ystadegau ar gyfer cymru statistics for wales

Statistical First Release

Llywodraeth Cymru Welsh Government

June 2016 Survey of Agriculture and Horticulture: Results for Wales

24 November 2016
SFR 156/2016

The June Agricultural and Horticultural Survey has been carried out since 1867 to provide annual estimates of agricultural activity in Wales on an annual basis.

The key results from the survey show that in June 2016:

- The number of sheep and lambs in Wales in 2016 is 9.8 million
- The number of cattle and calves in Wales in 2016 is 1.1 million

These estimates are best viewed within the longer term context. The charts below show these series since 1970.

Chart 1: Total sheep and lambs in Wales 1970 to 2016 (millions)

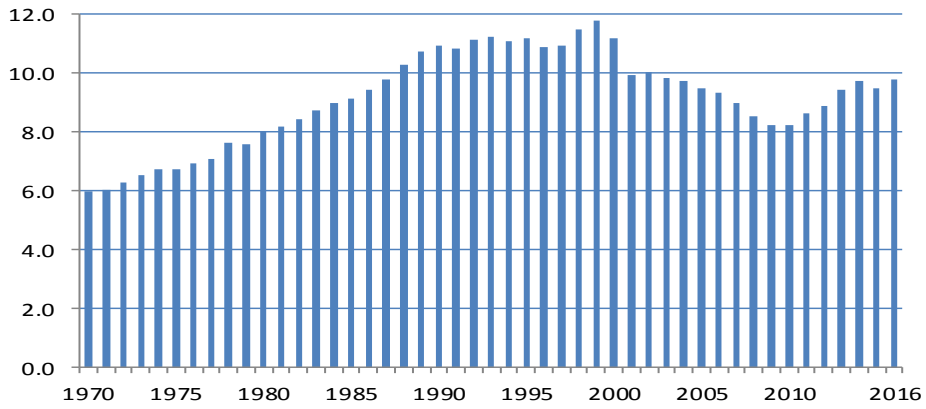
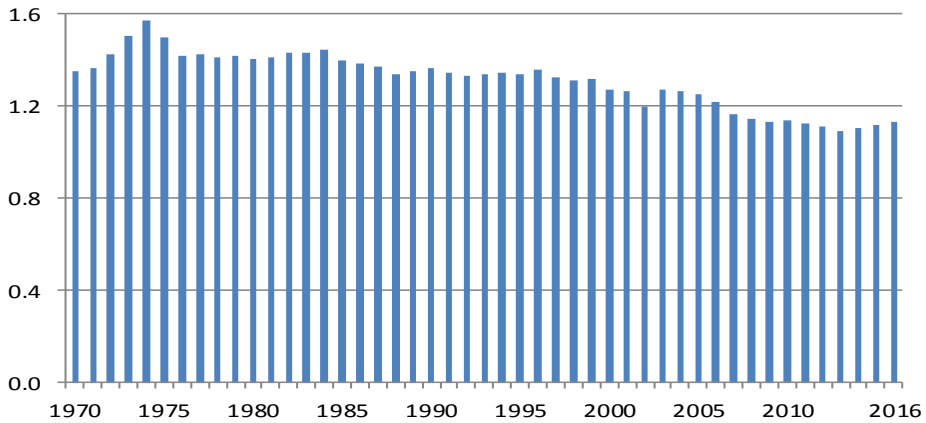


Chart 2: Total cattle and calves in Wales 1970 to 2016 (millions)



About this release

This release presents robust estimates for land use, livestock and labour on Welsh farms in 2016. More detailed analyses can be found in some of the other outputs listed in the Further Information section of this Release (page 15).

This release does not cover the use of agricultural produce (eg crops yields, meat and milk production). Further details on releases covering these topics are also included among the other outputs

In this release

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Section 1: Agricultural land use in Wales

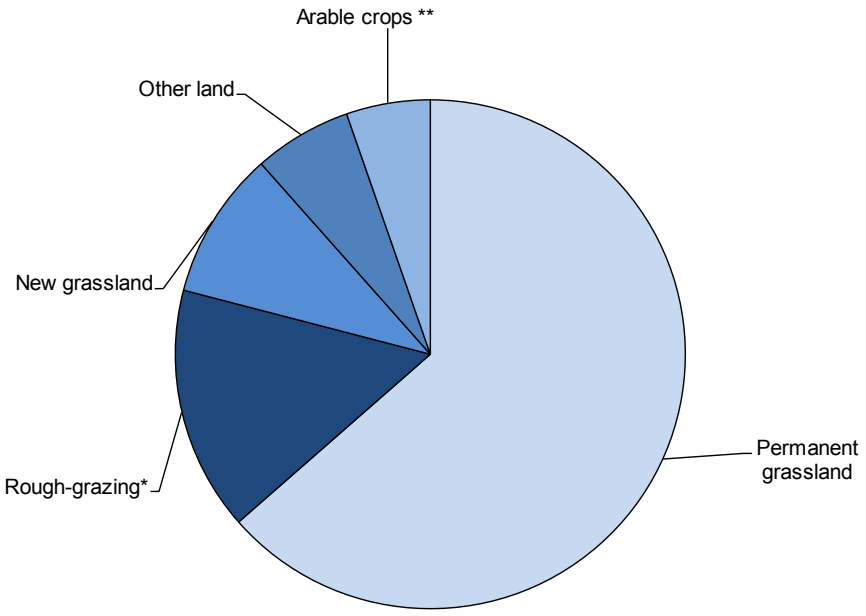
The estimates for the 2016 survey for agricultural land use show the following headline figures:

- The total amount of land on holdings rose by 0.9 per cent to **1,677,100 hectares** in June 2016. When combined with the 180,300 hectares of common rough grazing, this means that land used for agricultural purposes accounts for over 88 per cent of the total land area of Wales. However, this increase is at least partly attributable to holdings who have recently registered to qualify for farm woodland schemes.
- The total area of arable crops and bare fallow rose by 0.2 per cent to **87,700** hectares in June 2016. As can be seen on the accompanying spreadsheet, the 2016 estimate is in keeping with the most recent years' figures (c85,000). The exception to this was in 2013 when a spell of cold weather in the early months adversely affected that year's crop.

A full list of variables and time series for land use is included in the spreadsheet which can be downloaded with this release.

The landscape, soil quality and climate of Wales limits the use to which its land can be put. Most of Wales is hilly or mountainous and this, combined with relatively poor soil quality and a wet climate, means that the majority of the land is restricted to the grazing of sheep and cattle. This is illustrated in the split of the land on agricultural holdings by usage.

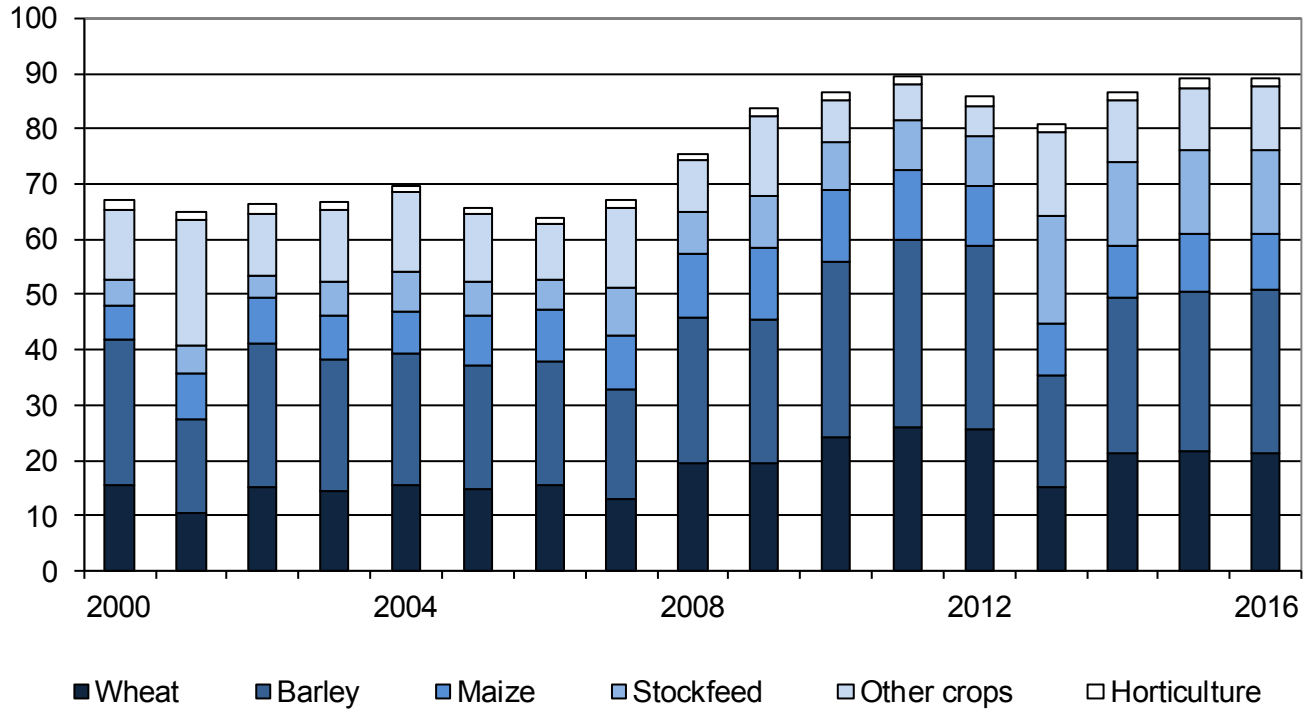
Chart 3: Split of land on agricultural holdings by usage 2016



*Rough grazing where holder has sole rights (ie excludes common rough grazing)

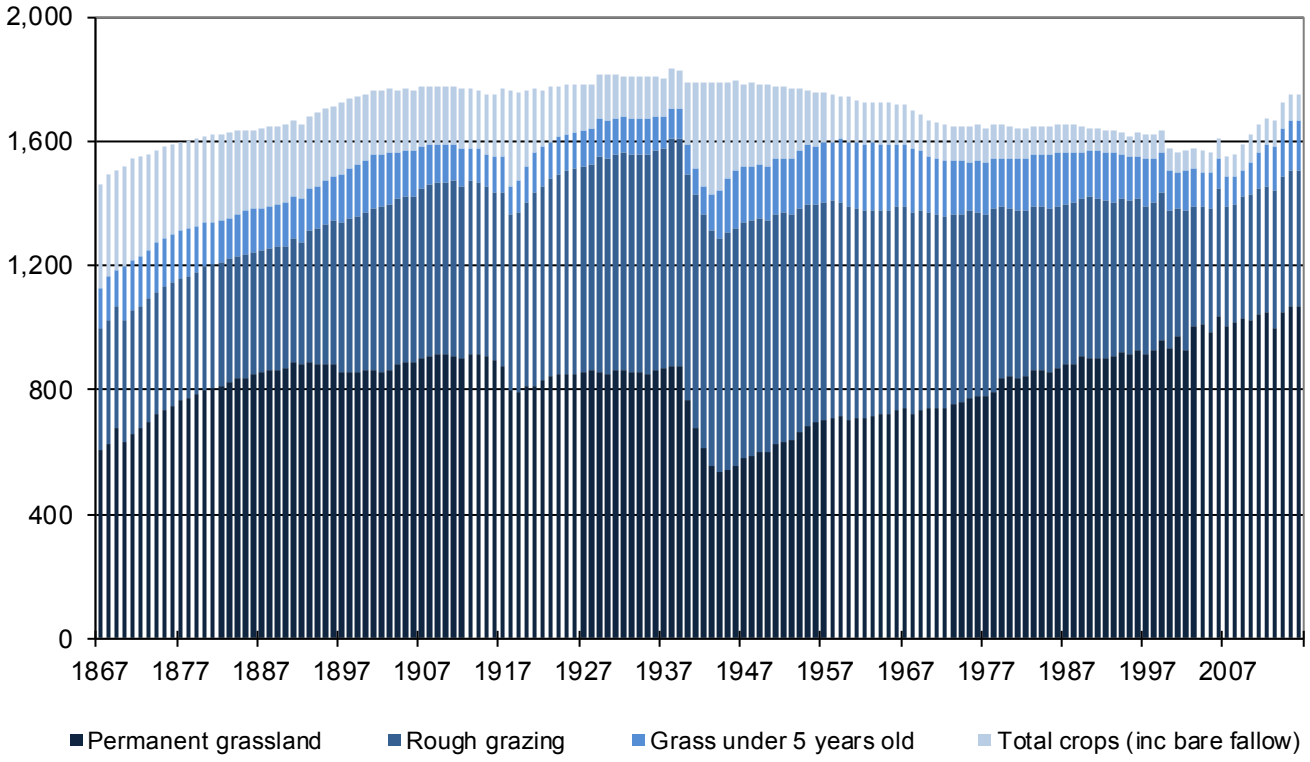
** Includes horticulture (vegetables and fruit grown in the open, hardy nursery stock and glasshouse)

Chart 4: Area of arable crops and horticulture (thousand hectares) in Wales 2000-2016



The increase in the total area in the latter years in the series is attributable to the phasing out of the Set-Aside Scheme in 2008. This scheme offered a financial incentive for farmers not to grow crops for food production on parts of their land. Instead the land would be left fallow or used for other purposes. As the scheme ceased, the land has returned to its original use.

Chart 5: Land on farm holdings in Wales (thousand hectares) 1867-2016



At the beginning of this series the area of crops grown in Wales was over 300,000 hectares. This gradually declined as mechanisation was introduced, meaning the land could be used more efficiently. The same yield of crop could now be obtained by using a smaller area of land. The effects of the World Wars (particularly the Second) can be seen where greater areas of crops were grown at the expense of grassland but these shifts were only temporary. The other factor which has impacted the area of crops in Wales is the improvement in transport links. Rather than crops being made available only in a relatively local area, faster transport has meant that crops grown in the more fertile areas of the UK (eg east of England) became more available and ultimately cheaper to produce than those grown in the less fertile land in Wales.

The increase in the total land on farm holdings in recent years may be affected by the improved registration of smaller holdings.

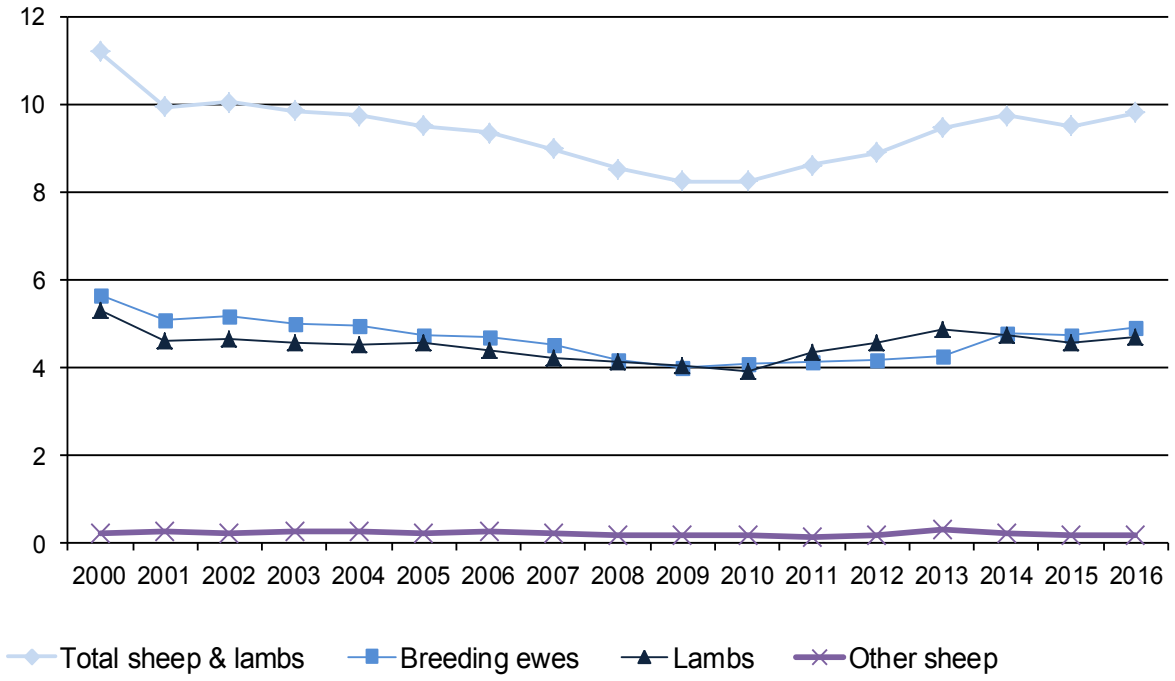
Section 2: Sheep and lambs in Wales

The estimates for the 2016 survey for sheep and lambs show the following headline figures:

- The total number of sheep and lambs in Wales was **9.81 million** – an increase of 3.2 per cent on the previous year. After falling below 8.5 million in 2009 and 2010, the number of sheep and lambs has fluctuated between 9.5 and 10 million in recent years;
- This increase was reflected in the number of breeding ewes (up 3.7 per cent) and the number of lambs (up 2.8 per cent). The numbers now stand at **4.9 million** and **4.7 million** respectively.

A full list of variables and time series for sheep is included in the spreadsheet which can be downloaded with this release.

Chart 6: Total sheep and lambs in Wales (millions) 2000-2016



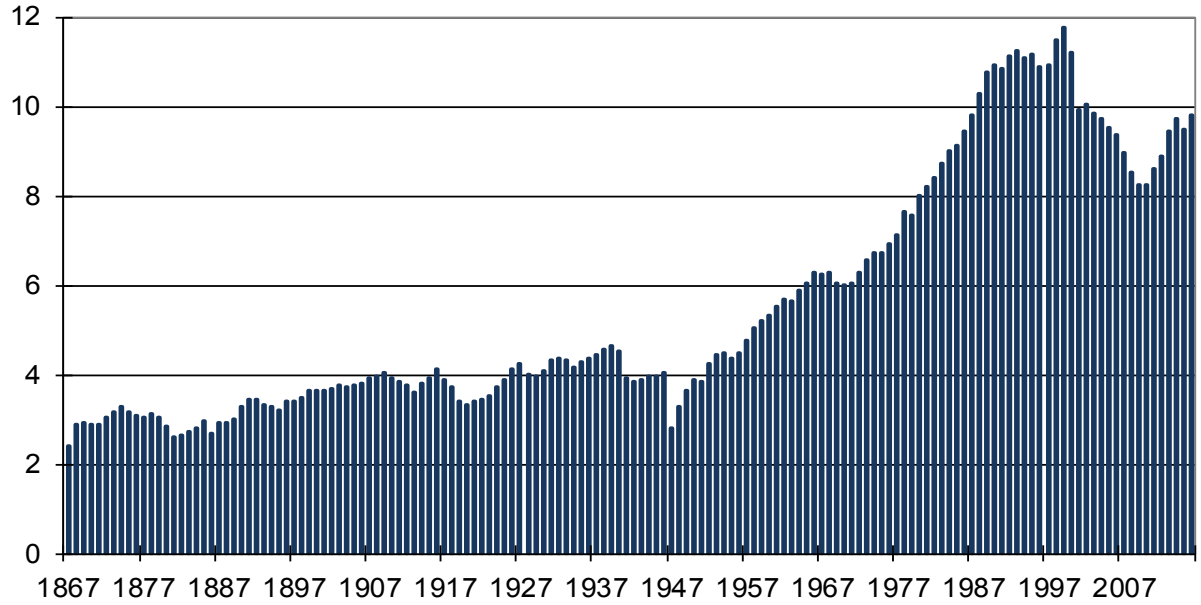
The number of sheep and lambs in Wales peaked towards the end of the 1990s at which point they began to gradually decline over subsequent years. This trend ended in 2010 when the total number of sheep and lambs reached 8.2 million, the same figure as in the previous year.

Numbers then rose steadily over the following 4 years. This increase was mainly attributable to an increase in the number of lambs. This was to the extent that the number of lambs began to exceed the number of breeding ewes. However, numbers returned closer to parity in 2014 and in 2015 and in 2016 the number of ewes have again become the slightly larger group

Prior to 2014 the industry had suffered from the effects of poor weather and low market prices in 2012 and 2013. The weather has led to many farmers not being able to finish lambs and thus sell them (or at least at an acceptable price). Thus many of these animals were retained on the farm while the farmer decided what to do with them. Often this meant that they were recorded as 'other female sheep' on the survey form and the data on the spreadsheet shows the effect of this.

The longer term series in the number of sheep and lambs is also of interest.

Chart 7: Total number of sheep and lambs in Wales (millions) 1867-2016



The numbers that we see today, whilst still not at their levels of 15 or so years earlier, are still high in the historical context. The general trend over the period (excepting the World Wars) was upward – from around 2.5 million in 1867 to over 6 million one hundred years later. At this time, the domestic market was subject to competition from imports – notably New Zealand. Upon the UK joining the European Union in 1974, farmers became eligible for various schemes under the Common Agricultural Policy, some of which were in part based on the number of livestock kept. In recent years these schemes have been modified so that they are now more based on maintaining land in a good condition. This may be a factor in the drop in numbers in recent years although the fluctuation in the most recent years could indicate that numbers are now finding their "natural" level.

The one-year trough in 1947 can be attributed to the extremely harsh winter of January to March that year – one of the severest on record. The volume of snowfall meant that many farmers were isolated from their flocks and with the ground frozen solid the sheep simply starved to death.

Section 3: Cattle and calves in Wales

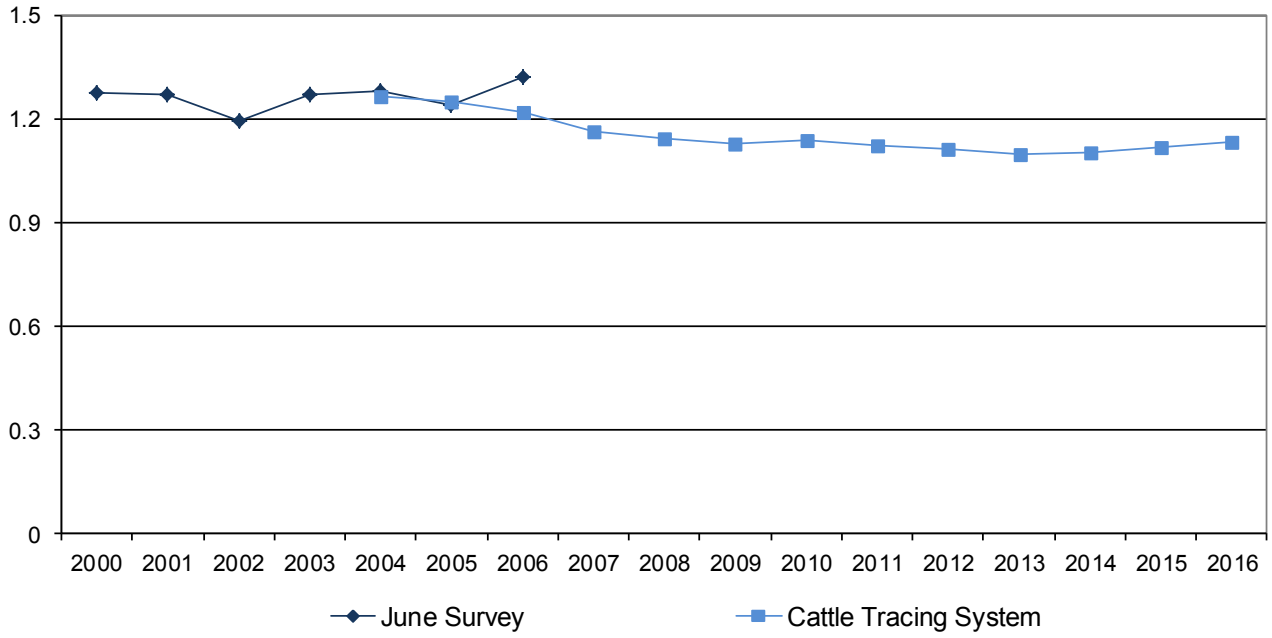
The estimates for the 2016 survey for cattle show the following headline figures:

- The total number of cattle and calves in Wales was **1,134,300** – this represents an increase of 1.4 per cent on the figure from June 2015;
- The number of dairy females aged 2 years or more fell by 0.8 per cent to a figure of **298,100**. This was caused by a 9 per cent fall in the number of these animals that had not calved. The number of females that had calved rose slightly (0.9 per cent);
- The number of beef females remained at the previous year's level of **208,600**. This follows a steady fall in numbers dating back to 2004.

A full list of variables and time series for cattle is included in the spreadsheet which can be downloaded with this release.

Since 2007 the data for cattle numbers has been sourced from the Cattle Tracing System (CTS) which is managed by the British Cattle Movement Service (BCMS), primarily for animal health purposes.

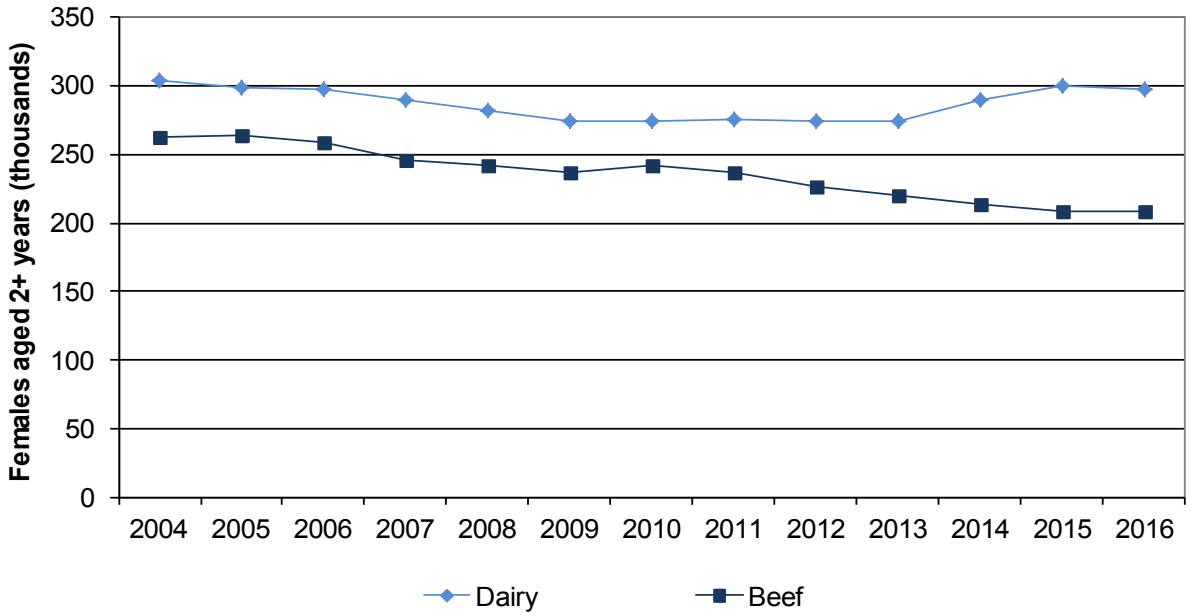
Chart 8: Total cattle and calves in Wales (millions) 2000-2016



Source: June Survey of Agriculture 2000-2006, Cattle Tracing System 2004-2016

The total number of cattle and calves has fallen by 12.1 per cent since June 2000. The breakdown between dairy and beef is not possible over the whole period because of the change to using data from the Cattle Tracing System. However the CTS data is available back to 2004 and so a comparison of dairy and beef numbers over this period is possible:

Chart 9: Number of female cattle aged 2 years and above 2004-2016



Source: Cattle Tracing System 2004-2016

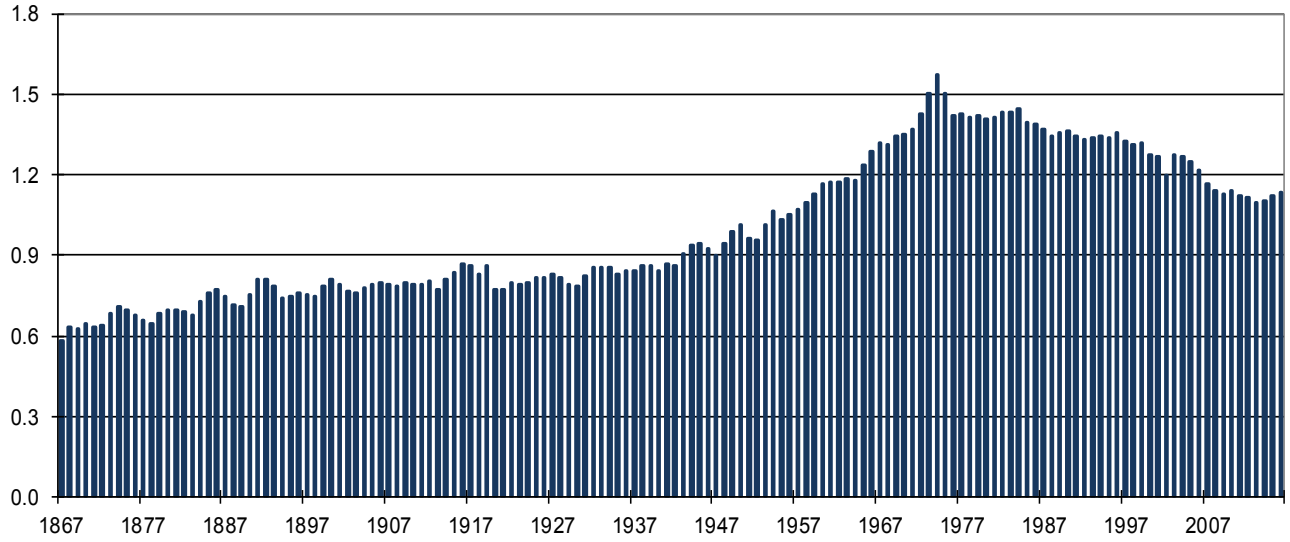
For the purposes of this release, dairy females are defined as all female cattle aged 2 years or more that are of a dairy breed. (With an equivalent definition for beef).

Between 2004 and 2013 there was a gradual fall in the number of dairy females. Increases in 2014 and 2015 returned the number to around the level seen in 2004. The number of beef females has fallen by over 50,000 (20 per cent) since 2004. With the odd exception, this decrease has been exhibited year-on-year across the period.

One possible contributory reason for this is that market forces have benefitted farmers not retaining as many beef females for future breeding and instead fattening more for sale for beef production. The switch from CAP Single Farm Payments being based partly on numbers of livestock could be another contributory factor in the general fall in numbers.

The longer term trend in cattle numbers is shown in the chart below:

Chart 10: Total number of cattle & calves (thousands) 1867 to 2016



Source: June Survey of Agriculture 2000-2003, Cattle Tracing System 2004-2016

Cattle numbers increased steadily over the first half of the period. From the 1940s to the mid 1970s the level of growth accelerated before numbers began to decline, a trend that continued until 2014.There are several contributory factors that may underpin these trends. The main ones include:

- The effects of rationing during and after the Second World War. Linked with spells of greater austerity this would restrict the market for beef and milk. This was followed by an encouragement for farmers to produce more in order to make the UK more self-sufficient in future;
- Advancements in farming methods. More selective breeding, automation (particularly in the milking process), advancements in animal feeds, improved veterinary care and increased efficiencies would all have an effect;
- The UK joining the European Union in 1974. EU subsidies became available including some based on the headcount of particular animals on farm. The link to headcount was removed several years ago and this would also have had an impact.
- In 1983 the EU introduced the concept of milk quotas for member states. This restricted the amount of milk that a dairy holding could produce (each individual holding's limit or quota). Any milk produced in excess of this quota could not be sold and thus was of no value. However the quota ended in 2015 and the effects of this are likely be seen in forthcoming years.

Section 4: Other livestock in Wales

The estimates for the 2016 survey for pigs, poultry, horses, goats and farmed deer show the following headline figures:

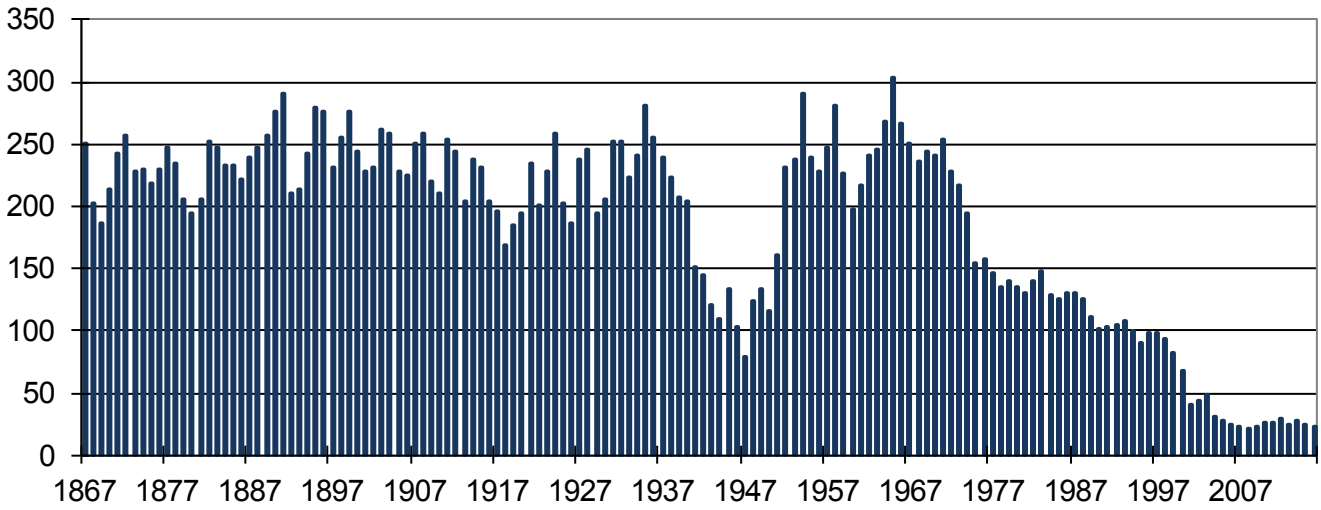
- There was a decrease of 8 per cent in the number of pigs in Wales in June 2016. The current total is **23,200**. This fall was seen among both breeding pigs (down 5 per cent to **3,800**) and fattening pigs (down 9 per cent to **19,400**);
- The total poultry in Wales was **7,828,700** in June 2016 – the majority of these were table chicken or broilers (**4.3 million**) and chicken kept for eggs (**1.8 million** birds);
- The number of horses in June 2016 was **45,500**, a decrease of 10 per cent on the figure from the previous year. However, it is worth noting that the majority of horses in Wales are kept for non-agricultural purposes. Most are found at liveries, riding schools or kept in paddocks or stables as pets for recreational purposes.

A full list of variables and time series for other livestock groups is included in the spreadsheet which can be downloaded with this release.

Pigs

In recent years the number of pigs in Wales has fluctuated at a level between **20,000** and **30,000**. This is as likely to be as attributable to variations among a handful of large producers from year to year as any sustained trend. However to appreciate the magnitude of the numbers today, it is interesting to consider them in the longer term context.

Chart 11: Total number of pigs (thousands) in Wales 1867-2016



The chart shows that historically the number of pigs in Wales was consistently over the 200,000 mark. The only exceptions were dips during and immediately after the World Wars. This ended in the mid 1970s (the last year when more than 200,000 pigs were recorded was 1973).

Since this point the number of pigs in Wales has fallen consistently. The reason for this fall is economic. Following the UK's entry into the European Union (EU) in 1974, the pig industry in this

country was faced with cheaper, imported meat from countries including Denmark, Germany and others.

The fall between 2000 and 2001 was particularly severe (over 40 per cent). This was exacerbated by the Foot and Mouth outbreak in the early months of 2001. As a proportion of the total population, the number of pigs slaughtered as a result of the outbreak was greater than for any other livestock group in Wales. Numbers did recover somewhat in the following two years before the gradual downward trend resumed.

The number of pigs hit its all-time low figure of just over **20,000** in June 2008. Since this point numbers have fluctuated up and down in subsequent years with no discernable trend showing.

The structure of the pig industry is different from that of cattle and sheep. Market forces have meant that pig meat production is no longer viable for many smaller producers. Remaining producers tend to be the larger ones and are relatively few in number. To illustrate this, over two-thirds of the pigs in June 2015 were to be found on less than 20 holdings.

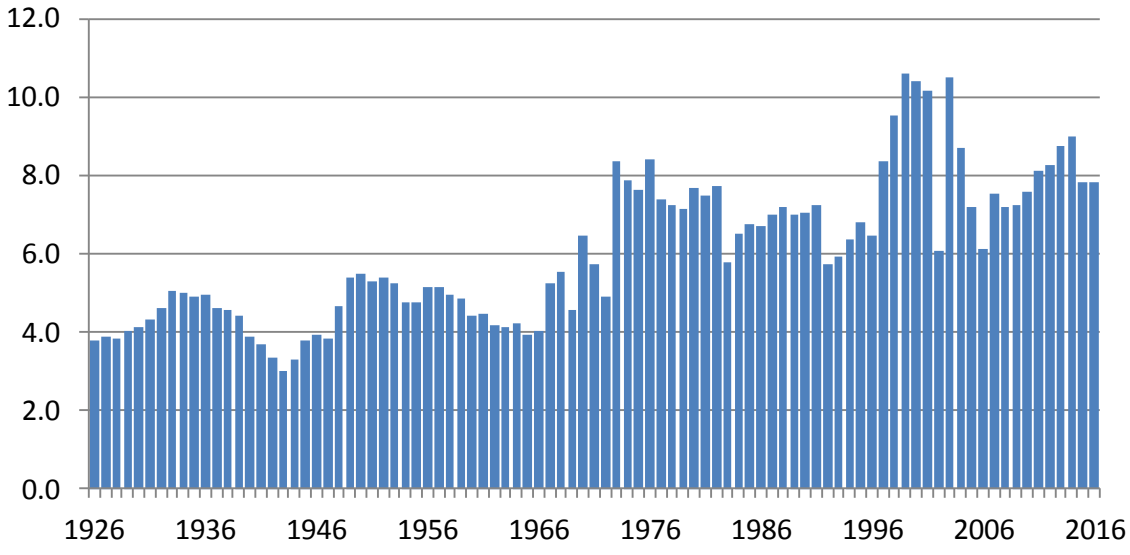
Poultry

The poultry industry in Wales is similar to that for pigs in the sense that almost all of the birds are to be found on a relatively small number of large producers. The number of birds is also particularly difficult to measure accurately since the June Survey provides a snapshot of activity on a single day (the first working day of June).

The housing of large poultry units requires that the sheds in which the birds are kept must be emptied periodically (every 2-3 months) for complete cleansing. It is perfectly possible that, on the survey day, any particular shed may contain no birds. It has already been stated that there are relatively few producers in Wales and so the number of sheds that are not in use on the day is clearly of great significance in estimating poultry numbers.

With this in mind it is perhaps better to consider the longer term trend.

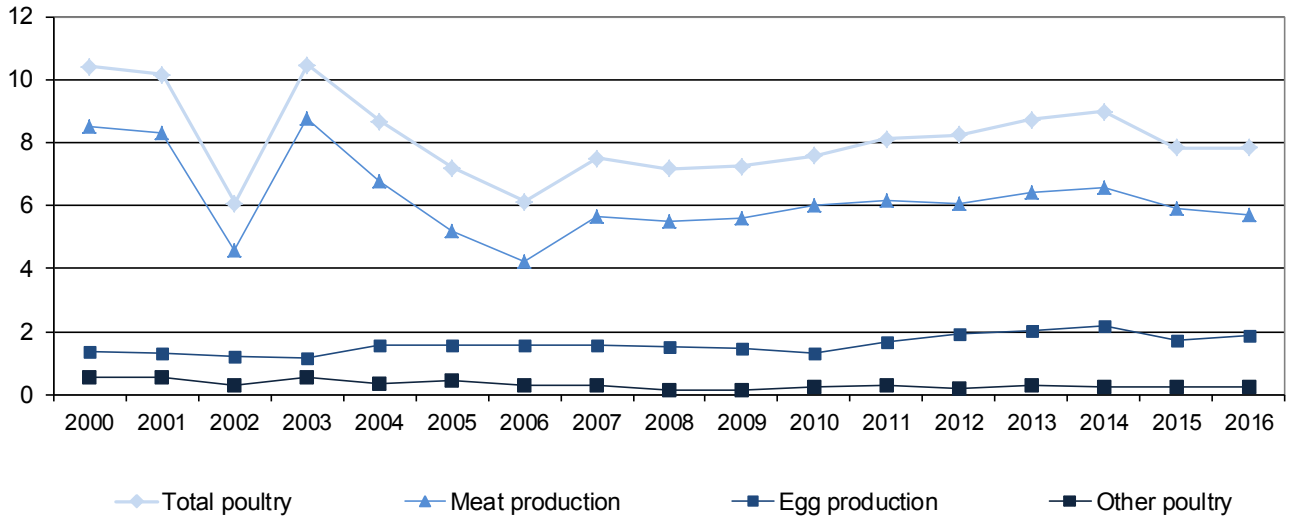
Chart 12: Total poultry (millions) in Wales 1926-2016



Even over this period there is no steady long-term trend – reflecting the volatile nature of this series mentioned above. It is fair to conclude that the numbers are generally lower in the earlier half of the chart. The increase in numbers after this can be attributed to the introduction of more intensive poultry units for the production of both meat and eggs. As stated above, the need for a period of emptying sheds for cleaning means the series exhibits more volatility over this period.

In terms of the number of birds, the poultry industry is dominated by the production of broilers (or table chicken) for meat production. This is illustrated in the chart below.

Chart 13: Poultry numbers (millions) in Wales 2000-2016



The striking feature is the 'V' caused by a sharp drop in 2002 followed by a recovery in 2003. The reasons for this are unclear. It may be that this is simply an extreme example of the "empty sheds" situation described above. Another possibility is a temporary switch of production to pigs after the Foot and Mouth outbreak. Pigs and poultry units are easily interchangeable and it might be the case that there was a temporary switch to help re-stock the pig population in the immediate aftermath.

Horses, goats and farmed deer

Data on these livestock groups are not presented as part of this Release although they are available in the accompanying spreadsheet. The reason for this is that, in an agricultural context for Wales as a whole, they are of less interest than other livestock groups.

As a result of mechanisation, the use of horses for agricultural purposes is almost a redundant concept in the 21st century. A tiny fraction may still be used in this way but these will be on tourism/museum sites rather on real modern-day working farms. Almost all of the horses in Wales today are kept purely for recreational purposes.

Whilst there are some goat herds in Wales, the majority of these will be relatively small and will not form the basis for a commercial undertaking. Typically they would be used for grazing to maintain the land and, in some cases, a small amount of milk production. There are a handful of more

commercial dairy producers but it isn't possible to focus on these without risking disclosure of individual farm operations.

Farmed deer need to be distinguished from deer in general. Farmed deer are those deer that are bred and kept primarily for producing meat or hide. Deer kept for recreational or tourism purposes are not included. Thus farmed deer tends to be a very specialised area with only a handful of producers and relatively few animals.

Section 5: Labour on agricultural holdings in Wales

The estimates for farm labour presented in this release are only intended to be indicative at this stage. Please see the comments on data quality below for further information. The estimates show that:

- The number of principal farmers, directors, business partners and their spouses was **39,900**. This represents a fall of 4 per cent from the figure for 2015;
- This number comprises **18,600** full-time principal farmers and **21,300** part-time. Both elements exhibited a similar reduction from the figures from 12 months ago;
- The number of people employed on farms at 1 June 2016 was **13,600**. This figure includes regular workers (who would work on the farm throughout the year) and casual workers who were working on survey day. It should be noted that it does not include self-employed people or contractors who may also work on the farm. Whilst this figure is 18 per cent lower than the equivalent number in 2015, the difficulties in estimating labour numbers outlined below are likely to be a significant contributory factor in this.

As reported in previous versions of this release, there are additional difficulties in the estimation of farm labour numbers. The estimation techniques applied to other areas of the form (based on the trends exhibited on similar farms over the past 12 months) are not suitable. Instead labour estimates are produced by comparing farms who have made a returned value in 2016 and in the previous survey.

In 2016 there was a further difficulty in that the questions on the survey form included additional questions required for the EU Farm Structure Survey. As well as the number of people working on the farm, this asks questions on characteristics such as whether people working on the farm are part of the holder's family and whether they undertake other paid work.

The decreases in estimated farm labour in 2016 mirror similar decreases seen in 2010 and 2013 – the last two times that the EU Farm Structure Survey was carried out in conjunction with the June Survey. This can be observed in the time series on the spreadsheet which can be downloaded with this release.

The time series for labour shows far more variability than would probably be expected. The nature of work carried out on the farm would be expected to be broadly the same year in, year out. Clearly there will be exceptional years which would entail an increased workload on the farm but these would cause peaks to appear in the series rather than the more general volatility that is observed.

This issue first became apparent in 2010 when the June Survey form was combined with the EU Farm Structure Survey for the first time. At that time a separate release was produced which further explained the associated problems.

In the 2010 release, and in subsequent releases, it has been stated that the whole topic of recording and reporting labour data on farms needs further consideration. This will aim to better reflect the pattern of more informal working arrangements that often take place in farming. It will also attempt to distinguish more between people who farm full-time and people who own or rent smaller holdings for whom agriculture may not be their primary occupation.

As stated above, the time series for farm labour should show much more stability than the estimates from the June Survey have demonstrated. An alternative measure of the level of labour required is the Standard Labour Requirement (SLR). This attempts to measure the amount of labour required on a farm in terms of the number of hours work required across a year. This is calculated across all types of farming which the quantity and type of each activity attracting a prescribed number of hours.

More work is required before this data is available for the 2016 survey but it is intended that more detailed analysis will be presented in spring 2017.

We also intend to carry out a consultation exercise following this year's survey with the intention of revising the question on farm labour in time for the June 2017 Survey.

Further details about the SLR-based analysis and the consultation will appear on the Welsh Government website in due course.

Key quality information

Relevance

The June Survey of Agriculture has been carried out annually since 1867 and provides estimates for all c35,000 registered active holdings in Wales. It was carried out as a Census of all farms until 1995, since when it has been conducted as a sample survey. The exception to this is every 10 years when the European Union require all member states to carry out a full Census (2010 being the most recent).

The June Survey is the primary source for information about agricultural land, livestock and farm labour covering all known farms. This is in contrast to administrative systems, such as the agricultural subsidy payments, which give definitive information about a restricted range of farms.

In 2016 the survey incorporated the EU Farm Structure Survey. This required a wider range of data than would be covered by the June Survey. In order to meet EU requirements for the Farm Structure Survey, a larger sample is taken than would be for just the June Survey. The 2016 Survey comprised a sample size of 18,800 and returns were received from 57 per cent of these holdings. The Welsh Government would like to thank all farmers who responded for their co-operation in this survey.

Users of the survey results

The Survey results are used by a variety of users. The main users (known to us) can be classified into the following groups:

Other areas of Welsh Government:	Survey data is used widely across agricultural policy areas within the Welsh Government. It is used in monitoring the effectiveness of existing policies and in projecting the effect of introducing or amending existing policies. Data is also used in the area of animal health in assessing the potential effects of various disease outbreaks or in limiting the spread of diseases. The data is also used extensively by Welsh Government economists in their work in assessing and analysing the agricultural economy in Wales (eg through the Farm Business Survey).
Government outside Wales:	Survey results are provided in the compilation of UK results by the Department for the Environment, Food and Rural Affairs (DEFRA). They are also provided to Eurostat who use them in their analysis of agricultural statistics across the European Union. Survey data is used periodically in assorted projects and studies into a range of aspects of agriculture. These are commissioned by DEFRA at a UK, Great Britain or England and Wales level.

Agricultural sector bodies:	The key sector bodies who make regular use of the survey results are: Farming unions – primarily the National Farmers Union (Wales) and the Farmers Union of Wales. Generally the statistics enable them to maintain an overall knowledge of the current state of the agricultural sector as well as being aware of the latest trends. Meat Promotion Wales / Hybu Cig Cymru – their role is to monitor the state of the red meat industry in Wales. Survey livestock numbers provide one of a number of inputs that they require in order to carry this out. The Agricultural Development and Advisory Service (ADAS) undertake consultancy, research and policy advice on the areas of the environment and rural development. They are an independent company but are frequently commissioned by the Welsh Government and other government departments. Agricultural survey data is often an input required to allow them to undertake this. Other, more specialist, sector bodies also require data but this is on a more infrequent basis.
Media:	First Releases of survey results are provided to contacts in the farming press. The interest from the general media is more infrequent, but in the past have come from television, radio and the written media.
Researchers:	Often academics and/or specialists who have a focus on a specific topic. In many cases the agricultural survey data is combined with data from other sources for modelling purposes. Recent examples would include statistics on numbers of cattle for studying greenhouse gasses, and details on the growing of arable crops in assessing the effect of pesticide usage.
Animal and Plant Health Agency (APHA)	Formerly known as the Animal Health and Veterinary Laboratories Agency (AHVLA). This body are provided with detailed survey data in order to carry out modelling work in the event of a serious disease outbreak or other emergency.
General enquiries:	A whole range of enquiries have been received in the past. These tend to be a combination of phone calls and e-mails to our general inbox (stats.agric@wales.gsi.gov.uk). This category includes individual farmers, schoolchildren, postgraduate students and other members of the public with an interest in agriculture or in Wales as a whole.

Accuracy

The results in this release, apart from cattle, are estimates based on a sample survey of farms. Statistical theory tells us that the greater the number of observations that are used in producing an estimate, the more robust that estimate will be. The results presented are largely robust and can be used with confidence at an all Wales level.

Cattle Tracing System (CTS) information was used for the first time in the June 2007 Survey of Agriculture** following checks that the figures produced from CTS for earlier years were comparable with the estimates from the June Survey for the equivalent years. As the CTS is intended to be a definitive source (by law all movements of cattle must be recorded), the figures should now be more accurate than a survey estimate (which by its nature is prone to statistical error).

The data recorded on CTS does not precisely correspond with that collected on the survey form prior to 2007. CTS is of a factual nature; it records the age, breed and sex of the animal as well as its movements during its lifetime. It does not record whether an animal is currently being used for breeding, is intended to be used for breeding in the future or whether the farmer intends to keep the animal at all. This limits any comparisons that can be made between current figures and those from several years ago.

However the June Survey covers a range of agricultural and horticultural variables. The number of observations can vary considerably for different variables and thus the data quality issues will vary from variable to variable. A more detailed description of the data quality issues associated with this survey can be found in Annex A (Methodology).

There is also a more detailed consideration of the data quality issues in "Agricultural Small Areas Statistics".

** The 2007 equivalent of this Release is not available on our website at present but a copy can be made available via e-mail on request.

Timeliness and punctuality

This is an annual release published in November each year in relation to the results from the survey in June. It is intended to provide timely headline indications for the major variables following the end of the survey in the autumn.

Accessibility and clarity

All of the data presented in this release are made available on an associated spreadsheet which is made available on the Welsh Government statistics and research website along with this release. This provides a time series of the key variables from 1998 to 2016.

Comparability and coherence

Comparisons with the rest of the UK

Comparable surveys are carried out in the other UK countries. Links to the results of the June 2016 Agricultural Survey for these countries are included below:

- **England**

  Gov.UK website: Structure of the agricultural industry

- **Scotland**

  Scottish Government website: Results of the June Scottish Agricultural Census

- **Northern Ireland**.

  Department of Agriculture, Environment and Rural Affairs website: Preliminary results of the June Agricultural Census 2016

  (Note these are preliminary results. Final results are released on 24 November 2016.)

Results for the United Kingdom will be published on 15 December 2016 by the Department of Environment, Food and Rural Affairs. Further details will be made available on the Government Service website.

Further information on agricultural statistics within Wales

This release provides headline results of the 2016 survey at an all-Wales level. More detailed results of the survey will be made available in separate future outputs. The other main outputs relating to agricultural statistics are listed below:

- **Welsh Agricultural Statistics:** an annual reference publication that contains information relating to a range of agricultural areas. This comprises data beyond that collected as parts of statistical surveys and consequently involves further preparatory work and collation.

  Next release due 13 December 2016

- **Farming Facts and Figures:** a much-abridged version of Welsh Agricultural Statistics that is intended as a quick reference for high level data. For this reason it is published in a hard copy format although the data is available on request. Farming Facts and Figures is also published annually.

  Next release due June 2017*.*

- **Agricultural Small Area Statistics:** this presents the most detailed results from the June Agricultural Census each year. To meet the increasing needs for detailed agricultural statistics, this bulletin outlines the trade-off between detail and data quality and provides the user with a data set which attempts to strike a balance between these ends.

  Next release due July 2017.

- **Farm Incomes in Wales:** this annual bulletin presents the results of the Farm Business Survey which is carried out by the University of Wales, Aberystwyth on behalf of the Welsh Government.

  Next Release 30 November 2016.

For further information on agricultural statistics for Wales, please contact Stuart Neil at the address shown on the front page. The Welsh Government has agricultural statistics for Wales, which are available over a long historical record.

There is a more detailed consideration of the data quality issues in "Agricultural Small Areas Statistics".

More general information relating to the Welsh Government website under the topic Environment and Countryside.

National Statistics status

The United Kingdom Statistics Authority has designated these statistics as National Statistics, in accordance with the Statistics and Registration Service Act 2007 and signifying compliance with the Code of Practice for Official Statistics.

National Statistics status means that official statistics meet the highest standards of trustworthiness, quality and public value.

All official statistics should comply with all aspects of the Code of Practice for Official Statistics. They are awarded National Statistics status following an assessment by the UK Statistics Authority's regulatory arm. The Authority considers whether the statistics meet the highest standards of Code compliance, including the value they add to public decisions and debate.

It is Welsh Government's responsibility to maintain compliance with the standards expected of National Statistics. If we become concerned about whether these statistics are still meeting the appropriate standards, we will discuss any concerns with the Authority promptly. National Statistics status can be removed at any point when the highest standards are not maintained, and reinstated when standards are restored.

Well-being of Future Generations Act (WFG)

The Well-being of Future Generations Act 2015 is about improving the social, economic, environmental and cultural well-being of Wales. The Act puts in place seven well-being goals for Wales. These are for a more equal, prosperous, resilient, healthier and globally responsible Wales, with cohesive communities and a vibrant culture and thriving Welsh language. Under section (10)(1) of the Act, the Welsh Ministers must (a) publish indicators ("national indicators") that must be applied for the purpose of measuring progress towards the achievement of the Well-being goals, and (b) lay a copy of the national indicators before the National Assembly. The 46 national indicators were laid in March 2016

Information on indicators and associated technical information - How do you measure a nation's progress? - National Indicators

Further information on the Well-being of Future Generations (Wales) Act 2015.

The statistics included in this release could provide supporting narrative to the national indicators and be used by public services boards in relation to their local well-being assessments and local well-being plans.

Further details

The document is available at:

http://gov.wales/statistics-and-research/survey-agricultural-horticulture/?lang=en

Next update

November 2017

We want your feedback

We welcome any feedback on any aspect of these statistics which can be provided by email to stats.agric@wales.gsi.gov.uk.

Open Government Licence

Annex A : Methodology

This section provides methodological notes on two aspects of the survey – the drawing of the sample for the survey and the raising of estimates for the population at the conclusion of the survey.

A1 Typology

Both the sampling and the result-raising for the survey are based on the stratification of holdings by farm size. This section describes how these size groups are arrived at.

Following the conclusion of the survey, a detailed data set is constructed for all holdings that were active at the time of the survey. This would include holdings who were not sampled or who did not respond. In these cases it was necessary to impute values – this is covered on the later section on Imputation.

Having this data at holding level means that, for each individual holding we can calculate additional derived fields. These mainly focus on the farm type and farm size. For typology purposes the farm size is measured by European Size Unit (ESU). This is a measure of the economic turnover of the holding. All active holdings will have data associated with it for land usage and livestock numbers and thus an ESU.

The ESU for each holding is calculated by applying a coefficient to each variable in that holding's data, the outcome being the coefficient multiplied by the quantity of that variable present. In other words, a weighted sum of the number of livestock and areas of crops.

To help interpret this measure, the following table shows how many animals or how much land of a specific use is required to give a value of one European Size Unit. This is a brief selection of some of the main variables, intended to give an illustration.

ITEM	REQUIRED FOR 1 ESU	MEASURE
Sheep - breeding ewes	29.3	headcount
Cows - dairy breeding females	1.0	headcount
Cows - beef breeding females	3.1	headcount
Pigs – breeding sows	2.8	headcount
Pigs - others	63.2	headcount
Laying hens	271.3	headcount
Table chicken (broilers)	563.4	headcount
Wheat	1.4	hectares
Barley	1.6	hectares
Oats	1.2	hectares
Potatoes	0.3	hectares

For sampling and raising purposes, holdings are grouped into 6 size groups as follows:

SIZE GROUP	CRITERIA IN ESU
Zero ESU	ESU is 0
Very small	>0 and <8
Small	=> 8 and <40
Medium	=> 40 and <100
Large	=> 100 and <200
Very large	=> 200

These will be the size groups referred to in the remainder of the Methodology section.

A2 Sampling

Sampling for the June Survey is carried out as a stratified sample with the ESU size group providing the strata for stratification. Each stratum has its own sampling rate with a higher rate in the larger strata. However the majority of holdings in Wales are in the small or very small strata and so the strategy needs to be adjusted to meet the quota of returns that Wales is required to provide as its part of the UK quota to the EU.

There will also be a number of holdings who have been registered in the previous 12 months. Since the size and type of these new holdings is not yet known, they are all included as part of the sample. In order to be able to fulfil the quota requirement, holdings were sampled at a rate of 100 per cent in all size groups from 'Small' upwards. For the smallest 'Very Small' group holdings were excluded from the sample if

a) They were sampled and responded in the 2015 survey, or

b) Their value of ESU fell below 0.375

The table below shows the final numbers sampled in each stratum:

SIZE GROUP	NUMBER SAMPLED
New holdings	1,175
Zero ESU	0
Very small	6,954
Small	6,424
Medium	2,587
Large	1,026
Very large	590
TOTAL	**18,756**

This framework excludes holdings with a zero ESU from the sample as, by definition, zero ESU means there is no agricultural activity on the holding (and thus little point in sending a form).

A3 Validation of survey data

All survey forms are returned to the Welsh Government where they are checked for basic errors (eg areas being given in acres and not hectares) and corrected where necessary. They are then sent for data capture and this data is then loaded for further validation checks.

Any data failing any of the validation rules is checked. After checking, the data may be corrected or it may found to be correct (and just outside the parameters of what would usually be expected). In the first case, it is hoped the correction will mean the amended data now passes validation. In the second case, the data value(s) are noted as accurate and allowed to stand.

At the close of the survey there will be some data which still have outstanding validation errors. Usually these will be where it has proved to be not possible to contact the farmer to resolve the matter.

A4 Estimation of results for the population (raising)

The purpose of the raising process is to obtain estimates for the population totals of each item on the survey form. These estimates will include responders, non-responders and those holdings not surveyed. Result raising is carried out separately for each section of the form (eg crops, sheep, cattle).

The original method of raising involved calculating a trend between the sample data and the base data. This trend is then applied to the base data for the missing holdings (ie those who were not sampled or who did not respond). However, this method did not prove suitable for some questions on the form. These were in areas where there was a limited amount of sample data and/or base data. In these cases, a very small number of "outliers" (observations that are markedly different from their base data values) can have a profound effect on the estimate. (These would tend to be cancelled out or at least have a much smaller influence where larger amounts of data were available).

Therefore the variables are split into two groups. Those where there is sufficient data to be able to use the original raising method and those which are not. These groups are shown below – in most cases listed by section than individual question. There is no numerical threshold in terms of the number of observations required to fall into one group or the other. The data itself neatly splits into areas where there are several hundred or thousand of observations and areas where there are relatively few (in most cases less than 100 and often less than 50).

SECTIONS/QUESTIONS THAT USE RAISING METHOD (WITH MANY OBSERVATIONS)	**SECTIONS/QUESTIONS THAT USE MOST RECENT OBSERVATIONS (WITH FEW OBSERVATIONS)**
Arable crops (13 questions)	Horticulture (6 questions)
Grass and other non-arable land (5 questions)	Pigs (12 questions)
Sheep (6 questions)	Poultry (8 questions)
Horses and goats (5 questions)	Farmed deer (1 question)

The simpler process is that using most recent observations so this method is described first. For each individual question, two lists of holdings are calculated. All holdings in June 2016 who have a (non-zero) value for that variable and an equivalent list from the previous year. These lists are then amalgamated. Any holdings that are no longer active are removed. Each holding is then assigned a value for that variable according to the following process:

The data provided in 2016 is taken where it is available

If there is no 2016 data then the 2015 value is taken

Note that holdings with a (non-zero) value in the previous year who returned a zero in 2016 will now be assigned that zero value. The final estimate is simply derived by totalling across all holdings. Note that no trend is applied (unlike in the raising method) because the paucity of data makes it impossible to calculate a sensible one.

The estimates produced by the raising method are calculated as follows. First all holdings that have outstanding validation errors are excluded from the raising process. Raising is carried out for individual questions at a time. It should be noted that only holdings with validation errors in that particular area being raised are excluded. That is to say, for example, if it was an estimate for sheep being raised, holdings with validation errors for crops would be included in the process.

In a similar manner to the validation errors, holdings that are thought to be outliers are excluded from the raising process. As mentioned above, outliers are holdings on which the change between the base value and the observed value may have a disproportionate effect on the raised estimate. Again only data relevant to the question being estimated are excluded. As this process is based on a relatively large number of observations, the effect of outliers is much diminished. Those outliers that are identified fall into two categories:

i) those holdings where the base data is one of the largest values for that variable and the observed value is zero or a tiny proportion of the base value (or the other way round)

ii) holdings in the larger size groups which exhibit very significant differences between the base and observed values. The larger size groups are focussed on in more detail as they contain far fewer holdings and an element of the raising concerns raising by individual strata (see below).

As mentioned previously, the raising is carried out for each individual item on the survey. After validation errors and outliers have been removed, the raising process involves producing two estimates by alternative methods.

The first estimate is derived by splitting holdings into their size group or strata and raising an individual estimate for each stratum. These estimates are then aggregated to produce the overall estimate for the item. The second estimate raises a single estimate for the item (irrespective of strata).

The two estimates, along with their associated standard errors, are then compared and the better (in most cases that with the lower error) is chosen. The data not included in the raising (validation errors and outliers) are then added to the selected raised estimate to produce the final estimate.

A5 Data quality

The results in this Release, apart from cattle, are estimates based on a sample survey of farms. The main quality issues are the following.

- **Sample size.** The sample is a relatively large share of the all farms in Wales. The sample is stratified so that larger farms are sampled more frequently than smaller ones.
- **Farm registration.** There is no compulsory register of farms in the UK. The registrations in place will cover the main commercial farms very well. The problem is to identify smaller farms that may not be commercially focused. While this will affect estimates of the number of farms, analysis has shown that it has limited impact on the estimates of total areas of land or livestock data.
- **Non-response.** Falling response rates are an issue for the survey, as with many other government surveys. This is a particular issue because certain farm types and sizes appear to be more or less likely to respond to the form. Non-response is a particular issue when a variable is dominated by a very small number of particularly large farms. Examples are poultry, pigs, horticulture and some of the smaller crops types. It also impacts on the range of any confidence interval and the percentage of the estimate that actually comes from responses.
- **Mis-response.** At the level of recording if land is grass or a crop or which species an animal is there is limited scope for mis-response. There is more scope for error in the sub-categories, particularly in reporting the difference between breeding animals and others. As already stated earlier it appears that there may be an issue of mis-response for some of the questions on farm labour.
- **Sampling error.** Any sample survey will be subject to sampling error as we take the survey responses and estimate what this means in terms of all farms in Wales.
- **Consistency over time.** The questions that we ask the farmers have been largely consistent since the last major re-design in 1998. Changes since then have largely been restricted to cosmetic changes to the form and changes to wording and guidance.
- **Cattle data.** Since the cattle data are taken from the registration of animals with the Cattle Tracing Service the quality issues are rather different. The cattle results are not affected by sampling or response issues. As with any administrative system the coverage will not be entirely perfect but it is extremely good. For this Release the main issue for cattle that there is a discontinuity in the series for dairy cows and beef cows when we change over from survey data to administrative data. The mismatch between the two series was considered in the release SDR 186/2007 (available on request).

The method of estimation used is dependent on the amount of data that is available for the item being estimated. Items such and sheep and grassland have data available in sufficient quantity to allow trends to be calculated between 2015 and 2016 to produce an estimate. In such cases it is possible to calculate the associated standard error and thus a confidence interval. These are shown in the following table.

Item	Method	Estimate	Responses	Share	C.I. (+/-)	RSE
Arable crops & bare fallow	T	86,858	31,041	36%	2.239	2.6%
Permanent grassland	T	1,065,603	486,455	46%	29,752	2.8%
Rough grazing	T	260,196	109,134	42%	10,170	3.9%
Sheep	T	9,810,486	4,422,198	45%	97,222	1.0%

Glossary

Responses – the number of forms received in June 2016 with a non-zero value for this item.

Share – the proportion of the estimate that is comprised of actual 2016 responses.

C.I. – the 95% Confidence Interval for the estimate (where a trend estimate has been produced)

RSE – the relative standard error for the estimate. As standard errors can be large (in value) for large estimates, dividing the error by the estimate produces a relative standard error (as a percentage) which is easier to interpret. The lower the value, the better the estimate.

In cases where limited data is available (eg horticulture) any calculated trend is prone to being dominated by observed changes on a very small number of holdings (perhaps even a single holding). This would introduce an unacceptable standard error if the estimate were based on this trend. Instead an estimate is produced by combining the observed values in 2016 with the values from holdings with that activity in 2015 (excluding those who are known to have stopped production in the meantime).

The main areas of production covered by this method are pig and poultry production. As stated in Section 4, the number of large producers in both of these industries is relatively small. This means that it is easier to focus on obtaining responses from these key producers and thus obtain a more robust estimate. For the 2016 survey, the shares of the estimate that were obtained from actual responses were 62 per cent for pigs and 65 per cent for poultry.

A6 Imputation

Once results are published, the next step is to break the numbers down to a more detailed level. In order to be able to provide the most flexibility in analysing the results, the data is derived at individual holdings level. In order to do this, it is necessary to impute data for holdings who are still active but who either weren't sampled in the 2016 survey or who did not respond.

For these holdings, the trend observed on those holdings with returns in the current year is applied to the base value for each question in turn. Thus in aggregate, when combined with the actual observed values, the sum across all holdings will be very close to the published final estimate for that question. Slight differences will occur because of rounding (eg livestock numbers must be integers) and so some very small adjustments are made to the largest values to tally the total with the estimate.

By definition the exception to this process is cattle where the CTS data covers the entire population and thus no imputation is necessary.

This process is not intended to produce accurate imputed data at individual holding level. Clearly the changes on each holding that are not known about will be different. What we can be sure about is that in aggregate the imputed data will be a robust estimate.