THE FOOD ETHICS COUNCIL AND HEATHER PICKETT

Farm Animal Welfare
Past, Present and Future

FREEDOM FOOD

A REVIEW OF FARM ANIMAL WELFARE IN THE UK • SEPTEMBER 2014
COMMISSIONED BY THE RSPCA'S FREEDOM FOOD SCHEME TO MARK ITS 20TH ANNIVERSARY

FULL REPORT

FARM ANIMAL WELFARE
PAST, PRESENT AND FUTURE

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Foreword from Freedom Food

As the new Chief Executive of Freedom Food, I am delighted to introduce this special research report to mark a key milestone in our history: our 20th anniversary.

Freedom Food was set up by the RSPCA in 1994. We commissioned this report as we wanted an independent assessment of how farming generally and farm animal welfare have developed, particularly in the UK, in our first twenty years. The report also refers to the roles played by the RSPCA and Freedom Food in the development of farm animal welfare overseas.

The report, compiled and written by the Food Ethics Council and independent farm animal welfare specialist Heather Pickett, shows that Freedom Food has played a key role in driving higher welfare standards for a large number of farm animals.

Ten different livestock sectors are now covered by the scheme and nearly 40 million terrestrial farm animals, having started with less than 100,000 animals in 1994. One of the scheme's greatest successes is farmed salmon where over 70% of UK production meets RSPCA welfare standards, having launched as recently as 2002. Eggs and pork are other major areas of success. There are, of course, many remaining challenges, notably chicken, where the Freedom Food production accounts for only a small proportion of the total birds produced.

The overall message from the report is very positive, with the RSPCA's and Freedom Food's achievements over the last twenty years being highlighted by experts in the field.

Looking ahead to the next twenty years, the report foresees considerable changes in the livestock sector: pressure on the agriculture industry to satisfy ever-increasing demands from the fast-growing global population (projected to rise by 1.4 billion by 2034) to produce more, cheap food will be complicated by the need for the sector to reduce its contribution to, and adapt to the impact of, climate change. This presents a challenge for further improvements in farm animal welfare as there will be increasing pressure to develop faster growing and higher yielding farm animals.

I agree with the experts interviewed that Freedom Food has an important role to play in driving animal welfare improvements, both in the UK and overseas.

Jez Cooper
Chief Executive of Freedom Food
September 2014

The RSPCA perspective

The RSPCA's Freedom Food scheme was launched in 1994 against the backdrop of a very different 'landscape' in the farming and food industries from the one that exists today. I joined the RSPCA the same year and, as this report ably illustrates, have seen substantial changes in farming practices, food retailing and consumer behaviour since then. There has also been a notable positive shift in approach and attitude towards the welfare of farm animals.

Progress in scientific research has substantially increased our knowledge of the physical and behavioural needs of different farmed species. Research and practical innovation have also enabled at least some of those new learnings to be implemented in practice, including through the RSPCA welfare standards for farm animals applied by Freedom Food members.

The launch of Freedom Food heralded a significant change of approach by the RSPCA. The Society was founded in 1824 specifically to improve the treatment of cattle and other livestock, and farm animal welfare has remained an important area of focus for the organisation throughout the following 190 years. However, along with other farm assurance schemes and similar initiatives, Freedom Food forged a new and increasingly constructive and collective approach towards improving animal welfare in farming.

As the report outlines, over the past 20 years progress has been made in many areas, often through the power of the marketplace rather than via legislation. Nevertheless, the importance of the latter in abolishing some of the most restrictive and inadequate farming systems has been vital. The report does, however, also illustrate that there is still a very great deal to be done before all farm animals are provided with the potential to have a good life.

If we are to tackle the many future challenges highlighted in this report, whilst still striving to improve the welfare of farm animals, cooperation between all interested parties will be essential. Against such a backdrop, perhaps the biggest challenge of all for those who value and understand the overarching societal importance of humane treatment of sentient animals, will be ensuring that farm animal welfare is included as an integral and important part of future food production policy.

The Freedom Food scheme, the RSPCA and many others mentioned in this report have the potential to contribute hugely to progressing this goal over the next two decades and beyond.

Dr Julia Wrathall
Head of Farm Animals, RSPCA
September 2014

Executive Summary

Introduction

Farming is vital to the UK economy; its total annual income is estimated to be £5.5 billion. Farmers are the stewards of around 70% of our country's land, and are responsible for the welfare of the one billion land animals and many millions of fish that are farmed for food here every year.

Each one of these animals has the capacity to experience physical and mental suffering and to experience pleasure and contentment. As a nation we are collectively responsible for determining what sort of lives these animals will lead. As such, farm animal welfare is high on the agenda of many members of the general public, food businesses, farmers, farm assurance schemes and, of course, animal welfare organisations.

The good news is that public concern for farm animal welfare, and the influence of this on purchasing decisions, appears to be increasing. A series of surveys since 2006 suggests an increasing proportion of shoppers is concerned about animal living conditions and identifies animal welfare as a key variable impacting their purchasing decisions.

And yet in many expert debates about achieving sustainable, fair and healthy food systems, farm animal welfare often does not get the attention it merits. That can sometimes be because of real or perceived conflicts between safeguarding welfare and addressing other pressing concerns, such as environmental protection.

To mark the 20th anniversary of the RSPCA's Freedom Food scheme this year (2014) independent researchers the Food Ethics Council and Heather Pickett were asked to undertake research into past and potential future factors driving changes in farm animal welfare in the UK.

They were tasked with finding out how farm animal welfare in the UK has changed over the past twenty years; how farm assurance schemes and labels have evolved during that time; what role they have played in driving up standards and practices; what role they might play in the future in both taking opportunities and addressing challenges; and what a vision of farm animal welfare might look like twenty years from now.

The research relied on a mixture of a literature review and face-to-face and email interviews with key stakeholders. Twenty-one experts with a wide range of perspectives on farm animal welfare were interviewed from retail, government, academia and non-governmental organisations (NGOs).

Looking back over the past 20 years

This report is one of two halves. First it looks back at how farm animal welfare and farm assurance schemes have changed over the past twenty years. In some ways, 1994 represented the peak of a shift to intensive farming that began in the Second World War.

The drive for cheap food led to animal welfare issues related to widespread adoption of confinement systems, genetic selection for growth rate and yield, and huge numbers of live animal exports to Europe. Farm animals were considered in law to be 'goods' with no recognition of their capacity for sentience and little protection of their welfare. In the twenty years that followed, the report has found significant changes in the number of animals farmed and the structure of the industry. There has been growth in the aquaculture (fish farming) and chicken meat sectors, a decline in the red meat sector, and consolidation across all sectors.

Breeding for increased growth rate and yield has continued apace, with associated health and welfare issues remaining largely unaddressed. However, there has been significant progress in moving away from the most intensive confinement systems such as battery cages and sow stalls.

There has been an increase in the numbers of animals reared in systems with higher welfare potential, including outdoor and enriched indoor systems. Farm assurance schemes, animal welfare NGOs and scientists, retailers, government legislation, consumers, celebrity chefs and farmers have all played their part in driving these changes.

The report tracks the growth of farm assurance schemes to cover the large majority of animals in most sectors, and shows how they have taken on a high degree of responsibility for farm animal welfare.

Looking forward over the next 20 years

Where next for animal welfare in the UK and, specifically, how can the RSPCA's Freedom Food scheme build on the progress it has made over the past twenty years to secure animal welfare in the next twenty?

The overwhelming consensus from expert interviewees was that, alongside other farm assurance schemes, the RSPCA's Freedom Food scheme has an important role to play in driving animal welfare improvements in the future, both in the UK and internationally. Critically though, the message was that it must not rest on its laurels – it should pursue high quality and then should try to use its influence to even greater effect.

The report predicts that the next 20 years will herald a period of considerable change for the livestock sector, with substantial challenges to overcome, as well as opportunities to drive improvements in farm animal welfare and for a greater proportion of farm animals to be able to live a 'good life'.

Figure A below summarises the key factors (clustered by theme) likely to affect farm animal welfare in the future that were identified by our expert interviewees and desk research.

The combination of environmental challenges, population growth and increasing demand for food, energy, water and land that will face the world over the coming years were described in 2009 by John Beddington, then the Chief Scientific Advisor to the UK Government, as a "perfect storm". He argued that these will lead to a 21st century Malthusian threat to the world's food supply.

Adapting to and mitigating the effects of climate change will add to the pressures already facing the agricultural sector in satisfying the seemingly insatiable demand for 'cheap' food. Responses to the threat of climate change, such as further genetic selection for growth rate or yield, could potentially have negative impacts on animal welfare in the future. However, selection could also lead to healthier, more robust and disease resistant animals. The message here is that investment in innovation can lead to positive changes across the livestock farming process from animal housing and feed to a reduction in the breeding of animals with no economic value because of their gender.

There are exciting developments in our understanding of farm animal behaviour, and the application of new outcomes-based animal welfare assessments. These innovations will help improve standards and guide assurance schemes.

It is likely we will see automated technologies developing alongside these assessments which could objectively monitor the welfare of animals over a long period of time.

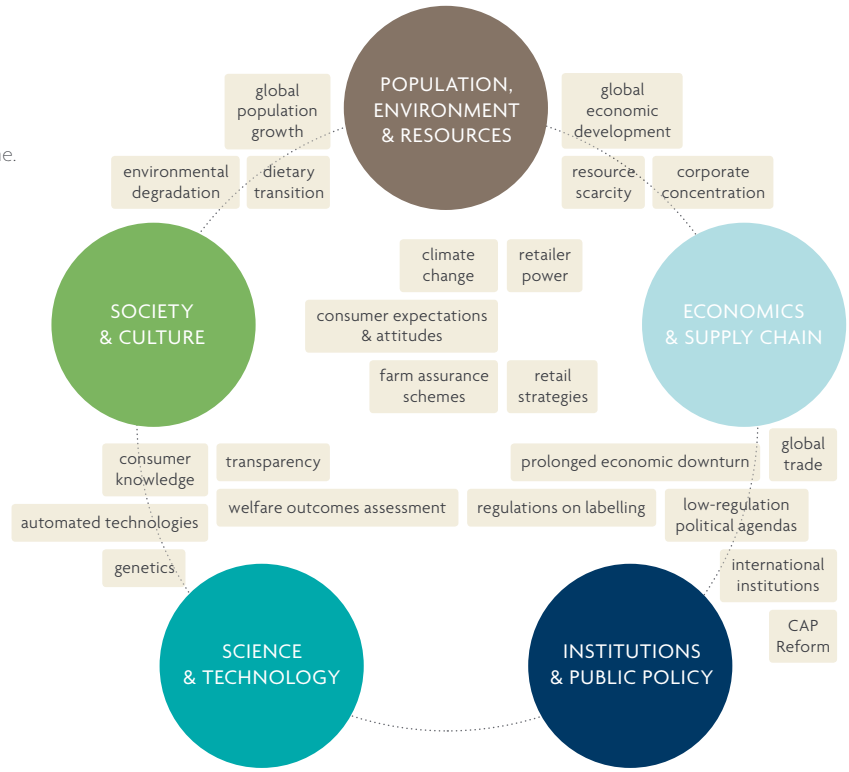
It is impossible to predict with any certainty how farming will evolve in the future. Some existing economic, social and environmental challenges are likely to become more acute and new challenges may emerge that few have anticipated. Farm assurance schemes will be vital in helping address these challenges.

One such challenge, identified by many expert interviewees in this report, may well be the increasingly international market for meat. Working to ensure animal welfare standards in meat imports to the UK could provide an opportunity for assurance schemes to influence producers abroad.

With animal welfare now a mainstream issue for consumers and retailers alike, and new technologies providing innovative ways to improve and monitor farm animal welfare, what role will farm assurance schemes in general, and the Freedom Food scheme in particular, have in the future?

The key messages were that, firstly, such schemes should continue to drive up standards and practice and, secondly, they should extend their influence internationally, where arguably many of the biggest opportunities – and challenges – exist for progress on farm animal welfare.

Figure A
Key factors affecting farm animal welfare
Identified by our expert interviewees and desk research, clustered by theme.



Conclusions

- Pressure on the agricultural sector to satisfy continuing societal demands for cheap food will be exacerbated by population growth, dietary shifts, resource constraints and the need for the sector to reduce its contribution to, and to adapt to the impacts of, climate change. Initiatives to reduce climate impacts that are focused on selecting increasingly fast-growing or high-yielding animals are likely to be of concern to farm animal welfare advocates over the coming years, with farm animal health and wellbeing today already compromised by genetic selection that prioritises production efficiency traits.
- Most expert interviewees felt that farm assurance schemes and retailer standards have helped, and are likely to help in the future, to deliver improved farm animal welfare. Since it was introduced in 1994, the RSPCA's Freedom Food scheme has played an important role in providing higher standards for a significant proportion of animals in several sectors. Organic schemes also provide higher standards for a minority of animals across all sectors, whilst progressive food companies are taking an increasingly proactive role in setting standards above the baseline for large numbers of animals in some sectors.
- The overwhelming consensus from expert interviewees was that the RSPCA's Freedom Food scheme does have an important role to play in driving animal welfare improvements in the future, both in the UK and internationally. Critically though, it must not rest on its laurels – it should pursue high quality and then should try to use its influence to even greater effect.
- Even as assurance schemes and leading food companies are driving standards up, the genetics of the animal are often pushing in the opposite direction so that even better standards, management and nutrition are needed to achieve an equivalent level of welfare. Hence in some ways, we are working hard even to stand still. Some recent shifting of breeding goals in certain species (e.g. dairy cattle) away from production-related parameters to those focused on health and welfare gives some grounds for optimism.
- In recent years, the focus has shifted somewhat away from farming systems and input standards towards also measuring and seeking to improve welfare outcomes for the animals. This trend is expected to continue and accelerate. The development and adoption of outcomes-based approaches to welfare is likely to be supported by the development of new automated technologies for assessing animal health and wellbeing.
- How farming systems will evolve in the future is uncertain. However, it is reasonable to expect that some existing economic, social and environmental challenges are likely to become more acute and new challenges will emerge that very few people have anticipated.

Recommendations

- A co-ordinated approach is needed between the farming industry, assurance schemes, food companies, animal welfare organisations, government and research to drive and monitor progress in farm animal welfare and consumer awareness.
- Farm animal welfare needs to be fully considered, not only as an important entity in itself, but also as part of an integrated view of the future. We need to move towards a shared vision of fair, healthy, humane and environmentally sustainable food and farming systems.
- The UK should seek to resurrect its historical position of playing a leadership role on farm animal welfare. Concerns about competitiveness must not be allowed to lead to the UK being left behind on welfare issues as other countries in Europe and beyond continue to make progress in improving standards. The UK should seek to drive further improvements in welfare standards and encourage others to follow so that the global trading environment is harnessed as an opportunity for a 'race to the top' rather than allowed to degenerate into a 'race to the bottom'.
- Farm assurance schemes should seek to set a challenging benchmark for farm animal welfare and work with partners across the food system to ensure their standards are translated into good (and improving) welfare outcomes in practice. Within that context, the RSPCA's Freedom Food scheme should seek to use its influence to even greater effect, extending its reach internationally, setting the benchmark standard for retailer schemes domestically, and increasing its impact for those species where penetration rates are currently low.

Introduction

Drivers for the report

Farm animal welfare is recognised as an issue of importance to many in the food system, from the general public and food businesses to farmers and assurance schemes and, not least, to the animals themselves. However, there may sometimes be real or perceived conflicts between safeguarding welfare and addressing other pressing concerns (such as environmental protection) and in many discussions around sustainable, fair, healthy food and farming systems, farm animal welfare often does not get the attention it merits.

As 2014 marks the twentieth anniversary of the RSPCA's Freedom Food scheme, now seems an opportune time to pause, rewind and reflect on how farm animal welfare has changed over the past two decades, and assess what has driven those changes. It is also a good moment to fast forward and consider how different factors might combine to hinder or accelerate progress on animal welfare in the next two decades.

How different is farm animal welfare in the UK today compared with twenty years ago? How have assurance schemes and labels evolved over the past twenty years, and what role have they played in driving up standards and practices? What role might they play in the future? What might a vision of farm animal welfare look like twenty years from now? These are just some of the questions explored in this report.

Context

Farming is a vital part of the UK economy, with total income from UK farming estimated to be £5.5 billion (thousand million) and with 464,000 people working on farms in 2013.[1] Farmers are stewards of much of the UK's land (the Utilised Agricultural Area makes up around 70% of the total UK land area[2]) and of its biodiversity. Farming has significant impacts on the environment – and is also being impacted by local and global environmental issues such as climate change.

One billion terrestrial animals[3] and many millions of fish are farmed for food in the UK every year. Each one of these animals has the capacity to experience physical and mental suffering and to experience pleasure and contentment. As a nation, we are collectively responsible for determining what sort of lives these animals will lead.

Growing consumer concern about the provenance of our food, including animal welfare and farming practices, means that addressing issues around farm animal welfare is vitally important for the future sustainability of the industry.

There is a range of different farming systems in the UK – including conventional, organic and integrated systems. There is also a range of approaches and views as to what sustainable farming systems might look like. So-called 'sustainable intensification' and associated issues are discussed more fully in section 2.2.1. While acknowledging the differences of perspective about the direction the food system should travel, this report considers the impact these trends are likely to have on livestock production and farm animal welfare in the UK and beyond.

Methodology

The Food Ethics Council (including Research Associate Chris Sutton) and Animal Welfare Consultant, Heather Pickett, were commissioned by the RSPCA's Freedom Food scheme to undertake independent research into past and potential future factors driving changes in farm animal welfare in the UK.

This project has relied on a mix of desk-based research and interviews with key stakeholders. Twenty-one experts were interviewed – in a mixture of phone interviews and e-mail interviews – ensuring input from people with a wide range of different perspectives from academia, government, farming and food industries, farm assurance and non-governmental organisations (NGOs). Semi-structured interview techniques were used – asking a core set of questions, but with the licence to interrogate particular responses further as appropriate. In order to allow people to express themselves freely, quotes have not been attributed in this report.

Desk research consisted of a literature search and targeted web search for academic and other literature. This was supplemented with e-mail correspondence with a further set of species-specific academic and industry experts, retailers, assurance schemes and relevant NGOs. The information was analysed and incorporated into this report.

Please see the acknowledgements (page 78) for a list of experts who contributed to this research. We also invited a number of other individuals and organisations to contribute. Organisations that declined to contribute were Red Tractor, the British Poultry Council, Tesco and Asda.

In terms of geographical scope, the research is primarily focused on changes in the UK. However, the researchers acknowledge the global context to food sourcing, the UK's position within the European Union and the fact that the UK imports and exports significant volumes of meat (See Figure 2.2.3). Therefore, as part of a global trading economy, it is impossible to look at UK production in isolation.

How the report is structured

The report consists of two main parts: firstly 'looking back' and secondly 'looking forward'. Part One charts the major factors influencing farm animal welfare in the UK over the past 20 years. Within that, it looks at the role of farm assurance schemes – including, but not limited to, Freedom Food. Part Two takes a forward-looking perspective, exploring key drivers that the research and experts indicate will affect farm animal welfare over the next two decades. These are supplemented by this introduction and a concluding chapter, Part Three, which sums up the research and outlines some potential future directions for farm animal welfare.

PART ONE

LOOKING BACK OVER THE PAST 20 YEARS

1.1 Changes to livestock farming and farm animal welfare since 1994

1.1.1 Setting the scene – the situation in the early 1990s

In some ways, the UK livestock industry in the early 1990s could be said to represent the peak of the intensification that has taken place since the Second World War. The drive to produce more food more cheaply led to the widespread adoption of confinement systems, such as battery cages for laying hens and sow stalls for pregnant pigs. Selective breeding had produced animals capable of growing faster and leaner, or producing more milk or eggs, than ever before. The development of assisted reproductive technologies and freezing techniques allowed animal breeding to become a global industry, with the highest-yielding genetics of a few elite individuals shipped all around the world.

Live exports of farm animals were at their peak, with up to two million sheep and half a million calves exported to the continent each year.[4,5] Farm animals were considered under the law to be mere 'goods', subject to the same free-trade rules as inanimate objects, with no recognition in law of their capacity for sentience[i] and little protection for their welfare during these long journeys across Europe.

The drive for cheap food was not without consequences. Cattle were suffering from the devastating brain disease BSE.[ii] Cases in cattle peaked at over 37,000 a year in 1992[6] and, in 1996, the link was made with the fatal human brain disease CJD.[iii] This was just one of a number of high-profile food scares in the late 1980s and early 1990s that were causing people to question the way food was produced (see Section 1.2).

There were also signs of change. Veal crates – so narrow that they prevented the calves confined in them from turning around – were banned in the UK in 1990. The live export trade was generating huge public opposition and farm animal welfare was becoming headline news.

In this section, some of the changes that have taken place in livestock farming since the early 1990s will be examined, along with the impact of these changes on farm animal welfare.

1.1.2 Structure of the UK livestock industry

There has been consolidation across the livestock industry over the past 20 years, with a decline in the number of farms and an increase in the average number of livestock per farm. The reduction in the number of farms ranges from less than 10% for meat chickens, to around 20% for breeding sheep, fattening pigs and beef cows, and close to 50% for dairy cows and breeding pigs (Fig. 1.1.1). **This equates to a loss of over 1,000 dairy farmers, over 1,000 sheep farmers, more than 700 suckler beef farmers and around 400 pig farmers *every year* since 1994.**

Average herd and flock sizes have increased over the past 20 years by 45% for meat chickens and 25% for dairy cows (Fig. 1.1.2). There have also been smaller increases for some of the other species.

The proportion of animals kept in the largest herd and flock sizes has particularly increased (Fig. 1.1.3). Three quarters of dairy cows are now kept in herds of 100 or more, compared with less than half 20 years ago; 70% of meat chickens are now kept in flocks of 100,000 or more, up from 50% in 1994; 80% of fattening pigs are now kept in herds of 1,000 or more, up from 60% in 1994.

Larger herd or flock sizes may present additional challenges for animal welfare. If something goes wrong on a large farm (e.g. a disease outbreak or a problem with a water delivery system) there is clearly a risk to the welfare of a greater number of animals than would be the case on a smaller unit, highlighting the importance of ensuring that high standards of management and stockmanship are applied at all times on all units and that effective contingency plans are in place to safeguard the welfare of all animals should an emergency arise. Where an increase in herd or flock size is accompanied by an increase in the number of animals per stock-keeper, this can mean less individual attention and an increased risk that health and welfare problems may go unnoticed.

Increasing group sizes have also been identified as an issue for farmed fish. An individual tank may contain more than 100,000 fry and the largest sea pens can house nearly as many 5kg salmon.[7] The Farm Animal Welfare Committee (FAWC[iv]) states:[8]

> *"Difficulties in monitoring welfare and responding to problems both of groups and individual fish are growing as pen sizes, automation and numbers of fish per stockperson increase."*

However, there can also be some potential benefits of larger herd, flock and group sizes. For example, larger farms are often better able to invest in equipment and technology that may have benefits for animal welfare. The most important question is whether the welfare of each individual animal is properly catered for, rather than how large or small the herd or flock is.

i Recognising the 'sentience' of animals means recognising that they are aware of how they feel and it matters to them.

ii Bovine Spongiform Encephalopathy

iii Creutzfeldt-Jakob Disease

iv In 2011, the Farm Animal Welfare Council was replaced by the Farm Animal Welfare Committee, which fulfils the same role of advising the UK Government on farm animal welfare matters. The abbreviation FAWC is used throughout this report to refer variously to the Council or the Committee.

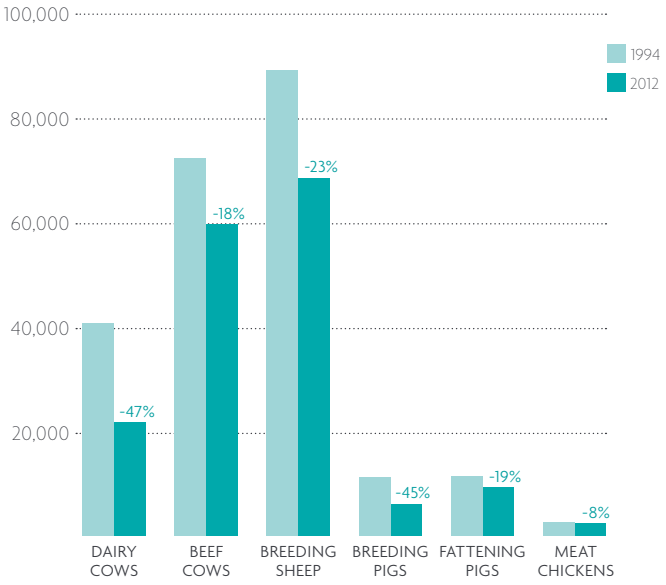


Figure 1.1.1
Number of livestock holdings in the UK, 1994 and 2012
Source: Defra.[9] NB. The data collection methodology has changed over this period. 1994 data include some non-commercial holdings.

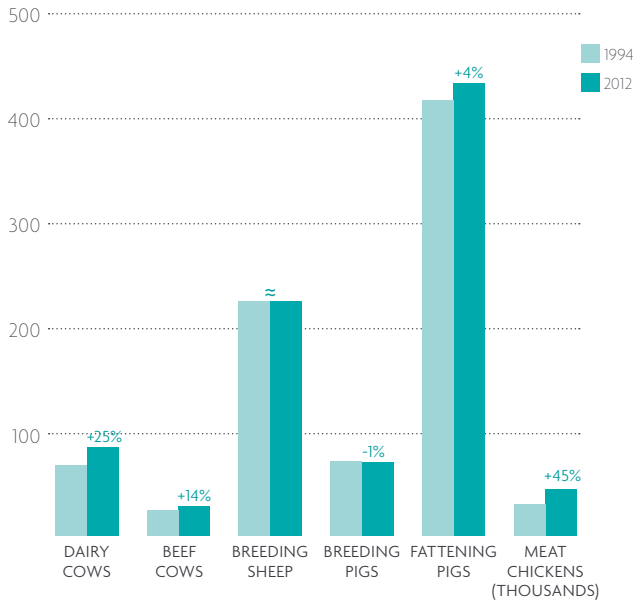


Figure 1.1.2
Average herd or flock sizes (total head per holding), 1994 and 2012
Source: Defra.[10] NB. The data collection methodology has changed over this period. 1994 data include some non-commercial holdings.

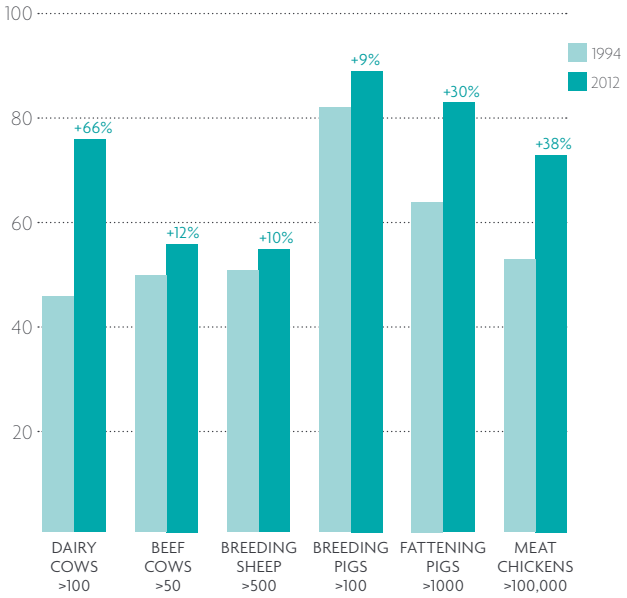


Figure 1.1.3
Proportion of animals kept in herd or flock sizes above the specified size, 1994 and 2012
Source: Defra.[11] NB. The data collection methodology has changed over this period. 1994 data include some non-commercial holdings.

1.1.3 Livestock numbers, production and yields

THE PRODUCTION OF RED MEAT SPECIES AND TURKEYS HAS DECLINED

For pigs, cattle and sheep, there has been a decline in the number of breeding animals (Fig. 1.1.4) and the number of animals slaughtered annually (Fig 1.1.5) over the past 20 years. There has also been a decline in the number of turkeys slaughtered (Fig. 1.1.6). The amount of meat produced has also declined for these species (Fig. 1.1.7); however, the decline in meat production is not as great as the decline in animal numbers because slaughter weights have increased. Average carcase weights have increased by 18% for pigs, 14% for cattle and 9% for sheep.

For pigs, the number of breeding sows (Fig 1.1.4) has declined more substantially than the number of pigs slaughtered (Fig. 1.1.5) because the average number of pigs reared per sow per year has increased by 10%, from 21.3 in 1994 to 23.5 in 2013.[12] This has been achieved largely through ongoing selection for increased litter size. The average number of piglets born alive per litter has increased from 10.8 in 1994 to 11.8 in 2013. Larger litter size is associated with lower piglet birth weight and higher piglet mortality.[13,14,15]

CHICKEN PRODUCTION HAS INCREASED AND GROWTH RATES HAVE ACCELERATED

In contrast with most other species, the number of meat chickens slaughtered (Fig. 1.1.6) and the amount of chicken meat produced (Fig. 1.1.7) have both increased by more than a third since 1994. Carcase weights have remained relatively steady for chickens but the time taken to reach slaughter weight has been reduced further. In 1991, a typical meat chicken reached a weight of 2.1 kg (a common slaughter weight) by 42 days of age (this is less than half the time taken in the 1950s).[16] By 2012, this weight could be achieved in around 35 days.[17]

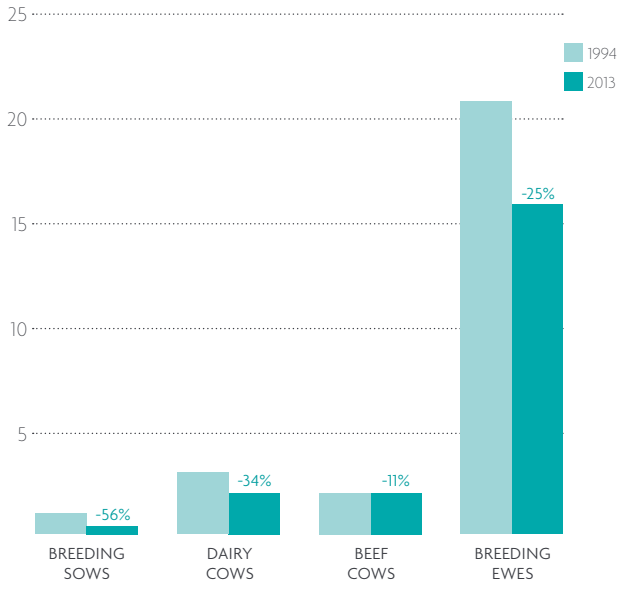


Figure 1.1.4
Number of breeding animals (millions) in the UK, 1994 and 2013
Source: Defra.[18] NB. Comparison year for ewes is 1995.

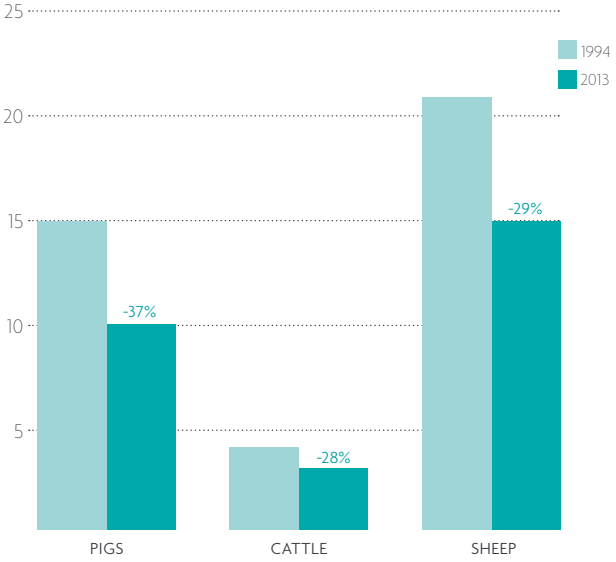


Figure 1.1.5
Number of livestock slaughtered (millions) in the UK, 1994 and 2013
Source: Defra.[19]

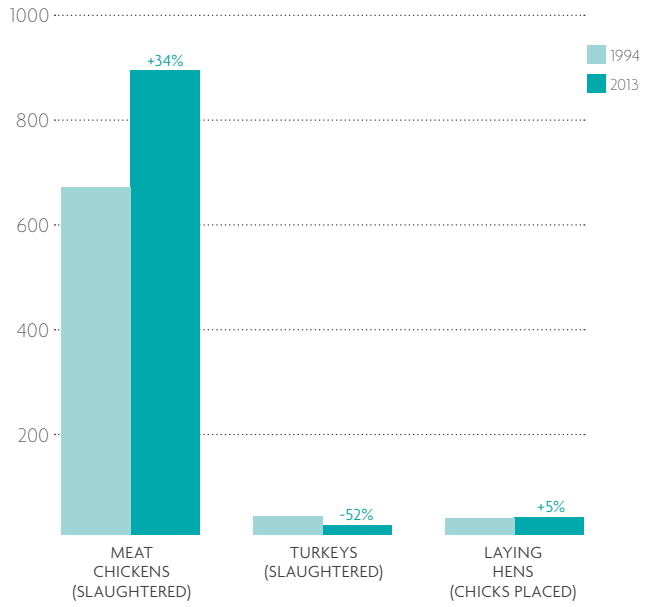


Figure 1.1.6
Number of poultry (millions) in the UK, 1994 and 2013
Source: Defra.[20]

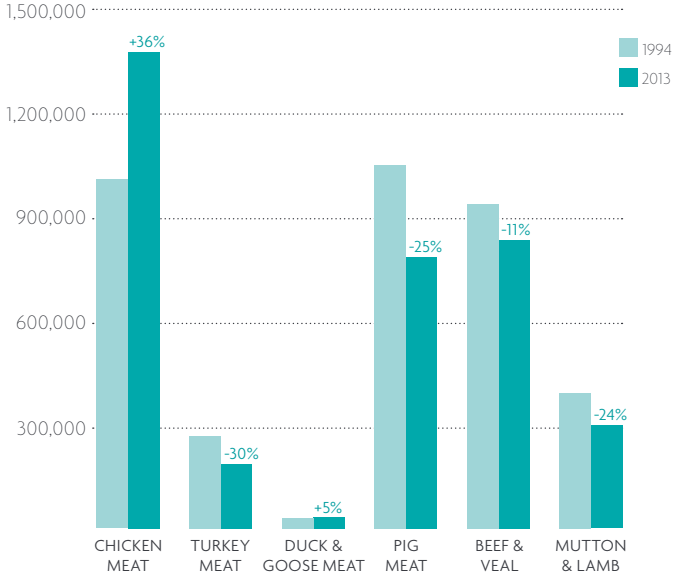


Figure 1.1.7
Meat production (tonnes) in the UK, 1994 and 2013
Source: Defra.[21]

LEVELS OF LAMENESS IN MEAT CHICKENS DO NOT APPEAR TO HAVE IMPROVED

Selection for increased growth rate, breast meat yield and feed conversion efficiency has contributed to an increase in health and welfare problems in meat chickens, including high levels of lameness.[22] For example, a survey of lameness in commercial intensively-reared meat chickens in the UK, published in 1992, found that 90% of birds had a detectable gait abnormality and 26% were severely lame.[23] Another large-scale UK study published in 2008 found that 98% of chickens showed some degree of gait abnormality and 28% were severely lame.[24] So this evidence suggests that the situation hasn't improved, and may even have deteriorated, over the past 20 years. The true extent of the problem is likely to be even greater because many severely lame birds would be culled and therefore excluded from the surveys.

EGG PRODUCTION HAS REMAINED RELATIVELY STEADY

The number of eggs produced for human consumption in the UK has increased by around 5% from 787 million dozen in 1994 to 829 million dozen in 2013.[25] The number of laying hens has risen by a similar margin over the same period (Fig. 1.1.6). Despite ongoing selection for higher egg yield per hen, the number of eggs produced per hen in the UK has declined slightly, from an average of 310 eggs/bird/year in 1996[26] to 297 eggs/bird/year in 2009.[27] However, this decline is likely to be largely the result of changes in housing systems (see Section 1.1.4) because production is slightly lower in non-cage systems. Breeding company data suggest that genetic potential for egg production has increased further to around 320 eggs per hen over a year from 20 to 72 weeks of age.[28] A primary focus of selection is now on extending the laying period.[29]

Genetic selection of commercial layers for increased egg production has resulted in much weaker bones compared with traditional breeds.[30] This is influenced by the fact that egg shell quality is maintained in genetically selected lines at the expense of bone strength and density.[31] A study published in 1990 found that around a quarter of free-range hens and over a third of hens from battery cages and aviaries suffered bone fractures.[32] For caged birds most of the fractures occurred during handling at the end of their life, whereas birds in aviaries were more likely to have old healed breaks, likely to have been sustained through accidents during a more active life.

BONE FRACTURES IN LAYING HENS APPEAR TO HAVE INCREASED SUBSTANTIALLY

Comparing the 1990 figures with more recent research suggests that the proportion of birds suffering bone fractures has increased dramatically over the past 20 years. A common type of fracture in laying hens is fracture of the keel bone. Research at the University of Bristol, published in 2008, looked at old fractures to the keel bone sustained during the laying period.[33] It found that 36% of hens from furnished cages had fractures of the keel bone and the average prevalence in non-cage systems ranged from 45% to 86%. The figures would be expected to be even higher if fractures of other bones and fractures sustained during handling at the end of the birds' lives were included.

THE NUMBER OF DAIRY COWS HAS DECLINED, WHILST MILK YIELD PER COW HAS INCREASED

The number of dairy cows in the UK has declined by more than a third between 1994 and 2013 (Fig. 1.1.4). Despite this, the amount of milk produced has declined by only around 7%, from 14.5 billion litres in 1994 to 13.5 billion litres in 2013. Milk output has been largely maintained by a significant increase in the average milk yield per cow, from 5300 litres/cow/year in 1994 to 7535 litres/cow/year in 2013.[34]

The genetic component underlying milk yield has been found to be positively correlated with the incidence of lameness, mastitis (inflammation of the udder), reproductive disorders and metabolic disorders.[35] The Animal Health and Welfare Panel of the European Food Safety Authority (EFSA) states:[36]

> *"Long term genetic selection for high milk yield is the major factor causing poor welfare, in particular health problems, in dairy cows."*

LEVELS OF LAMENESS AND CLINICAL MASTITIS IN DAIRY COWS HAVE REMAINED HIGH

Despite the continued increase in milk yield over the past 20 years, FAWC found little evidence that dairy cow welfare had deteriorated any further between its 1997 report[37] and its 2009 report[38] on the issue. Levels of lameness and clinical mastitis were still a cause for serious concern but had changed little over the period and longevity had actually increased slightly, although it was still well below optimal. Improvements in veterinary health care and nutritional management of high-yielding cows have probably helped to mitigate the health impacts of further yield increases but have apparently not been able to significantly reduce the incidence of some major health and welfare problems.

FARMED FISH PRODUCTION HAS SHOWN THE MOST GROWTH OUT OF ALL THE LIVESTOCK SECTORS

Aquaculture production in the UK has more than doubled between 1994 and 2012 (Fig. 1.1.8). Production from capture fisheries has declined by more than a quarter over the same period. Aquaculture now accounts for 24% of total UK fisheries production, compared with 9% in 1994. The Scottish salmon farming industry is the largest aquaculture sector in the UK, producing nearly 35 million fish for harvest in 2012.[39] Approximately 180 million salmon and trout eggs are laid down each year in Britain, making fish farming the second largest livestock sector (after meat chickens) in terms of numbers of animals.

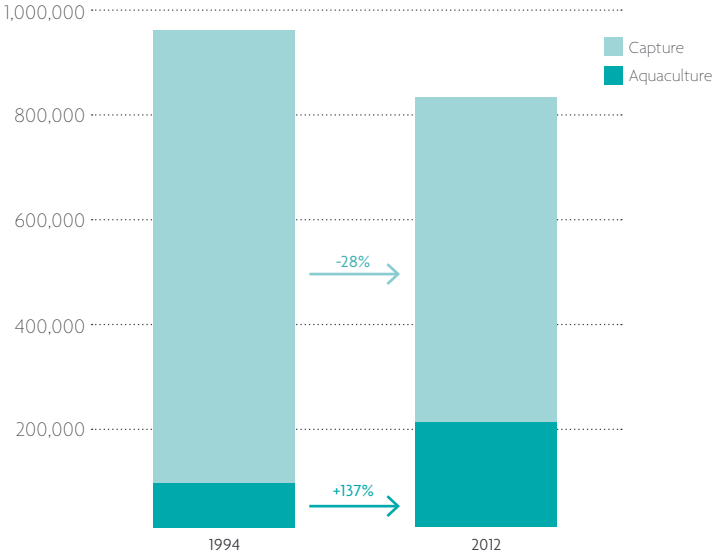


Figure 1.1.8
UK fisheries production (tonnes), 1994 and 2012
Source: FAO Fishstat.[40] NB. Data include some non-fish species (e.g. shellfish).

1.1.4 Farming systems and husbandry conditions

There have been some significant changes to farming systems and husbandry conditions over the past 20 years. A number of confinement systems have been phased out, largely as a result of pressure from welfare groups armed with scientific evidence of poor welfare in these systems and practical information demonstrating the feasibility of implementing more extensive conditions in practice. Developments in animal welfare science have allowed us to 'ask' animals which resources are important to them, how important they are (in terms of how much they are willing to work for access to them) and which conditions they prefer when given a choice. As one interviewee explained:

> *"Over the past 20 years there have been genuine advances in animal welfare science and our understanding of the welfare needs of animals. We have greater understanding of sentience and animal cognition and through schemes such as Welfare Quality and other initiatives to develop protocols for measuring or at least auditing animal welfare."*

»» FARM ANIMALS ARE NOW RECOGNISED AS SENTIENT BEINGS IN EU LAW

The legal recognition of animals as sentient beings in the EU in 1997 was a major victory for animal welfare and established a foundation on which future animal protection legislation could be built. Another landmark moment was the introduction of the Animal Welfare Act 2006, which overhauled animal welfare legislation in the UK and introduced a 'duty of care', making owners and keepers responsible for ensuring the welfare needs of their animals are met. The vital importance of key pieces of legislation was highlighted by one commentator as follows:

> *"European statute has been particularly influential – in terms of Treaties – particularly the Treaty of Amsterdam in 1997 because that was the first time from a European perspective that the sentience of animals was recognised. That's of course been carried forward into the Lisbon Treaty, but it was a huge turning point."*

Key legislative developments affecting the welfare of farmed animals in the UK are summarised in the timeline on page 23.

PIGS

SOW STALLS HAVE BEEN BANNED & MORE PIGS ARE BEING REARED IN SYSTEMS WITH HIGHER WELFARE POTENTIAL

Overwhelming evidence that confinement in narrow individual stalls is detrimental to the physical and psychological well-being of sows led to the prohibition of sow stalls in the UK from 1999. In 2001, the EU passed a Directive to phase out sow stalls across Europe by 2013 (except for the period from weaning the previous litter to four weeks after service).

The proportion of breeding sows kept outdoors in England increased from less than a third in 2006 to more than 40% in 2009.[41] This trend has contributed to a decline in the proportion of sows confined in a farrowing crate to give birth and nurse their piglets.

Since 2003, it has been a legal requirement in the EU for pigs to have "*permanent access to a sufficient quantity of material to enable proper investigation and manipulation activities, such as straw, hay, wood, sawdust, mushroom compost, peat or a mixture of such.*"[42] However, variable interpretation of this requirement has often resulted in failure to provide adequate amounts or appropriate types of enrichment materials to fully meet the behavioural needs of pigs. Provision of adequate enrichment is generally not feasible in housing systems with fully-slatted floors.[43]

Surveys of housing systems for pigs reared for slaughter in the late 1990s and in 2009 suggest that the proportion of pigs kept in systems with higher welfare potential, including indoor straw-based and outdoor systems, has increased from around a third to around two thirds, whilst the proportion kept in intensive fully-slatted systems has decreased from more than a third to around a quarter.[44,45,46]

Since 2003, routine tail docking and tooth clipping or grinding are prohibited for pigs in the EU and there is a requirement to change inadequate environmental conditions or management systems before resorting to these mutilations. Despite this, an estimated 80% of UK piglets are still tail docked[47] and a majority of pig breeders also clip the teeth of all their piglets.[48]

MEAT POULTRY

THE PROPORTION OF MEAT POULTRY REARED IN SYSTEMS WITH HIGHER WELFARE POTENTIAL HAS INCREASED

There has been a substantial increase in the proportion of meat poultry reared in systems with higher welfare potential in recent years. The British Poultry Council estimates that, in 2012, 18% of the UK meat chicken market was indoor systems operating to standards above industry baseline, 8% was free-range and 2% was organic.[49] The proportion reared in standard intensive systems has therefore fallen to around 72%. Reliable data on the proportion of meat poultry reared in systems with higher welfare potential in the early 1990s are not readily available but it is generally considered to be less than 5%.

Research has confirmed that enriching the environment of chickens with straw bales[50] and natural light[51] can increase activity levels and improve leg health in the birds. The RSPCA's Freedom Food scheme was instrumental in developing the concept of enriched indoor systems for meat poultry. The growth of the higher-welfare poultry market has been driven by celebrity-chef fronted campaigns (see Section 1.1.7) and the policies of several major retailers (see Section 1.3.4).

In a 2007 Defra report, the proportion of turkeys reared in free-range and semi-intensive 'pole barn' systems was estimated to be 10%.[52] A 2009 Defra survey suggests that the proportion of free-range turkeys has increased to around 18%.[53]

In the 1990s, many ducks were reared with water supplied only from 'nipple'-type drinkers. Without the opportunity to at least dip their heads and splash their feathers with water, ducks are unable to keep their eyes, nostrils and feathers fully clean.[54] The main industry assurance scheme for ducks now requires that the birds must be provided with water in a manner that enables them to cover their heads and considers that 'bell'-type drinkers can satisfy this requirement (see Section 1.3.1). Although 'bell' drinkers are not valued as highly by the ducks as wide troughs,[55] providing facilities that enable the birds to submerge their heads in water still represents a significant improvement on provision of 'nipple' drinkers only. A minority of ducks (including those reared to RSPCA and organic standards) benefit from full-body access to open water from a trough, bath, stream or pond.

EGG-LAYING HENS

CONVENTIONAL BATTERY CAGES HAVE BEEN BANNED AND MORE HENS ARE KEPT IN NON-CAGE SYSTEMS

For laying hens, uniquely, comprehensive data on production systems are available going back many years. The proportion of eggs passing through UK packing stations that are produced in cage systems has declined from 88% in 1996 to 51% in 2013.[56] A number of factors have contributed to this, including the introduction of compulsory method of production labelling for shell eggs in 2004 and policy decisions by several major retailers (see Section 1.3.4).

Conventional battery cages for laying hens were prohibited throughout the EU from 2012. Welfare groups were instrumental in pushing for this legislation. 'Furnished' cages (which incorporate a nest, perches and a small amount of additional space) are still permitted. Although they are not able to fully satisfy the behavioural needs of hens, the move to requiring furnished cages as a minimum standard is a step forward for welfare. As one expert commented:

> *"The other major success (though not an endpoint, in my mind just a stepping stone) was the development of the furnished cage. I don't believe that the ban on conventional cages would have been achieved without this alternative available."*

DAIRY CATTLE

SOME DAIRY COWS ARE NOW HOUSED YEAR-ROUND

Changes in feed and other aspects of management have seen some producers moving to year-round housing of dairy cows. An estimated 6% of producers in England continuously house all of their cows,[57] whilst others house the highest-yielding cows or those in the early stages of lactation. Overall, some estimates suggest around 10% of the UK dairy herd may now be kept in zero-grazing systems.[58] Many studies indicate that cows kept on pasture are healthier.[59] The risk of lameness, in particular, appears to be at least doubled in zero-grazing herds compared with grazing herds.[60,61]

BEEF CATTLE AND SHEEP

Beef cattle and sheep in the UK are reared in a variety of, often interconnected, systems from upland extensive systems to lowland grazing systems and some intensive indoor systems. Our expert interviewees did not consider that there has been any significant change in the balance between the different systems over the past twenty years.

FARMED FISH

THERE HAVE BEEN SOME IMPROVEMENTS IN FARMED FISH WELFARE

There have been developments in our understanding of farmed fish welfare and changes to fish husbandry conditions over the past 20 years. FAWC published opinions on farmed fish welfare in 1996[62] and again in 2014.[63] Changes over this period include:

- more automation of feeding, which tends to reduce competition and aggression, although there may still be a minority of fish that get less feed than they require;
- improvement in the design and management of many husbandry operations, such as smolting (the change necessary for salmon to move from freshwater to seawater) and grading (sorting fish by size), although some problems still occur;
- abnormalities such as eye cataracts, heart problems and spine deformities are still sometimes frequent but an increasing amount is known about their causation and prevention. For example, using higher temperatures to accelerate early development can increase skeletal deformities so this practice is now restricted. Levels of deformities are generally higher in triploid (sterile) salmon but a recent study under commercial conditions found that the severity of deformities was considerably lower than in previous studies;[64]
- although injuries are still sometimes common, methods of avoiding them are improving, such as the use of knot-free nets to reduce abrasion injuries and avoidance of the highest stocking densities to reduce biting injuries;
- recognition of the prime importance of water quality for fish welfare and a shift in focus toward viewing factors like stocking density largely in terms of their impact on water quality;
- improved survival of salmon from egg to smolt (when they are transferred to seawater), which has increased from less than a quarter in the late 1980s to around two thirds in 2011 (survival from smolt to harvest has remained relatively steady);
- Widespread adoption of assurance standards and codes of practice, with around 70% of UK salmon production now reared to RSPCA standards.

Overall, FAWC concludes that, within the historical and economic constraints of the systems they use, the aquaculture industry has made many improvements since the mid-1990s that have improved the welfare of many fish.[65]

1.1.5 Transport and slaughter

LIVE EXPORTS HAVE DECLINED

There has been a substantial decline in the number of animals exported live from the UK since the early 1990s. Live calf exports from the UK were suspended by the EU in 1996 due to BSE. Since the restrictions were lifted in 2006, the number of calves exported has never reached the levels of the early 1990s.

Concerns over bovine TB have contributed to limiting numbers. Another key contributor is the work of Compassion in World Farming and the RSPCA in convening the Beyond Calf Exports Stakeholders Forum in 2006. The Forum brought together leading stakeholders from the farming and food industry to find realistic and economically viable solutions that would result in a greater number of male dairy calves being reared for beef in the UK. Over the seven years of the Forum's work, the number of calves going abroad has declined by 90%, the number of dairy calves being retained for rearing in Britain has increased by 58% and the number of calves being killed at birth on farm has declined by 36%.[66]

EU legislation on animal transport has been revised several times over the years but animals are still subject to free-trade rules and can still be transported across Europe and beyond on journeys of unlimited length, albeit with requirements for stops at various intervals.

Although live exports have reduced, within the UK it is likely that many animals have to travel further to slaughter than previously because there has been a significant reduction in the number of slaughterhouses. For example, the number of red meat abattoirs in Britain has fallen from more than 480 in 1995[67] to fewer than 270 in 2013.[68]

In recent years there has been some progress in developing new systems for animal killing, particularly gas stun/kill systems for poultry, which can potentially benefit welfare because birds can be killed in their transport crates, thereby reducing the pain, fear and other problems associated with handling by humans and shackling.[69]

There are also welfare concerns regarding the handling of pigs when electrical stunning is used. The use of well-designed gas stun/kill systems can have advantages for pig welfare by reducing pre-slaughter handling and allowing pigs to be moved and stunned in groups.

However, many gas systems (including all those used in the UK to kill pigs) currently rely to varying degrees on the use of carbon dioxide, which can cause distress prior to loss of consciousness, especially at high concentrations.[70] Systems using inert gases (e.g. argon/nitrogen mixes) are generally more expensive and more technically challenging to manage (carbon dioxide is heavier than air and therefore easier to contain within the stunning system). Argon/nitrogen systems have been developed and are in commercial use for poultry, although they are currently only suitable for larger slaughterhouses. Until 2013, inert gases could not be used to stun/kill pigs under EU law, which may have delayed research and development. However, the change in legislation permitting their use for pigs may now herald a rise in interest and progress.

There have been changes in the methods used to kill farmed fish over the past 20 years, which would be expected to result in an improvement in welfare. When FAWC reported on the welfare of farmed fish in 1996, a number of inhumane killing methods were common practice, including asphyxiation and bleeding without prior stunning.[71] Currently, in the UK industry, salmon and larger trout are usually killed using a mechanical percussive stun (often delivered in an automated process) from which the fish generally will not recover (salmon are usually bled after the stunning process), whilst smaller trout are usually electrically stunned with sufficient current and duration to disrupt their respiration for long enough to cause death.[72] When properly applied, both of these methods should result in immediate loss of consciousness.

1.1.6 UK self-sufficiency in livestock products

UK SELF-SUFFICIENCY IN LIVESTOCK PRODUCTS HAS FALLEN, PARTICULARLY FOR PIG MEAT

UK self-sufficiency in livestock products has declined over the past 20 years, except for milk, which has increased slightly (Fig. 1.1.9). This means that the UK is now more reliant on imports to meet demand, especially for pig meat, where self-sufficiency has declined by more than a quarter to a little over 50%. This is a concern because imported products may not meet the same welfare standards as those that are domestically-produced and it is often more difficult to ascertain the production methods. However, the difference in welfare standards between the UK and other parts of Europe is lessening as EU legislation has caught up on issues like sow stalls. As one stakeholder commented:

> *"The UK has been helped because the last thing we want to do is gold plate our policies which puts us at a competitive disadvantage, so the EU legislation has raised the game as all member states have to do something about welfare".*

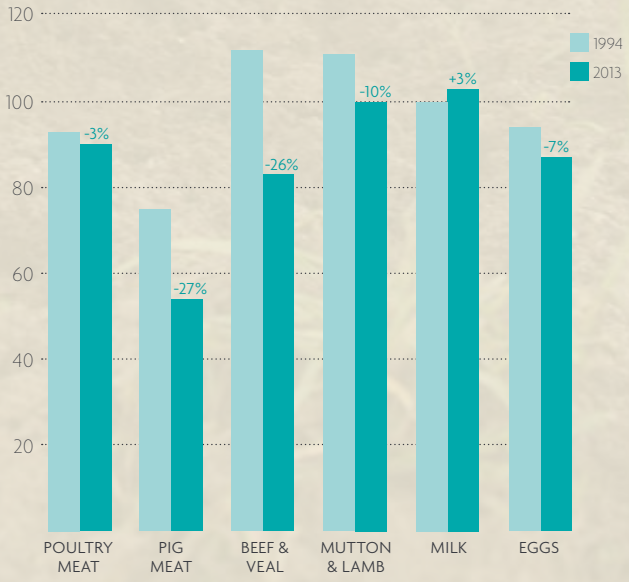


Figure 1.1.9
UK self-sufficiency (%) in livestock products, 1994 and 2013
Source: Defra,[73] except pig meat, AHDB.[74] NB. Comparison year for pig meat is 1995.

1.1.7 Consumer awareness of farm animal welfare issues

Consumers are increasingly concerned about the welfare of food-producing animals. A 2007 Eurobarometer survey indicates that UK consumers attach a high level of importance to the protection of farmed animal welfare (average rating of 7.8 out of 10) and that more than two thirds (68%) believe the welfare protection of farmed animals in the UK needs to be improved.[75] Over half (56%) of UK respondents say they would be prepared to change their usual place of shopping in order to be able to buy more animal welfare-friendly products.

A survey of perceptions and priorities of consumers on issues of sustainable food and farming and ethical supply chain management, conducted by the Plough to Plate Group, found that UK consumers ranked "raising standards of animal welfare" as their top future priority, ahead of the environment, local sourcing and fairer prices for producers.[76] A 2010 Eurobarometer survey found that two thirds (67%) of those surveyed in the UK were worried about the welfare of farmed animals, a higher percentage than for any of the other issues covered, including the quality and freshness of food, food poisoning, residues of pesticides, antibiotics, hormones or pollutants, food additives, weight gain and diet-related disease.[77]

Research published by the Institute of Grocery Distribution (IGD) in 2011[78] found that almost half (48%) of British grocery shoppers regard animal welfare as either extremely or very important when choosing what to buy in a supermarket. This is higher than for any other aspect of ethical shopping, including environmental impact, whether a product is local or British, and the impact on workers in developing countries. One interviewee commented:

> *"The evidence is very strong that as we've become more affluent, we don't like the fact that we're producing food from animals that have been kept in cages and crates or that have had bits chopped off them."*

»» CONSUMER CONCERN FOR ANIMAL WELFARE APPEARS TO HAVE GROWN

Between 2006 and 2009-10, the proportion of shoppers expressing concern for animal living conditions increased by 50% and the proportion identifying animal welfare as a key variable impacting their purchasing decisions doubled.[79] The proportion of shoppers who claim to have specifically bought a product with higher animal welfare credentials nearly doubled by the end of 2010, compared with 2006-7.

Consistent data are not available to track these trends further back in time. However, we can get some idea of the level of concern for the welfare of laying hens from a survey carried out by Mintel in 1991, which found that a third (32%) of respondents considered concern for animal welfare to be an important factor when purchasing eggs. Six other considerations were ranked more highly, including freshness, absence of cracks and value for money. By comparison, a Eurobarometer survey in 2005 found that two thirds (65%) of UK respondents say they are prepared to pay a price premium for eggs from a welfare-friendly production system.[80] Research published in 2010 found that 70% of respondents reported that they purchased free-range eggs always or often.[81]

Extensive media coverage of farm animal welfare issues in recent years, fronted by celebrity chefs Jamie Oliver and Hugh Fearnley-Whittingstall, played a notable role in raising consumer awareness. There was an increase in sales of higher-welfare poultry following the airing of 'Hugh's Chicken Run' and 'Jamie's Fowl Dinners' in January 2008, which drew the nation's attention to the realities of modern poultry production. These were followed by 'Jamie Saves Our Bacon' in January 2009, which looked at conditions for farmed pigs. There was also a high profile incident in 2006, when poultry workers were convicted of cruelty for playing 'baseball' with live turkeys.[82] The major retailers have responded to the increase in demand generated by the media and developed standards and products that have continued to fuel the trend (see Section 1.3.4). One stakeholder commented:

> *"Industry taking ownership and responsibility for animal welfare has been a seismic shift in the last 20 years – driven by retailer interest. Retailers know what matters to consumers, and consumers expect a certain level of animal welfare – this is not consumers demanding animal welfare, it is an implicit expectation that everything will be sorted. They expect NOT to have to worry about welfare. This is a grand ethical interest by retailers – about protecting brand up to a minimum level – they know farm animal welfare matters and will manage risks accordingly."*

1.1.8 TIMELINE OF KEY UK AND EU LEGISLATION AFFECTING FARM ANIMAL WELFARE

1990 Veal crates are banned in the UK from 1st January by the Welfare of Calves Regulations 1987[83]

1991 Council Directive 91/628/EEC introduces rules governing the transport of animals within the EU[84] – member states must incorporate the requirements into national legislation by 1st January 1993 • The Welfare of Animals at Markets Order 1990[85] (WAMO) comes into force in the UK on 1st March

1993 Council Directive 93/119/EC[86] introduces rules for the protection of animals at the time of slaughter or killing in the EU – member states must incorporate the requirements into national legislation by 1st January 1995

1995 The Welfare of Animals (Slaughter or Killing) Regulations 1995[87] (WASK) implement the EU Directive on slaughter in the UK • Council Directive 95/29/EC[88] amends EU legislation on animal transport – member states must incorporate the requirements into national legislation by 31st December 1996

1997 For the first time, animals are legally recognised as sentient beings in a protocol annexed to the Treaty of Amsterdam – it is now a legal requirement for the EU and its member states to "pay full regard to the welfare requirements of animals" when formulating and implementing EU policies on agriculture and research

1998 Council Directive 98/58/EC[89] sets out the framework for farm animal welfare protection in the EU – member states must incorporate the requirements into national legislation by the end of December 1999

1999 Sow stalls and tethers are banned in the UK from 1st January by the Welfare of Pigs Regulations 1991[90]

2000 The Welfare of Farmed Animals (England) Regulations 2000[91] implement the EU framework Directive on farm animals and set out specific rules for several species

2003 Commission Directive 2001/93/EC[92] requires pigs in the EU to be provided with manipulable materials and prohibits routine tail docking and tooth clipping/grinding

2004 Compulsory method of production labelling is introduced for retail shell eggs in the EU by Council Regulation (EC) No. 5/2001[93] (the law on egg labelling as to farming method is now to be found in Council Regulation (EC) No. 1234/2007 and Commission Regulation (EC) No. 589/2008)

2006 Tethering of sows is banned in the EU from 1st January by Council Directive 2001/88/EC[94] • The Animal Welfare Act[95] 2006 contains a 'duty of care', making owners and keepers in the UK responsible for ensuring the welfare needs of their animals are met • Veal crates are banned in the EU from 31st December by Council Directive 97/2/EC[96]

2007 Regulation (EC) No. 1/2005[97] applies from 5th January, overhauling the rules on animal transport in the EU and repealing Council Directive 91/628/EEC • The Mutilations (Permitted Procedures) (England) Regulations 2007[98] prohibit all mutilations of farm animals in the UK except those listed • The Welfare of Farmed Animals (England) Regulations 2007[99] replace the 2000 Regulations of the same name from 1st October • Council Directive 2007/43/EC[100] introduces species-specific legislation on the welfare of meat chickens and was the first time that welfare indicators were included in animal welfare legislation as a means of assessment – member states must incorporate the requirements into national legislation by 30th June 2010

2009 From 1st December, the Lisbon Treaty (2007)[101] extends the commitment to pay full regard to the welfare requirements of animals to other policy areas, including fisheries and technological development

2012 Conventional battery cages for laying hens are banned in the EU from 1st January by Council Directive 1999/74/EC[102]

2013 Council Regulation (EC) No. 1099/2009[103] on the protection of animals at the time of killing applies in the EU from 1st January, introducing a requirement for Animal Welfare Officers in slaughterhouses and certificates of competence for slaughterhouse staff and repealing Directive 93/119/EC • Sow stalls are banned in the EU from 1st January by Council Directive 2001/88/EC[104] (except for the period from the weaning of the previous litter to four weeks after service)

1.2 Introduction of farm assurance schemes

1.2.1 Development and growth of farm assurance schemes

Farm assurance schemes are voluntary schemes that apply standards for livestock production and other sectors. The standards may be set and developed by the scheme itself or by a separate standard-setting body (for example, the RSPCA sets the standards applied by the Freedom Food scheme). Livestock schemes may cover one or more parts of the chain from hatcheries, breeding units and farms, through to transport and slaughter. Assessment audits of scheme members are carried out to check compliance with the standards. The schemes are accredited by independent certification bodies which, in some cases, also carry out the assessments of scheme members and are themselves accredited by the United Kingdom Accreditation Service (UKAS).

The Soil Association was founded in 1946 by a group of farmers and scientists who were concerned about the impacts of increasingly intensive agricultural practices following the Second World War. It developed organic standards in the late 1960s and began certifying members in 1973. From 1984 to 1993, Food From Britain (FFB) was responsible for a certification system which established quality criteria and inspection systems for specific sectors including (until 1987) organic products.[105] This centralised scheme was brought to an end by the Government in 1993, leaving the door open for the farming industry and others to develop their own schemes.

A number of key drivers led to the development and growth of farm assurance schemes in the late 1980s and early 1990s:

- **A desire to restore consumer confidence.** A number of high profile food scares damaged consumer confidence, including:
  - Edwina Curry's announcement in 1988 that Britain's egg production was infected with *Salmonella*;
  - The emergence of BSE in cattle in the late 1980s and the confirmation in 1996 of the link between BSE and the fatal human brain disease CJD;
  - The major *E. coli* outbreak in Scotland in 1996, which infected 500 people and killed 20.

  One of the primary objectives of the industry-led farm assurance schemes is to protect the reputation of UK agriculture and reassure consumers that British food is safe to eat.
- **A requirement for retailers to show due diligence**, following the introduction of the Food Safety Act 1990.[106] In the early days of farm assurance, standards were often set by retailers and applied to producers and processors in their supply chains. By developing national farm assurance schemes, the farming industry could provide a universally recognised standard, enabling certified farmers to supply a number of retailers without having to be inspected by each. Today, major supermarkets and processors generally require all of their suppliers to be members of a recognised farm assurance scheme, although many retailers are also now, once again, developing their own additional standards.
- **A desire to promote environmentally responsible farming**. Concern for the environment is a central pillar of organic philosophy. Also, Linking Environment and Farming (LEAF) was launched in 1991 in response to growing concern about the impact of intensive farming on the environment.
- **A desire to promote farm animal welfare**. A primary driver leading to the launch of the RSPCA's Freedom Food scheme in 1994 was a desire to find a means of harnessing consumer power to drive improvements in farm animal welfare by linking welfare-minded consumers with higher-welfare farmers. Concern for animal welfare is also a central pillar of organic philosophy.

In recent years, the main industry-led schemes have been consolidated under the 'Red Tractor' umbrella. The 2013 horsemeat scandal highlights the ongoing importance of farm assurance schemes in providing traceability of livestock products and reassurance for consumers.

Key developments in the history of farm assurance in the UK are summarised in the timeline on page 25.

1.2.2 TIMELINE OF UK FARM ASSURANCE[107]

1973	Soil Association began certifying members to organic standards
1984	Government-led Food From Britain certification scheme launched
1986	First recorded case of BSE in cattle in the UK[108]
1987	First Scottish livestock assurance schemes launched[109]
1988	Edwina Currie announced in a TV interview that Britain's egg production was infected with *Salmonella*; egg sales fell 60% almost overnight.
1990	Food Safety Act introduces a requirement for due diligence[110] • Tartan Quality Mark for farmed salmon launched[111]
1991	Quality Meat Scotland launched • Linking Environment & Farming (LEAF) launched
1992	BSE in cattle peaked at over 37,000 reported cases per year[112] • Farm Assured British Beef & Lamb launched Northern Ireland Farm Quality Assured launched
1993	Government-led Food From Britain certification scheme ended
1994	**Freedom Food scheme launched**, applying RSPCA standards for laying hens and pigs • Farm Assured Welsh Livestock launched
1995	RSPCA standards launched for dairy cattle and sheep, and adopted by Freedom Food
1996	RSPCA standards launched for beef cattle, and adopted by Freedom Food • Farm Assured British Pigs launched • Link established between BSE in cattle and a new variant of the human condition CJD; beef consumption fell by one fifth compared with 1995; farmer membership of beef and lamb assurance schemes increased rapidly • 500 people are infected with *E coli* 0157:H7 and 20 die, following consumption of infected pies in Scotland[113]
1997	RSPCA standards launched for meat chickens and turkeys, and adopted by Freedom Food
1998	British Lion Quality Code of Practice launched for eggs with compulsory vaccination against *Salmonella*
1999	National Dairy Farm Assurance Scheme launched • Assured Chicken Production launched • Quality British Turkey launched[114] • RSPCA standards for ducks and poultry egg hatcheries launched, and adopted by Freedom Food
2000	Farm Assured British Pigs rebranded as Assured British Pigs • Assured Food Standards umbrella body launched with the Red Tractor logo
2002	RSPCA standards for farmed Atlantic salmon launched, and adopted by Freedom Food
2006	National Dairy Farm Assurance Scheme rebranded as Assured Dairy Farms • Code of Good Practice for Scottish Finfish Aquaculture launched
2007	Quality British Turkey brought under the Red Tractor umbrella[115]
2010	Assured British Pigs, Assured Chicken Production, Farm Assured British Beef & Lamb and Assured Dairy Farms rebranded as Red Tractor Pigs, Red Tractor Poultry, Red Tractor Beef & Lamb and Red Tractor Dairy respectively • Duck Assurance Scheme launched[116]
2012	Duck Assurance Scheme brought under the Red Tractor umbrella[117]
2013	Horsemeat is found in beef products on sale in UK supermarkets Tesco, Asda, Iceland, Co-operative, Aldi and Lidl, and in Findus ready meals, Ikea meatballs, and some batches of school meals.
2014	RSPCA standards for farmed rainbow trout launched, and adopted by Freedom Food

1.3 Development of farm assurance standards and impact on farm animal welfare

Farms that are members of a farm assurance or organic certification scheme are more likely to be compliant with legislation on animal welfare than non-certified farms.[118] This may be because regular inspections by a certification body make it more likely that a farm will comply with legislation, or because more compliant farms are more likely to join a certification scheme, or a mixture of the two. In response to these findings, Defra amended the risk model for selection of farms for government welfare inspections in 2012; members of a farm assurance or organic scheme are now, on average, visited less frequently by Government enforcement bodies.[119]

Farm assurance schemes have therefore assumed a level of responsibility for farm animal welfare, becoming the mainstay of welfare governance in most livestock sectors.[120] However, coverage is incomplete, with welfare on non-assured farms subject only to statutory control and fewer, but targeted and risk-based, government inspections. In most sectors, more than 80% of livestock are certified by one or more farm assurance scheme (Table 1.3.1). However, coverage for sheep is less than 70% and coverage for smaller sectors (e.g. rabbits, ratites such as ostrich, and camelids such as llamas) may be low or non-existent. Also, some schemes do not cover the whole life of the animal.

Table 1.3.1
Percentage of UK production certified under each scheme type

ANIMALS	INDUSTRY SCHEMES[121]	RSPCA'S FREEDOM FOOD SCHEME[122]	ORGANIC SCHEMES[123]
Pigs	90	32	1
Meat chickens	90	4	2
Turkeys	90	9	2
Ducks	90	7	2
Laying hens	90	50	3
Dairy cattle	82	<1	3
Beef cattle	82	<1	3
Sheep	65	<1	3
Salmon	99	70	3

Several expert interviewees commented that farm assurance schemes seem to be accelerating the benefits that they are bringing, after a period when there was not as much progress as many stakeholders would have liked:

> *"Initially the big assurance schemes were resistant to being focused on welfare, but they have come a long way in the past couple of years, with one or two playing more of a leadership role."*

> *"Farm assurance schemes are starting to deliver what they should have delivered a long time ago. There is a need to convert potential into reality and the only way to do that is at industry level determined by an industry strategy [...] Welfare specific schemes and organic schemes are providing welfare choice for consumers."*

Some of the expert stakeholders interviewed held the view that there was a clear positioning of assurance schemes in terms of input standards affecting animal welfare, namely that there are baseline schemes at the bottom, organic schemes at the top, with the RSPCA's Freedom Food scheme in the middle. However, some experts considered that there is no clear winner in terms of welfare outcomes between higher-welfare conventional systems and organic systems. Whilst the expert interviewees did not all agree on the exact positioning of the various standards relative to each other, there was general agreement that both the RSPCA's Freedom Food scheme and organic schemes offer significant potential welfare benefits over baseline standards. This is not necessarily the case with the general public, many of whom are unable to differentiate between different claims and different standards. As one expert said:

> *"If other schemes are claiming to provide high animal welfare and they're not, then consumers can become confused about what the various schemes are promoting."*

1.3.1 Industry schemes

The large majority of UK livestock is assured by Red Tractor or an equivalent industry scheme, including nearly 100% of farmed salmon, 90% of pigs and poultry, over 80% of cattle and 65% of sheep (Table 1.3.1). Red Tractor beef cattle and sheep must be reared on an assured farm for the last 90 and 60 days, respectively, so coverage for younger animals in these sectors is likely to be lower.

In relation to animal welfare, the standards of the industry schemes largely reflect legal requirements, although with some notable improvements in certain areas, particularly for some species. They also set out more detailed requirements for sectors that are not currently covered by species-specific legislation. It should be noted that farm animal welfare is only one of a number of aspects that these schemes consider – hence they bring other benefits to farmers and consumers.

The extent to which the industry schemes can implement welfare standards above the legal minimum is partly constrained by the need to compete with imported products, which may not meet the same standards. In some sectors, UK minimum legal standards have historically been significantly higher than those in many other countries. However, these differences are increasingly being eroded as, for example, sow stalls and veal crates have been phased out across the EU (see Section 1.1). On the one hand, this move towards 'levelling of the playing field' may be welcomed by the UK industry. However, it may not necessarily be beneficial for UK producers if they lose their unique selling point of better welfare standards compared with imported products.

Despite these constraints, there are some areas of the industry standards that exceed the legal minimum (Box 1.3.1). For example, several mutilations are prohibited by the industry schemes. These are largely operations that were not commonly performed in the UK anyway. However, the prohibition of pig castration by the main industry schemes may have helped to discourage wider adoption of castration, which might otherwise have risen with the increase in slaughter weights in recent years. Concern remains about the widespread practice of tail docking and tooth clipping in pigs, despite the legal restrictions (see Section 1.1). Phasing out tooth clipping in favour of grinding is being considered by the Red Tractor scheme, although such a move is opposed by the National Pig Association.[124]

The requirement for all animals, including poultry and fish, to be stunned prior to slaughter (or killed using methods that combine stunning and slaughter, such as gas systems) is a significant welfare advantage.

The very wide coverage of the industry schemes for most sectors means that even small improvements in welfare standards have the potential to benefit very large numbers of animals.

Box 1.3.1. Key features of the standards of industry assurance schemes* that exceed minimum legislative requirements include:

- Regular farm inspections;
- Limits on stocking density for poultry, including a marginal reduction on legal requirements for meat chickens, implementation of FAWC recommendations for turkeys, and lower outdoor stocking density for free-range laying hens;
- Provision of litter material for all meat poultry and environmental enrichment for turkeys and free-range meat chickens;
- Improved lighting for laying hens in free-range and barn systems, turkeys and ducks;
- Provision of some cover on the range for free-range turkeys;
- Ducks must be provided with water in a manner that allows them to cover their heads ('bell' drinkers, troughs, baths or showers);
- Castration of pigs, beak trimming of meat chickens and all mutilations of ducks are prohibited;
- Forced moulting of laying hens (where feed is withdrawn to induce birds to moult their feathers and stimulate a new cycle of egg laying) is prohibited;
- Additional requirements for staff training;
- More frequent herd or flock inspection than required by law;
- All farms must have a veterinary health plan;
- All pig and salmon farms must have regular veterinary visits;
- Monitoring of welfare outcomes for some species;
- Additional requirements for the handling of turkeys, ducks and end-of-lay hens;
- Slaughter without stunning is prohibited.

*Standards examined include Red Tractor Pigs, Red Tractor Poultry, Quality British Turkey, Duck Assurance Scheme, British Lion Quality Code of Practice, Red Tractor Dairy, Red Tractor Beef and Lamb, and the Code of Good Practice for Scottish Finfish Aquaculture.

Consumer awareness of Red Tractor

A YouGov survey in November 2012 found that over half (53%) of shoppers recognise the Red Tractor logo.[125] Research published by IGD in 2011 found that four in ten (41%) meat shoppers believe Red Tractor guarantees higher standards of animal welfare, with a fifth (21%) believing it represents the highest standards of animal welfare.[126]

1.3.2 The RSPCA's Freedom Food scheme

The RSPCA's Freedom Food scheme is unique in the UK in placing its primary focus on animal welfare. The standards are informed by science, to the extent that is possible. According to FAWC:[127]

> *"Freedom Food has provided a distinct lead in relation to the importance placed on the welfare component of its schemes, while delivering the core requirements of industry based schemes."*

This was supported by comments from the expert interviewees, who – notwithstanding certain criticisms – overwhelmingly felt that Freedom Food has made a positive contribution to improving farm animal welfare since its inception in 1994. As one commentator said:

> ***"Freedom Food has made an immense contribution in giving consumers a clear and distinct choice in the market regarding farm animal welfare. I think that it has been an exemplar, and I think that it is the kind of scheme that is urgently required on an international basis and certainly across Europe."***

It has carved out a role for itself in what some feel is quite a crowded market, as one expert noted:

> *"In many ways it has been a flagship farm assurance scheme for welfare and in fact is the only welfare farm assurance scheme."*

The Freedom Food scheme covers a significant proportion of the industry for farmed salmon (70%), laying hens (50%) and pigs (32%) (Table 1.3.1). Coverage is lower for turkeys (9%), ducks (7%), meat chickens (4%) and very low for dairy cattle, beef cattle and sheep (all <1%).

The Freedom Food scheme offers significant potential welfare benefits in terms of additional space and a more complex and stimulating environment, as well as a range of other additional standards covering husbandry, animal handling, transport and slaughter (Box 1.3.2).

For salmon, the proportion of the industry certified under the Freedom Food scheme continues to increase and is expected to reach close to 100%. Demand from retailers is seen as one of the key drivers for this trend.

One interviewee said:

> *"Freedom Food has become the working standard for salmon production, which is an enormous achievement. Everyone I've spoken to working in the Scottish salmon industry has nothing but positive things to say about Freedom Food. It's become almost impossible to distinguish RSPCA from Scottish salmon."*

The vast majority of the non-cage egg production sector is now covered by the Freedom Food scheme. There remain a number of serious welfare concerns in non-cage systems for laying hens, including high levels of bone fractures (see Section 1.1.3) and reliance on beak trimming to reduce the potential for serious damage due to outbreaks of harmful pecking behaviour. The high level of coverage of the Freedom Food scheme places the RSPCA in a strong position to attempt to tackle these issues. The scheme is working towards phasing out beak trimming. Addressing the level of bone fractures may be even more challenging, as this is likely to require a change in genetics. However, experience from meat chickens suggests that assurance schemes may be able to play a role in encouraging breeding companies to make the necessary changes (see below).

Around a third of the UK pig industry is covered by Freedom Food. The scheme is making progress in moving its members away from reliance on tail docking and tooth clipping of pigs.

Lower levels of foot pad dermatitis (sores on the feet) have been reported in Freedom Food chickens, compared with standard, free range and organic birds.[128] The RSPCA standards for meat chickens are unique in specifically addressing welfare issues associated with genetics, through the introduction, in 2006, of a limit on the growth rate of birds that can be reared under the scheme. At the time this standard was introduced, only one of the major global chicken breeding companies offered a bird that could satisfy the requirements. The standard was influential in the decisions of the two largest global chicken breeding companies to develop their own strains with a similarly reduced growth rate.[129] The number of birds reared under the scheme continued to increase following this change to the standards, more than doubling between 2006 and 2009. However, the number of birds reared under the scheme has fallen in recent years, despite continued growth of the market for chicken reared to standards above industry baseline, largely driven by retailer-led schemes (see Section 1.3.4).

A comparison of welfare in dairy cows on Freedom Food and conventional farms in a study published in 2003 found that Freedom Food farms had better results for 12 welfare indicators and poorer results for eight indicators.[130] In general, the proportions of Freedom Food and conventional farms on which intervention was required (according to an assessment based on consultation with experts) did not differ. In response to the levels of lameness identified in this study, the RSPCA introduced locomotion scoring of Freedom Food dairy cows (to score how well the cows move).

The RSPCA standards include more detailed requirements for slaughter than other schemes. The Freedom Food scheme is aiming to phase out the shackling of live poultry in slaughterhouses by 2016, which has the potential to substantially improve welfare.

Box 1.3.2. Key features of the RSPCA standards applied under the Freedom Food scheme that exceed minimum legislative requirements include:

- Regular farm inspections;
- Second 'layer' of inspections – often completely unannounced – by RSPCA specialist field staff to complement the annual audit by Freedom Food assessors;
- Close confinement systems are prohibited, including cages for laying hens, farrowing crates for pigs, tethering systems for cattle and yolked fostering pens for sheep;
- During the grazing season, pasture access is required for dairy cows (for part of the day, except during the first 8 weeks of lactation) and for sheep;
- Lower stocking densities for pigs, meat poultry, laying hens in multi-tier systems (and outdoors in free-range systems), cattle in loose housing systems, calves, sheep and farmed salmon;
- 'Thinning' (the planned removal of a proportion of the flock on one or more occasions, so as not to exceed the maximum stocking density) is prohibited for turkeys and ducks and will be phased out for chickens by 2016;
- Provision of litter material for all poultry;
- Provision of environmental enrichment for pigs, poultry and dairy cattle;
- Housing for pigs, cattle and sheep must provide a bedded lying area;
- Sows must be provided with nesting material prior to farrowing;
- Ducks must have access to open water (troughs or baths) which allow full body access;
- Improved lighting for housed animals, including provision of natural light for poultry;
- Detailed standards for air and water quality;
- Greater requirements for cover on the range for free-range poultry;
- Chicken breeds must be approved for use by the RSPCA;[131]
- Castration of pigs, beak trimming of meat chickens and indoor-reared turkeys, and all mutilations of ducks and salmon are prohibited;
- Restrictions on other mutilations, including tail docking, tooth clipping/grinding and nose ringing of pigs;
- Local anaesthetic must be used for disbudding (removal of the horn buds) of calves;
- Forced moulting is prohibited;
- Additional requirements for calf feeding to avoid anaemia;
- Restrictions on mixing of unfamiliar animals;
- Additional requirements for staff training;
- More frequent herd or flock inspection than required by law;
- All farms must have a veterinary health plan;
- All pig, dairy, beef, sheep and salmon farms must have regular veterinary visits;
- Monitoring of welfare outcomes;
- Tighter restrictions on feed withdrawal periods;
- Additional requirements for the handling of poultry and salmon;
- Use of electric goads is prohibited;
- Stricter limits on transport duration;
- The sale of pigs and sheep through livestock markets is prohibited and there are additional restrictions on the use of livestock markets for cattle;
- Calves must not be exported live and killing at birth is to be phased out;
- Slaughter without stunning is prohibited, shackling of live poultry at the slaughterhouse is to be phased out by 2016 and there are additional detailed requirements for slaughter;
- Requirement for CCTV monitoring at specified places/stages of the process in slaughterhouses.

Overall, the Freedom Food scheme has the potential to drive improvements in welfare for a significant proportion of animals in several sectors. One interviewee commented:

> *"What they've done is look at how we can improve welfare but do that in a commercially sustainable way, so actually farmers can afford to do this. And by doing that, I truly believe, they've managed to drive welfare throughout the country, because they've come up with solutions."*

RSPCA standards have also had wider influence beyond those animals reared under the Freedom Food scheme. For example, RSPCA standards were the first to introduce a requirement for veterinary health planning – a requirement that has now been adopted by all of the major UK assurance schemes. Aspects of the RSPCA standards have been directly incorporated into, or used as a basis for, several assurance standards, pieces of legislation and codes, both in the UK and internationally. Examples include the Lion Code standards for laying hens in non-cage systems, Global Animal Partnership '5-Step'™ standards for meat chickens, EU legislation on meat chickens and slaughter, Norwegian legislation on farmed salmon, and OIE recommendations for meat chickens.

Consumer awareness of Freedom Food

A 2012 YouGov survey found that around a quarter (24%) of shoppers recognise the Freedom Food logo.[132] Research published by IGD in 2011 found that half (52%) of meat shoppers believe that Freedom Food guarantees higher standards of animal welfare, with three in ten (30%) believing it represents the highest standards of animal welfare. Amongst shoppers who are aware of the Freedom Food scheme, this rises to almost nine in ten (86%) who believe that it represents higher animal welfare standards and three quarters (74%) who associate it with the highest animal welfare standards.[133] Almost two thirds (63%) of Freedom Food purchasers are attracted to the products because of the association with the RSPCA.

Some expert interviewees did express concern about how clear the Freedom Food label was and how much consumers understood its positioning versus other farm assurance schemes. As one said:

> *"I also think there's a little bit of confusion [amongst consumers] about what the Freedom Food label actually does mean."*

The low coverage of the Freedom Food scheme in the dairy, beef and sheep sectors may reflect lower consumer awareness of welfare issues affecting these species. In a 2005 Eurobarometer survey,[134] European citizens were asked to state which three types of farm animal were most in need of improved welfare protection. Laying hens were mentioned by 44% of respondents, meat chickens by 42% and pigs by 28%. In contrast, beef cattle, dairy cattle and sheep were mentioned by only 18%, 17% and 6% of respondents, respectively. In the same survey, 58% of UK respondents rated the welfare of laying hens as fairly or very bad, compared with 27% for pigs and just 13% for dairy cows.

In the IGD research, the most common reason given for not buying Freedom Food products was that shoppers do not notice these options when shopping, mentioned by over half (53%) of those aware of the scheme.[135] Widespread adoption and promotion of Freedom Food products by retailers, as has happened for salmon and eggs in particular, would appear to be key to driving further increases in the coverage of the scheme.

1.3.3 Organic schemes

The organic certification schemes are unique in having a legal basis for their standards in EU regulations. Some organic schemes, including but not limited to the Soil Association, set standards over and above organic legal requirements in a number of areas. The organic schemes cover between 1% and 3% of livestock, depending on the sector (Table 1.3.1).

UK organic schemes offer significant potential welfare benefits in terms of additional space and a more complex and stimulating environment, including outdoor access for all animals, as well as a range of other additional standards covering husbandry, animal handling, transport and slaughter (Box 1.3.3).

However, organic standards restrict the use of veterinary medicines, which may give rise to potential welfare concerns. Organic standards also place restrictions on feed ingredients, which may potentially raise issues in terms of meeting the nutritional requirements of high-yielding livestock breeds. The use of such breeds is strongly discouraged, although not specifically prohibited, by organic standards and, in practice, highly productive breeds are widely used.

Animal welfare is just one component of organic standards, which offer a number of other benefits, including avoidance of non-therapeutic antibiotic use and a range of environmental and biodiversity benefits. For example, research at Oxford University has found that organic farms support, on average, 34% more plant, insect and animal species than conventional farms.[136]

Compared with conventionally-reared animals, lower levels of lameness[137] and improved stress resistance at slaughter[138] have been reported in organic pigs. Lower levels of lameness[139,140,141] and hock injuries,[142] and similar[143,144] or lower[145,146] levels of mastitis have been reported in organic dairy cows. Scores for resource-based and animal-based parameters have been reported to be similar for organic and non-organic sheep reared in extensive grazing systems.

Lower levels of fearfulness[148] and similar levels of feather-pecking[149] and bone fractures[150] have been reported in organic laying hens. Improved leg health,[151] lower levels of fearfulness[152] and lower levels of hock burn[153,154] have been reported in organic chickens. Some studies have also found lower levels of foot pad dermatitis;[155] however, others have reported very high levels of foot pad dermatitis in organic chickens.[156] These findings illustrate the point that setting higher standards for the birds' environment does not necessarily guarantee that all aspects of welfare will be satisfactory, and demonstrate the vital importance of choosing appropriate breeds for organic systems and monitoring and acting upon welfare outcomes.

In general, organic standards do seem to offer many significant potential welfare advantages over baseline standards. The overall impact of organic schemes in driving welfare improvements, however, is limited by the relatively small number of animals reared to organic standards at present.

Box 1.3.3. Key features of organic standards* that exceed minimum legislative requirements include:

- Regular farm inspections;
- Close confinement systems are prohibited, including cages for laying hens, farrowing crates for pigs and tethering systems for cattle;
- Pasture access is required throughout their lives for pigs, cattle (during the grazing season) and sheep (during the grazing season) and for at least a proportion of their lives for poultry;
- Lower indoor and outdoor stocking densities for all animals;
- Housing for pigs, cattle and sheep must provide a bedded lying area;
- Sows must be provided with nesting material prior to farrowing;
- Provision of litter material, improved lighting, smaller flock sizes and greater requirements for cover on the range for poultry;
- Increased nesting and perching space for laying hens;
- Ducks must have access to open water (stream, pond or lake) which allows full-body access;
- Breeds must be chosen that avoid specific disease or health problems associated with intensive production and avoid problems at birth;
- Minimum slaughter ages for poultry;
- Use of sex-reversed and triploid salmon is prohibited;
- Mutilations must not be carried out routinely (mutilations of pigs, poultry and salmon are generally prohibited);
- Restrictions on mixing of unfamiliar animals;
- Later weaning ages for pigs, calves and lambs;
- Fish farms are not permitted to kill predators such as seals;
- More frequent herd or flock inspection than required by law for pigs and poultry;
- All farms must have a veterinary health plan;
- Monitoring of welfare outcomes by some schemes (producers are required to monitor and record welfare outcomes for poultry by the Soil Association and Organic Farmers & Growers; welfare outcomes assessment is included in inspections for the Soil Association);
- Additional requirements for staff training, tighter restrictions on feed withdrawal periods and additional requirements for the handling of salmon;
- Use of electric goads is prohibited;
- Stricter limits on transport duration;
- The sale of pigs through livestock markets is prohibited and there are additional restrictions on the use of livestock markets for cattle and sheep;
- Calves must not be exported live or sold into intensive systems and killing at birth is to be phased out (Soil Association);
- Slaughter without stunning is prohibited and additional requirements for slaughter.

*'Organic standards' refers here to generic UK organic standards as compared with minimum legal non-organic requirements. The standards presented are largely requirements of EU organic regulations; however, where the standards typical of organic certification schemes in the UK differ from these, the typical UK organic standards are presented. Standards examined to determine typical UK organic standards include Soil Association, Scottish Organic Producers Association, and Organic Farmers & Growers. Notable examples where one or more individual organic scheme has welfare standards that exceed the norm are also highlighted.

Consumer awareness of organic standards

YouGov found that around a quarter (27%) of shoppers recognise the Soil Association logo.[157] There appears to be a lack of awareness of animal welfare standards in organic farming among consumers in general, although organic consumers are more aware of the potential welfare benefits of organic standards. IGD found that less than a quarter (23%) of meat shoppers believe organic or the Soil Association guarantee higher standards of animal welfare, with just 7% believing they represent the highest standards of animal welfare.[158] Organic food is most commonly understood to mean that production was free of chemicals such as pesticides and hormones. However, among regular organic buyers, over half (55%) identify organic as a label that guarantees higher animal welfare standards. A survey in 2012 found that 31% of people reported animal welfare as one of the reasons for buying organic, with 10% citing this as the main reason.[159]

1.3.4 Retailer standards

The five largest multiple retailers account for more than 70% of retail meat purchases in the UK, with all of the multiples combined (including discounters) accounting for more than 80% of retail meat purchases.[160] **Major retailers have enormous power to specify the standards they require of their suppliers and to determine the range of products and standards from which consumers are able to choose**. The major retailers vary greatly in the degree to which they are engaged in driving improvements in welfare standards and consumer awareness.

Some retailers are taking an increasingly proactive role in setting welfare standards above baseline industry/legal standards for some or all of their livestock product ranges. Market segmentation on the basis of animal welfare standards, and competition between retailers, has significant potential to generate welfare gains. This is particularly evident in the poultry sector, where the numbers of eggs produced in non-cage systems and meat chickens reared to standards above industry baseline have increased substantially in recent years (see Section 1.1).

The decision by several major retailers to stop selling cage shell eggs and phase out the use of cage egg ingredient in their own brand products has undoubtedly contributed to the growth of the market for non-cage eggs. One stakeholder commented:

> *"It is important to remember that there has been a shift in the retail landscape over the last 20 years. The cheap end and the big end of the market have grown. What the likes of M&S and Waitrose do is copied and followed. The power of retail copying is underestimated. Competitive welfare-ism […] In the last twenty years, the market has driven welfare standards much more than the state."*

Nearly a fifth of the UK chicken meat market is now made up of birds from indoor systems operating to standards above industry baseline and most of this is produced to retailers' own standards. This growth in retailer-led standards for chickens has probably contributed to the falling market share for Freedom Food chicken. It is not clear whether chickens raised to the retailers' standards can necessarily be expected to experience equivalent welfare benefits to those reared to RSPCA standards under the Freedom Food scheme because, in many cases, some key points of difference remain in important areas affecting bird welfare.

Retailer standards vary in their requirements but are more likely to address aspects of welfare that are easier to communicate and are of greater concern to consumers. This may lead to other important aspects being neglected. For example, retailers are more likely to implement standards relating to the provision of additional space and environmental enrichment than those that address the problem of fast growth rate of birds. Many consumers are not aware of the serious welfare issues associated with genetics so there is less incentive for retailers to address these.

Research by IGD found that four in ten (40%) chicken buyers say they would be prepared to pay a little bit extra to ensure chickens have enough space to display natural behaviour but fewer than half this number (17%) would be prepared to pay a little bit extra for a slower-growing breed that is less prone to illness and defects.[161]

One expert interviewee highlighted this point about the selective nature of what some assurance schemes communicate to the public:

> *"Penetration of assurance schemes goes way beyond the farm – that shows the strength of assurance schemes, but much of that is hidden from the public. If you go onto retailer Corporate Responsibility websites, they will list assurance schemes focused on certain aspects, but not on others. People or consumers aren't asking for certain aspects of animal welfare, in part because they don't know about them."*

Another concern is the lack of transparency on auditing procedures and the exact requirements of the retailer standards because they are often not available for public scrutiny in the same way as those of the independent farm assurance schemes usually are.

In some cases, retailers may apply higher standards to fresh livestock products compared with frozen and processed products. Retailers also vary in the extent to which they require the same standards for imported products as for those sourced in the UK.

FAWC reached the following conclusions regarding retailer-led standards:[162]

> *"Although competitive standard setting [by retailers] has undoubtedly led to some important improvements in animal welfare, we are concerned that standards are sometimes being increased with little evidence of genuine additional whole life welfare gain. Moreover, in doing so, the differential and multiple regulatory burdens on producers, transporters and abattoirs are being increased. Additionally, the multiplication of varied standards across different retailers is confusing for consumers, particularly when detailed comparative information on these standards is not readily available. Informed consumer demand is thereby inhibited from becoming a powerful and direct driver of animal welfare improvement."*

Whilst there is a growing trend for some retailers to apply their own welfare standards for their animal product ranges, some retailers have maintained a commitment to independently certified products. For example, all fresh meat at Aldi is Red Tractor assured. Sainsbury's is the largest retailer of Freedom Food products reared to RSPCA standards, accounting for more than 60% of all UK Freedom Food sales, and has committed to sourcing all own-brand meat, poultry, eggs, game and dairy products from suppliers who adhere to independent higher welfare standards by 2020.[163]

1.3.5 Food service and food manufacturers

Companies in other sectors of the food industry also have the potential to exert substantial influence on the welfare of animals in their supply chains. A significant proportion of animal products are consumed via further processed foods and meals eaten outside the home. For example, retail purchases of shell eggs account for around half (51%) of the UK egg market, with a quarter (25%) being used in the food service sector and around a fifth (21%) being used in food manufacturing.[164]

Around 30% of UK average expenditure on food and drink is spent on eating out, although the proportion of calories obtained from eating out is, on average, only around 10% of total calorie intake.[165]

In general, companies in the food service sector show lower levels of engagement in driving improvements in animal welfare standards compared with the retail and manufacturing sectors; within the food service sector, companies that have a strong high street presence and trade under the corporate brand name are generally more likely to be engaged on animal welfare than those that have less proximity to the public and/or trade under multiple service brands.[166] A growing number of food service companies, particularly in the former category, have taken the decision to use exclusively non-cage eggs across their UK operations, including J D Wetherspoon, McDonald's, Burger King, Pret A Manger, Subway and Little Chef. Some have also made substantial commitments in other areas. For example, McDonald's announced in 2013 that it would use exclusively Freedom Food-approved pork across its entire UK menu.

The timeline on page 34 summarises some of the key developments in farm assurance standards and food company policies affecting farm animal welfare over the past twenty years.

1.3.6 Welfare outcomes assessment

Several major farm assurance schemes and retailers are introducing monitoring of welfare outcomes to help assess compliance with their standards. This is a very positive development, which could provide a powerful tool to benchmark current levels of welfare indicators and drive improvements.

AssureWel is a five-year (2010-2015) collaborative project, led by the RSPCA, Soil Association and University of Bristol, to develop a practical system of welfare outcomes assessment that can be used by farm assurance schemes. It also has collaborative links with several industry bodies, including Red Tractor, Quality Meat Scotland and UK organic certifying bodies.

The project aims to fully integrate welfare outcomes assessment for the main species into the RSPCA's Freedom Food and Soil Association schemes over a five year period. This has been achieved for laying hens and dairy cattle and is now being rolled out into pigs. Meat chicken, beef and sheep measures and protocols are currently being developed, with implementation planned for 2015. Producers can access feedback to help monitor and improve welfare on their farm. Welfare outcomes data can also be used by the schemes to inform standards development and continuous improvement.

Red Tractor has also recently introduced welfare outcomes assessment for pigs and dairy cattle.

FAWC concludes:[167]

> ***"Overall, we believe that farm assurance schemes have helped to deliver improved animal welfare, and the advent of welfare outcome assessments will help to continue this progress."***

1.3.7 UK FARM ASSURANCE STANDARDS & MARKET DEVELOPMENT TIMELINE

1993	Council Regulation (EEC) No. 2092/91 on organic production of agricultural products applies from 1st January, making organic food and farming subject to legal definition and control for the first time in the world
1994	Introduction of veterinary health planning in RSPCA welfare standards and adoption by Freedom Food
1997	Marks & Spencer ends sale of cage shell eggs
1998	Castration prohibited for Freedom Food pigs
1999	Marks & Spencer ends use of cage egg ingredient
2000	Council Regulation (EC) No. 1804/1999 applies from 24th August, defining common rules for organic livestock husbandry for the first time
2001	Waitrose ends sale of cage shell eggs
2004	Introduction of locomotion scoring and body condition scoring for Freedom Food dairy cows
2005	Freedom Food sows must be free to turn around from five days after farrowing
2006	Natural light required for Freedom Food ducks; Average genetic growth rate potential of Freedom Food chickens limited to 45g per day • Tesco launches 'Willow Farm' chicken in June • Waitrose launches equivalent standard plus line in September[168]
2007	Beak trimming prohibited for indoor-reared Freedom Food turkeys • Foot pad dermatitis must be monitored and recorded for Freedom Food turkeys • Marks & Spencer launches 'Oakham' chicken in May • The Co-operative launches 'Elmwood' chicken in October[169]
2008	The Co-operative ends sale of cage shell eggs • Waitrose ends use of cage egg ingredient in own brand products • Foot pad dermatitis must be monitored and recorded for Freedom Food meat chickens
2009	Council Regulation (EC) No. 834/2007 and Commission Regulation (EC) No. 889/2008 apply from 1st January, overhauling the legal framework and implementing rules for organic farming • Sainsbury's ends sale of cage shell eggs[170] • The Co-operative launches 'Elmwood' turkey at Easter[171] • Foot pad dermatitis must be monitored and recorded for Freedom Food ducks
2010	Commission Regulation (EC) No. 710/2009 applies from 1st July, laying down detailed rules for organic aquaculture • Natural light required for Freedom Food chickens • Environmental enrichment required in housing for Red Tractor free-range chickens • AssureWel project launched by RSPCA, Soil Association and Bristol University to develop a practical system of welfare outcome assessment for use by farm assurance schemes • The Co-operative ends use of cage egg ingredient in own brand products[172] • Live export of calves from Freedom Food farms prohibited and RSPCA standards will end the killing of male dairy calves on farm by 2016
2011	End of derogation in EU organic regulations that allowed pigs and sheep to be housed during the final fattening phase • Twice-yearly locomotion scoring required for Freedom Food dairy cows • The Co-operative launches 'Elmwood' pork in April[173] • CCTV required in slaughterhouses for all Freedom Food animals and all Co-operative primary own brand suppliers • The Co-operative Dairy Group created in August to provide a dedicated supply chain for milk[174] • The Co-operative database of animal welfare indicators extended to include 'Elmwood' turkey and pig farms and Co-operative Dairy Group farms • Introduction of welfare outcomes assessment on Freedom Food and Soil Association laying hen farms
2012	Natural light required for Freedom Food turkeys • End of derogation in EU organic regulations that allowed piglets to be castrated without anaesthesia/analgesia (castration of pigs was already prohibited by most UK organic schemes) • Sainsbury's ends use of cage egg ingredient in own brand products[175]
2013	Introduction of welfare outcomes assessment on Freedom Food and Soil Association dairy farms • Environmental enrichment required for Red Tractor turkeys • Introduction of welfare outcome assessments for Red Tractor pigs and dairy cows • McDonald's (UK) pork to be sourced exclusively from Freedom Food approved farms
2014	Close confinement at any time during farrowing prohibited for Freedom Food sows • Introduction of welfare outcomes assessment on Freedom Food and Soil Association pig farms

1.4 Conclusions from 'looking back'

There have been some significant changes over the past twenty years in the numbers of animals farmed and the structure of the industry, with declines in the red meat sector, growth in the aquaculture and chicken meat sectors and consolidation across all sectors.

Health and welfare problems associated with breeding for increased growth rate or yield do not appear to have improved, and in some cases have got substantially worse, over the past twenty years. The incidence of some of these problems has reached unacceptable levels.

There has been some significant progress in moving away from the most intensive confinement systems, such as sow stalls and conventional battery cages, over the past twenty years, through changes to legislation. Animal welfare scientists and welfare NGOs have been instrumental in driving these changes.

There has been an increase in the proportion of animals reared in systems with higher welfare potential, including outdoor and enriched indoor systems. There have also been improvements in husbandry conditions for many farmed fish. Farm assurance schemes, retailers, legislation, celebrity chefs, consumers and farmers have all played a role in driving these developments.

These changes in farming systems mean that a substantially larger proportion of animals now have the benefit of a more spacious, complex and stimulating environment than was the case twenty years ago.

In recent years, the focus has shifted somewhat away from farming systems and input standards towards also measuring and seeking to improve welfare outcomes for the animals.

Consumer concern for farm animal welfare, and the influence of this on purchasing decisions, appears to have increased, particularly in the past five to ten years, although it is not clear to what extent this reflects a genuine increase in concern or simply a wider availability of products marketed as offering higher welfare standards.

Farm assurance schemes have grown to cover the large majority of animals in most sectors and have taken on a degree of responsibility for farm animal welfare. Farms that are members of a farm assurance or organic certification scheme are more likely to be compliant with legislation on animal welfare.

Since it was introduced in 1994, the RSPCA's Freedom Food scheme has played an important role in providing higher standards for a significant proportion of animals in several sectors, particularly farmed salmon, laying hens and pigs. The RSPCA standards have also influenced other assurance standards, codes and legislation, both in the UK and abroad, and have thus made a positive contribution to the welfare of farm animals beyond the direct impact on those animals reared under the Freedom Food scheme.

Organic schemes provide higher standards for a minority of animals across all sectors, as well as offering other benefits such as avoidance of non-therapeutic antibiotic use and a range of environmental and biodiversity benefits.

Some retailers are taking an increasingly proactive role in setting welfare standards above baseline industry level for some or all of their livestock product ranges, which has undoubtedly played a role in raising standards for animals in their supply chains. However, there are concerns regarding the transparency and scope of some retailer standards.

A growing number of companies in the food service and food manufacturing sectors are becoming engaged in developing policies on farm animal welfare, although welfare remains low on the agenda of many companies, particularly for those with limited direct contact with consumers.

Overall, we consider that farm assurance schemes and food company standards are helping to deliver improved animal welfare for many farm animals across several sectors.

We should not be complacent though, as there is still much to be done. Even as many assurance schemes and retailers are driving standards upwards, the genetics of the animal are often pushing in the opposite direction so that even better standards, management and nutrition are needed to achieve an equivalent level of welfare. Hence in some ways, we are working hard just to stand still.

Indeed, despite advances in standards for a significant proportion of animals, the available evidence suggests that some key welfare outcomes (particularly relating to health and welfare problems that are exacerbated by breeding for increased growth rate or yield) have not improved over the past twenty years – hence why monitoring and working to improve welfare outcomes is so vitally important.

Many of the challenges facing UK farming – and farm animal welfare – in the last twenty years remain. It is vital to build on progress made in the last twenty years in order to secure positive welfare outcomes in the next two decades.

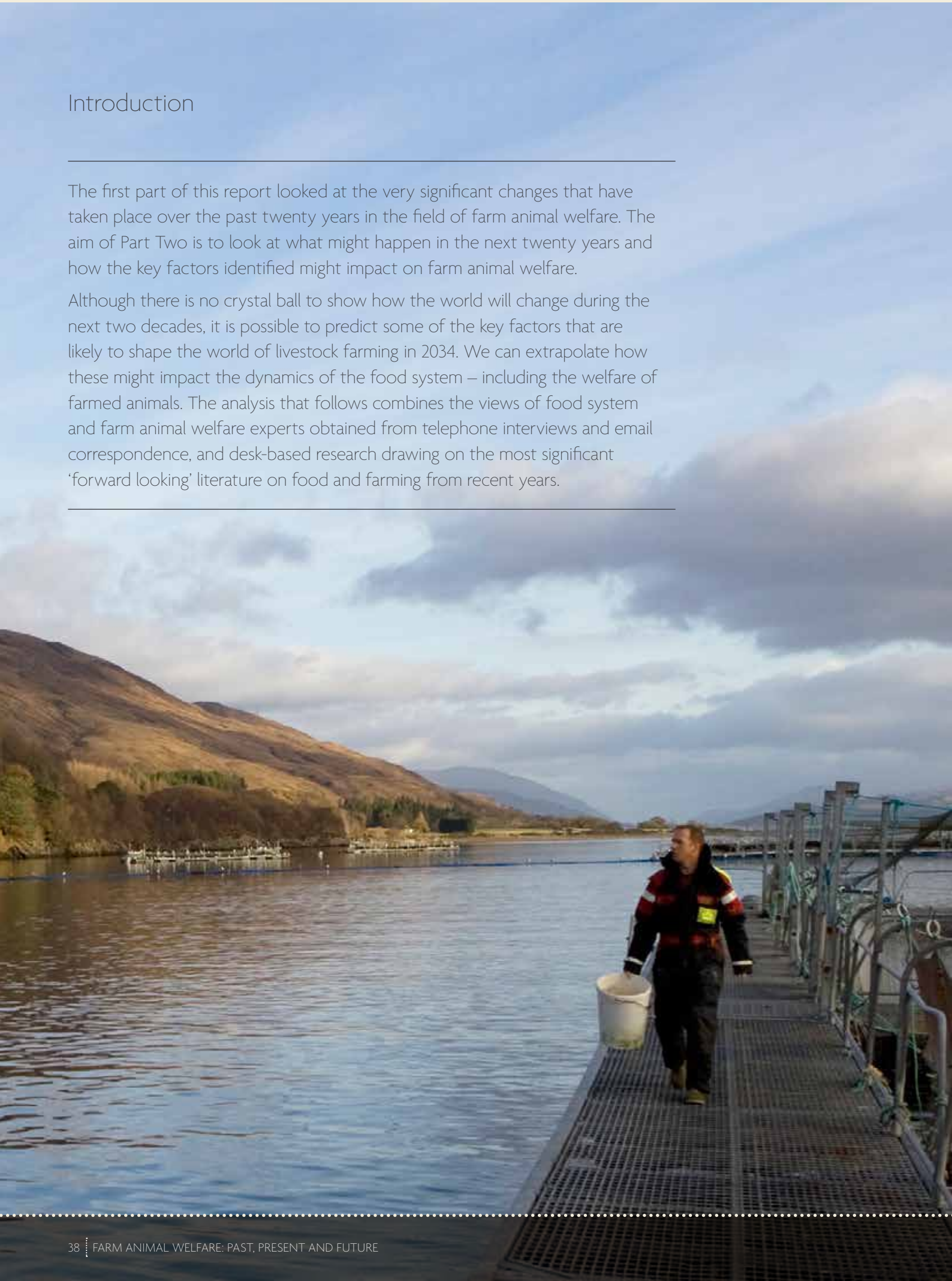
PART TWO

LOOKING FORWARD OVER THE NEXT 20 YEARS

Introduction

The first part of this report looked at the very significant changes that have taken place over the past twenty years in the field of farm animal welfare. The aim of Part Two is to look at what might happen in the next twenty years and how the key factors identified might impact on farm animal welfare.

Although there is no crystal ball to show how the world will change during the next two decades, it is possible to predict some of the key factors that are likely to shape the world of livestock farming in 2034. We can extrapolate how these might impact the dynamics of the food system – including the welfare of farmed animals. The analysis that follows combines the views of food system and farm animal welfare experts obtained from telephone interviews and email correspondence, and desk-based research drawing on the most significant 'forward looking' literature on food and farming from recent years.



2.1 Farm animal welfare 2034 – towards a good life?

The expert interviewees were asked for their vision of farm animal welfare in 2034. It was challenging to draw out concise answers to this question because the discussions were inevitably framed by broader perspectives on farming systems. In the interviews, visions for the future of livestock production invariably prompted discussions about the drivers and challenges that will actually influence the way animals are farmed over the coming years. In considering these broader questions there was a wide range of opinions among our panel of interviewees. How farming and the food system might change and the implications of that – both good and bad – for farm animal welfare are explored in subsequent sections.

Nevertheless, the common theme that emerged from many of the responses across all sectors was the sentiment that farm animals should have the opportunity to live a 'good life', alluding to the FAWC proposal set out in 2009 that the quality of an animal's life could be classified as: "a life not worth living, a life worth living or a good life."[176] FAWC proposed that each farm animal should have a life worth living to the animal itself, and that compliance with legislation should ensure this minimum quality of life. It also proposed that a growing number of farm animals should be able to experience a good life: one that is of significantly higher quality than a life worth living.[177]

For many years animal welfare in the United Kingdom has been guided by 'The Five Freedoms' developed by FAWC:[178]

- Freedom from hunger and thirst, by ready access to water and a diet to maintain health and vigour;
- Freedom from discomfort, by providing an appropriate environment;
- Freedom from pain, injury and disease, by prevention or rapid diagnosis and treatment;
- Freedom to express normal behaviour, by providing sufficient space, proper facilities and appropriate company of the animal's own kind;
- Freedom from fear and distress, by ensuring conditions and treatment that avoid mental suffering.

One widely held criticism of the Five Freedoms was the focus on negative aspects of animal welfare. The concept of providing animals with lives worth living and with increasingly good lives builds on the basis of the Five Freedoms. It enhances the welfare vision to emphasise the role of positive experiences in those animals' lives, rather than concentrating more narrowly on the meeting of basic needs and the prevention of unnecessary suffering.

FAWC proposed that for a 'life worth living' an animal would have on balance more positive experiences than negative. Several interviewees had a vision for 2034 where all farm animals in the UK are able to experience a good life, where the balance between good and bad experiences lies very definitely in the positive. One respondent noted that having got to a situation where we're able to avoid these 'negatives', we now really need to work on the 'positives', enabling animals to live meaningful lives rather than being seen as units of production "even if that unit of production is kept in a way which is acceptable in terms of it not being in distress or under constant, unacceptable stress".

The provision of a good life for animals is dependent on high levels of husbandry. One respondent drew on the connection between farm animal welfare and human welfare, emphasising the need to make sure that people have "*meaningful jobs around animals, which have variety [and] which pull on a wide skill set, so they maintain motivation to consistently provide the care that animals need in any farming system*."

More generally, our interview respondents recognised variously the role and responsibility of farmers, the food industry, governments and consumers in achieving high levels of farm animal welfare. So in summary, **a shared vision for farm animal welfare in 2034 could be described as a situation where farm animals have the opportunity to experience a good life, and farmers, the food industry, governments and consumers share the responsibility and are motivated to ensure that this happens**.

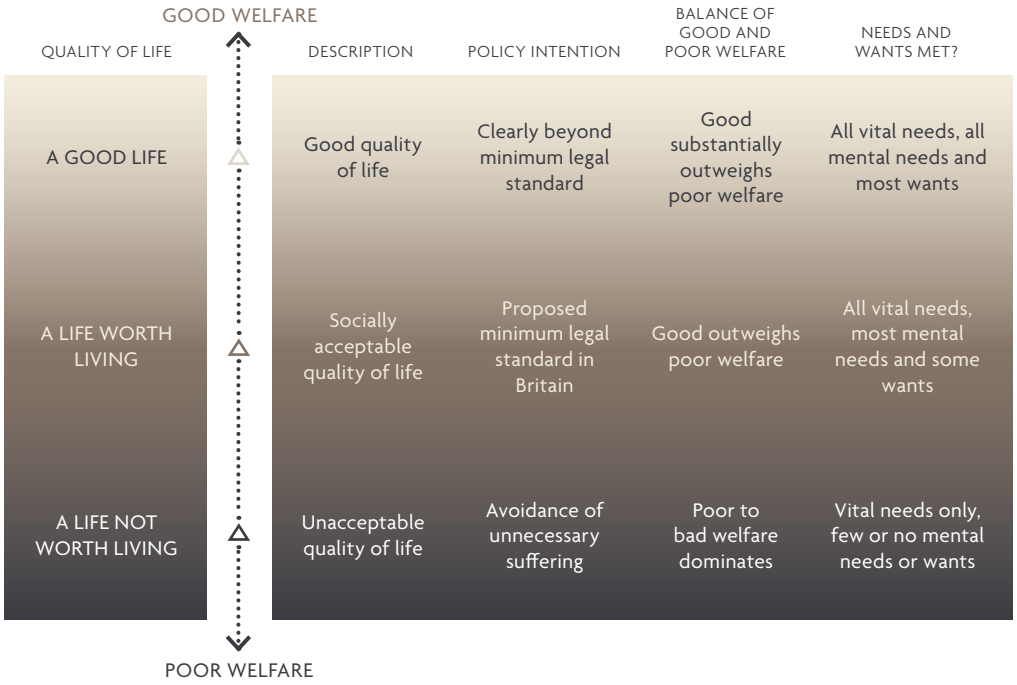


Figure 2.1.1.
The concept of quality of a life for a farm animal
An animal's welfare is assessed regularly and an overall judgement can then be made about the quality of its life. The triangular symbols indicate the approximate positions on a welfare scale that correspond with the different classifications. As new knowledge becomes available or moral positions alter, the 'sliders' may move along the welfare scale. Source: Farm Animal Welfare Council.[179] Crown Copyright.

2.1.1 Farm animal welfare challenges – now and into the next 20 years

We approached a number of animal welfare experts to ask their views on the key farm animal welfare challenges facing the farming sector over the next twenty years. While many concerns are unique to the circumstances of particular species and production systems, a number of challenges were raised that were common to the majority of farm animals. **Of particular concern for respondents was genetic selection and the impact of breeding for growth rate and yield on the quality of life for animals raised for these properties**. With environmental concerns driving production efficiency efforts to reduce the amount of greenhouse gas emissions, there is a risk to welfare as farm animals are placed under increasing pressure to be ever more efficient providers of food.

Other challenges to address over the coming years that are common across several species include mutilations, transport and slaughter practices, enrichment and housing conditions, and disease and parasites.

Genetic selection

Genetic selection for maximising yield or growth rate was an issue that many interviewees raised across most species, with various concerns about the welfare impact in a number of species (see Section 1.1.3).

In response to this challenge, breeding animals to improve robustness and health attributes was advocated by some of our interviewees as an important mechanism for addressing the issue. According to one expert, progress has been made in the dairy sector in changing the breeding index to incorporate more health and welfare traits, and so improvements should be seen over time. This progress, however, has not been seen in the poultry sector. With regards to laying hens, one academic expert suggested that animal welfare NGOs from many countries needed to work together to start a dialogue with global breeding companies with the aim of improving bird genetics to produce more robust, healthier birds with stronger skeletons and better immune function.

Some respondents advocated the use of economic mechanisms to incentivise welfare-friendly actions. For example in the dairy sector, this might result in payment mechanisms based on health or welfare improvements, something that already happens in the form of somatic cell counts in milk. Within the laying hen sector, one expert noted the detrimental impact of keel fractures on egg production, with uninjured birds eating less feed and producing heavier eggs, which already provides an economic incentive to solve the problem.[180] Another expert argued that standards could incorporate penalties for injuries caused by rough handling of birds, to incentivise better handling techniques.

The issue of feeding restrictions on breeding birds in the meat poultry sector (to reduce mortality and health problems associated with excessive weight gain) is an area that one of our respondents argued requires genetic selection for slower growth and more research to increase understanding of the levels of feed restriction the birds face and how this is experienced by them. This would enable the development of strategies to – at least – reduce the level of feed restriction required without compromising bird welfare.

Significant barriers are foreseen in addressing the issues raised by genetic selection for growth and efficiency traits, including pressure to deliver high volumes of meat at low cost while minimising environmental impact; a 'light-touch' political regime; and corporate concentration in breeding and genetics businesses. These factors are addressed in more detail in other sections of this report.

Mutilations

For several species, mutilations that are common practice in certain farming systems were a cause of concern to many of the expert interviewees and remain a challenge for the future.

Tail docking and tooth clipping in pigs were raised as concerns. These practices are often carried out with the aim of reducing tail biting and injuries to sows' teats and other pigs, the risk of which is increased by poor environments that lack enrichment for animals to exhibit foraging/rooting behaviours and management systems that restrict sow movement during farrowing. There is a growing recognition in the industry of the need to tackle this issue. As such, it has been identified as a key area for which solutions should be sought by the national 20:20 Pig Health and Welfare Strategy,[181] and as a priority issue by the Pig Health and Welfare Council welfare sub-group. An EU project called FareWellDock has also been initiated with the aim of facilitating progress on the issue of tail docking.

One animal welfare expert argued that the mutilations should be abolished, and better functional environmental enrichment provided for pigs to eliminate the need for such practices, a solution that could be provided by market mechanisms through assurance scheme standards or via government legislation.

Many pig producers on organic and Freedom Food farms are managing without docking, indicating that it is possible to operate without taking these measures. One welfare expert said that outcomes assessment projects will provide better information on the issue, recording incidences of tail biting in docked and undocked animals, as well as environmental data. This will enable correlations to be made between biting and environmental factors, and provide producers with information to compare themselves against others. Where biting levels are low, it may provide reassurance to producers that they do not need to dock tails.

Further information on reducing risk factors may also be gleaned. EFSA proposes a simple tool-box for on-farm use, including both resource/management-based and animal-based measures, to assess the functionality of the supplied manipulable materials and the presence of known risk factors for tail biting.[182]

Tail docking carried out on lambs to prevent flystrike (where flies lay eggs on the animal and the larvae can eat into the flesh) raised concerns amongst respondents and some felt that tail docking without anaesthetic should be prohibited. FAWC's guidance on tail docking in lambs is that greater effort should be directed at controlling flystrike by mechanisms other than tail docking. As well as breeding for reduced susceptibility to flystrike, which was also mentioned by our respondents, other solutions raised by FAWC included more effective control of scouring, shearing around the tail area, and seeking to control the fly populations themselves, for example by using pheromone traps.[183]

For laying hens, beak trimming (which is carried out on around 95% of birds to reduce damage from feather pecking and cannibalism) was raised as a significant concern, and is also an issue in turkey production. With long-delayed legislation to ban this practice for laying hens now anticipated to be implemented in the UK in 2016, there does seem to be the political will to abolish this practice, although a planned review of the latest research and information on this issue is due in 2015, with the decision on whether to impose a ban dependent upon the outcome. Interviewees also recommended additional solutions, including genetic selection for less injurious behaviour, improvements in measurement of feather loss and the development of improved management systems to reduce incidences of pecking and the need for beaks to be trimmed. The further development of welfare outcome assessment of several on-farm measures, including feather cover, is now being implemented on most non-cage laying hen farms through the Freedom Food and Soil Association schemes. This should contribute positively to improvements in a number of areas.

Other mutilation challenges raised for the coming years included the disbudding (removal of horn buds) without anaesthetic in calves reared for beef and dairy production, and the castration without anaesthetic of beef calves and sheep. Interviewees suggested addressing these practices via legal prohibition on undertaking them without anaesthetic. The licensing of immunocastration to provide an alternative to physical castration was also suggested, indicating the possible future role of more sophisticated biological approaches in providing alternatives to 'traditional' practices.

Transportation and slaughter

Transportation was raised as an issue of concern, particularly in relation to poultry and sheep. In poultry, welfare concerns were raised by one animal welfare expert around the catching, transport, pre-slaughter handling and slaughtering processes.

The interviewee felt that more research was needed to better understand issues such as temperature and moisture control and ventilation – though the necessary technological changes to vehicles might require significant investment.

With regards to slaughter, the use of appropriate mixes of gases was suggested as providing humane ways to kill poultry. Current regulations offer the option to use types and concentrations of gases that allow the cheapest method of slaughter rather than the most humane. **The development of new slaughter systems, rigorously tested to ensure that the gas mixtures used are as humane as possible, would be a big step forward**.

Transportation was also seen as a concern for laying hens at the end of their productive lives. The low value of hens at end of lay means that they are often subject to long journeys, the welfare impact of which can be exacerbated by the presence of brittle bones, bone breakages and poor feather cover. Potential solutions to this challenge may come from the development of markets for end-of-lay meat which would encourage more abattoirs to accept these hens, as well as the development of on-farm methods of slaughter which would remove the need for transportation altogether, for example using mobile slaughter units.

Transportation was also seen as an issue for sheep, with multiple journeys transporting animals between farms and via markets, and particular welfare concerns about the transport of low value animals. Suggestions for improvement include legislation to improve transport conditions and reduce transportation times, and better cooperation within the industry to reduce journey duration and frequency.

Housing and enrichment

Enrichment and stocking density were raised as issues for meat chickens, with more space, natural light and enrichment such as perches and straw bales recommended for improving intensive systems to promote activity and natural behaviour. For laying hens, there was some concern from respondents over the potential for furnished cages to enable birds to exhibit their natural behaviours. While one welfare expert called for all cages to be banned, others were more circumspect given recent investment in furnished cages, and because certain health indicators such as bone fractures are often lower in furnished cages. One expert predicted that outcome measures would improve understanding of positive behavioural states and provide potential mechanisms and incentives for improvement.

Housing systems were also raised as a concern in relation to beef cattle reared intensively at high density for slaughter at 20 months or less, using slatted floors or feedlots. Welfare concerns relating to these systems include behavioural restriction, discomfort and digestive disorders. Several respondents argued for legislation or a code to ban fully-slatted systems and require bedding. One expert pointed to the demonstrably improved welfare associated with organic and other schemes which guarantee grass finishing or at least one summer at grass, and also advocated the further promotion of Freedom Food or similar schemes to encourage pink veal production in the UK.

Lameness, disease and parasites

Disease and parasites were raised as significant welfare challenges for many species. In cattle the particular focus was on respiratory diseases, bovine viral diarrhoea (BVD), liver fluke/internal parasites and emerging diseases like Blue Tongue and Schmallenberg. In sheep, internal parasites and sheep scab were raised as issues, along with inadequate treatment of lameness caused by diseases like foot rot.

Different solutions were proposed by experts depending on the risk posed by the disease, including improved testing mechanisms for BVD and liver fluke in cattle, and stronger enforced legislation to combat some endemic diseases such as sheep scab. **Several experts called for more strategic approaches to animal health at farm level**, including farm-specific health and welfare plans that incorporate strategic approaches to farm health planning and identify key risk areas and challenges. One expert argued that "*we do not necessarily require any major technological advances to address problems, more an enhanced and economically credible relationship developed between sheep farmers and their veterinary advisers.*"

For lameness, early and correct treatment was advised as having a big impact in reducing the severity of the disease and its spread among the flock, while breeding for reduced levels of lameness may also be beneficial. The Sheep Health and Welfare Group (SHAWG) may have a role in driving initiatives to reduce lameness.

Disease and parasites in farmed salmon were also noted, particularly in relation to the difficulties in controlling sea lice and amoebic gill disease. To control these diseases, several respondents cited the importance of having more research on lice control methods and chemicals, and pointed out that with the Freedom Food scheme set to cover the whole industry, improvements should be possible.

Other issues

A welfare issue of significant concern relating to pigs is the use of farrowing crates in indoor systems, in which sows are kept from around a week before giving birth until their piglets are weaned. The crates are a concern for welfare because they significantly restrict the sow's movement. **Finding solutions to freedom at farrowing has been identified as a key issue for progression in the national Pig Health and Welfare 20:20 Strategy** and therefore acknowledged as an issue by the industry. Given the recent (albeit partial) sow stall ban across the rest of Europe, the welfare differences that did exist between the UK and the rest of Europe are slowly being eroded, with some other EU member states setting stricter unilateral rules than EU or UK law in certain areas. Whilst a move away from farrowing crates could provide the UK industry with an opportunity for differentiation, major barriers exist in the capital cost to install different systems, and producers are yet to be convinced that the latest specifically designed systems will deliver comparable piglet mortality rates when operated commercially.

Mortality in lambs was identified as a significant issue by one animal welfare expert who argued that breeding and management improvements could significantly reduce mortality rates. Some producers do have low mortality rates, indicating that improved results are possible. It was suggested that one development that might help would be adding a requirement to farm assurance schemes to record and reduce lamb mortality.

FAWC identifies inadequate legal protection as an issue of concern for farmed fish.[185] Fish that are under the control of humans are included in the Animal Welfare Act 2006, which provides legal protection against unnecessary suffering and places a duty of care on the person responsible for the fish to ensure their needs are met. However, farmed fish are excluded from the Welfare of Farmed Animals (England) Regulations 2007 (and similar legislation in Scotland and Wales) and therefore do not currently have the more detailed legal protection afforded to most terrestrial farm animals.

FAWC also calls for increased emphasis on the welfare of individual fish, as well as groups, and suggests that this may require adoption of techniques currently used experimentally such as tagging (already used for some broodstock), telemetry of sentinel individuals and computerised video analysis, combined with provision of appropriate conditions for particular individuals, such as small or sick fish.[186]

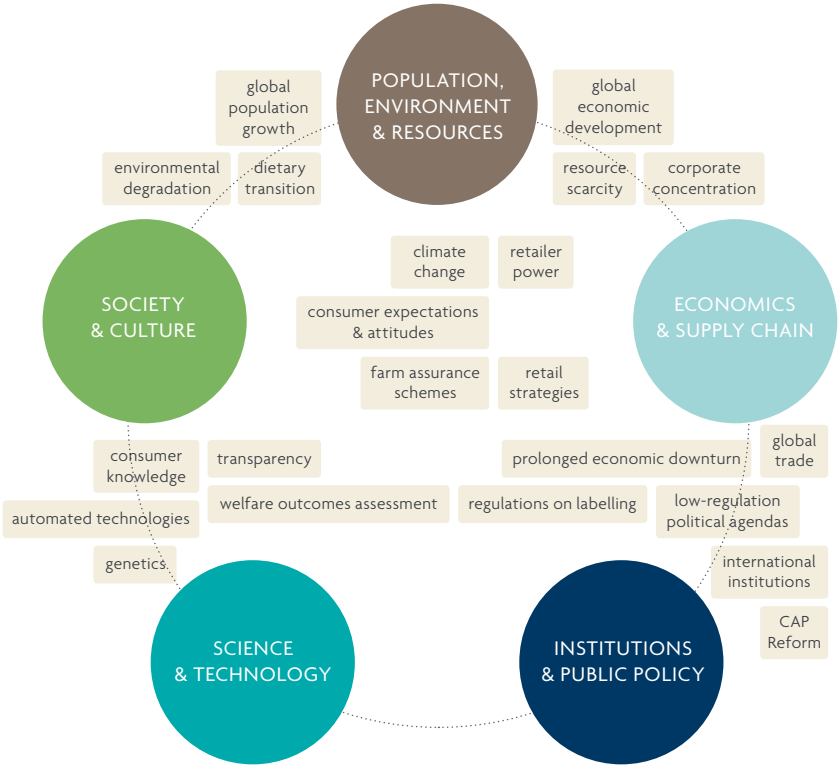
General observations

Providing a more general response to the issues outlined in this section, one welfare expert called for a better balance of economic, environmental and ethical concerns, which were all seen as essential components of sustainability. One academic respondent called for better co-ordination of the various levers available to influence standards, including government, farm assurance standards and monitoring, and industry knowledge transfer programmes to deliver improvements to welfare.

The incorporation of outcome measures into welfare assessment was also mentioned as part of the solution to these challenges by several respondents, enabling better assessment of welfare levels, informing compliance decisions with assurance schemes and providing opportunities for performance management-based economic incentives. Outcome measures are increasingly being used by assurance schemes and retailers for some terrestrial species, particularly pigs, dairy cattle, meat chickens and laying hens (Section 1.3.6). Work is underway to develop welfare outcome measures for other species, such as turkeys, sheep and goats.[187] The need for welfare monitoring and documentation systems was also identified as one of the top priorities in a review of current and future priorities for farmed fish welfare in the UK.[188] RSPCA standards for farmed fish include some welfare outcome measures, although further development is necessary to formalise the protocol.

2.2 Key factors impacting farming & animal welfare in the next 20 years

Figure 2.2.1
Key factors affecting farm animal welfare
Identified by our expert interviewees and desk research, clustered by theme. These themes will be explored in depth in the following sections.



2.2.1 Environment, population and resources

In 2009, John Beddington, then the Chief Scientific Advisor to the UK Government, described as a "perfect storm" the combination of environmental challenges, population growth and increasing demand for food, energy, water and land that will face the world over the coming years, leading to a 21st century Malthusian threat to the world's food supply.[189] This section looks at the components of the so-called 'perfect storm' and their potential impacts on the food system and farm animal welfare.

Key drivers

(i) Population demographics

In 2013 the world's human population reached 7.2 billion people. By 2034, taking the United Nation's medium projection, which assumes that globally fertility rates continue to follow a downwards trend, the population will still exceed 8.6 billion. **That will be an increase of nearly 1.4 billion people or an additional one person for every five currently on the planet**,[190] with the vast majority of the growth happening in developing regions.[191]

(ii) Economics and resources

The projected growth in population of 20% over the coming twenty years provides a great challenge for how we use the planet's limited resources. As food production is highly dependent on land, energy and water, it is impacted both by increased demand for food directly and also – as resources are constrained – by other demands on the use of land, energy and water with which it may be in competition.

Accompanying population growth, further demand on resources comes from economic growth. An Organisation for Economic Development (OECD) working paper predicts that the world economy could grow by 3% each year over the next fifty years.[192] By 2034 that implies a global economy 80% larger than it is today. Economic growth will not be even, with developing countries growing at a faster rate. China's and India's economies combined will be bigger than the total of the G7 economies (United States, Canada, France, Germany, Italy, Japan and the UK).

The combined population and economic growth effects will create a massive demand on basic resources with most of the growth in demand coming from developing countries. Energy demand is set to increase by 37% in the next 20 years, predominantly driven by growth in developing countries.[193]

As demand for food increases, so will demand from the agricultural sector for land, energy and water resources. Globally, little new agricultural land has been brought into production over recent decades and the total available stands at around five billion hectares. There is no consensus about how much more land could be brought into production, with the picture complicated by competing uses for land from urbanisation, forestry, amenity and conservation; the potential impact on climate change of deforestation; and the losses of existing agricultural land due to salinization (increasing salt content in the soils), soil degradation and desertification. **While meat consumption forms only 15% of the global human diet, 80% of existing agricultural land is allocated to animal grazing and feed crop and fodder production**.[194]

The impact on the food system is exacerbated by changes in food consumption habits as populations with increasing incomes alter their dietary habits. As populations become wealthier, they tend to increase consumption of fats, sugars and animal food products at the expense of cereals and fibre. This phenomenon has been described as the 'nutrition transition'.[195] In a resource-constrained environment, these shifts in diets are significant because, as seen above, animal food products, and in particular meat, generally use more resources than the cereal-based diets that were previously consumed. Other developing countries are not transitioning at the same high pace as has happened in China and Brazil. Nevertheless, demand for meat and fish, and therefore land and water-based livestock production, is set to increase significantly over the next 20 years across all meat and fish types, albeit at a slowing rate for land animals.[196]

One area of protein production set to increase rapidly over the coming years is aquaculture (Fig. 2.2.2). Across Europe the output of fish from aquaculture has been constant since the millennium, constituting about 20% of fish production. However, global aquaculture production is increasing at 7% each year and the European Commission intends to boost aquaculture as part of broader Common Fisheries Policy Reforms that seek to manage the precarious position of many of Europe's catch fisheries.[197, 198] The World Bank predicts that global capture fisheries output will remain broadly steady to 2030, whilst aquaculture production will expand to supply half of total fisheries production, and 60% of the fish destined for direct human consumption, by 2030.[199]

As many species of farmed fish are carnivorous, the increase in aquaculture production has a knock-on impact in increasing demand for fishmeal and fish oil for feed from catch fisheries, with demand set to increase by 70% and 90%, respectively, between 2010 and 2030. However, with significant improvements anticipated in the efficiency of feed and management practices, the World Bank suggests that the projected expansion of aquaculture will be achieved with only an 8% increase in the global fishmeal supply over that time period.[200] Shifting consumption towards species that are lower on the food chain (e.g. filter-feeders) could reduce pressure on wild fish resources.[201]

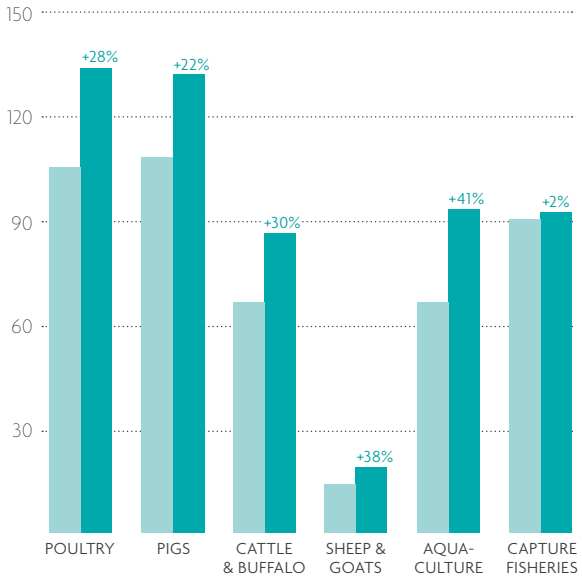


Figure 2.2.2
Meat and fish production (million tonnes) 2012 and 2030
Sources: 2012 meat data from FAOstat;[202] 2012 fish data from FAO Fishstat;[203] 2030 meat data calculated based on projections in FAO outlook report on world agriculture towards 2030/2050;[204] 2030 fish data taken from projections in World Bank report on prospects for fish to 2030.[205]

(iii) Climate Change

In 2013, the fifth assessment of the Intergovernmental Panel on Climate Change (IPCC) concluded that the evidence for climate warming was 'unequivocal', with human beings extremely likely to have been the dominant cause. Based on current GHG emissions trends, warming will continue, is likely to exceed two degrees and could exceed four degrees Celsius by the end of the century.[206]

Agriculture faces the challenge of adapting to the effects of climate change that are now likely to be unavoidable, and at the same time faces the challenge of reducing its significant contribution to climate-warming gases, especially those relating to nitrous oxide (N_2O) and methane (CH_4) which are far more potent climate change gases than carbon dioxide (CO_2).[207] Agriculture is also indirectly responsible for climate impacts from land use change, estimated to be of a similar scale to all the other agricultural impacts combined.[208] While converting land use to agriculture can have a negative climate impact, agriculture can also contribute positively to climate change mitigation through the carbon sequestration provided by retaining pastures for grazing livestock.[209,210]

(iv) Other environmental impacts

Climate change is not the only environmental concern of significance to the future of livestock farming over the next twenty years. The impact of waste outputs from agricultural systems into the land, water and air have important consequences for the surrounding environment.

Agricultural intensification and changes in agricultural management practices pose a significant threat to biodiversity. For example, species-rich semi-natural grasslands now make up a very small proportion of the grassland in England (approximately 3%);[211] the vast majority of grasslands are sown with a very limited number of species and managed intensively.

Agriculture can, however, have positive impacts on the environment. Extensive beef production, when managed sympathetically with the environment, can have a very positive environmental impact, both in terms of biodiversity and landscape.[212] Sheep grazing is a key management tool for the maintenance of many sensitive habitats in upland and hill areas of the UK.[213]

Impacts on livestock production

There is no doubting the scale of the challenges facing the global food system. The daunting task is to orientate the world's food production systems in such a way as to provide nutritious food for a growing population, making efficient use of increasingly scarce resources. Additionally, that food must be produced using methods which mitigate the food system's contribution to climate change and minimise other forms of environmental degradation, while at the same time adapting to climate change's effects which are now highly likely to occur and which have the potential to massively disrupt production efforts.

(i) Sustainable intensification versus agroecology

The term 'sustainable intensification' (SI) has come into common use as a potential way to meet the competing challenges of increased productivity in food production while decreasing environmental impacts, and represents the dominant paradigm among government and industry for thinking about the future of the food system. SI is a key recommendation of the UK government Foresight Report on the Future of Food and Farming, where it is defined to mean:[214]

> *"simultaneously raising yields, increasing the efficiency with which inputs are used, and reducing the negative environmental effects of food production."*

Although sustainable intensification does not refer necessarily to any particular agricultural system, it is a contested term often associated with favouring more industrialised[v] methods of production as the solution to food system challenges. It has consequently been criticised. Environmental groups associate intensification of production with industrialised farming methods that have increased yields but have also increased rather than reduced negative environmental effects. Animal welfare groups associate intensification of livestock farming with inherently poor animal welfare. From both these perspectives, the term has even been described as oxymoronic, that is, intensification along these lines is contradictory to sustainability.[215]

Agroecology might be described as providing an alternative paradigm for the future of the food system. Also loosely defined, the term implies treating farming as an ecosystem and advocates looking to integrate production methods more sympathetically with natural systems. It is associated with smaller-scale, more extensive production systems with fewer external inputs and farms that produce multiple rather than single outputs.[216]

Although there is not an exact dichotomy between sustainable intensification and agroecology, the responses from our panel of food system and animal welfare experts as to how the food system will develop over the next 20 years broadly reflect the alternative perspectives implied by these terms.

v Industrial systems are defined here as 'intensive systems, typically using high stocking densities, barren environments, highly productive breeds and often, though not necessarily, large-scale'

According to one respondent, sustainable intensification is necessary as it provides the scale that enables farms to be profitable, which in turn enables investment to be made in the right infrastructure and management to provide good standards of animal welfare. The risk of this approach, according to another expert is, however, that the sustainability aspect will be dropped in favour of intensification, and that narrowly defined metrics around carbon footprints and production efficiency will be used as proxies for sustainability. This risks missing important hidden aspects of sustainability in the livestock sector, for example in the impact of imported protein, the benefits provided by pastureland, or biodiversity supported by low-input systems of production.

Alternatively, we might see a move away from intensive methods of livestock production, with one expert arguing that with a growing population and pressure on resources, production methods that are dependent on large amounts of grain feed (and therefore land) will be increasingly unacceptable and undesirable. Therefore livestock production will need to move to more extensive production methods which will enable farm animals to "*add to rather than detract from the global food basket*."

Evidence from our desk research and interviews suggests that efficiency oriented initiatives are likely to continue in mainstream production, including increased production efficiency and improved yields for reduced environmental impact. These will take place alongside other approaches, including ecological approaches to production, managing consumer demand, altering dietary behaviour and reducing the amount of food waste.

(ii) The perfect storm and UK livestock production

At a regional level, the population and economic growth dynamics set to affect the livestock production system are less pronounced. With Western consumption levels already at double the global average and five times that of Africa, it is not surprising that growth in meat consumption in the next 20 years will be driven largely by developing countries.

In the UK, the potential combination of increased demand and constrained supply of food internationally has not so far led the government to alter its approach to domestic food provision. The 2011 Foresight report on the future of food and farming rejected self-sufficiency as a viable option for countries to secure global food security, but emphasised the role of global food system governance to secure fair distribution.[217] With a focus on international markets as the best way to secure adequate food provision domestically, it is unlikely that population or demand pressures internationally will result in a conscious effort by government to increase agricultural production domestically. The Environment, Food and Rural Affairs Committee warns that current levels of food security will not persist unless the Government plans now for future changes in weather patterns and changing global demand for food.[218]

With more favourable economic conditions predicted at home and burgeoning demand overseas, a recent European Commission forecast of livestock markets predicts a supportive environment for European meat production and consumption over the next ten years. Yet production levels are set to decline for beef and sheep meat, with pig meat production in 2023 predicted to be only 2.8% higher than a 2010/12 baseline. Poultry production is set to grow more strongly, increasing annually by 0.8% per year, but this still only results in overall growth of less than 10% over the next ten years.[219] Therefore it seems that **the main growth in livestock production to meet the significant growth in meat demand over the next twenty years is set to occur in developing countries**. Aquaculture in particular is predicted to be the area of greatest growth in terms of production of animal protein in the coming years (See Section 2.2.1), a situation likely to pose its own challenges to the welfare of the fish involved.

A major driver of changes in livestock production is the spectre of climate change and initiatives to curb livestock farming's impact. In line with the requirements set out in the Climate Change Act 2008 and as part of international obligations, the UK Government is committed to adopting policies that will reduce greenhouse gas (GHG) emissions across the economy by at least 80%, from 1990 levels, by 2050. Agriculture will be expected to play its part in this. The Greenhouse Gas Action Plan (GHGAP) is a voluntary commitment adopted by industry to reduce GHG emissions from agriculture by boosting farm efficiency.[220]

Current thinking on how the livestock industries in the UK will seek to achieve GHG emission reductions and address other environmental issues is set out in a number of 'roadmaps' being developed by Defra and industry, of which the Milk Roadmap was the first to be published in 2008, with more recent plans published for pigs and for beef and sheep. The Milk Roadmap has now been expanded into the Dairy Roadmap.

Industry initiatives focused on reducing climate impact look to improve efficiency and reduce environmental impact right across the production process. Common themes include:

- **Improving the productivity of breeding stock** by, for example, increasing the fertility or longevity of breeding animals so that they produce more young in each cycle or over their lifetime.[221,222]
- **Increasing feed conversion efficiency**, i.e. producing a larger amount of meat for a given quantity of feed. In the pig sector the two tonne sow project (2TS) has the target of raising the British average carcase weight of pig meat produced per sow per year to 2000kg in 2014 and 2200kg by 2020.[223] A third of indoor producers have already achieved the 2014 target and the top 10% of outdoor producers are close to meeting it.[224] The Beef and Lamb Roadmap also has targets for increased carcase weights per animal.[225] Feed efficiency can be enhanced through breeding to select more feed-efficient stock, but more immediate gains may be made by improving the quality of the feed ration given, for example by including more clover in the grassland on which cattle and sheep graze, which can improve animal performance but also reduce the need for artificial fertilisers on the grassland.[226]
- **Looking at alternative feed sources** that have less impact on the environment, for example domestically produced peas and legumes to substitute imported soy.[227] The use of co-products from human consumption such as brewer's grain may offer benefits, because the environmental impact is shared between the crops' primary and secondary use.[228] Over 40% of UK pig feed is now made up of co-products and by-products from food and alcohol manufacturing.[229]
- **Managing farm animal waste** in ways that make the best use of farmyard manure and reduce pollution into the local environment.[230]
- **Improving farm management** by promoting high levels of stockmanship, recognising that "improving housing conditions, space and access to feed and water all provide opportunities for increasing daily liveweight gains."[231]

Implications for farm animal welfare

Initiatives to improve the efficiency of animal production by promoting breeds of animals with faster growth or higher yields, and changes in how farm animals are fed and where they are housed, may have significant implications for their welfare. Technological developments may provide an opportunity to enhance welfare, for example with innovative production solutions such as the Dutch 'Rondeel' system for laying hens.[232] Alternatively, if it means making more demands of individual animals for which 'efficient' production has already led to risks of increased prevalence of various health and welfare problems (see Section 1.1.3) then farm animal welfare may be at substantial risk.

On the subject of sustainable intensification, FAWC advises:[233]

> ***"in pursuit of sustainable intensification, production should not be promoted at any cost. The concept of sustainability must include the welfare of farm animals. Indeed, livestock agriculture cannot be considered sustainable if an animal's life is not worth living."***

A drive for more efficient production may pose specific risks for particular species. The focus on increasing feed conversion efficiency and meat yield may be expected to have negative potential consequences for animal welfare. For example, the EFSA states:[234]

> *"The genetic selection of pigs for rapid growth and lean meat without enough consideration of other factors has lead [sic] to some widespread and serious problems, in particular leg disorders, cardiovascular malfunction when high levels of activity are needed or stressful conditions are encountered, and inadequate maternal behaviour."*

The aim of achieving further increases in the number of pigs per litter could also potentially be detrimental to welfare (see Section 1.1.3).

Similar welfare concerns apply to other species as well. If attempts to reduce GHG emissions from poultry focus on faster growth and feed conversion efficiency, this may be expected to have negative consequences for animal welfare. Lameness is a major welfare problem for fast-growing meat chickens (see Section 1.1.3).

As with pigs and poultry, there are potential welfare concerns associated with a focus on breeding ruminants for feed conversion efficiency and/or increased litter size. Mortality is higher in lambs born from multiple pregnancies, especially for triplets and higher multiples. For example, in Scottish Blackface sheep, triplet lambs have been found to be four times more likely to die during the first two weeks of life compared with singletons, and more than twice as likely compared with twins.[235]

Feed conversion efficiency is improved in highly muscled breeds of beef cattle carrying a 'double muscling' gene. However there are animal welfare problems caused by this hypemuscularity, including leg disorders, calving difficulties, increased susceptibility to stress and reduced cow longevity.[236]

GHG emissions for beef and sheep production are generally higher in more extensive systems, based on lower quality forages that support lower growth rates, generating greater levels of methane per unit of output.[237] This may result in pressure to reduce livestock numbers in hill farming systems. Further extensification of already extensive sheep production systems may be expected to lead to the possibility of poorer welfare through reduced animal care.[238] In Scottish hill sheep, modelling of shepherding at lambing time at different densities of sheep suggests that more extensive stocking rates reduce the effectiveness of the shepherd and the number of sheep that can be provided with close attention during lambing.[239]

However, the Beef and Sheep Roadmap indicates that reductions in GHG emissions should be achieved across all production systems rather than by any substantive change in focus in favour of one system over another, stating:[240]

> *"The challenge is to ensure that as much [landscape and biodiversity] value as possible is sustained as the industry adapts to cope with economic and environmental pressures. In meeting the challenge of reducing greenhouse gas emissions, for instance, there would be a compelling logic in moving production away from hill farming were it not for the fact that this could easily lead to immeasurable harm to the sustainability of these environments in a whole host of other important ways. More industry debate is needed around this emerging important issue."*

If attempts to reduce GHG emissions from dairy cattle focus on achieving further increases in milk yield, this may be expected to have negative potential consequences for animal welfare (see Section 1.1.3).

The impact on cow health, fertility and longevity affects the overall efficiency of the system so that increased milk yield is not necessarily associated with a reduction in GHG emissions. Research in Ireland[241] found that GHG emissions per kg milk increased with increasing cow genetic potential for milk production. A more robust New Zealand Friesian dairy cow strain was found to be associated with lower GHG emissions and higher profitability compared with a high-yielding North American Holstein strain.[242]

Encouragingly, the 2013 Dairy Roadmap[243] does not focus on the pursuit of increases in milk yield. It includes a number of broader targets regarding membership of Environmental Stewardship Schemes and adoption of water efficiency measures, nutrient and manure management planning, herd health planning, carbon footprinting, recycling of waste, and investment in renewable energy and emissions reduction technologies.

Some authors have advocated a move to zero-grazing systems to achieve reductions in GHG emissions from the dairy sector. For example, The Welsh Government's Land Use Climate Change Group (LUCCG) envisages:[244]

> *"CH_4 [methane] emissions from manure and slurry produced by the dairy herd and related beef production would be minimised, firstly by the rapid and comprehensive introduction of [anaerobic digestion]. Over time the plan would be for a fully housed, zero-grazed system on the higher grades of land. To expand CH_4 capture and energy production, the AD biogas would be supplemented by emerging technologies to scrub the enteric CH_4 from the sheds. Reduction of ammonia emissions by scrubbing would also assist in reducing N deposition and N_2O emissions from soil."*

This approach could be a concern for welfare. There are a large number of studies showing that cows kept on pasture are healthier and hence experience welfare benefits (see Section 1.1.4).[245]

As well as being affected by actions to mitigate climate change, farm animals may also be affected by farmers having to alter their production systems in order to adapt to climate change. As one of our interview experts noted, "*extreme weather events and how to cope with those are going to be pretty key in terms of looking after farm animal welfare. Particularly animal housing, as I think it's been ignored. Making sure animals have reasonable shelter from extreme weather is going to contribute in a fairly major way to wellbeing*."

Another commentator agreed that climate change might affect our ability to run some free-range systems. For example with pigs, high rainfall begins to jeopardise keeping pigs outside and increases the potential environmental implications of doing that. They explained that as a result we may need to see more novel systems being developed that allow some of the benefits of a free-range life, but are essentially indoor systems.

Climate change will also affect fisheries and aquaculture via changes in sea temperatures, acidity and circulation patterns, the frequency and severity of extreme events, and sea-level rise and associated ecological changes.[246]

2.2.2 Economics and supply chain

Key drivers

Several of our experts predicted a more globalised trading environment impacting livestock production and the meat supply chain over the coming years. Currently, UK livestock production can support around two thirds of UK domestic meat consumption (see Figure 2.2.3). However, because some production is exported, in reality the proportion of domestically reared meat produced is somewhat lower, so international trade is already a significant part of today's economic reality. For example, although the UK is 100% self-sufficient in lamb, we export 40% of what we produce while at the same time we consume the same amount of lamb in imports,[247] predominantly from New Zealand.[248]

Figure 2.2.3 shows the 2013 'balance sheets' for the main land-based farm animal species in the UK. For poultry and beef, we import over a quarter of our domestic consumption, while for lamb, we import 40%, and for pig meat, we import well over half. For example, looking at pig meat, the turquoise (left-hand) column shows that total domestic consumption was 1.5 million tonnes. Of this, 604,000 tonnes was met by domestic production but the majority, 927,000 (61%), was met by imports. The dark blue (right-hand) column shows domestic production. The UK produced 833,000 tonnes of pig meat. As before we can see that 604,000 tonnes of this is used to meet domestic consumption, but 229,000 is exported to other countries. So UK pig production of 833,000 tonnes could, in theory, meet over 50% of UK consumption, but in reality, because of the export market, actually meets just below 40% of domestic demand.

Figure 2.2.3 excludes farmed fish because aquaculture data are not captured in the Defra statistics. To provide some sort of comparison, 162,000 tonnes of farmed Atlantic salmon was produced in Scotland in 2012.[249] The Scottish Salmon Producers Organisation estimates that exports of 78,000 tonnes of fresh salmon were made in the same year.[250] The UK also engages in substantial trade in wild-caught fish. The UK landed around 600,000 tonnes of fish in 2012, over 460,000 tonnes of which was exported, while around 750,000 tonnes was imported.[251]

The majority of international trade for meat with the UK currently occurs with other countries of the EU. The main exceptions to this are New Zealand, from which over 60% of UK lamb imports originate (with a further 10% from Australia),[252] and Thailand, which is the source for 40% of the UK's processed chicken imports.[253] For UK exports, while trade is again dominated by the EU, there are signs that destinations further away are becoming more significant. The quantity of pig meat exports to China in 2013 was ten times that of five years earlier.[254]

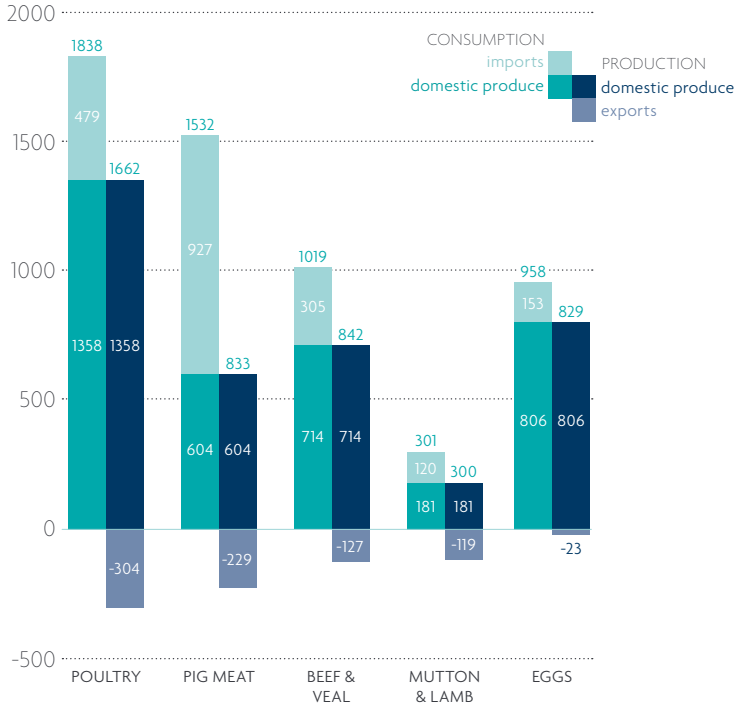


Figure 2.2.3
'Balance sheets' for main land-based farm animal species for 2013
Source: Defra,[255] except pig meat, AHDB.[256] Figures in thousand tonnes, except for eggs which are in millions of dozen. NB. Sum of columns may not equal total due to rounding.

A recent EU market outlook shows a mixed picture for European trade over the coming ten years, although undoubtedly the market will begin to be shaped by increases in livestock production and consumption in other parts of the world, as consumption and livestock production in emerging economies increase. In poultry markets, increased demand from the Middle East and China may provide opportunities for increased exports. In pig meat, market competition from US and Brazilian pig producers is predicted to dampen growth in the export market for pig meat. In the beef sector, exports to Russia and Turkey are set to decrease but there may be new opportunities in South Korea, the Middle East and Egypt.[257]

Imports into the EU are limited by preferential tariff quotas which determine import volumes from specific non-EU countries so it is difficult to assess how these might alter the trading landscape in the future. The package of reforms discussed as part of the World Trade Organisation Doha round of trade liberalisation negotiations included proposals for tiered reductions in the tariffs on agricultural products.[258] However, with those negotiations long stalled, it may be more general bilateral agreements – such as those agreed with South Korea and Canada in recent years which include agricultural elements – that determine the makeup of meat import and export markets over the coming 20 years.[259,260]

Another potential trend identified by our experts is a continuing concentration and consolidation of the meat supply chain. At one end of the supply chain, retailers are set to extend their control over supply further, with one of our interviewees predicting supermarkets specifying producers' standards for welfare and quality even more strictly, with contract farming arrangements becoming more common. At the other end, another expert spoke of increased global concentration in the businesses that control different aspects of the food system, including global genetics and breeding, and feed and nutrition.

Implications for farm animal welfare

Our interviewees found grounds to be both optimistic and cautious as a result of these changes. Internationalisation of trade on the one hand presents opportunities for good practice and awareness of good farm animal welfare practice and policy to be spread into different market places and influence a much greater number of farm animals. On the other hand, the increased length of supply chains may make it more difficult to influence food producers around the world, who are seemingly one step further away.

One respondent was concerned about competition from producers in countries with lower farm animal welfare standards than the UK and the potential this has to impact domestic producers obliged to operate to higher welfare standards. The implications of this for animal welfare are that competition creates pressure for lower standards in the face of unreasonable competition or that, economically, domestic producers suffer while producers with the advantage of lower animal welfare standards are able to succeed. However, this concern assumes that UK welfare standards are really always higher than elsewhere, but there are already several examples of where standards – including sometimes baseline legislation – in some other countries are equivalent to, or even higher than, those in the UK (e.g. Dutch legislation on provision of space for pigs).[261] A public policy expert approached the issue from a slightly different angle, arguing that **an increasingly internationalised trading environment generates a need for those concerned with animal welfare in the UK to extend their influencing skills to affect the policies of international organisations that might be setting standards for other localities**.

Another interviewee described the dynamic between retailers and their customers as potentially beneficial for animal welfare:

> *"Those producers that want to supply retail multiples must have animal welfare at the top of their list. We see it with retailers, but increasingly by processors, food service, hotel, catering etc. Anyone providing food to a consumer is worried about the standards of welfare that are going on in the farm because it is a consumer issue. There is a trust element - people want to know that food has been produced soundly and appropriately from an animal welfare point of view but also from food safety."*

From this perspective, even trends in globalisation or climate change are unlikely to alter the position of retailers. An alternative view came from another academic interviewee who, while agreeing that power resides with retailers, argued that this is not altogether in response to customer expectations. He argued that, in the past, animal welfare had been used as an attribute by major retailers to compete with each other, in other words as a way of differentiating their products in the marketplace. Therefore in the future, the extent to which retail strategies continue to seek to differentiate their products along those lines will be an important contributor to welfare standards continuing to be maintained or raised further.

Food retail is not the only sector of business involved in food provision. The factors that have led retailers to compete around farm animal welfare may not be so apparent in the food service sector. Consideration of farm animal welfare was conspicuous by its absence in two recent industry reports that looked at the future of the food service sector (one looking at the sector as a whole to 2020 and the other specifically at the restaurant purchasing function to 2025). However, predicted trends of more localised supply chains and reduced consumption of meat for health reasons will have knock-on implications for animal welfare.[262,263] In the shorter term, the Sustainable Restaurant Association predicted 2014 to be a "breakthrough year for animal welfare issues", with concern for animal welfare increasing in importance as an issue for restaurant consumers.[264]

The increase in global corporations operating in the food system also presents opportunities and challenges to animal welfare depending on people's perspectives. The challenge comes from ensuring that animal welfare is recognised as a priority for their businesses where financial concerns might tend to dominate. One academic pointed out that there are now only two or three global breeding companies who produce all commercial strains of laying hens, holding all the key genetic information. With their breeding models for the next 20 years predicted to be focused on increased production, there is a risk that welfare traits will not be given much weight and consequently lead to poor animal welfare outcomes. An alternative perspective is that the concentration of power in fewer corporations may offer an opportunity for improved welfare, as relatively few people need to be convinced of the benefits of good animal welfare in order to make significant change happen.

Perhaps one of the biggest threats to animal welfare in the economic sphere is the knock-on impact on both producers and consumers of coping in a difficult economic climate. One commentator argued that ensuring that producers are profitable enough to be able to invest in good quality facilities, of all sorts, was the singular most important change to improving animal welfare standards. They said:

> *"There is no doubt that if you're looking at actual performance on the ground, it is often farmers that are strapped for cash, aren't employing enough people, aren't investing in decent kit, aren't investing in training, that are delivering the worst welfare on the ground. So that's not a standards issue – it's about taking the pressure off. Welfare suffers when farmers and the industry are under pressure."*

With regards to consumption, undoubtedly the period of prolonged recession has had an impact on food purchasing behaviour, with suppressed incomes and raised food prices. In response to this, households on average have reduced the total amount of calories purchased and at the same time economised by switching their purchases to cheaper and more calorie-dense types of food.

During the economic downturn, the nutritional quality of food consumed has declined.[265] This economically constrained environment presents a risk to animal welfare in the coming years, with several interviewees recognising that **meat produced to higher welfare standards may be seen as a luxury in the context of national food security and rising food prices**. As one animal welfare expert noted,

> *"Policy makers tend to focus on the costs of welfare as the benefits are largely intangible, even though there are such strong links between animal welfare and human welfare that in pursuing high animal welfare we are actually pursuing human welfare."*

Notwithstanding the serious impact of restricted incomes caused by difficult economic times, several interviewees also raised broader concerns about the continuing 'cheap food' culture in our society, where low food prices are expected, but in reality mask hidden costs paid for in state subsidies, poor public health, environmental impacts and animal welfare. For example, one commentator noted:

> *"In the short term, the current economic model will hinder animal welfare. Cheap food is seen as a good thing as long as you don't look at how we pay for it through subsidies, through health costs, through environmental clean-up costs and externalities."*

2.2.3 Policy and public institutions

Key drivers

(i) United Kingdom

Over the next twenty years there are likely to be changes in the types of policies pursued by government in relation to farm animal welfare. Several interview respondents predicted that government regulation will be used less in the future as a way of improving farm animal welfare, for a number of reasons:

- Firstly, **the current economic environment and a long standing government commitment to cheap food is likely to make the government more wary of using legislation as a tool to raise the bar for farm animal welfare**. While regulation has been an effective tool in the past, the threat that it could have an impact on food prices may make it a less attractive policy option.
- Secondly, **there is an ongoing trend for governments at UK and European levels to use less regulation in principle**.[267] In the UK, in the face of economic recession, the government has an 'anti-red tape' agenda, so as well as regulation being an unlikely tool for the future, one expert feared that there may even be pressure to remove some farm animal welfare legislation which is already in place. Additionally, government is aware of the risks to domestic producers from 'gold-plating' European policies. In the past, in the eyes of some experts, the UK has sometimes 'gold-plated' EU legislation, for example by banning sow stalls and veal crates ahead of the bans in Europe (the sow stall ban is a complete ban in the UK but still only a partial ban in Europe). In 2011 the Government announced it would use a new set of principles when implementing EU Directives into UK law, effectively ending gold plating, with the aim of ensuring that UK interpretations of EU law do not place unfair restrictions on, and hence disadvantage, UK commerce, including farming.[268]
- A third reason for an expected fall in government regulation over the next twenty years is that **the easiest changes to legislate have arguably already been made**. So, the laws put in place in the UK and at European levels over the past 20 years have already banned what many perceive as the 'worst' production systems for animal welfare, for example conventional battery cages for laying hens and the use of stalls and tethers for sows (see Section 1.1). An animal welfare expert argued that today:

> *"There isn't a system out there where you can easily say, 'that's bad - let's ban it'. [There are] definitely still big issues for example in the dairy industry, but you can't say it is the system. Farrowing crates could be one, but I don't see that changing in the next twenty years."*

One welfare issue where the UK may potentially take action ahead of the EU is on beak trimming of laying hens, an issue of concern to interviewees from both the industry and farm animal welfare backgrounds. The consequences of beak trimming for welfare include trauma during the procedure,[269] pain due to tissue damage and nerve injury,[270] and loss of normal function due to reduced ability to sense materials with the beak.[271] However, there is also risk of serious welfare problems if appropriate steps aren't taken to minimise the risk of outbreaks of feather pecking and cannibalism that the beak trimming is carried out to mitigate.[272] There is precedence for banning the practice, with beak trimming having already been phased out in Switzerland and Austria, where harmful pecking and feather damage have been reduced through improvements in management.[273,274]

A ban on beak trimming was due to be implemented in the UK at the beginning of 2011 after legislation passed in 2002.[275] However, the industry had failed to make sufficient progress on controlling outbreaks of harmful pecking of hens in commercial systems for the change to take place and ministers deferred the ban on the advice of FAWC.[276] The government is currently committed to a review in 2015, with the objective of banning beak trimming in 2016.[277] Within the EU, the Netherlands have announced that beak trimming will be banned from 2018 and are seeking to raise the issue at the EU level.[278] One expert interviewee suggested that UK government action to drive improvements in husbandry and management of hens to increase feather cover and reduce harmful pecking would serve to improve welfare in both trimmed and intact-beak birds.

(ii) European Union

CAP funding: Events at the European level will continue to be important. Payments to farmers under Europe's Common Agricultural Policy are split between 'Pillar 1' direct support payments (which account for the larger share of funds) and 'Pillar 2' rural development funds. There are a number of payments under Pillar 2 to assist farmers who wish to improve animal welfare, on a voluntary basis, including financial assistance to adopt animal welfare commitments that go beyond relevant mandatory standards.[279] These payments can compensate farmers for all or part of the additional costs and income foregone as a result of the commitment. In the reform package agreed in 2013, the promotion of animal welfare was incorporated into the priorities of the Rural Development Programme.[280] **FAWC and welfare groups have called for more modulation (transfer) of funds from Pillar 1 to Pillar 2 to provide additional support to improve farm animal welfare**. One interviewee described FAWC's concept of a farm animal welfare stewardship scheme with funding made available to incentivise improvements in on-farm health and welfare in the same way that Pillar 2 funding is used to incentivise improved environmental practice via the use of environmental stewardship schemes. This is not an entirely new concept and has been implemented to some extent in some places, with welfare being considered, for example, as part of Scottish Rural Development Programme payments under CAP Pillar 2.

Animal product labelling: Another potential area for European regulation to make an impact is with regards to animal welfare labelling. The overall goal of policy in this area is to make it easier for consumers to identify and choose welfare-friendly products, and thereby give an economic incentive to producers to improve the welfare of animals.[281] Possible approaches include labelling based on the production method or on welfare outcomes.

While the EU's 2012-2015 strategy recognises the need to provide consumers with increased information, it falls short of any specific ways in which in this might happen.[282] **Several of our interviewees mentioned the significance of the EU potentially extending method of production labelling, which is already mandatory for shell eggs**,[283] **to areas such as broilers, where labelling terms are due to be reviewed soon, and pig products**. Agreed terms that are readily understandable would need to be developed.

(iii) Other international institutions

Our interviewees predicted an increased role for international institutions in regulating farm animal welfare in the future; the result of an increasingly globalised food system. The World Organisation for Animal Health (known as the OIE) and the World Trade Organisation were seen as particularly relevant.

Only about 1% of the world's animal production occurs in the UK. Close to half (46%) of pig production takes place in China[284] and Asia produces around 60% of the world's eggs.[285] Some commentators argue that the most pressing animal welfare issues are overseas, where animal welfare laws are sometimes less rigorous than in the UK. There is an important leadership role the UK can play in terms of influencing what happens on the international stage, but only if it maintains and continues to progress its own farm animal welfare standards and practices.

Farm animal welfare was first identified as a priority by the OIE in its Strategic Plan 2001-2005, with OIE Guiding Principles on Animal Welfare[286] included in the 2004 Terrestrial Animal Health Code. This was a landmark event for the recognition of the importance of animal welfare on the global stage. To date, the World Assembly of OIE Delegates (representing the 178 Member Countries and Territories) has adopted eight farm animal welfare standards covering transport and slaughter of terrestrial farm animals and farmed fish,[287,288] as well as including species-specific codes covering the animal welfare of beef cattle and broiler chickens.[289,290] Codes on dairy cattle, pigs and laying hens are likely to be adopted in the next five years. The OIE standards are based on internationally recognised concepts, such as the Five Freedoms, and whilst they incorporate welfare outcomes they do not contain detailed input standards. The standards are regularly updated to take account of scientific developments.

The OIE has limited financial and regulatory powers to ensure implementation and enforcement of its standards, so there is large variation in the degree of adoption and enforcement of these standards across different countries. The OIE is trying to address this through regional agreements and sharing best practice. Animal welfare standards in the UK and EU already go beyond the OIE standards in most areas. **While the OIE standards can be expected to have limited direct impact on UK standards in the short term, in the longer term there may be pressure to harmonise standards globally to achieve a level playing field for producers across the world**.

Some interviewees also saw the World Trade Organisation (WTO) becoming increasingly important in the sphere of animal welfare as the trade in meat products between countries increases. Although current negotiations on liberalising agricultural trade between countries as part of the Doha round have been stalled for some time, the EU has negotiated a number of bilateral trade agreements, with countries such as South Korea and Chile, where improving farm animal welfare standards has been a shared explicit goal.[291] Currently, under WTO rules, a country – or a group of countries like the EU – which has enacted improved welfare standards in its own territory, has limited flexibility in what it can do to require that its imports come from animals reared to similar standards or that its laws designed to protect animals or the environment must apply to imported products as well as domestically produced products. The EU first raised the issue of animal welfare within the WTO in 2000, an action that led to animal welfare being identified as a priority in the Strategic Plan of the OIE in 2001 (see above).[292]

Although animal welfare per se is not recognised by the WTO as a valid reason to restrict imports, there is some scope under WTO rules to argue justification for marketing or import restrictions under Article XX (a) [public morals] or (b) [animal health] and for mandatory labelling of imported animal products. Encouragingly, the WTO recently ruled that the EU's ban on the sale of commercially hunted seal products is compliant with WTO rules. This decision was the first time the WTO had ruled on a case directly affecting animal welfare, and public moral concerns over animal welfare were found to be a valid reason to ban product imports (although this decision is now being appealed).[293]

Implications for farm animal welfare

The changing political environment perhaps presents more challenges than opportunities to farm animal welfare in the foreseeable future. With governments in the UK and Europe pursuing an anti-red tape agenda, one animal welfare expert anticipated that one major challenge over the next five or six years will be to ensure that regulation as it currently stands, which has been so important to raising standards, is not allowed to slip backwards.

The UK government's concerns about 'gold plating' are seen as making it less likely the UK will lead on farm animal welfare in the future. While this approach may help to ensure domestic producers do not lose competitiveness against overseas producers, for one commentator it removes a potential unique selling point of British producers: that buying British actually means better welfare standards. In fact, there are already several examples of other EU member states recently introducing unilateral farm animal welfare legislation that surpasses both EU and UK laws (see Section 2.2.2).[294]

The prospect of the OIE and the WTO becoming more important in animal welfare regulation presents new challenges for ensuring high levels of farm animal welfare are maintained. With UK and EU standards considerably higher than those of the OIE, one standards expert raised the possibility that, in ensuring producers remain competitive in the international marketplace, the UK or Europe may eventually decide that standards should not be higher than those set globally. The WTO presents very obvious problems for animal welfare in not explicitly recognising this fundamental aspect of livestock production as a reason for a country to reject meat imports from other countries. This gives rise to the risk that domestic producers in that country may be undermined by cheaper imports produced to lower welfare standards, notwithstanding that lower production costs in developing countries generally owe more to differences in labour, feed and other costs, than to different animal welfare standards.[295]

2.2.4 Science and technology

Scientific advances and technological innovation are likely to have significant impacts on the development of farming and farm animal welfare over the next 20 years. Technological innovation is likely to evolve in response to both new knowledge about animal welfare science and in response to the environmental and production challenges outlined earlier in the report.

(i) Animal welfare assessment

Of particular significance over the coming years will be improvements in the way that farm animal welfare is measured, especially with regards to the development of 'welfare outcomes assessment'. This was mentioned by a number of our animal welfare and industry experts, with one animal welfare expert explaining that it "*represents a major new mechanism to drive welfare improvement.*"

Up to now, welfare standards set by assurance schemes, legislation and codes of practice have largely been based on 'inputs' – the resources provided to the animals (like the amount and type of space, feed, etc.). Increasingly in the future, we are likely to see welfare 'outcomes' incorporated into assurance standards, legislation and codes of practice. Welfare outcomes assessment is a practical and scientifically informed way of assessing and measuring animal welfare. It aims to provide an objective, accurate and direct picture of animal welfare.

The widespread adoption of welfare outcomes assessment as part of assurance scheme standards, legislation and codes, and producers' own on-farm monitoring of health and welfare, **has the potential to substantially improve farm animal welfare**. Measuring welfare outcomes tells us whether the resources being provided, and management practices being implemented, are achieving an adequate level of animal welfare in practice. It allows welfare problems to be identified and quantified and improvements to be monitored.

Our experts recognised that outcomes assessment will supplement rather than completely replace the use of input (resource) measures. As one interviewee explained:

> *"There will be input measures too, because, for example if you go over a certain stocking density with chickens, you know you are going to have problems."*

This perspective reinforces the view of EFSA, which notes that any system solely dependent on the measurement of welfare outcomes can be criticised on the basis that it is reactive rather than proactive: it relies on evidence of malpractice rather than seeking to prevent it through better attention to the provision of good husbandry.[296]

Research is ongoing to further develop welfare outcome measures. For example, 'grimace scales' are being developed for the measurement of pain in animals by assessing facial expressions. These were originally developed for laboratory animals and work is now underway to develop similar measures for pigs and sheep.[297]

Another evolving area of research is the use of judgement bias (whether animals appear to show 'optimism' or 'pessimism' in their evaluation of a situation) as a measure of the emotional state of animals.[298] Such techniques may potentially allow us to 'ask' animals how they feel about particular situations, to better understand the impact of husbandry procedures and events like transport from the animal's point of view.

(ii) Automation and related technologies

Several of our experts pointed to the changes in technology currently taking place and the impact they may have on livestock production in the next 20 years. As one expert put it:

> *"I think there's a lot of technology and new science available that we haven't taken as much advantage of as we could have in the past – as we focus more research on how we can deliver better animal welfare, I think I can see that as quite a big driver of change."*

The potential impact of technology on livestock production extends across the whole farming process, including different sorts of lighting, styles and sizes of housing and building materials.

Novel housing systems (like the Rondeel system for laying hens, mentioned as a positive development by one welfare expert) offer innovative solutions to meet the multiple challenges of animal welfare, biosecurity and environmental concerns. Such innovative systems offer the potential to combine some of the benefits of free-range systems for animal welfare, with some of the benefits of indoor systems, in terms of climate control, hygiene, manure management, biosecurity and protection from predators.

One expert noted that the move to outcomes assessment will be accompanied by the incorporation of more automated systems in welfare outcomes assessment which will improve measurement, reduce the potential for human error and better facilitate comparisons between different operators. Another predicted that new techniques will allow farmers to receive much more timely information on the health and wellbeing of their animals, enabling them to take action to treat poor health far more quickly.

Automated technologies may have applications in many different ways that can assist welfare assessment. Applications include automated feeders that can track whether calves are adapting to post-weaning diets and accelerometer devices attached to individual dairy cows that can record the length of time that cows lie down, which can be used as an indicator of lameness.[299] 'Optical flow' analysis uses a combination of video cameras and statistical analysis to identify patterns in the movement of groups of animals. Applied to flocks of meat chickens, it may provide new ways of assessing welfare, identifying patterns that predict high levels of mortality, hockburn and the prevalence of lameness.[300] Optical flow might even be able to identify disturbance within flocks that could be used to predict outbreaks of feather pecking.[301] Other potential technologies include systems that measure sound, analysing and classifying the vocalisations of animals, which may enable them to be used to identify emotional states or sick animals.[302]

Technologies like optical flow may support improvements in welfare by offering non-intrusive, non-invasive, consistent and continuous ways of measuring animal welfare.[303] In addition they provide a relatively cost effective way of measuring patterns of behaviour over time, something that is difficult to observe during the short periods of time available for on-farm assessments. In observing behaviour over time, they also may better identify conditions such as lameness, than humans can through direct observation.[304]

Monitoring the welfare of farmed fish is particularly challenging. Some methods are being developed for automated remote monitoring of fish, including submersible remotely operated vehicles.[305]

As well as being used in welfare assessment, automated technologies have the potential to be used in many different areas of livestock production, including milking, feeding, herding, monitoring, catching and slaughtering of farm animals. While some systems are already well developed and are being used commercially, others are still in the early stages of development. It seems likely that the use of these technologies to assist farmers is likely to increase as technologies are refined and become more economically viable. As one interviewee noted:

> *"Science and metrics will be used much more, informing the decision making about how we should look after animals, what farming systems, what nutrition we should be providing and how to provide that in a consistent way, as that will provide better welfare outcomes for the animals. We need to be better informed about what we've done, how we've done it, and what the outcome has been. To do that we'll need a revolution in farmers' take-up of technology and particularly precision technology."*

However, some experts commented on the importance of safeguarding against any trend for the use of automated technologies to replace rather than complement the direct contact of stock-keepers/animal carers, as the observational, flexible and empathetic powers of humans cannot (and should not) be replaced by machines.

(iii) Animal diets

One area which might significantly impact animal welfare is the development of innovative approaches to farm animal diets. As a food industry expert explained, animal diets sit at the intersection of sustainability and animal health and welfare. The challenge with, for example, meat chickens is to reduce reliance on soya to deliver sustainability benefits, but at the same time *"Can we still raise a healthy, happy chicken that will also look good on the shelf, so someone might want to buy it at the end of the day?"*

There is much ongoing research into improving the quality of livestock feed, such as to increase digestibility, and reduce digestive disorders, environmental impacts and feed costs. Examples include:

- **Plant breeding**[306] – e.g. to improve the digestibility of forage (which may have a role to play in reducing carbon emissions).
- **Feed processing**[307] – e.g. to improve the digestibility of starch and fibre and the availability of protein (which may have a role to play in reducing environmental pollution by reducing excreted nitrogen).
- **Feed additives**[308] – e.g. probiotics and prebiotics (which may possibly have a role to play in supporting a move away from reliance on antibiotics in pigs and poultry) and rumen stabilisers (which may reduce negative health and welfare impacts of species-inappropriate high-starch diets for ruminants).
- **Development of novel ingredients** – e.g. to make better use of by-products from crop production and food processing and to develop alternative protein sources to reduce reliance on soya and fishmeal from declining fish stocks.

(iv) Genetics

Molecular genetics is a rapidly developing science with the potential to revolutionise the breeding of farm animals. In the future, breeding is likely to be based increasingly on genomic profiles (information about the genes of an animal, including variations, gene expression and the way the genes interact with each other and the environment) rather than progeny testing (information about the performance of an animal's offspring). As our knowledge of the genome of different animals grows, it is likely to increasingly allow us to efficiently identify parts of it that relate to beneficial elements of the phenotype (the observable characteristics of an animal determined by both the genes and the environment).[309]

In the past, many breeding programmes concentrated on a limited number of parameters, usually focused on production traits. Modern breeding programmes can select for many different characteristics concurrently because modern computing power and specialised programmes allow the complex and sensitive analyses needed for this. Traits related to health and longevity are increasingly being included in selection indices, particularly for dairy cows.[310]

Other developments in genetics include breeding to produce animals of a particular sex. Sexed semen is commercially available in the dairy industry. It can reduce the number of unwanted male calves with poor conformation for beef production[311] and therefore the number of calves killed at birth or exported to the continent to be reared for veal, often in barren slatted-floor systems which are banned in the UK.

Technology for identifying the sex of chicks prior to hatching is currently being developed.[312] This may offer benefits in laying hens, where male chicks have no economic value and are killed after hatching. It may also be helpful in meat poultry breeding, where separate male and female lines are bred and then crossed to produce hybrid birds for commercial rearing so there are again surplus males hatched.

Interestingly, none of our interviewees focused on developments of genetic modification and cloning of farm animals as significant developments in farming over the next twenty years. While these ethically controversial technologies may offer potential animal welfare benefits, for example from modifications that increase disease resistance, at the moment they raise significant animal welfare concerns. Cloning has so far resulted in a high incidence of animals with pre- and post-natal deformity, as well as other significant health problems that are often fatal.[313,314]

(v) Veterinary science and antibiotics

Ongoing research and development of veterinary medicines, vaccines and disease control strategies will obviously be vital in protecting animal health and welfare in the face of current and evolving disease challenges. One particular concern raised was around the future availability of antibiotics with existing antibiotics losing their efficacy and new categories of antibiotics unlikely to be available for animal use. This may have a negative effect on intensive production, and could have negative welfare impacts, for example in creating hermetically sealed environments to prevent disease. One expert predicted that the pressure on antibiotic use will lead to increased levels of innovation around the support of animal immune systems and the reduction of stress levels, so that there is less susceptibility to disease. Research and development in this area is already taking place, with developments in rumen enhancers and probiotics, but can be expected to continue apace.

2.2.5 Consumers, citizens and society

Our interviewees expressed a wide range of views on the importance of consumer attitudes as a factor in determining the course of farm animal welfare in the future. Some commentators predicted that consumers will continue to want assurance that animals are treated decently, and therefore this will continue to ensure welfare remains a salient issue for retailers. Other responses were not so definite on the path of future consumer attitudes, but agreed that "*the extent to which consumers continue to care and to buy accordingly will be important*", recognising that animal welfare is one of a number of factors impacting consumer purchasing decisions and that consumers "*don't always act in the ways they say they are going to*."

One of our interviewees suggested that promoting consumer awareness of the animal welfare aspects of organic standards might facilitate expansion of organic schemes, although the relatively high price of organic products is likely to remain a barrier to substantial expansion.

One expert interviewee argued that, while it is easy to show that there has been an increase in purchasing products marketed as having higher welfare provenance, this is less to do with consumer attitudes and more to do with retailers differentiating their products from each other using welfare as an attribute to do that:

> *"To some extent it doesn't matter that consumers are not changing attitudes to welfare if it's being done for them – as long as higher standards are sustainable and sustained."*

Added to this from the industry's perspective is the risk of another big food scandal, following a sporadic history of food related issues and most recently the 'horsemeat scandal' in 2013 which placed the transparency of meat supply chains firmly in the public consciousness. In this sense, **retailers ensuring high standards of production, welfare and transparent supply chains acts like an insurance policy in mitigating the risk that a costly scandal will occur.**

Several commentators raised the potential for consumer attitudes to be influenced by knowledge and transparency around food value chains, emphasising the importance of food labelling and assurance schemes as important channels for providing transparency to consumers. A pan-EU survey found that animal welfare was a concern for 64% of people and that consumers aren't always well informed on production methods or their impacts on animal welfare.[315] A European Union feasibility study on animal welfare labelling found that it had the potential to increase consumer awareness and purchasing of higher welfare products.[316]

In the future, consumer attitudes to diet may have an impact on meat consumption with consequences for livestock production and animal welfare. Before it was disbanded, the UK Sustainable Development Commission[317] advised that "*reducing consumption of meat and dairy products*" is one of the key changes "*likely to have the most significant and immediate impact on making our diets more sustainable, in which health, environmental, economic and social impacts are more likely to complement each other.*"

In the UK, a group of NGOs formed the 'Eating Better' alliance in 2013 to campaign for reduced levels of meat consumption in the context of healthy and sustainable diets.[318] Although the idea of reducing meat consumption remains a contested topic in the UK, combined concerns about health and environment are likely to impact attitudes to meat consumption over the next 20 years. As mentioned by one interviewee, the opinions of prominent television chefs and celebrities may be influential in this regard. For example, a foray into veganism by Beyoncé and Jay-Z in late 2013 prompted newspaper articles on the mainstreaming of non-meat diets.[319,320]

The benefits of reduced meat consumption overall are compelling from an environmental perspective (see Section 2.2.1) and human health benefits have been reported to be associated with eating less but better quality meat in the UK.[321,322] However, wholesale reductions in meat consumption could have unintended impacts on the environment, for livestock farmers and for animal welfare, when looking at one region in isolation.

Of particular significance in the UK are the potential economic impacts of reduced demand on domestic producers and the impact this might have on farmer profitability. This could impact the viability of more marginal farming systems of higher environmental value and put pressure on higher animal welfare standards. Therefore it is important that economic drivers are considered along with any promotion of reduced meat consumption in order to ensure that positive environmental and welfare consequences result.[323] **Some advocate a move to 'less but better' meat consumption as a way of ensuring that reduced consumption is matched by support for sustainable, high welfare producers**, but more work needs to be undertaken to understand the mechanisms that would make this work in practice.[324]

One area where all stakeholders are likely to agree is a call for consumers to waste less of the meat that is produced. A report published by WWF-UK and the Food Ethics Council called for meat to be considered as a precious resource, maximising the amount of the animal carcase used for food and minimising what gets thrown away. With 13% of meat consumer purchases ending up in the bin, initiatives to reduce waste can produce the same amount of meat with fewer animals, reduce environmental impact and provide a cost saving to consumers.[325]

A number of potential alternative protein sources are currently being developed for use in human diets, and may have an impact on meat consumption in the future. While there are already meat substitutes in the form of fungi-based proteins (including Quorn), **in vitro meat offers the intriguing possibility of meat without livestock, although development is in its early stages**. In vitro meat would essentially be made from animal muscle cells cultured on a large scale, and could potentially provide an alternative to meat from livestock in the future. However, although the technologies to create skeletal muscle and fat tissue have been developed, there remain considerable technical challenges to overcome in order to produce meat with appropriate visual appearance, smell, texture and taste – and at a cost that is affordable.[326] This suggests that in vitro meat is unlikely to make any significant impact over the next 20 years. Similar concerns are equally applicable to the introduction of other alternative sources of protein into diets, for example insects (which are traditional foods elsewhere in the world) and microalgae, which have high protein content and high concentrations of vitamins and essential oils.[327,328]

2.3 The next 20 years – the role of farm assurance schemes

The responses given by our expert interviewees, and backed-up by our desk research, combine to create a picture of the livestock sector undergoing a period of considerable change over the coming 20 years. This is the result of environmental pressures, developments in political, economic and cultural spheres and advancements in scientific knowledge and technological knowhow. These changes will provide challenges and opportunities for livestock farming and farm animal welfare. This section explores the role of farm assurance schemes over the coming years in supporting high standards of animal welfare and championing a vision of all animals being able to achieve a good life in 2034.

2.3.1 The role of farm assurance schemes

We asked our expert interviewees their opinion on the role that farm assurance schemes should play over the next 20 years. The most common response, perhaps unsurprisingly, referred to the role of farm assurance in ensuring high standards of farm animal welfare.

For one interviewee, farm assurance schemes could play a role in making high farm animal welfare standards an 'explicit' and 'foundational' part of what they do, something the respondent felt Freedom Food and Soil Association schemes were already doing, but which they thought was not currently true of all assurance schemes.

For another industry specialist, **assurance schemes are able to provide confidence that a certain standard is in place, and through their reach across the sector they have the opportunity to continually drive higher standards of welfare**.

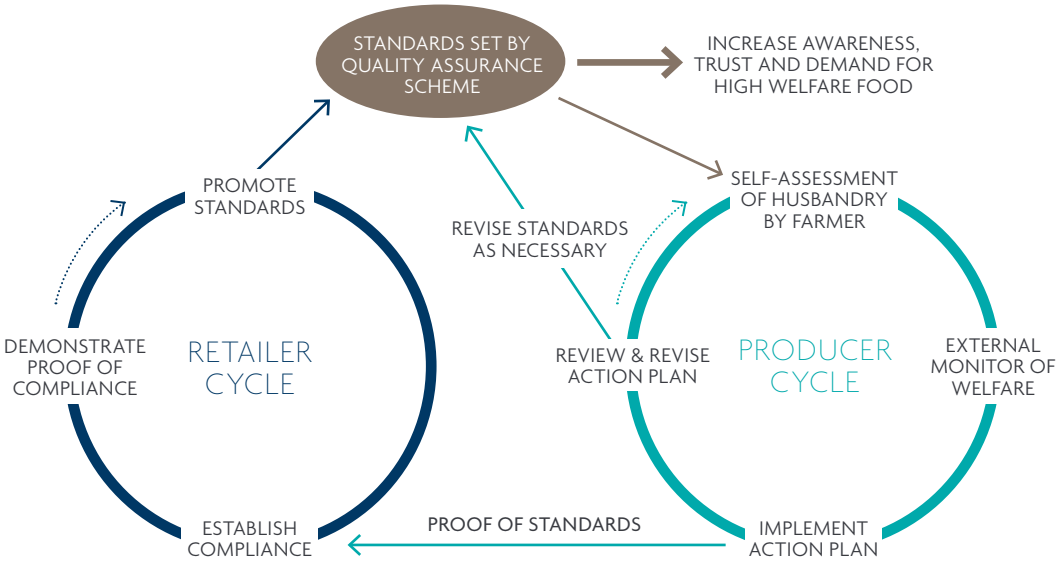
The role of assurance schemes in relation to the responsibilities of government was the subject of differing views. From one perspective, the responsibility for setting and ensuring a baseline level of animal welfare sits with the state. Assurance schemes have a complementary role, providing levels of welfare above the state minimum. A contrasting view from another interviewee was that, because the UK government is taking such a 'hands off' approach to animal welfare, assurance schemes already have the role of ensuring minimum standards. As a result of this, they will need to be stronger in addressing failures in farm animal welfare and work more closely with advisers and others to support improvement.

Several interviewees pointed to the development of welfare outcomes assessment and projects such as AssureWel having a big impact on the ability of assurance schemes to ensure high levels of welfare. As one expert stated:

> *"Farm assurance schemes are the perfect vehicle for ensuring that the husbandry and management on farm actually achieves the welfare potential of the systems being operated, through their audit processes and ensuring there are good outcome-based animal welfare measures."*

The use of outcome measures will also be important in enabling assurance schemes to communicate more effectively with farmers and consumers. Outcomes-based assessment can provide reassurance to farmers that the standards required under certain schemes really do deliver higher levels of welfare and can also be used to encourage support from retailers and consumers (Fig. 2.3.1). To the extent that outcomes approaches demonstrate that some systems or practices are consistently associated with lower welfare outcomes, their implementation may lead to changes in farm assurance standards themselves and even (potentially) legislation.

Figure 2.3.1
The 'Virtuous Bicycle': a vehicle designed to deliver improved animal welfare on-farm.
The producer cycle illustrates a dynamic process of self-assessment, external monitoring, action and review, on-farm; the retailer cycle illustrates the process of quality assurance and quality control at the retailer level. The direction of the bicycle is towards increased awareness, trust and demand for high welfare food. From Webster (2009).[329] Copyright UFAW.



Several respondents and interviewees raised the potential for assurance schemes to take a bigger and more proactive role in the livestock sector than they have to date. They could become more engaged with the farming sector in knowledge sharing and the dissemination of best practice, even seeing themselves as 'co-custodians' of farm animal welfare, essentially taking a far more influential role.

One expert described assurance schemes as needing to work more "*cleverly*" with others to drive improvement and suggested an 'Investors in People' type approach to animal welfare, where the focus was on encouraging continuous improvement rather than rigid pass/fail evaluation. The potential expansion of the remit of farm assurance schemes extends internationally. Increasing international trade provides a challenge as UK-based schemes do not generally cover international production, and standards in one region may be less applicable to the circumstances of another. Nevertheless, **the internationalisation of the food system is seen by one expert as providing an opportunity to influence positive developments in animal welfare** either directly by the assurance scheme expanding into other markets, or indirectly by providing advice to others setting up schemes.

While the wider trading environment provides an opportunity to influence welfare abroad, one respondent sounded a note of caution, arguing that assurance schemes are currently too expensive for the benefit they provide to work in an international environment. They suggested that schemes need to become more cost effective, making use of more automated approaches in order to work internationally.

Alongside discussion of the role of farm assurance schemes, many interviewees spoke of the challenges facing them. The common theme was the challenge for assurance schemes to achieve the right balance in their work. Alongside the need to evolve and progress standards are the requirements to reflect consumer opinion, listen to farmers and respond to the demands of retailers. At the same time the schemes must be economically viable, representing cost effectiveness for producers and resulting in products that consumers are willing to pay for.

2.3.2 The role of the RSPCA's Freedom Food scheme

Expert interviewees were asked for their comments on the role that Freedom Food might play in influencing farm animal welfare over the next two decades. They identified a number of challenges and opportunities for the RSPCA's Freedom Food scheme to take on in the future.

- **Continually raising the (mainstream) bar and ensuring quality welfare outcomes** – In the words of one interviewee, Freedom Food should be "*raising that baseline standard, encouraging more retailers to take that on board, and for shoppers to be buying with that as the baseline.*"
- **Ensuring continuous improvement and high standards expected of the RSPCA** – including noting some species-specific concerns, for example, beak trimming of hens, tail docking of pigs, and welfare issues in laying hens where a wide variation of welfare outcomes is present among producers operating under the Freedom Food scheme.
- **Striking an appropriate balance between improving 'quality' of animal welfare standards and increasing 'quantity'** (i.e. growing its market size and number of members) whilst also keeping the scheme commercially viable for the farmer ("*because without them we can't do anything*"). This relates to a critical tension identified between Freedom Food being a commercial scheme and one that is linked to a charity keen to be associated with high welfare standards. As one expert commented, it needs to be "*keeping that higher welfare because that's what they stand for, but continuing to ensure it can be applied on farm in a commercially sustainable way.*"
- **Growing its influence.** Firstly, it should help drive up animal welfare standards internationally – particularly across Europe, where several experts felt there were opportunities (as there are no equivalent schemes in the rest of the EU, other than in Germany and the Netherlands). Secondly, it should continue to influence retailer standards. Thirdly, raising consumer awareness of welfare issues for species where the Freedom Food scheme currently has low coverage may facilitate expansion of the scheme in these sectors.
- **Being transparent, honest and clear about its positioning** – as one interviewee put it "*to be clear with the public about what the different tiers [of standards] actually mean in the marketplace and where they sit within that.*" Another said "*they [the different assurance schemes] are doing different things; the attempt to show themselves to be better [than each other] is not needed any more.*"
- **Focus** – being clear about whether its strategy should be to strive to influence welfare for all species or to focus on a few. In so doing, some commentators highlighted that it should not be assumed that farm assurance schemes are always the best way to improve farm animal welfare in all sectors.
- **Demonstrating the broader benefits of good farm animal welfare** in terms of economics, ethics, human health, farm animal health and the environment. Freedom Food needs to assess how it can maximise these broader benefits (where they exist) and how it can avoid potential conflicts or trade-offs (for example with environmental issues such as carbon footprints of intensively reared chicken versus free-range chicken).

These findings largely mirror those of the McNair Report, published in May 2013, an independent inquiry and report commissioned by the RSPCA into the Freedom Food scheme. This proposed that Freedom Food and the RSPCA should work together to develop and implement an agreed strategy. It set out a number of recommendations for this strategy, which included that there should be an emphasis on quality (of animal welfare) and not quantity (of Freedom Food members); a clear focus on improvements in the welfare of animals; plans to increase Freedom Food's ability to influence other animal welfare standards, both in the UK and abroad; and inclusion within the strategy of outcome-based assessments.[330]

The overwhelming consensus from expert interviewees was that the RSPCA's Freedom Food scheme does have an important role to play in driving animal welfare improvements in the future, both in the UK and internationally. Critically though, it must not rest on its laurels – it should pursue high quality and then should try to use its influence to even greater effect.

2.3.3 Implications for food labelling

Common themes from our interviewees were around the need for transparency and simplicity in food labelling and the difficulty in achieving this. One expert argued that it was very important that labelling conveyed to consumers honestly that "*this is how the animal was reared.*" However, along with others interviewed, they warned of the current confusion that results from different schemes having different labels and describing things in inconsistent ways. Another issue raised was the difficulty in providing transparency around farm animal welfare in a simple label when the issue itself is multi-faceted and the space available for information is relatively small. As one expert interviewee noted:

> "*With the Food Information [Regulations], and the changes that's driving, that certainly means there's going to be a lot less space on the pack [...] to communicate some of these things. So [great] if the schemes are able to find a way to concisely, consistently engage on welfare [...] but it's going to become more difficult, as there ain't a lot of room there.*"

One respondent predicted that the issue of transparency would be facilitated by an evolution in technology used by retailers, such that consumers will be able to use screens in-store or at home to look up exactly where a product has come from and how it was produced. However, another expert pointed to the limited time that consumers spend making judgements about what to buy, making simplicity in messaging paramount, and potentially limiting the usefulness of more extensive information being displayed. Essentially the issue of labelling boils down to balancing the need for quick recognition with messaging that is meaningful to consumers.

While there was universal recognition for transparency and simplicity, our experts provided a diverse range of opinions as to how this should be achieved with provenance, method of production, specific welfare labelling, and broader 'omni-labels' covering a range of issues, all mentioned as potential approaches that should be pursued.

One industry expert argued that labelling should concentrate on country of origin labelling with domestic consumers encouraged to look for local or British products. The use of provenance labels can be easily extended to processed meats and ready meals, which makes it a simple system to understand. The responsibility then sits with the industry to ensure that the quality implied by a British provenance label can be trusted.

Other interviewees argued for more discrete information about how animals were reared or on the level of welfare associated with the production system used. One approach mentioned by several experts was the implementation of 'method of production' labelling, for example between organic, free range, indoor extensive systems and indoor intensive systems. One respondent argued that simple labelling along method of production lines "*will help consumers navigate the market*", noting that "*consumers [already] have enough knowledge and information these days to be able to tell a lot in terms of ethical, nutritional, environmental and animal welfare implications of their food.*"

Other experts noted that the EU may pursue method of production labelling, extending the system already in place for shell eggs, but were not sure whether or not this policy would be pursued. As one animal welfare expert said:

> *"There is acknowledgement from [the European] Commission that consumers want to know more at point of sale. If [this] translates into commitment for mandatory clear method of production labelling, scheme labels may just give additional assurance that auditing/detailed standards [are] in place. [It is] hard to say which way it will go."*

An alternative view was for the need for specific animal welfare labelling, with more consideration of animal welfare in the market place. One academic argued that this could happen through farm assurance schemes but could also be carried out through labelling. They noted that this approach was discussed for many years through the EU's Welfare Quality Programme but did not, in that case, result in a food labelling initiative. Another expert spoke of the potential for the different schemes collaborating to define a shared 'higher welfare standard' incorporating a combination of measures around higher levels of behavioural opportunities as well as health-based outcomes. This would provide more clarity in the market and has its precedent in the process undertaken by stakeholders to define organic production.

Rather than focusing specifically on welfare, one food industry expert argued that information on animal welfare should be displayed alongside other information on food packaging labels, recognising that food related issues, including animal welfare and environmental sustainability, need to be considered together. They advocated a simple three-stage grading system used in the Netherlands as a good model for how this should work. The 'Beter Leven' quality mark initiated by the Dutch Society for the Protection of Animals, awards products with one, two or three stars depending on how well livestock production complies with animal welfare criteria.[331] With criteria built up around environmental sustainability as well as animal welfare, such a system could be used to create a combined label indicating a product from animals reared to high welfare standards and in an environmentally responsible way.

2.4 Conclusions from 'looking forward'

The next 20 years will herald a period of considerable change for the livestock sector and, consequently, for the opportunities to drive improvements in farm animal welfare and for a greater proportion of farm animals to be able to live a 'good life'.

Pressure on the agricultural sector to satisfy continuing societal demands for cheap food will be exacerbated by the need for the sector to reduce its contribution to, and to adapt to the impacts of, climate change. Initiatives to reduce climate impact that are focused on selecting increasingly fast-growing or high-yielding animals, are likely to be of concern to farm animal welfare advocates over the coming years, with farm animal health and wellbeing today already affected by genetic selection that prioritises production efficiency traits.

However, the response to climate change and developments in genetic science also offer opportunities for improving the welfare of animals in 2034. The need to respond to climate change has led to innovation across the livestock farming process, from animal housing and resources to feed. Where investment is made, it offers opportunities to improve animal wellbeing in the process.

Many food chain thinkers have advocated agro-ecological approaches to food production for many years as a more sustainable alternative to 'industrialised' farming systems. The immediate threat of climate change and growing demand for animal products globally has also led to more considered thinking in industry and beyond about the future of livestock production and the changes that might need to be made to production and consumption behaviours in moving to a truly sustainable livestock production system, with safeguarding farm animal welfare as an essential component.

As well as presenting welfare risks in enabling the selection of ever higher-yielding animals, genetics also offers great opportunities for improvement in farm animal welfare, by helping to produce healthier, more robust and disease resistant animals. However, when it comes to biotechnological applications, even where positive gains for welfare may be achieved in some respects, unintended negative consequences on other aspects of animal wellbeing must always be guarded against. The sexing of semen and eggs provides a potential solution to the ethical challenge posed by the issue of offspring which have no economic value as a result of their gender.

One of the big opportunities for farm animal welfare is provided by improvements in our understanding of farm animal behaviour and the application of that in new outcomes-based welfare assessments. This will enable animal welfare experts to make better assessments about the overall welfare of animals in different production systems and provide information to improve farm animal welfare standards, assurance schemes and even animal welfare legislation. The development and adoption of outcomes-based approaches to welfare is likely to be supported by the development of new automated technologies for assessing animal health and wellbeing. These technologies often have the advantage of monitoring animals objectively over relatively long periods of time, leading to valuable insights into their behaviour and better assessments of welfare levels than may be possible, even by a welfare expert, examining animals in a short period of time.

How farming systems will evolve in the future is uncertain. However, it is reasonable to expect that some existing economic, social and environmental challenges are likely to become more acute and new challenges will emerge that very few people have anticipated. Most expert interviewees felt that farm assurance schemes and retailer standards are likely to play an important role in delivering improved farm animal welfare in the future.

Many expert interviewees mentioned the increasingly international market for meat as a driver of change in the sector over the next 20 years. While this provides challenges to animal welfare as international institutions become more important, it also provides an opportunity for the standards and assurance schemes that have been established in the UK to influence producers abroad, impacting farm animal welfare standards around the world.

Several experts interviewed felt that the RSPCA's Freedom Food scheme faces a number of challenges to its future success. Many felt that two key elements should be the focus. Firstly, it should continue to drive up standards (and practice) and, secondly, it should extend its influence internationally, where arguably many of the biggest opportunities – and challenges – exist for progress on farm animal welfare.

There was an overarching consensus from expert interviewees that farm assurance schemes will continue to have an important role to play in the future, whether that be simply providing an acceptable ethical minimum or more proactively setting the agenda for higher farm animal welfare standards.

PART THREE

OVERALL CONCLUSIONS

3.1 Discussion points

Change or progress?

There have certainly been very significant changes in farm animal welfare in the UK over the past 20 years. **The evidence suggests that there has been progress for many species in terms of raising the level of standards, including the prohibition of some of the most intensive confinement systems and an increase in the proportion of animals reared to standards above baseline level.**

It is though very difficult to say how much progress there has been in terms of the welfare outcomes experienced by the animals. Certainly we would expect some aspects of welfare to be greatly improved, particularly in relation to meeting the behavioural needs of certain animals. For example, all laying hens are now kept in systems where they may be able to satisfy, to some extent, their strong motivation to lay their eggs in a nest and all breeding sows are able to move freely and engage in social contact with others of their kind for the majority of their lives. However, there are some aspects of farm animal welfare where, despite the rhetoric, there is little available evidence of progress having been made, particularly in relation to the levels of certain health and welfare problems that are exacerbated by breeding for excessive growth rates and yields.

Most of the experts we spoke to welcome the recent shift away from *inputs* towards also measuring welfare outcomes and they expect the welfare *outcomes* approach to grow in prominence in the years ahead. That is likely to enable better judgements to be made on the scale and pace of improvements.

On the whole, the expert interviewees agreed that there is still a long way to go. There are still tensions about going 'too far ahead of consumers' and moving ahead of other competing countries to the extent that the UK's livestock industry becomes uneconomic.

International context

The international context is vitally important as the balance of trade when it comes to meat, and fish, is significant. In other words, we are a long way from being self-sufficient and it is unlikely, in the globalised trading environment in which we operate, that this will radically change in the near future (even with the increased likelihood of climate change-related impacts).

From a domestic perspective, there are potential threats of animal and human disease spreading from countries with poor animal production standards to the UK.[332]

The role of farm assurance schemes

There was almost universal acknowledgement amongst our expert interviewees that farm assurance schemes have pushed up standards and made a positive contribution to farm animal welfare in the UK. There is an (understandable) element of competition between different schemes. However, there was also a recognition that having different tiers might be useful, so that there is an accessible entry point for consumers and a range of levels for them to move to should they so choose. Providing information about schemes to consumers in clear, honest and consistent ways is critical if people are to stand a chance of understanding the relative benefits of different schemes and be able to make an informed choice about the welfare options.

There may be novel approaches that farm assurance schemes (and food companies) can take to drive improvements in farm animal welfare. For example, financial incentives (together with technical advice and support) were successfully used in Austria to address beak trimming and feather pecking in laying hens.[333] The farming industry can often find its own solutions to welfare problems if the economic situation can be made to encourage rather than discourage progress and if farmers are given appropriate support.

Other drivers of change: beyond farm assurance

It is clear from our research that changes in farm animal welfare have been, and will continue to be, driven by a range of factors and actors. Farm assurance schemes are a key part of that, but they are not the only driving force and indeed may not always be the best way to influence farm animal welfare in all sectors.

A joined up approach is needed from assurance schemes, food companies, government, research and other key groups (including welfare NGOs) to drive farm animal welfare improvements and consumer demand. As one expert interviewee said:

> *"In terms of how to solve these problems I would advocate co-ordinated industry / government strategies that use all levers available – farm assurance standards & monitoring, industry knowledge transfer programmes, better influencing skills for advisors & focused cross compliance requirements."*

Avoiding a blinkered focus on single issues

Environmental and farm animal welfare concerns should be seen as closely linked issues. Improvements in animal welfare can contribute to sustainable production and reduced environmental impact.

When considering farm animal welfare, the health and wellbeing of the people handling and caring for farm animals – right across the life of an animal – is too often ignored. However, this is a vitally important issue – how people are motivated and incentivised is a crucial determining factor in how well animals are cared for and treated.

Farm animal welfare is also important in the context of ongoing debate around human health and nutrition, which – although not a key focus of these discussions – is an important issue to be considered.

Farm animal welfare and ethics: unanswered questions?

Ethics and farm animal welfare issues are closely intertwined. What is considered acceptable or unacceptable is largely based on personal values but these values are influenced by transparency, connection and how much people really know about the conditions the animals enjoyed or endured during their life (and death). It is evident that many millions of people in the UK do care passionately about farm animal welfare. Equally, there are millions whose actions suggest they are not overly concerned about the issue or believe they are purchasing higher welfare products when they are not.

Is that because there is a perception (which some experts would support) that in the UK we're actually a lot further ahead on farm animal welfare than many other countries? Or if people in the UK *knew more* about those conditions, would they more demonstrably care about farm animal welfare? Do people care, but not know? Are some aspects of farm animal welfare, as some have suggested, being deliberately hidden or obscured from 'the end consumer'? Do people say they care, but not really want to know? Do they know but feel they cannot 'afford to care'? Or do people merely want to know that regulations and assurance schemes ensure an adequate minimum level of welfare so that they do not have to make an individual choice, which they might feel ill-informed or ill-qualified to make? This research has not attempted to answer these questions – we simply put these forward as important considerations as we think about the next twenty years.

3.2 Key conclusions

- Pressure on the agricultural sector to satisfy continuing societal demands for cheap food will be exacerbated by population growth, dietary shifts, resource constraints and the need for the sector to reduce its contribution to, and to adapt to the impacts of, climate change. Initiatives to reduce climate impacts that are focused on selecting increasingly fast-growing or high-yielding animals are likely to be of concern to farm animal welfare advocates over the coming years, with farm animal health and wellbeing today already compromised by genetic selection that prioritises production efficiency traits.
- Most expert interviewees felt that farm assurance schemes and retailer standards have helped, and are likely to help in the future, to deliver improved farm animal welfare. Since it was introduced in 1994, the RSPCA's Freedom Food scheme has played an important role in providing higher standards for a significant proportion of animals in several sectors. Organic schemes also provide higher standards for a minority of animals across all sectors, whilst progressive food companies are taking an increasingly proactive role in setting standards above the baseline for large numbers of animals in some sectors.
- The overwhelming consensus from expert interviewees was that the RSPCA's Freedom Food scheme does have an important role to play in driving animal welfare improvements in the future, both in the UK and internationally. Critically though, it must not rest on its laurels – it should pursue high quality and then should try to use its influence to even greater effect.
- Even as assurance schemes and leading food companies are driving standards up, the genetics of the animal are often pushing in the opposite direction so that even better standards, management and nutrition are needed to achieve an equivalent level of welfare. Hence in some ways, we are working hard even to stand still. Some recent shifting of breeding goals in certain species (e.g. dairy cattle) away from production-related parameters to those focused on health and welfare gives some grounds for optimism.
- In recent years, the focus has shifted somewhat away from farming systems and input standards towards also measuring and seeking to improve welfare outcomes for the animals. This trend is expected to continue and accelerate. The development and adoption of outcomes-based approaches to welfare is likely to be supported by the development of new automated technologies for assessing animal health and wellbeing.
- How farming systems will evolve in the future is uncertain. However, it is reasonable to expect that some existing economic, social and environmental challenges are likely to become more acute and new challenges will emerge that very few people have anticipated.

3.3 Recommendations

- A co-ordinated approach is needed between the farming industry, assurance schemes, food companies, animal welfare organisations, government and research to drive and monitor progress in farm animal welfare and consumer awareness.
- Farm animal welfare needs to be fully considered, not only as an important entity in itself, but also as part of an integrated view of the future. We need to move towards a shared vision of fair, healthy, humane and environmentally sustainable food and farming systems.
- The UK should seek to resurrect its historical position of playing a leadership role on farm animal welfare. Concerns about competitiveness must not be allowed to lead to the UK being left behind on welfare issues as other countries in Europe and beyond continue to make progress in improving standards. The UK should seek to drive further improvements in welfare standards and encourage others to follow so that the global trading environment is harnessed as an opportunity for a 'race to the top' rather than allowed to degenerate into a 'race to the bottom'.
- Farm assurance schemes should seek to set a challenging benchmark for farm animal welfare and work with partners across the food system to ensure their standards are translated into good (and improving) welfare outcomes in practice. Within that context, the RSPCA's Freedom Food scheme should seek to use its influence to even greater effect, extending its reach internationally, setting the benchmark standard for retailer schemes domestically, and increasing its impact for those species where penetration rates are currently low.

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Acknowledgements

The authors would like to thank the following people for kindly contributing their time and expertise to this research:

Full interviews

- Professor Richard Bennett, University of Reading
- Helen Browning, Soil Association
- Professor Henry Buller, University of Exeter
- Dr Abi Burns, Royal Society for the Protection of Birds (RSPB)
- Sue Ellis, Department for Environment, Food and Rural Affairs (Defra)
- Jane King, Farmers Weekly
- Senior representative from sustainable food research and development organisation
- Sue Lockhart, Sainsbury's
- Philip Lymbery, Compassion in World Farming[vi]
- Professor David Main, University of Bristol[vi]
- Catherine McLaughlin, National Farmers Union (NFU)
- Dr Julia Wrathall, Royal Society for the Prevention of Cruelty to Animals (RSPCA)[vi]

Additional issues/species-specific interviews

- Emeritus Professor Donald Broom, University of Cambridge
- Professor Cathy Dwyer, Scotland's Rural College (SRUC)
- Professor Sandra Edwards, University of Newcastle
- Dr Pete Goddard, Hutton Institute
- Chris Lloyd, English Beef and Lamb Executive (EBLEX)
- Professor Christine Nicol, University of Bristol
- Emeritus Professor John Webster, University of Bristol
- Dr John Webster, Scottish Salmon Producers Organisation
- Mark Williams, British Egg Industry Council (BEIC)

Those who provided us with additional information

- Chris Atkinson, Soil Association
- Ian Burgess, The Co-operative
- Lucinda Cobb, Lidl
- Martin Doherty, Agriculture and Horticulture Development Board (AHDB)
- Sarah Harriss, Department for Environment, Food and Rural Affairs (Defra)
- Caroline Miller, Aldi
- Emily Scott, Sainsbury's

We would also like to thank Freedom Food and the RSPCA's Farm Animals Department, plus Kate Rawles, Food Ethics Council member, for her advisory input. We would like to acknowledge the McNair report – an independent inquiry and report commissioned by the RSPCA into the Freedom Food animal welfare assurance scheme – which drew similar conclusions on some aspects.
This report's contents are the responsibility of the authors. The inclusion of a list of participants does not imply their endorsement of the views and recommendations contained herein.

vi These individuals had full interviews and were also asked species-specific questions

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The authors would like to thank all those that participated in this research.

YEARS OF FREEDOM FOOD

Public concern in the UK for farm animal welfare appears to be increasing in recent years. Despite this, farm animal welfare often does not get the attention it merits in many expert debates about achieving sustainable, fair and healthy food systems.

To mark the 20th anniversary of the RSPCA's Freedom Food scheme in 2014, independent researchers the Food Ethics Council and Heather Pickett were asked to undertake research into past and potential future changes in farm animal welfare in the UK. The work drew on views and information from a range of experts, including food and farming representatives, farm assurance schemes and leading academics.

The report looks at changes in farm animal welfare in the UK over the past twenty years and what are some of the factors driving change, including the role of farm assurance schemes and labels.

It goes on to explore what might happen in the next 20 years and what key influencing factors might be – from climate change to genetics, from changes in global trade to growing demands for transparency and beyond.