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EVALUATION OF THE ENVIRONMENTAL IMPACTS OF CAP (COMMON AGRICULTURAL POLICY) MEASURES RELATED TO THE BEEF AND VEAL SECTOR AND THE MILK SECTOR

FINAL DELIVERABLE REPORT
SPECIFIC CONTRACT NOTICE 30-CE-0101431/00-04
IMPLEMENTING FRAMEWORK
CONTRACT NOTICE 30-CE-0067379/00-89

Report prepared by the
Institute for European Environmental Policy
for DG Agriculture
December 2007

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ACKNOWLEDGEMENTS

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AWU	Annual work unit
BSP	Beef Special Premium
BSE	Bovine Spongiform Encephalopathy
BT	Bovine tuberculosis
CAP	Common Agricultural Policy
CMO	Common Market Organisation
CNDP	Complementary National Direct Payments
CPAS	Calf Processing Aid Scheme
DG AGRI	Directorate General for Agriculture and Rural Development
EC	European Commission
EU	European Union
EP	Extensification Premium
EQ	Evaluation Question
FADN	Farm Accountancy Data Network
EAGGF	European Agricultural Guidance and Guarantee Fund
FMD	Foot and mouth disease
FNVA	Farm Net Added Value
FSS	Farm Structure Survey
GAEC	Good agricultural and environmental condition
GATT	General Agreement on Tariffs and Trade
HNV	High Nature Value
LFA	Less Favoured Areas
LU	Livestock Units
MMB	Milk Marketing Board
NBA	National Beef Association
OECD	Organisation for Economic Co-operation and Development
OTMS	Over Thirty Months Scheme
PGI	Protected Geographical Indication
PSA	Private Storage Aid
PSE	Producer Support Estimate
SCP	Suckler Cow Premium
SPS	Single Payment Scheme
SP	Single Payment
SAPS	Single Area Payment Scheme
SMP	Skimmed Milk Powder
SMR	Statutory Management Requirements
UAA	Utilized Agricultural Area
WMP	Whole Milk Powder

EXECUTIVE SUMMARY

Introduction

There is an obligation under *Article 6 of the EC Treaty*[1] to integrate environmental protection requirements in the CAP. This evaluation seeks to determine the extent to which price support and direct payments applied in the beef and veal and dairy sectors since 1988, through progressive CAP reforms, are in coherence with the obligations of Article 6 of the Treaty. Six sets of CAP policy measures are addressed:

- Price support in the beef and veal sector;
- Price support in the milk sector in combination with the milk quota system;
- Direct payments applied before the 2003 CAP reform;
- Extensification payments;
- Coupled payments applied since the 2003 CAP reform; and
- The Single Payment Scheme and Single Area Payment Scheme.

The study has sought to assess the environmental effects of the CAP measures following a two-step approach. First there is an analysis of the causal chain, leading from the CMO measures to likely impacts at farm level, including impacts on farm structures and management practices. Second is consideration of the effects these are likely to have had on the environment. The environmental effects are various and can be either positive or negative. They can be divided into three principle groups:

- Those relating to greenhouse gases;
- Other more location specific forms of air and water pollution and effects on soils; and
- The maintenance or alteration of landscapes and biodiversity.

The linkages between specific policy measures and the environment are not always straightforward. The following points should be highlighted:

- The beef and dairy measures within the CAP are only one element in a group of drivers influencing farm structures and management decisions;
- They vary in their objectives and mechanisms but few are intended to have a direct influence on specific farm management practices. Certain other policies affecting the beef and dairy sectors, such as agri-environment, are often more prescriptive in this regard;
- There is limited empirical evidence available on actual environmental outcomes from CAP policy induced farm management decisions. It is often necessary to rely on reasoned analysis based on more general evidence; and

[1] The Treaty on European Union and the Treaty establishing the European Community; Official Journal C 321E of 29 December 2006. Article 6 "*Environmental protection requirements must be integrated into the definition and implementation of the Community policies and activities (…), in particular with a view to promoting sustainable development*."

- A ‘counterfactual’ has to be established to gauge the impact of a measure. This involves a series of assumptions that are unavoidably conjectural.

The study has drawn on a limited range of pan-European sources of quantified data about farm level structures, management and income. These include the Farm Accountancy Data Network (FADN), the Farm Structure Survey (FSS), other Eurostat and DG-Agri databases as well as national statistical databases. These allow observation of trends over time, although in most cases not beyond 2004 or 2005 limiting the evidence available on the most recent period of policy implementation.

Seven national case studies were conducted in France, Germany, Ireland, Italy, the Netherlands, Spain and United Kingdom to cover different production systems and climatic zones (Atlantic, Continental and Mediterranean). A regional dimension was also included in France, Germany, Spain, Italy and the UK, all of which are major beef and dairy producers.

The Beef and Veal CMO

Impacts of Price support

Assessing the extent to which price support in the beef and veal sector is in coherence with the environmental protection integration requirement requires a counterfactual assumption (the situation without CAP price support). An EU domestic price needs to be established for the period and also a counterfactual reference price. The approach taken has been to adopt OECD work on aggregate EU beef prices relative to world market prices and their estimate of the effects of price support. However it is considered that world prices are not a realistic counterfactual since without support under the CAP and in a number of other countries the world price would have been significantly higher, possibly by a factor of about 20 per cent.

Structural effects
Based on this assumption, CAP price support would appear to have increased the price received by beef and veal producers over the counterfactual and provided incentives for increasing production and the use of inputs, including land. In particular:

- **price support has sustained a higher number of beef cattle** (initially rising but against a declining trend since 1997) **and a higher level of beef and veal production than would otherwise have occurred.** Price support and other measures helped to buffer the sector against the impacts of BSE and FMD. Since the implementation of the beef and veal price cut in the 1992 CAP reform, the level of production over market requirements created by price support has decreased. However, the overall production effects of CAP policies were relatively unchanged by the 1992 reforms as hectare and livestock headage premiums were introduced largely compensating for the cuts in price support.

- **At least initially, price support also improved the level of income derived from beef and veal production**, although these benefits are likely to have been capitalised, to some degree, in production factors attached to beef farming, leading to higher fixed costs of production.

- **In principle price support will also have contributed to a higher number of beef farms** than would otherwise have been the case. Overall the number of beef farms is decreasing, but those that remain are increasing in size with the result that the declining cattle population is being concentrated within larger herds on larger farms. Such structural changes, however, also occur in sectors with little support, such as pig farming.

- **Price support would also appear to have helped to maintain extensive production systems within marginal areas to some degree**, with the overall level of production at stocking densities of less that one LU per hectare being maintained. An increasing proportion of this production has taken place within the LFA despite relatively low returns in these areas, for example the number of 'extensive specialist beef rearing farms' in the LFA increased by 40% between 1995 and 2001 in the EU-15 (based on FADN)**.** The FADN data shows that the number of farms with the highest livestock density has declined whereas the number of beef farms with the lowest livestock density has been significantly increasing. This does not correspond very well with the income analysis from which we would have expected to see the opposite trend, since incomes have been higher on more intensively stocked holdings. Factors such as stocking density limits for those in receipt of extensification payments may have been more significant than price support in reaching this outcome. Over the evaluation period, despite the changes outlined above, stocking densities as a whole have remained fairly stable.

- There has been a significant change in the distribution of beef cattle in Europe with marked increases in stock numbers in Ireland and Spain for example. In principle price support is neutral in this respect as it is built on the principle of one market with one price. However, in combination with market driven forces and national policies it explains some of the changes in national beef cattle numbers.

Environmental Effects

In general, the more cattle numbers are elevated above the counterfactual, the greater the pressures on the environment, particularly as a result of increased levels of manure, air pollution and feed requirements. Particular pressures are likely to be experienced in relation to:

- **Water quality** due to point source and diffuse water pollution from increased levels of livestock wastes, nutrient use on crop land and soil run off;
- **Increased pressure on soils** where inappropriate levels of grazing have occurred leading to a greater risk of soil erosion and localised poaching;
- **Biodiversity** where overgrazing has taken place on semi-natural habitats;
- **Increased emissions of greenhouse gas emissions**, in particular methane (CH_4) resulting from enteric fermentation; and
- Elevated levels of **ammonia emissions**, impacting on air quality, and acidification particularly in areas where concentration of production has taken place.

At the same time:

- the maintenance of cattle numbers associated with extensive grazing systems particularly in more marginal areas generally will have been environmentally beneficial where stocking densities have been kept within the carrying capacity of the land.

In summary the range of negative impacts arising from greater beef production should be viewed alongside the positive effects on landscape and biodiversity arising from the increased level of grazing by suckler cows

At farm level however, specific management practices can often be the most significant factor determining environmental impacts. Because price support is just one of a number of policy and market factors in the trends noted above, it is not possible to quantify the impacts precisely. Price support has declined over time whilst support to the beef sector in the form of direct headage payments and more recently decoupled payments has increased. It therefore is reasonable to assume that **the impacts of price support in the beef and veal sector at the farm level, and consequently on the environment, have become less pronounced relative to other factors over time.**

Impacts of Direct Payments and Extensification payments, 1988-2003

There has been significant expenditure on beef and veal direct payments (including the 'extensification' payment) over the evaluation period rising from €339 million in 1989 (12 Member States) to €7,245 million in 2005 (17 Member States – EU-15 plus Malta and Slovenia). The largest proportion of expenditure across all Member States over the evaluation period has been on the Suckler Cow Premium (37.3% of direct and extensification payments), followed by the Beef Special Premium (32.8% of payments). However direct and extensification payments have worked alongside other CMO measures (beef, dairy and cereals), other policies and legislation, market influences and broader socio-economic trends, which makes the specific, separate impacts of direct payments very difficult to determine.

Structural Effects

Direct payments have helped support farm incomes during a time of reducing price support and have increased in importance, as a proportion of farm income, over the evaluation period. In general terms:

- **Direct payments have helped to sustain beef farms and, by virtue of the system of headage payments, contributed to an increase in the number of beef cattle in the EU**, until around 2000, when there was a decline as a result of BSE, FMD and other factors. Over the period, beef cattle numbers have been higher than they would otherwise have been, although it is difficult to quantify this.

- Extensification payments contributed around 12-14 per cent, on average, of the farm net value added of more extensive specialist beef rearing farms in the EU-15, according to FADN data in 2000-2004. For the more extensive beef fattening farms the range was 12 to 18 per cent compared with 6 per cent for more intensive farms. This income effect will have contributed to the viability of a wide range of beef producers and the areas remaining under their management. The stocking

density threshold was set relatively high with a threshold of 1.8 LU/hectare rather than being targeted on the most extensive producers.

- **The suckler cow premium and the extensification premium appear to have had the most notable impact in terms of production levels, systems and farm structure.** There has been a significant increase in the number of suckler cows in the EU-15 over the period and an increase in the number and area of farms with suckler cows. **It is likely that the suckler cow premium, as well as the extensification premium, has helped to sustain beef production, increasing the number of farms running suckler cows, thereby slowing the general decline in the number of farms.** In turn, suckler cow farms have helped to retain extensive grazing regimes and grass-based forage systems. Other Pillar Two schemes such as LFA compensatory payments and agri-environment scheme payments have also contributed to these trends. **The suckler cow premium conditions relating to stocking density, individual producer quotas and regional ceilings, however, appear to have had a limited influence on production patterns at an aggregate level.**

- **Extensification payments have, however, had limited impact in terms of reducing cattle numbers and stocking densities**. 'Extensification' has occurred on a very limited scale mainly when stocking densities are only marginally above the stocking density threshold. In some regions they did limit the growth in beef cattle numbers and stocking density, as farmers sought to maintain access to the additional payment. However, in other areas, where stocking densities were previously low, they acted perversely as an incentive to increase beef cattle numbers and stocking densities up to the stocking density threshold. The targeting of extensification payments improved after the rule changes in 2000 although the effects of this are not clear.

- **Other direct payments, including the beef special premium and slaughter premium, have contributed to production above the counterfactual but had a less apparent influence on production levels and systems.** Expenditure on the beef special premium, rose significantly in four Member States (France, UK, Germany and Ireland) after 1994. Some farmers adapted their systems to increase eligibility for the beef special premium, for example in some Member States (UK, Ireland) it encouraged farmers to keep and finish more cattle than previously. In other cases, the beef special premium rules limited further intensification and in certain of the most productive regions, for example the Netherlands, some intensive beef producers who were unable to adhere to the stocking density limits, continued production without the direct payments. The slaughter premium has contributed to farm incomes which have helped sustain existing systems of beef and veal production. The deseasonalisation premium worked to extend the beef finishing period in certain Member States but with limited long term impact. **Consequently, these direct payments have generally helped sustain existing intensive systems of grassland management and fodder production.**

Environmental Effects

While the environmental impacts of these farm level effects vary between Member States, the general analysis is that the suckler cow premium and the extensification premium are the two payments that can be most clearly linked to environmental

impacts and that these have been mixed - some beneficial and some negative - depending on the location.

For example:

- **biodiversity and landscape** have benefited, at least in certain areas, from the retention of extensive cattle grazing, both within and outside LFAs and the continuation of traditional farming practices which sustain features such as small fields, boundary walls and hedges. However, environmental pressures have arisen in certain areas (e.g. parts of Spain and the UK), where cattle numbers have increased beyond the environmental carrying capacity of the land being grazed, with direct payments maintaining stocking levels beyond the sustainable level.

- The extensification premium has meant that fewer farms have intensified than might otherwise have done so, thereby preventing the associated adverse impacts on **water quality and soils**. Where payments have increased the area of land under extensive management, this has resulted in less eutrophication, siltation and soil erosion. In other areas, however, direct payments have either contributed to an increase in, or retention of cattle numbers which will have either increased or retained pressure on water quality and soils.

Continued pressure on the environment from overgrazing has not been significantly prevented by the standard conditions on direct payments and extensification premium, since these were not matched to the varied environmental conditions in different parts of Europe. For example, stocking thresholds were set at the same level for the whole EU territory which did not take into account the specific environmental and farming situation in different regions. In addition, livestock without premium rights were not covered by the stocking limits when extensification payments were introduced. As a result, at least in Spain, stocking densities were set too high to be environmentally beneficial, which encouraged overstocking and pushed livestock numbers to levels beyond the ecological carrying capacity of the land, leading to soil erosion and water pollution In drier areas, increased stock numbers have also put additional pressure on limited water resources.

As with price support, direct payments have contributed to an increase in the number of beef cattle numbers in the EU and this has had negative impacts in terms of **greenhouse gas emissions and air quality.** However, the fact that much of this increase can be attributed to extensively managed cattle means that the impact will have been less concentrated, in respect of air quality. The effect of the extensification payments, on the other hand, has been to maintain beef cattle numbers, and this will have sustained greenhouse gas emissions and, to a lesser extent, ammonia emissions. However, a more general intensification, which may have taken place in the absence of extensification payments, is likely to have had more adverse impacts on climate change and air quality.

The environmental impacts of the beef special premium and other direct payments are less apparent and relate mainly to the contribution of the payments to the maintenance of existing systems of beef production above the counterfactual. Much of the production is relatively intensive, as in the Netherlands. These intensive systems are associated with negative environmental effects, such as water pollution, soil erosion

and pressures on biodiversity, and these have, therefore been supported by beef special premium payments *inter alia*.

The relationship between direct payments and environmental measures such as agri-environment schemes depends on the circumstances. In some cases, there has been conflict between agri-environment scheme requirements for more extensive stocking and the general incentive for higher stocking arriving from direct, headage-based payments. Where the priority is to maintain grazing, the direct payments (suckler beef) may provide the incentive to sustain production whilst agri-environment measures compensate for specific management prescriptions.

The Dairy Sector

Price support and milk quotas

As with the beef and veal sector, establishing the counterfactual scenario, the situation without CAP price support, is not straightforward. A counterfactual reference price in the absence of the policy is needed for the analysis. Given the difficulties in calculating this, a method based on the OECD estimates of EU and world price levels and the value of EU price support has been adopted. The world market price reported by the OECD is, however, considered to be below that credible in a counterfactual by a factor of up to about 20 per cent but varying over time because of the impact of subsidies in the EU and some other exporting countries.

Structural Effects

In terms of production systems, dairy farming is more homogeneous than the beef and veal sector. There is reliance on a limited number of breeds, capable of high yields and widely used technologies. Most production occurs on specialised farms. The majority of farms are managed on a relatively intensive basis and stocking densities are higher than on beef farms.

The uncertainties regarding the precise production and structural effects of the dairy CMO price support mechanisms are considerable. The counterfactual is particularly hard to specify with any certainty and the price support effects are combined with the operation of the milk quota. The quota has limited production in the EU and has been binding on production in many Member States for most of the period. It has also prevented production from moving between Member States. In summary:

- The initial introduction of the quota system arrested a sharp upward trend in EU production.

- Whilst it is likely that price support on its own has increased the level of milk production above the counterfactual, production in the more competitive Member States has been constrained by the operation of the quota system, with production levels remaining fairly stable over the evaluation period. In this sense the quota system has inhibited some of the increase in milk production that might have occurred in response to price support alone. The separate impact of the two policies is therefore difficult to distinguish. At least initially, price support is likely to have improved the level of income derived from milk production, although these benefits are likely to have been capitalised to some degree in production factors attached to dairy farming, leading to higher fixed costs of

production. **Without the CMO, however, price levels probably would have been lower and less capitalised into land and quota.**

- In addition, it seems probable that price support has prevented as rapid a decline in the number of dairy farms as would otherwise have been the case. Furthermore, if quota had been permitted to move between Member States, the decline in the number of farms is likely to have been greater. More regional concentration within the EU would have occurred as indicated by the range of quota values. The situation in relation to the number of dairy cows is less clear. Whilst the milk quota has resulted in stabilising milk production, there has been increased productivity in terms of milk yield per cow and per hectare which in turn has led to a decline in the number of dairy cows over the years. **Cow numbers are likely to have been lower in the absence of the CMO, especially since quota has inhibited structural change.**

- Whereas there has been over supply relative to quota in some Member States, most notably Italy, this would have been less likely to have been the case at a lower or non-existent level of price support. In countries where milk quota is tradable between regions we have seen some regional concentration and specialisation of milk production. It appears reasonable to assume, therefore, that for the EU as a whole, production has been at a higher level than it would have been without the CMO in place and **that distribution of milk production between Member States, and therefore between regions in the EU, has been affected by the quota system. If quota had been tradable between Member States a greater level of geographic concentration of production would have been likely** (the transfer of quota within Member States is not considered at this stage, as this is the subject of an ongoing separate study). Relative price stability has contributed to confidence in the sector and hence both to investment and to the maintenance of production.

Environmental Effects

The environmental impacts of price support in combination with the milk quota regime are related to the higher numbers of dairy cows relative to the counterfactual. However, the potential environmental pressures resulting from this will depend to a significant degree on farm management decisions and investment in the dairy enterprise. Drivers of such decisions will include a range of factors including legislation such as the Nitrates Directive.

A greater number of dairy cows will result in:

- **Elevated emissions of methane**, one of the principal greenhouse gases, since these are directly related to cow numbers as well as higher levels of nitrous oxide production from manure, albeit on a smaller scale.
- Increased production of slurry and nutrients will add to the **pressures on the aquatic environment and increase ammonia emissions**, whilst increased feed requirements will result in a larger demand for fodder crops, meaning that a larger area of grass and other forage crops, particularly silage maize, will be devoted to dairy production. Since these forage areas are intensively managed on the majority of dairy farms the additional area represents an increased environmental pressure on most specialised dairy farms.

- A greater area of land devoted to fodder production, most of it likely to be under intensive management. This potentially increases the use of inorganic fertilisers and biocides, depending on the alternative land use, which leads to negative environmental effects, particularly on **water quality and biodiversity**.
- In so far as the CMO has increased the number of dairy cows and holdings above the counterfactual, less land has been available for other production systems. Beef cattle production, which in some circumstances would be an alternative to dairying, is generally a less intensive form of production. However, the scale of these effects cannot be estimated with any accuracy because of the uncertainties over the production impact of the CMO.

Concentration of production within larger farms occurred during the period, although the role of the CMO in driving this at an EU level is unclear. It has potential benefits as well as drawbacks in pollution terms. For example:

- It can result in more **pollution risks from livestock wastes** in particular where they are concentrated within a smaller area.
- However, there is some evidence to show that larger scale operations can be more efficient in managing manure, wastes and other pollution hazards. They may also be more profitable and ready to invest in measures to reduce negative environmental effects, for example improved manure and slurry handling facilities.
- The progressive implementation of the Nitrates Directive and other water pollution measures has brought with it more stringent water pollution standards at the same time as farms have got larger and it is not clear which of the two drivers (legislative pressure or investment associated with structural change) is more significant.

There is a general tendency towards intensification in the dairy sector, with higher annual milk production per cow, although this does not seem to be associated with increased stocking densities. This is partly because of a tendency for farms to maintain their forage area as milk cow numbers fall. At the same time, however, they may intensify production on the forage area, including by switching from grass to forage maize. If it is unprofitable or impossible for a farmer to increase production levels, they may concentrate either on increasing yields per cow on a fixed area or on containing costs or both. Higher yielding cows do generate more wastes, increasing environmental pressures. However, fewer cows are needed for a fixed quantity of milk as their yield rises. Consequently, there is a trade off between the two effects and **the total environmental burden from growing milk yields may be broadly unchanged in pollution terms**.

Coupled payments after 2003 reform

Since the 2003 reform came into effect the application of coupled payments in the beef and veal sectors in particular has been significantly reduced. Only nine Member States of the EU-15 have adopted some form of coupled payments in the beef sector. The relatively short period of implementation - the coupled dairy premium from 2004 and beef coupled payments since 2005 - means that there is little reliable data available to enable a robust analysis of their impacts. Data to assist with the assessment of impacts of CNDPs in new Member States is even scarcer.

Structural Effects
Despite the paucity of data, the following farm level effects have been observed in relation to the **beef and veal sector**:

- Coupled payments in the beef and veal sector have contributed to the maintenance of incomes on specialist beef farms in Member States where they have been retained. Specialist beef rearing farms are likely to have benefited in particular, from the coupled suckler cow premium and to a lesser degree from the coupled beef special premium and slaughter premium. In new Member States, CNDPs which are common in the beef sector have, alongside SAPS payments, contributed to an increase in farm incomes.

- Coupled payments appear to have contributed to maintaining beef cattle numbers above the counterfactual. In Member States which have retained the suckler cow premium, the number of suckler cows has not decreased to the same extent as those which have not. This effect probably applies in the LFA although there is insufficient data to prove this. This will have assisted the maintenance of extensive grazing regimes and grass-based forage systems. Pillar 2 schemes such as LFA compensatory payments and agri-environment scheme payments will have contributed to this result in varying degrees in different regions.

- The partially coupled beef special premium has contributed to some extent to the maintenance of beef cattle numbers in the countries where it has been implemented and this is likely to have supported farms with more intensive grassland management systems and fodder production.

- The influence of the coupled slaughter premium on production, systems and management is less clear as the impact on the incomes of existing systems of beef and veal production appears limited.

- CNDPs have been paid on a significant scale in some new Member States, and will have had similar effects to other partially coupled payments although there is little evidence to establish impacts. Suckler cow payments have been applied in five of the new Member States. However, they are only likely to have had a marginal impact on restructuring trends, resulting in fewer farms and farmers and more production concentrated in medium and larger farms.

In relation to the **dairy sector**, the coupled dairy premium has had limited impact on dairy farm incomes and minimal impact on production levels and management practices. This partly arises from the short time for which it has operated and the fact that most dairy farmers are not in a position to adapt their systems in such a short timeframe.

Environmental Effects
The environmental impacts of coupled payments are similar to those of the direct payments noted above. They include firstly those arising from management choices directly attributable to the payments and secondly those resulting from adherence to cross compliance conditions. However, it is important not to overstate their influence given the wide range of other drivers including market trends and Pillar Two schemes.

The main direct impacts are linked to the incentive to maintain more cattle than otherwise and the subsequent continuation of both intensive and extensive management systems. The coupled dairy premium appears to have negligible direct impact on farm production, management or environment. In summary:

- There will be **increased pressure on water quality and soils** resulting from the use of coupled payments because of elevated cattle numbers, leading to higher levels of organic waste being produced. The pressure, however, will vary considerably between regions depending on the stocking density. **These pressures will be increased, broadly in proportion to the number of additional stock.**

- **Biodiversity and landscape** are likely to have benefited from the coupled suckler cow premium, at least in certain areas, from the retention of extensive cattle grazing, both within and outside LFAs and the continuation of traditional farming practices which sustain features such as small fields, boundary walls and hedges. However, environmental pressures continue in certain areas (e.g. parts of Spain), where cattle numbers are being maintained beyond the environmental carrying capacity of the land being grazed.

- The maintenance of cattle numbers arising from beef coupled payments will have sustained **greenhouse gas emissions** and, to a lesser extent, **ammonia emissions** above the level that they would have been otherwise.

- The payments will affect the **balance between cattle and other grazing animals** where there is a choice. For example, in Spain, where beef cattle payments continue to be 100 per cent coupled but the sheep and goat premium has been 50 per cent decoupled, there will be an incentive to retain cattle although this is not the environmentally preferred option.

- All beef and dairy farmers receiving coupled payments are obliged to adhere to **cross compliance conditions**. Some, for example specialist dairy farms, have been brought into the cross compliance system for the first time. While the environmental standards embodied in the SMRs apply to cattle farming irrespective of cross compliance there is evidence from the case studies that it has had an impact on awareness of and response to these standards, in some countries at least. GAEC standards relating to grazing, scrub control and soil management are clearly relevant to cattle, especially beef farmers in most Member States. Insofar as they are enforced they can be expected to assist in the reduction of environmental pressures.

Direct payments, in short, incentivise the retention of more beef cattle that otherwise, subsequently raising environmental pressures with regard to air and water pollution and soils. At the same time there is a section of the suckler beef herd which is of importance for landscape and biodiversity management, particularly on permanent grassland, much but not all of it in the LFA. In some regions, the suckler cow premium provides a significant contribution to the viability of this environmentally sensitive segment of the beef herd although it is not targeted exclusively on it.

Single Farm Payment

Assessing the extent to which the shift from coupled payments to the different ways of operating the Single Farm Payment (SFP) is in coherence with the environmental integration obligation **can only be based on limited evidence from a short time period.** It is difficult to judge against the counterfactual of no payment.

Structural Effects
The shift from coupled to decoupled support can be expected to change production patterns over time as the market distortions associated with the former cease to operate. Structural adjustments that may potentially take place include:

- reduced stocking of those animals generating poor market returns; and
- the cessation of beef production on some farms and build up on others, depending on the efficiency of producers and their price expectations.

To date, however, apart from some decline in stock numbers, more significant changes have not yet become apparent, although there is some anecdotal evidence to suggest that some restructuring is occurring. This is probably because of the short time that has elapsed since the introduction of the SFP and the relatively limited changes in the actual payments received by most farmers so far due to the way in which the SFP is being introduced in different Member States. However, **we can anticipate greater changes in production patterns over time, depending partly on market developments, with subsequent environmental impacts.**

Based on the current data available at the EU level, it is difficult to discern any significant difference in farm level impact according to (a) the degree to which coupling has been retained in the beef sector, (b) the year in which the Single Payment Scheme was introduced and (c) the method used to calculate each farmer's Single Payment entitlement. Different trends taking account of these three variables may be more evident in the years to come. Despite this, the following farm level impacts have been observed:

- Although there are material variations, **beef cattle numbers are decreasing at a slightly faster rate in those Member States with fully decoupled payments** than in those that retain partially coupled payments. However, this is a pre-existing trend and it is difficult to ascertain the exact role of the SPS in influencing it.

- Although there are some exceptions, **beef cattle numbers have increased over the first years of accession (2004-2006) in those Member States that use the SAPS.** This follows significant fluctuations in stock numbers and may in part be due to cattle numbers returning to historically higher levels as conditions for investment have improved.

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- **Dairy cattle numbers are decreasing across all Member States irrespective of the date of integration of the dairy payment into the Single Payment Scheme,, choice of payment model or the retention of coupled payments in other sectors.** The SPS does not appear to distort an underlying trend towards the

rationalisation of the dairy industry whereby herds are falling but yields are increasing.

- Eight Member States appear to be using Article 69, predominantly in the beef rather than the dairy sector, with either environmental or product marketing objectives. There are considerable variations in the resources committed but little information available on the outcomes so far. **More information is required on the application of Article 69 before conclusions can be drawn on the scale of change** and the impact this may have on the environment.

- There is anecdotal evidence to show that restructuring of the beef and dairy sectors is occurring with some regional intensification, some localised marginalisation and some substitution between beef and sheep farming depending on regional conditions. A large scale conversion from animal rearing to arable farming looks unlikely given the **rules on the conversion of permanent pasture**.

Environmental Effects

The resulting environmental impacts of changing herd sizes range from the positive to the negative and depend very much on the local context. However, it would be wrong to attribute these changes completely to the introduction of the fully decoupled SPS or SAPS. The key impacts include:

- The decline in beef cattle numbers may be positive in terms of reducing **soil erosion and water pollution** and the increased specialisation of the dairy sector may help to limit point source pollution through the efficient management of manure although the level of risk is greater;
- Methane and nitrous oxide emissions will also decline as a result of a fall in cattle numbers, reducing **greenhouse gas emissions** from the beef and dairy sectors. Ammonia emissions from the beef sector would also decrease which will reduce the sector's contribution to acidification. However, if permanent pasture is ploughed up to permit the growth of arable crops, some carbon sequestration capacity is likely to be lost. Localised methane, nitrous oxide and methane emissions could increase where dairy cattle rearing becomes regionally concentrated, although at national level the net contribution of the sector to greenhouse gas emissions and acidification could decline; and
- Potential negative effects in terms of an enhanced risk of undergrazing or abandonment in some places, which may lead to less species rich pastures. At the same time declines in stocking density will be beneficial for **biodiversity** in some regions where these were previously above the ecological carrying capacity of the land. Increased specialisation and concentration of the dairy sector could result in decreased **landscape** diversity and a reduction in mixed farming systems, which tend to be beneficial to biodiversity.

In summary, it is too early to make a firm judgement about whether the different implementation options of the SPS are in coherence with the environmental integration option, given the limited information available. The evidence suggests that there are likely to be reductions in environmental pressures following an anticipated fall in cattle numbers. At the same time, the risk of undergrazing and biodiversity losses will increase.

The SPS and SAPS in principle avoid the direct production incentives of previous policies and the associated environmental costs. However, given the greater risk of reduced grazing and pasture maintenance in sensitive areas, cross compliance rules, including those on the conversion of permanent pasture, have a clear role in the new policy architecture alongside targeted rural development measures.

The impacts of the more recently introduced Article 69 measures are not yet clear. Having been only recently implemented there is little information forthcoming on their impacts on the beef sector and hence on the environment. More information on implementation and related impacts from the Member States concerned would be helpful.

Conclusions and Recommendations

A combination of price support and direct payments has led to elevated numbers of cattle above that which would otherwise have been the case in the beef, veal and dairy sectors with some restraints arising from the quota system in the dairy sector. This has increased:

- Levels of greenhouse gas emissions;
- Water pollution;
- Ammonia emissions;
- Pressure on soils;
- Land devoted to fodder production, including both intensively managed grass and maize; and
- Pressure on landscape and biodiversity in certain areas

At the same time it has supported the retention of a proportion of the beef herd which is extensively managed, which has contributed to landscape quality and biodiversity.

Attempts to target support more on the relatively extensive section of the herd through attaching stocking thresholds to direct payments have had limited success due to the use of standard stocking thresholds across the EU. These have not been sensitive to local environmental conditions and were set at too high a level to significantly differentiate in favour of those farms pursuing more extensive grazing systems.

Recommendations relating to the beef and veal sector

The suckler cow premium has been environmentally beneficial in some areas by retaining grazing by suckler cows where this is needed, particularly in areas of High Nature Value. However, as a policy tool it is not able to sufficiently fine tune the location or management of stock, such as matching stocking densities to the environmental needs of a particular area. From an environmental perspective the stocking density (and the right composition and management of stock) are essential to achieve the optimal grazing regime for the habitat required.

At present rural development measures aimed at sustaining beneficial farming practices offer compensation to producers in the LFA and those signing agri-environment agreements. However, compensation alone may not cover the full cost

of providing the desired environmental outcome if the underlying system in insufficiently profitable. For this reason, a capacity to focus support to farming systems of particular environmental value in the areas where they are most beneficial would complement these rural development measures.

Opportunities for more focussed support could be achieved through the use of a less sectorally focused and more environmentally flexible 'Article 69' approach, alongside more targeted Pillar Two measures, with the latter delivered through the agri-environment measure or a revised LFA measure with a greater emphasis on the delivery of environmental outcomes.

Additionally, there is a need to review the application of Article 69 to evaluate the outcomes that it has delivered up to now, particularly from an environmental perspective.

Recommendations relating to the dairy sector

Most dairy enterprises are managed intensively creating considerable environmental pressures, although some of these, such as greenhouse gas emissions, are declining. Only a small percentage is farmed less intensively on environmentally valuable habitats. Several areas of concentrated production are in Nitrate Vulnerable Zones. Confidence in European production has increased under current world prices. The Commission has indicated that milk quotas will cease to apply after 2015, with measures to allow a soft 'phasing out' proposed as part of the CAP Health Check.

This suggests two key policy related needs for the future in relation to the environment. Firstly, sufficient measures need to be in place to manage growing environmental demands – especially in relation to water pollution and climate change. Existing cross compliance measures do not focus on some of the most pressing concerns, such as diffuse pollution and accelerated reductions in greenhouse gas emissions. Additional action therefore appears necessary. Second, there may be circumstances in which the continuation of dairy cattle production is desirable environmentally, for example in Alpine pastures, and where alternatives such as beef rearing would either not be beneficial environmentally or would not be viable. In such cases a dedicated and well targeted measure under Article 69 could play a role to support rural development measures, such as agri-environment, which have been applied on a limited scale in the dairy sector relative to beef production.

1 METHODOLOGICAL APPROACH AND EVALUATION DATABASE

1.1 Methodological approach

The Evaluation Questions are organised into two main themes - price support and direct payments. Specifically, they cover:

Q1.1: Price support in the beef and veal sector
Q1.2: Price support and milk quotas in the dairy sector

Q2.1: Direct payments before the 2003 reform in the beef sector
Q2.2: Extensification payments
Q2.3: Coupled payments after the 2003 reform and the dairy premium.
Q2.4: Different implementation options for the Single Payment Scheme and Single Area Payment Scheme.

In addressing the six evaluation questions, the evaluators have sought to identify key linkages in the chain between the CMO policy measures, other driving forces, farm structures, systems and practices, and environmental outcomes when considering the findings of the evaluation. The following points should be noted:

- The CMO measures are only one of a range of drivers influencing farm structures and decisions, and this is confirmed in the literature and case studies;
- The CMO measures vary in their objectives and mechanisms. In some cases, they are intended to exert a direct influence on specific farm practices, but generally this is not the case. Other policies affecting the beef and dairy sectors such as agri-environment agreements can, however, be extremely prescriptive with regard to farm management decisions; and
- The ultimate goal should be to focus on the actual environmental outcomes arising from the changes to farm management practices and structures which have been directly affected by CMO measures. Actual environmental outcomes, however, are only measured to a limited degree, and the exact reasons for observed environmental changes can be difficult to determine, even if the main drivers are identified. Consequently, there is rather limited data on actual environmental outcomes and the analysis refers to pressures and opportunities, based on more general evidence as well as on empirical data. This observation is reinforced by the results of the seven case studies which reveal a scarcity of information about the precise environmental impacts arising from production in these sectors and the explanation for them.

The general approach used in the evaluation is summarised in Figure 1.1. It shows the relationship between policy measures, other drivers, farm level factors and environmental outcomes.

The evaluation of the impacts of the CMO measures in the beef and dairy sector is firmly grounded in an *evidence based approach*. As such, the conclusions are based on a process of logical reasoning drawing on empirical evidence. The evidence

needed to answer certain evaluation questions, however, does not always exist, especially given the difficulty in isolating those impacts which can be attributed to specific CMO measures. The relationship between policy instruments and environmental impacts is not straightforward and deterministic as impacts differ according to the specific context. The complexity of the causal chain has implications for the data collection process. In certain cases, therefore, the potential effects of measures have been derived from a theoretical understanding and with reference to the counterfactual.

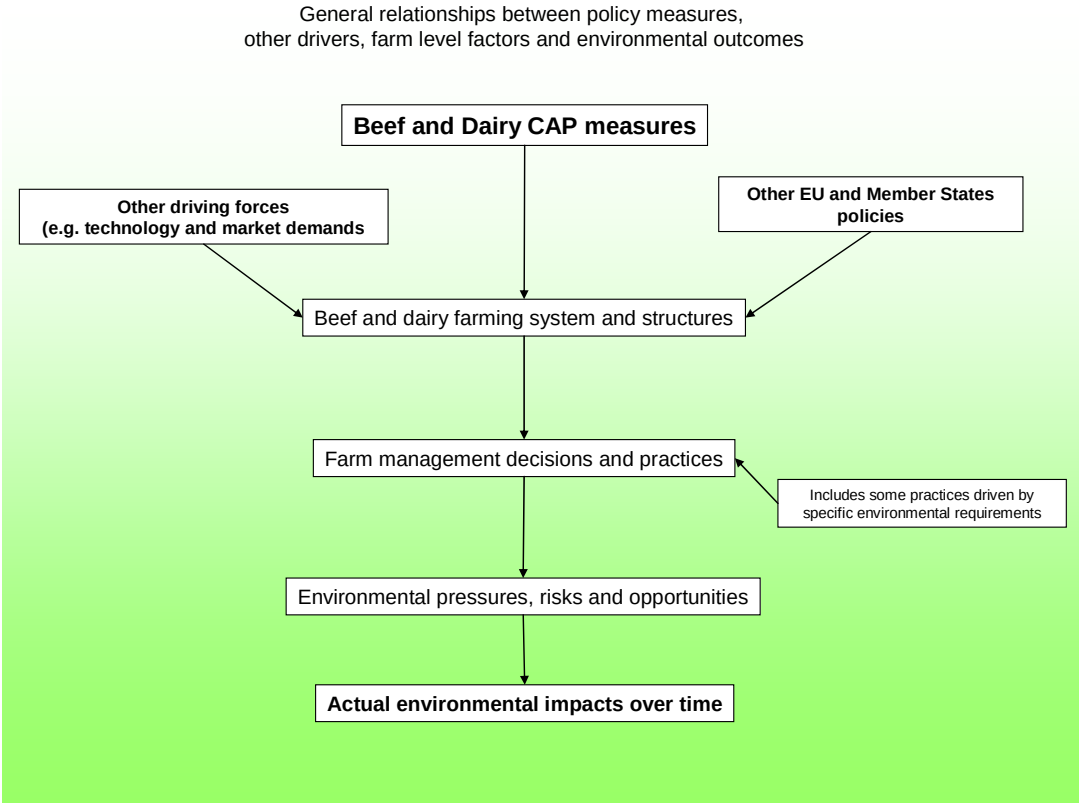

Figure 1.1 General relationship between policy measures, other drivers, farm level factors and environmental outcomes

Quantitative data are derived from a range of sources including the following pan-European databases: the Farm Accountancy Data Network (FADN), the Farm Structure Survey (FSS), other Eurostat databases and national statistical databases. Pan-European data sets have provided a tool through which to observe changes and trends over time in order to draw conclusions on the possible impacts of the CMO measures.

To complement these data sets, seven case studies have been conducted to provide a more detailed examination of certain issues raised by the Evaluation Questions and specifically, the different aspects of the implementation of the measures and their varying environmental impacts. Case studies were conducted in France, Germany, Ireland, Italy, the Netherlands, Spain, and the United Kingdom to cover different production systems and different climatic zones (Atlantic, Continental and Mediterranean). These Member States are also the largest beef and dairy producers at the present time (accounting for 80 per cent of the entire EU production).

Where possible, multiple sources of information have been gathered for each question as a means of cross-checking the validity of individual sources and to ensure the generation of a rich and robust dataset.

1.2 The Evaluation Database

1.2.1 Farm Accountancy Data Network

The Farm Accountancy Data Network (FADN) database has been extensively used in order to analyse trends over time for a number of variables, with farms divided according to a specific typology (presented below). The analysis has been carried out at both the EU and regional level. The FADN is the only micro-economic database harmonised at European level, and provides information about the structure of holdings and their economic results. It is suitable for comparing different production systems among Member States and between European regions.

FADN provides a consistent European basis for defining indicators used in the Evaluation Questions, and provides a range of information at the farm holding level. However the limitations of FADN, as set out below, should be kept in mind when interpreting the data. FADN does not include all agricultural holdings in the European Union but only those which can be considered commercial professional farms on account of their economic size. There are different minimum economic size units which are specific to individual Member States. Furthermore, when a data run is performed and the number of FADN farms is below 15 at a given geographic unit, the results are not displayed for reasons of statistical confidentiality.

Currently, the annual sample covers approximately 80,000 holdings in the EU-25, which represent a population of about 5,000,000 farms in the 25 Member States. These farms cover approximately 90 per cent of the total Utilised Agricultural Area (UAA) and account for more than 90 percent of total agricultural production.

The FADN dataset used in this Evaluation provided data on an annual basis from 1989 to 2004 for the following selected standard FADN ***farm types***:

41. Specialist dairying
421. Specialist cattle-rearing
421. Specialist cattle-fattening
43. Cattle-dairying, rearing and fattening combined
44. Sheep, goats and other grazing livestock
71. Mixed livestock, mainly grazing livestock
81. Field crops-grazing livestock combined

In order to conduct the analysis, data have been extracted from the FADN database administered by DG Agriculture. The FADN data set has been used to produce a ***farm typology*** developed for the purposes of this evaluation.

1.2.2 A Typology of Main Production Regions

In order to observe regional trends and specificities, a ***typology for EU producing regions*** has been developed. This was largely inspired by a study carried out by the French National Institute for Agronomic Research (INRA) (Chatellier, 2003) for the dairy sector. This typology was developed in 2002 with 1999 FADN data to enable a comparison across the regional diversity of the European dairy sector, recognising that the number of FADN regions (102) were too detailed and that a national level analysis is not sensitive to regional specificities.

The typology developed by INRA has been adapted for this Evaluation. It has been extended to the beef sector to facilitate a comparison between sectors and to show results common to the two sectors. The adoption of a similar typology has allowed the evaluation to:

- Take FADN statistical limitations by grouping small dairy regions into account;
- Achieve a minimum and comparable size between production regions;
- Group FADN regions on the basis of the particularities of regional dairy and beef farming systems; and
- Find a spatial contiguity within a production region. This could correspond to country administrative limits (for example, Austria, Sweden or Portugal) or could result in the merging of countries (for example, Belgium and Luxembourg).

Annex I (section I.2) sets out the details of the typology for the main production regions.

1.2.3 The FADN Farm Level Typology

To render the regional typology sensitive to the micro scale, a farm level typology has also been developed. The purpose of the farm level typology is to distinguish between different types of farms on which the CMO and direct support measures exert differing impacts. Specifically, it is focused on the different environmental impacts of the respective production systems. This is to support the micro-economic analysis, and in particular, the differentiated analysis for specific production regions.

A useful single environmental impact indicator is ***stocking density***, based on ruminant livestock units (LU) per hectare of forage, and this is used as an indicator to differentiate between different farm types in the typology. Stocking density is an indicator of both inputs to and outputs from beef and dairy systems, although the beef sector is slightly more complicated due to the range of outputs from rearing, fattening and finishing systems. In broad terms, therefore stocking density gives an indication as to the intensity of production/management and is closely associated with the use of concentrate feeds, type and productivity of fodder, and the use of fertilisers and pesticides. These production factors have, in turn, a range of environmental impacts.

For the purposes of this study, we have worked with the hypothesis that changes in the intensity of the overall farming system will be an indicator of changes in

environmental pressure, although this is subject to various caveats and reservations (c.f. section 3.4.1). Taking stocking density as a core measurable indicator the beef and dairy sectors can both be divided into two categories, intensive and extensive. These categories constitute the farm typology which underpins the evaluation as set out below and presented in table 1.1.

- For the beef sector: The typology distinguishes between intensive and extensive beef systems and a threshold of 1.4 LU/ha has been proposed to separate these two classes. This threshold corresponds to the requirements set by the extensification premium and it is used in some of Member States as the basis for LFA payments, as well as for some agri-environmental measures[2]. A total of 76 per cent of beef farms in the EU-15 have a stocking density of below 1.4 LU/ha.

- For the dairy sector, a stocking rate threshold of 1.8 LU/ha has been utilised. This is a higher threshold than the one used for beef farms, and has been chosen to provide a better discrimination in consideration of the fact that only 13 per cent of dairy farms have a stocking density of less than 1.4 and that these farms generally make use of more productive grasslands than beef farms, and can not often use extensive grasslands.

Table 1.1 Farm Typology used in the evaluation

Proposed farm type	***Stocking density***	***FADN farm types***
Specialist dairy – more intensive	>1.8LU/ha	41
Specialist dairy –less intensive	<=1.8LU/ha	41
Specialist beef rearing – Intensive	>1.4LU/ha	421
Specialist beef rearing- Extensive	<=1.4LU/ha	421
Specialist beef fattening – Intensive	>1.4LU/ha and LU/ha = 0[3]	422
Specialist beef fattening – Extensive	<=1.4LU/ha	422
Dairying, rearing and fattening combined – more intensive	>1.4LU/ha	43
Dairying, rearing and fattening combined – less intensive	<=1.4LU/ha	43
Mixed livestock system – more intensive	>1.4LU/ha	44, 71, 81
Mixed livestock system – less intensive	<=1.4LU/ha	44, 71, 81

For the purposes of the farm typology, the stocking density at farm level has been calculated as the sum of total livestock units divided by total forage area according to the following specifications:

- 'Total livestock units' includes dairy cows, other cattle, sheep and goats.
- 'Total forage area' includes fodder roots and brassicas, other fodder plants, fallow land, temporary grass, permanent grassland and rough grazing.

[2] It should be noted, however, that a threshold of 1.4 LU/ha can still be above the ecological carrying capacity of the land in certain marginal areas (for example in Spain and north-west Scotland).

[3] The class 'Specialist beef fattening – Intensive' include farms with more then 1.4 LU and farms without (or a very reduced) forage area. As an approximation of 'LU/ha = 0' farms with a number of LU >50 and a forage <1ha have been included in this category.

Table 1.2 Number of dairy cows and other cattle (LU) for farm typology classes for 1989, 2000 and 2004 in the EU-15 (Source FADN)

Dairy cows *(LU)*	**1989**	**2000**	**2004**		**1989**	**2000**	**2004**
Specialist beef fattening – Extensive	0	222	265		0.0%	0.0%	0.0%
Specialist beef fattening – Intensive	646	1237	1034		0.0%	0.0%	0.0%
Specialist beef rearing- Extensive	2746	891	866		0.0%	0.0%	0.0%
Specialist beef rearing – Intensive	405	1584	757		0.0%	0.0%	0.0%
Specialist dairy –less intensive	5141512	5415692	5956344		23.6%	26.6%	30.6%
Specialist dairy – more intensive	11020794	9835910	9311599		50.7%	48.3%	47.9%
Dairying, rearing and fattening combined – less intensive	244666	229483	225857		1.1%	1.1%	1.2%
Dairying, rearing and fattening combined – more intensive	1259900	702084	599287		5.8%	3.4%	3.1%
Mixed livestock system – less intensive	505278	789934	838091		2.3%	3.9%	4.3%
Mixed livestock system – more intensive	2582074	2373139	1661019		11.9%	11.7%	8.5%
Others	985536	1022267	861562		4.5%	5.0%	4.4%
Total Farm types	21749433	20368046	19456396		100.0%	100.0%	100.0%
Other cattle *(LU)*	**1989**	**2000**	**2004**		**1989**	**2000**	**2004**
Specialist beef fattening – Extensive	815184	615854	932115		2.6%	1.7%	2.7%
Specialist beef fattening – Intensive	1871096	1803749	2149463		5.9%	5.0%	6.3%
Specialist beef rearing- Extensive	2313357	4203795	4736108		7.3%	11.7%	13.9%
Specialist beef rearing – Intensive	1893733	3219480	2745736		5.9%	9.0%	8.1%
Specialist dairy –less intensive	3291108	4078576	4304139		10.3%	11.4%	12.7%
Specialist dairy – more intensive	7470012	6738402	6098012		23.5%	18.8%	18.0%
Dairying, rearing and fattening combined – less intensive	467378	516130	492373		1.5%	1.4%	1.4%
Dairying, rearing and fattening combined – more intensive	1914176	1559029	1404548		6.0%	4.3%	4.1%
Mixed livestock system – less intensive	2412961	3191712	3262180		7.6%	8.9%	9.6%
Mixed livestock system – more intensive	5401110	5324433	4019041		17.0%	14.8%	11.8%
Others	3977031	4606284	3824584		12.5%	12.8%	11.3%
Total Farm types	31831952	35859800	33965381		100.0%	100.0%	100.0%

Although this definition includes non-bovines, the contribution of sheep and goats should be relatively small in most cases given the criteria used to determine FADN farm types. Furthermore, the fact that sheep and goats are included in the stocking density does not affect the evaluation of the environmental impacts: sheep and goats contribute to pressure on the environment in a relatively similar way to bovine animals. Furthermore, it would not be possible to distinguish between forage used by bovines and non-bovines in order to get an accurate bovine-only stocking rate.

Table 1.2 provides an indication of the total number of cattle and dairy cows per farm type identified within the typology for the years 1989, 2000 and 2004 for the EU-15.

In Annex I, the methodology used for the FADN data abstraction is presented in detail. It also includes a detailed list of variables which allowed the assembly of the FADN evaluation database and the list of producing regions used in the evaluation.

1.2.4 Eurostat statistics and other EC statistics

The Eurostat *Eurofarm* database has also been used to analyse trends over time for a number of variables on agricultural holdings, which include number of animals and crop forage areas. The Eurofarm database is informed by data from the *Farm Structure Survey* (FSS)[4] and used to collect information in the Member States at different geographic levels (Member States and regions), and over time. Two kinds of FSS are carried out by Member States:

- a basic survey every 10 years (full scope Agricultural Census);
- several intermediate sample based surveys which are carried out regularly at two-year intervals (1993/1995/1997/2003/2005/2007).

The 1999/2000 Farm Structure Survey was the last comprehensive survey to be carried out in the majority of Member States. The last sample survey carried out and disseminated by Eurostat was in 2005, the data from which have been used in the evaluation.

The advantage of FSS data compared to the FADN is that all farms are included in the ten year census (1979, 1989 and 1999). As a result, FSS data afford a reliable picture of farm structures in the European Union. However, for some characteristics and some Member States, FSS data may differ from that derived from other sources. The problem arises from the multi-purpose nature of the survey which is not compatible with the establishment of a totally reliable sample, in particular, in situations where characteristics are relatively uncommon or apply specifically to specialised holdings (Eurostat, 2003).

The Eurostat *Livestock statistics, production forecasts, herd structure* database provides useful data on the number of cattle, divided into animal categories by age. Most Member States use statistical surveys to determine their livestock numbers.

[4] The *Farm Structure Survey* was developed to assess the agricultural situation across the EU, to monitor trends in the structure of holdings and to model the impact of external developments or policy proposals.

However some of them calculate cattle numbers from the register of bovine animals. Surveys are regularly carried out by Member States in November/December and in May/June. The database includes gross indigenous production (GIP) forecast data updated to 2007 at the time of writing this report.

Abstractions from the Eurostat *Meat Production* database have also been utilised. The first dataset refers to meat production in abattoirs, with the addition of estimates to cover production outside abattoirs (for example domestic slaughtering[5]). Foreign trade in live animals is also taken into account in order to establish gross indigenous production. In the majority of Member States, data are collected systematically from abattoirs. Some countries still use surveys to collect data, but each Member State has developed its own system for data collection depending on the country's administrative structure, particularly in the case of autonomous regions.

Statistics on *EC budget expenditure* for the different measures in the beef and dairy sectors and by Member State provide useful information about budget allocation and country expenditure.

1.3 The Case Studies

Case studies have been carried out at a national and, in some cases, at a regional level as follows:

- **France**: at national level and with regional in-depth analyses in *Bretagne*, mainly focusing on the dairy sector, and in *Auvergne*, mainly focusing on the beef and veal sector;
- **Germany**: at national level and with regional in-depth analysis on *Bayern*;
- **Ireland**: at national level;
- **Italy**: at national level and with regional in-depth analysis in *Emilia Romagna*;
- **The Netherlands** at national level;
- **Spain** at national level and with regional analyses in *Extremadura*, mainly for the beef and veal sector, and in *Galicia*, mainly for the milk sector;
- **United Kingdom** at national level and with regional in-depth analysis in *South West England*.

The aim of the case studies is to analyse the national implementation of the beef and dairy CMO measures providing, as far as possible, empirical evidence of the farm level responses and the environmental consequences. National Experts have collected and analysed qualitative and quantitative material and presented their results in case study reports[6].

[5] Because of health regulations, domestic slaughtering has practically disappeared in most EU Member States, particularly for large animals.

[6] The case study reports have been provided to the European Commission and do not form part of the final report. Each case study report includes annexes comprising a list of interviewees and interview transcripts.

The reports included:

- a ***literature*** review and web based research to identify relevant publications and documents on the beef and dairy sectors, impact of the CMO policies on farm behaviour and environmental impacts;
- an examination of environmental impacts drawing on material generated from ***interviews*** with experts and a small sample of farmers.

The main results of the case study reports can be summarised as follows:

- A detailed overview of the two sectors has been provided in each case study largely based on the statistics available at Member State and EU level.
- Each of the case study reports has provided a detailed description of the approach taken by the Member State to the implementation of beef and dairy policy measures with particular attention to the SFP as well as to other contextual measures, such as the Nitrates Directive (91/676/EC) and Water Framework Directive (2000/60/EC).
- The case study reports attempted to clarify the farm level response to the key measures, first referring to the impacts of the sector, focusing on emissions of local air pollutants, global atmospheric pollutants, water pollution, soil damage, pressures on landscape, and biodiversity. Evidence has been hard to find, although some insights were generated through the interviews.
- Some empirical evidence of actual environmental impacts from different farm management practices has been provided. However a scarcity of data on the environment and a lack of studies and research has been highlighted. This is particularly true for the beef sector and to a lesser extent for the dairy sector.
- In most of the Member States, the environmental impacts of the CAP measures are a relatively new object of study, especially when compared to the more extensive analyses that have been conducted on the role of the CAP measures on the structure of farming and the income of farmers.
- The farm interviews provided some indications on how measures have affected management decisions from the farm level perspective.
- Details of events since December 2004 were particularly important as no FADN data are available after this date. It has to be noted that most of case study Member States reported that it is too soon to record the effects of decoupling and often no changes in practices have been observed. Predictions about possible effects have been described by most of the case study experts.

2 THE BEEF AND VEAL SECTOR AND THE DAIRY SECTOR IN THE EUROPEAN UNION

2.1 Structural and economic developments in the beef and veal sector and the dairy sector

2.1.1 Structural developments

This section examines the trends and developments which have taken place across the EU in both the beef and veal sector and the milk sector during the evaluation period (1988 to present). The section examines developments in levels and patterns of production in the two sectors and changes to farm structure, herd size and herd structure.

Production
Milk production is the largest agricultural sector in the EU, worth over 18 per cent of the total value of agricultural production in 2006. The beef and veal sector is the EU's primary source of meat production and the second largest agricultural sector overall, although its share of total agricultural production has been in decline, falling from 11.9 per cent in 1995 to 10 per cent in 2005 (EC DGAgri, 2007).

In the late 1970s the EU went from being a net importer to becoming a net exporter of beef and veal and EU production has been greater than domestic market consumption until 2003 when EU consumption exceeded production. Production of beef and veal in the EU has remained relatively constant at around 8 million tonnes per year throughout the evaluation period. Production increased at the beginning of the 1990s and again in 1995 although since then there has been a gradual decline in overall production.

Figure 2.1 shows production of beef and veal between 1988 and 2005. The increase in production seen in 1990/91 was primarily due to the reunification of Germany and significant levels of beef production in the former DDR. The increase in production seen in 1995 was due to the enlargement of the EU from 12 to 15 countries (Austria, Finland and Sweden). The BSE crises in 1996 and 2000 had a significant impact on the beef and veal sector and this can be detected by increases in the levels of intervention storage rather than directly on EU beef and veal production as a whole.

Beef production in the EU 15 originates from both the dairy herd (about two thirds) and from the suckler herd (about one third) (EC DG Agri 2004). Beef produced from dairy herds tends to be crossed between a dairy breed mother and a beef breed father, whilst the parents of beef cows from suckler herds tend to be both be from cattle bred specifically for beef production. Suckler cow production tends to be based on grazing or grass–based systems, although there is a significant amount of variation between Member States. More intensive feeding systems also exist, for example, where the cattle are kept indoors throughout the year and fed a predominantly non-grass diet such as cereals (EC DG Agri, 2004).

Milk production in the EU has been linked to the milk quota regime throughout the evaluation period and as a result production levels have been very stable. Between

1984 and 1995 EU milk production fell from 129.6 million tonnes to 121.2 million tonnes due cuts in the milk quota (EC DG Agri, 1997b). However, since 1995 cows' milk production in the EU-15 has remained stable. The average annual production of cows' milk in the EU 15 was approximately 121 million tonnes between 1999 and 2005 and 142 million tonnes in the EU 25 in 2004 and 2005 (Eurostat, 2007). Figure 2.2 shows milk production in the EU between 1988 and 2005. The increase in 1995 and 2004 is due to the enlargement of the EU.

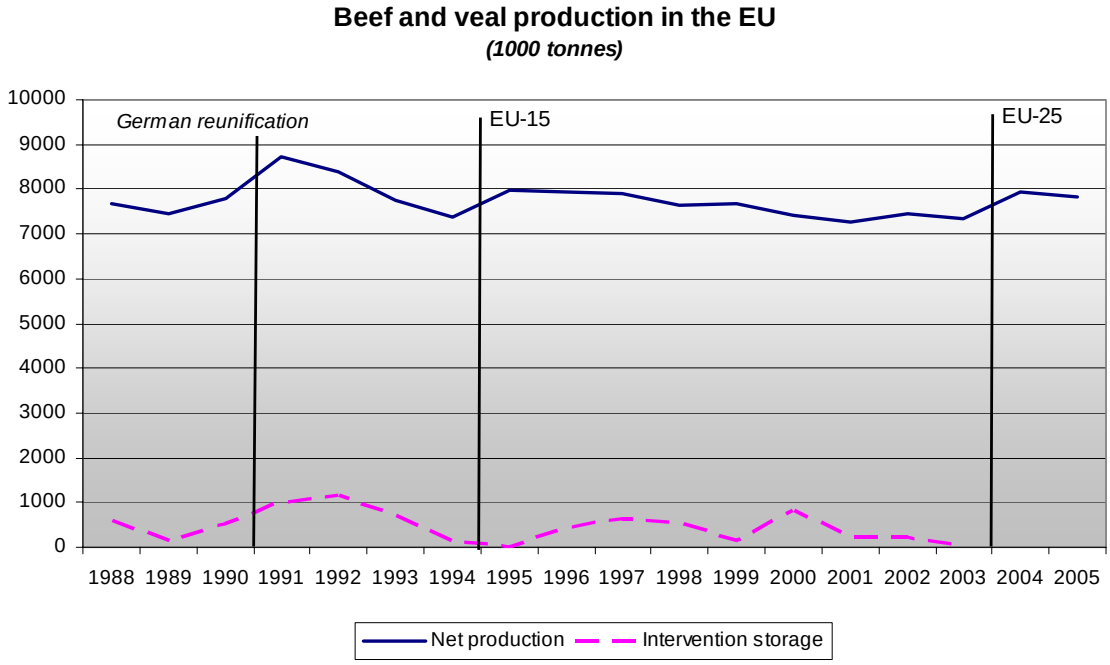

Figure 2.1 Production and intervention storage of beef and veal in the EU

(Source: European Commission DG-Agri)

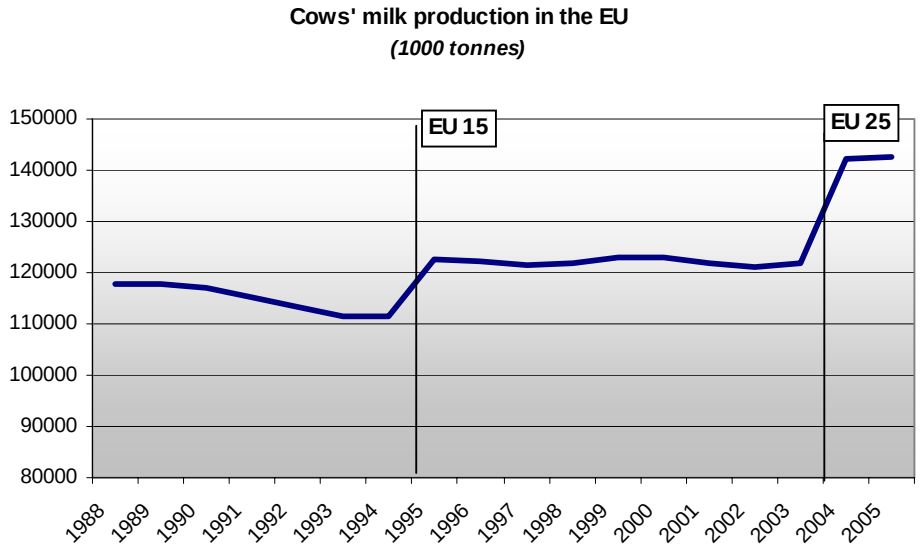

Figure 2.2 Production of fresh whole milk in the EU

(Source: European Commission DG-Agri)

There are two main categories of milk production: milk collections by dairies and on-farm consumption for domestic use, direct sales and use as cattle feed. In the EU 15 on-farm consumption accounted for just five per cent of total milk production in 2002 (EC, 2004), whilst in the EU 10 on-farm consumption accounts for a higher proportion, more than 25 per cent of total production in 2004 (EC DG Agri, 2005b).

Regional production

The main beef producers in the EU, in terms of the number of bovine slaughterings, are France, Germany and Italy. Between 1999 and 2002 these three Member States accounted for approximately 55 per cent of all slaughterings in the EU 15, whilst for the period 2003-2005 they accounted for just under 50 per cent of the EU 25 total.

Figure 2.3 Cattle livestock units by animal type and by main production region in 2004

(Source: FADN)

The UK (9.2 per cent), Spain (9.0 per cent) and Ireland (7.0 per cent) are also significant producers, followed by the Netherlands (4.8 per cent), Poland (3.9 per cent) and Belgium (3.4 per cent). The ten Member States (EU 10), which joined the EU in 2004, account for approximately 15 per cent of production in the EU 25 (Eurostat, 2007).

The three main milk producers in the EU-25 are Germany (19.8 per cent), France (17.2 per cent) and the UK (10.3 per cent), which together account for nearly 50 per cent of total cows' milk production. Other major producers include Poland (8.3 per cent), Italy (7.6 per cent), the Netherlands (7.6 per cent) and Spain (4.6 per cent). Together these seven Member States account for 75 per cent of cow milk production in the EU 25. The EU-10 account for approximately 15 per cent of cows' milk production in the EU 25 (Eurostat, 2007).

Figure 2.3 shows the distribution of dairy cows and 'other' cattle (i.e. all cattle excluding dairy cows) in terms of livestock units across the EU 15 in 2004. The map is divided into producing regions[7] and indicates that greatest overall numbers cattle are located in the north west of France, Ireland, the England (excluding east England) and Wales, and Ireland. Significant numbers of cattle are also found throughout Germany, the Netherlands, France, Italy, and Scotland. Dairy cows tend to be found in relatively high numbers along the Atlantic coast, in Germany, the Netherlands and the north of Italy. 'Other' cattle significantly outnumber dairy cows in Spain (excluding Galicia and the north of Spain), Ireland, the south and east of France, the south west of Germany and Italy. The lowest numbers of overall cattle tend to be found in the Mediterranean countries and in Scandinavia.

Cattle numbers

Data indicate that the total number of dairy cows and 'other' cattle (including suckler cows) in the EU is decreasing. In the case of dairy cows this reflects a long term trend, whilst the decline in 'other' cattle is a more recent trend dating from the late 1990s (see Figure 2.4). There was an especially large drop in the number of 'other' cattle and dairy cows in 2002 which can be attributed to the outbreak of foot and mouth in 2001.

The on-going decline in the number of dairy cows in the EU is due to increasing milk yields per cow as a result of improved genetics and feeding in combination with fixed milk production levels limited by quota. In the 20 years since the introduction of the milk quota systems, the EU dairy herd has contracted by about 40 per cent (EC DG Agri 2005b). Between 1995 and 2005 the average rate of decline in the EU dairy herd was 1.8 per cent. A similar pattern was observed in the EU 10 Member States between 2001 and 2005. In 2005 the EU 15 dairy herd stood at 18.5 million heads (Eurostat 2007).

Between the mid-1980s and the mid-1990s the EU suckler herd increased, in contrast to the EU dairy herd, with increases observed in most Member States. During the same period total cattle numbers, which include all cows, male cattle, calves and steers, were relatively stable. Eurostat figures indicate that the total number of cattle in the EU 12 reached a peak of 79.4 million in 1992, rising to 85 million in 1995 following the accession of Austria, Finland and Sweden to the EU. There has been a gradual decline since then and in 2003 EU 15 cattle numbers stood at 77 million. When cattle numbers in the EU-10 are taken into account this figure increases to 86 million. Figures for 2006 indicate that EU 15 and EU 25 cattle numbers have continued to fall reaching 74.8 million and 84.7 million heads of cattle respectively.

[7] These are the producing regions used in this evaluation, for methodology and FADN data limitations see section 1.2.1 and Annex I.

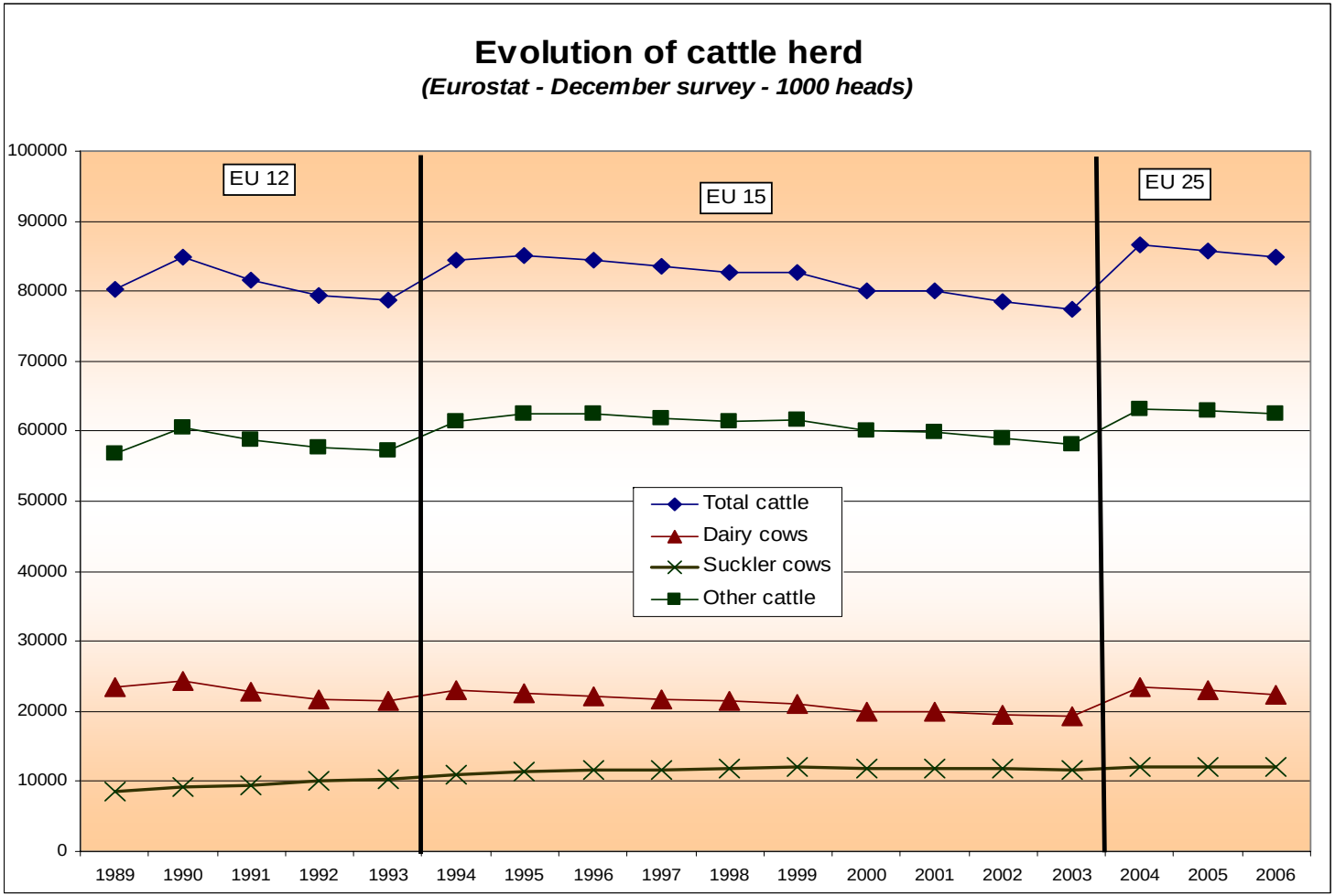

Figure 2.4 Evolution of cattle herd, main animal categories, from 1989 to 2006 in the EU

(Source: Eurostat)

Number of specialised farms

According to FADN data the total number of farms in categories relating to beef or dairy production, declined from approximately 1.5 million farms in 1989 to 1 million farms in 2004 (see Figure 2.5). The increase in 1995 is due to EU enlargement. Three FADN categories contain data on both beef and dairy production: (4) Specialist grazing livestock, (7) Mixed livestock and (8) Mixed crops-livestock. Category (4) can be sub-divided into: (41) specialist dairying, (44) sheep, goats and other grazing livestock, and (45) cattle-dairying, rearing and fattening combined (i.e. primarily beef production). The decline in the number of farms is most pronounced in categories (41) specialist dairying, (7) mixed livestock and (8) mixed crops-livestock. These three categories have also experienced the greatest increase in farm size as measured by UAA. From 1989 to 2004 the average farm size increased by 67 per cent, 104 per cent and 128 per cent in these categories respectively (see Figure 2.6). Overall, the average farm size is increasing for all categories except for (44) sheep, goats and grazing livestock, where farm size has been declining since 1995 and for (7) Mixed livestock since 2002.

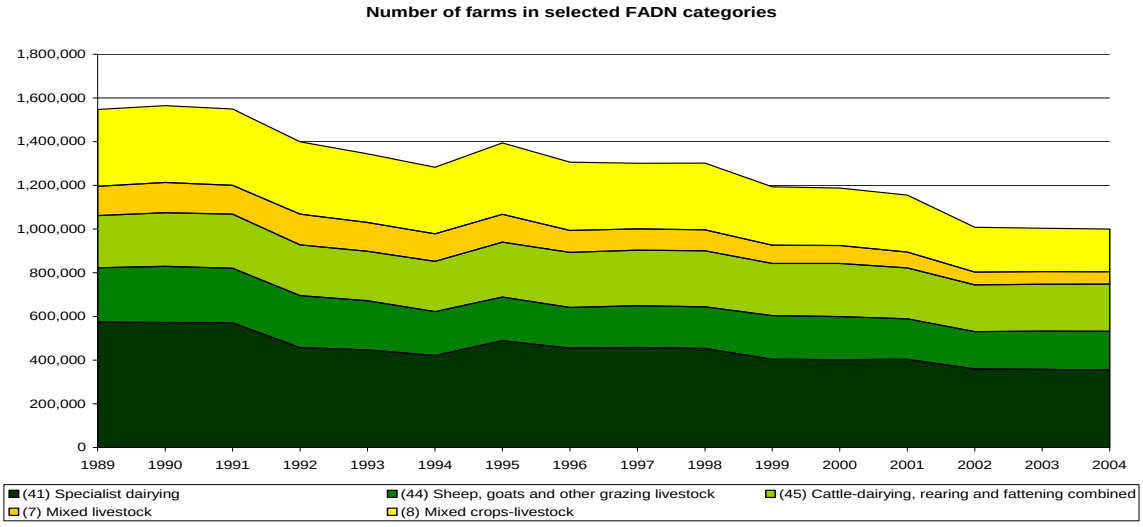

Figure 2.5 Number of farms within the selected FADN categories (EU 12/15).

(Source: FADN)

The average number of cattle per holding in the EU has been increasing consistently across both sectors over the evaluation period. According to Eurostat figures the average number of animals per holding on cattle farms in the EU 15 increased from 47.4 in 1997 to 57.8 in 2003 (33.8 in the EU 25). Cattle farms with the highest number of animals per holding in 2003 could be found in Denmark (89.2), Cyprus (225.9), Luxembourg (92.4), the Netherlands (95.9) and the UK (95.5). The smallest holdings in the EU 15 could be found in Austria (23.2), Greece (30.2), Spain (39.5), Portugal (16.2), and Italy (38.9). The average number of animals per EU 15 dairy holding increased from 24.0 in 1997 to 29.4 in 2001. By 2004 the average number of cows per dairy farm in the EU 15 stood at 37 (EC, 2006). The largest dairy farms in terms of number of animals per holding in 2003 could be found in the UK (79.2), Denmark (75.0), the Netherlands (54.1) and Cyprus (106.4). The smallest dairy holdings in the EU 15 were in Greece (13.7), Spain (17.6), Portugal (15.2) and Finland (17.5).

However, while cattle numbers per holding have been increasing, this appears to have taken place at a slower rate than the increase in the area of forage area per farm and as a result stocking density has decreased over the evaluation period at the EU level (Table 3.1). This overall decrease masks some significant differences between Member States, production regions and sector. According to FADN data, the largest decreases in stocking density across both sectors have taken place in Denmark, the Netherlands and Luxembourg, whereas the largest increases have taken place in Italy, Spain and Portugal. Table 2.1 shows the variation in stocking density trends for the beef, veal and dairy sectors between production regions set against regional trends in cattle numbers.

Table 2.1 Variation in stocking density across EU production regions for the beef, veal and dairy sectors 1995-2004

		Stocking density		
		Decrease	**No or small variation (-5% or + 5%)**	**Increase**
Heads of Cattle	**Decrease**	Belgium-Luxembourg, Denmark, Germany (Bavaria and West), France-West, Netherlands, UK (Central and East)	Germany-North, Greece	Portugal, Spain Other, UK-North
	no or small variation (-5% or + 5%)	France-East, Finland, Sweden	France (North, South-East and South-West), Austria	Germany-East, Ireland
	Increase	Spain North	France (Massif Central and Central)	Italy (North and Other)

(Own calculations from FADN results)

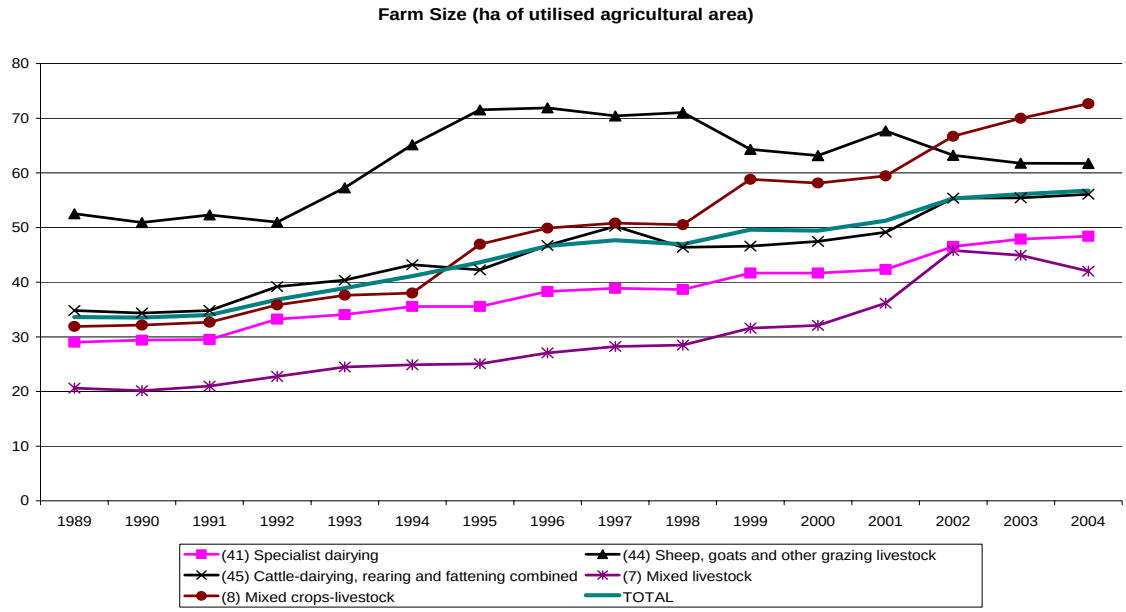

Figure 2.6 Average farm size within the selected FADN categories (EU12/15)

(Source: FADN)

2.1.2 Market aspects of the beef and veal sector and the milk sector

Market aspects of production
Trends in production of beef and cows' milk are shown in the previous section (see Figure 2.1 and Figure 2.2). In the milk sector consumption of dairy products in the EU increased between 1997 and in 2001 amounted to more than 108 million tonnes of milk equivalents for all uses of milk (EC, 2002). In general terms, there has been a steady long-term increase in consumption and production of cheese and other high value-added dairy products, whilst butter and skimmed milk powder (SMP) production have declined over time.

Beef production tends to follow a cyclical pattern over a two to three year period, in contrast to the dairy sector. Veal production is largely a by-product of dairy production and as a result is less prone to such patterns. Crises linked to Bovine Spongiform Encephalopathy (BSE) in 1996 and 2000 have had a significant impact on the beef and veal sector. These events caused a significant drop in the consumption of beef, which led to short term oversupply of beef and hence considerably reduced prices (DG Agri, 2004). In 2001, for example, EU beef consumption accounted for 6.7 million tonnes, 12 per cent lower than levels experienced prior to the BSE crises (EC, 2003). However, since 2003 EU consumption has recovered somewhat.

In recent years (1999-2003) overall production of drinking milk in the EU 15 has remained relatively stable at around 29 million tonnes per year. However, during this period there has been a decrease in the consumption of whole milk whilst consumption of skimmed and semi-skimmed milk has increased. The UK is the main producer of drinking milk in the EU, followed by Germany, France, Spain, Italy and Poland (Eurostat, 2005c).

Over the last 20 years, the EU cheese sector has been characterised by strong and steady growth, both for production and consumption. In 2003 cheese production from cows' milk amounted to more than 6.5 million tonnes for the EU 15, with total production in the EU 25 accounting for just under 7.5 million tonnes. 80 per cent of EU 25 cheese production takes place in just seven Member States with Germany and France together accounting for 47 per cent of total EU production. Italy, the Netherlands, Poland, Denmark and the UK are also significant producers (Eurostat, 2005c).

According to European Commission data, production of butter has been relatively stable during the evaluation period although with a gradual decline in the long term. This decline is due to the increasing use of milk for the production of cheese and other high value-added dairy products instead of butter. Germany and France are the main producers accounting for nearly 40 per cent of EU 25 production in 2003. Other significant producers include Ireland, the Netherlands, Poland, the UK, Italy and Belgium (Eurostat, 2005c).

Data indicate the production of skimmed milk and butter milk powder has declined over the evaluation period, peaking in 1990/91 just before the implementation of the 1992 CAP reform. The declining trend reflects the fact that there has been an

increasing demand for, and production of, high value products like cheese and other processed dairy products. Market trends in powdered milk products are linked to demand for animal feed and international markets. SMP can also be used as a residue to dispose of surplus proteins, for example, via intervention. Germany and France are the main producers of SMP in the EU 25 accounting for nearly 50 percent of production, followed by Ireland and the UK. The EU 10 account for approximately 20 per cent of total EU production (EC DG Agri, 2005b).

Evolution of prices

In real terms, milk and cattle producer prices have either declined or remained stable throughout the evaluation period as shown in Figure 2.7. This confirms a tendency typical of most of EU agricultural commodities in the same period. However, during this period producer prices for 'cattle' and 'cattle excluding calves' experienced a decline in 2001, but have subsequently recovered to the level in 2000.

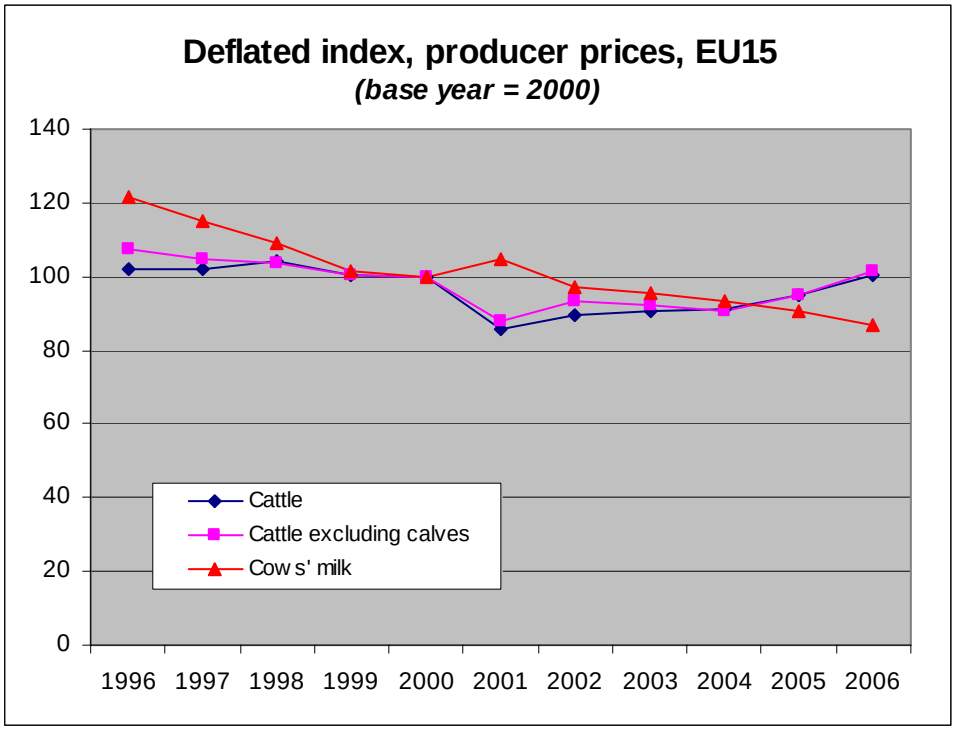

Figure 2.7 Deflated producer price index for cattle and cows' milk in the EU15

(Source: Eurostat)

Following the introduction of the milk quota system nominal EU milk prices increased by an average of 2.3 per cent per year until 1989. However, between 1990 and 1996 rises in EU milk prices were much more modest at 0.7 per cent per year. (EC DG Agri, 1997b).

According to Eurostat data, between 1989 and 2005[8] the average absolute selling price for cows' milk was relatively stable for the EU as a whole at just over 30 Euro (ECU) per 100 kg. Nominal milk prices increased in the last years in Spain and

[8] Data were not available for the following Member States: Denmark (2002-2005), Germany (2003-2005), Italy (2000-2005).

Portugal whilst in Netherlands, Sweden, Ireland and the UK milk prices fell over this period. Milk prices continued to experience only modest growth following the 2003 reform (Figure 2.8) and only recently, in 2007, have prices appeared to recover to a significant degree (EC DG Agri, 2005a).

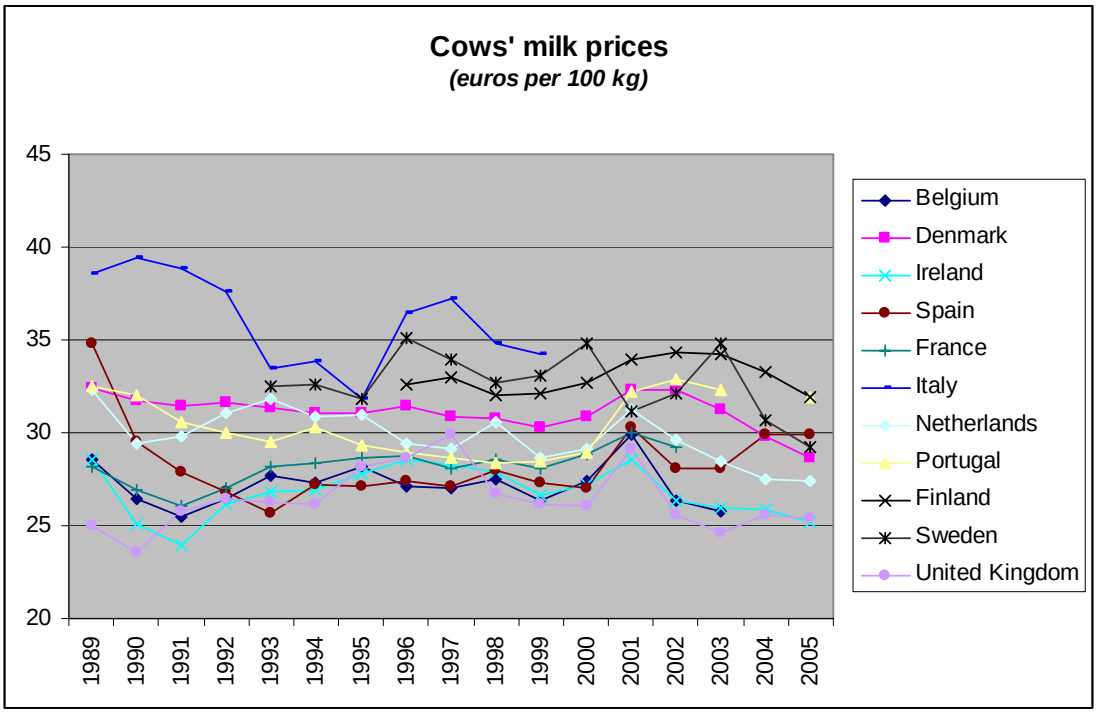

Figure 2.8 Cows' milk prices in selected EU Member States[9]

(Source: Eurostat)

EU beef prices increased until the late 1980s. This was followed by a period of gradual decline until 1996 when prices dropped significantly due to the BSE crisis (EC DG Agri, 1997). Prices recovered somewhat after this as consumer confidence and therefore consumption improved. However, in 1998 beef prices again fell significantly due to the loss of the Russian export market, which at that time accounted for around 40 per cent of all EU beef exports. In 1999 beef prices recovered slowly (EC DG Agri, 2000a) before falling again in 2001 (EC, 2003). Following the outbreak of foot and mouth disease (FMD) beef prices rose again (EC DG Agri, 2005a). The general EU price trend hides, however, significant national variations as shown in the diagram in Figure 2.9.

[9] Raw cows' milk; 3.7% fat content, ECU up to 1998 and Euro from 1999.

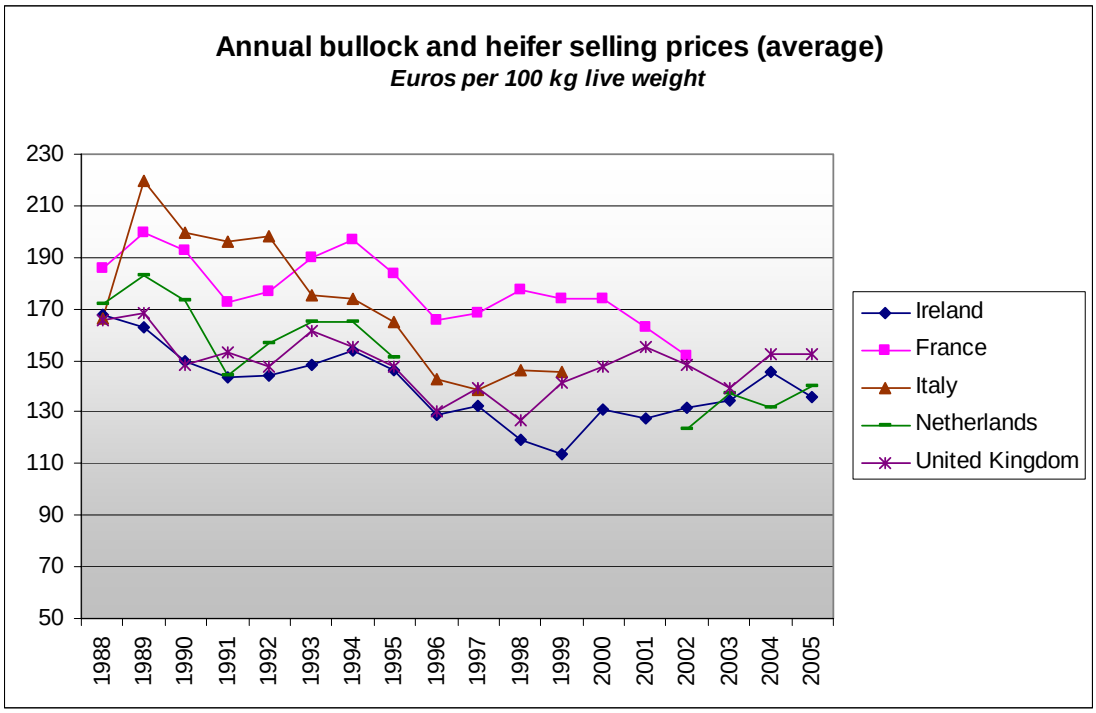

Figure 2.9 Annual bullock and heifer selling prices in selected EU Member States

(Source: own calculations based on Eurostat data)

Impact of Bovine Spongiform Encephalopathy (BSE) and Foot and Mouth Disease (FMD)

BSE or 'mad cow disease', a terminal disease linked to the central nervous system of cattle, was first identified in the UK in 1986. In 1996 a potential link between BSE and a new variant of the human brain disease Creutzfeldt-Jakob (CJD) was identified which resulted in a dramatic drop in EU beef consumption, but particularly in the UK and Germany (EC DG Agri, 2007). In 2000 a second BSE crisis ensued following the diagnosis of the disease in a number of Member States which had previously been thought to have been free of BSE, such as France (EC, 2000). In addition to the impact of BSE on consumption, mainly in terms of beef rather than dairy products, BSE also resulted in the removal of significant numbers of cattle. Between 1996 and 2004 more than eight million cattle were removed from the EU beef and dairy herds via slaughter schemes and around 6 million calves were subject to emergency schemes which attempted to align supply as close as possible with consumption (EC-DG Agri 2005b). In the UK, a beef export ban was introduced in 1996 and subsequently lifted in 2006, and cattle over 30 months were prevented from entering the food chain. The export of dairy products was not affected.

In 2001 an outbreak of foot and mouth disease in the UK resulted in the culling of around 850,000 cattle, primarily in the UK, but also in the Netherlands, France and Ireland (EC-DG Agri, 2005b). Movement restrictions imposed in the areas affected by FMD had an impact on the beef and dairy sectors as did the temporary closure of export markets. Where movement restrictions, put in place to control FMD, were judged to have caused severe adverse impacts on animal welfare, livestock farmers

were able to apply for aid to dispose of the animals through the livestock welfare disposal scheme[10] (EC, 2003).

2.2 CMO measures for the beef/veal sector and their implementation from 1988 onwards

2.2.1 Introduction

The CMO for the beef and veal sector has been reformed on several occasions since the early 1960s. This introduction summarises the main changes to the CMO, an overview of which is provided by Table 2.2 below.

Table 2.2 Major events in the development of the beef and veal CMO

Period	Measures:
CAP 1968-1988	*Market measures:* – Border measures such as tariffs and import quotas – Export subsidies (export refunds) – Intervention prices and domestic price support – Intervention storage and public purchase – Private Storage Aid *Direct payments* – Marketing support payments (based on number of animals) such as: – Cattle Slaughter Premium for UK – Calf subsidy for IT, IE and EL – Premium for maintaining suckler cows
CAP 1988-1992	*Market measures:* – Border measures such as tariffs and import quotas – Export subsidies (export refunds) – Intervention prices and domestic price support – Intervention storage and public purchase – Private Storage Aid – Marketing support payments (based on number of animals) *Direct payments:* – Beef Special Premium – Suckler Cow Premium – Extensification Premium
1992 CAP Reform	*Market measures:* – Reduction of intervention prices of 15 per cent from 1995 onwards – Fixing ceilings for intervention purchase – Reduction of price support *Direct payments:* – Increase of Suckler Cow Premium and Beef Special Premium – Introduction of Deseasonalisation Premium – Increase of Extensification Premium – Maximum stocking density limits introduced
BSE 1996	*Market measures:* – Temporary lift of annual ceiling for 1996 and 1997 – Intervention under more flexible conditions – Special private storage scheme for veal – Animal identification

[10] Aid number NN 25/2001.

	– Meat labelling – Over Thirty Month Scheme
Agenda 2000 Reform	*Market measures:* – Further reduction of market support price by 20 per cent – Intervention prices only in severe crises (Intervention as safety net) – Normal intervention abolished from 1.7.2002 – Private storage for internal market stabilisation *Direct payments:* – Slaughter Premium – Special Beef Premium – Suckler Cow Premium – Extensification Payment – Additional Suckler Cow Premium – Deseasonalisation Premium – National expenditure envelopes
BSE 2000	– Intervention storage (special purchase scheme) – Purchase for destruction or storage schemes
FMD 2001	– the Purchase for Destruction Scheme – the Special Purchase Scheme
2003 CAP Mid Term Review	*Direct payments:* – All payments eligible to become part of the single payment – Decoupling of direct payments (total or partial) – Member States may retain coupled aid in the beef sector for the suckler cow premium, the slaughter premium for calves, the slaughter premium for bovine adults and for the special male premium; – Single Area Payment Scheme and Complementary National Direct Payments in the beef and veal sector are applied in the New Member States.

Article 33 of the Treaty of Rome of 1957 sets out the objectives of the Common Agricultural Policy (CAP). The Treaty states that a common organisation of agricultural markets has to be established in order to attain these objectives, including common rules on competition and the co-ordination of both national market organisations and the European market organisation.

The first Council Regulation on the establishment of a common market organisation in the beef and veal sector was adopted in February 1964 and the support regime was fully operational from 1968 when the more detailed Regulation (EEC) 805/1968 was adopted. This Regulation introduced a single price system for beef and veal in the Community and led to the establishment of a single market in the beef and veal sector. The regulation comprised rules on price support and the trading system, with the aim of stabilising the market through adjusting supply and demand by means of a common customs tariff and export refunds. Support for prices in the European market was provided by a system of institutional price targets and a mechanism to purchase meat for storage (called buying-in by intervention). Intervention measures were set to prevent or mitigate substantial falls in prices and included aid for private storage. General rules for granting export refunds and the criteria for fixing the amount of such refunds were established in subsequent Regulations in 1968. General rules for granting private storage aid were defined.

During the 1970s and 1980s several Regulations were adopted amending the reference Regulation 805/1968 and establishing specific rules for the application of intervention measures and the trade system, in particular fixing the export refunds and the application of a system of import and export licences. Intervention, originally

envisaged as no more than a safety net, became the regime's principle support mechanism.

The support regime changed significantly with successive reforms driven by market developments or by exceptional circumstances in either EU or world markets. One of the most important features introduced was direct payments to farmers designed to maintain and stabilise their income. Direct payments became increasingly important with the progress of the different reforms and involved substantial changes in their implementation.

The first premium schemes were established on a small scale in the 1970s with the objective of giving greater autonomy to the market to reflect seasonal fluctuations in cattle marketing and consumer demand. They were first introduced in 1975; the Beef Variable Scheme in the UK and a calf subsidy introduced by Italy, Ireland and Greece. The Community paid only part of the cost, the reminder being borne by the country implementing the measure.

The Commission's Green Paper '*Perspectives for the Common Agricultural Policy*' (July 1985) included concerns about CAP expenditure and the large public stocks for beef which had to be 'progressively reduced, not only to avoid excessive costs of storage, but also to permit a sounder management of the agricultural markets'. In December 1986 the Council of Ministers agreed to a reform which put in place interim arrangements, to last two years, intended to reduce the quantity of beef sold to intervention. These were succeeded by a more substantial reform in 1989 in an effort to control agricultural surpluses and reduce the cost of support to taxpayers. The strategy behind this reform was to shift support from prices towards direct income support. In the beef and veal market organisation, this period was marked by the introduction of a system of premiums granted to support the income of beef producers. The EU introduced two schemes to help maintain the incomes of beef producers: the Beef Special Premium and Suckler Cow Premium. The support mechanisms of intervention, export refunds and import tariffs continued, for which a new ceiling for sales of beef into intervention was introduced.

As part of the MacSharry reform of the CAP in 1992, with Council Regulation (EEC) 2066/1992, the beef regime was reformed in a further effort to control surpluses and reduce the cost of support to taxpayers as well as satisfying some of the demands of the General Agreement on Tariffs and Trade (GATT). Compared to other sectors, the beef and veal sector was less affected by this round of CAP reform. However, Council Regulation 2066/1992 introduced important changes - driven by the strategy of shifting from market support to direct payments - in the form of headage premiums, to compensate for the price reduction.

The next overhaul of the beef and veal market organisation system was adopted through Regulation 1254/1999 which laid down specific new rules and repealed Regulation 805/68. This was done, as part of the package of measures agreed in Agenda 2000, in order to improve the balance between supply and demand on the internal market. This involved cutting intervention prices, ensuring an adequate farm income and restoring levels of beef consumption to levels experienced prior to the first BSE crisis in 1996, as well as providing further incentives for producers to move towards more extensive production methods. Intervention was reduced to a minimal

'safety net' and applied only in the case of severe crises. The reform included a decrease in prices compensated by increased direct payments to producers in the form of premiums based on the number of cattle they held in a reference period. The slaughter premium, as well as additional payments, the so-called 'national envelopes', were introduced as part of the compensation for lower prices. The extensification premium, first introduced in 1992, was also modified to further encourage environmentally sustainable production systems.

Member States had the option to introduce a form of voluntary cross compliance following the Agenda 2000 reform of the CAP. Council Regulation 1257/1999 allowed Member States to define appropriate environmental measures linked to the receipt of direct payments in return for agri-environment commitments. One of the measures was to make specific environmental requirements a condition for the receipt of direct payments. It is understood that only a very small number of Member States made use of this measure, including Denmark, France, Greece, the Netherlands and the UK.

More recently, the major reform of 2003 completely changed the beef and veal market organisation with the introduction of the Single Payment Scheme (SPS). The main aims of the reform were to improve the market orientation and sustainability of EU agriculture. This reform established a single income payment per holding which entered into force on 1 January 2005, although Member States could delay implementation until 2007. The reform involved a shift from support based on volumes of production through decoupling, although in practice Member States had the option to retain some coupled payments in the beef sector. A deduction may be made to a farmer's full single payment entitlement if they are found to be non-compliant with any of the cross compliance Statutory Management Requirements (SMRs) or standards for Good Agricultural and Environmental Condition (GAEC).

The SMRs include EU legislation for the environment, animal welfare, public health, animal identification and registration whilst GAEC standards focus on soil management and the maintenance of agricultural habitats and landscape features. Member States also had the option to provide additional support to the beef sector for specific environmental or quality objectives through the use of 'Article 69'. The SPS has been introduced in the EU 15 plus Malta and Slovenia. The remaining EU Member States have introduced an alternative payment scheme called the Single Area Payment Scheme (SAPS) which is a simplified version of the SPS in terms of the way the payment is calculated. Member States where SAPS has been introduced have an obligation to develop GAEC standards but payments are not subject to the SMRs. Intervention and private storage aid continue, albeit at reduced levels. New Member States have the possibility to pay to their farmers additional direct payments, the complementary national direct payments (CNDP).

The next table (Table 2.3) and figure (Figure 2.10) show an overview of budget expenditure for the Beef & Veal CMO by measure for the evaluation period.

Table 2.3 Beef and veal CMO EU expenditure by measure (€ million).

Year	Refunds	Intervention	Suckler cows Premium	Additional premium suckler cows	Beef Special premium	Extensifi-cation premium	Deseasona-lisation premium	Slaughter premium
1989	1343	663	182		157			
1990	1110	998	292		401			
1991	1282	2313	367		335			
1992	1333	2191	437		453			
1993	1711	1383	558		319		32	
1994	1708	-209	841	41	657	389	25	
1995	1761	-216	1009	38	957	438	23	
1996	1559	620	1469	44	1407	507	39	
1997	1499	750	1466	56	1239	569	45	
1998	774	145	1589	63	1341	706	24	
1999	595	-37	1595	63	1297	714	32	
2000	661	-83	1566	63	1299	715	25	
2001	363	326	1705	72	1530	914	23	494
2002	387	105	1880	97	1788	891	39	1184
2003	295	3	2151	75	1945	989	45	1718
2004	250	-8	2015	76	1928	1074	24	1726
2005	212	0	2149	79	2122	1111	0	1783
2006	114	0	1258	63	702	452		646

(Source: DG Agri EAGGF expenditure)

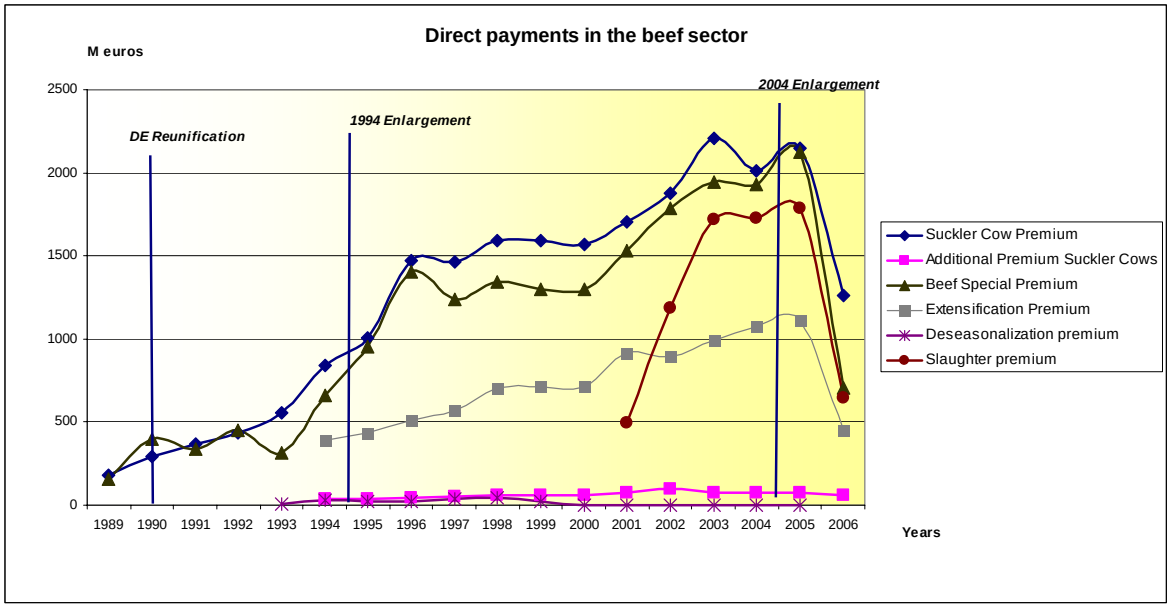

Figure 2.10 Direct payment expenditure across the EU

(Source: DG Agri Expenditure Database)

2.2.2 Trade measures and price support measures

The most important component of the traditional market support which has been in place since the outset of the regime is the system of price support and trade measures**.** In the early period of the CAP, the beef and veal regime was based on principles similar to the other sectors, applying measures often identified as 'classical market and price support measures'. These measures were, and still are, aimed at restricting cheaper imports entering the EU and permitting artificially high prices within the EU. These measures include, as main elements, border protection, intervention buying and export refunds.

The external trade system

- Rules on trade systems have been in force since the first Council Regulation on the establishment of the EU single market and of the CMO in the beef and veal sector, including a common customs tariff as well as general rules for granting export refunds. The regime has changed significantly with successive reforms driven by market developments or by exceptional circumstances in either EU or world markets. The EU trade system is composed of customs tariffs, import quotas, export refunds (or subsidies) and a system for inward processing, each of which have a specific set of rules.

Border protection measures include the following:

- *Import Tariffs* apply to the import of all categories of cattle (beef, calves and veal) with the exception of pure-bred cattle used for breeding (to the EU) unless the imports in question are subject to an import tariff quota or agreement. The levies are intended to bridge the gap between import prices and EU prices and are adjusted according to prevailing market prices in the EU.
- *Import quotas* are negotiated with some non-EU countries. Most live cattle and beef and veal imported to the EU enter under one of the concessionary import schemes or quotas. Imports are subject to either zero or reduced rates of specific import customs duty.
- *Export subsidies* compensate exporters by paying them the difference between the relatively high EU price and the lower world price. The subsidies are adjusted according to market conditions. Refund rates vary according to the type of beef exported and the export destination. Not all destinations qualify for refunds.
- *Inward Processing Measures* exempt beef imported for processing before being re-exported to non-EU countries, from both import customs duties and the *ad valorem* customs duties.

The CAP reforms over the past two decades have mainly focused on reducing price support. Tariffs have been adjusted in line with multilateral trade commitments but there has been no fundamental change with respect to the EU's policy on imports. However, for the beef sector it is a critical area of concern. The mechanisms have undergone some liberalisation but not so as to allow substantial imports. Tariffs continue to have a significant impact on both EU and international production.

Intervention

The system of intervention which applies to the EU beef and veal sector is intended to stabilise internal EU production at levels which prevent overproduction and maintain farm incomes at an adequate level through the use of *internal support measures*. In the beef and veal CMO, as for other sectors, these have taken the form of:

- public intervention buying under the intervention system; and
- aid for private storage.

Under the intervention system public authorities can buy certain commodities from farmers at a guaranteed price and put the commodities into public storage. These commodities are then released onto the market at a later stage when market conditions have improved. The system is intended to provide a safety net for producers to stabilise markets during major short term fluctuations in supply. The system is administered through a formal procedure involving authorised agencies in the Member States. In addition to public storage, meat can also be put into private storage. Aid is paid to the owner of the meat for a specified period of time provided that certain conditions are fulfilled.

As for several other commodities subject to production related support within a CMO, the beef regime was originally based on a system of three institutional prices set within the regime:

- *Target prices* represent the price set by the EU in a particular year and act as a reference point from which the other institutional support prices are derived.
- *Threshold prices* represent the minimum entry prices for imports from non-EU countries. They are calculated from target prices and take account of internal distribution costs to ensure that target prices cannot be undercut. They are higher than the intervention price (see below) in order to encourage EU buyers to purchase beef and veal within the EU.
- *Intervention prices* represent the intended floor in the market price. It is the guaranteed price below which an intervention body designated by the Member State buys in and stores commodities subject to intervention when market prices fall below the intervention price. Products bought into intervention can be denatured, used for humanitarian purposes or be sold by the Commission. Sales are by tender and the destination of the products is decided in advance by the Commission.

Target (or indicative) *prices*, *threshold price*s and *intervention prices* are set by the Council at the beginning of each marketing year based on a qualified majority on a proposal by the Commission and after consultation with the European Parliament.

Historically, the intervention system has been the principle mechanism for supporting beef prices, and therefore beef producers' incomes. However, intervention arrangements for beef and veal have changed several times since the introduction of the CMO and successive reforms of the CAP have gradually reduced the role played by price support and intervention storage. As part of the McSharry reforms, Council Regulation 2066/1992 initiated a shift away from market support towards the greater provision of compensatory direct payments, in the form of headage premiums. In addition, as a result of favourable market conditions, no intervention purchases took

place between the end of 1993 and the beginning of 1996. However, following the outbreak of BSE in March 1996 intervention was reopened under more flexible conditions (including a greater range of quality grades and higher slaughter weights admitted). Following the Agenda 2000 reforms Regulation (EC) 1254/1999 further modified the system of market support for the beef and veal sector. As a result, intervention buying of surplus beef from the market was reduced to a minimal 'safety net' which applies only in the case of severe crises. Following the 2000 BSE crisis and the outbreak of foot and mouth disease in 2001, emergency measures were adopted to in order to deal with growing surpluses of beef. These measures included the reopening of intervention in 2001 when around 250,000 tonnes of beef were taken off the market. This was the last time intervention buying of beef in the EU took place and intervention stores were finally emptied in summer 2004.

The general rules for the current system of intervention are set out in Article 27 of Council Regulation 1254/1999. Detailed rules are laid down in Commission Regulation 562/2000 concerning eligibility of products, the procedure for tendering and takeover, boning and storage. Regulation 1669/2006 has since replaced the Regulation 562/2000.

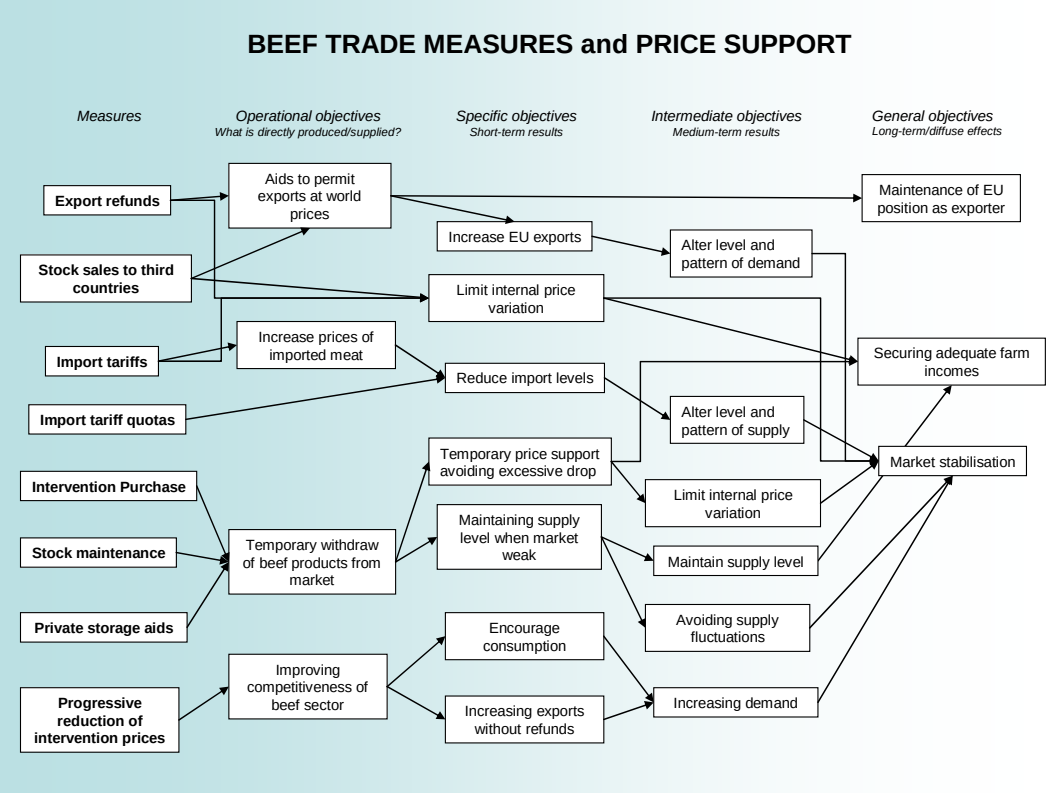

Figure 2.11 Intervention logic for beef trade measures and price support

Beef accepted into intervention has always been subject to restrictions. The EU operates a *system of carcass classification* in order to ensure that meat offered for sale into storage meets minimum quality standards. Beef can be a highly variable product in comparison to dairy commodities subject to intervention such as butter and SMP. In recognition of this, carcasses are classified in one of five categories (young bulls, bulls, steers, cows, or heifers) and then graded according to their conformation (the proportion of meat to bone) and their lean meat content. The rules for carcass

classification have been reviewed regularly with the objective of using a standardised system to support higher quality beef production. The system aims to encourage consistency between intervention purchase operations and between Member States. The Community scale for classification of carcasses was originally established in Council Regulation 1208/1981. The most recent rules on classification of carcasses of adult bovine animals are laid down in Commission Regulation (EC) No 295/1996 and Council Regulation (EC) No 1183/2006.

Figure 2.11 shows a diagram of the intervention logic for the beef price support and trade measures.

2.2.3 Direct payments to 2003

Suckler cow premium

The **suckler cow premium** (SCP) is a premium paid on suckler cows as a form of direct payment to specialised beef producers. According to Council Regulation 1254/1999, a suckler cow is defined as 'a cow belonging to a meat breed or born to a cross with a meat breed, and belonging to a herd intending to rear calves for meat production'. The objective of the premium was to support the incomes of producers specialised in suckler beef production at a satisfactory level. Introduced in 1980, the SCP was increased in 1989, then again as part of the 1992 reform together with individual producer allocation, then again as part of the Agenda 2000 reforms, alongside other changes in conditions. The Agenda 2000 changes included national ceilings to limit CAP expenditure; national reserves of SCP rights (for newcomers, young farmers and other priority producers); the option for Member States to pay a national additional premium up to €50/cow; the option to claim a proportion of the premium for heifers[11]; the obligation to keep a minimum proportion of heifers relative to the premium claim[12]; the introduction of a maximum stocking density of 2 LU per hectare of forage area used by the animals[13], reduced to 1.9LU/ha in 2002 then 1.8 LU/ha in 2003. The value of SCP increased from ECU 70/cow in 1993 to €200/cow in 2002. SCP rights could be traded between producers subject to conditions. The countries with the highest national ceilings for SCP were (in order) France, UK, Spain, Ireland, Germany and Italy.

Beef Special Premium

The **beef special premium** (BSP) is a special payment for producers holding male bovine animals subject to regional and individual limits. Its objective was to compensate producers specialising in beef production for the reductions in the intervention price and, in the longer term, support their incomes at a satisfactory level. Introduced in 1987, it provided payments for male cattle only after 8 months of age and again after 21 months. The premium was increased as part of the 1992 reform, together with a regional reference herd (national ceiling), an individual limit of 90

[11] Up to 20% heifers in 2000, then 40% heifers for 2001 onwards.

[12] At least 15% heifers in 2002 and 2003.

[13] The stocking density was calculated on the basis of all livestock on the holding (bovine animals, sheep and goats) covered by premium applications and of the forage area.

head of cattle per farm and a maximum stocking density of 3.5 LU/ha of forage area (reduced in stages to 2 LU/ha by 1996). The premium was increased again as part of the Agenda 2000 reforms, alongside other changes in conditions. The Agenda 2000 changes includes updated national ceilings; limits of 90 cattle per age category per holding; different bull and steer premiums; a stocking density of 1.8 LU/ha. Over the period the value of the BSP increased from ECU60/animal in 1993 to €150/steer or €210/bull for 2002 onwards. The countries with the highest national ceilings for beef special premium were France, UK, Spain, Ireland, Germany and Italy.

Extensification payments

The **extensification premium** was first introduced in 1992 with the specific aim of compensating specialised beef farmers for the competitive advantage enjoyed by intensive beef producers as a result of the drop in cereal prices. The premium was modified under Agenda 2000 by Council Regulation 1254/1999, which had the aim of further reducing the surplus of beef production and encouraging environmentally sustainable production. A specific objective of the extensification premium was to encourage beef producers towards extensive production in order to preserve and improve, in the longer term, environmental conditions.

Initially the extensification premium was ECU30/animal, payable on suckler cows in receipt of SCP and male bovine animals in receipt of BSP, on holdings where producers could prove that their stocking density during the year was less than 1.4 LU per hectare of forage area. However, because all livestock might not be included in the LU calculation, the overall stocking density on some holdings which qualify for and receive the extensification premium could, in practice, be significantly above this level. Producers with less than 15 LUs are exempt from the stocking density requirements but do not qualify for the extensification premium. In 1995 and 1996 (under EC Regulations 2417/1995 and 2222/1996 respectively) the amount of extensification premium was modified to 52 ECU/animal where the stocking density was less than 1 LU per forage hectare. As with the other direct payments, the extensification payment was increased as part of the Agenda 2000 reform to €100/animal for a stocking density of less than 1.4 LU/ha, although Member States had the option to modulate the extensification payment according to stocking density and hence adopt a two tier system[14]. The following other conditions were also introduced:

- The limits of stocking density remained unchanged compared to 1992;
- The eligibility criteria were made stricter by taking account of all the adult cattle actually present on the farm as well as sheep on which premiums are claimed;
- The number of hectares taken into account was limited to temporary and permanent pasture and all the other forage areas, except arable crops;
- The area of pasture to be defined by the Member States should represent at least 50 per cent of the total forage area declared. This did not exclude the mixed use of this land (pasture, hay, grass silage) during the same year; and

[14] 2000-2001: €33 for a stocking density of 1.6-2.0 LU/ha; €66 for a stocking density of <1.6 LU/ha. 2002-2004: €40 for a stocking density of 1.4-1.8 LU/ha; €80 for a stocking density of <1.4 LU/ha.

- In Member States where more than 50 per cent of the milk is produced in mountainous areas, the extensification premium is also applicable in the case of dairy cows kept on holdings situated in these areas.

Deseasonalisation premium

The **deseasonalisation premium** has the specific objective of balancing the beef market throughout the year, both in terms of evening out the supply of slaughtered animals and reducing price variations. Introduced with the 1992 reforms, it also provided direct support to farm incomes to compensate for price reductions. The premium could be granted in regions which experienced major problems due to a highly seasonal supply. The deseasonalisation premium was modified as part of the Agenda 2000 reforms. Premiums payable per animal slaughtered were varied according to the period of the year in which the slaughtering took place: €72.45 (weeks 1-15); €54.34 (weeks 16-17); €36.23 (weeks 18-21); €18.11 (weeks 22-23). Furthermore the premium could only be granted by Member States under certain specific conditions: where the number of steers slaughtered exceeded 60 per cent of the total number of male bovine animals slaughtered that year and; where the number of steers slaughtered from 1 September to 30 November exceeded 35 per cent of the total number of steers slaughtered that year[15].

Slaughter premium

The **slaughter premium** has the objective of compensating producers for the reductions in the intervention price, contributing to ensuring the provision of an adequate income. The first widely available slaughter premium was the 'calf conversion' premium introduced as part of the 1992 reforms. This aimed to curb the production of surplus beef by granting ECU 100 per male dairy calf slaughtered before it is 10 days old or by buying in animals with a carcass weight between 150 and 200 kg. When production was too concentrated within a given period, a premium of ECU 60 was payable per animal slaughtered between 1 January and 30 April. The slaughter premium introduced as part of the Agenda 2000 reform was payable on: bulls, steers, cows and heifers over 8 months old; and on calves aged 1-7 months with a carcase weight of less than 160 kg. The premiums, which were payable directly to farmers, subject to a minimum 2 month retention period, were: for bulls, steers, cows and heifers over 8 months old, €27 in 2000, €53 in 2001, and €80 for 2002 onwards; and for calves 1-7 months old, €17 in 2000, €33 in 2001, and €50 for 2002 onwards. The slaughter premium was subject to national ceilings for each type. The countries with the highest national ceilings for slaughter premium were France, Germany, Italy, UK, Netherlands, Ireland and Spain.

Additional payments

Additional payments were introduced as part of the Agenda 2000 reform with the specific objective of permitting Member States to support specific production systems. These additional payments could be made on a headage basis on male cattle, suckler or dairy cows and heifers or as supplements to the slaughter premium for adult cattle (subject to possible stocking density requirements established by Member States), or on an area basis per hectare of permanent pasture where such pasture is used for rearing cattle but is not used to support a claim for additional payments on

[15] Where the 35% rate was not achieved, Member States had the option to grant deseasonalisation premium at 60% of the established amounts to producers who had previously received it.

cattle. Additional payments were subject to global amounts (national envelopes) and needed to be made according to 'objective criteria' to ensure equal treatment between producers and avoid market and competition distortions. Specific conditions included the following:

- Additional headage payments for bovine males were limited in terms of numbers by regional ceilings or BSP claims or slaughterings. However, Member States could also set headage limits on a national or regional basis. Male bovines needed to be over 8 months old to qualify or, on slaughter, have a minimum carcase weight of at least 180 kg;
- Additional headage payments for suckler cows and heifers qualifying for SCP could only be granted as a supplementary amount per SCP unit;
- Additional headage payments for heifers could be granted for no more than the average number of heifers slaughtered in reference years; and
- Area payments could only be granted on permanent pasture up to the relevant regional base areas (the average number of hectares of permanent pasture available for rearing bovine animals during the reference years). Maximum area payments were set at €210/ha in 2000, €280/ha in 2001, and €350/ha in 2002 and subsequent years.

Figure 2.12 below shows the intervention logic for beef direct payments.

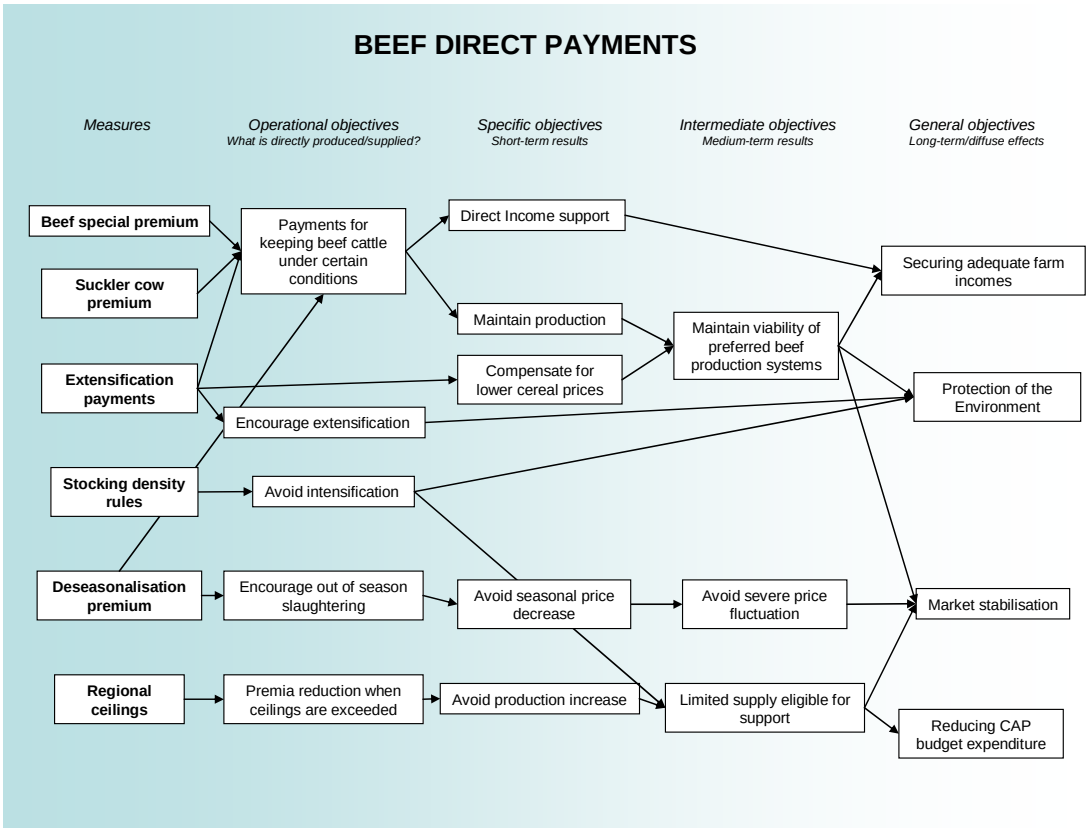

Figure 2.12 Intervention logic – Beef direct payments

2.2.4 BSE measures

BSE was first identified in the UK in 1986. Following the onset of the 1996 BSE crisis, already described earlier, a series of temporary measures were adopted by the Council and Commission in order to regain consumers' confidence in beef and to restore the market balance. The measures took the form of *elimination measures*, which were intended to remove animals/meat regarded as 'suspect' from the food chain, and *market measures* in the form of producer support (for example, additional headage payments, slaughter-based compensation for income losses and the use of intervention) and production control (via the slaughter of young calves and an early marketing premium). In addition, a series of measures to ensure the traceability of all EU beef were introduced in order to help control the spread of BSE and other animal diseases and to protect consumers.

In March 1996 the export of all beef from the UK both to the rest of the EU and to third countries was banned according to Commission Decision 96/239/EC. Following this, the UK introduced the Over Thirty Months Schemes (OTMS) which prevented meat from cattle older than 30 months entering the food or feed chain. Producers could receive compensation for animals older than this, albeit at prices pegged below market values. Additional payments were made to producers receiving BSP and SCP in 1996 and specific amounts were allocated to Member States (ECU 261 million). A further ECU 491.63 million was allocated to Member States on the basis of the size of national herds in order to support producers' incomes, providing payments did not distort competition. This measure was applied very differently in the Member States. Finally, Member States were required to implement either a calf processing aid scheme (CPAS) and/or an early marketing premium by 1 December 1996 for the period ending 30 November 1998. The UK and Portugal had already applied the CPAS prior to this. Approximately 1.5 million calves had been processed under each scheme by the end of 1997.

In 1999 the original ban on UK exports was relaxed to allow exports of boneless British beef products from animals aged between six and 30 months to resume. However, a second crisis started during the autumn of 2000, when the number of reported incidences of BSE in France increased significantly following the introduction of more widespread BSE testing. Following this, cases of BSE were reported in a number of other Member States, including the first reported cases in Spain, Germany and Italy, as BSE testing became more widespread. Individual Member States quickly imposed unilateral bans on imports of live cattle and bovine products from affected countries, and these were joined by non-EU countries and some of the EU candidate countries. In response to the crisis, a number of additional veterinary measures aimed at increasing public health protection and restoring consumer confidence were introduced throughout the EU, such as testing animals over 30 months intended for human consumption and a temporary ban on the use of meat-and-bone meal for all farm animals. A worldwide ban on British beef exports was lifted by the EU in 2006 and the Over Thirty Months Scheme was phased out.

2.3 CMO measures for the milk sector, the system of milk quotas and their implementation from 1988 onwards

2.3.1 Introduction

The CMO for the milk sector and the system of milk quotas have been reformed on several occasions since the 1960s. This introduction summarises the main changes, an overview of which is provided by Table 2.4.

Table 2.4 Major events in the dairy CMO

Period	Measures:
1968-1984	*Market measures:* – Public intervention for butter and skimmed-milk powder (SMP) and cheese – Aid for private storage (SMP, butter, cheese) – Disposal measures – Export refunds – Custom duties
1984 Milk quotas introduction	– The milk quota system for 5 years
CAP Reform 1992	*Milk quotas* – Milk quotas extended until March 2000 *Market measures:* – Reduction in institutional prices of 2 per cent for 91/92 and of 5 per cent (over 1993/95)
Agenda 2000 Reform	*Milk quotas* – Milk quotas extended until 2008 – Increased milk quotas (IT, EL, ES, IE, NI for 2000/1 and 2001/2, the rest of UE by 1.5 per cent from 2005/6 to 2007/8). *Market measures:* – Prices reduced from July 2005 by 15 per cent over three years; *Direct payments:* – Proposal of dairy premium; – An annual amount per Member State (national envelope) to be distributed at the discretion of the Member State within parameters set by the EU.
2003 CAP Mid term Review	*Milk Quota system:* – Milk quotas extended until 2014/5; – Increases in milk quota scheduled for 2005 deferred to 2006. *Market measures:* – Cut down intervention prices (butter by 25 per cent for the period 2004-2007, SMP by 15 per cent for 2004-2006 as agreed under Agenda 2000); – Butter intervention limited to the period between 1 March and 31 August each year and an annual volume limit introduced after which automatic intervention is suspended or replaced by intervention by tender (both these elements already exist for SMP intervention). *Direct payments:* – Direct payments from 2004 (dairy premium per tonne) – Direct payments included in the Single Farm Payment, optional from 2005, compulsory from 2007

A range of different products is covered by the milk and milk products CMO and in particular it includes: fresh, preserved, concentrated or sweetened milk and cream, butter and other milk fat, buttermilk, yoghurt, kephir and other fermented or acidified

milk and cream, cheese and curd, lactoserum, lactose and lactose syrup and, finally, milk-based compound feed stuffs.

The first Council Regulation on the establishment of a common organisation of the market in the milk sector was adopted in 1964. The support regime began to be fully operational only in 1968 when a more detailed Regulation (Regulation 804/68/EEC) was adopted. This has been amended many times and superseded by more recent measures. The regime in its early years was based on the classical elements of the CAP, as follows:

- Support prices, involving the annual fixing of a target price for milk in each Member State and on the basis of this price, an intervention price for butter. Intervention for SMP began in 1969, so no intervention occurred during the transitional phase from 1964-1968. Intervention for cheese began from the start;
- Variable import levies on a range of dairy products to protect against lower priced imports;
- Withdrawal and storage of surplus product through public intervention and private storage;
- Subsidy schemes to dispose of surpluses on the Community market; and
- Export subsidies for the disposal of dairy products on the world market at competitive prices where this was necessary.

The trend was towards an increase in management and emphasis on the Community market in the 1970s. Measures to reduce the dairy total surplus were introduced in the late 1970s and 1980s. In the early 1980s a target for cows' milk deliveries was set but the most important revision of the milk CMO occurred with the introduction of the milk quota system in 1984 to scale down market surpluses and the need for intervention. The quota system, whilst revised several times, has been in place continuously since 1984 and is due to continue until 2014.

The initial core Regulation was superseded by Regulation 1255/1999 which continues to define the elements of the regime. Agenda 2000 entailed some alterations to the CMO. The changes introduced were aimed at strengthening sector stability and competitiveness with a progressive reduction in institutional prices partly compensated by direct payments to producers. The 'mid term' review, agreed in 2003, brought a more radical change by cutting institutional prices further, eliminating the target price, reducing intervention quantities and decoupling direct payments. The decoupled 'Single Payment Scheme' aid payment will have incorporated and replaced this direct aid to farmers by 2007.

The next table (Table 2.5) shows an overview of budget expenditure for the Dairy CMO by measure.

Table 2.5 Expenditure for specific measures in the dairy sector (millions EUR)

Year	Intervention storage of skimmed-milk powder	Intervention storage of butter and cream	Intervention for other milk products	Refunds on milk and milk products	Aid for skimmed milk	Measures relating to butterfat
1989	2	456	113	2869	1081	355
1990	395	580	106	1931	844	525
1991	271	661	149	2249	1053	670
1992	-433	88	156	2056	1086	508
1993	-45	162	177	2287	857	685
1994	69	68	89	1927	779	669
1995	-89	-40	89	2267	791	629
1996	155	54	84	1605	749	635
1997	30	22	99	1753	675	607
1998	90	-23	74	1427	654	584
1999	108	108	87	1439	744	520
2000	-283	82	85	1671	708	449
2001	-14	-33	64	1107	480	460
2002	86	300	68	1160	446	459
2003	61	159	52	1595	584	444
2004	-11	-18	35	1494	591	401
2005	-60	-56	31	1141	283	283
2006	-5	-23	28	725	120	183

(Source: DG Agri, Evolution of EAGGF expenditure)

2.3.2 Price support measures and trade measures in the Milk CMO

Intervention system

One of the key instruments of market management under the CAP dairy regime is intervention. It is used to maintain market prices at a minimum level in spite of (short term) oversupply. In essence, intervention is a system in which products are bought by the EU/approved authorities when prices are low (at or below the intervention price) and supplies high, and sold when prices have increased and supplies on the open market reduced. In the dairy sector, the intervention system applies to butter and SMP. Intervention is based on products other than fresh milk because they can be readily stored and widely traded. In a few parts of the EU private storage for cheese occurs. Fresh milk is not suitable for direct market support due to its perishable nature. The intervention system is regulated by a system of institutional prices. Intervention measures take the form of:

- buying-in by national agencies (public storage); and/or,
- granting aid for private storage.

The specific objective of intervention arrangements is support of the market price in times of surplus by the purchase of agreed quantities of the required quality. Conversely, if and when supplies become tight, stocks may be put back on the market to alleviate the shortage and stabilise prices. In particular, the primary objective of public storage is to put a floor on the producer price of milk, whereas the private storage arrangements target the balancing of seasonal variations in production, in order to improve market stability.

Butter Intervention

Limits have applied to the volume of products that can be bought into intervention since 1987. These have declined over time starting with a limit of 180,000 tonnes of butter in 1987. Butter which meets the required quality and packaging standards can be sold into intervention purchasing if reported market prices drop below 92 per cent of the intervention price for two consecutive weeks. When intervention is open in a Member State, the intervention agency can buy butter into intervention at 90 per cent of the intervention price or more. The limit on the amount of butter allowed into intervention has lowered over time. In 2005 a ceiling of 60,000 tonnes has applied decreasing to 30,000 tonnes from 2008 onwards. If the limits on quantities are reached, the Commission may decide to open a system of tendering into intervention. Under this system, the Management Committee for Milk and Milk Products is asked to vote on the maximum buying-in price accepted. Tenders above this accepted price are rejected. When market prices allow, intervention stocks of butter can be sold, again by tender. Butter can be sold by tender for use in manufacturing, or with no end use requirements specified. The Commission considers tenders received from Member States and the Management Committee votes on the proposals. Since March 2004 butter intervention has only applied between March 1st and August 31st.

Skimmed Milk Powder (SMP) intervention

Intervention can apply to SMP which meets specified quality standards, such as a minimum protein quantity of 35.6 per cent. Intervention for SMP does not depend on market prices and is therefore open in all Member States from 1 March to 31 August. SMP is bought into intervention for the intervention price applicable on the day of its manufacture. The limit for the amount of SMP allowed into intervention is 109,000 tonnes. If the limit is reached, the Commission may suspend standing intervention and intervention purchasing may then be undertaken by a tendering system. The Commission, in conjunction with the Management Committee, sets a maximum buying-in price. When prices allow, intervention stocks of SMP can be sold, again by tender. The Commission considers tenders received from Member States and then the Management Committee votes on the proposals. To be eligible for intervention, products must be made by approved manufacturers and fulfil certain quality criteria. Regulation 1255/1999 on the CMO in milk and milk products was amended by Regulation 1787/2003 setting new intervention prices. As with beef a safety net approach is taken to intervention for butter and SMP. The butter intervention price is reduced by 25 per cent over a four year period starting on 1 July 2004. The SMP intervention price was reduced by 15 per cent over a three year period starting in 2004.

Private storage

The second form of intervention is by private storage rather than through public intervention stores. This has been widely used for butter and cheese. The system of private storage aid is applied in parallel to public buying-in, primarily to alleviate disruption to the market caused by seasonal fluctuations in the production of butter and to avoid intervention. Private storage measures for cheese are limited to certain kind of cheeses. It is usually only available from March to August each year. Under PSA arrangements, the butter remains in the ownership of the trader, but they receive a subsidy towards storage costs. As with intervention, the aim is to remove surplus products from the market at times of low prices and when supplies are high. Products are released back onto the market after the storage period is over (between 90 and

hundred days of storage). In principle, private storage aid is also available for SMP but historically, it has not been used. The level of aid is fixed taking into account the storage costs. The aid is paid for a minimum and a maximum storage period fixed for each product.

Since 1988 there has been a consistent trend towards more limited use of intervention following the different CAP reforms. There has been a move away from production-based market support to reduce the gap between EU and world market prices. Detailed rules for the application of Butter Intervention and Private Storage Aid for Butter are laid down in Commission Regulation (EC) 2771/99 as amended. Detailed rules for the application of Skimmed Milk Powder Intervention and Private Storage Aid for SMP are laid down in Commission Regulation (EC) 214/2001 as amended.

Trade measures
A system of border protection applies to a wide range of dairy products. This includes import tariffs imposed through the Common Customs Tariff (CCT) and the availability of an export subsidy (or refund) on certain products allowing export to the world market. Trade is closely monitored through a system of import and export licenses. Export subsidies and import tariffs are subject to conditions and limits established in the GATT agreements. The aim of import levies and export refunds is to stabilise market prices and to protect the EU market from competition from lower cost producers. These support the underlying objective of securing reasonable incomes for farmers. Key principles are set out in Regulation 1255/1999.

Import Tariffs: Imports of dairy products into the EU are subject to tariffs fixed in Euros and all imports require a licence. The original variable import levies were replaced by fixed bound duties in order to comply with the Uruguay Round. Quota volumes are set at reduced tariffs for these favoured trading nations, in particular, import arrangements for butter and cheese from New Zealand and other countries on a more limited scale. The general effect of these measures is to offer a high level of protection to the Community market although this has been slightly reduced by the GATT.

Export refunds are paid to exporters of a range of dairy products from the EU to third countries in order to compensate for the difference between EU prices and lower world prices. In the milk sector the level of the refunds are reviewed at least every four weeks (and in practice, every fortnight except in August and December).

Figure 2.13 shows a diagram of the intervention logic for the price support and trade measures in the dairy sector.

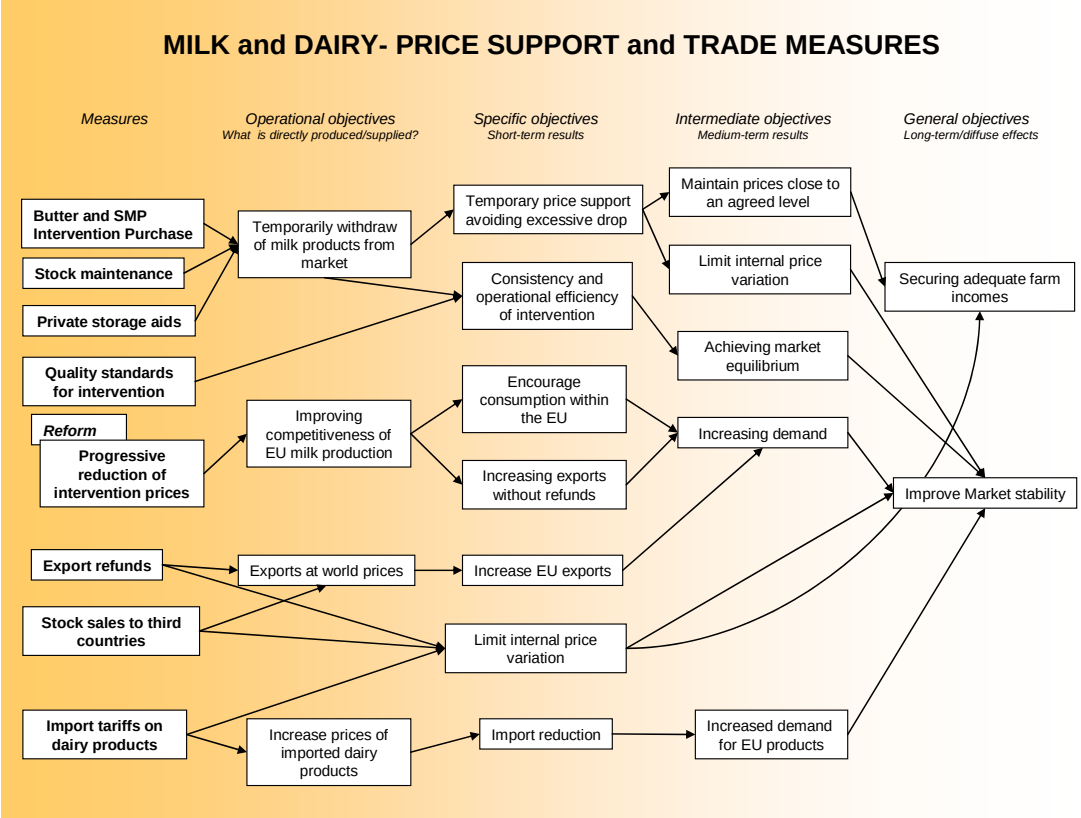

Figure 2.13 Intervention logic for price support and trade measures in the dairy sector

2.3.3 Marketing aids for dairy products

For certain milk products special measures also exist to facilitate the disposal of dairy products on the internal market. Special disposal measures exist for milk, SMP and skimmed milk and butter (butterfat). All of these schemes are designed to increase dairy product consumption within the EU market.

- *The school milk scheme:* The school milk scheme was introduced in 1977 by the EU to encourage the consumption of milk. It requires Member States to make subsidised milk available in primary and nursery schools wishing to participate in the scheme. Detailed rules are set out in Commission Regulation 2707/2000 (as amended).
- *Skimmed milk and skimmed milk powder (SMP):* The milk and dairy CMO includes several measures to help dispose of skimmed milk in liquid form and in its dehydrated form as powder (including buttermilk powder). Most aid is granted for the incorporation of liquid skimmed milk and SMP into animal feed, thereby, removing it from the open market. Detailed rules are laid down in Commission Regulation (EC) 2799/99.
- *Granting Aid for the production of casein and caseinates from skimmed milk:* The aid is granted to produce casein or caseinates from skimmed milk. It is a market management measure intended to encourage the production of casein or caseinates alternative products and to discourage the production of surplus SMP. Details are laid down in Commission Regulation (EC) 2921/90.

- *Granting aid for the use of butterfats in the manufacture of pastry products, ice cream and other foodstuffs:* This scheme provides aid to the market manufacture of dairy products in order to make their use economically competitive compared to alternative ingredients ,for example, vegetable fats. Details are laid down in Commission Regulation (EC) 1898/2005.
- *Subsidising the consumption of concentrated cooking butter:* The granting of aid for production of concentrated butter from open market butter and cream is intended to increase the consumption of concentrated butter produced from non-intervention sources. Detailed rules are laid down in Commission Regulation (EC) 1898/2005.

Currently all dairy aids including refunds are set to zero. Under some of the measures a certain amount of discretion may be possible at Member State level. For example, under the school milk scheme, participation can be decided at the local level.

2.3.4 The system of milk quota

The milk quota system was introduced by the ECC Council in April 1984 as a means of regulating milk production more effectively, based on a system of reference quantities for each holding. Prior to the introduction of the milk quota system there had been a substantial and increasing surplus of milk production. The main purpose of the milk quota system is to restrain the growth of milk production in order to tie the price support in the sector to limited quantities of milk. At the same time, the system is intended to permit structural development and adjustment of the sector, taking into account the diversity of the specificities of the various Member States. Under the milk quota system Member States are allocated national reference quantities. No transfers of quota can take place across national borders. The quantity is fixed for each Member State at a determined milk fat content. If milk production is above the national quota, those producers who have exceeded their individual quota are liable for a punitive levy on their over-production at the end of the quota year, known as a superlevy.

Originally established for a five year period starting from 1984, the milk quota system was extended until 1992 as part of the 'agricultural stabilisers' package in April 1988, and extended further until the year 2000 as part of the 1992 CAP Reform. Under the Agenda 2000 reforms the system was extended again until 2008 with a further extension granted under the 2003 Mid-Term Review. The current system is defined by Regulation 1788/2003 with detailed rules specified in Regulation 595/2004. Member States may allocate unused reference quantities to producers at purchaser or national level. Since 2004 the distinction between deliveries and direct sales has been specified at Member State level and can be changed as long as the national reference quantity is not altered. Exchange of quotas for deliveries and quotas for direct sales are permitted, on the basis of objective and duly justified statistical data, to take account of structural changes.

Within the national reference quantities, a national reserve may be created. The national reserve includes the individual quotas of producers who have not produced at all, and have not transferred quotas to other producers during the previous twelve months. The released quantities can be re-allocated on the basis of 'objective criteria' -which must be approved by the Commission- for example, to new entrants or small

producers. A reference (or representative) fat content for the delivered milk is also established and this is factored into the delivery volumes determined for each producer. The fat content of actual deliveries is then compared with the reference fat content. If a difference is observed between the observed and the reference fat content then the producer's delivery volume is adjusted to take account of this. Arrangements and rules for quota transfer vary considerably from one Member State to another.

Figure 2.14 shows a diagram of the intervention logic for the milk quota system.

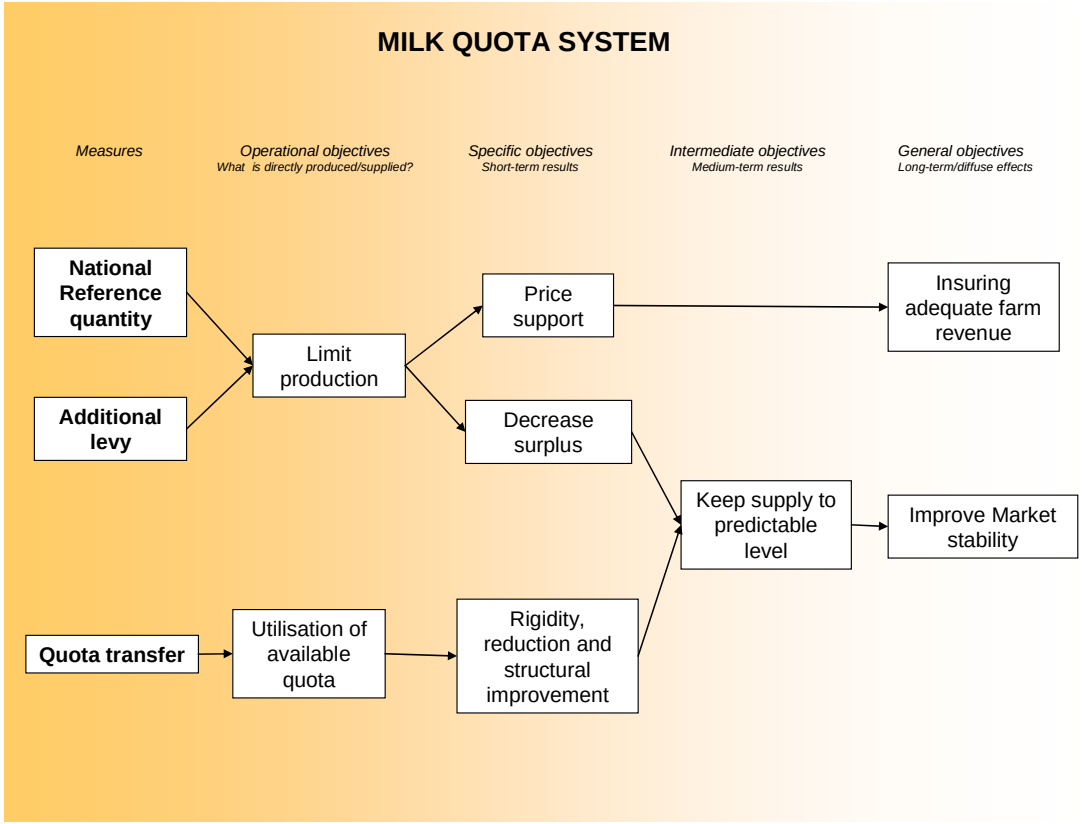

Figure 2.14 Intervention logic for milk quota system

2.4 Single Payment Scheme and other measures following the 2003 reform

The 2003 reform of the CAP introduced a number of significant policy changes as specified in Regulation (EC) 1782/2003. The central elements of the reformed CAP are:

- the introduction of an income support in the form of the Single Payment Scheme (SPS) in the EU-15, applied also by Malta and Slovenia from 2007, and the Single Area Payment Scheme (SAPS) in the remaining 8 new Member States;
- the decoupling of direct payments from levels of production, with options for partial decoupling in some sectors (including the beef and dairy sectors);
- compulsory cross compliance;
- restrictions on the conversion of permanent pasture;
- an option to use up to ten per cent of sectoral envelopes for supporting certain types of farming or promoting marketing of produce ('Article 69');
- compulsory modulation requiring a proportion of direct payments on a large proportion of holdings to be shifted to the EAFRD to increase funding for rural development;
- the introduction of a national reserve;
- the introduction of a short-term dairy premium; and
- the continuation of market measures such as intervention, private storage aid and the milk superlevy.

Objectives

At a general level, the objectives of the reformed CAP are to:

- allow farmers freedom to produce to market demand;
- promote environmentally and economically sustainable farming;
- simplify CAP application for farmers and administrators; and
- strengthen the EU's position in WTO agricultural trade negotiations.

The overall objective of the policy is to improve the market orientation and environmental sustainability of EU agriculture. Both of these aspects are addressed by removing the incentive to produce certain products through decoupling and the introduction of Single Payment Scheme and Single Area Payment Scheme. The environmental sustainability of EU agriculture is also addressed by making the receipt of direct aid dependent on meeting standards in the system of cross compliance and, to a lesser extent, through restricting the conversion of permanent pasture to arable usage and on providing an optional additional support payment to particular sectors through the use of Article 69.

Budgetary cost

National ceilings on SPS expenditure are set by the Commission for the Member States based on the total amount of relevant direct aids paid in a historic reference period in each Member State. If a Member State overshoots this ceiling proportional reductions from the total entitlement should be applicable. The national ceilings are shown in Annex VIII and VIIIa of Council Regulation 1782/2003. The new Member States can top-up the SPS or SAPS amount with Complimentary National Direct Payments. There are also limits to the aid received by individual farmers for any partially coupled payments. Limits are imposed on the number of animals that can

generate the granting of aid as well as the number of premium rights allocated to each farmer in the case of suckler cow premiums.

The operational, specific, intermediate and global objectives of the reformed CAP are summarised in the intervention logic diagrams that can be found in Figure 2.15.

2.4.1 Single Payment Scheme

The Single Payment Scheme (SPS) replaced most existing direct aids within the CAP. The SPS could be introduced by a Member State on 1 January 2005 at the earliest and 1 January 2007 at the latest. Member States have significant discretion in determining how the single payment is calculated. This depends in part on the decision of the Member State to introduce either fully or partially decoupled payments (see below) and the payment model chosen. There are three different payment model options:

1. The payment can be calculated based on each farmer's historic direct payment receipts over the reference period 2000 to 2002.
2. Alternatively these historic receipts can be averaged out on either a national or regional basis and be redistributed via a flat rate area payment. This regional, flat rate approach permits some redistribution of payments between farmers.
3. Member States may also opt for a mixed approach by either applying different calculation systems in different regions, by combining the above two approaches in a hybrid part-historic/part flat-rate static approach, or by applying a dynamic approach with a transition from a historic approach to a flat rate approach over a given period of time.

Farmers receive one SPS payment per year, paid between 1 December and 30 June. A farmer is eligible for the SPS if he or she is actively farming at the date each Member State introduces the scheme. Farmers are allocated a payment entitlement based on the reference amount they received in the reference period of 2000-2002. Farmers must have sufficient eligible hectares (all agricultural land, except permanent crops and forestry) to activate their entitlements. Entitlements can be transferred within Member States and sometimes only with regions, depending on Member State implementation.

If a farmer is found to be non-compliant with the cross compliance standards a penalty deduction can be made to the following year's Single Payment by the Member State's Paying Agency. The level of the deduction depends on the severity, extent, permanence and repetition of the non-compliance, and ranges from a maximum five per cent deduction for negligence to exclusion from the aid scheme in cases of intentional non-compliance.

Figure 2.15 shows a diagram of the intervention logic for SPS and SAPS.

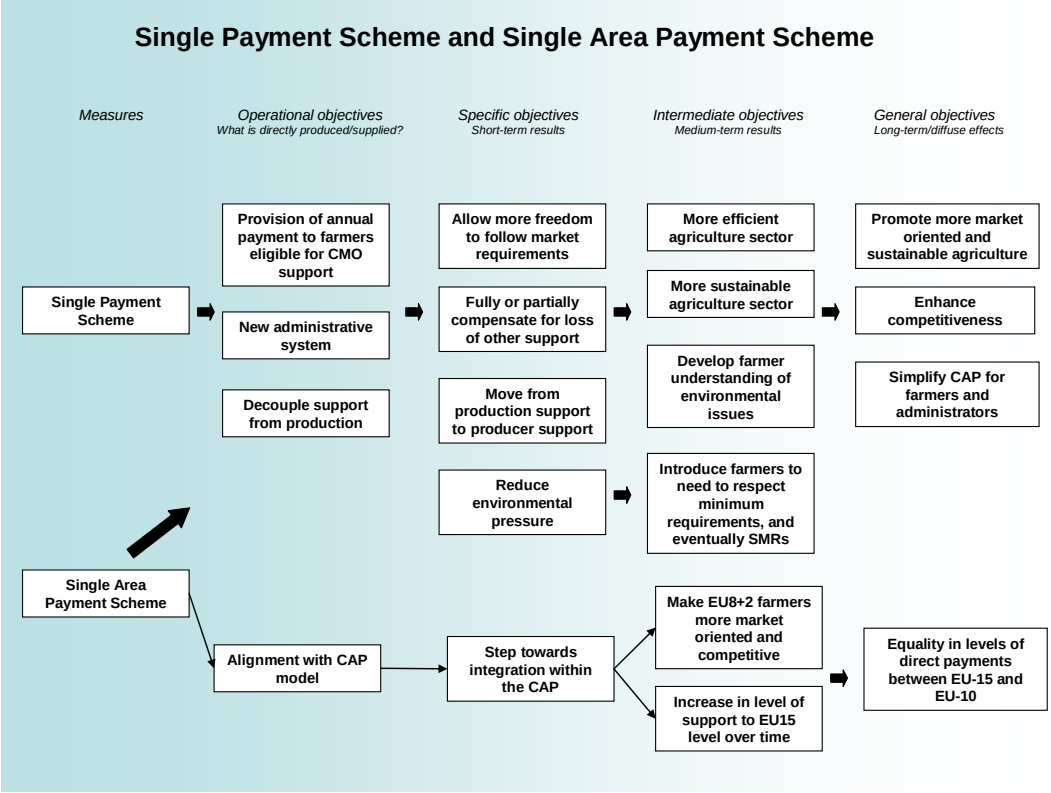

Figure 2.15 Intervention logic for SPS and SAPS

Partial decoupling

Member States may retain coupled aid in the beef sector for the suckler cow premium, the slaughter premium for calves, the slaughter premium for bovine adults and for the special male premium (and the arable, sheep and goats, olive oil and cotton sectors). There are restrictions on the total level of coupling and only specific combinations of coupled payments are permitted, as follows:

- up to 100 per cent of the calf slaughter premium can remain coupled;

and then any of these three options can be implemented, by retaining:

1. up to 100 per cent of the suckler cow premium and up to 40 per cent of the slaughter premium for adult bovines; or
2. up to 100 per cent of the slaughter premium for bovine animals other than calves; or
3. up to 75 per cent of the special male premium.

The extensification payment, additional payments and the deseasonalisation premium are fully decoupled.

Article 69 – Additional Payment

Member States can, at their discretion, direct up to ten per cent of the envelope in the beef sector for 'specific types of farming which are important for the protection or enhancement of the environment or for improving the quality and marketing of agricultural products'. An example of how a National Envelope could be used would

be to encourage the grazing of suckler cows on certain environmentally sensitive habitats, such as wet grasslands. The Article 69 option also applies to the dairy premium once it has been fully integrated into the SP.

National reserve
Member States, including the ten new Member States, must create a national reserve by applying a linear percentage reduction of up to three per cent of their national SPS ceiling. Entitlements that remain unused for three years are transferred to this national reserve. The national reserve can be used in particular to provide additional aid to farmers with low reference amounts compared to their production capacity and to provide entitlement to new entrants to farming.

2.4.2 Single Area Payment Scheme

As a transitory arrangement to implementing the SPS model new Member States can implement a Single Area Payment Scheme (SAPS), as set out by Council Decision 2004/281 and Commission Regulation 2199/2003. The SAPS allows uniform per-hectare payments to be made within a region. The new Member States began to implement the SAPS from the day of accession on 1 May 2004. Malta and Slovenia opted to implement the SPS from 2007. The other new Member States are expected to wait until 2009 before implementing the SPS. According to the agriculture chapter of the Act of Accession the accession countries receive 25 per cent of the EU-15 level of direct payments in 2004, rising in increments of five per cent per year to 40 per cent in 2007, and then rising in increments of ten per cent per year to reach 100 per cent in 2013. The new Member States will thus receive the full level of direct payments after a period of ten years.

Complementary National Direct Payments (CNDPs)
The accession countries can also top-up direct payments, subject to authorisation by the Commission, by making complementary national direct payments to farmers for any 'CAP like' scheme that existed in their country before accession, including beef and veal. This can be done in one of two ways. The first is to make a payment at a level not exceeding 55 per cent of EU-15 levels in 2004, 60 per cent of EU-15 levels in 2005, 65 per cent of EU-15 levels in 2006 and 70 per cent of EU-15 levels from 2007. The alternative way allows the accession countries to increase the amount of direct support a farmer would have been entitled to receive through a 'CAP like' scheme in 2003 by ten per cent. There is an exception for Slovenia where the payment level rises in steps of five per cent from ten per cent in 2004 to 25 per cent in 2007. The complementary direct payment is either financed by national money or from rural development money from the EAGGF (a kind of 'reverse modulation') for the period 2004-2006. This amount cannot exceed 20 per cent of its annual allocation from the EAGGF or, alternatively cannot exceed an amount of 25 per cent in 2004, 20 per cent in 2005 and 15 per cent in 2006. The rules for CNDPs may be changed for 2007 to ensure that the maximum rates of coupling as set in Regulation 1782/2003 also apply to the CNDPs. At the time of writing this was under discussion in the Direct Payments Management Committee.

2.4.3 Other measures

Dairy Premium
The dairy premium was introduced in 2004 as part of the 2003 Mid-Term Review reform. The dairy premium is paid directly to producers as a support payment to partially compensate for the cut in intervention prices introduced by the reform. The payments are composed of two elements. The first is the dairy premium proper which is paid equally to all milk producers. The second is the additional payment paid to individual producers based on criteria decided by the Member States, including for example production structures. The additional payments should not distort competition or markets. If additional payments were distributed evenly per tonne of quota held, this payment would increase the dairy cow premium by about 45 per cent. The total amount available for the dairy premium is based on the quota held at the end of the preceding quota year and amounts to: €8.15 per tonne of quota for 2004; €16.31 per tonne of quota for 2005; and €24.49 per tonne of quota for 2006. This premium must be fully integrated by all Member States into the Single Payment Scheme by 2007 at the latest and there is no option to maintain any form of partial decoupling.

Compulsory cross compliance
Council Regulation 1782/2003 requires farmers to observe certain standards in the areas of the environment, public, animal and plant health, and animal welfare in return for direct payments under the Single Payment Scheme. This is called cross compliance. Unless a farmer receives a partially coupled direct aid, he or she does not actually have to produce under the SPS. However, they must observe cross compliance or risk losing part or all of their payments. In order to respect cross compliance and to avoid any reduction in the total level of direct aid received, the farmer must adhere to Statutory Management Requirements (SMRs) drawn from 19 pieces of EU legislation and a number of standards aimed at ensuring the 'good agricultural and environmental condition' (GAEC) of eligible agricultural land. In the new Member States, recipients of the SAPS must also keep their land in 'good agricultural and environmental condition' although there is no immediate requirement to design, implement and monitor compliance with the SMRs (as described in Council Regulation 2199/2003).

The SMRs are drawn from 19 pre-existing EU Directives and Regulations in the areas of the environment, public, animal and plant health and animal welfare and apply to all farmers whether or not they receive the SP. Eight SMRs were subject to cross compliance from 1 January 2005, a further seven from 1 January 2006 and a final three from 1 January 2007. These are listed in Annex III of Council Regulation 1782/2003. GAEC is detailed in Annex IV of the same Regulation and consists of a total of four 'Issues' relating to the protection of soils and the maintenance of habitats and landscape features. Within these issues there are a total of eleven 'Standards'. Member States need to take account of the specific characteristics of their territory when defining nationally applicable GAEC measures. These characteristics include soil and climatic conditions, existing farming systems, land use, crop rotation systems, farming practices and farm structures. Because of this, not all Annex IV standards may be relevant to all Member States. Member States must also introduce a Farm Advisory System by 1 January 2007 to cover the standards set by cross compliance as a minimum.

Permanent Pasture

Council Regulation 1782/2003 also requires Member States to ensure that land that was under permanent pasture in 2003 (as determined by area aid applications) – 1 May 2004 for the new Member States - is maintained as permanent pasture. Derogations are allowed from this as long as the Member State takes action to prevent any significant decrease in its total permanent pasture area. This requirement will not apply to permanent pasture which becomes afforested, if that afforestation is for environmental purposes, with the exclusion of plantations of Christmas trees and fast growing species cultivated in the short term.

Council Regulation 796/2004 further specifies that permanent pasture is defined as land used to grow grasses or other herbaceous forage naturally (self-seeded) or through cultivation (sown) and that is not included in the crop rotation of the holding for five years or longer. This Regulation also states that the ratio shall not decrease by more than ten per cent relative to the ratio of the reference year of 2003. Member States, at national or regional level, can place obligations on farmers applying for direct aids to not convert land under permanent pasture without prior authorisation. Farmers can also be required to reconvert land into land under permanent pasture where it has been converted into land for other uses without the appropriate permissions. The percentage of land to be reconverted is to be based on the amount of land converted and the amount needed to re-establish the balance. Various derogations apply including land that was converted under agri-environment agreements.

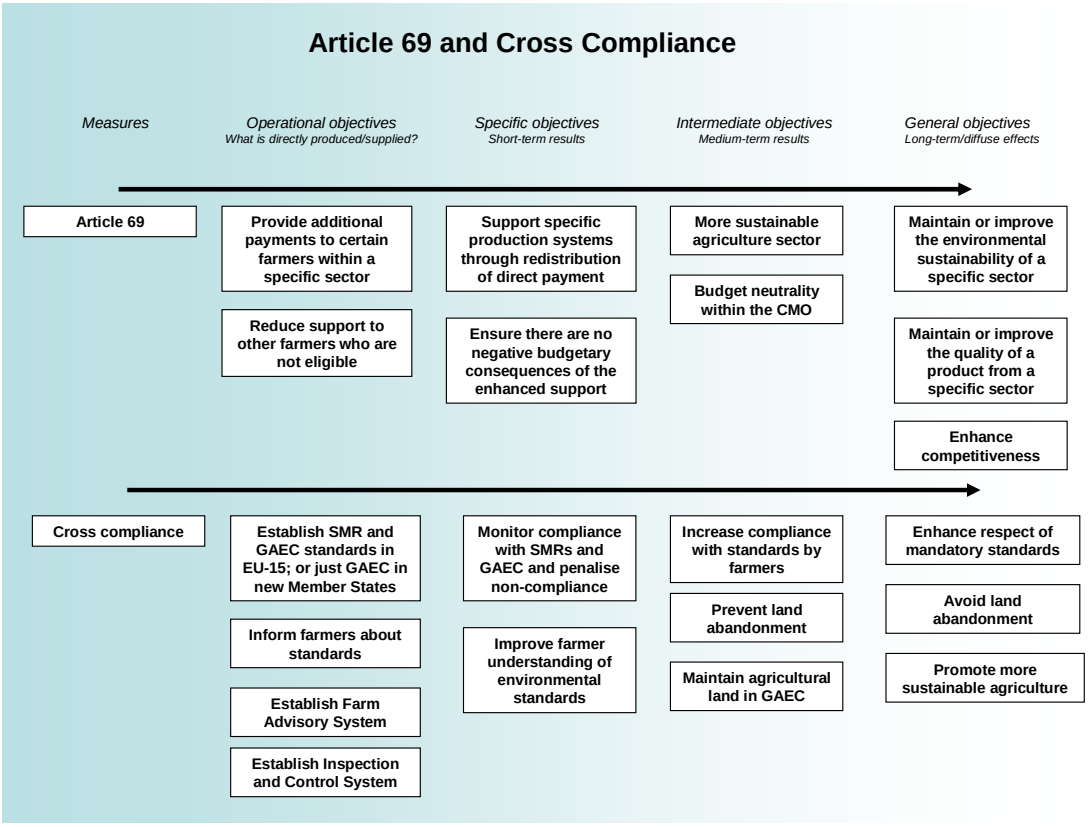

Figure 2.16 Intervention logic for Article 69 and Cross Compliance

Compulsory voluntary modulation
Compulsory modulation requires a proportion of the direct payments received by farmers with EAGF receipts above a threshold of €5,000 to be shifted to the EAFRD to increase funding for rural development. The proportion to be transferred each year is three per cent in 2005, four per cent in 2006 and five per cent for each year from 2007 to 2012. It may also be possible for Member States to apply additional voluntary modulation at up to 20 per cent. Voluntary modulation was also introduced as part of the Agenda 2000 reform with Regulation 1259/1999 and allowed Member States to reduce direct payments to farmers by up to 20 per cent. Council Regulation (EC) No 378/2007 laid down rules for voluntary modulation of direct payment provided for in Regulation (EC) No 1782/2003 and amending Regulation (EC) No 1290/2005. This has allowed Portugal and the UK to apply voluntary modulation of up to 20 per cent between 2007 and 2012.

Figure 2.16 shows a diagram of the intervention logic for Article 69 and Cross Compliance.

2.4.4 Member State Discretion

Member States are permitted a certain level of flexibility to adapt each of the following to meet national circumstances:

- The model for calculating the Single Payment;
- The decision to apply full or partial decoupling of direct payments, and if the latter, the rate at which payments are partially decoupled;
- The decision to use the additional payment provided by Article 69, and if so, which sector(s) to provide additional support to;
- The design of the system of cross compliance, including some freedom to define nationally relevant GAEC standards within the framework of Annex IV and approaches to the inspection and control and farm advisory systems;
- The way in which to ensure the overall level of permanent pasture is maintained, involving decisions such as appropriate trigger levels to halt the further conversion of permanent pasture;
- For the new Member States, a choice between the SPS and SAPS; and
- For the new Member States, the decision to make use of Complementary Direct Payments, and if so, whether these are funded from the EAGGF rural development fund or from national reserves.

In Annex II of this report a table is presented which summarises the following for each Member State:

- The start date of the SPS (2005, 2006 or 2007);
- If a regional approach is taken, the split of regions;
- The calculation method chosen (flat rate, static hybrid or dynamic hybrid);
- The sectors that remain coupled, if any, and at what level; and
- The application of Article 69, if used.

Ten Member States opted to introduce the SPS in 2005, five in 2006 (Finland, France, Greece, the Netherlands and Spain) and two (Malta and Slovenia) in 2007. The SAPS was applied from 2004 in 8 New Member States and from 2007 in Romania and Bulgaria. A number of different SPS models have been applied. Nine Member States and the UK regions of Scotland and Wales use the historical method. Three Member States and the UK region of Northern Ireland use the static hybrid approach and two Member States and the UK region of England apply the dynamic hybrid approach. Malta and Slovenia apply the 'SPS regional model' and the eight remaining Member States as well as Romania and Bulgaria apply the SAPS. Three Member States, Germany, Ireland and the UK have introduced full decoupling. Greece and Italy have introduced full decoupling for all beef payments, but maintain coupling for other sectors. The remaining Member States, with the exception of those applying the SAPS have maintained coupled beef payments. Five Member States have the suckler cow premium coupled at 100 per cent. The slaughter premium for calves in coupled at 100 per cent in six Member States. The slaughter premium for adults is coupled at 40 per cent in four Member States and at 100 per cent in one Member State. The special male bovine premium is coupled at 75 per cent in four Member States. Seven Member States and the UK region of Scotland have opted to make use of Article 69 (see below for details).

The new Member States had the option to make complementary direct payments to farmers. It is known that in 2004 Estonia, Latvia, Lithuania, Poland, Slovakia and Slovenia opted to use the option to transfer money from the EAGGF, whereas the Czech Republic and Hungary chose not to use EU rural development money by deciding to add money from their national budgets to augment direct payments (Farmer and Swales, 2005).

Use of Article 69

Seven Member States and one region (Greece, Spain, Italy, Portugal, Slovenia, Finland, Sweden and the UK region of Scotland) have opted to make use of Article 69:

- In Scotland Article 69 is used to finance 'The Scottish Beef Calf Scheme' which will give direct support to specialist beef producers, especially those in remote areas.
- In Spain, Article 69 is used in the beef sector to target both quality production and the environment. A top-up is granted to the suckler cow premium where the stocking density is less than 1.5 LU/ha and where the number of animals does not exceed 100 on any one holding. Payments will also be made to beef producers for participating in recognised quality schemes and voluntary labelling systems such as those that accredit product origin, integrated or organic farming. A total of ten per cent of the ceiling for dairy payments is also being used in Spain to pay for the participation of farmers in the code of good hygiene practice established by either quality schemes or regional authorities.
- In Finland, ten per cent of the overall national aid ceiling is used to finance high quality beef production. Aid is paid for raising suckler cows of certain beef breeds. Aid will also be paid for the slaughter of heavy male cattle and heavy heifers.
- In Sweden, 0.45 per cent of the national aid ceilings will be used for a range of measures targeting quality production. The first will pay to help cover the

certification costs of participation in quality certification schemes. The second will pay 75 per cent of the costs involved in the development of production methods or new products. The same payment rate and ceiling is also available to pay for the costs of preparation and participation in agricultural fairs and food exhibitions within the EU.

- In Greece Article 69 will be used to target quality production.
- The Portuguese usage of Article 69 aims at marketing, the environment and the maintenance of pure-bred indigenous breeds. Animals participating in agri-environment schemes are not eligible.
- A total of €180 per head is paid in Italy for suckler cows that meet certain requirements. The animal must be of a specified breed, meet certain age requirements, be kept for six months, and minimum grazing obligations must be respected including a maximum stocking density of 1.4 LU/ha. Alternatively the aid can be paid as a top up to the slaughter premium for compliance with PGI labelling or a voluntary labelling scheme. In this case the animal must be kept for seven months and slaughtered between 12 and 26 months.

3 DRIVERS OF FARM SYSTEMS AND STRUCTURES AND ENVIRONMENTAL PARAMETERS

3.1 Introduction

The previous chapter outlined the development of the EU beef and dairy sectors over the last two decades and summarised the CAP market measures in force over this period. The trends within the two related production sectors can be explained by a variety of factors. Policy measures are clearly only one of the drivers at work. Their role is considered in more depth in the subsequent chapters of the report which addresses the evaluation questions (Chapters 4 to 9).

This section has two purposes.

- First, it is intended to provide context and lay the foundations for the evaluation questions by summarising some of the influences on the two sectors; and
- Second, it seeks to identify some of the farm structural issues, farm systems and management practices of particular significance to enable an evaluation of environmental impacts. These are generic questions which are relevant to the answers to all the evaluation questions.

The analysis here is derived from the literature, data assembled for the project, the case studies and experience of the project team.

3.2 Non-policy drivers of farm systems and structures

In addition to the CMO measures referred to in the previous section there have been a range of additional drivers affecting the development of the beef and dairy sectors since 1988. Whilst some apply to agriculture as a whole, several are specific to the beef or dairy sectors or both. The principal categories of driver include:

a) *Market demand for meat, milk and dairy products*
Demand levels for the main products are subject to fluctuation and price alterations. Beef and veal competes with other meat, and demand can be influenced by shifts in the prices and appeal of chicken, pork and other meats. Both processors and retailers have a role in shaping the market as well as final consumers. Some market trends such as growing consumption of processed and prepared foods, an increasing concern with diet and health and a growing demand for lower fat products have had impacts on both the beef and dairy supply chains in this period.

b) *Cattle diseases*
The period was marked by significant outbreaks of two different cattle diseases, both of which had an impact on farmers in several Member States as well as on consumers. The BSE outbreak, which emerged in two major waves and the subsequent Foot and Mouth Disease outbreak, had an impact on demand mainly in the beef sector but also on some dairy farms in some areas following a raft of policy interventions. The two

diseases exerted the greatest influence after 1997 into the early years of the current decade with severe market disruption in some Member States (see Section 2.1.2).

c) *Technical progress and economies of scale*
Some of the most important areas of technical progress in this period included veterinary medicines, livestock breeding, artificial insemination, manure and waste handling, milking machines and fodder production. Technology has been cost and labour saving and both total factor productivity and labour productivity have increased throughout the years. Another important factor has been the need to exploit economies of scale. This is the relationship between production costs and the value of production by different scales of production. The key assumption is that the production cost relative to value of production will decrease by increasing production (Hallam, 1993). Included in the economics of scale is the effect of increasing human resources in agriculture created by better overall schooling and specific training in farm management.

d) *Labour costs and declining terms of trade*
Labour costs have been rising over the period and are an important factor in a labour intensive activity such as livestock farming. The need to contain labour costs, whether of the farm family or hired labour is reported as a driver in both sectors and has influenced the direction and uptake of farm management systems and technologies. More generally there has been a decline in the terms of trade for agriculture, with input prices increasing relative to output prices (OECD 1995). Labour prices have increased relative to technological alternatives. Farmers are generally price takers and have to adjust production to new terms of trade.

e) *Other inputs*
The price and availability of other inputs has been a driver throughout the period. The price of cereals and concentrated feed is one of the drivers most frequently referred to in the literature affecting the choice of system and management. For example, the choice between adopting an intensive beef cattle finishing system based substantially on cereals as opposed to grass can be significantly influenced by the price of feed grains. Other inputs of note include fertilisers and agrochemicals for forage production, machinery and energy, veterinary services and land.

3.3 Policy drivers other than beef and dairy CMO measures

Both beef and dairy farms are exposed to a range of policies driven by the EU or national law all of which will have some degree of impact on the farm business.

European legislation and initiatives
The case studies refer to a number of measures drawn mainly from the first and second pillars of the CAP and from environmental policy. In these studies and the literature, reference is made to:

- *CMO measures affecting cereal production*[16]: including direct payments for silage maize. These measures have affected cereal prices and, in some Member States, the profitability of silage maize which is often a direct alternative to grass as a fodder crop for cattle production. The use of silage maize as part of a feed mix in turn depends directly on sufficient market access to soya cakes at a low price.
- *Less Favoured Area (LFA) payments within Pillar II*[17]: These are compensating payments made to many but not to all eligible producers within the designated LFA. They have the potential to improve the economic viability of farms receiving these payments and hence the distribution of production. In some cases the payment rules include requirements affecting management practices, such as maximum stocking densities per hectare on the area of land eligible for payments. Beef farms are more frequently eligible for LFA payments than dairy producers.
- *Agri-environmental measures within Pillar II:* These voluntary management agreements, with farmers involve annual payments for compliance with environmental prescriptions. Consequently agri-environment measures can have a direct influence on farm management choices and may also affect farm viability in some cases. Many of these measures support extensive grassland management practices and low inputs of fertiliser and herbicides uses.
- *Organic production aids*[18]: Aid for maintaining and, in many cases, converting to, organic production, is an element of agri-environment policy in all Member States. The combination of incentives through these polices, price premia in the market, technical support and other factors has increased the share of organic production in both the beef and dairy sectors.
- *Other rural development polices*, for example, investment aid for buildings or waste management can have an impact on farm structures as well as management practices. This can be particularly important in the dairy sector, for example in relation to buildings and manure management.
- *Measures supporting early retirement* for farmers have been taken up on dairy farms in particular. In a number of Member States, including France, this has accelerated the exit of many small dairy farms from the sector.
- *EU environmental polices* also can influence farming systems and practices in this sector. One example cited in the case studies is the Nitrates Directive[19] which includes provisions setting an upper limit on the quantity of nitrogen from organic sources to be spread per hectare on farmland in designated Nitrate Vulnerable Zones (the whole farmed territory in some Member States). This can limit the number of livestock in certain areas unless manure is removed for disposal elsewhere. The Habitats Directive[20], pursuing 'favourable conservation status' for a range of sites designated for their biodiversity value is another example as

[16] Cereal CMO Regulation forms part of the CAP 2003 reform and was previously governed by Regulation (EEC) No 1766/92.

[17] Council Regulation (EC) No 1698/2005 of 20 September 2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD)

[18] Council Regulation (EC) No 834/2007 of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91.

[19] Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources.

[20] Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora.

significant areas are under agricultural management. Cattle grazing is the traditional management on a number of sites.

- *Rules of origin or denomination for specific products*: the European Union created food labelling systems known as PDO (Protected Designation of Origin) and PGI (Protected Geographical Indication). These rules restrict the location of production and in some cases the practices permitted for those foods granted the label and may underpin a significant price premium. This in turn, can influence the location of production and the viability of more traditional systems in some cases[21]. These rules were cited as a factor influencing dairy production patterns in parts of France for example, given the range of special regional cheeses as well as in Italy within the production region, for example, of Parmigiano Reggiano.

National legislation and initiatives

In addition to EU policy measures and national implementation of these, there are national polices which can act as drivers for the two sectors and/or influence management decisions. One good example would be land use planning rules and procedures.

These drivers, the significance of which tends to vary over time, and between places have been examined in parallel to the CMO measures in order to try to isolate the effects of the latter as much as possible. Evidence from the case studies suggests that there is relatively little literature available which attempts to do this in a rigorous way.

3.4 Farm management structures, systems and practices of relevance to the environment

The driving forces considered above may in some cases have a direct effect on farm practices whilst in others the primary impact is expected to be on farm structures and systems. Some structural impacts of particular relevance to this analysis are summarised here, along with those relating to farming systems and practices, for which the links to environmental outcomes are explored. The relationships discussed here inform the answers to the evaluation questions in subsequent chapters. Beef and dairy systems are grouped together unless otherwise specified.

3.4.1 Farm management structures

Four structural parameters are of particular interest in an analysis that is concerned with environmental outcomes. These are:

a) Scale of production;
b) Regional distribution of production;
c) Intensity of production; and
d) Specialisation of production

[21] A PDO includes products which are produced, processed and prepared in a given geographical area using recognised know-how. In PGI the geographical link must occur in at least one of the stages of production, processing or preparation; Council Regulation (EC) No 510/2006 and Commission Regulation (EC) No 1898/2006.

a) *Scale of production*

The scale of production can be measured in different ways, several of which have environmental implications.

- Output, measured in tonnes of meat or milk produced in a year indicates rather broadly the level of resources deployed in production. In environmental terms, output of milk is also an indicator of the volume of livestock wastes that will have been generated in the course of production and hence of overall nutrient levels associated with the sector.
- The number of cattle kept for beef or dairy production is an indicator of certain environmental pressures. While cattle vary in size and other attributes, there is a strong relationship between the number of animals, methane emissions from enteric fermentation and the volume of livestock wastes that enter the environment. Other pollutants, such as ammonia, are related to the number of cattle kept for production.
- The area of land devoted to beef and dairy production as a proportion of UAA is also significant environmentally. It is more difficult to establish precisely however since this also needs to take account of the area of fodder crops, which can be sizable. Both the area grazed by cattle and the area devoted to fodder crops such as silage maize are of environmental interest with respect to landscape management, biodiversity, nutrient management and other inputs on cropped land.

Other measures of scale, including the number of individual producers and average farm size are also of interest although their relationship to environmental outcomes is less direct. For example, with a falling number of dairy farms but increasing average size there are likely to be fewer sources of point pollution of fresh water from farm wastes, other factors (such as stocking density) being equal. However, with larger volumes of waste arising at each farm the potential pollution risk is greater. Trends in the number of cows in milk, dairy operations and cows per farm are similar throughout the OECD countries, with some exceptions in cow numbers (OECD 2004). This indicates that structural changes in the Europe are unlikely to be explained solely by reference to EU policies.

b) Regional distribution of production

The spatial distribution of beef and dairy production is also potentially important in determining environmental outcomes. This relevant in at least two respects:

- The regional concentration of production, as measured by the number of cattle in a watershed, can indicate the amount of land needed or other measures required to absorb nutrients. Hence it points to potential environmental pressures – which may be managed successfully or otherwise, depending on the farming practices adopted.
- The distribution of beef and dairy farms in relation to land with different environmental characteristics is also of relevance. For example, the presence or otherwise of cattle farms on land that is predominantly pasture and traditionally has been grazed could be a major factor in determining biodiversity and landscape values.

c) *Intensity of production*

This can be measured in different ways, for example in relation to total output per hectare (milk or meat), to the number of cattle per hectare (stocking density) or to inputs per hectare (of feeding stuffs, nitrogen or nutrients or, in some studies, energy). More intensive systems have higher inputs and outputs per hectare and higher stocking densities. Stocking densities have been selected as a useful indicator for this evaluation. They measure intensity at the farm management level and apply to both beef and dairy production. Data is available on stocking density in FADN and elsewhere. It can be measured in different ways, however, and care must be taken to avoid comparing data calculated on different bases.

Stocking density thresholds have been employed in a number of beef and veal CMO measures to differentiate direct payments between farms.

Stocking density is calculated by taking all the ruminant livestock on the farm, including sheep and goats and dividing the resulting sum by the total forage area in hectares (c.f. Section 1.2.1 and Annex I). As an indicator it reflects a combination of management choice and limitations that may be imposed by the land under management. In more disadvantaged areas there may be limited scope to increase stocking density because of soil, climate and other conditions.

There are, however, shortcomings to stocking density as an indicator of intensity, which are particularly important to recognise in terms of making judgements relating to environmental impacts. For example:

- The measurement of livestock units (LU) does not differentiate between cattle of different sizes or milk production levels.
- The fodder area in hectares is not differentiated according to productivity - rough grassland is treated the same as silage maize for example.
- There can be significant inaccuracies in the measurement of forage area. Common or community land is not included in the conventional measurement of forage area although it is an important grazing resource for some farms. This can distort stocking density figures at the farm, regional or even national level.

Stocking densities vary between beef and dairy farms, generally being higher in the latter. According to FADN, in 2004, the average stocking density on dairy farms was around 1.7 LU/hectare in the EU-15, compared to 1.1 on beef farms (see Table 3.1[22]). The distribution of farms between stocking density classes is shown in the table below. On this data, only 22-30% of dairy farms average below 1.4 LU/hectare compared with 50-64% of beef farms according to FADN data. Despite this, some intensive beef farms, such as those fattening young stock in specialised indoor units can also have very high stocking densities, such as 4.2 LU/hectare on beef fattening

[22] In FADN Stocking density is calculated at farm level as the sum of total livestock units (Dairy cows, Other cattle and Sheep and goats) divided by total forage area (Fodder roots and brassicas, Other fodder plants, Fallow land, Temporary grass, Permanent grassland, Rough grazing). The following data limitation has to be considered during interpretation of results: mountain pasture and other pasture outside the UAA of the holding it is not included in the calculation of stocking density. As a consequence farms with small forage crop area and uses common pastures are classified with intensive farms (EC - FADN 2006).

units in the Po Valley. According to FADN results, stocking densities are decreasing overall during the evaluation period. In particular, in specialist dairy farms stocking density decreased from 1.92 LU/ha in 1989 to 1.77 in 2004 and in specialist cattle rearing and fattening farms from 1.27 to 1.1. These changes are likely to be linked to a decrease in the number of animals and/or an increase in forage area.

d) *Specialisation of production*
Specialisation involves the focus of production on a single or small number of outputs and a move away from multiple enterprises on a farm. Mixed farms traditionally were widespread in the EU. On mixed farms it was common to pursue a mixture of livestock and cropping systems and there was a variety in the management practices adopted. Specialised farms can concentrate resources and management effort on a line of production but there may be implications for the environment. Specialised intensive beef producers with no cropping operations for example, have no arable or grassland on which to spread manure or slurry from stock housed indoors. This increases the need for good waste management. Specialised farms can, however, be efficient in their use of resources and reduce the level of pollution per unit of output. This can occur because they have specialised knowledge and equipment and the resources to invest in appropriate buildings and equipment.

Information on these four structural characteristics of the two sectors under examination and the trends emerging from more specific indicators provide a useful foundation for examining the environmental impacts and risks in greater detail. They do not provide a conclusive indicator of environmental damage or benefit but they point to issues where empirical data should be sought.

Table 3.1 Average stocking density for the main beef and dairy farm categories and their percentage in different stocking density classes in EU-15

	Average SD[23]	Less than 1	1 to1.2	1.2 to 1.4	1.4 to 1.6	1.6 to 1.8	1.8 to 2	2 to 2.4	More than 2.4
1989									
Specialist dairy farms	1.92	8%	6%	8%	9%	10%	10%	17%	32%
Specialist cattle rearing and fattening farms	1.27	24%	15%	13%	8%	6%	6%	6%	19%
Mixed livestock, mainly grazing livestock farms	1.85	10%	4%	8%	5%	7%	8%	14%	42%
Main beef and dairy farms (total)[24]	1.53	14%	7%	9%	8%	8%	8%	13%	32%
1995									
Specialist dairy farms	1.84	9%	8%	9%	10%	10%	9%	15%	29%
Specialist cattle rearing and fattening farms	1.19	29%	14%	14%	9%	8%	4%	6%	13%
Mixed livestock, mainly grazing livestock farms	1.74	11%	6%	8%	8%	8%	9%	11%	37%
Main beef and dairy farms (total)	1.41	18%	9%	10%	9%	9%	7%	11%	25%
2004									
Specialist dairy farms	1.77	11%	8%	11%	10%	11%	10%	15%	23%
Specialist cattle rearing and fattening farms	1.1	36%	14%	14%	9%	7%	4%	5%	10%
Mixed livestock, mainly grazing livestock farms	1.59	19%	5%	8%	12%	7%	7%	11%	31%
Main beef and dairy farms (total)	1.35	22%	11%	11%	10%	9%	8%	10%	19%

(Source FADN)

[23] Calves for fattening are not included

[24] Specialist dairying, Specialist cattle-rearing and fattening, Cattle-dairying, rearing and fattening combined, Sheep, goats and other grazing livestock, Mixed livestock, mainly grazing livestock and Field crops-grazing livestock combined.

3.4.2 Farming systems and practices

Both systems and practices can be influenced directly by CMO measures or less directly through economic and structural conditions arising from these measures, in combination with other drivers. In this context a farming system is a set of attributes that makes it possible to classify as a group farms with broadly similar management approaches (perhaps reflecting rather similar production conditions as well) 'Specialised intensive dairy production' is such a system. Beef and dairy systems involve the use of many different practices and a systems classification can be a convenient way to categorise groups of farms with a range of different management practices. Changes in the scale and dynamics of different systems can point to concrete environmental outcomes.

It must be noted that geographic and agronomic conditions have a considerable influence on the choice of system and farming practice open to individual farmers. Factors such as climate, soil fertility and water availability influence the choice of fodder crop, the period of grazing and other husbandry considerations.

Farming *systems* can be classified in different ways:

- By primary types of production on the farm (specialist dairy, suckler cows, etc). Changes from dairy to beef production on a farm would have noticeable environmental consequences, for example.
- Within the beef sector there are a range of systems based on function (for example, breeding or finishing) and on fodder supply (for example, outdoor grazing systems as opposed to indoor, concentrate based feeding regimes). Each is associated with certain management practices, with differing environmental implications.
- Similarly, farms can be classified according to whether they are intensive or more extensive in the way that stock is managed.
- Static systems (the great majority) or those that are transhumant, where there is seasonal movement of stock to grazing elsewhere for example, in the mountains.
- According to whether the farm is managed organically or conventionally.
- According to more elaborate criteria (including, in combination, some of those mentioned above), for example the typology for EU-15 dairy farms developed by CEAS in their study of the environmental impact of EU dairy farms (CEAS and EFNCP 2000).

In so far as CMO measures influence the use of different systems there is a linkage to management decisions and the practices associated with them. For the purposes of this study, we propose to work with the hypothesis that changes in the intensity of the overall farming system will be an indicator of changes in environmental pressure, although this is subject to various caveats and reservations.

Turning from farming systems to *practices*, it is clear that many farm management decisions and practices affect the environmental impact of beef and dairy farming. These impacts can be either positive or negative. A comprehensive list of practices would be lengthy. The sensitivity of the practice to local environmental conditions is a

central issue. In many cases the impact of a practice can be assessed only in relation to farm circumstances. An appropriate stocking density on permanent pasture, for example, will depend on the carrying capacity of the particular habitat, in a specific location and the way that it is managed. Even within a single village, there may be considerable differences in the environmentally sustainable stocking density between holdings or even fields.

At the same time there are some practices that are either environmentally beneficial or damaging in most circumstances and less local information is required to evaluate them. Maintaining hedges is an example of the former while spreading slurry on frozen ground illustrates the latter type of practice. Some of the practices of greatest significance to the environment are shown in Table 3.2 below and some of the impacts that these practices can have on particular aspects of the environment are set out in Section 3.5.

Farm practices change over time in response to technology, labour costs, policy interventions and other drivers. In some instances we can see a progression from those practices associated with extensive systems to those characterising more intensive systems. Three examples are given in the Figure below (Figure 3.1).

Farm level decisions to maintain or change practices of the kind portrayed in Table 3.2 will be responsible for a very significant proportion of the environmental pressures and opportunities arising on the ground.

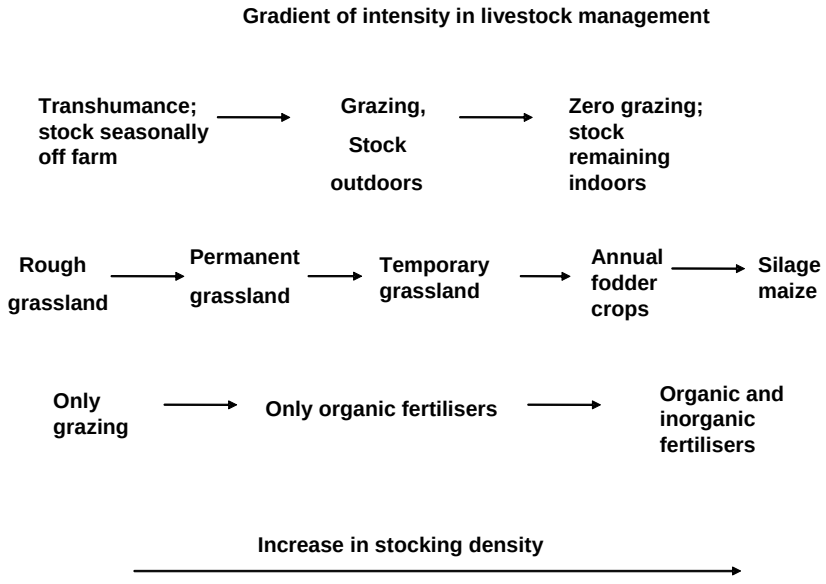

Figure 3.1 Three examples of changes in farm practices

Table 3.2 Types of practices and environmental implications

Type of Practice	Environmental Issues
Breed of Cattle Used in Production	• Feed requirements in relation to farm resources • Capacity to exploit local semi-natural vegetation where relevant • Conservation of genetic resources (rare breeds)
Grassland Management	• Grazing at an appropriate level and time • Timing and method of mowing • Grass conservation method for example, hay or silage making • Use of inputs including manure and inorganic fertilisers, herbicides • Carbon sequestration on unploughed permanent pasture • Continuous management of permanent pasture or ploughing and reseeding • Protection and management of field boundaries • Water level, drainage, irrigation • Exploitation of common land, transhumance, maintenance of pastures etc.
Other Crop Management	• Choice of forage crop; particular issues with forage maize which has displaced grass in sizable areas • Crop rotation and soil management including cover on arable soils in winter • Use of inputs, including fertilisers and agrichemicals • Disposal of slurry and other livestock wastes – quantity, timing, technology for spreading • Crop storage and conservation (for example, silage, a potential pollution source) • Management of water, landscape features etc, as above
Waste Management	• Design of livestock housing • Method and frequency of collecting livestock wastes • Method of waste storage, design and capacity of storage facility • Location of waste storage and handling in relation to hazards for example, water courses • Timing, frequency, quantity and methods of spreading or other disposal route • Management of wastes other than from livestock, including silage effluent, milk • Disposal of carcases
Landscape Management	• Field size • Rotation and management of field boundaries and other landscape / ecological features

	• Management of semi-natural vegetation, including scrub clearance • Management of stock in woodland and agro-forestry systems such as ‘dehesa’ or ‘pré-verger’ • Maintenance of drovers’ roads • Management of streams and rivers • Maintenance of seasonal grazing (transhumance)
Soil Management	• Appropriate stocking densities for example, on slopes, dry areas, wet patches etc. • Management of grazing and feeding to avoid poaching on heavily used areas • Appropriate management of crops and grass (see above) • Appropriate spreading and management of livestock wastes (see above) • Management of nutrients, including phosphates • Management leading to soil contamination for example, from heavy metals
Biodiversity Management	• Habitat and landscape management (c.f. sections above) • Management practices affecting species on cropped area, for example, timing of mowing • Control of wild species, for example, badgers, hunting, etc.
Size of the herd and landrace	• Capacity to graze • Adaptation to specific conditions (alpine pastures, wetlands, rough grasslands)
Other	• Veterinary medicine use • Management of noise and odours, especially from housed livestock • Energy efficiency • Bio-energy production from livestock wastes, crops and crop residues for example, biogas generators • Use of renewables for example, Solar energy use (for fodder drying, or water heating • Reductions in greenhouse gas emissions in addition to those accounted for above, for example, through changes in stock feeding regimes

3.5 Environmental issues in relation to livestock production

In this section the environmental pressures and impacts that arise from beef and dairy farming are considered. The section has been structured according to environmental themes and addresses both positive and negative impacts.

3.5.1 Greenhouse Gases

Beef and dairy cattle contribute to emissions of three greenhouse gasses through a variety of different routes. These are:

- Carbon dioxide, CO_2, arising from energy use on the farm, including crop cultivation, operation of livestock specific machinery, such as milking machines, refrigeration, slurry handling etc. Poor soil management can result in the release of CO_2. Off-farm factors such as nitrogen fertiliser production should also be counted in a full analysis.
- Methane, CH_4, which is a potent greenhouse gas with 23 times the direct global warming potential (GWP) of CO_2. This arises from enteric fermentation in the digestive systems of cattle and other ruminants and also from manure management.
- Nitrous Oxide, N_2O, more potent still, with a GWP 296 times CO_2. This arises from manure management and spreading, the application of nitrogen fertilisers and from the cultivation of leguminous crops, such as alfalfa.

Because livestock production is associated with emissions of two potent greenhouse gases it is responsible for a sizeable share of all such emissions from agriculture – eighty per cent according to the FAO (LEAD 2006). In the EU-15, agriculture accounts for about nine per cent of all greenhouse gas emissions (EEA 2007), with emissions falling over time – more than ten per cent between 1990 and 2005. Cattle represent a significant share of this total, with methane emissions from cattle alone amounting to twenty-six per cent of all EU-15 agriculture sector emissions in 2005 (EEA, 2007), representing 121,830 Gg of CO_2 equivalent. Other emissions associated solely with beef or dairy production are more difficult to isolate from the data.

While emissions are closely related to the number of livestock there is not a simple linear relationship because the size and breed of animal, the feeding and management regime, and the way in which wastes are handled and disposed of will affect the level of emissions.

Since greenhouse gas emissions have the same impact on global warming wherever they take place, then environmental benefits can be secured only if overall emissions fall. For example, displacing milk production from the EU to other countries is only beneficial if production elsewhere is associated with lower emissions per litre of milk. However, if total consumption of milk, beef and veal had remained unchanged at a global level and the cattle are simply raised in countries other than the EU total emissions will have been unchanged. In this sense the efficiency of production

systems is of particular concern for agricultural policy and not simply the number of animals maintained in one production area.

3.5.2 Water Quality

Pollution by nitrates, phosphates and sedimentation resulting in eutrophication is an issue associated with cattle production in both the beef and dairy sectors. The main sources of nitrogen and phosphates are inorganic fertilisers, organic manures and slurries, livestock feed and silage effluent. Other potential pollutants include fertilisers and pesticides used for feedcrops, veterinary medicines and pathogens associated with cattle. The degree to which water quality is affected will depend on a range of factors including soil and weather characteristics, the intensity, frequency and period of grazing and the rate at which manure is applied. Water pollution can be divided into two main types: point source (emanating from a specific, observable source) and diffuse (where pollutants are being dispersed over a wide area). Livestock, therefore, have a complex relationship with water pollution as not only are they direct and indirect contributors through the production of pollutants but they also influence the natural processes that can control and mitigate pollution loads.

The livestock sector has been a major contributor to the increase in fertiliser use over the past 50 years. Figures from the FAO from 2006[25] show that, within Europe, (particularly France, Germany and the UK), livestock and associated production of feed are responsible for more than 50 per cent of mineral nitrogen and phosphorous applied on agricultural land. Losses to freshwater ecosystems are also high within these Member States. This situation is not unique to Europe, however, with other OECD countries demonstrating similar trends.

In general, the risk of nitrate pollution is higher where cattle production systems have intensified, whilst extensive and low intensity production systems are at lower risk. However, whilst large intensive cattle units can increase the severity of pollution incidents, farm management practices are crucial when determining the environmental impact of an individual farm.

The storage and application of organic manures and slurries can have a big impact on water quality. For example, the likelihood of a pollution incident from a point source can be minimised by appropriate management and investment. Diffuse pollution can also be reduced by appropriate management practices. Phosphate pollution is closely linked to soil erosion and sedimentation. Overgrazing and unsuitable supplementary feeding practices can have a negative impact on water quality, as can cropping practices, with maize production in particular being a potential source of soil erosion and consequent nutrient runoff. A trend away from hay production to silage production also has implications for water quality as silage effluent is a potential pollutant.

[25] The contribution of livestock to agricultural N and P consumption in the form of mineral fertiliser for France, Germany and the UK was as follows: France N: 52%, P: 52%; Germany N:62%, P: 51% and UK N: 70%, P: 58%.

3.5.3 Water resources

The management of grassland and land used to grow forage crops for cattle can have a significant impact on water resources. In some areas irrigation is used to grow forage crops such as maize. This can put pressure on the availability of water in frier regions where water is a scarce resource. The use of water for irrigation can also have negative implications for natural watercourses and groundwater systems.

Drainage is also an important issue in terms of water resource management. Historically, large areas of natural and semi-natural habitats have been drained in order to 'improve' grassland for cattle production or to convert it to forage crop production. Natural and semi-natural habitats such as wetlands and marshes can mitigate the effect of high rainfall events and maintain a more constant supply of water. Drainage of such areas for cattle production can have negative implications for the soil's water storage capacity, whilst maintenance of these systems through extensive grazing practices can be beneficial in terms of water resource management.

3.5.4 Biodiversity

Many practices associated with beef and dairy production systems have resulted in long-term declines in biodiversity. These include:

- the effects of intensification resulting in higher inputs of fertilisers, organic wastes and pesticides;
- higher stocking rates leading to overgrazing;
- a switch from hay to silage; an increase in maize production;
- a general decline from mixed livestock farming systems towards more specialised systems;
- Cattle breeds can also have an impact on biodiversity depending on their suitability for a particular regime. Feed regimes associated with some breeds may have negative environmental impacts such as habitat damage caused by unsuitable supplementary feeding;
- Intensive and specialist housed cattle production systems, in particular, are likely to have an adverse impact on biodiversity as a result of increased forage crop production, whilst extensive cattle grazing is often associated with positive impacts on biodiversity; and
- Diffuse water pollution can have a deleterious effect on aquatic flora and fauna.

Cattle grazing can be an important management tool particularly in natural and semi-natural habitats where extensive grazing has traditionally taken place. However, the implications of cattle grazing on biodiversity are complex and much will depend on the habitat being grazed, stocking density and relative proportion of grazing by cattle compared with other types of livestock. Many grazed habitats with a high nature value will require a specific management regime in order to maintain biodiversity. In some cases biodiversity benefits could result from increasing the proportion of livestock grazing by cattle. In other habitats, biodiversity benefits could result from reductions in cattle grazing relative to other livestock. Undergrazing or the withdrawal of grazing can have negative implications for biodiversity, although limited scrub development may be beneficial in some areas. Large scale scrub formation due to undergrazing can result in negative impacts on biodiversity.

Cattle graze in a distinct way in comparison to other livestock, such as sheep and goats, and mixed grazing systems are often the most beneficial for biodiversity. Cattle do not graze vegetation too close to the ground, often leaving tussocks of grass which are used by insects and small mammals and do not graze selectively which is important for botanically diverse habitats. Trampling by cattle can also be an important means of controlling scrub, although high stocking levels can result in overgrazing. Sedimentation caused by overgrazing can have an adverse impact on watercourse biodiversity include invertebrate habitats and fish spawning areas.

3.5.5 Landscape

Beef and dairy production systems can have a significant impact on landscape. Larger scale intensive management in productive areas, as well as abandonment in marginal areas, can both lead to increasing homogeneity and loss of distinctiveness of the landscape.

Intensive production systems or insensitive management can have negative impacts on landscape character, for example, through increasing field sizes, removal of landscape features such as boundary features and small areas of woodland or wetland. Where production is becoming more intensive and stock are housed indoors, the erection of additional buildings and associated infrastructure can have significant negative impacts on the landscape by giving it a more 'industrial' character. The shift from grass-based systems to the use of maize as a fodder crop can also detract from the traditional character of the landscape. Increased soil compaction and erosion resulting from intensive grassland management may adversely affect below ground archaeological features.

3.5.6 Soils

Beef and dairy production systems can have a variety of impacts on soils. Intensive production systems are often associated with negative impacts in terms of soil erosion and compaction and possibly soil organic matter. High stocking rates can result in negative impacts on soil quality, although cattle in housed units will clearly not have a direct impact.

The production of forage crops for cattle does, however, have implications for soil management. Maize production, in particular, is vulnerable to soil erosion and the application of inorganic fertilisers and organic manures impacts on soil organic matter. Practices such as unsuitable supplementary feeding and over wintering of cattle outdoors can have negative impacts on soil quality, although negative impacts are largely dependent on stocking densities.

4 PRICE SUPPORT IN THE BEEF AND VEAL SECTOR

Q1.1: To what extent is the **price support** resulting from application of the market measures **in the beef and veal sector** in coherence with the obligation of integrating the environmental protection requirements into the CAP (article 6 of the EC Treaty) over the evaluation period?

The beef and veal sector has been subject to price support though trade related measures and market intervention throughout the period from 1988. Prices for beef products in the EU have been consistently above those on the world market. EU agriculture policy reforms have, over the evaluation period, reduced the level of internal prices and moved towards compensating producers with direct payments, the impact of which are discussed in Chapters 6 and 7. This Chapter is concerned solely with price supports. The related measures within the CMO and their principles are described in Chapter 2.2.2.

The Chapter is divided into sections. In this introduction, a number of hypotheses concerning the potential impact of price support measures are set out and these inform the central part of the analysis. The second part of the Chapter focuses firstly on the impact of CMO price support on farm structure, farm management, and the development of the sector, and secondly considers the environmental implications arising from these impacts.

There are a number of possible impacts of price support on farmer behaviour and farming systems as suggested in the causal diagram for price support in the beef sector shown below (Figure 4.1). These are set out below in the form of hypotheses. Each hypothesis is expressed in relation to the counterfactual scenario:

- A higher level of beef and veal production will have occurred;
- The number of beef and veal cattle is expected to be higher;
- The number of beef farms will be higher than otherwise;
- Less competitive farms are expected to be maintained for a longer period of time;
- Income from beef production is expected to have improved;
- The regional distribution of production will be affected;
- Extensive production systems will be maintained in marginal areas; and
- The overall level of stocking density is expected to increase.

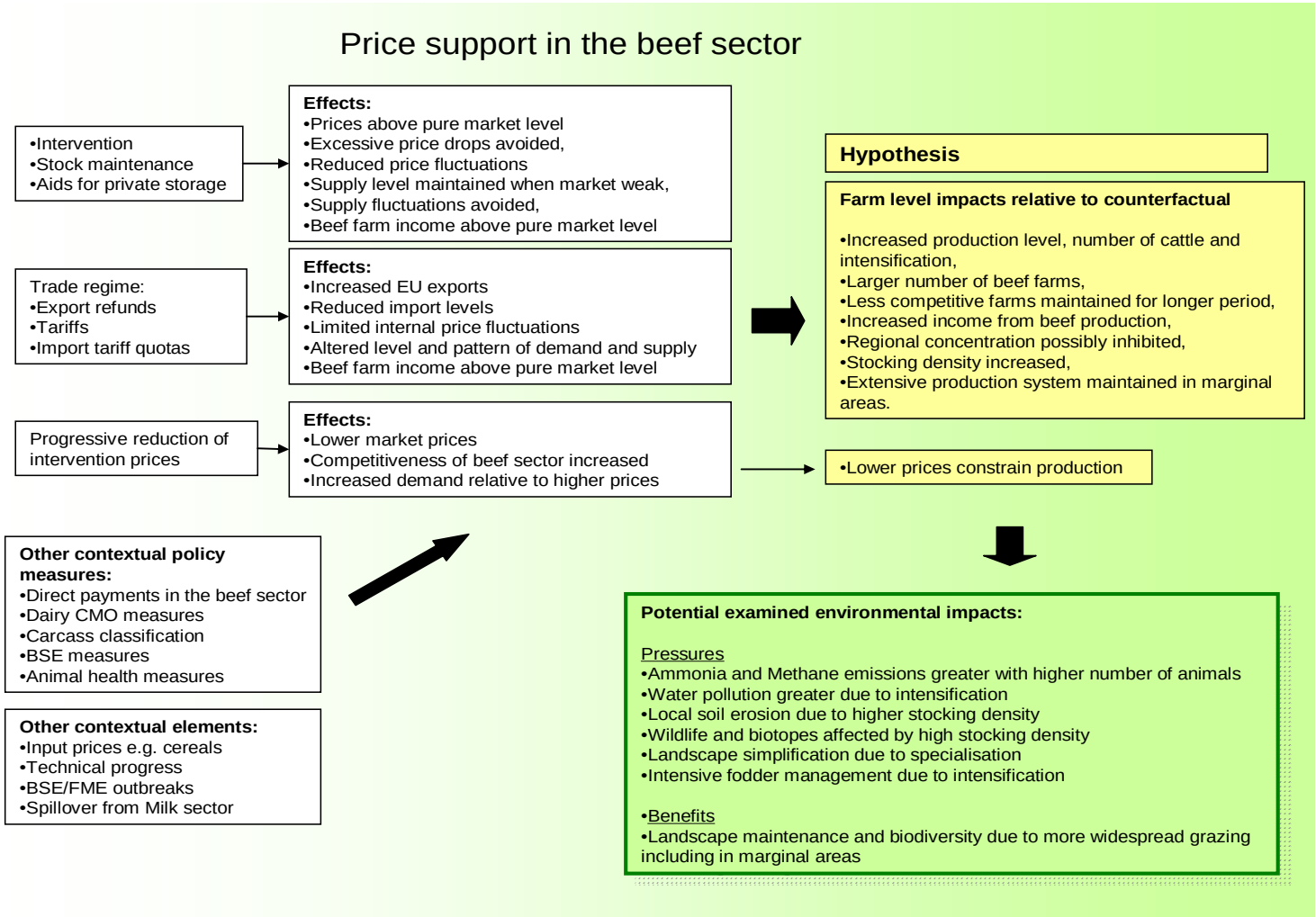

Figure 4.1 Diagram showing price support measures in the beef sector, other contextual policy measures, hypotheses and potential environmental impacts.

4.1 Analysis of farm impacts of price support in the beef and veal sector

4.1.1 Establishing counterfactual scenario

An analysis of the production effects of market price support is not straightforward. To establish these effects, according to mainstream neoclassical economics, the farm gate price of beef and veal under the CMO has to be compared with the beef and veal price in a counterfactual scenario - the situation with no policy intervention. Establishing the precise nature of the counterfactual scenario needs to take three issues into consideration. First an EU domestic price needs to be established. Secondly a counterfactual reference price is needed, which can be derived in a number of ways, and the comparison of these two variables gives an indication of the impact that the policy has had on the EU price. Thirdly, once this has been established, it is desirable to know the supply price elasticity of beef and veal production products so that a production function can be estimated.

Establishing a domestic market price for beef and veal needs for the EU-15 is not an easy task given the large variety of products on the market and the different prices in different Member States depending on the variety and quality of the beef and veal produced. In terms of a counterfactual reference price, in the economic literature this is usually a free market equilibrium price. The problem is, however, that such a price has to be estimated, it can not be observed anywhere. Often the world market price is used. This is also unsatisfactory because of the continuing agricultural support provided in many other countries. The current world price is probably lower than a future world market price in a global market without agricultural support.

The relationship between the price of a product and the quantity of the product produced is explained by a supply function. The crucial element is the supply price elasticity of beef and veal. Elasticities, however, will vary across types and qualities of beef and veal in the European market and are difficult to estimate[26].

Given the difficulties set out above in accurately quantifying a counterfactual reference price, a judgement has been made, based on the relevant economic literature. It is not proposed to calculate a reference price for the study but to assume that it should be above the world price, by a factor of about 20 per cent. The justification for this is set out in Sections 4.1.2 – 4.1.4.

4.1.2 A Methodology for Measuring Producer Support in the Beef Sector

The OECD has worked with measurement and evaluation of agricultural support since the mid 1980s, developing the concept of the Producer Support Estimate (PSE). This

[26] While it is difficult to estimate supply price elasticities due to the special characteristics of farm production such as climate and biology, the literature does provide some guidance. At a price elasticity of 0.5, if the output price increases by one per cent then the supply increases by 0.5 per cent. A study by Tweeten (1979) suggests that the short run beef supply elasticity is 0.5. Long run elasticities are likely to be greater. For farm production in general Tweeten suggests they are more than 1.0.

is defined as an estimate for the annual monetary value of gross transfers from taxpayers and consumers to agricultural producers, measured at the farm gate level. PSE includes elements from price support and various direct payments. The PSE is estimated by country and distributed over a list of commodities including beef and veal. Among the benefits of this methodology is the work already done by the OECD of weighting together the differences in market prices in the EU Member States and the various reference prices.

Following this approach, the beef and veal producer price at the farm gate is the production weighted average EU market price for all categories of adult bovine animals per calendar year. The beef and veal reference price is the unit export value in extra-EU trade of meat of bovine animal, fresh and chilled, in carcass weight equivalent, (calendar year) minus processing costs. [27] The OECD estimate of the value of market price support can be used, therefore, as a measure of total price support to beef and veal in the EU over the period.

4.1.3 Market Support Levels

Figure 4.2 shows the average European beef prices and the value of market price support for beef for the period 1986 to 2005 as estimated by the OECD. The Figure clearly illustrates how the price support policy appears to raise the producer farm gate price (compared to the reference farm gate price) and also reduces the variability of the producer farm gate price compared to the reference farm gate price.

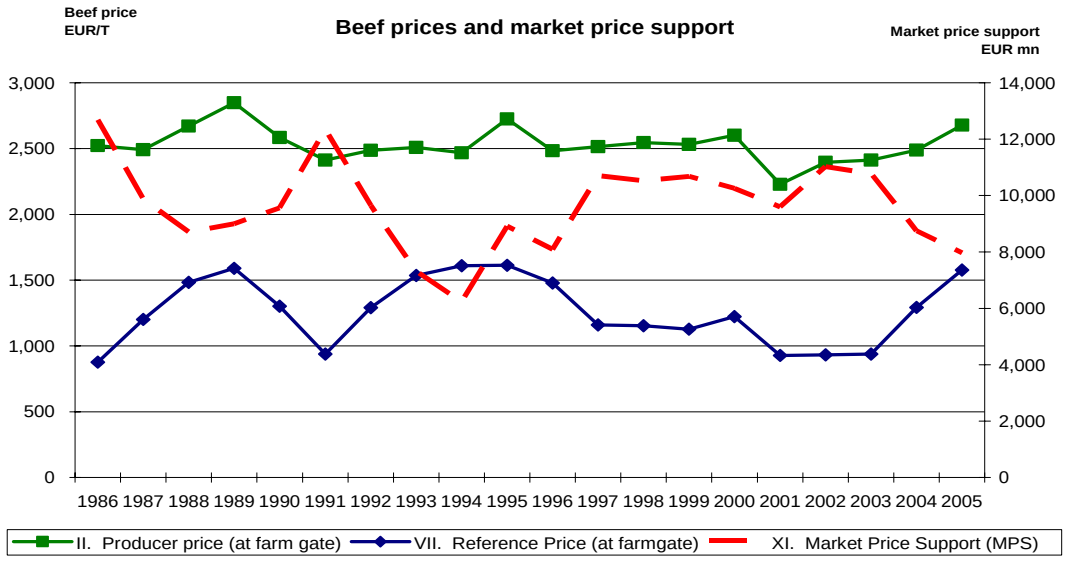

Figure 4.2 Beef prices and value of market price support for beef in nominal prices EU12/15

(Source: OECD)[28]

[27] Processing costs are calculated as actual processing costs in selected French abattoirs multiplied by the reference border price at the processing level (unit export value in extra-EU trade) divided by the producer price at the processing level (unit export value in intra-EU trade).

[28] The data in the Figure refer to EU12 before 1995 and EU15 from 1995 onwards (including in 2004 and 2005). The beef and veal producer price at farm gate is the production weighted average EU

The development of the EU producer price level and the value of market price support reflect a complex mixture of policy changes and various events influencing the supply of beef and veal in the EU.

In 1990 and 1991 EU production of beef and veal increased following the unification of Germany, accompanied by increasing market price support and falling producer farm gate prices. The 1992 CAP reform entailed a reduction in the intervention price for beef and veal by 15% over a three-year period starting in 1993 and the introduction of ceilings for intervention. Although the value of market price support was declining in 1993 and 1994, this did not translate into declining producer prices. This may be explained by the fact that beef and veal production fell over the same time period while internal demand for these commodities remained stable. This suggests that the reduction in production of beef and veal in this period was not driven by the changes in the market price support mechanism so much as by other factors, possibly including the increase in direct payments.

The enlargement of the EU to include Sweden, Finland, and Austria in 1995 was accompanied by an increase in the value of market price support and an increase in producer farm gate prices despite the fact that production of beef and veal increased more than internal demand. In 1996 producer prices for beef and veal dropped again following the first BSE crisis, however the raising of intervention ceilings for beef and veal in response to this for 1996 and 1997 meant that intervention stocks increased. Figure 4.2 shows how market price support rose in 1997 and remained at this level in the following years. Producer farm gate prices remained around the 1996 level until 2001 when they dropped again following the second BSE crisis in 2000 and the outbreak of Foot-and-Mouth disease in 2001.

From 2001 onward, producer farm gate prices for beef increased, accompanied by an increase in the value of market price support until 2003, despite the fact that Agenda 2000 entailed a reduction of the intervention price by 20% over the three-year period from 2000 to 2002, after which the intervention system was abolished. From then on only private storage remained, although the option of intervention at a very low price was retained as a safety net (Kyed 2005). However, there are still substantial border protection measures in place for beef which entail significant measures of market price support for this commodity. The 2003 CAP Mid Term reform did not include changes to the market price support scheme for the beef sector.

Figure 4.2 shows how market price support has served to increase producer farm gate prices compared to the reference farm gate price, defined as the unit export value in extra-EU trade of meat of bovine animal, fresh and chilled in carcass weight equivalent, (calendar year) minus processing costs. To the extent that the reference farm gate price may be considered a proxy for the producer price in a counterfactual scenario without market price support (see limitations set out in section 4.1.4), this demonstrates how EU market price support has increased producer prices significantly compared to the OECD counterfactual scenario, thus, all other things being equal, providing farmers substantial incentives for increasing production.

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market price for all categories of adult bovine animals per calendar year. The beef and veal reference price is as described by the text above (OECD 2007).

4.1.4 Modifications to the OECD Methodology in the Beef Sector

The OECD methodology does not give a completely accurate picture, however, as the reference price is taken as the actual current world market price. This can be misleading because the current world market prices are distorted by agricultural support policies in general and the removal of EU market support would itself have an effect on world market prices. According to Tangermann (2005) the equilibrium world market prices in the absence of policies could, for most agricultural products, well be above current world market prices, 'in some cases by a significant margin (say, 20 or 30% for the most heavily supported commodities)'. An adjusted counterfactual world market price might be a more realistic assumption for the calculations to avoid an overestimation of the price support effect and hence production effects. It is difficult to estimate a more realistic long term counterfactual price from the literature but for this purpose a price 20% above the world level can be assumed. This will lead to a smaller impact on production in the EU but an incentive to increase production is still likely to remain.

The case for a counterfactual reference price above the world market price is reinforced by the evidence of policies adopted by industrialised countries outside the CAP. If we consider the European countries before the signature of the Treaty of Rome in 1957, many ran some form of price policy regime in the beef sector (OECD, 1961). In the absence of the CAP, individual EU countries might therefore also have supported their beef sectors today, which might in turn also have had production effects. Several countries like Iceland, Japan, Korea and Norway continue to do so (OECD, 2005). This indicates that beef is one of the sensitive products for many OECD countries and some form of support here will be expected.

4.1.5 Price Stabilisation Effect

The various policy mechanisms that make up the price support system serve the dual purposes of increasing producer prices while also stabilising them compared to the situation without such intervention. The price stabilisation effects may also influence production levels. Figure 4.2 clearly shows that the producer price is relatively more stable than the reference price.

The economic rationale for this effect is the notion that when farmers are risk averse and market imperfections prevent them from insuring or smoothing out risks, then farmers' production decisions will be affected by their level of risk aversion. According to OECD, schemes which increase payments in the face of decreasing market prices while reducing payments in the case of increasing prices will result in increasing production provided there is partial income compensation for the price movements ('insurance effect'). Furthermore, policies which increase farmer wealth will also induce the farmer to produce more if the farmer's absolute risk aversion decreases with rising wealth ('wealth effect') (OECD, 2001).

As previously demonstrated, market price support has served to stabilise producer farm gate prices for beef at least partially. As EU farmers are likely to be risk averse,

the insurance effect may well be present in EU beef production although this is difficult to measure. Market price support may also have increased farmer wealth although capitalisation of support measures inland rents, for example, would tend to limit this. Unfortunately it is difficult to measure either the stabilisation effect or the extent of capitalisation in land market prices. Nonetheless, both the insurance and the wealth effect are likely to be present, which in turn reinforces the tendency for higher beef and veal production levels under the CAP market price support policies. However, it is very difficult empirically to distinguish between the price level and price stabilisation effects on production levels.

4.1.6 Input Price Effects

Production levels are not driven merely by output price levels and price support but will also be influenced by the level of input prices as well as technical developments. Figure 4.3 shows the development of the output price for beef and different measures of input prices in order to illustrate the trends in terms of trade for the beef sector. The input price index 'goods and services consumed in agriculture' is a general input price index for the whole agricultural sector and thus not specific to the beef sector. In order to capture some of the input costs specific to the cattle sectors, the other input price index shows the changes in the price of compound feed for cattle. As the Figure shows, the input price of goods and services increased more during 1995-2006 than the input price of compound feeding stuffs for cattle, suggesting that the former general price index might overestimate the increase in input prices for beef production. However, compared to the 1995 level for input and output prices, both sets of input prices have increased more than the output price for beef, suggesting a deterioration in the terms of trade for the beef producing sector.

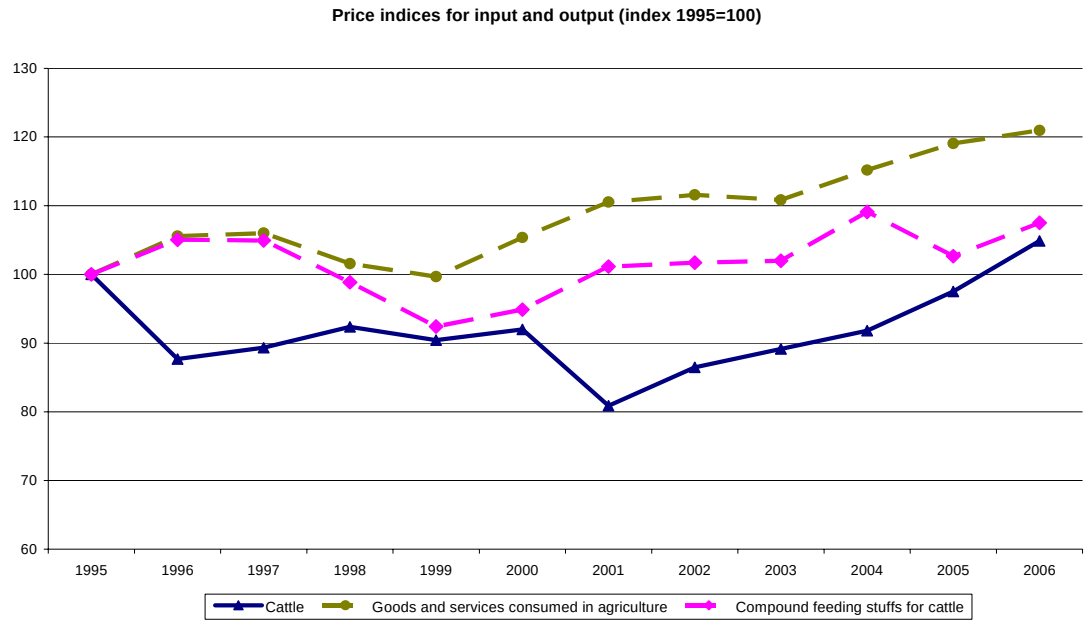


Figure 4.3 Output and input price indices in EU15

(Source: Eurostat)

The full implications of the deteriorating terms of trade for beef production are difficult to determine a priori. On the one hand, they suggest lower profitability in beef production, which could lead some producers to cease production or only farm part time while supplementing their income through non-farm-related employment. On the other hand, they might induce commercial farmers to become more efficient producers and probably in some cases scale up and specialise their farming operations in order to take advantage of the economies of size. The deteriorating terms of trade will thus also have implications for farming systems as, all other things being equal, they will tend to result in larger production units, specialisation of production, and, as a consequence , possibly also more geographical concentration of production.

4.1.7 Technology Effects

Another set of factors which are important in explaining the trends in farming systems is technological development. One measure of technical change is the development in the productivity of different production factors including labour and beef cattle. Figure 4.4 shows the development in labour productivity for beef production on farms categorised as 'cattle-dairying, rearing and fattening combined' in the FADN typology. Labour productivity is here defined as the value of beef production per annual work unit at these farms. This shows that this measure of labour productivity has increased from 1989 to 2004. As producer beef prices have not generally increased in this period of time (cf. Figure 4.2), this implies an increase in the amount of beef produced per annual work unit on these farms. However, the growth in labour productivity has not been completely smooth throughout the period.

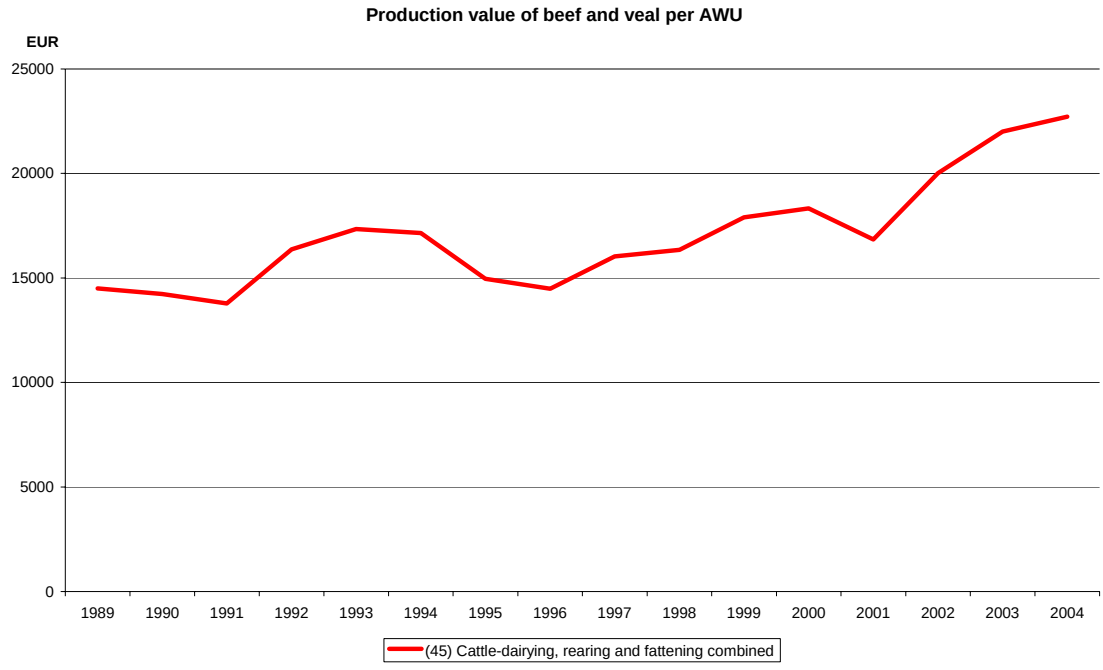


Figure 4.4 Labour productivity (annual work units) in selected types of beef production in the EU12/15

(Source: FADN)

The decline in labour productivity in 1990 and 1991 coincides with the unification of Germany, and the decline in 1995 coincides with the enlargement of the EU with Sweden, Finland, and Austria. The decline in labour productivity in 1996, on the other hand, coincides with the first BSE crisis, while the decline in 2001 coincides with second BSE crisis in 2000 and Foot-and-Mouth disease in 2001.

4.1.8 Farm Management

Turning to farm management, a key indicator of the changes in farming systems in the beef sector relates to the degree of intensity in beef production. Figure 4.5 shows the trend for the total number of 'other' (i.e. non-dairy) cattle as well as the stocking density per hectare and the stocking density per hectare of forage crops for EU12 / EU15. During the period 1989-2004 the total number of cattle have been affected by the same events discussed previously, increasing following German unification and EU enlargement in 1995, while dropping following the BSE and Foot-and-Mouth disease crises.

FADN results presented in Figure 4.5 show that the changes in stocking density per hectare are not closely connected with the changes in the total number of cows. Looking first at stocking density per hectare, this has remained relatively stable throughout the period although there is a marginal shift downwards following enlargement in 1995. The stocking density per hectare of forage area shows slightly more variation including a marginal decline in the period 1992 to 1997. While beef price support was reduced from 1993 to 1995, this marginally declining trend was more likely to be a result of the changes to the direct payment schemes in the 1992 CAP reform or other factors. However, the declining trend is reversed in 1997 as stocking density per hectare of forage crops increases slightly to 2003.

Furthermore, production in the beef and veal sector is affected by developments in the milk sector, to the extent that calves from dairy cows are used for the production of veal and beef, although some are culled shortly after birth and do not enter the production chain. This is a major driver in some Member States, such as the Netherlands. With declining numbers of dairy cattle because of higher productivity levels per cow, supplies of calves for beef production can be expected to fall over time.

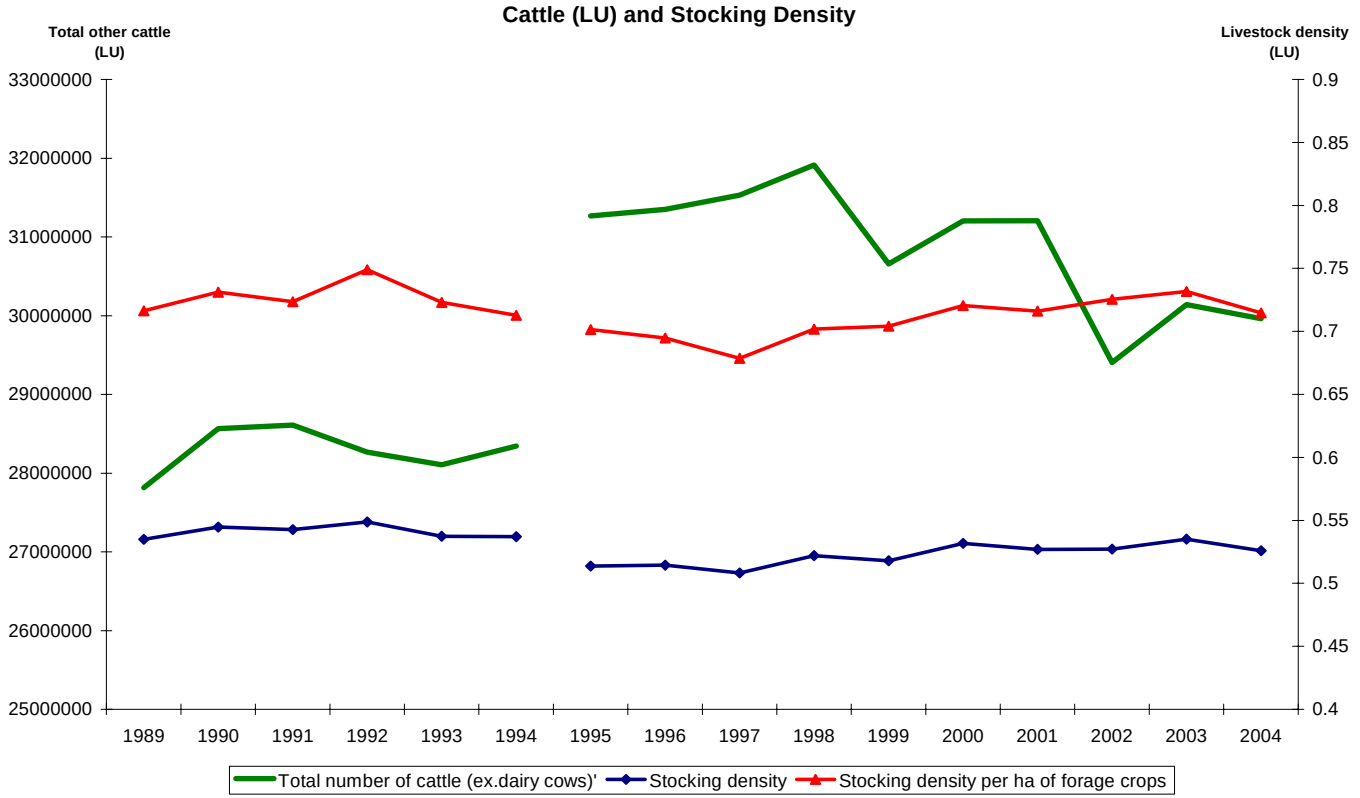


Figure 4.5 Number of cattle (LU) and Stocking densities – EU 12/15[29]

(Source: FADN)

[29] In the figure data refers to the following farm categories: Specialist grazing livestock, Mixed livestock and Mixed crops-livestock. Stocking density has been calculated by dividing 'Other cattle' FADN standard variable by 'Utilized Agricultural Area' and by 'Forage crops' FADN standard variables. 'Other cattle' includes all cattle excluding dairy cows.

4.1.9 Farm Income Effects

Price support increased farm income when it was introduced. In time the benefits of price support will have been at least capitalised to some degree in production factors attached to beef production[30]. This capitalisation process is likely to have induced higher fixed costs of production which eventually decreases the net income effect of price support. One measure for income is farm net value added[31] (FNVA) per annual work unit (AWU). On specialist cattle rearing-dairying and fattening farms, when it is divided according to different stocking density levels, as in Figure 4.6, it provides some interesting perspectives on beef production. FNVA per AWU has been increasing during the period of analysis, and it is seemingly not possible at this broad EU level to detect any very specific effects of changes made to the beef CMO.

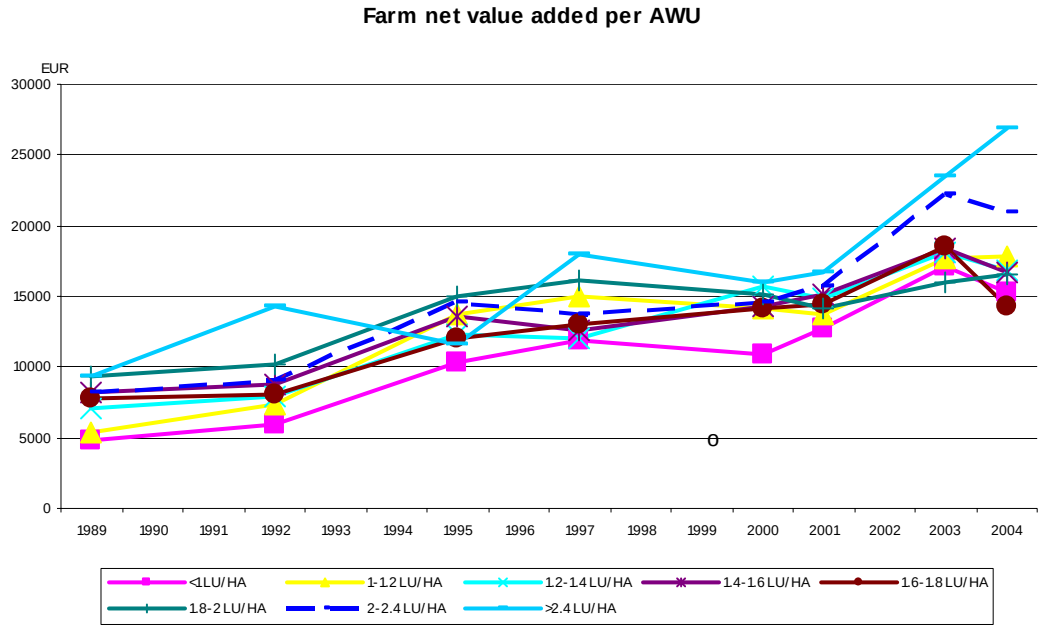


Figure 4.6 EU12/15 farm net value added per annual work unit on specialist cattle rearing and fattening farms divided into 8 categories of stocking density per forage area.

(Source: FADN)

There is, however, a slight increase in FNVA over the implementation periods of the MacSharry (1992-1995) and the Agenda 2000 (2000-2003) reforms. Nonetheless it is impossible to detect whether the increase is directly related to the reforms. Other factors, like technological development, input prices, capitalisation of subsidies and environmental regulations also have significant influence on the FNVA. One of the

30 A literature survey by Latruffe & Mouël (2006) for the OECD concludes that the economic literature clearly suggests that agricultural policies do affect farmland rental and selling prices. Consequently it is likely that, at least part of agricultural support is capitalised into farmland values and rents.

31 Farm Net Value Added is a measure of the remuneration to fixed factors of production (work, land and capital) on the farm. It comprises gross farm income less depreciation.

interesting features of Figure 4.6 is that the level of FNVA per AWU is lowest for the beef farms with the lowest stocking density almost throughout the entire evaluation period. Furthermore the beef farms with the highest stocking density have the highest level of FNVA per AWU through most of the evaluation period. It is not possible to detect any systematic patterns on the FNVA level for the remaining stocking density categories, other than that the trend is relatively similar, and there is a weak tendency for farms with higher stocking density to have a slightly higher FNVA per AWU.

From an economic point of view the most profitable strategy for specialist beef farms will be, in many cases, to have intensive beef production with high stocking density. The analysis of farm income hence suggests that we would expect an intensification of beef production during the period of analysis. This is, however, not what we have observed at the EU level.

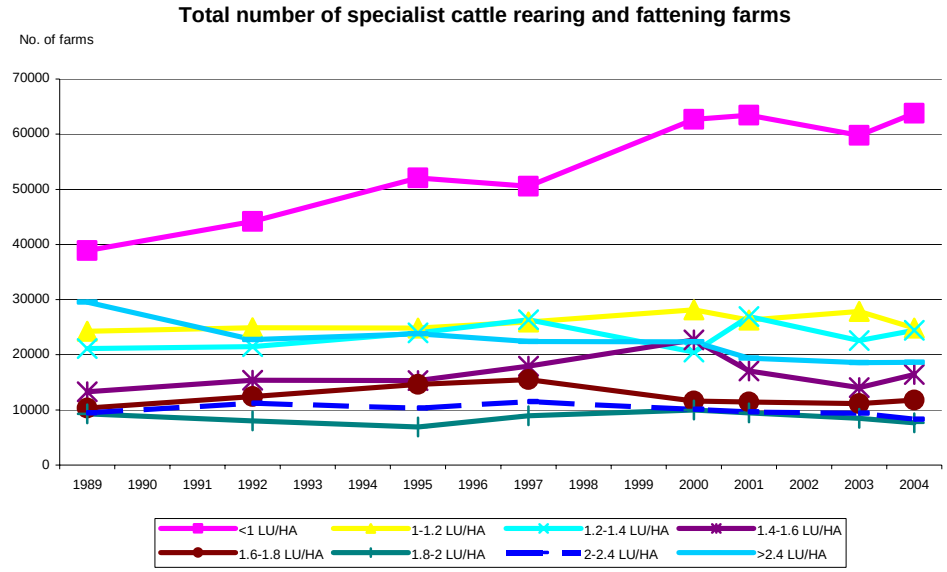


Figure 4.7 Number of specialist cattle rearing and fattening farms divided into 8 categories of stocking density per forage area in the EU 12/15

(Source: FADN)

From Figure 4.7 it is clear that the number of farms with the highest stocking density has declined whereas the number of farms with the lowest stocking density has been significantly increasing. The number of farms in the other stocking density categories has remained fairly stable over the evaluation period. This contrasts with the income analysis from which we would have expected an increase in the number of farms with high stocking density and a decrease in the number of farms with low stocking density. There are several feasible explanations for this. First of all, the MacSharry reform increased incentives for the extensification of beef production by introducing maximum stocking density limits, an extensification premium etc., although this does not change the fact that it would still have been more profitable to have a high stocking density within limits. Second, many farms may operate in circumstances in which higher stocking densities may not be agronomically feasible or economically attractive, for example in the LFA. Third, many farms may not seek a higher return, if their objectives are not primarily commercial. Fourthly, many countries have

environmental regulations which restrict total stocking density in some localities. For example, Denmark has a regulation which limits stocking density[32].

Another explanation of this pattern may be that some farms have changed their production structure so that they have jumped between FADN production categories. The general trend has been increasing specialisation throughout the evaluation period, as the specialist cattle rearing and fattening category has increased from 159,648 farms to 179,241 farms in the period 1989-2004 (Source FADN). The increase in the specialist cattle category is primarily due to an increase in the specialist beef farms with a stocking density of less than 1 LU/Ha. In 1989, 82% of these farms were found in less favoured areas. This share increased to 92% during the evaluation period[33]. Therefore specialisation in beef production appears to have taken place to a greater than average degree on the least intensive farms in less favoured areas. The FADN data also suggests that these farms have relatively small cattle herds, and in 2004 their average farm size was around 75 ha of UAA of which 71 ha was forage area.

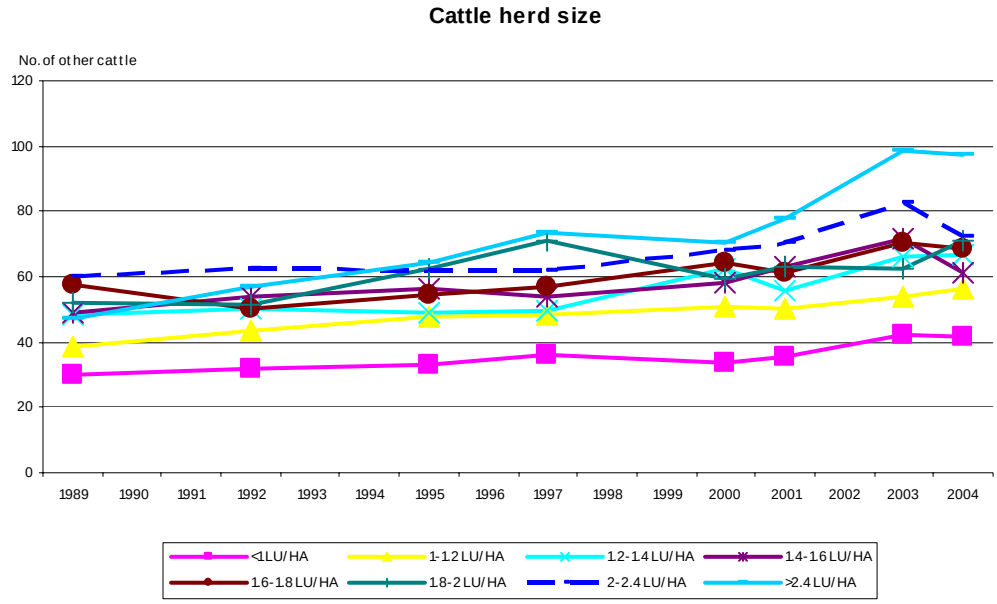


Figure 4.8 Average size of 'other cattle' herds on specialist cattle rearing and fattening farms divided into 8 categories of stocking density per forage area in the EU 12/15

(Source: FADN)

Even though the farm income analysis indicates that we would expect to observe increasing stocking density for specialist beef farms in the evaluation period, this has not been the case in practice.

[32] Animal production is not allowed to exceed a certain level of livestock units per hectare. The Danish regulation was introduced in the mid 1980s, and since the level of allowed livestock units per hectare has decreased gradually.

[33] Own calculations based on FADN data.

4.1.10 Conclusions on the hypotheses

In order to sum up this analysis of the farm impact of the beef and veal CMO we will go through the hypotheses mentioned in the beginning of this chapter one by one. These conclusions are all relative to the counterfactual.

It is difficult to be precise about the effects of price support measures on the beef and veal sector, not least because of the difficulties of establishing an accurate counterfactual. However it does seem that price support has increased the price received by beef and veal producers for specific commodities and provided incentives for increasing the use of inputs, including land. Compared to the hypotheses proposed in the introduction, this analysis suggests that price support can be said to have had the following effects:

- **Increased production levels**: In theory price support and price stabilisation will lead to increased production levels depending on both the price gap between the supported price and the counterfactual price and the supply elasticity. The production of beef and veal during the evaluation period has been at a level of around 8 million tonnes with a declining trend since 1995. This is a higher level of production than would have been experienced without price support. The CMO appears to have raised, and at least partially stabilised, the producer farm gate price (compared to the reference farm gate price) thereby providing farmers with an incentive to increase production. Since the implementation of the beef and veal price cut in the 1992 CAP reform the level of overproduction created by price support has decreased. The overall production effects of CAP policies were not changed much by the 1992 CAP reform because of the price cut compensations implemented through hectare and livestock headage premiums. The evidence, therefore, would appear to confirm the hypothesis that price support has led to increased levels of production.

- **Higher number of beef cattle:** While the overall number of heads of cattle in the EU as a whole has remained fairly constant over this period, within the suckler herd there was an increase in the herd size to 1998 followed by a decline, whereas the dairy herd has been declining throughout the period.

  Whilst there are several reasons for the growth in beef cattle numbers in the period 1988-97, the support offered by the CAP regime appears to be a significant driving force. Distinguishing between the price support effects and the impact of direct payments (see Chapter 6), is more difficult. It is worth noting the limited changes in producer beef prices between 1988 and 2000 (see Figure 4.2.1). The drop in beef cattle numbers since 1997 was clearly driven in part by the BSE and FMD outbreaks with policy changes, including intervention price reductions, possibly playing a part. Nonetheless, beef cattle numbers fell further during 2002-2005 despite the price increases shown in Figure 4.2. The prospect of decoupling may have been a driver before the policy itself changed at farm level.

  In summary, price support for beef and veal production is likely to have:
  - Sustained a larger specialist beef herd in the EU than would have occurred without price support.

- Contributed to the growth in cattle numbers up to around 1997 and, less clearly, to the subsequent decline.

- **Larger number of beef farms**: From mainstream economic theory it follows that price support will distort the optimal allocation of production factors and too many resources will be employed in beef production (ignoring externalities). The effect of this is that small farms are maintained for a longer period. Over the evaluation period the number of farms with beef and dairy cattle in the EU15 has decreased, however the average farm size has increased (see Figure 4.8) .Overall, the general pattern in the sector is that total production is decreasing, albeit at a slower rate than would be the case without price support. The total cattle herd is decreasing while the remaining cattle are concentrated in larger herds on larger farms. It is not possible to say how many of these structural adjustments are caused by changes in the beef and veal CMO or by other market and policy drivers. One explanatory link however could be that price support is linked to the production level which means that a higher level of production leads to increased support. This could give efficient beef producers an incentive to enlarge their farms and so increase their herd size.

- **Less competitive farmers maintained for longer period**: In principle this will occur if prices are maintained above the reference level. From Figure 4.7 it is clear that the number of farms with the highest stocking density has declined whereas the number of beef farms with the lowest stocking density has significantly increased. The number of farms in the remaining stocking density categories has developed more or less constantly over the evaluation period. This does not correspond very well with the income analysis (see Figure 4.6), from which we would have expected an increase in the number of farms with high stocking density and a decrease in the number of farms with low stocking density. This development has several feasible explanations which are discussed above in section 4.1.9.

- **Increased income from beef production**: Price support increased farm income when it was introduced. In time the benefits of price support are likely to have been capitalised to some degree in production factors attached to beef farming, leading to higher fixed costs of production. This eventually decreases the net income effect of price support. The beef and veal CMO price cuts following the CAP-reforms in the 1990s resulted in a decreasing income from beef and veal production if other policies are ignored. In practice, however, increased direct payments were designed to compensate for these cuts.

- **Regional concentration potentially altered**: Beef production takes place throughout the EU and trends have not been uniform. The main concentrations can be found in: France (including Midi-Pyrenées, Pays de la Loire, Limousin, Bourgogne and elsewhere), the UK, Spain (including Castilla-Leon and Extremadura), and Ireland. The case studies confirm that price support contributed to the viability of suckler beef producers, especially in Ireland. In Ireland, intervention expenditure peaked in the late 1980s and early 1990s after which there was a greater reliance on export refunds, with large quantities of beef exported to third world countries. The number of suckler cows grew from 600,000 in 1988 to around 1.2 million in 1998. In the eastern Länder in Germany, in

contrast, there was a marked drop in suckler cow numbers in the 1990s. Ceilings on direct payments in Member States may also have an impact. There has been a significant change in the distribution of beef cattle over time. The CMO builds on the principle of one market with one price and therefore the policy aims to be neutral in respect of developments between regions. Different development patterns across regions arise primarily because of market driven forces or national policies and EU policies implemented differently in the Member States. Consequently change in cattle distribution can be attributed to a range of factors, including the implementation of price support.

- **Extensive production systems maintained in marginal areas**: While there are variations between countries, as illustrated in the case studies, the overall level of low intensity production at stocking densities of less than 1 LU per hectare has been maintained. A substantial proportion is in the Less Favoured Areas. Over 90% of the specialised beef farms in this category were in the LFA by 2004, compared with 82% in 1989.

- **Stocking density increased**: According to Figure 4.5 thee have been limited changes in stocking density per hectare at the EU level during the period and this does not reflect changes in pricing levels or stock numbers to any marked degree. There was a marginal shift downwards following the EU enlargement in 1995. The stocking density per hectare of forage area shows slightly more variation including a marginal decline in the period 1992 to 1997. While beef price support was reduced from 1993 to 1995 this marginally declining trend is more likely to be a result of the changes to the direct payment schemes in the 1992 CAP reform which themselves included links to the stocking density per forage area**.** However, the declining trend is reversed in 1997 as stocking density per hectare of forage crops from then on increases slightly up to 2003. The hypothesis, therefore, does not appear to hold true.

4.2 Environmental Impacts

It is difficult to be precise about the impacts of CMO price support measures on the beef and veal sector. This lack of precision applies at the broader structural scale and is even more marked at the farm level when we focus on specific practices and impacts. This is confirmed by the case studies. .The first stage in answering the evaluation question, therefore, is to acknowledge that the relationship between the CMO measures and the environmental outcome is complex and unlikely to be quantified with any degree of confidence.

In principle, elevated cattle numbers have the potential to increase environmental pressures as a result of overstocking and intensive management practices. At the same time, the maintenance of cattle numbers in more marginal areas associated with extensive grazing systems can often result in significant positive environmental impacts. In practice, however, farm management practices can often be the most significant factor determining environmental impacts. It is also important to note that price support is just one of a number of policy and market factors explaining the trends noted above meaning that it is not possible to quantify the impacts. Finally, it is also important to stress that price support has declined over time whilst support to the beef sector in the form of direct headage payments and, more recently, decoupled

payments under the Single Payment Scheme has increased. It therefore seems reasonable to assume that the farm level, and consequently environmental, impacts of price support in the beef and veal sector have become less pronounced relative to other policy mechanisms over time. These issues are explored in Chapter 6 and Chapter 9.

Set out below is an assessment of the environment impacts of price support in the beef and veal sector in relation to both farm structural change and environmental theme.

4.2.1 Environmental impacts of changes in farm structure due to price support in the beef and veal sector

(1) Scale of production

The environmental consequences of elevated cattle numbers will mostly be experienced in the suckler beef sector, since dairy cattle numbers seem little affected by beef sector price support. These cattle are managed in a range of systems, varying from intensive indoor stock to the more extensively managed outdoor herds, many grazing on pasture. The number of specialist beef farms has fallen and the scale of production has increased. This trend almost certainly reflects the impact of several drivers alongside the CMO price support. It has resulted in fewer mixed farms and larger scale enterprises.

Beef cattle numbers above the counterfactual have both positive and negative environmental effects as follows:

- They will contribute to certain environmental pressures. In particular, emissions of methane are closely related to cattle numbers, as is the volume of livestock wastes arising, with consequences for water quality in particular (see Chapter 10 for more detail). Ammonia emissions also tend to rise. It is difficult, however, to quantify the exact impact.
- On the other hand, the elevated numbers may also have allowed the continuation of grazing on land where this otherwise would not have occurred. Some of this will have been relatively marginal grazing in economic terms, much of it in the LFA. About 65% of the suckler herd was kept in the LFA in the mid-1990s (DG Agri 1997). A large proportion of farmland of High Nature Value (HNV) is found in the LFA (EEA 2005).

(2) Changing regional distribution of beef production

Where the growth in beef cattle numbers has led to more intensive production, as in parts of Ireland, the environmental pressures, particularly regarding water pollution, have increased. However, many of the regions where suckler beef numbers have been sustained include significant areas of LFA where continued grazing under appropriate management offers landscape and biodiversity benefits.

(3) Intensity of Production

At an aggregate level, beef cattle stocking densities appear to have been fairly stable in the EU-15 since 1988. For all cattle, excluding dairy cattle, stocking density per hectare of forage crops has been around 0.55/LU per hectare for most of the period.

There have been more variations at Member State and regional level, as confirmed in the case studies. In Ireland, for example, average stocking densities on specialist cattle rearing and finishing farms rose from 1.23 LU/hectare in 1990 to 1.37 LU in 2005. In the Auvergne region in France, stocking densities on the main category of beef farms were around 1 LU/hectare between 1998 and 2000, with some fluctuations between years. Data for the old Länder in Germany are shown in Figure 4.9.

Within Member States, at the farm and area level, there significant changes in stocking densities may have taken place. Generally, intensity of production is likely to be lower without price support which would lead to a lower level of environmental pressure. However if the stocking density becomes too low then there is a risk of under-grazing which is undesirable for many habitats.

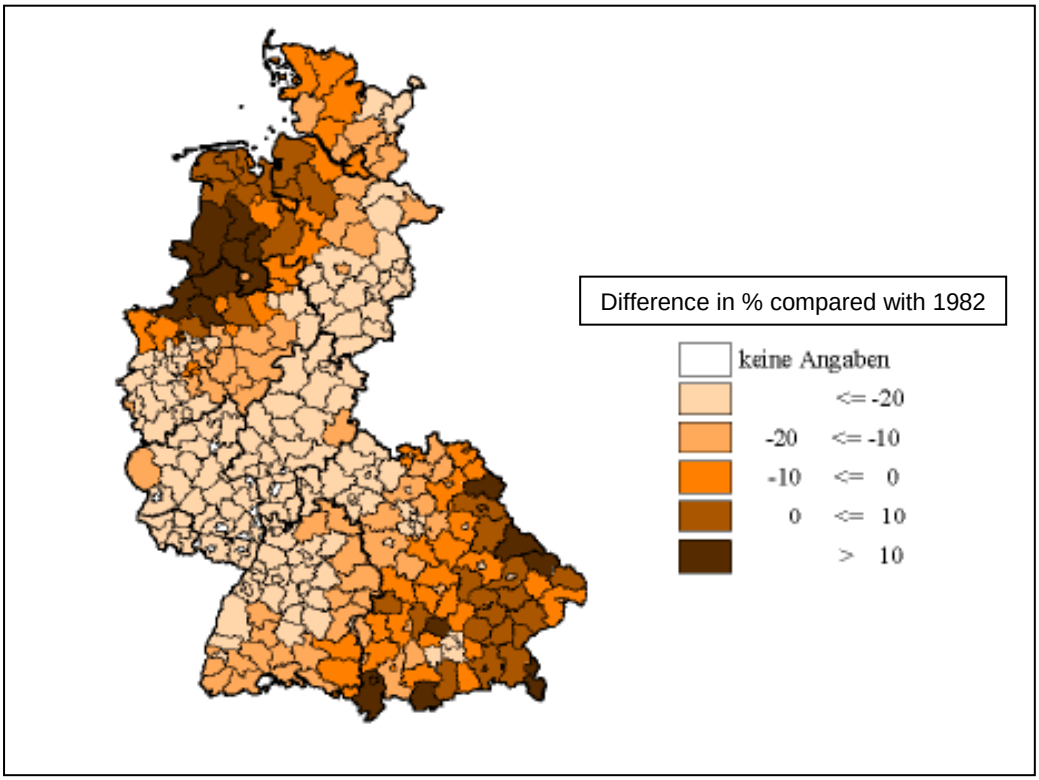


Figure 4.9 Change in cattle livestock per ha forage area 1982-1999 in the former Federal States ('old Länder')

(Source: SRU, 2004)

It is not clear that price support has contributed disproportionately to the continuation of beef cattle production at either the intensive or extensive end of the scale.

(4) Specialisation

Specialisation in beef production has occurred alongside increases in farm size. It has been apparent in both the more intensively managed beef sector, often finishing bull beef from the dairy herd with relatively high inputs of purchased feed as well as in the suckler beef herd. The case studies report specialisation in nearly all regions although there remain a large number of beef producers with other enterprises, including sheep and dairy farming activities.

As with intensification, there are clearly several different drivers in play and the CMO price support pressure is only one factor. Evidence from other OECD countries shows that specialisation is occurring elsewhere.

Specialised holdings are likely to entail different management practices from more mixed farms. This can result in changes in landscapes for example with larger dedicated buildings, enlarged field sizes and less varied features. However, specialised management may be associated with greater attention to good practice and environmental concerns on some farms. The literature and evidence from the case studies is far from conclusive on this point.

(5) Lack of Environmental Conditions

Unlike direct payments discussed in Chapters 6-8, price support through intervention and trade measures is not subject to environmental conditions. Direct payments may include rules, such as maximum stocking densities. They are also subject to cross compliance. This is not possible in the case of price support which is not a targeted measure. In this sense, the scope for environmental integration is limited in a policy of this kind.

4.2.2 Impacts of price support in the beef and veal sector by environmental theme

The main environmental impacts of price support in the beef and veal sector according to environmental themes are summarised below:

Water quality

In principle increasing cattle numbers can be expected to increase the potential for overstocking and thus negative impacts on water quality due to diffuse water pollution resulting from nutrient and soil runoff. Where increases in cattle numbers have been associated with more intensive management systems, this may also have resulted in changes to forage production systems. Forage crops such as maize can increase the likelihood of soil erosion and nutrient losses depending on climatic conditions, management practices and location. The potential for negative impacts resulting from the management of manures and slurries and the production of forage crops are also likely to increase but in practice will depend largely on the management at the farm scale.

For example, decisions made at farm level in terms of management practices and investment in infrastructure can mitigate and in some cases even reduce the potential for negative impacts of beef production on water quality. For example, if an increase in cattle numbers on a specific farm results in an increase in awareness of nutrient

management and investment in manure and slurry storage facilities, this can minimise the potential for negative environmental impacts.

The maintenance of cattle numbers within extensive, low input grazing systems are likely to be of lower risk in terms of their environmental impacts in on water quality due to the reduced risk of soil erosion and nutrient runoff. Price support in the beef sector is, therefore, unlikely to result in significant negative environmental impacts where it has maintained cattle numbers, as long as numbers do not exceed the carrying capacity of the land, although the nutrient load will be higher than would be the case otherwise. However, there have been well documented examples of overgrazing in areas traditionally associated with extensive grazing. For example, during the 1990s there were significant water quality problems resulting from poaching due to overgrazing and unsuitable supplementary feeding on common land. Where increases in cattle numbers have led to the introduction of housed cattle systems the impacts in terms of water quality in terms of poaching will decline.

Water resources

There is little direct evidence to suggest that increased cattle numbers relative to the counterfactual have resulted in significant impacts on water resources. That said, higher beef cattle numbers in dry regions (for example Extremadura, Spain) are likely to result in increased pressures on water resources. It is also likely that the maintenance or increase of the area under intensive forage cropping systems, particularly those which rely on irrigation, will result in negative impacts on water resources.

Biodiversity

Where price support has resulted in the maintenance of beef cattle numbers at stocking levels associated with traditional management practices, this is likely to result in the retention of associated biodiversity benefits. It is also important to note that many of these are associated with specific grassland management practices for particular species of flora and fauna on natural and semi-natural grassland habitats (for example, hay making, grazing). Where price support in the beef sector has resulted in an increase in cattle numbers, this is likely to have broadly negative impacts on biodiversity as a result of increased inputs, and the potential for overgrazing and localised poaching or through increased intensity of production of forage crops. Where production systems have moved from predominantly grazed to housed production systems this may also result in negative impacts on grassland biodiversity, particularly if grazing ceases altogether and is replaced by intensive forage production systems. Negative impacts on biodiversity, particularly aquatic flora and fauna, have also been caused as a result of diffuse water pollution from intensive production systems.

Landscape

The impact of price support in the beef and veal sector on the landscape is likely to have been fairly limited. A higher number of cattle numbers due to price support is unlikely to have had a direct impact on the presence of landscape features such as hedgerows or small fields. Where price support has led to higher stocking densities, this may have a negative impact on the quality of such features, although investment in infrastructure such as fencing to guard against livestock damage, can mitigate these impacts.

Where management practices have become more intensive and have resulted in more stock being housed indoors and increased production of forage crops such as maize, this can have significant negative impacts. The erection of additional buildings and associated infrastructure can change the characteristics of the landscape, giving it a more 'industrial' character and the conversion of grass to forage maize will mean a loss of the pastoral character of an area.

In more marginal areas, however, the maintenance of cattle within areas which have traditionally been grazed by cattle can be positive for the landscape, particularly if this has helped contribute to the maintenance of local cattle breads and associated genetic diversity.

Soils

The impact of elevated cattle numbers as a result of price support in the beef and veal sector will be similar to those related to water quality. In those areas where price support has contributed to maintenance of cattle numbers and management regimes associated with extensive management practices, the impact on soils is likely to be neutral, as long as soil erosion and poaching are avoided. Where price support has led to an increase in the number of cattle in an area, this is likely to lead to a greater pressure on soils with potentially damaging effects, particularly in relation to soil erosion, although this will largely depend on management practices implemented at farm level (for example, siting of feeding areas away from rivers, over-wintering stocking levels, etc.) and the management associated with forage crops such as maize. Where cattle are housed this will minimise the potential for overgrazing and poaching.

Air quality and climate change

Higher numbers of cattle associated with price support in the beef sector can be expected to have resulted in increased emissions of greenhouse gas (GHG) emissions and in particular methane (CH_4) resulting from enteric fermentation. While emissions are closely related to the number of livestock there is not a simple linear relationship because the size and breed of animal, the feeding and management regime, and the way in which wastes are handled and disposed of will affect the level of emissions. However, if emissions are considered by unit of beef produced, it is possible that an increase in the intensity of production systems may have resulted in reduced GHG emissions per unit of product due to the shorter finishing times associated with such systems.

In terms of ammonia emissions and air quality, intensive beef production systems can be expected to result in negative impacts where concentration of production has occurred. However, these impacts will depend to a large extent on the management systems in place for manure storage and application, with higher emissions likely from intensive, housed systems. Maintenance of cattle numbers in extensively grazed systems are unlikely to result in significant impacts in terms of ammonia or air quality due to the dispersed nature of production in these systems.

5 PRICE SUPPORT AND MILK QUOTAS IN THE DAIRY SECTOR

Q1.2: To what extent is the **price support** resulting from application of the market measures in the **dairy sector** in combination with the system of milk quota in coherence with the obligation of integrating the environmental protection requirements into the CAP (article 6 of the EC Treaty) over the evaluation period?

A number of policy mechanisms are used within the milk CMO to influence price levels as described in Chapter 2. These have been modified on many occasions but price support has been a feature of the CMO, throughout the evaluation period from 1988 to date. The milk quota regime has also been in place throughout the period, dating from 1984. The analysis in this chapter focuses on the impact of the combination of price support and the milk quota system, first at farm level and then examines the potential environmental implications of these impacts. The analysis of the quota system is confined to its overall impact, including the disincentive to produce over the threshold at EU and Member State level. The arrangements for quota transfer within Member States are an important component of the policy but are the topic of a separate study and are, therefore, not considered here.

The chapter is divided into sections. First the introduction sets out a series of hypotheses concerning the potential impact of the CMO measures. The second section discusses the impacts on farm structure and management. The third section is concerned with the environmental implications of these farm level impacts.

According to the causal diagram for price support in the milk sector**,** shown below (Figure 5.1), a range of possible impacts of price support on farmer behaviour and farming systems can be identified. The hypotheses include the following (relative to the counterfactual scenario):

- A higher level of milk production will have occurred;
- The number of dairy farms is expected to be higher;
- The number of dairy cows will be higher than otherwise;
- Income from milk production is expected to be higher than otherwise; and
- The regional concentration of production is likely to be constrained.

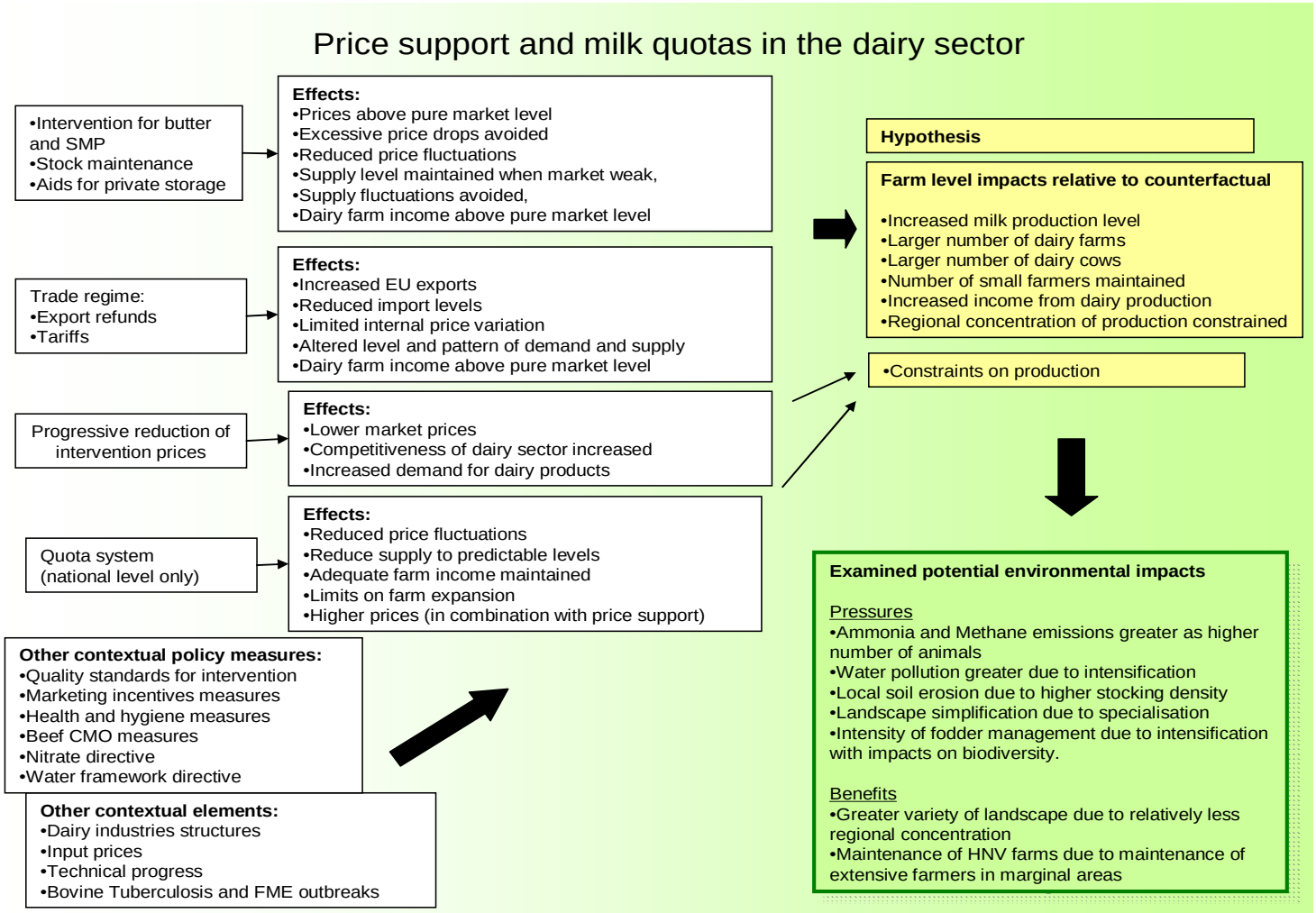


Figure 5.1 Diagram showing price support measures in the dairy sector, quota system and other contextual policy measures, hypotheses and potential environmental impacts.

5.1 Analysis of farm impacts of price support and milk quotas in the dairy sector

5.1.1 Establishing the counterfactual scenario

In considering the impact of price support in the dairy sector the challenge is similar to that for the beef and veal sector addressed in Chapter 4. An EU domestic price is required along with a counterfactual reference price which could be estimated in different ways. This gives an indication of the impact that the policy has had on the EU price relative to the alternative scenario with no policy intervention. Once this has been established, itself difficult, it is desirable to know the supply price elasticity of dairy products so that a production function can be estimated.

The methodology here, as in Chapter 4, is to use OECD work published in the literature, including the Producer Support Estimate (PSE) to examine the effects of price support in the EU. However, unlike in Chapter 4 on beef and veal the analysis needs to take account of the impact of milk quota, which has had a major effect on milk production during the period. The continued impact of the two policies introduces multiple and sometimes conflicting policy drivers in the dairy sector and separating the impact of the two policy strands is difficult, resulting in a greater level of uncertainty than is desirable in an evaluation exercise.

The OECD measurement of total agricultural support called Producer Support Estimate (PSE) is defined as an estimate of the annual monetary value of gross transfers from taxpayers and consumers to agricultural producers measured at the farm gate level. It is estimated by country and for different commodities one of which is milk. As with the beef sector, one of the benefits of this methodology is the work already done by the OECD of weighting together the different market prices in the EU Member States and the various reference prices.

The OECD estimate of market price support is used in this chapter as a measure of total price support to milk. This is an estimate for the monetary value of both consumer and taxpayer financed transfers to milk producers in connection with the market price support mechanism. This includes both the consumer financed transfers and the taxpayer financed costs for example, of intervention and export restitutions.

Figure 5.2 shows the milk prices and the value of market price support for milk in the EU-15 for the period 1986 to 2005 using OECD data. The Figure clearly illustrates how the price support policy appears to raise the producer farm gate price compared to the reference farm gate price.

Nonetheless, there are reasons to think that the OECD estimates of price support, based on comparisons with contemporary world prices do not provide a fully satisfactory counterfactual and this is discussed in Section 5.1.2 below. For this reason, we have argued that the appropriate reference prices for calculating the impact of CAP price support is above the world market level, possibly by more than 20 per cent in some periods.

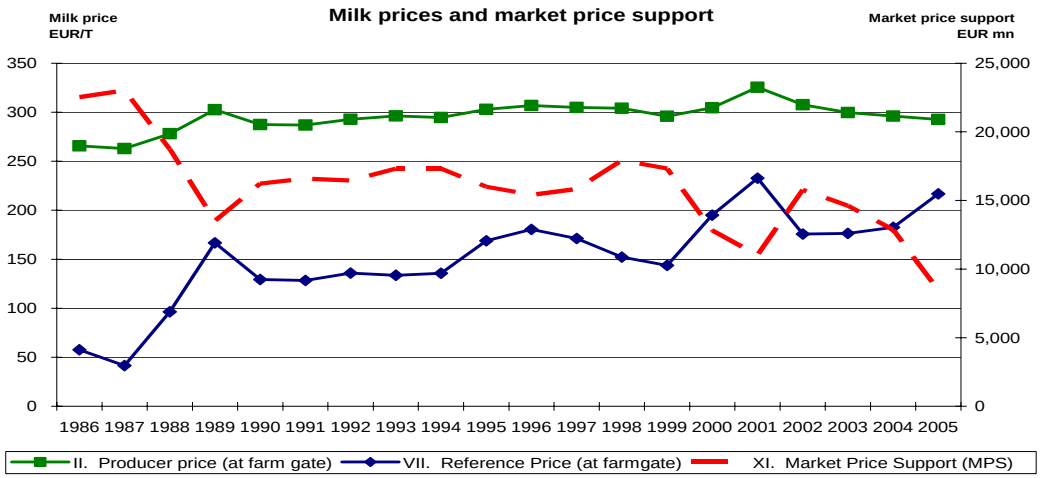


Figure 5.2 Milk prices and value of market price support for milk in nominal prices in EU12/15

(Source: OECD) [34]

The development in the producer price level and the level of market price support reflect a complex mixture of policy changes and various events influencing the supply of milk and milk products in the EU. In Figure 5.2 the producer price over the period has remained relatively stable, even though the institutional prices were lowered by 2 per cent in 1991 and 5 per cent over 1993-95 due to the 1992 CAP reform and the milk quota was increased in the Agenda 2000 reform for Italy, Greece, Spain and Ireland from 2000-02. These policy changes would normally indicate a price decline. A small price decline can be observed from 2002 onwards. The institutional changes are not readily observable in the producer price because the OECD has calculated the price as the total production value divided by the level of production (in milk equivalents) which includes cow's milk, cream and milk used on the farm. The producer price has small peaks in 1989 and in 2001 corresponding to a high reference price in the same years.

[34] The numbers in the diagram refer to EU12 before 1995 and EU-15 from 1995 onwards (including in 2004 and 2005). The milk price at the farm gate is the value of production (value of deliveries of cows' milk, cream -in milk equivalent- and milk used on the farm valued at the reference price for feed milk and at the delivery price for milk for human consumption) divided by the level of production. The published Eurostat price is net of the basic levy but it has been added back into the production price presented here. The milk reference price is the border prices of butter, SMP and cheese converted into a milk equivalent border price using technical coefficients minus a processing margin (calendar year). The border price of butter is the 'Butter f.o.b. export price, 82 per cent. Butterfat, N.E.'. The border price of SMP is 'Non fat dry milk f.o.b. export price, extra grade, Northern Europe', and the border price of cheese is the average unit value of extra-EU exports of the five largest traded categories. The processing margin is calculated as the difference between the domestic wholesale price (domestic wholesale prices of butter and SMP converted into a milk equivalent price using technical coefficients) and the producer price. The domestic wholesale price of butter is the 'wholesale price, branded butter' and the domestic wholesale price of SMP is the 'skim milk powder wholesale price (Germany) (OECD 2007). The value of market price support is an estimate for the monetary value of both consumer and taxpayer financed transfers to the milk producers in connection with the market price support mechanisms.

5.1.2 Market Support Levels

Figure 5.2 shows how market price support has served to keep producer farm gate prices at a higher level to the reference farm gate price, defined as the border prices of butter, SMP and cheese converted into a milk equivalent border price using technical coefficients minus a processing margin (calendar year) (cf. note related to Figure 5.2). To the extent that the reference farm gate price may be considered a proxy for the producer price in a counterfactual scenario without market price support, Figure 5.2 thus demonstrates how EU market price support has kept producer prices at a significantly and consistently higher level over time compared to the counterfactual scenario, thus, all other things being equal, providing farmers with incentives for increasing production compared to the counterfactual.

The development in market price support almost exactly mirrors the development in the reference farm gate price following the logic that when the reference price increases, the difference between the producer price and the reference price decreases, hence there is less need of market price support and the value of market price support declines. The contrary happens when the reference farm gate price falls. The reason why the mirroring is so clear with milk is that the production of milk is broadly constant in the EU as a whole during the period due to the milk quota, and changes in production quantities will therefore not be reflected in the absolute value of market price support to any significant degree.

While the gap between the EU price and the world price level depicted in Figure 5.2 is widely cited in the literature, it is not necessarily a reliable measure of the true impact of the CMO price regime. As for the beef sector, there are several reasons for questioning whether the current world price is an appropriate reference level or counterfactual scenario.

Perhaps most crucially, during the evaluation period world market prices have been distorted by agricultural support policies in many milk producing countries, many of them production related, thereby lowering world prices. The removal of the dairy price support in the EU potentially would have a significant impact on world prices since the Union is a major producer and trader.

An OECD study of the impact of dairy reforms provides one illustration of how the notion of distorted world market prices due to support policies is also highly relevant for the milk sector (OECD 2004b). Having implemented substantial modifications to the OECD AGLINK model, a scenario was designed in which all market price support to dairy was eliminated in all the countries represented in the AGLINK model. This resulted in world prices of butter, cheese, WMP, and SMP increasing by 57 per cent, 35 per cent, 17 per cent, and 22 per cent respectively compared to the 2008 baseline (cf. OECD 2004b p 30)[35]. While the results of this analysis are obviously sensitive to model and data assumptions (including assumptions about quota rent), they do suggest that an adjusted counterfactual world market price could

[35] While world market prices would increase following the elimination of all market price support to dairy in all AGLINK countries, internal EU prices for milk, butter, cheese, WMP, and SMP would drop by 10 per cent, 25 per cent, 10 per cent, 8 per cent, and 8 per cent respectively compared to the 2008 baseline (cf. OECD 2004b p 25).

be a more realistic assumption for the calculations in order to avoid an overestimation of the price support effect and hence production effects.

In addition, it is far from clear that the real counterfactual in the absence of the CMO would have been the complete absence of support for the milk sector. This was not the case in the European countries signing the Treaty of Rome in 1957. Price support for the dairy sector was common at the time, as it was in the countries that have joined the EU subsequently (OECD, 1961). Other OECD countries, such as Canada, continue to support milk production. While several have significantly lower general agricultural support than the EU, support levels to dairy producers are much closer to the EU (OECD, 2005). This indicates that milk is one of the most sensitive products for OECD countries and some form of support here might be a more realistic counterfactual.

In short, the significant theoretical price gap shown in Figure 5.2 almost certainly exaggerates the time impact of the CAP dairy support measure over time. World prices might have been 20 per cent higher or more in the absence of market support in producer countries. A more limited price gap would be more realistic, although it is difficult to propose a counterfactual with any precision. The price effect will have induced a production effect, although this too is difficult to estimate. Furthermore, the scale of the price effect on production will have been reduced during the period because of the operation of the milk quota system – assuming that the milk quota was binding i.e. effectively limited producers' response to the prices available.

5.1.3 Price Stabilisation Effects

Assuming that dairy farms are risk averse, the price stabilisation effects brought about by the milk CMO may affect production levels, as discussed in Chapter 4 for beef. Given a level of assured price stability it would be reasonable to anticipate an 'insurance effect' and a wealth effect if the producer's level of risk aversion declines with rising wealth induced partly by policy. As Figure 5.2 shows, market price support has served to stabilise producer farm gate prices for milk to a substantial degree. Both the insurance and the wealth effect may, therefore, be occurring and in principle will reinforce the tendency for higher milk production levels under the CAP market price support policies. However, it is very difficult empirically to distinguish between the price level effects and price stabilisation effects on production levels.

5.1.4 Input Price Effects

Trends in input prices will have an effect on production incentives alongside the development in output prices. Changes in the terms of trade for the dairy sector from 1995 onwards are depicted in Figure 5.3. The figure shows how milk prices have exhibited a slightly declining trend from 1995 to 2006 with a peak in 2001, which can be explained by the high reference price in that year (for definition of the reference price, see footnote for Figure 5.2). Input prices are increasing in the same period, and from 2001 onwards both input price indices increase more than the milk price (see section 4.1.6 for an explanation of the input price indexes). This indicates deteriorating terms of trade for milk production during the period.

The full implications of the deteriorating terms of trade for milk production are difficult to determine a priori. On the one hand, they suggest a lower profitability in milk production, which could lead some producers to cease production or move to part time farming while supplementing their income through non-farm-related employment. One alternative would be beef production but this is often less profitable than dairying and the terms of trade have deteriorated too. On the other hand, deteriorating terms of trade would in principle induce many commercial full-time farmers to become more efficient producers. They might scale up and in some cases specialise their farming operations in order to take advantage of the economies of scale. The case studies suggest that both these trends can be observed in the Member States.

Deteriorating terms of trade will, therefore, have implications for farming systems as, if the efficiency route is chosen, all other things being equal, they may be expected to result in larger production units, specialisation of production and, as a consequence possibly also geographical concentration of production. In the case of milk production, the potential for structural change and potential pace of change are inhibited at an EU scale by the milk quota allocation, especially in areas where it has not been tradable. It is therefore possible that milk producers have not been able to adjust as much as in a free market to the deteriorating terms of trade and take advantage of technological progress (for example advanced milking equipment) which often requires larger scale production in order to be utilised optimally.

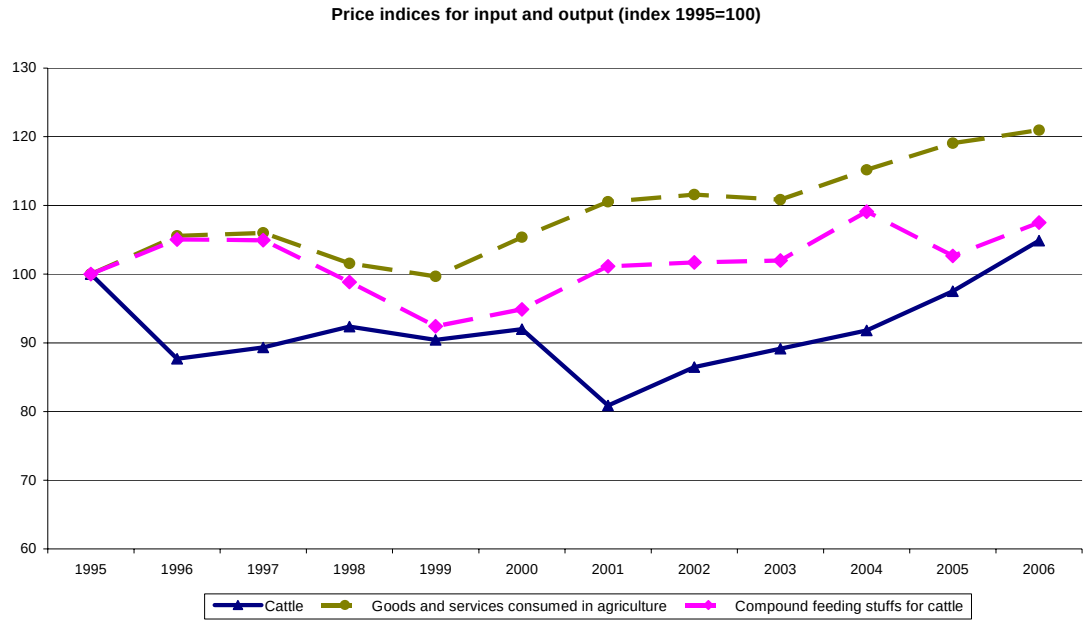


Figure 5.3 Price indices for input and output in the EU15 dairy sector

(Source: Eurostat)

5.1.5 Supply elasticities

The implications of price changes for production levels are captured by the supply elasticities for the product. The supply elasticity with respect to output prices consequently captures the percentage increase in supply following a 1 per cent

increase in the output price. The supply elasticities depend on the time horizon, as supply is generally assumed to be more elastic in the long run than in the short run. While it is difficult to estimate supply elasticities for EU milk production (due in part to the quota scheme) the literature does provide some guidance on the magnitude of these elasticities. An OECD study suggests that the long run milk supply elasticity for the EU 15 is around 1.23. Citing van der Noort (1982), Hansen (2001) arrives at long run price supply elasticity for milk for EU9 of 1.3. While these long run supply elasticity estimates are virtually identical, the short term price supply elasticity estimates differ. The OECD (2004b) reports a short run milk supply elasticity of 0.198, while Hansen presents a short run milk supply elasticity of 0.55 for EU9. Whether this difference in the short run elasticity estimates is due to different time periods, different geographical coverage, or some other set of factors is not clear.

Whether or not the correct supply elasticity and the effective price increase arising from the CMO can be accurately established, the impact on production levels can only be estimated if there are no quantitative restrictions on production. However, milk production in the EU is subject to the milk quota system. As long as output prices do not decline to a level that make the milk quota non-binding, changes in output prices (through for example, changes in the level of market price support) will not result in changes in overall production levels.

It is not clear precisely how far the quota has been binding in the different production regimes in the EU over the period. Table 5.1 shows estimates of quota overrun since 1993/94, suggesting that there are differences between Member States and, almost certainly, between production regions in Europe. In some years, for example in 2004/05 some Member States such as France and the UK are reported as producing significantly below their quota allocation. The same appears true in Portugal over a number of years. Clearly there will be variations over time, even if total production in the EU has been relatively stable and some countries such as the Netherlands and Italy have tended to over produce consistently.

The literature confirms this position. A study by INRA – Wageningen (2002) concludes that the quotas were binding in all EU-15 countries in 1998 as milk quota rents were above zero in all cases. On the other hand, Lips and Rieder (2005) argue that the quotas were not binding in Greece, and Portugal did not reach their quota quantities in several years.

In summary, it appears likely that the quota has been binding in many of the most productive dairying regions for the period since 1988 but not everywhere. The quota system has therefore prevented milk production from increasing as much as it would have done otherwise under the elevated support price arising from the CMO. This holds true for the EU as a whole and some Member States and production regions. However, it is not feasible to estimate the total effect of price support and quota on milk production against the counterfactual with any accuracy. It is reasonable to assume that production levels would have increased in several Member States and regions in the absence of quota and declined in others. Production as a whole probably would have been lower in the absence of the CMO.

Table 5.1 Application of the quota system - Quota overruns (tonnes)[36]

	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05	05-06
Belgium	-5952	**8517**	**17935**	**5880**	**16880**	**3640**	-1140	-15427	**6428**	**27831**	**4231**	**23763**	-4149
Denmark	**10560**	**15917**	**11478**	**23897**	**12113**	**10054**	**15915**	**17154**	**2872**	**24399**	**34102**	**1705**	-3167
Germany	-802243	-363913	**18546**	**387323**	**318069**	**186621**	**175625**	**250310**	**147496**	-86983	**370142**	**414175**	**201104**
Greece	-7024	**15242**	**7424**	-45556	**4877**	**24655**	**37273**	**15985**	-1364	-24319	-9868	-97515	-43636
Spain	**37942**	-77464	**136261**	**65791**	-32937	**40453**	**87632**	-207884	-145836	-27512	-47160	**68213**	**13265**
France	-203422	-74188	**163166**	-29581	-27778	-99368	-106534	-162130	-21495	**22153**	-354789	-261951	-333533
Ireland	-25873	**13751**	**51977**	**33723**	**38712**	-17850	**16793**	-16475	**8751**	-12141	**26888**	**45497**	-95434
Italy	-76	-53728	**568830**	**570775**	**631533**	**679230**	**573939**	**407881**	**388925**	**618039**	**478801**	**405627**	**610916**
Luxembourg	-956	**883**	**3012**	**2688**	**3277**	**2120**	**2993**	**801**	**3430**	**4389**	**1849**	**2309**	**2865**
Netherlands	**27344**	**49661**	**93980**	**81516**	**35723**	**55695**	**55835**	-11187	**54245**	**17623**	**51439**	**69442**	-5469
Austria			-57260	-17021	**34230**	**105526**	**17349**	**100069**	**98856**	**98994**	**87803**	**35963**	**74019**
Portugal	-337782	-304339	-181945	-168291	-105712	-39434	-5685	-22803	-53134	**8386**	-62970	-15839	**415**
Finland			-20381	-69780	-2575	-43417	**14567**	**25296**	**68676**	**32682**	-1179	-47906	-37548
Sweden			-92108	-32721	-25819	-20655	-3105	-11574	-9621	-100457	-83682	-95297	-147891
UK	**75908**	**142467**	**145392**	**54638**	**143957**	**39086**	**62151**	-275414	-72941	-119432	**24346**	-153230	-274761

(Source: DG- Agri)

[36] NB: Negative figures represent a shortfall relative to quota.

5.1.6 Technology Effects

In addition to output and input prices, technological development is also an important driver of production levels, farm management and farming systems. One measure of technical change is the development in the productivity of different production factors, including labour and dairy cows. In Figure 5.4 changes in labour productivity are depicted. Labour productivity is here defined as the value of milk production per annual work unit on specialist dairy farms. The other FADN farm categories are not of critical importance here as approximately 75-80 per cent of the dairy cows are allocated into the category of specialist dairying. In 1995 there is a slight decline in labour productivity reflecting the enlargement of the EU to include Sweden, Austria and Finland. The two latter Member States in particular had lower labour productivity in milk production.

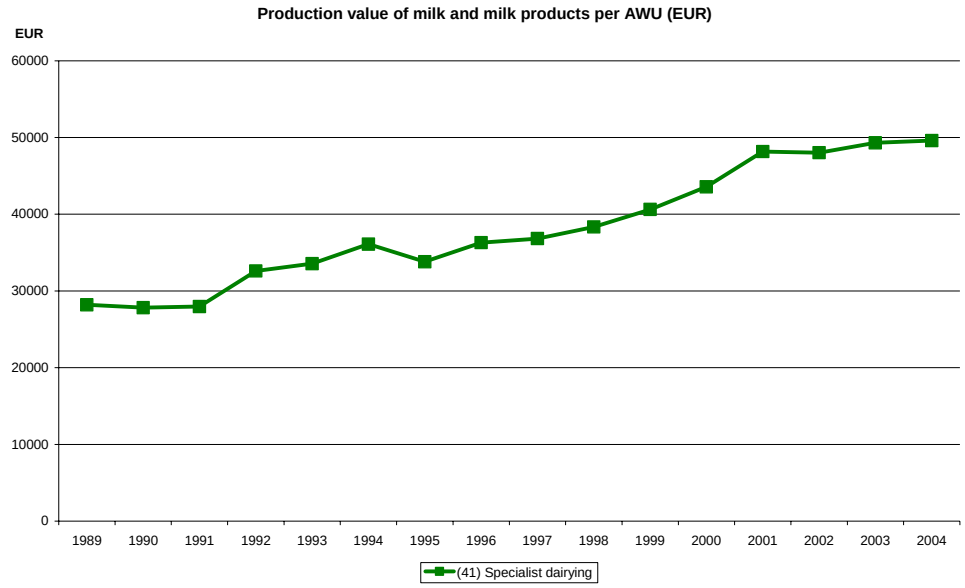


Figure 5.4 Production of milk and milk products per Annual Work Unit in the EU12/15

(Source FADN)

5.1.7 Farm Management

Turning to overall average milk yield per cow, shown in Figure 5.5, there is a clear productivity increase per cow as the milk yield has increased by almost 29 per cent from 1989 to 2003. This increase has been steady and sustained. This is also one of the main causes of the decline in the dairy herd as observed in Figure 5.6. The total dairy herd declines as the milk yield per cow increases because production is constrained by the milk quota.

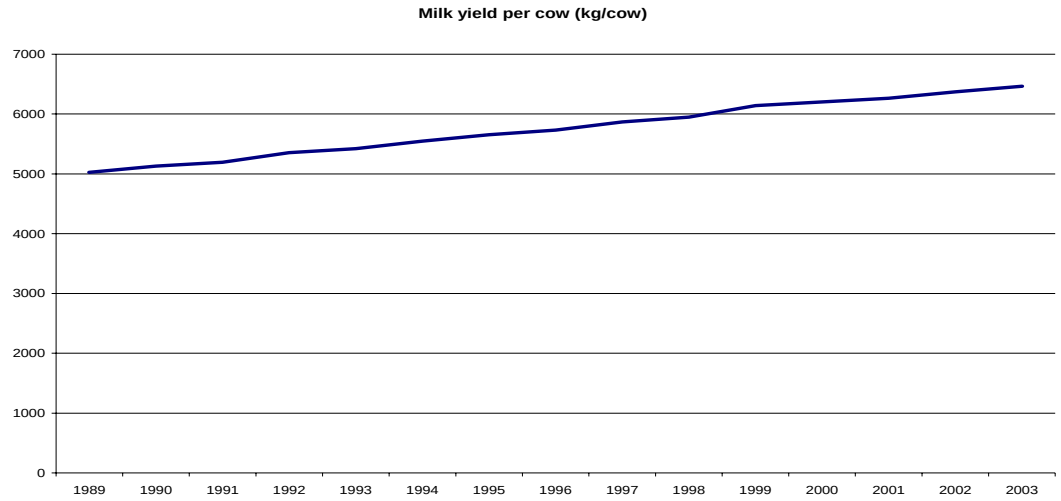


Figure 5.5 Milk yield per cow for cows within the selected FADN categories in EU12/15

(Source: FADN 2007)

In addition to showing changes in the average dairy herd size Figure 5.6 also depicts the average EU stocking density for dairy cows per total farm area and per unit area of forage crops. Stocking density can be an indicator of whether there has been intensification or extensification of dairy production during the evaluation period. The stocking density per forage area is generally higher than the stocking density according to the total farm size because the area with forage crops normally constitutes less than the total farm area. Nonetheless the two curves develop relatively in parallel with a declining trend from 1989-1997. From 1997 onwards the stocking density has been relatively constant.

One of the explanatory factors for this trend is likely to be the milk quota. The relative rigidity of the dairy farm structure due to quota could be expected to result in a decreasing stocking density at the beginning of the period. This is primarily due to the increasing average milk yield per cow, meaning that fewer cows are needed in order to fill the milk quota and, assuming no associated decrease is made to the relevant farmed area, the stocking density decreases accordingly. In this period the average herd size remained more or less constant whereas the general specialist dairy farm size is increasing (see Figure 2.6). By the end of the 1990s the milk quota became tradable and easier to reallocate within many countries. This meant that structural adjustments became easier, and this is probably one reason why the average dairy herd size starts to increase and the decrease in stocking density stabilises at a relatively constant level.

The case studies suggest that stocking densities on specialist farms have not increased but have been relatively stable in recent years. Despite the higher incomes on more heavily stocked farms the FADN data suggests that the number of specialist dairy farms with high stocking density has declined. This development cannot be explained by one factor alone. The milk quota, environmental regulations and production changes all appear part of the explanation, only at this level of analysis it is impossible to detect how much of the trend can be allocated directly to the milk quota regime.

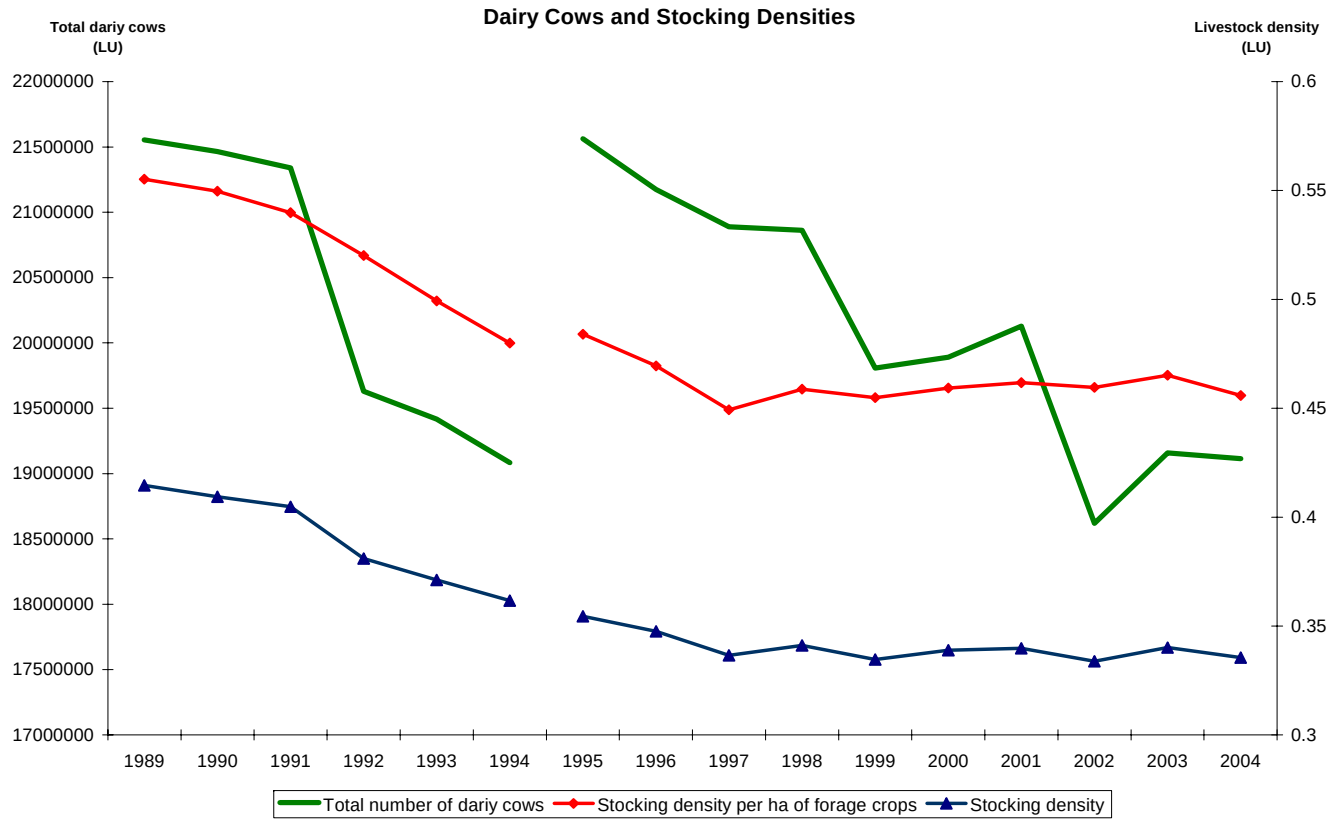


Figure 5.6 Development in the number of dairy cows and stocking density of dairy cows (EU 12/15)[37]

(Source FADN 2007)

[37] In the figure data refers to the following farm categories: Specialist grazing livestock (which includes Specialist Dairy), Mixed livestock and Mixed crops-livestock. Stocking density has been calculated by dividing 'Dairy cows' FADN standard variable by 'Utilized Agricultural Area' and by 'Forage crops' FADN standard variables.

5.1.8 Farm Income Effects

Farm income is the last issue to be considered in the analysis. Price support increased farm income when it was first introduced. In time the benefits of price support have been capitalised to some degree in the prices of milk quotas and production factors attached to milk production and milk quotas.[38] This capitalisation process has induced higher costs of production which eventually decreases the net income effect of price support. Farm income levels themselves do not directly explain either structural changes in the sector or related environmental impacts. Nevertheless a relative income measure like farm net value added (NFVA) per annual work unit (AWU) on specialist dairy farms gives an interesting perspective on milk production when it is divided according to different stocking density levels as in Figure 5.7. FNVA per AWU has been increasing during the period of analysis, and it is not possible to detect any specific effects of changes in the dairy CMOs at the EU-15 level. The level of FNVA per AWU is higher the higher the stocking density is. This is consistent over time.

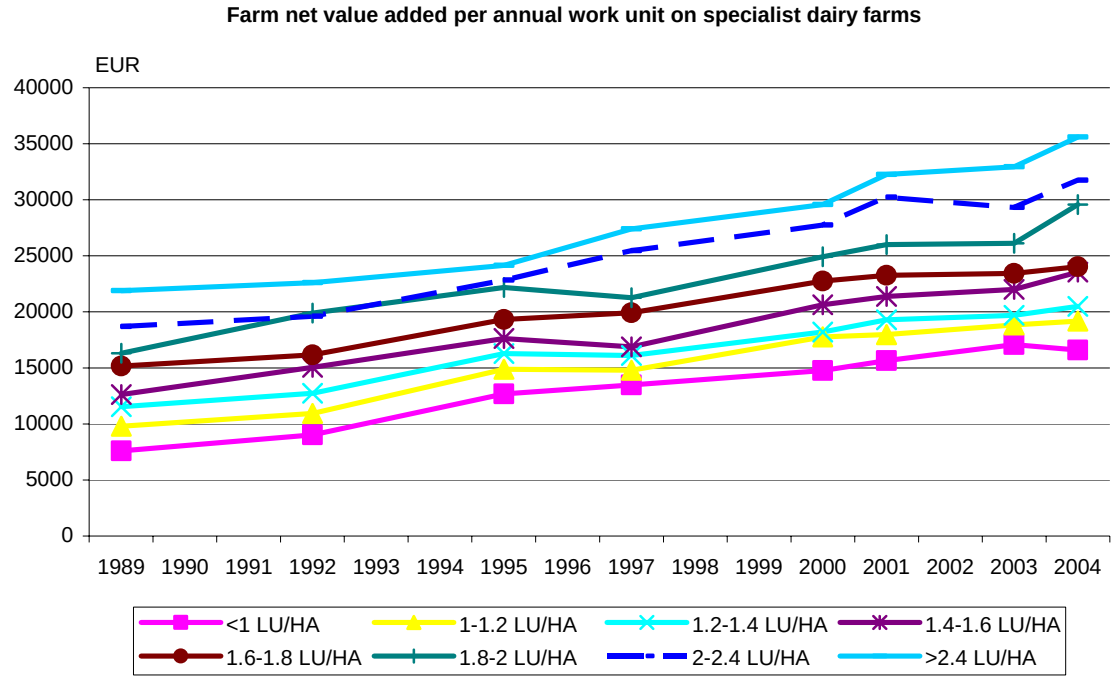


Figure 5.7 Farm net value added per annual work unit on specialist dairy farms divided into 8 categories of stocking density per forage area in the EU12/15

(Source: FADN)

From an economic point of view, the most profitable strategy for specialist dairy farms in most circumstances is likely to be the pursuit of more intensive production systems with higher stocking densities. Through an analysis of farm income we

[38] As noted in the EU Commission's 'Report on Milk Quotas' (2002 p 12), '[i]n cases where quotas are transferred together with land, the price for the quota becomes built-in to the land price. However, land is an immobile economic factor of production and the fact that land markets often show rigidities makes them a quite imperfect vehicle for milk quota transfers'.

would, therefore, expect to observe an intensification of dairy production during the period of analysis. What we observe however is more complex. Milk yields per cow have been increasing and this form of intensification is reported in most of the case studies. Trends in average stocking densities are rather different. From Figure 5.8 it is clear that the decline in the number of dairy farms has occurred particularly on those farms with high stocking density (farms with more than 2 LU per hectare). There are a number of possible explanations for this. Firstly, the milk quota has affected the structural development of dairy farms. With increasing milk yield per cow over time farmers need fewer cows in order to fulfil the milk quota, and the stocking density will decrease and eventually the farm moves to a lower stocking density category. This is what would be expected in some circumstances when milk quota is not tradable.

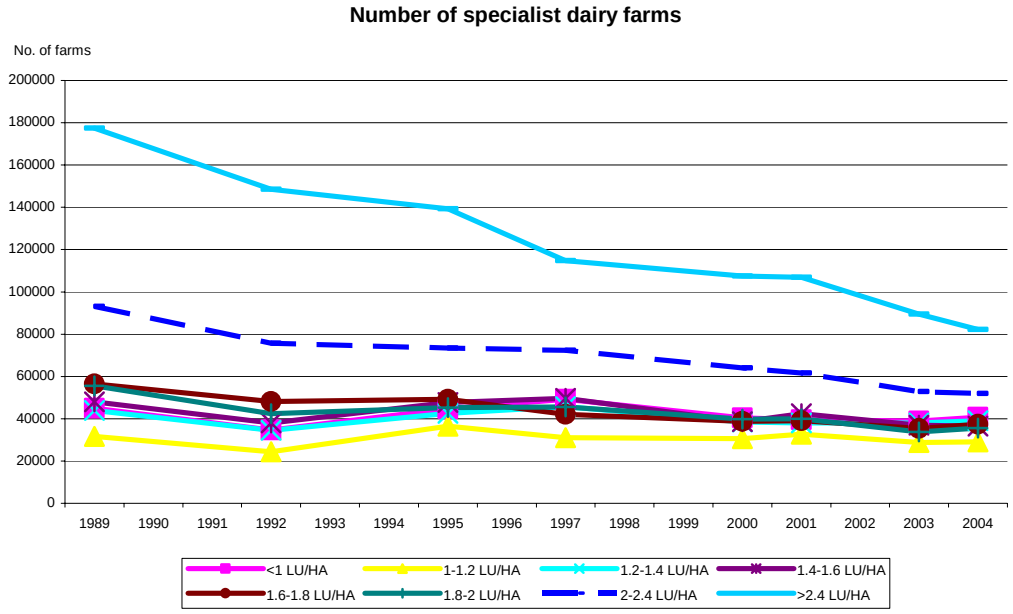


Figure 5.8 Number of specialist dairy farms divided into 8 categories of stocking density per forage area in the EU12/15

(Source: FADN)

In practice, however, the milk quota has been tradable (transferable) – at least to some extent - in many Member States, and therefore structural adjustment has been possible. This can also be observed by the fact that the average size of the dairy herd on specialist dairy farms has been increasing in the evaluation period (see Figure 5.9). Second, utilised fodder production per hectare is likely to have increased as a result of higher yields, conversion to different fodder crops and greater efficiency. Intensification of fodder production is reported in some of the case studies. Third, there may have been an increasing reliance on fodder imported onto the farm. Fourthly, many countries have environmental regulations which restrict the stocking density, often related to the Nitrates Directive or other water pollution measures. As an example Denmark has a regulation which limits stocking density[39]. Fifthly, some

[39]Animal production is not allowed to exceed a certain level of livestock units per hectare. Livestock units are calculated slightly differently in Denmark, and to avoid confusion the allowed stocking

farms have changed their production structure so that they have jumped to other FADN production categories. However, the structure of the available data makes it impossible to detect the movements of single farms across the different FADN categories.

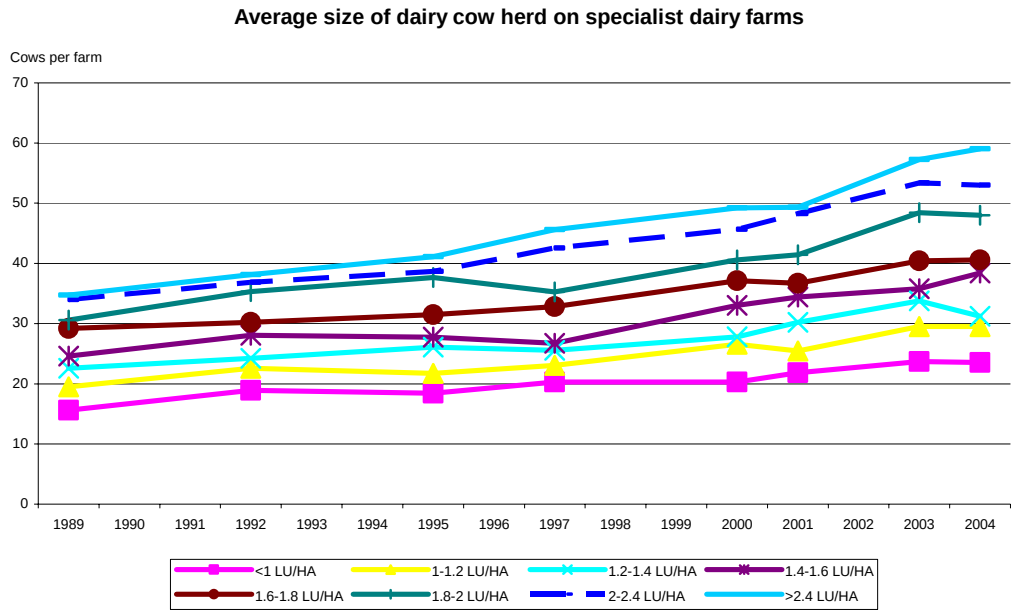


Figure 5.9 Average size of dairy cow herds on specialist dairy farms divided into 8 categories of stocking density per forage area in the EU12/15

(Source: FADN)

From the evidence available it is difficult to determine the weight that should be given to these different factors.

5.1.9 Conclusions on the hypotheses

In order to sum up this analysis of the farm impact of the dairy sector CMO we will go through the hypotheses mentioned in the beginning of this chapter one by one. These conclusions are all relative to the counterfactual. Finally, the overall effects created by the milk quota will be discussed separately.

- **Increased production levels**: Currently EU prices are near world levels. It is possible to postulate that the CMO could have resulted in a 20 per cent increase in milk output particularly in the early years of price support, or even a slight decrease in production more recently. In practice, however, total EU milk production has been almost constant throughout the evaluation period. The main explanation for this is the milk quota.

  The quota system has limited the production effects of price support during the evaluation period. This makes it difficult to judge the net impact on milk

density is not reported explicitly. The Danish regulation was introduced in the mid 1980s, and since the level of allowed livestock units per hectare has been decreased gradually.

production relative to the counterfactual. If we accept the argument that the counterfactual reference price should be significantly above the world price it is not clear how far production might have increased in the absence of quota. Some Member States have made more use of intervention storage for butter and skimmed milk powder than the average (for example, Ireland), so price support will have had regional as well as EU wide effects on production. However, we can't be entirely confident that milk production would have been lower in the absence of the CMO. Price levels probably would have been lower and less capitalised into land and quota without the CMO.

- **Larger number of dairy farms**: The number of dairy farms in the EU-15 has decreased over the evaluation period but still is likely to be higher than under the counterfactual. The decline has been greatest for the category of dairy farms with high stocking density (farms with more than 2 LU per hectare). The case studies from Spain and the Netherlands suggest that after implementation of a tradable milk quota system the number of small dairy farms declined significantly. A fixed milk quota system on the other hand dampens structural adjustments and results in a higher number of dairy farms. If quota had been permitted to move between Member States, the decline in the number of farms would have been greater on this evidence.

- **Larger number of dairy cows**: Because of the constant milk production induced by the milk quota and the increase in productivity in terms of milk yield per cow (see Figure 5.5) induced by the declining term of trade for agriculture the number of dairy cows has fallen over the years. However, relative to the counterfactual the position is less clear. Cow numbers probably would have been lower in the absence of the CMO, especially since quota has inhibited structural change.

- **Increased income from dairy production**: Initially price support increased farm income at the time it was introduced. Over time the benefits of price support will have been capitalised to some degree in the prices of milk quotas and production factors attached to milk production and milk quotas.

- **Regional concentration of production constrained**: The distribution of dairy production in the EU is highly uneven and the majority of production is found in specialist regions. Concentration is occurring within those Member States that enable quota transfer although the rate of regional concentration over the period is not very rapid (as demonstrated in the Case Studies and in OECD 2004). For example, two of the most competitive regions in the UK, where transfer of quota is relatively unrestricted are South West England and Northern Ireland. Figures on changes in net quota between 1994/5 and 2005/06 show that in Northern Ireland net quota increased from 1.36 million tonnes to 1.87 million tonnes, while in the South-West there was a reduction from 3.71 million tonnes to 3.54 million tonnes (RPA, 2007). This issue is considered further in the separate study on quota transfer within Member States.

5.1.10 Milk quota effects

The quota system has limited the production effects of price support during the evaluation period. This makes it difficult to judge the net impact on milk production

relative to plausible counterfactual scenarios. Nonetheless, the quota system has had some distinctive impacts that emerge either from empirical evidence or more theoretical considerations. First of all it is clear that the milk quota was introduced because of a significant oversupply of milk in the European Community created by the milk market price support.

While quota levels have been cut and subsequently increased over the period, it has proved an effective means of constraining output and preventing further escalation of production occurring prior to 1984. This will have had environmental consequences.

The quota has been binding at least in a majority of Member States throughout the period, as reflected in the fairly steady level of output. However, this appears to mask significant differences between the main production regions.

Quota has been an influence on structural development in the dairy sector, alongside other factors such as increasing output per cow for technological reasons and declining terms of trade. It will have inhibited or even locked expansion on many more competitive farms and altered management priorities – for example, providing an incentive to lower costs in the face of a ceiling on outputs.

The consequences of the quota compared to the counterfactual situation are: First, a lower number of dairy cows in the EU. Second, in countries with tradable milk quotas we have seen some regional concentration and specialisation of milk production more than in countries with non-tradable milk quotas. Third, because of the distribution of milk quota between EU Member States we have seen no cross border adjustment of the overall EU milk sector. A comparison could be made with the EU pig sector where the location of production has changed over time with a shift to countries like the Netherlands and Denmark due to the dynamics of exploiting comparative advantage. Another example is the United States where the location of milk production has changed a lot geographically over the years, moving to lower cost regions such as the South West.

5.1.11 Farm Level Conclusions

In terms of production systems, the dairy sector is more homogeneous than the beef and veal sector. There is a reliance on a limited number of breeds, capable of high yields and widely used technologies. Most production occurs on specialised farms, and the majority of farms are managed on a relatively intensive basis (CEAS *et al* 2000) with stocking densities higher than on beef farms (Chatellier 2003 and 2005).

The uncertainties regarding the precise production and structural effects of the dairy CMO price support mechanisms are considerable. The counterfactual is particularly hard to specify and the price support effects are combined with the operation of the milk quota which results in a complex chain of causality and some difficulties in isolating the price support effects, as noted above.

Whilst it is likely that price support on its own has increased the level of milk production above the counterfactual, production certainly in the more competitive Member States has been constrained by the operation of the quota system. The

separate impact of the two policies is therefore difficult to distinguish. Whereas there has been over supply relative to quota in some Member States, most notably Italy, this would have been less likely to have been the case at a lower or non-existent level of price support. In countries with milk quota tradable between regions we have seen some regional concentration and specialisation of milk production.

It appears reasonable to assume, therefore, that for the EU as a whole production has been at a higher level than it would have been without the CMO in place and that distribution of milk production between Member States, and therefore between regions in the EU, has been affected by the quota system. If quota had been tradable between Member States a greater level of geographic concentration of production would have been likely (the transfer of quota within Member States is not considered at this stage, as this is the subject of an ongoing separate study). Relative price stability has contributed to confidence in the sector and hence both to investment and to the maintenance of production.

5.2 Environmental Impacts

The impacts of CMO price support measures and quota on the dairy sector at the farm level are equally uncertain, especially when we focus on specific practices. The first stage in answering the evaluation question, therefore, is to acknowledge that the relationship between the CMO measures and the environmental outcome is complex and unlikely to be quantified with any degree of confidence

The environmental impacts of price support in combination with the milk quota regime will be related to the higher numbers of dairy cows relative to the counterfactual. However, the potential for negative environmental impacts resulting from this will depend to a significant degree on decisions taken at farm level in regards to management of and investment in the dairy enterprise. Drivers of such decisions will include a range of factors including legislation such as the Nitrates Directive.

5.2.1 Environmental impacts of changes in farm structure due to price support in the dairy sector

Building on the farm level outcomes discussed above, some environmental implications can be identified.

a) Impacts arising from the scale of production

The level of milk production in the EU has been relatively constant since the introduction of quotas in 1984, allowing for the effects of successive enlargements of the EU. Dairy cow numbers, however, have declined throughout the period, albeit at varying rates (see Figure 5.6). Only since 2002 does there seem to be some reduction in the rate of decline and this has not been sustained in several Member States. This has been due to increasing productivity per cow, a trend apparent throughout the OECD, apparently not attributable to the CMO.

On balance, it seems likely that dairy cow numbers are above those that otherwise would occur without the CMO. This will have had a number of environmental effects.

- Higher emissions of greenhouse gases from the cattle themselves and the associated forage requirements. Emissions of methane, one of the principal greenhouse gases, for example, are directly related to cow numbers, although factors such as feeding regimes play a part too. Dairy cows are estimated to produce around 100kg of CH_4 per head per year as a result of enteric fermentation (Vincent 2006). Manure from dairy cattle also contributes to nitrous oxide production, albeit on a smaller scale. Greenhouse gas emissions are discussed in more detail in Chapter 10.
- Increased production of slurry and nutrients, adding to the pressures on the aquatic environment and increasing ammonia emissions.
- Increased feed requirements, resulting in a larger demand for fodder crops.
- A larger area of grass and other forage crops, particularly silage maize, devoted to dairy production. Around twenty per cent of the forage area on specialist dairy farms comprises fodder maize and the proportion is substantially higher in some regions. Since these forage areas are intensively managed on the majority of dairy farms the additional area represents a potential environmental pressure on most specialised dairy farms. One caveat to this statement is that at a lower level of prices and production the farms moving out of milk might be less intensively managed. A smaller milk sector might be even more dominated by intensive producers.

The scale of these effects cannot be estimated with any accuracy because of the uncertainties over the production impact of the CMO.

Concentration of production within larger farms has potential benefits as well as drawbacks in pollution terms. It can result in more pollution risks from livestock wastes in particular where they are concentrated within a smaller area. At the same time, there is the possibility that larger scale operations will be more efficient in managing wastes and other pollution hazards. They may also be more profitable and ready to invest in measures to reduce negative environmental effects. Improved manure and slurry handling may be achieved on larger farms for this reason for example. The case studies do not provide definitive evidence on this although the existence of this trade off is confirmed in the UK in the water pollution statistics. Concurrently, with the progressive implementation of the Nitrates Directive more stringent water pollution standards have been introduced at the same time as farms have got larger and it is not clear which of the two drivers (legislative pressure or investment associated with structural change) is more significant. It may be easier to enforce more stringent water pollution standards where there are a smaller number of larger producers.

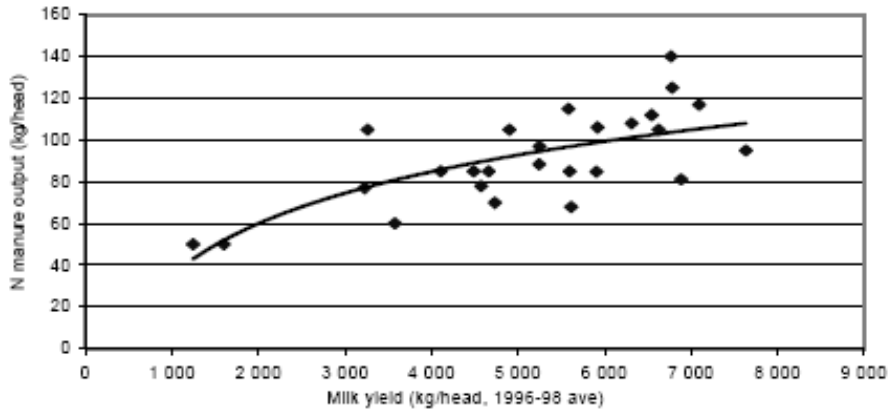
b) Intensity of Production

The literature and case studies suggest a general tendency towards intensification in the sector – as depicted in terms of rising milk yield per hectare in Figure 5.5. At the same time average stocking densities have not intensified over the period –

see Figure 5.6. This is partly because of a tendency for farms to maintain their forage area as milk cow numbers fall. At the same time they may intensify production on the forage area, including by switching from grass to forage maize. Intensity in terms of milk production per hectare will be growing on a proportion of farms with stable or falling stocking rates.

It is not clear that quotas have had the effect of increasing intensity over the long term although this may be the management response on many individual farms. If it is expensive or impossible for a farmer to increase production levels, they may concentrate either on increasing yields per cow on a fixed area or on containing costs or both. Several case studies contained anecdotal evidence on this point.

Higher yielding cows do generate more wastes, increasing environmental pressure. This is shown in Figure 5.10. However, fewer cows are needed for a fixed quantity of milk as their yield rises. Consequently, there is a trade off between the two effects and the total environmental burden from growing milk yields may be broadly unchanged in pollution terms.



Source: OECD Secretariat.

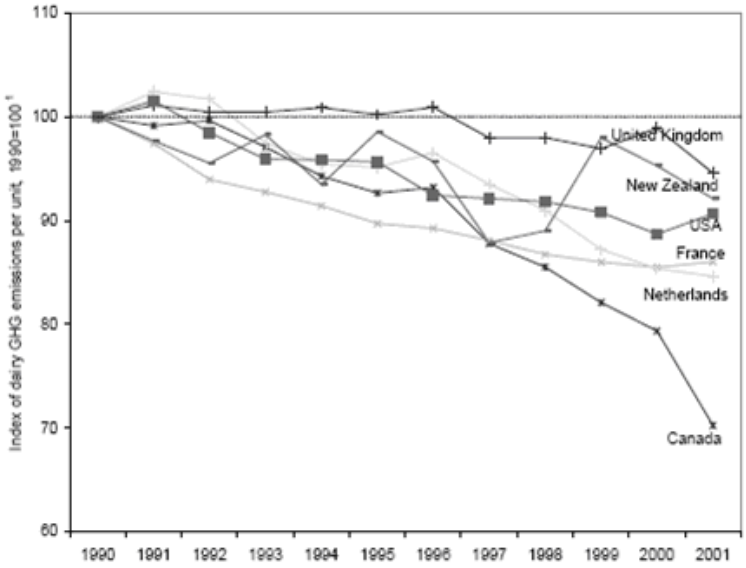
Figure 5.10 Relationship between nitrogen manure output and milk yields per cow

(Source: OECD 2004)

Similarly, intensification per unit area does not equate to increased pollution per unit of milk production. The emissions of greenhouse gasses from dairy cows in a range of OECD countries are shown in Figure 5.11. These are expressed in units of milk produced and show a downward trend over the period in both the EU and other countries.

Nonetheless it is clear that specialist dairy farms use more inorganic fertilisers and biocides than other types of cattle farms, see Figure 5.12. In so far as the CMO has increased the number of dairy cows and holdings above the counterfactual, less land has been available for other production systems. Beef cattle production, which in some circumstances would be an alternative to dairying, is generally a less intensive form of production.

In landscape terms there are benefits from the maintenance of appropriate levels of cattle production since they provide economic rationale for the management of pastoral landscapes, including grassland, hedges and other features. In some cultures there is a preference for retaining cattle in the landscape – rather than in sheds.



Note:
1. Each point represents the level of dairy cow GHG emissions per tonne of milk, with 1990 = 100.
Source: OECD Secretariat.

Figure 5.11 Dairy cow GHG emissions per unit of milk in selected countries 1990-2001

(Source: OECD 2004)

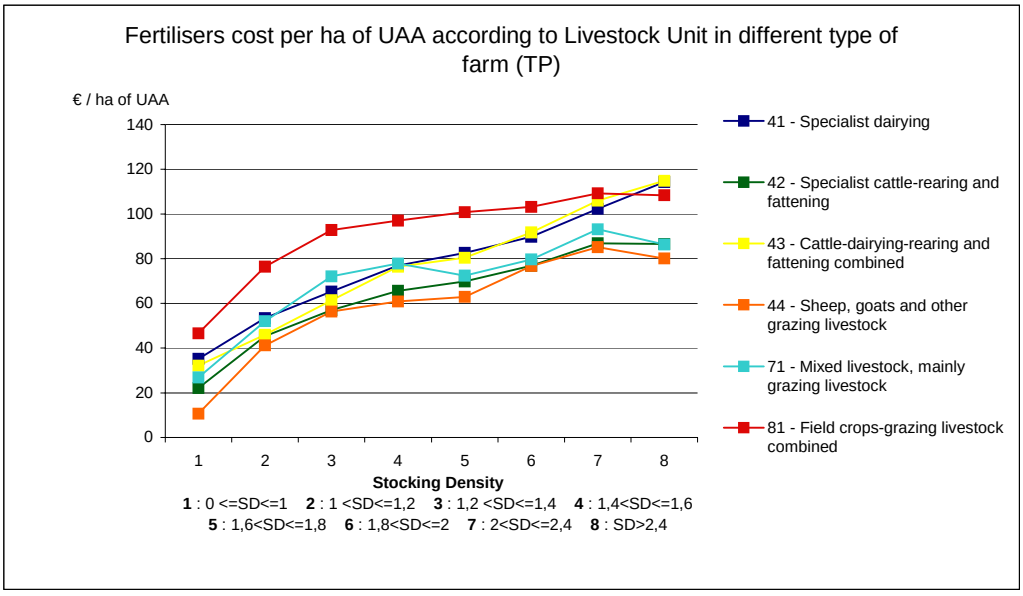


Figure 5.12 Fertilisers cost per ha of UAA for different farm types

(Source FADN)

Intensification, particularly the switch to zero grazing and growing of forage maize can have a negative impact on the landscape, although this is difficult to quantify.

On the other hand, by helping to maintain more marginal dairy farms than would otherwise survive, especially in the LFA, the CMO will have assisted the continued management by dairy cattle of some vulnerable landscapes and semi-natural habitats. Economically marginal farms tend to be disproportionately valuable in environmental terms if they are managed under low intensity systems.

c) Specialisation

This is occurring in the milk sector in EU and other countries on a continuous basis. It is probably driven by several different factors of which the dairy CMO is only one. Given the restricted availability of quota for many farmers it seems likely that specialisation will have been inhibited more than promoted by the operation of the quota system. Farms will consider other forms of expansion as well as increased dairy production.

On this basis, it seems unwise to attribute environmental impacts associated with specialisation to the price support and quota system.

5.2.2 Impacts of price support in the dairy sector by environmental theme

The main environmental impacts of price support in the dairy sector according to environmental theme are summarised below:

Water quality

The ongoing trend in intensification and concentration within the dairy sector coupled with the higher level of EU production as a result of price support will have increased the potential for negative environmental impacts on water quality. In principle, elevated dairy cow numbers can be expected to increase the potential for overstocking and thus have negative impacts on water quality due to diffuse water pollution from nutrient and soil runoff. Increased levels of housing of dairy cattle will also have significantly increased the volumes of manure and slurry concentrated on dairy holdings.

However, as mentioned above, decisions made at farm level in terms of management practices and investment in infrastructure can mitigate and in some cases even reduce the potential for negative impacts of dairy production on water quality in comparison to less intensive production systems where suitable investment is lacking. One example of this appears to be in England and Wales where recorded water pollution incidents linked to the dairy sector have declined over time whilst dairy farms have continued to intensify and concentrate production. The same may not be true for diffuse water pollution.

Water resources

There is little evidence to suggest that increased dairy cow numbers relative to the counterfactual have resulted in significant impacts on water resources as dairy production tends to be located in relatively wet regions such as the Atlantic Arc. It is likely however that the maintenance or increase of the area under intensive forage cropping systems, particularly those which rely on irrigation, could have resulted in negative impacts on water resources.

Biodiversity

Dairy production systems tend to be quite intensively managed and are not usually associated with natural and semi-natural grassland where biodiversity associated with grazing will be greatest, with the possible of exception of certain LFA production systems in some Member States (for example. those on Alpine meadows). The trends towards intensification and concentration of production in the dairy sector have the potential for broadly negative impacts on biodiversity as a result of increased inputs of fertilisers and the application of slurries, the potential for overgrazing and localised poaching or through increased intensity of production of forage crops. Where production systems have moved from predominantly grazed to housed production systems this may also result in negative impacts on grassland biodiversity, as a result of the cessation of beneficial practices associated with traditional grassland management (for example, hay and silage making, grazing).

Landscape

The impact of price support in the dairy sector on the landscape is unlikely to be significant, since it does not appear to be the leading driver of structural change, which does affect scale of production and, therefore, landscape features. An increase in dairy cow numbers relative to the counterfactual is unlikely to have had a very significant impact on the presence of landscape features such as hedgerows or small fields, although high stocking densities associated with dairy production systems may increase pressure on such features although investment in infrastructure such as fencing to protect these features from damage could mitigate these impacts.

Where management practices have resulted in increased housing of dairy cows and production of forage crops such as maize, this may result in negative impacts on landscape relating to the erection of additional sheds or a shift away from a more pastoral landscape. In particular, increased buildings and associated infrastructure, such as milking parlours, silage clamps and slurry stores can significantly change the character of the landscape to one of a more industrial nature.

Soils

Intensive management systems associated with dairy forage crops can have negative implications for soil quality. Higher dairy cow numbers relative to the counterfactual numbers will result in an increased area of land under forage crops such as maize, which can increase the likelihood of soil erosion and nutrient losses depending on climatic conditions, management practices and location.

Where price support has led to a concentration of dairy cows in an area, the impact on soils will largely depend on the management practices implemented at farm level (for example whether feeding areas are sited near watercourses or not, stocking levels, etc.) and the management associated with forage crops such as maize. Where cattle are housed this will minimise the potential for overgrazing and poaching, although

this may be balanced by the increased potential for soil damage resulting from the cultivation of forage crops such as maize.

Air quality and climate change

Greenhouse gas (GHG) emissions from dairy are about double those from other cattle. Dairy cow numbers in the EU have fallen throughout the evaluation period and this would be expected to have resulted in lower emissions of GHG and in particular methane (CH_4) resulting from enteric fermentation. However, the number of dairy cows is higher than would be the case under the counterfactual scenario and this means that it is likely that price support in combination with the milk quota regime has resulted in a higher level of greenhouse gas emissions than would otherwise have been the case. While emissions are closely related to the number of livestock there is not a simple linear relationship because the size and breed of animal, the feeding and management regime, and the way in which wastes are handled and disposed of will affect the level of emissions. Emissions per unit of product, however, may have declined as a result of the increase in the intensity of dairy production systems whereby milk yields per cow are increasing.

In terms of ammonia emissions and air quality, intensive dairy production systems may result in negative impacts where concentration of production has occurred. However, these impacts will depend to a large extent on the management systems in place for manure storage and application.

6 DIRECT PAYMENTS APPLIED BEFORE THE 2003 REFORM

Q2.1: To what extent are the **direct payments** applied before the entering into force of the 2003 CAP reform in coherence with the obligation of integrating the environmental protection requirements into the CAP?

This chapter focuses on the varying effects of direct payments in the beef and veal sector applied before the 2003 reform. The effects of price support in the beef and veal sector, and extensification payments, which both operated alongside direct payment measures, are considered in Chapters 4 and 7 respectively. Partially coupled payments applied after the 2003 reform are considered in Chapter 8.

The chapter is set out as follows: the introduction summarises the different direct payments, outlines the hypotheses that can be formulated about the likely impacts of the different direct payments and briefly describes the methodological approach adopted. Section 6.2 sets out the impacts on farm income, production, farming systems and structures, and farm management (including regional effects) and Section 6.3 describes the related environmental impacts.

The period covered by the analysis is from 1988 until the end of 2004 or 2005, being the dates on which direct payments in the beef and veal sector were superseded by the Single Payment Scheme and optional coupled payments in the EU-15 Member States.

The direct payments considered in this chapter include:

- Suckler cow premium;
- Beef special premium;
- Slaughter premium;
- Deseasonalisation premium; and
- Additional payments

Descriptions of these policy measures including objectives, conditions, expenditure, national/regional ceilings and payment rates are set out in Section 2.2.3. The policy context for the introduction and development of direct payments, namely the gradual shift from market support to direct payments, is also set out in Chapter 2.

The range of the various payments, and the complexity of the different conditions governing their application, can be expected to have had variable effects on different types of farm and in different Member States, leading to a range of farm and environmental impacts.

In this chapter the counterfactual is taken as the situation without direct payments. It could be expected that direct payments have contributed directly to farm income levels and sustained or improved the viability of beef enterprises/farms, particularly smaller units and those in marginal areas. As headage payments, it may be expected that direct payments have influenced stock numbers held on farm although these may have been restricted to some extent by individual farm ceilings on the number of stock eligible for premia (suckler cow premium), headage limits (beef special premium) and

stocking density requirements. Changes in stock numbers consequently are likely to have influenced overall beef production. It may also be expected that direct payments have influenced the uptake and/or continuation of different systems of beef production, for example suckler cow systems (suckler cow premium) and beef fattening systems (special premium, slaughter premium and deseasonalisation premium). Changes in livestock numbers and livestock systems may in turn have influenced the use of particular forage and feeding systems, with producers opting for intensive or extensive approaches.

Consequently it could be expected that there may have been a range of environmental impacts including positive impacts such as the maintenance of grazing on valuable semi-natural habitats, with biodiversity benefits, and a range of pressures relating to soils, water, landscape, biodiversity, climate change and air quality.

The ***main hypotheses*** for this evaluation question are listed below. Each hypothesis is expressed in relation to the counterfactual:

- Income from beef production is expected to have been maintained or improved;
- A larger number of cattle and higher level of production is expected to have occurred;
- A decreased stocking density is expected to have occurred in certain areas partly because of the conditions attached to the premia;
- Suckler cow production is expected to have been maintained in marginal farming areas;
- The extent of intensive beef finishing systems is expected to have increased;
- Intensive and extensive grassland management is expected to have been broadly maintained;
- A high level of fodder production is expected to have been maintained; and
- A range of consequent positive and negative environmental impacts are expected to have arisen.

The methodological approach adopted in answering this evaluation question is summarised below:

The ***analysis of farm impacts*** is divided into four sections. The farm income analysis firstly seeks to verify the hypothesis that farm income from beef production has been maintained or increased through direct payments. Then the farm production analysis explores the hypothesis that the income received through direct (headage) payments has incentivised farmers to keep a larger number of cattle, and sustained beef production at a higher level, than otherwise. This analysis also explores the extent to which direct payments contributed to a decrease in stocking density. The farming system analysis then seeks to verify the hypothesis that the viability of certain beef production systems has been improved through direct payment measures. In particular, we look at the hypothesis that suckler cow systems have been sustained in marginal areas and that intensive beef finishing systems have increased elsewhere. Finally, an analysis of impacts on farm management considers the hypotheses relating to land use and input use on farms in receipt of direct payments.

Data sources for the above analysis include, in particular, FADN data by farm type and region and Eurostat data on livestock numbers. Evidence from the case studies is

also used, in the form of findings from national literature, data sources and interviews. Lastly evidence from a comprehensive review of relevant literature is included.

The second stage of the analysis assesses the ***environmental impacts*** of the farming changes resulting from the different measures. This considers specific impacts of the farming changes on key environmental receptors including water quality, water resources, biodiversity, landscape, soils, and air quality and climate change. Empirical data from the literature and the case studies are particularly important here to help refine our impact assessment

Finally, conclusions are drawn on the extent to which direct payments are in coherence with and contribute to the obligation of integrating the environmental protection requirements at both European and Member State level.

In undertaking the assessment of impacts, it is acknowledged that disaggregating the income and other effects of direct payments from contextual policy measures, price movements and other drivers is difficult. Alongside direct payments, other EU policy measures relevant to the beef sector include: a reduction in price support; milk CMO measures; payments connected with BSE and FMD outbreaks, the evolution of agri-environment and LFA compensatory payments; and the introduction and implementation of the Nitrates and Water Framework Directives. Other contextual elements include: market and technological developments, the impacts of the BSE and FMD outbreaks; and changes in consumer preferences. Due caution is needed in attributing specific outcomes to direct payments, as will be noted in the text.

The effects of the **Dairy premium** are considered in Chapter 8, which addresses coupled payments after the 2003 reform, as this measure was implemented from 2004.

A causal diagram presenting policy measures, contextual elements, and some potential environmental impacts to be examined is shown in Figure 6.1.

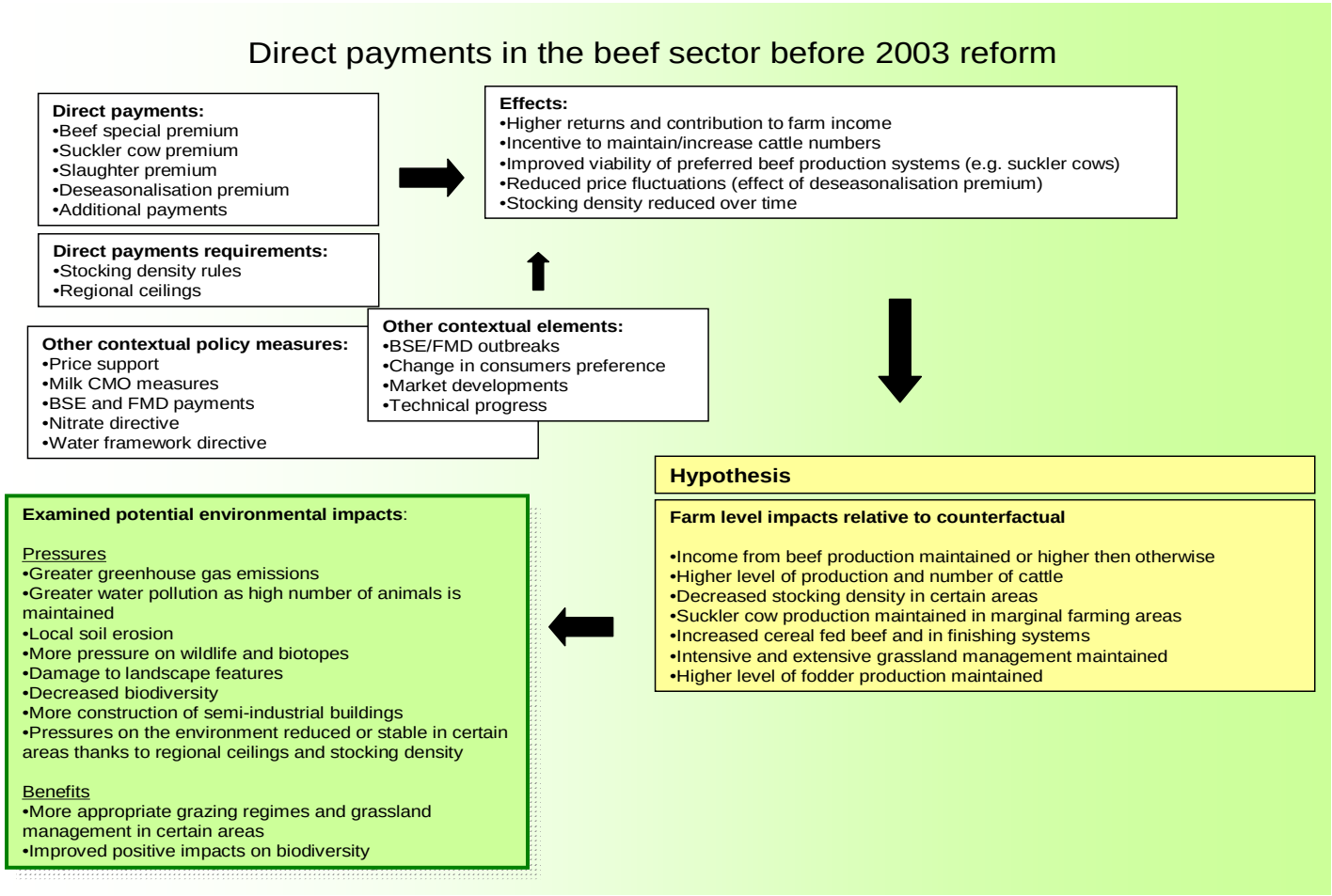


Figure 6.1 Diagram showing direct payments in the beef sector, other contextual policy measures, hypothesis and potential environmental impacts.

6.1 Analysis of farm level impacts of direct payments

6.1.1 Beef direct payments and farm viability

The first hypothesis concerns the extent to which **direct payments have contributed to the maintenance or improvement of farm incomes** and maintained or improved farm viability.

According to FADN data, gross farm incomes on the different types of farm with beef cattle have increased gradually over the evaluation period, see Figure 6.2. However growth has been modest in the most important category of beef farms 'specialist cattle rearing and fattening farms', which have the highest proportion of suckler cows (52 per cent of total suckler cows in 2004), male cattle over 2 years old (38 per cent) and male cattle between 1 and 2 years old (34 per cent) and calves for fattening (56 per cent) of any farm type. Farms in this category have the lowest average of the different categories of beef farm considered. 'Field crops-grazing livestock combined farms' have experienced the greatest growth in gross farm income.

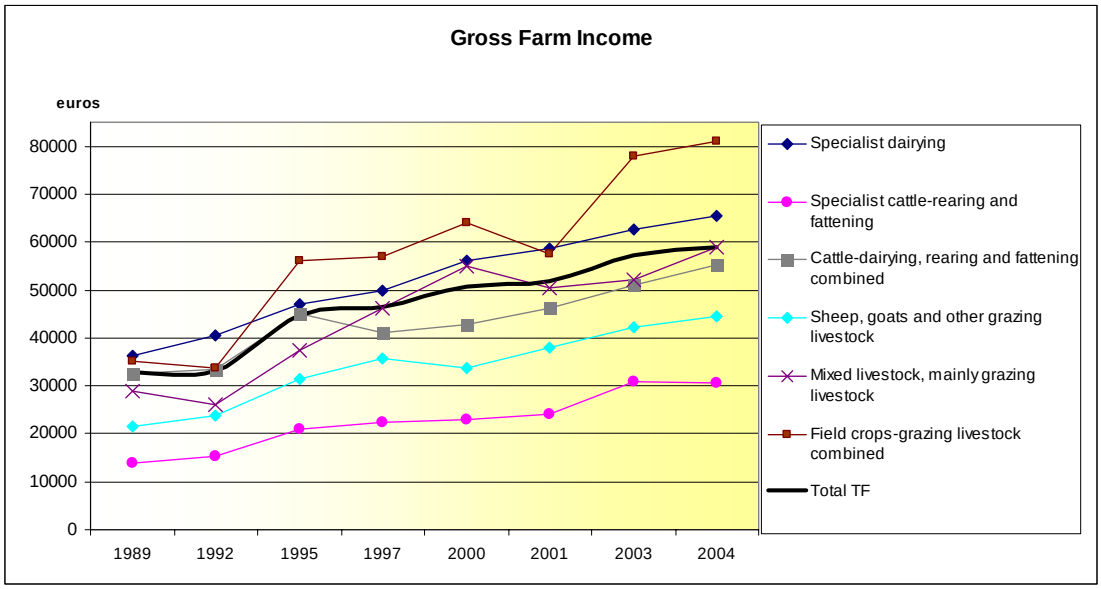


Figure 6.2 Gross Farm Income[40] (€) by farm type, EU12/15, average per farm

(Source: FADN)

During the evaluation period, there has been a significant increase in 'cattle subsidies' (as defined by FADN) received by different types of farm with beef cattle, as direct payments have gradually replaced price support, see Figure 6.3. These cattle payments include the direct payments covered by this chapter - suckler cow premium, beef special premium, slaughter premium, deseasonalisation premium and additional payment – as well as the extensification payments and national payments. The growing value of beef cattle subsidies received annually by the average 'specialist

[40] Gross Farm Income is defined in FADN as the Output - Intermediate consumption + Balance current subsidies & Taxes.

cattle rearing and fattening farm' and 'sheep, goats and other grazing livestock farm' is particularly noticeable.

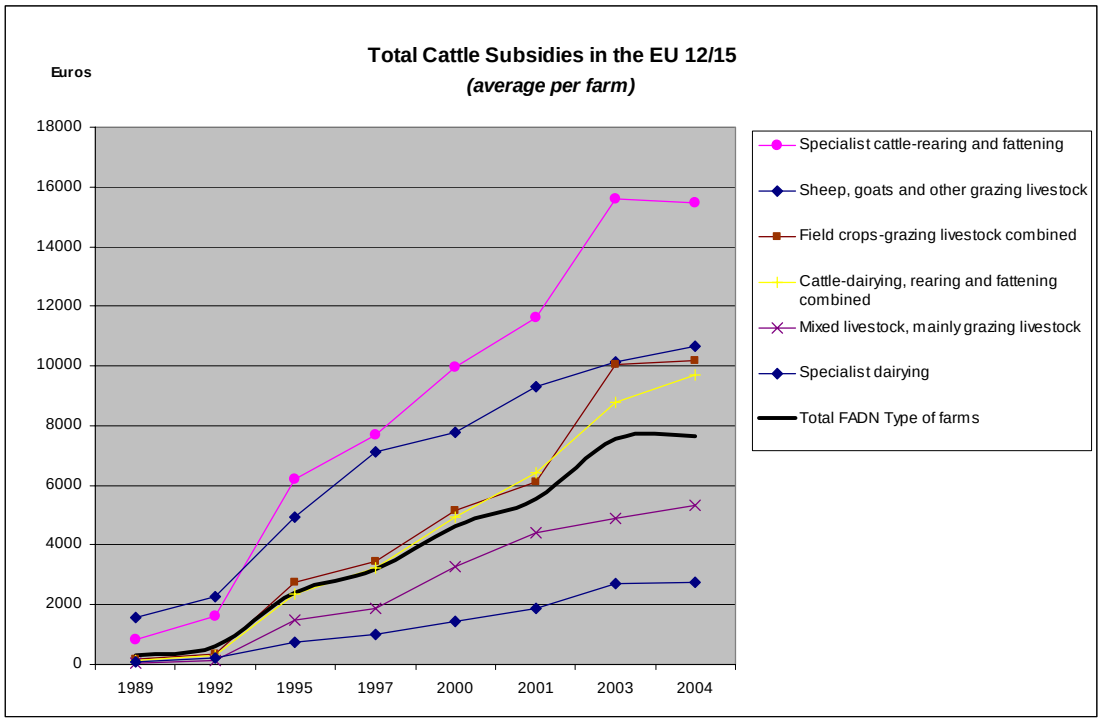


Figure 6.3 Cattle subsidies[41] (€) by farm type, EU average per farm

(Source: FADN)

The net effect is an increase in cattle subsidies (including the direct payments considered in this chapter) as a proportion of gross farm income on these farms, particularly between 1992 and 2003, see Figure 6.3. The increase in the proportion of gross farm income made up by these payments is particularly noticeable for 'specialist cattle rearing and fattening farms' and to a lesser extent for 'sheep, goats and other grazing livestock farms'. In 2004, cattle subsidies accounted for 50 per cent of gross farm income for the former and 24 per cent for the latter.

The importance of cattle subsidies to farm viability is emphasised when one looks at a different farm income measure, farm net value added (Figure 6.5). This takes account of depreciation to give a more accurate measure of remuneration to the fixed factors of production. The level of dependence on direct payments of 'specialist cattle rearing and fattening farms' is particularly striking. Direct payments accounted for 70 per cent of farm net value added on these farms in 2004.

The evidence, based on FADN data aggregated at an EU level, including increasing farm incomes and an increasing proportion of farm income and farm net value added coming from cattle subsidies suggests that direct payments have contributed significantly to farm incomes. Most categories of farms with beef cattle have become increasingly dependent on direct payments and this is most true of specialist cattle

[41] All farm subsidies (including national subsidies) received for cattle other than dairy cows in production.

farms. In turn, direct payments have become a significant influence on certain types of farm in terms of farm level decision-making, the nature of this influence in terms of the level and intensity of production and management practices is explored in the following sub-sections.

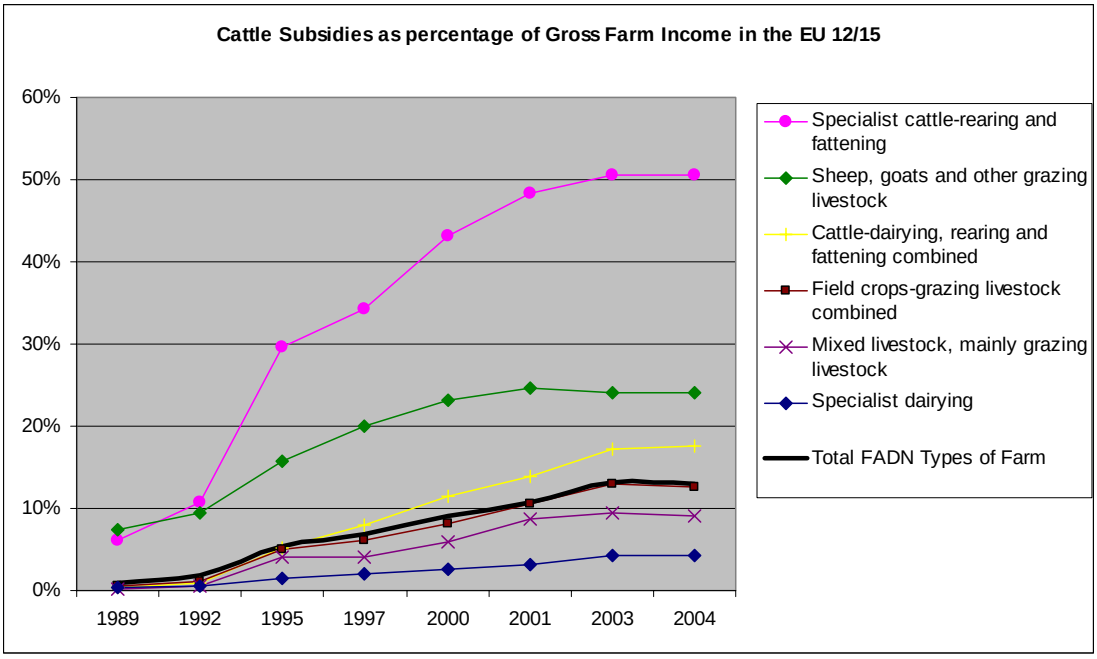


Figure 6.4 Cattle subsidies as percentage of Gross Farm Income by farm type, EU 12/15 average per farm

(Source: FADN)

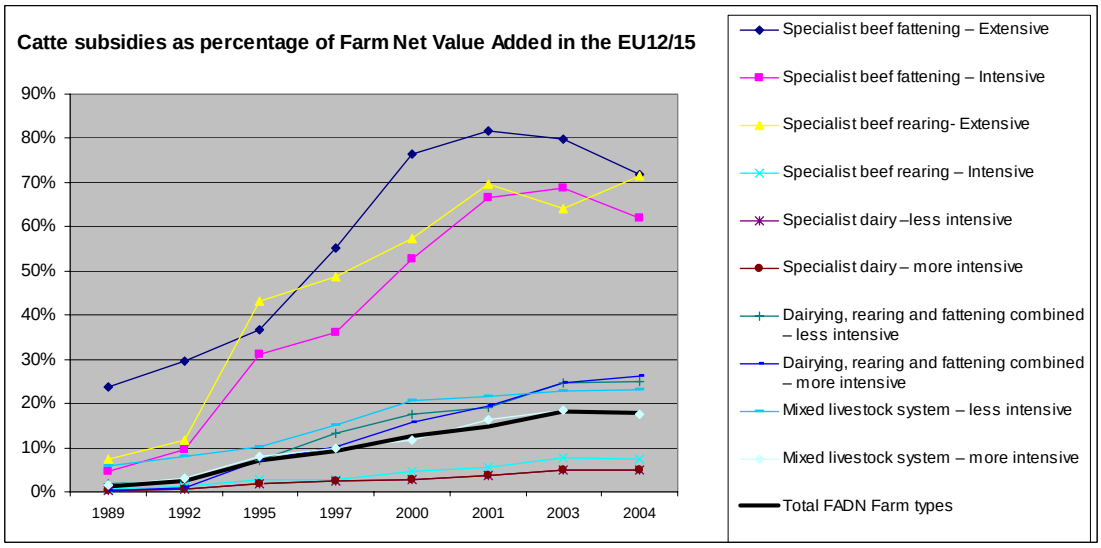


Figure 6.5 Cattle subsidies as percentage of Farm Net Value Added by farm type, EU 12/15 average per farm

(Source: FADN)

Case study evidence

These conclusions are not surprising given the increase in direct payments and the relatively static market prices over the period and they are supported by the country case studies. In Ireland, for example, towards the end of the period, direct payments comprised on average around 70 per cent of farm net value added on extensive rearing and fattening farms, see Figure 6.6. In the UK, there is evidence to suggest a 'culture of dependency' in the beef sector for some farmers, with subsidies making up a very significant proportion of beef farmers' incomes particularly during the BSE and then FMD outbreaks. Figure 6.6 shows cattle subsidies reaching a peak of 180 per cent of farm net value added in UK North region in 2000. In France and Spain too, the suckler cow premium contributed to maintaining the viability of the sector especially during periods of falling prices. To some extent then, direct payments grew to a scale where they incentivised some groups of farmers to focus on maximising their income from subsidies as opposed to the market. The case studies also indicate that the existence and continuation of beef direct payments gave many farmers a degree of assurance to enable them to plan for the future.

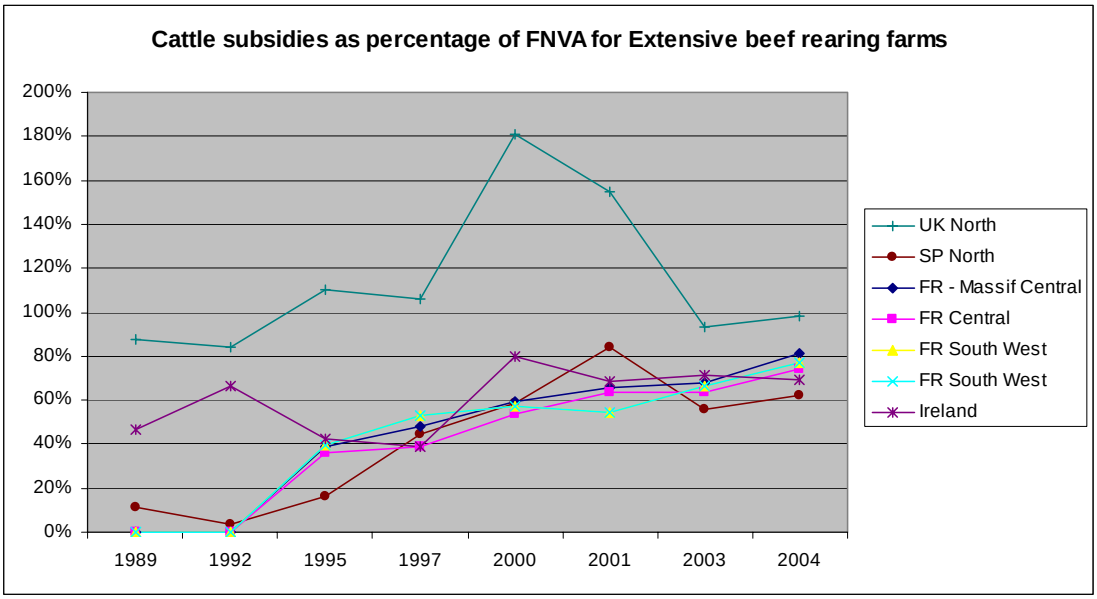


Figure 6.6 Cattle subsidies as percentage of Farm Net Value Added by farm type, EU12/15 average per farm

(Source: FADN)

6.1.2 Direct payments, number of cattle and level of production

The second hypothesis is that direct payments contributed to a **larger number of cattle and higher level of production** than otherwise would have occurred.

Trends in total cattle numbers in the EU over the evaluation period are shown in Figure 2.4. This shows a general decrease in the total number of cattle, albeit interspersed by increases at the time of successive enlargements. The total number of suckler cows has however increased over the period.

Changes in the total and average numbers of cattle (excluding dairy cows and measured in livestock units) on different types of farms are shown in Figure 6.7 and Figure 6.8. Figure 6.7 shows that there has been a significant increase in cattle (LU) on extensive specialist beef rearing farms over the evaluation period. Figure 6.8 shows that the average number of cattle per farm has increased for all categories. Intensive farms have the largest herd sizes.

Figure 6.9 illustrates the positive correlation at farm level, using EU averages, between increasing beef direct payments and increasing beef cattle numbers over the period. It should be noted that the percentage increase in average beef cattle subsidies is significantly greater than the percentage increase in average beef cattle numbers, reflecting both increasing payment rates over the period and perhaps the range of other factors influencing cattle numbers and production, including reducing price support.

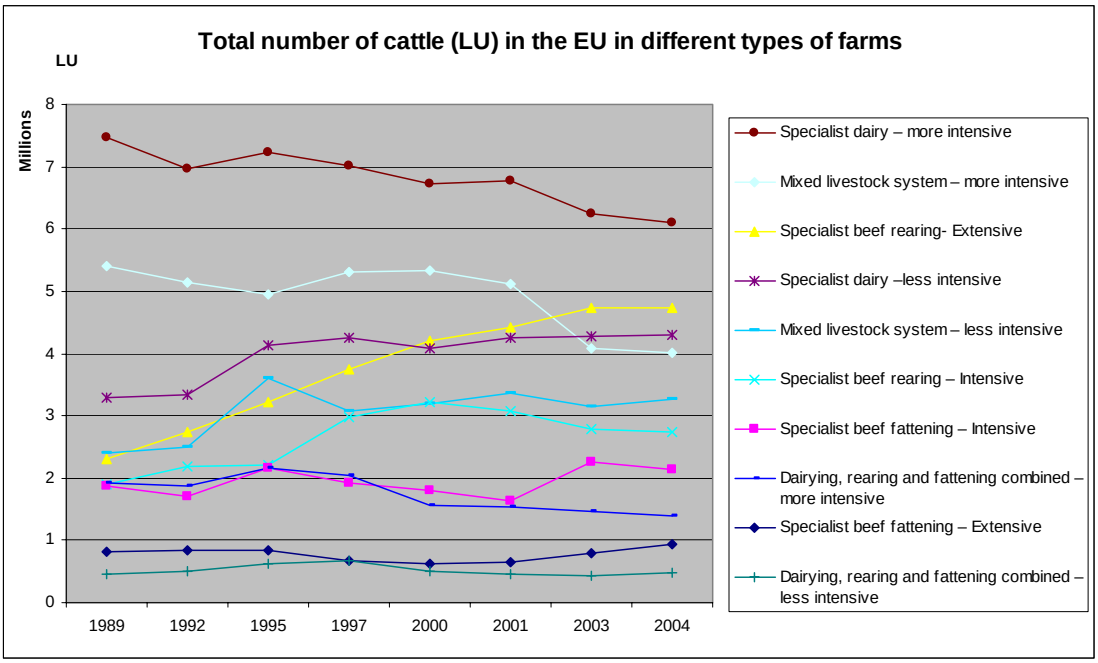


Figure 6.7 Total number of cattle (excluding dairy cows) (LU) in EU for different categories of farm

(Source: FADN)

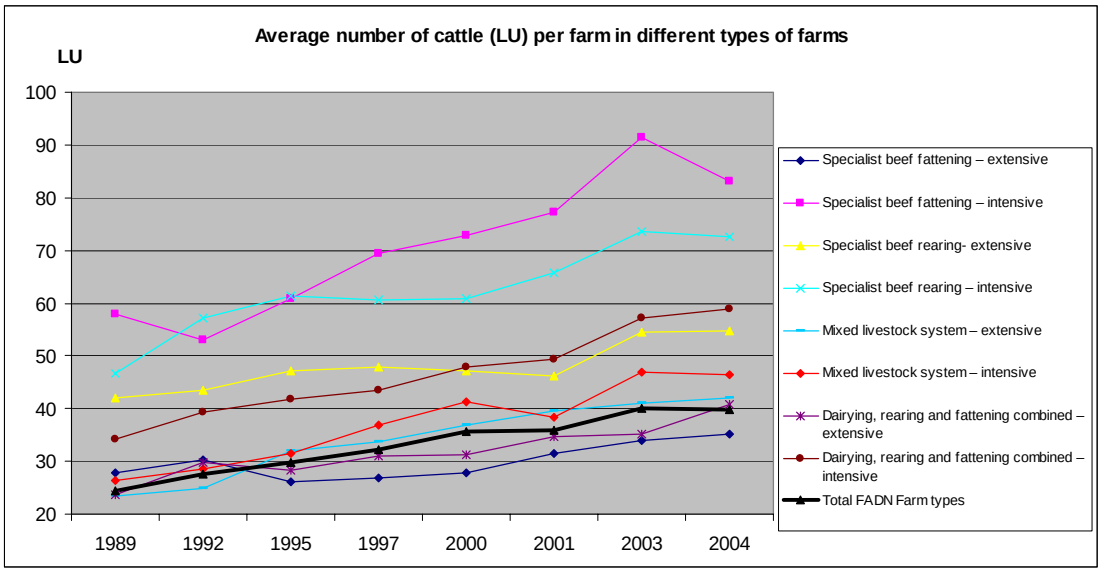


Figure 6.8 Number of cattle (LU, excluding dairy cows), average per farm for different categories of farms

(Source: FADN)

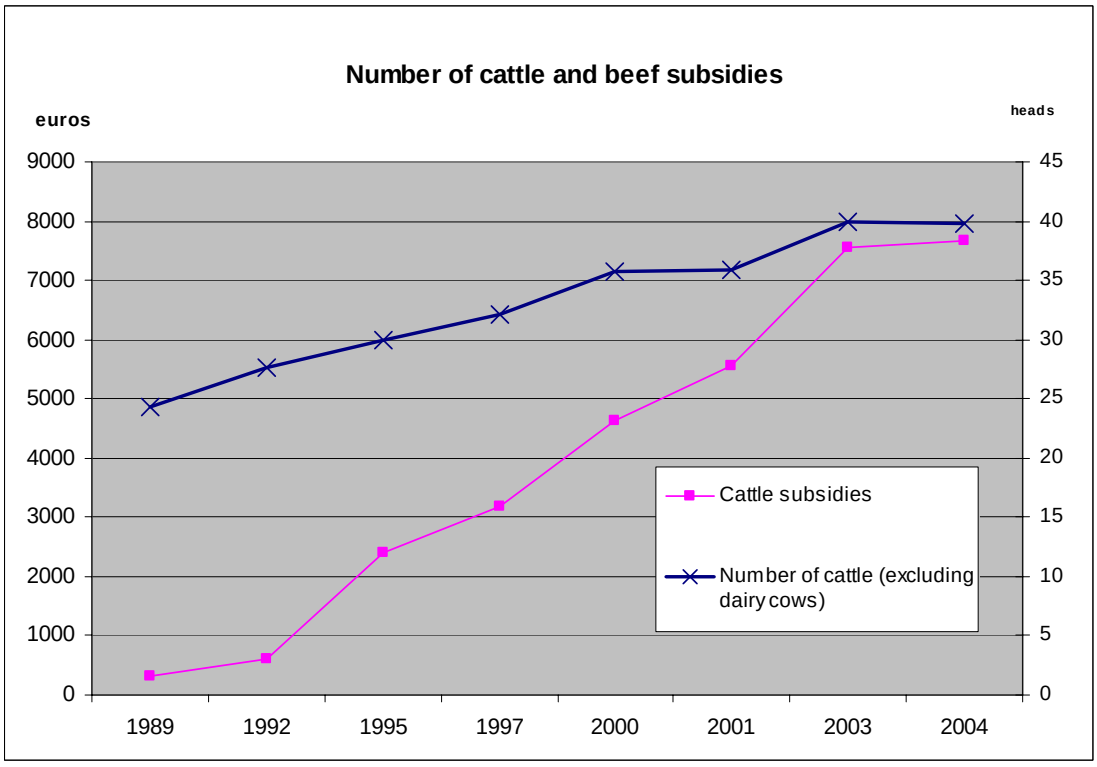


Figure 6.9 Number of cattle (LU, excluding dairy cows) and cattle subsidies, EU average per farm

(Source: FADN)

Trends in suckler cow numbers and suckler cows premiums

Turning to specific types of cattle, trends in suckler cow numbers and suckler cow premium expenditure are shown in Figure 6.10 and Figure 6.11.

There is a positive correlation between suckler cow premium expenditure and suckler cow numbers in most Member States over the evaluation period, suggesting that the suckler cow premium has been an important influence on the growth in suckler cow numbers in the EU as a whole. This influence occurred as a result of the suckler cow premium being a headage payment (with farmers expanding suckler cow numbers to increase subsidy income over the period) but also as a result of the increasing value of the suckler cow premium over the period.

The distribution of suckler cows across the EU-15 in 1995 and again in 2004 is shown in the maps in Figure 6.12. There has been an overall increase of 26 per cent in suckler cow numbers in 10 key production regions. The largest single increase was in Spain North (+178 per cent) followed by Italy Other (+93 per cent) and Ireland (+80 per cent). The greatest increase was on extensive beef rearing farms (+29 per cent) as opposed to extensive beef fattening farms (+22 per cent).

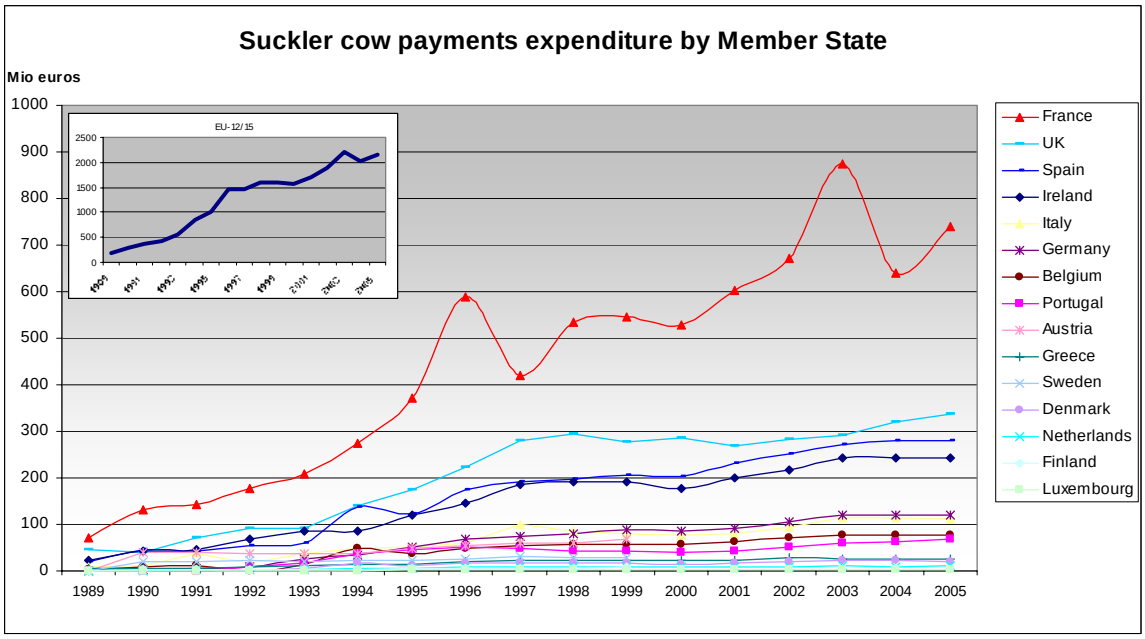


Figure 6.10 Suckler cow premium expenditure by Member State[42]

(Source: DG Agri Expenditure Database)

[42] In the legend, Member States are sorted by total suckler cow premium expenditure over the period.

The case studies support these trends and the trends in suckler cow numbers for each of the case study countries are shown in Figure 6.11.

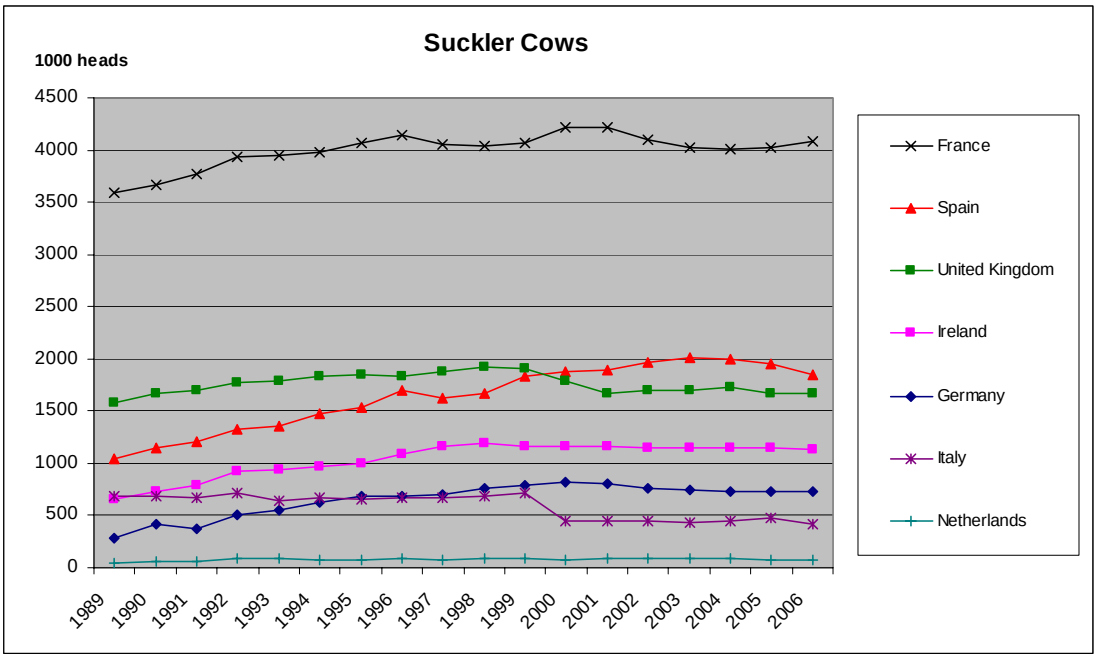


Figure 6.11 Number of suckler cows in case study countries

(Source Eurostat)

France is dominant in the EU with regard to the suckler cow sector and has experienced a steady increase in suckler cow premium expenditure from €72 million in 1989 to €740 million in 2005, and an increase in suckler cow numbers from 3.6 million to 4 million over the same period. Evidence from the case study suggests that while suckler cow numbers have increased in the Auvergne, the suckler cow premium does not appear to have been a significant influence on farmer decision-making in this regard.

In Ireland, case study evidence suggests that the suckler cow premium has contributed significantly to a sharp increase in production. Suckler cow premium expenditure increased from around €24 million in 1989 to a peak of €241 million in 2005. Over the same period suckler cow numbers doubled from around 0.6 million to 1.2 million.

In Spain, there were similar increases. Suckler cow premium expenditure increased from €21 million to €281 million over the period 1989 to 2005. Suckler cow numbers doubled from around 1 million to 2 million over the same period.

In the UK, suckler cow premium expenditure increased from €46 million in 1989 to €319 million in 2004. There was a steady increase in total suckler cow numbers over this period, albeit peaking in 1998 before falling back to a low point of around 1.7 million cows in 2001 following the Foot And Mouth Disease outbreak.

In Italy, suckler cow premium expenditure increased gradually over the evaluation period. However, while suckler cow numbers increased up to 1999, there was then a

significant decrease probably linked to a combination of ongoing restructuring, the BSE outbreaks and the introduction of the slaughter premium with the Agenda 2000 reforms. This enabled some farmers to reduce stocking densities and thereby secure greater access to suckler cow premium and beef special premium.

During the period to 1999-2000, there were several other influences which contributed to the overall increase in suckler cow numbers, aside from the suckler cow premium. The introduction of milk quotas encouraged some dairy farmers to switch to suckler cow production since opportunities in milk production were limited and some beef farmers started producing their own calves. In the UK, improved prices for finished cattle in the late 1980s helped. In France, there was strong demand from Italy for calves for fattening. In the Netherlands, less favourable conditions for intensive bull beef production were also a driver (although the policy response to the suckler cow premium, in terms of the increasing number of farms with suckler cows and increasing number of suckler cows, appears to have been particularly strong in the early part of the evaluation period). In several Member States less intensive suckler cow production was also supported by the extensification premium and in some cases agri-environment and LFA scheme payments, as evidenced by a number of the case studies (for example, France, Ireland and the UK).

It should be noted that the introduction of ceilings on suckler cow premium following the 1992 reforms appears to have had variable impact on suckler cow numbers. In Ireland, rights were relatively cheap and easy to acquire and did not restrict expansion. In Germany too, the new länder (in the East) received a high proportion of suckler cow premium allocation and experienced a rapid increase in suckler cow farms. In France, farmers were restricted to a degree by the allocation rules, with suckler cow premium quota being allocated at department level. In Spain, there is evidence for a considerable amount of suckler cow production operating without subsidy. In the UK, producers increased suckler cow numbers in the qualifying year to increase their individual allocations.

In summary, the suckler cow premium has been a significant influence in the maintenance and growth in the number of suckler cows in all Member States, although other factors have contributed to this trend. The premium appears to have been a significant factor in influencing many farms affected by BSE and FMD and the market fluctuations arising from the outbreaks to remain in beef production. The crises did however result in a decline in output in some Member States, for example in the UK producers were confronted by a lengthy ban on beef exports. National and individual farm ceilings on the number of stock eligible for suckler cow premium appear to have had limited and variable impact on the total number of cows kept.

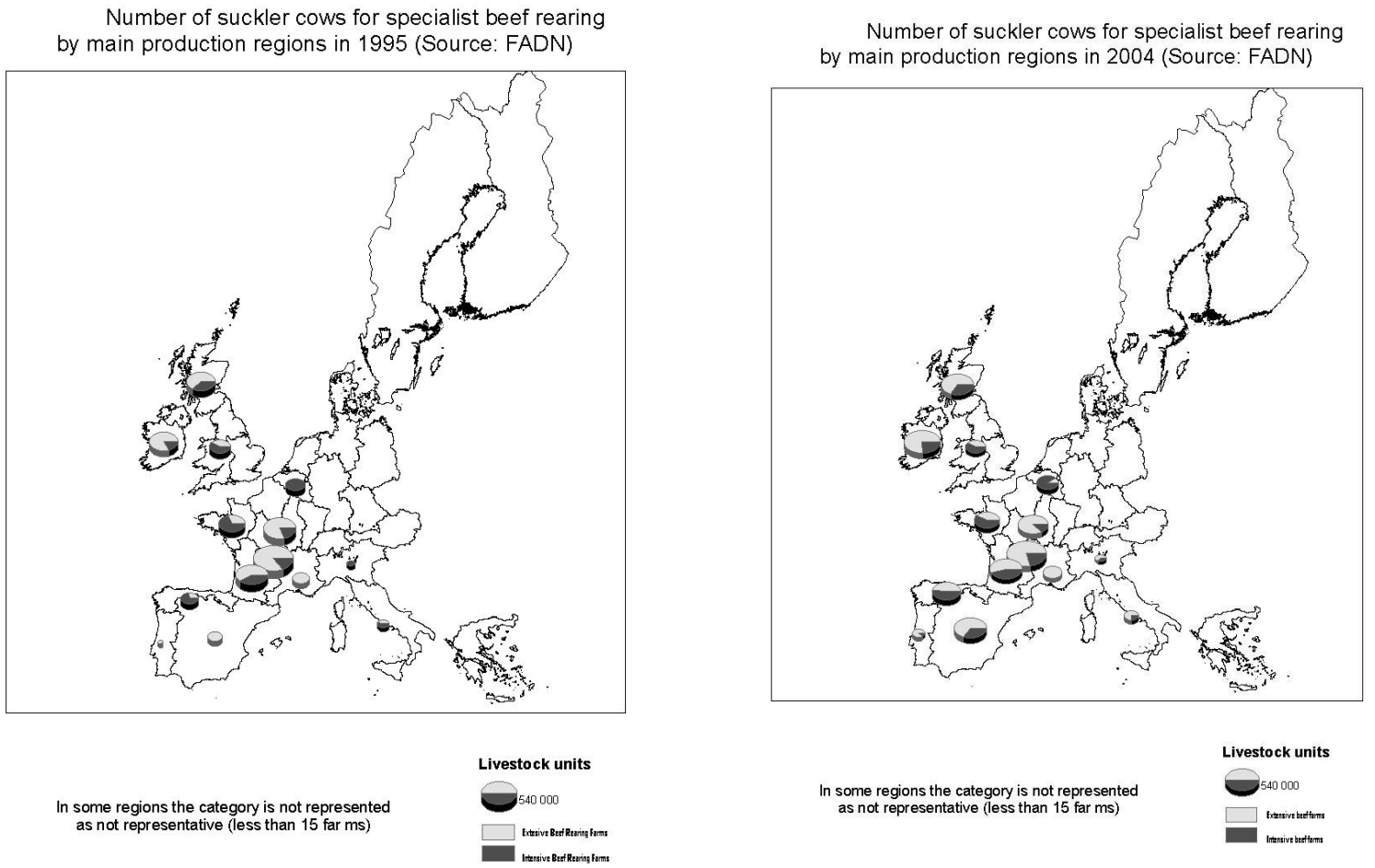


Figure 6.12 Number of suckler cows for specialist beef rearing and fattening in 1995 and 2004 (Source FADN)

Impacts of other direct payments on the beef cattle population

The correlation between the other direct payments - beef special premium, slaughter premium and deseasonalisation premium – and cattle numbers is much less clear cut than it is for the suckler cow premium.

Trends in ***beef special premium*** expenditure are shown in Figure 6.13, this shows rapidly increasing expenditure over the period, building up in response to lower institutional prices. Trends in the number of 1-2 year old male cattle, those most likely to have benefited from the beef special premium, are shown in Figure 6.15. While there was no obvious trend in the total number of eligible cattle, although total numbers fell towards the end of the evaluation period, there has been a steady increase in the average number of eligible cattle per farm. This is likely to reflect changes in farming structures as much as anything (fewer holdings, increasing herd sizes etc). However, beef special premium payments may have been a contributory factor.

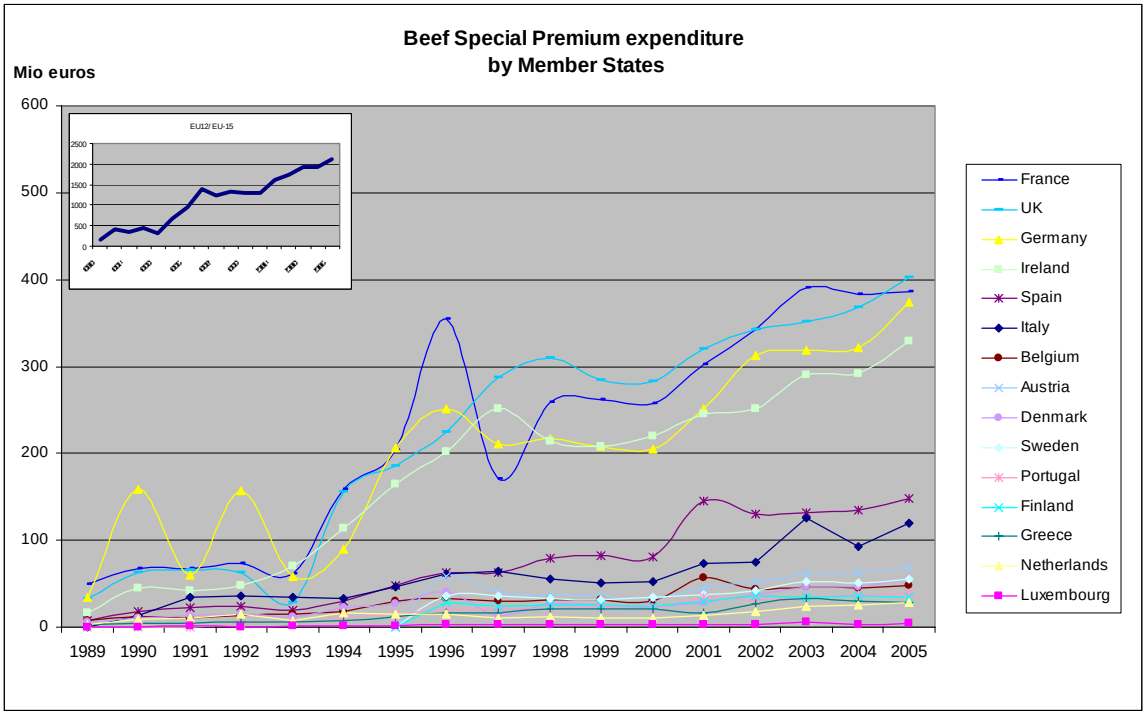


Figure 6.13 Beef special premium expenditure by Member State[43]

(Source: DG Agri Expenditure Database)

Evidence from the case studies confirms that with increasing expenditure on the beef special premium, the number of eligible 1-2 year old male cattle was maintained or declined gradually, see Figure 6.14 and Figure 6.15. The decline may be attributed partly to the falling size of the dairy herd, the impact of beef prices in real terms and the FMD and BSE crises. The premium did, however, encourage some producers to keep and finish more cattle than before. In Germany, a sudden increase occurred at the time of re-unification.

[43] In the legend, Member States are sorted by total beef special premium expenditure over the period.

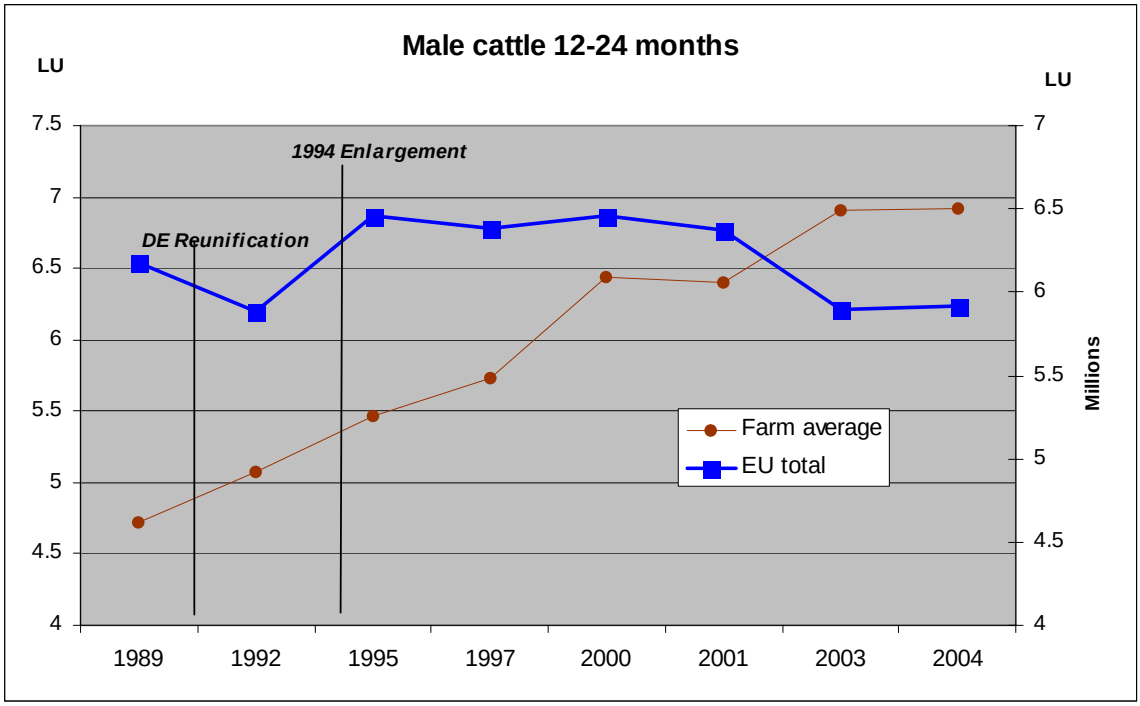


Figure 6.14 Number of 1-2 year old male cattle for the EU-12/15, farm average

(Source FADN)

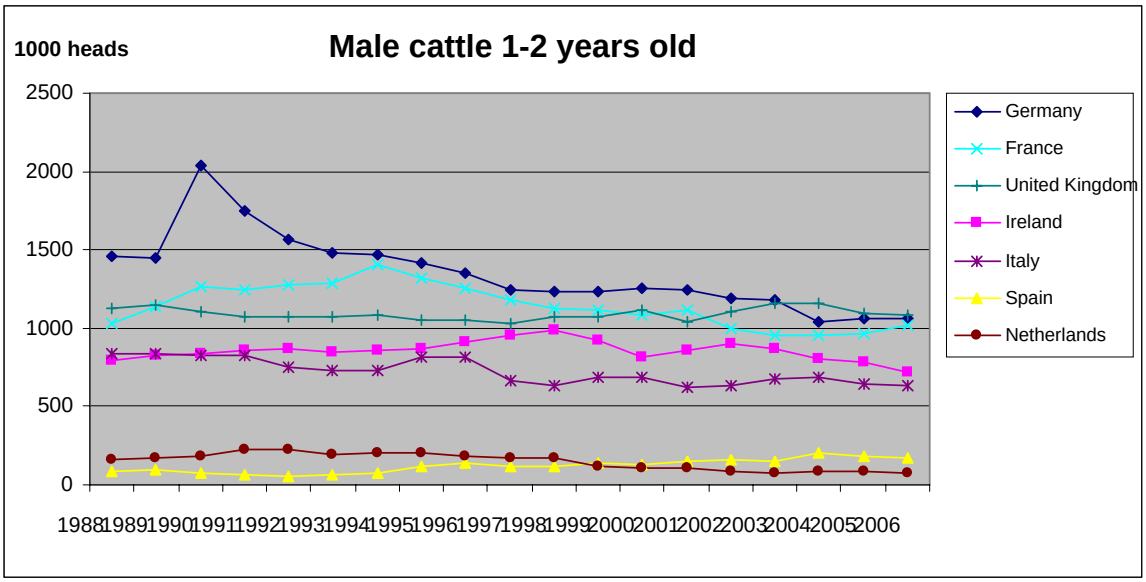


Figure 6.15 Number of 1-2 year old male cattle in case study countries

(Source Eurostat)

In Ireland and the UK, some dairy farmers and more intensive beef producers decided to keep and fatten more calves in order to claim one or both premium payments. In France and Spain too, the beef special premium led some suckler-cow holdings to keep male calves longer than otherwise, in order to claim the payment, in some cases fattening calves for sale and in other cases (where there was insufficient forage, experience or commercial contacts) simply selling them for finishing at a later age

than previously. Elsewhere, however, the beef special premium has contributed more to maintaining than increasing production.

In Germany, including Bavaria, the beef special premium was one of the most important premiums. Initially, it was not widely taken up due to the stocking density restrictions, although many farmers applied as small producers, as this avoided the need to prove their forage area and they could also apply for arable area aid payments and maize premiums. Later, after the Agenda 2000 reforms, more farmers leased grassland to enable them to claim beef special premium. The beef special premium also enabled some older farmers to restructure their systems, away from dairying or towards part-time farming. Overall, though, the beef special premium was not sufficient to counter a fall in production, with other factors such as the general decline in prices and decreased demand being particularly important.

In Italy, prior to Agenda 2000, the case study suggests that the beef special premium did not amount to sufficient expenditure to make a large impact on an already decreasing production trend. The number of calves imported for fattening declined over the 1990s and this continued after 2000. That said, after the Agenda 2000 reforms, more farmers adjusted production (lowered stocking density) in order to be able to claim the beef special premium and expenditure on this premium grew accordingly.

In the Netherlands, the beef special premium had a significant adverse impact on bull and steer beef production. This was due to the incompatibility between the intensive systems operated by many beef farms in the Netherlands and the scheme's maximum stocking density rules. However poor beef prices also contributed. Many farmers switched to rose veal production (without subsidies) and others to suckler cow production. A significant proportion of production continued without the benefit of any beef special premium. In some cases, at least in the UK, farmers did not claim beef special premium on eligible livestock due to the paperwork requirements (Entec 1997b).

The individual headage limit of 90 animals appears to have had little significant impact. In Spain, there is evidence that many large, intensive holdings simply divided their stock into more than one registered herd. In the UK, only 4 per cent of a sample indicated that the headage limit had affected the number of animals retained on the farm (Entec, 1997b). Similarly the impact of the premium being payable only on male cattle appears to have had limited impact, with the net difference between male and female cattle gradually being reduced over time as the premium became capitalised into store prices for male animals.

In terms of the ***slaughter premium***, there was a steep increase in expenditure on this measure from €0.5 million in 2001 to €1.7 million in 2004 following its introduction as part of the Agenda 2000 reforms. In most Member States, this growth occurred between 2001 and 2003 since when it has levelled off, see Figure 6.16.

This significant expenditure was primarily intended to compensate producers for reductions in intervention price. During 2001-2003, prices were weak in many Member States due to the impact of FMD and the slaughter premium will have provided a buffer against the market. Slaughtering has been falling steadily in the EU-

15 and there is no sign of increased activity since 2001, see Figure 6.17. This conclusion is supported by the case studies.

In Ireland, the slaughter premium: encouraged some dairy farmers to keep on and finish cattle for beef production; led to the sale of some unfinished animals; and encouraged the sale of cattle directly to the abattoir as opposed to the market.

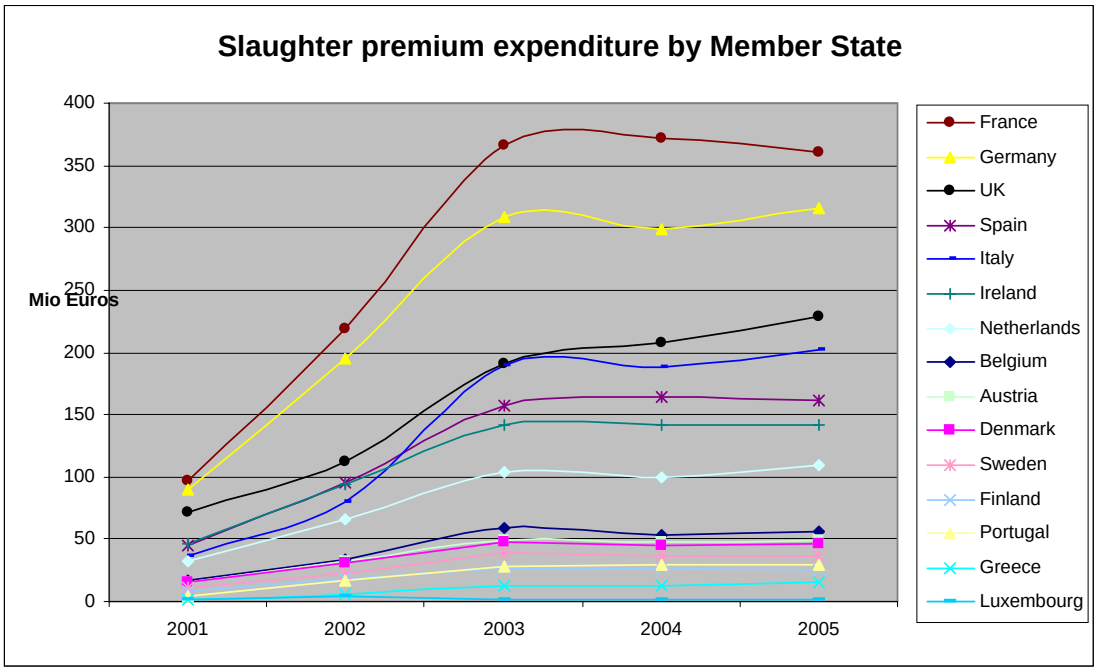


Figure 6.16 Slaughter premium expenditure in the EU-15 Member States[44]

(Source: DG Agri Expenditure Database)

In Italy, the slaughter premium mainly supported existing production, particularly calves from the intensive veal sector. However it also enabled some beef producers to restructure to gain access to other premiums. Initially the slaughter premium was underutilised due to a delay in setting up a bovine registration system (necessary to receive the premium) but this was eventually overcome.

In Spain, the UK and the Netherlands too, the slaughter premium contributed to farm incomes and maintaining production but had little influence in terms of livestock systems or farm management practices.

The ***deseasonalisation premium*** appears to have limited impact in terms of cattle numbers being kept or finished, and hence overall beef production. Expenditure on the deaseasonalisation premium was relatively modest compared to other direct payments and fluctuated between €23 million and €45 million over the period 1993 to 2004. The measure was only implemented in Ireland, UK, Germany and Sweden with Ireland and the UK being the main users. According to the case studies, its main effect, as intended, was to flatten the seasonal beef production profile in the countries in which it operated. More extensive, grass based farms were the main beneficiaries.

[44] In the legend, Member States are sorted by total slaughter premium expenditure over the period.

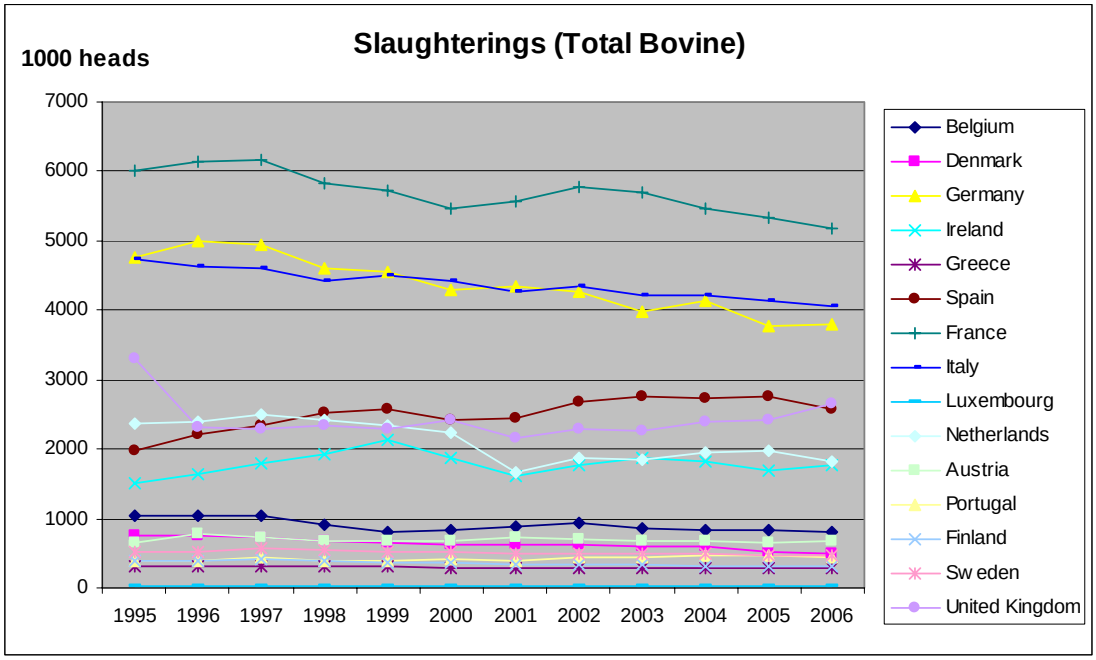


Figure 6.17 Cattle Slaughterings in selected EU Member States

(Source: Eurostat)

It is difficult to gauge the impact of ***additional payments*** on cattle numbers and beef production due to lack of detailed data. However, based on the case studies, they appear to have had limited impacts other than to work in tandem with the main premiums which they complemented. For example, in Ireland additional payments were made to the slaughter premium for beef-breed heifers, supporting suckler cow producers, whereas in Italy they were mainly applied as a supplement to the beef special premium, supporting beef fattening farms.

6.1.3 Stocking density rates

The third hypothesis is that **direct payments contributed to a decreased stocking density in certain areas.**

Suckler cow premium was subject to a maximum stocking rate of 2 LU/ha following the 1992 reforms. The stocking density was determined on the basis of all cattle, sheep and goats kept on the holding that were subject to premium applications expressed in relation to the forage area of the holding. After the Agenda 2000 reforms, the stocking density was reduced to 1.9 LU/ha for 2002, then 1.8 LU/ha for 2003-2004.

The beef special premium was also subject to a maximum stocking rate. The stocking rate was calculated in the same way as for the suckler cow premium and reduced in stages from 3.5 LU/ha in 1993 to 2 LU/ha for the years 1996-2000. After the Agenda 2000 reforms, as for the suckler cow premium, the stocking density was reduced to 1.9 LU/ha for 2002, then 1.8 LU/ha for 2003-2004.

Stocking density trends over the evaluation period for different types of farm are shown in Figure 6.18. This is derived from FADN data and so is subject to certain caveats. All beef farm types have average stocking densities below the maximum stocking rates imposed by both the suckler cow premium and beef special premium over the evaluation period. 'Specialist cattle rearing and fattening' farms and 'Sheep, goats and other grazing livestock' farms have the lowest stocking densities on average, although in addition to direct payments, these farms are also likely to benefit from extensification payments, LFA compensatory payments and often agri-environment scheme payments. The data suggests that, while average stocking densities have fallen, the scheme stocking density conditions would appear to have had limited influence on the trend, a contention supported by other studies. IEEP (2002) comment that the schemes' maximum stocking rates were above current stocking rates, and therefore did not act as a limit on growth or an incentive to extensify. INRA (1999) found that only 23 per cent of specialist beef holdings had a stocking density greater than 2 LU/ha (compared to 40 per cent of specialist dairy holdings).

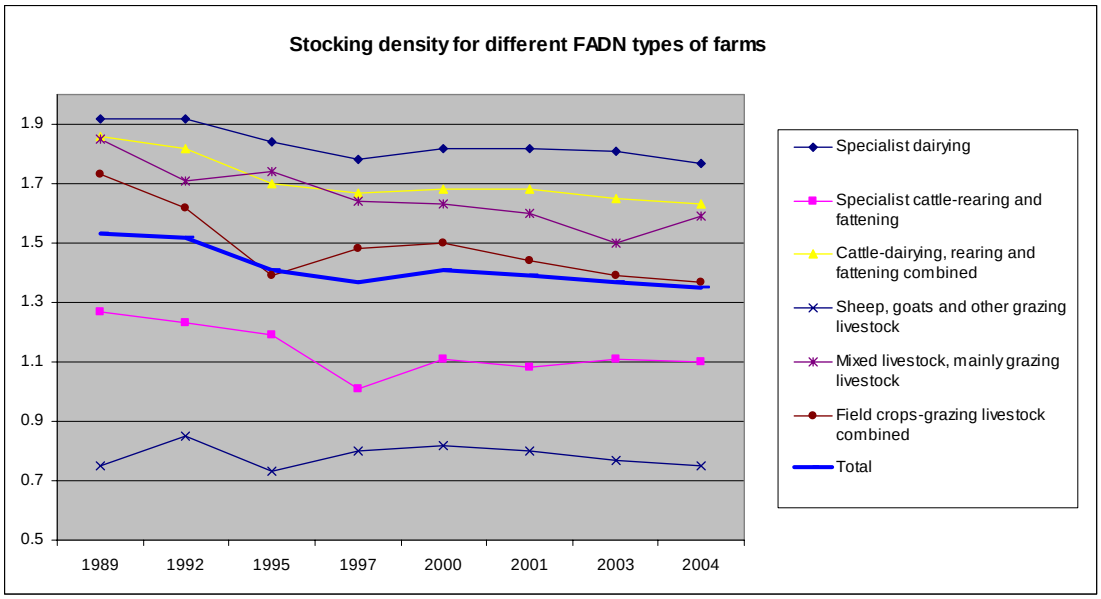


Figure 6.18 Stocking density (LU/ha)[45] by farm type, EU average per farm, EU-12/15

(Source: FADN)

It would be reasonable to assume therefore that maximum stocking rates associated with direct payments only had the potential to limit intensification (or promote extensification) on the more productive farms and/or in the more productive areas of Member States, for example the Netherlands (which experienced a decrease in stocking density for all cattle from 2.85 LU/ha to 2.24 LU/ha over 1989-2004) and Northern Italy (one of the few regions to experience an increase in stocking density, from 2.32 LU/ha to 2.58 LU/ha over 1989-2004). Stocking density trends across the EU are shown in the maps in Figure 6.21, although it must be noted that these refer to stocking densities for both beef and dairy cattle combined.

[45] Stocking rate based on FADN Standard Result variable SE120; this is the average number of bovine LU (except calves for fattening) and sheep/goats per hectare of forage UAA.

Figure 6.19 and Figure 6.20 show the number and area (UAA) of farms in different categories. They show that, over the evaluation period, there has been an increase in the number and area of extensive specialist beef rearing farms (mainly those with suckler cows) but a decrease in most other categories of farm. There has also been a significant increase in the area farmed by extensive, specialist beef rearing farms. These trends tie in with the shift to suckler cow production and the decreasing average stocking rates noted previously.

In summary, while there does appear to have been a decrease in stocking density over the evaluation period, this is not solely related to the influence of direct payments as both beef and dairy farms have experienced similar trends. Furthermore, the impact of maximum stocking rates associated with certain direct payments appears to have been limited to certain productive farms or areas, due to the relatively high level at which maximum stocking rates were set. In other, less productive areas, the level at which stocking rates were set has meant that stocking densities have increased considerably according to the case study reports (for example in Spain). Direct payments have however contributed to more suckler cow production and a greater area being farmed extensively for beef production (although extensification payments, LFA compensatory payments and agri-environment scheme payments have also been influential). We are therefore able to conclude that direct payments have made a limited contribution to reducing stocking density in specific areas. Their effect is both general, through influencing the system of production, and specific, by imposing stocking rate conditions which have been effective in certain limited situations.

Evidence from the case studies

The case studies are helpful in showing the variations across Member States and regions. In Ireland, most beef farms were unaffected by the maximum stocking density condition as existing stocking rates were well below the upper limit. However, for the minority of beef or dairy farms which were intensive, the maximum stocking rate did have a limiting influence given the importance of direct payments to overall farm income.

In Spain, climate and soil conditions dictate stocking densities that are far below the stocking density thresholds. Stocking densities of suckler cow enterprises in dry regions such as Extremadura are almost always below 0.5LU/ha. As a result the thresholds had no effect in this region. In fact, suckler cow numbers and stocking densities on all of the interviewed farms were found to have increased greatly over the past ten years, having almost doubled in some cases, but were still well below the thresholds applied to direct payments. All farmers reported the SCP as a major influence in increasing numbers. In other areas of Spain, where there are higher stocking densities, the fact that only animals claiming premiums are included in the calculation of stocking density in relation to suckler cow premium and beef special premium limited the agricultural and environmental effectiveness of the maximum stocking density limits. This is because very few farms in Spain have premium rights for all their cattle. It should be noted that this also applies to other countries, albeit to a lesser extent.

Another issue relating to stocking density is the ability of farmers to acquire additional land to count towards meeting stocking density requirements. There is evidence that farms in parts of Spain, SE France and Scotland have acquired the use

of fields of semi-natural vegetation some distance away from their main holding in order to comply with the stocking density limits but without actually grazing this additional land. This results in both the continuation of an intensive system of production on the main holding and potentially also the undergrazing of the marginal land (this would otherwise have been farmed by a grazier). This could have adverse consequences for biodiversity (IEEP, 2002).

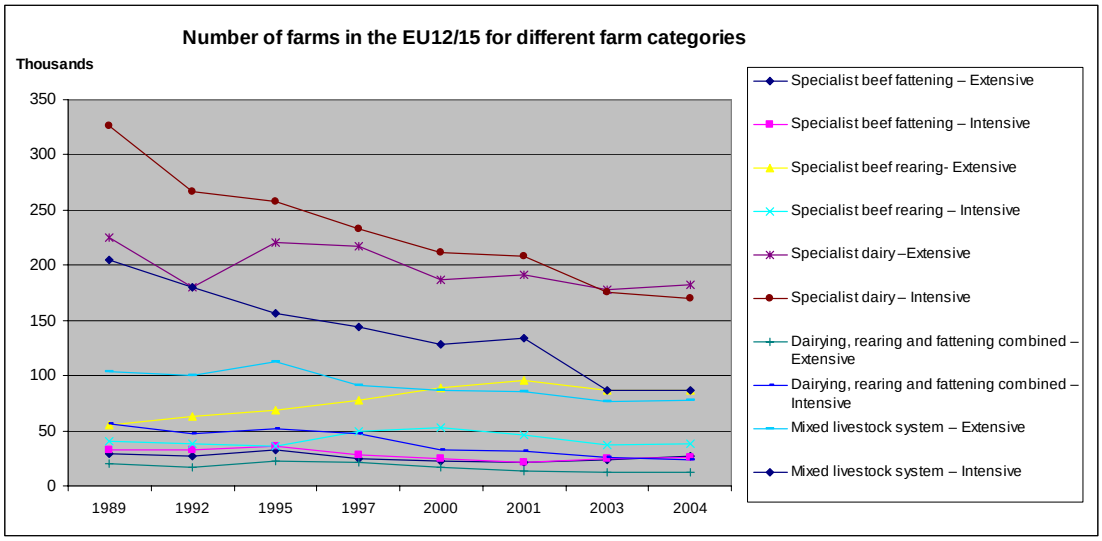


Figure 6.19 Trends in number of farms for different farm categories, EU-12/15

(Source: FADN)

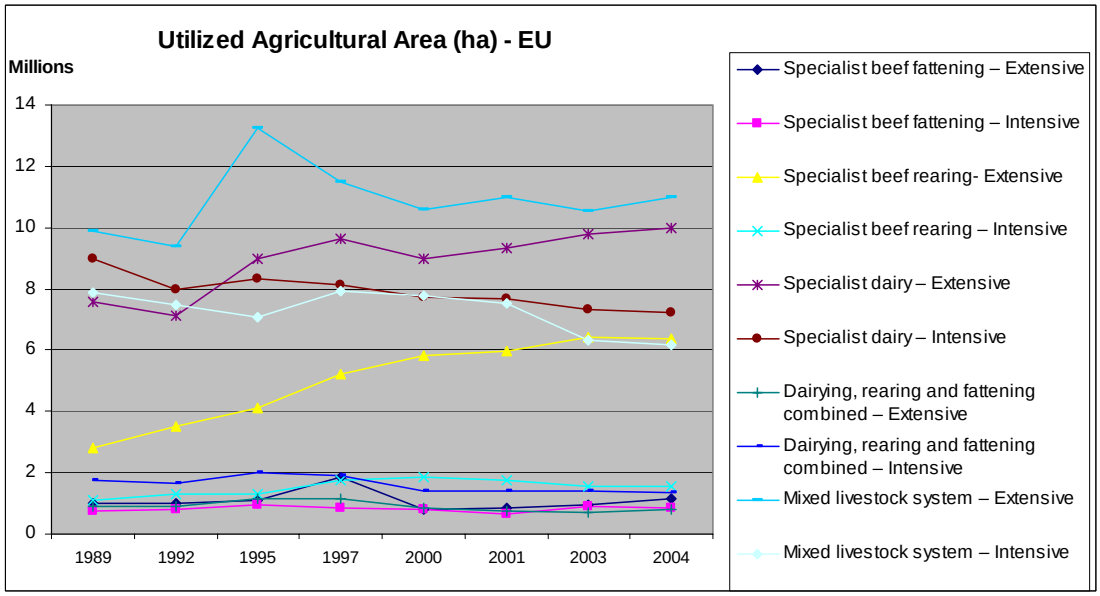


Figure 6.20 Utilised Agricultural Area for different farm categories, EU-12/15

(Source: FADN)

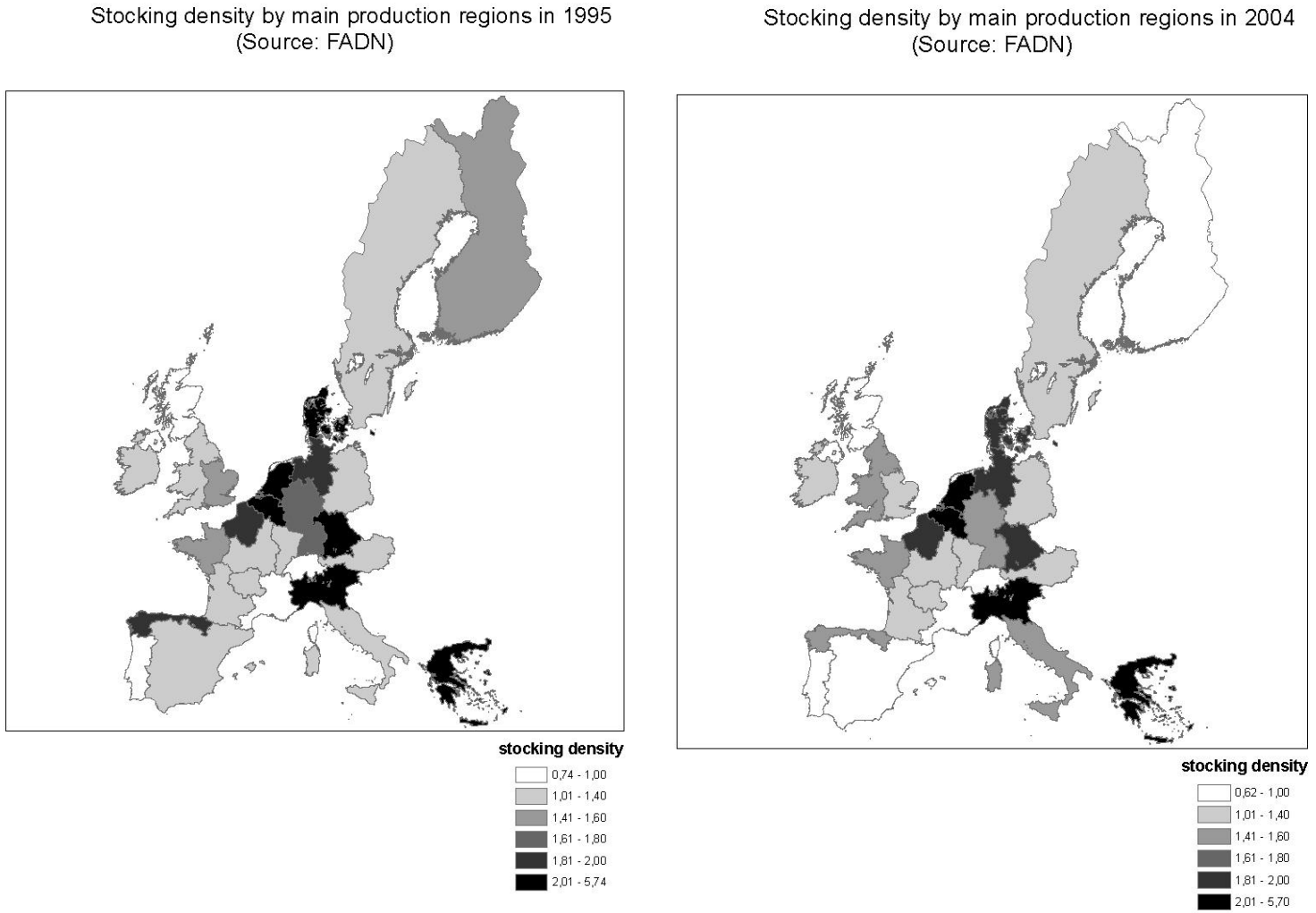


Figure 6.21 Stocking density in main EU production regions in 1995 and 2004

(Source: FADN)

6.1.4 Impacts on farming systems

A further hypothesis is that the **suckler cow premium helped to maintain suckler cow production especially in marginal areas.**

Changes in the number of beef and dairy cattle in Less Favoured Areas (LFAs) are shown in Figure 6.22 and Figure 6.23. While there are clear variations from one country to another, overall cattle numbers have been broadly sustained in LFAs during the evaluation period. Furthermore, although there we have no specific data, it is reasonable to assume that suckler cow numbers in LFAs have been at least been maintained, if not increased, given the increase in overall cattle numbers in LFAs and EU-wide suckler cow trends.

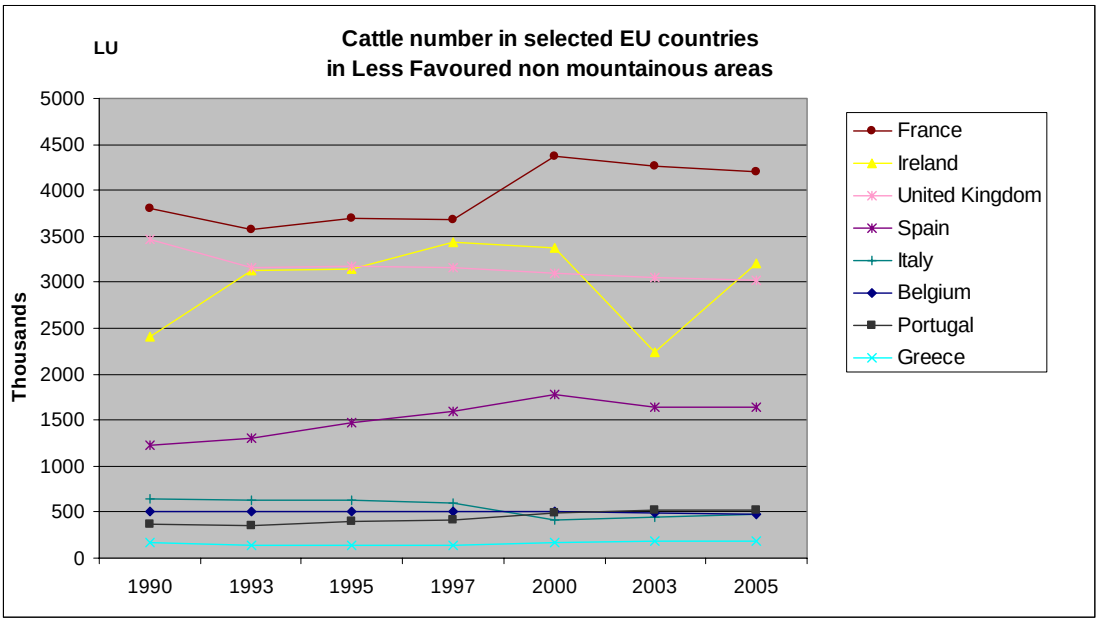


Figure 6.22 Number of cattle in non mountainous LFAs in selected EU countries

(Source Eurostat)

Figure 6.24 shows the total number of farms in LFAs by farm type with cattle. There is a general downward trend with the noticeable exception of extensive specialist beef rearing farms which have increased in number.

Turning to the contribution of the suckler cow premium to farm incomes, Figure 6.25 shows the suckler cow premium as a percentage of farm net value added for extensive beef rearing farms in selected regions/countries for the period 2000-2004 (the only period for which we have data at this level of detail). The graph shows the high and increasing contribution made by the suckler cow premium to extensive beef rearing farm incomes in regions/countries with a high proportion of LFA land. The high figures for the UK North region in 2000-2001 are likely to be a reflection of the adverse impacts on farm incomes stemming from the Foot and Mouth Disease outbreak and associated market impacts.

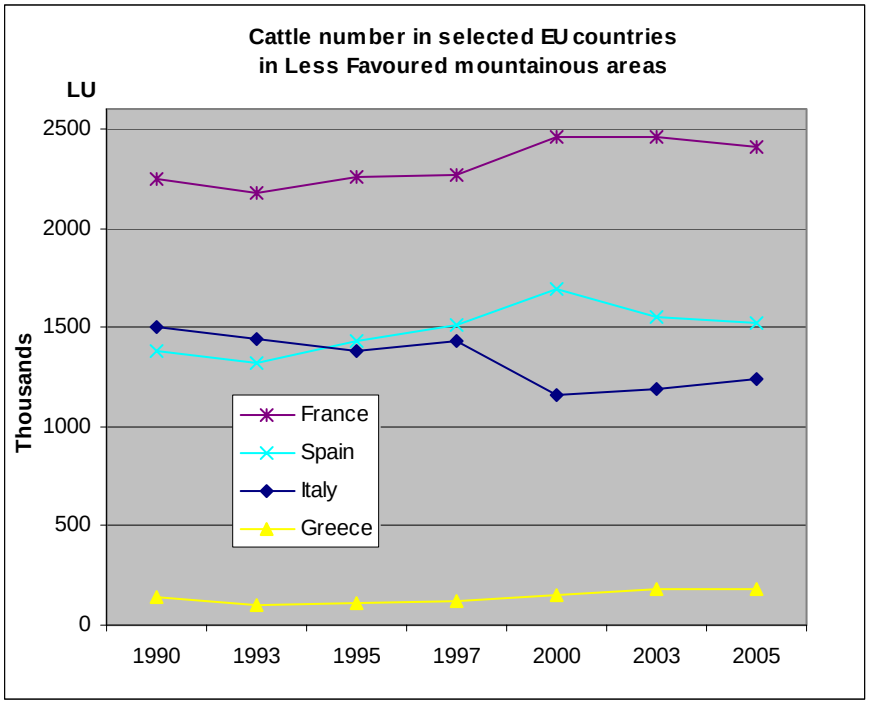


Figure 6.23 Number of cattle in mountainous LFAs areas in selected countries

(Source Eurostat)

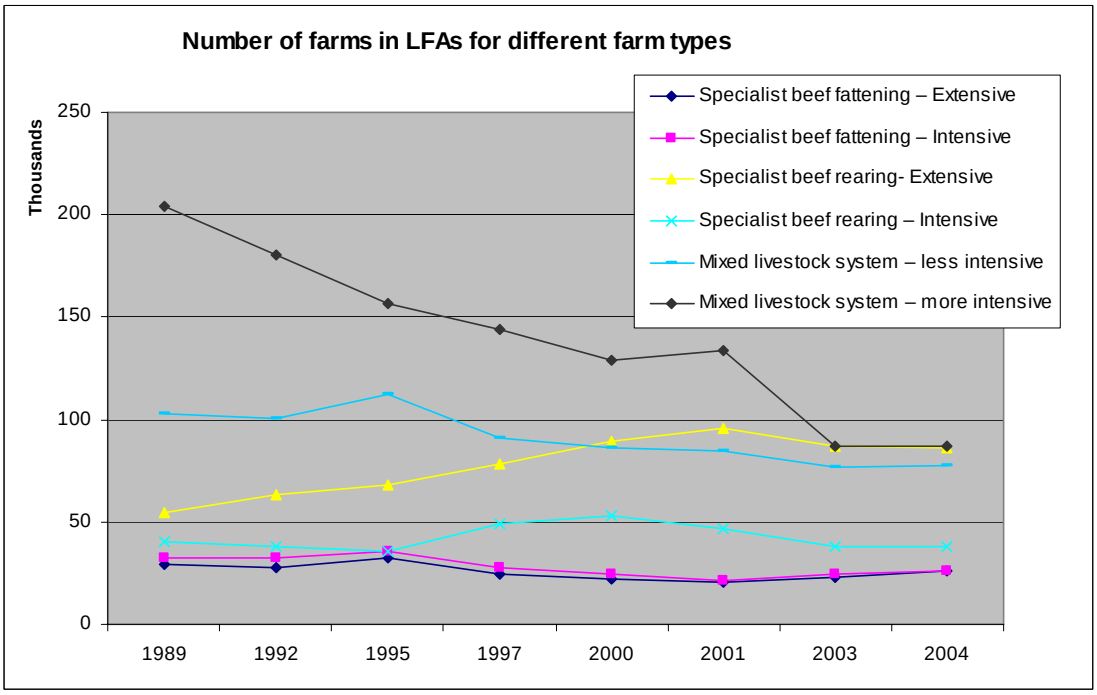


Figure 6.24 Number of holdings in LFAs in the EU 12/15

(Source FADN)

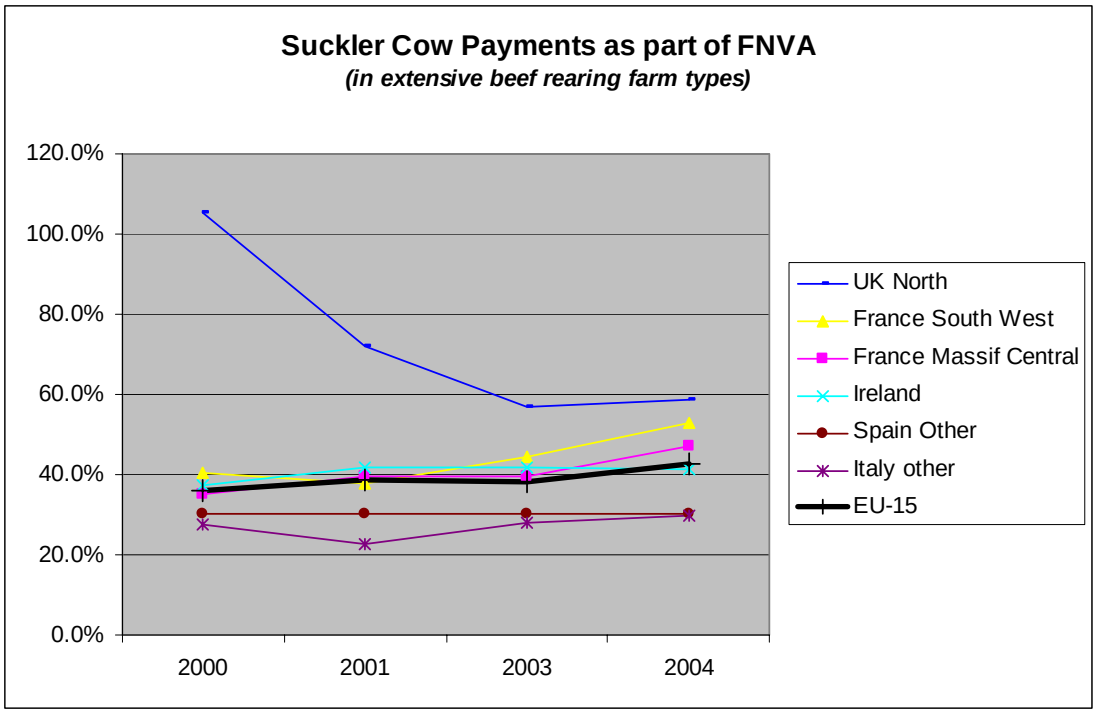


Figure 6.25 Suckler cow premium as percentage of Farm Net Value Added for extensive beef rearing farms in selected regions/countries, average per farm

(Source: FADN)

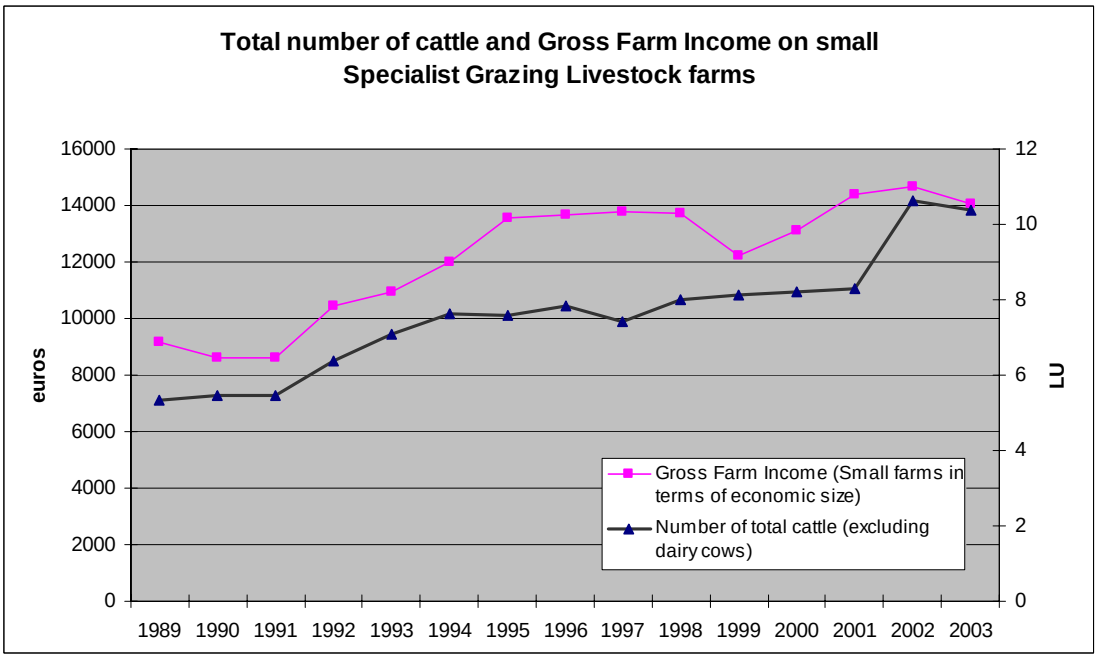


Figure 6.26 Total number of cattle (excluding dairy cows) and gross farm income on small Specialist Grazing Livestock farms[46]

(Source: FADN)

[46] Small farms, in this instance, are defined as those having less than 16 ESU. The ESU or European Size Unit is a unit of measurement of the economic size of an agricultural holding. 1 ESU corresponds to a total standard gross margin of ECU 1,200 of 1990 SGM.

As many small farms occur in marginal areas, there is likely to be a strong correlation between trends in suckler cow numbers on small farms and those in marginal areas. FADN data shows that both the number of cattle on small specialist grazing livestock farms and the gross farm income of these farms has increased over the period, see Figure 6.26. Without the support of the suckler cow premium (alongside other direct payments and schemes), it is likely that that there would have been a more rapid decline of smaller farms, and perhaps a stronger tendency towards other land uses, such as shooting. Some grazing land would probably have been abandoned, or continued in the abandoned state it was in previously.

While data is limited, these trends would appear to confirm the hypothesis that the suckler cow premium has helped maintain suckler cow production and (often small) suckler cow farms in marginal areas. Other contributory factors include LFA compensatory payments, extensification payments, agri-environment scheme payments and in some areas the added value (cheese mainly and beef) provided by PDO products. These all support low stocking density, extensive grazing and the limited use of fodder crops such as forage maize.

Evidence from the case studies

Evidence from the case studies supports a positive correlation between suckler cow numbers and suckler cow premium expenditure in LFAs.

In Ireland, where 75 per cent of the country is designated LFA, the number of suckler cows doubled over the period and the number of suckler cow holdings was maintained at around 80,000. Many of these suckler cow holdings were in the more marginal West and North of the country. However, as indicated previously, it is important to restate that many of these holdings would also have benefited from other scheme payments as well as non-farm income.

In the UK, the suckler cow premium lead to a disproportionate increase in suckler cow numbers in the uplands particularly on common land, where cattle were out-wintered. The main impact of this was in the South West of England due to harsher winters and lower grazing rights on common land elsewhere in England and the rest of the UK. Conversely, increases in the number of suckler cows in the lowlands were limited by the amount of forage available and the need for more housing and imported feed.

In Spain, the suckler cow premium contributed to the maintenance of the suckler cow herd and the viability of suckler cow farms in mountain areas. The premium is reported to have encouraged non-farmers to keep suckler cows, especially on common grazings, and to have encouraged graziers to change from labour-intensive sheep or goats (which require shepherding) to suckler cattle (which do not). Local overstocking is reported to occur in some upland areas as a result of these two phenomena.

In Germany, in Bavaria, where suckler cows are mainly concentrated in mountain areas such as the Bavarian Forest, there was also an increase in suckler cow numbers and suckler cow farms until 2003. Thereafter the number of suckler cows and suckler cow holdings decreased. There is a close association between part-time farming, small farms and suckler cow production in this region.

The next hypothesis is that **direct payments may have increased the extent of intensive beef finishing systems.** The argument here is that beef special premium and slaughter premium in particular incentivised intensive beef finishing systems.

Figure 6.19 shows that there has been a decrease in the number of both intensive specialist beef fattening farms and intensive dairy, rearing and fattening farms ('intensive' equating to a stocking density of more than 1.4 LU/ha). Figure 6.20 however, shows that the total area of intensive specialist beef fattening farms was relatively stable whereas the total area of intensive dairy, rearing and fattening farms decreased. Figure 6.7 confirms that intensive specialist beef fattening farms experienced an overall increase in total cattle numbers whereas intensive dairy, rearing and fattening farms experienced a decrease. The herd size for both categories of farm increased, see Figure 6.8.

In summary, these trends show that while the total number of cattle being fattened in intensive systems has not changed significantly (+9 per cent over 1989-2004), a higher proportion of beef cattle is now concentrated in larger, specialist fattening units.

This trend, alongside expenditure and farm income patterns, suggests a relatively weak positive correlation between direct payments and intensive beef finishing systems. The primary drivers affecting intensive beef production include market prices, cereal (feed) prices, technology development, labour costs and animal welfare issues. While direct payments (and other CMO measures, for example, price support) have clearly supported intensive beef producers, they do not appear to have incentivised production to any significant degree.

From the case studies, it appears that the introduction of direct payments with stocking density and headage limits were particularly restrictive for Mediterranean countries with intensive beef fattening systems.

In Italy, the shift from the price support to direct payments advantaged larger livestock farms. This has become more evident with the reduction in the beef special premium maximum stocking density, since larger farms, with more available land, were able to secure greater access to direct payments than small farms with relatively less or no land. Consequently, there was a noticeable increase in the number of large farms (with a large number of cattle and a large land area), a reduction in the number of small farms and a significant decline in the number of landless farms. It should be noted that the loss in income by intensive farms (due to limited eligibility for beef special premium payments as a result of stocking density restrictions) was partly compensated by the introduction of the slaughter premium which was not subject to stocking density conditions. It is worth noting at this stage, that Italy North is the most intensive cattle region in Europe with the highest stocking density and highest inputs (per hectare and per livestock unit), see maps in Figure 6.27.

In Spain too, there was a general intensification and concentration of beef production (+43 per cent in beef cattle numbers in Spain North and +122 per cent in Spain Other over the evaluation period) based on purchased feeds, to some extent in the sucker cow sector but especially in the fattening sector.

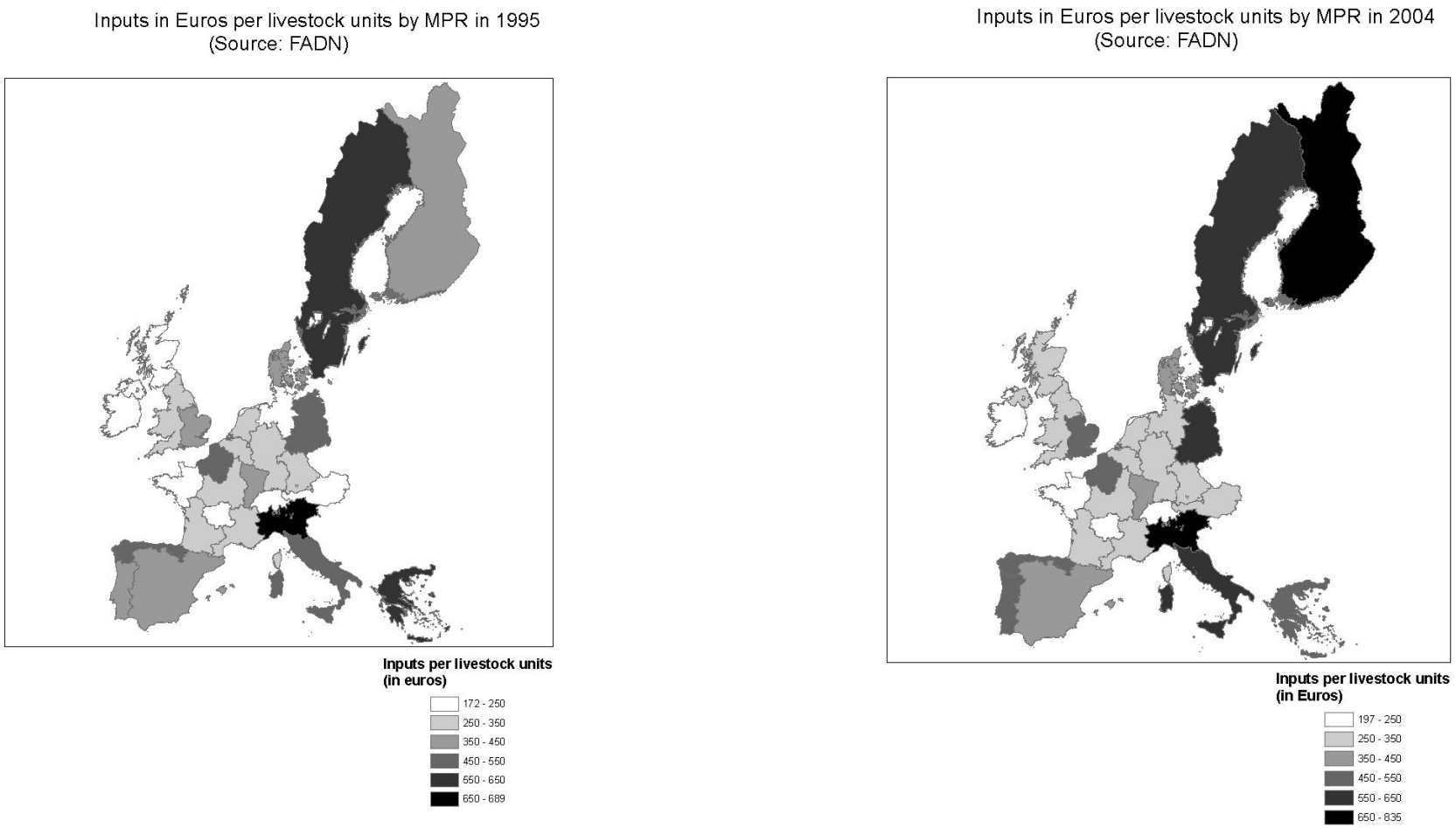


Figure 6.27 Inputs in Euros per livestock unit by main EU15 production regions in 1995 and 2004 in selected beef farm types *(Source: FADN)*

6.1.5 Impacts on farm management

Direct payments maintained both intensive and extensive grassland management.

There is limited evidence to substantiate this hypothesis directly. We are able to confirm that the suckler cow premium *inter alia* appears to have increased the number of suckler cows in the EU-15 Member States and many of these appear to have been farmed using grass-based systems. Furthermore the area grazed extensively by suckler cows, has increased and average stocking densities have decreased. However, direct payments have also supported more intensive suckler cow systems (especially in Mediterranean countries such as Spain and Italy) and a variety of generally intensive beef fattening systems. These systems are associated with more intensive grassland management as well as the growing of other fodder crops and cereals.

The maps Figure 6.27 show the variation in inputs per livestock unit across the EU and the change from 1995 to 2004. This shows an increase in the use of inputs (pesticides, fertilisers and feedstuffs measured in euros) in certain regions, for example in parts of the UK, Germany and Italy. However it is difficult to link this directly to the influence of direct payments.

Case study evidence from the UK suggests the following farm management impacts: very few farmers with suckler herds claiming to have altered herd management as a result of the changes to suckler cow premium; the vast majority of producers were not induced by the beef special premium to alter their production techniques when fattening cattle; some minor changes in terms of livestock movements at the margin in order to claim the first or second beef special premium payment, (with a higher proportion of the first premium claimed in the LFAs than the lowlands and vice versa for the second premium, reflecting the importance of uplands for rearing cattle and the importance of the lowlands for the final fattening phase); and relatively little impact on the proportion of male cattle animals kept on beef farms or on the average age of animals at slaughter (Entec 1997b).

In Ireland, the switch to suckler cows, away from drystock or stores, had implications in terms of the need for forage, as well as winter housing. Many farms used bag silage to meet their forage requirements, which contributed to the overall increase in grassland used for silage in Ireland. On the whole however this did not mean using high levels of fertiliser or other inputs given the extensive stocking rate. Furthermore many farms opted to sell their calves before winter to reduce the amount of forage required (and their stocking density). On more intensive units, existing intensive grassland management would have been sustained by direct payments rather than increased as such.

In Germany, in Bavaria, most specialised beef farms continued feeding maize silage, partly encouraged by the maize premium. Where grassland was taken on to maintain stocking density below the beef special premium threshold, this was not used to feed bulls but used to fatten heifers. The beef special premium had limited impact therefore on management practices.

In France, the main impact of Beef Special Premium in terms of management practices was the keeping of animals on farm longer than before, in order to claim both payments. This may have had the following consequences (although these are

unsubstantiated): an increase in the need of forage; an increase in the stocking density; and an increase in the buildings for over-wintering.

In summary, while we can reasonably conclude that direct payments have contributed to the maintenance of both intensive and extensive beef production systems, it is much more difficult to link changes in direct payments to changes in the intensity of grassland management.

Direct payments maintained a high level of fodder production.

Changes in the total area of forage plants (defined as temporary grass, green maize, leguminous plants and other green fodder) and permanent grassland and meadow, for selected Member States over the period 1990-2000 are shown in Figure 6.28 and Figure 6.29.

Figure 6.28 shows an overall increase in the area of forage plants in France, Spain and Ireland with declines in the UK and Italy. Ireland experienced the highest increase, at +256 per cent. Figure 6.29 shows a decrease in the total area of permanent grass and meadow for all of the selected countries apart from Spain, which experienced an 11 per cent increase. The overall effect, for the five countries taken together, was an increase of +3 per cent in the total area of forage plants and a decrease of -5 per cent in the total area of permanent grassland and meadow.

While much of the increase in the area in forage plants, and corresponding decrease in permanent grass and meadow, is undoubtedly due to the influence of the dairy sector, which has favoured the development of forage plants in particular, some of the change will be a result of the expansion of the beef sector, supported by direct payments.

Variations in permanent pasture as a proportion of UAA and fodder maize as a proportion of forage crops are shown in maps 1 and 2 in Annex IV. There has been an increase in the proportion of permanent pasture in parts of the UK, Germany and Spain but a decrease in Italy. By contrast, the proportion of fodder maize as a proportion of forage crops has increased in a swathe of central/northern parts of the EU, again this is primarily likely to reflect changes in the dairy sector.

Figure 6.30 and Figure 6.31 show the change in the average area of fodder crops, other forage plants and different types of grassland for beef farms in the FADN sample. These trends show an increase in the average area of other fodder plants (including fodder maize, other silage cereals and lucerne) over the evaluation period, as well as increase in the average area of permanent and temporary grassland. There is a strong positive correlation between the intensity of the cattle system and the area of forage maize as a proportion of total forage. Greater cattle numbers and higher stocking densities, partly influenced by direct payments, are likely to have contributed to the increase in the area of forage maize and other fodder crops, in particular for silage production (the environmental impacts of this is explored later). However, it should be noted that despite similar percentage increases, the absolute increase in permanent grassland is much greater than that for other forms of fodder or forage.

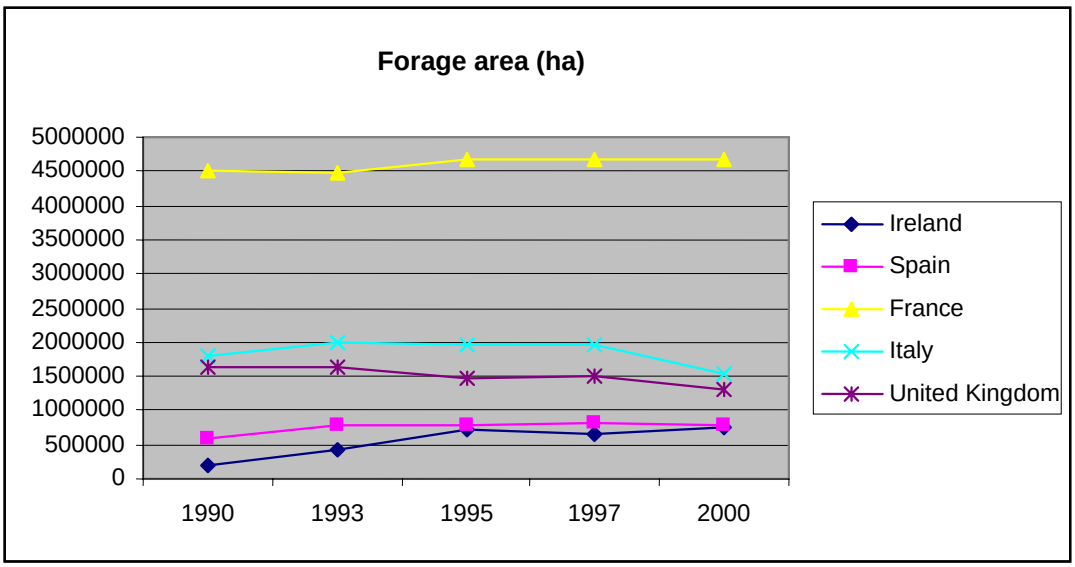


Figure 6.28 Forage area (ha) – selected Member States

(Source: Eurostat)

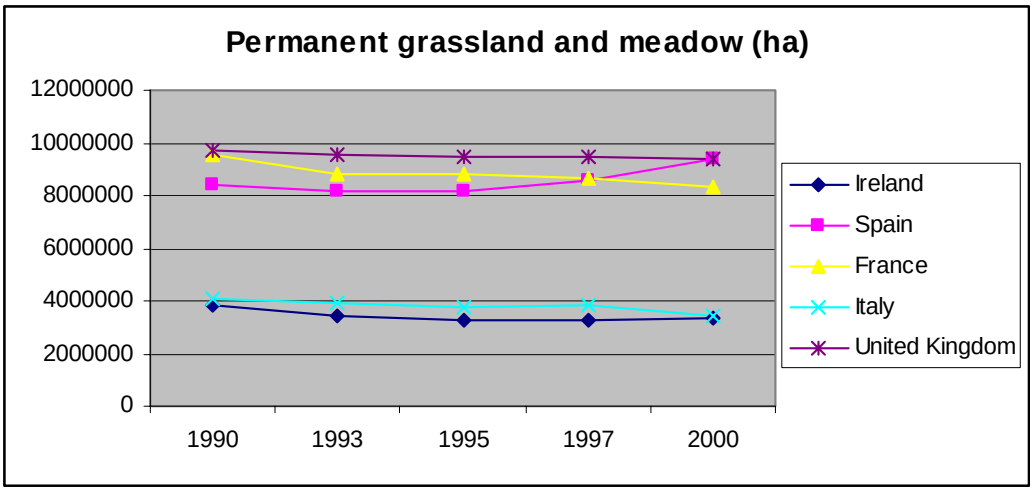


Figure 6.29 Areas of permanent grassland and meadow (hectares) – selected Member States

(Source: Eurostat)

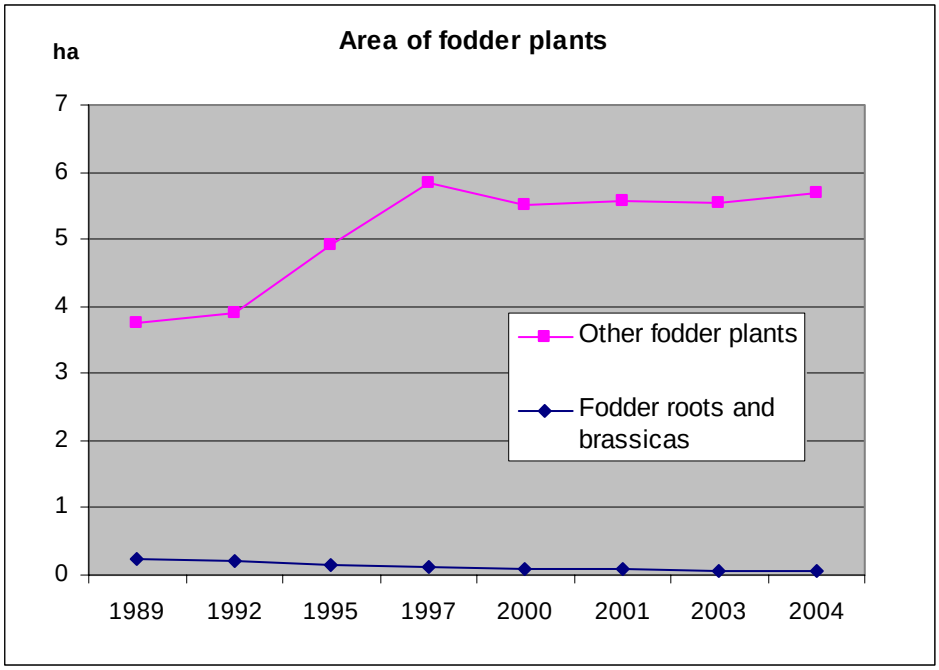


Figure 6.30 Area of fodder crops and other forage plants (ha), average per farm in EU12/15

(Source: FADN)

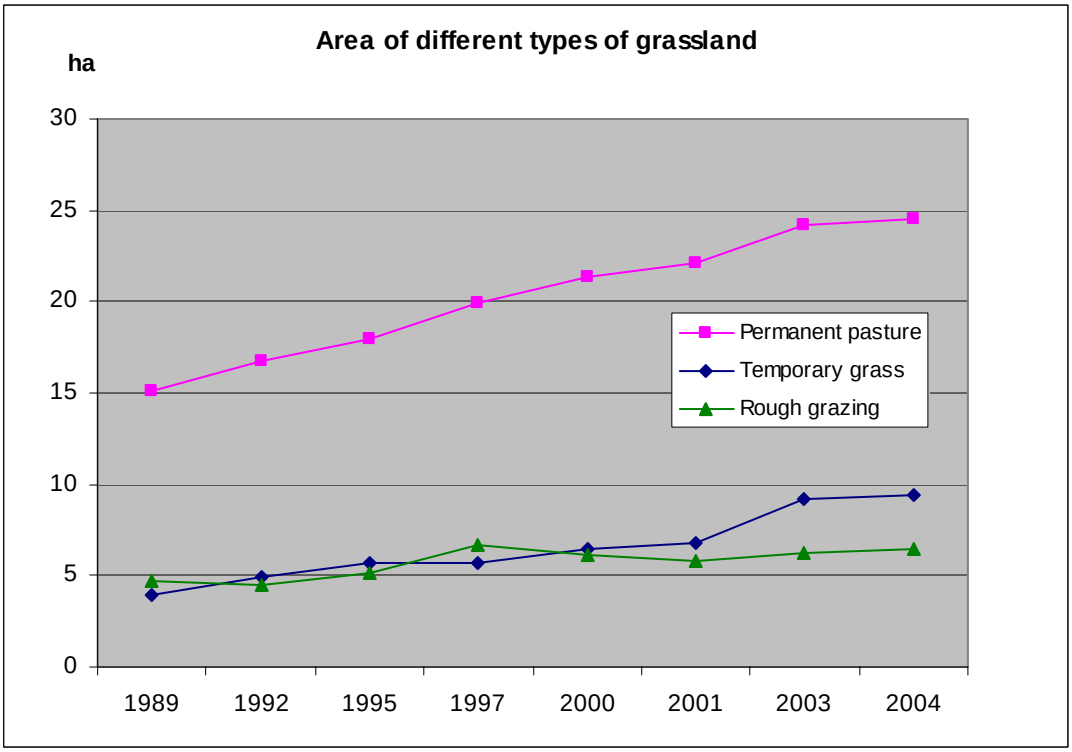


Figure 6.31 Area of different types of grassland (ha), average per farm in the EU12/15

(Source: FADN)

6.1.6 Summary of farm impacts

A summary of the broad farm impacts of beef and veal direct payments relative to the absence of these payments is set out below:

- Direct payments have helped maintain beef farms across the EU, many of which would otherwise have been unviable, as price support has been reduced;
- Direct payments have also contributed to the increase in beef cattle numbers in the EU until 2000, although beef cattle numbers declined thereafter;
- Suckler cow premium has been a significant driver behind the substantial increase in the number of suckler cows in the EU over the period and the increase in the number of farms operating suckler cow systems;
- Suckler cow premium has also contributed to the maintenance of suckler cow production in LFAs;
- Direct payments have played a role in the overall decrease in stocking densities, both generally through more suckler cow production and specifically through maximum stocking rate conditions, although the main impact of the latter has been on farms at or just above stocking density thresholds in more productive areas (for example, Netherlands, Italy), while in other areas the thresholds were too high to have an impact (for example, Spain);
- Individual ceilings and headage limits have constrained output for only a small proportion of farmers, with limited impact. In many countries/regions farmers were able to access additional suckler cow premium (for example, Ireland, Germany - new Länder), farm within beef special premium headage limits (for example, UK), or produce without subsidy (for example, Spain);
- Direct payments have helped maintain extensive and intensive grassland management on beef farms, in combination with price support, Pillar 2 measures and other factors;
- Direct payments have similarly helped maintain fodder production at a higher level than otherwise.

With reference to the impacts of direct payments on specific characteristics of beef production - scale, intensity, regional distribution and specialisation - the following conclusions can be drawn:

Scale of production: Direct payments appear to have contributed to the growth in beef cattle numbers over the evaluation period, although it is difficult to separate out the general effects of direct payments from other factors including price support. The suckler cow premium in particular has had a direct, positive influence on suckler cow numbers, particularly in the period to 2000. The production incentive of other direct payments appears to have been weaker.

Intensity of production: Direct payments have supported both intensive and extensive systems of beef production and have therefore been fairly neutral overall in terms of influencing intensity of production. An exception is the suckler cow premium, which has specifically encouraged more suckler cow production, thereby contributing to a greater area of land being farmed extensively for beef production (although agri-

environment and other schemes have also influenced this trend). Maximum stocking rates have affected a limited number of more productive farms.

Regional distribution: Direct payments have supported beef production across the EU however the policy influence has varied across Member States due to differences in farming systems. The suckler cow premium has contributed to an increase in suckler cow production in many countries and sustained suckler cow production in LFAs. The beef special premium and slaughter premium have supported the maintenance of beef and veal production systems and in some cases influenced its restructuring.

Specialisation: Direct payments have not generally influenced specialisation to any great degree. The exception is the suckler cow premium which directly encouraged suckler cow production.

6.2 Analysis of environmental impacts of direct payments

The environmental impacts of the farm level changes explored in the previous section are assessed below.

Water quality

An increase in overall cattle numbers arising from direct payments will have led to higher levels of organic waste being deposited on farmland, with potential water quality impacts. Much of this increase can be attributed to the growth in suckler cow numbers as a result of the suckler cow premium. However, in many cases, these suckler cows have been widely distributed in extensively managed systems, with grazing at relatively low stocking densities and with limited use of inputs for forage production. In some cases, however, increased diffuse water pollution does appear to have occurred as a result of increased stock numbers arising from direct payments (for example, diffuse pollution arising from soil erosion by overstocking of suckler cows on common land in some upland areas of the UK and more intensive management on some fattening units in Ireland). In these cases, other regulations and schemes have ameliorated the effects such as environmental conditionality[47] in the UK. Overall, this suggests some adverse impacts on water quality from the increase in cattle numbers, except in specific circumstances. Nevertheless, increased cattle numbers will have increased the potential for poaching, which can result in sedimentation and nutrient runoff.

In many cases, direct payments have helped maintain the viability of beef production systems, both intensive and extensive, without necessarily increasing stock numbers. In these circumstances, direct payments will have contributed to the continuation of higher stocking densities and intensive management practices than would otherwise have been the case, which can result in diffuse water pollution and eutrophication. Where the direct payments have supported production systems based on forage systems prone to soil erosion, such as maize, then this will have resulted in negative environmental impacts in some places.

[47] Standards aimed at preventing overgrazing and unsuitable supplementary feeding.

Forage maize is associated with a high level of fertiliser inputs and feedstuff purchases which contribute to a higher stocking density and level of production. Forage maize increases the environmental pressure on water resources with a risk of diffuse pollution by nitrates and pesticides. In the most of intensive cattle regions, the nitrate concentration exceeded the guide level. Forage maize also leaves the soil uncovered in winter time and increases the risk of erosion and nitrogen leaching. Fodder maize is mainly used in the North and West part of France (more than 20 per cent of the fodder area) and in Germany, Netherlands and Belgium (between 15 and 20 per cent of fodder area). The area under fodder maize increased between 1995 and 2004 in Denmark, Belgium, Netherlands and Germany North and West and is stable in the other countries (see Maps 1 and 2 in Annex IV).

The imposition of ceilings, headage limits and maximum stocking densities appears to have had a limited, albeit, beneficial environmental effect where it has helped reduce stocking densities and hence water pollution, mainly in more productive areas. In particular, there is limited evidence to suggest that maximum stocking densities could have prevented some producers in the Netherlands and the north of Italy from claiming direct payments. Retention periods under the Beef Special Premium have encouraged some producers in Ireland, the UK, France and Spain to keep male cattle for longer than they otherwise would have done. However, it is difficult to judge the environmental impact of this on water quality as producers would have had an incentive to adopt less intensive productive systems due to the associated longer finishing periods.

Water resources

Water resources are likely to have been affected to some degree by the increase in stock numbers and the maintenance of intensive and extensive systems of beef production. However, there is little evidence from the data reviewed or the case studies to suggest that this was a major issue. In dry regions (for example, Extremadura, Spain), the increase in suckler cows will have added to the burden on limited water resources. Elsewhere in more intensive systems, direct payments will have supported the continuation of management practices, such as irrigation and the growing of forage maize, which will have had an adverse impact on water resources. In wetter, more temperate countries, the impact on water resources is likely to have been very limited.

Biodiversity

A potentially beneficial impact of direct payments, and in particular the suckler cow premium, is the maintenance and enhancement of extensively grazed habitats. For example, many habitats, such as heathland, moorland and other habitats, in both upland and lowland areas require ongoing grazing by cattle or by a combination of cattle and other livestock (mixed grazing) in order to retain their biodiversity value. However, these benefits will only be observed if stocking rates are maintained at, or move towards, optimal levels for the specific habitat in question. In marginal areas such as LFAs, where beef production tends to offer poor economic returns, particularly where there could be a risk of abandonment, the increase in, or maintenance of cattle numbers as a result of direct payments (especially suckler cow premium) will have resulted in benefits to biodiversity providing overgrazing did not occur. Without the support of direct payments, it is likely that large areas of grazed habitats would have deteriorated in quality and extent as a result of land

abandonment, undergrazing or inappropriate grazing. It is important to note however, that beef direct payments have worked in combination with other measures in the beef and veal CMO, such as extensification payments, as well as agri-environment schemes and LFA compensatory schemes to deliver the specific environmental outcomes required in a particular geographical area (this is illustrated by a number of the case studies including those for France, Ireland and the UK).

However, increases in suckler cow numbers have also led to adverse impacts in certain areas. In Extremadura, Spain, an increase in stocking density has led to the degradation of dehesas (including the prevention of the natural regeneration of dehesa tree cover). Stocking density limits have been rendered ineffective by the presence of cattle without premia and the fact that the carrying capacity of the land is well below the thresholds. In the UK, there has also been overgrazing by suckler cows, and associated practices such as supplementary feeding, which has led to the degradation of some habitats (primarily common land in the uplands), although this was mitigated by the introduction of environmental conditionality in the 1990s. In the Burren, in Ireland, the shift to suckler cows led to less out wintering (this was previously carried out by store cattle) with negative impacts in terms of vegetation management.

On intensively managed units, there have been some adverse biodiversity impacts arising from continued diffuse water pollution. In Italy, this has been particularly noticeable during the summer, when water flow decreases. It should be noted, however, that the switch to intensive management, including intensive grassland management, the shift from hay to silage, cereal feeding etc occurred either before the period under evaluation or as a result of factors other than beef direct payments. However, where direct payments have helped to maintain beef production which relies on feed systems associated with low biodiversity values (for example, intensive grassland and maize) the payments will have supported the continuation of negative impacts on biodiversity.

Landscape

Extensively managed landscapes have also benefited from the maintenance of suckler cow grazing in LFAs and other areas. The financial support provided by direct payments has sustained a large number of small farms, a diversity of farm structures and valued landscapes in marginal areas across the EU. Again, suckler cow payments have worked in tandem with extensification payments, agri-environment scheme payments and LFA compensatory payments to support the maintenance of grazing and landscape features in these areas. To the extent that direct payments allow those farms using local cattle breeds to remain viable, this will have retained the landscape and biodiversity benefits associated with the management of these cattle breeds, as well as supporting genetic conservation.

On intensive beef farms, the landscape impacts of direct payments have been limited. The loss of landscape features such as hedges, small fields etc generally occurred before the beginning of the evaluation period and cannot be attributed to beef direct payments. Intensive indoor systems have arguably had negative landscape impacts, by increasing the area of land used to grow forage crops, and through the erection of additional buildings and associated infrastructure, although direct payments comprise only one out of a number influences on this system of production.

Soils

Extensive grazing systems supported by direct payments will have limited impacts on soil as long as overgrazing and unsuitable feeding practices are avoided (for example, overgrazing by suckler cows in some upland areas of the UK and from overstocking on fattening units). Where direct payments have supported systems resulting in these practices, then their impacts will have been negative. Well managed grass cover can reduce the risk of damaging soils (for example, through soil erosion, compaction etc.) in comparison to other land uses such as arable cropping or maize production. This particularly applies to extensive grazing by suckler cows in LFAs, for example, but to a certain extent also applies to more intensive grazing underpinned by direct payments elsewhere. Direct payments can therefore result in either largely neutral or negative impacts on soils depending on the production system supported. It is also not clear whether undergrazing or land abandonment would result in a higher degree of soil protection in comparison to beef production.

Direct payment measures	**Water quality**	**Water resources**	**Biodiversity**	**Landscape**	**Soils**	**Air quality & climate change**
Suckler cow premium	□/-	□/-	+/-	+/-	□/-	-
Beef special premium	□/-	□/-	□/-	□	□/-	-
Deseasonalisation premium	□	□	□	□	□	□
Slaughter premium	□	□	□	□	□	□
Additional payments	□	□	□	□	□	□

-- *strong deterioration,*
- *minor deterioration,*
□ *no deterioration or improvement overall,*
\+ *minor improvement,*
++ *strong improvement*
n/a *not applicable*

Table 6.1 Environmental impact of different direct payment measures

Air quality and climate change

By contributing to an overall increase in cattle numbers, direct payments and particularly suckler cow premium will have resulted in increased ammonia emissions. However, adverse air quality impacts are likely to have been limited due to the dispersed and extensive nature of suckler cow production. However, the beef direct payments have also supported the continuation of intensive, housed systems of production which have higher ammonia emissions and in greater concentrations.

Greenhouse gas emissions (NO_2 and CH_4) will generally have increased in line with the increase in cattle numbers. However direct payments have also contributed to lower stocking densities and, in particular, extensive beef rearing in some areas, which may have offset increases in greenhouse gas emissions to some extent

(Soussana et al, 2004). At the same time though it should be noted that more intensive production systems may result in lower methane and nitrogen dioxide emissions per unit of beef produced due to the shorter finishing times associated with such systems.

A summary of the environmental impacts of the different direct payments, based on the preceding analysis, is shown in Table 6.1.

6.3 Conclusions

There has been significant expenditure on beef and veal direct payments (including the 'extensification' payment) over the evaluation period rising from €339 million in 1989 (12 Member States) to €7,245 million in 2005 (17 Member States – EU-15 plus Malta and Slovenia). The largest proportion of expenditure across all Member States over the evaluation period has been on the Suckler Cow Premium (37.3% of direct and extensification payments), followed by the Beef Special Premium (32.8% of payments). However direct and extensification payments have worked alongside other CMO measures (beef, dairy and cereals), other policies and legislation, market influences and broader socio-economic trends, which makes the specific, separate impacts of direct payments very difficult to determine.

That said, it is possible to draw the following conclusions from the analysis.

- **Direct payments have helped support farm incomes** during a time of reducing price support and increased in importance, as a proportion of farm income, over the evaluation period.

- In general terms, **direct payments have therefore helped sustain beef farms and**, by virtue of the headage system of payments, **contributed to an increase in the number of beef cattle across the EU**, until 2000, when there was a decline as a result of BSE and other factors.

- **The suckler cow premium appears to have had the most notable impact in terms of production levels and systems and farm structure.** There has been a significant increase in the number of suckler cows across the EU over the period and an increase in the number and area of farms rearing beef extensively, using suckler cows. In LFAs, the suckler cow premium has helped sustained beef production, increased the number of farms running suckler cows and slowed the general decline in the number of farms in these marginal areas. In turn, suckler cow farms have supported extensive grazing regimes and grass-based forage systems. Other CMO measures and Pillar 2 schemes such as LFA compensatory payments and agri-environment scheme payments have also contributed to these trends. The suckler cow premium conditions relating to stocking density, individual producer quotas and regional ceilings, however, appear to have had a limited influence on production at an aggregate level.

- **Other direct payments including the beef special premium and slaughter premium, have contributed to production above the counterfactual but had a less apparent influence on production levels and systems.** Expenditure on the beef special premium, rose significantly in four Member States (France, UK,

Germany and Ireland) after 1994. Some farmers adapted their systems to increase eligibility for the beef special premium – for example in some Member States (UK, Ireland) it encouraged farmers to keep and finish more cattle than previously. In other cases the beef special premium rules limited further intensification and in certain of the most productive regions, for example the Netherlands, some intensive beef producers who were unable to adhere to the stocking density limits, continued production without the direct payments. The slaughter premium has contributed to farm incomes which have helped sustain existing systems of beef and veal production. The deseasonalisation premium worked to extend the beef finishing period in certain countries but with limited long term impact**. Consequently, these direct payments have generally helped sustain existing intensive systems of grassland management and fodder production.**

While the environmental impacts of these farm level effects vary from one Member State, the main points are as follows.

- **The suckler cow premium has had the clearest environmental impacts and these have been both positive and negative depending on the circumstances.** Biodiversity, landscape, water quality and soils have benefited from extensive cattle grazing, both within and outside LFAs. However adverse impacts have arisen in certain areas (for example, parts of Spain and the UK), where cattle numbers increased beyond the environmental carrying capacity of the land being grazed.

- **The environmental impacts of the beef special premium and other direct payments are less apparent** and relate mainly to the contribution of the payments to the maintenance of existing systems of beef production above the counterfactual. Much of the production is relatively intensive, as in the Netherlands. These intensive systems are associated with negative environmental effects, such as water pollution, soil erosion and pressures on biodiversity and these have, therefore, been supported by direct payments *inter alia*.

- Direct payments have contributed to an increase in the number of beef cattle numbers in the EU and this has had negative impacts in terms of **greenhouse gas emissions and air quality.** However, the fact that much of this increase can be attributed to extensively managed cattle means that the impact will have been less concentrated in respect of air quality.

- **Conditions applied to the suckler cow premium and beef special premium, such as maximum stocking densities or environmental conditionality have had mixed effects**. The effectiveness of these conditions has varied from one Member State/region to another, with greatest influence in more productive regions (for example, Netherlands, Italy) and less in more extensively managed areas (for example, Ireland, Spain).

- **Direct payments have often worked positively in tandem with agri-environment scheme and other types of payment**, where these have been available and adequately resource, and other regulations. However in some cases, there has been conflict between agri-environment schemes requirements for more

extensive stocking and the general incentive for higher stocking arriving from direct, headage-based payments.

In conclusion, direct payments have been environmentally beneficial in terms of supporting extensive cattle grazing across the EU, particularly in LFAs, and helping to limit intensification in more productive regions. However they have also increased overall cattle numbers and sustained existing intensive systems of production with their adverse environmental consequences.

7. EXTENSIFICATION PAYMENTS

Q2.2: To what extent did the **extensification payment** contribute to achieving positive environmental effects?

This chapter focuses on the extent to which beef extensification payments in the beef and veal sector contribute to achieving positive environmental effects. The effects of extensification payments made by the EU-15 Member States are examined in this chapter. The effects of price support in the beef and veal sector and other direct payments, which operated alongside extensification payments are considered in Chapters 4 and 6 respectively.

The chapter is set out as follows: the introduction summarises the implementation of the extensification payments, outlines the hypotheses that can be formulated about the likely impacts of extensification payments and briefly describes the methodological approach adopted. Section 7.1 sets out the impacts on farm income, farm production, farm systems and structures, and farm management (including regional effects) and Section 7.2 describes the related environmental impacts.

The period covered by the analysis is from 1992, the date on which extensification payments were introduced, until the end of 2004 or 2005, being the dates on which extensification payments, along with other direct payments, were abolished in the EU-15 Member States.

A description of the extensification premium (which was renamed as the extensification payment in 2000), including its objectives, conditions, payment rates and general evolution is set out in Section 2.2.3.

It should be noted that most Member States opted for a two tier system of extensification payment under the Agenda 2000 reform with only six Member States (Austria, Germany, Greece, Portugal , Spain, and Sweden) applying the single stocking density threshold. The authorities in France, Ireland and the United Kingdom informed the Court of Auditors that they chose the two-tier system because it would allow producers to reduce their production over a number of years and/or because it allows more produces to benefit. The authorities in Spain and Austria informed the Court of Auditors that they chose only one stocking density threshold in order to allow producers to benefit from a higher additional payment, as most beef producers in these countries would have no problems in meeting the lower stocking density. (Court of Auditors, 2002).

EAGGF expenditure on the extensification premium in the EU-15 is illustrated in Figure 7.1. The increase from 1997 to 1998 is primarily due to the introduction of a high extensification payment rate for compliance with a low stocking density threshold and the increase from 2000 to 2001 is primarily due to the introduction of higher extensification payment rates under the Agenda 2000 reform and EP for Dairy farms in marginal areas in Finland and Austria.

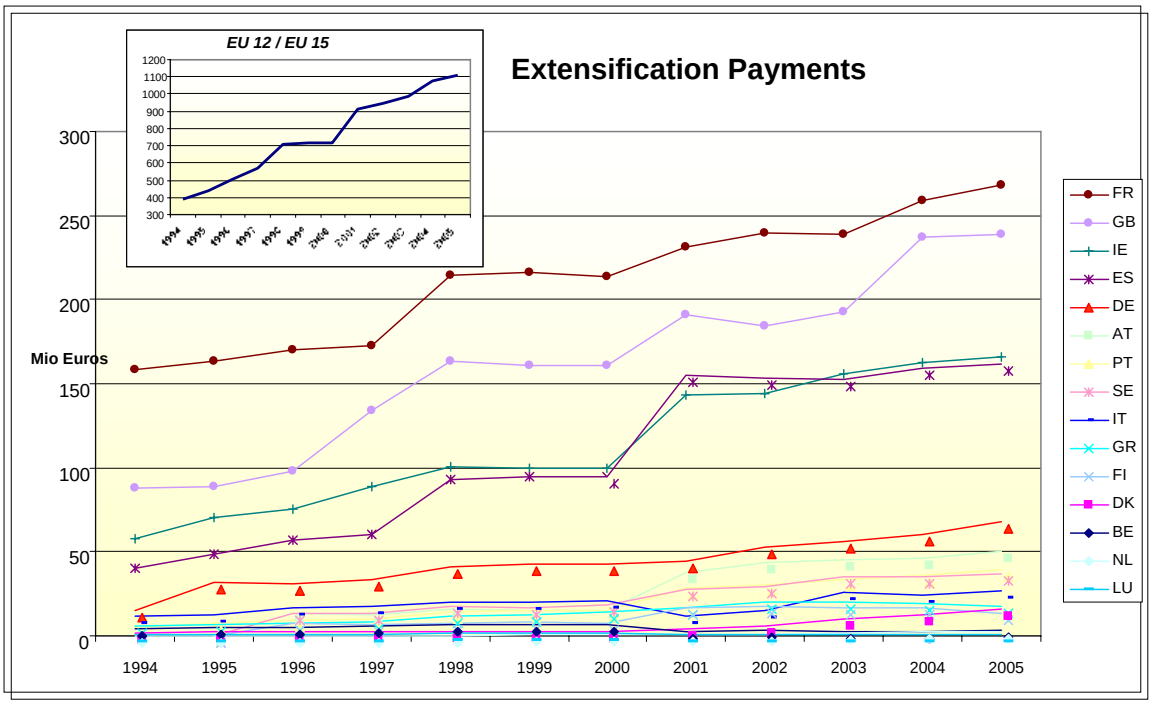


Figure 7.1 Extensification payment expenditure across EU-15

(Source: DGAgri EAGGF Expenditure)

The proportion of extensification payment expenditure by country over the period 1994-2005 is shown in Figure 7.2. Four countries - France, followed by the United Kingdom, Ireland and Spain - represent 78 per cent of expenditure on extensification payments over this period. This reflects the distribution of less intensive cattle farms in the EU.

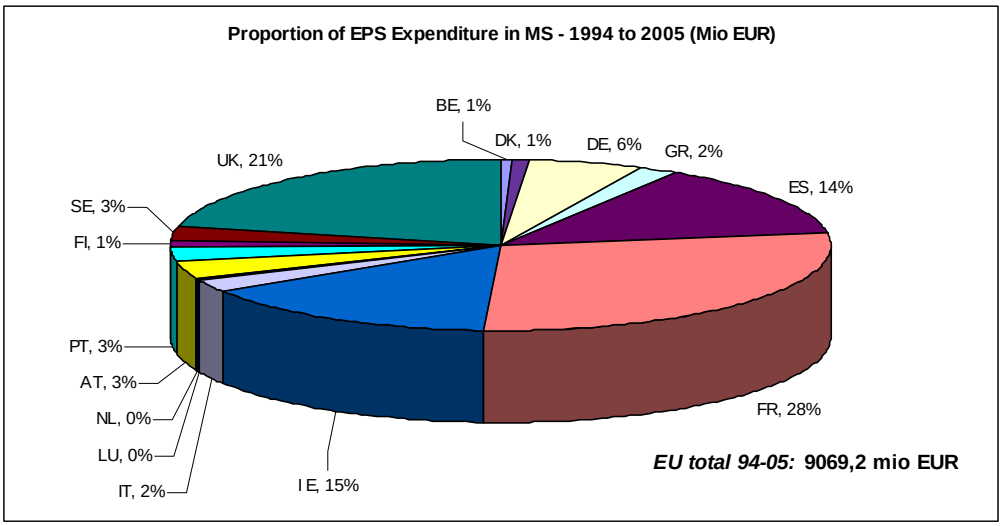


Figure 7.2 Extensification payment expenditure, 1994-2005, by Member State

(Source: DG AGRI)

A map showing the distribution of extensification payment expenditure is shown in Figure 7.3. This shows concentrations in the main grass growing regions and areas with strong pedoclimatic constraints (mountainous and dry Mediterranean areas).

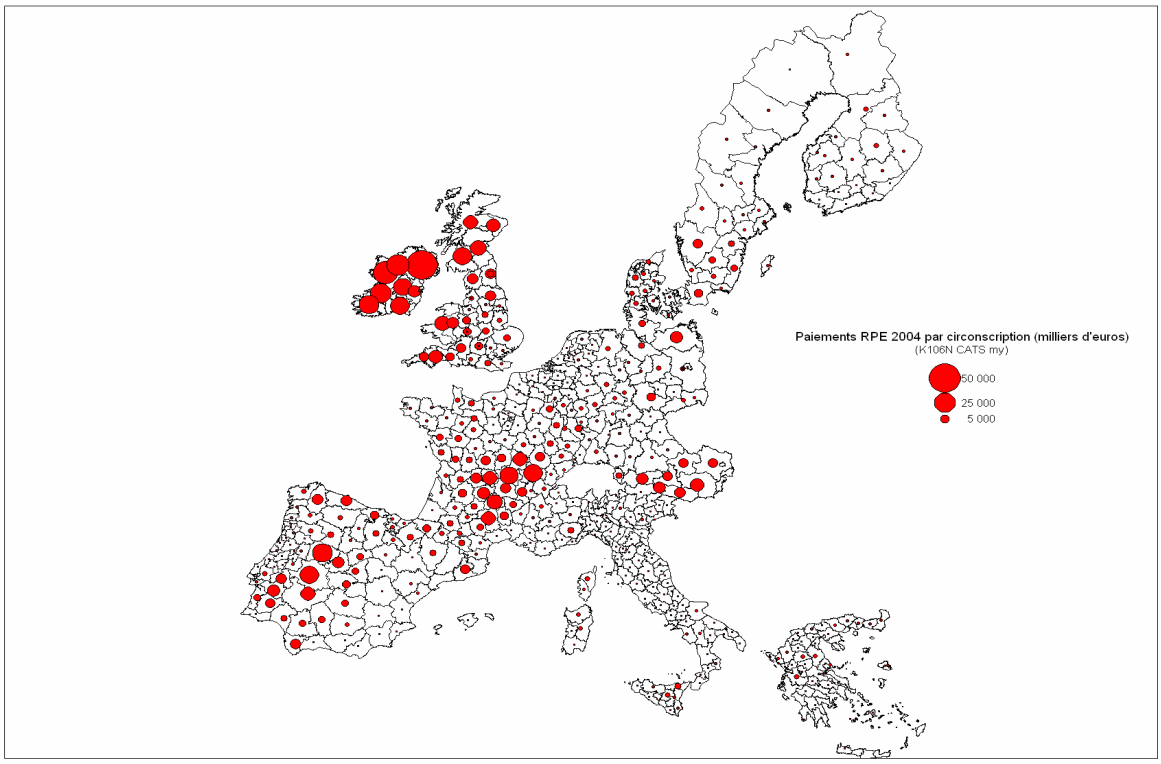


Figure 7.3 Distribution of extensification payments across the EU-15

Source: Ernst & Young (2007) using data from EC DG AGRI – CATS 2004

Over the period 1999-2005, EAGGF extensification payment expenditure as a proportion of suckler cow premium and beef special premium base payment expenditure remained relatively stable at around 25 per cent. As a proportion of the total beef and veal budget, extensification payment expenditure ranged from 8-16 per cent but averaged around 12 per cent over the period 1993-2004 (Ernst & Young, 2007).

The number of animals benefiting from extensification payments decreased, from 15.0 million in 1998 to 12.9 million (owned by 520,000 producers) in 2004. This included decreases in three of the main beneficiary countries – France, Spain and the UK – but an increase in Ireland (+16 per cent) and Austria (+55 per cent) amongst others. In 2004, 85 per cent of animals receiving the suckler cow premium also received extensification payments compared to 60 per cent of animals receiving the beef special premium (Ernst & Young, 2007). These proportions varied between Member States from under 20 per cent in intensive and semi-intensive beef production areas (for example, France North, Belgium, Netherlands, Belgium and Denmark) to over 70 per cent in more extensive production regions (for example, France Massif Central, France SW, Germany East, Ireland, Portugal, Spain, UK).

The main beneficiaries of extensification payments by farm type were mainly beef rearing farms (54-59 per cent of expenditure per year), beef fattening farms (38-43 per cent) and dairy farms in mountainous areas (1.3-3.2 per cent).

It could be expected that extensification payments have contributed directly to farm incomes on eligible farms, and sustained or improved the viability of less intensive farms, particularly in marginal areas. It may also be expected that the stocking density conditions have encouraged the maintenance or reduction in stock numbers held on farm and the maintenance or increase of eligible forage area on farm. Overall, therefore, it may be expected that extensification payments have resulted in fewer animals (cattle and probably sheep, as these also count towards the extensification payment stocking density) and a lower stocking density, at least on a proportion of holdings. In turn, there may have been more farms with extensive systems of production, together with associated management practices including lower grassland inputs per livestock unit or hectare. A proportion of farms may have increased in size and/or experienced an increase in eligible forage area as a proportion of the total area. It could be expected that there will be differences from one region to another regarding the extent to which there has been maintenance of extensive farms as opposed to the extensification of previously intensive farms.

Consequently it could be expected that there may have been a range of environmental impacts including positive impacts such as reduced pressure on soils, water, biodiversity and greenhouse gas emissions, the maintenance/enhancement of extensive grazing of valuable habitats, with biodiversity benefits, and the maintenance/enhancement of pastoral landscapes.

The main hypotheses for this evaluation question compared to the counterfactual are listed below:

- Income from beef production can be expected to be maintained or increased by extensification payments;
- Viability of less intensive farms can be expected to be maintained or improved, especially in more marginal areas;
- A proportion of farms may stretch to more extensive forms of production, with reduced stocking densities;
- The number of less intensive beef systems may be maintained at a higher level than otherwise;
- Changes in management practices may occur on including more extensive grassland management, more eligible forage area, and more grass as proportion of forage area; and
- There will be a range of consequent positive and negative environmental impacts arising from these impacts.

The methodological approach adopted in answering this evaluation question is summarised below.

The analysis of farm impacts is divided into four sections. The farm income analysis firstly seeks to verify the hypothesis that farm incomes have been maintained or increased through extensification payments and the hypothesis that the viability of less intensive farms in more marginal areas has been maintained or improved. Then the farm production analysis explores the hypothesis that extensification payments have encouraged a reduction in the number of cattle and stocking densities on certain holdings. The farming systems analysis then seeks to verify the hypothesis that less intensive systems have been maintained. Finally, an analysis of impacts on farm

management considers the hypotheses that extensification payments have relating to led to more extensive grassland management, more eligible forage area, and more grass as proportion of forage area.

Data sources for the above analysis include, in particular, FADN data by farm type and region. Evidence from the case studies is also used, in the form of findings from national literature, data sources and interviews. Lastly evidence from a comprehensive review of relevant literature is included.

The second stage of the analysis assesses the environmental impacts of the farming changes resulting from extensification payments. This considers specific impacts of the farming changes on key environmental receptors including water quality, water resources, biodiversity, landscape, soils, and air quality and climate change. Empirical data from literature and the case studies are particularly important here to help refine our impact assessment.

Finally, conclusions are drawn on the extent to which extensification payments have contributed to achieving positive environmental effects at both European and Member State level.

In undertaking the assessment of impacts, it is acknowledged that disaggregating the income and other effects of extensification payments from other direct payments, other CMO measures, other pillar two support, market changes, structural changes and technological development is difficult. Uncertainties and lack of evidence are highlighted.

A causal diagram presenting policy measures, other contextual measures and the potential environmental impacts to be examined are shown in Figure 7.4.

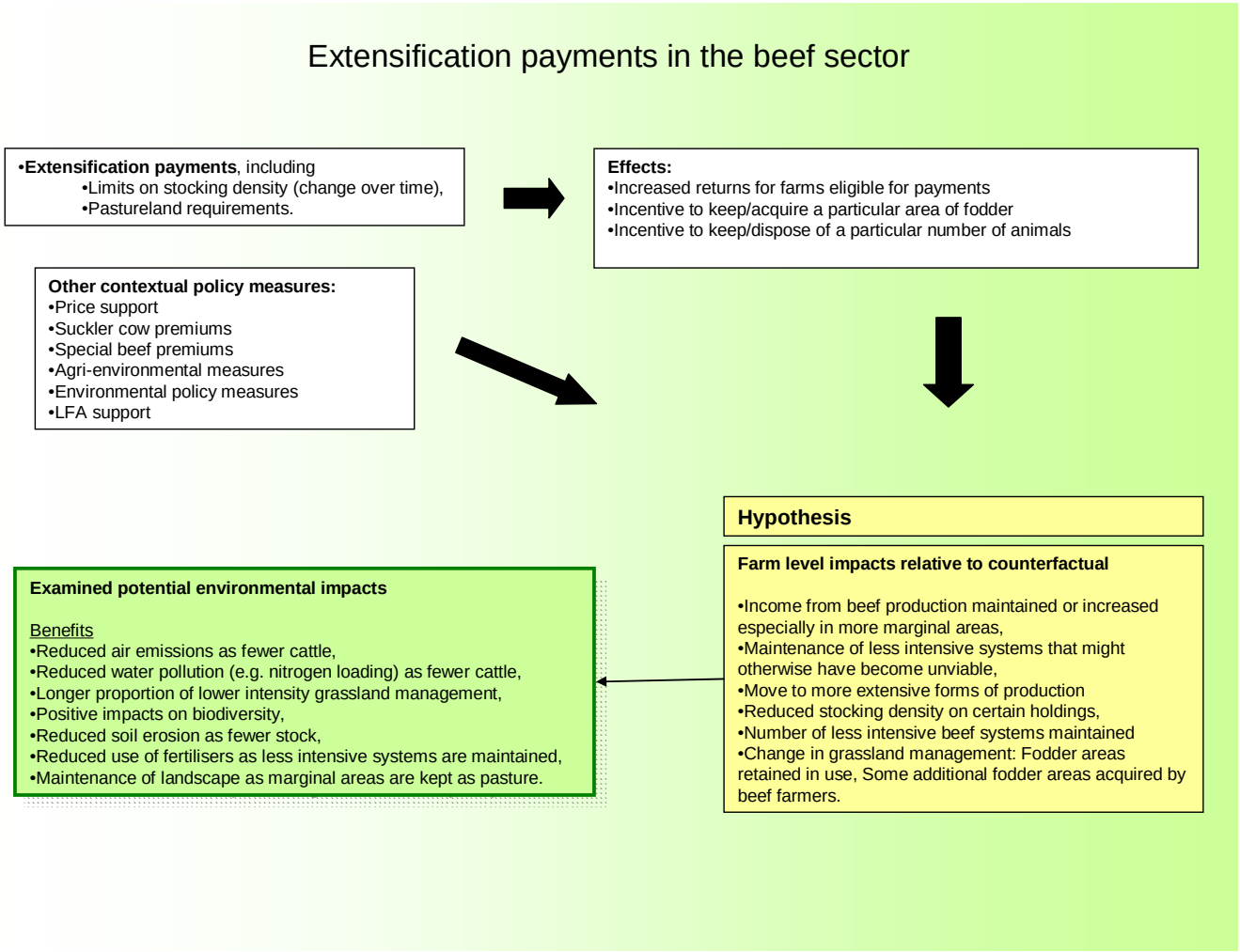


Figure 7.4 Diagram showing extensification payments, other contextual policy measures, hypotheses and potential environmental impacts.

7.1 Analysis of farm level impacts of extensification payments

7.1.1 Effects on farm income and viability

The first hypothesis is that **income on more extensive beef farms has been maintained or improved by extensification payments**.

Gross farm incomes for different types of farm are shown in Figure 6.2. This shows the gradual increase in gross farm income for all beef farms over the evaluation period, including the period in which extensification payments operated, 1993-2004.

Changes in average Gross Farm Income for extensive beef rearing and fattening specifically are shown in Figure 7.5.

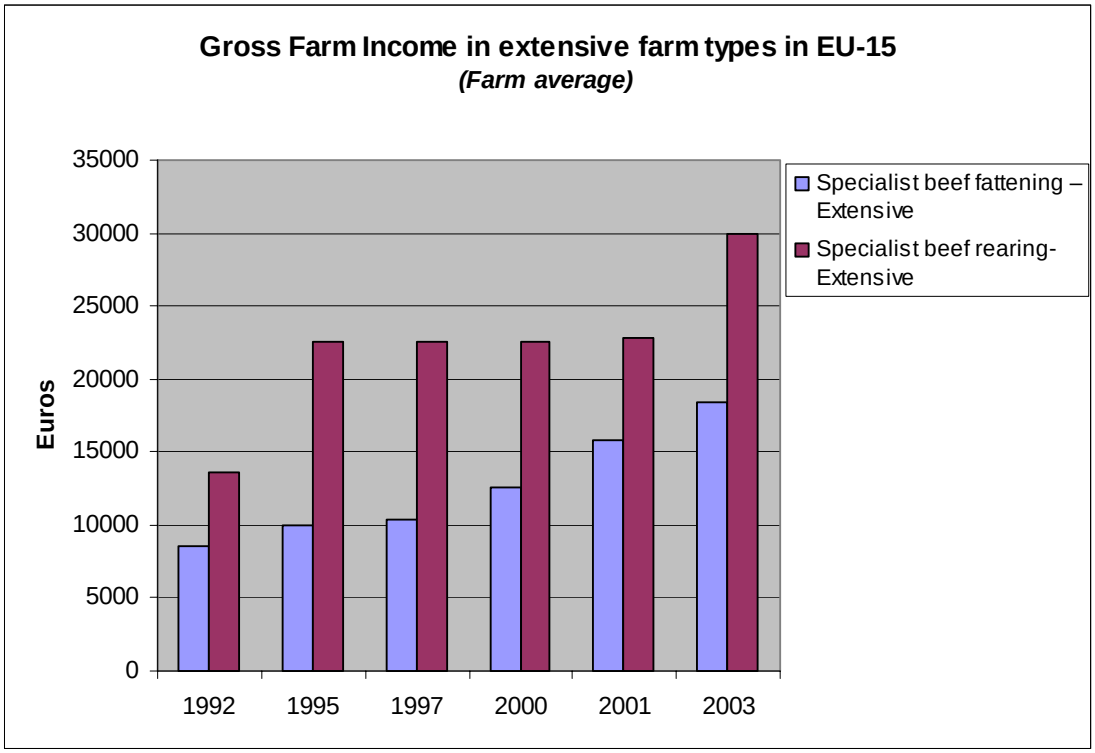


Figure 7.5 Gross Farm Income in extensive farm types in EU-15 from 1992 to 2003

(Source FADN)

Extensification payments for different types of farm over the period 2000-2004 (the years for which data is available) are shown in Figure 7.6. This shows the increasing importance of extensification payments particularly for extensive specialist beef rearing and fattening farms. This increase is likely to reflect the gradual adaptation of farming systems and the increasing number of cattle in receipt of extensification payments.

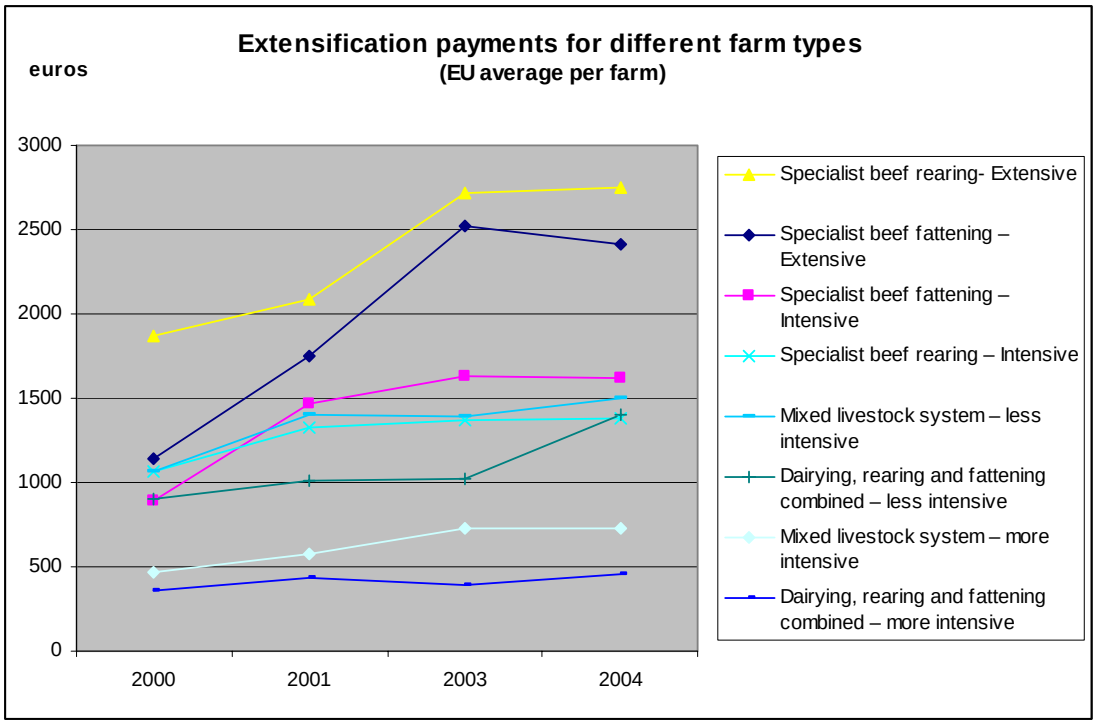


Figure 7.6 Extensification payments (€) by farm type in EU15, farm average

(Source: FADN)

Figure 7.7 shows the percentage contribution of extensification payments to gross farm income for different farm types over the period 2000-2004. This shows that the contribution of extensification payments to gross farm income gradually increased with extensive specialist beef rearing farms receiving 8 to 10 per cent of their income from the subsidies and extensive specialist beef fattening receiving 9 to 14 per cent (the peak in 2003 is likely to reflect weak market prices). 'Intensive' beef rearing and fattening farms received 3-5 per cent of their income from extensification payments (this type of farm was able to receive the extensification payment due to the different criteria used to determine eligibility for extensification payment compared to our farm typology).

Figure 7.8 shows the percentage contribution of extensification payments to farm net value added (which makes an allowance for depreciation) for different farm types over the period 2000-2004. For extensive beef rearing farms, the contribution of extensification payments to farm net value added has increased from around 12 to 14 per cent, on average, over the period. For extensive beef fattening farms, the contribution of extensification payment has ranged from 12 to 18 per cent (again, the peak in 2003 reflecting weak market prices). For intensive beef farms, the contribution ranges from 4 to 7 per cent.

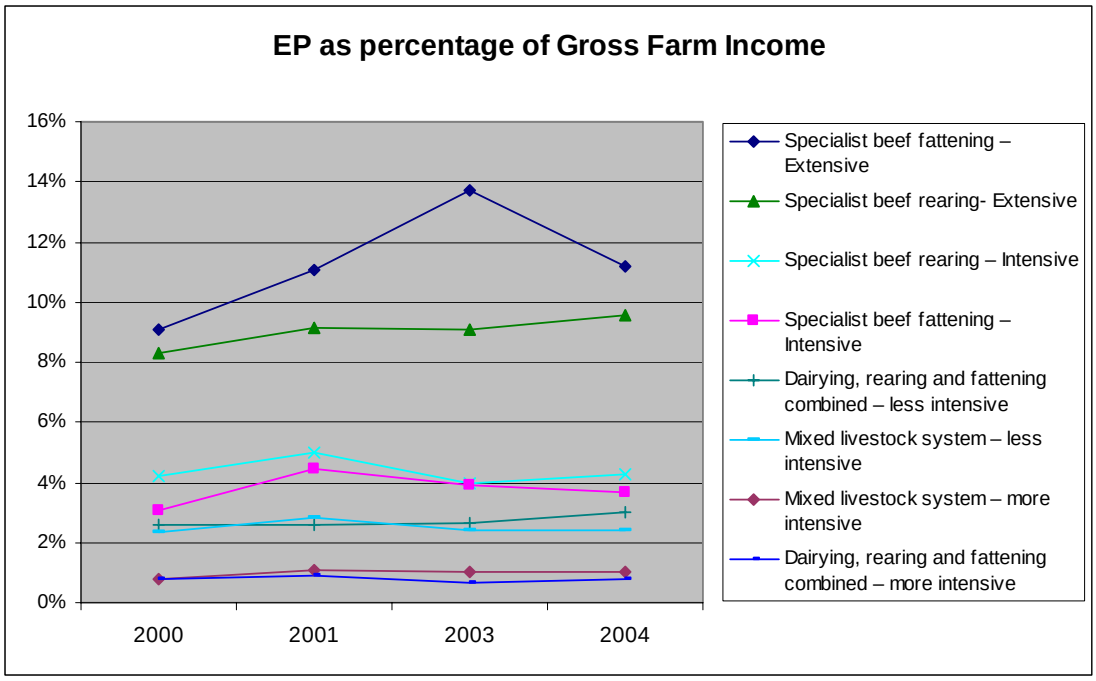


Figure 7.7 Extensification payments as percentage of Gross Farm Income by farm type, EU15, farm average

(Source: FADN)

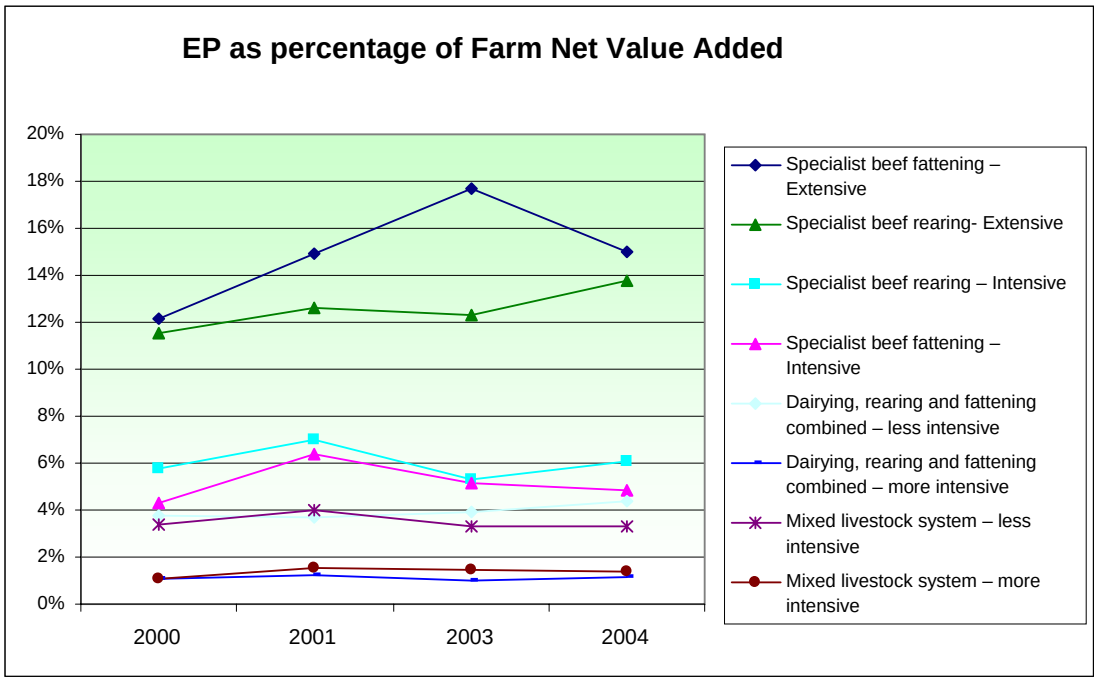


Figure 7.8 Extensification payments as percentage of Farm Net Value Added by farm type, EU15 farm average

(Source: FADN)

Over the period, 1994-2002, extensification payments amounted to 14.5-20 per cent of direct payments to beef producers. This is a significant part of producers' incomes, particularly when one considers that direct subsidies were forming an increasing proportion of total farm income during this period (see Figure 6.5). In France and the UK, which together accounted for around half of extensification payment expenditure, many beef producers were dependent on the direct beef subsidies to keep them in business and without these would otherwise have made larger losses or no profit (Court of Auditors, 2002). The overall importance of extensification payments to producer incomes, especially (extensive) beef fatteners, was confirmed by the recent evaluation of extensification payments (Ernst & Young, 2007).

In summary, based on available data and findings from literature and case studies, it is possible to confirm that extensification payments have helped maintain or improve incomes on more extensive beef farms.

The second hypothesis is that the **viability of less intensive farms in marginal areas has been maintained or increased by extensification payments**

Farms in marginal areas, notably LFAs, include many extensive beef rearing farms, and to a lesser extent, extensive beef fattening farms. As indicated previously, these types of farm have particularly benefited from extensification payments, in terms of contribution to gross farm income and farm net value added. Further detail is provided in Figure 7.9, which shows the percentage contribution of extensification payments to farm net value added for extensive beef rearing farms in countries/regions with a high proportion of LFA land over the period 2000-2004. Extensification payments made up 14-17 per cent of farm net value added on extensive beef rearing farms in Ireland and France Massif Central and a significant 'one off' contribution to similar farms in the UK North region during and immediately following the Foot and Mouth Disease outbreak.

The number of extensive farms in LFAs over the period 1989-2004 is shown in Figure 6.26. This shows an increase in the number of extensive specialist beef rearing farms from 1989 until 2001, then a slight decrease. The number of extensive beef fattening farms has declined gradually over the period. Both trends compare favourably to most other farm types While extensification payments are not the only factor influencing farm numbers, it is reasonable to assume that extensification payments (alongside other beef direct payments, LFA compensatory payments and agri-environment scheme payments *inter alia*) have contributed to the survival of extensive beef farms in LFAs. The case studies and literature confirm the heavy reliance of farms in LFAs on direct payments, including extensification payments.

In Ireland, where around 70 per cent of the total agricultural area is LFA, extensification payments have had a beneficial effect on beef farming in Ireland alongside other support and schemes such as the Rural Environmental Protection Scheme and the Disadvantaged Areas Compensatory Allowance Scheme. The majority of farms on marginal land particularly in the West and North, benefited from extensification payments, most of these at the higher rate. These farms are characteristically small and part time.

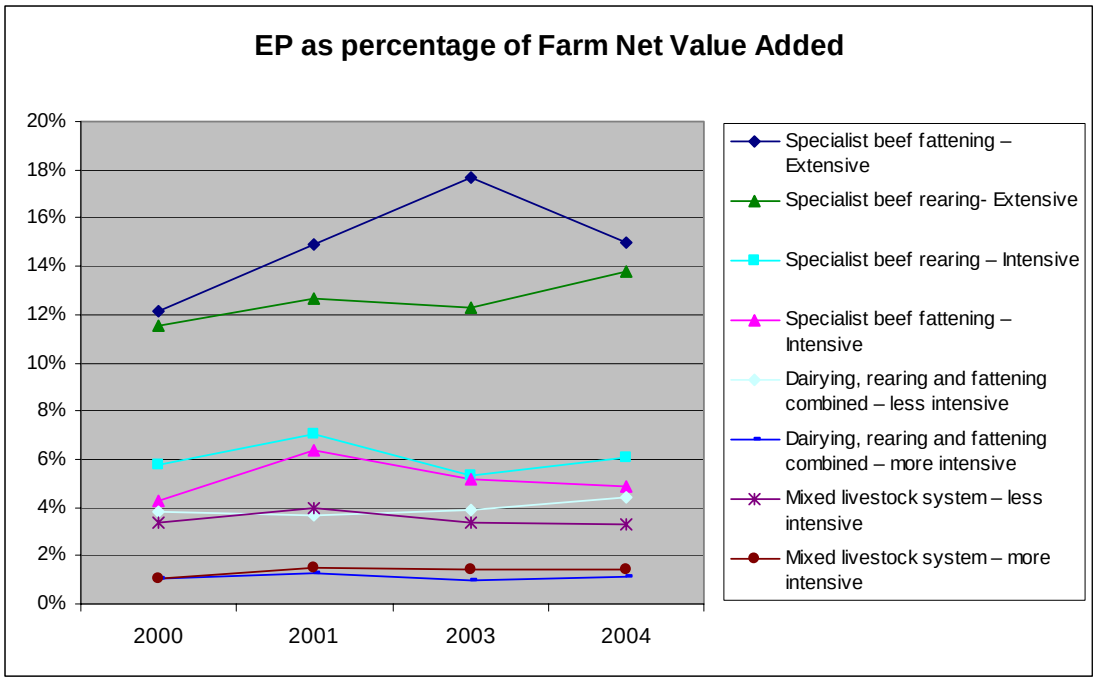


Figure 7.9 Extensification payments as percentage of Farm Net Value Added for extensive beef rearing farms for selected regions

(Source: FADN)

In the UK, in 1999/2000, beef direct subsidies represented between -504 per cent (that is, the subsidy revenue was almost five times greater than the net loss) and 270 per cent of net farm income for LFA farmers specialising in beef or mixed livestock farming. In the five years 1995 to 2000, direct livestock subsidies increased in importance as a percentage of revenue for LFA livestock farmers, from 33 per cent to 45 per cent. Extensification payments made up between 20 per cent and 25 per cent of these beef subsidies (Court of Auditors, 2002).

In France, too, interviews confirm that extensification payments have helped maintain cattle numbers and meat production in LFAs alongside other CMO measures.

In summary, based on available data on farm incomes and farm numbers, and the case studies, it is reasonable to conclude that extensification payments have helped maintain or increase the viability of less intensive beef farms in marginal areas.

7.1.2 Effect on farm production

The next hypothesis is that **a proportion of farms may stretch to more extensive forms of production with reduced stocking densities**

Those farms benefiting most from extensification payments are extensive beef rearing farms and extensive beef fattening farms, see Figure 7.6 and Figure 7.7. The total number of cattle on extensive beef fattening farms has been relatively stable over the period since 1994, whereas there has been a significant increase in the total number of cattle on extensive beef rearing farms, see Figure 6.8. During this time, there have also been changes in the number of both types of farm, a decrease for extensive beef

fattening farms and an increase for extensive beef rearing farms. The net effect is that there has been an increase in the average number of cattle per farm on both extensive rearing farms and extensive fattening farms (see Figure 6.9).

The fact that the percentage increases in average number of cattle per farm are not dissimilar to those for other (intensive and mixed) types of beef farm suggests that extensification payments do not appear to have had a significant impact in terms of either reducing or indeed increasing cattle numbers. Other factors are likely to have been important not least the production incentive provided by the main direct payments (suckler cow premium and beef special premium) and the need to reduce costs by securing economies of scale.

FADN data for 2000-2004, showing an increase in the average number of cattle per farm receiving extensification payments, support these findings (see Table 7.1).

Table 7.1 Number of animals receiving extensification payments, EU average per farm

Farm type	2000	2001	2003	2004
Specialist beef fattening – Extensive	21.63	26.66	32.38	30.88
Specialist beef rearing - Extensive	29.15	30.52	34.79	35.05
All farm types	10.43	11.37	12.12	12.43

(Source FADN)

Turning to stocking density, Figure 6.21 shows a decreasing stocking density for specialist beef rearing and fattening farms, in common with other types of farm. However Figure 7.10 contains more detail, showing the stocking density on extensive beef rearing farms in selected regions in countries with the highest expenditure on extensification payments. Instead of reducing stocking density, these farms generally appear to have maintained or increased stocking density.

These findings are not entirely surprising. The Court of Auditors report (2002) concluded that the extensification payments do 'little to encourage intensive farmers to use more extensive methods'. The European Commission replies to the same report confirm and justify this, stating that 'the premium encourages extensive farmers to continue their extensive production' and that without specific support, in the form of extensification payments, extensive producers may have been encouraged to abandon extensive production methods given the difficulties in the bovine market.

The recent evaluation of extensification payments (Ernst & Young, 2007) confirms this finding, concluding that extensification payments have had a weak effect in terms of reducing stocking density and encouraging genuine extensification at farm level and no effect on the reduction in stocking density at regional level. Only a small percentage of intensive farms (more than 2.2LU/ha) have entered in the extensive premium scheme (between 1999 and 2002): 5 per cent in the countries with one tier and 11 per cent with two tiers.

Instead, they found that a key contribution of extensification payments was to maintain extensive agriculture and keep low stocking rates in extensive production regions. 93 per cent of the extensification payment beneficiaries in 1999 had a similar stocking density in 2002.

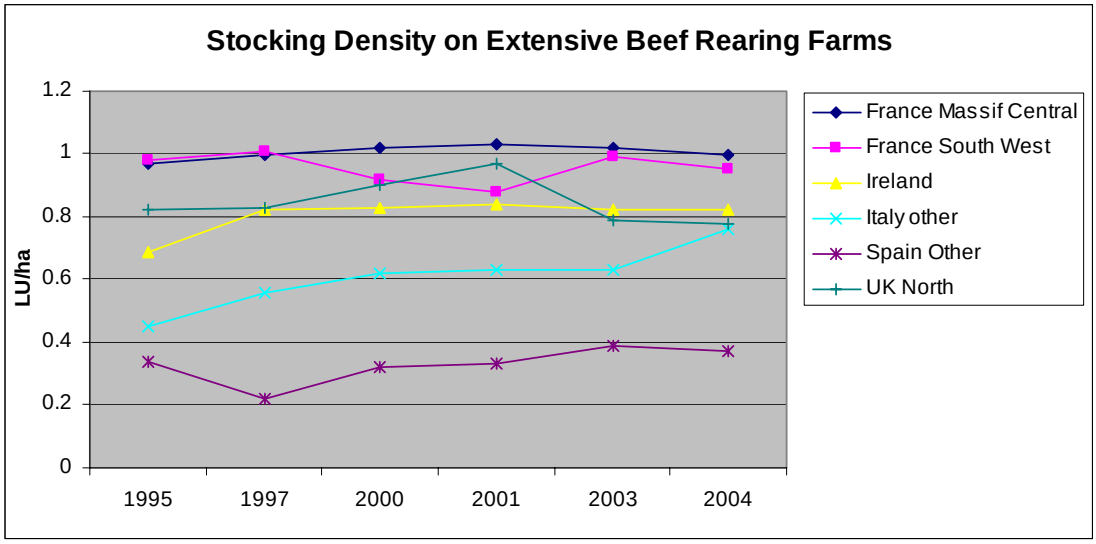


Figure 7.10 Stocking density (LU/ha)[48] on extensive beef rearing farms for selected regions, average per farm

(*Source: FADN data)*

Data on the distribution of extensification payments support the contention that the majority of the extensification payments support existing, extensive producers rather than encourage additional extensive farming. Over 65 per cent of EU cattle on which either the beef special premium or suckler cow premium was paid during 1994 to 2000 also qualified for extensification payments, see Figure 7.11. In France, Ireland and the United Kingdom, which have two thirds of the EU's suckler cow herd and where such farming is traditionally extensive, the proportion of cattle receiving extensification payments was higher: France (80 per cent), Ireland (75 per cent), and United Kingdom (76 per cent). In some regions, the proportion was even higher, for example over 90 per cent in the Auvergne region in France (91 per cent of those benefiting from the BSP and 94 per cent of those benefiting from SCP). During the same period, less than 5 per cent of extensification payments were in Member States where intensive beef rearing is more prevalent (in order of financial importance: Italy, Belgium, Denmark, Netherlands).

However, the literature reviewed provides evidence that some farmers have indeed reduced stocking densities to claim the payment. Andersen, E. et al. (2000) in a review of two studies, one in Denmark (Andersen, 1999) and the other in the United Kingdom (Winter et al., 1997; Winter and Gaskell, 1998) highlighted the fact that 38.5 per cent of extensification payment claimants sampled in Denmark said that they had had to reduce their stocking densities in real terms to comply with the extensification payment conditions, as did 23.7 per cent of extensification payment claimants sampled in the United Kingdom. The difference in the proportion of farmers reducing stocking density in the two countries was linked to the more

[48] Stocking rate based on FADN Standard Result variable SE120; this is the average number of bovine LU (except calves for fattening) and sheep/goats per hectare of forage UAA.

intensive character of the Danish beef industry compared to that in the United Kingdom. Differences in the intensity of farming between the two countries also had impact on the proportion of livestock farmers receiving extensification payments (12.9 per cent in Denmark and 65.2 per cent in the United Kingdom). In other words, in the more intensive country, fewer farmers claimed extensification payments and where they did so, they needed to adapt more to qualify for them. In the majority of cases, this involved increasing their forage area (rather than decreasing stock numbers). This was mainly achieved by taking on additional permanent grassland as opposed to increasing the area of forage crops.

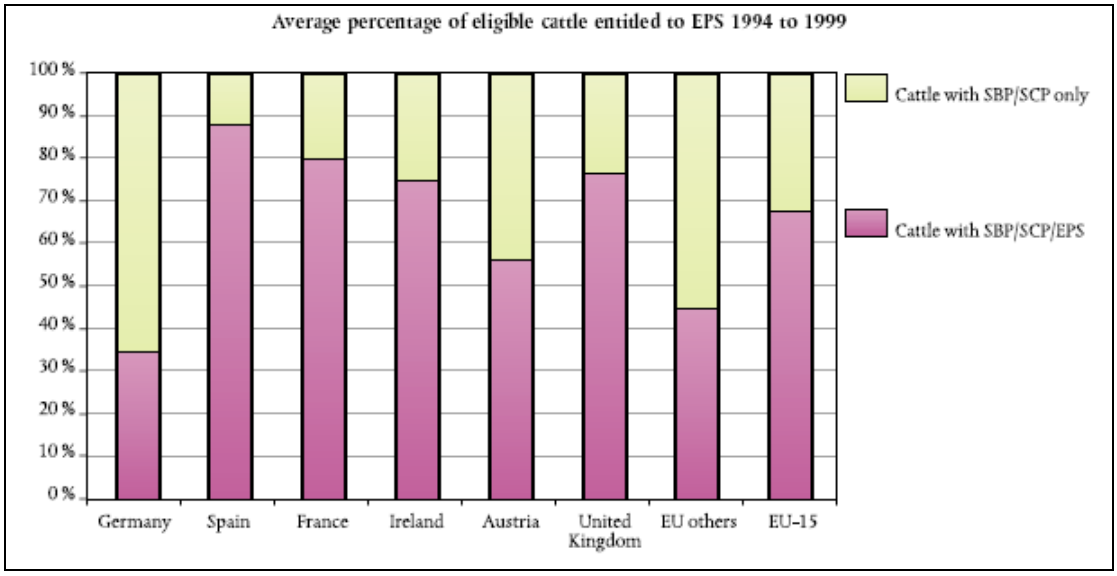


Figure 7.11 Proportion of eligible cattle entitled to extensification payments, 1994-2000

(Court of Auditors, 2002)

So, while a range of other factors influence producers' decisions regarding cattle numbers and stocking densities (for example, cost and availability of lands and buildings, natural conditions, other payments, agricultural prices, consumer demand, the impact of BSE and other animal diseases etc), extensification payments may have had a significant effect on at least some farmers' decisions. This is particularly likely to be the case in the more intensive countries.

A major weakness identified by all the literature (for example, Andersen, E. et al., 2000) prior to the Agenda 2000 reforms was that extensification payments did not take actual stocking density into account in the farm eligibility criteria. Beef producers were therefore able to benefit from higher animal subsidies either by excluding a number of animals from their special beef and suckler cow claims in order to achieve a lower theoretical stocking density, and therefore getting the extensification premium on all their claimed cattle, or by limiting their claims to 15 animals, as small producers are not required to meet the stocking density requirements to get the main beef premiums. This weakness was addressed by Agenda 2000 reforms. However, it should be noted that the new stocking density rules still excluded sheep not subject to claim (i.e. rams and all lambs under 1 year old) and did not change the fact that land declared as forage area was not necessarily grazed by cattle only. The stocking density rules for suckler cow premium and beef special premium remained unchanged, leading to a different approach between these schemes

and the extensification payments scheme. The Commission, in its response to the Court of Auditors report, highlighted the different objectives of these stocking density rules, stating that 'the stocking density for the 'basic' premiums limits the number of animals eligible to the premiums and leads to a reduction in the number of premiums granted (whereas) the stocking density for the extensification payment works as a trigger for a top-up payment to the 'basic' premiums.'

Evidence from the case studies in terms of the role of extensification payments in reducing cattle numbers and stocking densities is as follows:

In the Auvergne, France, relatively few farmers needed to adapt their farming systems in order to receive extensificaton payments, given the traditionally low stocking density of 1-1.2 LU/ha for beef rearing farms. Three of the four farmers interviewed who received extensification payments acknowledged that they did not have to change their practices to benefit from it, although they did need to take care to remain below the stocking density limit. It should be noted that second pillar measures, including LFA compensatory and agri-environment scheme payments, also impacted on stocking rates and these may have had greater impact given that they were responsible for 39 per cent of subsidies in the region, compared to 11 per cent for the extensification payments.

In the UK, farmer interviews suggest that extensification payments were rarely accompanied by a genuine reduction in stocking rates. This position was confirmed by a study by Entec (1997) which found that the introduction of the extensification premium to suckler cow premium did not result in significant reductions in the numbers of suckler cows kept by farmers. In some cases, farmers may have rented additional land to meet scheme requirements but without actually changing farm management. In other cases, farmers were even able to increase stocking levels and still qualify for the premium (Winter et al 1998). The majority of beef farmers received the extensification premium, ranging from 86 per cent of LFA suckler farmers to 45 per cent of farmers with semi-intensive systems (Winter et al 1998). While cattle and sheep farms were the main beneficiaries of extensification premium, a significant proportion of mixed farms and, to a lesser extent, dairy farms with eligible cattle also received the premium (Entec 1997). It should be noted that both studies cited were undertaken before the stocking density rule change in 2000.

In Ireland, there is some debate about the extent to which extensification payments reduced stocking levels or simply sustained extensive stocking rates. In practice, it probably reduced stocking rates but only at the margin (for example, where the stocking rate was near to 1.5 LU/ha) and then only for the relatively more intensive beef and dairy farms (a small proportion of the total). What the extensification payments did do successfully however was to cap stocking rates for many cattle farms with stocking rates lower than 1.4 LU/ha in 1993. Many farmers continued to increase their stocking rates, incentivised by headage based payments, but only up to this threshold. In this way, extensification payments had an important role in limiting the impact of the other beef schemes. In Ireland, the economics of the various schemes *inter alia* favoured extensive grazing with the benefit of both extensification payments and agri-environment scheme payments (the Rural Environment Protection Scheme was launched in 1994, at around the same time as the extensification premium).

In Spain, in the drier regions (i.e. all but the Atlantic regions and Pyrenees), suckler-cow holdings generally have stocking densities far below the limits applied to extensification payments. Stocking densities generally are well below 0.5 LU/ha, and 0.2LU/ha is quite common. As a result, nearly 90 per cent of animals receiving suckler cow premium also received the extensification payment, so extensification payments had little impact other than as an additional income stream for such farms. In the North West of Spain, where beef farms are quite often over 1.4 LU/ha, extensification payments did not encourage many farmers to extensify, for two reasons: the difficulty (and cost) of finding suitable extra land, and the fact that herds are small, so farmers are very reluctant to reduce numbers. In some cases farmers acquired rights to common grazing land in order to benefit from the extensification payment, although they did not necessarily graze the land. It should be noted that the omissions from the stocking density calculations, including sheep and goats not subject to claim, and pigs, were potentially significant in some regions of Spain (and possibly elsewhere in Europe). These types of livestock can exert significant grazing pressure, for example pigs in the dehesa systems of the west of Spain.

In Germany, extensification payments were widely taken by large farms in the new länder as little or no adaptation was necessary, the stocking densities being less than in other parts of the country. In Bavaria, most farms with suckler cows also applied for extensificaton payments for the same reason and, in LFA mountainous areas, farms involved with heifer fattening also applied. In some cases, farmers maintained livestock numbers and tried to lease in additional fields, especially in LFAs where rents were low.

In Italy, extensification payments were mainly taken up where beef production was already extensive (for example, mountainous regions, Southern Italy and Sardinia). Here they were considered more as an additional income stream than as a way of redirecting production. The interviews suggest that had extensification payments not been available, then nothing much would have happened as intensification in these areas was limited by other factors, physical and geographical mainly.

To summarise, while in many cases extensification payments have supported farms with existing extensive systems of production, evidence from the data, literature and case studies enables us to confirm the hypothesis that extensification payments, at least in more intensive areas (for example, Denmark), encouraged a proportion of farms to adopt more extensive forms of production with reduced stocking densities. Conversely, however, farmers in some already extensively stocked countries (for example, Ireland, Spain) were able to increase stocking rates and still qualify for extensification payments.

7.1.3 Impacts on farming systems and farm management

The next hypothesis is that **the number of less intensive beef systems has been maintained at a higher level than otherwise by extensification payments**

The previous sections support the hypothesis that extensification payments have helped maintain less intensive systems in the sense that they have contributed to the incomes of extensive beef rearing and beef fattening farms (around 12-15 per cent of farm net value added, see Figure 7.8) and maintained the viability of less intensive systems, especially in LFAs. In addition, Figure 6.19 and Figure 6.20 show that the total number and total utilisable agricultural area of extensive beef rearing farms has increased significantly over the period 1994-2004. The total number and area of extensive beef fattening farms has also been relatively stable. Therefore, less intensive beef systems, despite their relatively poor profitability, do appear to have been supported over the period in which extensification payments operated.

However, as the Court of Auditors report concludes, extensive beef and mixed livestock farming often takes place in areas of the EU where land quality, natural handicaps and climate allow little choice for other agricultural alternatives. In addition, those farmers with extensive systems often benefit from EU-funded schemes including agri-environment schemes and compensatory allowances for LFAs. In other words, the extensification payment is only one of a number of influences on and supports for less intensive systems.

The case studies from France, UK, Ireland and Spain support these findings. For example, in Ireland, extensification payments contributed to the maintenance of smaller, extensive beef farms especially in marginal areas. It provided another source of income, alongside the Rural Enterprise Protection Scheme, the Disadvantaged Areas Compensatory Allowance Scheme and the main direct payments, particularly the Suckler Cow Premium.

A further hypothesis is that **extensification payments have led to changes in management practices including more extensive grassland management, more eligible forage area and more grass as a proportion of forage area.**

Trends in input costs per hectare for selected regions (in countries with the highest expenditure on extensification payments) are shown in Figure 7.12. Inputs covered include fertilisers, crop protection (sprays) and feed for grazing livestock. The graph shows a generally low level of input costs per hectare but a gradual increase over the period. The exception is in Italy, where there has been a more significant increase. This may be attributed to inflation, a slower growth in forage area relative to input costs compared to other countries, and the replacement of banned meat and bone meal in feed with more expensive imported oil-cake and vegetable flour.

It should be noted that Andersen (2004) proposed a threshold of €150/ha for High Nature Value permanent grassland systems and arable grazing livestock systems in Europe. This corresponds closely to the input rates on extensive beef rearing farms shown in Figure 7.12, suggesting their potential for nature protection due to their extensive nature.

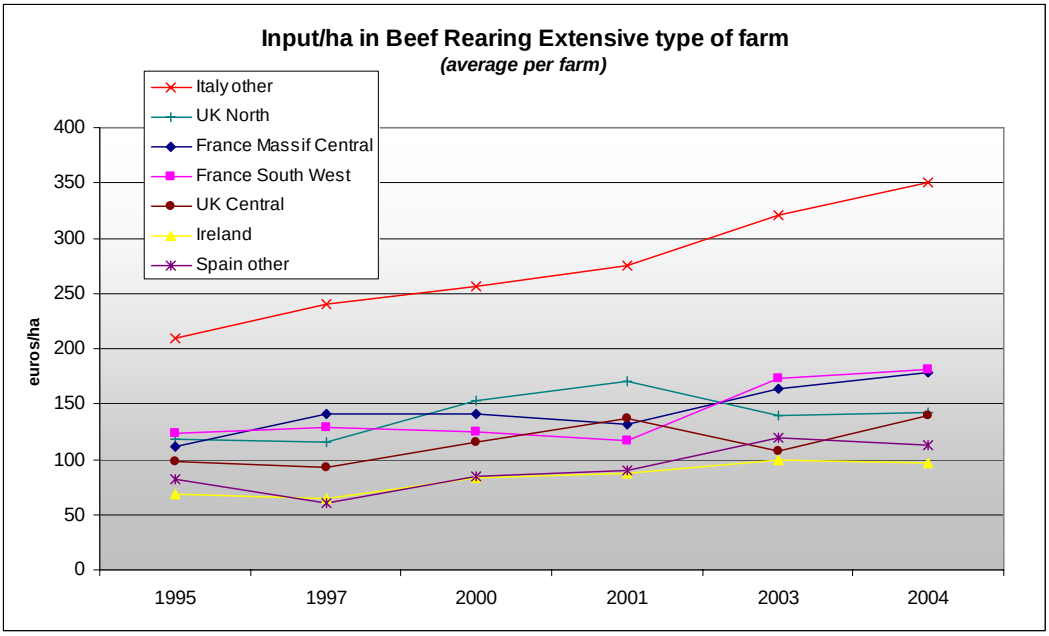


Figure 7.12 Input costs per hectare[49] on extensive beef rearing farms for selected regions, average per farm

(Source: FADN)

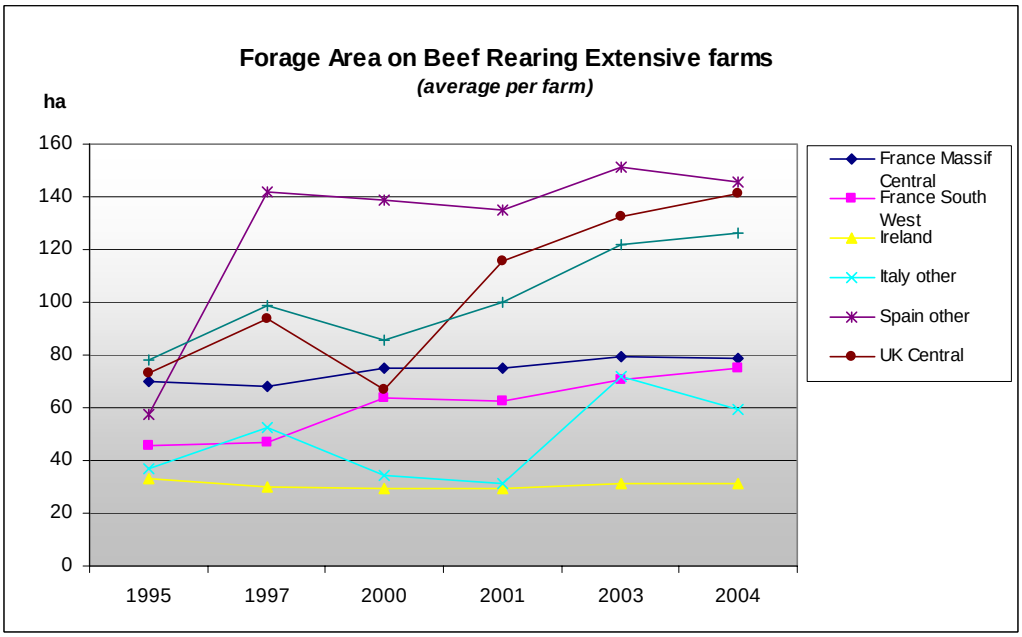


Figure 7.13 Forage area[50] on extensive beef rearing farms for selected regions, average per farm

(Source: FADN)

[49] Input costs per hectare are based on the following FADN standard result variables: 'Fertiliser costs', 'Crop protection' and 'Feed for grazing livestock' divided by UAA.

[50] Forage area is calculated as the sum of Temporary grass areas, Meadow and permanent grass areas and rough grazing.

Figure 7.13 shows trends in forage area per farm for extensive beef rearing farms in the same regions. Forage area is defined as permanent pasture, meadow, temporary grass and rough grazing. As one might expect with increases in the average number of cattle per farm (Figure 6.8) and reducing average stocking densities (Figure 6.21), the average forage area per farm in most regions has gradually increased over the period. The exception is Spain Other, where there was significant increase between 1995 and 1997, although this is most likely to be explained by a change in the approach to data recording. This increase in forage area, combined with the stable or increasing number of cattle, reflects the strategy adopted many farmers which was to secure more grassland rather than to decrease cattle numbers. This was possible in extensive grazing regions with large areas of unutilised farmland and, to some extent was also encouraged by some agri-environment measures (for example the *prime á l'herbe* in France).

Grassland made up the majority of the total forage area (including both grassland and fodder crops) for extensive beef rearing farms in the selected regions over the period, 1994-2004. In other words there appears to have been no noticeable shift to grass-based forage, at least for these farms, as a result of extensification payments.

These findings broadly concur with the Court of Auditors report (2002), this sampled a number of extensification payment scheme claimants in Member States and found that extensification payments had little impact on the production decisions taken by producers. Further evidence of limited impacts on production and management decisions, is that 89 per cent of claimants in Spain, 43 per cent of claimants in Ireland and 44 per cent of claimants in the United Kingdom (52 per cent in Scotland, 40 per cent in England) opted to claim extensification payments under the simplified scheme, whereby they undertake to keep their stocking rates below a certain level at all times, indicating that these were most likely to be existing extensive farmers.

Case study evidence supports the contention that extensification payments tended to support existing extensive management rather than encourage more farmers to adopt extensive management.

In Ireland, for example, extensification payments helped to keep relatively low stocking rates on the majority of Irish beef farms. This, in turn, sustained low levels of inputs, restricted the quantity of manure and slurry being produced, stored and spread, and limited the improvement of pasture. One unintended impact included a reduction in sheep numbers on some farms claiming the Extensification Premium, particularly in the West. Sheep numbers counted towards extensification stocking rate but attracted no payment therefore many farmers reduced sheep numbers and substituted cattle to optimise returns.

In Italy and Germany, too, extensification payments had little impact on systems of production and broadly contributed to maintaining the status quo.

7.1.4 Summary of farm impacts

A summary of the farm impacts of extensification payments is set out below:

- Extensification payments have contributed to the maintenance of extensive beef farms across the EU, especially in LFAs. Extensification payments have worked in tandem with other direct payments as well as agri-environment and LFA compensatory schemes to support extensive beef farms;
- Extensification payments have helped cap the increase in the number of beef cattle and stocking densities in certain areas (for example, Ireland), where direct payments may otherwise have encouraged an increase in production. In some cases, the extensification payment stocking density threshold, and the headage basis of payment, has acted as an incentive to increase beef cattle numbers and stocking densities up to the extensification payment stocking density threshold;
- Extensification payments have made a much more limited contribution in terms of reducing cattle numbers and stocking densities. This has tended to occur where stocking densities are marginally above the extensification payment stocking density threshold;
- Extensification payments have contributed to the maintenance of less intensive systems and extensive grassland management, and had a limited impact in terms of encouraging extensive grassland management over a greater area.

With reference to the impacts of the extensification payments on specific characteristics of beef production - scale, intensity, regional distribution and specialisation - the following conclusions can be drawn:

Scale and intensity of production: Extensification payments have generally helped extensive producers maintain their existing scale and intensity of production. However in some areas, extensification payments have also helped prevent increases in production and intensity which might otherwise have occurred. In a limited number of other cases, they have contributed to a decrease in production and intensity.

Regional distribution: Extensification payments have contributed to the maintenance of extensive systems of beef production across the EU, in particular in Atlantic regions, (UK and Ireland), France (Massif Central), dry Mediterranean regions (Spain) and mountainous regions (Austria). Beef production in marginal areas, LFAs, has been supported by extensification payments working in tandem with other direct payments and LFA and agri-environment scheme payments.

Specialisation: Extensification payments have benefited the incomes of extensive beef rearing and fattening farms in particular. They have also contributed to the increase in the number and area of extensive beef rearing farms, alongside other drivers.

7.2 Analysis of environmental impacts of extensification payments

The environmental impacts of extensification payments are explored below.

Water quality
Key influences on water quality which may be affected by extensification payments include: total number of cattle, stocking rates, extent of different types of forage and use of fertilisers and sprays. In broad terms, extensification payments have supported less intensive beef systems without significantly reducing or increasing cattle numbers. This suggests that the effects on water quality have been fairly neutral, as payments will not have resulted in significant changes in quantities of organic waste. Where stocking densities are close to the threshold, some farmers may have reduced cattle numbers to qualify for extensification payments, potentially benefiting water quality. In other areas, however, where traditional stocking densities are low, extensification payments may have encouraged farmers to increase stock numbers and stocking densities up to the threshold stocking density, adversely affecting water quality. The conditions requiring 50 per cent of total forage area to be pasture are likely to have been positive, but limited, in terms of reducing siltation and inputs reaching watercourses. Overall, the impact of extensification payments on water quality has probably been fairly neutral, in the sense that they have maintained extensive systems over a wide and increasing area of land, and discouraged intensification, thereby limiting related water quality problems.

Water resources
Water resources are unlikely to have been significantly impacted by extensification payments as overall there has been little impact on stock numbers and only limited impact on forage production. However, in some drier areas, where stocking densities are low, extensification payments will have contributed to increased pressure on water resources by encouraging increases in cattle numbers up to the threshold level.

Biodiversity
One of the positive environmental influences of extensification payments in some regions, has been to help maintain cattle numbers on extensively grazed habitats, both in LFAs and elsewhere. In other regions, particularly Mediterranean regions, however, the retention of grazing by sheep/goats is often more important environmentally.

Extensification payments have supported the extensive management of grassland, heathland, moorland and other habitats, very often alongside agri-environment scheme payments, LFA compensatory payments and other CMO measures (this is supported by evidence from Ireland, UK and France). This will have benefited High Nature Value farming systems. They did not however contribute to a general reduction in stocking densities and in some cases they supported stocking densities at a level beyond that which was suitable for the environmental carrying capacity of the land, leading to overgrazing and loss of habitat quality. It could be argued that the extensification payment stocking densities sent out the wrong message to farmers by implying that it was acceptable to maintain stock up to the limit when in many cases it was damaging. This occurred in areas as diverse as upland moorlands in the UK through to dehesas in Spain.

One of the key benefits of extensification payments is that they specifically supported grazing with cattle (as well as mixed cattle and sheep grazing). This has been beneficial for maintaining the diversity and structure of vegetation on certain habitats. However, in certain areas, such as in Spain, the combination of SCP and extensification payments means that support for suckler cows is much higher than support for sheep/goats (measured in €/LU). Cows have, therefore, tended to replace sheep/goats in upland and mountain areas and this has been reported to result in overgrazing of habitats by untended cattle.

The conditions for calculating stocking densities have had unintended consequences for biodiversity, both negative and positive. For example, in Ireland, the inclusion of sheep receiving headage payments in the stocking density calculation resulted in a reduction in sheep being grazed in certain upland areas[51] and a decrease in the amount of overgrazing which had been a significant problem. In Spain, the conditions for extensification payments did not deal with the problem of excessive grazing by other stock such as pigs. That said, the change in the stocking density rules as part of Agenda 2000 is generally thought to have been positive for biodiversity.

By preventing the deterioration of water quality resulting from intensification, extensification payments have also contributed to the maintenance of aquatic wildlife.

Landscape

Extensification payments are likely to have supported traditionally managed landscapes in LFAs and lowland areas, again alongside other schemes and measures. The extra income from these payments has benefited less profitable small and/or part time farms in these areas, thereby maintaining diversity. The continuation of cattle grazing and related grassland management will also have contributed to the maintenance of traditional landscapes, sustaining features such as small fields, boundary walls and hedges.

Soils

For the most part, extensification payments do not appear to have had a significant impact on soils. The maintenance of grazed habitats by cattle supported by extensification payments will generally have been beneficial in that they will have prevent any negative impacts that might have occurred from increased intensification. In certain cases, however, where stocking densities have increased as a result of extensification payments, some soil-related problems may have arisen including soil erosion from overgrazed habitats and/or or soil compaction in certain areas.

Air quality and climate change

By contributing to the maintenance of cattle numbers, extensification payments have broadly sustained greenhouse gas emissions at the same level that they would have been otherwise. Without extensification payments, some farmers may well have increased cattle numbers beyond the scheme's stocking density thresholds, whereas

[51] Claimed sheep counted towards the extensification payment stocking density calculation but did not generate any additional extensification payment.

others may have maintained lower stocking density rates than they eventually did while in receipt of extensification payments.

Extensification payments are unlikely to have had an adverse impact on air quality, via ammonia emissions, due to the dispersed and extensive nature of the cattle benefiting from the payments.

Permanent pasture is beneficial for long term storage of carbon in the soil. According to INRA researches, the carbon storage in the first 30 cm in the soil is 70 tonnes for permanent grassland against 45 tonnes for an annual crop.

Other issues

Evidence from Italy suggests that more extensive farming practices, supported by extensification payments, may also improve animal health and animal welfare. The incidence of several animal diseases (BSE, FMD etc.) is related to the practice of intensive production systems. The reduction of stocking density can reduce the development and the spreading of those diseases. Lower stocking density is also reported as being associated with better animal welfare. The relationship between extensification payments and public health is indirect. In particular, the reduction of stocking density and the reductions in the intensity of grassland management may reduce water pollution and nitrogen loading in some water catchments, two conditions that clearly improve public health. In some Mediterranean areas, extensification payments have helped maintain open spaces through grazing and thereby contributed to preventing fire risk.

7.3 Conclusions

A specific objective of extensification payments was to encourage extensive beef production in order to preserve and improve, in the longer term, environmental conditions. Determining the extent to which this has been achieved is difficult however as there was close interaction, at farm level, between extensification payments and other measures and schemes, including other beef direct payments, LFA compensatory payments and agri-environment scheme payments as well as the influence of other policies and legislation, market forces and socio-economic trends. That said, the following conclusions can be drawn from the analysis.

- **Extensification payments** contributed around 12-14 per cent, on average, of the farm net value added of more extensive specialist beef rearing farms in the EU-15, according to FADN data in 2000-2004. For the more extensive beef fattening farms the range was 12 to 18 per cent compared with 6 per cent for more intensive farms. This income effect **will have contributed to the viability of a wide range of beef producers and the areas remaining under their management**.

- **This income trend is likely to have contributed to the increase in the number and area of extensive beef rearing farms and helped maintain the number and area of extensive beef fattening farms**. LFAs have also experienced this trend, so it is reasonable to conclude that extensification payments have contributed to maintaining and improving the viability of, mainly extensive beef rearing, farms in these areas. This has sustained a wider distribution of beef farms and cattle than otherwise.

- Extensification payments have limited the growth in beef cattle numbers and stocking density in certain areas, as farmers have sought to maintain access to the additional payment, however, in other areas, extensification payments have acted as an incentive to increase beef cattle numbers and stocking densities up to the stocking density threshold. **Extensification payments have had limited impact in terms of reducing cattle numbers and stocking densities, with this impact tending to occur when stocking densities are only marginally above the stocking density threshold.**

- **Extensification payments have generally sustained less intensive systems** including extensive grazing regimes and grass-based forage production. To a lesser extent, they have also encouraged extensive grassland management over a greater area of land.

The environmental impacts of extensification payments are as follows.

- **Biodiversity and landscapes** have benefited from grazed habitats being extensively grazed by cattle or mixed stock. Extensification payments have also contributed to be continuation of traditional farming practices which sustain features such as small fields, boundary walls and hedges.

- **Water quality and soils** have also benefited from extensification payments with more land being subject to low intensity management, resulting in less eutrophication and siltation and soil erosion. Fewer farms have intensified, thereby avoiding adverse impacts on water quality.

- **Extensification payments have had some negative environmental effects** however. These arise from an increase in stocking densities in some areas leading to overgrazing, soil erosion and water pollution. In drier areas, increased stock numbers have also put additional pressure on limited water resources.

- The maintenance of beef cattle numbers as a result of extensification payments has also sustained **greenhouse gas emissions** from the extensive beef sector and, to a lesser extent, ammonia emissions. However, a more general intensification, which may have taken place in the absence of extensification payments, is likely to have had more adverse impacts on climate change and air quality.

In conclusion, our analysis suggests that, overall, extensification payments have had a mixed impact on the environment. They have had a somewhat positive effect, firstly by helping to sustain extensive cattle grazing across large areas of land, with biodiversity and landscape benefits in particular, and secondly by limiting the intensification of beef production systems, thereby reducing potential negative impacts on water quality, water resources, air and soil pollution. However, while the payment has encouraged the retention of extensive grazing systems, it has not necessarily encouraged stocking levels to be within the ecological carrying capacity of the land and agri-environment schemes have often been needed to deal with issues of overgrazing. A lower, or more flexible, stocking threshold level would potentially have had a greater environmental impact, particularly in those regions where the extensification payment has continued to allow overgrazing.

8 COUPLED PAYMENTS AFTER THE 2003 REFORM IN THE BEEF AND DAIRY SECTOR

Q2.3: To what extent are the **coupled payments** applied after entering into force of the 2003 CAP reform in coherence with the obligation of integrating the environmental protection requirements into the CAP?

This chapter focuses on the extent to which coupled payments in the beef and dairy sectors applied after the 2003 reform are in coherence with the obligation of integrating environmental protection requirements into the CAP. The effects of the following different coupled or partially coupled payments in the beef and veal sector are examined: suckler cow premium; beef special premium; slaughter premium for calves; slaughter premium for adult cattle; and, in respect of certain new Member States, complementary national direct payments. The effect of the coupled dairy premium is also explored in this chapter. The effects of the Single Payment Scheme and Single Area Payment Scheme, which operate alongside coupled payments in certain Member States, are considered in Chapter 9.

The chapter is set out as follows: the introduction summarises the different coupled payments, outlines the hypotheses that can be formulated about the likely impacts of the different coupled payments and briefly describes the methodological approach adopted. Section 8.2 sets out the impacts on farm income, farm production, farm systems and structures, and farm management (including regional effects). Section 8.3 describes the related environmental impacts.

The start point for the period covered by the analysis is 1 January 2004 for the coupled dairy premium and, for the most part, 1 January 2005 for coupled payments in the beef and veal sector. The end point is early January 2007. The time coverage is complicated by the range of implementation dates in the Member States for coupled payments in the beef and veal sector and the date at which the dairy premium is decoupled and integrated into the Single Payment.

A major barrier facing the analysis is the short time period between the introduction of coupled payments and the present day. This limits the availability of data and other evidence as well as the likely impacts on the ground. The short term impact of the coupled dairy premium can be difficult to identify particularly when it broadly compensates for the milk cut price.

A brief summary of the coupled payments is set out below to provide the basis for our subsequent analysis.

Coupled payments in the beef sector:
Under the 2003 reform of the CAP, the following combinations of coupled payment and coupling percentages are permitted:

1. Up to 100 per cent of calf slaughter premium; and/or
2. One of the following three options:

a. Up to 100 per cent of the suckler cow premium and up to 40 per cent of the slaughter premium for adult bovines
b. Up to 100 per cent of the slaughter premium for adult bovines
c. Up to 75 per cent of the beef special premium

The premium rates for the coupled payments are the same as those applying in 2004, prior to the implementation of the CAP reform agreement.

Nine Member States of the EU-15 have adopted coupled payments in the beef sector, see Table 8.1 below. Further details of Member State implementation of the 2003 reform options are set out in Annex II.

Table 8.1 Beef sector coupled payments by Member State[52]

Beef sector coupled payment option	Beef sector coupled payments and coupling rates:	Member State	Start date
1 & 2a	Slaughter premium calves (100%) Suckler cow premium (100%) Slaughter premium bovine adults (40%)	Austria	2005
		Belgium[53]	2005
		France	2006
		Portugal	2005
		Spain	2006
1 & 2 b	Slaughter premium calves (100%) Slaughter premium bovine adults (100%)	**Netherlands**[54]	2006
2c	Male beef special premium (75%)	Denmark	2005
		Finland	2006
		Sweden[55]	2005

Source: adapted from European Commission, February 2007

France, Portugal and Spain have 100 per cent coupling for all listed beef payments in their outer regions. When applying the coupled suckler cow premium, Member States have the option to grant an additional national suckler cow premium of €50 per animal provided no discrimination is caused within the Member State concerned.

Dairy Premium:
The dairy premium was first announced as part of the Agenda 2000 reform, subsequently amended in the 2003 reform and finally introduced as a coupled payment in 2004. The objective of the dairy premium is to compensate milk producers

[52] Case studies have been undertaken for Member States highlighted in bold.

[53] Belgium (Zone Sud: Wallonia) opted for 100% suckler cow premium only

[54] Netherlands: slaughter premium calves 100% coupled until 2010, thereafter decisions have to be made

[55] Sweden: 74.55% beef special premium until 2009

for institutional milk price cuts.[56] The dairy premium is based on a payment per tonne of milk quota, and its value has increased gradually over the period 2004-2006. Additional payments are also payable, either per tonne of quota held or according to other objective criteria determined by Member States.

From 2005, Member States have the option to decouple the dairy premium and incorporate it into the Single Payment. Decoupling becomes obligatory for all Member States from 2007. The timing of the decoupling of the dairy premium by Member State is shown in Table 8.2 below:

Table 8.2 Decoupling of dairy premium by Member State

Year in which dairy premium was decoupled	Member States
2005	Denmark, Germany, Ireland, Sweden, UK
2006	Belgium, Spain, France, Italy, Luxembourg, Finland,
2007	Greece, Netherlands, Austria, Portugal,

(Source: European Commission)

Expenditure on the coupled dairy premium and the additional payment in 2005 and 2006 (relating to the 2004 and 2005 claim years) by Member State is set out in Table 8.3. The main beneficiaries in 2005 were Germany, France, the United Kingdom, the Netherlands and Italy.

Table 8.3 Coupled dairy premium and additional payment expenditure in the EU15 and Slovenia in 2005 and 2006 (M Euros)

	Dairy premium		Additional payments	
	2005	2006	2005	2006
Austria	22.0	42.7	10.1	19.5
Belgium	26.5	51.8	12.1	23.4
Germany	224.2	0.0	101.0	0.0
Denmark	36.2	-	16.3	-
Spain	45.4	87.8	20.1	38.2
Finland	19.2	37.0	8.8	17.1
France	193.8	376.4	88.7	171.6
United Kingdom	113.2	0.0	51.2	0.0
Greece	5.0	10.0	2.3	4.5
Ireland	42.3	0.0	19.0	0.0
Italy	80.8	155.9	36.3	69.6
Luxembourg	2.2	0.2	1.0	0.1
Netherlands	90.0	173.7	40.5	78.4
Portugal	14.8	28.3	6.2	13.5
Sweden	26.9	34.7	12.2	15.7
Slovenia	1.0	2.4	0.5	1.2
Total	**943.5**	**1088.9**	**426.1**	**452.7**

Member States budget data Dairy premium - (Art.95, R.1782/03) and for Additional Payment (Art.96, R.1782/03) - (Source DGAgri)

[56] The butter intervention price was cut by 25% between 2004 and 2007 and the Skimmed Milk Powder price by 15% between 2004 and 2006.

Complementary National Direct Payments:
New Member States have the option to make complementary national direct payments (CNDPs) to farmers in the beef and dairy sectors *inter alia* alongside SAPS payments or SPS. These come from their own funds or may be cofinanced via the rural development budget within ceilings set at EU level. The financial envelopes, options and payment rates are set out in Annex III.

Complementary national direct payments in the beef and dairy sectors were implemented in all new Member States. The payment types and rates vary from one country to another, however they include: suckler cow payments in five countries (Estonia, Hungary, Latvia, Lithuania and Slovakia), extensification payments in two countries (Lithuania and Hungary); beef bull/steer payments in four countries (Czech Republic, Estonia, Lithuania and Hungary); beef slaughter payments in two countries (Latvia and Lithuania); and dairy cow or milk payments in six countries (Cyprus, Estonia, Hungary Latvia, Lithuania and Malta).

Slovenia, alongside Malta, has adopted the SPS regional model with effect from 2007. Slovenia has opted to retain a 75 per cent beef special premium and an additional payment for extensive beef production (CEEC Agri Policy, 2007). Prior to 2007, Slovenia had a full range of coupled payments in the beef and dairy sectors since they opted to apply the direct payments that were in force in the EU-15 before the reform.

The Counterfactual
In assessing the potential impacts of coupled payments, it is important to be clear on the counterfactual. For the purposes of this analysis, the main counterfactual is the situation without coupled payments and without any alternative decoupled payments. This approach is consistent with the other evaluation questions. However, in this chapter, we also explore impacts relative to a secondary counterfactual, that is the situation where there are no coupled payments, but these elements have been incorporated into the main decoupled single farm payment. We also consider the impacts of (partially) coupled payments with the situation before 2005 when there were fully coupled payments.

Relative to the main counterfactual, it could be expected that coupled payments have contributed directly to maintaining farm income levels in the beef and/or dairy sectors. It may also be expected that coupled payments have contributed to maintaining higher levels of beef and veal production and milk production than otherwise. Coupled payments may also have contributed to the maintenance of particular systems of beef production, notably suckler cow production where Member States have opted for the 100 per cent coupled suckler cow premium. Consequently, coupled payments may have contributed to the continuation of both extensive systems of management and, to a lesser extent, intensive systems of management.

Consequently, it could be expected that there have been a range of environmental impacts including positive impacts, such as the maintenance of appropriate grazing regimes benefiting biodiversity, and negative impacts, such as sustained or increased pressures relating to soils, water and greenhouse gas emissions.

The main hypotheses for this evaluation question relative to the main counterfactual are listed below:

- Income from beef and dairy production can be expected to be maintained at a higher level than otherwise by coupled payments;
- Beef and dairy production may be expected to be maintained at a higher level than otherwise by coupled payments;
- Suckler cow production in marginal farming areas can be expected to be maintained at a higher level than otherwise by coupled payments; and
- Fodder production can be expected to be supported at a higher level than otherwise by coupled payments.

The methodological approach adopted in answering this evaluation question is summarised below.

The analysis of farm impacts is divided into four sections. The farm income analysis firstly seeks to verify the hypothesis that farm income from beef and veal and dairy production has been maintained at a higher level than otherwise by coupled payments. Then the farm production analysis explores the hypothesis that coupled payments have maintained a higher level of production and a higher stocking density than otherwise. The farming system analysis then seeks to verify the hypothesis that suckler cow production has been sustained in marginal areas. Finally, an analysis of impacts on farm management considers the hypotheses that coupled payments have maintained intensive and extensive grassland management and maintained fodder production at a higher level than otherwise.

The second stage of the analysis assesses the environmental impacts of any farming changes resulting from coupled payments. This considers specific impacts of the farming changes on key environmental receptors including water quality, water resources, biodiversity, landscape, soils, and air quality and climate change. Finally, conclusions are drawn in relation to the counterfactual at both European and Member State level.

Data sources for the above analysis include FADN (although this is not available beyond 2004) and other databases, evidence from the case studies in the form of findings from national literature, data sources and interviews, and a review of recent relevant literature. It should be noted that empirical data is particularly important in the analysis for this question given the short timeframe in which coupled payments have operated.

In undertaking the assessment of impacts, it is acknowledged that disaggregating the effects of coupled payments from market changes, structural changes, technological development and other support is difficult. The relative impact of the coupled element of the single farm payment, compared to the decoupled element, is also likely to vary both at the level of the Member State and the individual. Uncertainties and lack of evidence are highlighted.

A causal diagram presenting policy measures, other contextual measures and the potential environmental impacts to be examined are shown in Figure 8.1 .

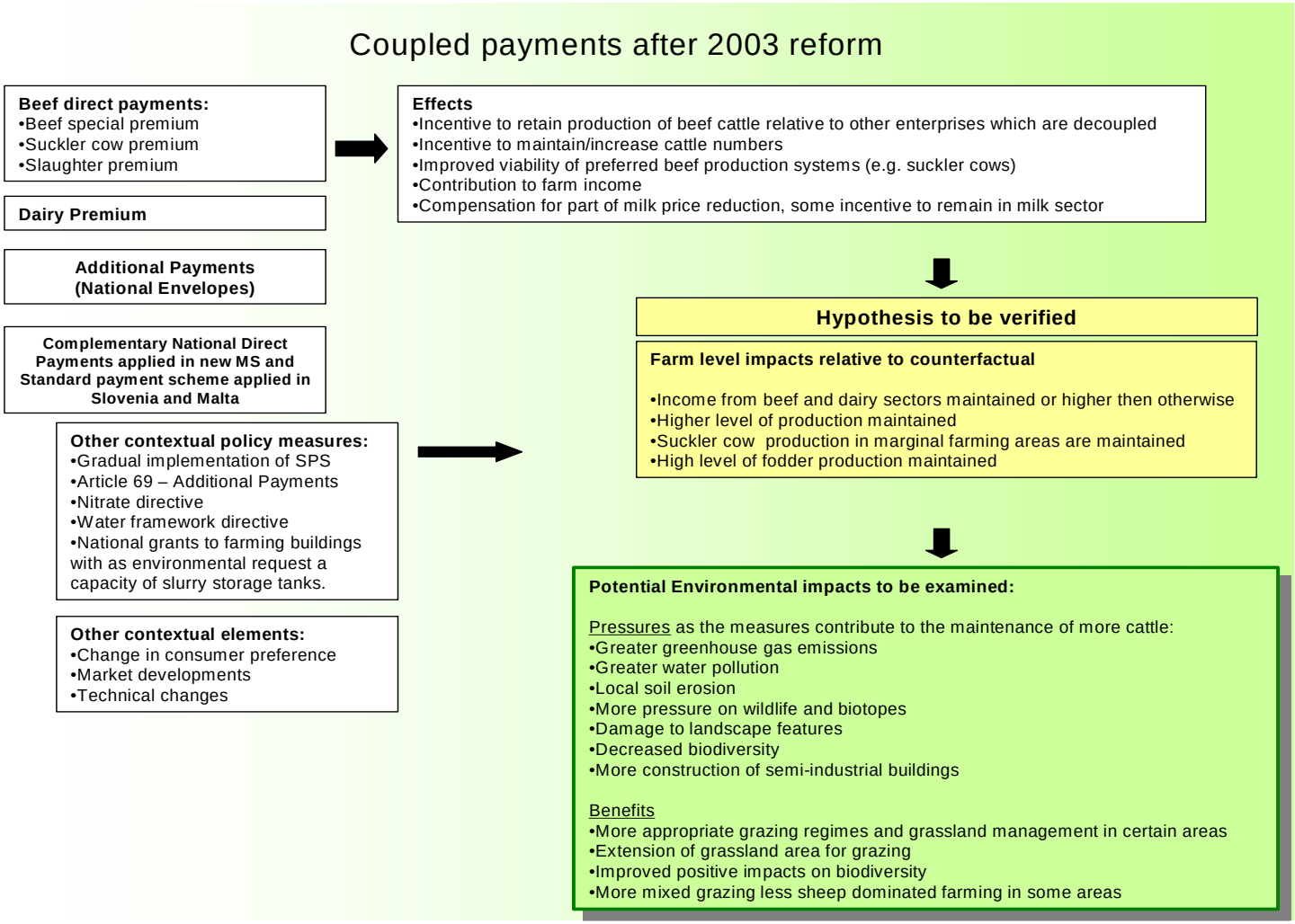


Figure 8.1 Diagram showing coupled payments after 2003 reform, other contextual policy measures, hypotheses and potential environmental impacts

8.1 Analysis of farm level impacts of coupled payments

8.1.1 Coupled payments in the beef and dairy sectors and farm viability

The first hypothesis concerns to the extent to which **income from beef and dairy production has been maintained at a higher level than otherwise by coupled payments.**

Beef sector:
FADN data is not available for the period following the implementation of coupled payments. However data on direct payments in 2004 provides a baseline for assessing the importance of similar, coupled payments in subsequent years. Consequently we can obtain a crude indication of the likely contribution of relevant coupled payments to farm income, farm profit and farm viability.

Figure 8.2 shows relevant direct payments as a proportion of farm net value added for different farm types across the EU-15. This shows the relative importance of the suckler cow premium on specialist beef rearing farms - 43 per cent of farm net value added on extensive farms and 39 per cent on more intensive farms, on average. Similarly the beef special premium and slaughter premium were important on specialist fattening farms, together accounting for over 47 per cent of farm net valued added on intensive farms and 36 per cent on extensive farms.

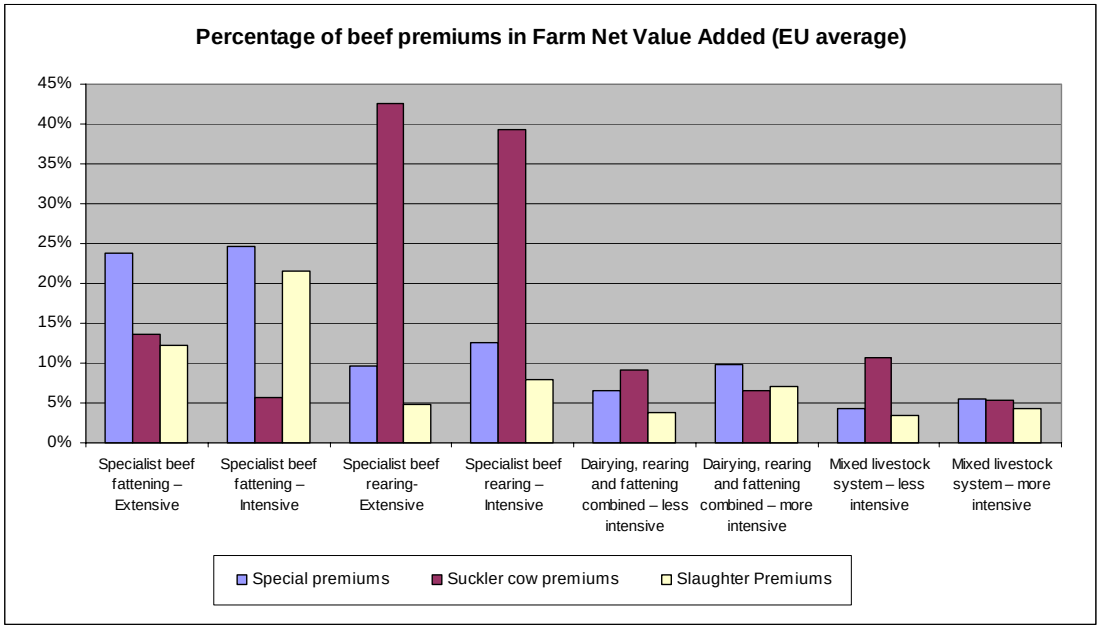


Figure 8.2 Relevant direct payments as percentage of Farm Net Value Added by farm type, 2004

(Source FADN)

Figure 8.3 shows relevant direct payments as a proportion of farm net value added for livestock farms (excluding specialist dairy farms) in relevant Member States in 2004.

The importance of the suckler cow premium is evident in certain regions in France (Massif Central, Central, South East and South West), Portugal and Spain (Other). In

these regions, the suckler cow premium comprises more than 10 per cent or more of farm net value added and in the Massif Central, the figure is as high as 33 per cent. For the other countries with the coupled suckler cow premium, this percentage ranges from 5 per cent (Austria) to 8 per cent (Belgium-Luxembourg).

Beef special premiums are generally less important as a percentage of farm net value added. For those countries retaining the Beef Special Premium - Denmark, Finland and Sweden – this figure ranges from 4 per cent to 8 per cent. Similarly, the slaughter premium also appears less significant. In the Netherlands, the only country with 100 per cent coupled adult and calf slaughter premia, the slaughter premium contributes 3 per cent of farm net value added.

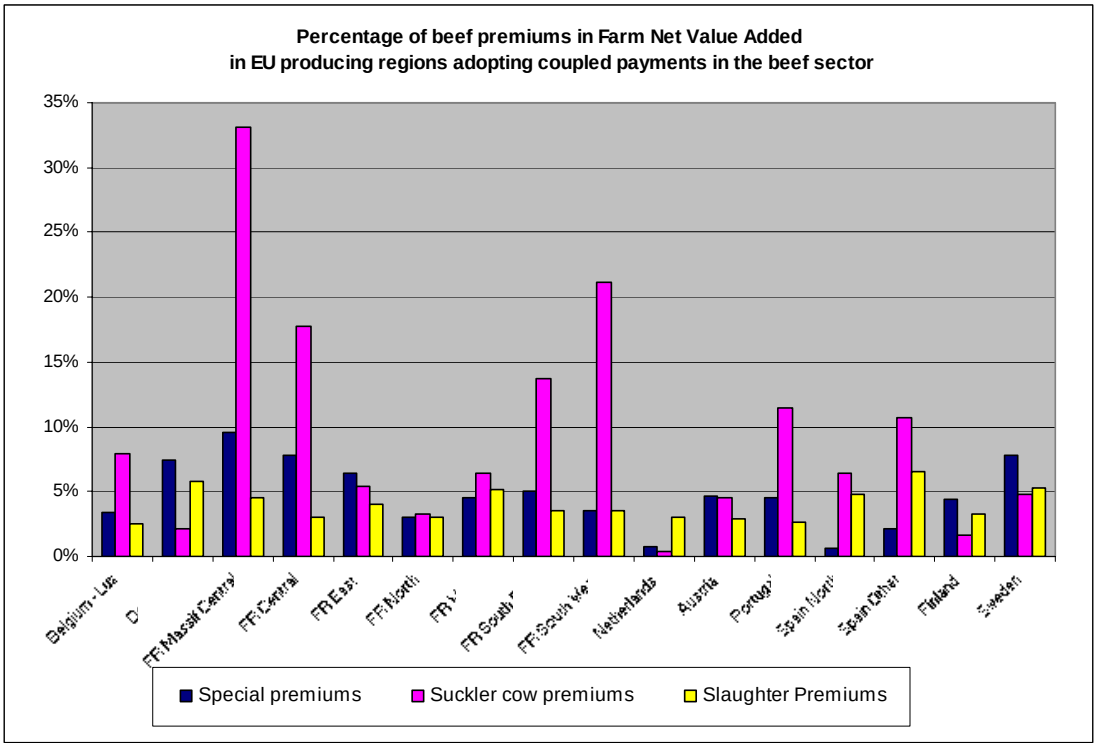


Figure 8.3 Relevant direct payments as percentage of Farm Net Value Added by country, 2004

(Source FADN)

Coupled payments in the period 2005-2007 will be based on the same level of premium as relevant direct payments in 2004, albeit subject to coupled percentages.

It could therefore be expected that, relative to the main counterfactual, the 100% coupled suckler cow premium will continue to be particularly beneficial for farm incomes on specialist beef rearing farms and therefore influential. This particularly applies to certain regions of France, Portugal and Spain.

The influence of partially coupled payments on farm incomes could be expected to decrease in proportion to the coupled percentage. As the influence of beef special premium and slaughter premium is already weak (see Chapter 6) this suggests that the impact of the partially coupled beef special premium and slaughter premium on farm incomes over 2005-2007 is likely to be even smaller. However, it should be noted that

assistance for fattening farms will contribute to their viability and thus in principle support calf prices and thereby some suckler herds. These relationships will vary in different parts of Europe.

At this stage, it is interesting to consider the income effect of coupled payments relative to the secondary counterfactual, that is the scenario where the relevant payments are fully decoupled. All Member States implementing the 100 per cent coupled suckler cow premium have adopted a historic payment model (see Annex II), so relevant farmers would receive a similar income under the secondary counterfactual as otherwise provided they maintain the same number of eligible stock. In other words, while the income effect of coupled payments is likely to be limited, the associated production effect is more significant, since they are obliged to keep the stock.

Three of the nine Member States implementing coupled payments in the beef and veal sector do not have a historic payment model for the SPS - Denmark, Finland and Sweden. These countries operate static or dynamic hybrid models (see Annex II), which suggests a greater difference between the secondary counterfactual and the situation with coupled payments. However these countries only apply the partially coupled beef special premium, which provides a relatively small contribution to farm net value added, the impact on incomes is therefore likely to be limited.

Evidence from the case studies regarding the influence of coupled payments on farm incomes is set out below.

In Spain, calculations by economists (Caja de Badajoz, 2006) appear to confirm that the suckler cow premium is critical to the profitability (viability) of keeping suckler cows, although this is contradicted to some extent by the presence of large numbers of cattle without such premiums. However there is no assessment of the difference in income based on coupled payments and income based on a decoupled payment. In Spain, the SPS has been implemented on a historical model, so it must be assumed that there will be little or no difference in income provided that suckler cow numbers are maintained above the numbers claimed previously.

The Netherlands case study suggests that the slaughter premium contributes to farm incomes but has little influence in terms of production decisions, systems or farm management practices. In respect of the secondary counterfactual, there should be no difference between the income received from the coupled slaughter premium and the income received from a decoupled single payment incorporating the slaughter premium element. This is based on the fact that the single payment is based on historical receipts. However, it should be noted that the actual rates of coupled payment were reduced due to budgetary ceilings, resulting in 100 per cent slaughter premium being €70/adult or €40/calf in 2006, compared to indicative rates of €80/adult or €50/calf.

Dairy sector:
A similar approach to that used above can be adopted in the dairy sector to assess the likely income impacts of the coupled dairy premium.

Figure 8.4 shows the level of dairy premium and additional payments together (shown as 'dairy premium') as a proportion of farm net value added for dairy farms in the main milk producing regions of the EU-15 in 2004 drawn from FADN. The contribution of the 2004 dairy premium to farm net value added ranges from around 4 per cent (for less intensive farms in Denmark) to over 8 per cent (for less intensive farms in UK Central). The EU average is 6.7 per cent. It is difficult to determine any particular pattern in terms of the importance of the dairy premiums when comparing more intensive and less intensive dairy farms. Differences between Member States are more significant and are likely to reflects factors such as milk prices, cost structure and quota availability.

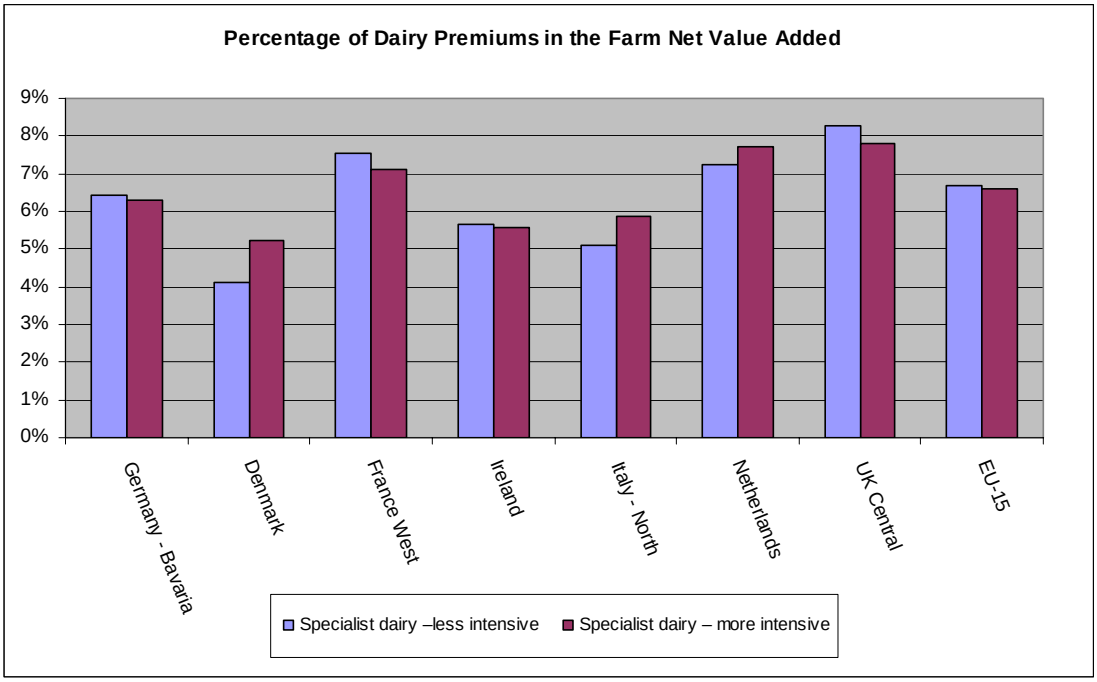


Figure 8.4 Dairy Premium as a percentage of Farm Net Value Added, by main dairy production region in 2004

(Source: FADN)

Over the period 2005-2006, the level of the dairy premium receivable by dairy farmers has increased by a factor of two and three respectively (to €16.31/t in 2005 and €24.49/t in 2006). The level of the additional payment has also increased in the same way. The influence of the dairy premium and additional payments on production decisions and other factors should therefore have increased proportionately. This excludes changes in quota held by the farmer.

Two possible counterfactuals can be considered when assessing the impact of the coupled dairy premium on farm incomes: the main counterfactual is the situation where there is no coupled dairy premium and no other alternative direct payment or replacement support; the secondary counterfactual is the situation where the dairy premium is fully decoupled and incorporated into the single farm payment (the present regime). It is also possible to consider the impacts of the coupled dairy

premium in comparison to situation before 2004, that is no dairy premium but pre-existing levels of price support.

Unfortunately there is no recent, published research exploring the impacts of the coupled dairy premium on farm incomes. It could be expected that, relative to the main counterfactual, there is an income effect equal to the value of the coupled dairy premium, that is 4-8 per cent of farm net value added, which is not insignificant. With regard to the secondary counterfactual, it could be expected that there is a minimal income effect as decoupled dairy premium element of the single farm payment is based on the value of the coupled premium.

When comparing the coupled dairy premium with the previous regime, it may be expected that there is also little impact as the coupled dairy premium was intended to be set at a level to compensate for the reductions in price support. Two studies have explored the impact of the Agenda 2000 reforms, including both price reductions and the introduction of the dairy premium. Chatellier (2003) estimated a -9 per cent reduction in gross farm income and a -13 per cent reduction in family farm income compared to the 1999 situation. De Bont et al (2003) calculated a -16 per cent reduction in income of specialised dairy farms, assuming a price decrease of 16 per cent. However, at a 12 per cent decrease in milk price, the income reduction was calculated to be zero. In other words, the income impact of moving to a system with a coupled dairy premium very much depends on the accompanying percentage reduction in milk price.

Evidence from case studies regarding the influence of the coupled dairy premium on farm incomes suggests that the dairy premium has had little impact on income received by dairy farmers, relative to the previous regime. Anecdotal evidence also suggests that any impact of the shift to the coupled dairy premium has been masked to some extent by improvements in global commodity markets, resulting in improved prices and incomes.

In France, the interviews undertaken suggest that the dairy premium is estimated to be ‘about right’ given the diminution in the intervention price. However, variations in impact occur depending on the type and proportion of dairy products supplied by co-operatives, which impact on milk producer price. In Ireland, some farmers felt that the dairy premium did not fully compensate for price reductions. It also had the effect of deferring cash flow to later in the year, compared to price support, which was receivable on a regular basis within payments for milk.

Complementary National Direct Payments:

Evidence of the effect of CNDPs on beef and dairy farm incomes is limited. In general terms, farm incomes have risen in the new Member States since 2004 but remain well below average levels in the EU-15 (CEEC AgriPolicy, 2007). While some of the extra income has come from the market, much has resulted from EU support expenditure including CNDPs (see Annex III). Where there has been low or no CNDPs, the rise in farm incomes has been modest.

8.1.2 Coupled payment and farm production

The second hypothesis concerns the extent to which a **higher level of production has been maintained by coupled payments than otherwise.**

Beef and veal

Table 8.4 shows trends in the total numbers of cattle (excluding dairy cows) over the period 2000-6 in the nine Member States which retained beef coupled or partially coupled payments with the six Member States without coupled payments.

Table 8.4 Changes in total numbers of cattle (excluding dairy cows) over 2000-2006, by Member State

Total Cattle (Excluding Dairy Cows) ***(1000 heads)***								
	2000	**2002**	**2004**	**2006**	***Change* 00-02**	***Change* 02-04**	***Change* 04-06**	***Change* 00-06**
Member States with beef coupled or partially coupled payments								
Austria	1,535	1,478	1,513	1,476	-3.7%	2.4%	-2.5%	-3.9%
Belgium	2,372	2,167	2,086	2,075	-8.6%	-3.7%	-0.5%	-12.5%
Denmark	1,247	1,127	1,047	1,024	-9.6%	-7.1%	-2.2%	-17.9%
Finland	677	669	634	620	-1.3%	-5.2%	-2.3%	-8.5%
France	15,936	15,643	15,001	15,103	-1.8%	-4.1%	0.7%	-5.2%
Netherlands	2,358	2,234	2,257	2,230	-5.3%	1.0%	-1.2%	-5.4%
Portugal	1,059	1,054	1,105	1,100	-0.5%	4.8%	-0.5%	3.9%
Spain	5,023	5,324	5,596	5,476	6.0%	5.1%	-2.2%	9.0%
Sweden	1,192	1,173	1,150	1,131	-1.6%	-1.9%	-1.7%	-5.1%
Total	**31,398**	**30,869**	**30,390**	**30,234**	**-1.7%**	**-1.6%**	**-0.5%**	**-3.7%**
Member States with beef decoupled payments								
Germany	10,004	9,359	8,745	8,571	-6.5%	-6.6%	-2.0%	-14.3%
Greece	388	461	490	515	18.8%	6.3%	5.1%	32.7%
Ireland	5,177	5,204	5,090	4,915	0.5%	-2.2%	-3.4%	-5.1%
Italy	4,460	4,784	4,677	4,526	7.3%	-2.2%	-3.2%	1.5%
Luxembourg	156	148	143	140	-5.3%	-3.1%	-2.2%	-10.2%
United Kingdom	8,538	8,152	8,387	7,986	-4.5%	2.9%	-4.8%	-6.5%
Total	**28,724**	**28,107**	**27,351**	**26,653**	**-2.1%**	**-2.0%**	**-3.2%**	**-7.2%**

(Source:Eurostat)

While cattle numbers have continued to decline generally over the period 2004-6, the decrease in the Member States with coupled payments has been noticeably less (-0.5 per cent) than the decrease experienced in those Member States with no coupled payments (-3.2 per cent). This would tend to support the hypothesis that coupled payments have supported beef production, at least relative to the secondary counterfactual, and probably relative to main counterfactual (no coupled or decoupled payments), given the findings set out in Chapter 6, although there is no empirical evidence to prove this in the current situation. However caution must be applied as account needs to be taken of pre-existing trends in beef cattle numbers. Over the preceding years, there were declines of -1.7 per cent (2000-2) and -1.6 per cent (2002-

4) for Member States which opted for coupled payments, compared to declines of -2.1 per cent (2000-2) and -2.0 per cent (2002-4) for Member States with beef decoupled payments. In other words, it appears that there has been a slow down in the decrease in cattle numbers in Member States with coupled payments, compared to an acceleration in the decline in cattle numbers in other Member States. A further complicating issue is the fact that Member States introduced the 2003 reforms in different years, making direct, robust comparisons difficult. A fuller exploration of these issues is set out in Section 9.9.1.

Table 8.5 Changes in total numbers of suckler cows over 2000-6, by Member State[57]

Suckler cows (1000 heads)								
	2000	**2002**	**2004**	**2006**	***Change* 00-02**	***Change* 02-04**	***Change* 04-06**	***Change* 00-06**
Member States with 100% coupled suckler cow premium								
Austria	253	245	262	271	-3%	7%	3.7%	7%
Belgium	542	502	502	525	-7%	0%	4.5%	-3%
France	4214	4095	4002	4077	-3%	-2%	1.9%	-3%
Portugal	342	359	384	411	5%	7%	7.2%	20%
Spain	1880	1971	1994	1843	5%	1%	-7.6%	-2%
Total	**7231**	**7172**	**7143**	**7127**	**-1%**	**0%**	**-0.2%**	**-1%**
Member States without 100% coupled suckler cow premium								
Denmark	121	113	102	99	-7%	-10%	-2.9%	-18%
Finland	28	29	32	40	2%	10%	26.6%	43%
Germany	824	763	731	731	-7%	-4%	0.0%	-11%
Greece	96	134	134	138	40%	0%	3.3%	44%
Ireland	1155	1151	1151	1129	0%	0%	-1.9%	-2%
Italy	446	444	452	419	0%	2%	-7.3%	-6%
Luxembourg	33	31	30	28	-5%	-3%	-5.6%	-13%
Netherlands	80	82	88	72	3%	7%	-18.2%	-10%
Sweden	153	158	161	167	3%	2%	3.8%	9%
United Kingdom	1783	1694	1729	1662	-5%	2%	-3.9%	-7%
Total	**4719**	**4599**	**4608**	**4485**	**-3%**	**0%**	**-2.7%**	**-5%**

(Source:Eurostat)

Table 8.5 shows trends in the number of suckler cows in the five Member States with 100 per cent suckler cow premium, compared to the remaining ten Member States of the EU-15. The data shows that the reduction of suckler cow numbers over the period 2004-6 in Member States with the 100 per cent suckler cow premium is noticeably less (-0.2 per cent) than the decrease experienced by Member States without this type of coupled payment (-2.9 per cent). However these averages hide considerable variations between Member States, for example an increase of +7.2 per cent in Portugal compared to a decrease of -7.6 per cent in Spain, although both countries have the coupled suckler cow premium. Preceding trends also suggest a lower rate of decline in suckler cow numbers in Member States with the coupled suckler cow

[57] Certain data are still provisional. Data for Ireland is missing

premium than those without. Given the contribution of the coupled suckler cow premium to farm income and the findings of Chapter 6, it is reasonable to assume that the coupled suckler cow premium is contributing to the retention of suckler cow numbers relative to the main counterfactual, as well as the secondary counterfactual, although we have no data to substantiate this. There are also a range of other important factors influencing production.

Trends in the number of bovine male animals between 1 and 2 years old, those likely to benefit from the beef special premium, are shown in Table 8.6. Those Member States with the 75 per cent beef special premium show an increase in the number of potentially eligible animals (+2.7 per cent) over 2004-6 whereas those without this coupled payment have experienced a reduction (-3.2 per cent). Again, however, the averages show variations between Member States with the coupled beef special premium, for example an increase of +36 per cent in Denmark compared to a decrease of -4.9 per cent in Sweden. There is also considerable variability between these Scandinavian countries in preceding years. This suggests that caution needs to be exercised in ascribing much influence on stock numbers given the range of other contributory factors.

Table 8.6 Changes in total number of 1-2 year old bovine males over 2000-6, by Member State

Bovine male animals aged between 1 and 2 years (1000 heads)								
	2000	**2002**	**2004**	**2006**	***Change 00-02***	***Change 02-04***	***Change 04-06***	***Change 00-06***
Member States with 75% coupled beef special premium								
Denmark	51	35	25	34	-31.4%	-28.6%	36.0%	-33.3%
Finland	100	107	98	103	5.6%	-8.3%	5.6%	2.9%
Sweden	165	152	147	140	-4.9%	-3.6%	-4.9%	-15.3%
Total	**316**	**294**	**270**	**277**	**2.7%**	**-8.3%**	**2.7%**	**-12.4%**
Member States without 75% coupled beef special premium								
Austria	188	180	178	170	-4.5%	-1.0%	-4.5%	-9.5%
Belgium	161	154	144	135	-6.7%	-5.9%	-6.7%	-16.2%
France	1082	1002	951	1016	6.8%	-5.1%	6.8%	-6.1%
Germany	1253	1186	1036	1062	2.5%	-12.6%	2.5%	-15.2%
Greece	50	48	58	62	6.4%	20.8%	6.4%	23.4%
Ireland	813	902	800	721	-9.9%	-11.4%	-9.9%	-11.3%
Italy	690	637	692	634	-8.3%	8.7%	-8.3%	-8.1%
Luxembourg	15	13	12	13	9.6%	-8.0%	9.6%	-10.8%
Netherlands	102	88	81	80	-1.2%	-8.0%	-1.2%	-21.6%
Portugal	78	74	79	69	-12.9%	7.3%	-12.9%	-11.6%
Spain	133	157	207	172	-17.3%	32.2%	-17.3%	29.2%
United Kingdom	1120	1101	1154	1086	-5.9%	4.9%	-5.9%	-3.0%
Total	**5684**	**5541**	**5394**	**5220**	**-3.2%**	**-2.7%**	**-3.2%**	**-8.2%**

(Source:Eurostat)

The influence of the coupled slaughter premium on production is even less clear cut. The nine Member States with the 100 per cent coupled slaughter premium for calves experienced a 18.8 per cent *reduction* in calves being slaughtered, compared to a 6.7 per cent increase in those Member States which had no such coupled payment. There are clearly a number of other more important contributory factors probably including market demand, ongoing restructuring in both the dairy and beef sectors, and animal health influencing these figures.

Evidence from case studies

Evidence from case studies regarding the influence of coupled payments on beef production is as follows.

In Spain, the maintenance of the coupled suckler cow premium is expected to have the effect of maintaining the current number of suckler cows (although Eurostat data actually indicates a decrease of 7.6 per cent over the period of 2004-6, see Table 8.5). Significant increases in numbers are considered unlikely but this will depend on market prices. Most suckler farms in Spain have a significant percentage of suckler cows without any premium, suggesting that numbers of these cows, at least, are primarily dependent on the market value of the calves. The farmers interviewed cited the importance of 100 per cent coupling of the suckler cow premium in order to prevent abandonment, although the continuation of the presence of large numbers of cattle without premium rights seems to contradict this.

It should be noted that the incentive for suckler farms to keep and fatten calves has been reduced with the removal of the Beef Special Premium (as may be reflected in the 17.3 per cent decrease in 12-24 month old calves over the period 2004-6, see Table 8.6). This is likely to have eased this pressure on forage resources. The 40 per cent coupled slaughter premium for adult bovines is considered unlikely to have a significant impact on production due to its low level. The 100 per cent coupled slaughter premium for calves is of less significance in Spain, due to its low take-up and the relatively low payment which is unlikely to act as much of an incentive to produce.

In France, the choice to keep the suckler cow premium coupled was motivated by the aim of maintaining the beef sector and the continuation of beef production across the country. While detailed substantiating data is not available, it is likely that the coupled payment has helped maintain suckler cow numbers (this may be reflected in the 1.9 per cent increase over the period 2004-6, see Table 8.5). The removal of the stocking density limit from the coupled suckler cow premium is likely to have a limited impact given the availability of forage and the importance of agri-environment schemes to suckler cow farmers, especially in areas such as the Auvergne. The coupled slaughter premium is not expected to have any impact on production or numbers being slaughtered in the view of the case study author. This is unsurprising given the limited impact found in our analysis of the pre 2003 slaughter premium (Section 6.1.2) and the 40 per cent coupling applied to adult bovines, the option most likely to be taken up in France.

In the Netherlands, the maintenance of 100 per cent coupled slaughter premium for both adult cattle and calves is not expected to have much impact on the level of

production relative to the main counterfactual (without coupled or decoupled payments), although it is expected to have an income effect. The reason for the selection of this particular coupled payment option was based on the following factors: the importance of the veal production in the country; the maintenance of the slaughter premium in other countries; the close link between veal and beef production in the Netherlands; and finally the fact that the reference period (2000-2002) had been affected by FMD which in turn had influenced the balance between calves and adult cattle (if the slaughter premium had been decoupled, this would have affected the single payment receivable by farmers).

Dairy sector

Eurostat data shows that there has been a decrease of -4.3 per cent in dairy cow numbers on average across the EU-15 over the period 2004-6, following decreases in preceding years of -1.8 per cent (2000-2) and of -3.7 per cent (2002-4), see Table 0.3 Changes in total number of dairy cows (1,000 heads) over 2000-6, by EU-15 Member State. EU-15 milk production has been relatively stable at 120 million tonnes.

While it is difficult to be certain of the influence of the coupled dairy premium on dairy production from this data, evidence from the case studies suggests that the coupled dairy premium has had very limited impact, particularly relative to the secondary counterfactual but probably also relative to the main counterfactual.

This limited effect partly relates to the short period of its existence as a coupled payment. For some countries (for example Germany, Ireland and the UK) this was only one year, (2004). In other countries, dairy premiums operated as coupled payments for two years (for example France, Italy and Spain) or three years (for example Netherlands). Dairy farmers are not in a position to adapt their systems in such a short timeframe given the level of investment in cows, buildings and equipment.

Also important however, is the fact that herd strategy (for example, genetics, milk yield) and quota strategy are much more important drivers of production in the dairy sector than the coupled dairy premium. More generally, the process of restructuring and concentration of production will continue as a result of a range of factors including market prices and socio-economic factors and the coupled dairy premium is unlikely to have made much difference. In Spain, however, some interviewees said that the decoupling of the dairy premium would give a further signal to less viable farms to get out of the sector due to the changes required to adhere to cross compliance conditions. In Spain, there is a large number of small, unmodernised, unviable dairy holdings with elderly farmers.

It is worth noting that the initial announcement of the coupled dairy premium led to some dairy farmers (for example in Ireland, Italy and Germany) acquiring further milk quota in order to increase their baseline quota prior to 31 March 2004 in order to increase their subsequent dairy premium payment. In Italy, this created some instability on the quota market, causing an increased demand for milk quota and a significant increase in quota prices. The additional quota may have enabled some additional production on individual farms, but the overall impact on the sector appears to have been limited.

Complementary National Direct Payments

The effect of support provided through CNDPs on farm production must be considered in the context of: firstly, expanding markets and economic growth; secondly farming incomes being below the national average income in all new Member States; and thirdly, the squeeze on smaller farms which are unable to achieve higher productivity due to lack of scale economies, owner's lack of capital, lack of adequate rural credit facilities and in many cases lack of skills in modern farming methods,

The implications of this are that although CNDPs are supporting beef and dairy production and particular systems of production (for example suckler cow systems) in the new Member States, where applied, they are expected only to slow rather little the ongoing process of restructuring. There are likely to be fewer farms and farmers and more production concentrated in medium and larger farms. Unfortunately however there is insufficient data to substantiate this.

In terms of stock numbers, the data shows that there has been an increase of +5 per cent in cattle numbers (excluding dairy cows) on average in the new Member States over the period 2004-6, compared to a decrease of -2.2 per cent over the preceding period 2002-4, see Figure 9.2. The influence of CNDPs on these trends is unclear: five out of the seven countries which have implemented CNDPs have experienced an increase in cattle numbers over the period 2004-6 but two countries (Cyprus and Slovakia) have not. The situation is complicated by very different pre-existing trends in cattle numbers. In summary, however, CNDPs may have some effect in terms of increasing cattle numbers, relative to the main counterfactual, at least in some countries.

In Slovenia, it is estimated that most extensive beef producers will benefit from the shift to SPS and coupled beef payments, whereas intensive specialist producers will lose (CEEC AgriPolicy, 2007). Slovenia's extensive beef production systems are associated with high quality products, so long term prospects for these producers appear positive.

8.1.3 Impacts on farming systems

The third hypothesis is that **suckler cow production in marginal farming areas has been maintained at a higher level than otherwise by coupled payments.**

The findings of Section 8.1.2 suggest that the coupled suckler cow premium has helped support suckler cow production in relevant Member States over the past couple of years. The analysis of FADN data set out in Section 6.2 also indicates a positive correlation between suckler cow premium expenditure and suckler cow numbers in LFAs (albeit under the pre 2003 CAP reform regime). It is therefore reasonable to assume that, where applied, the coupled suckler cow premium has contributed to maintenance of suckler cow production in LFAs, although recent LFA specific data is lacking.

Evidence from the case studies also supports the hypothesis. In France, the Ministry of Agriculture and farming bodies lobbied for the re-coupling of the suckler cow premium precisely because they feared that total decoupling would result in the disappearance of production from smaller holdings and certain regions and, conversely, concentrate production in larger units in specialised production areas. These trends would have been expected to have adverse environmental impacts in LFAs, arising from the loss of grazing livestock. In Spain too, the indications are that the coupled suckler cow premium is likely to sustain suckler cow numbers in LFAs thus maintaining a situation of overstocking in some drier regions such as Extremadura. In both countries however, there is a lack of data to prove these trends.

In summary, while it is likely that suckler cow production in marginal farming areas has been maintained by coupled payments, there is presently insufficient data to substantiate this hypothesis.

8.1.4 Impacts on farm management

The fourth hypothesis is that the **fodder production has been supported at a higher level than otherwise by coupled payments.**

All things being equal, it is reasonable to assume that if cattle numbers have been maintained by coupled payments, then the area of grassland and forage crops will also have been maintained at a higher level than otherwise.

Table 8.7 shows trends in the area of permanent grassland and meadow, and forage plants (defined as temporary grass, green maize, leguminous plants and other green fodder) over the period 2003-5, comparing the nine Member States which retained beef coupled payments with the six Member States without beef coupled payments.

Table 8.7 Area of permanent grassland and meadow and forage plants and changes over 2003-5, by Member State (EU15)

				Permanent grassland and meadow (Ha)			Forage plants (Ha)		
	Member State	Payment model	Year of decoupling	2003	2005	Change	2003	2005	Change
Fully decoupled beef payment	Germany	SPS Dynamic Hybrid	2005	4,936,820	4,928,960	-0.2%	1,589,020	1,804,990	13.6%
	Greece	SPS Historical	2006	820,240	824,250	0.5%	173,210	197,670	14.1%
	Ireland	SPS Historical	2005	3,185,720	3,064,910	-3.8%	793,640	789,580	-0.5%
	Italy	SPS Historical	2005	3,336,410	3,346,950	0.3%	1,692,980	1,788,250	5.6%
	Luxembourg	SPS Static Hybrid	2005	64,830	67,500	4.1%	26,070	22,870	-12.3%
	United Kingdom	Three different models	2005	9,763,600	9,808,920	0.5%	1,314,510	1,324,300	0.7%
	Total			**22,107,620**	**22,041,490**	**-0.3%**	**5,589,430**	**5,927,660**	**6.1%**
Partially coupled beef payment	Austria	SPS Historical	2005	1,809,450	1,788,470	-1.2%	221,820	247,620	11.6%
	Belgium	SPS Historical	2005	535,590	519,100	-3.1%	251,480	251,390	0.0%
	Denmark	Hybrid	2005	181,390	180,660	-0.4%	444,300	440,140	-0.9%
	Finland	SPS Dynamic Hybrid	2006	27,600	25,650	-7.1%	621,580	623,260	0.3%
	France	SPS Historical	2006	8,306,740	8,131,420	-2.1%	4,699,620	4,566,390	-2.8%
	Netherlands	SPS Historical	2006	875,020	808,720	-7.6%	425,210	452,960	6.5%
	Portugal	SPS Historical	2005	1,494,310	1,768,620	18.4%	385,080	394,230	2.4%
	Spain	SPS Historical	2006	8,526,230	8,653,210	1.5%	725,100	649,190	-10.5%
	Sweden	SPS Static Hybrid	2005	481,970	509,430	5.7%	994,580	1,083,710	9.0%
	Total			**22,238,300**	**22,385,280**	**0.7%**	**8,768,770**	**8,708,890**	**-0.7%**

(Source Eurostat, FSS survey)

Overall the Member States with coupled payments experienced a slight increase in permanent grassland and slight decrease in forage plants, whereas those Member States without coupled payments experienced the opposite effect. However, the differences between the two groups are slight and there are more differences between individual countries, suggesting that it would be dangerous to draw conclusions from this data. Clearly these trends are also influenced by a range of other factors other than coupled payments.

The significant increase in permanent grassland for Portugal within Table 8.7 looks anomalous. However, according to INE-Portugal (personal communication) agriculture land use has radically changed in last two decades. The area occupied by arable land and permanent crops has been decreasing as it is not as profitable as it use to be and it has been replaced by permanent grassland and meadow, the area of which has increased by 373 per cent since 1989. In most areas livestock production is now managed under extensive systems.

While there is insufficient data to substantiate this hypothesis, we can make the following comments based on our previous analysis and evidence gathered from case studies.

The coupled suckler cow premium is likely to have contributed to maintenance of similar levels of fodder production as previously due to its impact on suckler cow numbers. The type of fodder used and its management is also unlikely to change significantly under fully coupled payments. There is likely to be a continuation of extensive, grass-based systems on many farms and in certain cases, more intensive systems either alongside dairy herds or independently. Both the France and Spain case studies suggest a continuation of present grassland management practices with coupled suckler cow premium payments.

The coupled beef special premium and slaughter premium, where applied, are likely to help sustain beef fattening systems. These systems are associated with more intensive grassland management (as well as the growing of other fodder crops and cereals). However the influence of these coupled payments on stock numbers seems likely to have been relatively weak (particularly at 75 per cent for the beef special premium and 40 per cent for the slaughter premium for adult bovines). Consequently, their influence on fodder production is also likely to have been relatively weak. However, the full decoupling or partial recoupling (25 per cent) of arable crops can be expected to encourage a switch from grass silage from maize silage in some areas, over time. Per kg of dry matter, grass silage is generally less expensive to produce than maize silage.

The coupled dairy premium appears to have had little impact on management on dairy farms. Its influence on the type, intensity and extent of fodder production on dairy farms is therefore also likely to be minimal.

CNDPs are likely to have similar effects as coupled payments applied in EU-15 Member States, although the impact depends on the focus and size of the payment. In other words, while payments targeted at suckler cows may help support the continuation of more extensive fodder production, payments targeted at other beef cattle, veal calves and dairy cows (or milk) are likely to sustain more intensive fodder production. This is particularly likely to occur on more commercial, medium to large farms which are seeking to increase productivity and competitiveness.

8.1.5 Summary of farm level impacts of coupled payments

- The maintenance of incomes on specialist beef farms where coupled payments have been implemented at a higher level than otherwise, relative to the main counterfactual. Specialist beef rearing farms are likely to have benefited from the coupled suckler cow premium in particular, especially in certain key regions (for example France Massif Central and France South West). Specialist beef fattening farms are also likely to have benefited, albeit to a lesser degree, from the coupled beef special premium and slaughter premium in Member States where these have been implemented.
- The maintenance of beef cattle numbers where coupled payments have been implemented at a higher level than otherwise, relative to the main counterfactual. This particularly applies to the coupled suckler cow premium, which appears to have supported suckler cow numbers, and to a much lesser extent the partially coupled beef special premium. The influence of the coupled slaughter premium on production appears to be minimal or is hidden by other, more powerful drivers.
- Coupled suckler cow premium payments are likely to have maintained suckler cow numbers in LFAs in the five Member States concerned at a higher level than otherwise, relative to the main counterfactual.
- The coupled suckler cow premium is likely to have contributed to the continuation of similar types and levels of fodder production as previously, mainly extensive. Other coupled payments are likely to have had a relatively weak influence on fodder production.

- The dairy premium appears to have had some limited impact on income relative to the main counterfactual and little or no impact on production levels or management practices.
- In new Member States, where CNDPs are applied, the impacts are likely to vary according to the focus of the payments. CNDPs are only likely to slow the process of restructuring in the case of suckler cow producers. In the case of beef fattening and dairy farms, CNDPs are more likely to support existing trends of restructuring and intensification.
- In Slovenia, coupled payments in the beef sector are expected to sustain and encourage extensive beef production.

With reference to the impacts of coupled payments on specific characteristics of beef and dairy production - scale, intensity, regional distribution and specialisation - the following tentative conclusions can be drawn, subject to the limited data available to us at this time:

Scale of production: Coupled beef payments appear to have contributed to the maintenance of beef cattle numbers, particularly where the coupled suckler cow premium has been implemented. The coupled dairy premium appears to have had little or no impact on dairy production.

Intensity of production: Existing extensive and intensive systems of production have been supported by coupled payments, including the coupled dairy premium and CNDPs. There is no evidence to suggest that either coupled beef or dairy payments have contributed to any particular intensification or extensification trend.

Regional distribution: Coupled suckler cow premiums appear to be contributing to the maintenance of suckler cows and suckler cow production in implementing Member States (for example, France, Austria), including LFAs in these countries. The impacts of other coupled payments are less clear.

Specialisation: There is no evidence to suggest that coupled payments have influenced specialisation to any great degree. The exception is that some CNDPs may have contributed to, and others slowed, an ongoing process of restructuring, including specialisation.

8.2 Analysis of environmental impacts of coupled payments

In addition to considering the environmental consequences of the farm impacts arising from coupled payments, it is important to consider cross compliance and its effects. From 2005, farmers receiving coupled payments (beef or dairy) have had to adhere to cross compliance conditions, as implemented by Member States, with considerable variations between them. A key question, therefore, is to what extent farmers in receipt of beef or dairy coupled payments have had to adapt their management practices to meet cross compliance conditions. The environmental impacts of these changes also require consideration.

In general terms, cross compliance is expected to result in a range of environmental benefits, and potentially some disbenefits. These are highlighted in the following sections, based on work to date by *Alliance Environnement* in its Cross Compliance

Evaluation, IEEP as part of its Cross Compliance Network project (Swales, 2007) and IEEP/Cumulus in its Cross Compliance: A Policy Options Paper (Cumulus/IEEP, 2007).

Cross compliance is, however, at an early stage of implementation and the environmental impacts will become much clearer over time. Furthermore, the extent to which any benefits of cross compliance can be attributed to coupled payments alone will be very difficult to determine given the fact that most farmers will also be receiving a significant amount of decoupled support through the SPS, or in the case of certain new Member States, SAPS. Cross compliance in relation to the SPS is discussed in Chapter 9.

These concerns aside, our analysis of the overall environmental impacts of coupled payments is as follows. It should be noted that, in broad terms, while the following analysis is focused on EU-15, similar environmental impacts are likely to apply in new Member States applying CNDPs, although cross compliance does not apply to these measures.

Water quality

The maintenance of cattle numbers through beef coupled payments is likely to have sustained the same quantities of organic waste being deposited on land, with potentially negative impacts on water quality. However suckler cows are likely to be the principal beneficiaries of these payments and these tend to be widely distributed and extensively managed. Coupled suckler cow premiums should not, therefore, lead to significant adverse impacts on water quality, although more serious problems could occur in certain localities and/or with poor management. Coupled beef special premium payments may support higher levels of beef cattle in relevant Member States than otherwise would be the case. These may be associated with more intensive management practices and associated pressures on water quality, although it is difficult to isolate these impacts.

In both cases however, adverse impacts are likely to be ameliorated by cross compliance conditions including: improved compliance with the nitrates, groundwater and sewage sludge Directives; improved soil management practices; protection of permanent pasture; and retention of landscape features. These are likely to have helped to reduce the amount of nitrogen and phosphates, silt and pesticides in watercourses, water bodies and groundwater.

The dairy premium is unlikely to have any clearly identifiable impact on water quality other than providing a direct obligation for dairy farmers to adhere to cross compliance. Specialist dairy farms receiving no other direct payments would otherwise be outside the cross compliance system. One of the most significant influences of cross compliance for dairy farmers relates to compliance with the Nitrates Directive SMR, since dairy farms are a major source of nitrate pollution. Those that have derogations from the 170 kg/ha maximum nitrate load under the Directive (up to 230 or 250 kg in Denmark, Austria, Germany and the Netherlands) have all done so in relation to cattle farms. Case study evidence from Spain and Ireland suggests that improved compliance will have positive effects, over time, by pushing holdings to improve their slurry storage and handling in particular. However, this will depend on how strictly the relevant SMRs are applied.

The case studies suggest that, if strictly applied, SMRs will undoubtedly add to the pressure on less viable holdings to abandon production. Such holdings do not have the capital to invest in improvements in waste management. Cross compliance could, therefore, add to the trend towards concentration of production in larger holdings. In the Netherlands and Italy, some farmers also indicated they might buy land or decrease herd size in order to comply with the Nitrates Directive SMR. In Germany, some dairy farmers indicated that they may seek to 'trade' their manure off the farm to reduce nitrogen loading, while others, especially in the South, indicated a reduction in stocking density to secure agri-environment scheme payments might be a better strategy.

It must be stressed that the extent to which environmental improvements via cross compliance can be attributed to the coupled dairy premium is limited by two factors. First, cross compliance only applied from 2005 (by which time a number of Member States had already decoupled the dairy premium) and, second, many dairy farmers are likely to have been subject to cross compliance anyway by virtue of involvement in other agricultural enterprises with direct payments (for example beef, arable etc).

Water resources

Water resources are likely to have been affected to some degree by the maintenance of beef animals arising from coupled payments. In dry regions, for example in parts of Spain and Portugal, the maintenance of suckler cows will have maintained pressure on limited water resources, with potential ongoing adverse effects. Support provided through coupled beef special premium and slaughter premium is also likely to maintain more intensive management on beef farms in certain Member States. This is likely to perpetuate greater usage of water for drinking, irrigation and cropping of maize and other 'thirsty' fodder crops. In wetter, more temperate countries with coupled payments, the impacts on water resources are likely to be limited.

The dairy premium is unlikely to have any impact on water resources.

Biodiversity

The main biodiversity benefits of coupled payments relate to the maintenance of suckler cow numbers at a higher level than under the counterfactual where continued grazing is required, preferably by cattle and especially in areas of high nature value, including parts of LFAs. Suckler cows are important for the extensive management of some grazed habitats in these areas and coupled support is likely to sustain the systems operated by many, often small, farms. Habitats benefiting from coupled suckler cow payments are likely to include grassland, heathland, moorland and other habitats, in both upland and lowland areas. Without sufficient grazing stock and good management, it is anticipated large areas of grazed habitats would deteriorate in quality and extent as a result of undergrazing or inappropriate grazing. Coupled payments are not the only driver here, however, as agri-environment schemes and LFA compensatory payments are also important for sustaining appropriate grazing management, although these are not necessarily available in all regions.

It should be remembered, however, that while cattle grazing is the preferred management on some types of vegetation, sheep are more appropriate in some cases, for example on fragile soils on Mediterranean mountains and *dehesas*. For this reason, the maintenance of suckler cow numbers may also perpetuate adverse

biodiversity impacts, including the degradation of dehesas in Spain arising from stocking levels beyond natural carrying capacities and an increase in cattle numbers at the expense of sheep. This is, to some extent, being encouraged by the differential coupling rates for different livestock, with sheep/goat support having been 50% decoupled. The coupled beef special premium, and possibly the slaughter premium, may also sustain intensive management leading to diffuse water pollution and adverse impacts on aquatic flora and fauna. Cross compliance will potentially limit negative effects through: improved compliance with the birds and habitats Directives; improved soil management practices; protection of permanent pasture; the retention of landscape features; and restrictions on overgrazing *inter alia.*

The dairy premium is unlikely to have any impact on biodiversity other than providing a direct obligation for dairy farmers to adhere to cross compliance, especially in relation to the birds and habitats Directives.

Landscape

Extensively managed pastoral landscapes will also benefit from the maintenance of suckler cow grazing both in LFAs and other areas. The coupled suckler cow premium will make a contribution through sustaining cattle numbers. The financial support provided by coupled payments is likely to have sustained a diversity of farm structures and valued landscapes in marginal areas across the EU. Again, these payments have worked in tandem with agri-environment scheme payments and LFA compensatory payments to support the maintenance of grazing and landscape features in these areas. To the extent that direct payments allow those farms using local cattle breeds to remain viable, this will have retained the landscape and biodiversity benefits associated with the management of these cattle breeds, as well as supporting genetic conservation.

Adverse landscape impacts in extensively and intensively managed areas are likely to be limited by cross compliance conditions including obligations to retain landscape features as far as these are enforced.

The dairy premium is unlikely to have any impact on landscape other than through cross compliance.

Soils

Soils will benefit from cross compliance conditions including those designed to reduce erosion and improve structure and organic matter. These are likely to ameliorate adverse impacts arising from beef coupled payments such as the maintenance on cattle on suitable land or at unsuitable stocking rates.

The dairy premium is unlikely to have any impact on soils other than through cross compliance.

Table 8.8 Environmental impacts of different coupled payments

Direct payment measures	Water quality	Water resources	Biodiversity	Landscape	Soils	Air quality & climate change
Coupled suckler cow premium	□/-	□/-	+/-	+/-	□/-	-
Coupled beef special premium	□/-	□/-	□/-	□	□/-	-
Coupled slaughter premium	□	□	□	□	□	□
Coupled dairy premium	□	□	□	□	□	□
Cross Compliance	+	□	+	+	+	□

-- *strong deterioration,*
- *minor deterioration,*
□ *no significant deterioration or improvement overall,*
+ *minor improvement*
++ *strong improvement*
n/a *not applicable*

Air quality and climate change

The maintenance of cattle numbers arising from beef coupled payments is likely to sustain greenhouse gas emissions at a higher rate than might be expected under the main and, to a lesser extent, secondary counterfactual, thereby contributing to climate change. Ammonia emissions too are likely to be higher than otherwise, based on the maintenance of cattle numbers.

The dairy premium is unlikely to have any impact on air quality and climate change because there is no clear effect on cattle numbers.

A summary of the environmental impacts of the different coupled payments (or their equivalent CNDP) and cross compliance is shown in Table 8.8.

8.3 Conclusions

Coupled payments in the beef and veal and dairy sectors are limited in terms of: their application across different Member States; their support for different production systems; and crucially the timescale over which they have been operating. In addition, the relatively recent implementation of coupled payments - the coupled dairy premium from 2004 and beef coupled payments since 2005 - means that there is very little reliable data available to enable a robust analysis of their impacts. Data to assist with the assessment of impacts of CNDPs in new Member States is even scarcer. That said, it is possible to draw the following conclusions from the analysis.

- **Coupled payments in the beef and veal sector have contributed to the maintenance of incomes on specialist beef farms in Member States where they have been retained.** Specialist beef rearing farms are likely to have benefited in particular, from the coupled suckler cow premium and to a lesser degree from the coupled beef special premium and slaughter premium. In new Member States, CNDPs which are common in the beef sector have, alongside SAPS payments contributed to an increase in farm incomes.

- **Coupled payments have also contributed to maintenaning beef cattle numbers at a higher level compared to the main, and to a lesser extent, secondary counterfactual.** This applies to those Member States which have retained the suckler cow premium, where, on average, the number of suckler cows has not decreased to the same extent as other countries. Suckler cow numbers in LFAs are also likely to have benefited from coupled payments, although there is insufficient data to prove this. In turn, coupled suckler cow premiums are likely to have supported extensive grazing regimes and grass-based forage systems. Pillar 2 schemes such as LFA compensatory payments and agri-environment scheme payments will have contributed to this management in regions where these schemes are implemented with sufficient resources and relevant measures.

- The partially coupled beef special premium has contributed to some extent to the maintenance of beef cattle in the countries where it has been implemented and this is likely to have supported farms with more intensive grassland management systems and fodder production.

- The influence of the coupled slaughter premium on production, systems and management is less clear. At most, it appears to have provided a small amount of support to existing systems of beef and veal production.

- **The coupled dairy premium has had limited impact on dairy farm incomes and minimal impact on production levels and management practices**. This partly relates to the very short time for which it operated and the fact that dairy farmers are not in a position to adapt their systems in such a short timeframe.

- **CNDPs** are likely to have supported beef and dairy production in new Member States and, in certain cases particular systems of production (for example suckler cow systems). However, they are only likely to have had a marginal impact on restructuring trends which is resulting in fewer farms and farmers and more production concentrated in medium and larger farms.

The environmental impacts of coupled payments include firstly those arising from management choices directly attributable to the payments and secondly those resulting from adherence to cross compliance conditions. However, it is important not to overstate the influence of coupled payments on the environment, given the wide range of other drivers including market trends, technological development, socio-economic factors and Pillar Two schemes.

The main environmental impacts are linked to the maintenance of cattle numbers and the continuation of intensive and extensive management systems associated with them.

- The 100 per cent coupled suckler cow premium is more influential than other coupled payments and it is broadly beneficial in terms of biodiversity and landscape, but negative in terms of sustaining greenhouse gas emissions and, in certain areas, continuing to exert pressure on limited resources. The coupled beef special premium has a weaker influence but may sustain numbers of cattle for fattening in some areas, perpetuating adverse impacts arising from more intensive management. The environmental impact of the coupled slaughter premium appears less clear and is arguably very limited. Similarly the coupled dairy premium appears to have negligible direct impact on farm production, management or environment.

- All beef and dairy coupled payments have an indirect environmental impact by obliging farmers to adhere to cross compliance conditions. The role of coupled payments in triggering cross compliance should however not be overstated given its fairly recent introduction and the fact that many beef and dairy farmers are already likely to be adhering to cross compliance as a condition of decoupled support.

In conclusion, coupled payments have had both negative and positive impacts on the environment. They are likely to have yielded firstly, biodiversity and landscape benefits linked to extensive cattle grazing supported, in part, by the coupled suckler cow premium in certain Member States and secondly, more general environmental benefits resulting from the obligation for farmers to adhere to cross compliance. However coupled payments are also likely to have sustained cattle numbers leading to adverse environmental impacts both in intensive systems and in some extensive systems, where numbers exceed local carrying capacity.

9 SINGLE PAYMENT SCHEME

Q2.4: At the present level of implementation, to what extent is the shift from coupled payments to the different ways of implementing the **Single Payment Scheme** (SPS), in coherence with the obligation of integrating the environmental protection requirements into the CAP?

9.1 Introduction

This section focuses on the extent to which fully decoupled payments in the beef and dairy sector applied after the 2003 CAP reform and the different implementation options chosen are in coherence with the obligation of integrating environmental protection requirements into the CAP. The environmental effects of partially coupled payments are considered in Chapter 8. In its consideration of the Single Payment Scheme, this chapter attempts to examine the varying effects of the different payment calculation methods. It also looks at the SAPS, but not CNDPs which as a generally coupled form of payment are analysed in Chapter 8. An analysis of the environmental impact of the dairy premium is included here from the point at which it became included in the Single Payment. The use of Article 69 is also considered in this chapter because the associated payment forms part of the farmer's Single Payment.

The chapter is set out as follows: the introduction continues by outlining how the SPS has been implemented in the Member States thus far. A number of hypotheses are formulated about the possible impacts of the different elements of the 2003 reform, as they relate to the beef and veal sectors. The farm level impacts are considered in section 9.2 and section 9.3 describes the related environmental impacts. Section 9.4 concludes by answering the evaluation question.

The period covered by the analysis is mostly from 1 January 2005, with the end point being early 2007. The time coverage is complicated by the range of implementation dates of the SPS, the SAPS and the date at which the dairy premium is integrated into the Single Payment.

9.1.1 Implementation of the Single Payment Scheme and Related Measures

The central elements of the reformed CAP of interest to this section, as specified in Regulation (EC) 1782/2003, can be summarised as follows:

- the introduction of an income support in the form of the Single Payment Scheme (SPS) in the EU-15, selected also by Malta and Slovenia, and the Single Area Payment Scheme (SAPS) in the remaining eight new Member States;
- the decoupling of direct payments from levels of production, with options for partial decoupling in some sectors, including beef but not dairy (except through 'Article 69);
- a choice of three different payment models: historic, flat rate regional or hybrid;
- compulsory cross compliance;

- restrictions on the conversion of permanent pasture; and
- an option to use up to ten per cent of sectoral envelopes for supporting certain types of farming or promoting marketing of produce ('Article 69').

In order to lay the foundations for the analysis of the hypotheses, it is first necessary to explain the different ways in which Member States have implemented the 2003 CAP Reform. This permits Member States to be clustered into four groups according to their implementation options. The parameters for this exercise are the payment model chosen, whether the payment is calculated in a different way in different regions within a Member State, the year the fully decoupled Single Payment was introduced, the year in which the dairy premium was integrated into the Single Payment and whether Article 69 is used. This allows us to delimit the period of coverage for this analysis given the varying dates of introduction of the Single Payment, the SAP and the introduction of the dairy premium. The different implementation options for those Member States that introduced fully decoupled payments are listed in Table 0.1 according to the payment model chosen.

The Member States with fully decoupled payments in all sectors are: Germany, Ireland, Luxembourg, Malta and the UK. Greece and Italy have fully decoupled payments in the beef and dairy sectors, but maintain coupled payments in the seeds sector. As seeds are of no relevance to the beef and dairy sector the Single Payment in these Member States is also considered fully decoupled for the purposes of our analysis.

Table 0.1 Implementation Choices for the Fully Decoupled Single Payment Scheme.

Member State/Region	Payment Model	Regional Differentiation	Fully decoupled payment - year of introduction	Dairy premium - year of inclusion in SP	Use of Article 69
Germany	SPS Dynamic Hybrid	Yes	2005	2005	No
UK - Eng	SPS Dynamic Hybrid	Yes	2005	2005	No
Greece	SPS Historical	No	2006	2007	Yes
Ireland	SPS Historical	No	2005	2005	No
Italy	SPS Historical	No	2005	2006	Yes
UK - Sco	SPS Historical	No	2005	2005	Yes
UK - Wales	SPS Historical	No	2005	2005	No
Malta	SPS Regional Model	No	2007	N/A	No
Luxembourg	SPS Static Hybrid	No	2005	2005	No
UK - NI	SPS Static Hybrid	No	2005	2005	No

Source: adapted from European Commission, May 2007

The historical model of the SPS, as used in Greece, Ireland, Italy and Scotland and Wales in the UK, is calculated according to each applicant's historic direct payment receipts over the reference period 2000 to 2002. The static hybrid model has been used by Luxembourg and Northern Ireland. This means each applicant's payment is made up of an element based on historic receipts (as with the historical model) and an element paid at a flat rate to all applicants. The relative size of each element remains the same each year.

The SPS Dynamic Hybrid Scheme is used by one Member State (Germany) and one region (England, UK). With this model the payment shifts from a historic payment over a period of years to a flat rate payment. Slovenia and Malta, as Member States that acceded in 2004, apply a scheme where a flat rate payment is paid to all farmers. The UK is notable for applying three different payment models across its four territories. The approach to implementation is further differentiated by the cases of England and Germany where different payment rates are calculated on a regional basis. In Germany, this differs between the Länder and in England this varies between three regions (normal, Severely Disadvantaged Area, and moorland). The situation is complicated in these Member States by the varying influence of different payment rates and calculation methods.

The effect of the SAPS on the beef and dairy sector is also considered in this chapter. The SAPS allows uniform per-hectare payments to be made within a region. The ten new Member States began to implement the SAPS from the day of accession on 1 May 2004. Malta and Slovenia opted to implement the SPS from 2007. Bulgaria and Romania implemented the SAPS from 1 January 2007. The new Member States can also pay Complementary National Direct Payments (CNDPs). CNDPS are specifically considered in Chapter 8.

The year of introduction of the fully decoupled Single Payment varies from 2005 (in eight of the Member States/regions of interest to this chapter) to 2006 in Greece and 2007 in Malta. The coupled version of the dairy premium is considered in Chapter 8, but is considered again here from the point in time it is integrated into the fully decoupled Single Payment. This is either 2005, 2006 or 2007 (the date at which decoupling of the dairy premium became obligatory for all Member States). Two Member States and one region which operate a fully decoupled Single Payment also use Article 69. Five other Member States (Finland, Portugal, Slovenia, Spain and Sweden) also use Article 69 but apply partially coupled payments. The application of Article 69 in these Member States is also considered in this chapter.

9.1.2 Cross-compliance standards

All farmers in those Member States operating the Single Payment Scheme are required to adhere to cross-compliance standards as set out under Regulation 1782/2003 in return for their payment. Unless farmers observe certain standards in the areas of the environment, public, animal and plant health and animal welfare they risk losing part or all of their payments.

Cross-compliance requirements comprise two elements. Firstly, the 19 Statutory Management Requirements (SMRs), defined at EU level and which are drawn from existing EU Directives and Regulation, and secondly a number of minimum requirements for ensuring the 'good agricultural and environmental condition' (GAEC) of agricultural land which are defined by Member States. Member States must also ensure that the extent of permanent pasture (as at the level of the reference year) is maintained and that a comprehensive advisory system to support cross compliance is established (obligatory from January 2007). In the new Member States, farmers in receipt of Single Areas Payments must also keep their land in 'good

agricultural condition' but there is no current requirement for them to comply with the SMRs (see Chapter 2 for more detail).

Although this chapter is focused on those Member States that have implemented fully decoupled direct payments, all Member States are considered in order to facilitate a comparative analysis of the environmental effects of the different implementation options of the Single Payment.

The above overview highlights the complex nature of the Single Payment Scheme. The different implementation options may lead to a different set of impacts on farm incomes, farm structures, beef and dairy herd sizes and so influence the resulting environmental impacts. There is likely to be a time lag between the introduction of policy changes and the response at the farm level. We may therefore expect the initial impacts of the reform to be more evident in those Member States which introduced the decoupled payment in 2005.

9.1.3 Potential farm level response to implementation choices

It could be expected that the receipt of a fully decoupled Single Payment could affect the beef or dairy farmer's decision making in a number of different ways. The fully decoupled SPS removes the direct incentive to rear cattle and provides the opportunity for farmers to adjust their business to take advantage of market opportunities whilst continuing to receive a support payment. It may be logical to assume that the farmer would attempt to maximise his or her income from the market, with a range of effects on production. Some will seek to increase output. However, there are a number of constraints on the expansion of production. In the case of dairy farmers, this comes in the form of the milk quota. The ability to change the scale of enterprise in the short run is also limited for most farmers given, for example, insufficient land availability. There is also a time lag between the farmer recognising positive market signals and being able to increase production to take advantage of improving market prices. It may also be technically and practically difficult for a farm business to increase production even if market prices are favourable. Regulation and cross compliance may also restrict the farmer's ability to increase the size of their business. Those scaling back production may face constraints as well but generally more limited ones. In either case, it may be some time before decisions to change production can be observed on the ground.

There are other possible responses. One could be to diversify into other agricultural or non-agricultural activities. The area of land that can be converted to arable farming should be limited by the cross-compliance rules governing the conversion of permanent pasture, thereby limiting structural change. Alternative non-farming income sources may be sought in some cases but will be restricted by, for example the level of relevant expertise or enterprise within the farm household. It is possible that some farmers choose not to continue any farming activity and simply maintain the land in Good Agricultural and Environmental Condition in return for receipt of the Single Payment. Aside from market signals, there may be second level drivers that mitigate an exit from farming and influence farm management, the most predominant of which could be the desire to continue the family tradition of beef or dairy farming.

The choice of a Member State to implement a historical, regional flat rate or hybrid payment model may also influence land management decisions. The regional flat rate approach facilitates the redistribution of direct payments, which may be to the benefit of smaller, more marginal producers, although this will differ across Member States depending on farm structures. Recent research in the Netherlands, for example (De Bont et al, 2007) indicates that a flat rate would benefit most arable farmers and extensive livestock farms and potentially disadvantage dairy and specialist veal producers.

A historic approach will not have the same effect, and farmer reactions are more difficult to predict. The hybrid system may complicate farmer decision making as the payment shifts from a historic basis to a regional flat rate basis over time. The picture is further complicated in England and Germany where different payment rates are in place in different regions. In the Member States that apply the SAPS, it may be the case that as the value of the SAPS rises over time, the level of investment in relevant infrastructure may also increase, resulting in expanding herds and increased production. Land abandonment would appear to be less likely as the value of the SAPS rises. The use of the Article 69 option, depending on its application within a Member State, may provide farmers with an incentive to maintain livestock production in order to access the available funds.

9.1.4 Hypotheses

The main hypotheses for the evaluation question are listed below. Each hypothesis is expressed in relation to the counterfactual.

- Fully decoupled payments contribute to the maintenance of farm incomes in the beef and dairy sectors;
- The number of beef cattle declines at a greater rate in those Member States that maintain a fully decoupled payment than in those Member States which retain partial decoupling;
- The number of dairy cattle declines following the integration of the dairy payment in the decoupled Single Payment;
- A greater decline may occur in the level of fodder production in those Member States with fully decoupled payments than in those Member States with partially decoupled payments;
- The use of Article 69 should help to maintain or increase beef/dairy production in discrete localities where the measure applies; and
- The shift from coupled to fully decoupled support results in structural change with inefficient beef/dairy farms in receipt of the fully decoupled Single Payment leaving the sector and more efficient beef/dairy farms in receipt of the fully decoupled Single Payment expanding in terms of size and output**.**

A causal diagram presenting policy measures, contextual elements, and some potential environmental impacts to be examined is shown in Figure 0.1

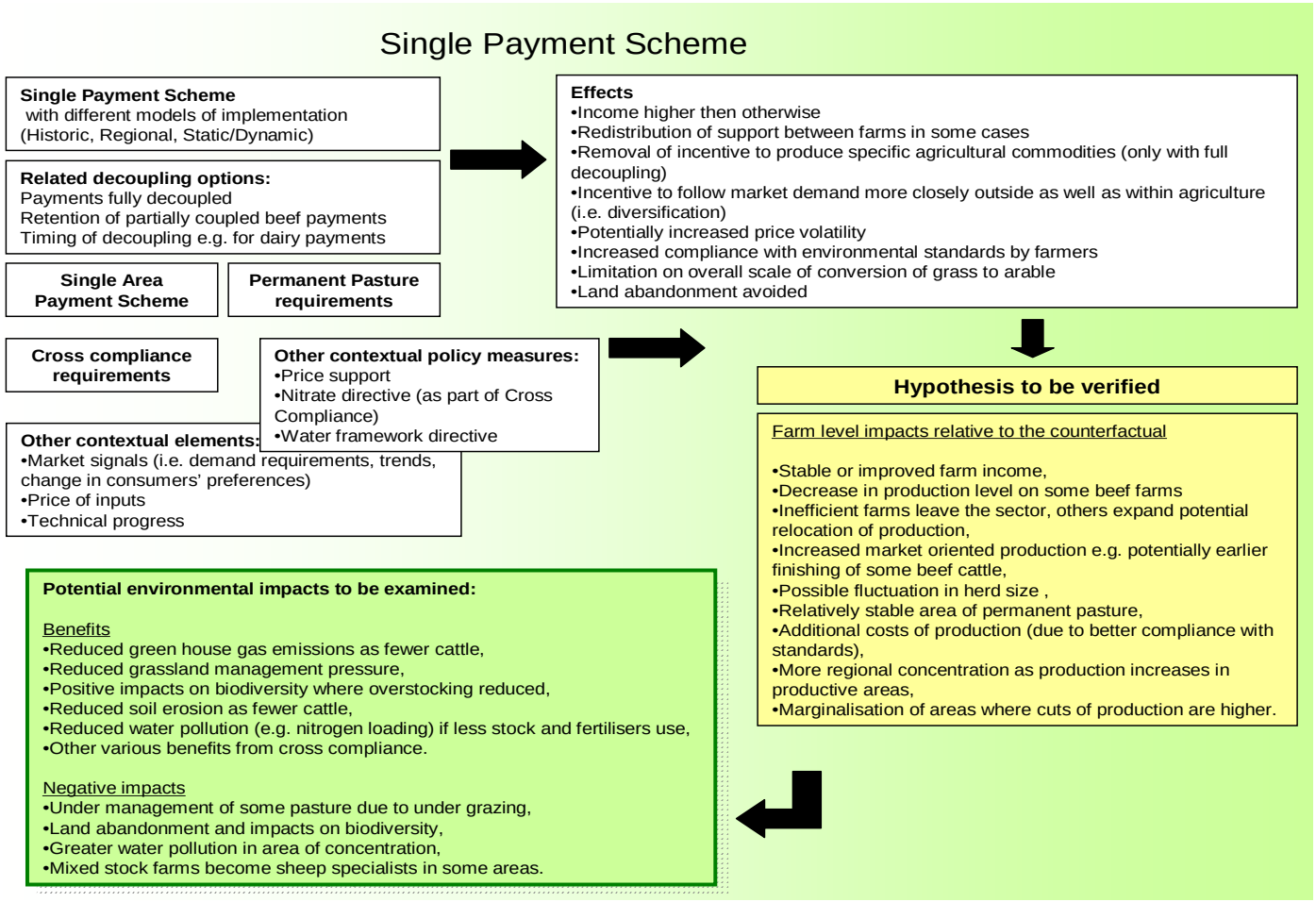


Figure 0.1 Diagram showing Single Payment Scheme, other contextual policy measures, hypotheses and potential environmental impacts

9.2 Analysis of farm level impacts of decoupled payments

9.2.1 Effect on farm incomes

The first hypothesis concerns the extent to which **fully decoupled payments have contributed to the maintenance of farm incomes in the beef and dairy sectors**.

Data on farm income in FADN is only available until 2004 and therefore it is not possible at present to understand the extent to which fully decoupled payments are contributing to the maintenance of farm incomes. The conclusions from Chapter 8 indicate that the Single Payment is likely to be a key source of income for many farmers.

The UK case study describes the changes in income that beef and dairy farmers are likely to experience. Dairy farmers did not receive direct payments prior to the introduction of the dairy premium. As a result, the case study author argues, they will not be worse off under the SPS system and in comparison to beef farmers will be better off as they have received a new income stream. However, decoupling means that some dairy farmers may choose to exit the industry and in the absence of any productive farming activity have the option of simply meeting cross compliance standards, keeping their land in 'good agricultural and environmental condition' in order to claim the SPS or of switching to another enterprise. In comparison, beef producers have historically received relatively high direct payments and as a result these farmers are likely to experience a greater loss (or smaller increase than otherwise) over the transition period from a historical to a flat-rate area payment than farmers with similar farms but keeping other types of stock such as sheep. As a result a significant fall in suckler cow numbers is expected due to decoupling (Cumulus, 2007). In comparison, in Scotland and Wales SPS payments are based on historic claims. As a result beef farmers in these countries should not be comparatively worse off than other farming sectors which traditionally received lower rates of direct payment. However, as a result of decoupling farmers will be under no obligation to maintain beef farming operations if they are unprofitable. Therefore farmers who have traditionally reared cattle may move into other types of farming if it is more profitable to do so.

There is insufficient evidence to substantiate this hypothesis. The SPS does contribute to farm incomes, but its relative value is also influenced by production choices, changing market prices, input prices and labour costs, which have a less predictable influence on farm income.

9.2.2 Effects on number of cattle and farm production

The second hypothesis is that **the number of beef cattle numbers is declining at a greater rate in those Member States that maintain a fully decoupled payment than in those Member States which retain partial decoupling.**

A change in the total number of cattle following the introduction of the Single Payment is perhaps the best available indicator of the impact of the SPS on farmers'

decision making in any Member State. Any trend towards an increase or decrease in cattle numbers is also helpful in analysing the associated potential environmental impacts.

Table 0.2 shows the change in the total number of cattle in real and percentage terms for each Member State between 2000 and 2006. For the EU-15, the table is split by those Member States operating a fully decoupled beef payment and those maintaining a partially coupled beef payment. Information is also provided on the choice of payment model and the year of decoupling. Caution is required when comparing the figures between those Member States that introduced the Single Payment in 2005 and those that introduced it in 2006. Five Member States did not introduce the Single Payment until 2006 meaning that the figures for 2006 may be a product of the preceding regimes in as much as the outcome of an initial reaction to the introduction of the Single Payment. It may therefore be logical to set aside this group of Member States from this analysis (Greece, Finland, France, Netherlands, Spain). Data is also provided for the two Member States operating the SPS Transitional Scheme and those Member States using the SAPS.

The table shows that there has been a decline in beef cattle numbers in most Member States since 2000. Four EU-15 Member States (Greece, Italy, Portugal, Spain) have experienced an overall increase, although some individual years are marked by a decrease. A comparison of the data between 2004, before the introduction of the Single Payment, and in 2006, following the introduction of the Single Payment, shows that overall there has been a greater fall in beef cattle numbers in those Member States that apply a fully decoupled Single Payment than those that maintain a partially coupled payment (-3.2 per cent compared with -0.5 per cent). The greatest drop amongst those countries with a fully decoupled payment has been in the UK (-4.8 per cent). Greece is the only Member State in the same group to experience an increase (+5.1 per cent)[58]. However, given the general pre-existing trend of a downward movement in beef cattle numbers, it is difficult to know how much the SPS acts to either accentuate or slowdown the decline. At this stage, it cannot be anticipated whether these emerging trends will remain as such in future years.

The pattern in the EU-15 contrasts with that in the new Member States[59]. Both Malta and Slovenia, the two Member States that operate the SPS Transitional Scheme, have experienced a small increase in cattle between 2004 and 2006. Amongst the Member States applying SAPS, all but two (Cyprus and Slovakia) have experienced an increase in cattle numbers in recent years. Taking these Member States as a whole, the total cattle population has increased by five per cent between 2004 and 2006. This rise in cattle may partly be explained by ongoing restructuring following accession to the EU and perhaps the influence of a direct payment that is increasing in value each year allowing new investments to be made and expansion to occur.

[58] The figure for Greece must be treated with caution, not least because the Single Payment was introduced in 2006 and the 2006 figure may be the result of the last years of the coupled subsidy regime rather than the initial product of a decoupled Single Payment. However, if the change was to be attributed to the Single Payment, the increase may at least be partially explained by the cross compliance GAEC standard which requires a minimum stocking density of 0.2 LU/ha. This is the only Member State to exercise such a requirement through cross compliance, although the stocking rate may appear too low to stimulate an increase in the cattle population.

[59] The case of those Member States applying SAPS needs to take account of the use of CNDPs, which as a coupled form of payment may be influencing these figures. CNDPs are examined in Chapter 8. Bulgaria and Romania are omitted from the analysis as they acceded in 2007 and we only have data until 2006.

Table 0.2 Changes in total number of cattle (excluding dairy cows) (1,000 heads) over 2000-6, by EU-15 Member State

	Member State	Payment model	Year of decoupling	2000	2002	2004	2006	Change total cattle 00-02	Change total cattle 02-04	Change total cattle 04-06	Change total cattle 00-06
Fully decoupled beef payment	Germany	SPS Dynamic Hybrid	2005	10,004	9,359	8,745	8,571	-6.5%	-6.6%	-2.0%	-14.3%
	Greece	SPS Historical	2006	388	461	490	515	18.8%	6.3%	5.1%	32.7%
	Ireland	SPS Historical	2005	5,177	5,204	5,090	4,915	0.5%	-2.2%	-3.4%	-5.1%
	Italy	SPS Historical	2005	4,460	4,784	4,677	4,526	7.3%	-2.2%	-3.2%	1.5%
	Luxembourg	SPS Static Hybrid	2005	156	148	143	140	-5.3%	-3.1%	-2.2%	-10.2%
	United Kingdom	Three different models	2005	8,538	8,152	8,387	7,986	-4.5%	2.9%	-4.8%	-6.5%
	Total			**28,724**	**28,107**	**27,531**	**26,653**	**-2.1%**	**-2.0%**	**-3.2%**	**-7.2%**
Partially coupled beef payment	Austria	SPS Historical	2005	1,535	1,478	1,513	1,476	-3.7%	2.4%	-2.5%	-3.9%
	Belgium	SPS Historical	2005	2,372	2,167	2,086	2,075	-8.6%	-3.7%	-0.5%	-12.5%
	Denmark	Hybrid	2005	1,247	1,127	1,047	1,024	-9.6%	-7.1%	-2.2%	-17.9%
	Finland	SPS Dynamic Hybrid	2006	677	669	634	620	-1.3%	-5.2%	-2.3%	-8.5%
	France	SPS Historical	2006	15,936	15,643	15,001	15,103	-1.8%	-4.1%	0.7%	-5.2%
	Netherlands	SPS Historical	2006	2,358	2,234	2,257	2,230	-5.3%	1.0%	-1.2%	-5.4%
	Portugal	SPS Historical	2005	1,059	1,054	1,105	1,100	-0.5%	4.8%	-0.5%	3.9%
	Spain	SPS Historical	2006	5,023	5,324	5,596	5,476	6.0%	5.1%	-2.2%	9.0%
	Sweden	SPS Static Hybrid	2005	1,192	1,173	1,150	1,131	-1.6%	-1.9%	-1.7%	-5.1%
	Total			**31,398**	**30,869**	**30,390**	**30,234**	**-1.7%**	**-1.6%**	**-0.5%**	**-3.7%**
SPS Transitional Scheme	Malta	SPS Transitional Scheme	2007	N.D.	10.74	11.57	11.67	:	7.7%	0.9%	**:**
	Slovenia	SPS Transitional Scheme	2007	353.43	333.26	317.13	341.52	-5.7%	-4.8%	7.7%	**-3.4%**
SAPS	Bulgaria	SAPS	n/a	290	341	311	286	17.7%	-8.8%	-7.9%	-1.1%
	Cyprus	SAPS	n/a	30	32	34	32	4.8%	7.2%	-6.0%	5.6%
	Czech Republic	SAPS	n/a	1,053	998	938	972	-5.2%	-6.0%	3.6%	-7.7%
	Estonia	SAPS	n/a	122	138	133	136	13.5%	-3.6%	2.1%	11.7%
	Hungary	SAPS	n/a	450	432	419	427	-4.0%	-3.0%	1.9%	-5.1%
	Latvia	SAPS	n/a	162	184	185	195	13.1%	0.8%	5.3%	20.0%
	Lithuania	SAPS	n/a	310	336	358	440	8.4%	6.6%	22.8%	41.9%
	Poland	SAPS	n/a	2,741	2,486	2,470	2,644	-9.3%	-0.7%	7.1%	-3.5%
	Romania	SAPS	n/a	:	1,250	1,242	1,294	:	-0.7%	4.2%	:
	Slovakia	SAPS	n/a	404	378	338	323	-6.4%	-10.4%	-4.6%	-20.0%
	Total			**:**	**6,575**	**6,429**	**6,750**	**:**	**-2.2%**	**5.0%**	**:**

(Source: Eurostat)

There is not a sufficient divergence in changes to cattle numbers between Member States to analyse the differing impact of each SPS payment model. The pre-existing trend of a decline in cattle numbers means caution is required if the decline is to be attributed to the SPS as the impacts of market prices and ongoing re-structuring in the beef sector are likely to be contributory factors. This data, on the surface, would seem to demonstrate that each payment model in the EU-15 is having a similar impact on cattle numbers. However, it fails to tell us about the occurrence of regional differences, such as localised intensification of production or marginalisation and abandonment, for example in relation to the LFA. Different rates of decline or increase may become more evident in the future. This could be particularly true for those Member States which operate a dynamic hybrid scheme, where production decisions may be more likely to change when the payment is no longer based on historical receipts but rather on the flat rate regional amount. The time lag between policy changes and changes in farm management also requires reflection.

The decrease in cattle numbers identified in the Eurostat data is in line with the trend predicted by the Commission's Impact Assessment of the 2003 reform proposals (as of January 2003 and therefore not based on the final reform agreement). It used two models to predict the changes in the beef and dairy sectors compared with Agenda 2000 levels. It assumed a decoupling scenario alongside a number of other assumptions. According to this report, the total cow herd is expected to fall by 3.5 per cent by 2009, with the suckler cow sector expected to be the most affected with a projected fall in herd size of around 14 per cent. The number of suckler cows was expected to drop by 11.9 per cent by 2007, and total cows by 3.6 per cent.

Evidence from the case studies confirms this emerging trend of a decrease in cattle numbers. In Ireland, a survey of farmers' attitudes and intentions in 2004 indicated that reductions in cattle numbers would be modest and only a small minority of farmers (4 per cent) would actually exit cattle enterprises as a result of decoupling (Dunne & Cushion, 2005). This compares to a 3.4 per cent decrease in cattle numbers from 2004 to 2006 for this Member State, which introduced the Single Payment in 2005. According to the author of the German case study, it is expected that when the payment moves from a historic to a flat rate regional payment in 2010 that the livestock population will decline due to its unprofitability and inefficiency, although the level of agri-environment payments and associated stocking density requirements could influence these changes.

According to farm level interviews conducted for the UK case study, beef cow numbers and particularly suckler cow numbers have declined or may do so in the future. According to the case study author, despite the low profitability of beef cattle, many farmers appear to be reluctant to cease beef production altogether due to cultural reasons and a personal preference for maintaining cattle. Other evidence collected in the UK (CSL/CCRU, October 2006) states that beef cattle will become less numerous overall. There will be marked decreases in uplands and losses in the least productive parts of existing lowland semi-natural grazed habitats such as heathlands, unless grazing activity is supported through agri-environment schemes.

The overall weight of evidence is pointing to a decrease in beef cattle numbers. This change cannot be wholly attributed to decoupling and the SPS, given the pre-existing trend of a decline in cattle numbers, which are likely to have more to do with the

overall profitability and the ongoing re-structuring of the sector. In addition, given the lack of clear differences between Member States, it is difficult to differentiate impacts by payment model and the level of coupling. With these caveats, and based on the available data, there is some rather limited evidence to suggest that this hypothesis can be substantiated.

The next hypothesis states that **the number of dairy cattle may decline following the integration of the dairy payment in the decoupled Single Payment.**

This section considers the impacts of the dairy payment since it was integrated into the Single Payment, whilst Chapter 8 considers the coupled dairy payment. Table 0.3 shows the change in the total number of dairy cows in real and percentage terms for each EU-15 Member State between 2000 and 2006. The table is split according to the year the dairy payment was integrated into the Single Payment.

Ina absolute terms, in all but two Member States (Luxembourg, Italy), the total dairy cattle population has decreased between 2000 and 2006. For the EU-15 as a whole the total herd has decreased by almost ten per cent. Over the most recent time period (2004-2006) the dairy herd has continued to decline (with the exception of Luxembourg and Greece[60]) albeit at differing rates. The same trend is true for those Member States which introduced the decoupled dairy payment in 2005, indicating that the SPS has little bearing on the underlying trend. The three countries with the largest dairy herd in 2004 (Germany, France and the UK) have experienced declines of six per cent, 3.7 per cent and 5.5 per cent respectively. Meanwhile, the production of cow's milk in the EU-15 has remained relatively stable at around 120m tonnes over the period 2002-2005 (Eurostat, 2006) whilst yields continue to rise steadily, to a figure of over 6,000 kg/head in 2004 (Figure 5.5). This suggests the rationalisation in overall cow numbers is offset by increased productivity.

According to this data, there appear to be no discernible trend in the number of cattle according to the year of introduction of the decoupled dairy payment (when it was integrated into with the Single Payment) or payment model. The fluctuations appear to be Member State specific and reflect the pre-existing pan-European trend of a decline in dairy herds and a concomitant rise in yield per head as acknowledged above. The emerging trend of a decline in the dairy herd is at variance to the Commission's prior Impact Assessment of the 2003 Reform proposals. This assessment predicted that the number of dairy cows would increase by 1.9 per cent by 2007 and 3.2 per cent by 2009, when compared to Agenda 2000 levels. A positive increase could still happen in 2007 should market circumstances provide for this, although this would require a substantial reversal to the emerging negative trend in dairy cow numbers. According to the UK case study, there will be some increases in cattle in dairy areas with dairy farming continuing the trends toward fewer but larger farms concentrated in lowland areas with accompanying increases in maize production. The recent figures from the UK June Census, however, continue to show a decline in the dairy herd of 1.2 per cent in 2006/07 with a 9.6 per cent drop in the number of dairy heifers.

[60] It is difficult to verify the data for Greece in this table given the large decrease in 2000 – 2002 followed by the large increase between 2004-2006

Table 0.3 Changes in total number of dairy cows (1,000 heads) over 2000-6, by EU-15 Member State.

Member State	Payment model	Year of introduction of decoupled dairy payment	2000	2002	2004	2006	Change total cattle 00-02	Change total cattle 02-04	Change total cattle 04-06	Change total cattle 00-06
Germany	SPS Dynamic Hybrid	2005	4,563.60	4,373.39	4,286.60	4,029.80	-4.2%	-2.0%	-6.0%	-11.7%
Ireland	SPS Historical	2005	1,152.78	1,128.75	1,121.82	1,087.10	-2.1%	-0.6%	-3.1%	-5.7%
Luxembourg	SPS Static Hybrid	2005	43.60	42.07	41.07	46.19	-3.5%	-2.4%	12.5%	5.9%
United Kingdom	Three different models	2005	2,339.04	2,229.45	2,141.71	2,023.78	-4.7%	-3.9%	-5.5%	-13.5%
Denmark	Hybrid	2005	644.00	613.00	569.00	555.00	-4.8%	-7.2%	-2.5%	-13.8%
Sweden	SPS Static Hybrid	2005	425.80	403.40	401.12	384.69	-5.3%	-0.6%	-4.1%	-9.7%
Greece	SPS Historical	2006	180.00	152.00	150.00	167.75	-15.6%	-1.3%	11.8%	-6.8%
Italy	SPS Historical	2006	1,772.00	1,911.00	1,838.00	1,813.74	7.8%	-3.8%	-1.3%	2.4%
Belgium	SPS Historical	2006	629.40	591.01	570.61	531.91	-6.1%	-3.5%	-6.8%	-15.5%
Finland	SPS Dynamic Hybrid	2006	357.90	343.05	317.85	309.42	-4.1%	-7.3%	-2.7%	-13.5%
France	SPS Historical	2006	4,153.27	4,134.00	3,947.00	3,799.00	-0.5%	-4.5%	-3.7%	-8.5%
Spain	SPS Historical	2006	1,140.57	1,154.21	1,056.92	980.54	1.2%	-8.4%	-7.2%	-14.0%
Austria	SPS Historical	2007	621.00	588.97	537.95	527.42	-5.2%	-8.7%	-2.0%	-15.1%
Netherlands	SPS Historical	2007	1,532.00	1,546.00	1,502.00	1,443.00	0.9%	-2.8%	-3.9%	-5.8%
Portugal	SPS Historical	2007	354.71	340.83	337.65	307.24	-3.9%	-0.9%	-9.0%	-13.4%
Total			**19,910**	**19,551**	**18,819**	**18,007**	**-1.8%**	**-3.7%**	**-4.32%**	**-9.6%**

(Source: Eurostat)

The new Member States are exhibiting the same downward trend in dairy cows as the EU-15. Setting the small increase for Romania aside (because the data precedes the introduction of SAPS in 2007) and the case of Bulgaria, these Member States have experienced a decrease in dairy cows since acceding to the EU in 2004. Milk production has been relatively stable (DG Agriculture, 2006), indicating that the yield per head has been increasing.

Table 0.4 Changes in total number of dairy cows (1,000 heads) over 2004-6, by EU-12 Member State

Member State	Payment model	2002	2004	2006	Change total cattle 02-04	Change total cattle 04-06	Change total cattle 02-06
Bulgaria	SAPS	358.20	368.72	350.14	2.9%	-5.0%	-2.3%
Cyprus	SAPS	26.23	26.08	23.94	-0.6%	-8.2%	-8.7%
Czech Republic	SAPS	464.00	429.30	417.30	-7.5%	-2.8%	-10.1%
Estonia	SAPS	115.60	116.50	108.90	0.8%	-6.5%	-5.8%
Hungary	SAPS	338.00	304.00	275.00	-10.1%	-9.5%	-18.6%
Latvia	SAPS	204.60	186.20	182.38	-9.0%	-2.1%	-10.9%
Lithuania	SAPS	443.30	433.90	399.00	-2.1%	-8.0%	-10.0%
Malta	SPS Transitional	8.03	7.84	7.45	-2.4%	-5.0%	-7.2%
Poland	SAPS	2,934.62	2,730.45	2,636.96	-7.0%	-3.4%	-10.1%
Romania	SAPS	1,627.40	1,566.40	1,639.36	-3.7%	4.7%	0.7%
Slovakia	SAPS	230.18	201.73	184.95	-12.4%	-8.3%	-19.6%
Slovenia	SPS Transitional	139.98	134.01	112.51	-4.3%	-16.0%	-19.6%
Total		**6890.14**	**6505.13**	**6337.89**	**-5.6%**	**-2.6%**	**-8.0%**

(Source Eurostat)

It is difficult to accept the hypothesis given that a decline in dairy cow numbers could have been expected irrespective of the implementation of SPS and SAPS. Further variables, such as the retention of coupled payments in other sectors, choice of payment model or year the dairy payment was integrated into the Single Payment are therefore likely to be of secondary and limited influence. This is likely to mean that the SPS and SAPS are not the key driver of dairy cattle numbers. However, precise causality is difficult to establish.

9.2.3 Impacts on farming systems and farm management

The third hypothesis is that there is likely to be **a greater decline in the level of fodder production in those Member States with fully decoupled payments than in those Member States with partially decoupled payments.**

Table 8.7 in the previous chapter shows the change in (a) the area of permanent grassland and meadow and (b) the area of forage plants (defined as temporary grass, green maize, leguminous plants and other green fodder) for EU-15 Member States between 2003 and 2005. It is therefore possible to relate changes to the SPS in those Member States that introduced the Single Payment in 2005, but not those which delayed introduction until 2006.

We may have expected, following our earlier hypothesis that the number of cattle in Member States with fully decoupled payments should decline more than in those Member States with a partially coupled payment, that the same should be true for the total area of forage plants if there are fewer animals to feed. However, according to the aggregated figures for these two groupings, the opposite appears to be true.

Among those countries with decoupled beef payments, the three biggest producers of forage plants have experienced an increase in the total forage area from 0.7 per cent in the UK and almost 14 per cent in Germany. Over the 2004-2006 period, these Member States have experienced a decline in beef and dairy cattle numbers. Among those Member States which have retained partially coupled payments, the overall trend is a small decline in the total forage area, although there have been some substantial increases (Austria) and decreases (Spain) against a backdrop of declining herds. As there is no clear pattern, caution is required when attributing changes in the area of permanent pasture and forage plants to the SPS or SAPS.

It is not clear from these figures whether the change in forage area can be attributed to a change in the growth or decline of maize. The cultivation of maize creates a number of environmental pressures such as soil erosion. According to the German case study author, it is expected that maize cultivation will decrease as livestock numbers decline. However, the case study also notes that no decline has yet been observed as many farmers have continued to produce maize for energy instead, promoted by national energy legislation.

It may be expected that the area of permanent grassland would decline as a consequence of a decline in cattle numbers in the Member States with fully decoupled beef payments. It might be logical to assume that this grassland would be converted into arable use, although the cross-compliance rules limiting the conversion of permanent pasture should limit the extent to which this might take place. Alternatively this grassland could have been abandoned, although again the cross compliance GAEC rules should prevent this. Such changes may not be easily detected from statistics. Overall, there is only a small difference in the change of permanent pasture between those Member States with fully decoupled payments and those Member States with partially decoupled payments. The figure for Portugal looks anomalous given the country has experienced a decline in cattle numbers, although it is possible this grassland is being used by sheep or goats.

Based on the available data, this hypothesis cannot be substantiated.

The fourth hypothesis is that **the use of Article 69 helps to maintain or increase beef/dairy production in discrete localities where measures apply.**

The option to use Article 69 was taken up by seven Member States and one region (Greece, Spain, Italy, Portugal, Slovenia, Finland, Sweden and the UK region of Scotland). It is used for the beef sector in all cases. In Spain, the dairy sector is also included. Table 0.5 summarises how Article 69 has been applied[61]. Information is lacking concerning the precise operation of the schemes such as the eligibility criteria.

Most schemes concern beef cows, although dairy cows are also targeted in Spain. Payment rates range from around €20 per animal in Portugal and Italy to €200 per animal in Finland and Greece. Payment rates at the lower end would appear too low to incentivise production. Cows on organic farms in Portugal receive slightly more than

[61] It should be noted that no information is available for Slovenia at present.

Table 0.5 Summary of Article 69 Implementation

Member State	Type of Cow	Payment (per animal)	Conditions
Finland	Suckler cow, heifer	€200	?
	Heavy male cattle (over 330 kg)	€80	?
	Heavy heifers (over 210 kg in weight)	€80	?
Greece	?	€200	Minimum of 20 animals on holding. Each animal with a weight of 240 kg at the end of its first year and 280 kg at the end of its second year; carcass must be of R3 classification.
Italy	Suckler cows with genealogical registration	€22.80	?
	Specialist breeds (dairy and meat)	€22.80	Maximum of 1.4 LU/ha, maintenance of pasture activity required.
	Other suckler cows (less than 7 years old).	€22.80	Maximum of 1.4 LU/ha, average number of heads is at least 5 LU per year, at least 50 per cent of the fodder area must be permanent pasture.
	Male bovines held in the farm for at least 6 months and aged between 8 and 20 months.	€22.80	Maximum of 1.4 LU/ha, average number of heads is at least 5 LU per year, at least 50 per cent of the fodder area must be permanent pasture
	Bovines slaughtered between 12 and 26 months kept in for at least 7 months and bred according to any labelling scheme or organic scheme.	€22.80	Animals participating in agri-environment schemes are not eligible.
Portugal	Bovines on conventional farms	€20.00	Animals participating in agri-environment schemes are not eligible.
	Bovines on organic farms	€24.00	Animals participating in agri-environment schemes are not eligible.
	Domestic female pure breds (indigenous breeds?)	€103.00	Must be registered by 1 June each year. Animals participating in agri-environment schemes are not eligible.
Spain	Suckler cows	?	Stocking density must not exceed 1.5LU/ha (holdings with 15 LU or less are excluded from this requirement). First 40 head receive full payment; next 41-70 head receive 2/3 of the payment; next 71-100 head receive 1/3 of the payment. In each herd, only the first 100 head receive payment.
	Calves	?	Must comply with a labelling system meeting the standards of organic production, integrated production or geographic denomination.
	Dairy cows	?	Payment is in proportion to the quota held by the holding, up to a maximum of 500 tonnes. To receive this payment, the beneficiary must participate in a quality control system for milk. This is to aid the participation of farmers in the code of good hygiene practice.
Sweden	?	20 SEK/ha (€2/ha)	Certification costs of participation in quality certification schemes
	?	75 per cent of the costs	Pays for the development of production methods or new products, up to a maximum of 50,000 SEK (€5,500) per year; or preparation and participation in agricultural fairs and food exhibitions within the EU.
UK - Scotland	Beef Calves	£70 (€100) for the first ten calves in a herd, and £35 (€50) for all others	Calves must be born on the farm and kept on Scottish land continuously from birth for at least 30 days. Calves must be at least 75% beef bred Targets specialist beef producers in remote areas.

(Source: Farmer, Swales and Bartley, 2005, information received from DG Agriculture, case studies conducted for this study).

those on conventional farms, but the difference in payment rate would look insufficient to encourage organic conversion. The much higher rate for traditional breeds could encourage their production, especially if no upper limit on the number of eligible animals has been set. According to the Italian case study, the payment of €22.80/head is considered by experts and farmers' associations as inadequate to meet the environmental goals of Article 69. In addition, the focus of the measure in Italy is not thought to be targeted sufficiently at extensive systems that deliver environmental outcomes, with only 15-18 per cent of suckler cows eligible for the payment in 2006, compared with 54 per cent of cattle for slaughter. Overall, from an analytical perspective, there are not enough different types of cow targeted by the schemes, and therefore payment rates, in any one Member State to be able to distinguish any potential difference in environmental outcome (De Filippis, Frascarelli 2007).

A maximum stocking rate is only set in Italy and Spain. This should counteract the possibility of overgrazing, if set at the correct level. The Italian scheme probably specifies the most relevant criteria from an environmental perspective by specifying a maximum stocking density and requiring the grazing of permanent pasture. In Greece there must be at least 20 animals on the holding in order to qualify for the payment, which may encourage overgrazing in the absence of any stocking density criteria. Sweden is distinct in setting an area as opposed to headage payment, although the size of the payment at €2/ha would appear too small to distort underlying production patterns. In addition, the associated scheme targets participation in a quality certification scheme as opposed to maintaining production systems that are beneficial to the environment.

The application of Article 69 will have an economic impact on farms as a result of taking up to ten per cent of the Single Payment available to beef and dairy farmers and redirecting it to potentially fewer farms through Article 69. The amount of the relevant ceiling being used for Article 69 ranges from 0.45 per cent in Sweden to seven per cent in Spain and Italy, for the beef sector. In Spain ten per cent of the dairy ceiling is channelled in to Article 69. It is not possible to make an analysis of the environmental impact arising from this redistribution of payments. Income cuts that arise from applying Article 69 could result in changing farming practices and negative environmental impacts on those farms which are not eligible. As another study stated, 'A worse case scenario would be if national envelopes [the UK terminology for Article 69] created environmental problems in one place or on one type of farm in order to raise money to solve problems in another' (GFA and IEEP, 2003).

The case studies highlight some issues pertinent to some of the Member States operating Article 69. In Scotland and Italy Article 69 is regarded as a recoupled payment. In Scotland, this is not welcomed by some representatives of the beef industry as it is thought to encourage market inefficiencies by supporting small producers at the expense of larger inefficient ones. However, in the opinion of the UK case study author it is felt that the Article 69 scheme could have an overall positive environmental impact by maintaining beneficial grazing regimes in marginal areas. The Italian case study author remarks that Article 69 is unlikely to have an influence on the risk of abandonment of livestock activities in the most marginal areas as the eligibility criteria have been applied to distribute the funding in as non-selective way as possible.

More information is needed regarding the objectives of the schemes, eligibility criteria and environmental conditionality before an analysis can be made of the environmental impacts of the Article 69 payment. As such, there is not enough evidence to substantiate this hypothesis at this relatively early stage of policy implementation.

The fifth hypothesis is that **the shift from coupled to fully decoupled support potentially results in structural change with inefficient beef/dairy farms in receipt of the fully decoupled Single Payment leaving the sector and more efficient beef/dairy farms in receipt of the fully decoupled Single Payment expanding in terms of size and output.**

This hypothesis is difficult to substantiate given the relative infancy of the Single Payment Scheme. In particular, there is no data through which to discern any regional concentration of beef/dairy production in the more productive/efficient beef and dairy farming areas or any marginalisation of beef/dairy production in less productive/efficient beef and dairy farming areas. However, the case studies do provide some evidence which tends to support the hypothesis.

In the case study for Ireland it is acknowledged that evidence to date is limited. However, the case study author states that the SPS is likely to result in a reduction in farms with suckler cows, a reduction in farms with beef cattle generally and increasing specialisation in dairy, beef and other sectors. The case study author writes that on more marginal, smaller farms, many of which are run by part-time farmers, there is likely to be a reduction in stock numbers, particularly suckler cows, and stocking density. These farms are likely to seek to continue to manage their grassland extensively albeit using less stock and simpler systems (for example, more drystock). On more commercial, larger beef and dairy farms, farmers are likely to specialise to produce to specific markets. One example, from the farmers interviewed, is bull beef production for export, this has the advantage of also reducing stocking rate to comply with SMR4 (Nitrates Directive).

According to the UK case study, there is some evidence to show that in lowland systems production has intensified in order to maintain income from beef operations. Oglethorpe (2005) has also highlighted that farmers are moving out of suckler production into sheep production in uplands and that some lowland beef systems are being substituted by sheep systems and grass-fed beef systems are intensifying on lowland grass. The German case study highlights the influence of factors external to the SPS on beef production. It is noted that the Bavarian cultural landscape program and compensatory allowance (in Less Favoured Areas) provide a payment attached to a minimum stocking density which helps maintain beef production. Most farmers fulfil this with suckler cows, heifer fattening or other less intensive production systems.

There is insufficient evidence to analyse the impact of the regional payment model in the UK and Germany. In England, for example, there are three different payment rates for the Single Payment according to whether the farm is in the Severely Disadvantaged Area (one component of the LFA measure in England), in the moorland area or in neither of the above. The regional differentiation in payment rates may influence restructuring processes.

The rules on the conversion of permanent pasture should restrict any large scale conversion of pasture to arable crops. The overall area of pasture cannot drop below ninety per cent of the 2003 reference amount. It is more likely that pasture will either continue to be grazed (perhaps as the result of the agri-environment measure or the LFA measure) or maintained at the minimum level of satisfy cross compliance rather than abandoned.

There is insufficient evidence to support the hypothesis. Drawing from the case studies, which are largely based on anecdotal information, it is likely that there may be some regionalised intensification of production on the one hand and localised marginalisation on the other. In other cases beef farming may be substituted by sheep farming. The permanent pasture conversion rules should limit a large scale restructuring to arable farming.

9.2.4 Summary of farm level impacts

There is limited evidence to draw on from which to answer the evaluation question. This is mainly due to the short timescale over which the Single Payment Scheme has been in operation. In some cases the fully decoupled SPS has only been in operation since 2006, meaning it is difficult to draw conclusions about its impact in 2007. We can, albeit with some caution, say that decoupled payments appear to have had the following farm level impacts:

- Beef cattle numbers are decreasing at a slightly higher rate in those Member States with fully decoupled payments than in those Member States that retain partially coupled payments. However, this is a pre-existing trend and it is difficult to ascertain the exact role of the SPS in influencing this trend.
- Although there are some exceptions, beef cattle numbers have increased over the first years of accession (2004-2006) in those Member States that use the SAPS. This follows significant fluctuations in stock numbers and may in part be due to cattle numbers returning to historically higher levels as conditions for investment have improved.
- Dairy cattle numbers are decreasing across all Member States irrespective of the date of integration of the dairy payment into the Single Payment, choice of payment model or the retention of coupled payments in other sectors. The SPS does not appear to distort a pre-existing, underlying trend towards the rationalisation of the dairy industry whereby herds are falling but yields are increasing.
- Article 69 may have an impact on maintaining beef cattle numbers in the specific areas of those Member States where the payment is distributed. Only one Member State is targeting the dairy sector, and thus the impact will be much smaller here. More information is required on the application of Article 69 before conclusions can be drawn on the scale of change and the impact this may have on the environment.
- There is anecdotal evidence to show that some restructuring of the beef and dairy sectors is occurring with some regional intensification, some localised marginalisation and some substitution of beef farming with sheep farming. A large scale conversion from animal rearing to arable farming looks unlikely given the rules on the conversion of permanent pasture.

- Based on the current data available at the EU level, it is difficult to discern any significant difference in farm level impact according to (a) the degree to which coupling has been retained in the beef sector, (b) the year in which the Single Payment Scheme was introduced and (c) the method used to calculate each farmer's Single Payment entitlement. Different trends taking account of these three variables may be more evident in the years to come.

9.3 Analysis of environmental impacts of decoupled payments

The farm level impacts noted above are likely to result in a range of positive and negative environmental impacts, but these will relate very much to the local context.

Water quality

The evidence presented above shows beef cattle and dairy cattle numbers are decreasing in those Member States with fully decoupled payments. This should lead to a reduction in organic manure, slurry and silage effluent, resulting in a reduction in the level of nitrogen and phosphates in water courses. This will help to reduce the risk of eutrophication. The opposite is likely to be true where beef cattle numbers are rising, as is happening among those Member States that apply the SAPS.

There is evidence to suggest that dairy production is becoming more regionally concentrated and intensified. The chance of more severe water pollution incidents occurring may be increased due to the close proximity of a number of large scale, intensively operated dairy units. However, such units are also likely to have the capital to be able to make the necessary infrastructural investments, such as to build slurry stores and so reduce the risk of point source pollution incidents.

Information from the case studies suggests that the introduction of cross-compliance as a requirement for receipt of the SPS has accelerated adherence to some pieces EU environmental legislation that are contained within the SMRs, particularly the Nitrates Directive. This should have a beneficial impact on water quality.

There is a concomitant possibility that maize production is increasing to provide cattle feed. Soil erosion and sedimentation are associated with maize production.

Biodiversity

Changes in cattle numbers can have both positive and negative impacts on biodiversity. The nature of the impact is partly dependent on the stocking density, the habitat being grazed and the species that is grazing.

In those Member States where beef cattle and dairy cattle numbers are declining, the risk of overgrazing is likely to be averted. This can reduce habitat damage, for example around supplementary feeding points where cattle would gather to eat or drink. At the other extreme undergrazing or abandonment could occur and scrub could develop, although this will partly be constrained by cross compliance GAEC rules.

There is some evidence to suggest that cattle grazing will be replaced by sheep grazing in some parts of the EU depending on local conditions, such as whether shepherding is required. Sheep graze in a different way to cattle and this could effect the species composition of semi-natural pastures.

In those areas where dairy farming is becoming more regionally concentrated, negative impacts on biodiversity are likely to arise as a result of an increase in the number of specialist dairy systems, intensive grass production and the growth of maize. Requirements to adhere to cross-compliance, should limit some of these negative impacts, particularly in relation to the level of inputs. There may also be an associated decline in mixed systems, which generally provide more benefits to biodiversity than specialist units. Unsuitable stocking rates in systems where outdoor grazing occurs could have a negative impact on biodiversity.

The requirements attached to the receipt of an Article 69 payment may specify a stocking limit in some cases. If this is designed to take into account local circumstances, this may be beneficial to biodiversity, as well as soils and water.

Soils

The reduction in beef cattle numbers observed in many Member States is likely to reduce the risk of soil erosion. The presence of fewer cattle reduces the risk of unsuitable supplementary feeding or the problems that might arise through the over wintering of stock outside. Beef cattle numbers are generally increasing in the new Member States, and depending on the state of the soil at the point of accession, the problems of soil erosion, poaching and compaction may occur.

There appear to be localised instances of dairy cow numbers increasing in discrete areas characterised by specialist units. If the cattle are kept outdoors, there is an increased risk of soil erosion, poaching and compaction (which in turn can create water run-off problems). The growth of maize, grown to provide fodder, is also linked with soil erosion. However, the risk of soil erosion is reduced where cattle are kept indoors.

Landscape

There are likely to be a number of impacts on landscape character. A growth of intensive, indoor dairy systems would result in reduced landscape diversity. The absence of grazing cattle from pastures could have an adverse impact on visual diversity. A change from beef to sheep grazing could also alter the appearance of the landscape.

Air quality and climate change

The impact of the beef and dairy cattle sectors on air quality and climate change is likely to reduce as cattle numbers decline. Methane and nitrous oxide emissions will decline as a result, reducing greenhouse gas emissions from the beef and dairy sectors. Ammonia emissions from the beef sector would also decrease which will reduce the sector's contribution to acidification. However, if permanent pasture is ploughed up to permit the growth of arable crops, some carbon sequestration capacity is likely to be lost. Localised methane, nitrous oxide and methane emissions could increase where dairy cattle rearing becomes regionally concentrated, although at national level the net contribution of the sector to greenhouse gas emissions and acidification could decline.

9.4 Conclusions

The answer to this evaluation question is based on limited evidence from a short time period but it demonstrates that there is a less than definitive link between the Single Payment Scheme, the beef and dairy sectors and environmental impacts. The same applies to the Single Area Payment Scheme. The analysis has attempted to juxtapose those trends in Member States applying fully decoupled payments in the beef and dairy sectors with those Member States that maintain some form of coupled payment. It is relatively clear that beef cattle numbers have fallen more sharply in fully decoupled Member States in the past two years. However, trend data also shows that, for the most part, cattle numbers have been declining for some time, indicating that decoupling in particular is having a limited influence on underlying trends so far. The exception may be for beef cattle in those Member States applying the SAPS. It is possible to speculate that in these countries beef cattle numbers are increasing, possibly as a result of new investment linked to the receipt of the Single Area Payment.

The resulting environmental impacts of changing herd sizes are both positive and negative and depend very much on the local context. However, it is wrong to attribute these changes completely to the introduction of the fully decoupled Single Payment Scheme or the Single Area Payment Scheme. Beef cattle numbers have declined which may be positive in terms of reducing soil erosion and greenhouse gas emissions, for example, but negative in terms of an enhanced risk of undergrazing, which may lead to less species rich pastures. The environmental impacts in those Member States where beef cattle numbers are increasing are likely only to be negative if stocking densities increase beyond the carrying capacity of the farm. If this occurs, problems may arise for soil erosion, water quality and biodiversity, as a result of overgrazing. The increased specialisation of the dairy industry may help to limit point source pollution through the efficient storage of manure, but could create problems such as decreased landscape diversity and a reduction in biodiversity friendly mixed farming systems.

In summary, it is too early to make a firm judgement about whether the different implementation options of the SPS are in coherence with the environmental integration obligation, given the limited information available. The evidence suggests that there are likely to be reductions in environmental pressures following an anticipated fall in cattle numbers. At the same time, the risk of undergrazing and biodiversity losses will increase.

The SPS and SAPS in principle avoid the direct production incentives of previous policies and the associated environmental costs. However, given the greater risk of reduced grazing and pasture maintenance in sensitive areas, cross compliance rules, including those on the conversion of permanent pasture, have a clear role in the new policy architecture alongside targeted rural development measures.

10 CONCLUSIONS

This chapter brings together the overall conclusions of the evaluation exercise, covering both the dairy and beef regimes and other related measures within the CAP. Conclusions regarding specific measures and evaluation questions have been included in Chapters 4 - 9. The central focus here is on the environmental impacts arising from the implementation of the measures over the period since 1988, but these depend greatly on the influence that the policies have had on farm structures and management decisions. Much of the evaluation exercise has been concerned with identifying these farm level effects since it was not possible to rely on existing literature to provide such an analysis.

The CAP beef and dairy regimes are substantive and include a range of specific policy measures that have evolved considerably over the period examined. Their impact has to be assessed in relation to an assumption about what would have occurred in the absence of the policy measures. Specifying the counterfactual is not straightforward. In this study it has been defined:

a) In relation to price support measures, as the price that might have applied within the EU in a global scenario in which the EU and other major suppliers did not support the price of milk or beef products (i.e. above the short term world price).
b) In relation to direct payments, it is the situation in which other factors (including changes to institutional prices) remain the same but the direct payments are not made.
c) In relation to decoupled payments, the counterfactual is the absence of payments, but reference has also been made to the position in those Member States that have retained coupled payments.
d) In relation to milk quota, as the absence of a milk quota system, with other factors, including price support, remaining unchanged.

In all cases, this introduces a conjectural element into the analysis of policy impacts that is difficult to avoid. Quantifying the impacts of a policy measure in the absence of a quantified counterfactual is particularly hazardous. Information on environmental impacts of farm management decisions directly attributable to policy decisions is relatively scarce so many of the conclusions rely on reasoning and a limited evidence base rather than a body of clear empirical data.

10.1 The Beef and Veal CMO

Measures within the Beef and Veal CMO have comprised a mixture of price support and direct payments (see Chapters 4, 6 and 7). Since 2005 a sizeable proportion of the direct payments have been decoupled, with variations between Member States (see Chapters 8 and 9). A more targeted form of direct payments, using the Article 69 measures, has also been introduced in some Member States.

Throughout the period since 1988, beef prices in the EU have been significantly above those on the world market, although the long term equilibrium position, without price support by the major producers, would indicate a smaller gap between the EU and the world price. Without being able to specify the counterfactual price very exactly, it is difficult to estimate the precise significance of the price support and other measures provided through the CAP. It is clear that a considerable level of support has been provided and that production has been sustained above the level that otherwise would have occurred. At a lower support level structural change in the beef sector would have taken place, cost structures would have altered and over time there would have been an adjustment to a new, lower, price level.

It has not been feasible to model such a process so the approach in this evaluation has been to focus on certain key variables, including the number and distribution of beef cattle in the EU, which are important variables from an environmental perspective (see Chapter 3).

Over the evaluation period, policy has progressed through an arc, beginning with a focus on the product being supported (price support), moving to a phase where the stock themselves became an important determinant of support levels (direct payments), to the current stage where beef producers receive a mixture of price support, for example, through border protection, and decoupled payments, which for the most part, relate more to past production levels than current livestock management. Since 2005, Member States have been obliged to implement a system of cross compliance on direct payments in the sector which has reinforced environmental obligations of which most, but not all of which, have applied previously to the producers in question but have not necessarily been enforced. In this sense, environmental concerns have become more prominent and explicit in the objectives and machinery of the CMO since 1988.

10.1.1 Environmental impacts related to price support and coupled direct payments, 1988-2003

Some of the principal farm impacts of the policy on the beef and veal sector over this period can be summarised briefly before turning to the environmental implications.

Farm Structural Impacts

Beef cattle numbers are higher in the EU as a result of the combined effect of price support and direct payments than they would have been otherwise. Whilst the counterfactual is rather imprecise, a more liberal regime with less support would have been associated with significantly fewer cattle. In the absence of the CMO,

shocks to the market, for example, BSE and FMD, would have led to a larger number of farms exiting the sector.

Beef cattle numbers climbed or were held at a fairly consistent level in several Member States, for example Ireland, and this is a clear policy effect. The restrictions on production linked to direct payments under the CMO have also had some impact. For example, stocking density ceilings have had a visible effect in those Member States with very intensive systems such as the Netherlands, although this is only one of a number of factors in this Member State that led to the decrease in the number of beef cattle, other factors being poor prices, restrictions as a result of national manure policy and the more favourable market situation for rose veal. In general terms, therefore, these restrictions have had a mixed effect, but have not changed the pattern of production greatly in most Member States.

In addition to enhanced cattle numbers, price support and direct payments in the beef sector have:

- Increased the income received from beef production;
- Helped maintain a wider distribution of beef production than otherwise would have been the case;
- Helped maintain a greater number of farms and farmers in beef production than otherwise would have been the case; and
- Potentially contributed to the underlying trend towards more specialised production.

Direct payments specifically, both separately and collectively, have had a number of impacts and these vary considerably between Member States due to differences in farming systems. Specifically:

- Over a period of many years the suckler cow premium has resulted in an increase in the number of suckler cows and the number and area of farms with such cattle. In the last decade numbers have fallen in many Member States but they still remain above the counterfactual. This increase is also in part attributable to the milk quota system with some farmers switching from dairy to suckler beef production. Without the support of the suckler cow premium (alongside other direct payments and schemes), it is likely that there would have been a more rapid decline of smaller specialist beef farms, in marginal areas and perhaps a greater tendency towards other land uses;
- Extensification payments have helped sustain more extensive beef production systems, particularly within marginal areas such as the LFA (for example 92 per cent of specialist beef farms with a stocking density of less than 1 LU/ha were within the LFA in 2004) and this will have helped to retain the environmental benefits associated with these systems. However, there is no evidence to suggest that extensification payments have resulted in a widespread reduction in stocking rates and in some cases they have incentivised producers to increase stocking levels up to the threshold;
- Other direct payments have also added to the returns to beef production and contributed to sustaining it above the counterfactual. However, the numbers of young male cattle have not risen in the same way that the suckler herd did. Direct payments, together with price support, have therefore tended to broadly sustain

existing production systems at a range of intensities with their existing positive and/or negative environmental effects; and

- Direct payment conditions relating to stocking density, individual producer limits and regional ceilings, for example, appear to have had some impacts on farming practices, but not sufficient to alter the main trends. The standard stocking limits attached to payments across Member States was not capable of reflecting the differences in ecological carrying capacity of the land in different regions.

Environmental Impacts

In environmental terms, impacts from beef and veal production arise particularly from:

- Changes in the number of livestock kept and the period for which they live;
- The management system adopted; and
- The distribution of stock in relation to relevant environmental parameters such as proximity to water bodies, soil characteristics, semi-natural habitats managed through grazing etc.

The environmental effects of these impacts on the beef and veal sector are various and can be either positive or negative. They can be divided into three principle groups:

- Those relating to greenhouse gases;
- Other more location specific forms of air and water pollution and effect on soils;
- The maintenance or alteration of landscapes and biodiversity.

In chapters 4 – 9, a number of specific impacts on water quality, water resources, air pollutants, landscape and biodiversity have been identified. In overall terms price support and direct payments have had either an overall neutral, or negative impact on the environment, with effects depending on locally specific conditions and management practices. Only the suckler cow premium and the extensification premium can be said to have resulted in some benefits and these are limited to certain regions. Where these occur, they are related to the maintenance of existing extensive beef systems especially on permanent grassland and areas with semi-natural vegetation and the environmental benefits that are generally associated with such production systems. However, in some regions with extremely low carrying capacity, the incentive effect of these payments, coupled with inappropriate stocking density thresholds, has created negative effects through pressure from overstocking.

In general, the higher level of beef cattle to the counterfactual means that environmental pressures arising from cattle production are greater, although the scale of additional numbers is difficult to specify. The most acute pressures in relation to a higher number of beef cattle are:

- **Higher emissions of greenhouse gases**, specifically methane and nitrous oxide;
- A **higher volume of livestock wastes and ammonia and nitrogen loadings** on the environment, although effective nutrient management and slurry storage can help minimise these impacts;

- **Pressures on soils and semi-natural habitats** in areas where inappropriate levels of grazing are occurring and where more intensive forage production systems are introduced.

In the more intensively managed segment of the European beef and veal herd, the site-specific pressures are greater than in the extensively managed segment where feed consumption is lower, less inputs are consumed in fodder production and stocking densities tend to be lower and more in keeping with the carrying capacity of the land. Figures 10.1 and 10.2 demonstrate the extent to which expenditure on fertilisers and agrochemicals per hectare rises with stocking density in all the categories of beef farm referred to in this study, with expenditure being significantly lower in the farms with a stocking density below 1.2 LU per hectare.

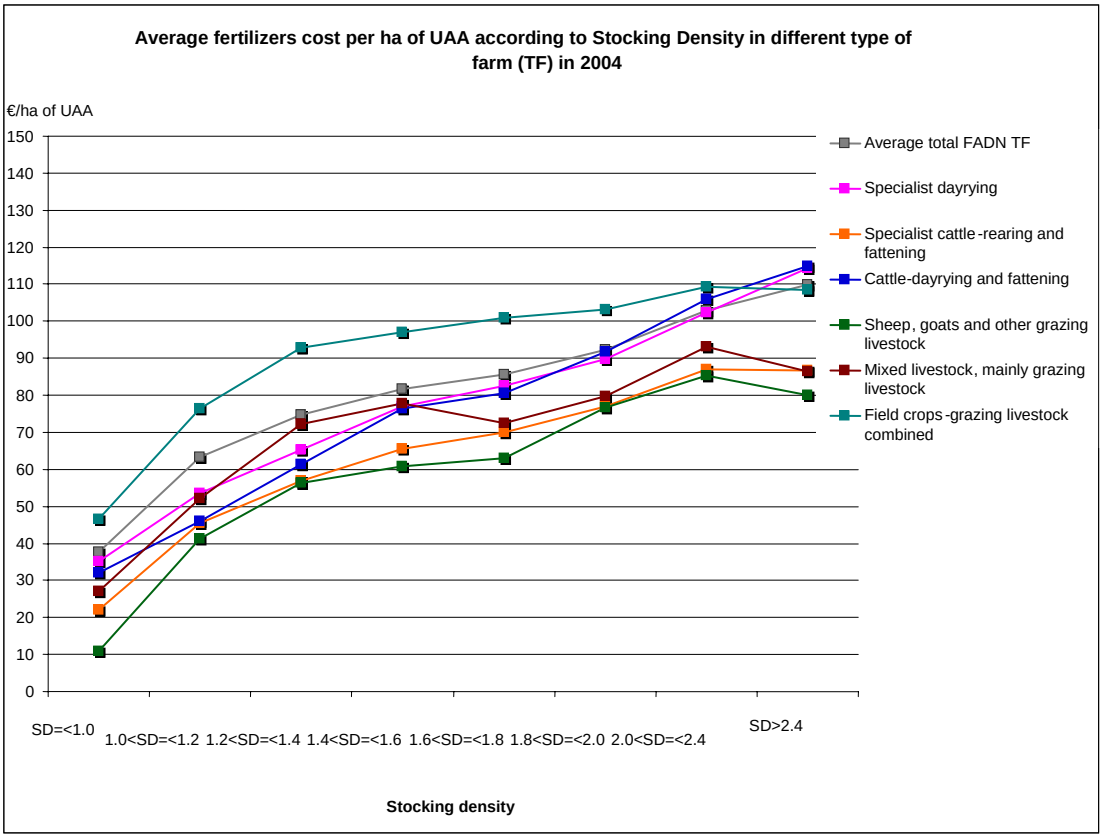


Figure 10.1 Average fertiliser[62] cost per ha of UAA according to Stocking Density in different types of farms in 2004

(Source: FADN)

It is those farms with lower stocking densities where the positive environmental benefits of beef production are most pronounced. Compared to the counterfactual **price support and direct payments, particularly the suckler cow premium, appear to have helped to maintain extensive beef production where it might otherwise have become economically unviable.** The environmental benefits associated with these systems tend to be location specific and are associated with

[62] Purchased fertilisers and soil improvers.

landscape and habitat management, particularly the retention of pastoral systems and their associated field patterns, grazed vegetation and boundary features.

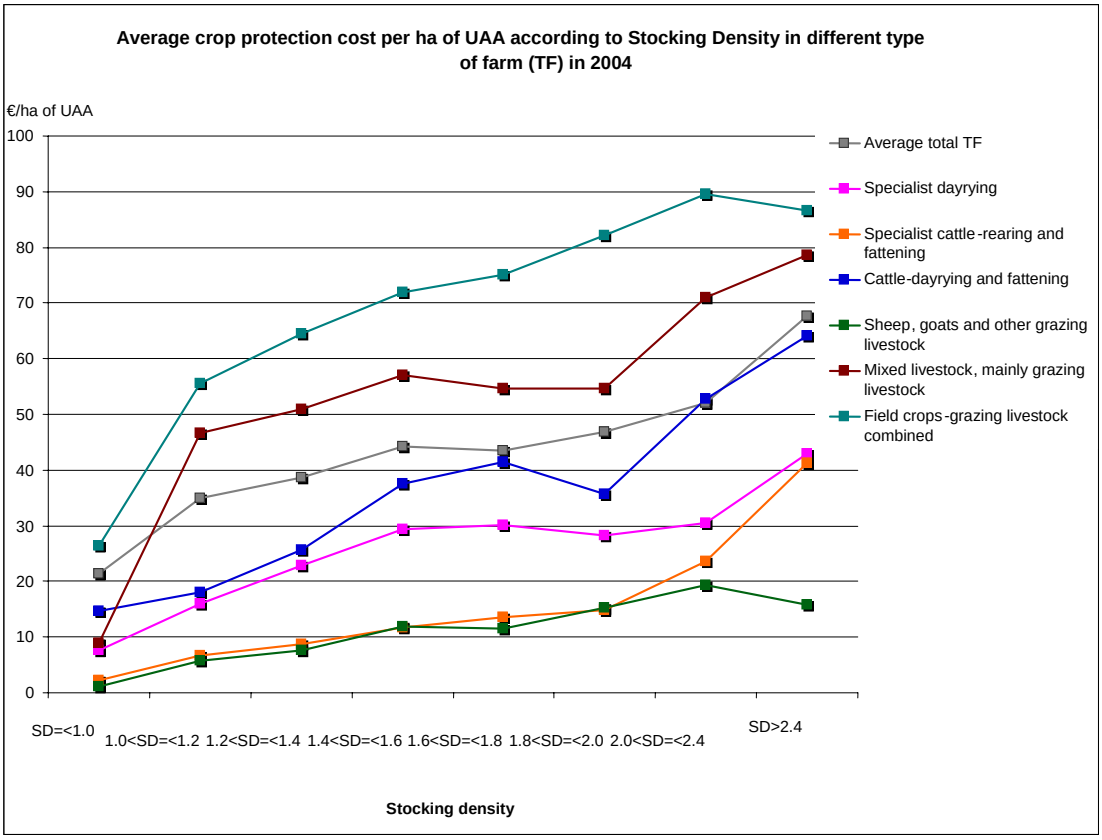


Figure 10.2 Average crop protection[63] cost per ha of UAA according to stocking density in different types of farms

(Source: FADN)

In biodiversity terms, the continued management of semi-natural vegetation, particularly on those habitats for which cattle grazing is the preferred management, is the main benefit of beef production, as long as stocking levels are kept within the carrying capacity of the land. A significant proportion of 'High Nature Value' farming systems comprises extensive beef cattle farms, particularly within LFAs and areas where more intensive fodder production has not been cost effective. The continuation of grazing is a priority in biodiversity terms over much of this area and for many habitats other forms of stock are not necessarily a substitute for beef cattle in terms of ecological impact as their grazing patterns do not produce the vegetation structure needed to support the mix of species required by these habitats. While it is difficult to be precise about the extent of this area, it is likely to amount to many million hectares. However, cattle grazing is not ecologically desirable for all habitats. In some regions, particularly the drier southern regions, sheep and goats are better adapted to the fragile vegetation and soil types.

The effects of price support and direct payments on other environmental variables such as water quality, water resources, soils and landscape tend to be

[63] Plant protection products.

less positive. Higher cattle numbers lead to higher levels of organic waste being deposited on farmland, with potentially damaging impacts on water quality. Diffuse water pollution can also occur from soil erosion and poaching as a result of overstocking, as seen in some of the case study examples, or from soil erosion caused by the growth of forage crops such as maize when inappropriately sited. The effects on landscape of the CMO tend to be fairly neutral, with landscape features, such as hedgerows or boundary walls, unlikely to experience any significant changes. However, where production is becoming more intensive and stock are housed indoors, the erection of additional buildings and associated infrastructure can have significant negative impacts on the landscape by giving it a more 'industrial' character.

10.1.2 Environmental Impacts relating to support since 2003

The evidence suggests that it is too early to say what the precise effect of decoupling on the environment is. Having only been implemented in Member States since 2005, there is limited data available from which to make a full assessment. However information from the case studies do help to give some indications and some logical deductions can also be made.

Farm Structural Effects

The shift from coupled to decoupled support can be expected to change production patterns over time as the market distortions associated with the former cease to operate. Structural adjustments that may potentially take place include:

- reduced stocking of animals generating poor market returns; and
- the cessation of beef production on some farms and build up on others, depending on the efficiency of producers and their price expectations.

To date, however, apart from some decline in stock numbers, more significant changes have not yet become apparent, although there is some anecdotal evidence to suggest that some restructuring is occurring. This is probably because of the short time that has elapsed since the introduction of the SPS and the relatively limited changes in the actual payments received by most farmers so far due to the way in which the SFP is being introduced in different Member States. However, we can anticipate greater changes in production patterns over time, depending partly on market developments, with subsequent environmental impacts.

Although there are material variations, beef numbers do appear to be decreasing at a slightly faster rate in those Member States with fully decoupled payments than in those that retain partially coupled payments. Aggregate stocking densities are declining in many Member States but this can disguise a trend towards heavier stocking in some areas and declining stocking densities in others.

Where the suckler cow premium remains coupled, this appears to be contributing to the retention of more stock than otherwise might occur, thus slowing down the rate of decline of less intensively managed beef cattle, particularly within certain regions, including many LFAs. Qualitative evidence from the case studies in France and Spain appears to back this up. Other remaining coupled premia, such as the beef special premium and the slaughter premium may also be having some impact but this is less evident.

Environmental Effects

In environmental terms, it is difficult without a very considerable amount of detailed information to make general judgements about the impacts of a decoupled payment system as these are very much dependent on the locality and the management of any given area in terms of the stocking density, the external inputs being used, and the habitat being grazed in relation to the carrying capacity of the land. Table 10.1 sets out the likely overall impacts of direct payments on the environment by theme.

However it is clear that a certain level of grazing is required for the provision of biodiversity and landscape benefits over a substantial area and without grazing there would be a marked deterioration in the quality and extent of environmentally valuable habitats. In some cases, the same benefits could be provided by grazing by other livestock, such as sheep, or by the retention of a suitable cutting regime as required by cross-compliance as long as this is properly enforced. In other cases, cattle are needed, either on their own or in a mixed system with sheep, to retain the necessary diversity of grazing and browsing patterns to provide the vegetation structure and conditions needed for retaining specific habitats.

Table 10.1 Impacts of direct payments and cross-compliance on the environment, by theme

	Water quality	**Water resources**	**Biodiversity**	**Landscape**	**Soils**	**Air quality & climate change**
Direct payments before 2003 reform						
Suckler cow premium	□/-	□/-	+/-	+/-	□/-	-
Beef special premium	□/-	□/-	□/-	□	□/-	-
Deseasonalisation premium	□	□	□	□	□	□
Slaughter premium	□	□	□	□	□	□
Additional payments	□	□	□	□	□	□
Extensification payments	□	□/-	+/-	+/□	□/-	□
Coupled direct payments after 2003 reform						
Coupled suckler cow premium	□/-	□/-	+/-	+/-	□/-	-
Coupled beef special premium	□/-	□/-	□/-	□	□/-	-
Coupled slaughter premium	□	□	□	□	□	□
Cross Compliance	+	□	+	+	+	□

-- *strong deterioration,*
- *minor deterioration,*
□ *no deterioration or improvement overall*
+ *minor improvement*
++ *strong improvement*

The extent to which beef cattle numbers are retained in the most environmentally sensitive locations cannot be attributed to the retention of coupled payments alone as it also depends on the operation of more targeted policies such as agri-environment

payments. However, because these are designed to be compensatory they do not provide the same underlying support for High Nature Value systems as can be provided by direct payments such as the suckler cow premium.

Where still coupled and applied to predominantly extensive systems, the suckler cow premium can be expected to contribute to biodiversity and landscape benefits as a result of the retention of extensive cattle grazing in particular areas. However, this does not guarantee benefits in all circumstances. Where the payments have sustained numbers above the carrying capacity of the land, then adverse impacts in terms of water quality and biodiversity are likely to have been experienced.

The impacts of the more recently introduced Article 69 measures are not yet clear. Having been only recently implemented there is little information forthcoming on their impacts on the beef sector and hence on the environment. More information is required on the application of Article 69 before conclusions can be drawn on the scale of change and the impact this may have on the environment.

In addition to considering the environmental consequences of the farm impacts arising from coupled and decoupled payments, it is also important to consider cross compliance and its effects. From 2005, farmers receiving coupled payments (beef or dairy) have had to adhere to cross compliance conditions, as implemented by Member States, with considerable variations between them. It is still too early to be able to quantify the exact extent to which farmers have had to adapt their management practices to meet cross compliance conditions. However, in general terms, cross compliance is expected to result in a range of environmental benefits, and at the very least appears to have increased farmers' awareness of the requirements of the specific environmental legislation involved, particularly in relation to soils and water quality.

10.2 The Dairy CMO

Since 1988 the dairy CMO has consisted of a series of measures providing price support and a quota system (introduced in 1984) that has been adjusted to some degree over time. Direct CMO payments have been only introduced to a limited extent in the form of the dairy premium and this has only happened more recently.

In broad terms, the analysis suggests that the combination of price support and the operation of quotas at Member State and farm level has stabilised production of milk at a consistent and predictable level. Over the same period, however, the number of dairy cattle and the number of farms have declined overall as a result of technical and structural changes. This trend, however, cannot be attributed to the CMO as it is observed in nearly all OECD countries.

There are many uncertainties regarding the precise production and structural effects of the dairy CMO mechanisms. The counterfactual is difficult to specify and price support effects cannot be seen in isolation of the operation of milk quota, thus making it difficult to distinguish the separate impact of the two systems.

Since 2005, cross-compliance has been introduced within the dairy sector for the first time, linked to the dairy premium, and this has been a significant development. It has

reinforced environmental obligations, most of which have applied to the producers in question previously but have not necessarily been enforced. In this sense, environmental concerns have for the first time become explicit in the objectives and machinery of the dairy CMO.

10.2.1 Environmental impacts related to price support and coupled direct payments, 1988-2003

Some of the principal farm impacts of the policy on the dairy sector over this period can be summarised briefly before turning to the environmental implications.

Farm Structural Effects
Despite a general trend of ongoing decline in the number of dairy cows in the EU, dairy cattle numbers have been higher over the period compared to the absence of the CMO regime (the counterfactual). However, it is difficult to be precise about the extent of this. The same is true of the total number of dairy farms.

The quota system has constrained the overall growth in cattle numbers that would have occurred with the price support arrangements operating without quota. The impacts of the quota system vary between Member States and over time. In general the system has prevented the migration of production to more competitive Member States and, in some Member States with internal restrictions on quota transfer, it has also prevented or slowed down regional concentration.

The supply control of milk through the dairy quota has led to a range of producer responses aimed at maximising the average net margin received from each litre produced. These include increasing the intensity of production of the forage area (i.e. switching from grass to forage maize), increasing yield per cow on existing field areas, enabling a reduction in stock numbers, or increasing the stocking density by reducing the land area used for dairying, and freeing up other land for alternative enterprises such as beef, sheep or marketable crops.

The extent to which dairy price support and quotas contribute to the process of farm enlargement is unclear but the overall pace of enlargement may have been reduced by the existence of quotas.

The majority of dairy farms in the EU are managed intensively and on some farms this will have been accelerated by price support. They tend to be associated with more intensively managed grassland and there is a growing trend to keep stock housed indoors. Intensification creates additional environmental pressures with regard to water pollution, biodiversity and landscape but may be broadly neutral with regard to greenhouse gas emissions.

Environmental Effects
If dairy cattle numbers have been approximately 20 per cent above the counterfactual (as established in Chapter 4) there will be a range of environmental impacts, the extent of which will be dependent on the management practices implemented at farm level and the management associated with forage crops such as maize.

As for the beef and veal sector, these impacts can be divided into those that relate to greenhouse gases, other more location specific forms of air and water pollution and effects on soils, and the maintenance or alteration of landscapes and biodiversity. In general, price support and the milk quota system taken together can be said to have had an overall negative impact upon the environment, although quotas will have constrained the level and extent of environmental impacts that might have occurred otherwise. The main environmental impacts are likely to have been:

- Higher levels of methane and nitrous oxide production, increasing the EU's greenhouse gas emissions. Emissions from dairy are about double those from other cattle, for example. If the beef and dairy regimes together have caused cattle numbers in the EU 15 to be about 10-20% higher than they would otherwise have been, this will have led to a corresponding increase in GHG emissions. Emissions vary depending on the type of cattle, the feeding regime and other factors. Nonetheless, if we assume a linear relationship between cattle numbers and emissions, but ignore emissions other than those arising from enteric fermentation, it can be estimated that around 12-24,000 Gg of CO_2 equivalent might have been added to the EU's annual emissions by the additional animals. In effect this would be something between 0.2 and 0.5% of all EU emissions;
- More ammonia emissions, particularly where increased concentration of production has occurred, with the level reflecting management practices as well as livestock numbers;
- Increased levels of waste production, generally in the form of slurry, creating water pollution pressures, especially from nitrates. Pollution is being reduced by improved management but remains a serious concern in relation to the dairy sector;
- Higher levels of fodder production, most of it intensively managed grass or green maize. Input use on this area is relatively high on most farms so environmental pressures such as pressures on water quality and risks to soil erosion arising from fertiliser and herbicide use, ploughing of temporary pasture and the cultivation of maize will be elevated.

The majority of dairy farms do not maintain species rich semi-natural grassland where biodiversity associated with grazing is greatest. However, a small proportion of dairy farms do provide benefits for biodiversity as they are low intensity or manage important habitats, for example, alpine meadows. In supporting the dairy sector as a whole, the CMO almost certainly will have prolonged the viability of many of these farms which tend to be less profitable and more extensive and these are found disproportionately in new Member States.

The impact of price support and quotas within the dairy sector are unlikely to have significant impacts on the landscape. However, the trend towards fewer, larger holdings, particularly where management practices have led to increased housing of dairy cows and an increase in the production of forage crops such as maize can have significant detrimental impacts. In particular, increased buildings and associated infrastructure, such as milking parlours, silage clamps and slurry stores can change the character of the landscape to one of a more industrial nature.

In general terms, increased regional concentration of dairying is environmentally undesirable in so far as it raises the concentration of pollutants in an area and subsequent pollution risks, reduces landscape diversity and reinforces the trend towards specialisation and the decline of mixed farming. The quota system has prevented the transfer of quota and hence milk production between Member States and to some degree between regions within Member States (an issue being addressed in a separate study). In this sense, the quota system has contributed to a constraint on regional concentration.

10.2.2 Environmental Impacts relating to support since 2003

The continued existence of dairy quota means that the impacts of decoupling within the dairy sector have not been as extensive as they might otherwise have been. The dairy premium does not appear to have any clear effect on cattle numbers and as such is unlikely to lead to significant environmental impacts beyond the need to adhere to cross compliance requirements. Should quota be removed in the future then this would lead to sizeable distributional changes within and between Member States.

The introduction of cross compliance as a condition of receipt of the SPS, however, should not be underestimated. There is some evidence to suggest that, while many of the requirements reinforce existing legislation rather than setting new standards, awareness has risen and compliance and enforcement are higher than previously.

One of the biggest influences in relation to cross-compliance has been improved compliance with the Nitrates Directive. This will have positive effects over time by pushing holdings to improve their slurry storage and handling. However, there are indications that this may also lead to some structural change too, for example it may add to the pressure on less viable holdings to abandon production and in other cases it may cause farmers to buy land or decrease herd size to ensure compliance. These structural changes could also have implications for the environment.

10.3 Policy Recommendations

10.3.1 Recommendations relating to the beef and veal sector

The suckler cow premium has been environmentally beneficial in retaining grazing by suckler cows where this is needed, particularly in areas of High Nature Value. However, as a policy tool it is not able to sufficiently fine tune the location or management of stock, such as matching stocking densities to the environmental needs of a particular area. From an environmental perspective the stocking density (and the right composition and management of stock) are essential to achieve the optimal grazing regime for the habitat required.

At present rural development measures aimed at sustaining beneficial farming practices offer compensation to producers in the LFA and those signing agri-environment agreements. However, compensation alone may not cover the full cost of providing the desired environmental outcome if the underlying system in insufficiently profitable. For this reason, a capacity to focus support to farming

systems of particular environmental value in the areas where they are most beneficial would complement these rural development measures.

Opportunities for more focussed support could be achieved through the use of a less sectorally focused and more environmentally flexible 'Article 69' approach, alongside more targeted Pillar Two measures, with the latter delivered through the agri-environment measure or a revised LFA measure with a greater emphasis on the delivery of environmental outcomes.

Additionally, there is a need to review the application of Article 69 to evaluate the outcomes that it has delivered up to now, particularly from an environmental perspective.

10.3.2 Recommendations relating to the dairy sector

Most dairy enterprises are managed intensively creating considerable environmental pressures, although some of these, such as greenhouse gas emissions, are declining. Only a small percentage is farmed less intensively on environmentally valuable habitats. Several areas of concentrated production are in Nitrate Vulnerable Zones. Confidence in European production has increased under current world prices. The Commission has indicated that milk quotas will cease to apply after 2015, with measures to allow a soft 'phasing out' proposed as part of the CAP Health Check.

This suggests two key policy related needs for the future in relation to the environment. Firstly, sufficient measures need to be in place to manage growing environmental demands – especially in relation to water pollution and climate change. Existing cross compliance measures do not focus on some of the most pressing concerns, such as diffuse pollution and accelerated reductions in greenhouse gas emissions. Additional action therefore appears necessary. Second, there may be circumstances in which the continuation of dairy cattle production is desirable environmentally, for example, in Alpine pastures and where alternatives such as beef rearing would either not be beneficial environmentally or would not be viable. In such cases a dedicated and well targeted measure under Article 69 could play a role to support rural development measures, such as agri-environment, which have been applied on a limited scale in the dairy sector relative to beef production.

ANNEX I: FADN EVALUATION DATABASE

FADN Evaluation Database and data processing in the framework of the 'Evaluation of the Environmental Impacts of CAP measures related to Beef and Veal & Milk sector'

A specific FADN data abstraction has been carried out within the framework of the Evaluation in order to:

a) Apply a more differentiated farm typology than the standard FADN one for both beef and dairy farms.
b) Utilise FADN data to look at trends over time for a number of variables with farms divided according to a proposed farm typology.
c) Conduct analysis at both European and Regional level.

The evaluation database can be subdivided into three:

- The European level dataset
- The 10 New Member State dataset for 2004
- The Producing region dataset

I.1 European level dataset

Data were collected for the following years: 1989, 1992, 1995, 1997, 2000, 2001, 2003 and 2004.

The subset was made up of farms with more than 5 LU bovine animals. In order to calculate this threshold the sum of standard variables 'Dairy cows' (SE085) and 'Other Cattle' (SE090) has been used.

Data were aggregated at EU-15 level.

Data for farms belonging to the following type of farms (TF):

41. Specialist dairying
42. Specialist cattle-rearing and fattening
43. Cattle-dairying, rearing and fattening combined
44. Sheep, goats and other grazing livestock
71. Mixed livestock, mainly grazing livestock
81. Field crops-grazing livestock combined

Data were divided according to the following stocking density classes:

- Less than 1 LU/ha
- From 1 to 1.2 LU/ha
- From 1.2 to 1.4 LU/ha
- From 1.4 to 1.6 LU/ha
- From 1.6 to 1.8 LU/ha
- From 1.8 to 2 LU/ha
- From 2 to 2.4 LU/ha
- More than 2.4 LU/ha

Stocking density is calculated at farm level as the sum of total livestock units divided by total forage area according to the following FADN code specification:

'Total livestock units' includes:

- Dairy cows (SE085)
- Other cattle (SE090)
- Sheep and goats (SE095)

'Total forage area' includes:

- Fodder roots and brassicas (K144AA)
- Other fodder plants (K145AA)
- Fallow land (K146AA)
- Temporary grass (K147AA)
- Permanent grassland (K150AA)
- Rough grazing (K151AA)

The variables used are listed in section I.4 of this Annex.

Due to the fact that data for Cataluña region was not available for 2004 at the time of writing the report, data for 'Cataluña' for the year 2003 have been used to estimate the contribution of the region in the year 2004.

I.2 Data set for New Member States

Data for new Member States (Malta excluded) were available only for the year 2004 at the time of writing the report.

Data were aggregated and provided by single New Member States as specified in the following table in relation to FADN regions:

FADN regions
Estonia 755
Latvia 770
Hungary 760 - 761 - 762 - 763 - 764 - 765 – 766
Lithuania 775
Poland 785 - 790 - 795 - 800
Slovenia 820
Czech Republic 745
Cyprus 740
Slovakia 810

The subset was constructed with similar specifications as the EU-15 described in section I.1

I.3 Production regions dataset

Data were collected for the following years: 1989, 1992, 1995, 1997, 2000, 2001, 2003 and 2004.
The subset was made up of farms with more than 5 LU bovine animals as specified in the previous section (I.1).
Farm data were aggregated according to the following farm type (TF) and stocking density:

FADN farm types	***Stocking density***	***Proposed farm type***
41	>1.8LU/ha	Specialist dairy – more intensive
41	<=1.8LU/ha	Specialist dairy –less intensive
421	>1.4LU/ha	Specialist beef rearing – Intensive
421	<=1.4LU/ha	Specialist beef rearing- Extensive
422	>1.4LU/ha and LU/ha = 0[64]	Specialist beef fattening – Intensive
422	<=1.4LU/ha	Specialist beef fattening – Extensive
43	>1.4LU/ha	Dairying, rearing and fattening combined – more intensive
43	<=1.4LU/ha	Dairying, rearing and fattening combined – less intensive

[64] The class 'Specialist beef fattening – Intensive' include farms with more then 1.4 LU and farms without (or a very reduced) forage area. As an approximation of 'LU/ha = 0' farms with a number of LU >50 and a forage area <1ha have been included in this category.

44, 71, 81	>1.4LU/ha	Mixed livestock system – more intensive
44, 71, 81	<=1.4LU/ha	Mixed livestock system – less intensive

Stocking density was calculated as described in section I.1.

The following data limitation has been considered during interpretation of results: mountain pasture and other pasture outside the UAA of the holding it is not included in the calculation of stocking density. As a consequence farms with small forage crop area and uses common pastures are classified with intensive farms. The uses of common pastures have been observed through variable A42 (Days of grazing outside UAA).

Data was aggregated according to the following production regions :

Proposed regions	**FADN regions**
Finland	Finland 670-680-690-700
Sweden	Sweden 710-720-730
Austria	Austria 660
Ireland	Ireland 380
Denmark	Denmark 370
Netherlands	Netherlands 360
Portugal	Portugal 610-620-630-640-650
Greece	Greece 450-460-470-480
Belgium and Luxembourg	Belgium 340-341-342-343 Luxembourg 350
Germany-North	Schleswig-Holstein 010
	Hamburg 020
	Niedersachsen 030
Germany-East	Brandenburg 112
	Mecklenburg-Vorpommern 113
	Sachsen 114
	Sachsen-Anhalt 115
	Thueringen 116
Gemany-West	Nordrhein-Westfalen 050
	Hessen 060
	Rheinland-Pfalz 070
	Baden-Württemberg 080
	Saarland 100
Germany-Bavaria	Bayern 090
France-North	Ile-de-France 121
	Picardie 132
	Haute-Normandie 133
	Nord-Pas-de-Calais 141
France-Central	Champagne-Ardenne 131
	Centre 134
	Bourgogne 136
France-West	Basse-Normandie 135
	Pays de la Loire 162
	Bretagne 163
France-East	Lorraine 151
	Alsace 152
	Franche-Comté 153
France-Massif Central	Limousin 184
	Auvergne 193
France-South West	Poitou-Charentes 164

	Aquitaine 182
	Midi-Pyrénées 183
France-South East	Rhône-Alpes 192
	Languedoc-Roussillon 201
	Provence-Alpes-Côte 203
	Corse 204
UK-North	Scotland 431
	Northern Ireland 441
UK-Central	Wales 421
	England-North 411
	England-West 413
UK-East	England-East 412
Spain-North	Galicia 500
	Asturias 505
	Cantabria 510
	Pais Vasco 515
	Navarra 520
Spain-Other	La Rioja 525
	Aragón 530
	Cataluña 535
	Baleares 540
	Castilla-León 545
	Madrid 550
	Castilla-La Mancha 555
	Comunidad Valenciana 560
	Murcia 565
	Extremadura 570
	Andalucia 575
	Canarias 580
Italy-North	Val d'Aosta 221
	Piemonte 222
	Lombardia 230
	Trentino 241
	Alto-Adige 242
	Veneto 243
	Friuli-Venezia Giulia 244
	Liguria 250
	Emilia-Romagna 260
Italy-Other	Toscana 270
	Marche 281
	Umbria 282
	Lazio 291
	Abruzzo 292
	Molise 301
	Campania 302
	Calabria 303
	Puglia 311
	Basilicata 312
	Sicilia 320
	Sardegna 330

I.4 FADN variables constituting the Evaluation database

Variables and codes according to FADN classification (European Commission, Community Committee for the Farm Accountancy Data Network 2006, RI/CC 1256 rev 4 and RI/CC 882 Rev 8.2).

General Information

System variables

- Farms represented (SYS02)
- Sample farms (SYS03)

Farm Return variables

- Less-favoured areas (A39), number of farms
- Irrigated area (A40),
- Days of grazing outside UAA (A42)
- Areas with environmental restrictions (A45), number of farms

Structure and yield

Standard Results variables

- Economic size, ESU (SE005)
- Total labour input, AWU (SE010)
- Total Utilised Agricultural Area, ha (SE025)
- Rented U.A.A., ha (SE030)
- Forage crops, ha (SE071)
- Agricultural fallows, ha (SE072)
- Number of animals, LU (SE080)
- Dairy cows, LU (SE085)
- Other cattle, LU (SE090)
- Sheep and goats LU (SE095)
- Pigs (SE100)
- Poultry (SE105)
- Stocking density, LU/ha (SE120)
- Milk yield, kg/cow (SE125)

Farm Return variables

- Fodder roots and brassicas (K144AA)
- Other fodder plants (K145AA)
- Fallows and set aside (K146AA)
- Temporary grass (K147AA)
- Other arable crops (K148AA)
- Land prepared for sowing, leased to third parties (K149AA)
- Permanent grassland (K150AA)
- Rough grazing (K151AA)
- Quantity of cows' milk (K162QQ)
- Quantity of cows' milk products (K163QQ)
- Fodder maize (K326AA)
- Other silage cereals (K327AA)
- Other fodder plants (K328AA)
- Dry pulses for fodder (K329AA)

- Calves for fattening (D23AV)
- Other cattle < 12 months (D24AV),
- Male cattle 12–24 months (D25AV),

- Female cattle 12-24 months (D26AV),
- Male cattle over 24 months (D27AV),
- Breeding heifers (D28AV),
- Heifers for fattening (D29AV),
- Dairy cows (D30AV),
- Cull dairy cows (D31AV),
- Other cows (D32AV).

Output (euros)

Standard Results variables

- Total output (SE131)
- Forage crops (SE195)
- Total output livestock and livestock products (SE206)
- Cows' milk and milk products output (SE216)
- Beef and veal output (SE220)

Costs (euros)

Standard Results variables

- Total inputs (SE270)
- Total intermediate consumption (SE275)
- Total specific costs (SE281)
- Fertilisers (SE295)
- Crop protection (SE300)
- Feed for grazing livestock (SE310)
- Feed for grazing livestock home-grown (SE315)
- Other specific livestock costs (SE330)
- Machinery & building current costs (SE340)
- Energy (SE345)
- Interest and financial charges (SE380)

Farm Return variables

- Concentrated feedingstuffs for grazing livestock (F64),
- Coarse fodder for grazing stock (F65)
- Water costs (F81)

Subsidies (euros)

Standard Results variables

- Total subsidies (SE605)
- Total subsidies on livestock (SE615)
- Subsidies dairying (SE616)
- Subsidies other cattle (SE617)

Farm Return variables - Table J

- Subsidies for calves for fattening (JC23)
- Subsidies for Other cattle < 12 months (JC24)
- Male cattle 12–24 months (JC25)
- Female cattle 12-24 months (JC26)
- Male cattle over 24 months (JC27)
- Breeding heifers (JC28)

- Heifers for fattening (JC29)
- Subsidies for dairy cows (JC30)
- Subsidies for cull dairy cows (JC31)
- Subsidies for other cows (JC32)
- Subsidies for cows` milk (JC162)
- Subsidies for cow's milk products (JC163)
- Subsidies for cattle under contract (JC307)
- Subsidies beef (JC700)
- Dairy premium (JC770)
- Environmental subsidies (JC800)
- Subsidies in environmental restriction areas (JC810)
- Compensatory allowances in LFA (JC820)
- Support for quality (JC840)

Farm Return variables - Table M

- Total beef direct premiums (M700CP)
- Special premium, number of animal and total aid (M710AA and M710CP);
- Special premium for bulls (M711AA and M711CP)
- Special premium for steer (M715AA and M715CP)
- Deseasonalisation premium (M720AA and M720CP)
- Suckler cow premium, total (M730AA and M730CP)
- Suckler cow premium for suckler cows and heifers (M731AA and M731CP)
- Suckler cow premium for suckler cows (M732AA and M732CP)
- Suckler cow premium for heifers (M733AA and M733CP)
- Suckler cow premium, additional national premium (M735AA and M735CP)
- Slaughter premium, total (M740CP)
- Slaughter premium, 1 to 7 months (M741AA and M741CP)
- Slaughter premium, 8 months and over (M742AA and M742CP)
- Extensification payment, total (M750AA and M750CP)
- Extensification premium for male bovines and suckler cows (M751AA and M751CP)
- Extensification premium for dairy cows (M753AA and M753CP)
- Additional payments (national envelopes) (M760CP)
- Headage payments (total) (M761CP)
- Top-up of slaughter premium (M762AA and M762CP)
- Male bovine animals (M763AA and M763CP)
- Top-up of suckler cow premium (M764AA and M764CP)
- Dairy cows (M765AA and M765CP)
- Heifers (M766AA and M766CP)
- Area payments (M769AA and M769CP)
- Dairy premium and additional payments, number of animal and total aid (M770AA and M770CP)
- Dairy premiums (M771AA and M771CP)
- Additional payments (M772AA and M772CP)

Quotas and other rights

Farm Return variables

- Milk quota (Payments, Receipts, Quantity) (L401A, L401B, L401G, L401H, L401I)
- Suckler cow premiums (Payments, Receipts, Quantity) (L402A, L402B, L402G, L402H, L402I)
- Male cattle premiums (Payments, Receipts, Quantity) (L403A, L403B, L403G, L403H, L403I)

Income (euros)

Standard Results variables

- Depreciation (SE360)
- Gross Farm Income (SE410)
- Farm Net Value Added (SE415)
- Family Farm Income (SE420)
- Farm Net Value Added / AWU (SE425)
- Family Farm Income / FWU (SE430)
- Balance current subsidies & taxes (SE600)

Balance sheet

Standard Results variables

- Breeding livestock (SE460)
- Non-breeding livestock (SE470)

Land and Buildings, Deadstock, Circulating Capital

Farm Return variables

- Agricultural land, buildings and rights (G94CV)
- Agricultural land (G95CV)
- Land improvements (G97CV)
- Farm buildings (G98CV)
- Acquisition costs, quotas and other rights (G99CV)
- Machinery and equipment (G101CV)

ANNEX II: IMPLEMENTATION OF THE SPS, CHOICES CONCERNING DECOUPLING IN THE BEEF SECTOR AND USE OF ARTICLE 69 (EU-15)

Country	Start Date	Regional Option	SPS Model/SAPS	Coupling of beef sector payments and coupling rates:	Date for introduction of decoupled dairy payment	Use of Article 69
Austria	2005	-	SPS Historical	Suckler cow premium (100%) Slaughter premium calves (100%) Slaughter premium bovine adults (40%)	2007	No
Belgium	2005	Zone Nord: Flanders and Brussels	SPS Historical	Suckler cow premium (100%) Slaughter premium calves (100%)	2006	No
		Zone Sud: Wallonia	SPS Historical	Suckler cow premium (100%)	2006	
Denmark	2005	One region	SPS Hybrid	Male beef special premium (75%)	2005	No
Finland	2006	3 regions (North, Central, South)	SPS Dynamic Hybrid (transition from historic to flat rate)	Special male beef premium (75%)	2006	Article 69 application: 10% of the ceiling for the bovine sector (to finance extensive quality beef production)
France	2006	-	SPS Historical	Suckler cow premium 100% Slaughter premium calves 100% Slaughter premium bovine adults 40% 100% coupling for all payments in the outermost regions.	2006	No
Germany	2005	13 Regions, split by Länder with some groupings: Bremen and Lower Saxony; Hamburg in Schleswig-	SPS Dynamic Hybrid (transition from historical to flat rate)	Full decoupling	2005	No

Country	Start Date	Regional Option	SPS Model/SAPS	Coupling of beef sector payments and coupling rates:	Date for introduction of decoupled dairy payment	Use of Article 69
		Holstein and Berlin in Brandenburg				
Greece	2006	-	SPS Historical	Full decoupling of all beef payments.	2006	Article 69 application: 10% of the ceiling for the bovine sector
Ireland	2005	-	SPS Historical	Full decoupling	2005	No
Italy	2005	-	SPS Historical	Full decoupling of all beef payments.	2006	Article 69 for quality production: 7% of the ceiling for the bovine sector.
Luxembourg	2005	One region	SPS Static Hybrid	Full decoupling	2005	-
Netherlands	2006	-	SPS Historical	Slaughter premium calves (100%) (until 2010; thereafter decoupled) Slaughter premium bovine adults (100%)	2007	No
Portugal	2005	-	SPS Historical	Suckler cow premium (100%) Slaughter premium calves (100%) Slaughter premium bovine adults (40%) 100% coupling in Azores/Madeira.	2007	Article 69: 1% for the bovine sector
Spain	2006	-	SPS Historical	Suckler cow premium (100%) Slaughter premium calves (100%) Slaughter premium bovine adults (40%) 100% coupling in Canary Islands.	2006	Article 69 application: 7% of the ceiling for the bovine sector 10% of dairy payments
Sweden	2005	Three regions (based on reference yield)	SPS Static Hybrid	Special male premium (74.55%) until 2009.	2005	Article 69 application: 0.45% of the ceiling for the bovine sector.
UK	2005	England, three sub regions: England normal, moorland, and	SPS Dynamic Hybrid (transition	Full decoupling	2005	Modulation. England will apply an additional

Country	Start Date	Regional Option	SPS Model/SAPS	Coupling of beef sector payments and coupling rates:	Date for introduction of decoupled dairy payment	Use of Article 69
		Severely Disadvantaged Area minus moorland	from historical to flat rate)			national modulation rate of 2% in 2005 and 6% in 2006 in addition to the compulsory EU rates of 3% and 4%.
	2005	Scotland	SPS Historical	Full decoupling	2005	Article 69 application: 10% of the ceiling for the bovine sector. To pay £70 (for first 10 calves in herd) then £35 for all others, to supplement quality suckler cow production, esp. in remote areas, to supply quality Scottish beef.
	2005	Wales	SPS Historical	Full decoupling	2005	No
	2005	Northern Ireland	SPS Static Hybrid	Full decoupling	2005	No

Source: European Commission, May 2007.

ANNEX III: IMPLEMENTATION OF SAP, CNDP AND TRANSITIONAL SCHEMES IN THE NEW MEMBER STATES

New Member States	2004	2005	2006	2007
Czech Rep	***SAPS***			
	Single Area Payment: 56.41 €/ha Financial Envelope: 198.94 M €	Single Area Payment: 71.42 €/ha Financial Envelope: 249.296 M €	Single Area Payment: 88.886 €/ha Financial Envelope: 310.457 M €	Single Area Payment: 102.45 €/ha Financial Envelope: 355.384 M €
	CNDP in the beef / veal and milk sectors			
	No payments in the beef and veal and milk sectors	Maximum amount: 70.771 M € (including sheep and goat sectors) Bovine animal: 67.90 €/LU	Maximum amount: 95.003 M € (including sheep and goat sectors) Ruminants (maximum rate): 91.14 €/LU	Maximum amount: 96.497 M € (including sheep and goat sectors)
Cyprus	***SAPS***			
	Single Area Payment: 69.21 €/ha Financial Envelope: 9.69 M €	Single Area Payment. 101.96 €/ha Financial Envelope: 14.274 M €	Financial Envelope: 17.236 M €	Financial Envelope: 19.439 M €
	CNDP in the beef / veal and milk sectors			
	Dairy cows: 227 €/head Milk: 35 €/tonnes of quota	Dairy cows: 227 €/head Milk: 35 €/tonnes of quota		
Estonia	***SAPS***			
	Single Area Payment: 26.75 €/ha Financial envelope: 21.40 M €	Single Area Payment: 34.89 €/ha Financial envelope: 27.908 M €	Single Area Payment: 44.28 €/ha Financial envelope: 35.422 M €	Single Area Payment: 50.63 €/ha Financial envelope: 40.503 M €
	CNDP in the beef / veal and milk sectors			
	Maximum amount: 7.228 M € - Suckler cows. heifers at least	Maximum amount: 17.849 M € - Suckler cows: 109.57 €/head	Maximum amount: Suckler cow 1.534 M € Cattle 6.467 M €	Maximum amount: Suckler cows 1.620 M € Cattle 6.737 M €

New Member States	2004	2005	2006	2007
	24 months old: 69.29 €/head - Bulls or steers at least 8 months old: 49.49 €/head - Heifers at least 8 and up to 24 months old: 34.65 €/head - Calves at least 1 and up to 8 months old 9.90 €/head	- Dairy cows 87.87 €/head - Bulls or steers at least 8 months old 67.59 €/head - Heifers at least 8 and up to 24 months old 47.32 €/head - Calves at least 1 and up to 8 months old 13.52 €/head	Dairy 17.824 M € - Suckler cows: 114.31 €/head - Dairy 28.54 €/tonne - Bulls or steers at least 8 months old 48.77 €/head - Cows 48.77 €/head - Heifers at least 8 and up to 24 months old 34.14 €/head - Calves at least 1 and up to 8 months old 9.75 €/head	- Suckler cows: 120.74 €/head
Latvia	***SAPS***			
	Single Area Payment: 20.66 €/ha Financial Envelope: 30.48 M €	Single Area Payment. 26.44 €/ha Financial Envelope: 38.995 M €	Financial Envelope: 48 429 M €	Financial Envelope: 55.815 M €
	CNDP in the beef / veal and milk sectors			
	Maximum amount per sector (M €): Suckler cows: 2.684 Slaughtered bovine animals: 9.946 Milk: 4.387 Suckler cow: 138.57 €/head	Maximum amount per sector (M €): Suckler cows: 2.604 Slaughtered bovine animals: 9.946 Milk: 11.484 Suckler cow:	Maximum amount per sector (M €): Suckler cows 2.515 Slaughtered bovine animals 9.946 Milk 20.051 Suckler cow:	

New Member States	2004	2005	2006	2007
	Slaughtered bovine animals: 80 €/head Milk: 6.31 €/tonne	134.45 €/head Slaughtered bovine animals: 80 €/head Milk: 16.51 €/tonne	129.88 €/head Slaughtered bovine animals: 80 €/head Milk: 28.83 €/tonne	
Lithuania	***SAPS***			
	Single Area Payment: 32.5 €/ha Financial Envelope: 82.07 M €	Single Area Payment: 40.5 €/ha Financial Envelope: 104.346 M €	Single Area Payment: 48.9 €/ha Financial Envelope: 128.534 M €	Single Area Payment: 57.3 €/ha Financial Envelope: 147.781 M €
	CNDP in the beef / veal and milk sectors			
	Maximum amount per sector (M €): Suckler cows: 3.48 Beef: 14.77 Slaughtered bovine animals: 5.67 Suckler cow: 144.81 €/head Slaughtered bovine animals: 25.78 €/head Beef: 147.71 €/head	Maximum amount per sector (M €): Suckler cows: 3.825 Beef: 17.302 Slaughtered bovine animals: 13.136 Milk: 22.892 Suckler cow: 111.79 €/head (Extens. suppl. 50.10 €/head) Slaughtered bovine animals: 55.9 €/head Beef: 108.32 €/head (Extens. suppl. 51.55 €/head) Milk: 13.9 €/tonnes	Maximum amount per sector (M €): Suckler cows: 3.851 Beef: 20.756 Slaughtered bovine animals: 14.578 Milk: 43.725 Suckler cow: 121.03 €/head (Extens. suppl. 54 €/head) Slaughtered bovine animals: 60.7 €/head Beef: 117.17 €/head (Extens. suppl. 55.80 €/head) Milk: 26.55 €/tonnes	Maximum amount per sector (M €): Suckler cows: 9.635 Slaughtered bovine animals: 24.039 Milk: 46.295 Partially coupled premiums: Beef (75%) 157.5 €/head
Hungary	***SAPS***			
	Single Area Payment: 70.22 €/ha Financial Envelope: 305.81 M €	Single Area Payment: 86.21 €/ha Financial Envelope: 375.431 M €	Financial Envelope: 445 499 M €	Financial Envelope: 509.562 M €
	CNDP in the beef / veal and milk sectors			

New Member States	2004	2005	2006	2007
	Maximum amount per sector (M €): Beef: 12.877 Suckler cow: 14.537 Cattle extensification: 9.702 Milk: 16.970 Beef: 136.09 €/head Suckler cow: 124.25 €/head Cattle extensification: 45.85 €/head Milk: 8.71 €/tonne	Maximum amount per sector (M €): Beef: 13.745 Suckler cow: 15.234 Cattle extensification: 10.319 Milk: 37.836 Beef: 145.26 €/head Suckler cow: 130.21 €/head Cattle extensification: 48.76 €/head Milk: 19.43 €/tonne	Maximum amount per sector (M €): Beef: 14.606 Suckler cow: 15.917 Cattle extensification: 10.930 Milk: 61.009 Beef: 154.36 €/head Suckler cow: 136.04 €/head Cattle extensification: 51.65 €/head Milk: 33.31 €/tonne	Maximum amount per sector (M €): Beef: 15.880 Suckler cow: coupled payment 13.616, decoupled payments 3.835 Cattle extensification: 11.903 Milk: 65.552 Suckler cow: 116.38 €/head
Malta	***Standard payment scheme***			***SPS***
	Standard payment scheme includes Slaughter premium, Veal premium, Special beef premium and Dairy premium.			SPS regional model. one region; Full decoupling
Poland	***SAPS***			
	Single Area Payment: 44.46 €/ha Financial Envelope: 659.86 M €	Single Area Payment: 57.42 €/ha Financial Envelope: 823.166 M €	Financial Envelope: 997.483 M €	Financial Envelope: 1145.834 M €
	CNDP in the beef / veal and milk sectors			
	No CNDP in the beef or milk sectors			
Slovenia	***Standard payment scheme***			***SPS***
	Standard payment scheme includes: Suckler cow premium. Additional national suckler cow premium. Special premium. Slaughter premium (adult and for calf). Additional payment (additional payment to slaughter premium for adult bovines). Extensification payment;			SPS regional model. one region; Coupled special male premium (75%) Article 69: 10 % of the bovine sector.
Slovakia	***SAPS***			
	Single Area Payment: 43.85 €/ha Financial Envelope: 85.72 M €	Single Area Payment: 54.71 €/ha Financial Envelope: 106.959 M €	Financial Envelope: 128.640 M €	Financial Envelope: 147.342 M €
	CNDP in the beef / veal and milk sectors			

New Member States	2004	2005	2006	2007
		Maximum amount per sector (M €): Suckler cows: 3.126 Suckler cow: 111.34 €/head	Maximum amount per sector (M €): Suckler cows: 3.243 Suckler cow: 115.50 €/head	Maximum amount per sector (M €): Suckler cows: 3.738 Suckler cow: 133.13 €/head Calves: 133.13 €/head

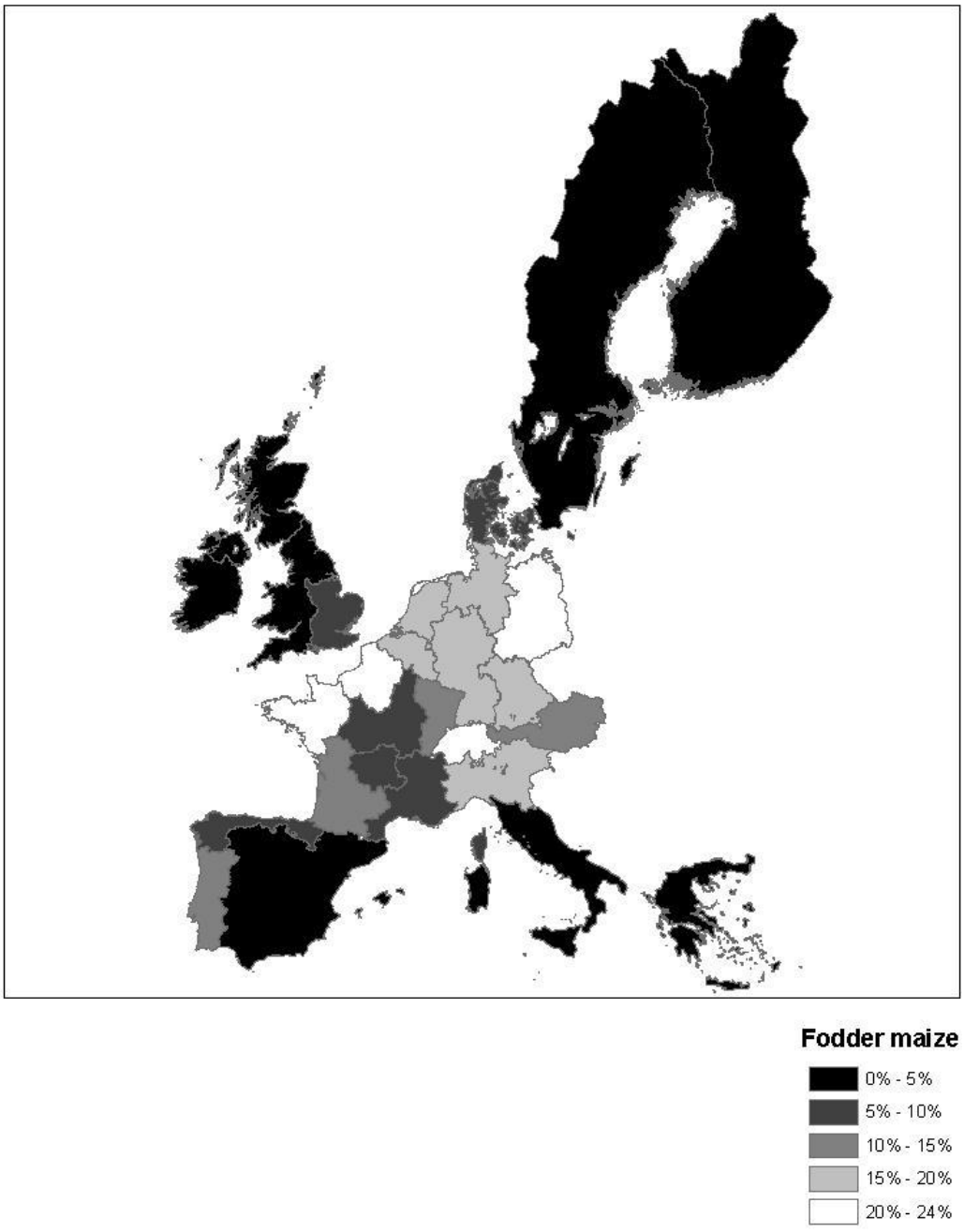
Sources: European Commission – DG Agriculture based on Commission's Decisions; 'Situation and Perspective for the meat sector in Cyprus, Czech Republic, Hungary, Latvia, Lithuania and Slovenia, Agro economic policy analysis of the new member states, the candidate states and the countries of the western Balkans CEEC AGRI POLICY'; Ministries of Agriculture in New Member States personal communication.

ANNEX IV – MAPS FOR THE BEEF & DAIRY EVALUATION

Map 1

Fodder maize as a percentage of total area of fodder crops in 1995

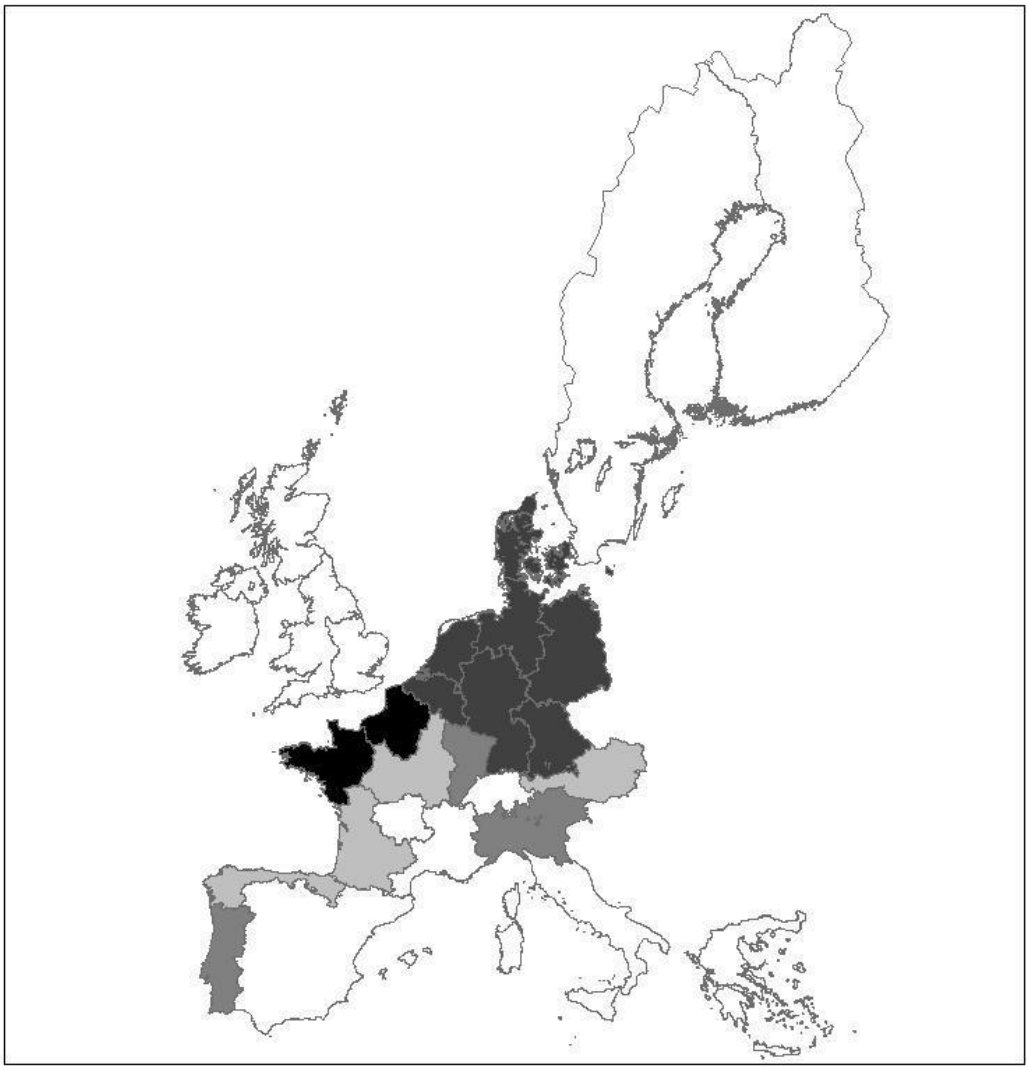
Source FADN



Map 2

Fodder maize as a percentage of total area of fodder crops in 2004

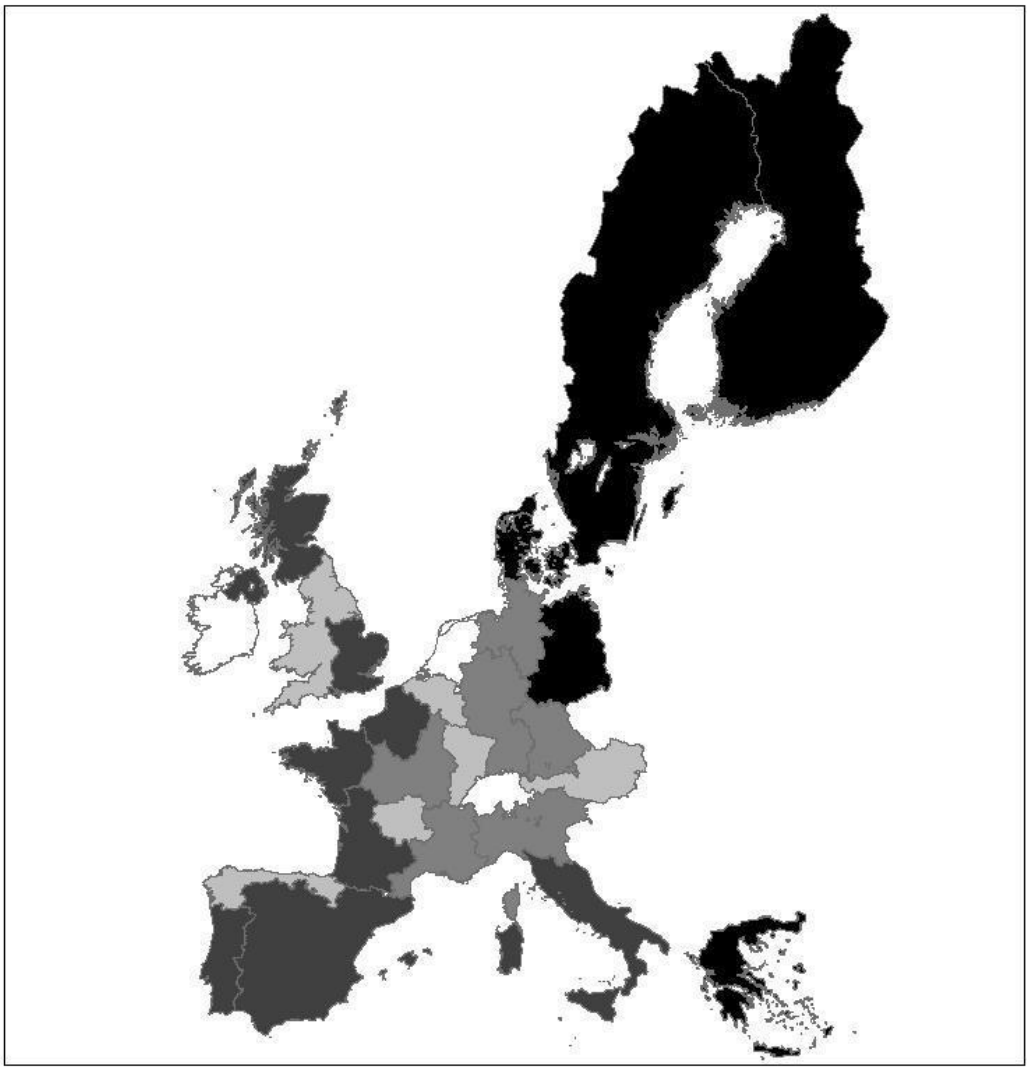
Source FADN



Map 3

Permanent pasture as a percentage of UAA in 1995

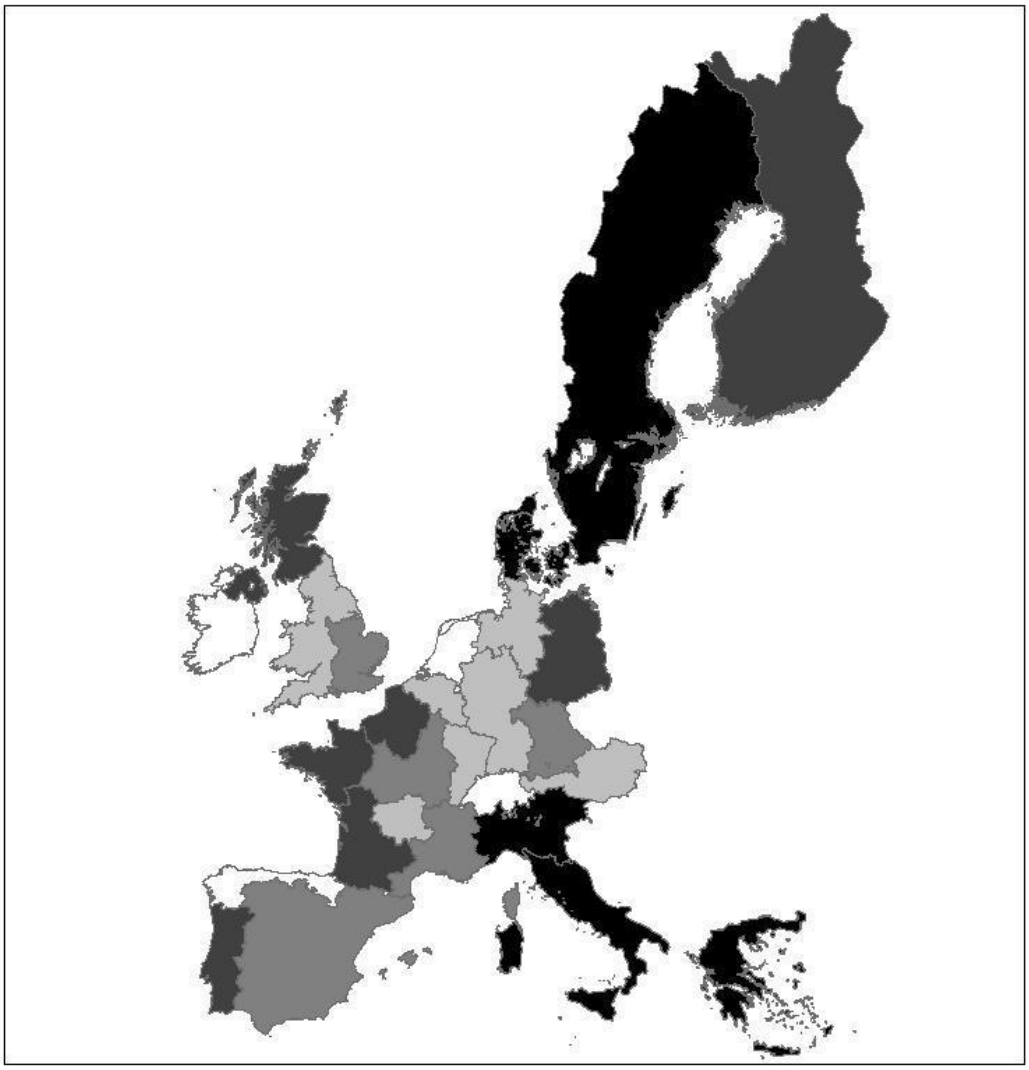
Source FADN



Map 4

Permanent pasture as a percentage of UAA in 2004

Source FADN



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