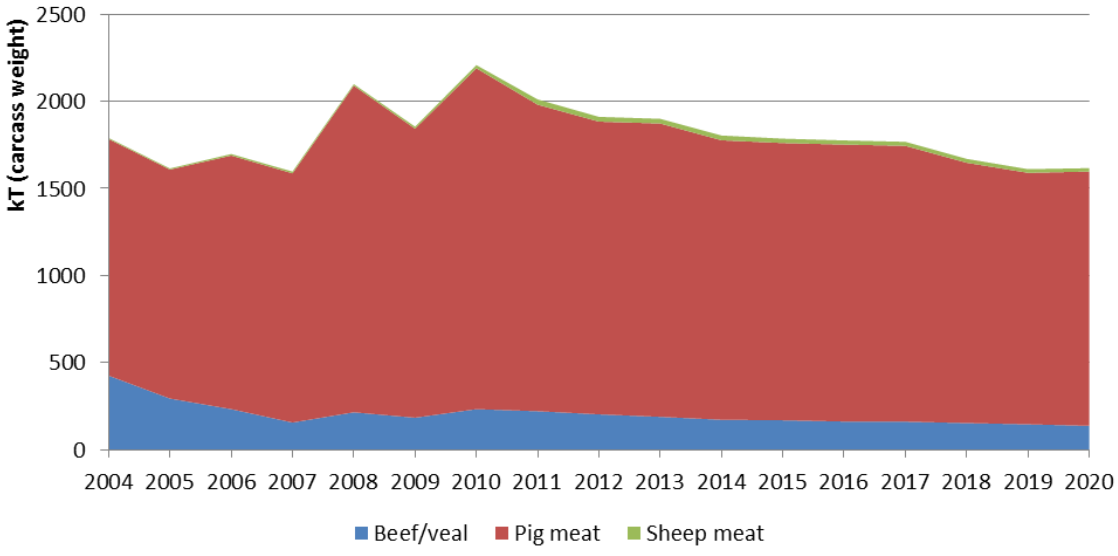
** Approximately 90 per cent of the raw materials for gelatine is derived from pigs and other porcine according to the Gelatine Manufacturers of Europe, http://www.gelatine.org/en/metanavigation/top/faq.html, accessed on 28/08/2012;Source: Eurostat COMEXT, extracted on 20/06/12*

Table A11.35 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
Prepared meat product	20	18	16	15	18	20	86
Gelatine	81	67	70	84	77	76	376
Live pigs	1	1	1	1	1	1	7

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

Figure A11.2 The overwhelming majority of EU red meat exports are derived from pigs and this pattern is forecast to continue in the years to come



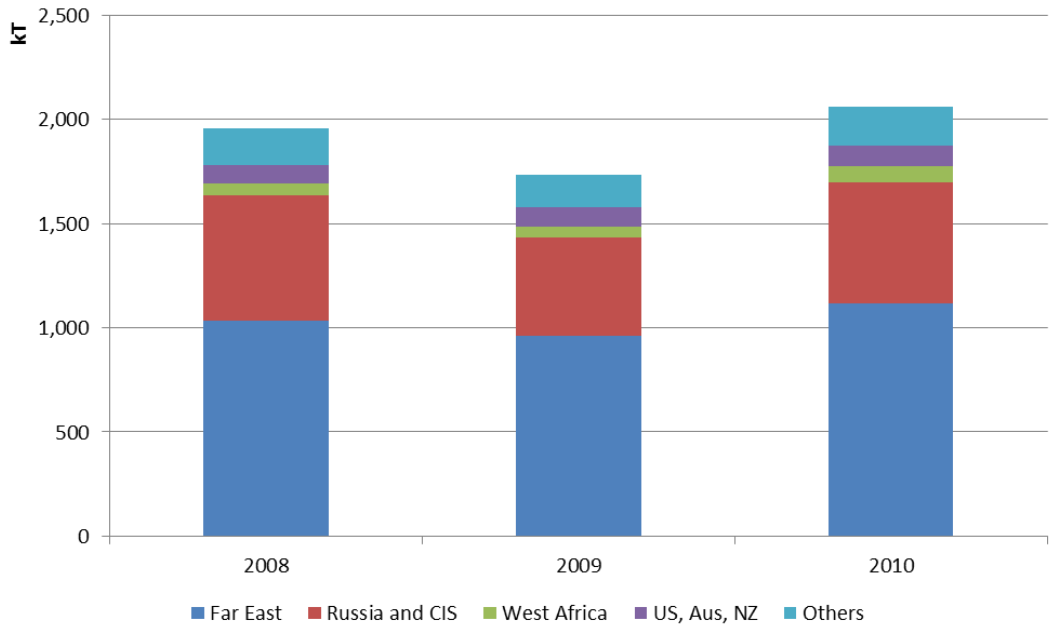
Source: OECD-FAO (2011)

Table A11.36 Volume and share of total EU exports of porcine meat and offal by destination, 2008-2010

	Volume (kT)			Share (%)		
	2008	2009	2010	2008	2009	2010
Angola	19	18	21	1.0%	1.0%	1.0%
Australia	43	45	49	2.2%	2.6%	2.4%
Belarus	47	23	72	2.4%	1.3%	3.5%
China	148	185	217	7.5%	10.7%	10.5%
Congo	10	13	21	0.5%	0.8%	1.0%
Cote D'Ivoire	20	21	27	1.0%	1.2%	1.3%
Croatia	38	39	38	2.0%	2.2%	1.8%
Hong Kong	472	429	443	24.2%	24.7%	21.5%
Japan	228	179	226	11.7%	10.3%	11.0%
Montenegro	16	17	16	0.8%	1.0%	0.8%
New Zealand	4	6	8	0.2%	0.4%	0.4%
Philippines	27	19	66	1.4%	1.1%	3.2%
Russia	415	364	435	21.3%	21.0%	21.1%
Singapore	13	17	23	0.7%	1.0%	1.1%
South Africa	14	15	27	0.7%	0.9%	1.3%
South Korea	120	99	115	6.2%	5.7%	5.6%
Taiwan	5	4	14	0.3%	0.3%	0.7%
Thailand	5	6	8	0.2%	0.3%	0.4%
Ukraine	140	85	74	7.2%	4.9%	3.6%
US	45	39	43	2.3%	2.3%	2.1%
Vietnam	15	23	4	0.7%	1.3%	0.2%
Grand Total	1,954	1,733	2,059	94.5%	94.9%	94.6%

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

Figure A11.3 Patterns of EU pig meat product exports by destination, 2008-10



Source: Eurostat, supporting data is available in Table A11.36.

Table A11.37 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
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 A11.38 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 A11.39 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, data extracted on 24/07/12

Table A11.40 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, data extracted on 24/07/12

A11.3.3 Ovine and caprine

Table A11.41 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 A11.42 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 A11.43 Ovine and caprine exports by volume, kT

	2006	2007	2008	2009	2010	2011
Sheep meat	4.1	3.4	4.4	6.1	10.9	12.8
Goat meat	0.7	1.3	0.6	0.6	0.7	0.7
Sheep and goat offal*	0.7	0.7	1.4	2.6	3.1	4.0
Live sheep	10.3	9.0	6.1	7.5	22.8	45.6
Live goats	0.2	0.1	0.2	0.1	0.2	0.3

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

Table A11.44 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 A11.45 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 A11.46 Volume of EU imports of sheep and goat meat by country of origin, kT

	2006	2007	2008	2009	2010	2011	Sum	Share
Australia	18	17	18	18	15	17	102	8%
Europe (non-EU)	1	1	1	1	2	1	6	1%
New Zealand	191	192	189	185	164	149	1,071	85%
South America	15	13	12	15	13	12	79	6%
World	224	222	220	219	194	179	1,258	100%

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

Table A11.47 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, data extracted on 24/07/12

Table A11.48 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, data extracted on 24/07/12

Table A11.49 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, data extracted on 24/07/12

A11.3.4 Equine

Table A11.50 Value of EU exports of equine products and live animals, €Mio

	2006	2007	2008	2009	2010	2011	Sum
Horse meat[13]	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 A11.51 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 A11.52 Volume of EU imports of horse meat by country of origin, kT

	2006	2007	2008	2009	2010	2011	Sum	Share
Argentina	15	16	13	9	12	7	73	30%
Australia	1	1	0	0	1	0	3	1%
Brazil	14	12	8	3	8	2	47	19%
Canada	4	7	14	9	10	9	53	22%
Mexico	1	4	7	7	7	5	32	13%
United States	10	4	0	0	-	2	16	7%
Uruguay	2	3	3	2	3	3	16	7%
Grand Total	47	47	46	31	42	28	242	100%

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

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

Table A11.53 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, data extracted on 24/07/12

Table A11.54 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, data extracted on 24/07/12

A11.3.5 Dairy production

Table A11.55 Value of EU exports of dairy products, Mio €

	2006	2007	2008	2009	2010	2011	Total
Milk[14]	1,571	2,192	2,554	1,882	2,820	3,334	10,757
Buttermilk[15]	126	186	169	136	196	260	835
Whey[16]	376	604	455	414	555	734	2,523
Butter[17]	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
Milk proteins/caseinates	383	389	487	318	327	458	2,363

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

Table A11.56 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
Milk proteins/caseinates	187	225	197	151	150	157	1,066

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

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

[15] 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

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

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

Table A11.57 Volume of EU exports of dairy by product, kT

	2006	2007	2008	2009	2010	2011
Milk	1,099	1,137	1,349	1,505	914	1,004
Buttermilk	104	100	120	141	89	113
Whey	377	450	450	524	358	399
Butter	154	149	156	126	241	212
Cheese	549	572	670	674	580	589
Total dairy	2,282	2,408	2,744	2,971	2,182	2,316
Milk proteins/caseinates	75	62	65	65	55	389

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

Table A11.58 EU dairy product exports in 2010 by destination, kT

	Milk/cream	Buttermilk	Whey	Butter	Cheese	Grand Total
North Africa and Middle East	598	11	36	43	103	790
Russia	45	20	29	26	207	327
South East Asia	323	27	27	384	75	835
West Africa	300	21	6	9	10	346
US	3	2	3	0	109	117
Europe (non-EU)	128	46	13	27	97	311
World	1,505	141	126	524	674	2,971

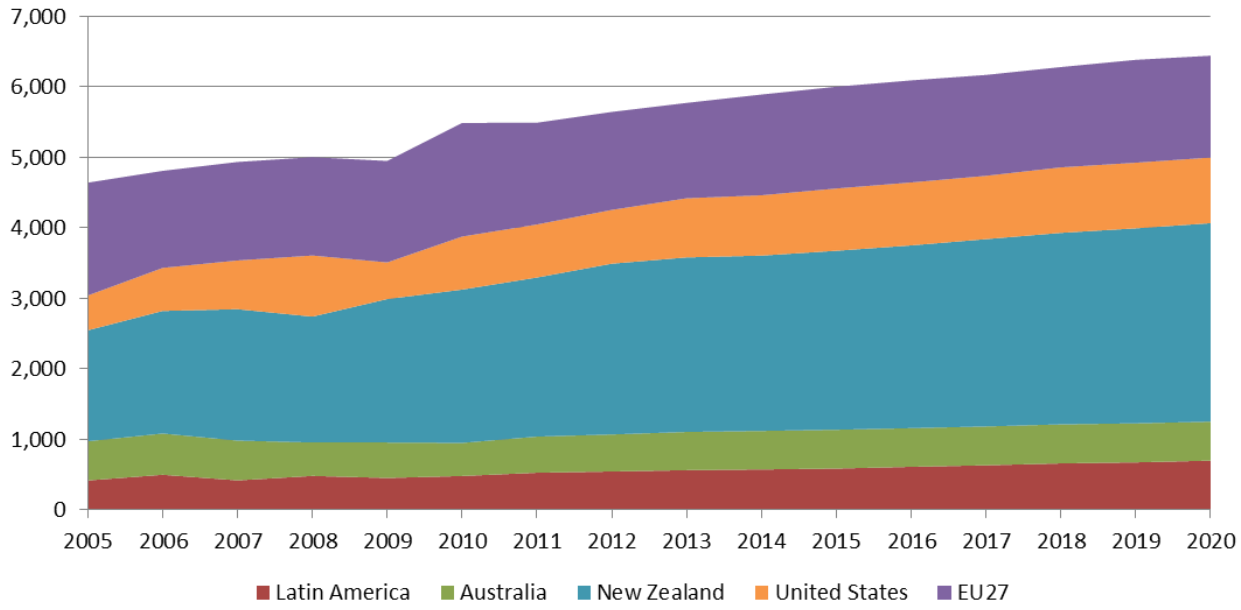
Source: Eurostat COMEXT, extracted on 20/06/12

Table A11.59 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
Europe (non-EU)	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

Figure A11.4 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 A11.60 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*
Europe (non-EU)	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 A11.61 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 A11.62 Volume of EU cheese imports by country of origin, kT

	2006	2007	2008	2009	2010	2011	Total	Share
Australia	11.6	11.0	9.1	6.1	3.4	2.7	44.0	8%
Canada	4.1	4.3	4.2	2.8	1.1	0.0	16.5	3%
New Zealand	37.5	28.4	17.6	24.0	26.6	15.5	149.5	29%
Norway	4.4	2.9	2.9	2.2	2.4	2.9	17.8	3%
Switzerland	41.0	44.3	45.0	47.9	47.5	49.9	275.7	53%
United States	0.8	3.2	5.3	0.4	0.8	1.7	12.1	2%
Grand Total	100.5	94.2	84.3	83.6	82.0	73.4	518.0	100%

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

Table A11.63 Volume of EU butter imports by country of origin, kT

	2006	2007	2008	2009	2010	2011	Total	Share
Australia	0.8	1.2	0.5	0.7	0.0	-	3.3	1%
Europe (non-EU)	0.2	2.0	1.7	1.8	2.2	6.1	7.3	1%
New Zealand	88.8	79.9	53.9	59.2	34.0	32.9	348.6	88%
United States	0.3	8.2	7.6	0.2	3.1	7.7	27.1	7%
Grand Total	90.3	91.4	63.7	61.9	39.9	46.9	394.1	100%

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

Annex 12 Stakeholders consulted

Table A12.1 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 and trade (Bovine)	Company Breeding selection, embryo importer and semen exporter	Viking Genetics	Denmark, Sweden, Finland
Breeding (Porcine)	Breeding selection and semen importer/exporter	Pen Ar Lan	France
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,	Trade association, animal	European Forum of Farm	EU

Sector	Organisation type	Organisation name	Country/level of operation
porcine, ovine and caprine, equine)	breeders	Animal Breeders	
Breeding (Bovine, porcine)	Company, AI and breeding selection and semen exporter/importer	Genus	Global
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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