

The Farm Management Handbook 2021/22

Editor

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SAC Consulting**

October 2021

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ELECTRONIC VERSION OF THE FARM MANAGEMENT HANDBOOK

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Foreword

UK agriculture has continued to operate effectively despite the challenges of dealing with the COVID-19 virus. However, as significant numbers of EU workers return to their home nations following the UK exit from the EU, additional logistical challenges have impacted upon UK supply chains. Many food processors have had to cope with reduced staff numbers on product packing lines and shortages of HGV drivers to deliver finished product to the supermarket shelves. For the first time in recent history, many of us have witnessed empty shelves in the local supermarket – a sobering experience that makes you appreciate just how vulnerable our food supply chain really is.

In the background to COVID-19 there are growing concerns over climate change. In November 2021, Glasgow will host the 26th United Nations Climate Change Conference – better known as COP26 (*Conference of the Parties*). Climate change is, without doubt, one of the most significant challenges facing the world economy today, and how we manage climate change will affect all our lives in some capacity. Like most primary production sectors, agriculture has a role to play in managing climate change and this is reflected in this 42nd edition of the Farm Management Handbook which now includes a new *Carbon* section which provides carbon footprint information for the main farm enterprises, together with mitigation measures to help reduce the farming footprint.

The 42nd edition of the Farm Management Handbook, produced with the support of the Scottish Government's SRDP Farm Advisory Service (FAS) provides a comprehensive and up-to-date source of information for all involved in the assessment and planning of farm and rural businesses.

The crop and livestock financial data remain central to the Farm Management Handbook. This year has involved significant revision to the livestock sections with many of the previous assumptions being updated to reflect more current systems and practices. In addition to the new carbon section mentioned above, we also have a new stand-alone section on *Pollution and the Environment*.

The SAC Farm Management Handbook is a budgeting book. The Handbook is an annual publication - more regular market and input cost data are provided at www.fas.scot under '*Publications*'. Enterprise budgets are expressed to gross margin level. The fixed costs of an individual business should also be considered when preparing forward budgets as they can have a significant impact on the profitability and/or success of a business. The Handbook could not be produced without the help of colleagues and friends throughout the industry. This help, and indeed all comments and suggestions, are very much appreciated.

Alastair Beattie
October 2021

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Enterprise Budgeting

The Farm Management Handbook is designed to provide guidelines in preparing forward budgets.

Output

Output is based on anticipated sales prices (adjusted for replacement costs where required) plus enterprise specific subsidies (as applicable). Livestock output prices are based on market forecasts while crop output prices are based on forward sales values for 2022 as set in summer 2021.

All non enterprise specific subsidies, e.g. Basic Payment Scheme (BPS) and Less Favoured Area Support Scheme (LFASS) are excluded from the enterprise gross margins. These subsidies are regarded as whole farm income therefore should be included in whole farm gross margin budget calculations. See Rural Aid Schemes section (page 489) for more information on subsidies.

Variable costs

Variable costs (e.g. feed, seed, fertiliser, vet and medicine and sprays) are specific to an enterprise and vary in proportion to the size of the enterprise. Enterprise gross margins will vary considerably between individual businesses due to differing land quality, climate, production system, yields, prices and managerial abilities. All variable costs are based on projected prices for the year ahead, set in summer 2021.

Gross margins

A gross margin is **not** a profit figure. No account is taken of "fixed" or "overhead" costs such as labour, power and machinery, property upkeep, rent or finance charges.

The gross margin of an enterprise is:

OUTPUT

less

VARIABLE COSTS

Enterprise performance levels are expressed on a per head basis and, for land using enterprises, on a per hectare (acre) basis. It is also assumed that the enterprise is in a "steady state" where, for instance, the size of a dairy herd is the same at the start and end of the year.

The gross margin data represents good technical performance at estimated prices for 2021/22 but should not be regarded as industry standards or targets, nor should it be used as actual data for compensation purposes. That is, these are indicative margins that should be customised to the specific requirements of the user.

Fixed costs

Fixed costs (e.g. labour, machinery, general overheads and finance) are costs that cannot readily be allocated to a specific gross margin. Fixed costs are generally unaffected by small changes in enterprise size but can vary from year to year. As a result, they are often referred to as overhead or indirect costs. Depreciation (for property and machinery) is also considered as a fixed cost and it is useful to keep this separate to allow a broad assessment of the capital investment needs of a business. If actual fixed costs are not available for a particular farm type, the figures in the Whole Farm Data section (page 467) can be used.

Rounding

Because of rounding, individual items may not add to sub-totals or totals.

Remember! The gross margins are indicative and are not industry standards or targets. Care should therefore be taken when comparing actual results with values in the handbook or when using this information for budgeting purposes. Data should be adjusted to reflect local physical differences and changes in price.

Should you require assistance in using the Handbook, please contact your local SAC Consulting office. For contact details see Contacts section (page 560).

Crop Inputs

Introduction

Crop inputs such as fertilisers, organic manures, lime and sprays all have a quantifiable value on farm. This section provides information that many of the crop gross margins and grassland and forage crop cost of production data refer to and include.

Fertiliser

Fertiliser levels used in the enterprise data are intended only as a guide for budgeting purposes and should not be regarded as a recommendation. In practice, many factors affect the level of N, P₂O₅ and K₂O required by a specific crop, including previous cropping policy, the quantity of organic manures being used and soil nutrient status. Budgeted N levels will require adjustment for Nitrate Vulnerable Zone (NVZ) Action Programme regulations.

Fertiliser prices used are based on typical prices paid in autumn 2021. Fertiliser costs used in the gross margins are shown in the table below.

| | Fertiliser Price | Nutrient Cost |
|---|-------------------------|--|
| Nitrogen (Ammonium Nitrate) | £340.00 /t | £0.99/kg N |
| Phosphate (Triple Super Phosphate) | £495.00 /t | £1.08/kg P ₂ O ₅ |
| Potassium (Muriate of Potash) | £420.00 /t | £0.7/kg K ₂ O |

All gross margins assume nutrients are derived from purchased fertiliser and applied to soils at moderate P and K status. Nutrient inputs for crops should be adjusted for applied organic nutrients which can reduce costs.

Lime

No charge for share of lime is included in the variable costs of arable, grassland and forage crops. Costs for lime will vary significantly depending on type (e.g. calcium, magnesium), distance from source, type of haulage (artic or 8 wheeler) and spreading contractor's charges. An appropriate annual maintenance charge (including delivery and application) to be included in individual margins could be calculated to suit specific farm practice using the example below:

| Cost | Rate | Frequency of application | Annual charge |
|-------|---------|--------------------------|---------------|
| £35/t | 3.7t/ha | 4 years | £32.34/ha |

For more information on lime see SRUC Technical Note 656.

Slurry and Manure

Use of slurries or manures has not been considered in the enterprise data but organic manures are a valuable source of major nutrients (N, P₂O₅ and K₂O), secondary nutrients, trace elements and organic matter.

When planning inorganic fertiliser applications for crops and grassland, the total crop requirement should be adjusted to account for any use of slurries and manures.

The following table is an estimated value based on the total nutrients present in the stored slurry and manure prior to application to land.

| Manure Type | DM (%) | Total plant nutrient | kg/t or kg/m³ | £/kg | Total value (£/t or £/m³) |
|-----------------------|---------------|-------------------------------|---------------------------------|-------------|---|
| Cattle FYM (Fresh) | 25 | N | 6.0 | 0.99 | 5.91 |
| | | P ₂ O ₅ | 3.2 | 1.08 | 3.44 |
| | | K ₂ O | 8.0 | 0.70 | 5.60 |
| | | | | | 14.96 |
| Cattle Slurry | 6 | N | 2.6 | 0.99 | 2.56 |
| | | P ₂ O ₅ | 1.2 | 1.08 | 1.29 |
| | | K ₂ O | 3.2 | 0.70 | 2.24 |
| | | | | | 6.09 |
| Sheep FYM (Fresh) | 25 | N | 7.0 | 0.99 | 6.90 |
| | | P ₂ O ₅ | 3.2 | 1.08 | 3.44 |
| | | K ₂ O | 8.0 | 0.70 | 5.60 |
| | | | | | 15.94 |
| Pig FYM (Fresh) | 25 | N | 7.0 | 0.99 | 6.90 |
| | | P ₂ O ₅ | 6.0 | 1.08 | 6.46 |
| | | K ₂ O | 8.0 | 0.70 | 5.60 |
| | | | | | 18.96 |
| Pig Slurry | 4 | N | 3.6 | 0.99 | 3.55 |
| | | P ₂ O ₅ | 1.8 | 1.08 | 1.94 |
| | | K ₂ O | 2.4 | 0.70 | 1.68 |
| | | | | | 7.16 |
| Layer manure | 35 | N | 19.0 | 0.99 | 18.72 |
| | | P ₂ O ₅ | 14.0 | 1.08 | 15.07 |
| | | K ₂ O | 9.5 | 0.70 | 6.65 |
| | | | | | 40.44 |
| Broiler/turkey litter | 60 | N | 30.0 | 0.99 | 29.57 |
| | | P ₂ O ₅ | 25.0 | 1.08 | 26.90 |
| | | K ₂ O | 18.0 | 0.70 | 12.60 |
| | | | | | 69.07 |

Availability to crops of the nutrients in organic manures will be significantly altered by the timing and method of application, and other factors including temperature, rainfall and crop growth stage and health. For further guidance on the use of organic manures, refer to SRUC Technical Note 650.

Nutrient Planning

Using the information below, total quantities of slurries and manures produced on farm can be calculated.

| Livestock | Typical volume of excreta produced | |
|--|------------------------------------|--------------------|
| | m ³ /day | m ³ /wk |
| Dairy Cow (annual milk yield > 9,000l) | 0.064 | 0.45 |
| Dairy Cow (annual milk yield 6,000-9,000l) | 0.053 | 0.37 |
| Dairy Cow (annual milk yield < 6,000l) | 0.042 | 0.29 |
| Dairy Heifer (13 months to first calf) | 0.040 | 0.28 |
| Dairy Heifer (3 to 13 months) | 0.020 | 0.14 |
| Beef Cow (> 500kg) | 0.045 | 0.32 |
| Beef Cow (≤ 500kg) | 0.032 | 0.22 |
| Steer/heifer (over 25 months) | 0.032 | 0.22 |
| Steer/heifer (13 to 25 months) | 0.026 | 0.18 |
| Cattle (3 to 13 months) | 0.020 | 0.14 |
| Bull beef (over 3 months) | 0.026 | 0.18 |
| Calf (up to 3 months) | 0.007 | 0.05 |
| Sow (130 to 225kg) & litter | 0.011 | 0.08 |
| Maiden Gilt (90 to 130kg) | 0.006 | 0.04 |
| Breeding Boar (66 to 150kg) | 0.006 | 0.04 |
| Breeding Boar (over 150kg) | 0.008 | 0.06 |
| Weaner (7 to 31kg) | 0.001 | 0.01 |
| Grower (31 to 66kg) - dry fed/liquid fed | 0.004/0.007 | 0.03/0.05 |
| Finisher (66kg to slaughter) - dry fed/ liquid fed | 0.006/0.010 | 0.04/0.07 |
| Ewe (> 60kg) | 0.005 | 0.04 |
| Ewe (≤ 60kg) | 0.003 | 0.02 |
| Lambs (6 months to tupping) | 0.002 | 0.01 |
| Goat | 0.003 | 0.02 |
| Breeding deer | 0.006 | 0.04 |
| Other deer | 0.003 | 0.02 |
| Horse | 0.024 | 0.17 |
| Laying Hens (per 1000, up to 17 wks) | 0.040 | 0.28 |
| Laying Hens (per 1000 caged, > 17 wks) | 0.120 | 0.84 |
| Laying Hens (per 1000 free range, > 17 wks) | 0.091 | 0.64 |
| Broilers (table, per 1000) | 0.120 | 0.84 |
| Broiler (breeders, per 1000, up to 25 wks) | 0.040 | 0.28 |
| Broiler (breeders, per 1000, > 25 wks) | 0.120 | 0.84 |
| Turkeys (per 1000, male) | 0.160 | 1.12 |
| Turkeys (per 1000, female) | 0.120 | 0.84 |
| Ducks (per 1000) | 0.100 | 0.70 |

When calculating quantities of slurries and manures as part of a farm waste management plan, adjustments for livestock numbers, housing periods and collection of contaminated water and bedding (e.g. straw and sawdust) will be required.

For further information on nutrient planning refer to Nitrate Vulnerable Zones guidance and SRUC Technical Notes 633, 649, 650, 651, 652, 655, and 668 or Nutrient Management Guide (RB209).

For more information on NVZ's across the UK, see:

Scotland -

www.gov.scot/Topics/farmingrural/Agriculture/Environment/NVZintro

England -

<https://www.gov.uk/guidance/nutrient-management-nitrate-vulnerable-zones>

Wales -

<https://gov.wales/cross-compliance-nitrate-vulnerable-zones-smr-1-2014>

Northern Ireland -

<https://www.daera-ni.gov.uk/articles/nitrates-directive>

Planet Scotland

PLANET Scotland is a software system designed to help farmers improve their financial and environmental performance through better use of organic and bagged fertilisers. It has been specially developed to take Scottish soils, cropping and growing conditions into account. This practical approach to nutrient management aims to give farmers a real win:win and, with the increasing focus on reducing emissions that contribute to climate change, could also help farms reduce their carbon footprint and so benefit both the business and the wider environment.

PLANET stands for Planning Land Application of Nutrients for Efficiency and the Environment and this outlines the approach that the software takes. Farmers and growers in NVZs will already be familiar with this planning approach and PLANET Scotland will allow NVZ farmers to use information produced by PLANET as part of their NVZ record keeping as well as benefiting from all of PLANET's other features. It will also integrate with standard desktop agronomy packages and therefore will only require key data to be entered once. In addition to fertiliser application, the software will also help with farm gate nutrient balances and with planning slurry storage requirements.

The software is available free of charge to all Scottish farmers and growers and to their consultants. There is a programme of workshops, on-line and PC-based training packages including video material, a helpline for IT and technical enquiries, and a dedicated website available to help users. To find out more, see www.planet4farmers.co.uk.

Residual Values of Fertilisers, Manures and Lime

Many fertilisers and manures have a residual value that needs to be calculated as part of a farm valuation or when a farm transfers between owners or tenants.

Estimates of the residual value of manures can be obtained by a feeding stuff calculation or by calculation of nutrients in manure (FYM) or slurry. The following valuations are based on information taken from SRUC Technical Notes on fertilisers as noted on page 7. Valuers must show discretion in the values used and to vary the values used according to the standard of husbandry, previous cropping, the state of drainage and the effectiveness of crop protection. Values are given in respect to growing seasons, not calendar years.

Compensation for manures using the residual values of feeding stuffs

Residues of feeding stuffs fed to livestock will be recovered in manures or slurries thus giving these organic manures a specific value. The values of nutrients in purchased feeds or feeds produced on the farm which are retained in farmyard manures or slurries can be calculated using the figures in the following table.

| Feeding stuff | Average % in feeding stuff | | | Compensation value (£) | |
|--|----------------------------|-------------------------------|------------------|----------------------------|------------------------|
| | N | P ₂ O ₅ | K ₂ O | per tonne of food consumed | |
| | | | | Before 1 growing season | After 1 growing season |
| Soya bean meal or cake | 6.99 | 1.50 | 2.68 | 17.21 | 8.60 |
| Rapeseed meal or cake | 5.77 | 2.33 | 1.55 | 11.26 | 5.63 |
| Beans | 4.53 | 1.03 | 1.39 | 9.36 | 4.68 |
| Peas | 3.52 | 1.15 | 1.14 | 7.76 | 3.88 |
| Fish meal | 10.50 | 7.63 | 1.03 | 12.72 | 6.36 |
| Wheat | 1.75 | 0.65 | 0.47 | 3.39 | 1.69 |
| Barley | 1.78 | 0.79 | 0.52 | 3.73 | 1.86 |
| Oats | 1.48 | 0.67 | 0.52 | 3.56 | 1.78 |
| Maize | 1.42 | 0.60 | 0.37 | 2.72 | 1.36 |
| Bran & other offals of wheat | 2.54 | 2.36 | 1.49 | 9.84 | 4.92 |
| Maize gluten 60% | 9.68 | 0.58 | 0.12 | 4.25 | 2.12 |
| Brewers' & distillers' grain (wet) | 1.07 | 0.23 | 0.02 | 0.59 | 0.29 |
| Brewers' and distillers' grain (dried) | 3.42 | 1.03 | 0.06 | 1.99 | 1.00 |
| Hay | 1.49 | 0.51 | 2.16 | 12.10 | 6.05 |

| Feeding stuff | Average % in feeding stuff | | | Compensation value (£) | |
|--|----------------------------|-------------------------------|------------------|----------------------------|------------------------|
| | N | P ₂ O ₅ | K ₂ O | per tonne of food consumed | |
| | | | | Before 1 growing season | After 1 growing season |
| Dried grass | 2.80 | 0.73 | 2.92 | 16.65 | 8.32 |
| Grass silage | 0.69 | 0.19 | 0.79 | 4.48 | 2.24 |
| Wheat straw | 0.54 | 0.15 | 1.07 | 5.88 | 2.94 |
| Barley straw | 0.58 | 0.22 | 1.53 | 8.34 | 4.17 |
| Oat straw | 0.46 | 0.18 | 1.82 | 9.80 | 4.90 |
| Straw treated with ammonia | 0.96 | 0.18 | 1.22 | 6.82 | 3.41 |
| Swedes | 0.15 | 0.06 | 0.24 | 1.34 | 0.67 |
| Turnips | 0.19 | 0.08 | 0.20 | 1.15 | 0.58 |
| Potatoes | 0.30 | 0.09 | 0.58 | 3.19 | 1.60 |
| Dried sugar beet pulp (molasses) | 1.55 | 0.15 | 1.92 | 10.69 | 5.34 |
| Pot ale syrup | 2.52 | 2.26 | 1.25 | 8.53 | 4.26 |
| Molasses (sugar cane) | 0.65 | 0.20 | 3.42 | 18.28 | 9.14 |
| Compound cakes & meals for each 1% crude protein | 0.16 | 0.08 | 0.06 | 0.41 | 0.20 |
| Feed additives containing urea for each 1% crude protein | 0.16 | 0.00 | 0.00 | 0.06 | 0.03 |

For further feeding stuffs see PLANET (www.planet4farmers.co.uk).

The calculation of nutrients in FYM or slurry from feeding stuffs depends on the following principles:

- The proportions of nutrients present in FYM and slurry will under ideal conditions be 35% for N, 45% for P₂O₅ and 75% K₂O.
- Where storage conditions are sub-optimal then these percentages should be reduced by up to half.
- For slurry the percentage given in a) for N should only be used for spring or summer application. For autumn and winter application the allowances should be reduced by 2/3 and 1/3 respectively.

An example calculation for the value of FYM taken from the nutrients from a feeding stuff is shown in the following table:

e.g. residual value of one tonne of barley fed to livestock.

| Plant Nutrient | kg/t | £/kg | Total £/t | % | Value of FYM (£/t) | |
|-----------------------------------|------|------|-----------|----|-------------------------|------------------------|
| | | | | | Before 1 growing season | After 1 growing season |
| N | 17.8 | 0.99 | 17.54 | 35 | 6.14 | 3.07 |
| P₂O₅ | 7.9 | 1.08 | 8.50 | 45 | 3.83 | 1.91 |
| K₂O | 5.2 | 0.70 | 3.64 | 75 | 2.73 | 1.37 |
| | | | 29.68 | | 12.70 | 6.35 |

In calculating the value of manures, instances occur where records of the feeds fed to livestock are not available. In this case the value of stored farmyard manure or slurry can be estimated on the basis of the average nutrient content as shown in the following tables whilst also considering, in the case of slurry, the season of application.

Residual value of fertilisers and manures

The current value of the major plant nutrients, the principal forms used in agriculture, and proportions available for use over time for which compensation can be estimated is detailed in the following table:

| Source | | Proportion of applied plant nutrients available for crop use after (growing season) | | |
|-----------------------------------|---|---|------|-----|
| | | 1 | 2 | 3 |
| N | (a) Inorganic fertilisers, dried blood, dried poultry manure and liquid digested sludge | nil | nil | nil |
| | (b) Other organic manures | 1/5 | 1/10 | nil |
| P₂O₅ | All fertilisers and manures | 1/2 | 1/4 | 1/8 |
| K₂O | All fertilisers and manures | nil | nil | nil |

Storage and application principals, as per those stated in the previous section, will affect the value of manures. In the following examples, the proportion of nutrients available in the three growing seasons following application as a compound fertiliser (for example 20:10:10), fresh cattle FYM and cattle slurry, are valued.

e.g. application of 1 tonne of 20:10:10 compound fertiliser.

| Plant Nutrient | kg/t | £/kg | Total £/t | Value of fertiliser (£/t) after (growing season) | | |
|-------------------------------|------|------|-----------|--|-------|-------|
| | | | | 1 | 2 | 3 |
| N | 200 | 0.99 | 197.10 | nil | nil | nil |
| P ₂ O ₅ | 100 | 1.08 | 107.61 | 53.80 | 26.90 | 13.45 |
| K ₂ O | 100 | 0.70 | 70.00 | nil | nil | nil |
| | | | 374.71 | 53.80 | 26.90 | 13.45 |

e.g. application of 1 tonne of fresh cattle FYM.

| Plant Nutrient | kg/t | £/kg | Total £/t | Value of organic manure (£/t) after (growing season) | | |
|-------------------------------|------|------|-----------|--|------|------|
| | | | | 1 | 2 | 3 |
| N | 6.0 | 0.99 | 5.91 | 1.18 | 0.59 | nil |
| P ₂ O ₅ | 3.2 | 1.08 | 3.44 | 1.72 | 0.86 | 0.43 |
| K ₂ O | 8.0 | 0.70 | 5.60 | nil | nil | nil |
| | | | 14.96 | 2.90 | 1.45 | 0.43 |

e.g. application of 1 tonne of fresh cattle slurry.

| Plant Nutrient | kg/m ³ | £/kg | Total £/t * | Value of organic manure (£/t) after (growing season) | | |
|-------------------------------|-------------------|------|-------------|--|------|------|
| | | | | 1 | 2 | 3 |
| N | 2.6 | 0.99 | 1.71 | 0.34 | 0.17 | nil |
| P ₂ O ₅ | 1.2 | 1.08 | 1.29 | 0.65 | 0.32 | 0.16 |
| K ₂ O | 3.2 | 0.70 | 2.24 | nil | nil | nil |
| | | | 5.24 | 0.99 | 0.49 | 0.16 |

* N adjustment for winter application timing.

Residual value of lime

The loss of lime from soils varies over time and for specific field circumstances (e.g. soil type, annual rainfall, high use of nitrogen) however, the average rate of loss from the soil is equivalent to about 0.35 tonnes of calcium oxide (CaO) per hectare per annum.

Considering this, there is a residual value for lime applications which may be useful when valuing farm assets in a farm valuation or a farm transfer between owners or tenants.

Compensation for lime residues should be based on the neutralising value (NV) of the lime applied, normally reduced by 0.35 tonnes of calcium oxide per hectare or by one-seventh, whichever is the greater for each growing season since the time of application. Compensation for lime should be calculated on the basis of the current price (delivered and spread) for the residual quantity.

An appropriate calculation of residual quantity of liming materials is set out in the following table:

| Quantity applied (NV %) t/ha | CaO equiv. applied t/ha | Annual loss of CaO equivalent t/ha | Residual quantity of CaO equivalent (t/ha) after (growing season) | | | | | | |
|------------------------------|-------------------------|------------------------------------|---|------|------|------|------|-----|-----|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7.0 (50%) | 3.50 | $\frac{1}{7}(0.50)$ | 3.0 | 2.5 | 2.0 | 1.5 | 1.0 | 0.5 | nil |
| 4.4 (46%) | 2.02 | 0.35 | 1.67 | 1.32 | 0.97 | 0.62 | 0.27 | nil | nil |

Pesticide Use

For each of the arable and potatoes gross margins, and the grassland and forage crops variable cost data, pesticides (including herbicides, insecticides, fungicides, nematicides and plant growth regulators where applicable) are included as appropriate for each crop. Pesticide programs are from independent agronomists.

Pesticide product prices used are only an indication of industry prices and do not account for volume/group discounts and regional variances. Agronomy fees (not included in gross margins and variable cost data) can range from £10/ha for spring cropping to £13/ha for winter cropping.

Read the label before you buy and use pesticides safely. Care must be taken to choose a brand of a pesticide product which has been authorised for use on the crop it is intended to spray. Not all brands of a particular pesticide are authorised for the same uses or crops. Be on the lookout for counterfeit pesticides.

A full list of pesticides can be found in The UK Pesticide Guide 2021 and on www.plantprotection.co.uk.

The use of pesticides is controlled under the Food and Environment Protection Act 1985, and subsequent EU Regulations. All EU regulations were transferred into GB legislation on 1st January 2021.

Anyone who uses a pesticide must take “reasonable precautions” to protect human health or the environment. Anyone with the need to use a professional pesticide product in the course of their business or employment may not use that pesticide or give instruction to others on the use of that pesticide unless they have received adequate instruction, training, and guidance in the correct use of that pesticide. They must hold a Chemicals Regulation Directorate (CRD) recognised Certificate of Competence unless they are working under the direct supervision of someone who holds a certificate (i.e. they are being trained). Those previously operating under ‘grandfathers rights’ (i.e. born before 31 December 1964) must now also have a Certificate of Competence.

It is the responsibility of the purchaser of a professional pesticide product to ensure that the intended user holds a Certificate of Competence.

Those who hold a Certificate of Competence approved by the CRD for the safe application of pesticides can join the National Register of Spray Operators (NRoSO). The scheme ensures that operators participate in ongoing continuous professional development (CPD). UK quality assurance schemes such as Scottish Quality Crops generally require that the NRoSO membership number of the operator making spray applications to quality assured crops is recorded for each spray application.

Currently, the recognised Certificate of Competence for the use of pesticides are issued by the National Proficiency Tests Council (Tel: 024 7685 7300) and the Scottish Skills Testing Service (Tel: 0131 339 8739).

Quality assurance schemes, such as Scottish Quality Crops or Red Tractor Assurance, require that competence to advise on pesticide usage and to apply pesticides is demonstrated by evidence of appropriate training and qualifications, i.e. BASIS Professional Register numbers, Pesticide Application (PA) certificates or equivalent, and NRoSO membership details.

Off-label use

The product label does not cover every possible use of a pesticide product. Minor uses are often covered by an Extension of Authorisation for Minor Use (EAMU). Use of any chemical in accordance with an EAMU is entirely at growers' risk, and growers must obtain and read the appropriate document for that particular authorisation and the general Guidance Notes on off-label uses before using it (available at <https://secure.pesticides.gov.uk/offlabels/search.asp>).

Pesticides no longer authorised

Pesticide product authorisations may be reviewed, amended, suspended or revoked at any time. Several pesticides have been withdrawn from use. It is an offence to use a pesticide which is no longer authorised. To check if a pesticide product is still authorised, or is under revocation, take a note of the MAPP number from the label, then go to <https://secure.pesticides.gov.uk/pestreg/ProdSearch.asp>.

Arable

Introduction

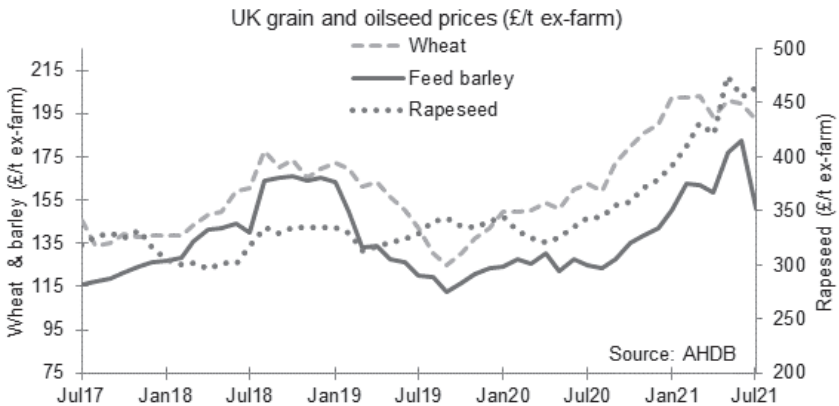
Markets and price drivers

The impact of reduced wheat plantings in the UK in 2020 will continue to be felt as we move into the 2021/22 marketing year; 2021 has been a very tight season for wheat. The market therefore is short of wheat as we transition into the new season and a delay to UK or EU harvests could drive some short-term volatility through the third quarter of 2021. Looking ahead, new crop wheat production is very unlikely to be high enough to balance supply and demand. At a forecasted 2021 harvest production of 14.63Mt and a carryout of 1.2Mt the combined total falls short when compared to the UK 5-year average by 1.35Mt.

In terms of gauging forward demand, COVID-19 will invariably continue to feature, although demand for wheat for food use and the industrial sector is only estimated to have been down 5% on pre-pandemic levels. An ever-increasing return to normal life however presents a possible positive for the milling industry as more normal food service returns. Add to this the move to E10 and the planned re-opening of the Vivergo bioethanol plant and demand will grow in the industrial market, and with imported maize currently expensive, wheat looks the favourable feedstock. Furthermore, with barley now scarce and forecast production reduced next season, the potential for increased inclusion of wheat in feed rations is more likely over the longer term. The discount of barley to wheat has narrowed to sit in line with 5-year average levels.

On the global scale, cereal inventories in 2021/22 are expected to rise for the first time since 2017/18 (FAO). Global production at 2,817Mt for 2021 is a new record high and 1.7 percent (47.8 Mt) higher than in 2020. The forecast for world cereal utilisation in 2021/22 is 2,810Mt, 1.5 per cent higher than in 2020/21. World cereal stocks, by the close of season in 2021/22, are now forecast to rise above their opening levels although markets will continue to be supported in view of the marginal decline in the global stocks-to-use ratio to 28.1 per cent.

Although the USDA is forecasting a third consecutive year of record world wheat and maize production, it is perhaps the changing face of demand that will factor in market prices through 2021 and into 2022. China has undoubtably changed the dynamic of world demand drawing in huge quantities of maize, soya, and barley. Add to this, the import requirements of other Eastern and African countries and increased demand will be a bigger factor than supply or crop size. Demand will factor heavily at UK level too. Wheat will not need to be priced to be competitive for export although the exception will be barley. A predicted 1.5Mt barley surplus means exports will be required both as feed and malting particularly out of southern UK where haulage to domestic maltings is uneconomic.



Livestock feed followed by milling, malting, distilling, and exports are the main UK markets. In Scotland, the whisky sector uses around half of total Scottish grain output. The 5-year suspension of the 25 per cent export tariff on Scotch malt whisky imposed by the US and the similar removal of export tariffs in the UK-Australia Free Trade Agreement will help distillers regain some of the £3.8 bn export value lost in 2020 due to these tariffs and the coronavirus pandemic. As a result, demand for malting barley and wheat for distilling are both expected to rise through into 2022.

Looking to the oilseed sector, with UK oilseed rape production now only 1.0Mt and half as much again being imported, a key factor strengthening prices has been the growth in global demand for vegetable oil at a time when sunflower and palm oil production declined. The forecasts point to vegetable oil production slightly exceeding demand in 2021/22. Yet with a small surplus expected, and low stocks globally, it seems likely that there will still be underlying support in the market.

Marketing

Achieving a satisfactory grain price is essential for profitable cereal production. Grain and oilseed producers benefit from well-developed futures markets which make for transparent pricing and enable crops to be bought and sold up to two years ahead of harvest. Given that prices readily swing £50 to £100/t between seasons, arable farmers should consider spreading sales to achieve a satisfactory average. It is essential that arable farmers set their own target prices based on their costs and margin requirements.

Premium crops such as malting barley and milling oats are generally grown on contract as there can be little or no spot trade at harvest, particularly in Scotland. Contract conditions vary widely but will require that specific standards are attained such as moisture, germination,

nitrogen levels and screenings. Many contracts offer growers flexibility in the pricing, through use of min-max or LIFFE wheat futures as a base.

Margins

Crop returns are highly sensitive to the yield and market price. Differences in fixed costs, particularly machinery, can have the greatest impact on profitability while variations in input costs such as fertiliser and sprays are relatively small between farms. Higher straw prices in the north and west can result in a good return from straw than in otherwise more marginal cereal cropping areas. Straw prices have been strong in recent years boosting returns across Scotland.

Variety choice

Crop varieties should be selected to match the farm conditions, the chosen agronomic strategy and intended end use. Feed markets are less demanding but may require some parameters to be met such as minimum specific weight. For home use, other characteristics such as straw length can be important. Premium markets such as malting barley and milling wheat have very specific requirements and lists of approved varieties. See links below to relevant market and variety information:

Scottish varieties:

<https://pure.sruc.ac.uk/en/publications/scottish-recommended-lists-for-cereals-202122>

UK recommended varieties: <https://ahdb.org.uk/rlcomments>

Malting requirements and varieties: www.ukmalt.com/

Milling requirements: www.nabim.org.uk/wheat/wheat-varieties/

Subsidies and support

For details of the latest subsidy arrangements see the Rural Aid Scheme section on page 489.

Wheat - Winter

PHYSICAL DATA

(a) Seed

Certified seed second generation (C2) sown at 230 kg/ha (1.83 cwt/acre).

(b) Fertiliser

200 : 67 : 83 kg/ha N : P₂O₅ : K₂O (160 : 54 : 66 units/acre). See page 4 for more information on nutrient planning.

(c) Sprays

Herbicides Autumn residual herbicide to control annual meadow grass and broad leaved weeds and one herbicide in spring.

Fungicides Four fungicide applications at GS25-30, GS31-32, GS39 and GS59 to cover eyespot, septoria and head diseases, including growth regulation.

Additional treatments to the basic programme could include:

Take all £180/t for seed treatment.

Mildew £18.50/t for seed treatment.

Aphids £6.25/ha

Wild oats £28.33/ha

Slugs £11.00/ha

Annual meadow grass £23.78/ha per application.

Black grass £38.00/ha (spring control).

Bromes £36.19/ha

Desiccant £6.00/ha

(d) Other crop expenses

For baling straw, costs for net wrap at 50-77p/bale for large round straw bales average weight 200kg are included. Omit other expenses costs if selling straw in the bout.

Additives can be used to preserve moist grain for feeding livestock. Cost will vary depending on product, length of storage period and moisture content at treatment. Alkaline grain treatments (for grain harvested at 16-22% moisture for long term storage), add £19-21/t. Propionic acid treatments (for grain harvested at 18-20% moisture for long term storage), add £6-10/t. Ammonia treatment for feeding straw will cost £23-26/t straw. Treatment costs exclude grain processing and straw tubelining (see pages 400-401 for these costs).

Wheat - Winter

GROSS MARGIN DATA

| | | | | | | |
|----------------------------|--------------|-------|--------------------|-------|--------------|-------|
| Grain yield: t/ha (t/acre) | 6.0 | (2.4) | 8.0 | (3.2) | 10.0 | (4.0) |
| Straw yield: t/ha (t/acre) | 3.2 | (1.3) | 4.2 | (1.7) | 5.2 | (2.1) |
| OUTPUT | | | £/ha (acre) | | | |
| Grain @ £180/t* | 1,080 | | 1,440 | | 1,800 | |
| Straw @ £70/t | 224 | | 291 | | 364 | |
| | <u>1,304</u> | (528) | <u>1,731</u> | (701) | <u>2,164</u> | (876) |
| VARIABLE COSTS | | | | | | |
| Seed @ £455/t | 105 | | 105 | | 105 | |
| Fertiliser | 327 | | 327 | | 327 | |
| Sprays | 143 | | 143 | | 143 | |
| Other expenses | 11 | | 14 | | 17 | |
| | <u>586</u> | (237) | <u>589</u> | (238) | <u>592</u> | (240) |
| GROSS MARGIN | <u>718</u> | (291) | <u>1,142</u> | (463) | <u>1,572</u> | (636) |

GRAIN PRICE SENSITIVITY

| | | | | | | |
|---------|-----|-------|-------|-------|-------|-------|
| £160 /t | 598 | (242) | 982 | (397) | 1,372 | (555) |
| £195 /t | 808 | (327) | 1,262 | (511) | 1,722 | (697) |
| £210 /t | 898 | (363) | 1,382 | (559) | 1,872 | (758) |

* Feed price (milling premium £15-40/t, biscuit premium £5-15/t)

Basis of data:

Sale price estimate for 2022 harvest, November ex-farm spot price at 15% moisture content and average quality. Straw sold baled, ex-farm price estimate for arable areas.

Wheat - Spring

PHYSICAL DATA

(a) Seed

Certified seed second generation (C2) sown at 220 kg/ha (1.75 cwt/acre).

(b) Fertiliser

150 : 52 : 71 kg/ha N : P₂O₅ : K₂O (136 : 42 : 57 units/acre). See page 4 for more information on nutrient planning.

(c) Sprays

Herbicides One application for spring germinating broadleaved weeds.

Fungicides Two applications for leaf diseases at GS31-32 and GS39-49.

Additional sprays to the basic programme could include:

Mildew £18.80/ha

Wild oats £22.66/ha

Desiccant £6.00/ha

(d) Other crop expenses

For baling straw, costs for net wrap at 50-77p/bale for large round straw bales average weight 200kg are included. Omit other expenses costs if selling straw in the bout.

Additives can be used to preserve moist grain for feeding livestock. Cost will vary depending on product, length of storage period and moisture content at treatment. Alkaline grain treatments (for grain harvested at 16-22% moisture for long term storage), add £19-21/t. Propionic acid treatments (for grain harvested at 18-20% moisture for long term storage), add £6-10/t. Ammonia treatment for feeding straw will cost £23-26/t straw. Treatment costs exclude grain processing and straw tubelining (see pages 400-401 for these costs).

Wheat - Spring

GROSS MARGIN DATA

| | | | | | | |
|----------------------------|------------|-------|--------------------|-------|--------------|-------|
| Grain yield: t/ha (t/acre) | 4.5 | (1.8) | 6.5 | (2.6) | 8.5 | (3.4) |
| Straw yield: t/ha (t/acre) | 2.5 | (1.0) | 3.6 | (1.4) | 4.7 | (1.9) |
| OUTPUT | | | £/ha (acre) | | | |
| Grain @ £180/t* | 810 | | 1,170 | | 1,530 | |
| Straw @ £70/t | 174 | | 251 | | 328 | |
| | <u>984</u> | (398) | <u>1,421</u> | (575) | <u>1,858</u> | (752) |
| VARIABLE COSTS | | | | | | |
| Seed @ £495/t | 109 | | 109 | | 109 | |
| Fertiliser | 253 | | 253 | | 253 | |
| Sprays | 60 | | 60 | | 60 | |
| Other expenses | 8 | | 12 | | 15 | |
| | <u>430</u> | (174) | <u>434</u> | (176) | <u>437</u> | (177) |
| GROSS MARGIN | <u>554</u> | (224) | <u>987</u> | (399) | <u>1,421</u> | (575) |

GRAIN PRICE SENSITIVITY

| | | | | | | |
|---------|-----|-------|-------|-------|-------|-------|
| £160 /t | 464 | (188) | 857 | (347) | 1,251 | (506) |
| £195 /t | 621 | (251) | 1,085 | (439) | 1,548 | (626) |
| £210 /t | 689 | (279) | 1,182 | (478) | 1,676 | (678) |

* Feed price (milling premium £15-40/t, biscuit premium £5-15/t)

Basis of data:

Sale price estimate for 2022 harvest, November ex-farm spot price at 15% moisture content and average quality. Straw sold baled, ex-farm price estimate for arable areas.

Barley - Winter

PHYSICAL DATA

(a) Seed

Certified seed second generation (C2) sown at 220 kg/ha (1.75 cwt/acre). Alternatively, hybrid 6 row sown at 145 kg/ha (1.16cwt/ac). Conventional seed price used.

(b) Fertiliser

180 : 67 : 83 kg/ha N : P₂O₅ : K₂O (144 : 54 : 66 units/acre). See page 4 for more information on nutrient planning.

(c) Sprays

Herbicides Autumn residual herbicide to control annual meadow grass and broad leaved weeds and one herbicide in spring.

Fungicides Three fungicide applications at GS25-30, GS31 and GS49 for rhynchosporium, mildew and other leaf diseases.

Additional sprays to the basic programme could include:

Wild oats £28.33/ha

Aphids £6.26/ha

Desiccant £6.00/ha

(d) Other crop expenses

For baling straw, costs for net wrap at 50-77p/bale for large round straw bales average weight 200kg are included. Omit other expenses costs if selling straw in the bout.

Additives can be used to preserve moist grain for feeding livestock. Cost will vary depending on product, length of storage period and moisture content at treatment. Alkaline grain treatments (for grain harvested at 16-22% moisture for long term storage), add £19-21/t. Propionic acid treatments (for grain harvested at 18-20% moisture for long term storage), add £6-10/t. Ammonia treatment for feeding straw will cost £23-26/t straw. Treatment costs exclude grain processing and straw tubelining (see pages 400-401 for these costs).

Barley - Winter

GROSS MARGIN DATA

| | | | | | | |
|----------------------------|--------------|-------|--------------------|-------|--------------|-------|
| Grain yield: t/ha (t/acre) | 6.0 | (2.4) | 7.5 | (3.0) | 9.0 | (3.6) |
| Straw yield: t/ha (t/acre) | 3.3 | (1.3) | 4.1 | (1.7) | 5.0 | (2.0) |
| OUTPUT | | | £/ha (acre) | | | |
| Grain @ £159/t* | 954 | | 1,193 | | 1,431 | |
| Straw @ £75/t | 248 | | 310 | | 371 | |
| | <u>1,202</u> | (486) | <u>1,503</u> | (608) | <u>1,802</u> | (729) |
| VARIABLE COSTS | | | | | | |
| Seed @ £435/t | 96 | | 96 | | 96 | |
| Fertiliser | 308 | | 308 | | 308 | |
| Sprays | 104 | | 104 | | 104 | |
| Other expenses | 11 | | 14 | | 16 | |
| | <u>519</u> | (210) | <u>522</u> | (211) | <u>524</u> | (212) |
| GROSS MARGIN | <u>683</u> | (276) | <u>981</u> | (397) | <u>1,278</u> | (517) |

GRAIN PRICE SENSITIVITY

| | | | | | | |
|---------|-----|-------|-------|-------|-------|-------|
| £139 /t | 563 | (228) | 831 | (336) | 1,098 | (444) |
| £174 /t | 773 | (313) | 1,093 | (442) | 1,413 | (572) |
| £189 /t | 863 | (349) | 1,206 | (488) | 1,548 | (626) |

* Feed price (malting price approx. £10-20/t higher)

Basis of data:

Sale price estimate for 2022 harvest, November ex-farm spot price at 15% moisture content and average quality. Straw sold baled, ex-farm price estimate for arable areas.

Barley - Spring

PHYSICAL DATA

(a) Seed

Certified seed second generation (C2) sown at 190 kg/ha (1.51 cwt/acre).

(b) Fertiliser

130 : 52 : 71 kg/ha N : P₂O₅ : K₂O (104 : 42 : 57 units/acre). See page 4 for more information on nutrient planning.

(c) Sprays

Herbicides Post emergence herbicide to control broadleaved weeds.

Fungicides Two applications at GS31 and GS45 for rhynchosporium, mildew and other leaf diseases.

Additional sprays to the basic programme could include:

Mildew £12.75/ha

Wild oats £22.66/ha

Aphids £6.26/ha

Desiccant £6.00/ha

(d) Other crop expenses

For baling straw, costs for net wrap at 50-77p/bale for large round straw bales average weight 200kg are included. Omit other expenses costs if selling straw in the bout.

Additives can be used to preserve moist grain for feeding livestock. Cost will vary depending on product, length of storage period and moisture content at treatment. Alkaline grain treatments (for grain harvested at 16-22% moisture for long term storage), add £19-21/t. Propionic acid treatments (for grain harvested at 18-20% moisture for long term storage), add £6-10/t. Ammonia treatment for feeding straw will cost £23-26/t straw. Treatment costs exclude grain processing and straw tubelining (see pages 400-401 for these costs).

Barley - Spring

GROSS MARGIN DATA

| | | | | | | |
|----------------------------|------------|-------|--------------------|-------|--------------|-------|
| Grain yield: t/ha (t/acre) | 4.0 | (1.6) | 5.5 | (2.2) | 7.5 | (3.0) |
| Straw yield: t/ha (t/acre) | 2.1 | (0.8) | 2.9 | (1.2) | 3.9 | (1.6) |
| OUTPUT | | | £/ha (acre) | | | |
| Grain @ £159/t* | 636 | | 875 | | 1,193 | |
| Straw @ £75/t | 156 | | 215 | | 293 | |
| | <u>792</u> | (321) | <u>1,090</u> | (441) | <u>1,486</u> | (601) |
| VARIABLE COSTS | | | | | | |
| Seed @ £440/t | 84 | | 84 | | 84 | |
| Fertiliser | 234 | | 234 | | 234 | |
| Sprays | 56 | | 56 | | 56 | |
| Other expenses | 7 | | 9 | | 13 | |
| | <u>381</u> | (154) | <u>383</u> | (155) | <u>387</u> | (157) |
| GROSS MARGIN | <u>411</u> | (167) | <u>707</u> | (286) | <u>1,099</u> | (444) |

GRAIN PRICE SENSITIVITY

| | | | | | | |
|---------|-----|-------|-----|-------|-------|-------|
| £139 /t | 331 | (134) | 596 | (241) | 949 | (384) |
| £174 /t | 471 | (191) | 789 | (319) | 1,211 | (490) |
| £189 /t | 531 | (215) | 871 | (352) | 1,324 | (536) |

* Feed price (malting price approx. £15-50/t higher)

Basis of data:

Sale price estimate for 2022 harvest, November ex-farm spot price at 15% moisture content and average quality. Straw sold baled, ex-farm price estimate for arable areas.

Oats - Winter

PHYSICAL DATA

(a) Seed

Certified seed second generation (C2) sown at 190 kg/ha (1.51 cwt/acre).

(b) Fertiliser

140 : 53 : 104 kg/ha N : P₂O₅ : K₂O (112 : 42 : 83 units/acre). See page 4 for more information on nutrient planning.

(c) Sprays

Herbicides Autumn residual herbicide to control annual meadow grass and broad leaved weeds and one herbicide in spring.

Fungicides Two sprays for mildew and crown rust at GS31 and GS49 including growth regulation.

(d) Other crop expenses

For baling straw, costs for net wrap at 50-77p/bale for large round straw bales average weight 200kg are included. Omit other expenses costs if selling straw in the bout.

Additives can be used to preserve moist grain for feeding livestock. Cost will vary depending on product, length of storage period and moisture content at treatment. Alkaline grain treatments (for grain harvested at 16-22% moisture for long term storage), add £19-21/t. Propionic acid treatments (for grain harvested at 18-20% moisture for long term storage), add £6-10/t. Ammonia treatment for feeding straw will cost £23-26/t straw. Treatment costs exclude grain processing and straw tubelining (see pages 400-401 for these costs).

Oats - Winter

GROSS MARGIN DATA

| | | | | | | |
|----------------------------|------------|-------|--------------------|-------|--------------|-------|
| Grain yield: t/ha (t/acre) | 5.0 | (2.0) | 7.5 | (3.0) | 9.0 | (3.6) |
| Straw yield: t/ha (t/acre) | 3.2 | (1.3) | 4.7 | (1.9) | 5.7 | (2.3) |
| OUTPUT | | | £/ha (acre) | | | |
| Grain @ £145/t* | 725 | | 1,088 | | 1,305 | |
| Straw @ £65/t | 205 | | 307 | | 369 | |
| | <u>930</u> | (376) | <u>1,395</u> | (565) | <u>1,674</u> | (677) |
| VARIABLE COSTS | | | | | | |
| Seed @ £480/t | 91 | | 91 | | 91 | |
| Fertiliser | 268 | | 268 | | 268 | |
| Sprays | 74 | | 74 | | 74 | |
| Other expenses | 10 | | 16 | | 19 | |
| | <u>443</u> | (179) | <u>449</u> | (182) | <u>452</u> | (183) |
| GROSS MARGIN | <u>487</u> | (197) | <u>946</u> | (383) | <u>1,222</u> | (494) |

GRAIN PRICE SENSITIVITY

| | | | | | | |
|---------|-----|-------|-------|-------|-------|-------|
| £125 /t | 387 | (157) | 796 | (322) | 1,042 | (422) |
| £160 /t | 562 | (227) | 1,058 | (428) | 1,357 | (549) |
| £175 /t | 637 | (258) | 1,171 | (474) | 1,492 | (604) |

* Milling price

Basis of data:

Sale price estimate for 2022 harvest, November ex-farm spot price at 15% moisture content and average quality. Straw sold baled, ex-farm price estimate for arable areas.

Oats - Spring

PHYSICAL DATA

(a) Seed

Certified seed second generation (C2) sown at 190 kg/ha (1.51 cwt/acre).

(b) Fertiliser

100 : 53 : 104 kg/ha N : P₂O₅ : K₂O (80 : 42 : 83 units/acre). See page 4 for more information on nutrient planning.

(c) Sprays

Herbicides Typical weed control for annual broadleaved weeds.

Fungicides Two sprays at GS25-30 and GS49 for mildew and crown rust including growth regulator.

(d) Other crop expenses

For baling straw, costs for net wrap at 50-77p/bale for large round straw bales average weight 200kg are included. Omit other expenses costs if selling straw in the bout.

Additives can be used to preserve moist grain for feeding livestock. Cost will vary depending on product, length of storage period and moisture content at treatment. Alkaline grain treatments (for grain harvested at 16-22% moisture for long term storage), add £19-21/t. Propionic acid treatments (for grain harvested at 18-20% moisture for long term storage), add £6-10/t. Ammonia treatment for feeding straw will cost £23-26/t straw. Treatment costs exclude grain processing and straw tubelining (see pages 400-401 for these costs).

Oats - Spring

GROSS MARGIN DATA

| | | | | | | |
|----------------------------|------------|-------|--------------------|-------|--------------|-------|
| Grain yield: t/ha (t/acre) | 3.5 | (1.4) | 5.0 | (2.0) | 6.5 | (2.6) |
| Straw yield: t/ha (t/acre) | 2.1 | (0.8) | 3.0 | (1.2) | 3.9 | (1.6) |
| OUTPUT | | | £/ha (acre) | | | |
| Grain @ £145/t* | 508 | | 725 | | 943 | |
| Straw @ £65/t | 137 | | 195 | | 254 | |
| | <u>645</u> | (261) | <u>920</u> | (372) | <u>1,197</u> | (484) |
| VARIABLE COSTS | | | | | | |
| Seed @ £520/t | 99 | | 99 | | 99 | |
| Fertiliser | 228 | | 228 | | 228 | |
| Sprays | 59 | | 59 | | 59 | |
| Other expenses | 7 | | 10 | | 13 | |
| | <u>393</u> | (159) | <u>396</u> | (160) | <u>399</u> | (161) |
| GROSS MARGIN | <u>252</u> | (102) | <u>524</u> | (212) | <u>798</u> | (323) |

GRAIN PRICE SENSITIVITY

| | | | | | | |
|---------|-----|-------|-----|-------|-----|-------|
| £125 /t | 182 | (74) | 424 | (172) | 668 | (270) |
| £160 /t | 304 | (123) | 599 | (242) | 895 | (362) |
| £175 /t | 357 | (144) | 674 | (273) | 993 | (402) |

* Milling price

Basis of data:

Sale price estimate for 2022 harvest, November ex-farm spot price at 15% moisture content and average quality. Straw sold baled, ex-farm price estimate for arable areas.

Triticale

PHYSICAL DATA

(a) Seed

230 kg/ha (1.83 cwt/acre).

(b) Fertiliser

180 : 52 : 71 kg/ha N : P₂O₅ : K₂O (144 : 42 : 57 units/acre). See page 4 for more information on nutrient planning.

(c) Sprays

Herbicides Pre-emergence application.

Fungicides Two sprays at GS31 and GS39-45 including growth regulation.

(d) Other crop expenses

For baling straw, costs for net wrap at 50-77p/bale for large round straw bales average weight 200kg are included. Omit other expenses costs if selling straw in the bout.

Triticale

GROSS MARGIN DATA

| | | | | | | |
|----------------------------|------------|-------|--------------------|-------|--------------|-------|
| Grain yield: t/ha (t/acre) | 4.0 | (1.6) | 6.0 | (2.4) | 8.0 | (3.2) |
| Straw yield: t/ha (t/acre) | 2.6 | (1.1) | 3.9 | (1.6) | 5.2 | (2.1) |
| OUTPUT | | | £/ha (acre) | | | |
| Grain @ £140/t | 560 | | 840 | | 1,120 | |
| Straw @ £55/t | 143 | | 215 | | 286 | |
| | <u>703</u> | (285) | <u>1,055</u> | (427) | <u>1,406</u> | (569) |
| VARIABLE COSTS | | | | | | |
| Seed @ £545/t | 125 | | 125 | | 125 | |
| Fertiliser | 283 | | 283 | | 283 | |
| Sprays | 66 | | 66 | | 66 | |
| Other expenses | 9 | | 13 | | 17 | |
| | <u>483</u> | (195) | <u>487</u> | (197) | <u>491</u> | (199) |
| GROSS MARGIN | <u>220</u> | (90) | <u>568</u> | (230) | <u>915</u> | (370) |

GRAIN PRICE SENSITIVITY

| | | | | | | |
|---------|-----|-------|-----|-------|-------|-------|
| £120 /t | 140 | (57) | 448 | (181) | 755 | (306) |
| £155 /t | 280 | (113) | 658 | (266) | 1,035 | (419) |
| £170 /t | 340 | (138) | 748 | (303) | 1,155 | (467) |

Basis of data:

Sale price estimate for 2022 harvest, November ex-farm spot price at 15% moisture content and average quality. Straw sold baled, ex-farm price estimate for arable areas.

Oilseed Rape - Winter

PHYSICAL DATA

(a) Seed

| | |
|-----------|--|
| Oil | 45% |
| Seed rate | Hybrid - 4kg/ha : Conventional - 5kg/ha Conventional seed price used. |

(b) Fertiliser

200 : 49 : 38 + 75 kg/ha N : P₂O₅ : K₂O + SO₃
(160 : 39 : 30 + 60 units/acre). See page 4 for more information on nutrient planning.

(c) Sprays

Herbicides Pre-emergence herbicide to control annual meadow grass and broadleaved weeds.

Fungicides Autumn and spring fungicides for sclerotinia, light leaf spot or phoma.

Desiccation Desiccation, including the use of a pod-sealant, has largely replaced swathing. If swathing is used over desiccation, reduce spray costs by £14.00/ha. For swathing costs see page 400.

Additional sprays to the basic programme could include:

| | |
|--|----------------------------------|
| <i>Slugs</i> | £11.00/ha per application. |
| <i>Sclerotinia</i> | £14.15/ha (high risk situations) |
| <i>Rape winter stem weevil and pollen beetle</i> | £7.45/ha |
| <i>Volunteer cereals</i> | £10.80/ha |
| <i>Mayweed</i> | £26.95/ha |

(d) Other crop expenses

Assuming straw has been chopped. If baling, include costs for net wrap at 50-77p/bale for round straw bales, average weight 200 kg.

Oilseed Rape - Winter

GROSS MARGIN DATA

GROSS MARGIN DATA

| | | | | | | |
|----------------------------|-----|-------|-----|-------|-----|-------|
| Grain yield: t/ha (t/acre) | 3.0 | (1.2) | 4.0 | (1.6) | 5.0 | (2.0) |
| Straw yield: t/ha (t/acre) | - | (0.0) | - | (0.0) | - | (0.0) |

OUTPUT

| | £/ha (acre) | | | | | |
|----------------|--------------------|-------|--------------|-------|--------------|-------|
| Grain @ £478/t | 1,434 | | 1,912 | | 2,390 | |
| Straw @ £0/t | - | | - | | - | |
| | <u>1,434</u> | (580) | <u>1,912</u> | (774) | <u>2,390</u> | (967) |

VARIABLE COSTS

| | | | | | | |
|----------------|------------|-------|------------|-------|------------|-------|
| Seed @ £13/kg | 65 | | 65 | | 65 | |
| Fertiliser | 276 | | 276 | | 276 | |
| Sprays | 148 | | 148 | | 148 | |
| Other expenses | - | | - | | - | |
| | <u>489</u> | (198) | <u>489</u> | (198) | <u>489</u> | (198) |

| | | | | | | |
|---------------------|------------|-------|--------------|-------|--------------|-------|
| GROSS MARGIN | <u>945</u> | (382) | <u>1,423</u> | (576) | <u>1,901</u> | (769) |
|---------------------|------------|-------|--------------|-------|--------------|-------|

GRAIN PRICE SENSITIVITY

| | | | | | | |
|---------|-------|-------|-------|-------|-------|-------|
| £428 /t | 795 | (322) | 1,223 | (495) | 1,651 | (668) |
| £528 /t | 1,095 | (443) | 1,623 | (657) | 2,151 | (870) |
| £578 /t | 1,245 | (504) | 1,823 | (738) | 2,401 | (972) |

Basis of data:

Sale price estimate for 2022 harvest, November ex-farm price including oil bonus. An average oil content of 43% has been assumed resulting in a bonus of 4.5% above the base price. The oil bonus comprises a 1.5% increase in the price for every 1% rise in oil content above 40%.

Oilseed Rape - Spring

PHYSICAL DATA

(a) Seed

| | |
|-----------|---------|
| Oil | 45% |
| Seed rate | 5 kg/ha |

(b) Fertiliser

100 : 28 : 22 + 40 kg/ha N : P₂O₅ : K₂O + SO₃
(80 : 22 : 18 + 32 units/acre). See page 4 for more information on nutrient planning.

(c) Sprays

Herbicides Pre-emergence herbicide for problem weeds such as shepherds' purse.

Fungicides One spray to control pollen beetle.

Desiccation Desiccation has largely replaced swathing. If swathing is used over desiccation, reduce spray costs by £14.00/ha. For swathing costs see page 400.

Additional sprays to the basic programme could include:

Volunteer cereals £10.80/ha

Sclerotinia £36.00/ha

Pod sticker £8.00/ha

(d) Other crop expenses

Assuming straw has been chopped. If baling, include costs for net wrap at 50-77p/bale for round straw bales, average weight 200 kg.

Oilseed Rape - Spring

GROSS MARGIN DATA

GROSS MARGIN DATA

| | | | | | | |
|----------------------------|-----|-------|-----|-------|-----|-------|
| Grain yield: t/ha (t/acre) | 1.8 | (0.7) | 2.5 | (1.0) | 3.0 | (1.2) |
| Straw yield: t/ha (t/acre) | - | (0.0) | - | (0.0) | - | (0.0) |

OUTPUT

| | £/ha (acre) | | | | | |
|----------------|-------------|-------|--------------|-------|--------------|-------|
| Grain @ £478/t | 860 | | 1,195 | | 1,434 | |
| Straw @ £0/t | - | | - | | - | |
| | <u>860</u> | (348) | <u>1,195</u> | (484) | <u>1,434</u> | (580) |

VARIABLE COSTS

| | | | | | | |
|----------------|------------|-------|------------|-------|------------|-------|
| Seed @ £15/kg | 75 | | 75 | | 75 | |
| Fertiliser | 144 | | 144 | | 144 | |
| Sprays | 48 | | 48 | | 48 | |
| Other expenses | - | | - | | - | |
| | <u>267</u> | (108) | <u>267</u> | (108) | <u>267</u> | (108) |

| | | | | | | |
|--------------|------------|-------|------------|-------|--------------|-------|
| GROSS MARGIN | <u>593</u> | (240) | <u>928</u> | (376) | <u>1,167</u> | (472) |
|--------------|------------|-------|------------|-------|--------------|-------|

GRAIN PRICE SENSITIVITY

| | | | | | | |
|---------|-----|-------|-------|-------|-------|-------|
| £428 /t | 503 | (204) | 803 | (325) | 1,017 | (412) |
| £528 /t | 683 | (276) | 1,053 | (426) | 1,317 | (533) |
| £578 /t | 773 | (313) | 1,178 | (477) | 1,467 | (594) |

Basis of data:

Sale price estimate for 2022 harvest, November ex-farm price including oil bonus. An average oil content of 43% has been assumed resulting in a bonus of 4.5% above the base price. The oil bonus comprises a 1.5% increase in the price for every 1% rise in oil content above 40%.

Spring Field Beans

PHYSICAL DATA

(a) Seed

250 kg/ha (1.99 cwt/acre).

(b) Fertiliser

0 : 40 : 40 kg/ha N : P₂O₅ : K₂O (0 : 32 : 32 units/acre). See page 4 for more information on nutrient planning.

(c) Sprays

Herbicides Pre-emergence herbicide and control of annual meadow grass and broadleaved weeds.

Fungicide Two applications to control chocolate spot and downy mildew.

Desiccation Cost included.

(d) Other crop expenses

Additives can be used to preserve pulses for feeding livestock. Cost will vary depending on product used, length of storage period and moisture of pulses at treatment. For pulses harvested at 20% moisture for long term storage, add £9-13/t grain treated with propionic acid, excluding processing (see page 400 for processing costs).

Spring Field Beans

GROSS MARGIN DATA

| | | | | | | |
|----------------------------|--------------------|-------|--------------|-------|--------------|-------|
| Grain yield: t/ha (t/acre) | 2.5 | (1.0) | 4.5 | (1.8) | 5.5 | (2.2) |
| OUTPUT | £/ha (acre) | | | | | |
| Grain @ £230/t | 575 | | 1,035 | | 1,265 | |
| | <u>575</u> | (233) | <u>1,035</u> | (419) | <u>1,265</u> | (512) |
| VARIABLE COSTS | | | | | | |
| Seed @ £555/t | 139 | | 139 | | 139 | |
| Fertiliser | 78 | | 78 | | 78 | |
| Sprays | 107 | | 107 | | 107 | |
| Other expenses | - | | - | | - | |
| | <u>324</u> | (131) | <u>324</u> | (131) | <u>324</u> | (131) |
| GROSS MARGIN | <u>251</u> | (102) | <u>711</u> | (288) | <u>941</u> | (381) |

GRAIN PRICE SENSITIVITY

| | | | | | | |
|---------|-----|-------|-----|-------|-------|-------|
| £200 /t | 176 | (71) | 576 | (233) | 776 | (314) |
| £245 /t | 289 | (117) | 779 | (315) | 1,024 | (414) |
| £260 /t | 326 | (132) | 846 | (342) | 1,106 | (448) |

Basis of data:

Sale price estimate 2022 harvest, November ex-farm price. Deductions for field beans, which do not meet minimum quality standards, can reduce the price considerably.

Spring Peas

PHYSICAL DATA

(a) Seed

250 kg/ha (1.99 cwt/acre).

White/Large Blue Compounding Pea

(b) Fertiliser

0 : 20 : 30 kg/ha N : P₂O₅ : K₂O (0 : 16 : 24 units/acre). See page 4 for more information on nutrient planning.

(c) Sprays

Herbicides A pre-emergence herbicide to control annual and broadleaved weeds.

Fungicide Two sprays at flowering for downy mildew and botrytis control.

Insecticide Aphid control.

Desiccation A desiccant is included.

(d) Other crop expenses

Additives can be used to preserve pulses for feeding livestock. Cost will vary depending on product used, length of storage period and moisture of pulses at treatment. For pulses harvested at 20% moisture for long term storage, add £9-13/t grain treated with propionic acid, excluding processing (see page 400 for processing costs).

Spring Peas

GROSS MARGIN DATA

| | | | | | | |
|----------------------------|--------------------|-------|--------------|-------|--------------|-------|
| Grain yield: t/ha (t/acre) | 2.5 | (1.0) | 4.0 | (1.6) | 5.5 | (2.2) |
| OUTPUT | £/ha (acre) | | | | | |
| Grain @ £265/t | 663 | | 1,060 | | 1,458 | |
| | <u>663</u> | (268) | <u>1,060</u> | (429) | <u>1,458</u> | (590) |
| VARIABLE COSTS | | | | | | |
| Seed @ £545/t | 136 | | 136 | | 136 | |
| Fertiliser | 43 | | 43 | | 43 | |
| Sprays | 95 | | 95 | | 95 | |
| Other expenses | - | | - | | - | |
| | <u>274</u> | (111) | <u>274</u> | (111) | <u>274</u> | (111) |
| GROSS MARGIN | <u>389</u> | (157) | <u>786</u> | (318) | <u>1,184</u> | (479) |

GRAIN PRICE SENSITIVITY

| | | | | | | |
|---------|-----|-------|-----|-------|-------|-------|
| £235 /t | 314 | (127) | 666 | (270) | 1,019 | (412) |
| £280 /t | 426 | (172) | 846 | (342) | 1,266 | (512) |
| £295 /t | 464 | (188) | 906 | (367) | 1,349 | (546) |

Basis of data:

Sale price estimate for 2022 harvest, November ex-farm price. Deductions for protein peas, which do not meet minimum quality standards, can reduce the price considerably. Bad weather at harvest can result in very high loss levels.

Cauliflower and Broccoli

PHYSICAL DATA

(a) System

Transplants grown in trays in glasshouses over winter are purchased and field planted from early March to late summer for harvest from June/July to November (or early spring the following year if overwintered cauliflower). Varieties, geographical location and use of crop covers dictate management, harvest timing and end market.

(b) Seed

| | Cauliflower | Broccoli |
|-------------|------------------|------------------|
| Sowing rate | 38,000 plants/ha | 46,000 plants/ha |

Cost varies with variety, disease resistance and target market.

(c) Fertiliser

| | N | P ₂ O ₅ | K ₂ O |
|-------------|-----------|-------------------------------|------------------|
| Cauliflower | 290 kg/ha | 100 kg/ha | 175 kg/ha |
| Broccoli | 250 kg/ha | 100 kg/ha | 175 kg/ha |

Adjustments made for soil status where necessary. See page 4 for more information on nutrient planning.

(d) Sprays

Herbicides Stale seed beds burnt off with glyphosate. Residual herbicide applied post transplanting.

Fungicides Applications to control mildew, white blister, ring spot and alternaria.

Insecticides For aphid and caterpillar control.

Trace elements Boron, manganese, magnesium sulphate, molybdenum applications all may be required.

(e) Other crop expenses

Based on 1/5 of the grown area being under covers (i.e. nets, fleece or polythene).

(f) Irrigation

Irrigation can be necessary. These costs have not been included.

(g) Casual labour

These costs are not included. Using the data below a guide to cost could be calculated. Labour charged at £12.84/hr at rates below:

| Operation | hr/ha |
|-------------------|-------|
| Transplanting | 17 |
| Harvest (fresh) | 32 |
| Harvest (florets) | 20 |
| Additional labour | 17 |

Cauliflower and Broccoli

GROSS MARGIN DATA

| | Cauliflower | | Broccoli | |
|--------------------------|--------------|--------------------|--------------|---------|
| Yield: t/ha (t/acre): | | | | |
| Processing | 19.5 | (7.9) | 10.6 | (4.3) |
| Heads | 21.0 | (8.5) | 11.1 | (4.5) |
| Average | 20.3 | (8.2) | 10.9 | (4.4) |
| OUTPUT | | | | |
| | | £/ha (acre) | | |
| @ £420/t | 8,190 | | - | |
| @ £625/t | - | | 6,625 | |
| | <u>8,190</u> | (3,314) | <u>6,625</u> | (2,681) |
| VARIABLE COSTS | | | | |
| Modules | 1,140 | | 736 | |
| Fertiliser | 516 | | 476 | |
| Sprays | 258 | | 258 | |
| Other expenses | 204 | | 180 | |
| | <u>2,118</u> | (857) | <u>1,650</u> | (668) |
| GROSS MARGIN | <u>6,072</u> | (2,457) | <u>4,975</u> | (2,013) |
| PRICE SENSITIVITY | | | | |
| £450 /t | 6,657 | (2,694) | 3,120 | (1,263) |
| £525 /t | 8,120 | (3,286) | 3,915 | (1,584) |
| £600 /t | 9,582 | (3,878) | 4,710 | (1,906) |
| £675 /t | 11,045 | (4,470) | 5,505 | (2,228) |
| £750 /t | 12,507 | (5,062) | 6,300 | (2,550) |
| £825 /t | 13,970 | (5,654) | 7,095 | (2,871) |

Basis of data:

Crops have target markets of fresh heads for supermarket fresh sales and floretted for processing (e.g. stews or freezer packs). An average for yield and price has been budgeted.

Prices are based on previous years averages, in season prices can be affected by regional availability, weather effects, customer demand and supermarket promotions.

* Ignoring the effect of COVID-19, labour is broadly increased across all operations by circa 7% - driven partly by the minimum living wage increase, but in the main labour is just less efficient.

Timothy - Hay, Greencut

PHYSICAL DATA

(a) System

As practised on the Carse of Stirling and Clackmannan.

(b) Yield

Average between 7 t/ha (2.8 t/acre) and 8 t/ha (3.2 t/acre) with some aftermath grazing (or alternatively round bale silage).

Price rises usually as the season progresses but hay also loses weight with storage - as much as 15% over a winter, depending upon the conditions of storage.

(c) Seed

Annual charge: assumes a 10-year sward life and that 'Basic' seed will be sown to keep open the option of a seed crop.

Seed rate: 13-18 kg/ha.

(d) Fertiliser

Standard practice would see only N applied annually, usually as sulphate of ammonia, supported by periodic dressings of phosphate and potash.

The fertiliser costs overleaf consider an application of the rates below.

See page 4 for more information on nutrient planning.

| kg/ha (units/acre) | Average | Premium |
|---|---------|----------|
| N | 80 (64) | 120 (96) |
| P ₂ O ₅ (annual allocation) | 40 (32) | 50 (40) |
| K ₂ O | 48 (38) | 60 (48) |

(e) Sprays

Annual nominal charge to cover a range of circumstances.

(f) Other crop expenses

Net wrap cost is costed on the basis of 5-6 round bales/t and assuming one roll of net will wrap 410 bales.

Timothy - Hay, Greencut

GROSS MARGIN DATA

| | | | | |
|--|------------|--------------------|------------|-------|
| Average yield: t/ha (acre) | 7.0 | (2.8) | 8.0 | (3.2) |
| OUTPUT | | £/ha (acre) | | |
| Hay (ex-field or early store) @ £110/t | 770 | | 880 | |
| Aftermath grazing let @ £40/ha | 40 | | 40 | |
| | <u>810</u> | (328) | <u>920</u> | (372) |
| VARIABLE COSTS | | | | |
| Seed (annual charge) | 7 | | 7 | |
| Fertiliser | 155 | | 214 | |
| Sprays (annual charge) | 5 | | 5 | |
| Other expenses | 16 | | 18 | |
| | <u>183</u> | (74) | <u>244</u> | (99) |
| GROSS MARGIN | <u>627</u> | (254) | <u>676</u> | (273) |

Stubble to Stubble Arable Operations

The costs of stubble to stubble operations for winter wheat, winter barley, spring barley and winter oilseed rape are illustrated below. These calculations should be adapted and adjusted for site specific circumstances.

Assumptions:

- Yield data taken from crop gross margins on pages 21, 25, 27 and 35.
- All straw is assumed to be baled.
- Contractors assumed to undertake all cultivation, sowing, crop maintenance, harvesting and carting to store. See pages 399-402 for contractor costs.
- Fuel cost itemised separately to contractors charges. Machinery fuel use (l/ha) and fuel cost on page 396-397.
- Drying costs based on costs on page 403.

| | Winter wheat | Winter barley | Spring barley | Winter OSR |
|-------------------------------|-----------------|------------------|------------------|---------------|
| Yield - grain (t /ha) | 8.0 | 7.5 | 5.5 | 4.0 |
| Yield - straw (t /ha) | 4.2 | 4.1 | 2.9 | - |
| Grain MC at harvest (%) | 18 | 16 | 15 | 10 |
| | £/ha | | | |
| Cultivation costs | | | | |
| <i>Plough and cultivate</i> | 111 | 111 | 111 | 111 |
| <i>Sow</i> | 38 | 38 | 38 | 38 |
| <i>Roll and destone</i> | 19 | 19 | 19 | 19 |
| <i>Spray</i> | 68 | 55 | 41 | 55 |
| <i>Fertilise</i> | 32 | 21 | 21 | 21 |
| <i>Fuel</i> | 43 | 41 | 40 | 41 |
| | 311 | 284 | 270 | 284 |
| Harvest costs | | | | |
| <i>Harvest</i> | 91 | 91 | 91 | 92 |
| <i>Bale/stack</i> | 64 | 63 | 45 | - |
| <i>Carting</i> | 8 | 12 | 8 | 4 |
| <i>Dry grain</i> | 88 | 53 | - | 36 |
| <i>Fuel</i> | 14 | 13 | 11 | 8 |
| | 266 | 230 | 155 | 140 |
| Total cost (£/ha) | 576 | 515 | 425 | 424 |
| Total cost (£/ac) | 233 | 208 | 172 | 172 |
| Cost per t grain (£/t) | 72 | 69 | 77 | 106 |

Equivalent Grain Weights at Varying Moisture Contents

The formula for converting wet grain weight to dry grain weight is:

$$\text{Weight loss} = \frac{W_1 (M_1 - M_2)}{100 - M_2}$$

where: W_1 = starting weight of grain.
 M_1 = starting moisture of grain.
 M_2 = final moisture of grain.

This formula accounts only for weight change due to moisture loss only.

| 100t at Moisture Content % | Final moisture content % | | | | | | | | |
|----------------------------------|--------------------------|--------|-------|--------|-------|--------|-------|-------|-------|
| | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 |
| | Dried grain - t | | | | | | | | |
| 35 | 81.25 | 80.25 | 79.27 | 78.31 | 77.38 | 76.47 | 75.58 | 74.71 | 73.86 |
| 33 | 83.75 | 82.72 | 81.71 | 80.72 | 79.76 | 78.82 | 77.91 | 77.01 | 76.14 |
| 31 | 86.25 | 85.18 | 84.15 | 83.13 | 82.14 | 81.18 | 80.23 | 79.31 | 78.41 |
| 29 | 88.75 | 87.65 | 86.59 | 85.54 | 84.52 | 83.53 | 82.56 | 81.41 | 80.68 |
| 27 | 91.25 | 90.12 | 89.02 | 87.95 | 86.90 | 85.88 | 84.88 | 83.91 | 82.95 |
| 25 | 93.75 | 92.59 | 91.46 | 90.36 | 89.29 | 88.24 | 87.21 | 86.21 | 85.22 |
| 23 | 96.25 | 95.06 | 93.90 | 92.77 | 91.67 | 90.59 | 89.53 | 88.51 | 87.50 |
| 21 | 98.75 | 97.53 | 96.34 | 95.18 | 94.05 | 92.94 | 91.86 | 90.80 | 89.77 |
| 19 | - | 100.00 | 98.78 | 97.59 | 96.43 | 95.30 | 94.19 | 93.10 | 92.41 |
| 17 | - | - | - | 100.00 | 98.81 | 97.65 | 96.51 | 95.40 | 94.32 |
| 15 | - | - | - | - | - | 100.00 | 98.84 | 97.70 | 96.59 |

Further information on storage requirements for grain can be found on page 427, costs of grain storage are found on pages 425 and 438 and costs of grain drying on page 403.

Futures and Options Markets

The futures markets offer a means to manage price risk in a wide range of agricultural commodities. In the UK, the most relevant markets are the UK LIFFE feed wheat futures (www.theice.com) and the Paris European Rapeseed futures and Milling Wheat futures (www.euronext.com). Contracts for futures (forward prices) and options (price insurance) are available in both of these markets. Further details on the market, lists of registered brokers and how to trade can be found at the website above.

On a global basis the most important agricultural futures market is the Chicago Board of Trade which offers contracts on wheat, maize, oats, soyabeans, soyameal and others, see www.cmegroup.com. AHDB Cereals and Oilseeds has detailed market information on their website and also provides a guide to price risk management, futures and options. See <https://cereals.ahdb.org.uk/markets.aspx>.

Potatoes

Introduction

Markets and Price Drivers

The potato market in the UK is split between seed, ware for fresh market and ware for processing. The 2020/21 potato marketing season has been dominated by significant disruption caused by the global COVID-19 pandemic. The chipping and processing sectors have been worst affected by lockdown measures which were first enforced in March 2020. With the closure of many hospitality businesses and venues, sales into these markets virtually stopped overnight leaving growers and processors with very few options to market their potatoes. Most hotels, pubs, cafés, restaurants, and entertainment venues have remained closed for the best part of one full year, and even now (in October 2021) as the UK eases out of lockdown, there are still some restrictions placed on hospitality venues limiting customer footfall.

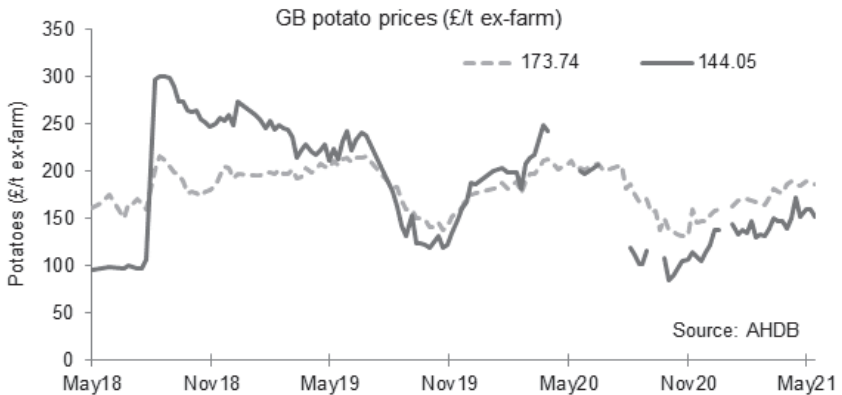
Retail sales have dominated the potato market, with nearly all consumers eating at home throughout the pandemic. This includes consumers largely working from home and an increased desire to cook from scratch rather than eating processed foods 'on the move'. This trend is likely to continue post-Pandemic as many businesses look to move towards a flexi-working approach where employees can work between their office and home environments to best suit business, personal, and lifestyle requirements.

Maris Piper has been the consumer favourite throughout lockdown and demand for good quality stocks of Piper continue to rise as we head towards the end of the 2020/21 crop season. This demand is mainly driven by consumer awareness and loyalty to the brand name 'Maris Piper' as it is familiar with many consumers and is an all-round cooking variety. At the point of writing (June 2021), there is a considerable free-buy price difference between Piper and Whites. In Scotland, the Median free-buy price for Piper is £255/t ex-farm, £200/t ex-farm more than Whites (£55/t ex-farm). There are reports of some good quality Piper stocks reaching highs of £350/t ex-farm with tightening availability of remaining Piper continuing to drive up farmgate prices. This is a prime example of market forces where demand outstrips supply and unforeseen changes in the market, such as lockdown, can have a significant impact on farm gate prices.

Growers with large volumes of Whites stocks, and varieties specifically grown for processing markets have not been so fortunate and are finding it difficult to sell surplus stocks. However, the 2021 planting season was delayed slightly due to the cold and wet spring which slowed crop development and therefore extend the 2020/21 'old crop' season. This helped to increase potato movement and reduced potential waste in the supply chain.

In 2020, the total GB planted area was 117,466ha, a decrease by around 2,788ha on the previous year. Total harvested area was 115,919ha with average reported net yield of 46.3t/ha. The total 2020 estimated GB production was 5.37Mt.

The following chart illustrates the weekly average free-buy price trend during the trading period May-May during 2018-2021 crop years.



Consumer Trends

Potatoes have experienced declining retail sales over the past 20 years as there is a shift in consumer demand for quick, easy, and convenient meals. Research indicates that only 35% of consumers enjoy and are confident in cooking a variety of dishes. This leaves 32% who claim they have a limited repertoire of meals they feel confident cooking, and 33% who either do not enjoy cooking, or have a basic to no level of culinary skills (Source: AHDB/YouGov, Consumer Tracker, August 2018). Studies also indicate that consumer lifestyles are changing as there is a significant rise in the number of 1–2 person households, with this consumer demographic moving towards a more varied, convenient, and healthy diet which is enjoyable, and offers good value for money.

According to Kantar Worldpanel data cited by AHDB, carbohydrates account for a 6% share of the food and drink retail market. Approximately three-quarters of consumers agree that carbohydrates provide energy (76%), are a good source of fuel for sport/energy (72%) and are an important part of a healthy balanced diet (72%) (AHDB/YouGov, Consumer Tracker, Aug-18). Health and convenience are key consumer drivers, but perceptions on these aspects differ depending on the carbohydrate itself. Currently, potatoes are perceived as the third healthiest carbohydrate, behind sweet potatoes and rice, and the third most convenient carbohydrate behind pasta and rice (Source: AHDB: Latest Retail and Consumer Insights on Potatoes, 2019).

Potato Market Performance

In the 12 weeks ending 21st March 2021, total potato volume sales were up 6.7% year-on-year. Fresh potatoes saw volume growth of 7.7% driven by prepack potatoes, with loose potatoes experiencing a decline. Processed potato products were up 4.9% with frozen chips contributing to the greatest volume growth, up 6.5M kg. Potato savoury snacks also saw a rise in volume sales, up 12.9% year-on-year (Source: AHDB 2021).

The long-term market effects of the COVID-19 pandemic are unknown, but for the short-term it is likely that fresh volume sales, frozen chips, and savoury snacks will continue to rise as more consumers eat at home.

Marketing

Contracts have been a standard feature of the ware and processing market for a long time where factories need to procure supplies well in advance and ensure that their growers attain a sustainable price. The fresh market is more volatile and complex with some growers utilising cold storage facilities to lengthen their supply season with the prospect of higher free-buy prices later in the season. In seasons of oversupply in the market, contracts have become more popular where growers have tried to lock down a proportion of their crop for a known price. However, in a season of undersupply, growers will hold onto uncontracted stocks as long as possible to negotiate higher prices. Given the price volatility in the free-buy market, contracts are becoming more popular among fresh market growers, particularly for those who are forward planning, or obtaining capital from the bank to support business expansion.

The grower's hand is also strengthened in negotiations by producing potatoes free from damage, disease and skin blemish, as aesthetics are a major selling point in the fresh potato sector.

The seed market is virtually all done on contract where growers multiply seed stocks in partnership with the seed houses. Growers must attain high standards of crop health, seed purity and hygiene, good yields of the correct size band and timely and accurate supply. Reputation and reliability will gain growers higher quality contracts.

Margins

Crop returns are highly sensitive to the net (packed out) yield achieved which also affects the price. Attention to crop health and damage minimisation are critical. Seed costs are variable with growers looking to multiply their own seed where they can. Fertiliser costs can be adjusted according to the market with savings on nitrogen and potash for new, salad and seed potato growers. Sprays are quite uniform across the board but the need for nematicides to combat Potato Cyst Nematode (PCN) is a significant outlay. Differences in fixed costs, particularly machinery, have the greatest impact on overall profitability.

Variety Choice

The most important factor when selecting a potato variety is suitability for the end market. For crisps, tubers with good shape, high dry matter, resistance to damage and yellow flesh are required. For chips, oval tubers with good uniformity and low reducing sugar content are best. For the fresh packing market, taste and resistance to disease causing skin blemishes are important.

The most popular variety is Maris Piper which can be boiled, chipped or roasted equally well, and commands brand loyalty. Salad varieties are popular as they can be boiled within 20 minutes without peeling and chopping, which makes them competitive with pasta and rice.

Resistance to pests and diseases is becoming increasingly important due to the loss of key chemical active ingredients. The most valuable traits are resistance to PCN (which also helps to reduce the viable population of PCN in the field), blackleg, powdery scab and blight. Gross yield as with wheat and barley is not as important as net/sold yield is to potatoes. Emphasis is on quality over quantity in the pursuit of profitability.

Potatoes - Loose New (Covered and Open)

PHYSICAL DATA

(a) Seed

Nominal planting rate of 3.5 t/ha. No charge included for chitting. Bought in seed. Cost varies with variety, e.g. Rocket, Epicure, seed size and classification grade. Seed rate also varies with variety and seed size.

(b) Fertiliser

90 : 150 : 110 kg/ha N : P₂O₅ : K₂O (72 : 120 : 88 units/acre). See page 4 for more information on nutrient planning.

(c) Sprays

Seed treatment Treatment for rhizoctonia.

Herbicides Residual herbicide tank mix with multiple active ingredients.

Blight control 3-5 spray program with protectant and tuber blight control chemicals. Cost may be higher in high blight pressure years.

Desiccation Haulm destruction by pulverizing. No chemical cost. For pulverising costs, see page 401.

(d) Other crop expenses

Levy costs have been removed. It is unclear what, if any, statutory levy arrangements will be in place for the 2022 growing season.

25 kg bags (£9.00-9.50/t of crop) could be an *additional* item, depending on circumstances.

Includes cost of fleece material and labour cost of covering, uncovering and general maintenance during the season.

(e) Irrigation

Irrigation may be applied in some circumstances for yield and quality. These costs are not included. Annual capital charge could be £350-500/ha plus £1.60-1.90/ha.mm with a contract charge of approximately £5.40/ha.mm.

(f) Casual labour

These costs are not included. Costs calculated using the data below could be used. Labour charged at £12/hr (assumes lifting and grading done at the same time) at the rates below:

| Operation | hr/ha |
|------------------------|-----------------|
| Lifting (by harvester) | 20 |
| Grading | low yield 25 |
| | medium yield 38 |

Potatoes - Loose New (Covered and Open)

GROSS MARGIN DATA

| | Covered | | Open | |
|------------------------|--------------------|---------|--------------|---------|
| Yield: t/ha (t/acre): | | | | |
| Ware | 14 | (5.7) | 20 | (8.1) |
| Stockfeed | - | (0.0) | - | (0.0) |
| OUTPUT | £/ha (acre) | | | |
| Ware @ £475/t | 6,650 | | - | |
| Ware @ £300/t | - | | 6,000 | |
| Stockfeed @ £0/t | - | | - | |
| | <u>6,650</u> | (2,691) | <u>6,000</u> | (2,428) |
| VARIABLE COSTS | | | | |
| Seed @ £320/t | 1,120 | | 1,120 | |
| Fertiliser | 327 | | 327 | |
| Sprays | 326 | | 331 | |
| Other expenses | 875 | | - | |
| | <u>2,648</u> | (1,072) | <u>1,778</u> | (720) |
| GROSS MARGIN | <u>4,002</u> | (1,619) | <u>4,222</u> | (1,708) |
| WARE PRICE SENSITIVITY | | | | |
| £200 /t | 152 | (62) | 2,222 | (899) |
| £350 /t | 2,252 | (911) | 5,222 | (2,113) |
| £500 /t | 4,352 | (1,761) | 8,222 | (3,327) |
| £650 /t | 6,452 | (2,611) | 11,222 | (4,541) |
| £800 /t | 8,552 | (3,461) | 14,222 | (5,756) |

Potatoes - Early Set Skin Pre-Pack Bakers (Covered and Open)

PHYSICAL DATA

(a) Seed

Planted at 2.4 t/ha with bought in seed. Cost varies with variety, e.g. Marfona, Osprey etc, seed size and classification grade.

(b) Fertiliser

170-180 : 130 : 200 kg/ha N : P₂O₅ : P : K₂O (136-144 : 104 : 160 units/acre). See page 4 for more information on nutrient planning.

(c) Sprays

Seed treatment Seed treatment for Rhizoctonia control.

Nematicide Assumption of 15-20% of the area treated with nematicide for free living nematode or PCN control.

Herbicides Covered crops residual herbicide tank mix. Uncovered crops contact plus reduced rate residual herbicides applied pre-emergence.

Blight control 8-9 spray program including protectant, curative and tuber blight protection chemicals.

Slug control 3-4 applications.

Desiccation Pulverising followed by 2 spray chemical desiccation program. For pulverising costs, see page 401.

(d) Other crop expenses

Levy costs have been removed. It is unclear what, if any, statutory levy arrangements will be in place for the 2022 growing season. Fleece for covered crop included.

(e) Irrigation

Irrigation may be applied in some circumstances for yield and quality. These costs are not included. Annual capital charge could be £350-500/ha plus £1.60-1.90/ha.mm with a contract charge of approximately £5.40/ha.mm.

(f) Casual labour

These costs are not included. Costs calculated using the data below could be used. Labour charged at £12/hr at the rates below:

| Operation | hr/ha |
|---|-------------------------|
| Lifting (by harvester) | 20 |
| Grading (half the grading done by regular labour) | low yield high yield |
| | 44 50 |

Potatoes - Early Set Skin Pre-Pack Bakers (Covered and Open)

GROSS MARGIN DATA

| | Covered | | Open | |
|-----------------------|--------------------|---------|--------------|---------|
| Yield: t/ha (t/acre): | | | | |
| Ware | 42 | (17.0) | 47 | (19.0) |
| Stockfeed | - | (0.0) | - | (0.0) |
| OUTPUT | £/ha (acre) | | | |
| Ware @ £260/t | 10,920 | | - | |
| Ware @ £180/t | - | | 8,460 | |
| Stockfeed @ £0/t | - | | - | |
| | <u>10,920</u> | (4,419) | <u>8,460</u> | (3,424) |
| VARIABLE COSTS | | | | |
| Seed @ £340/t | 816 | | 816 | |
| Fertiliser | 447 | | 457 | |
| Sprays | 538 | | 502 | |
| Other expenses | 875 | | - | |
| | <u>2,676</u> | (1,083) | <u>1,775</u> | (718) |
| GROSS MARGIN | <u>8,244</u> | (3,336) | <u>6,685</u> | (2,706) |

WARE PRICE SENSITIVITY

| | | | | |
|---------|-------|---------|-------|---------|
| £50 /t | -576 | -(233) | 575 | (233) |
| £100 /t | 1,524 | (617) | 2,925 | (1,184) |
| £125 /t | 2,574 | (1,042) | 4,100 | (1,659) |
| £175 /t | 4,674 | (1,892) | 6,450 | (2,610) |
| £200 /t | 5,724 | (2,316) | 7,625 | (3,086) |
| £250 /t | 7,824 | (3,166) | 9,975 | (4,037) |

Potatoes - Pre-Pack Salads

PHYSICAL DATA

(a) Seed

Nominal planting rate of 5 t/ha. Bought in seed. Variety e.g. Charlotte etc. Cost varies with variety and seed size.

(b) Fertiliser

90 : 170 : 110 kg/ha N : P₂O₅ : K₂O (72 : 136 : 88 units/acre). See page 4 for more information on nutrient planning.

(c) Sprays

Seed treatment Seed treatment for Rhizoctonia. Assumption of 50% of the area treated with an in furrow fungicide for blackdot control.

Herbicides Contact plus reduced rate residual herbicides applied pre-emergence.

Nematicide Assumption of 20% of area treated with reduced rate nematicide for free living nematode control.

Blight control 8-9 spray program including protectant, systemic, curative and tuber blight control chemicals. Cost may be higher in high blight pressure years.

Slug control 2 applications of slug pellets.

Desiccation Pulverizing followed by reduced rate chemical desiccation. For pulverising costs, see page 401.

(d) Other crop expenses

Levy costs have been removed. It is unclear what, if any, statutory levy arrangements will be in place for the 2022 growing season. An average period of 6 months cold storage is included.

(e) Irrigation

Irrigation may be applied in some circumstances for yield and quality. These costs are not included. Annual capital charge could be £350-500/ha plus £1.60-1.90/ha.mm with a contract charge of approximately £5.40/ha.mm.

(f) Casual labour

These costs are not included. Costs calculated using the data below could be used. Labour charged at £12/hr (assumes lifting and grading done at the same time) at the rates below:

| Operation | hr/ha |
|------------------------|-----------------|
| Lifting (by harvester) | 20 |
| Grading | low yield 25 |
| | medium yield 38 |

Potatoes - Pre-Pack Salads

GROSS MARGIN DATA

Yield: t/ha (t/acre):

| | | |
|-----------|-----------|---------------|
| Ware | 37 | (15.0) |
| Stockfeed | 4 | (1.6) |
| | <u>41</u> | <u>(16.6)</u> |

OUTPUT

| | | |
|--------------------|--------------------|----------------|
| | £/ha (acre) | |
| Ware @ £320 /t | 11,840 | |
| Stockfeed @ £20 /t | 80 | |
| | <u>11,920</u> | <u>(4,824)</u> |

VARIABLE COSTS

| | | |
|----------------|--------------|----------------|
| Seed @ £320/t | 1,600 | |
| Fertiliser | 349 | |
| Sprays | 553 | |
| Other expenses | 1,808 | |
| | <u>4,310</u> | <u>(1,744)</u> |
| GROSS MARGIN | <u>7,610</u> | <u>(3,080)</u> |

WARE PRICE SENSITIVITY

| | | |
|---------|--------|---------|
| £75 /t | -1,455 | -(589) |
| £150 /t | 1,320 | (534) |
| £200 /t | 3,170 | (1,283) |
| £250 /t | 5,020 | (2,032) |
| £300 /t | 6,870 | (2,780) |
| £375 /t | 9,645 | (3,903) |

Potatoes - Maincrop Ware (Pre-Pack Bakers)

PHYSICAL DATA

(a) Seed

Planted at 2.4 t/ha (can range from 2.0-3.0 t/ha for 35-55 mm seed depending on variety). Bought in. Cost varies with variety, seed size and classification grade.

(b) Fertiliser

200 : 130 : 200 kg/ha N : P₂O₅ : K₂O (160 : 104 : 160 units/acre). See page 4 for more information on nutrient planning.

Reduce N by 33% for indeterminate varieties, e.g. Vales Sovereign.

(c) Sprays

Seed treatment Seed treatment for rhizoctonia control. Assumption 50% of the area treated with in furrow fungicide for control of blackdot.

Nematicide Assumption of 15-20% of area treated for free living nematode or PCN control.

Herbicides Contact plus reduced rate residual herbicide tank mix.

Blight control 12 spray blight program for moderate blight pressure including protectant, systemic, curative and tuber blight protection chemicals.

Slugs control 2-3 applications.

Desiccation 2-3 spray chemical desiccation program.

(d) Other crop expenses

Levy costs have been removed. It is unclear what, if any, statutory levy arrangements will be in place for the 2022 growing season. Costs for average cold storage period of 6 months are included.

(e) Irrigation

Irrigation may be applied in some circumstances for yield and quality. These costs are not included. Annual capital charge could be £350-500/ha plus £1.60-1.90/ha.mm with a contract charge of approximately £5.40/ha.mm.

(f) Casual labour

These costs are not included. Costs calculated using the data below could be used. Labour charged at £12/hr at the rates below:

| Operation | hr/ha |
|---|-------------------------------|
| Lifting (by harvester) | 20 |
| Grading (half the grading done by regular labour) | low yield 55 high yield 70 |

Potatoes - Maincrop Ware (Pre-Pack Bakers)

GROSS MARGIN DATA

| | | | | |
|------------------------|--------------|--------------------|---------------|----------------|
| Yield: t/ha (t/acre): | | | | |
| Bakers | 16 | (6.5) | 24 | (9.7) |
| Pre-pack | 26 | (10.5) | 31 | (12.5) |
| Outgrades | 8 | (3.2) | 10 | (4.0) |
| | <u>50</u> | <u>(20.2)</u> | <u>65</u> | <u>(26.3)</u> |
| OUTPUT | | £/ha (acre) | | |
| Bakers @ £280/t | 4,480 | | 6,720 | |
| Pre-pack @ £170/t | 4,420 | | 5,270 | |
| Outgrades @ £20/t | 160 | | 200 | |
| | <u>9,060</u> | <u>(3,667)</u> | <u>12,190</u> | <u>(4,933)</u> |
| VARIABLE COSTS | | | | |
| Seed @ £355/t | 852 | | 852 | |
| Fertiliser | 477 | | 477 | |
| Sprays | 638 | | 638 | |
| Other expenses | 2,205 | | 2,867 | |
| | <u>4,172</u> | <u>(1,688)</u> | <u>4,834</u> | <u>(1,956)</u> |
| GROSS MARGIN | <u>4,888</u> | <u>(1,979)</u> | <u>7,357</u> | <u>(2,977)</u> |
| WARE PRICE SENSITIVITY | | | | |
| £50 /t | 1,768 | (715) | 3,637 | (1,472) |
| £130 /t | 3,848 | (1,557) | 6,117 | (2,476) |
| £210 /t | 5,928 | (2,399) | 8,597 | (3,479) |
| £290 /t | 8,008 | (3,241) | 11,077 | (4,483) |

Note:

Many packers will split grade the pack size (e.g. 45/50-65/70 mm) from the baker (65/70-85 mm), paying a flat rate for all sizes above the 45/50 mm bottom riddle.

Potatoes - Maincrop Ware (Pre-Pack Premium Varieties)

PHYSICAL DATA

(a) Seed

Planted at 1.9 t/ha (varies with variety e.g. Maris Piper, Desiree, King Edward etc). Bought in. Cost varies with variety, seed size and classification grade.

(b) Fertiliser

180 : 130 : 200 kg/ha N : P₂O₅ : K₂O (144 : 104 : 160 units/acre). See page 4 for more information on nutrient planning.

(c) Sprays

Seed treatment Full rate seed treatment for rhizoctonia control. Treated with in furrow fungicide for control of blackdot.

Nematicide Assumption of 15-20% of area treated for free living nematode or PCN control.

Herbicides Contact plus reduced rate residual herbicides applied pre-emergence.

Blight control 12 spray blight program for high blight pressure including protectant, systemic, curative and tuber blight protection chemicals.

Slugs control Comprehensive reduced dose season program.

Desiccation 3 spray chemical desiccation program.

(d) Other crop expenses

Levy costs have been removed. It is unclear what, if any, statutory levy arrangements will be in place for the 2022 growing season. Average cold storage period of 6 months and sprout suppression are included.

(e) Irrigation

Irrigation may be applied in many circumstances for yield and quality. These costs are not included. Annual capital charge could be £350-500/ha plus £1.60-1.90/ha.mm with a contract charge of approximately £5.40/ha.mm.

(f) Casual labour

These costs are not included. Costs calculated using the data below could be used. Labour charged at £12/hr at the rates below:

| Operation | hr/ha |
|---|-------------------------------|
| Lifting (by harvester) | 20 |
| Grading (half the grading done by regular labour) | low yield 55 high yield 70 |

Potatoes - Maincrop Ware (Pre-Pack Premium Varieties)

GROSS MARGIN DATA

| | | | | |
|-----------------------|--------------|-------------|---------------|---------|
| Yield: t/ha (t/acre): | | | | |
| Pre-pack | 45 | (18.2) | 57 | (23.1) |
| Outgrades | 5 | (2.0) | 8 | (3.2) |
| | <u>50</u> | (20.2) | <u>65</u> | (26.3) |
| OUTPUT | | £/ha (acre) | | |
| Pre-pack @ £205/t | 9,225 | | 11,685 | |
| Outgrades @ £20/t | 100 | | 160 | |
| | <u>9,325</u> | (3,774) | <u>11,845</u> | (4,794) |
| VARIABLE COSTS | | | | |
| Seed @ £310/t | 589 | | 589 | |
| Fertiliser | 457 | | 457 | |
| Sprays | 649 | | 649 | |
| Other expenses | 2,430 | | 3,159 | |
| | <u>4,125</u> | (1,669) | <u>4,854</u> | (1,964) |
| GROSS MARGIN | <u>5,200</u> | (2,105) | <u>6,991</u> | (2,830) |

WARE PRICE SENSITIVITY

| | | | | |
|---------|--------|---------|--------|---------|
| £50 /t | -1,775 | -(718) | -1,844 | -(746) |
| £100 /t | 475 | (192) | 1,006 | (407) |
| £150 /t | 2,725 | (1,103) | 3,856 | (1,561) |
| £200 /t | 4,975 | (2,013) | 6,706 | (2,714) |
| £250 /t | 7,225 | (2,924) | 9,556 | (3,867) |

Potatoes - Maincrop Ware (Processing - Chips)

PHYSICAL DATA

(a) Seed

Planted at 3.0 t/ha with 35/55mm seed (varies depending on variety, e.g. Maris Piper, Markies, etc). Bought in. Cost varies with variety, seed size and classification grade.

(b) Fertiliser

180 : 130 : 300 kg/ha N : P₂O₅ : K₂O (144 : 104 : 240 units/acre). See page 4 for more information on nutrient planning.

Organic manures may be best avoided for processing crops – late and variable release of N could affect fry quality.

(c) Sprays

Seed treatment None unless rhizoctonia infection present on seed.

Nematicide Assumption of 15-20% of area treated for free living nematode or PCN control.

Herbicides Contact plus reduced rate residual herbicides applied pre-emergence.

Blight control 12 spray blight program for high blight pressure including protectant, systemic, curative and tuber blight protection chemicals.

Slug control Comprehensive reduced dose season program.

Desiccation 3 spray chemical desiccation program.

(d) Other crop expenses

Levy costs have been removed. It is unclear what, if any, statutory levy arrangements will be in place for the 2022 growing season.

Storage and sprout suppressant costs are included. Chip processing in Scotland is mainly for chip shops, so costs of bags need to be included (£9.00-9.50/t of crop for 25 kg bags).

(e) Casual labour

These costs are not included. Costs calculated using the data below could be used. Labour charged at £12/hr at the rates below:

| Operation | hr/ha |
|---|-------|
| Lifting (by harvester) | 20 |
| Grading (half the grading done by regular labour) | 40 |

Potatoes - Maincrop Ware (Processing - Chips)

GROSS MARGIN DATA

| | Off-field | | Ex-store | |
|------------------------|--------------------|----------------|--------------|----------------|
| Yield: t/ha (t/acre): | | | | |
| Ware | 52 | (21.0) | 52 | (21.0) |
| Stockfeed | 5 | (2.0) | 5 | (2.0) |
| | <u>57</u> | <u>(23.1)</u> | <u>57</u> | <u>(23.1)</u> |
| OUTPUT | £/ha (acre) | | | |
| Off-field @ £145/t | 7,540 | | - | |
| Ex-store @ £185/t | - | | 9,620 | |
| Stockfeed @ £20/t | 100 | | 100 | |
| | <u>7,640</u> | <u>(3,092)</u> | <u>9,720</u> | <u>(3,934)</u> |
| VARIABLE COSTS | | | | |
| Seed @ £280/t | 840 | | 840 | |
| Fertiliser | 527 | | 527 | |
| Sprays | 502 | | 502 | |
| Other expenses | - | | 2,445 | |
| | <u>1,869</u> | <u>(756)</u> | <u>4,314</u> | <u>(1,746)</u> |
| GROSS MARGIN | <u>5,771</u> | <u>(2,336)</u> | <u>5,406</u> | <u>(2,188)</u> |
| WARE PRICE SENSITIVITY | | | | |
| £50 /t | 831 | (336) | - 1,614 | -(653) |
| £110 /t | 3,951 | (1,599) | 1,506 | (609) |
| £170 /t | 7,071 | (2,862) | 4,626 | (1,872) |
| £230 /t | 10,191 | (4,124) | 7,746 | (3,135) |
| £300 /t | 13,831 | (5,597) | 11,386 | (4,608) |

Note:

Prices quoted include typical bonus additions for good dry matter, low tuber count, good size (length), good fry colour and low defect levels.

Potatoes - Maincrop Ware (Processing - Crisps)

PHYSICAL DATA

(a) Seed

Planted at 3.0 t/ha. 35/55mm seed, varies depending on variety, e.g. Hermes, Saturna, Lady Rosetta, Lady Claire, etc. Bought in. Cost varies with variety, seed size and classification grade.

(b) Fertiliser

200 : 130 : 300 kg/ha N : P₂O₅ : K₂O (160 : 104 : 240 units/acre). See page 4 for more information on nutrient planning.

Organic manures may be best avoided for processing crops – late and variable release of N could affect fry quality.

(c) Sprays

Seed treatment None unless rhizoctonia infection present on seed.

Nematicide Assumption of 15-20% of area treated for free living nematode or PCN control.

Herbicides Contact plus reduced rate residual herbicides applied pre-emergence.

Blight control 12 spray blight program for high blight pressure including protectant, systemic, curative and tuber blight protection chemicals.

Slug control 3 applications.

Desiccation 3 spray chemical desiccation program.

(d) Other crop expenses

Levy costs have been removed. It is unclear what, if any, statutory levy arrangements will be in place for the 2022 growing season.

Processing storage for a 4-month period and sprout suppressant costs are included.

(e) Irrigation

Irrigation may be applied in some circumstances for yield and quality.

These costs are not included. Annual capital charge could be £350-500/ha plus £1.60-1.90/ha.mm with a contract charge of approximately £5.40/ha.mm.

(f) Casual labour

These costs are not included. Costs calculated using the data below could be used. Labour charged at £12/hr at the rates below:

| Operation | hr/ha | |
|---|------------|----|
| Lifting (by harvester) | 20 | |
| Grading (half the grading done by low yield regular labour) | 44 | |
| | high yield | 55 |

Potatoes - Maincrop Ware (Processing - Crisps)

GROSS MARGIN DATA

| | Off-field | | Ex-store | |
|-------------------------------|--------------------|----------------|--------------|----------------|
| Yield: t/ha (t/acre): | | | | |
| Ware | 44 | (17.8) | 44 | (17.8) |
| Stockfeed | 4 | (1.6) | 4 | (1.6) |
| | <u>48</u> | <u>(19.4)</u> | <u>48</u> | <u>(19.4)</u> |
| OUTPUT | £/ha (acre) | | | |
| Off-field @ £135/t | 5,940 | | - | |
| Ex-store @ £170/t | - | | 7,480 | |
| Stockfeed @ £20/t | 80 | | 80 | |
| | <u>6,020</u> | <u>(2,436)</u> | <u>7,560</u> | <u>(3,059)</u> |
| VARIABLE COSTS | | | | |
| Seed @ £360/t | 1,260 | | 1,260 | |
| Fertiliser | 547 | | 547 | |
| Sprays | 502 | | 502 | |
| Other expenses | - | | 2,412 | |
| | <u>2,309</u> | <u>(934)</u> | <u>4,721</u> | <u>(1,911)</u> |
| GROSS MARGIN | <u>3,711</u> | <u>(1,502)</u> | <u>2,839</u> | <u>(1,148)</u> |
| WARE PRICE SENSITIVITY | | | | |
| £50 /t | - 29 | -(12) | -2,441 | -(988) |
| £110 /t | 2,611 | (1,057) | 199 | (81) |
| £170 /t | 5,251 | (2,125) | 2,839 | (1,149) |
| £230 /t | 7,891 | (3,193) | 5,479 | (2,217) |
| £300 /t | 10,971 | (4,440) | 8,559 | (3,464) |

Note:

Prices quoted include typical bonus additions for good dry matter, low tuber count, good size (length), good fry colour and low defect levels.

Potatoes - Seed (Low and High Number Varieties)

PHYSICAL DATA

(a) Seed

Planted at 4.8 t/ha (can range from 3.5-6.1 t/ha for 35/55 mm seed depending on variety and top riddle size on which daughter crop will be sold). Half bought in. Cost varies with variety, seed size and classification grade.

(b) Fertiliser

80 : 170 : 110 kg/ha N : P₂O₅ : K₂O (64 : 136 : 88 units/acre). See page 4 for more information on nutrient planning.

Reduce N by 25% for indeterminate varieties, e.g. Cara and Markies.

(c) Sprays

Seed treatment Multipurpose seed treatment applied at grade plus reduced rate fungicide applied for rhizoctonia.

Nematicide Assumption of no treatment applied. Application may be required in field and varieties at risk of spraing.

Herbicides Contact plus reduced rate residual herbicides applied pre-emergence.

Blight control 8-9 spray program with protectant, systemic, curative and tuber blight protection products for moderate-high blight pressure.

Aphid control Up to 8 applications.

Slug control 2 applications.

Desiccation Pulverising followed by chemical desiccation. For pulverising costs, see page 401.

(d) Other crop expenses

Levy costs have been removed. SPCS field inspection fees, roguing and labels are included. Positive ventilation and cold storage. Other costs may include bags (£7.50-11.20/t of crop), chemical treatment at storage time and royalties (which will depend on variety).

(e) Casual labour

These costs are not included. Costs calculated using the data below could be used. Labour charged at £12/hr at the rates below:

| Operation | hr/ha |
|---|-------|
| Lifting (by harvester) | 20 |
| Grading (half the grading done by regular labour) | 40 |

Potatoes - Seed (Low and High Number Varieties)

GROSS MARGIN DATA

| | Low | | High | |
|-------------------------------|--------------------|----------------|--------------|----------------|
| Yield: t/ha (t/acre): seed | 25 | (10.1) | 35 | (14.2) |
| Yield: t/ha (t/acre): ware | 6 | (2.4) | 6 | (2.4) |
| Yield: t/ha (t/acre): s/feed | 2 | (0.8) | 2 | (0.8) |
| | <u>33</u> | <u>(13.4)</u> | <u>43</u> | <u>(17.4)</u> |
| OUTPUT | £/ha (acre) | | | |
| Seed @ £260/t | 6,500 | | - | |
| Ware @ £60/t | 360 | | - | |
| Stockfeed @ £20/t | 40 | | - | |
| Seed @ £220/t | - | | 7,700 | |
| Ware @ £60/t | - | | 360 | |
| Stockfeed @ £20/t | - | | 40 | |
| | <u>6,900</u> | <u>(2,792)</u> | <u>8,100</u> | <u>(3,278)</u> |
| VARIABLE COSTS | | | | |
| Seed @ £380/t | 1,824 | | 1,520 | |
| Fertiliser | 339 | | 339 | |
| Sprays | 665 | | 634 | |
| Other expenses | 2,602 | | 3,362 | |
| | <u>5,430</u> | <u>(2,197)</u> | <u>5,855</u> | <u>(2,369)</u> |
| GROSS MARGIN | <u>1,470</u> | <u>(595)</u> | <u>2,245</u> | <u>(909)</u> |
| SEED PRICE SENSITIVITY | | | | |
| £150 /t | -1,280 | -(518) | -205 | -(83) |
| £250 /t | 1,220 | (494) | 3,295 | (1,333) |
| £300 /t | 2,470 | (1,000) | 5,045 | (2,042) |

Potatoes - Dual Purpose (Seed and Ware)

PHYSICAL DATA

(a) Seed

Planted at 3.8 t/ha (can range from 3.5-5 t/ha for 35x55 mm seed depending on variety. Half bought in. Cost varies with variety, seed size and classification grade.

(b) Fertiliser

150 : 150 : 200 kg/ha N : P₂O₅ : K₂O (120 : 120 : 160 units/acre). See page 4 for more information on nutrient planning.

(c) Sprays

Seed treatment Multipurpose seed treatment applied at grade plus reduced rate fungicide applied for rhizoctonia. Fungicide incorporated into soil on 50% area for powdery scab control.

Nematicide Assumption of no treatment applied. Application may be required in field and varieties at risk of spraing.

Herbicides Contact plus reduced rate residual herbicides applied pre-emergence.

Blight control 8-9 spray program with protectant, systemic, curative and tuber blight protection products for moderate blight pressure.

Aphid control Up to 8 applications.

Slug control 2-3 applications.

Desiccation Pulverising followed by chemical desiccation. For pulverising costs, see page 401.

(d) Other crop expenses

AHDB levy costs have been removed. SPCS field inspection fees; roguing and labels and positive ventilation and cold storage are included. Other costs include bags (£7.50-£11.20/t of crop), chemical treatment at storage time and royalties, depending on variety.

(e) Irrigation

Irrigation may be applied in some circumstances for yield and quality. These costs are not included. Annual capital charge could be £350-500/ha plus £1.60-1.90/ha.mm with a contract charge of approximately £5.40/ha.mm.

(f) Casual labour

These costs are not included. Labour charged at £12/hr as per labour rates on page 66 for low yields.

Potatoes - Dual Purpose (Seed and Ware)

GROSS MARGIN DATA

| | | |
|------------------------------|--------------------|---------|
| Yield: t/ha (t/acre): seed | 22 | (8.9) |
| Yield: t/ha (t/acre): ware | 19 | (7.7) |
| Yield: t/ha (t/acre): s/feed | 4 | (1.6) |
| | <u>45</u> | (18.2) |
| OUTPUT | £/ha (acre) | |
| Seed @ £220/t | 4,840 | |
| Ware @ £110/t | 2,090 | |
| Stockfeed @ £20/t | 80 | |
| | <u>7,010</u> | (2,837) |
| VARIABLE COSTS | | |
| Seed @ £260/t | 988 | |
| Fertiliser | 449 | |
| Sprays | 689 | |
| Other expenses | 3,469 | |
| | <u>5,595</u> | (2,264) |
| GROSS MARGIN | <u>1,415</u> | (573) |

WARE PRICE SENSITIVITY

| | | |
|---------|-------|---------|
| £50 /t | 275 | (111) |
| £110 /t | 1,415 | (573) |
| £170 /t | 2,555 | (1,034) |
| £230 /t | 3,695 | (1,495) |

Grassland

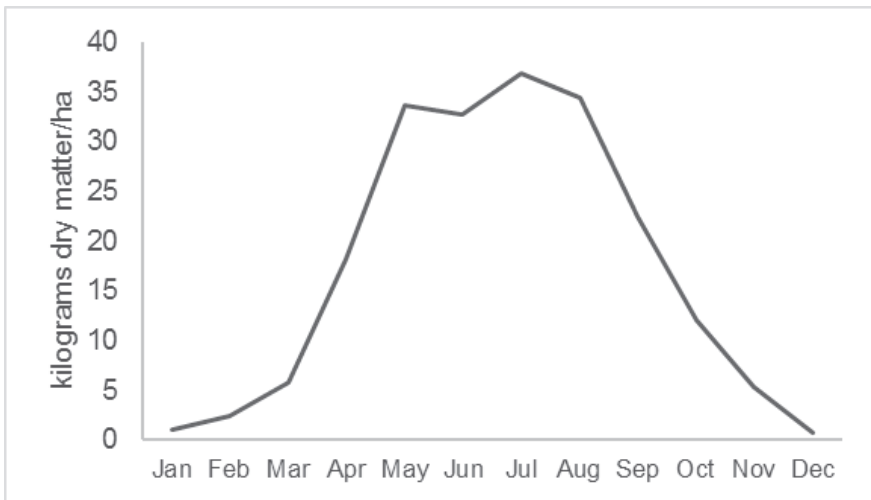
Introduction

This section covers basic technical and financial cost data related to grassland production.

Utilised grass yield, i.e., the kilograms of grass that is grown and consumed by livestock is a driver of net profitability on grazing livestock farms. Grass yield data for Scotland is limited, although measuring grass is beneficial to understand reseeding requirement, stocking rate, grazing planning, and feed budgeting decisions. Grass is quantified in kilograms of dry matter per hectare (kg DM/ha) to feed budget based on the nutritional component of grass (i.e., omitting water component) and understand the feed value in a given area.

Grass yield can range from 1t DM/ha on hill ground to 20t DM/ha on good dairy land. Average grass yield is around 6t DM/ha on Scottish upland/lowland grazing livestock farms. Grass growth varies greatly from year-to-year, farm-to-farm and field-to-field but a general pattern taken from farmers measuring grass with SAC Consulting is shown below.

Average grass growth through the year on Scottish livestock farms



Potential dry matter yields (kgDM/ha) at different N levels/ha

| kg N/ha | Yield (kgDM/ha) | Cow grazing days /ha | Stocking density (LU/ha) |
|---------|-----------------|----------------------|--------------------------|
| 0 | 3,000 | 240 | 0.46 |
| 75 | 4,200 | 335 | 0.64 |
| 125 | 5,500 | 439 | 0.84 |
| 175 | 7,000 | 559 | 1.07 |
| 250 | 8,000 | 639 | 1.23 |
| 310 | 10,000 | 799 | 1.53 |

The values in the previous table assume low clover content. Use the table below to account for clover contribution.

| Accounting for clover: Clover Content (%DM) | Potential Nitrogen supply (kg N/ha) |
|--|--|
| 20-30% | 180 |
| 40% | 240 |
| 50-60% | 300 |

Analysis of grazed leafy grass often ranges from 15-25% DM, 10-12.5 megajoules of metabolizable energy (MJ ME)/kg DM and 12-26% crude protein – it is often as nutritious as concentrate feed. The cost per kg DM depends on the yield, as shown below:

The cost of grazed grass at different yield scenarios

| Full plough reseed – seven-year rotation, 75kg N/ha | | | |
|--|------|------|------|
| Yield (t DM/ha) | 4 | 6 | 8 |
| Variable costs (£/ha) | 94 | 94 | 94 |
| Establishment annual share (£/ha) | 71 | 71 | 71 |
| Rent (£/ha) | 120 | 120 | 120 |
| Total (£/ha) | 285 | 285 | 285 |
| Cost/kg DM (£/kg DM) | 0.07 | 0.05 | 0.04 |

The variable cost data tables for grass, silage and hay provide the basis of the forage costs for the livestock enterprise gross margin figures.

The following practises improve margins based on grass management:

1. Optimising utilisation with good grazing management
2. Maintaining good soil health
3. Reseeding and rejuvenating the sward

Grazing systems defined

The following table illustrates the main grazing methods practised in Scotland.

| | Grazing Interval | Rest Period* | Grass Height Targets | | Grass Utilisation |
|-----------------|-------------------------|---------------------|-----------------------------|-------------|--------------------------|
| | | | Entry | Exit | |
| Set stocking | over 1 week | NA | 5-8cm | | 50% |
| Paddock grazing | 0.5 days-1 week | 15-30 days | 8-10cm | 5cm | 65-80% |
| Mob grazing | 0.5 days-3 days | 40 days+ | 30cm+ | 10-20cm | 30-50% |

* Guide during the growing season, this should be flexible according to the growing conditions.

More information on mob grazing and rotational grazing is available in the following FAS New Entrants Factsheets:

- Mob Grazing with Beef Cattle:
<https://www.fas.scot/publication/mob-grazing-with-beef-cattle/>
- Rotational Grazing:
<https://www.fas.scot/downloads/rotational-grazing/>

Stocking rate

Stocking rate is expressed as grazing livestock units (see page 118 – Livestock section), GLU per effective (adjusted) hectare where:

- 2.5 GLU/ha (1 per acre) is very intensive (very high N input)
- 2.0 GLU/ha is intensive (high N input)
- 1.5 GLU/ha is semi intensive (moderate N input or high clover %)
- 1.0 GLU/ha is extensive (low N input/clover based)
- 0.5 GLU/ha is very extensive (very low/no N inputs)

Choice of seed mixtures

The seed mixture should be chosen using recommended varieties tested in Scotland by SRUC, England & Wales by NIAB-TAG or Northern Ireland by DAERA. Grass swards will contain mainly perennial ryegrass, white clover, and timothy. Varieties chosen should be compatible and chosen according to the farm system, the use of the ley (silage, hay, dual purpose), special requirements such as disease resistance and winter hardiness.

Swards that are worn out with a low percentage of sown species remaining will have a lower yield potential and will have a much lower response to nitrogen. If sward performance is not sufficient to maintain stocking rates, or requires additional purchased feed, then renewing the sward is recommended.

Sward Improvement

Options for sward improvement range from full ploughing (reseeding/replacement) to oversowing (renovation). The approximate costs of different improvement methods are outlined in the following table. These include variable costs as well as the cultivation costs.

Assumptions:

- A long-term seed mixture at full rate, 37kg/ha, for ploughing and direct drilling, and half rate, 18kg/ha, for oversowing.
- Fertiliser inputs are based on moderate P and K soil status. No fertiliser assumed for the over sow. pH is assumed to be ideal thus no cost for lime is included.
- Chemical costs for the destruction of the old sward prior to cultivation have been assumed for ploughing and direct drilling options. Other pesticides may be required for specific circumstances.
- Cultivation methods are assumed to be carried out by contractors. Contractor costs can be found on pages 399-402.
- Machinery fuel use (l/ha) and fuel cost on page 396-397.

| | Plough | Direct drill | Over sow |
|-------------------------------------|--------------------|---------------------|-----------------|
| Reliability | High | Mod/High | Moderate |
| Speed of improvement | Moderate | Moderate | Rapid |
| Loss of grass production | High | High | Low |
| | £/ha (acre) | | |
| Variable costs | | | |
| <i>Seed</i> | 156 | 156 | 76 |
| <i>Fertiliser</i> | 138 | 138 | - |
| <i>Sprays</i> | 12 | 12 | - |
| | 306 (124) | 306 (124) | 76 (31) |
| Cultivation costs | | | |
| <i>Spray</i> | 14 | 14 | - |
| <i>Plough</i> | 64 | - | - |
| <i>Power harrow/subsoil</i> | 54 | - | - |
| <i>Harrow</i> | - | - | 23 |
| <i>Roll and destone</i> | 19 | - | - |
| <i>Sow</i> | 33 | 56 | 33 |
| <i>Roll</i> | 24 | 24 | 24 |
| <i>Fertilise</i> | 11 | 11 | - |
| <i>Fuel cost</i> | 45 | 15 | 10 |
| | 262 (106) | 119 (48) | 89 (36) |
| Total costs | 569 (230) | 426 (172) | 165 (67) |
| <i>No. of years per cultivation</i> | 7 | 7 | 7 |
| Total cost per annum | 81 (33) | 61 (25) | 24 (10) |

Preserved Grass Production Costs

The table on the following page shows the cost of producing preserved grass as silage or hay.

Assumptions:

- Yield and N fertiliser are outlined on pages 82 and 84.
- Establishment costs based on figures on page 77.
- Annual variable costs are based on variable cost data (less annual share of seed) shown on pages 83 and 85.
- Annual production costs are assumed to be carried out by contractors. Contractor costs can be found on pages 399-401.
- Machinery fuel use (l/ha) and fuel cost on page 396-397.
- Other crop expenses for ensiled silage are based on using plastic sheets. For baled silage, this includes net wrap and plastic wrap as described on page 83. For hay, the cost for net wrap is included in the annual variable costs.
- Land rent and maintenance or a finance charge associated with a silage clamp have not been included in the calculations.
- Yield potential will vary and no account has been taken for wastage in the preserved state and at feeding.

Cost of producing preserved grass as silage or hay

| | Silage 1 cut ensiled | Silage 1 cut bales | Hay 1 cut bales |
|------------------------------------|-----------------------------------|---------------------------------|------------------------------|
| N fertiliser use (kgN/ha) | 125 | 125 | 125 |
| Yield (t FW/ha) | 20 | 20 | 6 |
| Yield (t DM/ha) | 6 | 6 | 5 |
| Bale weight (round 4' x 4' - kg) | - | 650 | 250 |
| | | £/ha | |
| Establishment costs (annual share) | 81 | 81 | 81 |
| Annual variable costs | 201 | 201 | 274 |
| Annual production costs | | | |
| <i>Spray</i> | 14 | 14 | 14 |
| <i>Fertilise</i> | 11 | 11 | 11 |
| <i>Mow</i> | 24 | 24 | 24 |
| <i>Rake</i> | 16 | - | 41 |
| <i>Lift, cart and clamp crop</i> | 120 | - | - |
| <i>Bale, wrap and stack</i> | - | 157 | 51 |
| <i>Other crop expenses</i> | 3 | 86 | - |
| <i>Fuel</i> | 35 | 16 | 21 |
| | <hr/> 222 | <hr/> 308 | <hr/> 161 |
| Total cost per annum (£/ha) | <hr/> 505 | <hr/> 590 | <hr/> 516 |
| Cost per t FW (£/t) | 25 | 30 | 86 |
| Cost per t DM (£/t) | 84 | 98 | 101 |
| Cost per bale (£/bale) | - | 19 | 22 |

Grassland - Grazing

PHYSICAL DATA

(a) System

Assume a 7-year sward life.

Establishment costs described on page 77.

(b) Yield

See pages 74-76 for the dry matter yield and stocking rate (LU/ha) assumptions for varying Nitrogen application rates.

(c) Seed

A nominal annual charge (assume a 7-year sward life, for longer leys reduce the annual charge accordingly):

| Mixture | £/ha |
|-----------------|---------|
| One year | 105-130 |
| Two-three years | 115-170 |
| Four-six years | 125-175 |
| Permanent | 130-185 |

(d) Fertiliser

See page 4 for more info on nutrient planning.

| kg/ha (units/acre)/annum | | | | | | | | | | |
|-------------------------------|---|-----|----|------|-----|-------|-----|-------|-----|-------|
| N | 0 | (0) | 75 | (60) | 125 | (100) | 175 | (140) | 250 | (200) |
| P ₂ O ₅ | 0 | (0) | 10 | (8) | 15 | (12) | 20 | (16) | 30 | (24) |
| K ₂ O | 0 | (0) | 15 | (12) | 15 | (12) | 20 | (16) | 30 | (24) |

(e) Sprays

A nominal annual charge (assume a 7-year sward life, for longer leys reduce the annual charge accordingly) to cover a herbicide during establishment, followed by a herbicide to control a broader range of perennial weeds, such as docks, thistles, and nettles.

Grassland - Grazing

VARIABLE COST DATA

| | | | | | | | | | | |
|--------------------|--------------------|------|------------|------|------------|-------|------------|-------|------------|-------|
| Fertiliser kg N/yr | 0 | (0) | 75 | (60) | 125 | (100) | 175 | (140) | 250 | (200) |
| VARIABLE COSTS * | £/ha (acre) | | | | | | | | | |
| Seeds | 23 | | 23 | | 23 | | 23 | | 23 | |
| Fertiliser | 0 | | 95 | | 150 | | 208 | | 300 | |
| Sprays | 11 | | 11 | | 11 | | 11 | | 11 | |
| Other expenses | - | | - | | - | | - | | - | |
| | <u>34</u> | (14) | <u>129</u> | (52) | <u>184</u> | (74) | <u>242</u> | (98) | <u>334</u> | (135) |

FERTILISER PRICE SENSITIVITY (+/-)

| | | | | | | | | | | |
|---------------------------------------|---|-----|---|-----|----|-----|----|-----|----|------|
| 10 p/kg N | 0 | (0) | 8 | (3) | 12 | (5) | 17 | (7) | 25 | (10) |
| 10 p/kg P ₂ O ₅ | 0 | (0) | 1 | (0) | 1 | (0) | 2 | (1) | 3 | (1) |
| 10 p/kg K ₂ O | 0 | (0) | 2 | (1) | 1 | (0) | 2 | (1) | 3 | (1) |

* The cost per tonne of dry matter grown varies and should also include a share of reseeded costs (contractor/machinery upkeep/fuel). Cost will also depend on the response to nitrogen (see page 74), and grazing utilisation.

Grassland - Silage and Aftermath Grazing

PHYSICAL DATA

(a) System

Assume a 7-year sward life.

Establishment and harvest costs are described on page 77 and 79.

(b) Yield

Settled silage (kg fresh weight) at 25%DM.

| | | | | | | | | |
|--|-----------|--------------|-----------|---------------|-----------|---------------|-----------|---------------|
| Fertiliser N kg/ha (units/acre)/annum | 70 | (56) | 130 | (104) | 250 | (200) | 310 | (248) |
| Silage t/ha (t/acre) | | | | | | | | |
| 1st cut | 20 | (8.1) | 20 | (8.1) | 25 | (10.1) | 20 | (8.1) |
| 2nd cut | - | - | 10 | (4.0) | 15 | (6.1) | 16 | (6.5) |
| 3rd cut | - | - | - | - | - | - | 16 | (6.5) |
| Total | <u>20</u> | <u>(8.1)</u> | <u>30</u> | <u>(12.1)</u> | <u>40</u> | <u>(16.2)</u> | <u>52</u> | <u>(21.0)</u> |

Apportionment - the following yield ratios are suggested:

| | | | | |
|-----------|----|----|----|----|
| Silage | 50 | 80 | 80 | 95 |
| Aftermath | 50 | 20 | 20 | 5 |

(c) Seed

A nominal annual charge (assume a 7-year sward life, for longer leys reduce the annual charge accordingly):

| Mixture | £/ha |
|-----------------|---------|
| One year | 105-130 |
| Two-three years | 115-170 |
| Four-six years | 125-175 |
| Permanent | 130-185 |

(d) Fertiliser

Neither P₂O₅ nor K₂O is assumed for aftermaths, although their use would be recommended subject to nutrient management planning. See page 4 for more info on nutrient planning.

| Silage cuts | kg/ha (units/acre)/annum | | | | | | | |
|-------------------------------|--------------------------|------|-----|-------|-----|-------|-------|-------|
| | One | | Two | | Two | | Three | |
| For silage | | | | | | | | |
| N | 70 | (56) | 100 | (80) | 220 | (176) | 310 | (248) |
| P ₂ O ₅ | 34 | (27) | 51 | (41) | 68 | (54) | 88 | (70) |
| K ₂ O | 120 | (96) | 180 | (144) | 240 | (192) | 312 | (250) |
| For aftermath | | | | | | | | |
| N | 0 | (0) | 30 | (24) | 30 | (24) | - | - |

Grassland - Silage and Aftermath Grazing

VARIABLE COST DATA

| Fertiliser kg N/ha (units/acre)/annum | 70 | (56) | 130 | (104) | 250 | (200) | 310 | (248) |
|--|-------------|------|------------|-------|------------|-------|------------|-------|
| Silage cuts | One | | Two | | Two | | Three | |
| VARIABLE COSTS | £/ha (acre) | | | | | | | |
| Seeds | 23 | | 23 | | 23 | | 23 | |
| Fertiliser | 190 | | 309 | | 488 | | 619 | |
| Sprays | 11 | | 11 | | 11 | | 11 | |
| Other expenses | - | | - | | - | | - | |
| | <u>224</u> | (91) | <u>343</u> | (139) | <u>522</u> | (211) | <u>653</u> | (264) |

FERTILISER PRICE SENSITIVITY (+/-)

| | | | | | | | | |
|---------------------------------------|----|-----|----|-----|----|------|----|------|
| 10 p/kg N | 7 | (3) | 13 | (5) | 25 | (10) | 31 | (13) |
| 10 p/kg P ₂ O ₅ | 3 | (1) | 5 | (2) | 6 | (2) | 8 | (3) |
| 10 p/kg K ₂ O | 12 | (5) | 18 | (7) | 24 | (10) | 31 | (13) |

(e) Sprays

A nominal annual charge (assume a 7-year sward life, for longer leys reduce the annual charge accordingly) to cover a herbicide during establishment, followed by a herbicide to control a broader range of perennial weeds, such as docks, thistles and nettles.

(f) Other crop expenses

Heavy duty silage covers cost approximately £1.73/m² (7-10 year lifespan). Associated gravel bags cost approximately £1.40/bag. Silage sheets cost approximately £0.18/m² for top sheets and £0.37/m² for wall liners. Clamp film is approximately £0.11/m². If baling, include costs for net wrap at 50-77p/bale for large round bales and bale wrap at £1.70-3.00/bale depending on number of layers of net and wrap and size of bales.

The use of an inoculant will typically add £1.15-1.60/t depending on the product chosen and its rate of application.

Grassland - Hay and Aftermath Grazing

PHYSICAL DATA

(a) System

Assume a 7-year sward life.

Establishment and harvest costs are described on page 77 and 79.

(b) Yield

| | | | |
|---------------------------------------|---------|-----------|-----------|
| Fertiliser N kg/ha (units/acre)/annum | 80 (64) | 140 (112) | 180 (144) |
| Hay t/ha (t/acre) | 5 (2.0) | 6 (2.4) | 7 (2.8) |
| Aftermath (cow grazing days) | 125 | 140 | 180 |

Apportionment - a yield ratio of 75 : 25, hay : aftermath should be used.

To prevent heating in store, aim to bale hay at 15-20% moisture and leave to stand in field until heating ceases.

(c) Seed

A nominal annual charge (assume a 7-year sward life, for longer leys reduce the annual charge accordingly):

| Mixture | £/ha |
|-----------------|---------|
| One year | 105-130 |
| Two-three years | 115-170 |
| Four-six years | 125-175 |
| Permanent | 130-185 |

(d) Fertiliser

Neither P₂O₅ nor K₂O is assumed for aftermaths, although their use would be recommended subject to nutrient management planning. See page 4 for more info on nutrient planning.

| | | kg/ha (units/acre)/annum | | | | | |
|---------------|-------------------------------|--------------------------|------|-----|------|-----|-------|
| For hay | N | 80 | (64) | 80 | (64) | 80 | (64) |
| | P ₂ O ₅ | 30 | (24) | 35 | (28) | 42 | (34) |
| | K ₂ O | 90 | (72) | 108 | (86) | 126 | (101) |
| For aftermath | N | - | - | 60 | (48) | 100 | (80) |

(e) Sprays

A nominal annual charge (assume a 7-year sward life, for longer leys reduce the annual charge accordingly) to cover a herbicide during establishment, followed by a herbicide to control a broader range of perennial weeds, such as docks, thistles and nettles.

(f) Other crop expenses

Net wrap cost is costed on the basis of 5-6 round bales/t and assuming one roll of net will wrap 410 bales.

Grassland - Hay and Aftermath Grazing

VARIABLE COST DATA

| | | | | | | |
|--|--------------------|------|------------|-------|------------|-------|
| Fertiliser kg N/ha (units/acre)/annum | 80 | (64) | 140 | (112) | 180 | (144) |
| VARIABLE COSTS | £/ha (acre) | | | | | |
| Seeds | 23 | | 23 | | 23 | |
| Fertiliser | 174 | | 251 | | 311 | |
| Sprays | 11 | | 11 | | 11 | |
| Other expenses | 10 | | 12 | | 14 | |
| | <u>218</u> | (88) | <u>297</u> | (120) | <u>359</u> | (145) |

FERTILISER PRICE SENSITIVITY (+/-)

| | | | | | | |
|---------------------------------------|---|-----|----|-----|----|-----|
| 10 p/kg N | 8 | (3) | 14 | (6) | 18 | (7) |
| 10 p/kg P ₂ O ₅ | 3 | (1) | 4 | (2) | 4 | (2) |
| 10 p/kg K ₂ O | 9 | (4) | 11 | (4) | 12 | (5) |

Forage Crops

Introduction

Home-grown forage crops offer high yielding alternatives to grass, but establishment cost and time out of pasture production must be considered. Yield, quality, and utilisation are key to cost-effective forage crop production. Increasing the amount of grazed forage in the diet reduces reliance on expensive purchased feed and aids with filling the forage gap in the winter months.

Forage crops can be useful in both arable and grazing rotations; they make a good break crop between grass-to-grass re-seeds and provide time to correct deficiencies in pH, P and K, soil compaction and weed control. They can also be used as a pioneer crop in uncultivated areas.

Crops can be either full season crops or catch crops. To ensure high DM yields and to justify the cost of production and length of time taken out of production a full season crop should be grown on good land with full cultivations and correct agronomy. A catch crop can be grown after silage, wholecrop cereal or early harvested cereals to give a bonus crop of forage and allow an early re-seed the following spring.

Wholecrop silage

Wholecrop silage can provide a high-starch, high-fibre feed, replacing some or all of the grass silage in the ration. As it is high yielding, production costs per kilogram of dry matter (DM) are competitive with other forages. Although the crude protein can be lower, unless using a legume or a cereal-legume mix. The earlier harvest reduces risk of bad weather at harvest time and provides time for winter cropping. Compared with grass silage, managing consistent quality is easier.

Brassicas and root crops

Both brassica and beet crops such as kale, forage rape, rape/kale hybrids, fodder beet, grazing turnips, swedes and stubble turnips provide nutritious, cost-effective feeds. Out-wintering on brassicas and beet crops can extend the grazing season and can allow for more animals to be kept, with minimal extra infrastructure investment.

Leafy forage crops are generally high in protein while roots/bulbs are higher in energy. Fodder beet is the highest energy yielding crop, allowing high stocking densities – some farmers will manage 100 ewes per hectare for around two and a half months (Jan – Mar).

Forage brassica and root crops should only be fed to livestock up to 70% of the total DM intake and a grass runback and fresh water should always be provided. Livestock should be transitioned slowly and carefully on to forage crops to allow rumen adaption. Another source of forage should be supplied, for example straw for dry cows, silage or hay for more productive stock. For lamb finishing, concentrates can also provide additional nutrition. Correct mineral/trace element supplementation is important when feeding forage crops.

The use of an electric fence is advisable to encourage stock to eat the whole crop evenly for high utilisation and to ensure the ration has an adequate mix of energy and protein.

It is important to assess the yield of the crop (by cutting and weighing several 1m² sections) and then accurately working out the area the group of stock require each day. To assess the yield, make a frame that is 1m² and cut several representative samples of the crop. Place the sample in a bag and weigh using a spring balance. Multiply the average of your samples by 10,000 to give a fresh weight per hectare then again by the DM% (from the following tables - overleaf) to give DM yield/ha. The crop can then be rationed to the stock based on their nutritional requirements, taking into account the likely utilisation % and any other forages provided.

The yield for fodder beet is assessed differently and will depend on the width of the rows. If the rows are 45cm apart, then measure 5.5 metres along a drill, if they are 50cm apart, then measure 5 metres along a drill. Lift the whole plant (bulb and leaf) from both sides of the area measured, lifting 2 rows of beet at either 5m or 5.5 metres length (depending on row width). Weigh the leaf and the bulb separately. Repeat this over 5 different sample areas, to sample 25m² in total. Calculate the total fresh weight of the bulb and leaf over the 5 sites. Multiply this by 400 and divide by 1,000 to get the tonnes of fresh weight per hectare. Then multiply this figure by the dry matter (bulb ~15%, leaf ~10%) to calculate the tonnes of dry matter/ha. Dry matter analysis is recommended to understand the actual values for the crop.

Forage Crop Technical Data

The following tables provide technical data that can be used in conjunction with the variable cost data for all the crops illustrated later in the section.

Variable costs include seed, chemical and fertiliser as per variable cost data for each crop. Costs of establishment are not included and will vary enormously depending on previous cropping, nutrients in the soil, whether it is a full season or catch crop and past experience of the various methods of establishment. Machinery costs on pages 399-402 can be referred to for typical ploughing, cultivation and drilling costs.

| | Kale | Forage rape | Kale/rape hybrid | Chicory |
|-----------------------------------|-------------|--------------------|-------------------------|----------------|
| Sown | May- Jul | Apr- Aug | Apr-Aug | May-Jul |
| Utilised | July-Mar | Aug- Dec | Jun-Jan | Mar-Nov |
| Variable cost (£/ha) | 279 | 172-224 | 161-279 | 145 |
| Grazings | 1 | 1 | 1-2 | Several |
| DM (%) | 15-17 | 10-14 | 12-15 | 12 |
| ME (MJ/kgDM) | 10.5 | 10.5 | 10.5 | 12 |
| CP (%) | 14-17 | 19-20 | 18-19 | 18 |
| % utilisation | 80 | 80 | 80 | 70 |
| Av DM yield (t/ha) | 7.5 | 4.5 | 6 | 10 |
| Cow graze days/ha ¹ | 1,260 | 756 | 1,008 | 1,680 |
| ha/50 cows/100days ¹ | 4.0 | 6.6 | 5.0 | 3.0 |
| Lamb graze days/ha ² | 6,000 | 3,600 | 4,800 | 7,000 |
| ha/250 lambs/100days ² | 4.2 | 6.9 | 5.2 | 3.6 |

| | Swede | Turnips | Stubble turnips | Fodder beet |
|-----------------------------------|--------------|----------------|------------------------|--------------------|
| Sown | Mar-May | Apr- Jun | May-Sept | Mar-May |
| Utilised | Oct-Apr | Sep-Apr | Aug-Dec | Oct-May |
| Variable cost (£/ha) | 162 | 188 | 254 | 637 |
| Grazings | 1 or lifted | 1 | 1 | 1 |
| DM (%) | 11-15 | 12-15 | 12-15 | 13-16 |
| ME (MJ/kgDM) | 12.5 | 10.5 | 10.5 | 13 |
| CP (%) | 10-11 | 17-18 | 17-18 | 6-8 |
| % utilisation | 80 | 80 | 80 | 80 |
| Av DM yield (t/ha) | 8 | 5 | 4 | 15 |
| Cow graze days/ha ¹ | 1,600 | 840 | 672 | - |
| ha/50 cows/100days ¹ | 2.6 | 4.6 | 7.9 | - |
| Lamb graze days/ha ² | 6,400 | 4,000 | 3,200 | 12,000 |
| ha/250 lambs/100days ² | 3.9 | 6.3 | 7.8 | 2.1 |

¹ Cows getting 50MJ/day from crop and the rest from other forage.

² Lambs allowed 1kg DM/day of crop.

The nutritional qualities shown above represent an average; crops vary, and it is advised to analyse high value crops for dry matter, Metabolisable Energy (ME) and protein to ensure appropriate allocations are being made.

Dry cow wintering example - A herd of dry suckler cows require 75MJ/hd/day ME. On a diet of kale and straw, 50MJ is expected to come from kale. At 7.5tDM/ha, 10.5ME and 80% utilisation each m² of kale will

contain 6.3 MJ. Therefore, the herd of 50 cows require 397m² of kale per day.

Ewe grazing example - 100 ewes are given an allowance of 1kg DM of forage rape per head/day. With a yield of 4.5tDM/ha and utilisation of 80%, the group will require 278m²/day or approximately 0.19ha (0.5 acres) per week.

Preserved Forage Crop Technical Data and Production Costs

The following table shows the cost of preserving forage crops including arable silage, forage maize and wholecrop wheat.

Assumptions:

- All crops ensiled.
- Yield potential will vary depending on site, timing, weather conditions and wastage at feeding.
- For breakdown, see variable cost data for each individual crop.
- Establishment and production costs based on contractor charges on pages 399-401, and fuel use (l/ha) and fuel cost on page 396-397.
- Total cost per annum does not include land rent and maintenance or finance charge associated with a silage clamp. The true cost will be higher due to wastage.

| | Arable silage pea/ cereal mix ensiled | Forage maize under plastic ensiled | Wholecrop ferm'd winter wheat ensiled | crack'd winter wheat ensiled |
|------------------------------------|---|--|---|--|
| Yield (t FW/ha) | 30 | 40 | 25 | 15 |
| Yield (t DM/ha) | 8 | 15 | 10 | 12 |
| ME (MJ/kgDM) | 10 | 10.5 | 10.5 | 10.5 |
| CP (%) | 16 | 9 | 9.5 | 9.5 |
| | | £/ha | | |
| Variable costs | 386 | 484 | 512 | 696 |
| Establishment costs | | | | |
| <i>Plough</i> | 64 | 64 | 64 | 64 |
| <i>Sow</i> | 57 | 139 | 57 | 57 |
| <i>Roll and de-stone</i> | 19 | 19 | 19 | 19 |
| <i>Fuel</i> | 42 | 42 | 42 | 42 |
| | 181 | 263 | 181 | 181 |
| Production costs | | | | |
| <i>Spray</i> | 14 | 14 | 41 | 41 |
| <i>Fertilise/Slurry/FYM</i> | 11 | 15 | 32 | 32 |
| <i>Lift, cart and clamp crop</i> | 160 | 172 | 160 | 160 |
| <i>Other crop expenses</i> | 3 | 3 | 3 | 3 |
| <i>Fuel</i> | 16 | 35 | 19 | 19 |
| | 204 | 238 | 255 | 255 |
| Total cost per annum (£/ha) | 771 | 985 | 948 | 1,132 |
| Cost per t FW (£/t) | 26 | 25 | 38 | 75 |
| Cost per t DM (£/t) | 96 | 66 | 95 | 94 |

Forage Peas and Pea/Cereal Mixtures (Arable Silage)

PHYSICAL DATA

(a) System

Forage peas (sown Mar-Jun) are grown as a catch crop to be grazed *in situ*, zero-grazed or ensiled/baled (harvested at flowering when pods have formed but not yet filled and wilted for 1-2 days). Peas can be grown alone, or in mixtures with barley or oats and undersown with grass for arable silage. Peas are highly palatable to livestock so must be introduced gradually and monitored to prevent bloat. Total production costs including establishment and harvest are described on page 92.

(b) Yield (in 12-16 weeks)

| | Fresh t/ha (t/acre) | Dry matter t/ha (t/acre) |
|---------------|------------------------|-----------------------------|
| Forage peas | 20-30 (8-12) | 6-8 (2.4-3.2) |
| Arable silage | 20-35 (8-14) | 6-10 (2.4-4.0) |

(c) Seed rates (kg/ha)

| | | | |
|--------------|------|-------------------------------------|---------|
| Forage peas: | | Arable silage undersown with grass: | |
| direct drill | 125 | peas | 40-60 |
| (broadcast | 150) | cereal | 60-80 |
| | | total | 100-140 |

Seed mixtures cost (p/kg):

| | |
|--------|------|
| Cereal | 38.3 |
| Peas | 57 |

(d) Fertiliser – kg/ha (units/acre)

| | Forage peas | | Undersown arable silage | | | |
|-------------------------------|-------------|------|-------------------------|---------|---------------|------|
| | | | at sowing | | after harvest | |
| N | 0 | (0) | 40-60 | (32-48) | 50 | (40) |
| P ₂ O ₅ | 50 | (40) | 90 | (72) | 25 | (20) |
| K ₂ O | 50 | (40) | 90 | (72) | 25 | (20) |

Apportionment of the cost of fertiliser in the seed bed and the residual value of nitrogen to the subsequent crop may be justified. See page 4 for more information on nutrient planning.

(e) Sprays

Pre emergence herbicide for forage peas can be used at a cost of £58.05/ha. There are no broad spectrum post emergence herbicides available for this crop. Varietal tolerance to a proposed spray should be ascertained.

A silage additive (£1.00-£1.60 per tonne silage – depending on the product chosen and its rate of application) is recommended for silages with a high pea content.

Forage Peas and Pea/Cereal Mixtures (Arable Silage)

VARIABLE COST DATA

| | Forage Peas | | Arable silage undersown | |
|----------------|------------------------|------|------------------------------------|-------|
| VARIABLE COSTS | | | £/ha (acre) | |
| Seed | 96 | | 69 | |
| Fertiliser | 89 | | 317 | |
| Sprays | - | | - | |
| Other expenses | - | | - | |
| | <u>185</u> | (75) | <u>386</u> | (156) |

FERTILISER PRICE SENSITIVITY (+/-)

| | | | | |
|---------------------------------------|---|-----|----|-----|
| 10 p/kg N | 0 | (0) | 10 | (4) |
| 10 p/kg P ₂ O ₅ | 5 | (2) | 11 | (4) |
| 10 p/kg K ₂ O | 5 | (2) | 13 | (5) |

Forage Maize

PHYSICAL DATA

(a) System

Forage maize is ensiled and the clamp should be monitored for overheating. Introduce gradually into the animal's diet, ensuring there is an adequate source of long fibre in the ration and protein supplementation is essential. Contractor costs for establishment and harvest are described on page 92.

(b) Yield

| | Without plastic | With plastic |
|--------------|-----------------|--------------|
| Fresh (t/ha) | 40 | 50 |
| DM (t DM/ha) | 12 | 15 |

(c) Seed

Target established plant density 100,000 plants/ha; sow at 15% above target plant density. Do not sow too early (soil temperature 8-10°C, 10 cm depth for 7 days).

Seed cost based on £67.50/pack (45,000 seeds).

(d) Fertiliser

| | kg/ha | (units/acre) |
|-------------------------------|-------|--------------|
| N | 120 | (96) |
| P ₂ O ₅ | 60 | (48) |
| K ₂ O | 165 | (132) |

Maize sown under plastic will have no placement fertiliser and will rely on nutrients from slurry only. See page 4 for more information on nutrient planning.

(e) Sprays

Pre-emergence herbicide, then later before 8 leaf stage (without plastic). Post-emergence herbicide treatment approximately £37.50/ha.

In some years, slugs can be a problem. Pellets will cost in the region of £11.00/ha per application.

Forage Maize

VARIABLE COST DATA

| | Without plastic | | With plastic | |
|----------------|----------------------------|-------|-------------------------|-------|
| VARIABLE COSTS | | | £/ha (acre) | |
| Seed | 173 | | 173 | |
| Fertiliser | 298 | | - | |
| Sprays etc. | 75 | | 75 | |
| Other expenses | - | | 236 | |
| | <u>546</u> | (221) | <u>484</u> | (196) |

FERTILISER PRICE SENSITIVITY (+/-)

| | | | |
|---------------------------------------|----|-----|---|
| 10 p/kg N | 12 | (5) | - |
| 10 p/kg P ₂ O ₅ | 6 | (2) | - |
| 10 p/kg K ₂ O | 17 | (7) | - |

Whole Crop Cereal - Winter Wheat

PHYSICAL DATA

(a) System

Whole cropping of wheat provides an alternative feed to silage providing a good source of starch and fibre. The crop can be harvested at various growth stages creating different products. Additives can be used for improving preservation and feed quality. For example grain moisture >45% (soft dough, soft cheese) fermented whole crop, grain moisture 30% (hard cheese) crimped grain or urea treated whole crop and <30% treated and processed whole crop. See page 20 for more detail on growing winter wheat.

(b) Yield

| | Fermented whole crop | Cracked whole crop |
|--------------|----------------------|--------------------|
| Fresh (t/ha) | 29 | 14 |
| DM (t DM/ha) | 10 | 12 |

(c) Seed

Certified seed second generation (C2) sown at the rate of 220 kg/ha.

(d) Fertiliser

See page 4 for more information on nutrient planning.

| | kg/ha | (units/acre) |
|-------------------------------|-------|--------------|
| N | 200 | (160) |
| P ₂ O ₅ | 67 | (54) |
| K ₂ O | 83 | (66) |

(e) Sprays

Herbicides Autumn residual herbicide to control annual meadow grass and broad leaved weeds.

Fungicides Two applications at GS31-32 and GS39 for eyespot, leaf diseases (e.g. septoria).

For sprays against other hazards see page 20.

(f) Other crop expenses

Fermented whole crop wheat can be made successfully without an additive, but the use of additives can improve aerobic stability. Additive costs range from £1.00-£1.60 per tonne - depending on the product chosen and its rate of application. Refer to page 92 for other crop expenses such as plastic covers.

Whole Crop Cereal - Winter Wheat

VARIABLE COST DATA

| | Fermented whole crop | | Cracked whole crop | |
|----------------|---------------------------------|-------|-------------------------------|-------|
| VARIABLE COSTS | £/ha (acre) | | | |
| Seed @ £455/t | 100 | | 100 | |
| Fertiliser | 327 | | 327 | |
| Sprays etc. | 85 | | 85 | |
| Other expenses | - | | 184 | |
| | <u>512</u> | (207) | <u>696</u> | (281) |

FERTILISER PRICE SENSITIVITY (+/-)

| | | | | |
|---------------------------------------|----|-----|----|-----|
| 10 p/kg N | 20 | (8) | 20 | (8) |
| 10 p/kg P ₂ O ₅ | 7 | (3) | 7 | (3) |
| 10 p/kg K ₂ O | 9 | (4) | 9 | (4) |

Rye for Early Grazing

PHYSICAL DATA

(a) System

A catch crop of winter rye sown after early harvested cereal (Sep/Oct) and followed by light grazing at the end of the calendar year and subsequent cropping.

(b) Yield

Can be variable but, given early sowing, dry matter yields of up to 0.75t DM/ha in autumn and 2.25t DM/ha in spring can be achieved. Total dry matter yields up to 5.5t DM/ha can be achieved.

Forage rye can provide early spring grazing for 15-20 cows or 50-60 sheep per hectare over a three-week period.

(c) Seed

Rate – 185 kg/ha.

Early sowing is important but it is often difficult to obtain good viable seed in August or early September.

(d) Fertiliser

See page 4 for more information on nutrient planning.

| | kg/ha (units/acre) | | | | Total | |
|-------------------------------|--------------------|------|--------------|------|-------|------|
| | Seed bed | | Early spring | | | |
| N | - | - | 80 | (64) | 80 | (64) |
| P ₂ O ₅ | 30 | (24) | - | - | 30 | (24) |
| K ₂ O | 30 | (24) | - | - | 30 | (24) |

Rye for Early Grazing

VARIABLE COST DATA

| VARIABLE COSTS | £/ha (acre) | |
|----------------|--------------------|-------|
| Seed | 125 | |
| Fertiliser | 132 | |
| Sprays etc. | - | |
| Other expenses | - | |
| | <hr/> | |
| | 257 | (104) |
| | <hr/> | |

FERTILISER PRICE SENSITIVITY (+/-)

| | | |
|---------------------------------------|---|-----|
| 10 p/kg N | 8 | (3) |
| 10 p/kg P ₂ O ₅ | 3 | (1) |
| 10 p/kg K ₂ O | 3 | (1) |

Kale

PHYSICAL DATA

(a) System

System involves strip grazing behind an electric fence (to reduce crop wastage), allowing at least 3m of space per cow and a runback including hay/straw and water.

Kale can be fed as part of a catch crop mixture which includes kale, stubble turnips and forage rape. Each brassica complements each other by means of nutritional benefits (see pages 88-89). Other benefits include winter hardiness and a prolonged utilisation period of the crop. Some varieties are early maturing and others are late.

(b) Yield

| | Fresh | | DM t/ha (t/acre) | |
|-------------|-------|--------|---------------------|-------|
| Autumn kale | 70 | (28.3) | 8 | (3.2) |
| Winter kale | 50 | (20.2) | 7 | (2.8) |

Strip-grazed, a suitable daily allowance per cow (3 hr grazing) would be 47kg FW, including 20% wastage.

(c) Seed

Rate (direct drilled ungraded seed) – 4.0 kg/ha at £13/kg.

Seed treated with neonicotinoid which is still approved for animal feed, game and seed.

(d) Fertiliser

| | kg/ha | (units/acre) |
|-------------------------------|-------|--------------|
| N | 160 | (128) |
| P ₂ O ₅ | 50 | (40) |
| K ₂ O | 170 | (136) |

Fertiliser rates will vary greatly with circumstances. Assume following grass, greater N requirements if following harvested crops. Some farmers may also choose to top dress some of the N. See page 4 for more information on nutrient planning.

(e) Sprays

Herbicides Stale seed bed and a pre emergence herbicide.

Slugs Slug pellets may be broadcast or drilled with the seed at a cost of £11.00/ha.

Flea Beetle Insecticide may be required at a cost of £6.71/ha.

Kale

VARIABLE COST DATA

| VARIABLE COSTS | £/ha (acre) |
|----------------|-------------|
| Seed | 62 |
| Fertiliser | 194 |
| Sprays etc. | 23 |
| Other expenses | - |
| | <hr/> |
| | 279 (113) |

FERTILISER PRICE SENSITIVITY (+/-)

| | | |
|---------------------------------------|----|-----|
| 10 p/kg N | 12 | (5) |
| 10 p/kg P ₂ O ₅ | 3 | (1) |
| 10 p/kg K ₂ O | 7 | (3) |

Forage Rape & Hybrids

PHYSICAL DATA

(a) System

Grazed system which must be introduced gradually with an area of runback with alternative forage, e.g. grass/hay/straw, as well as free access minerals and water.

There are several hybrids (rape/kale) on the market which are quick to establish and can be utilised within 10-12 weeks after sowing. They offer the benefit of early grazing in summer/autumn if other forage supplies are limited.

Sown with Italian ryegrass provides additional feed, grazing after the rape has been utilised and ensilaging opportunity.

(b) Yield

Total dry matter yield of approximately 4.5t DM/ha. About 50 lambs/ha (20 lambs/acre) (starting weight approx. 27 kg) will finish off rape, with a suitable 'run back' on to grass or stubble.

(c) Seed

| | kg/ha | (lb/acre) |
|--------------------------|-------|-----------|
| Drilled | 6 | (5.3) |
| Direct drilled/broadcast | 8 | (7.1) |

These rates will need to be varied with soil condition.

Seed cost – £3.50/kg.

Inclusion of 10 kg Italian ryegrass would add approx. £22.50/ha to the cost.

(d) Fertiliser

| | kg/ha (units/acre) | |
|-------------------------------|--------------------|----------------|
| | Drilled/broadcast | Direct drilled |
| N | 100 (80) | 140 (112) |
| P ₂ O ₅ | 25 (20) | 25 (20) |
| K ₂ O | 35 (28) | 35 (28) |

Catch crops after early potatoes would require less fertilisers. See page 4 for more information on nutrient planning.

(e) Sprays

Burn off land pre drilling for direct drilled crops only.

Insecticide for flea beetle may be required at a cost of £6.71/ha.

Forage Rape & Hybrids

VARIABLE COST DATA

| | Broadcast | | Drilled | | Direct drilled | |
|----------------|------------------|------|--------------------|------|-----------------------|------|
| VARIABLE COSTS | | | £/ha (acre) | | | |
| Seeds | 42 | | 31 | | 42 | |
| Fertiliser | 130 | | 130 | | 170 | |
| Sprays etc. | - | | - | | 12 | |
| Other expenses | - | | - | | - | |
| | <u>172</u> | (70) | <u>161</u> | (65) | <u>224</u> | (91) |

FERTILISER PRICE SENSITIVITY (+/-)

| | | | | | | |
|---------------------------------------|---|-----|---|-----|----|-----|
| 10 p/kg N | 8 | (3) | 8 | (3) | 12 | (5) |
| 10 p/kg P ₂ O ₅ | 3 | (1) | 3 | (1) | 2 | (1) |
| 10 p/kg K ₂ O | 4 | (2) | 4 | (2) | 3 | (1) |

Stubble Turnips

PHYSICAL DATA

(a) System

Grazed system which must be introduced gradually with an area of run-back with alternative forage e.g. grass/hay/straw as well as free access to minerals and water. Strip grazing is preferred to reduce wastage.

It can be grown with other brassicas e.g. rape, which would offer an element of protection for the stubble turnip from frost prior to grazing.

(b) Yield

Can be highly variable particularly affected by date of sowing; but drilled crops sown in early July can finish 50-70 lambs/ha (20-28 lambs/acre) (starting weight approx. 27kg), although often requiring cereal supplementation to do so. Total dry matter yield approximately 4t DM/ha.

(c) Seed

Seed rates can be varied to alter the proportions of leaf to bulb.

| | kg/ha | (lb/acre) |
|----------------|-------|-----------|
| Direct drilled | 3.6 | (2.7-5.4) |

Seed cost – £4.60/kg

(d) Fertiliser

These rates are variable, higher N rates increase the leaf to bulb ratio. See page 4 for more info on nutrient planning.

| | kg/ha (units/acre) | |
|-------------------------------|--------------------|------|
| N | 50 | (40) |
| P ₂ O ₅ | 25 | (20) |
| K ₂ O | 50 | (40) |

(e) Sprays

Burn off land pre-drilling for direct drilled crops only.

Insecticide for flea beetle may be required at a cost of £6.71/ha.

Stubble Turnips

VARIABLE COST DATA

| | Drilled | | Direct drilled | |
|----------------|----------------|-------|-----------------------|-------|
| VARIABLE COSTS | | | £/ha (acre) | |
| Seed | 23 | | 23 | |
| Fertiliser | 231 | | 231 | |
| Sprays etc. | - | | 12 | |
| Other expenses | - | | - | |
| | <u>254</u> | (103) | <u>266</u> | (107) |

FERTILISER PRICE SENSITIVITY (+/-)

| | | | | |
|---------------------------------------|----|-----|----|-----|
| 10 p/kg N | 9 | (4) | 9 | (4) |
| 10 p/kg P ₂ O ₅ | 10 | (4) | 10 | (4) |
| 10 p/kg K ₂ O | 5 | (2) | 5 | (2) |

Swedes and Turnips

PHYSICAL DATA

(a) System

The crop allows for two feeding systems, strip grazing by use of electric fencing or lifting and storing in a clamp. Roots must be clean and undamaged to prevent the risk of fungal disease in storage.

(b) Yield

| | Swedes | | Turnips | |
|---------|------------|----------------------------|-----------|-----------|
| | Fresh | DM roots, t/ha (t/acre) | Fresh | DM |
| Average | 75 (30.4) | 8.0 (3.2) | 60 (24.3) | 5.0 (2.0) |
| Premium | 100 (40.5) | 9.5 (3.8) | 80 (32.4) | 7.5 (3.0) |

In addition, turnips will yield 15 to 30 t leaf/ha (1.5 to 3.0 t DM).

(c) Seed

Swede seed graded, dressed and precision sown (15 cm spacing) at 0.4 kg/ha and treated with neonicotinoid which remains approved for swede.

Turnip at 5kg/ha, untreated seed as neonicotinoid treatment not now approved.

Seed cost (p/kg):

| | |
|-------------------|----|
| Swedes – graded | 97 |
| Turnips – treated | 11 |

(d) Fertiliser

See page 4 for more info on nutrient planning.

| | Swedes | | Turnips | |
|-------------------------------|--------------------|-------|---------|-------|
| | kg/ha (units/acre) | | | |
| N | 90 | (72) | 90 | (72) |
| P ₂ O ₅ | 200 | (160) | 200 | (160) |
| K ₂ O | 150 | (120) | 125 | (100) |

(e) Sprays

Pre-emergence herbicide for annual grass and broad leaved weeds.

Insecticide for flea beetle may be required at a cost of £6.71/ha.

Swedes and Turnips

VARIABLE COST DATA

| | Swedes | | Turnips | |
|----------------|------------|------|-------------|------|
| VARIABLE COSTS | | | £/ha (acre) | |
| Seed | 38 | | 64 | |
| Fertiliser | 101 | | 101 | |
| Sprays etc. | 23 | | 23 | |
| Other expenses | - | | - | |
| | <u>162</u> | (65) | <u>188</u> | (76) |

FERTILISER PRICE SENSITIVITY (+/-)

| | | | | |
|---------------------------------------|---|-----|---|-----|
| 10 p/kg N | 4 | (2) | 4 | (2) |
| 10 p/kg P ₂ O ₅ | 3 | (1) | 3 | (1) |
| 10 p/kg K ₂ O | 5 | (2) | 5 | (2) |

Multi-Species Sward

PHYSICAL DATA

(a) System

Three-year ley incorporating various grasses, herbs and legumes such as chicory, plantain and white clover. The crop is best utilised in a rotational grazed system. A few days longer rest period required compared with ryegrass and white clover swards. No winter grazing. The crop should be rested, typically by mid-September in year of establishment and by November thereafter. Additional animal health benefits should also be considered.

(b) Yield

Variable, better in warmer soils. A crop suitable for over 40 lambs/ha (16 lambs/acre) is possible in year of establishment (year 1). Adopt a restricted grazing period in year one. 15-30 ewes and twins/ha (6-12 ewes and twins/acre) can be grazed in years 2 and 3, typically from June, and lambs during that autumn.

(c) Seed

Rate – 10 kg/ha.

Sow into a fine, warm and firm seedbed by early June.

Seed costs - £8.00/kg. Cost annualised over an assumed three year rotation.

(d) Fertiliser

| | kg/ha | (units/acre) |
|-------------------------------|-------|--------------|
| N | 50 | (40) |
| K ₂ O | 25 | (20) |
| P ₂ O ₅ | 25 | (20) |

Little or no fertiliser is required where established on a prime site using white clover as a companion crop. See page 4 for more info on nutrient planning.

(e) Sprays

An annual charge to cover pre-drilling stale seed bed preparation.

Otherwise, clover-safe herbicides unavailable for use. Poor competitor so good establishment is critical. Only topping should be carried out to control tall weeds post-emergence.

Multi-Species Sward

VARIABLE COST DATA

| VARIABLE COSTS | Direct drilled £/ha (acre) |
|----------------|-------------------------------|
| Seed | 47 |
| Fertiliser | 94 |
| Sprays etc. | 4 |
| Other expenses | - |
| | <hr/> |
| | 145 (59) |

FERTILISER PRICE SENSITIVITY (+/-)

| | | |
|---------------------------------------|---|-----|
| 10 p/kg N | 5 | (2) |
| 10 p/kg P ₂ O ₅ | 2 | (1) |
| 10 p/kg K ₂ O | 2 | (1) |

Fodder Beet

PHYSICAL DATA

(a) System

Fodder beet can be grazed behind an electric fence or harvested and fed as chopped or whole. If harvesting the crop, try to minimise soil contamination. It has a large yield potential, for a palatable, digestible feed for animals through the winter. This crop is not a brassica.

Transition of animals on and off the crop requires careful consideration, especially that of cattle *(continued on next page).

(b) Yield

| | Roots - t/ha (t/acre) | | | |
|---------|-----------------------|--------|----|-------|
| | Fresh | | | DM |
| Average | 60 | (24.3) | 10 | (4.0) |
| Premium | 90 | (36.4) | 14 | (5.7) |

In addition, fodder beet will yield 35 t leaf/ha (3 to 4 t DM); as winter progresses this may die off with frost and snow damage.

(c) Seed

Pelleted monogerm seed precision drilled at 15 cm spacing in 55 to 65 cm rows (approx. 3-4 kg/ha). Treated seed is available at a premium cost.

(d) Fertiliser

| | kg/ha | (units/acre) |
|-------------------------------|-------|--------------|
| N | 100 | (80) |
| P ₂ O ₅ | 60 | (48) |
| K ₂ O | 150 | (120) |

Potash level may be reduced to 75 kg/ha where agricultural salt (400 kg/ha) is applied.

All or part of the nutrient requirement can be satisfied with slurry or FYM. See page 4 for more info on nutrient planning.

(e) Sprays

Pre-emergence broad leaved weed control and then up to four post emergence applications at low rates.

Fodder Beet

VARIABLE COST DATA

| VARIABLE COSTS | £/ha (acre) |
|----------------|-------------|
| Seed | 225 |
| Fertiliser | 268 |
| Sprays etc. | 144 |
| Other expenses | - |
| | <hr/> |
| | 637 (258) |

FERTILISER PRICE SENSITIVITY (+/-)

| | | |
|---------------------------------------|----|-----|
| 10 p/kg N | 10 | (4) |
| 10 p/kg P ₂ O ₅ | 6 | (2) |
| 10 p/kg K ₂ O | 15 | (6) |

* Cattle should be transitioned over 21 days, starting with 1kg DM per animal per day until all cattle are eating bulbs readily, then increase by 1kg DM every two days until they start to leave some beet behind.

Ensure animals have received vaccinations for clostridial infections prior to grazing the crop, as beet can increase the chance of such infections due to the high sugar load in the intestines

Red Clover

PHYSICAL DATA

(a) System

Red clover-ryegrass mixtures provide a good silage crop whilst offering high quality aftermaths for finishing lambs. Up to 300g per day growth rate is possible for weaned lambs grazing red clover. Not suitable for winter grazing or intense autumn grazing.

Phyto-oestrogens affect ewe fertility so avoid grazing 6 weeks either side of tupping and limit grazing replacement ewe lambs on red clover as there is some, albeit limited, evidence that it affects reproductive tract development.

(b) Yield

| | t/ha (t/acre) Fresh | DM |
|---------|------------------------|----|
| Average | 37 | 10 |
| Premium | 56 | 15 |

(c) Seed

For a high red clover sward:

15kg/ha (6kg/acre) red clover

5kg/ha (2kg/acre) grass seed

Spring sowing at 10-15mm depth when soil temperatures exceed 10°C works best.

(d) Fertiliser

| | kg/ha | (units/acre) |
|-------------------------------|-------|--------------|
| N | 0 | (0) |
| P ₂ O ₅ | 70 | (56) |
| K ₂ O | 70 | (56) |

P and K application should be guided by recent soil analysis. Clover require higher pH than grasses, target 6-6.5. Nitrogen application is not required. See page 4 for more information on nutrient planning.

(e) Sprays

Do not use residual herbicides on previous crops that could affect germination of clover.

Red Clover

VARIABLE COST DATA

| VARIABLE COSTS | £/ha (acre) |
|-----------------|-------------|
| Seed @ £7.85/kg | 141 |
| Fertiliser | 124 |
| Sprays etc. | - |
| Other expenses | - |
| | <hr/> |
| | 265 (107) |

FERTILISER PRICE SENSITIVITY (+/-)

| | | |
|---------------------------------------|---|-----|
| 10 p/kg N | 0 | (0) |
| 10 p/kg P ₂ O ₅ | 7 | (3) |
| 10 p/kg K ₂ O | 7 | (3) |

Livestock

Livestock Units

| | Livestock units | | Livestock units |
|---|--------------------|--|--------------------|
| Dairy cows | 1.00 | <u>Ewes and ewe replacements</u> ³ | |
| Dairy bulls | 0.65 | Hill Ewes | 0.06 |
| Beef cows | 0.75 | Upland Ewes | 0.08 |
| Beef bulls | 0.65 | Lowland Ewes | 0.11 |
| Heifers in calf (rearing) | 0.80 | Rams | 0.08 |
| <u>Other cattle</u> ¹ | | <u>Lambs</u> | |
| 0-12 months | 0.34 | Store lambs <1 year | 0.04 |
| 12-24 months | 0.65 | Breeding ewe hoggs: | |
| Over 24 months ² | 0.80 | 6 months – 1 year | 0.06 |
| Horses | 0.80 | Other sheep > 1 year | 0.08 |

¹ excluding intensive beef systems

² reduced in proportion to time animal on farm

³ excluding suckling lambs

Notes

1. A Livestock Unit is usually defined in terms of feed requirements. The ratios in the table above are based on metabolisable energy requirements, with one unit being considered as the maintenance of a mature 625 kg Friesian cow and the production of a 40-45 kg calf, and 4,500 litres of milk at 36 g/kg of butterfat and 86 g/kg solids-not-fat.
2. To calculate the stocking density of grazing livestock allowances should strictly be made for variation in output, e.g. yield per cow or liveweight gain per head, and also for quantities of non-forage feed consumed by each category of stock.
3. To calculate the total livestock units on a farm reduce in proportion the time animals are on farm within any year. The appropriate livestock units should be multiplied by the monthly average livestock numbers, except in the case of lambs and purchased stores where throughput should be used.
4. Because of the range in breed and type of animal within any one category (e.g. Friesian and Jersey dairy cows), the results obtained from the use of these figures must be interpreted with care.
5. Livestock units used by the Scottish Government for calculating stocking densities as part of eligibility for subsidy schemes differ slightly. See page 490 for more detail.

Basis of data: Defra, 'Definitions of Terms used in Agricultural Business Management' (Mar 2010).

Livestock Traceability

Cattle – current situation

All cattle are required to have a 'passport'. Without a passport cattle cannot be slaughtered for human consumption.

Cattle are required to be double tagged. Beef calves must have both tags fitted within 20 days of birth. Dairy calves must have one tag fitted within 36 hours of birth and the second tag fitted within 20 days of birth. **NOTE:** For all calves, births must be registered on the Cattle Tracing System (CTS) within **7 days of tagging** and within 27 days of birth. Lost or illegible tags (including those with backs or fronts missing), must be replaced within 28 days of discovery.

Deaths must be reported and passports returned within 7 days. If the animal is over 24 months of age, it must be tested for BSE.

When an animal moves from one holding to another, both off and on movements should be recorded in the holding register within 36 hours of the movement taking place. For further guidance see www.bcms.gov.uk.

An on-farm record must be retained for all cattle on the holding. All dairy births (within 7 days), any other calf (within 30 days), deaths (within 7 days) and movements (within 48 hours) all need to be recorded in farm records. These records must be retained for a 10-year period. A copy of a herd register can be downloaded at www.fas.scot/downloads/sample-blank-herd-register-bovine-animals/.

In Scotland, links between holdings no longer apply. To keep cattle you must register each holding that you use (owned, rented or seasonally rented) with ScotMoves (<http://www.scoteid.com/>). Cattle moving to and from the different holdings (location codes) within a business have to be recorded with ScotMoves within 48 hours of moving. This can be done by email, online, telephone/fax, paper or by using software packages. ScotMoves is not compulsory and on/off movements can be lodged with BCMS instead, but the keeper must be registered as a keeper of cattle at the receiving holding and no more than one keeper can be registered on that holding. Full details including possible exemptions can be found at www.scoteid.com.

Cattle Tracing System changes 4th October 2021

On the 4th October, the Cattle Tracing System in Scotland changed from BCMS to ScotEID-ScotMoves+. Cattle registration and movements in Scotland are no longer accepted by BCMS. Timescales for tagging and registering cattle will not change but in Scotland all birth notifications and movements will need to be notified to ScotEID-ScotMoves+.

Cattle tagging EID changes

A new anticipated European standard for Low Frequency (LF) cattle tags, once adopted, means that tags must be WYSIWYG (What You See Is What You Get) compatible, exactly like our current LF sheep tags.

However, the current UK cattle numbering system is incompatible with the new standard and it therefore will have to be changed when it is adopted by the UK. BCMS cannot deal with this change and will close. Cattle tracing will therefore be devolved to each country.

Due to the complications of the new LF cattle tag standard, progress towards its implementation on a UK basis has been slow.

In Scotland, Ultra-High Frequency (UHF) tagging is the preferred technology as it has many advantages. The technology is cheaper, they are WYSIWYG compatible, they can be read singly or in batches at a greater distance, they don't interfere with LF tags, and they can be encoded with information.

Currently, ScotEid UHF tags are voluntary and available as part of a pilot scheme being tested on farms and through abattoirs. They are available only as a UHF secondary tag.

At present, until there is an agreed UK position on cattle renumbering for LF, Scottish cattle keepers have two options: to use current LF non-WYSIWYG tags and readers or to voluntarily use ScotEID UHF WYSIWYG tags.

It is likely that LF will be compulsory at some point in the future for all UK cattle, whilst Scotland is most likely to mandate UHF, cattle due to their advantages over LF. It is therefore conceivable that dual tagging will therefore be required in some form in the future for Scottish cattle.

Sheep

To keep sheep, you must register each holding that you use (owned, rented or seasonally rented) with your local Rural Payments and Inspections Directorate (RPID) office. It is compulsory for all Scottish sheep born after 31 December 2009 to be tagged with an Electronic Identifier (EID) before they leave the holding of birth (unless under a concession) or are 9 months old, whichever comes first.

There are three types of tag that can be used:

- Slaughter Tags (a single EID tag with a flock mark and no visible individual identifier).
- A matching set of double tags with individual identifiers, one of which must be an EID tag.
- An EID bolus and black ear tag.

All sheep that are to be sold or slaughtered by the time they are one year old can be identified with any one of the above tags (tag types must not be mixed). However, the most common type for sheep under 12 months old are slaughter tags for store and finished lambs.

Any animals kept beyond 12 months of age must have a matching set of double tags with individual numbers – one an EID tag. Any slaughter

tagged animals that are to remain on the holding after they are a year old, must be upgraded (provided they are completely traceable) by removing the slaughter tag and replacing with a matching set of double tags with individual identifiers one of which must be an EID tag on or before they are one year old. These must be recorded in the replacement register.

A record of identification must be kept in the flock records with the date the animals were EID tagged and their individual number if double tagged or flock number if slaughter tagged. Batch recording can be used.

Any homebred sheep losing their tags must have them replaced within 28 days of discovery. If they are on the holding of birth you can use your existing double tags one of which must be EID. If the sheep are not on the holding of birth, then red replacement EID tags must be used. The exception to this is upgrading bought in ewe lambs that can be upgraded to your own existing tags provided they are fully traceable. Replacement tags must be recorded in the flock records.

Flock books should include a section on identification and replacements and a continuous record must be kept. The register must be retained for three years. A holding register (orange book) is downloadable from the Farm Advisory Service website www.fas.scot/downloads/blank-flock-register/.

Records for all on/off movements, identification and replacement of tags must be completed in the register within 48 hours. An annual flock inventory must be completed usually with the December Census.

All sheep movements in Scotland must be reported to SAMU (Scottish Animal Movements Unit) within 3 days. Any EID animals moving through Scottish Critical Control points (markets, abattoirs etc) are logged and uploaded to the ScotEID database. These movements can form part of your records. The ScotEID website (www.scoteid.com) is a source of information on tagging rules and regulations as is Scottish Government's own website at www.gov.scot/Topics/farmingrural/Agriculture/animal-welfare/IDtraceability/SheepandGoats

Goats

The rules for goats are identical to sheep except the EID component is not compulsory and tattoos can be used.

Deer

To keep deer, you must register each holding that you use (owned, rented or seasonally rented) with your local Rural Payments and Inspections Directorate (RPID) office. Deer must be identified as required by the Tuberculosis (Deer) Order 1989 (as amended) before moving on or off a holding and before a TB test (unless under 16 weeks old).

The owner/keeper must complete a movement declaration found at:

The movement declaration must be retained on the premises of departure for six months.

Pigs

To keep pigs you must register your holding with the local RPID office and obtain a County Parish Holding (CPH) number for every holding that you use within 30 days of when pigs are first kept. You must also contact your local Animal Health Office (AHPA) to register as a keeper of pigs and also to obtain a pig herdmark. All pigs born on your holding must be identified before leaving the holding of birth by an eartag or a permanent tattoo (either on the ear or a slapmark on the shoulder). See www.gov.scot/publications/pig-identification-registration-guidance-keepers-scotland/.

If under 12 months old, a temporary mark (paint) can be used for farm to farm movements only. For all movements to a show or exhibition, for breeding purposes, to a semen collection centre or, intra-community trade or export or under a walking licence, all pigs must also have an eartag or a tattoo with the herd mark and a unique individual identification number) not a slapmark. A slapmark, eartag or tattoo can be used for movement to a market or slaughterhouse. All replacement tags must be cross referenced in the holding register.

Movements must be notified either prior to leaving the holding or on the day of the move. This can be done electronically through www.scoteid.com or by telephone or in writing to the ScotEID information Centre. The receiving keeper must check and confirm receipt of pigs within 3 days of their arrival. The movements also need to be noted in the holding register within 48 hours of the move. These records must be kept for a minimum of 3 years and once a year, the pigs on the holding must be recorded. ScotEID can be used for this. Rules for movements between England, Wales and Northern Ireland, and for imports and exports can be found at: www.gov.scot/publications/pig-identification-registration-guidance-keepers-scotland/pages/5/

Poultry

Following the Avian Influenza (Preventative Measures) (Scotland) Order 2007, any person keeping more than 50 poultry must register as a keeper. This can be done through www.gov.uk/poultry-registration-scotland, by post, telephone or email. Movement records must be kept for poultry and/or eggs. Where the breeding, laying or broiler flock has more than 250 birds, salmonella testing records must be kept.

All livestock movements

All movements of cattle, sheep, goats and other ruminating animals (except camelids) and swine are subject to a standstill period (unless an exemption applies). This period of standstill, in effect, does not permit

the movement of any animal to a market if it has been presented at a market within the previous 13 days (20 for pigs), or an English or Welsh market within the previous 6 days (20 for pigs), except any animal marketed in a livestock market in any of the Scottish island areas. Many exemptions apply and they can be found at: www.gov.scot/Topics/farmingrural/Agriculture/animal-welfare/Diseases/MovementRestrictions/ExemptHTML

Animal Health Planning

Livestock health planning is an effective tool to improve health, welfare and productivity. It is farm specific and it should be led by the farmer and be done in conjunction with the farm vet, supported by nutritionist and other consultants. While health planning is a mandatory requirement for farm assurance scheme standards, it will only bring real efficiency improvements to the farm's livestock systems if it is a dynamic approach to managing health and productivity rather than a document that is produced once per year.

Dynamic health planning involves continuous improvement of the livestock's health and production and requires regular and on-going engagement with the farm vet and other consultants as required during key parts of the production cycle. Areas that need intervention will be identified and actions agreed and prioritised to get the most out of the livestock system.

During the dynamic health planning the farmer and the people involved should: -

1. **Set targets** - the targets should be specific, realistic and measurable e.g. "I want to wean 92 calves at 230kg".
2. **Identify risks** - the risks that can prevent a farmer from achieving the targets set should be identified e.g., what can go wrong with calving? A plan for every risk to prevent this happening should be in place.
3. **Monitor** - the data required for monitoring the progress on the specific targets set should be captured, analysed and reviewed regularly. The monitoring process will enable the farmer and his/her vet and consultants to implement actions on time to prevent things going wrong.
4. **Review** - the review of the outcome of the targets at the end of the e.g. weaning period will demonstrate whether those targets have been achieved. Not all targets will be achieved but knowing the cause of this failure will enable a better understanding of their livestock's system and lead to improvement each year.

Many farmers and vet practices have devised their own health planning system, which reflects the needs for their situation. Health planning does

not have to be computer-based but the advantage of a programme run on the web is that all livestock's information are kept in one place and the farmer, the vet and consultants can access the plan and data from different locations and can collaborate in real time.

SRUC Veterinary Services have developed the SAHPS (Scottish Animal Health Planning System) to support farmers and vets involved in flock/herd health planning. The concept of SAHPS programme requires the farmer to enter farm data into the web-based system including production data, treatments/vaccines, disease incidents and the vet to analyse this data to identify risks and to plan actions to improve profits while safeguarding animal health and welfare. A new mobile phone app now allows farm data to be entered quickly, easily and in real time.

The development and maintenance of SAHPS and the supporting app have been supported by the Scottish Government. Both are free to Scottish veterinary practices and farmers and they are also available to veterinary practices and farmers in England and Wales on a chargeable basis.

In 2020, key performance data taken from SAHPS highlighted the following:

| | | Lower quartile | Upper quartile |
|---------------------|---------------|-----------------------|-----------------------|
| Cattle Herds | Calves Weaned | 62% | 89% |
| | Barren Cows | 27% | 9% |
| | | | |
| Sheep Flocks | Lambs Weaned | 121% | 165% |
| | Barren Ewes | 9% | 3% |

For more information visit at sahps.co.uk/ or email enquiries@sahps.co.uk

Premium health schemes

Health schemes offer a framework that help farmers establish the status of certain livestock diseases and provide guidance for prevention, reduction, eradication, and certification of freedom from those diseases. The farm vet can advise the farmer on Health Scheme options, the diseases that he/she needs to focus on and suggest a programme of testing and management to control those diseases. The level of assurance for buyers looking to eliminate disease risk, for farmers wishing to minimise the impact of disease in their herd/flock and for farmers wishing to export to countries that have achieved eradication of disease(s) are among the reasons that a farmer will consider joining a Health Scheme. The SRUC Veterinary Services offer the Premium Cattle Health Scheme (PCHS) and the Premium Sheep and Goat Health Scheme (PSGHS). Diseases covered by these schemes are listed overleaf:

PCHS

- Bovine Virus Diarrhoea (BVD)
- Leptospirosis
- Infectious Bovine Rhinotracheitis (IBR)
- Johne's Disease
- Neospora
- Bovine TB (England only)

PSGHS

- Maedi Visna (MV)
- Caprine Arthritis Encephalitis (CAE)
- Enzootic Abortion of Ewes (EAE)
- Scrapie

In addition to the livestock Health Schemes mentioned above, SRUC Veterinary Services offer the Premium Assured Strangles Scheme (PASS) supported by the British Horse Society (BHS). The PASS aims to prevent and eliminate Strangles from infected yards and to offer a national control programme to reduce the risk of Strangles for horses overall.

For more information on all the above health schemes visit at www.SRUC.ac.uk/vets

Veterinary medicine records

If you are the keeper of food producing animals or treat farm animals intended for human consumption, you must keep the following for 5 years from the date of treatment, or disposal of the veterinary medicine products. Records must include:

- A record of the proof of purchase or, where medicines were not bought, documentary evidence of how they were acquired.
 - ✓ name and batch number of the product
 - ✓ date of purchase
 - ✓ quantity purchased
 - ✓ name and address of the supplier
- A record of all veterinary medicine products administered to the animals, including those administered by the vet.
 - ✓ name and batch number of the product
 - ✓ date of administration
 - ✓ quantity administered
 - ✓ identification of the animal treated
 - ✓ withdrawal period
 - ✓ name of person/vet that administered the product
- A record of the disposal of all veterinary medicine products that have not been used for animal treatment.
 - ✓ date of disposal
 - ✓ quantity disposed
 - ✓ method and place of disposal

It is compulsory to retain all the above information for 5 years whether or not the animal has been sold, slaughtered or died. All records must be

durable, permanent, and made available for inspection on request by an authorised person. The records may be kept electronically.

Nutritive Values and Relative Values (£) of Feedingstuffs

The tables are provided as a general guide and should be used with care. Each foodstuff has been attributed a specific nutritive value and often this will vary, e.g. the nutritive value of draff (see page 127). The relative values of the feedingstuffs are also affected by the rationing situation.

The relative values for ruminants are calculated on an ME (metabolisable energy) and CP (crude protein) basis using barley and rapeseed meal as standard reference foods. The relative values for pigs are calculated on a NE (net energy) and Dig Lys (digestible lysine) basis, using barley and hipro soya as standard reference foods.

If the relative value of a foodstuff is higher than the price then it is good value for money. For ruminants, this does not take into account other characteristics of the feedstuff, for example, the high digestible undegradable protein (DUP) content of soya bean meal for ewes in late pregnancy or digestible fibre properties of sugar beet pulp. For pigs, relative value does not take into account the content of other amino acids and for both types of animal the negative characteristics such as low palatability.

Nutritive values of feedingstuffs-ruminants

| | Dry matter (g/kg) | ME (MJ/kg DM) | CP (g/kg DM) |
|--------------------------|----------------------|------------------|-----------------|
| Rapeseed meal | 900 | 12.0 | 400 |
| Barley | 860 | 13.2 | 115 |
| Hay (average) | 850 | 8.6 | 85 |
| Hay (good) | 860 | 9.2 | 100 |
| Silage (average) | 240 | 10.6 | 130 |
| Silage (good) | 240 | 11.2 | 140 |
| Barley straw | 860 | 6.3 | 35 |
| Oats | 870 | 12.0 | 100 |
| Wheat | 860 | 13.6 | 115 |
| Maize | 860 | 13.8 | 95 |
| Brewers grains (draff) | 230 | 11.1 | 200 |
| Wheat dark grains | 900 | 13.5 | 340 |
| Malt dark grains | 900 | 12.2 | 265 |
| Maize gluten (20%) | 880 | 12.9 | 220 |
| Soya bean meal (47%) | 890 | 13.3 | 530 |
| Potatoes | 210 | 13.3 | 90 |
| Swedes | 105 | 14.0 | 90 |
| Molassed sugar beet feed | 890 | 12.5 | 100 |

Relative values (£) of feedingstuffs-ruminants

| | £/t | | | | | |
|--------------------------|-----|-----|-----|-----|-----|-----|
| RAPESEED MEAL | 210 | | | | 230 | |
| BARLEY | 140 | 160 | 180 | 140 | 160 | 180 |
| Hay (average) | 79 | 88 | 97 | 81 | 90 | 99 |
| Hay (good) | 91 | 100 | 110 | 93 | 102 | 111 |
| Silage (average) | 32 | 35 | 38 | 32 | 36 | 39 |
| Silage (good) | 33 | 36 | 39 | 34 | 37 | 40 |
| Barley straw | 45 | 51 | 57 | 44 | 51 | 57 |
| Oats | 123 | 141 | 157 | 123 | 141 | 157 |
| Wheat | 145 | 166 | 186 | 145 | 166 | 187 |
| Maize | 144 | 166 | 188 | 142 | 165 | 186 |
| Brewers grains (draff) | 37 | 39 | 42 | 39 | 41 | 43 |
| Wheat dark grains | 212 | 221 | 229 | 227 | 236 | 244 |
| Malt dark grains | 173 | 182 | 190 | 184 | 192 | 201 |
| Maize gluten (20%) | 168 | 181 | 194 | 175 | 188 | 201 |
| Soya bean meal (47%) | 260 | 257 | 254 | 287 | 284 | 280 |
| Potatoes | 33 | 38 | 43 | 33 | 38 | 43 |
| Swedes | 18 | 20 | 23 | 17 | 20 | 23 |
| Molassed sugar beet feed | 132 | 151 | 170 | 132 | 151 | 170 |

Nutritive values of feedingstuffs-pigs

| | NE (MJ/kg as fed) | Dig Lys (g/kg as fed) |
|--------------------------|----------------------|--------------------------|
| Hipro soya bean meal | 8.4 | 26.6 |
| Barley | 9.6 | 2.8 |
| Oats | 8.0 | 3.0 |
| Wheat | 10.5 | 2.5 |
| Wheat feed | 7.7 | 4.6 |
| Wheat bran | 6.2 | 4.0 |
| Maize | 11.1 | 1.8 |
| Wheat dark grains | 9.3 | 5.6 |
| Maize gluten (20%) | 7.0 | 4.0 |
| Peas | 9.7 | 12.5 |
| Beans | 8.6 | 12.8 |
| Molassed sugar beet feed | 6.6 | 2.9 |
| Molasses | 7.0 | 0.1 |
| Biscuit waste | 11.7 | 2.5 |
| Rapeseed meal | 6.5 | 14.0 |

Relative values (£) of feedingstuffs-pigs

| | £/t | | | | | |
|--------------------------|-----|-----|-----|-----|-----|-----|
| HIPRO SOYA BEAN MEAL | 300 | | | | | 350 |
| BARLEY | 140 | 160 | 180 | 140 | 160 | 180 |
| Oats | 122 | 138 | 154 | 123 | 139 | 155 |
| Wheat | 149 | 171 | 194 | 148 | 170 | 192 |
| Wheat feed | 130 | 144 | 158 | 134 | 149 | 163 |
| Wheat bran | 107 | 118 | 129 | 111 | 122 | 134 |
| Maize | 151 | 175 | 200 | 148 | 173 | 197 |
| Wheat dark grains | 157 | 174 | 191 | 163 | 180 | 197 |
| Maize gluten (20%) | 116 | 130 | 143 | 121 | 134 | 147 |
| Peas | 213 | 226 | 239 | 233 | 246 | 259 |
| Beans | 201 | 212 | 222 | 222 | 233 | 243 |
| Molassed sugar beet feed | 103 | 116 | 130 | 105 | 118 | 132 |
| Molasses | 88 | 104 | 120 | 84 | 100 | 116 |
| Biscuit waste | 164 | 189 | 214 | 162 | 187 | 212 |
| Rapeseed meal | 184 | 189 | 193 | 209 | 214 | 218 |

Gestation Table

| Date of service | | Births due | | Date of service | | Births due | | Date of service | | Births due | |
|-----------------|--------|------------|--------|-----------------|--------|------------|--------|-----------------|--------|------------|--------|
| Cow | Ewe | Ewe | Hind | Cow | Sow | Ewe | Hind | Cow | Sow | Ewe | Hind |
| 01-Jan | 12-Oct | 30-May | 19-Aug | 06-May | 15-Feb | 03-Oct | 23-Dec | 08-Sep | 20-Jun | 05-Feb | 27-Apr |
| 06 | 17 | 04-Jun | 24 | 11 | 20 | 08 | 28 | 13 | 25 | 10 | 02-May |
| 11 | 22 | 09 | 29 | 16 | 25 | 13 | 02-Jan | 18 | 30 | 15 | 07 |
| 16 | 27 | 14 | 03-Sep | 21 | 02-Mar | 18 | 07 | 23 | 05-Jul | 20 | 12 |
| 21 | 01-Nov | 19 | 8 | 26 | 07 | 23 | 12 | 28 | 10 | 25 | 17 |
| 26 | 06 | 24 | 13 | 31 | 12 | 28 | 17 | 03-Oct | 15 | 02-Mar | 22 |
| 31 | 11 | 29 | 18 | 05-Jun | 17 | 02-Nov | 22 | 08 | 20 | 07 | 27 |
| 05-Feb | 16 | 04-Jul | 23 | 10 | 27 | 07 | 27 | 13 | 25 | 12 | 01-Jun |
| 10 | 21 | 09 | 28 | 15 | 22 | 12 | 01-Feb | 18 | 30 | 17 | 06 |
| 15 | 26 | 14 | 03-Oct | 20 | 01-Apr | 17 | 06 | 23 | 04-Aug | 22 | 11 |
| 20 | 01-Dec | 19 | 8 | 25 | 06 | 22 | 11 | 28 | 09 | 27 | 16 |
| 25 | 06 | 24 | 13 | 30 | 11 | 27 | 16 | 02-Nov | 14 | 01-Apr | 21 |
| 02-Mar | 12 | 30 | 19 | 05-Jul | 16 | 02-Dec | 21 | 07 | 19 | 06 | 26 |
| 07 | 17 | 04-Aug | 24 | 10 | 21 | 07 | 26 | 12 | 24 | 11 | 01-Jul |
| 12 | 22 | 09 | 29 | 15 | 26 | 12 | 03-Mar | 17 | 29 | 16 | 06 |
| 17 | 27 | 14 | 03-Nov | 20 | 01-May | 17 | 08 | 22 | 03-Sep | 21 | 11 |
| 22 | 01-Jan | 19 | 8 | 25 | 06 | 22 | 13 | 27 | 08 | 26 | 16 |
| 27 | 06 | 24 | 13 | 30 | 11 | 27 | 18 | 02-Dec | 13 | 01-May | 21 |
| 01-Apr | 11 | 29 | 18 | 04-Aug | 16 | 01-Jan | 23 | 07 | 18 | 06 | 26 |
| 06 | 16 | 03-Sep | 23 | 09 | 21 | 06 | 28 | 12 | 23 | 11 | 31 |
| 11 | 21 | 08 | 28 | 14 | 26 | 11 | 02-Apr | 17 | 28 | 16 | 05-Aug |
| 16 | 26 | 13 | 03-Dec | 19 | 31 | 16 | 07 | 22 | 03-Oct | 21 | 10 |
| 21 | 31 | 18 | 8 | 24 | 05-Jun | 21 | 12 | 27 | 08 | 26 | 15 |
| 26 | 05-Feb | 23 | 13 | 29 | 10 | 26 | 17 | 21 | 21 | 20 | 20 |
| 01-May | 10 | 28 | 18 | 03-Sep | 15 | 31 | 22 | 26 | 26 | | |

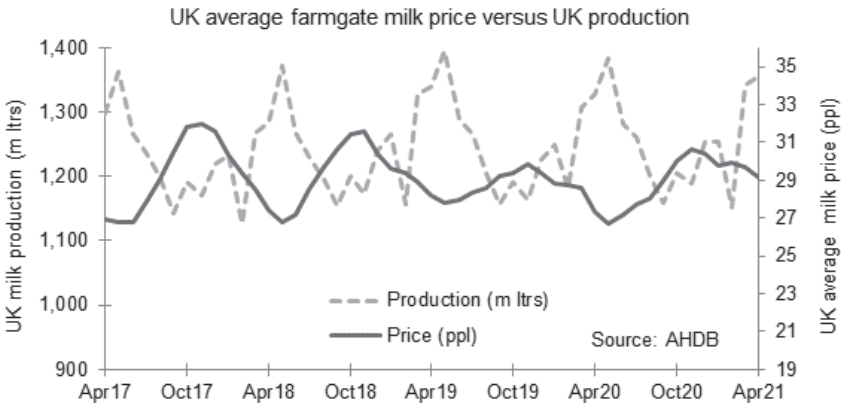
Note: Refer to the Miscellaneous section for gestation values for the above livestock. Values will change for different breed types.

Dairying

Introduction

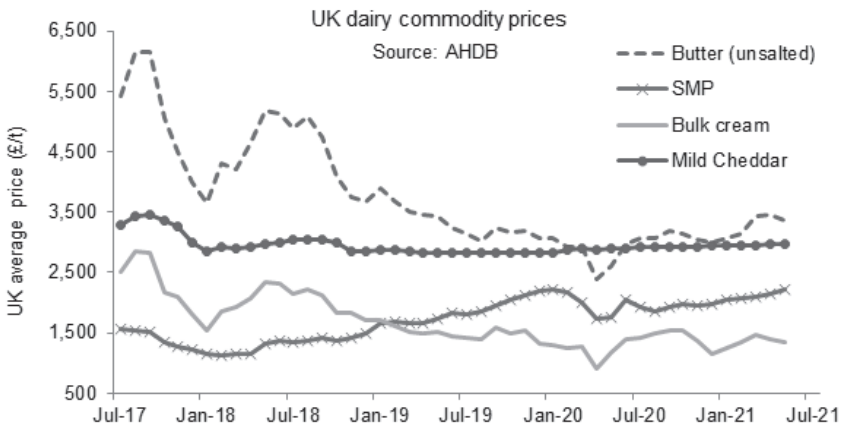
Farm-gate milk prices and price drivers

The UK average farm-gate prices were fairly steady in the last quarter of 2020 and the first quarter of 2021, ranging from 29.68ppl–30.66ppl. Despite a national lockdown in the first quarter of 2021 due to the ongoing COVID-19 pandemic, milk prices have remained relatively stable, with many milk buyers increasing their prices in May–July 2021 on the back of falling production and increased demand with the reopening of the food service sector. As a result of hot dry weather impacting on grass growth, the spring flush peaked at the end of April, slightly earlier than in 2020. Despite this, milk volumes for the first half of the year were slightly higher than 2020, partly due to volume reduction requests by some milk buyers in April and May 2020 in response to COVID-19. UK milk supply for the 2020/21 milk year was 15,013 million litres, up 41 million litres from the previous year. The UK average farm-gate milk price peaked at 30.66ppl in November 2020 with a low of 26.71ppl in May 2020.



The UK farm-gate milk price is mainly driven by the commodities market. Dairy fats (butter and cream) have on average increased in price over the 12-month period from June 2020 to May 2021, rising until November, where the 2nd English lockdown resulted in a fall in butter and cream prices, but then picked up again in the first quarter of 2021. During this period butter has risen from £2,980/t in June 2020, peaking at £3,450/t in April 2021. Cream has ranged from £1,150/t to £1,540/t during this 12-month period. The market for cheddar has remained very stable over the last 12 months ranging from £2,910/t to £2,980/t. At the time of writing, SMP is at its highest level at £2,210/t (May 2021 price) compared to the previous 12 months. Powder prices have been rising due to increasing demand from China for animal feed as the country rebuilds its pig herd following the swine flu outbreak and relaxation of the two-child policy to three.

The rise in commodity prices in the 2020/21 milk year was mainly due to prices starting from a low base in April, the first full month of the UK lockdown. Milk production also dropped in April and May 2020, partly due to one of the main milk buyers (Müller) requesting its farmers to curb production by 3%.



EU milk production (excluding the UK) increased by 1.2% in 2020, with the biggest contributors being Germany, France and then the Netherlands. However, it is expected that growth in 2021 will be a modest 0.8%.

World milk supplies for April 2021 were 2.2% above the same month in 2020, with an average daily production of 840 million litres. Most of this growth came mainly from New Zealand, Argentina, and the US (+11.7%, +3.5%, and +3.3% respectively, compared to April 2020). Growth in global milk production for 2021 is predicted to be around 1%, with most of this increase expected to come from the US and the EU.

Milk supply contracts

All UK dairy farmers are contracted to supply milk to an individual milk purchaser/processor. A select number of dairy farmers are on retailer-aligned contracts. Farmers on these contracts have seen their farm-gate milk prices maintained, based on a cost of production formula used by the individual retailer. At the time of writing (June 2021), aligned milk contracts are in the region of 30.39ppl–33.35ppl for a standard liquid litre. The majority of non-aligned farm-gate milk prices are in the region of 29.00ppl–30.00ppl for a standard liquid litre, based on 4% butterfat and 3.3% protein.

The price paid for milk going for manufacturing purposes places more emphasis on compositional quality, with a standard manufacturing litre being based on 4.2% butterfat and 3.4% protein. Historically, liquid contracts have tended to be poorly rewarded for components compared to manufacturing contracts but this has changed in recent years.

Depending on the contract, bonuses and penalties are awarded with milk composition and hygiene quality being either above or below the standard litre respectively. For hygiene quality, a standard litre is based on a bactoscan of 30,000/ml, somatic cell count (SCC) of 200,000/ml and thermoturics of 500/ml.

Additional bonuses for milk collections may include every other day collections, volume bonuses and flexible collection times.

Fixed price contracts

From time to time, some milk purchasers offer fixed contracts, allowing producers to fix a certain proportion of their milk at a given price for a period of time. 'Futures contracts' allow farmers to reduce their exposure to market volatility with regards milk price and to plan ahead with purchasing key inputs such as feed and fertiliser. Futures broker FC Stone calculates regular forward milk prices based on European milk futures contracts and currency exchange rates. Futures market based values are referred to as UK Milk Futures Equivalent (UKMFE) and the current gross price, as of end June 2021, was 33.22ppl. The price the farmer receives will be lower than these futures values once adjusted to reflect processor margin and transport costs (Net UKMFE price as of end June 2021 was 29.06ppl). To put this in perspective, the estimated cash cost of production for all year-round calving herds for the 12-month period ending December 2020 was 28.7ppl for the middle 50% and 25.8ppl for the top 25% respectively (AHDB Dairy), giving a respective net margin of 0.36ppl-3.26ppl.

Outlook

Little growth in domestic and global milk production is predicted for 2021 despite positivity in dairy commodities and milk prices holding up well during the spring flush and summer months. High input costs during winter 2020/21 have forced farmers to examine their feed costs. With the aim of producing more milk from forage, the focus has been on cutting silage earlier to improve quality.

It is expected that once the hospitality sector opens fully this autumn, we will see increased demand for dairy products and more consumer spending. With holidays abroad curtailed, and more people opting to holiday within the UK, this could see increased demand for dairy products throughout the second half of 2021.

It is expected that global growth in milk production will slow in the second half of 2021 due to rising feed costs linked to adverse weather at planting time. Despite recent strong demand for dairy products (especially from China), rising GDP, economic growth and demand returning in hospitality/food service sectors, demand is likely to soften in the second half of the year with less import demand from China as it increases its domestic production. With much of the global growth expected to come from North America, an increase in the availability of US products on the global market, this could limit further positive price movements.

Lactation Curves

The table below is an example of a lactation curve for a cow yielding 7,000 litres and can be used for budgeting purposes.

| Month | Yield each month for a cow yielding 7,000 litres | | | | | | | | | | | |
|-----------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | Month of calving | | | | | | | | | | | |
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| January | 12.3 | - | - | 4.7 | 6.4 | 7.4 | 8.5 | 9.6 | 10.6 | 11.8 | 12.9 | 13.4 |
| February | 12.0 | 11.0 | - | - | 4.5 | 5.9 | 6.8 | 7.7 | 8.6 | 9.7 | 10.8 | 11.6 |
| March | 13.0 | 13.5 | 12.4 | - | - | 5.3 | 6.8 | 7.7 | 8.6 | 9.8 | 10.9 | 12.0 |
| April | 11.9 | 12.8 | 13.4 | 12.4 | - | - | 5.3 | 6.7 | 7.6 | 8.6 | 9.8 | 10.8 |
| May | 12.1 | 13.2 | 14.3 | 15.1 | 14.1 | - | - | 6.0 | 7.5 | 8.6 | 9.7 | 10.8 |
| June | 10.4 | 11.7 | 12.8 | 13.8 | 14.6 | 13.8 | - | - | 6.0 | 7.3 | 8.3 | 9.4 |
| July | 8.7 | 9.9 | 11.0 | 12.0 | 13.2 | 14.1 | 13.1 | - | - | 5.5 | 6.9 | 7.9 |
| August | 7.5 | 8.5 | 9.4 | 10.6 | 11.7 | 13.0 | 13.9 | 12.8 | - | - | 5.3 | 6.6 |
| September | 6.7 | 7.5 | 8.4 | 9.5 | 10.8 | 12.0 | 13.4 | 13.9 | 12.8 | - | - | 5.3 |
| October | 5.4 | 6.8 | 7.6 | 8.6 | 9.7 | 11.2 | 12.5 | 13.6 | 14.2 | 13.1 | - | - |
| November | - | 5.1 | 6.1 | 7.0 | 7.9 | 9.1 | 10.3 | 11.5 | 12.5 | 13.0 | 12.1 | - |
| December | - | - | 4.6 | 6.3 | 7.1 | 8.2 | 9.4 | 10.5 | 11.6 | 12.6 | 13.3 | 12.2 |
| | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

These figures are broadly applicable to other yield levels.

It should be noted that the figures are intended only as a general guide and that annual yield, milking frequency, lactation number, calving index, feeding regime and geographical area will all affect the actual curve obtained.

Dairy Cow - Summary of Assumptions

(a) Milk Price 2021

The following gross margins include four annual yield levels, based on average production of 1,000,000 litres per annum:

| Litres /cow | Calving system | Contract type | Average price (ppl) * |
|-------------|----------------|---------------|-----------------------|
| 5,000 | Spring | Manufacturing | 30.0 |
| 7,000 | All year round | Manufacturing | 30.0 |
| 8,500 | All year round | Liquid | 29.0 |
| 10,000 | All year round | Liquid | 29.0 |

* Use price sensitivity to change gross margins to reflect current milk price.

Note that calving system and contract type are not specific to average yield per cow and it is not unusual for higher yielding herds to be on manufacturing contracts. Similarly, block calving herds (whether spring or autumn or both, are capable of much higher yields than 5000 litres)

(b) Feeding

The systems shown are all based on a grass silage feeding regime. As milk yield increases, forage quality becomes more critical. Although high milk yields can be achieved using conventional systems based on grass, grass silage and concentrates, the inclusion of a second forage, such as a wholecrop cereal or maize silage, will normally enhance intake and performance as will forage replacers such as draff or grainbeet along with other distillery by-products, fodder beet and potatoes. To avoid excessive concentrate use (target concentrate use per litre should be less than 0.4kg), good grassland management and well-preserved grass silage with high intake characteristics are key. Multi-cut silage can improve forage quality and reduce demand for purchased concentrates and protein sources.

Many different feeding systems exist. A TMR (Total Mixed Ration) is where cows receive 100% of their nutrition in a mixed ration fed in the feed trough. PMR (Partial Mixed Ration) is where cows are fed a base ration with additional concentrates fed at a rate depending on their level of milk production. Typically, feeding to yield is based on providing 0.45kg concentrate per litre over the base ration through the parlour, robot or out of parlour feeders.

Dairy farmers can replace part or all the purchased compound dairy cake or blends with home mixes using home-grown cereals and purchased straights. These mixes typically cost £15-20/t less than purchased product, but they do, however, incur greater demand on labour and machinery and require more storage capacity.

(c) Other livestock expenses

These are based on commercial dairy herds and include milk recording, bedding, sawdust, and dairy detergents.

Dairy Cow - Spring Block Calving

PHYSICAL DATA

| | |
|-------------------------------|-------------|
| Calving period | Spring |
| | /cow |
| Average annual yield (litres) | 5,000 |
| Herd life (years) | 5.0 |
| Calving interval (days) | 370 |
| Cow size (kg) | 500 |
| Feed requirements (kg): | |
| Silage | 5,500 |
| Concentrates | 750 |
| Concentrates fed (kg/litre) | 0.15 |
| Overall forage area (ha): | |
| Silage & aftermath grazing | 0.11 |
| Grazing | 0.33 |
| Total | <u>0.44</u> |

Basis of data:

1. A spring calving herd managed on a low input system. Calving between February and April. Maximum utilisation of grazed grass - 150 days winter feeding period.
2. A herd of 200 cows producing 1 million litres, assumed at 4.4% BF and 3.5% Protein.
3. Diet includes 165kg feeding straw.
4. Calf sale/transfer value is an average of dairy heifers, males and beef cross calves at £137.75/hd then adjusted for calving interval and mortality. The calf value can be altered by £9.17 for each £10 difference in the sale/transfer price.
5. Cull cow sale price of £469.00/hd has been adjusted for herd life and mortality. The annual share can be altered by £1.95 for each £10 difference in cull cow price.
6. Heifer purchase/transfer price varies according to yield. A purchase price equating to 15ppl has been used. This has been adjusted for herd life and mortality. The annual share can be altered by £2.04 for each £10 difference in purchase/transfer price.

Dairy Cow - Spring Block Calving

GROSS MARGIN DATA

| | |
|-----------------------------------|--|
| Calving period | Spring /cow |
| Average annual yield (litres) | 5,000 |
| OUTPUT | |
| Spring milk @ 30 p/litre | 1,500 |
| Calf value | 126 |
| Cull cow (annual share) | 94 |
| | <hr/> |
| | 1,720 |
| Heifer replacement (annual share) | 153 |
| | <hr/> |
| | 1,567 |
| VARIABLE COSTS | |
| Concentrates @ £260/t | 195 |
| AI | 35 |
| Vet & medicines | 48 |
| Other livestock expenses | 101 |
| | <hr/> |
| | 379 |
| Gross Margin before forage | <hr/> |
| | 1,188 |
| Forage variable costs: | |
| silage @ £653/ha | 72 |
| | |
| grazing @ £334/ha | 110 |
| Total Variable Costs | <hr/> |
| | 561 |
| GROSS MARGIN £/cow | <hr/> |
| | 1,006 |
| GROSS MARGIN £/forage ha | <hr/> |
| | 2,287 |
| Sensitivity-Change ± | Change in Gross Margin/head (£) |
| 1 p/litre in milk price | 50 |
| £10/t in concentrate price | 8 |

Dairy Cow – Moderate Input

PHYSICAL DATA

| | |
|-------------------------------|-------------|
| Calving period | All year |
| | /cow |
| Average annual yield (litres) | 7,000 |
| Herd life (years) | 4.2 |
| Calving interval (days) | 390 |
| Cow size (kg) | 600 |
| Feed requirements (kg): | |
| Silage | 8,700 |
| Concentrates | 1,800 |
| Concentrates fed (kg/litre) | 0.26 |
| Overall forage area (ha): | |
| Silage & aftermath grazing | 0.17 |
| Grazing | 0.24 |
| Total | <u>0.41</u> |

Basis of data:

1. A moderate input system calving all year round; 200 days winter feeding period with cows at grass day and night during the grazing period.
2. A herd of 143 cows producing 1 million litres, assumed at 4.2% BF and 3.4% Protein.
3. Diet includes 115kg feeding straw.
4. Calf sale/transfer value is an average of dairy heifers, males and beef cross calves at £148.00/hd then adjusted for calving interval and mortality. The calf value can be altered by £8.61 for each £10 difference in the sale/transfer price.
5. Cull cow sale price of £563.00 /hd has been adjusted for herd life and mortality. The annual share can be altered by £2.34 for each £10 difference in cull cow price.
6. Heifer purchase/transfer price varies according to yield. A purchase price equating to 15ppl has been used. This has been adjusted for herd life and mortality. The annual share can be altered by £2.45 for each £10 difference in purchase/transfer price.

Dairy Cow – Moderate Input

GROSS MARGIN DATA

| | |
|-----------------------------------|--|
| Calving period | All year /cow |
| Average annual yield (litres) | 7,000 |
| OUTPUT | |
| All year milk @ 30 p/litre | 2,100 |
| Calf value | 127 |
| Cull cow (annual share) | 135 |
| | <hr/> |
| | 2,362 |
| Heifer replacement (annual share) | 257 |
| | <hr/> |
| | 2,105 |
| VARIABLE COSTS | |
| Concentrates @ £260/t | 468 |
| AI | 46 |
| Vet & medicines | 78 |
| Other livestock expenses | 101 |
| | <hr/> |
| | 693 |
| Gross Margin before forage | <hr/> |
| | 1,412 |
| Forage variable costs: | |
| silage @ £653/ha | 111 |
| | |
| grazing @ £334/ha | 80 |
| Total Variable Costs | <hr/> |
| | 884 |
| GROSS MARGIN £/cow | <hr/> |
| | 1,221 |
| GROSS MARGIN £/forage ha | <hr/> |
| | 2,979 |
| Sensitivity-Change ± | Change in Gross Margin/head (£) |
| 1 p/litre in milk price | 70 |
| £10/t in concentrate price | 18 |

Dairy Cow – Moderate/High Output

PHYSICAL DATA

| | |
|-------------------------------|-------------|
| Calving period | All year |
| | /cow |
| Average annual yield (litres) | 8,500 |
| Herd life (years) | 3.6 |
| Calving interval (days) | 400 |
| Cow size (kg) | 650 |
| Feed requirements (kg): | |
| Silage | 11,200 |
| Concentrates | 2,800 |
| Concentrates fed (kg/litre) | 0.33 |
| Overall forage area (ha): | |
| Silage & aftermath grazing | 0.22 |
| Grazing | 0.24 |
| Total | <u>0.46</u> |

Basis of data:

1. A moderate input system calving all year round; 230 days winter feeding period. During the grazing period cows are housed at night and grazed during the day.
2. A herd of 118 cows producing 1 million litres assumed at 4.1% BF and 3.3% Protein.
3. Diet includes 160kg feeding straw.
4. Calf sale/transfer value is an average of dairy heifers, males and beef cross calves at £184.00/hd then adjusted for calving interval and mortality. The calf value can be altered by £8.40 for each £10 difference in the sale/transfer price.
5. Cull cow sale price of £536.00/hd has been adjusted for herd life and mortality. The annual share can be altered by £2.71 for each £10 difference in cull cow price.
6. Heifer purchase/transfer price varies according to yield. A purchase price equating to 15ppl has been used. This has been adjusted for herd life and mortality. The annual share can be altered by £2.86 for each £10 difference in purchase/transfer price.

Dairy Cow – Moderate/High Output

GROSS MARGIN DATA

| | |
|-----------------------------------|--|
| Calving period | All year /cow |
| Average annual yield (litres) | 8,500 |
| OUTPUT | |
| All year milk @ 29 p/litre | 2,465 |
| Calf value | 135 |
| Cull cow (annual share) | 150 |
| | <hr/> |
| | 2,750 |
| Heifer replacement (annual share) | 364 |
| | <hr/> |
| | 2,386 |
| VARIABLE COSTS | |
| Concentrates @ £260/t | 728 |
| AI | 55 |
| Vet & medicines | 95 |
| Other livestock expenses | 104 |
| | <hr/> |
| | 982 |
| Gross Margin before forage | <hr/> |
| | 1,404 |
| Forage variable costs: | |
| silage @ £653/ha | 144 |
| | |
| grazing @ £334/ha | 80 |
| Total Variable Costs | <hr/> |
| | 1,206 |
| GROSS MARGIN £/cow | <hr/> |
| | 1,180 |
| GROSS MARGIN £/forage ha | <hr/> |
| | 2,564 |
| Sensitivity-Change ± | Change in Gross Margin/head (£) |
| 1 p/litre in milk price | 85 |
| £10/t in concentrate price | 28 |

Dairy Cow - High Output

PHYSICAL DATA

| | |
|-------------------------------|-------------|
| Calving period | All year |
| | /cow |
| Average annual yield (litres) | 10,000 |
| Herd life (years) | 3.0 |
| Calving interval (days) | 415 |
| Cow size (kg) | 650 |
| Feed requirements (kg): | |
| Silage | 12,600 |
| Concentrates | 3,800 |
| Concentrates fed (kg/litre) | 0.38 |
| Overall forage area (ha): | |
| Silage & aftermath grazing | 0.24 |
| Grazing | 0.00 |
| Total | <u>0.24</u> |

Basis of data:

1. A high input, high output system calving all year round and housed for 365 days on a complete winter ration (assumes no access to grass or zero grazing).
2. A herd of 100 cows producing 1 million litres assumed at 4.0% BF and 3.2% Protein.
3. Diet includes 245kg feeding straw.
4. Calf sale/transfer value is an average of dairy heifers, males and beef cross calves at £192/hd then adjusted for calving interval and mortality. The calf value can be altered by £8.09 for each £10 difference in the sale/transfer price.
5. Cull cow sale price of £450.00/hd has been adjusted for herd life and mortality. The annual share can be altered by £3.11 for each £10 difference in cull cow price.
6. Heifer purchase/transfer price varies according to yield. A purchase price equating to 15ppl has been used. This has been adjusted for herd life and mortality. The annual share can be altered by £3.06 for each £10 difference in purchase/transfer price.

Dairy Cow - High Output

GROSS MARGIN DATA

| | |
|-----------------------------------|--|
| Calving period | All year /cow |
| Average annual yield (litres) | 10,000 |
| OUTPUT | |
| All year milk @ 29 p/litre | 2,900 |
| Calf value | 156 |
| Cull cow (annual share) | 150 |
| | <hr/> |
| | 3,206 |
| Heifer replacement (annual share) | 459 |
| | <hr/> |
| | 2,747 |
| VARIABLE COSTS | |
| Concentrates @ £260/t | 988 |
| AI | 65 |
| Vet & medicines | 111 |
| Other livestock expenses | 132 |
| | <hr/> |
| | 1,296 |
| Gross Margin before forage | <hr/> |
| | 1,451 |
| Forage variable costs: | |
| silage @ £653/ha | 157 |
| | |
| grazing @ £334/ha | - |
| Total Variable Costs | <hr/> |
| | 1,453 |
| GROSS MARGIN £/cow | <hr/> |
| | 1,294 |
| GROSS MARGIN £/forage ha | <hr/> |
| | 5,391 |
| Sensitivity-Change ± | Change in Gross Margin/head (£) |
| 1 p/litre in milk price | 100 |
| £10/t in concentrate price | 38 |

Replacement Heifer Rearing

Fodder requirements of Holstein Friesian heifers

The following tables provide forage data to budget for the cost of replacement heifers. Also see pages 148-149.

| | | Approx. closing lwt (kg) | Heifer grazing (days) | Mainly silage ration | | |
|------------------------------|------|--------------------------------|-----------------------------|----------------------|---------------|----------------|
| | | | | Conc (kg) | Straw (kg) | Silage (kg) |
| Early autumn | | | | | | |
| (1st Sept)/24 months | | | | | | |
| Birth | | 40 | - | - | - | - |
| 0-3 | S-N | 110 | - | 140 | 45 | - |
| 4-8 | D-A | 220 | - | 410 | 135 | 800 |
| 9-14 | My-O | 355 | 123 | 125 | - | 1,160 |
| 15-20 | N-A | 490 | - | 275 | - | 4,290 |
| 21-24 | My-A | 585 | 102 | 42 | 85 | 440 |
| Total | | | <u>225</u> | <u>992</u> | <u>265</u> | <u>6,690</u> |
| Forage (ha) | | | 0.21 | - | - | 0.13 |
| Early spring | | | | | | |
| (1st April)/24 months | | | | | | |
| Birth | | 40 | - | - | - | - |
| 0-3 | A-J | 110 | - | 140 | 45 | - |
| 4-8 | J-N | 220 | - | 415 | 140 | 800 |
| 9-14 | D-My | 355 | - | 275 | - | 3,150 |
| 15-20 | J-N | 490 | 61 | 185 | - | 2,890 |
| 21-24 | D-M | 585 | - | 205 | 170 | 2,910 |
| Total | | | <u>61</u> | <u>1,220</u> | <u>355</u> | <u>9,750</u> |
| Forage (ha) | | | 0.06 | - | - | 0.19 |

| | | Approx. closing lwt (kg) | Heifer grazing (days) | Mainly silage ration | | |
|-----------------------------|------|--------------------------------|-----------------------------|----------------------|---------------|----------------|
| | | | | Conc (kg) | Straw (kg) | Silage (kg) |
| Early autumn | | | | | | |
| (1st Sept)/27 months | | | | | | |
| Birth | | 40 | - | - | - | - |
| 0-3 | S-N | 100 | - | 170 | 45 | - |
| 4-8 | D-A | 205 | - | 330 | 180 | 820 |
| 9-14 | My-O | 335 | 153 | 47 | - | 560 |
| 15-20 | N-A | 455 | - | 275 | - | 4,100 |
| 21-27 | My-N | 600 | 153 | 60 | 185 | 1,735 |
| Total | | - | 306 | 882 | 410 | 7,215 |
| Forage (ha) | | | 0.29 | - | - | 0.18 |

| | | | | | | |
|------------------------------|------|-----|------|-----|-----|-------|
| Early spring | | | | | | |
| (1st April)/27 months | | | | | | |
| Birth | | 40 | - | - | - | - |
| 0-3 | A-J | 100 | - | 170 | 45 | - |
| 4-8 | J-N | 205 | - | 335 | 185 | 820 |
| 9-14 | D-My | 335 | 50 | 200 | - | 1,980 |
| 15-20 | J-N | 455 | 122 | 60 | - | 1,630 |
| 21-27 | D-M | 600 | 60 | 155 | 63 | 4,565 |
| Total | | - | 232 | 920 | 293 | 8,995 |
| Forage (ha) | | | 0.23 | - | - | 0.22 |

Replacement Heifer Rearing

PHYSICAL DATA

| Time of birth | Early autumn | Early spring | Early autumn | Early spring |
|-------------------------------|----------------------|------------------|----------------------------|------------------|
| Age at calving | 24 months | 24 months | 27 months | 27 months |
| Ration type | Mainly silage | Mainly silage | Mainly silage | Mainly silage |
| Milk, whole | 0 | 0 | 0 | 0 |
| Milk, substitute | 40 | 40 | 40 | 40 |
| Concentrates: | | | | |
| starter (proprietary) | 90 | 90 | 110 | 110 |
| rearer | 360 | 360 | 325 | 325 |
| cereal mix | 542 | 770 | 447 | 485 |
| straw | 265 | 355 | 410 | 293 |
| Forage: silage | 6,690 | 9,750 | 7,215 | 8,895 |
| silage | 0.13 | 0.19 | 0.18 | 0.22 |
| grazing | 0.21 | 0.06 | 0.29 | 0.23 |
| Total forage | 0.34 | 0.25 | 0.47 | 0.45 |
| <i>Basis of data:</i> | | | | |
| (a) Quality of forage: | ME (MJ/kg DM) | DM (g/kg) | 'Substitution Rate' | |
| Silage - 24m calving | 11.0 | 300 | 3 - 3.5 | |
| Silage - 27m calving | 10.5 | 300 | 3 - 3.5 | |
| Straw | 6.3 | 850 | 1 | |

- (b) The forage hectares shown are derived from the Grassland section for silage (310 kgN, 3 cuts for heifers calving at 24 months; 220 kgN, 2 cuts for heifers calving at 27 months and grazing (175 kgN). The hectares for silage include a proportion of aftermath grazing, which in turn has been deducted from the grazing requirement.
- (c) Intensification of grazing can save up to 25% of the area allocated.

Replacement Heifer Rearing

GROSS MARGIN DATA

| Time of birth | Early autumn | Early spring | Early autumn | Early spring |
|-------------------------------------|---------------|---------------|---------------|---------------|
| Age at calving | 24 months | 24 months | 27 months | 27 months |
| Ration type | Mainly silage | Mainly silage | Mainly silage | Mainly silage |
| OUTPUT - Heifer at calving | 1,388 | 1,388 | 1,388 | 1,388 |
| Less heifer calf | 146 | 146 | 146 | 146 |
| | <u>1,242</u> | <u>1,242</u> | <u>1,242</u> | <u>1,242</u> |
| VARIABLE COSTS | | | | |
| Milk, whole @ 29.5 p/litre | 0 | 0 | 0 | 0 |
| Milk, substitute @ £1880/t | 75 | 75 | 75 | 75 |
| Concentrates: starters @ £295/t | 27 | 27 | 32 | 32 |
| rearing @ £260/t | 94 | 94 | 85 | 85 |
| mainly cereal mix @ £230/t | 125 | 177 | 103 | 112 |
| straw @ £90/t | 24 | 32 | 37 | 26 |
| Vet & medicines | 42 | 42 | 42 | 42 |
| AI & other livestock expenses | 67 | 67 | 67 | 67 |
| | <u>454</u> | <u>514</u> | <u>441</u> | <u>439</u> |
| | <u>788</u> | <u>728</u> | <u>801</u> | <u>803</u> |
| Gross margin before forage | | | | |
| Forage variable costs: | | | | |
| silage @ £653/ha, silage @ £522/ha, | 85 | 124 | 94 | 116 |
| grazing @ £242/ha | 51 | 15 | 70 | 56 |

Total Variable costs

| | | | | |
|---------------------------------|--------------------|--------------------|-------------------|-------------------|
| GROSS MARGIN (birth to calving) | 605 | 653 | 605 | 611 |
| GROSS MARGIN/forage ha (acre) | 652 | 589 | 637 | 631 |
| | <u>1,918 (776)</u> | <u>2,356 (953)</u> | <u>1354 (548)</u> | <u>1395 (564)</u> |

Note: The calf price of £120 and value of heifer sold of £1500 have been adjusted to allow for mortality (5-10%) and barren and reject heifers (5-10%) respectively.

Contract Dairy Heifer Rearing

Contract rearing dairy heifers by a dedicated rearer allows the farm to focus purely on the milking herd and reduces time and resources previously allocated to youngstock.

As achieving target body weight at different stages throughout the rearing process is the basis of efficient heifer rearing programmes, contracts are often based on certain targets being met, such as growth rate, age at bulling and age at first calving. The aim should be for heifers that calve at 24 months to reach 85-90% of mature body weight at calving.

Contract rearers tend to take delivery of heifers from between 2 to 4 months of age, returning them to the dairy farmer at 4 to 6 weeks before calving.

There are various types of contract:

- *Contract payment based on per animal per day.* This is where the farmer pays a flat rate fee per head per day based on the actual rearing costs.
- *Weight gain on a per kilogram basis contract.* The difference between the delivery weight to the rearer and the return weight to the farmer is divided by the number of days to determine growth rate per day. The danger with this type of contract is that the rearer must avoid producing heifers that are over-conditioned.
- *Sell and buy-back contract.* The rearer buys the calves at an agreed price, with the farmer retaining the right to buy back the heifers 4 to 6 weeks prior to calving. The rearer retains control of the system but is responsible for all costs and losses incurred. The farmer runs the risk of buying back heifers at an age or weight that is not desirable in their system.
- *Labour and Facilities only contract.* A contract where the farmer stipulates the rearing policy and covers all costs such as feed, semen, veterinary medicine and transport costs (as well as any losses). The rearer only provides the labour and facilities.

Care must be taken to ensure that both the rearer and the dairy farmer's responsibilities are clearly defined, including performance targets and who covers what costs. The rearer should have insurance to cover any third-party claims involving the heifers in his care.

A summary of charges are based on the rearer paying all costs associated with the heifers in their care, excluding transport given below:

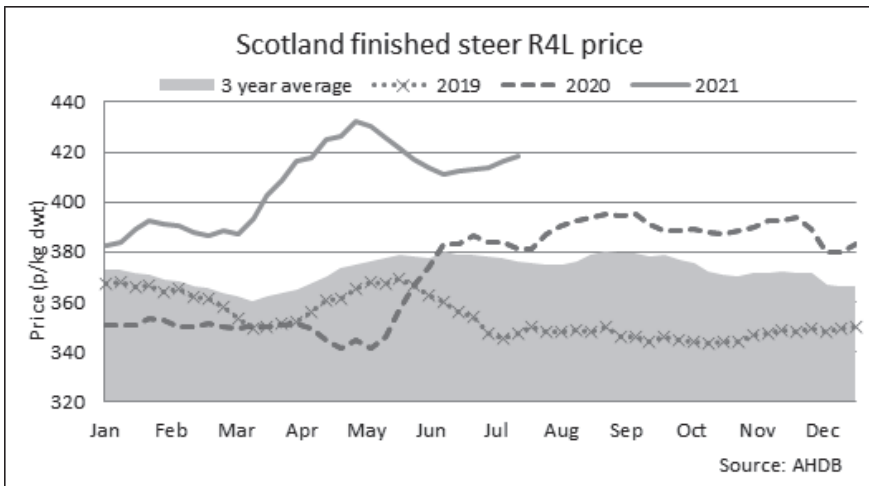
| | Charge | |
|--|---------------|----------------|
| | £/day | £/month |
| From 14 days to 3 or 6 months of age | 1.28-1.51 | 39-46 |
| From 6 months to calving (at 2 years of age) | 1.02-1.25 | 31-38 |

Beef Cattle

Introduction

Markets and price drivers

The last few years have seen supply and demand become increasingly important to the beef market. With no intervention, the beef industry is now exposed to market forces and as such, beef price has become much more volatile. The market has been steady in 2020 with the COVID-19 outbreak closing hospitality and driving retail sales which helped to underpin the price. Imports were very low due to the closed hospitality sector and therefore lack of demand. The post Brexit paperwork issues caused delays both to imports and exports at the start of the year. The majority of Scottish processing is now controlled by foreign companies.



The UK is still heavily reliant on imports of beef, particularly from Ireland. The volume of beef imported to the UK has a major effect on the UK price.

Volatility and lack of certainty impacts producer confidence especially considering beef production's long lead-time. Meeting carcass specification of the intended market is essential, and a short finishing period is likely to be most cost effective. Carcass balance issues also influence the producer price, for example, demand for higher value steaks over the BBQ season can lift whole carcass value. Beef demand is equally sensitive to inflation, the competitiveness of beef imports and alternative proteins such as chicken. This was particularly clear in the spring of 2020 when COVID-19 restrictions led to panic buying of low value cuts, while high value cuts were not needed as the hospitality sector was shut down.

With few exceptions, beef is traded on the commodity spot market and therefore most producers cannot use forward contracts or other price levelling mechanisms as a risk management tool. There is now a great deal of interest in shortening supply chains and dealing with or close to

the end consumer. While the whole beef industry can't do this, there are opportunities for some businesses to deal directly with their consumer and ensure both profitability and business resilience.

Marketing

The vast majority of prime cattle marketed in Scotland are marketed direct to the slaughterhouse and sold deadweight. However, a large proportion will be traded at some stage in their lives through the auction system. The live cattle auction provides a valued service, bringing many buyers and sellers together and creating genuine, healthy competition to buy livestock.

While some farmers sell all their cattle on one day, many seek to spread their risk by targeting several large sales per year. Price can be influenced by gaining feedback from buyers and selling the right type of cattle at the appropriate sales. Similarly, when selling direct to processors, a higher price might be achievable if a large number of in-specification cattle can be delivered at pre-arranged times and/or agreed to be spread throughout the year.

Margins

The bottom-line contribution of cattle is highly sensitive to the sales price. With the current market system, farmers have very limited options to influence the price they receive. For most farmers, efficiency savings are the key to improving financial performance. Efficiency savings also bring about a reduction to the carbon footprint for individual farm businesses.

The most profitable suckler cow enterprises make a positive net margin before subsidy. Top performing suckler beef systems tend to rear more calves per cow, to heavier weights, using less purchased feed. To achieve this, grassland management is key. Furthermore, while fixed costs may be lower, they are also diluted by selling more kilos of beef. The best farmers target investment in infrastructure and equipment towards things that lead to cost savings.

Suckler cow margins look to have improved in the year with the stronger store cattle trade leading many store cattle to be worth over £100 more this year. For producers with homegrown feeds and straw this will have benefitted them, however, with the rising input costs in some businesses the margin may be squeezed.

Finishers margins have been under pressure this year, even with a high sales price (for Spring 2021 in excess of £4.00/kg) the high price of store cattle has reduced any possible improvement in the margin.

Other benefits

It is important to remember that the cows form part of a business. How the enterprise complements other parts of the business is also important. For example, the share and spread of demand for labour and machinery will affect the success of the enterprise mix in a business. Furthermore,

well managed multiple enterprises can spread risk and improve cash flow, having additional and multiple sale dates.

Suckler cows play a vital role in managing upland grazings, providing benefit to biodiversity, landscape management and grazing quality. Mixed livestock grazing systems also contribute to reduced worm burdens for both cattle and sheep. Their manure is also an important source of nutrients for arable cropping as part of a crop rotation. Consequently, any enterprise should not be viewed in isolation.

Subsidies and support

The Scottish Suckler Beef Support Scheme (SSBSS), commenced in 2015. Payment is made on male and female calves, which are at least 75% beef bred, born on your holding and have been kept there for at least 30 days. The net payment rate per eligible calf on the mainland was approximately £98 and £144 on the islands. Actual payment rates are determined by the number of calves claimed each year and the exchange rate for that year. Payments are confirmed once applications are validated in the spring following the year of claim.

For further details on payments and the requirements of the SSBSS see pages 495-496 in the Rural Aid Schemes section.

General Reference Data

Effect of slaughter age on performance of intensively finished Holstein bulls

| Slaughter weight (kg) | 326 | 399 | 456 | 494 |
|------------------------------|------------|------------|------------|------------|
| Slaughter age (days) | 223 | 270 | 301 | 358 |
| Finishing period (days) | 150 | 185 | 207 | 276 |
| Finishing gain (kg) | 233 | 288 | 331 | 390 |
| Finishing gain (kg/day) | 1.55 | 1.56 | 1.60 | 1.41 |
| Feed intake (kg) | 998 | 1,422 | 1,653 | 2,152 |
| FCR (kg feed/kg gain) | 4.28 | 4.94 | 4.99 | 5.52 |
| Carcass weight (kg) | 172 | 215 | 242 | 267 |
| KO% | 52.9% | 54.0% | 53.0% | 54.1% |
| Saleable meat yield (kg) | 127 | 158 | 176 | 193 |
| Saleable meat yield (%) | 73.9% | 73.2% | 72.8% | 72.2% |

Store cattle valuations

The sale value of store cattle can vary depending on time of sale. This variation has been removed for the gross margins.

The age and weight of calves at sale varies depending on season or month of calving - *be cautious when comparing spring and autumn calving herds.*

Note that an increasing share of fixed costs are attributable as the length of time trading stock spend on farm increases – this is true where other breeding or trading stock could have made use of the farm resources.

Foster calves

To reduce risk of disease, it is assumed that no foster calves are bought to replace dead calves. No cost for replacement calves has been included in the margins thus, if foster calves are bought, the appropriate adjustment should be made to the gross margin.

Liveweight to deadweight-price conversion

In order to calculate the deadweight price, divide the liveweight price by the killing out percentage (KO %). For example: $200 \text{ p/kg} / 0.52 = 385 \text{ p/kg}$ deadweight. See following quick reference table:

| Liveweight Price (p/kg) | Killing out % | | | | | |
|-------------------------------|-------------------------|-----|-----|-----|-----|-----|
| | 50% | 52% | 54% | 56% | 58% | 60% |
| | Deadweight price (p/kg) | | | | | |
| 180 | 360 | 346 | 333 | 321 | 310 | 300 |
| 182 | 364 | 350 | 337 | 325 | 314 | 303 |
| 184 | 368 | 354 | 341 | 329 | 317 | 307 |
| 186 | 372 | 358 | 344 | 332 | 321 | 310 |
| 188 | 376 | 362 | 348 | 336 | 324 | 313 |
| 190 | 380 | 365 | 352 | 339 | 328 | 317 |
| 192 | 384 | 369 | 356 | 343 | 331 | 320 |
| 194 | 388 | 373 | 359 | 346 | 334 | 323 |
| 196 | 392 | 377 | 363 | 350 | 338 | 327 |
| 198 | 396 | 381 | 367 | 354 | 341 | 330 |
| 200 | 400 | 385 | 370 | 357 | 345 | 333 |
| 202 | 404 | 388 | 374 | 361 | 348 | 337 |
| 204 | 408 | 392 | 378 | 364 | 352 | 340 |
| 206 | 412 | 396 | 381 | 368 | 355 | 343 |
| 208 | 416 | 400 | 385 | 371 | 359 | 347 |
| 210 | 420 | 404 | 389 | 375 | 362 | 350 |
| 212 | 424 | 408 | 393 | 379 | 366 | 353 |
| 214 | 428 | 412 | 396 | 382 | 369 | 357 |
| 216 | 432 | 415 | 400 | 386 | 372 | 360 |
| 218 | 436 | 419 | 404 | 389 | 376 | 363 |
| 220 | 440 | 423 | 407 | 393 | 379 | 367 |
| 222 | 444 | 427 | 411 | 396 | 383 | 370 |
| 224 | 448 | 431 | 415 | 400 | 386 | 373 |
| 226 | 452 | 435 | 419 | 404 | 390 | 377 |
| 228 | 456 | 438 | 422 | 407 | 393 | 380 |
| 230 | 460 | 442 | 426 | 411 | 397 | 383 |
| 232 | 464 | 446 | 430 | 414 | 400 | 387 |
| 234 | 468 | 450 | 433 | 418 | 403 | 390 |
| 236 | 472 | 454 | 437 | 421 | 407 | 393 |
| 238 | 476 | 458 | 441 | 425 | 410 | 397 |
| 240 | 480 | 462 | 444 | 429 | 414 | 400 |
| 242 | 484 | 465 | 448 | 432 | 417 | 403 |
| 244 | 488 | 469 | 452 | 436 | 421 | 407 |
| 246 | 492 | 473 | 456 | 439 | 424 | 410 |
| 248 | 496 | 477 | 459 | 443 | 428 | 413 |
| 250 | 500 | 481 | 463 | 446 | 431 | 417 |

Hill Suckler Cows

PHYSICAL DATA

| | Spring | Autumn |
|--|----------------|----------------|
| | Feb-Apr | Sep-Nov |
| Calving period | | |
| Calves weaned per 100 cows put to the bull | 90% | 90% |
| Month of weaning | October | July |
| Days to weaning | 220 | 270 |
| Month of sale | October | October |
| Lwt of calves: at weaning (kg) | 235 | 270 |
| Lwt of calves: at sale/transfer (kg) | 235 | 335 |
| Herd life of cows (years) | 7 | 7 |
| Herd life of bulls (years) | 4 | 4 |
| Cow mortality (%) | 1 | 1 |
| Calf mortality (%) | 4.5 | 4.5 |
| Cow:bull ratio (:1) | 35 | 35 |
| Feeding/cow and calf (winter days): | 180 | 200 |
| silage (t) | 5.5 | 7.5 |
| straw (kg) | - | - |
| creep feed (kg) (incl. pre sale) | - | 250 |
| cow concentrates (kg) | 50 | 200 |
| cow cobs (kg) | 50 | 50 |
| grazing (hill/rough pasture) | >0.5 | >0.6 |
| Silage fertiliser (kg N/ha) | 125 | 125 |
| Silage: | | |
| yield (t/ha from 1-cut) | 20 | 20 |
| DM quality (g/kg) | 300 | 300 |
| ME quality (MJ/kg DM) | 10 | 10 |
| Rough grazing (ha) | >0.6 | >0.5 |
| Silage & aftermath grazing (ha) | 0.28 | 0.375 |
| Housing system: | | |
| Straw for general use incl. calving pens | 0.33 | 0.42 |
| Straw bedding (if in bedded courts) (t) | 1.25 | 1.50 |

Based on bought-in straw.

* Amend bedding costs for cows overwintered or housed on straw.

Assumptions:

1. Grazing is assumed to be hill grazing with some improvements, carrying a maintenance charge of £50/grazing livestock unit.
2. SSBSS value is based on mainland payments, adjusted for living calves at 30 days of age. For further detail on this scheme see pages 156 and 495-496.

Hill Suckler Cows

GROSS MARGIN DATA

| | Spring | Autumn |
|--------------------------------------|----------------|----------------|
| | Feb-Apr | Sep-Nov |
| | £/cow | £/cow |
| Calving period | | |
| OUTPUT | | |
| Calf sales (lwt) | | |
| Steers | | |
| 350 kg @ 230 p | - | 693 |
| 250 kg @ 230 p | 486 | - |
| Heifers | | |
| 320 kg @ 230 p | | |
| 220 kg @ 230 p | | |
| Scottish Suckler Beef Support Scheme | 90 | 90 |
| | 576 | 783 |
| Less: Replacement - cow | 83 | 83 |
| bull | 25 | 25 |
| | 468 | 675 |
| VARIABLE COSTS | | |
| Cow concentrates @ £279/t | 14 | 56 |
| Cow cobs @ £273/t | 14 | 14 |
| Creep feed @ £270/t | - | 68 |
| Vet & medicines | 36 | 36 |
| Straw bedding @ £100/t (bought-in) | 33 | 42 |
| Commission, haulage & tags | 44 | 52 |
| | 141 | 268 |
| Gross Margin before forage | 327 | 407 |
| Forage variable costs: | | |
| silage @ £224/ha | 62 | 84 |
| grazing @ £10/grazing livestock unit | 11 | 15 |
| | 73 | 99 |
| Total Variable Costs | 214 | 367 |
| GROSS MARGIN £/cow | 254 | 308 |

Sensitivity-Change ±

| | |
|---------------------------|----|
| 10 p/kg in lwt sale price | 22 |
| Sale weight ± 10kg | 21 |
| Herd life ± 1 year | 16 |

Change in Gross Margin/head (£)

| | | |
|---------------------------|----|----|
| 10 p/kg in lwt sale price | 22 | 31 |
| Sale weight ± 10kg | 21 | 21 |
| Herd life ± 1 year | 16 | 16 |

Replacement Cost prices:

| | | | |
|-----------|--------|-------------------------|--------|
| Cull cow | £720 | In-calf heifer (purch.) | £1,250 |
| Cull bull | £1,000 | Replacement bull | £4,500 |

Upland Suckler Cows - Mainly Silage Diets

PHYSICAL DATA

Breed: Commercial cows bred to a range of bulls, mostly continental.

| Calving period | Feb-Apr | May-Jun | Aug-Oct |
|--|----------------|----------------|----------------|
| Calves weaned | 92% | 92% | 92% |
| Month of weaning | October | February | July |
| Days to weaning | 220 | 270 | 300 |
| Month of sale | October | April | October |
| Lwt of calves: at weaning (kg) | 275 | 310 | 340 |
| Lwt of calves: at sale/transfer (kg) | 275 | 350 | 400 |
| Herd life of cows (years) | 7 | 7 | 7 |
| Herd life of bulls (years) | 4 | 4 | 4 |
| Cow mortality (%) | 1 | 1 | 1 |
| Calf mortality (%) | 4.5 | 4.5 | 4.5 |
| Cow:bull ratio (:1) | 35 | 35 | 35 |
| Feeding/cow and calf (winter days): | 180 | 180 | 200 |
| silage (t) | 4.8 | 5.0 | 7.5 |
| straw (t) | 0.3 | 0.2 | 0.35 |
| calf concentrates (kg) | 100 | 500 | 350 |
| cow concentrates (kg) | 100 | 150 | 200 |
| Grazing fertiliser (kg N/ha) | 125 | 125 | 125 |
| Silage & aftermath fertiliser (kgN/ha) | 200 | 200 | 200 |
| Silage: | | | |
| yield (t/ha from 1-cut) | 23 | 23 | 23 |
| DM quality (g/kg) | 300 | 300 | 300 |
| ME quality (MJ/kg DM) | 10.5 | 10.5 | 10.5 |
| Overall forage area (ha): | | | |
| silage and aftermath grazing | 0.21 | 0.22 | 0.33 |
| grazing | 0.30 | 0.30 | 0.34 |
| | <u>0.51</u> | <u>0.52</u> | <u>0.67</u> |

Housing system: In cubicles*

| | | | |
|--|------|------|------|
| Straw for general use incl. calving pens | 0.33 | 0.33 | 0.42 |
| Straw bedding (if in bedded courts) (t) | 1.25 | 1.75 | 1.50 |

Based on bought-in straw, adjust if home-grown.

* Amend bedding costs for cows outwintered or housed on straw.

Assumptions:

1. Mainly grass farm either buying in all straw and concentrates or growing small amount of cereals. May/June calves weaned in February when on silage diets.
2. SSBSS value is based on mainland payments, adjusted for living calves at 30 days of age, and an exchange rate of £0.89/€. For further detail on this scheme see pages 156 and 495-496.

Upland Suckler Cows - Mainly Silage Diets

GROSS MARGIN DATA

| Calving period | Feb-Apr | May-Jun | Aug-Oct |
|--------------------------------------|---------|---------|---------|
| OUTPUT | £/cow | £/cow | £/cow |
| Calf sales (lwt - 92% crop) | | | |
| Steers | | | |
| 290 kg @ 230 p | 582 | - | - |
| 370 kg @ 230 p | - | 741 | - |
| 420 kg @ 230 p | - | - | 846 |
| Heifers | | | |
| 370 kg @ 230 p | - | - | - |
| 380 kg @ 230 p | - | - | - |
| Scottish Suckler Beef Support Scheme | 92 | 92 | 92 |
| | <hr/> | <hr/> | <hr/> |
| | 674 | 833 | 938 |
| Less: Replacement - | 98 | 98 | 98 |
| cow | | | |
| bull | 29 | 29 | 29 |
| | <hr/> | <hr/> | <hr/> |
| | 547 | 706 | 811 |
| VARIABLE COSTS | | | |
| Cow concentrates @ £279/t | 28 | 42 | 56 |
| Calf concentrates @ £277/t | 28 | 139 | 97 |
| Vet & medicines | 38 | 38 | 38 |
| Feeding straw @ £90/t (bought-in) | 27 | 18 | 32 |
| Bedding straw @ £90/t (bought-in) | 30 | 30 | 38 |
| Commission, haulage, tags & levies | 49 | 55 | 59 |
| | <hr/> | <hr/> | <hr/> |
| | 200 | 322 | 320 |
| Gross Margin before forage | <hr/> | <hr/> | <hr/> |
| | 347 | 384 | 491 |
| Forage variable costs: | | | |
| silage @ £224/ha | 47 | 49 | 73 |
| grazing @ £184/ha | 55 | 55 | 63 |
| | <hr/> | <hr/> | <hr/> |
| | 102 | 104 | 136 |
| Total Variable Costs | <hr/> | <hr/> | <hr/> |
| | 302 | 426 | 456 |
| GROSS MARGIN £/cow | <hr/> | <hr/> | <hr/> |
| | 245 | 280 | 355 |
| GROSS MARGIN £/ha | <hr/> | <hr/> | <hr/> |
| | 481 | 541 | 533 |

Sensitivity-Change ±

| | Change in Gross Margin/head (£) | | |
|---------------------------|---------------------------------|----|----|
| 10 p/kg in lwt sale price | 25 | 32 | 37 |
| Sale weight ± 10kg | 21 | 21 | 22 |
| Herd life ± 1 year | 19 | 19 | 19 |

Replacement cost prices:

| | | | |
|-----------|--------|-------------------------|--------|
| Cull cow | £931 | In-calf heifer (purch.) | £1,550 |
| Cull bull | £1,125 | Replacement bull | £5,200 |

Suckler Cows - Mainly Straw Diets

PHYSICAL DATA

Breed: Dairy-beef cross cows bred to range of bulls, mostly continental.

| Calving period | Feb-Apr | May-Jun | Aug-Oct |
|---|----------------|----------------|----------------|
| Calves weaned (%) | 92% | 92% | 92% |
| Month of weaning | October | December | July |
| Days to weaning | 220 | 200 | 300 |
| Month of sale | October | April | October |
| Lwt of calves: at weaning (kg) | 275 | 270 | 340 |
| Lwt of calves: at sale/transfer (kg) | 275 | 350 | 395 |
| Herd life of cows (years) | 7 | 7 | 7 |
| Herd life of bulls (years) | 4 | 4 | 4 |
| Cow mortality (%) | 1 | 1 | 1 |
| Calf mortality (%) | 4.5 | 4.5 | 4.5 |
| Cow:bull ratio (:1) | 35 | 35 | 35 |
| Feeding/cow and calf (winter days): | 180 | 180 | 200 |
| silage (t) | 1.5 | - | - |
| straw (t) | 1.5 | 2.2 | 1.3 |
| calf concentrates (kg) | 120 | 550 | 400 |
| cow concentrates (kg) | 600 | 550 | 1,500 |
| Grazing fertiliser (kg N/ha) | 175 | 175 | 175 |
| Silage & aftermath fertiliser (kg N/ha) | 175 | - | - |
| Silage: | | | |
| yield (t/ha from 1-cut) | 23 | 23 | 23 |
| DM quality (g/kg) | 300 | 300 | 300 |
| ME quality (MJ/kg DM) | 10.5 | 10.5 | 10.5 |
| Overall forage area (ha): | | | |
| silage and aftermath grazing | 0.07 | - | - |
| grazing | 0.34 | 0.38 | 0.40 |
| | <u>0.41</u> | <u>0.38</u> | <u>0.40</u> |

Housing system: Straw bedding assumed*

| | | | |
|-------------------|------|------|------|
| Straw bedding (t) | 0.75 | 1.05 | 0.90 |
|-------------------|------|------|------|

Based on home-grown straw, adjust if bought-in.

* Amend bedding costs for cows overwintered or housed elsewhere.

Assumptions:

1. Mixed farm growing sufficient grain to cover concentrate and straw feeding/bedding requirements. Only purchasing protein and minerals. May/June calves weaned earlier to reduce cow wintering costs. Small amount of silage made to cover extra grass growth in early season.
2. SSBSS value is based on mainland payments, adjusted for living calves at 30 days of age, and an exchange rate of £0.89/€. For further detail on this scheme see pages 156 and 495-496.

Suckler Cows - Mainly Straw Diets

GROSS MARGIN DATA

| Calving period | Feb-Apr | May-Jun | Aug-Oct |
|---------------------------------------|---------|---------|---------|
| OUTPUT | £/cow | £/cow | £/cow |
| Calf sales (lwt - 92% crop) | | | |
| Steers | | | |
| 290 kg @ 230 p | 582 | - | - |
| 370 kg @ 230 p | - | 741 | - |
| 420 kg @ 230 p | - | - | 836 |
| Heifers | | | |
| 260 kg @ 230 p | | | |
| 330 kg @ 230 p | | | |
| 370 kg @ 230 p | | | |
| Scottish Suckler Beef Support Scheme | 92 | 92 | 92 |
| | 674 | 833 | 928 |
| Less: Replacement - | 98 | 98 | 98 |
| cow | | | |
| bull | 33 | 33 | 33 |
| | 543 | 702 | 797 |
| VARIABLE COSTS | | | |
| Cow concentrates @ £239/t (home-mix) | 143 | 131 | 359 |
| Calf concentrates @ £247/t (home-mix) | 30 | 136 | 99 |
| Feeding straw @ £65/t (home-grown) | 98 | 143 | 85 |
| Bedding straw @ £65/t (home-grown) | 49 | 68 | 59 |
| Vet & medicines | 38 | 38 | 38 |
| Commission, haulage & tags | 49 | 55 | 59 |
| | 407 | 571 | 699 |
| Gross Margin before forage | 136 | 131 | 98 |
| Forage variable costs: | | | |
| silage @ £224/ha | 15 | - | - |
| grazing @ £242/ha | 82 | 92 | 97 |
| | 97 | 92 | 97 |
| Total Variable Costs | 504 | 663 | 796 |
| GROSS MARGIN £/cow | 39 | 39 | 1 |
| GROSS MARGIN £/ha | 96 | 102 | 2 |

| Sensitivity-Change ± | Change in Gross Margin/head (£) | | |
|---------------------------|---------------------------------|----|----|
| 10 p/kg in lwt sale price | 25 | 32 | 36 |
| Sale weight ± 10kg | 21 | 21 | 21 |
| Herd life ± 1 year | 19 | 19 | 19 |

Replacement cost prices:

| | | | |
|-----------|--------|-------------------------|--------|
| Cull cow | £931 | In-calf heifer (purch.) | £1,550 |
| Cull bull | £1,125 | Replacement bull | £5,800 |

Spring Calving Cows Producing 18 - 20 Month Finished Cattle

PHYSICAL DATA

Breed: Commercial cows bred to a range of bulls, mostly continental

| | Steers | Heifers |
|--|---------------|----------------|
| Calving period | Feb-Apr | Feb-Apr |
| Calves weaned (%) | 92% | 92% |
| Month of weaning | October | October |
| Calves sold finished (%) | 91% | 91% |
| Sale weight (kg lwt) | 650 | 600 |
| Dead weight (kg dwt) | 365 | 340 |
| Weaning weight (kg lwt) | 290 | 260 |
| Herd life of cows (years) | 7 | 7 |
| Herd life of bulls (years) | 4 | 4 |
| Cow:bull ratio (:1) | 35 | 35 |
| Feeding/cow and calf (winter days): | | |
| silage (t) | 5.0 | 5.0 |
| straw bedding (t) | 2.0 | 2.0 |
| calf concentrates (kg) pre-weaning | 100 | 100 |
| cow concentrates (kg) | 100 | 100 |
| Forage area (ha): | | |
| silage + aftermath | 0.16 | 0.16 |
| grazing | 0.30 | 0.30 |
| Overwintered calves: | | |
| Feeding period 180 days, October-April | | |
| Liveweight gain (kg) | 110 | 110 |
| Average daily liveweight gain (kg) | 0.8 | 0.8 |
| Feeding: barley/protein/minerals (t) | 0.42 | 0.35 |
| silage (t) | 3.5 | 3.0 |
| Silage area (ha) | 0.11 | 0.10 |
| Finishing cattle: | | |
| Feeding period (days): at grass | 180 | 180 |
| housed | 60 | 60 |
| Liveweight gain | 250 | 230 |
| Daily liveweight gain: at grass | 0.8 | 0.8 |
| housed | 1.2 | 1.2 |
| Feeding: concentrates at grass (t) | 0.20 | 0.25 |
| barley/protein/minerals in house (t) | 0.70 | 0.70 |
| straw fed in house (t) | 0.1 | 0.1 |
| Grazing area (ha) | 0.23 | 0.20 |

Housing system: Straw bedding assumed, home-grown*

* Amend bedding costs for cows overwintered or on slurry systems.

Assumption: SSBSS value as per note on page 164.

Spring Calving Cows Producing 18 - 20 Month Finished Cattle

GROSS MARGIN DATA

| OUTPUT | Spring born | |
|--|------------------|------------------|
| | Steer £/cow | Heifer £/cow |
| Calf sales (dwt - 91% crop) | | |
| 365 kg @ 400 p | 1,329 | - |
| 340 kg @ 400 p | - | 1,238 |
| Scottish Suckler Beef Support Scheme | 91 | 91 |
| | <u>1,420</u> | <u>1,329</u> |
| Less: Replacement - cow | 98 | 98 |
| bull | 33 | 33 |
| | <u>1,289</u> | <u>1,198</u> |
| VARIABLE COSTS | | |
| Cow concentrates @ £279/t | 28 | 28 |
| Calf concentrates @ £277/t | 28 | 28 |
| Barley, protein & minerals @ £230/t housed | 258 | 242 |
| Barley, protein & minerals @ £230/t at grass | 46 | 58 |
| Feeding straw @ £65/t (home-grown) | 7 | 7 |
| Bedding straw @ £65/t (home-grown) | 130 | 130 |
| Vet & medicines | 72 | 72 |
| Commission, levies & haulage | 91 | 88 |
| | <u>660</u> | <u>653</u> |
| Gross Margin before forage | <u>629</u> | <u>545</u> |
| Forage variable costs: | | |
| silage @ £343/ha | 93 | 89 |
| grazing @ £184/ha | 98 | 92 |
| | <u>191</u> | <u>181</u> |
| Total Variable Costs | <u>851</u> | <u>834</u> |
| GROSS MARGIN £/cow | <u>438</u> | <u>364</u> |
| GROSS MARGIN £/ha (acre) | <u>547 (222)</u> | <u>479 (194)</u> |

Sensitivity-Change ±

| | |
|---------------------------|--|
| 10 p/kg in dwt sale price | |
| Not bedded on straw | |
| £10/t in straw price | |

Change in Gross Margin/head (£)

| | |
|-----|-----|
| 33 | 31 |
| 130 | 130 |
| 21 | 21 |

Replacement cost prices:

| | | | |
|-----------|--------|-------------------------|--------|
| Cull cow | £931 | In-calf heifer (purch.) | £1,550 |
| Cull bull | £1,125 | Replacement bull | £5,750 |

Overwintering Spring-Born Suckled Calves

PHYSICAL DATA

| | Spring-born | | Spring-born | | |
|---|-----------------------------|--------|-------------|--------|-------|
| | Steer | | Heifer | | |
| Purchase/transfer date | October | | October | | |
| Sale/transfer date | April | | April | | |
| Feeding period (days) | 180 | | 180 | | |
| Liveweight: at purchase/transfer (kg) | 290 | | 260 | | |
| at sale/transfer (kg) | 420 | | 386 | | |
| Average daily liveweight gain (kg/day) | 0.7 | | 0.7 | | |
| Mortality (%) | 1% | | 1% | | |
| Feeding: | diet basis | silage | straw | silage | straw |
| | barley/protein/minerals (t) | 0.30 | 0.75 | 0.25 | 0.75 |
| | silage (t) | 3.5 | - | 3.0 | - |
| | straw (t) ME 6.5 MJ/kg DM | - | 0.8 | - | 0.8 |
| Silage area (ha) | 0.11 | - | 0.10 | - | |
| Silage: yield (t/ha) | 31 | 31 | 31 | 31 | |
| | DM quality (g/kg) | 300 | 300 | 300 | 300 |
| | ME quality (MJ/kg DM) | 10.6 | 10.6 | 10.6 | 10.6 |
| | N-fertiliser (kg/ha) | 220 | 220 | 220 | 220 |
| Housing system: Straw bedding assumed*. | | | | | |
| Straw bedding (t) | 0.5 | 0.3 | 0.5 | 0.3 | |
| Cost @ £65/t based on home grown straw - adjust if bought in. | | | | | |
| * Amend bedding costs if outwintered or on slurry systems. | | | | | |

Assumptions:

1. Silage diet concentrates phased out by 4 weeks to turnout.
2. Silage could be costed on a per tonne basis for clamp silage instead of a per hectare basis to reflect the true cost of growing, making, storing and handling silage.

Overwintering Spring-Born Suckled Calves

GROSS MARGIN DATA

| OUTPUT | Spring-born | | | |
|-------------------------------------|--|------------------|------------------|--------------|
| | Steer £/head | Heifer £/head | | |
| Sale value (lwt - 1% mortality): | | | | |
| 420 kg @ 230 p | 956 | - | | |
| 386 kg @ 230 p | - | 879 | | |
| Less: Weaned calf (lwt): | | | | |
| 290 kg @ 230 p | 667 | - | | |
| 260 kg @ 230 p | - | 598 | | |
| | <u>289</u> | <u>281</u> | | |
| VARIABLE COSTS | | | | |
| <i>Diet basis</i> | <i>silage</i> | <i>straw</i> | <i>silage</i> | <i>straw</i> |
| Barley, protein & minerals @ £230/t | 69 | - | 58 | - |
| Barley, protein & minerals @ £230/t | - | 173 | - | 173 |
| Feeding straw @ £65/t (home-grown) | - | 52 | - | 52 |
| Bedding straw @ £65/t (home-grown) | 33 | 20 | 33 | 20 |
| Vet & medicines | 30 | 30 | 30 | 30 |
| Commission, levies & haulage | 49 | 49 | 47 | 47 |
| | <u>181</u> | <u>324</u> | <u>168</u> | <u>322</u> |
| Gross Margin before forage | <u>108</u> | <u>- 35</u> | <u>113</u> | <u>- 41</u> |
| Forage variable costs: | | | | |
| silage @ £343/ha | 38 | - | 34 | - |
| Total Variable Costs | <u>218</u> | <u>324</u> | <u>202</u> | <u>322</u> |
| GROSS MARGIN £/head | <u>71</u> | <u>- 35</u> | <u>79</u> | <u>- 41</u> |
| GROSS MARGIN £/ha (acre) | <u>641 (260)</u> | <u>-</u> | <u>790 (320)</u> | <u>-</u> |
| Sensitivity-Change ± | Change in Gross Margin/head (£) | | | |
| 10 p/kg in lwt sale price | 42 | 42 | 38 | 38 |
| 10 p/kg in lwt purchase price | 29 | 29 | 26 | 26 |
| Not bedded on straw | 33 | 20 | 33 | 20 |
| £10/t in straw price | 5 | 11 | 5 | 11 |

Finishing Spring-Born Suckled Calves Intensively at 13 Months

PHYSICAL DATA

| | Spring-born | |
|--|-------------|---------|
| | Steer | Bull |
| Purchase/transfer date | October | October |
| Sale date | June | May |
| Feeding period (days) | 240 | 225 |
| Liveweight: at purchase/transfer (kg lwt) | 300 | 300 |
| at sale (kg lwt) | 612 | 630 |
| Deadweight at sale (kg dwt) | 337 | 353 |
| Average daily liveweight gain (kg/day) | 1.30 | 1.47 |
| Mortality (%) | 1.0 | 1.0 |
| Feeding: | | |
| barley/protein/minerals (t) | 1.8 | 2.5 |
| straw (t) ME 6.5 MJ/kg DM | 0.3 | 0.3 |
| Housing system: Straw bedding assumed*. | | |
| Straw bedding (t) | 0.5 | 0.5 |

Based on home-grown straw, adjust if bought-in.

* Amend bedding costs if on slurry based systems.

Finishing Spring-Born Suckled Calves Intensively at 13 Months

GROSS MARGIN DATA

| OUTPUT | Steer £/head | Bull £/head |
|-------------------------------------|-----------------|----------------|
| Sale value (dwt - 1% mortality): | | |
| 337 kg @ 400 p (612 kg lwt) | 1,333 | - |
| 353 kg @ 390 p (630 kg lwt) | - | 1,362 |
| Less: Store purchase (lwt): | | |
| 300 kg @ 230 p | 690 | - |
| 300 kg @ 210 p | - | 630 |
| | <hr/> 643 | <hr/> 732 |
| VARIABLE COSTS | | |
| Barley, protein & minerals @ £240/t | 427 | 600 |
| Feeding straw @ £65/t (home-grown) | 20 | 20 |
| Bedding straw @ £65/t (home-grown) | 33 | 33 |
| Vet & medicines | 30 | 30 |
| Commission, levies & haulage | 60 | 61 |
| Total Variable Costs | <hr/> 570 | <hr/> 744 |
| GROSS MARGIN £/head | <hr/> 73 | <hr/> -12 |

| Sensitivity-Change ± | Change in Gross Margin/head (£) | |
|-------------------------------|---------------------------------|----|
| 10 p/kg in dwt sale price | 33 | 35 |
| 10 p/kg in lwt purchase price | 30 | 30 |
| Not bedded on straw | 33 | 33 |
| £10/t in straw price | 7 | 7 |

Finishing Year Old Autumn-Born Suckled Calves at 18 Months

PHYSICAL DATA

| | Autumn-born | |
|--|-------------|---------|
| | Steer | Heifer |
| Purchase/transfer date | October | October |
| Sale date | April | April |
| Feeding period (days) | 180 | 180 |
| Liveweight: at purchase/transfer (kg lwt) | 420 | 380 |
| Liveweight: at sale (kg lwt) | 650 | 600 |
| Deadweight at sale (kg dwt) | 360 | 340 |
| Average daily liveweight gain (kg/day) | 1.3 | 1.2 |
| Mortality (%) | 1.0 | 1.0 |
| Feeding: | | |
| barley/protein/minerals (t) | 0.96 | 0.67 |
| kg/day | 3.9 | 3.7 |
| silage (t) | 4.5 | 4.5 |
| kg/day | 25.1 | 25.1 |
| Silage area (ha) | 0.15 | 0.15 |
| Silage: yield | 31 | 31 |
| DM quality (g/kg) | 300 | 300 |
| ME quality (MJ/kg DM) | 10.6 | 10.6 |
| Silage fertiliser (kg N/ha) | 220 | 220 |
| Housing system: Straw bedding assumed*. | | |
| Straw bedding (t) | 0.75 | 0.70 |

Based on home-grown straw, adjust if bought-in.

* For slatted court omit bedding costs.

Assumptions:

1. Calves from Upland/Lowground Suckler Cows – silage or straw diet.
2. Silage could be costed on a per tonne basis for clamp silage instead of a per hectare basis to reflect the true cost of growing, making, storing and handling silage.

Finishing Year Old Autumn-Born Suckled Calves at 18 Months

GROSS MARGIN DATA

| | Steer £/head | Heifer £/head | |
|-------------------------------------|--|--------------------------|--|
| OUTPUT | | | |
| Sale value (dwt - 1% mortality): | | | |
| 360 kg @ 400 p (650 kg lwt) | 1,426 | - | |
| 340 kg @ 400 p (600 kg lwt) | - | 1,346 | |
| Less: Weaned calf (lwt): | | | |
| 420 kg @ 230 p | 966 | - | |
| 380 kg @ 230 p | - | 874 | |
| | 460 | 472 | |
| VARIABLE COSTS | | | |
| Barley, protein & minerals @ £240/t | 230 | 161 | |
| Bedding straw @ £65/t (home-grown) | 49 | 46 | |
| Vet & medicines | 23 | 23 | |
| Commission, levies & haulage | 62 | 60 | |
| | 364 | 290 | |
| Gross Margin before forage | 96 | 182 | |
| Forage variable costs: | | | |
| silage @ £343/ha | 51 | 51 | |
| Total Variable costs | 415 | 341 | |
| GROSS MARGIN £/head | 45 | 131 | |
| GROSS MARGIN £/ha (acre) | 303 (123) | 876 (355) | |
| Sensitivity-Change ± | | | |
| | Change in Gross Margin/head (£) | | |
| 10 p/kg in dwt sale price | 35 | 34 | |
| 10 p/kg in lwt purchase price | 42 | 38 | |
| Not bedded on straw | 49 | 46 | |
| £10/t in straw price | 7 | 7 | |

Finishing Year Old Spring-Born Suckled Calves at 18 - 20 Months

PHYSICAL DATA

| | Spring-born | |
|---|----------------|-----------------|
| | Yearling steer | Yearling heifer |
| Purchase/transfer date | April | April |
| Sale date | December | October |
| Feeding period (days): at grass | 240 | 240 |
| housed | 100 | 80 |
| Liveweight: at purchase/transfer (kg lwt) | 420 | 386 |
| at housing (kg lwt) | 532 | 498 |
| at sale (kg lwt) | 650 | 600 |
| Deadweight at sale (kg dwt) | 370 | 340 |
| Average daily lwt gain: at grass (kg/day) | 0.8 | 0.8 |
| housed (kg/day) | 1.1 | 1.2 |
| Mortality (%) | 0.3 | 0.3 |
| Feeding: | | |
| concentrates at grass (t) | 0.20 | 0.25 |
| barley/protein/minerals in house (t) | 1.1 | 0.7 |
| straw fed in house (t) ME 6.5 MJ/kg DM | 0.1 | 0.1 |
| Housing system: Straw bedding assumed* | | |
| Straw bedding (t)** | 0.25 | 0.20 |
| Grazing area (ha) | 0.23 | 0.20 |
| Grazing fertiliser (kg N/ha) | 175 | 175 |
| Stocking rate at grass (animals/ha) | 4.2 | 5.0 |

* Amend bedding costs if on slurry based systems.

** Based on home-grown straw, adjust if bought-in.

Finishing Year Old Spring-Born Suckled Calves at 18 - 20 Months

GROSS MARGIN DATA

| | Steer £/head | Heifer £/head |
|--|--|--------------------------|
| OUTPUT | | |
| Sale value (dwt - 0.3% mortality): | | |
| 370 kg @ 400 p (650 kg lwt) | 1,476 | - |
| 340 kg @ 400 p (600 kg lwt) | - | 1,356 |
| Less: Yearling calf (lwt): | | |
| 420 kg @ 230 p | 966 | - |
| 386 kg @ 230 p | - | 888 |
| | <u>510</u> | <u>468</u> |
| VARIABLE COSTS | | |
| Barley, protein & minerals @ £230/t (at grass) | 46 | 58 |
| Barley, protein & minerals @ £230/t (housed) | 244 | - |
| Feeding straw @ £65/t (home-grown) | 7 | - |
| Bedding straw @ £65/t (home-grown) | 16 | - |
| Vet & medicines | 16 | 16 |
| Commission, levies & haulage | 64 | 61 |
| | <u>393</u> | <u>135</u> |
| Gross Margin before forage | <u>117</u> | <u>333</u> |
| Forage variable costs: | | |
| grazing @ £242/ha | 56 | 48 |
| Total Variable costs | <u>449</u> | <u>183</u> |
| GROSS MARGIN £/head | <u>61</u> | <u>285</u> |
| GROSS MARGIN £/ha (acre) | <u>263 (107)</u> | <u>1,423 (576)</u> |
| Sensitivity-Change ± | | |
| | Change in Gross Margin/head (£) | |
| 10 p/kg in dwt sale price | 36 | 34 |
| 10 p/kg in lwt purchase price | 42 | 38 |
| Not bedded on straw | 16 | - |
| £10/t in straw price | 3 | - |

Beef Cattle Summer Finishing

PHYSICAL DATA

| | Steer | Heifer |
|----------------------------------|---------------|---------------|
| Liveweight at purchase (kg) | 450 | 420 |
| Liveweight at slaughter (kg lwt) | 600 | 570 |
| (kg dwt) | 330 | 310 |
| Cattle bought | mid-April | mid-April |
| Cattle sold | mid-September | mid-September |
| Finishing period (days) | 150 | 150 |
| Liveweight gain (kg) | 150 | 150 |
| Daily liveweight gain (kg) | 1.0 | 1.0 |
| Supplementary feed: | | |
| barley, proteins & minerals (kg) | 308 | 250 |
| Grazing area (ha) | 0.23 | 0.20 |
| Grazing fertiliser N (kg/ha) | 175 | 175 |
| Feed levels per day: | | |
| first 8 weeks (kg) | 0 | 0 |
| next 6 weeks (kg) | 3 | 2 |
| next 4 weeks (kg) | 4 | 3 |
| last 2 weeks* (kg) | 5 | 4 |

* Feed at this level to finish by mid-September. Many will house by this time if finishing later.

Assumptions:

In practice, a proportion of the following cattle may be sold as forward stores or housed for autumn finishing at heavier weights. If so, additional concentrate feeding will be required.

Beef Cattle Summer Finishing

GROSS MARGIN DATA

| OUTPUT | Steer £/head | Heifer £/head |
|--|--|------------------|
| Sale value (dwt): | | |
| 330 kg @ 400 p (600 kg lwt) | 1,320 | - |
| 310 kg @ 400 p (570 kg lwt) | - | 1,240 |
| Less: Purchased store calf in April (lwt): | | |
| 450 kg @ 230 p | 1,035 | |
| 420 kg @ 230 p | - | 966 |
| | <u>285</u> | <u>274</u> |
| VARIABLE COSTS | | |
| Barley, protein & minerals @ £230/t | 71 | 58 |
| Vet & medicines | 16 | 16 |
| Commission, levies & haulage | 60 | 58 |
| | <u>147</u> | <u>132</u> |
| Gross Margin before forage | <u>138</u> | <u>142</u> |
| Forage variable costs: | | |
| grazing @ £242/ha | 56 | 48 |
| Total Variable costs | <u>203</u> | <u>180</u> |
| GROSS MARGIN £/head | <u>82</u> | <u>94</u> |
| GROSS MARGIN £/ha (acre) | <u>355 (144)</u> | <u>468 (189)</u> |
| Sensitivity-Change ± | Change in Gross Margin/head (£) | |
| 10 p/kg in dwt sale price | 33 | 31 |
| 10 p/kg in lwt purchase price | 45 | 42 |

Calf Rearing Costs to 3 Months

PHYSICAL DATA

| | Bucket fed | Ad-lib fed |
|----------------------------------|-------------------|-------------------|
| Liveweight (kg): at birth | 40 | 40 |
| at sale, 3 months | 110 | 115 |
| Liveweight gain (kg/day) | 0.78 | 0.83 |
| Feeding period (days) | 90 | 90 |
| Mortality (%) | 5 | 4 |
| | kg | kg |
| Feeding*: Milk substitute | 28 | 42 |
| Calf concentrates | 160 | 150 |
| Hay | 35 | 30 |
| Bedding (straw) | 0.2 | 0.2 |

* Homebred calves receive colostrum followed by whole milk up to 10 days of age.

Calf Rearing Costs to 3 Months

VARIABLE COST DATA

| | Bucket fed | Ad-lib |
|------------------------------------|-------------------|---------------|
| VARIABLE COSTS | | |
| Feed: | | |
| milk substitute @ £1880/t | 53 | 79 |
| calf concentrate @ £295/t | 47 | 44 |
| hay (purchased) @ £120/t | 4 | 4 |
| | <hr/> | <hr/> |
| | 104 | 127 |
| Vet & medicines & tags | 22 | 22 |
| Bedding straw @ £65/t (home-grown) | 13 | 13 |
| | <hr/> | <hr/> |
| | 35 | 35 |
| | <hr/> | <hr/> |
| Total Variable Costs | 139 | 162 |

| Sensitivity-Change ± | Change in costs/head (£) | |
|---------------------------------|---------------------------------|------|
| £100/t in milk substitute price | 2.80 | 4.20 |
| £10/t in calf concentrate price | 1.60 | 1.50 |

Assumptions:

1. Dairy calves do not receive SSBSS payments – eligible calves have to be 75% beef genetics.
2. Adjust straw cost if bought-in.

Intensive Finishing of Dairy Bred Bulls

PHYSICAL DATA

| | Holstein | Beef Cross |
|---|----------|---------------|
| Breed | | |
| Liveweight at start (kg) | 110 | 120 |
| Feeding period (days) | 290 | 300 |
| Liveweight at slaughter (kg lwt) | 500 | 545 |
| Deadweight at slaughter (kg dwt) | 265 | 300 |
| Killing out percentage (%) | 53 | 55 |
| Overall daily liveweight gain (kg/day) | 1.3 | 1.4 |
| Mortality (%) | 3 | 3 |
| Feeding ¹ : | | |
| 110-120 kg liveweight/purchase to slaughter: | | |
| concentrates (barley/protein/minerals) (t) | 2.15 | 2.30 |
| straw (t) | 0.4 | 0.4 |
| Housing system: Straw bedding assumed ² . | | |
| Straw bedding ³ (t) | 0.6 | 0.6 |

¹ For home bred calves see '*Calf rearing costs to 3 months*' (pages 178-179) for cost of feeding to 12-14 weeks (or 110-115kg lwt).

² If housed on slurry based systems omit bedding costs.

³ Adjust straw cost if bought-in.

Intensive Finishing of Dairy Bred Bulls

GROSS MARGIN DATA

| | Holstein £/head | Beef Cross £/head |
|--|--|-------------------------|
| OUTPUT | | |
| Sale value (dwt - adj 3% mortality): | | |
| 265 kg @ 350 p | 900 | - |
| 300 kg @ 370 p | - | 1,077 |
| <i>Less: Calf purchase (3 months):</i> | | |
| @ £220 | 220 | - |
| @ £320 | - | 320 |
| | <hr/> 680 | <hr/> 757 |
| VARIABLE COSTS | | |
| Concentrates @ £240/t | 516 | 552 |
| Feeding straw @ £65/t (home-grown) | 26 | 26 |
| Bedding straw @ £65/t (home-grown) | 39 | 39 |
| Vet & medicines | 18 | 18 |
| Commission, haulage & levies, etc. | 49 | 54 |
| Total Variable costs | <hr/> 648 | <hr/> 689 |
| GROSS MARGIN £/head | <hr/> 32 | <hr/> 68 |
| Sensitivity-Change ± | | |
| | Change in Gross Margin/head (£) | |
| £10/t in concentrate price | 22 | 23 |
| 10 p/kg in dwt sale price | 25 | 29 |

Forage Based Finishing Dairy Steers at 24 Months

PHYSICAL DATA

| | Holstein | Beef |
|--|----------|--------------|
| Breed | | Cross |
| Liveweight at start (kg) ¹ | 110 | 125 |
| Feeding period (days) | 659 | 659 |
| Liveweight at slaughter (kg lwt) | 618 | 632 |
| Deadweight at slaughter (kg dwt) | 315 | 335 |
| Killing out percentage (%) | 51 | 53 |
| Overall daily liveweight gain (kg/day) | 0.8 | 0.8 |
| Mortality (%) | 3 | 3 |
| Feeding: | | |
| 110-125 kg liveweight/purchase to slaughter: | | |
| concentrates (2nd stage calf mix) (t) | 0.15 | 0.15 |
| concentrates (barley/protein/minerals) (t) | 0.59 | 0.68 |
| silage (t) - over two housing periods | 6.0 | 6.4 |
| Grazing area - over two summers (ha) | 0.42 | 0.42 |
| Silage area - for two housing periods (ha) | 0.30 | 0.32 |
| Silage: | | |
| yield | 20 | 20 |
| DM quality (g/kg) | 240 | 240 |
| ME quality (MJ/kg DM) | 10.6 | 10.6 |
| Silage fertiliser (kg N/ha) | 125 | 125 |

Housing system: Straw bedding assumed ².

| | | |
|--------------------------------|-----|-----|
| Straw bedding ³ (t) | 1.2 | 1.2 |
|--------------------------------|-----|-----|

¹ For home bred calves see 'Calf rearing costs to 3 months' (pages 178-179) for cost of feeding to 12-14 weeks (or 110-115kg lwt).

² If housed on slurry based systems omit bedding costs.

³ Adjust straw cost if bought-in.

Forage Based Finishing Dairy Steers at 24 Months

GROSS MARGIN DATA

| | Holstein | Beef Cross ³ |
|---------------------------------------|------------------|-------------------------|
| OUTPUT | £/head | £/head |
| Sale value (dwt - adj 3% mortality): | | |
| 315 kg @ 390 p | 1,192 | - |
| 335 kg @ 390 p | - | 1,267 |
| Less: Calf purchase: | | |
| @ £220 | 220 | - |
| @ £320 | - | 320 |
| | <u>972</u> | <u>947</u> |
| VARIABLE COSTS | | |
| Concentrate calf mix @ £260/t | 36 | 36 |
| Concentrate barley blend @ £240/t | 142 | 163 |
| Bedding straw @ £65/t (home grown) | 78 | 78 |
| Vet & medicines | 33 | 33 |
| Commission, haulage & levies, etc. | 57 | 58 |
| Total Variable costs | <u>346</u> | <u>368</u> |
| Gross Margin before forage | <u>626</u> | <u>579</u> |
| Forage variable costs: | | |
| silage @ £224/ha | 67 | 72 |
| grazing @ £184/ha | 77 | 77 |
| | <u>144</u> | <u>149</u> |
| Total Variable costs | <u>490</u> | <u>517</u> |
| GROSS MARGIN £/head ¹ | <u>482</u> | <u>430</u> |
| GROSS MARGIN £/ha (acre) ² | <u>335 (136)</u> | <u>291 (118)</u> |

Sensitivity-Change ± Change in Gross Margin/head (£)

| | | |
|----------------------------|----|----|
| £10/t in concentrate price | 6 | 7 |
| 10 p/kg in dwt sale price | 30 | 33 |

¹ Unlike other beef finishing enterprises featured in the Farm Management Handbook, spanning over two years effectively incurs double the fixed cost share, which is not included above.

² This enterprise produces a strong gross margin per head but the extensive nature of this enterprise dilutes its return per hectare.

³ The higher sales value of a continental-cross steer is majorly offset by the higher calf purchase price.

Sheep

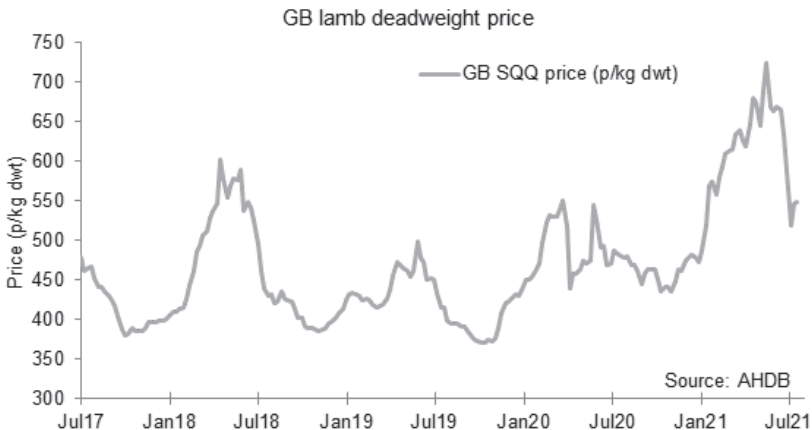
Introduction

Markets and price drivers

The UK is a significant sheep meat producer (33.5 million sheep). It is one of the largest sheep meat producers in the world – we are the third largest sheep meat exporter, yet we are the fourth largest sheep meat importer. To address seasonality of supply and carcass balance issues, the UK exports whole and half carcasses, predominantly to France and Germany, and imports legs and loins from New Zealand. The EU is currently the largest market for UK produce, accounting for 90% of the exports in 2020. The significance of exports makes trade links, export demand, and exchange rate highly important. The sector is highly sensitive to future trade deals.

UK domestic consumption of lamb has declined over the last 40 years. However, the halal market is a key driver for the sector, with consumption stimulated by Islamic festivals including Ramadan, Eid al-Fitr and Qurbani/Eid al-Adha. Lamb is seen by many as a luxury or premium product due to its high price in the supermarket. The retail price/kg of lamb has risen by 19% over the last five years; this value growth is greater than other proteins.

The producer price is significantly influenced by seasonality of supply as shown in the chart below. Most producers finish their lambs off grass or forage crops; therefore weather is a key driver influencing grass growth and lamb supply and thus, lamb price.



Producer price is also affected by sheep meat imports, principally from New Zealand (NZ). Historic trade links and a high value market renders the UK a major NZ customer, however, the demand from China is increasing, and offers a closer market for NZ lamb. The NZ-Chinese trade has been enhanced by African Swine Fever and a growing Chinese population. Therefore, in recent years, NZ have been contributing a declining proportion of its EU import quota. Variation in imports from

Australia and NZ is also affected by inclement weather. Timing of imported lamb onto UK markets rather than the volume has a bigger influence on producer price.

Marketing

Prime lamb sales are almost entirely reliant on the spot market. Since it is a seasonal product, the timing of sales has a large influence on price. As highlighted in the lamb price chart overleaf, the UK deadweight prime lamb price fluctuates greatly within a season. The Islamic festival of Ramadan is an important marketing date, although difficult to target as it moves forward 10 days each year. Old season lamb tends to recover value heading towards the Easter market and as supply declines. However, producers incur greater costs to either grow a lamb quickly for the early market or delay sale until the price rises again in early spring. As the season progresses into the summer, the volume of lamb reaching the marketplace increases and the supply exceeds domestic demand. This moves the UK to being a net exporter, meaning a heavy reliance on the European customer.

The auction market typically accounts for 50% of sheep sales across the UK. Like the cattle market, the live auction system provides an important service. It is a mechanism that brings together sheep and customers to establish a transparent price. The most common method to spread risk, when selling at livestock auctions, is to target multiple sales per year. The future price may be influenced by buyer feedback. Similarly, when selling direct to processors, an improved price may be achieved if a large number of in-specification lambs can be delivered at pre-arranged times.

Supermarket specification lamb accounts for most domestic sales, however, a butcher's lamb is also a sizeable market (c. 10%). Over 40% of lamb marketed is out of specification. Exports include the heavy lamb trade to northern European countries, particularly France, which account for ~40% of sheepmeat exports. Belgium and Luxembourg are particularly important outlets for E and U grade lambs.

Technical performance

Sheep enterprise margins are inevitably sensitive to the sales price. However, there is limited opportunity to influence the overall market and greater potential exists through improving output per hectare and cost control. Top performing flocks consistently rear more lambs, sell more finished (if they are on the right land type) and use less purchased feed. Grassland management is also better. Whilst fixed costs on these top performing farms may be lower, they are also spread over more kilos of lamb sold (higher output).

The sheep sector was particularly at risk from a no deal Brexit in December 2020, but due to a high global demand, short global supply, and a favourable currency for export, the product has traded exceptionally well. Now concerns are being raised on future trade deals, with a deal being made in principle with Australia. The threat from this

deal is minimal at present due to Chinese demand for Australian sheep meat. Future trade deals closer to home are a real concern, and producers should now be preparing to understand the costs of sheep systems and building price and key input cost sensitivity into budgets.

Subsidies and support

The Scottish Upland Sheep Support Scheme (SUSSS) is a coupled support payment for sheep to provide additional support to producers on LFASS category A land. The payment rate is estimated at €70/ewe hogg annually, but actual payment rates will be determined by the number of hogg applications each year. The full payment is made in the summer following the year when the claim is made. This support has not been included in the 2021/22 budget gross margins due to the specific nature of scheme eligibility. See Rural Aid Schemes, page 489 for more details.

General Reference Data

Sheep feeding

Suggested daily rations (kg fresh matter) for Scottish Blackface ewes (60 kg lwt) during pregnancy using average quality baled silage (DM 300g/kg, ME 10.5MJ/kg DM) and hay (DM 830g/kg, ME 8.3MJ/kg DM).

| Weeks before lambing | Single-bearing ewes | | Twin-bearing ewes | |
|----------------------|---------------------|---------------------|-------------------|---------------------|
| | <i>Silage</i> | <i>Concentrates</i> | <i>Silage</i> | <i>Concentrates</i> |
| 8 | 2.8 | 0 | 2.8 | 0 |
| 6 | 2.8 | 0 | 2.7 | 0.15 |
| 4 | 2.7 | 0.25 | 2.5 | 0.35 |
| 2 | 2.6 | 0.35 | 2.3 | 0.45 |
| | <i>Hay</i> | <i>Concentrates</i> | <i>Hay</i> | <i>Concentrates</i> |
| 8 | 1.1 | 0 | 1.1 | 0.1 |
| 6 | 1 | 0.15 | 1 | 0.4 |
| 4 | 0.9 | 0.4 | 0.8 | 0.6 |
| 2 | 0.85 | 0.55 | 0.7 | 0.8 |

Suggested daily rations (kg fresh matter) for crossbred ewes (e.g., mule, 75 kg lwt) during pregnancy using average quality baled silage (DM 300 g/kg, ME 10.5 MJ/kg DM) and hay (DM 830 g/kg, ME 8.3 MJ/kg DM).

| Weeks before lambing | Single-bearing ewes | | Twin-bearing ewes | |
|----------------------|---------------------|---------------------|-------------------|---------------------|
| | <i>Silage</i> | <i>Concentrates</i> | <i>Silage</i> | <i>Concentrates</i> |
| Mid-pregnancy | 2.8 * | 0 | 3 * | 0 |
| 8 | 3.3 | 0 | 3.2 | 0.15 |
| 6 | 3.2 | 0.1 | 3 | 0.35 |
| 4 | 3.1 | 0.25 | 2.8 | 0.5 |
| 2 | 3 | 0.4 | 2.7 | 0.75 |

| | <i>Hay</i> | <i>Concentrates</i> | <i>Hay</i> | <i>Concentrates</i> |
|---------------|------------|---------------------|------------|---------------------|
| Mid-pregnancy | 1 * | 0 | 1.1 * | 0 |
| 8 | 1.3 | 0 | 1.4 | 0.15 |
| 6 | 1.3 | 0.15 | 1.2 | 0.35 |
| 4 | 1.2 | 0.35 | 1.1 | 0.65 |
| 2 | 1.1 | 0.6 | 0.8 | 1 |

* restricted amount fed. Requirements in mid-pregnancy can also be met with grazed grass or forage crops such as swedes or fodder beet.

Concentrates based on high quality compound, e.g. ME 12.5 MJ/kg DM and 18% CP (fresh basis). Farmers lambing their flocks from mid-April can meet the pregnant ewe's requirements on well managed grass alone.

Wool

Due to the manufacturing industry closing overnight due to the covid pandemic, in the midst of the wool trading season, the 2020 wool clip held very little value. Trading was moved to online and the large stockpile of wool started to move slowly. Now in 2021, the British Wool Board is unable to pay an advance on this year's wool clip. Payment for delivery of this wool, will be made when the 2022 wool is sent to the depot. However, producers will be paid the balance of their 2020 wool clip if this was submitted.

Deductions are usually made for haulage, but for 2021 British Wool announced all onward carriage fees at all approved collection sites would be abolished. For more details of wool prices, charges, collection centres and grading depots, please contact the BWMB (www.britishwool.org.uk).

Extensive Hill

PHYSICAL DATA

| Breeds | Blackface, South Country & Lairg type Cheviot | | |
|---------------------------|---|-------|-------|
| | Lambs reared (%) | | |
| | 70% | 85% | 100% |
| Ewe hoggs wintered | Away | Away | Away |
| Lamb crops per ewe (avg) | 4 | 4 | 4 |
| Ram flock life (seasons) | 3 | 3 | 3 |
| | /100 ewes tupped | | |
| Rams (no.) | 3 | 3 | 3 |
| Lamb numbers: | | | |
| marked | 73 | 88 | 103 |
| sold/retained | 70 | 85 | 100 |
| sold: finished lambs | 0 | 0 | 0 |
| store lambs | 44 | 59 | 74 |
| flock replacement | 26 | 26 | 26 |
| Ewe numbers: | | | |
| draft/cast | 14 | 15 | 16 |
| mortalities | 12 | 11 | 10 |
| Wool sales (kg) | 160 | 160 | 160 |
| Concentrate feeding (kg) | 1,800 | 1,900 | 2,000 |
| Hay reserve (/annum) (kg) | 2,000 | 2,000 | 2,000 |

Basis of data:

1. Lambs are assumed sold at or by the autumn sales 2021 (estimated price).
2. Lambing percentage reflects the range of performance found.
3. Mortality in ewe hoggs is assumed to be 3%.
4. Ewe concentrate feeding – 18% CP, ideally a balanced compound with feeding of ewes selected on the basis of scanning results. Assumes self-feed blocks are used on less accessible hills although expensive per unit of energy, ME range 8.5 to 12 MJ/kg DM, total block intake can range from 25-100 blocks/100 ewes.
5. Higher performance can result from better winter nutrition and provision of improved summer grazing for selected ewes, particularly those nursing twins.
6. Grazing is not charged.
7. Hay bought in.

Extensive Hill

GROSS MARGIN DATA

| | | | Lambs reared (%) | | |
|----------------------------|---|-----|-------------------|--------------|--------------|
| | | | 70% | 85% | 100% |
| OUTPUT | | | £/100 ewes tupped | | |
| Store Lambs | 44 @ | £51 | 2,244 | - | - |
| | 59 @ | £51 | - | 3,009 | - |
| | 74 @ | £51 | - | - | 3,774 |
| Draft/cast ewes: | 14 @ | £55 | 770 | - | - |
| | 15 @ | £55 | - | 825 | - |
| | 16 @ | £55 | - | - | 880 |
| Wool sales 160kg @ £0.1/kg | | | 16 | 16 | 16 |
| | | | 3,030 | 3,850 | 4,670 |
| Less: | ram replacement (net) | | 350 | 350 | 350 |
| | | | <u>2,680</u> | <u>3,500</u> | <u>4,320</u> |
| VARIABLE COSTS | | | | | |
| | Sheep feed @ £260/t | | 468 | 494 | 520 |
| | Away wintering ewe hoggs at £21/head (inc. haulage) | | 546 | 546 | 546 |
| | Vet, medicines & dips | | 469 | 477 | 486 |
| | Commission, levies, haulage, shearing, scanning & tags | | 519 | 608 | 697 |
| | | | <u>2,002</u> | <u>2,125</u> | <u>2,249</u> |
| | Gross margin before forage | | <u>678</u> | <u>1,375</u> | <u>2,071</u> |
| | Forage variable costs: | | | | |
| | hay @ £200/tonne | | 400 | 400 | 400 |
| | Total Variable Costs | | <u>2,402</u> | <u>2,525</u> | <u>2,649</u> |
| | GROSS MARGIN | | <u>278</u> | <u>975</u> | <u>1,671</u> |

Sensitivity-Change ±

| | |
|--------------------------------|-----|
| £5/hd in all lamb sales | 220 |
| £5/hd in draft ewe price | 70 |
| £10/tonne in concentrate price | 18 |
| 10% in lambing rearing rate | 224 |

Change in Gross Margin/100 ewes (£)

| | | |
|-----|-----|-----|
| 220 | 295 | 370 |
| 70 | 75 | 80 |
| 18 | 19 | 20 |
| 224 | 301 | 377 |

Improved Hill

PHYSICAL DATA

| | | | |
|---|--|-------------|-------------|
| Breeds | Hill breeds inc Blackface hill type, NCC | | |
| Lambing period | Assumed to commence 2nd week April | | |
| | Lambs reared (%) | | |
| | 110% | 120% | 130% |
| | Home | Home | Home |
| Ewe hoggs wintered | | | |
| Lamb crops per ewe | 4 | 4 | 4 |
| Ram flock life (seasons) | 3 | 3 | 3 |
| | /100 ewes tupped | | |
| Rams (no.) | 3 | 3 | 3 |
| Lamb numbers: | | | |
| marked | 113 | 123 | 133 |
| sold/retained | 110 | 120 | 130 |
| sold: ewe lambs | 10 | 20 | 30 |
| finished lambs | 10 | 20 | 30 |
| store lambs | 62 | 52 | 42 |
| flock replacement | 28 | 28 | 28 |
| Ewe numbers: | | | |
| draft/cast | 14 | 15 | 16 |
| mortalities | 10 | 9 | 8 |
| Ewe hoggs purchased | 0 | 0 | 0 |
| Wool sales (kg) | 250 | 250 | 250 |
| Concentrate feeding (kg) | 4,500 | 5,000 | 5,500 |
| Silage (ha) | 2 | 2 | 2 |
| Hay reserve (/annum) (kg) | 0 | 0 | 0 |
| Bedding straw - 6wk period (kg/day) | 80 | 80 | 80 |
| Improved permanent pasture assumed (ha) | 7.0 | 7.0 | 7.0 |

Basis of data:

1. Estimate of stock prices autumn/early winter 2021.
2. Finished lambs – assume 36 kg liveweight (16-17 kg carcass weight).
3. Ewes are first tupped as gimmers.
4. Ewe concentrate feeding – ideally a balanced compound 18% CP.
5. Approximately 14 ewes/hectare on improved pasture (125kg N/ha, see Grassland-Grazing section, page 80) assumed alongside hill grazing (not costed) and silage aftermath (70kg N/ha, one cut, see Grassland Silage and Aftermath, page 82).
6. Straw bedding based on 80 kg/day for 100 ewes housed over a 6-week lambing period.
7. Silage yield and quality 6t DM/ha; ME 10.5 MJ/kg DM.

Improved Hill

GROSS MARGIN DATA

| | | Lambs reared (%) | | |
|---|---------------------|--------------------------|-------------|-------------|
| | | 110% | 120% | 130% |
| OUTPUT | | £/100 ewes tugged | | |
| Ewe lambs: | 10 @ £95 | 950 | - | - |
| | 20 @ £95 | - | 1,900 | - |
| | 30 @ £95 | - | - | 2,850 |
| Finished lambs: | 10 @ £75 (36kg lwt) | 750 | - | - |
| | 20 @ £75 | - | 1,500 | - |
| | 30 @ £75 | - | - | 2,250 |
| Store lambs: | 62 @ £50 | 3,100 | - | - |
| | 52 @ £50 | - | 2,600 | - |
| | 42 @ £50 | - | - | 2,100 |
| Draft/cast ewes: | 14 @ £55 | 770 | 770 | 770 |
| Wool sales 250kg @ £0.1/kg | | 25 | 25 | 25 |
| | | 5,595 | 6,795 | 7,995 |
| Less: ram replacement (net) | | 400 | 400 | 400 |
| | | 5,195 | 6,395 | 7,595 |
| VARIABLE COSTS | | | | |
| Sheep feed @ £260/t | | 1,170 | 1,300 | 1,430 |
| Vet, medicines & dips | | 597 | 606 | 614 |
| Bedding straw @ £90/t (bought-in) | | 302 | 302 | 302 |
| Commission, levies, haulage, shearing, scanning & tags | | 758 | 844 | 931 |
| | | 2,827 | 3,052 | 3,277 |
| Gross margin before forage | | 2,368 | 3,343 | 4,318 |
| Forage variable costs: | | | | |
| 2 ha silage @ £224/ha | | 448 | 448 | 448 |
| improved permanent pasture @ £184/ha | | 1,288 | 1,288 | 1,288 |
| | | 1,736 | 1,736 | 1,736 |
| Total Variable Costs | | 4,563 | 4,788 | 5,013 |
| GROSS MARGIN | | 632 | 1,607 | 2,582 |
| GROSS MARGIN per forage ha | | 70 | 179 | 287 |

| Sensitivity-Change ± | Change in Gross Margin/100 ewes (£) | | |
|------------------------------------|--|-----|-----|
| 10 p/kg lwt in finished lamb price | 35 | 69 | 104 |
| £5/hd in all lamb sales | 410 | 460 | 510 |
| £5/hd in cast ewe price | 70 | 70 | 70 |
| 10% lamb rearing rate | 480 | 600 | 720 |

Draft Blackface Ewes

PHYSICAL DATA

| | | | |
|--|--|-------------|-------------|
| Breeds | Draft Blackface to a terminal or crossing sire | | |
| Lambing period | Commencing mid-March | | |
| | Lambs reared (%) | | |
| | 130% | 140% | 150% |
| Ewe flock life (seasons) | 1.5 | 1.5 | 1.5 |
| Ram flock life (seasons) | 3 | 3 | 3 |
| | /100 ewes tupped | | |
| Rams (no.) | 2.5 | 2.5 | 2.5 |
| Lamb numbers: | | | |
| marked | 133 | 143 | 153 |
| sold/retained | 130 | 140 | 150 |
| sold: | | | |
| store | 13 | 14 | 15 |
| finished | 52 | 56 | 60 |
| breeding | 65 | 70 | 75 |
| Ewe numbers: | | | |
| sales | 64 | 64 | 64 |
| mortalities | 3 | 3 | 3 |
| purchased | 67 | 67 | 67 |
| Wool sales (kg) | 250 | 250 | 250 |
| Concentrate use: | | | |
| Ewe concentrate: ME 12.5 MJ/kg, 18% CP (kg) | 5,500 | 6,000 | 6,500 |
| Forage: hay - 12,600 kg and | | | |
| aftermath grazing (ha) | 2.5 | 2.5 | 2.5 |
| grazing (ha) | 7.0 | 7.0 | 7.0 |
| Total forage (ha) | <u>9.5</u> | <u>9.5</u> | <u>9.5</u> |
| Bedding straw (kg/day) | 80 | 80 | 80 |

Basis of data:

1. This enterprise often supplies ewe lambs for a crossbred flock enterprise on farm, therefore all ewe lambs might be kept. Estimated breeding stock prices, autumn, help determine the value of this.
2. Estimate of finished and store lamb prices, summer and autumn 2021.
3. Silage yield and quality 6 t DM/ha; ME 10.5 MJ/kg DM.
4. Liveweight of lambs at sale: 36 kg, 32 kg store or sold as ewe lambs for breeding.
5. Straw bedding based on 80 kg/day for 100 ewes housed over a 6-week lambing period.
6. Approximately 14 ewes/hectare on improved pasture (125kg N/ha, see Grassland-Grazing section, page 80) assumed alongside hill grazing (not costed) and silage aftermath (70kg N/ha, one cut, see Grassland Silage and Aftermath, page 82).

Draft Blackface Ewes

GROSS MARGIN DATA

| OUTPUT | Lambs reared (%) | | |
|---|--------------------------|--------|--------|
| | 130% | 140% | 150% |
| | £/100 ewes tupped | | |
| Ewe lambs: 65 @ £95 | 6,175 | - | - |
| 70 @ £95 | - | 6,650 | - |
| 75 @ £95 | - | - | 7,125 |
| Finished lambs: 13 @ £75 (36 kg lwt) | 975 | - | - |
| 14 @ £75 (36 kg lwt) | - | 1,050 | - |
| 15 @ £75 (36 kg lwt) | - | - | 1,125 |
| Store lambs: 52 @ £50 | 2,600 | - | - |
| 56 @ £50 | - | 2,800 | - |
| 60 @ £50 | - | - | 3,000 |
| Cast ewes: 64 @ £55 | 3,520 | 3,520 | 3,520 |
| Wool sales 250kg @ £0.1/kg | 25 | 25 | 25 |
| | 13,295 | 14,045 | 14,795 |
| Less: ewes purchased - 67 @ £66 | 4,422 | 4,422 | 4,422 |
| ram replacement (net) | 354 | 542 | 542 |
| | 8,519 | 9,081 | 9,831 |
| VARIABLE COSTS | | | |
| Ewe concentrate @ £260/t | 1,430 | 1,560 | 1,690 |
| Vet, medicines & dips | 635 | 643 | 652 |
| Bedding straw @ £90/t (bought-in) | 302 | 302 | 302 |
| Commission, levies, haulage, shearing, scanning & tags | 1,365 | 1,426 | 1,487 |
| | 3,732 | 3,931 | 4,131 |
| Gross margin before forage | 4,787 | 5,150 | 5,700 |
| Forage variable costs: | | | |
| silage @ £224/ha | 560 | 560 | 560 |
| grazing @ £184/ha | 1,288 | 1,288 | 1,288 |
| Total Variable Costs | 5,580 | 5,779 | 5,979 |
| GROSS MARGIN | 2,939 | 3,302 | 3,852 |
| GROSS MARGIN per forage ha | 309 | 348 | 405 |

Sensitivity-Change ±

Change in Gross Margin/100 ewes (£)

| | | | |
|-------------------------------|-----|-------|-------|
| £5/hd in store lamb price | 260 | 280 | 300 |
| £5/hd in breeding stock value | 325 | 350 | 375 |
| £5/hd in cast ewe price | 320 | 320 | 320 |
| £5/hd in ewe purchase price | 335 | 335 | 335 |
| 10% lamb rearing rate | 975 | 1,050 | 1,125 |

Crossbred Ewes

PHYSICAL DATA

| | | | |
|---|--|-------------|-------------|
| Breeds | Large crossbred (75-85kg) e.g. Scotch Mule, Mule-cross | | |
| Breed of ram | Terminal Sire | | |
| Lambing period | Commencing early April | | |
| | Lambs reared (%) | | |
| Lambing period | 140% | 160% | 170% |
| Lamb crops per ewe (avg) | 4.5 | 4.5 | 4.5 |
| Ram flock life (seasons) | 3 | 3 | 3 |
| | /100 ewes tupped | | |
| Rams (no.) | 2.5 | 2.5 | 2.5 |
| Lamb numbers: | | | |
| marked | 142 | 162 | 182 |
| sold/retained | 140 | 160 | 180 |
| sold: finished lambs | 120 | 140 | 160 |
| store lambs | 20 | 20 | 20 |
| Ewe numbers: | | | |
| culls | 17 | 17 | 17 |
| mortalities | 5 | 5 | 5 |
| gimmers purchased | 25 | 25 | 25 |
| Wool sales - ewes, rams & hoggs (kg) | 270 | 270 | 270 |
| Ewe concentrate: ME 12.5 MJ/kg DM, 18% CP (kg) | 5,000 | 6,000 | 7,000 |
| Forage: improved grazing (ha) | 10.0 | 10.0 | 10.0 |
| silage (ha) | 2 | 2 | 2 |
| Total forage (ha) | <u>12</u> | <u>12</u> | <u>12</u> |
| Bedding straw (kg/day) | 80 | 80 | 80 |

Basis of data:

1. Estimates of gimmer, finished and store lamb and cast ewe prices 2021. Finished lambs at 42 kg, store 34 kg.
2. Bedding straw based on 80 kg/day for 100 ewes housed over a 6-week lambing period. This can be deducted if no housing required.
3. Modern rams are capable of running at 80/100:1 in lowland flocks, stocked tightly.
4. Approximately 14 ewes/hectare on improved pasture (125kg N/ha, see Grassland-Grazing section, page 80) assumed alongside hill grazing (not costed) and silage aftermath (70kg N/ha, one cut, see Grassland Silage and Aftermath, page 82)
5. Silage yield and quality 6 t DM/ha; ME 10.5 MJ/kg DM.
6. Concentrate feeding will vary; systems with higher silage quality and better pasture utilisation will use less concentrates.

Crossbred Ewes

GROSS MARGIN DATA

OUTPUT

| | Lambs reared (%) | | |
|---|-------------------|---------------|---------------|
| | 150% | 160% | 170% |
| | £/100 ewes tupped | | |
| Finished lambs: 120 @ £84 (42kg lwt) | 10,080 | - | - |
| 140 @ £84 | - | 11,760 | - |
| 160 @ £84 | - | - | 13,440 |
| Store lambs: 20 @ £59 | 1,180 | - | - |
| 20 @ £59 | - | 1,180 | - |
| 20 @ £59 | - | - | 1,180 |
| Cast ewes: 17 @ £80 | 1,360 | 1,360 | 1,360 |
| Wool sales 270kg @ £0.15/kg | 41 | 41 | 41 |
| | <u>12,661</u> | <u>14,341</u> | <u>16,021</u> |
| Less: gimmers purchased - 25 @ £150 | 3,750 | 3,750 | 3,750 |
| ram replacement (net) | 500 | 500 | 500 |
| | <u>8,411</u> | <u>10,091</u> | <u>11,771</u> |
| VARIABLE COSTS | | | |
| Ewe concentrate @ £260/t | 1,300 | 1,560 | 1,820 |
| Vet, medicines & dips | 714 | 722 | 731 |
| Bedding straw @ £90/t (bought-in) | 302 | 302 | 302 |
| Commission, levies, haulage, shearing, scanning & tags | 1,215 | 1,344 | 1,472 |
| | <u>3,531</u> | <u>3,928</u> | <u>4,325</u> |
| Gross margin before forage | <u>4,880</u> | <u>6,163</u> | <u>7,446</u> |
| Forage variable costs: | | | |
| silage @ £224/ha | 448 | 448 | 448 |
| grazing @ £184/ha | 1,840 | 1,840 | 1,840 |
| Total Variable Costs | <u>5,819</u> | <u>6,216</u> | <u>6,613</u> |
| GROSS MARGIN | <u>2,592</u> | <u>3,875</u> | <u>5,158</u> |
| GROSS MARGIN per forage ha | 216 | 323 | 430 |

Sensitivity-Change ±

Change in Gross Margin/100 ewes (£)

| | | | |
|-----------------------------|-------|-------|-------|
| £5/hd in all lamb sales | 700 | 800 | 900 |
| £5/hd in cast ewe price | 85 | 85 | 85 |
| £5/hd in gimmer price | 125 | 125 | 125 |
| 10% lamb rearing rate | 1,126 | 1,294 | 1,462 |
| 30% change in stocking rate | 552 | 552 | 552 |

Pure Maternal Flock

PHYSICAL DATA

Breeds Mid-sized (60-70kg) e.g. Lleyn, Romney, Aberfield, Easycare
 Lambing period March-April

| | Lambs reared (%) | | |
|---|------------------|-------|-------|
| | 140% | 160% | 180% |
| Lamb crops per ewe | 4.5 | 4.5 | 4.5 |
| Ram flock life (seasons) | 3 | 3 | 3 |
| | /100 ewes tupped | | |
| Rams (no.) | 2.5 | 2.5 | 2.5 |
| Lamb numbers: | | | |
| marked | 142 | 162 | 182 |
| sold/retained | 140 | 160 | 180 |
| sales: | | | |
| ewe lambs | 25 | 35 | 45 |
| finished lambs | 74 | 82 | 90 |
| store lambs | 16 | 18 | 20 |
| flock replacements | 25 | 25 | 25 |
| Ewe numbers: | | | |
| culls | 18 | 18 | 18 |
| mortalities | 4 | 4 | 4 |
| gimmers purchased | - | - | - |
| Wool sales (kg) | 270 | 270 | 270 |
| Ewe concentrate: ME 12.5 MJ/kg, 18%CP (kg) | 2,000 | 3,000 | 4,000 |
| Forage: grazing (ha) | 7.0 | 7.0 | 7.0 |
| silage (ha) | 2.0 | 2.0 | 2.0 |
| Total forage (ha) | 9 | 9 | 9 |
| Bedding straw (kg/day) | 80 | 80 | 80 |

Basis of data:

1. Estimate of ewe lamb, finished and store lamb prices, cast ewe prices, summer and autumn 2021.
2. Finished lambs liveweight at sale, 38 kg, store lambs 32 kg.
3. Bedding straw based on 80 kg/day housed over a 6-week period. This can be deducted if no housing required.
4. Modern rams can run at 80/100:1 in lowland flocks, stocked tightly.
5. Approximately 14 ewes/hectare on improved pasture (125kg N/ha, see Grassland-Grazing section, page 80) assumed alongside hill grazing (not costed) and silage aftermath (70kg N/ha, one cut, see Grassland Silage and Aftermath, page 82).
6. Silage yield and quality 6 t DM/ha; ME 10.5 MJ/kg DM.
7. Concentrate feeding will vary; systems with higher silage quality and better pasture utilisation will use less concentrates.

Pure Maternal Flock

GROSS MARGIN DATA

| OUTPUT | Lambs reared (%) | | |
|---|-------------------|---------------|---------------|
| | 140% | 160% | 180% |
| | £/100 ewes tupped | | |
| Ewe lambs: 25 @ £95 | 2,375 | - | - |
| 35 @ £95 | - | 3,325 | - |
| 45 @ £95 | - | - | 4,275 |
| Finished lambs: 74 @ £74 (38kg lwt) | 5,476 | - | - |
| 82 @ £74 | - | 6,068 | - |
| 90 @ £74 | - | - | 6,660 |
| Store lambs: 16 @ £56 | 896 | - | - |
| 18 @ £56 | - | 1,008 | - |
| # @ £56 | - | - | 1,120 |
| Draft/cast ewes: 18 @ £60 | 1,080 | 1,080 | 1,080 |
| Wool sales 270kg @ £0.15/kg | 41 | 41 | 41 |
| (add £290/100 ewes for Romney wool) | 9,868 | 11,522 | 13,176 |
| Less: ram replacement (net) | 542 | 542 | 542 |
| | <u>9,326</u> | <u>10,980</u> | <u>12,634</u> |
| VARIABLE COSTS | | | |
| Barley, protein & minerals @ £260/t | 520 | 780 | 1,040 |
| Vet, medicines & dips | 804 | 814 | 823 |
| Bedding straw @ £90/t (bought-in) | 302 | 302 | 302 |
| Commission, levies, haulage, shearing, scanning & tags | 1,008 | 1,136 | 1,263 |
| | <u>2,634</u> | <u>3,032</u> | <u>3,428</u> |
| Gross margin before forage | <u>6,692</u> | <u>7,948</u> | <u>9,206</u> |
| Forage variable costs: | | | |
| silage @ £224/ha | 448 | 448 | 448 |
| grazing @ £184/ha | 1,288 | 1,288 | 1,288 |
| | <u>1,736</u> | <u>1,736</u> | <u>1,736</u> |
| Total Variable Costs | <u>4,370</u> | <u>4,768</u> | <u>5,164</u> |
| GROSS MARGIN | <u>4,956</u> | <u>6,212</u> | <u>7,470</u> |
| GROSS MARGIN per forage ha | 551 | 690 | 830 |

Sensitivity-Change ±

Change in Gross Margin/100 ewes (£)

| | | | |
|-----------------------------|-----|------|------|
| £5/hd in all lamb sales | 575 | 675 | 775 |
| £5/hd in cast ewe price | 90 | 90 | 90 |
| 10% lamb rearing rate | 875 | 1040 | 1206 |
| 30% change in stocking rate | 386 | 386 | 386 |

Early Finished Lamb Production

PHYSICAL DATA

| | | | |
|--|--|---------------|---------------|
| Breeds | Suffolk/Continental cross ewe to terminal sire | | |
| Lambing period | Mid-December to end January | | |
| | Lambs reared (%) | | |
| | 140% | 160% | 180% |
| Lamb crops per ewe (avg) | 5 | 5 | 5 |
| Ram flock life (seasons) | 3 | 3 | 3 |
| | /100 ewes tupped | | |
| Rams (no.) | 2.5 | 2.5 | 2.5 |
| Lamb numbers: | | | |
| marked | 143 | 163 | 183 |
| sold finished | 140 | 160 | 180 |
| Lamb liveweight at slaughter (kg) | 40 | 40 | 40 |
| Lamb deadweight at slaughter (kg) | 19 | 19 | 19 |
| Ewe numbers: | | | |
| culls | 18 | 18 | 18 |
| mortalities | 4 | 4 | 4 |
| gimmers purchased | 26 | 26 | 26 |
| Wool sales - ewes, rams & hogs (kg) | 270 | 270 | 270 |
| Concentrate use: | | | |
| ewe concentrate: ME 12.5 MJ/kg, 18% CP (kg) | 5,000 | 6,000 | 7,000 |
| lamb concentrate (kg) | 4,000 | 5,000 | 6,000 |
| Total concentrate (kg) | <u>9,000</u> | <u>11,000</u> | <u>13,000</u> |
| Forage: silage (ha) | 2.4 | 2.4 | 2.4 |
| grazing (ha) | 5.6 | 5.6 | 5.6 |
| Total forage (ha) | <u>8.0</u> | <u>8.0</u> | <u>8.0</u> |
| Bedding straw (kg/day) | 80 | 80 | 80 |

Basis of data:

1. Breeding stock prices, autumn 2021.
2. Finished lamb prices, June average.
3. Bedding straw based on 80 kg/day for 100 ewes housed over a 12-week housing period.
4. Modern rams are capable of running at 80/100:1 in lowland flocks, stocked tightly.
5. Ewes housed over winter. Lambs creep fed at grass
6. Approximately 18 ewes/hectare on improved pasture (125kg N/ha, see Grassland-Grazing section, page 80) assumed alongside silage aftermath (70kg N/ha, one cut, see Grassland Silage and Aftermath, page 82).

Early Finished Lamb Production

GROSS MARGIN DATA

| OUTPUT | Lambs reared (%) | | |
|---|--|--------|--------|
| | 140% | 160% | 180% |
| | £/100 ewes tupped | | |
| Finished lambs 140 @ £97 (40 kg lwt) | 13,580 | - | - |
| 160 @ £97 | - | 15,520 | - |
| 180 @ £97 | - | - | 17,460 |
| Cast ewes: 18 @ £73 | 1,314 | 1,314 | 1,314 |
| Wool sales 270kg @ £0.15/kg | 41 | 41 | 41 |
| | <hr/> | <hr/> | <hr/> |
| | 14,935 | 16,875 | 18,815 |
| Less: gimmers purchased - 26 @ £150 | 3,900 | 3,900 | 3,900 |
| ram replacement (net) | 500 | 500 | 500 |
| | <hr/> | <hr/> | <hr/> |
| | 10,535 | 12,475 | 14,415 |
| VARIABLE COSTS | | | |
| Barley, protein & minerals @ £260/t | 1,300 | 1,560 | 1,820 |
| Lamb concentrate @ £260/t | 1,040 | 1,300 | 1,560 |
| Vet, medicines & dips | 612 | 613 | 614 |
| Bedding straw @ £90/t (home-grown) | 605 | 605 | 605 |
| Commission, levies, haulage, shearing, scanning & tags | 1,310 | 1,448 | 1,588 |
| | <hr/> | <hr/> | <hr/> |
| | 4,867 | 5,526 | 6,187 |
| Gross margin before forage | <hr/> | <hr/> | <hr/> |
| | 5,668 | 6,949 | 8,228 |
| Forage variable costs: | | | |
| silage @ £224/ha | 538 | 538 | 538 |
| grazing @ £184/ha | 1,030 | 1,030 | 1,030 |
| Total Variable Costs | <hr/> | <hr/> | <hr/> |
| | 6,435 | 7,094 | 7,755 |
| GROSS MARGIN | <hr/> | <hr/> | <hr/> |
| | 4,100 | 5,381 | 6,660 |
| GROSS MARGIN per forage ha | <hr/> | <hr/> | <hr/> |
| | 513 | 673 | 833 |
| Sensitivity-Change ± | | | |
| | Change in Gross Margin/100 ewes (£) | | |
| 10 p/kg lwt in finished lamb price | 538 | 614 | 691 |
| £5/hd in cast ewe price | 90 | 90 | 90 |
| £5/hd in gimmer price | 130 | 130 | 130 |
| £10/tonne concentrate price | 90 | 110 | 130 |
| 10% lamb rearing rate | 1,358 | 1,552 | 1,746 |

Low Cost System

PHYSICAL DATA

| | | | |
|------------------------------------|--|--------------|--------------|
| Breeds | Mid-sized (60-70 kg) Maternal bred ewe | | |
| Lambing period | late April/May | | |
| | Lambs reared (%) | | |
| | 140% | 150% | 160% |
| Lamb crops per ewe | 4.5 | 4.5 | 4.5 |
| Ram flock life (seasons) | 3 | 3 | 3 |
| | /100 ewes tupped | | |
| Rams (no.) | 2.0 | 2.0 | 2.0 |
| Lamb numbers: | | | |
| marked | 144 | 154 | 164 |
| sold/retained | 140 | 150 | 160 |
| sales: | | | |
| ewe lambs | 10 | 20 | 30 |
| finished lambs | 68 | 68 | 68 |
| store lambs | 40 | 40 | 40 |
| Ewe numbers: | | | |
| culls | 18 | 18 | 18 |
| mortalities | 4 | 4 | 4 |
| Wool sales (kg) | 270 | 270 | 270 |
| Concentrate use: | | | |
| barley/SBP to ewes at tupping (kg) | 400 | 400 | 400 |
| lamb finishing supplement (kg) | 750 | 750 | 750 |
| Total barley and concentrate (kg) | <u>1,150</u> | <u>1,150</u> | <u>1,150</u> |
| Forage: grazing (ha) | 8.5 | 8.5 | 8.5 |
| silage aftermath (ha) | 1.7 | 1.7 | 1.7 |
| Total forage (ha) | <u>10.2</u> | <u>10.2</u> | <u>10.2</u> |

Basis of data:

1. Breeding stock price estimates, autumn.
2. Estimate of finished and store lamb prices, autumn.
3. Lambs sold finished October/November, store September/October.
4. Wool shedding breeds can reduce costs further.
5. Liveweight of lambs at sale: 38 kg.
6. Modern rams are capable of running at 80/100:1 in lowland flocks, stocked tightly.
7. Minimal targeted late pregnancy feeding to triplet-bearing ewes, with some feed in reserve for extreme weather. Hoggs should be trained to eat concentrates.
8. Approximately 12 ewes/ha on improved pasture (125kg N/ha, see Grassland-Grazing section, page 80) assumed alongside silage aftermath (70kg N/ha, one cut, see Grassland Silage and Aftermath, page 82).

Low Cost System

GROSS MARGIN DATA

| | | Lambs reared (%) | | |
|--|---------------------|-------------------|--------|--------|
| | | 140% | 150% | 160% |
| OUTPUT | | £/100 ewes tupped | | |
| Ewe lambs | 10 @ £95 | 950 | - | - |
| | 20 @ £95 | - | 1,900 | - |
| | 30 @ £95 | - | - | 2,850 |
| Finished lambs: | 68 @ £74 (38kg lwt) | 5,032 | - | - |
| | 68 @ £74 | - | 5,032 | - |
| | 68 @ £74 | - | - | 5,032 |
| Store lambs: | 40 @ £52 | 2,080 | - | - |
| | 40 @ £52 | - | 2,080 | - |
| | 40 @ £52 | - | - | 2,080 |
| Draft/cast ewes: | 18 @ £60 | 1,080 | 1,080 | 1,080 |
| Wool sales 270kg @ £0.15/kg | | - | - | - |
| | | 9,142 | 10,092 | 11,042 |
| Less: ram replacement (net) | | 433 | 433 | 433 |
| | | 8,709 | 9,659 | 10,609 |
| VARIABLE COSTS | | | | |
| Barley & mineralised SBP @ £260/t | | 104 | 104 | 104 |
| Lamb finishing pellets @ £260/t | | 195 | 195 | 195 |
| Vet, medicines & dips | | 479 | 488 | 497 |
| Commission, levies, haulage, scanning & tags | | 914 | 982 | 1,051 |
| | | 1,692 | 1,769 | 1,847 |
| Gross margin before forage | | 7,017 | 7,890 | 8,762 |
| Forage variable costs: | | | | |
| silage @ £224/ha | | 381 | 381 | 381 |
| grazing @ £184/ha | | 1,564 | 1,564 | 1,564 |
| | | 1,945 | 1,945 | 1,945 |
| Total Variable Costs | | 3,637 | 3,714 | 3,792 |
| GROSS MARGIN | | 5,072 | 5,945 | 6,817 |
| GROSS MARGIN per forage ha | | 497 | 583 | 668 |

| Sensitivity-Change ± | Change in Gross Margin/100 ewes (£) | | |
|------------------------------------|-------------------------------------|-----|-----|
| 10 p/kg lwt in finished lamb price | 248 | 248 | 248 |
| £5/hd in all lamb sales | 590 | 640 | 690 |
| £5/hd in cast ewe price | 90 | 90 | 90 |
| 10% lamb rearing rate | 806 | 901 | 996 |
| 30% change in stocking rate | 584 | 584 | 584 |

Gimmering

PHYSICAL DATA

Breeds

System

Ewe lambs purchased in autumn, wintered on swedes and hay, grazed tightly in summer and sold as gimmers in autumn

| | /100 sheep |
|---------------------------|-------------------|
| Mortalities (no.) | 2 |
| Wool sales (kg) | 270 |
| Concentrate use: | |
| Barley (kg) | 0 |
| Forage: hay-5,000 kg (ha) | 1.5 |
| swedes (ha) | 2.5 |
| grazing (ha) | 5.0 |
| Total forage (ha) | <u>9.0</u> |

Basis of data:

1. Ewe lamb price, autumn.
2. Estimate of gimmer price, autumn.
3. Silage yield and quality 6 t DM/ha; ME 10.5 MJ/kg DM.
4. Silage and aftermath grazing.
5. Yield of swedes 75 t/ha. See page 108-109 for swede production costs.
6. Opportunity to rear gimmers on a contract basis or mate the ewe lambs and keep or sell progeny
7. Approximately 20 ewes/ha on improved pasture (125kg N/ha, see Grassland-Grazing section, page 80) assumed alongside silage aftermath (70kg N/ha, one cut, see Grassland Silage and Aftermath, page 82).

Gimmering

GROSS MARGIN DATA

| | £/100 sheep |
|--|--------------------|
| OUTPUT | |
| Crossbred gimmers: 98 @ £150 | 14,700 |
| Wool sales 270kg @ £0.15/kg | 41 |
| | <hr/> |
| | 14,741 |
| <i>Less:</i> Crossbred ewe lambs purchased - 100 @ £95 | 9,500 |
| | <hr/> |
| | 5,241 |
| VARIABLE COSTS | |
| Concentrates - barley & minerals @ £260/t | - |
| Vet, medicines & dips | 328 |
| Commission, levies, haulage, shearing, scanning & tags | 1,197 |
| | <hr/> |
| | 1,525 |
| | <hr/> |
| Gross margin before forage | 3,716 |
| Forage variable costs: | |
| silage @ £224/ha | 336 |
| swedes @ £162/ha | 405 |
| grazing @ £184/ha | 920 |
| | <hr/> |
| Total Variable Costs | 3,186 |
| | <hr/> |
| GROSS MARGIN | 2,055 |
| | <hr/> |
| GROSS MARGIN per forage ha | 228 |

| Sensitivity-Change ± | Change in Gross Margin/100 sheep (£) |
|-----------------------------|---|
| £5/hd in sale price | 490 |

Short Keep Lambs - Winter Finishing on Rape

PHYSICAL DATA

| | | |
|------------------------------------|--|-------------------|
| System | Store lambs purchased in September/October, sold finished November/December | |
| Grazing period: range, low to high | | |
| stocking period (days) | | 45-75 |
| average (days) | | 55 |
| Stocking rate: range (no./ha) | | 40-60 |
| average (no./ha) | | 50 |
| Liveweight at start (kg) | | 27 |
| Liveweight at slaughter (kg) | | 42 |
| Deadweight at slaughter (kg) | | 19 |
| | | /100 lambs |
| Mortalities (no.) | | 2 |
| Area of rape (ha) | | 2 |
| Area of grass 'run-back' (ha) | | 0.6 |
| Concentrates (cereal) fed (t) | | 1 |

Basis of data:

1. Estimate of store lamb price, autumn 2021.
2. Estimate of finished lamb/hogg price, November/December.
3. Performance from lambs grazing rape can vary greatly between years. The requirement for supplementary concentrates is also very variable from year to year, and area to area. Cereal supplementation will be more necessary in higher rainfall areas, and it may be difficult to finish lambs in very high rainfall areas. Small lambs under 25 kg liveweight fail to perform well on rape and should be finished inside. A dry run back area with suitable forage and water should be provided. See page 104-105 for forage rape production costs.
4. Grazed on pasture without N fertiliser see Grassland-Grazing section, page 80.

Short Keep Lambs - Winter Finishing on Rape

GROSS MARGIN DATA

| OUTPUT | £/100 lambs |
|--|-------------|
| Finished lambs: 98 @ £89 (42 kg lwt) | 8,722 |
| Less: Store lambs purchased - 100 @ £52 | 5,200 |
| | <hr/> |
| | 3,522 |
| | |
| VARIABLE COSTS | |
| Concentrates - barley & minerals @ £260/t | 260 |
| Vet & medicines | 164 |
| Commission, levies, haulage, shearing, scanning & tags | 833 |
| | <hr/> |
| | 1,257 |
| Gross margin before forage | <hr/> |
| | 2,265 |
| Forage variable costs: | |
| forage rape @ £172/ha | 344 |
| Total Variable Costs | <hr/> |
| | 1,601 |
| GROSS MARGIN | <hr/> |
| | 1,921 |
| GROSS MARGIN per forage ha | <hr/> |
| | 739 |

| Sensitivity-Change ± | Change in Gross Margin/100 lambs (£) |
|--------------------------|--------------------------------------|
| £5/hd in lamb sale price | 490 |

Short Keep Lambs - Indoor Finishing on Concentrates

PHYSICAL DATA

| | |
|--|--|
| System | Store lambs housed in December, sold finished February |
| Liveweight at housing (kg) | 28 |
| Liveweight at slaughter (kg) | 36 |
| Deadweight at slaughter (kg) | 16.5 |
| Food conversion efficiency (kg feed/kg lwt gain) | range 7-10 |
| Finishing period (days) | 60 |
| Daily liveweight gain (g) | 100-150 |
| | /100 lambs |
| Mortalities (no.) | 3 |
| Concentrates: whole barley (kg) | 4,020 |
| sugar beet pulp (kg) | 1,610 |
| protein supplement (46% CP) (kg) | 805 |
| salt/minerals/vitamins (kg) | 165 |
| Total mix (kg) | <u>6,600</u> |
| Silage feeding (kg) | 2,000 |
| Bedding straw (housed period) (kg/day) | 80 |

Basis of data:

1. Estimate of store lamb price, autumn 2021.
2. Estimate of finished lamb price, February.
3. Suitable for lambs that are difficult to finish outside: ram lambs, anything under 25 kg in the autumn and thin lambs.
4. Profitability depends on rising lamb prices rather than food conversion efficiency. Late-born smaller lambs, non-standard types, any lambs under 25 kg liveweight and lambs that have failed to finish outside are all suitable for this system.
5. Care should be taken when introducing housed lambs to concentrate feeding where starchy cereals (e.g. barley) are used. Acidosis can often result, causing digestive upsets and in some cases, mortality. Typical feed conversion rate is 8.25 kg concentrate to produce 1 kg lwt (including concentrate fed during introductory period), for Blackface and other hill breeds. Crossbred lambs convert at 7-7.5 kg when gaining from 30-35 kg to 40-45 kg. Minerals will contain no Mg and low P.

Short Keep Lambs - Indoor Finishing on Concentrates

GROSS MARGIN DATA

| OUTPUT | £/100 lambs |
|--|-------------|
| Finished lambs: 97 @ £89 (36 kg lwt) | 8,633 |
| Less: Store lambs purchased - 100 @ £54 | 5,400 |
| | <hr/> 3,233 |
| VARIABLE COSTS | |
| Concentrates homemix @ £260/t | 1,716 |
| Vet & medicines | 164 |
| Bedding straw @ £90/t (bought-in) | 302 |
| Commission, levies, haulage, shearing, scanning & tags | 826 |
| | <hr/> 3,008 |
| Gross margin before forage | <hr/> 225 |
| Forage variable costs: | |
| silage @ £224/ha | 90 |
| Total Variable Costs | <hr/> 3,098 |
| GROSS MARGIN | <hr/> 135 |

| Sensitivity-Change ± | Change in Gross Margin/100 lambs (£) |
|--|--------------------------------------|
| 10 p/kg lwt in finished lamb price | 363 |
| £5/hd in store lamb purchase price | 500 |
| £10/t in concentrate price | 66 |
| 10 days in finishing period - straw, feed and silage | 357 |

Long Keep Lambs - Finishing on Swedes

PHYSICAL DATA

| | | |
|---------------------------------------|---|-------------------|
| Breeds | | 0 |
| System | Store lambs purchased in September/October, run over stubbles and grassland to mid- December, folded on swedes to end March/ mid-April | |
| Liveweight at start (kg) | | 27 |
| Liveweight at slaughter (kg) | | 44 |
| Deadweight at slaughter (kg) | | 21 |
| Finishing period (days) | | 70 |
| | | /100 lambs |
| Mortalities (no.) | | 4 |
| Concentrates: barley and minerals (t) | | 1.0 |
| Forage: silage (ha) | | 0.50 |
| swedes (ha) | | 1.40 |
| grazing (ha) | | 0.00 |
| Total forage area (ha) | | <u>1.90</u> |

Basis of data:

1. Estimate of store lamb price, autumn 2021.
2. Estimate of finished hogg price, spring.
3. Silage yield and quality 6 t DM/ha; ME 10.5 MJ/kg DM.
4. Yield of Swedes - 75 t/ha. See pages 108-109 for swede production costs. Use winter hardy varieties of swedes after December. A dry run back area with suitable forage and water should be provided. Supplement with an extra 100 g/head/day of soya if swede tops lost by frost and no grassy runback available. Provide access to dry lying area.
5. Grazing cost not included.

Long Keep Lambs - Finishing on Swedes

GROSS MARGIN DATA

| | £/100 lambs |
|--|--------------------|
| OUTPUT | |
| Finished lambs: 96 @ £114 (44 kg lwt) | 10,944 |
| Less: Store lambs purchased - 100 @ £52 | 5,200 |
| | <hr/> 5,744 |
| VARIABLE COSTS | |
| Concentrates @ £260/t | 260 |
| Vet & medicines | 349 |
| Commission, levies, haulage, shearing, scanning & tags | 916 |
| | <hr/> 1,525 |
| Gross margin before forage | <hr/> 4,219 |
| Forage variable costs: | |
| silage @ £224/ha | 112 |
| swedes @ £162/ha | 227 |
| grazing @ £184/ha | - |
| | <hr/> 1,864 |
| Total Variable Costs | <hr/> 3,880 |
| GROSS MARGIN | <hr/> |

| Sensitivity-Change ± | Change in Gross Margin/100 lambs (£) |
|-------------------------------|---|
| £5/hd in lamb sale price | 480 |
| £5/hd in store purchase price | 500 |

Red Deer

Introduction

The June 2017 agricultural census recorded 8,000 farmed deer in Scotland – from 96 registered holdings, up 1,000 head (15%) from the previous year. It is estimated that deer and deer farm numbers have significantly increased since 2017. In 2018 Scotland produced around 3,500 tonnes of venison from wild deer, with farmed production only around 100 tonnes. The total UK venison market is estimated to be worth £100m with the farm sector in Scotland valued at approximately £540k. Over the last ten years, until the COVID-19 pandemic, UK retail sales of venison have steadily grown with recent research by Kantar showing that the UK venison retail market grew by 11% in 2019. UK supply had been supplemented by imported venison to keep pace with market demand. However, imports have dramatically reduced in recent years with New Zealand products going to other markets including the USA.

Prior to COVID-19 and its impact on the catering, food service, restaurants, and events markets there was a drive in Scotland to encourage increased production of Scottish farmed venison and in so doing, reduce reliance on imports. Currently there are large volumes of wild venison held in cold storage and it will be some time before the market recovers fully from the impact of the pandemic.

On a positive note, the two major UK retailers of farmed venison have pledged to source only from UK farms from 2021.

A sector wide strategy for venison “Beyond the Glen” was launched in September 2018 and has been developed to fit with the Scotland Food and Drink strategy Ambition 2030.

The Scottish Venison Association was formed as a successor to the Scottish Venison Partnership to implement the strategy, an aim being to substantially increase the farmed sector output from 100 tonnes to 850 tonnes. This will be achieved by growing the annual kill from 1.7k to 15k animals and growing the value of the sector to £4.6m.

In the longer-term, the required increase to meet anticipated demand could be achievable if the relative profitability of farmed deer were to improve compared to beef and sheep. Much will depend on what changes to agricultural support and trade access are made following Brexit and whether these create opportunities for new enterprises such as deer farming. Interestingly non-EU venison enjoys tariff free access to the EU compared to tariffs of ~50% for beef and sheep-meat. Brexit has brought further challenges for imports and exports. The sector may find post-Brexit that imports, and exports diminish further and more wild roe venison, which is traditionally exported to Europe, is available for the UK market.

Support and subsidies

Historically deer farming did not attract support payments and subsidies putting it at a disadvantage to cattle and sheep farming. However, the reformed CAP regime now enables deer farmers to claim support payments under the Basic Payment Scheme. Scottish deer farmers remain disadvantaged however in that specific grant schemes (such as the SACGS) do not allow inclusion of deer-specific equipment such as crushes.

Starting deer farming

The main barriers to people entering deer farming are the start-up costs which are estimated at upwards of £100,000 for a 100 hind breeding herd. Red deer breeding hinds will generally cost from £350 - £600 for pedigree stock with breeding stags costing from £1000 - £3,000. Other significant costs include fencing at £10.50 - £15.00/m (fencing costs have increased substantially due to the soaring price of timber and wire) and handling facilities, crush and weigh scales at £10,000 - £20,000.

Other barriers identified had been access to an abattoir, knowledge of where to obtain limited breeding stock and specialist knowledge relating to the industry. As the sector has grown, these barriers have been addressed with a dedicated deer abattoir opening in Fife and, as the sector expands, quality Scottish-bred breeding stock are now readily available. Also, the development of the new Scottish Venison Industry Strategy, previous initiatives such as the Deer Farm and Park Demonstration Project and well-attended training and on-farm open days run by British Deer Farms and Parks Association (BDFPA) and the Venison Advisory Service have helped spread knowledge about the sector.

Once set up, there is a relatively low labour demand for deer farming meaning that it may fit well with existing livestock or arable enterprises. In general, deer are relatively healthy and free from disease. The main health issues are: TB, Johne's disease, cryptosporidium, copper deficiency, lungworm and increasingly liver fluke, all of which are manageable with good practice. Scotland also remains officially and internationally recognised as free of bovine TB and measures are taken to ensure this status remains.

Farmed venison processing and markets

Deer farmers are unique in the livestock sector in being able to kill their deer either on the farm or in an abattoir. Deer for slaughter must be examined ante-mortem by a vet within 72 hours of death unless being transported to and killed in an abattoir. The meat must be processed through facilities that have been licensed and regularly inspected by the Food Standards Agency or Food Standards Scotland. Only two supermarkets in the UK purchase farmed venison generally from abattoir killed carcasses.

Currently there are two dedicated abattoirs in the UK killing Scottish farmed deer, one in Scotland and one in Yorkshire.

It is a QA requirement for the industry that all deer farms must have a physical vet inspection at least annually and Deer Health Plans kept updated.

Downfield is the only farmed deer abattoir and processing plant in Scotland. Downfield is fully licensed by Food Standards Scotland (FSS), BRC accredited and accepts deer from farms and estates all over Scotland. Prior to the COVID-19 pandemic, Downfield supplied venison to chefs, suppliers and independent retailers in the Scottish food industry and offered fresh and frozen venison products under the Stagison brand. Since the COVID-19 outbreak, Downfield has seen an upturn in demand for their services from deer farmers who have been able to set up on-farm shops and provide local delivery services from their own farms.

Some finished farmed deer are processed directly through the Dovecote Park producer group through state-of-the-art slaughter and processing facilities in Yorkshire. This group comprises members who farm deer to the highest welfare standards and are audited annually. All farms have Quality Assurance. Dovecote supplies high-end retail, selected foodservice outlets and is experiencing significant growth in venison sales.

Other Scottish finished farmed deer are marketed collectively through UK-wide First Venison Ltd which comprises a dedicated co-operative supply route to market.

Another option is for farmers to sell their deer to finishers. There are several producers in England and Scotland that will accept deer from 6 months old and finish them on their own farm before processing.

Venison Market and Consumer Information

Detailed market research undertaken across the UK by Kantar has indicated that the retail home venison market is growing in value, recording an increase of 10.9% through 2019. This research funded by the Scottish Government provides, for the first time, an accurate snapshot of how the UK retail venison market is performing and outlines consumer views in Scotland and the rest of the UK towards buying and eating venison. The Kantar research, which took place before the COVID-19 pandemic, found that the UK retail venison market was worth £14.4m in 2019, with a total of 1,221 tonnes sold that year. An additional two times that amount of venison is produced, most of it from Scotland's wild deer, which goes to market via other routes – catering, hotels and restaurants and foodservice; independent butchers, farmers markets and mail order; and for export.

Kantar's research drilled down into the UK grocery retail sector, establishing that sales of primary cuts (including diced, cubed, stewing,

steak, mince and roasting), were worth £7.1m (up by 43%), burgers and grills some £5.2m and sausages worth £1.0m. Venison is sold in the UK grocery retail sector at an average price of £11.78 per kilogram. The retail market is dominated by two brands accounting for 59% of sales with Highland Game (who specialise in wild venison) at #1 and Waitrose own label at #2. In terms of retailer share of venison Waitrose is in front with 33.2% of the market, Sainsbury's following with 13% and then Morrisons with 10.7%.

Attitudinal research undertaken by 56 Degree Insight highlighted that 49% of venison is bought from the supermarket; 26% from butchers; 14% from farm shops; and 9% from mail order. Venison shoppers are likely to be older and more affluent, 30% of all venison is consumed by those aged 65 and over. Also 52% choose venison because of taste; 34% because of high quality; 24% because of health/nutritional qualities; 22% to try something different; and 19% because they can buy it locally. Venison is 5x more likely to be eaten as a treat and 2x more likely to be eaten for health reasons versus other red meat.

Impact of COVID-19

Due to COVID-19, venison sales into the restaurant/catering/foodservice sector have been decimated. As the restaurant sector begins to reopen, we anticipate venison sales to recover slightly but the sector is anticipating a significant downturn for the remainder of 2020/21 and beyond. To overcome this downturn in foodservice sector, several deer farms which have previously sold through a processor into the food service sector, have taken the decision to sell directly to the consumer using their own farm shop or on-line sales.

The impact of COVID-19 is more significant for the wild sector with some estates indicating that deer stalking would not take place during the coronavirus restrictions. This has had a huge impact on income generated by the estates from stalking although the amount of venison going to processors has not diminished proportionally, albeit a much-reduced price has been paid. Significant volumes of wild venison are being held in storage.

Discussions have taken place between Scottish Venison Association and Scottish Government regarding funding for a recovery plan for Scottish venison post COVID-19. The major asks relevant for the farmed sector are:

- Consumer advertising and PR campaign covering Scotland and London & SE England focussing on wild and farmed venison. Because of lock-down this campaign ran during March/April 2021.
- Funding to develop a short supply chain project in Scotland - local venison for local markets. This is ongoing.

References

A range of information relating to deer farming is available from the organisations below:

- “Beyond the Glen”. A strategy for the Scottish Venison Sector to 2030: www.deer-management.co.uk/wp-content/uploads/2018/09/Venison-Strategy-1.pdf
- Scottish Venison: <https://www.scottish-venison.info>
- The Venison Advisory Service: www.venisonadvisory.co.uk/
- The Deer Farm & Park Demonstration Project: <http://deerfarmdemoproject.scottish-venison.info/>
- The Scottish Venison Partnership (now Association): www.scottish-venison.info/
- The British Deer Farms and Parks Association: <http://bdfpa.org/>
- Quality Assured Farm Venison Scheme: <https://www.saiglobal.com/assurance/farm-assurance/quality-assured-farm-venison.htm>

Red Deer - Lowground Breeding and Feeding

PHYSICAL DATA

| | | |
|---------------------------------|--------------------------|-------------------|
| Calving period | | May-Jun |
| Sale period | | Aug-Nov |
| Herd life: | hinds (years) | 12 |
| | stags (years) | 6 |
| Calves born | | 90% |
| Calves reared | | 85% |
| Hind deaths (no.) | | 1 |
| Liveweight at sale: | 15-18 month stags (kg) | 108 |
| | 15-18 month hinds (kg) | 85 |
| | cull hinds (kg) | 110 |
| Killing out percentage | | 54% |
| | | /100 hinds |
| Stags (no.) | | 3 |
| Sales: | | |
| | 15-18 month stags (no.) | 43 |
| | 15-18 month hinds (no.) | 35 |
| | cull hinds (no.) | 7 |
| Winter feeding period (days): | | |
| | hinds and stags | 100 |
| | calves | 180 |
| Feeding: | concentrates (t) | 20.5 |
| | silage (t) | 161.2 |
| Silage: | yield (t/ha from 2 cuts) | 31 |
| | ME quality (MJ/kg DM) | 10 |
| | fertiliser (kg N/ha) | 220 |
| Grazing | fertiliser (kg N/ha) | 175 |
| Total forage area required (ha) | | |
| Silage and aftermath grazing | | 5.2 |
| Grazing | | 13.0 |
| | | <hr/> |
| | | 18.2 |

Hay (3.8 ha at 7 t/ha) and swedes (1.7 ha at 75 t/ha) can be fed as an alternative to silage.

Housing system (straw bedding assumed):

Hinds housed January to April, calves housed November to April.

| | | |
|----------------------|-----------------------------|------|
| Straw bedding (t/hd) | - hinds and stags | 0.10 |
| | - calves | 0.10 |
| Antler sales | - kg per stag | 5.50 |
| | - kg per yearling | 0.5 |
| | - yearling antlers saleable | 10% |

Red Deer - Lowground Breeding and Feeding

GROSS MARGIN DATA

| OUTPUT | | £/100 hinds |
|-----------------------------------|------------------------|--------------|
| Sale value (dwt): | | |
| Stags | 58 kg @ 500 p/kg dwt | 12,325 |
| Hinds | 45 kg @ 500 p/kg dwt | 7,985 |
| Cull hinds | 59.4 kg @ 350 p/kg dwt | 1,455 |
| Antlers: | 18.6 kg @ £10 /kg | 186 |
| | | <hr/> 21,951 |
| Less: hinds purchased | | 3,040 |
| share of replacement stag | | 950 |
| | | <hr/> 17,961 |
| VARIABLE COSTS | | |
| Concentrates @ £300/t | | 6,141 |
| Vet & medicines | | 573 |
| Bedding straw @ £90/t (bought-in) | | 1,691 |
| Other livestock expenses | | 2,350 |
| | | <hr/> 10,755 |
| Gross Margin before forage | | <hr/> 7,206 |
| Forage variable costs: | | |
| silage @ £343/ha | | 1,784 |
| grazing @ £242/ha | | 3,146 |
| | | <hr/> 4,930 |
| Total Variable Costs | | <hr/> 15,685 |
| GROSS MARGIN £/100 hinds | | <hr/> 2,276 |
| GROSS MARGIN £/ha | | <hr/> 125 |

| Sensitivity - Change ± | Change in Gross Margin/100 hinds (£) |
|-------------------------|--------------------------------------|
| £5/hd in all deer sales | 425 |

Replacement cost prices:

| | | | |
|-----------|------|------------------|--------|
| Cull hind | £208 | Hind (purch.) | £380 |
| Cull stag | £265 | Replacement stag | £2,000 |

Basis of data:

Sale price - slaughter price based on expected prices for sales to the abattoir. In practice, many deer farms sell part of their production direct to retailers, caterers and consumers at deadweight prices over £5.50/kg but with additional processing and marketing costs.

Red Deer - Upland Breeding Selling Calves

PHYSICAL DATA

| | | |
|---|-----------------------|-------------------|
| Calving period | | May-Jun |
| Sale period | | Nov-Dec |
| Herd life: | hinds (years) | 12 |
| | stags (years) | 6 |
| Calves born | | 90% |
| Calves reared | | 85% |
| Hind deaths (no.) | | 1 |
| Liveweight at sale: | stag calves (kg) | 50 |
| | hind calves (kg) | 40 |
| | cull hinds (kg) | 110 |
| Killing out percentage | | 54% |
| | | /100 hinds |
| Stags (no.) | | 3 |
| Sales: | | |
| | stag calves (no.) | 43 |
| | hind calves (no.) | 35 |
| | cull hinds (no.) | 7 |
| Winter feeding period (days): | | |
| | stags | 150 |
| | calves | 30 |
| Feeding: | concentrates (t) | 11.3 |
| | hay (t) | 4.2 |
| Hay: | yield (t/ha) | 7 |
| | ME quality (MJ/kg DM) | 8.5 |
| | fertiliser (kg N/ha) | 125 |
| Grazing | fertiliser (kg N/ha) | 125 |
| Total forage area required (ha) | | |
| Hay and aftermath grazing | | 0.6 |
| Grazing | | 10.0 |
| | | <hr/> |
| | | 10.6 |
| Hill outrun | | 70.0 |
| Housing system (straw bedding assumed): | | |
| Hinds outwintered on hill, replacement calves housed November to April. | | |
| Straw bedding (t/hd) | - hinds and stags | 0.00 |
| | - calves | 0.10 |
| Antler sales | - kg per stag | 5.50 |

Red Deer - Upland Breeding Selling Calves

GROSS MARGIN DATA

| OUTPUT | | | £/100 hinds |
|-----------------------------------|-----------|--------------|-------------|
| Sale value: | | | |
| Stag calves | 50 kg @ | 275 p/kg lwt | 5,844 |
| Hind calves | 40 kg @ | 300 p/kg lwt | 4,259 |
| Cull hinds | 59.4 kg @ | 350 p/kg dwt | 1,455 |
| Antlers: | 16.5 kg @ | £10 /kg | 165 |
| | | | <hr/> |
| | | | 11,723 |
| Less : hinds purchased | | | 3,040 |
| share of replacement stag | | | 952 |
| | | | <hr/> |
| | | | 7,731 |
| | | | |
| VARIABLE COSTS | | | |
| Concentrates @ £300/t | | | 3,381 |
| Vet & medicines | | | 573 |
| Bedding straw @ £90/t (bought-in) | | | 63 |
| Other livestock expenses | | | 2,350 |
| | | | <hr/> |
| | | | 6,367 |
| Gross Margin before forage | | | <hr/> |
| | | | 1,364 |
| | | | |
| Forage variable costs: | | | |
| hay @ £297/ha | | | 178 |
| grazing @ £184/ha | | | 1,840 |
| | | | <hr/> |
| | | | 2,018 |
| Total Variable Costs | | | <hr/> |
| | | | 8,385 |
| GROSS MARGIN £/100 hinds | | | <hr/> |
| | | | -654 |
| GROSS MARGIN £/ha | | | <hr/> |
| | | | -62 |

| Sensitivity - Change ± | Change in Gross Margin/100 hinds (£) |
|-------------------------------|---|
| £5/hd in all deer sales | 425 |

Replacement cost prices:

| | | | |
|-----------|------|------------------|--------|
| Cull hind | £208 | Hind (purch.) | £380 |
| Cull stag | £265 | Replacement stag | £2,000 |

Red Deer - Finishing Stag Calves

PHYSICAL DATA

| | | |
|---|-----------------------------|-------------------|
| Time of purchase | | October |
| Sale period | | Aug-Nov |
| Stags reared | | 97 |
| Liveweight: | at purchase (kg) | 50 |
| | at sale (kg) | 108 |
| Killing out percentage | | 54% |
| Deadweight at sale (kg) | | 58 |
| Mortality | | 3% |
| Liveweight gain (kg/day) | | 0.15 |
| | | /100 stags |
| Feeding: | concentrates (t) | 10.9 |
| | silage (t) | 80.6 |
| Silage: | yield (t/ha) | 31 |
| | ME quality (MJ/kg DM) | 10 |
| | fertiliser (kg N/ha) | 220 |
| Grazing | fertiliser (kg N/ha) | 175 |
| Total forage area required (ha) | | |
| Silage and aftermath grazing | | 2.6 |
| Grazing | | 5.5 |
| | | <hr/> 8.1 |
| Hay (2.0 ha at 7 t/ha) and swedes (0.8 ha at 75 t/ha) can be fed as an alternative to silage. | | |
| Housing system (straw bedding assumed): | | |
| Calves housed November to April. | | |
| Straw bedding (t/hd) | - calves | 0.10 |
| Antler sales | - kg per yearling | 0.50 |
| | - yearling antlers saleable | 10% |

Red Deer - Finishing Stag Calves

GROSS MARGIN DATA

| OUTPUT | | | £/100 stags |
|-----------------------------------|----------|--------------|--------------|
| Sale value: | | | |
| Finished stags | 58 kg @ | 500 p/kg dwt | 28,130 |
| Antlers: | 4.9 kg @ | £10 /kg | 49 |
| | | | <hr/> 28,179 |
| Less : calves purchased | 50 kg @ | 275 p/kg lwt | 13,750 |
| | | | <hr/> 14,429 |
| VARIABLE COSTS | | | |
| Concentrates @ £300/t | | | 3,274 |
| Vet & medicines | | | 243 |
| Bedding straw @ £90/t (bought-in) | | | 873 |
| Other livestock expenses | | | 2,140 |
| | | | <hr/> 6,530 |
| Gross Margin before forage | | | <hr/> 7,899 |
| Forage variable costs: | | | |
| silage@ £343/ha | | | 772 |
| grazing @ £242/ha | | | 1,012 |
| | | | <hr/> 1,784 |
| Total Variable Costs | | | <hr/> 8,314 |
| GROSS MARGIN £/100 stags | | | <hr/> 6,115 |
| GROSS MARGIN £/ha | | | <hr/> 755 |

| Sensitivity - Change ± | Change in Gross Margin/100 stags (£) |
|------------------------|--------------------------------------|
| £5/hd in stag sales | 485 |

Basis of data:

Sale price - slaughter price based on expected prices for sales to the abattoir. In practice many deer farms sell part of their production direct to retailers, caterers and consumers at deadweight prices over £5.50/kg but with additional processing and marketing costs.

Pigs

Introduction

Markets and prices

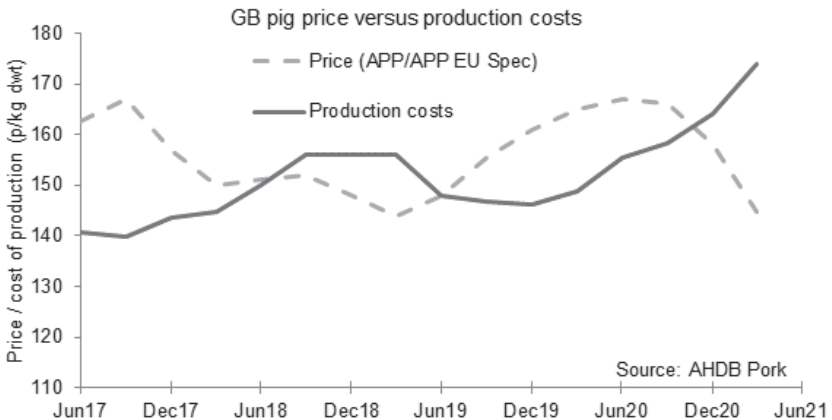
The last 12 months has seen pig producers exposed to an unwelcome perfect storm which has seen prices received fall significantly as well as seeing increases in production costs caused by a range of external influences.

Prices continued to rise through the first half of 2020, with the A.P.P peaking at 167p/kg before levelling off during the summer. This changed in the autumn with prices beginning to fall sharply as the impacts of COVID-19 in processing plants reduced capacity along with the effects of the pandemic across the country. This was combined with the knock-on effects of the African Swine Fever outbreak in Germany which saw an influx of cheap pork competing with home produced supplies. This continued into 2021 and was exacerbated by the new export regimes as a result of Brexit with carcass balance and cull sow markets affected. As the processing sector struggled with the effects of COVID-19, this meant that pigs were having to remain on farm longer, leading to heavier weights and more pigs falling outwith target specifications with the APP falling to 142p/kg by February 2021 (AHDB). More locally, the closure of the Brechin plant for several weeks in early 2021 not only presented huge logistical and welfare challenges for Scottish producers but also saw the loss of that plants ability to export to the valuable Chinese market, reflected in reduced prices received. At the point of writing, there is light at the end of the tunnel with prices steadily improving from the lows seen at the start of the year.

Producer costs have also increased over the past year, with feed costs rising significantly following the UK's poor grain harvest. Protein costs have also increased; according to AHDB figures feed costs had risen to nearly 117p/kg pigmeat in the first quarter of 2021 compared to 90 p/kg 12 months earlier. Producers have also incurred extra costs through having to keep pigs on farm longer due to COVID-19 issues elsewhere in the supply chain, leading to extra feed and space requirements along with transport to alternative processing plants.

Producer margins have been on a rollercoaster over the past few years from a peak of £23/head (27p/kg) in autumn 2017. Price falls through 2018 and rising costs (mainly feed) saw this situation reversed, with the average producer losing £11/head (13p/kg) by the start of 2019 (Q1 2019). Prices received then steadily increased and coupled with sharply falling feed prices in spring 2019, producers were soon breaking even again (Q2 2019) and at the start of 2020 (Q1 2020) producers were making a margin of £14/head (16p/kg). Despite prices continuing to increase through the summer, costs increased more rapidly, and combined with prices starting to fall in the autumn of 2020 meant that margins quickly went from a positive to a negative margin of 6p/kg (£6 per pig) in the final quarter of 2020. This trend has continued into 2021

with the latest AHDB figures for the period (Q1 2021) showing that costs of production had risen to record levels at nearly 174p/kg (£156 /hd) compared to a pig price of 145p/kg (£130/hd), meaning producers were losing 29p/kg or £26 per finished pig.



The 2020 UK December census showed a small increase in the female breeding herd, up 0.5% on the year to 406,000 head. However, the Scottish total breeding herd population increased significantly in the year to December 2020 according to Scottish Government survey figures, increasing 13.7% to 39,133, the highest for more than a decade. In addition, there were also 4,110 gilts over 50kg to be used for breeding – a decrease on the year of 10.6% however it should also be noted that within the breeding herd the number of sows in pig had risen by 20.3% reflecting the higher numbers of gilts taken into herds in preceding years. With census and surveys of the pig herd however it is important to treat year on year changes with caution. The move away from natural serving to artificial insemination continues although breeding boar numbers increased on the year (by 13.4%). Overall total pig numbers increased on the year by 14.5%, with growing and finishing pigs increasing by 14.9% with all classes showing increases. While the increase in growing and finishing pigs is not surprising given the increases in the breeding herd in recent years, this has not translated fully into extra pigs being finished in Scotland with a large number of weaners still moving to England for finishing and slaughtering.

Sow productivity increased slightly in 2020 with AHDB Pork reporting the average number of pigs weaned per sow in the UK for the 12 months to December 2020 being 26.22 compared with 26.11 in 2019. The indoor herd saw a marginal reduction in productivity with pigs weaned per sow falling from 27.45 to 27.43 on the year, with top third producers achieving over 30 pigs weaned per sow per year. Within these figures, litters per sow had decreased although there were increases in numbers born alive and a reduction in pre-weaning mortality. 2020 saw the outdoor herd

continue to close the gap in terms of productivity with numbers weaned per sow increasing to 24.43 from 24.12 the previous year.

The UK remains far from self-sufficient in pig meat with domestic production just over half of total UK consumption. Clean pig slaughterings increased marginally by 0.6% in 2020, however, the continuing trend of increased slaughter weights (86.9kg in 2020 compared to 84.9kg in 2019), meant that 984,300t UK pig meat was produced, up 2.8% on the year. UK domestic consumption figures increased slightly in 2020 despite the challenges of the pandemic and exports showed a 6% increase on the year to 400,000 tons which were worth £654m. The UK also imports a significant volume of product from a range of countries to fulfil the shortfall in domestic production although these reduced by 9% (to 832,000t) in 2020. Most of these suppliers are from within the European Union with the biggest being Denmark, Germany, and the Netherlands.

With UK product being seen by some markets as premium and the need to ensure maximum value from the carcass, the UK also exports a relatively large volume of lower value product. Most exports of UK pig meat have been to the EU in recent years however the volume going to China is increasing yearly particularly considering their domestic supply problems caused by African Swine Fever. In early 2021 new Brexit rules and checks were impacting on volumes going to the EU.

Marketing and processing

The UK pig industry is more rationalised than other livestock sectors, such as beef and sheep with the supply chain for pigs more vertically integrated than the beef and sheep sectors with contracts more common. Most of the pigs in Scotland are also marketed through two producer co-operatives.

In Scotland, expansion of capacity at the remaining slaughterhouses has not so far led to any significant recovery in local fattening and slaughtering however the Scottish clean pig kill did increase to 355,239 head in 2020, a rise of 3.8% on 2019, with clean pig slaughterings in Scotland at their highest since 2012. Despite the increased slaughtering capacity, large numbers of weaners continue to head to England for finishing and slaughter.

In 2018, Quality Meat Scotland launched '*Provenance and Profit – A strategy for Scotland's pig industry*'. The initiative aims to double the sector value by 2030. Quality Meat Scotland have also run successful marketing campaigns in recent years including "Go Places with Pork" which aimed to build on the "Specially Selected Pork" brand by promoting the health benefits and versatility of pork. March 2021 saw the publication of the Scottish Pig Industry Leadership Group's report to the Scottish Government identifying not only environmental mitigation strategies to enable the pig sector to further reduce emissions but also

making proposals to policy and support to help deliver and achieve these targets.

Margins

Feed is the biggest cost in pig production and typically accounts for approximately 50-60% of overall costs, although this has risen to 67% in early 2021 (AHDB) as feed prices have increased and prices received have fallen. As such the profitability of pig production generally hinges on three factors; the price received for pigs, the feed price, and the efficiency of feed conversion. A more enduring route to profitability for pig producers is to raise the number of pigs reared per sow. Numbers produced have continued to increase in recent years and since summer 2016, pig production has mostly been profitable. This has encouraged many producers to invest in their businesses, not only to accommodate the increased numbers of pigs but also to provide the space to take these pigs through to increasingly heavier weights. In addition, producers have also invested in new technology to further drive production efficiencies and improve environmental performance.

Breeding Pigs - Indoor Units

PHYSICAL DATA*

| | 4 week weaning | |
|---|----------------|---------|
| | Average | Premium |
| Litters/sow/year (no) | 2.25 | 2.33 |
| Live pigs born/litter (no) | 13.90 | 14.80 |
| Piglet mortality (%) | 12.17 | 10.66 |
| Weaners/litter (no) | 12.21 | 13.22 |
| Pigs weaned/sow/annum** | 27.47 | 30.81 |
| Pigs sold/sow/annum | 26.64 | 29.88 |
| Age at weaning (days) | | 27.0 |
| Age at sale/transfer (days) | | 75 |
| Liveweight at weaning (kg) | | 7.40 |
| Liveweight at sale (kg) | | 33.0 |
| Sow:boar ratio | | 100 |
| No. sows replaced annually (%) | | 55.0 |
| No. boars replaced annually (%) | | 40 |
| Sow mortality (%) | | 7.50 |
| Feed use (conventional diets): | | |
| sow meal (sow, boar, gilt) (kg) | | 1,450 |
| Daily liveweight gain (g/day) | | 0.440 |
| Feed conversion ratio (:1) | | 1.70 |
| <i>Feed (kg of feed/sow/annum):</i> | | |
| Creep feed (14 days of age to 9 kg lwt) | 75 | 84 |
| Weaner diet (9 to 15 kg lwt) | 299 | 336 |
| Rearing diet (15 to 34 kg lwt) | 873 | 979 |
| Total feed/sow/annum | 2,697 | 2,848 |

* Based on data derived from AHDB Pork.

** Per sow and gilt in the herd, rounded and with an allowance for barreners.

Breeding Pigs - Indoor Units

GROSS MARGIN DATA

| | £/sow/annum 4 week weaning | |
|--------------------------------|-------------------------------|---------|
| | Average | Premium |
| OUTPUT | | |
| Weaners sold @ £50* | 1,332 | 1,494 |
| Less: | | |
| sow and boar replacement (net) | 65 | 65 |
| | <hr/> | <hr/> |
| | 1,267 | 1,429 |
| VARIABLE COSTS | | |
| Feed: | | |
| sow meal @ £250/t | 363 | 363 |
| creep feed @ £820/t | 61 | 69 |
| weaner diet @ £515/t | 154 | 173 |
| rearing diet @ £265/t | 231 | 259 |
| Vet & medicines | 28 | 30 |
| Other livestock expenses | 86 | 90 |
| Total Variable Costs | <hr/> | <hr/> |
| | 923 | 984 |
| GROSS MARGIN | <hr/> | <hr/> |
| | 344 | 445 |
| Gross Margin/weaner sold | <hr/> | <hr/> |
| | 12.91 | 14.89 |

| Sensitivity-Change ± | Change in Gross Margin/sow/annum (£) | |
|-----------------------------|---|----|
| £1/weaner sold | 27 | 30 |
| 1 weaner pig for sale | 50 | 50 |
| £5/t in feed prices | 14 | 14 |

Replacement cost prices:

| | | | |
|----------------------------------|------|------------------|------|
| Cull sow (160 kg @ 65 p/kg dwt) | £104 | Replacement gilt | £210 |
| Cull boar (180 kg @ 60 p/kg dwt) | £108 | Replacement boar | £800 |

* Weaners sold includes a 3% post weaning mortality.

Basis of data:

1. Feed cost is purchased feed, an estimate derived from quoted list prices.
2. Vet and medicine costs and other livestock expenses are SAC Consulting estimates.

Breeding Pigs - Outdoor Units

PHYSICAL DATA

| | Average | Premium* |
|--|---------|----------|
| Breeding herd | | |
| Stocking rate (sows/ha) | 14 | 14 |
| Litters/sow/year (no.) | 2.23 | 2.34 |
| Live pigs born/litter (no.) | 12.5 | 13.2 |
| Piglet mortality (%) | 12.4 | 11.9 |
| Weaners/litter (no.) | 10.9 | 11.7 |
| Pigs weaned/sow/annum | 24.4 | 27.3 |
| Weight at weaning (kg) | 7.1 | 7.4 |
| Age at weaning (days) | 26.5 | 26.0 |
| Proportion sows replaced annually (%) | 48.5 | 47.5 |
| Proportion boars replaced annually (%) | 40 | 40 |
| Sow mortality (%) | 5.0 | 5.7 |
| Sow:boar ratio (:1) | 100 | 100 |
| Sow feed used (kg/annum) | 1,463 | 1,442 |
| Weaners | | |
| Post weaning mortality (%) | 3.8 | 3.0 |
| Weaners sold/sow | 23.48 | 26.45 |
| Age at sale/transfer (days) | 75 | 75 |
| Weight at sale (kg) | 33.00 | 33.00 |
| Weight gain (kg) | 25.87 | 25.58 |
| Daily liveweight gain (g/day) | 469 | 469 |
| Feed conversion ratio (:1) | 1.70 | 1.70 |
| Weaner feed (kg/weaner) | 43.98 | 43.49 |

* Selected on pigs reared/sow/year.

Breeding Pigs - Outdoor Units

GROSS MARGIN DATA

| | £/sow/annum | |
|--------------------------------------|----------------------|----------------------|
| | Average | Premium |
| OUTPUT | | |
| Weaned pigs @ £50 | 1,174 | 1,322 |
| Less: sow and boar replacement (net) | 57 | 56 |
| | <u>1,117</u> | <u>1,266</u> |
| VARIABLE COSTS | | |
| Feed: sow cobs @ £265/t | 388 | 382 |
| weaner feed @ £275/t | 295 | 326 |
| Vet & medicines | 35 | 35 |
| Transport | 30 | 30 |
| Other livestock expenses | 85 | 85 |
| Total Variable Costs | <u>833</u> | <u>858</u> |
| GROSS MARGIN | <u>284</u> | <u>408</u> |
| GROSS MARGIN/weaner sold | <u>12.11</u> | <u>15.42</u> |
| GROSS MARGIN £/ha (acre) | <u>3,980</u> (1,610) | <u>5,709</u> (2,311) |

| Sensitivity-Change ± | Change in Gross Margin/sow/annum (£) | |
|-----------------------------|---|----|
| £1/weaner sold | 24 | 27 |
| 1 weaner pig for sale | 50 | 50 |
| £5/t in feed prices | 1 | 3 |

Replacement cost prices:

| | | | |
|----------------------------------|------|------------------|------|
| Cull sow (160 kg @ 65 p/kg dwt) | £104 | Replacement gilt | £210 |
| Cull boar (180 kg @ 60 p/kg dwt) | £108 | Replacement boar | £800 |

Note:

Sow costs are higher than indoor units due to the requirement for cob nuts for management purposes.

Finishing Pigs

PHYSICAL DATA

| Type of finisher | All Average | Finishers Premium |
|---------------------------------------|----------------|----------------------|
| Liveweight: at purchase/transfer (kg) | 33.0 | 33.0 |
| at slaughter (kg) | 112.0 | 114.0 |
| Deadweight: at slaughter (kg) | 84.6 | 86.6 |
| Killing out (%) | 75.5 | 76 |
| Mortality (%) | 3.5 | 3.0 |
| Liveweight gain (g/day) | 859 | 942 |
| Feed conversion ratio (:1) | 2.78 | 2.59 |
| Feed use (kg) | 220 | 210 |
| Days in herd | 92 | 86 |
| Sale price (p/kg dwt) | 155 | 156 |
| Feed price (£/t) | 240 | 240 |

Finishing Pigs

GROSS MARGIN DATA

| | £/hd | |
|---|----------------|----------------------|
| | All Average | Finishers Premium |
| OUTPUT | | |
| Sales | 131.07 | 135.16 |
| Less: weaner cost @ £50 (plus allowance for mortality) | 51.75 | 51.50 |
| | <hr/> 79.32 | <hr/> 83.66 |
| VARIABLE COSTS | | |
| Feed | 52.80 | 50.40 |
| Vet & medicines | 2.0 | 2.0 |
| Other livestock expenses | 8.00 | 8.00 |
| Total Variable Costs | <hr/> 62.80 | <hr/> 60.40 |
| GROSS MARGIN | <hr/> 16.52 | <hr/> 23.26 |
| Sensitivity-Change ± | | |
| 1 p/kg dwt in sale price | 0.85 | 0.87 |
| £10/t in feed prices | 2.20 | 2.1 |

Basis of data:

Other livestock expenses include deductions for power, water, bedding, haulage, commission and levies.

Poultry

Introduction

Since the stockpiling of spring 2020 and supply chain disruption throughout the year as COVID-19 affected the workforce, the poultry sector has begun to stabilise following a turbulent few months. During the pandemic, the egg sector fared well, with farmgate prices rising by just over 14% in Q3 2020 and continued at 13.5% into Q1 2021. With eggs in high consumer demand, returns to producers have been generally favourable. Broiler producers, on the other hand, have experienced a more challenging year with processing closures interrupting supply and materials shortages.

As well as prices, the last year has also seen some significant shifts in consumption trends for eggs with consumers showing less preference for egg size and colour, and more preference for purchasing through direct sales. While these trends may reflect lack of availability and choice throughout the pandemic, it may be the start of changing consumer preferences going forward.

The pandemic may be easing along with vaccinations, but 2021 is providing new challenges for poultry producers. Rising soya meal prices (peaking at nearly £450/t in January) are increasing feed costs rapidly, driven by pig herd expansion in China following the African Swine Fever outbreak, and poor weather and yields for soy producers. Fuel prices have also been increasing, squeezing profit margins tighter; unfortunately, the strong egg demand and prices of the last year are no longer keeping up with increased input costs.

In policy, Scottish Government have expressed an interest in developing a protein strategy for Scotland, which may drive new opportunities, incentives, and development of viable soya alternatives for poultry feed in the longer term. In Westminster, the outlook is less favourable. The recent announcement of a trade deal with Australia may not in itself hugely threaten domestic poultry production, but indicates the direction of future trade deals, and the implications for environmental and welfare standards; the Trade and Agriculture Commission (TAC), established in July 2020, advises that government should apply tariffs on low-welfare imports to protect British farmers. On the other hand, the threat of chlorinated chicken imports from the States seems diminished with a new Biden administration in less of a rush to agree a trade deal – a positive for broilers.

Chicken Egg Production

In 2020 the UK produced 31.2 million cases of eggs (360 eggs to a case) down 388,000 cases on 2019. Production dipped notably in Q2 and Q3, most likely linked to supply chain constraints due to the COVID-19 pandemic. Of the total produced, 70% of eggs were produced in England and Wales, 14% in Scotland and 16% in Northern Ireland (source - Defra

2021a). Eggs bought for processing dropped to a record low in Q2 2020 due to the closure of food service, with only a small recovery across the year (-14% from 2019). Producers have also seen an increase in farmgate egg prices through 2020, at an average of 80.4 ppd (pence per dozen), a 13.4% increase from 2019, and Q1 2021 seeing a 15.4% increase on Q1 2020. While these were welcome rises and reflected an increase in demand in lockdowns, going into 2021 higher prices are no longer compensating for drastically increasing input prices. The increase in layer settings in Q2 has continued throughout the year (with around 200,000 more chicks placed than the 5-year average) and layer settings (up 2.2% on the year), indicating strong current and forecasted consumer demand for eggs.

Free-range production rose 3.7% from 2019. The table below shows egg production by system as a % of total egg production by year.

| | 1965 | 1980 | 2010 | 2020 |
|------------|------|------|------|-------|
| Cage* | 53% | 95% | 50% | 40.4% |
| Barn | 37% | 4% | 5% | 2.5% |
| Free range | 10% | 1% | 42% | 53.6% |
| Organic | - | - | 3% | 3.5% |

* enriched cages became a legal requirement for cage systems for laying hens in 2012.

Trends for eggs by production type have varied widely over the past 50 years, and anyone considering investing in an egg production business should be sure of the market for their egg type. In recent years, the market share of free-range egg production has edged steadily higher due to consumer demand and EU regulations (Council Directive 1999/74/EC) that banned conventional cages in 2012 on welfare grounds. While historically free range eggs have not penetrated the retail market, a retailer pledge to move away from caged eggs and the general trend of increasing free range and declining barn egg production, indicates that there may be a shift to more free range sourcing in processing.

Independent egg producers can sell their eggs via the large egg producers/packers, or through local businesses (e.g. hotels, farmer's markets). The British Free Range Egg Producers Association (BFREPA) provide guidance on contracts between producers and packers, which can be found here: <https://www.bfrepa.co.uk/wp-content/uploads/2019/10/Contracts-Booklet-October2019.pdf>. Flock size and thus scale of egg output will probably govern which route an egg producer favours. See page 122 for information on poultry keeping regulations.

Over 90% of eggs in the UK are produced using the British Lion Quality Code of Practice, which ensures that the eggs sold are indeed British and adhere to various UK and EU legislation governing the food safety of eggs, in particular that laying hen flocks are vaccinated against

Salmonella and that all eggs are traceable. For more information, see <http://www.egginfo.co.uk/>.

Egg grading

Egg grading percentages are dependent on a large number of variables, e.g., lighting programmes and feed specifications and can be altered by changing the feeding and lighting during rearing and the feed specifications during lay. Most major breed management manuals provide suitable information. The following table shows the egg grading ratios as a percentage with weight for each grade.

| | Ratio | Grade A weight |
|------------|-------|----------------|
| Very large | 4.0% | >73g |
| Large | 42.0% | 63-72.99g |
| Medium | 43.0% | 53-62.99g |
| Small | 4.0% | <53g |
| Seconds | 7.0% | - |

Egg price indicators

| | Pence per 6 pack | | | |
|------------|-------------------|--------------|---------------|---------------------|
| | <i>Very large</i> | <i>Large</i> | <i>Medium</i> | <i>Mixed weight</i> |
| Cage | - | - | - | 70 |
| Barn | - | - | - | - |
| Free range | 157 | 120 | 88 | 100 |
| Organic | 320 | 248 | 190 | 185 |

Source: Leading supermarkets average price for standard 6 packs (July 2021).

Quality assurance

The predominant and most recognised hen egg assurance scheme is the British Lion Quality Code of Practice.

For updates on changes to the Code of Practice for Lion Quality eggs visit the British Egg Industry Council website at:

www.britisheggindustryCouncil.com

Other assurance schemes, such as Freedom Foods free range egg production, or Soil Association organic egg production, can be found at:

- www.freedomfood.co.uk/industry/rspca-welfare-standards
- www.soilassociation.org/farmersgrowers/technicalinformation/poultrylaying

Broiler Meat Production

The UK produced 1.7 million tonnes of broiler chicken meat in 2020, a decrease of 3.9% from 2019. Overall, this shows little significant change on the year, although doesn't represent the wider fluctuations in supply

and demand throughout the year as a result of COVID-19 impacts (e.g. stockpiling, and outbreaks in processing facilities). Chicken meat sales have survived the pandemic well in comparison to other meats, and the closure of food service for much of the year seems to have just shifted sales to groceries for home cooked poultry, rather than reduced sales as per most other meats. Cooked chicken sales, however, have fallen as work from home reduced on-the-go food trends. Producers, on the other hand, have had to manage shortage of materials and the risk (or reality in some cases) of culling birds on farm due to lack of processing capacity. As the pandemic continued into 2021, the early months saw lower broiler placements to mitigate this risk again.

Retailers have also reported an increased interest in British chicken, following reports in the last couple of years that the UK may be forced into accepting chlorinated chicken post-Brexit, to the concern of the public. However, the new Biden presidency indicates that trade discussions may be much longer and more considered, and less of a threat in undermining standards in British poultry production. The potential impact of other trade deals on poultry yet remains to be seen.

Most broiler chickens are reared conventionally, with free range and organic production accounting for about 5% of the market. Conventional rearing typically means in light-controlled houses but providing natural daylight through windows (along with other types of environmental enrichment, such as perches and bales of wood shavings/straw) is becoming increasingly popular. Both male and female broiler chicks grow rapidly, so either or both sexes can be reared, depending on what target slaughter weight is desirable. With conventional rearing, the average liveweight at the point of slaughter (at around 36-40 days of age) is 2.2 kg (Defra 2020b).

Legislation governing the keeping of conventionally reared broiler chickens (Council Directive 2007/43/EC) stipulates the maximum stocking densities allowed but note that the UK does not permit the highest stocking density of >39-42 kg/m² (Defra 2011). For more information on housing space requirements see page 427.

Many broiler producers sell their produce under the Assured Chicken Production scheme, which is part of the Red Tractor farm assurance scheme, to ensure food safety and traceability. For more information, see <https://assurance.redtractor.org.uk/standards>

Useful Poultry References

- British Poultry Council (BPC): www.britishpoultry.org.uk/
- BFREPA (British Free Range Egg Producers' Association) – www.bfrepa.co.uk & www.theranger.co.uk
- USDA 2019, Livestock and Poultry: World Markets and Trade
- Council Directive 1999/74/EC Laying down minimum standards for the protection of laying hens, pp1-5.
- Council Directive 2007/43/EC Laying down minimum rules for the protection of chickens kept for meat production, pp1-10.
- Defra 2011 Interim guidance for keepers of conventionally reared meat chickens: www.gov.uk/government/publications/meat-chicken-keeper-guidance
- Defra 2020a. United Kingdom Egg Statistics: www.gov.uk/government/statistics/egg-statistics.
- Defra 2020b. United Kingdom Poultry and Poultry Meat Statistics: www.gov.uk/government/statistics/poultry-and-poultry-meat-statistics
- <https://www2.gov.scot/Topics/farmingrural/Agriculture/Livestock/eggs>

Laying Hens - Free Range

PHYSICAL DATA

Source: Hyline Brown Management Guide 2019
Egg stock Brown

| | |
|------------------------------------|-----------|
| Body weight at 17 weeks (kg) | 1.40-1.48 |
| Body weight at 70 weeks (kg) | 1.91-2.03 |
| Age at 50% production (age, weeks) | 20 |
| Peak production (%) | 95-96 |

Laying period:

| | |
|--|---------|
| Pullets housed (weeks) | 17 |
| Pullets point of lay (weeks) | 18 |
| Weeks in lay per annum adjusted for downtime | 48.5 |
| Bird laying cycle (week 18 to 72) (eggs) | 319-330 |
| Adjusted egg production (bird/annum) * | 272 |

Mortality:

| | |
|--|-------|
| Livability during lay (%) - refer to breed management guides | 0.97 |
| Stocking density (birds/ha) | 2,500 |

Feed:

| | |
|-----------------------------------|--------|
| Feed use (16 to 18 weeks) (kg/hd) | 1.10 |
| Feed use (19 to 72 weeks) (kg/hd) | 41.664 |

* Adjusted for 365d, mortality, downtime (pullet to lay, washing)

Note:

Other bird expenses include veterinary treatments, disinfectants, litter, dead bird disposal and range maintenance.

Laying Hens - Free Range

GROSS MARGIN DATA

| | £/1000 bird/annum Wholesale | £/doz Wholesale |
|--|--------------------------------|--------------------|
| OUTPUT | £ | £ |
| Eggs sales @ £0.982/doz | 22,268 | 0.98 |
| Old hen value less catching cost | 48 | 0.00 |
| Less: | | |
| Pullet purchase @ £4.42 per bird | 4,420 | 0.19 |
| | <u>17,896</u> | <u>0.79</u> |
| VARIABLE COSTS | | |
| Concentrate feed purchased @ £299.08/t | 11,272 | 0.50 |
| Other bird expenses | 650 | 0.03 |
| Total Variable Costs | <u>11,922</u> | <u>0.53</u> |
| GROSS MARGIN | <u>5,974</u> | <u>0.26</u> |

| Sensitivity ± | Change in Gross Margin/1000 birds/annum (£) |
|---|---|
| £0.10/doz eggs sold | 2,268 |
| £10/t feed | 377 |
| 1% increase in mortality at point of lay (£/1000 birds) | 60 |

Basis of data:

1. Egg price based on BFREPA UK average packer to producer free range price, as at July 2021.
2. High numbers of second grade eggs may be penalised and devalue the average price received.
3. Pullet price based on estimated BFREPA price (16 week fully vaccinated 3,000 bird order), July 2021.
4. Producers selling direct to market will incur additional packaging, grading and marketing costs as well as increased transport, labour and administration costs.

Grading, packaging and marketing costs vary significantly from business to business depending on the degree of automation, the size of the packing operation and the requirements of the customer being supplied.

Organic Farming

Introduction

In 2020 the area of organic farmland in the UK increased by 2.80% to 489,000ha compared to the 485,200ha in 2019. This is mainly due to a continued increase in arable crops, temporary grassland and woodland. The organic land area has decreased steadily from a high of 743,500ha in 2008 to a low of 474,000ha in 2018. The area of organic land in the UK now covers 2.8%. In contrast, organic production in Europe (EU28) has grown by 34% over the 2012-18 period, covering 7.5% of farmland.

The area of land used for organic farming in Scotland in 2020 was 95,700ha; this has increased from 92,100ha in 2018 and represents 1.7% of Scottish farmland. The area of in-conversion land has increased from 6,800ha in 2019 to 8,700ha in 2020.

The total number of organic livestock in the UK has also continued to increase, but this is mainly due to a 10.8% increase in poultry numbers, with a 1.0% increase in cattle, 6.5% decrease in sheep, and a 19.8% decrease in pig numbers. Other livestock (goats, deer and horses) rose by 8.8%.

Total organic food sales in the UK increased by 12.7% during 2020, creating a market worth £2.79 billion (the highest growth level in 15 years). Organic produce makes up approximately 1.37% of the UK food and drink sector.

At farm level, the organic milk price premium is generally 10ppl premium on conventional milk. The finished beef price trend has generally followed the conventional price, with an organic premium of approximately 50p -100p/kg. The premium for organic lamb remains small at peak sale season in the autumn, but outwith this period, premiums are usually available (10-100p/kg).

The prices for organic cereals, have remained buoyant, with premiums of approximately £100/t for organic cereals, but this is dependent on price of imported organic cereals.

Why farm organically?

Organic farming seeks to work with natural biological systems to produce high quality food in an environmentally sustainable way that minimises damage to the environment and wildlife. This enables organic produce to attract a price premium.

Organic farming systems exclude the use of agrochemicals and synthetic fertilisers, and generally have low input systems with lower variable costs, which combined with price premiums have the potential to create profitable businesses where enterprise output can be maintained.

In Scotland, organic farming has been supported under the Agri-environment Climate Scheme (AECS) of the Rural Development

Programme. Attractive rates have been available for both organic conversion and maintenance funding as shown in the following table.

| £/ha | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|----------------|------------|--------|-------------|--------|--------|
| | Conversion | | Maintenance | | |
| Arable | 280 | 280 | 65 | 65 | 65 |
| Fruit/veg | 400 | 400 | 200 | 200 | 200 |
| Improved grass | 140 | 140 | 55 | 55 | 55 |
| Rough grazing | 12.50 | 12.50 | 8.50 | 8.50 | 8.50 |

The first two years of organic conversion payments are higher than the latter three years where maintenance rates apply. This is to compensate for lower output during the conversion period before organic premiums can be attained.

Land that is managed organically is exempt from all Greening requirements of the Basic Payment Scheme (BPS) (see the Rural Aid Schemes section on page 489).

The principles of organic farming also accord with the ethos of many land managers. Using clover and livestock manures to provide fertility, the promotion of health rather than treatment of disease, and an 'acceptable' weed burden that provides food for birds and pollinating species are the aims of some land managers. Going through the formal process of certification allows produce to be sold as organic, and so receive a price premium.

How to get into organic farming

Some farm businesses require big changes to their systems in order to convert, while others will require little change. It is worth talking through the implications of converting with an adviser. Many organisations run organic farm walks throughout the year, giving farmers the chance to visit an organic farm which will demonstrate the link between organic farming and good environmental management.

There are several different organic bodies that provide certification (details on page 253). The choice of certification body can depend on several factors, including cost and the enterprises operated on the farm. Grant funding is available for farmers, and it is advisable that this is secured before conversion.

Organic conversion

Converting to organic farming will require changes in farm management with emphasis on increasing a farm's self-reliance: growing most of its own livestock feed; recycling nutrients through manure management; and using ley phases with a lot of clover to fix nitrogen, and which helps to provide fertility for arable crops later in the rotation. As well as building fertility, crop rotations also provide clean grazing and help manage the weed burden. The requirement for more 'natural' production restricts the amount of concentrates that can be fed to cattle and sheep, emphasising

a forage-based system. Housed livestock have maximum stocking densities, and must also have a dedicated lying area, possibly necessitating changes to housing with existing slatted floors.

Technical information

The data used in the preparation of the gross margins overleaf has been a necessary compromise of organic production figures from across Scotland. This should be borne in mind when using the margins, for example, in areas where straw is difficult to source a much higher price should be allocated to bedding.

Silage yield is based on a lower yielding, two cut system. Where yields are high due to a large clover yield in a year with an early spring, this should be increased. If only one cut is taken and yields are lower then the forage area will have to be adjusted accordingly. Silage costs are based on baling and wrapping a third of the silage produced. This cost will increase or decrease depending on the proportion of pit or baled silage.

Organic certification

Any farmer wishing to produce food for sale as organic must comply with regulations setting out the minimum standards of production. Certification bodies have their own standards which are generally more specific, and in some respects stricter than the basic EU standards. All farmers in the UK are certified to this higher level.

Compared to 2018 and 2019, the number of licensed producers and processors in Scotland has continued to decrease from 577 in 2018 to 559 in 2019, and now 541 in 2020. The number of producers however has increased by five to 388.

Organic Farming Contacts

Certification bodies

| | |
|---|---|
| Scottish Organic Producers Association (SOPA) | 0131 335 6606 info@sopa.org.uk |
| The Biodynamic Association (BDA) | 01453 759 501 office@biodynamic.org.uk |
| Organic Farmers and Growers (OF&G) | 01939 291 800 info@ofgorganic.org |
| Irish Organic Association (IOA) | +353 090 643 3680 info@irishoa.ie |
| The Organic Food Federation | 01760 720 444 info@orgfoodfed.com |
| Organic Trust Ltd. | + 353 (0) 185 30271 organic@iol.ie |
| Quality Welsh Food Certification Ltd. (QWFC) | 01970 636 688 enquiries@qwfc.co.uk |
| Soil Association Certification Ltd. | England: 0300 330 0100 Scotland: 0131 666 2474 |
| Global Trust Certification Ltd. | 01244 898165 gtenquiries@saiglobal.com |
| Information and advice | |
| SAC Consulting | 01467 625385 |
| The Organic Research Centre | 01488 658 298 hello@organicresearchcentre.com |

Organic Wheat - Winter

PHYSICAL DATA

(a) Seed

Organic seed sown at 200 kg/ha (1.60 cwt/acre).

(b) Fertiliser

No manure or mineral fertiliser applied routinely to first crop after ley. Annualised cost of rock phosphate and permitted potash fertiliser (e.g. sulphate of potash) after derogation.

(c) Trace elements

Trace elements (e.g. manganese sulphate).

(d) Other crop expenses

Net wrap at 50-77p/bale for round straw bales.

Organic Wheat - Winter

GROSS MARGIN DATA

| | | | | | | |
|----------------------------|--------------|-------|--------------------|-------|--------------|-------|
| Grain yield: t/ha (t/acre) | 4.0 | (1.6) | 5.3 | (2.1) | 6.5 | (2.6) |
| Straw yield: t/ha (t/acre) | 2.1 | (0.9) | 2.8 | (1.1) | 3.4 | (1.4) |
| OUTPUT | | | £/ha (acre) | | | |
| Grain @ £275/t* | 1,100 | | 1,458 | | 1,788 | |
| Straw @ £45/t | 95 | | 126 | | 155 | |
| | <u>1,195</u> | (484) | <u>1,584</u> | (641) | <u>1,943</u> | (786) |
| VARIABLE COSTS | | | | | | |
| Seed @ £550/t | 110 | | 110 | | 110 | |
| Fertiliser | 52 | | 52 | | 52 | |
| Trace elements | 10 | | 10 | | 10 | |
| Other crop expenses | 9 | | 12 | | 14 | |
| | <u>180</u> | (73) | <u>183</u> | (74) | <u>186</u> | (75) |
| GROSS MARGIN | <u>1,015</u> | (411) | <u>1,401</u> | (567) | <u>1,757</u> | (711) |

GRAIN PRICE SENSITIVITY

| | | | | | | |
|---------|-------|-------|-------|-------|-------|-------|
| £255 /t | 935 | (378) | 1,294 | (524) | 1,627 | (658) |
| £295 /t | 1,095 | (443) | 1,506 | (609) | 1,887 | (764) |
| £315 /t | 1,175 | (476) | 1,612 | (652) | 2,017 | (816) |

* Feed price (milling premium £30/t)

Basis of data:

Sale price estimate for 2022 crop, September/October ex-farm spot price at 15% moisture content and average quality.

Organic Oats - Spring

PHYSICAL DATA

(a) Seed

Organic seed sown at 200 kg/ha (1.60 cwt/acre).

(b) Fertiliser

No manure or mineral fertiliser applied routinely to first crop after ley. Manure applied to 2nd and 3rd crop after ley. Annualised cost of rock phosphate and permitted potash fertiliser (e.g. sulphate of potash) after derogation.

(c) Trace elements

Trace elements (e.g. manganese sulphate).

(d) Other crop expenses

Net wrap at 50-77p/bale for round straw bales.

Organic Oats - Spring

GROSS MARGIN DATA

| | | | | | | |
|----------------------------|------------|-------|--------------------|-------|--------------|-------|
| Grain yield: t/ha (t/acre) | 3.0 | (1.2) | 4.0 | (1.6) | 5.0 | (2.0) |
| Straw yield: t/ha (t/acre) | 1.8 | (0.7) | 2.4 | (1.0) | 3.0 | (1.2) |
| OUTPUT | | | £/ha (acre) | | | |
| Grain @ £270/t* | 810 | | 1,080 | | 1,350 | |
| Straw @ £45/t | 81 | | 108 | | 135 | |
| | <u>891</u> | (361) | <u>1,188</u> | (481) | <u>1,485</u> | (601) |
| VARIABLE COSTS | | | | | | |
| Seed @ £530/t | 106 | | 106 | | 106 | |
| Fertiliser | 52 | | 52 | | 52 | |
| Trace elements | 10 | | 10 | | 10 | |
| Other crop expenses | 7 | | 10 | | 12 | |
| | <u>175</u> | (71) | <u>177</u> | (72) | <u>180</u> | (73) |
| GROSS MARGIN | <u>716</u> | (290) | <u>1,011</u> | (409) | <u>1,305</u> | (528) |

GRAIN PRICE SENSITIVITY

| | | | | | | |
|---------|-----|-------|-------|-------|-------|-------|
| £250 /t | 656 | (265) | 931 | (377) | 1,205 | (488) |
| £290 /t | 776 | (314) | 1,091 | (442) | 1,405 | (569) |
| £310 /t | 836 | (338) | 1,171 | (474) | 1,505 | (609) |

* Milling price (feed price £30/t lower)

Basis of data:

Sale price - estimate for 2022 crop, September/October ex-farm spot price at 15% moisture content and average quality.

Organic Barley - Spring

PHYSICAL DATA

(a) Seed

Seed sown at 200 kg/ha (1.6 cwt/acre).

(b) Fertiliser

No manure or mineral fertiliser applied routinely to first crop after ley. Manure applied to 2nd and 3rd crop after ley. Annualised cost of rock phosphate and permitted potash fertiliser (e.g. sulphate of potash) after derogation.

(c) Trace elements

Trace elements (e.g. manganese sulphate).

Organic Barley - Spring

GROSS MARGIN DATA

| | | | | | | |
|----------------------------|------------|-------|--------------------|-------|--------------|-------|
| Grain yield: t/ha (t/acre) | 3.0 | (1.2) | 4.0 | (1.6) | 5.0 | (2.0) |
| Straw yield: t/ha (t/acre) | 1.6 | (0.6) | 2.1 | (0.9) | 2.7 | (1.1) |
| OUTPUT | | | £/ha (acre) | | | |
| Grain @ £255/t* | 765 | | 1,020 | | 1,275 | |
| Straw @ £50/t | 80 | | 106 | | 133 | |
| | <u>845</u> | (342) | <u>1,126</u> | (456) | <u>1,408</u> | (570) |
| VARIABLE COSTS | | | | | | |
| Seed @ £530/t | 106 | | 106 | | 106 | |
| Fertiliser | 52 | | 52 | | 52 | |
| Trace elements | 10 | | 10 | | 10 | |
| Other crop expenses | 7 | | 9 | | 11 | |
| | <u>174</u> | (70) | <u>176</u> | (71) | <u>178</u> | (72) |
| GROSS MARGIN | <u>671</u> | (272) | <u>950</u> | (384) | <u>1,230</u> | (498) |

GRAIN PRICE SENSITIVITY

| | | | | | | |
|---------|-----|-------|-------|-------|-------|-------|
| £235 /t | 611 | (247) | 870 | (352) | 1,130 | (457) |
| £275 /t | 731 | (296) | 1,030 | (417) | 1,330 | (538) |
| £295 /t | 791 | (320) | 1,110 | (449) | 1,430 | (579) |

* Feed price (malting premium £30/t)

Basis of data:

Sale price estimate for 2022 crop.

Organic Beans - Spring

PHYSICAL DATA

(a) Seed

Seed sown at 225 kg/ha (1.8 cwt/acre).

(b) Fertiliser

No manure or mineral fertiliser applied routinely to first crop after ley. Manure applied to 2nd and 3rd crop after ley. Annualised cost rock phosphate and permitted potash fertiliser (e.g. sulphate of potash) after derogation.

(c) Trace elements

Trace elements (e.g. manganese sulphate).

Organic Beans - Spring

GROSS MARGIN DATA

| | | | | |
|----------------------------|--------------|-------|--------------------|-------|
| Grain yield: t/ha (t/acre) | 3.0 | (1.2) | 5.0 | (2.0) |
| OUTPUT | | | £/ha (acre) | |
| Grain @ £410/t* | <u>1,230</u> | | <u>2,050</u> | |
| | <u>1,230</u> | (498) | <u>2,050</u> | (830) |
| VARIABLE COSTS | | | | |
| Seed @ £700/t | 175 | | 175 | |
| Fertiliser | 52 | | 52 | |
| Trace elements | 10 | | 10 | |
| Other crop expenses | <u>-</u> | | <u>-</u> | |
| | <u>237</u> | (96) | <u>237</u> | (96) |
| GROSS MARGIN | <u>993</u> | (402) | <u>1,813</u> | (734) |

GRAIN PRICE SENSITIVITY

| | | | | |
|---------|-------|-------|-------|-------|
| £370 /t | 873 | (353) | 1,613 | (653) |
| £450 /t | 1,113 | (450) | 2,013 | (815) |
| £470 /t | 1,173 | (475) | 2,113 | (855) |

* Feed price

Basis of data:

Sale price estimate for 2022 crop. Deductions for high levels of field beans which do not meet minimum quality standards can reduce the price considerably.

Organic Potatoes - Maincrop

PHYSICAL DATA

(a) Seed

Planted at 2.5 t/ha. This figure can rise to 4 t/ha depending on seed size. Organic seed must be used unless a derogation is obtained for specialist varieties.

(b) Fertiliser

Farm yard manure used, no artificial fertiliser.

(c) Sprays

Seed treatment None.

Nematicide Assumption of no treatment applied.

Herbicides None used.

Blight control None used.

Aphid control None used.

Slug control 2 applications of ferric phosphate (derogation obtainable) for high risk situations. If low risk situation (i.e. sandy soils), reduce cost by £43/ha.

Desiccation Pulverising and/or gas burning. See page 401 for costs.

(d) Other crop expenses

SPCS field inspection fees; roguing and labels and positive ventilation and cold storage are included. Other costs may include bags (£7.50-£11.20/t of crop) and royalties (which will depend on variety).

(e) Irrigation

Irrigation may be applied in some circumstances for yield and quality. These costs are not included. Annual capital charge could be £350-500/ha plus £1.60-1.90/ha.mm with a contract charge of approximately £5.40/ha.mm.

(f) Casual labour

These costs are not included. Costs calculated using the data below could be used. Labour charged at £12/hr as per labour rates on page 66 for low yielding potato crops.

Organic Potatoes - Maincrop

GROSS MARGIN DATA

| | | | | |
|------------------------------|--------------|----------------|--------------------|----------------|
| Yield: t/ha (t/acre): seed | - | (0.0) | - | (0.0) |
| Yield: t/ha (t/acre): ware | 25 | (10.1) | 49 | (19.8) |
| Yield: t/ha (t/acre): s/feed | 1 | (0.4) | 2 | (0.8) |
| | <u>26</u> | <u>(10.5)</u> | <u>51</u> | <u>(20.6)</u> |
| OUTPUT | | | £/ha (acre) | |
| Seed @ £0/t | - | | - | |
| Ware @ £310/t | 7,750 | | 15,190 | |
| Stockfeed @ £20/t | 20 | | 40 | |
| | <u>7,770</u> | <u>(3,144)</u> | <u>15,230</u> | <u>(6,163)</u> |
| VARIABLE COSTS | | | | |
| Seed @ £360/t | 900 | | 900 | |
| Fertiliser | - | | - | |
| Sprays | 50 | | 50 | |
| Other expenses | 2,016 | | 3,841 | |
| | <u>2,966</u> | <u>(1,200)</u> | <u>4,791</u> | <u>(1,939)</u> |
| GROSS MARGIN | <u>4,804</u> | <u>(1,944)</u> | <u>10,439</u> | <u>(4,224)</u> |
| WARE PRICE SENSITIVITY | | | | |
| £150 /t | 804 | (325) | 2,599 | (1,052) |
| £250 /t | 3,304 | (1,337) | 7,499 | (3,035) |
| £310 /t | 4,804 | (1,944) | 10,439 | (4,225) |
| £360 /t | 6,054 | (2,450) | 12,889 | (5,216) |

Organic Dairying

Introduction

Organic dairy farming aims for self-sufficiency within a unit. An effective way of doing this is by utilising high quality grass and grass silage as the main source of both protein and energy. This achieves economies in concentrate feeding. Further economies can be made by growing more protein on the farm such as peas and beans and increasing the use of clover in grass leys to reduce bought-in protein costs. Replacing compound feeds and blends with home mixes will help reduce feed costs further. The higher reliance on forage means that milk output is around 20% lower than in a conventional system.

Gross margins

The enterprise performance levels are specific to the individual cow per annum based on the whole herd performance divided by the average number of cows in the herd. They allow for a number of variables, but also contain a number of constant assumptions.

Variables

Traditionally dairy herds could either be classed as spring or autumn calving. A more level production of milk is now being encouraged by milk purchasers. This has resulted in adjustments to calving patterns, with more herds now achieving all-year round calving.

Feeding systems vary ranging from a simple system of silage or grass ad-lib with parlour cake fed to yield. Higher input systems may make use of a partial mixed ration with a low level of concentrate fed along with silage, again topped up with parlour feeding. Total mixed rations may also be fed without additional parlour feed. Organic concentrate costs are significantly higher, in the region of about 50-70% over conventional feeds. Whatever the system, forage inclusion must be a minimum 60% of the total ration on a dry matter basis. It is a requirement of the organic certification standards that dairy cows must be at pasture when conditions allow, which is typically over 200 days on average per year.

Constant assumptions

| | |
|-------------------------------|--------------|
| Herd life | 3 to 5 years |
| Calving interval | 390 days |
| Cow mortality | 1-2% |
| Calf mortality (up to 7 days) | 8% |
| Size of cow | 600 kg |
| Winter feeding period | 180 days |

Rations

For simplicity the feeds included have been restricted to ad-lib silage and grass plus 18% crude protein, 13.0 ME compound cake.

Organic Dairying - Summary of Assumptions

(a) Average price assumed (ppl)

An average price of 38ppl is assumed. This will fluctuate seasonally and may be partly dependent on quality characteristics such as hygiene measures and milk fat and protein percentage.

(b) Calf value

A sale/transfer price of £148/hd has been adjusted for calving interval and mortality. The calf value can be altered by £8.61 for each £10 difference in the sale/transfer price.

(c) Cull cow (annual share)

A sale price of £563.00/hd has been adjusted for herd life and mortality, and assumes no variation between high and low yielding cows. The annual share can be altered by £2.34 for each £10 difference in cull cow price. Assumed herd life of 4.17 years.

(d) Heifer replacement (annual share)

Heifer purchase/transfer price varies according to yield. A purchase price equating 15ppl has been used, here, and this has been adjusted for herd life and mortality. The annual share can be altered by £2.45 for each £10 difference in purchase/transfer price.

(e) Other livestock expenses

These are taken from commercial dairy herds and include milk recording, bedding sawdust and dairy detergents.

Organic Dairy Cow - 7,000 Litres

PHYSICAL DATA

| | |
|---------------------------------|-------------|
| Calving period | All year |
| | /cow |
| Average annual yield (litres) | 7,000 |
| Feed requirements (kg) | |
| Silage (kg) | 7,700 |
| Concentrates (kg) | 1,800 |
| Concentrates fed per litre (kg) | 0.26 |
| Overall forage area (ha) | |
| Silage and aftermath grazing | 0.25 |
| Grazing | 0.34 |
| Total | <u>0.59</u> |

Basis of data:

See *Summary of assumptions-physical data*, page 264-265.

Organic Dairy Cow - 7,000 Litres

GROSS MARGIN DATA

| | |
|---|-------------|
| Calving period | All year |
| | /cow |
| Average annual yield (litres) | 7,000 |
| OUTPUT | £ |
| All year milk @ 38 p/litre | 2,660 |
| Calf value | 128 |
| Cull cow (annual share) | 135 |
| | <hr/> |
| | 2,923 |
| Less: Heifer replacement (annual share) | 257 |
| | <hr/> |
| | 2,666 |
| VARIABLE COSTS | |
| Concentrates @ £430/t | 774 |
| AI | 46 |
| Vet & medicines | 78 |
| Other livestock expenses | 101 |
| | <hr/> |
| | 999 |
| Gross margin before forage | <hr/> |
| | 1,667 |
| Forage variable costs: | |
| Silage @ £82/ha | 21 |
| Grazing @ £82/ha | 28 |
| | <hr/> |
| Total Variable costs | 1,048 |
| GROSS MARGIN £/cow | <hr/> |
| | 1,618 |
| GROSS MARGIN £/ha | <hr/> |
| | 2,743 |

Sensitivity-Change ±

| | |
|----------------------------|----|
| 1 p/litre in milk price | 70 |
| £10/t in concentrate price | 18 |

Organic Suckler Cows - Mainly Silage Diets

PHYSICAL DATA

| | |
|-------------------------------------|--|
| Breed: | Commercial type cows bred to a range of bulls, mostly continental |
| Calving period | Feb-Apr |
| Calves weaned (%) | 92 |
| Month of weaning | October |
| Days to weaning | 220 |
| Month of sale | October |
| Liveweight of calves at sale | |
| Steers (kg) | 260 |
| Heifers (kg) | 240 |
| Herd life of cows (years) | 7 |
| Herd life of bulls (years) | 4 |
| Cow mortality (%) | 2 |
| Calf mortality (%) | 3 |
| Cow:bull ratio (:1) | 35 |
| Feeding/cow and calf (winter days): | 180 |
| silage (t) | 6 |
| calf concentrates (kg) | 180 |
| cow concentrates (kg) | - |
| Straw (t) | 0.9 |
| Silage: | |
| yield | 30 t/ha from 2 cuts; |
| quality | DM 220 g/kg; ME 10.5 MJ/kg DM |
| Overall forage area (ha) | |
| silage and aftermath grazing | 0.20 |
| grazing | 0.45 |
| | <hr/> |
| | 0.65 |
| | <hr/> |

Assumptions:

Mainly grass farm either buying in all straw and concentrates or growing small amount of cereals.

Note:

1. Cull cow value based on 100% of cull cows into the food chain.
2. SSBSS based on 94% calves claimed. See pages 156 and 495-496 for more details.

Organic Suckler Cows - Mainly Silage Diets

GROSS MARGIN DATA

| Calving period | Feb-Apr | |
|---|---------|------------------|
| OUTPUT | £/cow | |
| Calf sales (lwt - 92% crop) | | |
| Steers | | |
| 260 kg @ 230p | | 529 |
| Heifers | | |
| 240 kg @ 230p | | 92 |
| Scottish Suckler Beef Support Scheme | | <u>621</u> |
| Less: Replacement - cow | | 88 |
| bull | | <u>26</u> |
| | | <u>507</u> |
| VARIABLE COSTS | | |
| Barley @ £303/t | | 55 |
| Minerals | | 15 |
| Vet & medicines | | 37.9 |
| Straw - feeding & bedding @ £90/t (bought-in) | | 81 |
| Commission, tags & levies | | <u>28</u> |
| | | <u>216</u> |
| Gross Margin before forage | | <u>291</u> |
| Forage variable costs: | | |
| silage @ £82/ha | | 16 |
| grazing @ £82/ha | | <u>37</u> |
| | | <u>53</u> |
| Total Variable Costs | | <u>269</u> |
| GROSS MARGIN £/cow | | <u>238</u> |
| GROSS MARGIN £/ forage ha (acre) | | <u>365</u> (148) |

Sensitivity-Change ±

| | |
|---------------------------|----|
| 10 p/kg in lwt sale price | 23 |
| Sale weight ± 10kg | 21 |
| Herd life ± 1 year | 18 |

Replacement cost prices:

| | | | |
|-----------|--------|-------------------------|--------|
| Cull cow | £900 | In-calf heifer (purch.) | £1,450 |
| Cull bull | £1,150 | Replacement bull | £4,750 |

Organic Finishing Cattle

PHYSICAL DATA

| | |
|--|---------|
| Liveweight at purchase (kg) | 250 |
| Liveweight at slaughter: | |
| kg lwt | 580 |
| kg dwt | 320 |
| Cattle bought | October |
| Cattle sold | January |
| Finishing period (days) | 440 |
| Liveweight gain (kg) | 330 |
| Daily liveweight gain (kg) | 0.75 |
| Supplementary feed-barley, protein & minerals (kg) | 700 |
| Straw (t) | 0.8 |
| Overall forage area (ha) | |
| silage and aftermath grazing | 0.22 |
| grazing | 0.25 |
| | <hr/> |
| | 0.47 |
| | <hr/> |

Organic Finishing Cattle

GROSS MARGIN DATA

| OUTPUT | £/head | |
|---|--------------|-------|
| Sale value (dwt): | | |
| 320 kg @ 490p | 1,568 | |
| Less: Purchased store calf in October (lwt) | | |
| 250 kg @ 230p | 575 | |
| | <u>993</u> | |
| VARIABLE COSTS | | |
| Barley, protein & minerals @ £355/t | 249 | |
| Vet & medicines | 18 | |
| Straw - feeding & bedding @ £90/t (bought-in) | 72 | |
| Commission, tags & levies | 52 | |
| | <u>391</u> | |
| Gross Margin before forage | <u>602</u> | |
| Forage variable costs: | | |
| silage @ £82/ha | 18 | |
| grazing @ £82/ha | 21 | |
| | <u>39</u> | |
| Total Variable Costs | <u>430</u> | |
| GROSS MARGIN £/head | <u>563</u> | |
| GROSS MARGIN £/ha (acre) | <u>1,198</u> | (485) |
| Sensitivity-Change ± | | |
| 10 p/kg in dwt sale price | 32 | |
| Dwt sale weight ± 10kg | 49 | |

Organic Breeding Ewes - Finished Lamb Production

PHYSICAL DATA

| | |
|--------------------------------------|--------------------------------|
| Breeds | Crossbred ewe to terminal sire |
| Lambing period | April/May |
| Lamb crops per ewe (avg) | 4 |
| Ram flock life (seasons) | 3 |
| | /100 ewes tupped |
| Rams (no.) | 2.5 |
| Lamb numbers: marked | 150 |
| mortalities | 5 |
| sold finished | 145 |
| Lamb lwt at slaughter (kg) | 42 |
| Lamb dwt at slaughter (kg) | 20 |
| Ewes: culls | 20 |
| mortalities | 5 |
| gimmers purchased | 25 |
| Wool sales (kg) | 272 |
| Concentrate use: barley/mineral (kg) | 2,000 |
| Total concentrate (kg) | 2,000 |
| Forage (ha): silage | 1 |
| grazing | 12 |
| Total forage (ha) | 13 |

Basis of data:

1. Silage yield and quality 30 t/ha from 2 cuts; ME 10.5 MJ/kg DM.
2. Breeding stock and finished lamb prices 2021/22 season.

Organic Breeding Ewes - Finished Lamb Production

GROSS MARGIN DATA

| OUTPUT | £/100 ewes tugged | |
|---|-------------------|-------|
| Finished lambs: 145 @ £104/hd | 15,080 | |
| Cast ewes: 20 @ £80/hd | 1,600 | |
| Wool sales: 272kg @ £0.15/kg | 41 | |
| | <u>16,721</u> | |
| Less: 25 gimmers purchased @ £150/hd | 3,750 | |
| ram replacement (net) | 292 | |
| | <u>12,679</u> | |
| VARIABLE COSTS | | |
| Cereals & minerals @ £460/t | 920 | |
| Vet, medicines & dips | 488 | |
| Commission, levies, shearing, scanning & tags | 1,098 | |
| Gross margin before forage | <u>10,173</u> | |
| Forage variable costs: | | |
| 1 ha silage @ £82/ha | 82 | |
| 12 ha grazing @ £82/ha | 984 | |
| Total Variable Costs | <u>3,572</u> | |
| GROSS MARGIN | <u>9,107</u> | |
| GROSS MARGIN £/ forage ha (acre) | <u>701</u> | (284) |
| Sensitivity-Change ± Change in Gross Margin/100 ewes (£) | | |
| £1/hd in finished lamb price | 145 | |
| £1/hd in draft ewe price | 20 | |
| 5% change in lambs sold | 754 | |

Crofts and Small Farms

Introduction

This section gives an overview of crofting and small farms.

Information on land tenure and legislation is included as well as information on support schemes specifically directed to crofts and small farms.

Gross margins have been designed with a smaller scale in mind. These focus on beef cattle, sheep and poultry.

For new entrants to farming, this section should be read in conjunction with the New Entrant section on page 449.

Crofting

Crofting is a form of land tenure which is unique to Scotland. Generally, a croft is a relatively small agricultural land holding which is normally held in tenancy and which may or may not have buildings or a house associated with it.

Crofts range in size from less than 0.5ha to more than 100ha. An average croft is nearer 5ha.

A crofter is the tenant or owner-occupier of a croft. Usually, the crofter holds the croft on the "statutory conditions", which apply to every croft tenancy, and will not have a written lease.

There are 20,570 crofts in Scotland with 15,388 individual crofters making up crofting households with a total population of around 33,000.

There are legislative duties which must be adhered to when taking over a croft. Residence on the croft is required or the crofter must reside within 32km. There is a duty not to neglect the croft, to cultivate and maintain the croft for agriculture or to put it to another purposeful use (e.g. any use which does not have an adverse effect on the croft, the public interest, the interests of the landlord or the use of adjacent land).

Common grazings

There are over 1,000 common grazings in the crofting counties. A common grazing is an area of land shared by a number of crofter shareholders. The use of a common grazing is governed by a grazing committee, elected by the shareholders in the Common. Individual shareholders have a 'souming' which governs the amount of stock they are allowed to graze. Details of shares and 'soumings' are contained in the Regulations for the Common Grazing.

The Crofting Commission

The Crofting Commission is a Non-Departmental Public Body (NDPB) responsible for regulating crofting. The Commission comprises of six Crofting Commissioners elected from geographic areas in the crofting

counties, and three Commissioners appointed by the Scottish Government.

Obtaining a croft

There are several ways to obtain a croft. The following table gives details of these, and the requirements involved.

| Type of change | Description | Notification to Crofting Commission | Crofting Register Required? |
|--|---|---|-----------------------------|
| Assignment | Transfer of a croft tenancy from tenant crofter to proposed new tenant | Assignment Application Croft Tenancy form | Yes |
| Sub - Let | Transfer of a croft tenancy from tenant crofter to proposed new tenant for a fixed period of time | Subletting Application Croft Tenancy form | No |
| Change of ownership – tenant purchasing croft | Purchase of Croft | Notification of change of ownership form | No |
| Change of ownership – change of owner-occupier | Purchase of Croft | Notification of change of ownership form | Yes |
| Letting | Croft is let by landlord or owner-occupier to a tenant | Application to Let Croft (Whole or Part) | Yes |
| Short Term Letting | Owner Occupier letting a croft to a tenant for less than 10 years | Short Term Let Application Owner-Occupier Crofter | No |

Crofting terms

Decrofting is the term used for the process of removing land from crofting tenure. This is typically used to secure a house site suitable for commercial lending.

Resumption, similar to decrofting, is the removal of land from croft tenure; in this case it is carried out by the landlord, following permission from the Scottish Land Court.

Apportionment is the term used when someone who shares in a common grazing wants to take part of the common grazing for their own exclusive use.

Crofting register

The crofting register is map based and provides a definitive record of the extent of, and interest in, land within crofting tenure in Scotland. The register shows the boundaries of land and also name and address of the crofter. The register is maintained by the Keeper of the Registers of Scotland.

Applications to register a croft should be submitted to the Crofting Commission. As well as completing Form A which can be found at <https://www.ros.gov.uk/services/forms/guidance-and-forms> you must also supply a clear and legible map showing the boundaries of the croft. Maps that meet the desired standard can be acquired from local authorities, architects and surveyors and distributors of Ordnance Survey maps.

Small Farms

In contrast to crofts, small farms are not specifically mentioned in legislation; instead they are governed under the same agricultural tenancy legislation as detailed in pages 418-423. To be eligible for small farm specific grants and services, the Scottish Government deems a small farm to be a holding between 3ha and 30ha in size.

Rural Aid Schemes for Crofts and Small Farms

Agriculturally active crofts and small farms are entitled to the same direct subsidies that are available to the rest of the farming industry, as detailed in the Rural Aid Schemes section on page 489. There are also grant schemes specifically designed to benefit crofters and small farmers.

Crofting Agricultural Grant Scheme (CAGS)

This scheme provides grants for crofters to make improvements to their crofts and help to sustain their businesses. Funds of up to £25,000 for individual crofters and £125,000 for groups of crofters can be used for capital projects, such as the construction or improvement of agricultural buildings and for the establishment of Common Grazings Committees.

CAGS grant rates are shown in the following table:

| | Young Crofters ² | Individuals Other Crofters | Young Crofters ² | Groups ¹ Other Crofters |
|------|--|---|--|---|
| LFA | 80% | 60% | 90% | 80% |
| NLFA | 60% | 40% | 80% | 60% |

¹ e.g. Grazing committees.

² under 41 years old, with adequate occupational skills and competence, and in business for less than 5 years.

Funding for eligible capital projects can cover all aspects of the project, including the cost of materials, transportation of materials, costs of contractors and own labour. Items eligible for grant aid include:

1. Erection or improvement of agricultural buildings, and shelters for the temporary housing and sheltering of out-wintered livestock.
2. Works associated with agricultural building, including yards, hard-standings, dungsteads, and silos (excluding grain silos).
3. Investment in land management, including the initial grassland improvement works for the restoration of degraded land and the control of bracken.
4. Slurry stores.
5. Arterial drainage and field drainage.
6. All other forms of general drainage including under drainage, hill drainage and ditching.
7. Provision or improvement of facilities for the organised feeding of out-wintered livestock, including permanently fixed troughs and feed barriers, and associated concrete bases.
8. Provision or improvement of equipment for the handling and treatment of livestock.
9. Planting of shelter belts and the provision of fences, hedges, walls, gates or stock grids.
10. Provision or improvement of amenities, including water supplies, mains electricity connections, electricity generators or gas supplies.
11. Provision of electrical equipment.
12. Provision or improvement of access tracks to land improvement areas, roads, bridges, culverts or boat slips.
13. Assistance of up to £500 towards the establishment of a properly constituted Common Grazings Committee.

Small Farms Grant Scheme

This scheme provides support to eligible farmers or crofters for investments related to development, modernisation or adaptation of small farms, i.e. holdings that have between 3ha and 30ha of eligible agricultural area. To be eligible, total gross income for sole traders should be no more than £30,700 and £41,000 for partnerships or groups. Funds of up to £25,000 for individuals and £125,000 for groups can be used to erect or improve agricultural buildings, provision of slurry stores, field drainage, handling facilities, shelter belts, electrical equipment and for access.

Croft House Grant (CHG)

This scheme provides grants for crofters to improve and maintain the standards of crofter housing, with the aim of attracting and retaining people within the crofting areas of Scotland. Grants are available for new builds, major repairs, internal improvements and rebuilding work.

Intervention rates

Funding of 40% of the costs up to a maximum of £38,000 in high priority areas and up to £28,000 in standard priority areas. Projects below £8,000 in value are ineligible for grant aid under CHG.

New House

There are limits applied to the size of a new build house which relate to the number of bedrooms:

| House type | Two bed single storey | Two bed two storey | Three bed single storey | Three bed two storey | Four bed single storey | Four bed two storey | Five bed single storey | Five bed two storey |
|----------------------------------|-----------------------|--------------------|-------------------------|----------------------|------------------------|---------------------|------------------------|---------------------|
| Maximum eligible floor area (m2) | 112 | 120 | 138 | 146 | 164 | 172 | 191 | 199 |

These limits also apply to house improvement grants where the proposal is to increase the size of the dwelling house.

House Improvements

The grant can be used to facilitate minor and major improvements to existing croft houses. Croft houses which have been decrofted for mortgage purposes are still eligible provided the applicant meets the remaining scheme requirements. Please see below examples of minor and major improvements; this list is not exhaustive.

Example of Minor improvements include:

- First time provision of modern fitted kitchens (not replacement).
- First time provision of bathrooms, or replacement of new bathroom suites.
- First time provision of storm porches with floor area not exceeding four square metres.
- First time provision of a central heating system, or replacement of elements of the system which have become unsafe or un-serviceable.
- Rewiring where the existing wiring has become unsafe or un-serviceable.

Examples of Major improvements include:

- Replacement of doors and windows.
- Replacement of roof covering.
- Replacement of gutters and down pipes.
- Provision of, or modification and repairs to chimneys and flues.
- Repairs to cracks in walls.
- Provision of chemical damp proof courses.
- Provision of, or replacement of external rendering, where this is required to maintain water tightness.
- Replacement of decayed or undersized structural elements such as lintels.
- Repairs to timber roof and floor structure where water ingress or infestation has led to decay.

- Provision of, or modification to external walls, and internal partitions as required to create a functional dwelling house.
- Provision of thermal and sound insulation to external wall linings, internal partitions, floors, and roof spaces.
- Provision of, or replacement of floors, solums and under-floor ventilation.
- Lowering external ground levels and provision of external drainage where required to divert surface water from the building.
- Provision of ramps and other means of access.
- Application of chemical treatment for woodworm and other infestations.

Quotes

No quotes are required for new build houses; improvement works require a minimum of two competitive quotes for the proposed works. If the crofter is a builder and wishes to carry out the work this is acceptable; however, they must submit a quotation. In these circumstances the crofter would need to submit the two other competitive quotes in addition to his/her own. The quotations must be submitted along with the application.

Eligibility & Application Windows

Eligibility is partly based on the production of a 5-year business plan for the croft. Applications are accepted all year round, but decisions are typically made four times a year with the following closing dates: 1st March, 1st June, 1st September and 1st December.

Scoring

Applications are assessed on a points system to help prioritise funding. Scoring takes into account: current accommodation, assignation re-let details, other property which is/was owned and could/has been sold, and also current and proposed croft activity.

Agri-Environment Climate Scheme (AECS)

Full details of AECS can be found on page 498. There are a number of options which are particularly relevant for crofters and small farms. These include:

| Management Option | Payment Rate |
|--|---|
| Conservation Management of Small Units (up to 30ha) | £77.78/ha |
| Cattle Management on Small Units (up to a max of 20ha @ 2 ha/cow) | Retention - £107.38/ha Introduction - £162.63/ha |
| Cropped machair | £239.76/ha |

Croft and Small Farm Gross Margins

The gross margins on the following pages give an insight into livestock enterprises on a smaller scale. The gross margins are an illustration and must be adjusted for specific circumstances. The variable costs take

account of added costs for smaller volumes being purchased and/or for being based in remote areas. All concentrate feeding and straw (for feeding and bedding) are assumed to be bought-in.

Beef

The suckler cow margins are based on crofts and small farms with a mixture of inbye ground and rough grazing/common grazing. The margins provide an illustration of a herd with 10 native type suckler cows on in-wintered (native cross cattle) and out-wintered (pure native) systems calving mainly in February - April.

Output is based on a calving percentage of 90% and selling weaned calves in October. Income from the SSBSS (see page 495-496 for more detail) is based on the Island rate. This should be reduced for £40/cow (90% calving percentage) if budgeting for a mainland system. Adding value to output would come from direct marketing beef.

Replacement costs are based on purchasing all breeding stock. If hiring a bull, this cost should be adapted.

For more information on keeping cows see pages 118-129, 154-183, 426 and 429.

Sheep

For crofts and small farms, sheep provide a basis in getting started in commercial livestock farming. Compared to cattle, sheep require a lower capital investment to establish a flock and income can be generated within a 12 month period due to their short gestation period.

The sheep gross margins illustrate technical and financial performance for a range of croft and small farm situations. The margins are based on Blackface and Cheviot hill breeds and Mule and Texel type lowland breeds. Where other breeds are used, prices should be adjusted accordingly. Income comes from selling lambs and cast sheep at the auction market either as store or finished animals. Adding value to output would come from direct marketing lamb or fleece.

Replacement costs are based on retaining homebred ewe lambs or buying in gimmers for lowland situations. Rams are assumed to be hired. Where buying rams, costs should be adjusted. The margins do not account for keeping flock replacements.

For more information on keeping sheep see pages 118-129, 186-211, 426 and 429.

Free range chicken egg production

Free range egg production is an ideal enterprise for a croft or small farm business. There is a smaller land requirement compared to other livestock, low flock set-up costs and quick and regular cashflow. Any significant capital expense will be mainly dictated by requirement for bird housing.

When keeping more than 50 birds the keeper must be registered (see page 122 for more detail). If the intention is to sell eggs beyond the farm gate, e.g. to farm shops or local shops, then the business should be registered with the Scottish Government Eggs and Poultry Unit. For details and guidance see:

<https://www.ruralpayments.org/publicsite/futures/topics/inspections/all-inspections/egg-and-poultry-inspections/>.

For alerts from APHA about poultry diseases see:

<https://www.gov.uk/guidance/apha-alert-subscription-service>

The enterprise illustrated assumes chicken egg production using hybrid birds. Egg production using native chicken breeds or other species, such as ducks or geese could also be considered. The gross margin assumes buying point of lay pullets, purchase of feeding in 25kg bags (purchasing at least 1t at a time) and marketing eggs at the farm gate using labelled (with laying date and best before) half dozen boxes. When selling the eggs at the farm gate, a premium price is available as customers appreciate the eggs freshness, provenance and taste.

Other croft and small farm enterprise options

See the Diversification section on page 291 for more information on other livestock and farm diversification ideas.

Suckler Herd - Croft and Small Farm

PHYSICAL DATA

Breed: Cross bred native and purebred native cows bred to native bull.

| | Upland suckler in-wintered | Hill suckler out-wintered |
|--|--|--|
| Calving period | | Feb-Apr |
| Calves weaned | 90% | 90% |
| Month of weaning | October | October |
| Days to weaning | 220 | 220 |
| Month of sale | October | October |
| Lwt of calves: at weaning (kg) | 255 | 235 |
| Lwt of calves: at sale/transfer (kg) | 255 | 235 |
| Herd life of cows (years) | 10 | 9 |
| Herd life of bulls (years) | 4 | 4 |
| Cow mortality (%) | 1 | 2 |
| Calf mortality (%) | 4 | 4 |
| Cow:bull ratio (:1) | 10 | 10 |
| Feeding/cow and calf (winter days): | 180 | 180 |
| silage (t) | 5.4 | 6 |
| straw (t) | 0.6 | 0 |
| calf concentrates (kg) | 100 | 0 |
| cow concentrates (kg) | 180 | 180 |
| Grazing fertiliser (kg N/ha) | 40 | 30 |
| Silage & aftermath fertiliser (kgN/ha) | 125 | 125 |
| Silage: | | |
| yield (t/ha from 1-cut) | 20 | 20 |
| DM quality (g/kg) | 280 | 280 |
| ME quality (MJ/kg DM) | 10.5 | 10.5 |
| Overall forage area (ha): | | |
| silage and aftermath grazing | 0.27 | 0.30 |
| Improved grazing | 0.30 | 0.20 |
| Unimproved / Hill Grazing | 2.00 | 4.00 |
| | <hr style="width: 50%; margin: 0 auto;"/> 2.57 | <hr style="width: 50%; margin: 0 auto;"/> 4.50 |
| Housing system: In cubicles (if straw bedding used, adjust straw costs) | | |
| Straw for general use incl. calving pens | 0.25 | 0.10 |

Suckler Herd - Croft and Small Farm

GROSS MARGIN DATA

| | Upland suckler in-wintered | Hill suckler out-wintered |
|--------------------------------------|-------------------------------|------------------------------|
| | £/cow | |
| OUTPUT | | |
| Calf sales (lwt) | 90% | 90% |
| Steers | | |
| Heifers | | |
| 270 kg @ 262 p | 240 kg @ 238 p | 575 |
| 250 kg @ 230 p | 220 kg @ 220 p | - |
| Scottish Suckler Beef Support Scheme | 128 | 477 |
| | <hr/> | <hr/> |
| | 703 | 605 |
| Less: Replacement - | | |
| cow | 71 | 73 |
| bull | 50 | 50 |
| | <hr/> | <hr/> |
| | 582 | 482 |
| VARIABLE COSTS | | |
| Cow concentrates @ £315/t | 57 | 57 |
| Calve concentrates @ £315/t | 32 | 0 |
| Vet & medicines | 65 | 65 |
| Straw feeding and bedding @ £150/t | 128 | 15 |
| Commission, haulage, tags & levies | 59 | 55 |
| | <hr/> | <hr/> |
| | 340 | 192 |
| Gross Margin before forage | <hr/> | <hr/> |
| | 242 | 290 |
| Forage variable costs: | | |
| silage @ £548/ha | 148 | 164 |
| grazing @ £129/ha | 39 | 26 |
| | <hr/> | <hr/> |
| | 187 | 190 |
| Total Variable Costs | <hr/> | <hr/> |
| | 527 | 382 |
| GROSS MARGIN £/cow | <hr/> | <hr/> |
| | 55 | 100 |
| GROSS MARGIN £/ha | <hr/> | <hr/> |
| | 21 | 22 |

Sensitivity-Change ±

| | |
|---------------------------|----|
| 10 p/kg in lwt sale price | 23 |
| Sale weight ± 10kg | 23 |
| Herd life ± 1 year | 14 |

Change in Gross Margin/head (£)

| | |
|----|----|
| 23 | 21 |
| 23 | 20 |
| 14 | 9 |

Replacement cost prices:

| | | | |
|-----------------------|------|----------------------------------|--------|
| Native cross cull cow | £930 | Native cross i/c heifer (purch.) | £1,550 |
| Pure native cull cow | £720 | Pure native i/c heifer (purch.) | £1,250 |
| Cull bull | £999 | Replacement bull (purch.) | £3,000 |

Sheep Flock – Croft and Small Farm

PHYSICAL DATA

| Breeds: | Hill - Lowland | | |
|-------------------------------------|-------------------------|-------------|-------------|
| Breed of Sire | Hill | Low | Low |
| Breed of Dam | Hill | Hill/Low | Low |
| Lambing period | Early April | | |
| | Lambs reared (%) | | |
| | 80% | 120% | 160% |
| Lamb crops per ewe (avg) | 4.5 | 4.5 | 4.5 |
| | /10 ewes tupped | | |
| Rams Hired | 1 | 1 | 1 |
| Lamb numbers: | | | |
| marked | 8 | 12 | 16 |
| sold/retained | 8 | 12 | 16 |
| sold: finished lambs | 0 | 1 | 13 |
| store lambs | 5 | 8 | 3 |
| retained for breeding | 3 | 3 | 0 |
| Ewe numbers: | | | |
| culls | 1 | 2 | 2 |
| mortalities | 1 | 1 | 1 |
| gimmers purchased | 0 | 0 | 3 |
| Wool sales - ewes, rams & hogs (kg) | 16 | 25 | 27 |
| Ewe concentrate (kg) | 180 | 450 | 600 |
| Forage: improved grazing (ha) | 0 | 1 | 1 |
| silage/hay (ha) | 0 | 0.2 | 0.3 |
| Total forage (ha) | <u>0</u> | <u>0.9</u> | <u>1.3</u> |
| Bedding straw (kg/day/hd) | 0 | 0.8 | 0.8 |

Sheep Flock - Croft and Small Farm

GROSS MARGIN DATA

OUTPUT

| | | Lambs reared (%) | | |
|---|------|------------------|-------|-------|
| | | 80% | 120% | 160% |
| | | /10 ewes tupped | | |
| Finished lambs: | 0 @ | £0 | - | - |
| | 1 @ | £79 | - | 79 |
| | 13 @ | £84 | - | - |
| Store lambs: | 5 @ | £51 | 255 | - |
| | 8 @ | £58 | - | 464 |
| | 3 @ | £61 | - | - |
| Cast ewes: | 1 @ | £50 | 50 | - |
| | 2 @ | £55 | - | 110 |
| | 2 @ | £78 | - | - |
| Wool sales: | 16 @ | £0.10 | 2 | - |
| | 25 @ | £0.10 | - | 3 |
| | 27 @ | £0.15 | - | - |
| | | | <hr/> | <hr/> |
| | | 307 | 656 | 1,435 |
| Less: gimmers purchased @ £149/hd | | - | - | 373 |
| ram hire @ £5/ewe | | 50 | - | - |
| ram hire @ £6/ewe | | - | 60 | 60 |
| | | <hr/> | <hr/> | <hr/> |
| | | 257 | 596 | 1,002 |
| VARIABLE COSTS | | | | |
| Ewe concentrates @ £320/t | | 58 | 144 | 192 |
| Vet, medicines & dips | | 80 | 83 | 85 |
| Bedding straw @ £150/t | | - | 50 | 50 |
| Commission, levies, haulage, shearing, scanning & tags | | 55 | 89 | 148 |
| | | <hr/> | <hr/> | <hr/> |
| | | 193 | 366 | 475 |
| Gross margin before forage | | <hr/> | <hr/> | <hr/> |
| | | 65 | 231 | 528 |
| Forage variable costs: | | | | |
| silage @ £548/ha | | - | 110 | 137 |
| grazing @ £129/ha | | - | 90 | 129 |
| Total Variable Costs | | <hr/> | <hr/> | <hr/> |
| | | 193 | 565 | 741 |
| GROSS MARGIN | | <hr/> | <hr/> | <hr/> |
| | | 65 | 31 | 262 |

Sensitivity-Change ±

Change in Gross Margin/100 ewes (£)

| | | | |
|------------------------------------|----|----|----|
| 10 p/kg lwt in finished lamb price | - | 4 | 50 |
| £5/hd in all lamb sales | 25 | 45 | 80 |
| £5/hd in cast ewe price | 5 | 10 | 10 |
| £5/hd in gimmer price | - | - | 12 |

Free Range Laying Hens - Croft and Small Farm

PHYSICAL DATA

| | |
|--|--------|
| System: | Hybrid |
| Body weight at 17 weeks (kg) | 1.44 |
| Body weight at 70 weeks (kg) | 1.97 |
| Age at 50% production (age, weeks) | 20 |
| Peak production (%) | 80 |
| Pullets housed (weeks) | 16 |
| Pullets point of lay (weeks) | 18 |
| Weeks in lay per annum adjusted for downtime | 49.1 |
| Bird laying cycle (week 18 to 85) | 270 |
| Adjusted egg production (eggs/bird/annum) * | 184 |
| Livability during lay (%) - refer to breed management guides | 92% |
| Feed use (16 to 18 weeks) (kg/hd) | 1.23 |
| Feed use (19 to 72 weeks) (kg/hd) | 49.14 |

* Adjusted for 365d, mortality, downtime (pullet to lay, washing)

Free Range Laying Hens - Croft and Small Farm

GROSS MARGIN DATA

| OUTPUT | £/100 bird/annum | £/doz |
|----------------------------------|------------------|-------------|
| Eggs sales @ £3/doz | 4,598 | 3.00 |
| Old hen value less catching cost | 0 | 0.00 |
| Less: | | |
| Pullet purchase @ £7.5 per bird | 750 | 0.49 |
| | <u>3,848</u> | <u>2.51</u> |
| VARIABLE COSTS | | |
| Feed @ £401/t | 1,479 | 0.97 |
| Other bird expenses | 400 | 0.08 |
| Packaging - trays & cases | 192 | 0.13 |
| Total Variable Costs | <u>2,071</u> | <u>1.18</u> |
| GROSS MARGIN | <u>1,777</u> | <u>1.33</u> |

| Sensitivity ± | Change in Gross Margin/100 birds/annum (£) |
|--|---|
| £0.10/doz eggs sold | 153 |
| £10/t feed | 37 |
| 1% increase in mortality at point of lay (£/100 birds) | -2 |

Note: Costs are typically much higher in a smaller flock, however, this can be mitigated through higher value egg sales direct to customers.

Diversification

Introduction

The Scottish Agricultural sector is facing significant changes following Brexit, current changes in agricultural policy and subsidies, and the challenge in addressing our global climate emergency.

As the agricultural industry moves towards a clearer focus on providing environmental benefits – natural habitat, water resources, carbon sequestration, landscapes, biodiversity, and social capital – we are likely to see diversification become even more critical to business survival as farmers reduce their dependency on direct farm payments.

According to the Scottish Farm Business Income Estimates 2019-20, farm business income has, on average, decreased since the previous year. Average income decreased 36% to £25,800 from £40,300 in 2018-19. This is a result of increased costs and decreased revenues and support payments in several different areas. The positive result identified in the Scottish Farm Business Survey, which measures economic and environmental performance of over 400 farming businesses, is the impact of diversification on business profitability. More than half of farms surveyed have diversified activities that use farm resources to generate additional incomes to their businesses. Farms with diversified activities on average generated an additional £21,300 per annum more than farms without diversified activities.

Diversified activities are becoming more important. The income gap between farms with diversified activities and those without has increased over the past five years. Diversification doesn't need to involve large capital expenditure, or a significant change to primary agricultural activities, often small, low-cost, ventures can have a positive impact on financial performance.

Diversification presents many opportunities for farmers, crofters and land managers to re-assess their asset base and look at ways to generate new income streams to provide a sustainable future for their business

Diversification enterprises should ideally complement the existing business model, drawing upon the current skills & interests, experience, buildings, machinery, and/or land capabilities. It is important that farmers do not diversify out of desperation, as new business enterprises can take a considerable amount of time and commitment to show results. Depending on the type of diversified enterprise chosen, it may also place pressures and demands on other resources, labour, capital, buildings, land and machinery on the existing enterprise.

Diversification Considerations

It is highly recommended that businesses considering diversification carry out market research, a feasibility study and business plan with a

diversification professional working directly in the industry. This will ensure that the best possible advice is presented to the business before they start their diversified journey.

Ongoing consideration must be given to government guidelines, public health, public attitudes and demands during the COVID-19 pandemic. Careful consideration should be given for the possibility of future outbreaks, rise in cases, lockdown measures, and how your business can adapt to remain profitable during challenging economic times.

Before launching a new business venture, it is crucial to assess the following factors:

1. **Market** – Assess the market you intend to supply. Are there any opportunities in the market? What is your USP? Can you build and develop your USP? Who are your customers? Where are they located? What is the size of your market? Is it a growing market or is the market saturated? Who are your competitors? Identify strengths and weaknesses in your competitors and consider how you can differentiate your offer
2. **Resources** – Are there any under-utilised resources e.g. outbuildings, cottages, machinery, land, watercourses, woodland, upland pasture etc. suitable for farm diversification? Is the proposed new venture correct for you, your family and the farming business? Do you or your family have specific qualities, interests, skills and experience that would lend to a specific business venture? Do you have the time to invest in the new business venture while continuing to run the core farming activities? Do you need to take on additional labour?
3. **Location** – Does your existing business, or proposed new venture, have location advantages? Is it near to a busy commuter route? Is it close to tourist attractions? Does the farm have good access? E.g., tarmac/gravel tracks. Consider accessibility and ease of customer use.
4. **Labour** – Do you have sufficient labour and resource to run the new venture along with the existing farm business? Do you need to employ part-time or full-time staff? Don't spread resource thinly just to try and reduce costs. It is important to maximise efficiency but maintain good product/service quality and customer experience. As we learn new lessons and adjust to new ways of living and working following the Coronavirus pandemic, businesses of all sectors should place an increased focus on the health, safety, and welfare of their employees and customers. Do staff feel safe in the workplace? Do they have any health concerns or family circumstances? Can you exercise flexi-working? Do they have the right equipment and PPE to carry out their jobs? Staff are one of your biggest assets. As an

employer, manager, or team leader, it is important to remain flexible and understanding as situations change in the future.

5. **Legal** – Entering into a new business venture may have a different tax and VAT structure from the existing farming enterprise. Seek legal advice from your accountant and/or lawyer when scoping a new business venture. HMRC should be consulted regarding VAT issues, see pages 540-543 for details on VAT. Diversified businesses may require additional staff. This will increase the amount of employer's National Insurance and pension contributions payable under automatic enrolment. The proposed diversified business may be subject to Inheritance Tax and/or Capital Gains Tax in future when the farm owner/manager passes away. Diversification can change how farmland and buildings are treated for Inheritance Tax purposes. It is advised to seek advice from a trained professional.
6. **Insurance** – Changes to your insurance policy may be required when setting up a diversified enterprise. New activities relating to property and/or agricultural buildings will result in a change in cover. Agricultural buildings which are no longer used for livestock or machinery may be classed as a "change in agricultural use". Contents insurance may be required if the new business has internal materials contained within the buildings, holiday accommodation, or glamping activities. Public Liability Insurance is required to protect you if a member of the public suffers personal injury, or if any of their property is damaged, as a result of your business activities. Employers Liability Cover would be required if you employ full-time or part-time staff to manage, administrate or assist with the business enterprise. This also covers cleaning and maintenance staff.
7. **Risk Management** – A Health and Safety and Fire Plan is required before setting up a new business venture. Business Interruption Cover is insurance that covers the loss of income that a business suffers after a natural disaster e.g., fire, wind, flooding etc. Although Business Interruption Cover is not essential, it is advantageous to cover any financial loss/loss of income incurred due to a natural disaster. One of the lessons learnt from the Coronavirus pandemic is the need for crisis management. Business owners and managers should have contingency plans in place in case there are new variants of the virus, new government restrictions imposed on the business, or changes in public attitudes and demands towards travel and social interactions. If you are considering a new diversified enterprise build in flexibility for delivery from the outset.
8. **Hygiene** – If you are responsible for developing and maintaining a business' food safety management procedures, you are legally required to have formal food safety and hygiene certification – contact your local authority for more information. Following registration, your business will undergo regular inspections to ensure

that you meet food hygiene standards and legislation. You must also follow the principles of Hazard Analysis and Critical Control Point (HACCP). Useful information can also be found on the Food Standards Scotland website (<http://www.foodstandards.gov.scot>).

9. **Planning Permission** – Planning permission may be required if the new business venture involves erecting or modifying a permanent building. Planning permission may also be required if there is a change of agricultural land or change of land use. It is advisable to contact your local authority and/or professional planning consultant early to gauge what planning regulations are required. Getting your local authority on board early is beneficial in the long run and they can answer any questions or concerns you may have before a project begins. See pages 430-434 for further details.

Part-Time Off-Farm Work

Although off-farm employment is not typically seen as 'farm diversification' it can provide an additional income stream to the farm business and utilise existing personal skills and talents. Consider how you/your family can put existing skills, qualities and talents to greater use, provide additional income, and how this could be achieved whilst maintaining core farm operations. Agricultural contracting continues to be a popular off-farm activity, using either surplus machinery or labour capacity, or machinery purchased specifically for this work. Contracting charges for a range of agricultural activities are shown on pages 399-402.

Sources of Information

SAC Consulting published a guide for farm diversification giving advice on suitable diversification enterprises supported with case studies of successful diversified businesses. This guide can be found here:

<https://www.ruralbrexit.scot/resource/future-proof-your-business-through-diversification-report/>

Links to support organisations and other useful sources of information include:

SRUC – <https://www1.sruc.ac.uk/>

SAC Consulting - <https://www1.sruc.ac.uk/business-services/what-is-your-goal/diversification/>

Farm Advisory Service - <https://www.fas.scot/>

AHDB Beef and Lamb Box Scheme –

<http://beefandlamb.ahdb.org.uk/directselling/box-schemes/>

Food Standards Scotland – <http://foodstandards.gov.scot/business-and-industry/advice-for-new-businesses>

Soil Association – <https://www.soilassociation.org/>

Business Gateway – <https://www.bgateway.com/>

Scotland Food & Drink – <https://www.foodanddrink.scot/>

Connect Local – <https://connectlocal.scot/>

Quality Meat Scotland – <http://qmScotland.co.uk/>

Visit Scotland – <https://www.visitscotland.com/accommodation/caravan-camping/glamping/>

Inspired Camping – <https://www.inspiredcamping.com/starting-a-glamping-business/>

Food Hygiene – HACCP <https://www.food.gov.uk/business-guidance/hazard-analysis-and-critical-control-point-haccp>

Speciality Crops

Speciality oil crops

Several speciality oil crops have been grown in the UK for a wide range of uses. Some oilseed crops perform particularly well in Scotland yielding higher oil levels while others are not suited to Scotland due to agronomic constraints, particularly the higher risk of a late and wet harvest. Production of several crops has been concentrated in the south of England or overseas to ensure more reliable harvest conditions. Crops with greater potential for cultivation in Scotland are outlined below.

Oilseed rape – Developing specialist markets for conventional oilseed rape (*Brassica napus*) and also cultivation of oilseed rape varieties with specialist oil profiles allows diversification whilst having the benefit of a crop which is familiar to growers. Several growers throughout Scotland have set up specialist brands of cold pressed rapeseed oil for culinary use in recent years. These include Mackintosh of Glendaveny, Ola Oils, Summer Harvest, Borderfields, Supernature and Black and Gold. Markets have been developed which recognise the excellent nutritional characteristics of rapeseed oil (it has the lowest levels of saturated fatty acids of all commonly used fats and oils) in combination with the benefits of cold pressing to maintain natural vitamin content.

High Erucic Acid Rapeseed (HEAR) is grown to produce erucic acid, used as a specialist lubricant particularly for plastics for which it has clearance for food contact. Seed from HEAR varieties is not suitable for human consumption and HEAR varieties cannot be grown in the same rotation as conventional varieties. Yields are typically below the best conventional varieties but similar to average yielding conventional varieties. Contracts for production are available from a number of merchants with current premiums around £25-35/t over conventional rapeseed.

Another oilseed rape type, with high oleic, low linolenic levels in its oil (HOLL), is used as a specialist healthy frying oil. The oil profile of this type means that it is very stable, resisting oxidation and retaining its taste in a catering environment. Details of varieties can be found on the North UK Oilseed Rape Varieties List (AHDB).

Linseed – Linseed oil is high in α -linolenic acid, and used for the manufacture of coatings, drying agents and putty. Although this fatty acid would be desirable for nutrition, its presence leads to rapid oxidation of the oil, reducing shelf life. The area of linseed has recently increased in the south of England as an alternative to oilseed rape which has become more difficult to establish since the neonicotinoid insecticide ban. In Scotland the area of linseed grown is currently low. Spring sown varieties tend to be rather late maturing for Scottish conditions. The introduction of autumn sown varieties provides an earlier harvest and these have potential for Scotland if winter hardiness can be confirmed with trials currently in progress.

Minor oilseed crops – A range of more novel oilseed crops can be grown in the UK and Scotland though few are presently being widely grown due to limited contracts and agronomic limitations though this may change.

Crambe: Like HEAR, Crambe (*C abyssinica*) is grown for the erucic acid contained in its seeds. It has been grown extensively in the UK and it grows well in Scotland. Crambe contains higher levels of erucic acid than HEAR, but its yields are slightly lower.

Echium: Echium (*Echium plantagineum*) also known as Viper's bugloss, produces high levels of stearidonic acid (14% of oil). The oil has valuable application in cosmetics and in skin care for the treatment of eczema and sunburn and as an anti-wrinkle preparation, as well as for health supplements such as a fish oil alternative as an Omega 3, 6 and 9 source. Echium has been successfully grown in trials in Scotland, although it is challenging to grow and produces low yields. It is spring sown, the crop flowers for an extended period and time of swathing has to be carefully selected to maximise seed setting.

Specialist oilseed crops seed suppliers and contract buyers include; Premium Crops (www.premiumcrops.com), and Nature's Crops (www.naturescrops.com).

Camelina: Part of the *Brassicaceae* family like canola and mustard, camelina used to be grown in the UK prior to oilseed rape and imported palm oil. It has uses in the food market as a distinctively nutty and pepper oil, or as a seed for topping baked products, and is high in Omega 3 fatty acids. There is also growing interest in its use as a biofuel, particularly for aviation. Technical notes on growing have been produced by Bangor University:

(<http://www.calu.bangor.ac.uk/Technical%20leaflets/030201Camelinafinal.pdf>).

Speciality grains and pulses

Minor cereals and grains – with growing consumer interest in low gluten or gluten-free cereals and many supermarkets having special diet

sections, there is increasing opportunity for producers to diversify into alternative cereals. While yields may be lower than conventional varieties, premiums for certain crops can compensate for this, and cereals such as rye, emmer and spelt can perform well in challenging conditions, depending on careful variety choice.

Dehulling and processing can be challenging as machinery may need to be adjusted, and small quantities can be a barrier for larger processors. A 'growing contract' is advisable for alternative cereal crops, as well as consulting the processor on the best choice of variety for the intended use/market.

Buckwheat can be sold as gluten-free if not contaminated with other cereals, research has shown various health benefits including lowering blood sugar, and it holds potential as a plant protein as a naturally high protein cereal. Quinoa is also a popular alternative to cereals and has been successfully grown in several areas of the UK; though not grown commercially in Scotland, it has been trialled and improving climate may provide more opportunities for quinoa in the near future. Hodmedod, a company based in Suffolk, are growing the first chia and camelina seed crops, as well as a variety of pulses, in the UK, proving that there is market potential, albeit niche.

Alternative proteins – Grain legumes are often seen as a low-income crop in arable rotations, with higher value break crops such as rape given preference. However, improving prices, reflecting increasing market interest for locally grown (and soya alternative) legumes for both feed and food, offers great potential for future domestic pea and bean production. Higher value feed markets, such as protein substrate for salmon feed, as well as more options for products destined for human consumption (with a premium of up to £100/t), offer better returns from vegetable proteins than in recent years. Ongoing research and development in processing to refine protein quality may provide further market opportunity in the future.

Changing consumer demands has seen a year on year growth in meat alternative products such as Quorn, and Beyond Meat, as well as more sophisticated ways of processing vegetable proteins, providing increasing demand and higher-value markets for pulse crops. Hodmedod, a company based in Suffolk, were also successful in growing the first lentil crop since Roman times in 2017, as well as marketing a range of pulses, including fava beans, yellow and green split peas and carlin peas.

Legumes require no additional nitrogen and can carry over 30kg N/ha in the soil for subsequent crops, reducing N leaching and costs of applied N (of £24/ha). They are beneficial in arable rotations for disease, weed and nitrogen management, and although they are less profitable as stand-alone crops, their returns are improved when factoring in yield benefits and reduced input costs to subsequent crops in the whole rotation. Trials

of intercropping peas with spring barley in Scotland have shown to have no adverse effects on yield and improved returns, and farmers in Scotland are actively and productively doing this; alternative methods of cropping such as this therefore offer potential for expanding production of other legumes. The PGRO publish an annual list of recommended varieties, as well as an agronomy guide for grain legumes, trial results and troubleshooting guides (www.pgro.org).

Lupins: Lupins can be grown as a high-quality alternative to soya for livestock feed, and offer a much higher protein content than either peas or beans. There are various potential food uses, although being a common allergen it is less preferred for food markets. Largely spring varieties are available in the UK and prefer a pH of 7 or less. An Agronomy Guide for growing lupins is available on the PGRO website (<http://www.pgro.org/downloads/Lupin-Agronomy-Guide-2014.pdf>).

Essential oil crops

Essential oil crops are generally grown on a smaller scale than the specialist oil crops mentioned above and can provide high value opportunities. Several are being grown throughout the UK, including lavender, peppermint, rose and rosemary, although the less favourable conditions at harvest in Scotland limit production potential.

Tea

The Tea Gardens of Scotland are one of a very small number of Scottish producers of tea. Tea produced in Scotland is a niche and high value product and is challenging to produce, with many tea growing businesses integrating with visitor experiences such as gardens, tastings, and blending courses.

Fibre crops

Flax and hemp for fibre can both be cultivated successfully in Scotland and more widely in the UK. There is interest in increasing the use of natural fibres, however, commercial scale processing of these fibres is currently absent or limited in Scotland and the UK at present.

The use of natural fibre products and the particular attributes of products derived from these fibres, is generating global interest in these crops for a wider range of fibre qualities. End uses include biocomposites for car components in the automotive industry, lightweight glass replacement in the aviation industry and insulation materials in the construction industry. A further use for hemp in construction is as hemcrete, where the inner core of the stem is blended with a lime based binder and cast around a timber frame. Hemcrete's qualities of high levels of thermal insulation and excellent strength characters are of note and it meets building regulations, counting towards the code for sustainable homes (CSH). There is also scope for hemp to be used in sustainable packaging alternatives, as industry, consumers and policy increasingly look for non-plastic options.

Flax is traditionally used for high quality linen production requiring exacting production conditions, however, there is no longer a viable commercial market for it in the UK. There are no longer any large-scale buyers of hemp in the UK since Hemcore of Essex went into administration in 2013. A family run business remains processing its own hemp for horse bedding and construction in Yorkshire www.eastyorkshirehemp.co.uk/. There is also a nascent hemp producers association; www.ukhemp.co.uk/.

Industrial hemp is usually grown for either fibre or oils/seeds, and there are currently around 40 producers across the UK; currently dual-purpose varieties struggle in the UK as the seeds ripen a month after the fibre is suitable for harvest. Hemp can be incorporated into an arable or mixed arable rotation as a break crop, and is effective in improving soil, sequestering carbon (up to 15t CO₂ per ha, according to recent research, outperforming even timber), absorbing soil pollutants, and reducing use of inputs. Hemp is relatively hardy, but performs best on deeper, lowland soils.

In addition to using the stems for fibre, the oil from the seeds has an application in the higher-value specialist food market, a market which has more than doubled during the last five years due to interest in health claims, and is expected to triple in value over the next five years; products from this include essential (CBD) oils, cooking (hemp) oils, teas, milk alternatives, and flours/meals, as well as protein-based by-products.

The lack of processing facilities in Scotland and the UK limits greater cultivation of these crops as they are bulky and expensive to transport in their raw state, hence it is necessary to have processing facilities close to the site of production for economic viability. Only varieties of hemp with a THC content of less than 0.2% and from EU approved seed can be grown; a licence is required for the cultivation of hemp, which can be obtained through the processor of the hemp fibre, or applied for directly through the Home Office, and lasts for three growing seasons.

Alternative Livestock

There is a wide range of alternative livestock enterprises that farmers can diversify into, many of which can use existing husbandry skills, and complement existing livestock systems on the farm. Alternative livestock are principally kept for fibre (e.g. cashmere goats, alpacas, angora goats, etc), meat (e.g. wild-boar, buffalo, ostrich, venison, ducks, geese, rabbits, etc), milk and dairy products (e.g. dairy-goats, dairy-sheep, etc) or worms for a variety of reasons including; composting of green waste, fishing bait, sale of composting and earthworms for household food waste/compost, etc.

Diversification into alternative livestock can have considerable capital costs to start-up, particularly through the requirement to purchase

livestock, equipment, and infrastructure (deer fencing, handling facilities etc.

Before diversifying into alternative livestock, the economic viability of this venture should also be explored. Whether you keep alternative livestock for fibre, meat, or other uses, the end markets can be very niche with limited demand. Market research is advisable before you commit.

Often the early adopters of alternative livestock species control the breeding stock and command premium prices for their stock so some industries in infancy can be expensive to enter. Examples of stock prices include:

- Breeding female alpacas cost around £3,000 to £15,000 depending on age and pedigree. Top end breeding females can cost up to £25,000. Stud males cost £10,000 to £40,000 depending on age and pedigree. Top end stud males can cost up to £60,000. Stocking density is 3 to 5 alpacas per acre. Fleeces vary in price - hand spinners pay £40 - £80 depending on quality. Specialist shearing is required at a cost of around £15-40 per animal (Source: Bowbridge Alpacas Scotland, 2021).
- Wild boar stock costs: Gilts and young boars around £350 - £500. In-pig sows and adult boars around £500 - £700 (Source: SRUC, 2019).
- Dairy goats cost around £175 - £250/hd.
- Cashmere goats cost around £100/hd with bucks costing around £150 - £250/hd.
- Dairy ewes generally cost from £150 - £300/hd.
Goat stocking density: around 20-25 goats per acre (Source: G Webster, Scottish Goatkeepers' Federation, 2019).

In addition to the actual cost of livestock, there are high capital costs associated with stock control, such as housing, fencing and specialist handling facilities (e.g. specialised wild boar and deer fencing). If alternative livestock are being farmed for meat then it is also recommended to check that local abattoirs are licensed to slaughter that specific type of animal and, if not, what alternatives may exist.

Honey production may be a suitable diversification option for some farmers. Bees play an important role in the pollination of food crops and could be introduced alongside an existing arable, fruit or vegetable enterprise. More information can be obtained from the Scottish Beekeepers' Association (www.scottishbeekeepers.org.uk) and the British Beekeepers' Association (www.bbka.org.uk).

Insect farming could provide a sustainable alternative protein source for animal feed, while helping to reduce our reliance on protein imports and environmental impacts. Insect farming provides a circular economy opportunity to turn organic residues, including pre-consumer food waste, into feedstock for food systems. Scotland is well placed to become a global leader in this emerging industry, contributing to the Scottish

Government's circular economy objectives and food waste reduction targets. Insect farming can also support aquaculture, agriculture and food and drink businesses. Insects need high quality feeds to perform well just like any other livestock. Production systems can be very expensive, highly automated with purpose-built units. More information can be found here:

<https://www.zerowastescotland.org.uk/event/insect-farming-scotland>

Farmers considering diversifying into alternative livestock must assess the market potential for their product and ensure that an adequate return can be generated to meet start-up costs. Some novel livestock industries have a limited infrastructure in place (to buy specialised feed, sale of breeding stock, or marketing of finished produce) meaning it is more difficult to negotiate on price or find alternative suppliers. There is a tendency in some forms of alternative livestock to rely on selling breeding stock as a means of recovering the capital investment, but market outlets for meat, fibre, and other products must be closely examined (perhaps through farmers' markets and farm shops, or finding specialist high value niche markets for products).

It is advised that anyone who is considering diversifying into alternative livestock should contact the appropriate producer association for advice and support at an early stage of the diversification process. It would also be valuable to speak to others already working in the sector.

Information specifically on deer farming can be found on pages 214-225.

Retailing

Selling farm produce directly to consumers can be an excellent diversification option for farmers enabling them to add value to their primary produce. The COVID-19 pandemic has increased consumer awareness of the food and drink they consume, where it comes from, and the environmental impacts of our global food system. This has presented huge opportunities for farmers, and food and drink producers to sell their produce locally, promoting high quality produce with strong provenance and environmental credentials.

Farm retailing evolved in the 1970s when farmers sold fresh produce at the farm gate and fruit farms welcomed the general public to pick their own fruit.

Since then, farm shops have multiplied as farmers have diversified to add value to their produce and farm businesses. Farm retailing can range from a simple 'honesty box' approach, a 'box' delivery service, a vending facility to a large multifunctional retail outlet. Those thinking of entering this market should take into consideration the production costs of the venture, the time, commitment, travel, competition, and support required to sell directly to the consumer.

As with any business venture, market research, a feasibility study, and a rigorous business plan incorporating a marketing plan should be prepared and should include information and research into all the relevant aspects of the proposal, such as:

- The size of the local population within a 30-60 minute drive of the proposed retail outlet(s).
- Key transport routes, e.g., is the proposed site on a key arterial route?
- Capital costs: car parking and access, construction, storage facilities, website creation, brand and digital investment, purchase of delivery van(s), interior design and materials etc.
- Running costs: including business rates, rent, staff costs, advertising, and other fixed/variable costs.
- Consideration of range, variety and pricing (this should reflect the quality of produce offered including the freshness, environmental impact and provenance of the produce on offer).
- Competitor outlets (not just other farm shops)
- Planning permission requirements.
- Legislative requirements (e.g. environmental health, food hygiene, labelling, health and safety, trading standards, access from the local Highways Authority, accessibility requirements). There may be further legislative requirements following the COVID-19 pandemic.

Further advice is available from a number of sources including:

- SAC Consulting Food and Drink: <https://ww1.sruc.ac.uk/business-services/help-in-your-sector/food-drink/01224711044>
- Taste of Scotland: <http://taste-of-scotland.com/farmers-markets-in-scotland/>
- National Farmers' Retail and Markets Association: www.farma.org.uk; 0345 319 6740
- The Larder - A Guide to Scotland's Food & Drink: <https://food.list.co.uk/guides/the-larder/>
- Scottish Government food and drink policy: <https://beta.gov.scot/policies/food-and-drink/>
- Scotland Food and Drink: <http://www.foodanddrink.scot/>
- Food Tourism Scotland Strategy: <https://www.foodanddrink.scot/resources/publications/food-tourism-scotland/>

Farmers' markets

Farmers markets provide a great opportunity for producers to sell directly to consumers, and for consumers to purchase fresh, local food and drink on the high street. Most farmers' markets are held monthly, with some held more frequently, particularly in areas with larger populations. Most farmers' markets will have the ethos of providing consumers with high quality food and drink grown or produced locally and some markets will consider other products produced in the local area such as arts and crafts or other artisan products.

Markets are run by a variety of organisations including farmers and/or producers, town centre management companies, local councils, or by companies appointed by the council to run markets. All farmers' markets and individual stallholders are expected to meet the same health and safety standards as any other retail outlet. Farmers' markets can provide the opportunity to communicate the benefits of the product and gather feedback directly from the end consumer. Farmers' markets can be considered more expensive by consumers, although research has indicated that product pricing is comparable with retailers where similar high-quality produce is available. It is important to consider your price point and marketing to encourage sales; and to be able to measure the value (profits) you gain by selling at a market.

In recent years, some farmers markets have noticed a decline in footfall as there has been a shift in demand among consumers to purchase produce online. This trend has been accelerated following the Coronavirus pandemic due to lockdown and temporary closure of some physical markets. There has been a big increase in online retail sales through businesses own websites, or via collaborative online food hubs and farmers markets.

Whilst many businesses sell produce via their own website, there are opportunities to market produce through collaborative online platforms. 'Neighbourfood' is an example of an online marketplace where consumers can order food and drink online via the web-based platform and collect from a local collection hub. This provides consumers with a platform to browse a whole catalogue of local produce and enables producers to showcase their produce at relatively low cost.

More information can be found here:

<https://www.neighbourfood.co.uk/>
<https://www.neighbourfood.co.uk/markets>

Some regional food groups also successfully ran their own virtual markets using a common hashtag and a variety of social media platforms. Consumers could search for the market using the hashtag and then contact the seller direct via encrypted routes such as Facebook Messenger or WhatsApp. Simple tools to enable online payment, or e-commerce website functionality supports hassle-free sales and encourages more direct consumer interaction.

Producers considering selling produce through a farmers' market should:

- Assess what is already being sold at the market. Will there be a demand for their produce? Is there enhancement of the product range? Some markets will limit the number of producers from the same sector eg meat, alcohol etc
- Contact the market organiser for more information on the operation of the local market.

- Visit a local market and obtain information on competitors' products and prices.
- Consult other sources of advice, e.g. Farm Retail Association <https://farmretail.co.uk/> There is also a Farm Retail Association (FRA) Facebook members' forum which provides an informal platform for farm shops and stakeholders to share knowledge and information.
- Consider whether the business can commit the time, money and other resources to preparing and selling produce at farmers' markets.
- Think about how the customer will be attracted to the product. Consider the product itself, packaging, information about the product, layout of the stall and price.
- Consider how the product can be stored and displayed, ensuring compliance with all legislation and other regulations. For more information contact Food Standards Scotland (www.foodstandards.gov.scot)
- Contact your local regional food group.

Farm shops

Farm shops vary in size and product/service offering. The farm retail market is saturated in some regions and therefore it is important to carry out a feasibility study before starting. New retail outlets or farm cafes must provide a unique selling point or have a strong attraction in order to attract and retain customers. Many farm shops are now becoming food tourism destinations where customers will spend time participating in recreational/leisure activities during their visit.

Points to consider when planning a farm shop:

- The increase in popularity of farm shops is linked to the growing trend amongst consumers to buy local food with strong provenance and traceability. Most farm shop businesses are initially based around products that are produced or made on the farm, in the shop, or where possible, within the local area. But ranges stocked start to develop over time to ensure that customer needs are being met and to take advantage of opportunities to sell other products and add value.
- Good accessibility, road networks and infrastructure.
- A storage area similar in size to that of the shop, with good vehicle access will be required. Some of this will need to be chilled or refrigerated, depending on products sold.
- Building costs vary considerably depending upon size, type and extent of the development. Refurbishing redundant buildings can be more expensive than building new but may produce a more 'authentic' farm shop feel than a new build. If starting small, build in capacity for expansion as the business grows, including the car parking area.
- Linking the farm shop to produce grown or made on the farm and telling the history or provenance of the farm is a key marketing tool.
- Encouraging customers to stay longer by providing additional recreational/leisure activities will generally increase average spend per customer. A café and/or other activities such as children's play

area, walking paths, nature trails, etc. will help to extend customer stay and potentially increase customer spend.

- Retailing is a customer service business, so recruiting and retaining good staff is essential. If the shop has a butchery and/or café selling good quality meals, then a master butcher and chef may be necessary.
- Franchising areas (e.g. butchery or café) out to existing local businesses is worth considering as they can bring the necessary skills and provide an additional revenue stream through rent of the premises. This is particularly worthwhile for small / start-up businesses which may look to increase brand visibility among a strong customer base in a popular farm shop or farm retail destination.
- Consider local and regional competition and, where possible, incorporate a defined USP to differentiate from other farm shops.
- One thing that is critical that can be overlooked is the 'story' of the farm shop. It is important to make your farm shop different from all the others out there. Build it around a story that consumers can buy in to and that makes them feel like their visit has been an experience. Too many farm shops run the danger of becoming rural supermarkets and that can devalue the overall offer and the initial intention. The link to the farm and the story is important in terms of provenance and credibility.

Depending upon size and location, a well-presented farm shop and café can generate an annual turnover of between £500,000 and £1,000,000 with some larger farm shops generating well over £1million per annum. Staff costs generally range between 20%-40% of total business turnover depending on the type of business, with the percentage usually higher in the café (30%-50%) than the shop (12%-20%) (Source: Farm Retail Association, 2019).

Vending machines

With strong consumer demand for local, traceable food, installing a vending machine is a relatively low-cost method of diversification. Farm vending allows consumers to purchase fresh local produce such as potatoes, vegetables, eggs, soft fruit, and more, 24 hours per day, 365 days per year. Farm vending provides farmers with significantly higher profit margins than mainstream markets, and ensures that profits are retained at the farm gate. Farm vending allows consumers to purchase fresh produce direct from the farm, or from a collection point e.g. local attraction, shopping centre, or train station, without the overheads involved with running a 'typical' farm shop.

Farm vending machines are custom built and come in varying locker sizes. Machines can be ambient or chilled depending on the type of produce sold. Some farms have chosen to create walk-in farm vending retail spaces where customers can browse products, purchase fresh milk, and buy fresh coffee from self-service takeaway machines).

In the correct location, with a good variety of produce available, farm vending machines can have a payback period of around 12 months. Vending machines should be ideally positioned where there is good vehicular access and/or areas with high customer footfall on a farm near to the main road, shopping centre, caravan park, petrol station etc. Machines need to be kept under cover to protect them from the elements and consideration should be given for parking and groundworks. Planning permission may be required if the machine is located within a purpose built shed/outbuilding. Keeping vending machines stocked with a variety of seasonal fresh produce is important to ensure repeat custom. A blend of vending and face to face retail can offer an extension to a 'regular' farm shop, enabling customers to pick up pre-ordered product out of hours.

Milk vending is also growing in popularity in Scotland. Many dairy farmers have diversified into milk vending to help increase profit margin. Milk vending machines vary in size and specification. Prices range from £6,000 to £16,000+ depending on brand, features, installation, and product technology (prices vary depending on supplier, installation, technology, and service package). Basic tanks will include milk tanks, agitator, control system, chilled milk compartment, and a dispenser system. More advanced models can include contactless payment systems and SMS alert systems when machines are running low on stock.

It is important to seek guidance from your local Environmental Health department before diversifying into farm vending.

Consider health & hygiene measures in light of the coronavirus pandemic to keep customers safe.

Tourism

Agri-Tourism

Farm-based recreation or 'agri-tourism' is becoming increasingly popular among tourists/visitors and is a diversification enterprise which promotes a more diverse and sustainable rural economy. Agri-tourism provides farmers, crofters and landowners with additional income and the opportunity to connect with the public showcasing life in the countryside.

Across many rural parts of Scotland, agri-tourism provides economic prosperity and supports livelihoods in many communities. Agri-tourism provides customers with the opportunity to visit and stay at a farm, or rural business, eat a variety of local food and drink on offer, visit local tourist attractions, towns, cities and villages, and support the Scottish food and drink sector.

Lengthy lockdown measures imposed during the ongoing COVID-19 pandemic has heightened public appreciation of nature, the environment,

outdoor spaces, and the benefits these have in promoting good physical and mental health.

Agri-tourism has moved towards the provision of rural experiences where customers can get a real hands-on flavour of the countryside, or the daily life of a farmer. Bespoke packages can be created which may include accommodation, private dining experiences, farm tours and activities, or offered as a stand-alone activity.

As with all enterprises the pandemic has highlighted the importance of building flexibility into delivery e.g., if you offer face-to-face B&B accommodation can you flex into dine-in-room if required without detracting from the experience.

Farm Tours

Farm tours and supervised on-farm experiences can be very socially beneficial for both farmers and customers, strengthening relationships between farmers and the general public. Farm tours and other educational initiatives provide visitors with the opportunity to learn about farming, food production, and the environment, and can be very financially rewarding for farmers. Farm tours are relatively easy to set up without considerable overheads, but considerations should be given for public liability insurance, health & safety, and showcasing your business and farm animals to the general public in the best possible way.

Wellbeing Tourism

As we ease out of lockdown, consumer demand for health and wellness tourism in Scotland is on the rise. With strong demand for staycations, rural experiences, and natural pursuits, rural tourism and farming businesses can capitalise on emerging health and wellness trends following the COVID-19 pandemic.

Consumers are increasingly looking for more than just visiting the countryside. The pandemic has fuelled recognition of the importance of personal health, wellbeing, relaxation and finding new ways to switch off from digital devices, and this is extending to their holiday decisions.

Wellbeing tourism has been identified as one of the top new farm diversification trends by the Farm Business Innovation Show, and rural businesses can be part of this growth market by offering varied and exciting escapes in the countryside, where visitors can be active and engage, for example in farm activities, farm tours, and nature trails.

Sensory gardens, forest bathing, organic skincare products, paddleboard yoga, thermal pools and wild swimming are all driving consumer interest. Digital detox is high on the agenda, as is social connection following the pandemic. Those booking rural breaks in Scotland also want good local food and drink with nutritional benefits.

Ecotourism and nature-based tourism

An increasing number of tourists and visitors are looking for “green” holidays or activities. Ecotourism, which tends to be connected to educational aspects such as the promotion of sustainability, is different from nature-based tourism which can be viewed as tourism to places of natural significance or beauty, although there is some overlap between the two concepts.

Businesses looking to diversify could consider their own ‘green credentials’ and how they could, if necessary, modify their marketing to attract the maximum number of customers. Many businesses are members of initiatives such as the Green Business Tourism Scheme (www.green-tourism.com) and membership of such schemes can be used in marketing and promotional material. Tourism businesses could incorporate nature-based activities such as wildlife-watching and adventure-based activities into their offering to take advantage of their natural capital. Information on the local environment, scenery and nature-based activities in the area could also be provided to potential customers. Signposting and collaboration between businesses adds to the customer experience and also supports the local economy.

Self-catering

Planning permission and building regulations (see pages 430-434) are the essential first steps when considering offering self-catering accommodation. If starting a new business or converting/extending your premises, you should contact your local authority planning department for their advice on planning permission at a very early stage. Any structural alterations to a property, or the construction of a new building, will be subject to building regulations, so again contact your local authority. Compliance with other regulations, particularly fire will also be required. Self-catering accommodation may be more successful when located along popular tourist routes and in areas with good tourist facilities/activities. As there may be strong competition for business in some areas, it is important to offer a high standard of accommodation and possibly other facilities, which may increase capital costs. Suitable parking and good vehicle accessibility are important. Good marketing is required to maximise occupancy rates and participation in quality assurance schemes will also be beneficial, e.g. VisitScotland Quality Assurance Schemes (www.visitscotland.org). Membership of associations can also be beneficial, such as the Association of Scotland’s Self-Caterers (<http://www.assc.co.uk/>). These associations and membership groups provide up to date information and guidance particularly any changes to health and safety, cleaning protocols, and COVID-19 guidelines.

A large proportion of customers base their accommodation choices on reviews on sites such as Trip Advisor (<https://www.tripadvisor.co.uk/>) and/or Facebook. Managing and responding to reviews on these sites is

important to ensure customer satisfaction and maintaining a positive reputation in the marketplace.

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It is important to keep properties well maintained and presented to encourage repeat custom and promote customer recommendations.

Bed and breakfast

In common with self-catering units, the quality of bed and breakfast (B&B) accommodation must be of a high standard in order to attract customers in what is a very competitive market. Location and proximity to tourist attractions and facilities are also important selling points. It is important to consider seasonality and regional variations in occupancy when budgeting/forecasting. Compliance with all appropriate regulations, particularly fire regulations and relevant food hygiene regulations will also be required. If the establishment offers dinner, business rates may apply.

Glamping

Glamping pods, Wigwams, Yurts, Shepherd Huts, Bell Tents and other glamping facilities may be a suitable diversification option for farmers, landowners, and/or rural businesses. The glamping market in some regions has reached saturation point and careful consideration should be given to competition in your area before starting.

Glamping is a tourism experience where individuals, couples, or groups seek to immerse themselves in the natural environment by going back to basics and re-connecting with nature from a luxurious base. Glamping has become a popular option for UK holiday-makers and overseas visitors seeking the luxuries of hotel accommodation alongside the freedom and adventure of camping. Glamping sites provide electricity, heating, kitchen and toilet facilities as standard with many sites now offering saunas, jacuzzi's and hot tubs. Due to the popularity and availability of glamping in the agri-tourism market, customer expectations have increased, and many providers are now operating in competition with 4- and 5-star rural accommodation providers.

Glamping pods generally sleep 2 to 6 people depending on size and specifications, providing a romantic space for couples or a functional getaway for small groups.

Glamping sites should ideally be located near areas of spectacular scenery, on the banks of lochs, nestled beneath hillsides, along popular walking or cycling routes, or within proximity of towns, villages or cities. Planning permission may be required for a glamping site in some locations. Conflicts of interest between tourism, accommodation, cars,

caravans, and the natural environment should be considered. Seek advice from your local authority at an early stage of the diversification project.

Costs – basic glamping pods range from £3,000-£8,000 each with more advanced models ranging from £10,000-£20,000 each. Basic wigwams start around £7,000 with larger more advanced models ranging from £14,000-£20,000. Yurts also vary in size, shape and cost. Small 10ft yurts start around £4,000-£6,000 with larger models 25ft-40ft ranging from £15,000-£40,000. Costs, delivery charges and installation will vary with certain manufacturers. Maintenance costs are around 5-10% of the capital value per annum.

Customer charges vary depending on season, quality, size and location. Good examples range between £45 and £90 per night during peak season with luxury examples reaching highs of £120+ per night (based on 2 people sharing).

Sources of information

Sources of further information for tourist accommodation include:

- Criteria/guidance for Small Serviced Classification (http://www.visitscotland.org/business_support/quality_assurance/accommodation/self_catering_accommodation.aspx)
- Farm Stay (www.farmstay.co.uk)
- Accommodation in Scotland (<http://www.explorescotland.net/holiday-in-scotland/accommodation/>)
- Farm Business Innovation Diversification into Glamping (http://www.farmbusinessshow.co.uk/news/blog.asp?blog_id=2518)

Sports & Leisure Tourism

The sports and leisure tourism market has grown rapidly over the past 5 years. The health and wellness industry covers a range of areas from healthy eating, staying fit, and maintaining a healthy weight, to looking after mental and physical health. The retail value of the health and wellness market in the UK increased from over £18 billion in 2015 to nearly £20 billion in 2018 (Source: Statista 2019). UK farmers could tap into this market by providing customers with the opportunity to enhance their health, fitness, and wellness in a natural countryside setting.

Farm/Outdoor Fitness

Farm fitness is a relatively new concept which is quite novel as a diversification enterprise. There is growing public interest in accessing outdoor fitness facilities following the Covid-19 pandemic. Throughout lockdown, indoor gyms, swimming pools, sports halls, and aerobics/fitness class venues have been temporarily closed. As we ease from lockdown, people can now meet in small groups outdoors for leisure, sports, and fitness activities.

It is possible to start a farm/outdoor fitness enterprise and employ suitable staff with appropriate skills, qualifications, and enthusiasm, but careful consideration should be given to how the enterprise fits in with existing farming operations.

The 'Farm Fitness' brand began as a purpose-built outdoor gym facility developed by an English farmers' son. 'Farm Fitness' is a custom training facility located against the idyllic farmyard backdrop with stunning countryside views. Customers can pre-book to use the outdoor equipment or get a personalised training session replicating farming activities. Farm Fitness was voted one of the best gyms in the world and 'coolest outdoor space' by fitness magazine Men's Health (<https://www.farmfitness.co.uk/>).

Other farm-based gyms and outdoor fitness activities have recently entered the market offering personalised, and group training sessions. Another example is PeaceFit, a new facility based at Peacehill Farm, Wormit, in Fife offering one-to-one, group, and family fitness classes.

Outdoor fitness has also increased in popularity as fitness enthusiasts across the UK seek the adventure and thrill of outdoor fitness pursuits. This has largely been driven by the increase in outdoor events pre-COVID-19 such as 'Tough Mudder', 'Men's Health Survival of the Fittest' and the 'Beast Race'. Farmers could tap into this market as a method of diversification by using land and obstacles surplus to requirements. The 'Wolf Run', voted Farmers Weekly Farm Diversification of the Year 2018, is a farm-based 10km adventure race featuring 25 man-made and natural obstacles, including lakes, fallen trees, bale stacks and a 100m waterslide (<https://thewolfrun.com/>). Outdoor fitness is a relatively low-cost diversification option for farmers seeking to test the market before investing in purpose-built gym facilities. Health & safety, risk assessments, and insurance should be considered for this enterprise, along with an environmental assessment to review possible damage to natural habitat, woodland, fields, etc.

Children's activities

Farm-based children's soft play areas are popular among families during the holiday season. Converting old farm buildings or utilising fields for use as a children's play park can be a profitable venture for farmers/landowners. Location, ease of access, and activities offered determine the success of the enterprise. A children's play park would complement a farm shop, café or retail outlet. During the summer a straw bale maze is a novel activity for kids. A farm can charge around £5-10 per child per visit. Public liability insurance, health and safety, and PVG disclosure checks would be required.

Outdoor Education

Outdoor education plays an important role in children's development, educating them on the provenance of food, farming, and the environment.

Outdoor education and activities also promote good mental and physical health, by allowing those from an urban area the opportunity to explore the countryside in a safe and supervised environment.

Eco-therapy & Care Farming

Mental ill-health is one of the most common health issues worldwide and is sadly on the rise. Following the COVID-19 pandemic the number of people experiencing mental ill-health is predicted to rise in future, therefore it is ever-more important now to find new solutions to support people with mental health issues.

One form of therapy rising in popularity is eco-therapy. Eco-therapy, often referred to as 'green care', or 'green exercise' is a form of therapeutic treatment where patients take part in activities in the natural environment. These activities may include gardening, caring for animals, woodland walks, and horse riding, and is scientifically proven to support people with anxiety and depression. Nature has incredible healing qualities and eco-therapy is now being prescribed by General Practitioners for stress and anxiety.

There is an important difference between eco-therapy and recreation. Eco-therapy involves a trained practitioner or therapist who tailors sessions to the needs of the client, actively participating in activities and setting clinical objectives to ensure client progress and development. It is clinically proven that eco-therapy not only improves mood, wellbeing, and self-esteem, it also has physical benefits for clients. Activities in natural settings on a farm, garden or woodland area encourage physical movement which also lowers stress and improves mood and wellbeing. Group sessions provide opportunities for clients to socialise with others, which is an important factor in supporting clients with mental health issues. Clients often make quicker progress with others in a group setting as they feel that they are not 'alone' with their troubles. This leads to a greater sense of achievement and purpose, provides structure and routine to clients who may not have that in their lives, and builds team working skills, building relationships, and supporting future career development opportunities.

Hovercrafts

Hovercrafting is an extremely popular activity for stag and hen parties, corporate days, and tourists. A hovercraft is a cross between an aircraft and a boat designed to travel over water and land at speed. Hovercrafting can be incorporated into an existing farming enterprise, utilising spare grass fields (and rivers/lochs if available). Hovercraft activities can be hired out for £100-200 per person per hour. Package deals can be offered to larger groups. New hovercrafts cost around £8,000-15,000 each excluding VAT. Prices vary depending on supplier and availability. Public liability insurance would be required to run a hovercraft activity centre.

Equestrian Enterprises

Equestrian related enterprises are often seen as good diversification options for farms or rural occupiers as they can easily complement the existing infrastructure land and business model of the farm. Enterprises that are commonly considered are:

- Horse Livery
- Cross Country Course
- Riding School
- Horse Bed and Breakfast
- Horse Riding Holidays
- Equine Health
- Equine Chiropractic
- Equine Massage

It must be decided from the outset on the service that is to be provided and thus the level of input that is required. Factors to be considered include:

Demand – In many areas there is an oversupply of equestrian facilities and it is strongly recommended that a feasibility study should be carried out before embarking on any new venture.

Location – Good riding country, with access for safe, off-road riding and within easy reach of at least one centre of population is the ideal situation. Enterprises with unique offerings, specialist services/facilities or located on the outskirts of major towns/cities may be able to command a premium price.

Land – On free draining ground, horses and ponies will require around 0.50-0.75 hectares (1-2 acres) of well established, moderate quality grazing per head (equine grass mixtures are available, as it should be noted that grazing intended for production animals may not be suitable for horses and ponies, especially those prone to obesity and laminitis). A larger area will be required where land is poorer or where year-round turnout is required. If insufficient land is available or where the diversified business is to be kept separate from the main farm business, rent may be required. Grassland management costs will vary according to land available but may include a reseeding policy, with annual fertiliser applications, weed control, and seasonal field operations such as harrowing, rolling and topping.

Fencing – Well maintained fencing which is suitable for horses (electric fencing is often preferred), with good gates and an adequate water supply. In some cases smaller paddocks or all weather turnout areas may be required. See pages 405-406 for fencing costs.

Shelter – This will include field shelters and/or well ventilated permanent stables. Wooden field shelters or loose boxes cost around £2,000-

£5,000 each. Conversion of an existing agricultural building may be less expensive. Construction of a 12 box yard, including tack and feed rooms could cost around £25,000 upwards (excluding groundworks and services). Rubber matting in stables is desirable but not essential. Some customers may have their own preferences. Prices for field shelters / stables may vary between suppliers, and planning permission should be obtained before development. For biosecurity reasons, an isolation stable would be advisable in the event of new horses arriving from unknown locations and to prevent disease transmission between horses.

General facilities – Lorry and car parking areas, secure tack and feed stores, a muck disposal area, covered hard standing area with water supply, good drainage, grooming area, kitchen and toilet facilities are basic requirements. If storage of customers tack and equipment is provided on-site, this should be factored into your insurance cover.

Riding facilities – An all-weather outdoor schooling area is almost essential in order to attract customers (e.g. livery yards) and an indoor arena may also be desirable (e.g. for riding schools). A 40m x 20m outdoor schooling area could cost around £10,000-£40,000 and there will be on-going maintenance costs associated with this which will be determined by the frequency of maintenance and the type of equipment being used. A similar size indoor arena could cost around £75,000-£150,000. Both outdoor and indoor costs are determined by the level of ground works required, the size of the arena, the surface chosen and provision of lighting and mirrors. Planning permission may be required for an indoor and/or outdoor arena/school.

Labour – Personnel with customer care and people skills are essential for equestrian enterprises and often a yard/facility manager with experience/qualifications in horse care and events is an important asset. Businesses employing labour will have costs such as wages, employers' liability insurance and the cost of personal protective clothing. Training may be required for business owners or employees to develop their skills.

Operating costs – These are highly dependent on service provision and can include feed (concentrates and forage), bedding (straw or shavings), electricity and water, machinery repairs, fuel, property repairs, insurance, advertising/website/social media management and business rates.

Horse health and welfare – Information on the minimum requirement for keeping horses can be found in the Code of Practice for the Welfare of Equidae <http://www.scotland.gov.uk/Resource/Doc/271583/0080953.pdf>). Many yards will operate a worming programme on site but the cost of wormer would generally be an additional charge. It may be appropriate to consider a health scheme for the horses in the yard, e.g. the Premium Assured Strangles Scheme (PASS) (see page 125 for more detail). Although most horse owners are registered with a recognised veterinary practice, the yard should have a point of contact with a local vet in case of an emergency.

Health and safety – All businesses should be aware of health and safety regulations, see pages 413-415 for more details or the publication at: http://adlib.everysite.co.uk/resources/000/264/078/Livery_Yards_Guidance_2006.pdf.

Fire safety - Businesses should also be aware of their responsibilities with regards to fire safety. More details can be found at: <https://www.gov.uk/government/collections/fire-safety-law-and-guidance-documents-for-business>

Value added tax (VAT) – Advice from an accountant or tax advisor should be sought to make a judgement on whether the services and products provided should be taxable, e.g. depending on the business's VAT status the provision of DIY livery may not attract VAT, however the additional services provided through full livery are likely to attract VAT.

Rates – Buildings used for agriculture are normally exempt from rates however horses are not considered as agricultural 'livestock'. Where a business is providing buildings for use by horses, these buildings are potentially rateable. Advice should be taken from local Council representatives for specific circumstances. The Small Business Bonus Scheme may apply depending on the size of the enterprise and the area occupied for commercial purposes.

Planning – For any new buildings or change of use of agricultural buildings/land (i.e. outdoor arena), planning permission will be required. Advice should be taken from a local planning consultant or the local Council planning department. For more information on planning regulations see pages 430-434.

Approved centres – This would show clients that the business has been assessed against detailed criteria and recognised as being well managed, offering first rate customer care, high levels of horse husbandry and general good practice throughout. See www.bhs.org.uk and www.abrs-info.org for more information.

Living accommodation – Facilities may need to be provided for staff (if required) and for guests where a lodging service is on offer, e.g. bed and breakfast, dormitories/bunkhouses or self-catering in a farm cottage/static caravan/log cabin. When providing accommodation and meals, investigation into local authority regulations, e.g. fire and food hygiene, should be carried out. Membership of quality assurance schemes may also be considered.

Horse livery

On-farm horse and pony livery can range from providing grazing only, to DIY livery, and full livery (including labour, grazing, stabling, grooming, feeding and possibly exercise).

Financial returns will vary depending on the level of service (which is dependent on the knowledge of the person/s running the yard) and facilities being provided (e.g. a basic farm diversification or a specialist professional yard).

Livery services are likely to range from 70-100% occupancy. Grass and DIY livery are realistically the base market for farm diversification projects while part and full livery services will be more suited to yards with skilled personnel.

Examples of livery services and approximate returns are shown in the following table:

| Livery | Service | Returns (£/horse/wk) |
|---------------|---|---------------------------------|
| Grass | Grass keep only, no stable | £15-30 |
| DIY | Stable and grazing only, all horse care carried out by horse owner (hay and bedding can be included as extra) | £20-45 |
| Part | Full care* for part of the week (e.g. weekdays with DIY at weekend) | £60-90 |
| Full | Full care* including or excluding exercise | £75-150 |

* *full care includes stable, grazing, labour, feeding, bedding but excludes wormer, vet costs and farrier.*

Example gross margins (**not** including site specific fixed costs such as labour, rent, rates, maintenance, PPE, insurance, professional and subscription/licence fees, etc) for livery services are shown in the following table. Variable costs can also fluctuate, whether or not the business provides feeding (hay etc.) and bedding. Some livery enterprises can offer discounts for bulk purchases.

Adding value to a livery enterprise is common by providing customers with additional services. These services can include the provision of horse care assistance to DIY livery horse owners, clipping (if skilled personnel are available), products (such as straw and hay/haylage) or other enterprises described in the following sections. Horse transport may also be offered for an additional charge.

| | Grass | DIY | Part | Full |
|----------------------------------|---------------------|------------|-------------|-------------|
| Occupancy (wks) | 44 | 44 | 44 | 44 |
| Price (£/wk) | 25 | 40 | 80 | 110 |
| | £/horse/year | | | |
| OUTPUT | | | | |
| Livery | 1,105 | 1,768 | 3,536 | 4,862 |
| Other Income | - | - | - | - |
| | 1,105 | 1,768 | 3,536 | 4,862 |
| VARIABLE COSTS | | | | |
| Concentrates 0.6t @ £350/t | - | - | 217 | 217 |
| Hay 2.5t @ £160/t | - | - | 396 | 396 |
| Bedding - shavings 1.2t @ £280/t | - | - | 329 | 329 |
| Misc | - | - | - | - |
| | - | - | 942 | 942 |
| Forage variable costs: | | | | |
| grazing 0.6ha @ £34/ha | 20 | 20 | 20 | 20 |
| Total Variable Costs | 20 | 20 | 962 | 962 |
| GROSS MARGIN | 1,105 | 1,768 | 2,594 | 3,920 |

Cross country schooling course

The availability of a fairly extensive area of well drained ground in an accessible location is essential for this enterprise. Varied terrain with access to a river/stream provides options for different jump constructions including a water jump. Initial investment may be high and in addition to many of the equestrian enterprise factors previously mentioned, can include:

- General groundworks
- Field access (for official and emergency service vehicles)
- Jump purchase
- Jump construction
- Communications

It is estimated that jumps cost in the range of £250 to £1,000 per jump. It is essential that the course and all jumps are approved by an experienced and approved course designer in terms of siting, fence design, construction, materials and safety. A consultation fee for this would be expected.

Income will be seasonal depending on factors such as geographical location, weather and availability of land (out with normal farm management practices). The season would commonly run from the end February/start March through to October. Hire costs per horse range from £20 - £35 per hour depending on the number/height/range of jumps available.

Maintenance of the ground and jumps will be cost specific to this enterprise.

Riding school

A riding school is a specialised facility which requires experienced management and operation.

Basic requirements include the availability of land (for grazing and riding), stabling, ancillary areas and riding facilities. An indoor schooling area is almost essential in Scotland to ensure an income all year round.

The level of investment will be heavily influenced by the availability of buildings for conversion. Horses and ponies will also need to be purchased and costs can range from £750 - £4000 depending on size and suitability.

Income should be budgeted on year-round accessibility with evenings and weekends being the peak times out-with school holidays. Lesson charges range from £10-£50 per rider per hour depending on the number of horses in the ride, the quality of the horse/pony being hired, and level of instruction being given. Up to 8 riders may safely join a low level, slow paced beginner type lesson.

Labour and operating costs (as described previously) should be budgeted. Teaching staff will cost upwards of £20 per hour in addition to basic wage rates for yard staff. Management time and costs in terms of staffing will be significant. Local authority licensing under the Riding Establishments Act 1964 and 1970 will be essential when offering horses for lessons (riding lessons offered to someone on their own horse would not require this licence).

Horse bed and breakfast

This enterprise is focussed on providing a bed and breakfast service for horses (and humans) who require respite while on long journeys or as an overnight stay prior to, or during an event. The proximity of the facility to major arterial routes or areas of particular interest for off-road riding or equestrian events is an important factor to consider.

Horse B&B is largely successful where equine facilities are already in place and limited investment is required. Requirements include the availability of one or more stables and an area for the turnout of horses. Accommodation for people (i.e. bed and breakfast in a house or self-catering) can be optional and add value to the service.

Income may be irregular depending on location and on the time of year where there are local scenic riding routes/events available. Charges vary depending on the services and quality offered.

Running costs and management requirements will vary but are likely to be fairly minimal.

Horse riding holidays

Location is fundamental to the success of horse-riding holidays. A riding holiday centre is most suited to premises in scenic and rural areas. Good access to off-road riding over a variety of terrain is essential.

The service can include the provision of horses to hire or there can be the option for guests to bring their own horses.

Basic facilities could include:

- A covered area for tacking up.
- Stables (for hire horses and/or guest's horses).
- Grazing (for hire horses and/or guest's horses).
- A tack room.
- Toilet facilities.
- Living accommodation for guests.

The service can be enhanced by providing other riding facilities, i.e. all weather or indoor arenas, show jumping and cross country facilities, riding lessons, and all-inclusive luxury accommodation. With the above in mind, investment could be great if starting with a blank canvas. This enterprise will work best when there are already horses and facilities in place. Local authority licensing will apply where horses are provided.

Income is likely to be based on short stays (e.g. weekend) or on weekly terms and are likely to be seasonal (end March to end September). Prices will range with a high dependence on the service and facilities provided. These can start at £250 for shorter stays to £1,300 for longer and more intensive/themed stays.

Operating costs will be influenced by the level of services provided. Basic, smaller scale enterprises will have costs for facilities/infrastructure, maintenance, and the keep of horses/ponies. Premium enterprises will have a much greater expense for labour and catering.

Riding for the differently abled

A riding school for differently abled adults and/or children is a rewarding diversification enterprise. Horses and ponies provide therapy, achievement and enjoyment to people who are differently abled. Providing a safe, fun, and supporting learning environment can improve the lifestyle for people with physical and learning difficulties, mental illnesses or other additional support needs. For further information see <http://www.rda.org.uk/>.

Wedding Venues

Converting old or disused farm buildings into a wedding venue may be a profitable diversification option for farmers. Farm-based wedding venues have grown in popularity over the past 5-10 years as couples see farm barns, marquees, and farm countryside as the special place to host their

wedding. With ongoing COVID-19 restrictions having an impact on wedding ceremonies, outdoor weddings in beautiful natural surroundings are proving popular.

Combining a working farm and a wedding venue does not come without its challenges and requires considerable commitment and a specific skillset to run successfully. However, developing a successful wedding venue on a working farm can be a very lucrative diversification option providing significantly higher profits than the core farm business. Prices vary depending on location, package offering, and unique selling points. As a guide, farm-based wedding venues can generate between £3,500 - £7,500 solely for the ceremony and reception depending on the quality-of-service provision. Additional service packages can be added on.

Wedding venue considerations:

- Location of the venue near to a main road with good access and transport links. The location should ideally have a picturesque landscape with suitable car parking, toilet facilities and accessibility for differently abled people.
- The level of service offered; basic package of the venue as standard but extra services such as; catering, bar, disco/band/entertainment, transport, photography, and on-site accommodation could be included for an additional charge.
- Planning permission may be required for the renovation or erection of the proposed venue.
- Legislation requirements such as; health and safety, food hygiene, public liability insurance, alcohol licencing, and employment law may apply to the venture.

Pet Boarding Facilities

Animal husbandry is second nature to many farmers and may be a suitable diversification option to capitalise on underutilised farm buildings. Boarding kennels or a cattery could be incorporated into an existing farm business. Kennel and cattery units vary in size and specifications.

Pet boarding facility considerations:

- The location of the business should ideally be situated near a town or city with a large customer population.
- A change of building or land use may require a change in your insurance.
- Running a kennels or cattery business is a lifestyle choice and the owner may be tied to the business 24/7. Consider employing full-time/part-time staff to share workload and shift patterns to maintain a good work-life balance.
- Noise impacts from dogs and cats may cause offence or nuisance to neighbours.

- Before starting the business, you must contact the local authority to cover any building planning issues, business rates, operating licences and any other obligations.
- You must receive a licence under the Animal Boarding Establishment Act 1963.
- Public liability and product liability insurance is required. You should also be insured for professional indemnity and against the loss of income if you lose your licence. Liability to animals in your care custody and control is definitely required. In the case of kennels and catteries, cover for vets' fees can be extended to include any illness in a client pet that commences within 72 hours after leaving your establishment. Property damage cover should also be purchased.

For further information and a guide to building kennels or a cattery visit <https://www.gla.ac.uk/t4/~vet/files/teaching/SAHusbandry/boardingkennels.pdf>

Forestry and Farm Woodlands

Introduction

Woodlands can be a valuable part of the farm business, providing multiple benefits such as shelter for livestock, windbreaks for crops and income from timber. They also have a positive impact on a larger scale by capturing carbon, creating wildlife habitat, and contributing to natural flood management.

Increasing the area of woodland in Scotland is a key Scottish Government objective to help meet national targets for reducing carbon emissions, supply the demand for wood products with home-grown timber, and restore and expand native woodlands for biodiversity benefits. Farmers are being encouraged to plant new woodlands and actively manage existing woodlands to benefit the farm business and provide public goods.

On 1 April 2019 forestry became fully devolved in Scotland. Scottish Forestry replaced Forestry Commission Scotland, taking responsibility for policy, regulation, and the Forestry Grant Scheme (FGS). Forestry and Land Scotland (FLS) replaced Forest Enterprise Scotland in looking after publicly owned forests. Both organisations are agencies of the Scottish Government.

This section provides guidance on trees and the law, plant health, woodlands and shelter, timber prices, financial assistance for farm woodlands, and taxation.

Trees and the Law

Felling Permissions

Anyone wishing to fell trees requires a Felling Permission (previously called a felling licence) issued by Scottish Forestry, unless an exemption applies or another form of felling approval such as a felling licence (including a forest plan) has previously been issued. It is an offence to fell trees without a Felling Permission if no exemptions apply. Illegal felling can result in a fine of up to £5,000 per tree and a criminal record for those involved.

Changes to the regulation of tree felling in Scotland came into effect on 1 April 2019 when the Forestry and Land (Scotland) Act 2018 replaced the Forestry Act 1967 in Scotland. Felling Licences issued before 1 April 2019 are still valid, if the expiry date has not been passed.

Exemptions

You may be allowed to fell trees without a Felling Permission if an exemption applies. The 2019 regulations made some changes to exemptions, full details are available from Scottish Forestry: <http://forestry.gov.scot/support-regulations/felling-permissions>. Two

important changes are that a Felling Permission is now required to clear windblown trees, and to fell nuisance trees.

Exemptions include:

- Up to 5 cubic metres of timber within any set calendar quarter. This exemption does not apply in native broadleaved woodland between 0.1 and 0.5 hectares inclusive and Caledonian Pinewood sites.
- Trees with a stem diameter of 10cm or less, when measured 1.3m from the ground.
- A tree that poses an immediate danger to people or property.
- Completely dead trees. Trees that are dying or have blown over are not exempt.

Restrictions

Felling must also comply with legislation and best practice regarding water quality, flood risk, conservation areas, and protected species such as badgers or bats.

Felling trees covered by a Tree Preservation Order (TPO) or within a Conservation Area requires additional consent from the Local Authority. Felling within a Site of Special Scientific Interest (SSSI) requires consent from Nature Scot, formerly Scottish Natural Heritage (SNH).

Obligation to replant

Felling Permissions, except those for thinning, are issued on the condition that the felled area will be replanted within a specified timescale, including areas cleared of windthrow. This includes the obligation to carry out the maintenance necessary for the trees to become established. Scottish Forestry may allow replanting in an alternative area of the same size as the felled area.

Grant funding is available to help with restocking through the Woodland Improvement Grant (WIG) for Restructuring Regeneration. Note that you first need to have an approved Long-term Forest Plan (LTFP) or Management Plan to be eligible for WIG funding.

Plant Health

The threat posed by tree pests and diseases is increasing, due to increased global travel, and imported plants and wood products. Climate change is also altering the ranges of many plant pathogens. The risk of spreading tree diseases can be reduced by taking simple biosecurity measures, such as cleaning mud from shoes, dogs' paws, and bike and car tyres between visits to different woodlands. Five of the most common current threats to tree health are described below but this list is not exhaustive.

You can find guides to symptoms of tree pests and diseases on the Observatree www.observatree.org.uk/resources and Forest Research

websites: <http://forestresearch.gov.uk/tools-and-resources/pest-and-disease-resources>. If you are concerned about the health of any trees, seek professional advice and report any confirmed cases on the Tree Alert online reporting tool: <https://treealert.forestresearch.gov.uk/>. It is required by law that diseases classified as notifiable are reported.

Scottish Forestry monitors woodlands for early warning signs of tree health problems and issues Statutory Plant Health Notices (SPHNs) to landowners. An SPHN will usually require the felling of trees to contain an infection and avoid it spreading further.

Larch disease (*Phytophthora ramorum*) – notifiable disease

P. ramorum is currently the biggest threat to tree health in Scotland, having already infected and killed thousands of hectares of larch. *P. ramorum* does not affect the quality of the timber so infected trees can still be processed but only by facilities that hold a licence to handle the material. A Management Zone covers the centre of the primary outbreak in Galloway. The area covered by the management zone is best viewed on the Scottish Forestry Map viewer:

<https://scottishforestry.maps.arcgis.com/apps/webappviewer/index.html?id=0d6125cfe892439ab0e5d0b74d9acc18>

There are no movement restrictions, including records of such movement, if infected larch wood from inside the management zone remains wholly within that zone. The disease is spreading throughout Scotland and any movement of affected wood outside of the management zone requires a movement licence.

Outside the Management Zone, Scotland is split into three risk zones, based on how suitable the climate is for *P. ramorum*: Zone 1 is highest risk and covers most of the west coast; central regions are Zone 2; Zone 3 in the east is the lowest risk. For a map of the zones, see: <https://forestry.gov.scot/sustainable-forestry/tree-health/tree-pests-and-diseases/phytophthora-ramorum>.

The rules around felling and planting larch vary between the zones but **outbreaks of *P. ramorum* are occurring in all three risk zones**. All woodland owners should remain vigilant and regularly inspect for symptoms of the disease. Japanese, European and hybrid *Larix* species are all affected. While larch is the main timber tree at risk, rhododendron and other ornamental shrubs are also susceptible and help spread the disease. Other susceptible tree species include sweet chestnut, horse chestnut, beech, and several non-native oak.

P. ramorum is a notifiable disease so must be reported. First check the symptoms against online guidance and report the suspected outbreak through Tree Alert (see above for links). If *P. ramorum* is confirmed, Scottish Forestry will issue an SPHN (if outside the management zone), placing a legal requirement on the owner to fell the infected trees, and a buffer zone around them, within a set timescale. If you receive an SPHN,

grant aid is available to assist with agents' fees and restocking. For further information see page 341 and:

<https://www.ruralpayments.org/topics/all-schemes/forestry-grant-scheme/tree-health/>.

Chalara Ash dieback (*Hymenoscyphus fraxineus*) – notifiable disease if found in new areas

First discovered in the UK in 2012, Chalara Ash dieback is an infection caused by the *H. fraxineus* fungus, which is spreading throughout Scotland. Young trees are most vulnerable, while mature trees may only succumb to the disease once weakened by prolonged exposure. The airborne spores can spread within miles of an outbreak but transport of plants and spores in mud on tyres and shoes is thought to be responsible for spreading the disease over longer distances.

The general advice is not to fell live ash trees, even if they are infected, unless they pose a safety risk. This will allow resistant trees to be identified and survive as future breeding stock. Ash is one of the last tree species to come into leaf in spring so it is best to look for Chalara symptoms from July to September.

A Plant Health Order prohibits movement of ash seeds, plants, and trees within the country. Ash firewood and timber can continue to be moved but it is recommended that any leaf material is removed before movement.

Chalara is a notifiable disease if an outbreak is found in an area previously thought to be unaffected, see online map: <http://chalaramap.fera.defra.gov.uk/>.

Juniper disease (*Phytophthora austrocedri*) – notifiable disease

P. austrocedri is a fungus-like pathogen which threatens juniper trees in Britain. Juniper (*Juniperus communis*) is an important but declining native species, thus a significant proportion of juniper woodlands are protected. Infected trees have been found at sites across Scotland and the north of England. The pathogen primarily attacks roots and extends up into the lower stem. Eventually the tree will be killed by girdling of the main stem. The pathogen is notifiable, and all suspected cases must be reported through Tree Alert.

Red band needle blight (*Dothistroma septosporum*)

D. septosporum is a fungus which typically attacks older needles on conifers, initially creating yellow bands that turn red. Sometimes all but the base of the needles can turn brown, rather than causing bands. Infected needles will die and fall off, gradually weakening the tree. This reduces timber yields and can eventually kill trees.

It has been found on a range of conifer species but pine are the most common hosts, including Scots, Lodgepole and Corsican pine. The disease exists throughout Scotland and is managed by thinning to

increase airflow through the woods, and by planting less susceptible tree species in future rotations. It is not a notifiable disease and there are no restrictions on timber movement.

Dutch elm disease (*Ophiostoma novo-ulmi*)

This disease has already killed 60 million elm trees in Britain and continues to spread throughout Scotland. It is caused by a fungus that is spread from tree to tree by the elm bark beetle.

Local authorities may require owners to fell elms infected by Dutch elm disease, under the Dutch elm disease (Local Authorities) (Amendment) Order 1988. To prevent the spread of the disease, regulations also control the movement of elm logs within the terms of a licence. It is not a notifiable disease.

Woodland and Shelter

Trees and woodland can provide valuable protection from wind and driving rain which can:

- reduce lamb and ewe mortality resulting from evaporative chilling
- increase weight gain in livestock
- increase milk yields in cows
- improve livestock health and condition
- reduce feed costs
- reduce evapotranspiration of pasture and crops
- protect light soils
- increase soil organic matter content

Woods can act as a wind shield or a wind break, depending on the porosity of the wood. These principles are set out below:

Wind Shield

- Virtually impermeable woodland (<40% porosity)
- Reduces wind speed by up to 90%
- Wind speed reduction over distance of up to 10 times tree height from lee side of forest
- Greatest shelter within distance of 3 to 5 times of tree height
- Completely stops wind within small area; high turbulence in field
- Best for livestock protection

Wind Break

- Permeable woodland (40-60% porosity)
- Reduces wind speed by up to 70%
- Wind speed reduction over distance of 20-30 times tree height from lee side of forest
- Achieves reduced wind speeds across large area
- Little turbulence well above ground
- Best for crops and silage

Scottish Timber Log Prices

The table below provides a comparison of Scottish timber prices. These values are representative of prices offered for clear fell harvesting only; lower prices will be offered for thinning operations.

Prices vary according to market conditions, quality of timber, total volume harvested, ease of access and transport cost. Values are given in £/t, sold on an out-turn tonnage basis. Roadside sales are net of harvesting costs, while standing sales are net of harvesting and haulage costs and represent the gross margin of that crop.

Typical broadleaf and conifer log prices for the year to May 2021 are as follows:

| Species | Log Type | Price (£/t) | |
|----------------|------------------|-------------|----------|
| | | Roadside | Standing |
| Larch | Logs | 60-80 | 55-75 |
| Scots pine | Logs | 65-95 | 70-90 |
| Sitka spruce | Green logs* | 75-95 | 65-85 |
| Sitka spruce | Pallet wood | 55-75 | 50-65 |
| Mixed conifers | Chipwood or pulp | 30-50 | 20-40 |
| Lodgepole pine | Logs | 65-80 | 60-75 |
| Mixed conifer | Slats | 40-60 | 35-50 |
| Hardwd Logs | Various | 50-220 | 40-200 |

- * Green Logs are timber stems of a size and quality suitable for use in construction, such as roof joists or beams.

Timber crop values at clear fell range considerably, with high quality crops usually selling well. Estimated standing sale timber values for Sitka spruce (yield class 16, appropriately thinned) felled at 45 years old can be anywhere from £6,000 to £22,000/ha.

Woodland owners increasingly keep part of the timber harvested for their own use for woodfuel. The cost to harvest and extract small round-wood to roadside is typically in the range £12-18 per tonne.

Financial Assistance for Farm Woodlands

Financial assistance for the creation and maintenance of forestry and farm woodlands is supported through the Forestry Grant Scheme (FGS).

The FGS is entirely administered, except for payments, by Scottish Forestry. Payments are made by Rural Payments and Services (RP&S) Full details of the FGS can be found at:

<https://www.ruralpayments.org/publicsite/futures/topics/all-schemes/forestry-grant-scheme/>.

The following information has been adapted from the above website to give an overview of the scheme options. Applicants should refer to the full scheme guidance as revisions are likely and applicants should always check for the latest updates.

Forestry activity is supported under eight categories and these are:

1. Woodland Creation
2. Agroforestry
3. Woodland Improvement Grant
4. Sustainable Management of Forests
5. Tree Health
6. Harvesting and Processing
7. Forest Infrastructure
8. Forestry Co-operation

Woodland creation

Grants for woodland creation largely continue as they have since 2015. These can be very attractive for planting of a significant scale especially for timber-producing woodlands. 60-70% of new planting tends to be of productive woodlands. Scottish Forestry achieved 89% of the Scottish Government woodland creation target of 12,000ha for 2020/21. Demand for Woodland Creation grants continues to be high, with contracts already approved and budget allocated for 75% of the 12,000ha target for 2021/22, at the time of writing.

FGS offers a per-hectare payment for initial planting, which varies depending what type of woodland you want to grow (the nine options are listed below). Capital payments are available for items required to establish the woodland, including fencing, tree shelters, bracken control, and gorse removal. An annual maintenance payment is paid per-hectare and claimed on the Single Application Form (SAF) for five years. You can continue to claim Basic Payment on land planted under the scheme.

Small Woodlands Loan Scheme

Scottish Forestry has introduced a loan scheme to help with the costs of establishing Woodland Creation projects. FGS funding is paid after initial operations are complete, typically three months from when a claim is submitted. The loan can provide 50% of the value of capital items up front, acting as a partial bridging loan in the time between the work being done and the grant funding being paid. Woodland creation schemes up to 50ha are eligible, up to a maximum value of £40,000 per application.

Sheep and Trees

The Sheep and Trees initiative is aimed at supporting upland sheep farmers to grow a timber crop while continuing to farm livestock (where sheep are a major component). This package offers funding for forest infrastructure, such as new road building, along with woodland creation. Forest Infrastructure grant can be claimed when planting between 10 and

50ha under the Conifer or Diverse Conifer options in blocks of at least 10ha.

Woodland Creation Options and Grant Rates

There are nine options for woodland creation, each with specific requirements for composition and stocking densities:

1. Conifer – timber crops of predominantly Sitka spruce.
2. Diverse Conifer – timber crops of species other than Sitka spruce.
3. Broadleaves – grown at high stocking density to produce hardwood timber.
4. Native Scots Pine – native pinewood habitat creation or expansion.
5. Native Upland Birch – low-density downy birch habitat on shallow peaty soils (<50cm depth).
6. Native Broadleaves – other native woodlands, mainly lowland habitat types.
7. Native Low-density Broadleaves – specific native woodland or scrub habitats such as transition zones between woodlands and open hill.
8. Small or Farm Woodland – mixed broadleaved and conifer woodlands less than 10ha, no individual block more than 5ha.
9. Native Broadleaves in Northern and Western Isles – native woodland habitats in high exposure areas on the islands or elsewhere within the crofting counties.

A higher rate of grant is payable in four target areas:

1. Conifer, Diverse Conifer or Broadleaves in areas defined as being preferred or potential in the relevant local authority woodland strategy or equivalent.
2. Areas identified by the Cairngorms National Park Authority as a priority for woodland expansion, for predominately Scots pine or native broadleaved options.
3. Woodlands for Water, in priority areas identified by SEPA, for all options other than the Conifer option.
4. Native woodland options within the area identified as the Highland Native Woodland Target area.

A capital grant is available for using vegetatively propagated genetically-improved Sitka spruce. This is to encourage use of the most productive plants to grow high-yielding timber crops.

The Central Scotland Green Network (CSGN) offers an additional capital item payment for woodland creation schemes within the CSGN area of central Scotland. Different payment rates per hectare are offered within the Core, Outer Core and Fringe areas. These CSGN areas are shown on Scottish Forestry's Map Viewer:

<https://scottishforestry.maps.arcgis.com/apps/webappviewer/index.html?id=0d6125cfe892439ab0e5d0b74d9acc18>.

CSGN payments are limited and may not be available if the budget for a particular year has already be allocated.

The planting grants and capital grants applicable to the woodland creation scheme are as follows:

| Planting Grant | Payment rate (£/ha) | | |
|---|-----------------------------|-------------------------------|----------------------------|
| | <i>Initial Planting</i> | <i>Annual Maintenance</i> | <i>Total for 5 yrs</i> |
| Standard Areas | | | |
| Conifer* | 1,920 | 208 | 2,960 |
| Diverse conifer* | 2,160 | 336 | 3,840 |
| Broadleaves* | 2,880 | 528 | 5,520 |
| Native Scots Pine | 1,840 | 272 | 3,200 |
| Native upland birch | 1,840 | 128 | 2,480 |
| Native broadleaves | 1,840 | 272 | 3,200 |
| Native low-density broadleaves | 560 | 96 | 1,040 |
| Small or farm woodland* | 2,400 | 400 | 4,400 |
| Native Broadleaves in Northern and Western Isles | 3,600 | 624 | 6,720 |
| Target Areas | | | |
| Conifer | 2,160 | 234 | 3,330 |
| Diverse conifer | 2,430 | 378 | 4,320 |
| Broadleaves | 3,240 | 594 | 6,210 |
| Native Scots Pine | 2,070 | 306 | 3,600 |
| Native upland birch | 2,070 | 144 | 2,790 |
| Native broadleaves | 2,070 | 306 | 3,600 |
| Native low-density broadleaves | 630 | 108 | 1,170 |
| Small or farm woodland | 2,700 | 450 | 4,950 |
| Native Broadleaves in Northern and Western Isles | n/a | n/a | n/a |

* Where ploughing is the agreed method of ground preparation, the Initial planting payment rate is reduced by £240/ha for the Conifer option, £270/ha for the Diverse conifer option, £360/ha for the Broadleaved option and £300/ha for the Small or Farm Woodland option.

| Capital Item Grant | Payment rate |
|-------------------------------------|---------------------|
| CSGN – Core Area Contribution | £2500/ha |
| CSGN – Out Core Area Contribution | £1500/ha |
| CSGN – Fringe Area Contribution | £750/ha |
| Genetically improved Sitka Spruce | £150/ha |
| Stock fence | £4.40/m |
| March stock fence | £2.75/m |
| Deer fence | £7.60/m |
| Deer fence - high cost | £9.90/m |
| Upgrading stock fence to deer fence | £3.28/m |
| Rabbit-proofing stock or deer fence | £1.60/m |
| Tree shelter: 1.2 to 1.8 metres | £2.00 each |
| Tree shelter: 0.6 to 1.1 metres | £1.16 each |
| Vole guard | £0.19 each |

| Capital Item Grant | Payment rate |
|--|---------------------|
| Enhancing or modifying a stock fence - Black Grouse and Capercaillie core areas | £2.00/m |
| Enhancing or modifying a deer fence | |
| - Low cost Black Grouse/Capercaillie core areas | £2.00/m |
| - High cost Black Grouse/Capercaillie core areas | £4.48/m |
| Conversion of deer fence to stock fence Black Grouse and Capercaillie core areas | £1.60/m |
| Gate for stock fence | £136 each |
| Gate for deer fence | £172 each |
| Badger gate | £64 each |
| Self-closing gate for non-vehicular access | £280 each |
| Building or restoring drystone dykes | £26.40/sq. m |
| Bracken control, mechanical or chemical removal | £225/ha |
| Gorse removal | £720/ha |

Demand for Woodland Creation grants is high and has been increasing for the past few years. Applications for FGS can be submitted all year round but funding runs from April each year and becomes increasingly competitive as contracts are approved and budget allocated. Applications are scored on how well they will deliver Scottish Forestry's objectives.

Scottish Forestry pay particular attention to the 'value for money' of proposed schemes. Those with a total grant value (including 5 years of maintenance payments but excluding any CSGN contribution and basic payments) of greater than £6000/ha are classed as 'high cost' schemes. There is a smaller pool of money available for these schemes and grant funding is therefore more competitive. It is usually necessary to demonstrate a significant level of public benefit.

Fencing is generally considered the preferred method of protecting a new woodland. At scale, fencing is also usually cheaper than using individual tree shelters. Scottish Forestry may support tree shelters if using them will cost less than fencing.

Illustrative Budgets for Woodland Creation

Two illustrative budgets (using the grant rates in the previous table) have been prepared based upon the current FGS to indicate typical incomes and expenditures between the various planting models and specifications for smaller farm woodlands. Some allowance has been made for the costs of grant application, general management, protection or game-keeping, insurance, or long-term maintenance in these examples. Supplier and contractor costs are typical for the stated quantities and land type and will vary with geographic location and circumstances.

Example 1 - 40ha site for diverse conifer

Assumptions:

- Planting diverse conifers in target area.
- Up to 10% of the area can be retained as open ground and still get the full grant on it.
- Between 5% and 10% of the area must be planted with broadleaves.
- Minimum stocking densities of 2,500 stems/ha for conifers and 1,100 stems/ha for broadleaves are required.

| Item | Quantity | Typical supplier/ contractor cost | Grant |
|---|----------|--------------------------------------|-----------------------|
| Design/grant application fees | - | £9,900 | - |
| Supply and erect fencing (m) | 2,600 | £11.50/m | £9.20/m ¹ |
| Supply and hang deer gates | 2 | £350/each | £172 each |
| Continuous mounding (ha) | 36 | £320/ha | - |
| Conifers (bare root, incl. planting) | 88,400 | 42p each | - |
| Broadleaves (bare root incl. planting and vole guard) | 2,220 | 71p each | 19p each ² |
| Contract supervision fees | - | £22,000 over 5 yr | - |
| Replacement planting | - | £8,340 over 3 yr | - |
| Weeding with herbicide (per application) ³ | 90,620 | 9p each | - |
| Contingency | | 5% of costs | - |
| Initial planting grant (higher target area rate) | 40ha | - | £2430/ha |
| Maintenance grant (5 years) | 40ha | - | £378/ha/yr |

| Cash flow summary | Year 1 | Years 2-3 | Years 4-6 | Total |
|---------------------|----------|-----------|-----------|----------|
| Establishment costs | £126,569 | £26,014 | £10,865 | £163,447 |
| Grant income | £121,886 | £30,240 | £45,360 | £197,486 |
| Net income | £-4,683 | £4,226 | £34,495 | £34,039 |

¹ includes £7.60/m for deer fencing and £1.60/m for rabbit proofing

² grant for vole guard only

³ cash flow summary assumes one herbicide application per year, in years 1-4

If the proposed planting site is in a standard area the planting grant and maintenance grant would be £19,200 less.

If the proposed planting site is located within the CSGN inner core area, the CSGN capital grant would give an *additional* income of £100,000. In the CSGN outer core area, additional income would be £60,000. In the CSGN fringe area, additional income would be £30,000.

Example 2 - 20ha site for native broadleaves

Assumptions:

- Planting native broadleaves in a standard area.
- Up to 15% of the area can be retained as open ground and still get the full grant on it.
- Minimum stocking densities of 1,600 stems/ha for broadleaves are required.

| Item | Quantity | Typical supplier/ contractor cost | Grant/inc rate |
|---|----------|--------------------------------------|-----------------------|
| Design/grant application fees | - | £3,875 | - |
| Supply and erect fencing (m) | 1,800 | £11.50/m | £9.20/m ¹ |
| Supply and hang deer gates | 2 | £350/each | £172 each |
| Continuous mounding (ha) | 17 | £320/ha | - |
| Broadleaves (bare root incl. planting and vole guard) ² | 27,625 | 71p each | 19p each ² |
| Contract supervision fees | - | £10,660 over 5 yr | - |
| Replacement planting | - | £5,277 over 3 yr | - |
| Weeding with herbicide (per application) ³ | 27,625 | 9p each | - |
| Contingency | | 5% of costs | - |
| Initial planting grant | 20ha | | - £1,840/ha |
| Maintenance grant (5 years) | 20ha | | - £272/ha/yr |
| Sale of carbon credits | 17ha | | £3,000/ha |

| Cash flow summary without carbon income | Year 1 | Years 2-3 | Years 4-6 | Total |
|---|-----------|--------------|--------------|---------|
| Establishment costs | £71,598 | £11,319 | £4,319 | £87,236 |
| Grant income | £58,953 | £10,880 | £16,320 | £86,153 |
| Net income | -£12,645 | £-439 | £12,001 | £-1,083 |
| Cash flow summary with carbon income | | | | |
| Carbon income | | £41,650 | £17,850 | £59,500 |
| Net income, including sale of carbon credits | -£12,645 | £41,211 | £29,851 | £58,417 |

¹ includes £7.60/m for deer fencing and £1.60/m for rabbit proofing

² grant for vole guard only

³ cash flow summary assumes one herbicide application per year, in years 1-4

With FGS funding alone, this proposal would run at a net cost of £1,083 over the first 6 years. Recent increases in the costs of labour and materials means that smaller schemes that could have run at a net surplus a few years ago may not break even now.

Income from sales of carbon credits is playing an increasingly important role in making certain types of woodland creation schemes financially viable. One condition of carbon funding is the 'additionality rule' – the income from selling carbon credits must be essential to allow the project to go ahead. This example demonstrates such a scenario, where income from selling carbon credits turns a net cost into a net surplus.

Per-hectare rates for sales of carbon credits have increased during the last 12 months but can vary widely from £600/ha to £4,000/ha. For more information on Carbon values, please refer to page 345.

If this proposal was located within the CSGN inner core area, the CSGN capital grant would give an *additional* income of £50,000. In the CSGN outer core area, additional income would be £30,000. In the CSGN fringe area, additional income would be £15,000.

When planning farm woodlands it is important to consider other benefits and costs. For example:

- Additional benefits can include shelter, conservation, sporting, amenity and carbon sequestration, the latter seeing dramatic price rises throughout 2020/21. See pages 344-346 for further information on forestry and climate change.
- The loss of agricultural production from the land is an opportunity cost and this can be minimised by planting less productive land, such as where bracken has established. If a significant proportion of the farm is planted it may be possible to reduce fixed costs.
- Potentially, one of the largest financial impacts is the effect on land values. Generally, the more productive the land that is planted with trees, the greater the potential loss in capital value. In some circumstances capital values can be improved by new woodland, for example through better shelter, amenity, or sporting.

Woodland Improvement Grant

This grant aims to support forest management, activity to enhance the environment, and improve public access to existing woodlands. There are five options in this category:

1. Habitats and Species
2. Restructuring Regeneration
3. Low Impact Silvicultural Systems (LISS)
4. Woodlands In and Around Towns (WIAT)
5. Planning including Long-term Forest Plan, Forest Plan Renewal, Woodland Grazing Plan, WIAT Urban Woodland Management Plan and Deer Management Plan

Grant payments for options under the Woodland Improvement Grant are as follows:

| Option | Grant payment |
|-------------------------------------|--|
| Habitats and Species | Standard costs for capital works and items from a set list. Actual costs are available for work in woodland SSSI and Natura sites where it can be demonstrated that the actual costs of the eligible capital items will be higher than the set standard costs list for this option |
| LISS | Standard costs for capital works and items from a set list |
| WIAT | Standard costs for capital works and items from a set list |
| Long-term Forest Plan | £25/ha for first 200ha, £5/ha thereafter (minimum £500; maximum £15,000) |
| Forest Plan Renewal | £10/ha for first 200ha, £5/ha thereafter (minimum £500; maximum £10,000) |
| Woodland Grazing Management Plan | £1,200 per plan |
| WIAT Urban Woodland Management Plan | £1,000 for any area up to 10ha, £25/ha thereafter |
| Deer Management Plan | £12/ha for first 500ha, £1/ha thereafter (minimum £5,000; maximum £15,000) |

Payments for restocking, (known as restructuring regeneration) comprise a single capital payment. An approved long-term Forest Plan or Woodland Management Plan must be in place to be eligible for these grants. The payments are:

| | |
|---|---------|
| Delivering UKFS Woodland (no more than 75% of area as a single species) | £300/ha |
| Delivering Diversity and Resilience Woodland (no more than 60% of area as a single species) | £550/ha |
| Improved Vegetative Stock for Sitka Spruce | £60/ha |

Sustainable Management of Forests

These grants support a range of activities in existing woodlands that will:

- Increase species and structural diversity through Low Impact Silvicultural Systems (LISS) management
- Encourage natural regeneration to expand native woodlands
- Bring native woodlands and designated woodland features into active management and good ecological condition
- Support management of rural and urban woodlands for public access.
- Control grey squirrels where they are a threat to the red squirrel population
- Control predators to benefit Capercaillie and Black Grouse

- Reduce deer impacts to a level that will allow regeneration of conifer and broadleaved species.

The grant support for this category comprises nine options. All payments are made for up to a maximum of five years. An approved Long-Term Forest Plan (LTFP) or Woodland Management Plan must be in place to be eligible for these grants. Approved Deer Management Plans and/or Woodland Grazing Plans may also be required to be eligible for some options.

| Grant | Payment rate |
|--|---|
| Low Impact Silvicultural Systems (LISS) | £30/ha/yr |
| Native Woodlands | £25/ha/yr |
| Livestock Exclusion | £43/ha/yr |
| Woodland Grazing | £100/ha/yr |
| Public Access – Rural Woods | £100/ha/yr |
| Public Access – Woods In and Around Towns (WIAT) | £100/ha/yr for first 10ha £10/ha/yr for any additional areas |
| Grey Squirrel Control | £200 per trap/yr |
| Predator Control for Capercaillie and Black Grouse | £6.60/ha/yr |
| Reducing Deer Impact | £6.00/ha/yr |

Forest Infrastructure

This option has two aims:

1. Existing Woodlands - To provide support for new access infrastructure that will bring small-scale, undermanaged woodlands or inaccessible woodlands back into active management to improve the economic value of forest and woodland through timber production, to increase the area of woodland in Scotland that is in sustainable management and to improve the environmental and social benefits of woodland. This option is limited to woodlands of up to 50 hectares in size.
2. Sheep and Trees - To provide support for new access infrastructure to new woodlands as part of the Sheep and Trees initiative. This initiative is aimed at raising awareness of the many opportunities woodland can bring to land managers. This option, as part of the Sheep and Trees grant package, is only available for upland livestock farmers when creating between 10ha and 50ha of productive Conifer or Diverse Conifer woodland and is limited to up to 30m per hectare planted, with a cap of 1,500m per application.

Grant support is available for several capital grant operations associated with construction of new forest infrastructure:

| Grant | Payment rate |
|--|-------------------------|
| Forest road with on-site material * | £25.80 per linear metre |
| Lay-bys, turning areas, and loading bays | £6.60 per square metre |
| Bell-mouth junction ** | £32.40 per square metre |

- * in the Sheep and Trees option allowance of up to 30 metres/ha of woodland creation (cap of 1,500 metres/application)
- ** not available for the Sheep and Trees option

Agroforestry

Agroforestry can be described as an integrated approach to land management, where trees and agriculture co-exist to provide multiple benefits. This option provides grant support to help create small-scale woodlands within sheep grazing pasture. These trees can:

1. provide shelter for livestock
2. provide timber
3. increase biodiversity
4. enhance the landscape

This grant has two payment types:

- a capital grant for initial establishment
- an annual maintenance grant that is paid for five years

The rate of capital grant that can be claimed depends on the number of trees that are planted per hectare. Two stocking levels and grant rates are available:

| Planting density | Initial payment | Annual maintenance |
|------------------|-----------------|--------------------|
| 400 trees/ha | £3,600/ha | £84/ha/yr |
| 200 trees/ha | £1,860/ha | £48/ha/yr |

The rate per hectare has been set to cover:

- purchase of trees and stakes
- purchase or construction of appropriate protection
- planning, site assessment, supervision, ground preparation, and planting

A contribution is also included to the cost of beating-up and weeding.

Tree Health

This option provides support to prevent the spread of larch disease, *Phytophthora ramorum* (see page 328 for more information on the disease itself).

This option helps with the restoration of forests affected by the disease by supporting the work to remove infected trees and carry out subsequent replanting.

Grant support consists of a number of standard cost capital items. These are available for work to help prevent the spread of disease and restore affected woodlands. The eligible items and payment rates for eligible operations on infected land are listed in the following table:

| Grant | Payment |
|---|----------------|
| Agent services - Advisory | £200 |
| Agent services - Compliance | £500 |
| Agent services - Harvesting and marketing | £1,000 |
| Tree clearance (clearing saw) | |
| - Larch under 26 years - first 5ha | £600/ha |
| - Larch under 26 years - >5ha up to 10ha | £450/ha |
| - Larch under 26 years - >10ha | £300/ha |
| Tree clearance (other mechanised equipment) | |
| - Larch under 26 years - first 5ha | £1,200/ha |
| - Larch under 26 years - >5ha up to 10ha | £900/ha |
| - Larch under 26 years - >10ha | £600/ha |
| Un-economic felling | |
| - Larch on Islands - first 5ha | £2,400/ha |
| - Larch older than 26 years - first 5ha | £1,200/ha |
| - Larch greater than 26 years - >5ha up to 10ha | £900/ha |
| - Larch greater than 26 years - >10ha | £600/ha |
| Restocking - Delivering Diversity and Resilience in Woodlands | £1,400/ha |
| Manual Rhododendron Eradication | |
| - Light | £3,500/ha |
| - Medium | £5,500/ha |
| - Difficult | £7,300/ha |
| Mechanised Rhododendron Eradication | |
| - Light | £2,200/ha |
| - Medium | £3,400/ha |
| - Difficult | £5,600/ha |
| Foliar Spray Treatment Rhododendron Eradication | £200/ha |
| Follow-up Rhododendron Eradication | £200/ha |
| Stem Injection Rhododendron Eradication | |
| - Medium | £3,000/ha |
| - Difficult | £4,500/ha |

Harvesting and Processing

This option supports investments in three main areas:

1. New specialised equipment which will increase the local small-scale harvesting and processing capacity with the aim of:
 - helping to bring woodlands into management
 - promoting the economic and sustainable production of timber and timber products through processing
 - adding value to local economies on a non-industrial scale processing (less than 10,000 tonnes per annum), primary timber processing (less than 5,000 tonnes per annum), secondary processing equipment (less than 500 cubic metres per annum)
 - providing support to facilitate and support diversification and to assist with the creation of new small-scale enterprises and related employment.

2. New specialised equipment for forest tree nurseries (including tree nurseries in England and Wales) and ground preparation and fencing equipment for afforestation projects with the aim of:
 - promoting economic development in rural areas in Scotland by supporting new and existing forestry businesses
 - scaling up and expanding the capacity within the forest tree nursery sector and the forestry contractor resource to help delivery of the Scottish Government ambitious woodland creation target
 - helping forest nurseries to adapt, become more resilient and recover from COVID-19.
3. Support for the mobile equipment to help forestry businesses or enterprises to adapt and recover from COVID-19, with the aim of:
 - promoting economic development in rural areas in Scotland by supporting new and existing forestry businesses.

Grant support is based on actual costs with a maximum contribution of 40%. The balance of funding must come from private funds and not from other public funds. Public funds include all EU funds, and any UK government funds, including local authority and lottery grants. In any single application, the minimum and maximum grant award totals will be:

- Aim 1 – harvesting and primary processing equipment minimum £2,500 and maximum £50,000
- Aim 1 – secondary processing equipment minimum £1,000 and maximum £6,000
- Aim 2 – nursery and ground prep equipment minimum £2,500 and maximum £50,000
- Aim 3 - mobile equipment to help adapt and recover from Covid-19 minimum £2,500 and maximum £50,000

Up to two application rounds will normally be run each year with a closing date of 31 January or 30 June for the submission of applications. Applications with a claim year of 2021 must spend grant awards by the end of March 2022.

The grant cannot be used for purchase of chippers or second-hand equipment. A business case must be submitted as part of the grant application.

Forestry Co-operation

This option aims to encourage landscape-scale collaborative projects between two or more landowners by providing support for project facilitation and co-ordination. The subsequent management activity can be supported through other options within the Forestry Grant Scheme.

Grant support of £250 per day is available for up to 40 days to support the cost of a project co-ordinator for the following stages of a project:

- Feasibility – this stage is the initial exploratory phase
- Consolidation – this stage focusses on the detail of the project.

Trees and Taxation

Forestry enjoys several benefits in relation to taxation. Their value to stimulating the forestry sector was recognised in the Land Reform Review in 2014. Taxation considerations for forestry are listed below:

Income Tax - Currently, profits arising from the commercial occupation of woodlands are not chargeable to Income Tax and Corporation Tax and the value attributable to trees is exempt from Capital Gains Tax. The sale of voluntary carbon credits is not currently chargeable to VAT. However, applicants should always seek professional independent advice based on their specific circumstances.

Capital Gains Tax (CGT) - There is no CGT applied to the gain in value of commercial trees. CGT does however apply to a gain in value on the land.

Inheritance Tax (IHT) - Where commercial woodland has been in individual ownership for at least two years, it will normally attract 100% IHT Business Property Relief.

Corporation Tax (CT) - Where a company owns woodland which is independent of their trading operations, there is no CT liability on income generated by timber sales or surplus resulting from forestry grants.

For more detail see the Taxation section on page 527.

Forestry and Climate Change

Afforestation is one of the methods by which climate change reduction targets can be achieved. For each new hectare of forest and woodland created, it is estimated that, on average, seven tonnes of CO₂ will be removed from the atmosphere each year. The Climate Change Plan includes commitments to incrementally increase the annual woodland creation target from 12 000 to 18 000 ha per year by 2024/25. Scotland's forests cover is currently 18.7% of the total land mass area. The Scottish Government's forestry strategy aim is to increase this to 21 % by 2032.

Growing trees act as a carbon sink, sequestering carbon dioxide from the atmosphere and converting it to wood. This carbon remains locked away as long as the timber is used in construction, fencing or other wood products.

The total carbon stock in UK Forests is estimated to have increased to 4.0 billion tonnes of carbon dioxide equivalent in 2020, up from around 3.2 billion tonnes of carbon dioxide equivalent in 1990. Of this 4 billion tonnes CO₂e, over half (51%, 2.0 billion tCO₂e) is sequestered in Scotland's forestry stock.

The permanent planting of trees (not Christmas trees) on agricultural land will result in net sequestration of carbon. Deep peats (greater than 50cm deep) should not be planted as peat itself sequesters carbon and planting it with trees would cease its function as such. Similarly, evidence suggests that maximum C-sequestration benefits on a per-hectare-basis might be achieved on the highly productive lowland areas, although potentially at a high agricultural opportunity cost. Agroforestry, where trees are planted in a way that allows the land is to be kept in agricultural production may be an option here. Scotland-wide, significant benefits are also possible on the less productive lands, by avoiding disturbance of organic soil layers.

Carbon value

Tree planting on agricultural land will contribute to reducing a farm's carbon-footprint, where:

- It is a permanent change in land use.
- The planting conforms to the UK Forestry Standard.
- The risks to the planting and the accuracy of sequestration predictions are considered.

New woodland may qualify for payments under a carbon brokerage scheme (the Woodland Carbon Code – WCC), as long as additionality can be proven whereby it can be demonstrated that the creation of the woodland would not have happened without the assistance of the WCC.

Current payments for new planting range from £6000 to £4,000/ha net dependent on species, contract period, location and management regime. Values offered vary significantly between projects, as it is often the case that the carbon value of a woodland scheme is also linked by investors to the diverse range of other benefits a site may deliver, for example, a native broadleaved scheme which reduces flood risk for an area would likely achieve significantly higher carbon values than a commercial conifer monoculture plantation.

Carbon Credit values have risen significantly from 2020 into 2021 as more businesses and individuals look to reduce the environmental impact of their activities as part of efforts to work towards 'net zero' targets and wider Environmental, Social and Governance (ESG) principles, and as growing awareness of climate change also starts to influence public perception of greenhouse gas emissions and a shift towards sustainable living. More businesses and individuals are looking to offset their own emissions, and woodland creation is playing a huge part in this move as an affordable and sustainable approach to offsetting emissions whilst also delivering a multitude of biodiversity and landscape benefits.

To the end of March 2021, a total of 708 projects had been registered under the Woodland Carbon Code, covering around 32 thousand hectares of woodland with a projected total sequestration of 11.1 million tonnes of carbon dioxide over the lifetime of these projects.

Wood fuel

Wood can be used as a renewable heat source and is usually sold to the customer as logs, chips or pellets. Woodland owners can sell smaller sized roundwood as logs. Values vary according to whether the wood is soft wood (conifer) or hard wood (broadleaf); for log prices see page 331.

Standing and lying deadwood can be of considerable ecological value, it may also have a lower calorific value than 'live' wood. Where it is safe to do so, deadwood should be left in the forest.

Short Rotation Forestry (SRF) is a system for producing woody biomass for renewable energy projects. For more information on this system and biomass heating, see pages 379 and 373-374.

Woodland as pollution control

Native riparian woodland can provide an effective buffer against diffuse pollution. Woodland acts as a buffer reducing the risk of surface run-off, leaching, spray pesticide drift and fertilisers entering the watercourse. Trees can reduce the risk of erosion and when fenced can help prevent stock from entering the water courses.

Woodland as flood control

Forests and woodlands can slow down and reduce levels of flooding downstream. The forest canopy slows the rate at which rain reaches the ground, tree roots make the soil more porous and therefore more able to retain water (together with generally higher organic content than outside the forest), and transpiration of water from the soil.

Species choice for woodland creation

Sitka spruce, comprising over 60% of the national timber crop, has traditionally been favoured for its rapid growth and great adaptability. It is however a high-rainfall species, requiring over 2m of rain per year. On the drier east coast, the incidence of drought crack in Sitka spruce, which makes otherwise valuable timber worthless, is increasing as the climate becomes drier and warmer. Greater species diversity is therefore required, placing emphasis on more suitable species such as Norway spruce and Scots pine. Although slower growing and lower yielding than Sitka spruce, the long-term view should be taken, establishing trees which in decades ahead will be tolerant of drier and warmer conditions and still produce good quality timber.

Carbon

Climate change, carbon, and the environment

It is now widely accepted that all businesses, including farms will have to take action to reduce greenhouse gas emissions responsible for driving climate change.

Scottish Government have set ambitious targets to reduce greenhouse gas losses across Scotland, with an interim goal of a 75% reduction in emissions by 2030 (against a 1990's baseline), with the aim of achieving net zero emissions by 2045.

Agricultural production is underpinned by natural biological processes, which in turn give rise to greenhouse gases. With around 7.5 MtCO₂e (million tonnes CO₂ equivalent) of greenhouse gases attributed to the agricultural sector in 2018, in terms of contributions to total Scottish greenhouse gas emissions it is third on the list behind transport (12.9MtCO₂e) and business (8.4 MtCO₂e), (Scottish Government, 2020).

Agricultural greenhouse gas emissions

There are three main greenhouse gases produced through routine agricultural activities:

- Carbon dioxide (CO₂) is produced by burning fossil fuels such as coal, oil, and diesel.
- Methane (CH₄) is produced as a natural by-product of enteric fermentation during ruminant digestion and, to a lesser extent, from management of organic manure.
- Nitrous oxide (N₂O) which is released during the application of synthetic and organic fertilisers to the soil, from urine deposition by grazing animals, soil cultivation and changes in land use and vegetation.

Greenhouse gases are typically quantified in terms of CO₂ equivalents (CO₂e) based on their relative global warming potential (GWP) over a 100-year period. The table below provides an approximate assessment of the GWP of the main three greenhouse gases.

Greenhouse gases and their global warming potential (GWP)

| Greenhouse gas | GWP (over 100 year period) per kg emitted |
|-----------------------------------|---|
| Carbon dioxide (CO ₂) | 1 |
| Methane (CH ₄) | 25 |
| Nitrous oxide (N ₂ O) | 298 |

By expressing emissions in terms of CO₂ equivalents, it allows groups of greenhouse gases to be quantified as a single number allowing cross sector and year-on-year results to be easily compared.

Agriculture as part of the solution to climate change

As other sectors cut their emissions, it is anticipated that the contributions from farming activities will gain more prominence. However, the agricultural sector has the potential to be part of the solution to climate change.

Through improving technical efficiency and using new technologies and techniques, alongside implementing land management practices which can store or 'sequester' carbon removing it from the atmosphere and locking it into soils, vegetation and trees, the agricultural sector has a key role to play.

More information on practical mitigation measures and steps farmers are taking to reduce emissions and sequester carbon is available at www.farmingforabetterclimate.org (see below).

Farmer led groups

Following the work of the Suckler Beef Climate Group in 2020, the Scottish Government established four additional Farmer Led Groups (arable, dairy, pig, and upland farming/crofting) to explore how individual sectors can reduce emissions and contribute to Scotland's climate change targets. These groups put forward a range of proposals to Scottish Government in early 2021 for consideration. The final reports including recommendations from the Suckler Beef Climate Group, are available at <https://www.gov.scot/policies/agriculture-and-the-environment/farmer-led-climate-change-groups/>

Farming for a Better Climate

The Farming for a Better Climate programme, funded by the Scottish Government and facilitated by SAC Consulting, suggests practical tips and ideas to improve business efficiency, reduce greenhouse gas losses from the farm and help farmers and land managers adapt to a changing climate.



Practical ideas, which can be easily developed and adapted to suit most farms, are grouped into five key action areas:

1. Optimise livestock management.
2. Optimise the application of fertilisers and manures.
3. Locking carbon into soils and vegetation.
4. Using energy and fuels efficiently.
5. Developing renewable energy.

As part of the Farming for a Better Climate initiative, SAC Consulting works with volunteer Climate Change Focus Farms across Scotland, forming farmer discussion groups to trial and develop a range of practical solutions to reduce emissions and improve farm profitability. Recent

projects include exploring soil regenerative agriculture techniques with a group of farmers in the northeast of Scotland.

For more information, including updates from the Soil Regenerative Agriculture Group, practical guides, farmer case studies or to register for the free e-newsletter highlighting what other farmers are doing, email climatechange@sac.co.uk, visit www.farmingforabetterclimate.org and find Farming for a Better Climate on Facebook and follow on Twitter [@SACfarm4climate](https://twitter.com/SACfarm4climate).

Farm carbon calculators and carbon footprinting

Farm carbon calculators are highly useful business tools, not only for understanding carbon management within the business, but also helping determine relative resource use and efficiency across the business. Often the farms with the lowest carbon emissions are also the most productive and profitable within their sector, so carbon footprints can help a farm to save money and improve performance.

Typically farm carbon calculators will ask for information on:

- Crop areas and yields
- Livestock numbers and productivity
- Input use (feed, fertilisers, bedding, pesticides etc.)
- Electricity and fuel use
- Manure and fertiliser management

Some tools also ask for information on land use and farm practices to provide a soil carbon sequestration figure.

A farm carbon assessment involves:

1. Calculating an initial carbon footprint measurement.
2. Benchmarking
3. Identifying mitigation (positive change) measures.
4. Monitoring and reviewing.

1. Calculating an initial (baseline) carbon footprint

This will provide a 'starting-point' to help to understand current practices and productivity and to provide a baseline to monitor progress. The more accurate a business is when inputting data, the greater the accuracy of the carbon footprint.

Up until 12th October 2021 grant funding of £500 is available through the Farm Advisory Service (www.fas.scot/carbon-audits/) to carry out a farm business carbon audit. Audits are carried out using Agrecalc, the carbon and resource efficiency calculator developed by SAC Consulting to give a picture of carbon emissions from each farm enterprise, and across the farm business.

Further grant funding may be available in 2022.

2. Carbon footprint benchmarking

Benchmarking a baseline carbon assessment will enable businesses to compare their farm enterprises to other similar farms, to identify high emissions areas, and opportunities for mitigations and optimising resource use.

As shown in the sample report, Agrecalc's benchmarking facility can provide businesses with an indication of whether the performance of an individual enterprise is above or below average and can highlight areas where improvements can be made. The quick glance enterprise emissions report benchmarks a business's enterprise emissions broken down by source against similar farms, together with the 'opportunity level' for improvement.



- » Home
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Anna Test Farm > Agrecalc Reports

export Agrecalc Report | widescreen view

Agrecalc

Quickjump to another report

Compare to...

Report - Agricultural Resource Efficiency

Please note - the following benchmark tables and charts do not yet include soil carbon sequestration. This will be added soon once sufficient benchmark data is available.

Sector: Beef

Region

Enterprise type: Spring calving upland suckler cows

Year calc relates: End Dec 2020

System: Breeder/store

Reporting date: 28th Jun 2021

Group:

Report reference:

Producer:

Compared to: Beef Enterprises (system specific) 2017 to 2021 (1433) reports

Farm: Test Farm

System Admin's Menu

- » All Farms
- » Benchmarking

Farm Menu

Test Farm

- » Farm Home
- » Edit Farm Details
- » Farm Report Data Entry
- » Results
 - » Resource use and Emissions
 - » Comparisons
 - » Year on Year Results
 - » Charts
 - » Agrecalc Reports

Quick glance enterprise emissions

| | * kg CO ₂ e/ kg dwt | Opportunity Level | Comparison |
|----------------------|-----------------------------------|-------------------|------------|
| Enteric fermentation | 17.87 | Low | 22.23 |
| Manure management | 6.66 | Low | 9.41 |
| Fertiliser | 6.16 | Medium | 5.07 |
| Purchased feed | 2.31 | Medium | 2.29 |

Physical performance of enterprise

| | Value | Comparison |
|----------------------------------|-------|------------|
| Area of land utilised (ha) | 97 | 202 |
| Female breeding stock (no) | 127 | 109 |
| Heifer sale weight (kg lwt/head) | 444 | 450 |
| Steer sale weight (kg lwt/head) | 481 | 468 |
| Young bulls sale weight (kg lwt) | | 653 |
| Purchased feed use (kg/cow) | 689 | 1,418 |
| Homegrown fodder use (kg/cow) | 7,559 | 9,624 |

3. Identifying suitable mitigation measures

Mitigation measures fall into 3 categories:

1. Avoiding or reducing emissions through improving efficiency and or work practices.
2. Reducing or eliminating through changing inputs e.g., switching to renewable energy sources.
3. Sequestering or offsetting emissions.

Effective mitigation strategies for one farm may not be effective on another farm, so specialist advice from a farm advisor may be helpful to identify actions that are best suited to the individual farm and to identify short-term and longer-term options.

Mitigation measures can include:

- Looking at most significant emissions sources on the farm and in comparison to other farms.
- Identifying easy changes e.g., switching an input for one with lower associated emissions or finding ways to reduce energy/fuel use.
- Focusing on 'win-wins' that will provide resource and cost savings as well as carbon savings, such as precision feeding of livestock. The Marginal Abatement Cost Curve, produced by SRUC researchers, provides substantial detail into the cost-effectiveness of selected mitigation measures.
- Investigating funding schemes. The Sustainable Agriculture Capital Grant Scheme piloted in 2020 provided up to £20,000 of grant per farm for capital items linked to emissions reduction.
- Using the baseline carbon audit results to test out potential impact of implementing different measures e.g., finishing cattle earlier, this can be a useful tool when creating a carbon plan for the business going forward.

The Farming for a Better Climate website provides advice and resources for farmers wishing to assess and improve their carbon footprint.

4. Monitor and review

After new practices and measures have been implemented, repeating the carbon assessment process helps to monitor and review progress. Carrying out a second audit a year or two later will allow a business to assess the impact of the 'easy wins', but for more involved practices and system changes waiting three to five years may be more appropriate.

Choosing the most appropriate carbon calculator

As there are various farm carbon calculators in the UK that will generate a farm carbon footprint with differing methodologies, outputs, and features – which one should you choose? All carbon calculators are essentially computer models, and how they calculate emissions varies according to the underlying calculations and assumptions made. The more detailed the data input, the more accurate the result. For an independent comparison of the key farm greenhouse gas calculators see online at:

<https://www.climateexchange.org.uk/research/projects/comparative-analysis-of-farm-based-carbon-audits/>

The key questions to consider when choosing a farm carbon calculator are:

- What data does it ask for? Do you have this data readily available in your farm records?

- Are the results presented in a way that is useful to you and will help inform business decisions? Are you interested in whole farm results, individual enterprise results, or both?
- Does the tool enable you to benchmark against other similar farms?
- What standards and methodology are used? Calculators based on IPCC (Intergovernmental Panel on Climate Change) guidelines are considered more scientifically rigorous, and certification such as PAS 2050 means it has been reviewed and verified by a third party on its use of the internationally applicable method for quantifying product carbon footprints.
- Does your buyer e.g., milk company or your participation in a particular grant or business support scheme require or recommend that you use a particular carbon calculator?

Once you have chosen your carbon footprinting tool, it is best to stick with the same one to make it easier to compare your progress year on year.

Farm carbon accounting and the National Inventory

A crucial principle of farm carbon footprinting is that it calculates only the emissions associated with agricultural activities on the land, not overall emissions from the land itself. To be able to measure, monitor and benchmark with consistency and to identify areas for efficiency and resource use improvement, it is necessary to separate out natural cycles of greenhouse gases from land and those resulting from agricultural activity.

Due to how carbon is accounted on a national scale in the UK's Greenhouse Gas Inventory, farm woodlands and renewables are classified as non-agricultural activities. This means that the carbon benefit is attributed to LULUCF (Land Use, Land Use Change and Forestry) and Energy sectors respectively.

However, some carbon tools, such as Agrecalc, calculate carbon sequestration from woodlands and soil carbon, and energy generated by on-farm renewables, in addition to whole farm emissions. This allows the user to measure and monitor the footprint of these, as part of the whole farm picture. Renewables generated and used on-farm are included in this. As renewables have a lower carbon footprint than grid electricity, emissions from farm energy use associated with enterprises will also be reduced. While farm woodlands may currently be considered part of the LULUCF, agroforestry is one way in which trees would be considered part of agriculture, according to the GHG Inventory.

Carbon benchmarks by enterprise

As an illustrative guide to carbon benchmarking within Scottish Agriculture the following benchmarks were extracted from the Agrecalc dataset. The benchmarks provide breakdown of emission sources by enterprise, and average key performance indicators. Additional options are available in the Agrecalc webtool, including comparison with the top 25% performers and benchmarking against previous carbon audits.

| Beef Benchmarks | Upland suckler spring calving cows | | Lowland suckler spring calving cows | |
|-----------------------------------|--|----------------------------------|---|-----|
| | EMISSIONS BY SOURCE | kg CO ₂ e/ kg dwt (%) | | |
| Enteric fermentation | 22.23 | 53% | 19.72 | 52% |
| Manure management | 9.41 | 22% | 7.59 | 20% |
| Fertiliser | 5.07 | 12% | 5.44 | 14% |
| Purchased feed | 2.29 | 5% | 2.02 | 5% |
| Purchased bedding | 0.75 | 2% | 0.71 | 2% |
| Fuel | 1.32 | 3% | 1.14 | 3% |
| Electricity | 0.04 | 0% | 0.05 | 0% |
| Other | 1.09 | 3% | 1.01 | 3% |
| TOTAL EMISSIONS | <u>42.22</u> | | <u>37.69</u> | |
| KEY PERFORMANCE INDICATORS | | | | |
| Steer sale weight kg | 488 | | 506 | |
| Mortality % | 3 | | 3 | |
| Calving % | 92 | | 92 | |

| Sheep benchmarks | Crossbred ewe flock | | Good hill ewe flock | |
|-----------------------------------|----------------------------|----------------------------------|------------------------|-----|
| | EMISSIONS BY SOURCE | kg CO ₂ e/ kg dwt (%) | | |
| Enteric fermentation | 17.22 | 56% | 19.63 | 60% |
| Manure management | 6.00 | 20% | 6.71 | 20% |
| Fertiliser | 4.11 | 13% | 2.72 | 8% |
| Purchased feed | 1.50 | 5% | 1.70 | 5% |
| Purchased bedding | 0.10 | 0% | 0.07 | 0% |
| Fuel | 0.89 | 3% | 0.86 | 3% |
| Electricity | 0.04 | 0% | 0.03 | 0% |
| Other | 0.90 | 3% | 1.11 | 3% |
| TOTAL EMISSIONS | <u>30.76</u> | | <u>32.81</u> | |
| KEY PERFORMANCE INDICATORS | | | | |
| Lamb sale weight (kg dwt/head) | 18.97 | | 17.57 | |
| Mortality % | 7 | | 4 | |
| Lambing percentage (%) | 159 | | 135 | |

| Dairy benchmarks | Dairy - all year calving, 8,000l avg. yield | |
|-----------------------------------|--|-----|
| EMISSIONS BY SOURCE | kg CO ₂ e/ kg FPC milk | |
| Enteric fermentation | 0.54 | 42% |
| Manure management | 0.28 | 22% |
| Fertiliser | 0.16 | 12% |
| Purchased feed | 0.27 | 21% |
| Purchased bedding | 0.01 | 1% |
| Fuel | 0.03 | 2% |
| Electricity | 0.01 | 1% |
| Other | 0.02 | 2% |
| TOTAL EMISSIONS | 1.30 | |
| KEY PERFORMANCE INDICATORS | | |
| Milk production (l/cow) | 7,784 | |
| Mortality % | 5 | |
| Calving % | 81 | |

Ruminant systems – key emissions sources

- **Enteric fermentation** – methane emissions are caused by the digestive process of the animal as they break down plant materials in the rumen. This is a normal process, so emissions cannot be eliminated, however there is much ongoing research into the role of diets and additives in reducing enteric emissions.
- **Manure management** – total emissions relate to how much time livestock spend at pasture, on the hill, or housed, whether slurry or bedded systems, and how the manure is stored.
- **Fertiliser** – linked to fertiliser use for pasture, other home-grown forages/feed crops and bedding produced on farm for livestock use.
- **Purchased feed** – this source of emissions is regarded as embedded emissions. Embedded emissions may include fertiliser, fuel use in the production of the feed, as well as transport to the farm.

Top mitigation actions for beef and sheep systems

- Improve livestock performance - linked to genetic selection (breed, EBVs) and management practices e.g., seeking to reduce days to slaughter, reduce age at first calving and reduce carcass weight.
- Increase calves/lambs reared – linked to reducing mortality rates through improved breeding selection, birth management, nutrition, and body condition scoring management.
- Increase homegrown forage use and reduce purchased feeds – linked to adapting management practices to make better quality silage, improve grassland management, growing additional forage

crops and seeking to match feed demand with grass supply (appropriate lambing and calving dates).

- Optimising feeding and nutritional strategy, use of precision feeding to reduce days to slaughter, improve feed conversion efficiency, thereby improving ewe and cow performance.
- Optimising soil nutrient use by carrying out soil sampling, nutrient budgeting incorporating organic manures, manure management, and optimal fertiliser application and timings.

Top mitigation actions for dairy systems

- Improving livestock performance through genetic selection (breed, EBVs) and management practices to reduce calving interval, improve fertility, using sexed semen, and improving milk quality.
- Increasing milk output and quality through optimising nutrition, body condition score management, and improving the health and welfare of the herd.
- Increasing homegrown forage use and reducing purchased feeds through producing better quality silage, improving grassland management, reviewing grazing strategies, growing alternative forage crops, and seeking to better match feed demand with grass supply.
- Optimising nutrient use through soil sampling, nutrient budgeting incorporating organic manures, manure management, and optimal fertiliser application and timings.
- Reviewing manure management and storage linked to the use of slurry store covers, acidification and separation, and precision spreading.

| Cereal Benchmarks | Malting spring barley | | Feed wheat | |
|-----------------------------------|---|-----|-------------------|-----|
| EMISSIONS BY SOURCE | kg CO₂e/ kg grain (%) | | | |
| Manure and fertiliser | 0.24 | 67% | 0.29 | 71% |
| Pesticides | 0.00 | 0% | 0.00 | 0% |
| Lime | 0.04 | 11% | 0.03 | 7% |
| Fuel | 0.06 | 17% | 0.06 | 15% |
| Electricity | 0.00 | 0% | 0.00 | 0% |
| Crop residues | 0.03 | 8% | 0.03 | 7% |
| Other | 0.00 | 0% | 0.00 | 0% |
| TOTAL EMISSIONS | 0.36 | | 0.41 | |
| KEY PERFORMANCE INDICATORS | | | | |
| Grain yield (t/ha) | 6.4 | | 8.9 | |
| Straw yield (t/ha) | 3.5 | | 3.5 | |
| Fertiliser use (t per t grain) | 0.09 | | 0.78 | |
| Electricity use (kWh per t grain) | 3.62 | | 17.06 | |
| Red diesel use (l per t grain) | 18.82 | | 18.88 | |

Top mitigation actions for cereal crops

- Optimising nutrient use using soil sampling, nutrient budgeting incorporating organic manures, manure management, optimal fertiliser application and timings and optimising fertiliser/manure/biosolids use.
- Exploring alternatives to synthetic nitrogen using grassland and legumes in crop rotation, using more N-efficient crop varieties, choosing lower emission fertilisers, and the use of cover crops for nutrient carry-over.
- Monitoring and improving fuel use – identifying use hotspots and using GPS to reduce fertiliser and fuel use.
- Reducing tillage intensity where appropriate. This is beneficial for fuel as well as seeking to reduce soil compaction and soil carbon, although there are potential trade-offs with crop productivity.
- In areas/seasons where grain drying is necessary, consider energy sources with lower associated emissions, e.g., renewable energy.

Top enterprise emissions sources for cereal crops

- **Manure and fertiliser** – the embedded emissions of fertiliser and manure (imported or 'home-produced') and the process of application and volatisation.
- **Fuel use** – linked to the field operations of establishing, treating, harvesting, and drying the crop.
- **Crop residues** – these emissions relate to the incorporation of the proportion of the crop not removed at harvest. For example, if straw is incorporated, the crop residue emissions will be higher than if it was removed. Benefits of straw incorporation to soil carbon and subsequent crop yields are not included in the carbon calculation but should be recognised.
- **Lime use** – this may or may not be a component in the carbon footprint, depending on whether the farm is recording actual lime use when it is applied, or the annual liming requirement. When applied correctly, the benefits of liming on productivity and improving emissions per unit of output of crop generally outweigh the emissions associated with using it.

Mitigation actions for other sectors

While the livestock and crop systems selected give an indication of emissions sources for other similar ruminant animal systems, emissions from mono-gastric livestock like pigs and poultry are quite different. Emissions are largely from nitrous oxide and carbon dioxide, reflecting embedded emissions of purchased feeds (including land use change), and energy use for indoor systems.

Top mitigation measures for pigs and poultry usually focus on optimising feeds, nutrition, health, and genetics.

Whole farm emissions mitigation

General whole farm actions can also be taken to reduce or offset emissions across agricultural enterprises. These include:

- **Energy and fuel use:** monitoring energy and fuel use, such as using a smart meter, can assess the efficiency of equipment and activities, and help identify small changes such as switching to more energy efficient lightbulbs or insulating areas of heat loss in water pipes.
- **Renewable energy:** generating renewables on farm, such as wind, solar and hydro-electric power may reduce energy bought in from the grid for use on farm and have lower emissions when doing a carbon audit. According to the National Inventory, emissions mitigation from energy sold to the grid is also considered as 'exported' from the farm. See the Renewable Energy section, page 363, for further information on a wide range of farm renewable activities.
- **Fertiliser and manure management:** preparing a farm nutrient management plan can help to identify opportunities for better utilisation of organic and inorganic fertiliser e.g., applying nitrogen at optimum rates and timings, maintaining, or increasing clover content of swards or other legume crops.
- **Carbon sequestration and offsetting:** various measures can be used to manage soil carbon, including tillage practices, soil erosion control, conserving areas for biodiversity, and managing or increasing woodland areas. For more information on farm woodlands see the Forestry and Farm Woodlands section, page 325.

Soil carbon sequestration

On farms, soil carbon can be increased or decreased depending on the use of the land. All soil has existing (resting) carbon stocks, i.e., a natural level of carbon in the soil, which is determined by climatic factors such as temperature, moisture content, as well as mineral composition and soil texture. Generally, the soil carbon stocks in the UK vary between around 80–120 tonnes carbon per hectare to a depth of 30cm. Changes in the management of the land may affect whether these resting soil carbon stocks are maintained, increased, or depleted.

Agriculture is part of a natural carbon cycle, where carbon in the atmosphere is captured in plants and recycled to the atmosphere through livestock and animal consumption or natural breakdown. Without interference the system is in a carbon balance, with soil carbon stocks being maintained. As this (biogenic) carbon is recycled relatively quickly into the atmosphere, the growth of plant material on its own cannot usually be considered as sequestration.

Agricultural practices affecting this system can alter the amount of carbon 'recycled', resulting in either carbon sequestration or carbon loss, depending on the practice. The principle used by IPCC is that changes in

agricultural practice that lead to changes in soil carbon stock levels will; if maintained, take effect over a 20-year period. After year 20 it is assumed that the soils have reached a new equilibrium of soil carbon stocks (higher or lower) and that no more soil carbon sequestration will then take place from this change in management practice.

Example: As part of the natural cycle, grass and stored carbon is removed by grazing animals, which then return the carbon back into the atmosphere or the soil, either as enteric fermentation or as manure. The portion of the grass not eaten by stock or removed by harvesting machinery, together with the roots, will in time decompose, and the carbon will then be stored in the soil. Therefore, the ability for grassland to sequester carbon in the soil depends on grassland management practices, forage utilisation, stocking density, reseeding practices, as well as land use factors such as the length of time it has been grassland, and the soil type.

In reality, it is accepted that soil carbon changes may not occur evenly over a set time and the length of time this change occurs may vary widely too. However, to make carbon estimates workable at the farm level a simplification of complex soil carbon interactions is considered necessary, as has been adopted by the current IPCC methodology.

Carbon sequestration is not an infinite process – soil will not keep absorbing carbon indefinitely, no matter how you manage it. All soils will have a natural maximum carbon threshold, based on the soil type, characteristics, structure, and management, just as soil organic matter will increase to a point but reach a maximum potential percentage individual to that type of soil. This is described as the soil reaching ‘carbon saturation’.

The role of peatland in farm carbon accounting

Farm carbon footprinting aims to estimate emissions occurring solely as a result of agricultural activities. While peatland may be found on a croft, farm, or an estate, most of the carbon sequestered by peatland occurs naturally, whether or not that land is farmed, so shouldn't be included in a farm's carbon footprint. This is consistent with other farm GHG accounting such as nitrous oxide emissions, in that soils produce nitrous oxide emissions naturally, but we only include in a farm's carbon footprint the 'extra' emissions which come as a result of management.

Methodologies to explore the impact of farm management practices on the carbon stock change of peatland are being explored, although it should be noted that this is a double-edged sword; often, farming of peatland reduces or reverses the sequestration process vs. natural peat, which would have to be accounted into farm carbon footprints.

Renewable Energy

Introduction

Fluctuating energy prices, government incentives and a growing awareness of the impact of climate change have prompted many farmers to consider generating renewable energy, as well as assessing where energy efficiency savings can be made. The introduction of the Feed-in Tariff (FIT) and Renewable Heat Incentive (RHI) greatly reduced the payback periods for renewable energy projects and helped kick-start the industry. However, as uptake has increased and the technology improved, tariffs have been reduced or removed entirely. FITs closed to all new applications from 1st April 2019, the non-domestic RHI scheme closed to new applications in March 2021 and other incentives have reduced. Energy savings are now the driving factor for most farm scale renewable projects. This section provides an introduction to the renewable energy technologies that are most relevant to the rural sector: wind, hydro, anaerobic digestion, biomass heating, ground source heat pumps, biodiesel and energy crops. Landowners pursuing renewable energy projects are advised to seek independent advice to verify likely energy yields, costs and technical and economic viability, rather than rely solely on information supplied by equipment manufacturers.

Energy efficiency

Before considering installing any renewable energy generation technologies it makes sense to review what opportunities there may be to improve energy efficiency. Undertaking an energy audit helps to identify energy uses and highlight potential opportunities to reduce energy bills as well as to improve your business's carbon footprint (see page 349 for more detail on carbon footprinting). The first step in reducing energy use is to measure current usage levels to set a baseline. This can be measured by taking meter readings or by using figures from business trading accounts. Using more regular physical and financial records will provide greater detail and understanding of energy uses. Comparing the level of energy used in subsequent years against the baseline figure will then give an idea of trends in energy consumption. Sources of energy inefficiency can then be identified and addressed, both in terms of technical solutions and management changes.

Benchmarking energy use against other similar farms can also highlight where improvements can be made. There can be differences in energy use of 30% or more with comparable businesses. The greatest savings in energy use will come from changes to farming systems and practices, therefore agricultural knowledge is vital to be able to exploit these potential savings.

Renewables options appraisal

Each renewable energy technology has different characteristics, which will influence whether or not it is suited for use on a particular farm. It is vital to carefully consider what your objectives are and what you want from a renewable energy installation at an early stage. The following

factors are important to consider before deciding which renewable energy technology option(s) you wish to investigate:

- What is the scale and pattern of your energy demand?
- What energy resources do you have available on your farm?
- How much capital do you have access to for investment?
- What level of risk are you willing to take?

For general information on energy efficiency and renewables, see:

- Farming for a Better Climate (www.farmingforabetterclimate.org/)
- Energy Savings Trust (www.energysavingtrust.org.uk)
- Carbon Trust (www.carbontrust.com)
- Scottish Renewables (www.scottishrenewables.com)
- Renewable Energy Association (www.r-e-a.net)

Grants and Incentives

Renewable electricity – Feed-in Tariffs & Smart Export Guarantee

The FIT scheme was one of the main incentives for farmers looking to install renewable energy technologies, but this closed to new applications on 1st April 2019. The Smart Export Guarantee (SEG) has been introduced as a partial replacement to the FIT export tariff and enables generators to be paid for electricity exported to the grid. SEG is an obligation set by the government for licensed electricity suppliers to offer a tariff and make payment to small-scale low-carbon generators for electricity exported to the National Grid, as long as they meet certain criteria. The SEG rate is determined by the various licensees, however, the payment rate is lower than the old FIT scheme, where both an export and generation tariff were offered. Using renewables to offset your own energy demand and therefore reduce your energy bills is still the best option. Some small-scale renewable technologies no longer need to rely as heavily on incentive payments to be financially viable. The lower cost of the technology and the savings from offsetting energy bills can make some appropriately designed small-scale renewable projects an economically viable option.

Renewable Heat - Renewable Heat Incentive

The Renewable Heat Incentive (RHI) is a Government scheme that provides financial support for the generation of renewable heat and production of biomethane. Renewable systems suitable to the farm scale such as biomass boilers, solar thermal panels, heat pumps (ground, water and air source) and heat recovered from anaerobic digestion systems (non-domestic scheme only) are eligible.

There were two distinct RHI schemes; non-domestic and domestic. The non-domestic RHI opened at the end of November 2011, while the domestic RHI only launched in April 2014. The non-domestic RHI scheme has now closed to new applications as of March 2021. An extension to the domestic RHI up to March 2022 was announced in the

March 2020 budget, but this scheme is also set to close on 31 March 2022. The Government are currently consulting on options for the future support for low carbon heat, beyond the Renewable Heat Incentive (RHI). They have proposed a Green Gas Support Scheme (GGSS) aimed at increasing the proportion of green gas in the grid through support for biomethane injection, and a Clean Heat Grant which provides support for heat pumps and in certain circumstances biomass, through an upfront capital grant to help address the barrier of upfront cost.

For more information on the non-domestic RHI scheme, see Ofgem: <https://www.ofgem.gov.uk/environmental-and-social-schemes/non-domestic-renewable-heat-incentive-rhi>

The **domestic RHI** scheme is open to single domestic premises, including farmhouses until March 2022. A building is considered to be a single domestic premises if it is a 'separate and self-contained premises for Council Tax purposes.

There are a number of eligibility criteria for the scheme. If you are considering a renewable heat project it is vital that you familiarise yourself with these criteria to avoid installing a system, which is not eligible for tariff payments. Tariff levels have been calculated to bridge the financial gap between the cost of conventional and renewable heat generation systems. Payments for the domestic scheme are made over a seven-year term and the tariff levels are currently set at (June 2021):

- 10.92 p/kWh for air source heat pumps;
- 7.01 p/kWh for biomass boilers, and biomass pellet stoves;
- 21.29 p/kWh for ground source heat pumps;
- 21.49 p/kWh for solar thermal.

The domestic RHI tariff rates are subject to review and possible degression on a quarterly basis, in much the same way as for the non-domestic tariffs. For the most up-to-date tariff rates refer to the Ofgem website at: <https://www.ofgem.gov.uk/publications/domestic-rhi-tariff-table-2021-2022>

Since 1 April 2016 tariffs are adjusted in line with the Consumer Price Index.

Payments are made on the basis of the expected annual heat demand of the building concerned, rather than by metering the actual heat use or heat generation. The exception is solar thermal systems where payments are calculated using the estimated annual generation figures calculated by your MCS installer on your MCS certificate.

To be eligible your scheme must only heat a single property and have an Energy Performance Certificate (EPC), which includes heat demand figures, no more than 24 months old. Furthermore, your renewable heating product must be certified by the Microgeneration Certification

Scheme (MCS). Any product or installations that do not have an MCS certificate will not be eligible for the Domestic RHI.

After your scheme is installed you have 12 months to apply to the domestic RHI scheme, starting from the commissioning date shown on your MCS certificate. If you fail to submit within this timeframe, you will not be eligible under the new scheme rules. All applications could be audited so you must ensure that you have all the relevant paperwork ready for an audit. Where applicable you would need to produce:

- A copy of your MCS Installation Certificate.
- Copy(s) of your MCS Compliance Certificates.
- Copy(s) of your domestic EPC.
- Copy of your utility bill or council tax bill.
- Purchase receipts for the renewable technologies.
- Fuel receipts for biomass boilers and stoves.
- Calibration certificates, if applicable (where the heating system is metered).

For further information on the domestic RHI scheme see:

<https://www.ofgem.gov.uk/environmental-and-social-schemes/domestic-renewable-heat-incentive-domestic-rhi>

As of 5 October 2015, the **RHI Biomass Sustainability Criteria** came into effect for the domestic and non-domestic RHI schemes. These criteria are in place to ensure any biomass used in systems receiving the RHI is sourced from sustainable sources. They have to be sustainable from both a carbon point of view and also a “land use” aspect (i.e. growing of the biomass does not involve damaging protected land types). These criteria are designed around imported timber, which has far higher risk of breaching the carbon and land use criteria. As a result, evidence requirements for end users using UK timber are more stringent than what is necessarily required. The type of end user will dictate how these criteria are met, for example:

- Biomass boiler end users who buy in woodfuel (i.e. chips, pellets, firewood or briquettes), have to buy all their fuel from an RHI approved supplier on the *Biomass Suppliers List*, (<http://biomass-suppliers-list.service.gov.uk/find-a-fuel>). For end users in the domestic scheme this is the *ONLY option*.
- Biomass boiler end users who “self-supply” their own woodfuel from their own land, will need to register as a self-supplier on the *Biomass Suppliers List* (<https://biomass-suppliers-list.service.gov.uk/supplier-registration>). Self-supply is deemed to be sustainable therefore they do not need to demonstrate the carbon or land use sustainability. However, they do usually need some kind of woodland management plan in place.
- Biomass boiler end users who produce their own woodfuel (e.g. buy in roundwood from the commercial market and chip it to produce their own fuel), will need to register as a full supplier on the *Biomass*

Suppliers List. As long as you are a small business you are able to use the online simple application process. This includes a simplified carbon calculator, which needs a few basic questions about the raw material wood, where it comes from and how it is processed. This will give an estimated carbon footprint for your fuel and needs to be less than 34.8gCO₂e/MJ heat. Most woodfuels (even pellets) pass this with ease with typical values for chip from UK timber in the range of 5-8gCO₂e/MJ heat.

- Biomass boiler end users using straw in a year for the first time, have an equivalent to the BSL for non-woody crops – the **Sustainable Fuels Register**. This was launched to enable users of straw, *Miscanthus* and other non-woody biomass to register their fuels for a 1 year period, which will avoid the need to report directly to Ofgem on a quarterly basis and carrying out complex calculations. If the straw is purchased on the commercial market, then this enables suppliers of straw to sell to RHI boilers, without the end user having to trace the exact growing location of every load. However, in the case of straw, the market is fairly buoyant already, it remains to be seen if commercial straw merchants will consider registering themselves unless there is a higher price for use as fuel, which currently there does not appear to be. Full details can be found at www.sfregister.org
- Anaerobic digestion end users using the spare heat from the CHP unit, or burning the gas directly for heat, will need to report directly to Ofgem with evidence that the feedstocks meet the criteria. This will involve using a complex piece of software to calculate the carbon footprint. In addition, evidence of the land use for the past 7-15 years will need to be given to prove that the land used to grow the feedstock has not fallen into any protected categories over the years. If it is your own land then IACS data should be sufficient, however, if the crop is purchased on the commercial market then this is going to be very difficult.

Renewable electricity - Renewable Obligation Certificates (ROCs) and Contracts for Difference (CfDs)

Large-scale renewable electricity production in the UK is now supported by the Contracts for Difference. The Renewables Obligation (RO) ended to new entrants on the 31st March 2017.

Contracts for Difference (CfD) are available for all low carbon electricity generation (including nuclear and Carbon Capture and Storage - CCS) and guarantee operators a set price (known as the 'strike price') for each MWh of energy that they produce over the duration of the contract. Investors are able to lock in for a 15-year term to a given strike price, which is set at a level intended to be sufficient to cover the long-run costs of their low carbon technology. Key terms of the contract cannot be altered, even in the event that a future government seeks to change policy objectives, thus this should help to provide more certainty to investors.

The CfD works by drawing up a contract between the government and the generator that agrees a reference price or a strike price (based on wholesale rates). The generators will then sell some energy to suppliers, and the cost at which they sell it at may be the same as the strike price; below it; or slightly above it. If the sales of energy by the generators are the same as the strike price, then there is no further action. If the price is below that price, it will trigger top-up payments by the suppliers, while if the sales by the generators are at a higher price, it will result in generators paying back the difference.

The third round of contracts for less established technologies ran from 29th May 2019 to 18th June 2019. This included Advanced Conversion Technologies, Anaerobic Digestion (>5MW), Dedicated Biomass with CHP, Geothermal, Offshore Wind, Remote Island Wind (>5MW), Tidal Stream and Wave. With a budget of £60million it was £230m below what was offered in the last round the previous year. The variation in money available in each round makes planning developments very difficult and likely only accessible to larger projects.

The fourth allocation round plans to open in December 2021. A consultation on CfD, which closed in May 2020 has altered some of the criteria and made changes for future rounds. Biomass conversions have been removed from the scheme as an eligible technology from allocation round 4 onwards and floating wind has been added. Round 4 aims to double the capacity of renewable energy compared to the last round and expand the number of technologies supported, with offshore wind, onshore wind, solar, tidal, and floating offshore wind projects all eligible to bid.

For more information, please view details at:

<https://www.cfdallocationround.uk/>

Renewable transport fuels (biofuels)

Support for biofuels is provided by the Renewable Transport Fuels Obligation (RTFO). Small biodiesel producers are also entitled to a duty free allowance for the first 2,500 litres that they produce if this is used for personal consumption only.

The RTFO requires suppliers of transport or non-road mobile machinery fuel in the UK to show that a percentage of the fuel that they supply comes from renewable and sustainable sources. Fuel suppliers who supply at least 450,000 litres of fuel a year are affected; this includes suppliers of biofuels as well as suppliers of fossil fuel. Companies supplying less than 450,000 litres a year in the UK can still register if they want to claim Renewable Transport Fuel Certificates (RTFCs). Any company that supplies sustainable biofuel for use in road transport or non-road mobile machinery in the UK can claim RTFCs. These RTFCs can then be traded or sold to companies that need them to meet their obligations under the RTFO.

The RTFO came into effect on 15 April 2008 and the amount of biofuel that must be supplied by volume increased annually up to April 2013 when it reached 4.75%. In April 2018 new biofuel targets came in aiming at doubling the use of renewable fuels in the UK within 15 years and cutting the reliance on imported diesel. Changes to the RTFO will compel owners of transport fuel who supply at least 450,000 litres a year or more, to make sure the mix is at least 12.4% biofuel by 2032.

In 2020, bioethanol comprised 25% of supply, biodiesel 65% and biomethanol and others 10%. 75% of biofuel covered by the RTFO is made from wastes, principally used cooking oil. United Kingdom feedstocks made up 13% of verified renewable fuel.

As well as obliging fuel suppliers to meet targets for the volumes of biofuels supplied, the RTFO requires companies to submit reports on carbon emission savings and the sustainability of biofuels.

The major changes announced in 2018 were:

- Increasing the biofuels volume target to 9.75% in 2020, and 12.4% in 2032.
- Setting an additional target for advanced waste-based renewable fuels, starting at 0.1% in 2019 and rising to 2.8% in 2032.
- Setting a sustainable level for crop biofuels, an initial maximum cap of 4% of fuel in 2018, reducing annually from 2021 to reach 3% in 2026 and 2% in 2032.
- Bringing renewable aviation fuels and renewable fuels of non-biological origin into the scheme.

A consultation titled; Amending the Renewable Transport Fuels Obligation (RTFO) to increase carbon savings on land, air and at sea closed in April 2021 and the government are analysing the feedback, with further changes expected during 2021-2022.

For further information on the RTFO please see:
www.gov.uk/guidance/renewable-transport-fuels-obligation

Wind Power

On-farm wind power has two main scales of operation to consider, with commercial wind farm sites having a focus on exporting power to the grid, while small to medium scale generation is more concerned with offsetting purchased power within the farm business. Even if the power generated is primarily being used on the farm, demand may not always be constant, therefore it is likely that a proportion of the power produced will have to be sold to the grid at certain times.

For landowners with suitable sites for large-scale wind developments there are several development options available:

- Allow a developer to install the turbine(s) in exchange for an annual payment;
- Install the turbine(s) independently either by self-funding or using bank finance, or any combination of the two;
- Joint venture scheme with developer or neighbour;
- Community project with local buy-in.

Wind turbines

Wind turbines are best located in exposed areas with open fetch especially in the direction of the prevailing wind, away from residencies, though situated as close as possible to a grid connection and with good road access. Farmland is often ideal because the total footprint of a turbine development is relatively small and does not lead to a significant loss of agricultural land.

Larger wind turbines take advantage of the higher wind speeds that exist at greater altitude and so are more efficient and economic, however, they also require a larger capital investment.

When comparing the potential benefits of wind power, it is important to be able to compare like with like, therefore, an understanding of the following terms is key:

Rated power - The maximum power that can be produced when the turbine is operating within its safety limits. It is quoted in kW, which is a measure of the energy produced per second.

Theoretical power production - Rated power x number of hours of production per day x number of days operation per year: 500 kW x 24 hrs x 365 days = 4,380,000 kWh.

Capacity factor - Wind is not always blowing at a speed sufficient to spin the turbine and generate power, therefore, the capacity factor refers to the percentage of the total available time that the turbine is actually generating power, e.g. 30%.

Actual power production per year - Theoretical power x capacity factor: 4,380,000 kWh x 30% = 1,314,000 kWh.

The actual power produced will depend on the average wind speed in the area and other factors such as the height of the turbine, diameter of the rotor and the proximity of any feature that shelters the turbine or creates turbulence such as buildings, trees, walls, and the like.

Hydro Power

Small-scale run-of-river hydro schemes can be a viable source of renewable electricity on a suitable site.

The key factors that determine the power produced by a hydro scheme are:

Head - The vertical distance through which the water will fall.

Flow Rate - The quantity of water that will be available for power production.

Developers of hydropower schemes require a water use licence from Scottish Environment Protection Agency (SEPA) who will seek to ensure a balance between the benefits to renewable energy generation and the adverse impacts on the water environment. Schemes where the fall in the river between the intake and discharge points has a gradient of 1 in 10 or steeper will be more likely to obtain a water use licence.

Civil engineering costs vary greatly from site to site. Development costs for very small schemes are much higher per kW capacity than larger schemes. Small sites where the available head is 3 m or less are unlikely to provide a reasonable return on investment unless existing infrastructure can be utilised to reduce capital cost. Higher head schemes need lower flows and hence smaller and cheaper equipment to generate the same power as low head schemes.

The flow rate will vary during the year, however, for a scheme to be viable there must be sufficient flow to keep the system operating at near its rated power for a large proportion of the time. Some flow must be left in the stream for environmental sustainability and consideration of the needs of migrating fish is important.

An indication of the power production of a scheme can be obtained from the following equation:

$$\text{Power produced (kW)} = 7 \times \text{Flow rate (m}^3\text{/s)} \times \text{Head (m)}$$

A capacity factor of 50% can be expected where a scheme is sized on the mean flow of the river, therefore a 10 kW scheme may have an annual output of approximately 43,800 kWh, which is sufficient for about 10 houses.

Further information can be obtained from British Hydropower Association (www.british-hydro.org).

Solar Photovoltaics

The sun's energy has always been used by farmers for growing and drying crops. With electricity prices on the increase, farmers can now look to harness the power of the sun in a rather different way. Solar photovoltaic (PV) panels, which produce electricity from sunlight, have become an increasingly common sight on farms in recent years. Despite the comparatively low solar insolation levels in Scotland when compared to the south of England, solar PV can still be a viable option north of the border.

PV panels can be either roof or ground-mounted. Roof mounted arrays are more efficient in terms of land use because they make use of an

existing area of space that is not currently adding value to a farm business. Farms also commonly have large areas of roof available in the form of barns and sheds, although it is important to check that roofs are strong enough to support a system if retrofitting to an existing structure. Another issue is that roofs do not always face in the optimum direction (south) or at the optimum angle (usually around 30-40 degrees) and may be shaded by other structures, and in these cases ground-mounted arrays can be an alternative option.

Ground mounting allows for the ideal positioning of panels, which maximises the efficiency of a scheme. However, it can also mean that land use is diverted away from food production and into energy production. Land used for small-scale livestock, such as sheep and poultry, is ideal for ground-mounted solar development. The panels are mounted on a framework at a height that allows animals to graze and forage beneath them without damaging or compromising the operation of the system. Advice on the impacts of installing ground mounted solar panels on area based agricultural subsidy payments should be taken.

The capital costs of panels have fallen meaning that solar PV can still be a viable long-term investment in the right location and under the right conditions.

Biomass Heating

Biomass has been an attractive option for farms due to RHI payments, however the non-domestic RHI has now closed and the domestic scheme is closing in March 2022.

Biomass boilers are a well proven, efficient and reliable technology that has been developed over many years in countries such as Austria and Germany. These boilers are generally technologically advanced and highly efficient. More basic boilers are available which are less efficient and have very little automation, and consequently come at a significantly lower capital cost.

There are four main types of biomass boiler: woodchip boilers, pellet boilers, log boilers and straw boilers. All four options have pros and cons and care must be taken to ensure the right type of system is selected to match user requirements, including factors such as the degree of automation required, the scale and patterns of heat demand, capital cost and local fuel availability.

A few key facts about different woodfuel options include:

- Woodchip and pellet boilers can be fully automated.
- Log and straw boilers can be an economic option where farms have their own log or straw supply. However, they must be loaded manually, generally on a daily basis as a minimum.

- Woodchip is a lower cost fuel when compared to pellets, but is bulky and can be difficult to handle.
- Wood pellets are clean, easier to handle, require less space to store and have a higher energy output. They are more expensive than chip and cannot be produced on-farm. However, the capital cost of a pellet boiler is lower than a chip boiler.
- Woodchip boilers and their fuel supply systems have higher capital costs, and for technical reasons they are generally not suited to smaller, domestic applications (e.g. below 50kW).

Costs for biomass boilers are highly variable depending on the individual system requirements. There may also be significant costs associated with installations such as constructing a fuel store, or purchasing specialist vehicles to use for handling or loading fuel, etc.

The introduction of the RHI has resulted in non-domestic woodfuel systems that are creating demand for poor quality timber and creating an additional driver for poor quality farmland to be used for agri-forestry.

In most small-scale situations, it is not practical to produce electrical power from biomass, because such systems are complex and expensive. For this reason generating power is only worth considering when there is a large demand for both heat and power.

Farm Scale Biodiesel

On-farm biodiesel production is not currently competitive with diesel due to the high cost of rapeseed and vegetable oil, the low price of diesel and difficulties accessing support payments. Biodiesel can be made from a wide range of vegetable oils and animal fats (tallow). High quality straight vegetable oil (SVO) can also be used as a fuel at higher inclusion rates in certain engines. The use of biodiesel and SVO above 5% inclusion could impact on engine manufacturer's warranties.

On-farm biodiesel production from rapeseed involves two stages; cleaning and crushing the seed to extract oil and esterification of the oil by mixing with methanol in the presence of a catalyst to remove glycerol. Although chemically this is a simple process there is a need for careful quality control to achieve the required standards. Handling methanol and the catalyst (usually potassium hydroxide) on the farm is hazardous and requires attention to health and safety and insurance. To produce SVO is the same as for biodiesel without the esterification reaction step. Rapeseed meal is an important co-product of the crushing process and a useful protein supplement for animal feed.

Growers should calculate an 'on the road' price taking into account the costs of feedstock, capital and operating costs, allowing for income from production of rapeseed meal, and adding the full fuel duty and VAT.

Small-scale producers may benefit from a 2,500 litre tax free personal allowance. Production costs for SVO are considerably lower.

Renewable Transport Fuel Obligation (RTFO) Certificates offer the potential for increased returns however it may prove difficult for smaller operators to access this income. Biodiesel from waste materials such as tallow receive double RTFC's. Data on carbon and sustainability performance must be independently verified before RTFCs are awarded. The RTFO buy-out price increased from 30p/litre to 50p/litre in October 2020 with the aim of future proofing the scheme against increased costs and provides greater certainty of delivering continued GHG savings in transport.

Anaerobic Digestion

Anaerobic digestion (AD) uses bacteria to convert organic matter into methane and carbon dioxide (referred to as "biogas"), in the absence of oxygen. The biogas can be used to provide heat, generate electricity or upgraded to biomethane (carbon dioxide is removed) for injection into the gas grid. In addition AD can provide other benefits; utilising wastes, reducing emissions of methane, cutting odours and enhancing water quality.

Feedstock can be any biodegradable non woody plant, animal matter (manures/slurry), energy crops (grass, rye or maize silage, beet) and food waste. Food wastes are becoming less attractive due to falling gate fees for accepting them, complex licensing and regulation and higher capital costs of the plant for pasteurisation. However, sustainability requirements that 50% of biogas must be derived from wastes or residues has the potential to open up new markets for AD, so long as the waste material is responsibly sourced and suitable for AD. It is important that the mix is kept relatively consistent and that the balance of carbon to nitrogen is suitable for the bacteria. Feedstock can comprise conventional grass silage, however, specialised energy crops are likely to perform better overall in an AD plant, as they are not selected for feed quality, just dry matter yield and nitrogen efficiency.

The high degree of automation and control in a modern biogas plant means that on-farm plant costs are high; in the region of £0.75/m³ to £1.50/m³ of biogas produced. Government incentives are essential for the viability of the sector, so any change to support payments and RHIs (see pages 365-368) should be closely monitored. For any proposed plant, the cost and availability of feed stock will be the main factors determining viability. If you do not have enough of your own land available to produce sufficient feedstock, securing long term contracts for off-farm feedstocks will be essential if you are seeking a bank loan. A thorough feasibility study is also recommended to assess the viability of any project being considered.

For larger scale AD plants, whether gas-to-grid or Combined Heat and Power, farmers are mainly involved as feedstock suppliers. The capital costs of gas-injection plants are higher due to the need to “scrub” the gas to meet grid standards (remove carbon dioxide). The location of these plants is also dependent on local gas grid capacity. Where feasible, gas to grid AD plants have a clear economic advantage, and this is reflected in the increasing number of new plants following this approach. For farmers supplying feedstock the principles are the same though there may be greater seasonality of pricing in gas to grid plant reflecting payment structures for wholesale gas (higher prices in the winter).

Farmers growing crops for AD feedstock will find that prices vary from plant to plant and will reflect the basis of the sale; standing crop or delivered plant. Typical feedstock payment rates are; £65 to £85/t Dry Matter standing and £85 to £105/t Dry Matter delivered. Prices will also reflect shared costs such as specialist machinery and the value assigned to digestate.

Based on recent prices AD energy crops are currently attractive for many arable growers in part due to the low prices for conventional cereals this season. The relative profitability of AD and cereal crops will change from year to year and that is why AD crops are best included as part of range of crops and market outlets. AD plant operators are unique in offering relatively long contracts of 5 to 10 years for feedstock crops. Therefore, the best approach for most farmers is likely to be to include AD crops as part of mixed cropping system. This will deliver some security of income from long term AD contracts alongside flexibility to benefit from any rise in grain prices that may occur.

AD crops may also offer other potential benefits to the farm business including; spreading the workload, providing early entry for oilseed rape and enabling grass to be brought back profitably to all-arable rotations.

Farmers growing AD feedstock must now meet key sustainability standards to receive support. Ofgem require all RHI claimants to demonstrate their feedstocks meet sustainability criteria regarding land use change (rarely relevant in UK) and carbon emissions. For the RHI the carbon intensity of the feedstock must be less than 34.8 g CO₂ equivalent per MJ of energy produced. In crop production the main source of greenhouse gases is inorganic nitrogen fertiliser, so usage needs to be minimised. In AD systems this is partly achieved by the application of digestate back to the crop. With careful planning it is likely that most crops grown for AD will be able to meet these carbon targets. Ofgem provide an online calculator and guidance though it is advised that expert advice is also sought when preparing this information especially for the first time. See www.ofgem.gov.uk for full details.

Crop Costs for Anaerobic Digestion

PHYSICAL DATA

(a) Yield and harvest

Yields are based on crops grown in southern and central Scotland assuming average weather conditions and SRUC's experience from recent trials. Actual yields will vary widely and are much less certain in the north with maize not recommended outwith south west Scotland. Trial results indicate that rye yields are more consistent year to year than beet, reflecting the crop's longer growing period. Harvest of winter hybrid rye is typically around the middle to end of July with maize and energy beet harvests in late October.

(b) Seed

Certified seed has been assumed for all crops and hybrid seed for rye and maize.

(c) Fertiliser

Full rates of artificial fertiliser have been calculated to match crop offtake. Where digestate from an Anaerobic Digestion (AD) plant is applied fertiliser rates should be adjusted accordingly. In practice digestate use is likely to reduce but not entirely replace the requirement for artificial fertiliser due to mismatches in nutrient availability and timing between crops.

(d) Sprays

Full rates based on current best practice have been assumed.

(e) Contract

These include the cost of specialist contractors for harvesting and transporting the roots or silage produced to a nearby (within 3 miles) AD plant. Transport costs should be adjusted accordingly to the distances involved.

(f) Output prices

The price in the market for AD feedstock will be determined by local feedstock supply and demand issues and the conditions of the contract. The contract price will reflect the basis of the sale; standing crop, ex-farm or delivered to plant. It will also reflect the method agreed to share other costs such as specialist machinery and the value and costs assigned to any digestate applied to the land (see previous pages).

Crop Costs for Anaerobic Digestion

COST OF PRODUCTION DATA - LOCAL DELIVERED BASIS

| | Energy beet | Hybrid rye | Grass silage | Maize |
|---|------------------------|-----------------------|-------------------------|--------------|
| Yield: fresh (t/ha) | 67.5 | 42.0 | 36.0 | 38.0 |
| Dry matter (%) | 22% | 34% | 29% | 30% |
| Yield : dry matter (t/ha) | 14.85 | 14.28 | 10.44 | 11.40 |
| Methane yield (m ³ /fresh t) | 99 | 108 | 95 | 106 |
| Energy (MWhr TH/fresh t) | 1.2 | 1.3 | 1.1 | 1.3 |
| Energy (MWhr TH/ha) | 79.7 | 54.1 | 40.9 | 48.0 |
| | £/ha | | | |
| COSTS | | | | |
| Seeds | 194 | 154 | 22 | 175 |
| Fertiliser | 248 | 354 | 412 | 298 |
| Sprays | 180 | 47 | 11 | 75 |
| Contract cultivation | 288 | 230 | 57 | 253 |
| Contract harvesting | 330 | 146 | 357 | 142 |
| TOTAL COSTS (£/ha) | 1,240 | 932 | 858 | 943 |
| TOTAL COSTS (£/t) | 18 | 22 | 24 | 25 |
| TOTAL COSTS (£/MWhr TH) | 16 | 17 | 21 | 20 |

Note: Contract costs include fuel. The above cost of production data exclude charges such as land rental, interest, management time and any margin requirements which will be important to include when considering any contract price agreement.

Biomass Crops for Energy

Willow short rotation coppice

Willow is a perennial biomass crop grown principally for energy production on a 15 to 20 year rotation with harvesting every 3 to 4 years once established. Returns from the crop are highly dependent on yield and woodchip price. The main market for the woodchip is on contract to power generators and large-scale thermal plants. The woodchip is not suitable for small-scale biomass heating schemes without significant grading and drying costs due to the high bark and moisture content and oversized chips. Given the limited markets, high costs of establishment, variable growth rates and lack of planting grants the crop is largely uneconomic.

Short rotation forestry

This is a variation on conventional forestry based on early harvesting of fast growing species through coppicing and regrowth. In general, the most economic age to harvest conventional timber species is at maturity so the case for shorter rotations in most species remains unproven. A number of tree species capable of coppicing can be used for short rotation forestry (SRF), e.g. Alder, *Notofagus*, Poplar, Eucalyptus and Sycamore. Large-scale trials with a number of species and sites are currently being carried out by the Forestry Commission. As with conventional forestry, a wide range of sites will be suitable for cultivation of these species, including sites which have a lower nutrient status and a poorer land classification.

Trees are grown to butt size 15-20 cm for harvest at 8-20 years. Current advice is to plant at 2m square and apply broad spectrum herbicide to control weeds during establishment. Nitrogen application in the first year should be avoided as there is no benefit to growth. SRF has not been examined on a sufficiently extensive scale or time period to derive crop data as yet. Yields will vary from site to site, with average annual increments estimated at between 4 to 9 m³/ha/yr or around 1.5 to 3.2 ODT/yr. Planting grants may be available as part of the forestry grant schemes being offered under Rural Development across the UK. See the Forestry Commission (<https://forestry.gov.scot/>) for updates on the energy forestry trials work underway.

Miscanthus

Miscanthus is a perennial energy crop suited to the southern half of the UK with viability dependent on yields, contract prices and proximity to biomass power stations or other market outlets. The crop has also found a higher value outlet as poultry and horse bedding due to its high level of moisture absorbency and low dust levels. The miscanthus chips are also less favoured than woodchips for fuel due to low bulk density and high chlorine content. As a result, growing the crop for bedding is becoming the preferred end use in many areas. The crop uses a C4 photosynthetic pathway, like maize, requiring high light intensities and temperatures.

Yields at suitable sites south of a line from the Severn to the Wash are expected to be 12-15 ODT/ha. Lowground sites north of this may also be feasible but as with maize, yields and viability are likely to be reduced.

The crop is established using rhizomes, typically at 15,000 plants/ha. Like willow coppice, planting requires specialist equipment and relatively costly planting material resulting in high establishment costs. After the first year the crop can be harvested annually and has a useful life of 15-20 years. Weed control is necessary in the establishment year and possibly in the first spring. Nutrient demand is low with typically an application of 40N:40P:40K kg/ha in year one. Most crops are unlikely to require further applications although up to 150 kg/ha N may be applied over the first 2 years in some situations. The need for pest and disease control is low.

Reed canary grass

Reed canary grass is a perennial plant well suited to cultivation in northern and western parts of the UK and commonly grown in Scandinavia for fodder and increasingly for AD. In the UK the plant is widely used as a game cover crop. It grows well under marginal conditions, including upland areas and brownfield sites in northern and western areas. It is a perennial crop established from seed (unlike *Miscanthus*) leading to considerable cost advantages.

Establishment and cultivation are undertaken with existing farm equipment with the need for some nitrogen fertiliser to achieve maximum yield. Trial yields vary from 5 to 14 ODT/ha with the crop performing better at more northern sites where average yields of over 10 ODT/ha have been achieved. Further work is needed to determine viability but it has cost saving and land use flexibility advantages compared to other perennial crops and can utilise more marginal land. The crop also has useful flexibility in its end use; in the summer it can be cut for AD production or grazed by cattle; in the winter and spring it can be baled for biomass fuel or animal bedding.

Fuel

Introduction

This section provides information on fuel prices, calorific values, relative costs accounting for efficiency of conversion, costs and regulations for liquid fuel storage.

When comparing different fuels, it is essential to include any losses from conversion to heat as different fuels and technologies differ significantly.

Fuel Prices

The figures provided below are an approximation of the price in spring/summer 2021. These should be used as a guide only and should be supported by actual quotes that take into consideration site specific information. In most cases fuel prices change on a daily basis and the price will depend on many factors including the volume purchased, location, length of contract and supply profile. Fuel prices this year have continued to be impacted by the COVID-19 crisis which has caused prices to fluctuate.

All prices are exclusive of climate change levy (CCL), where applicable, and VAT.

Electricity

The following prices apply to Scottish electricity bills in each of the two distribution areas:

| | | North p/kWh | South p/kWh |
|---------------|----------------|----------------|----------------|
| '03' profile* | Single rate | 14.851 | 13.380 |
| '04' profile* | Day/night rate | 15.340/11.697 | 14.279/10.575 |

* first 2 digits of MPAN/supply number – denotes type/size of business supply

Standing charges vary widely. For large supplies they are less relevant, however, for small supplies the standing charge will be a much greater proportion of the annual cost.

Gas

| Tariff type (piped gas for farms and businesses) | unit p/kWh | daily charge | average p/kWh |
|---|---------------|-----------------|------------------|
| Credit (domestic) | 3.57 | 32.65 | 4.36 |
| Debit (domestic) | 3.15 | 24.16 | 3.74 |
| Pre-pay (domestic) | 2.96 | 34.36 | 3.79 |
| Business - <5,000 kWh | 4.24 | 27.00 | 6.21 |
| Business - <30,000 kWh | 3.93 | 10.00 | 4.05 |
| Business - >245,000 kWh | 3.28 | 172.47 | 3.54 |

Propane

| | Price |
|---|---------------------|
| Propane (bulk, not in a long term contract) | 38.00 p/litre |
| Propane (47 kg cylinders) | £69.78 per cylinder |
| Butane (12 kg cylinders) | £35.33 per cylinder |

Diesel oil

| | p/litre |
|---------------------------------------|---------|
| Gas oil (red diesel), 35 sec, tractor | 57.60 |
| Kerosene, 28 sec, Aga Cookers, etc | 43.19 |
| Derv (white diesel) | 130.60 |

Coal

| | £/t |
|------------------------------|--------|
| House coal (100 x 10kg bags) | 256.25 |

Biomass Fuels

| | Price |
|--|-----------------------|
| Firewood - seasoned hardwood logs (delivered) | £115/m ³ |
| Firewood - seasoned softwood logs (delivered) | £88.63/m ³ |
| Woodchips (G30, 30% moisture) | £130/t |
| Wood pellets (5 t blown, including delivery) | £240/t |
| Wood pellets (100 x 10kg bags, including delivery) | £309.25/t |

Straw

| | £/t |
|-----------------------------|-----|
| Large round bales (ex farm) | 100 |

Calorific Values of Fuels

These values are only approximate and may vary quite considerably:

| | |
|----------------------------------|-----------------------------|
| Electricity | 3.60 MJ/kWh |
| Gas | 3.60 MJ/kWh |
| Propane/Butane | 50.00 MJ/kg; 25.50 MJ/litre |
| Gas oil | 42.50 MJ/kg; 35.70 MJ/litre |
| Kerosene | 43.50 MJ/kg; 36.64 MJ/litre |
| Coal | 31.40 MJ/kg |
| Firewood (20% moisture content) | 14.71 MJ/kg |
| Woodchips (30% moisture content) | 12.50 MJ/kg |
| Wood pellets | 16.85 MJ/kg |
| Straw (20% moisture content) | 13.80 MJ/kg |

Note: 1 tonne liquefied propane gas = 1,957 litres (approx.)
1 m³ of loose seasoned hardwood timber = 0.35 tonnes (approx.)
1 m³ of loose seasoned softwood timber = 0.25 tonnes (approx.)

Fuel Cost Values

The fuel cost values have been corrected for efficiencies:

| | p/MJ | Efficiency (%) | p/MJ | p/kWh |
|--|------|----------------|------|-------|
| Electricity | 4.08 | 100 | 4.08 | 14.67 |
| Gas | 0.88 | 80 | 1.09 | 3.94 |
| Propane (bulk) | 1.49 | 80 | 1.86 | 6.71 |
| Propane (47 kg) | 2.98 | 80 | 3.72 | 13.39 |
| Butane (12 kg) | 5.90 | 80 | 7.37 | 26.55 |
| Gas oil | 1.61 | 70 | 2.30 | 8.30 |
| Kerosene | 1.18 | 70 | 1.68 | 6.06 |
| Coal (open fire) | 0.82 | 25 | 3.26 | 11.75 |
| Firewood (efficient log boiler) ¹ | 2.41 | 80 | 3.01 | 10.84 |
| Firewood (basic log boiler) ² | 2.23 | 60 | 3.72 | 13.40 |
| Woodchips ³ | 1.04 | 80 | 1.30 | 4.68 |
| Wood pellets (blown) | 1.42 | 85 | 1.68 | 6.03 |
| Wood pellets (bagged) | 1.84 | 85 | 2.16 | 7.77 |
| Straw (cereal) | 0.72 | 60 | 1.21 | 4.35 |

¹ burning softwood 20% moisture content

² burning hardwood 20% moisture content

³ 30% moisture content

Fuel Storage

Safe storage for fuel on farms, rural businesses and dwellings should be a high priority. Regulation for the storage of fuel is covered by the Water Environment (Controlled Activities) (Scotland) Regulations 2011 and The Control of Pollution (Silage Slurry and Agricultural Fuel Oil) (Scotland) Regulations 2003. These regulations are applicable for farms, although there are exclusions. For example: where oil is stored for use exclusively as a fuel for heating a farmhouse or other residential premises and where that oil storage capacity is less than 2500 litres (in this case Building Regulations (Scotland) 2004 apply to new tanks) and if any storage tank is underground.

The regulations apply to both new and existing oil storage tanks storing petrol, diesel, mineral oil, heating oil, lubricating oil, waste oil and vegetable/plant oil above ground (inside or outside a building). One of the main requirements for new and existing above-ground tanks where there is a storage capacity of 200 litres or more, is the provision of a secondary containment system (bund) of sufficient capacity to contain at least 110% of the largest tank or 25% of the total storage capacity. For

further detail on the regulations, guidance should be sought from your local SEPA office or see:

<https://www.sepa.org.uk/regulations/water/pollution-control/oil-storage-in-scotland/> or refer to NetRegs, more detail on page 442.

Fuel storage tanks come in various types, shapes, and sizes. When choosing your fuel tank, siting should be taken into consideration. Guide prices for storage tanks are shown below:

| Plastic tanks | Capacity (litres) | | | | |
|---------------------|----------------------|--------|--------|----------------------|--------|
| | 1200 | 1500 | 2000 | 2500 | 5000 |
| Single skin | £453 | £543 | £662 | £724 | £1,477 |
| Bunded | £1,200 | £1,100 | £1,299 | £1,474 | £2,155 |
| Dispensing (bunded) | - | £1,523 | - | £1,700 | £2,677 |
| Underground | £3,000 (1400 litres) | | | £3,529 (3000 litres) | |

All tank prices are ex VAT and do not include delivery and, design and installation charges.

Labour and Machinery

Introduction

The largest component of fixed costs on farm is labour and machinery. This is also the most variable between farms. For this reason, it is essential to fully understand and manage both labour and machinery costs as they can have a large bearing on the financial viability of the farm business. This section details the key elements including standard labour requirements by enterprise, machinery operating data such as rates of work per hour, methods to calculate the cost of owned machinery, detailed contractors charges for a wide range of farm operations and regulations for on-road use. The final section details essential information on labour costs, regulation and health and safety requirements.

Standard Labour Requirements

| Enterprise CROPS (per hectare) | Hours/ annum | Enterprise LIVESTOCK (per animal) | Hours/ annum |
|---|---------------------|--|---------------------|
| Cereals | 18 | Dairy cows | |
| Oilseeds | 16 | 50 cows | 42 |
| Hops | 60 | 100 cows | 35 |
| Sugar beet | 33 | 150+ cows | 28 |
| Field beans and peas | 16 | Beef cows | 26 |
| Potatoes | | Other cattle | 12 |
| early | 200 | Sheep | |
| main crop | 110 | ewes and rams (lowland) | 5.2 |
| Fodder crops | 6 | ewes and rams (LFA) | 3.7 |
| Miscanthus | 16 | other sheep (lowland) | 2.9 |
| Outdoor vegetables/salad | 280 | other sheep (LFA) | 3.1 |
| Other peas and beans | 500 | Pigs and poultry | |
| Vining peas | 12 | sows | 28 |
| Top and soft fruit | 425 | finishing and rearing pigs | 2.3 |
| Hardy nursery stock | 1,900 | piglets (<20 kg) | 0.2 |
| Fruit/vegetables under cover | 7,000 | broilers | 0.09 |
| Flowers/plants under cover | 13,000 | laying hens | 0.36 |
| Mushrooms | 7,220 | growing pullets | 0.24 |
| Fallow | 2.9 | other poultry | 0.10 |
| Grassland | 3.1 | Goats | 12 |
| Silage (made by farm) | | Deer | 15 |
| 1 st cut | 12 | Horses* | 40 |
| 2 nd cut | 10 | | |
| Rough grazing | 1.5 | | |

Note: There are difficulties in standardising labour requirements and these figures represent 'typical' labour requirements under representative

conditions for enterprises of average size and performance. They are not necessarily reflective of economic viability.

If calculating farm labour demand, note that crop coefficients should be reduced proportionately for operations carried out by contractors. Livestock coefficients should be reduced pro rata if an animal is not on farm for a full year.

These figures relate to those published in a report of the UK Farm Classification Document (October 2014) and which recommends that 1900 hours of labour are equivalent to one standard annual labour unit. To reflect smaller field sizes, the standard labour requirements for field enterprises should be increased by 50% for Northern Ireland.

*Detailed figures for horses can be found in the following publication: The Equine Business Guide, ABC, 7th Edition, 2019.

Machinery Operating Data

Rates of work

The following figures are typical rates of work for conditions in northern UK. Actual rates of work can vary widely from these figures depending on the organisation of the system. Methods of calculating rates of work are shown later.

For 'stand alone' operations such as ploughing and cultivating, factors such as soil type and conditions, field size and shape, topography, operator experience and size of tractor will affect the overall work rate.

Rates of work for planting, drilling, spraying and fertilising operations will depend on application rates and external field factors such as ease and speed of refilling and location of materials (e.g. water, fertiliser, seed potatoes).

For other operations, which require a system approach, such as grain, silage and potato harvesting, additional factors such as crop yields, labour and transport availability can have a marked effect on work rate.

| | Typical rate of work (ha/8 h day) |
|---|--|
| Ploughing (reversible plough): | |
| 4 furrows | 6.9 |
| 6 furrows | 10.4 |
| Cultivating: | |
| heavy disc, 3 m, 100 mm deep | 13.4 |
| light tine, 3.5 m, 100 mm deep | 15.7 |
| harrows, 4.5 m | 20.2 |
| combination cultivator (for seedbed preparation), 3 m | 13.6 |

| | Typical rate of work (ha/8 h day) | |
|--|--|----------------------|
| power harrow, 3 m, 150 mm deep | | 10.0 |
| roller, 2.4 m, heavy | | 12.3 |
| roller, 7.3 m, light | | 46.7 |
| potatoes, bedforming, 1.83 m bed | | 6.0 |
| potatoes, stone windrowing basic, 2 row (Reekie) | | 4.5 |
| Fertilising: | | |
| twin disc, 1,000 kg capacity | | 24.0 |
| lime spreader, 2 machines and 1 loader | | 32.0 |
| slurry, 6,000 litre size, 0.8 km haul | | 29.6 |
| Grain drilling: establishment (following ploughing) | | |
| 3 m grain only drill | | 16.2 |
| 3 m grain/fertiliser drill | | 13.0 |
| 3 m combination power harrow/grain only drill | | 12.6 |
| 4 m combination power harrow/grain/fertiliser drill | | 15.0 |
| 4 m trailed machine/grain/fertiliser drill | | 32.5 |
| Grass: seed sowing - drill 3.7 m wide | | 10.4 |
| Roots: precision sowing, 2 row | | 2.4 |
| Potatoes: planting, 2 row, cupped design (narrow spacing) | | 6.0 |
| Potatoes: planting, 6 row, belt design (wide spacing) | | 15.0 |
| | <i>Application rate</i> | |
| | <i>200 litres/ha</i> | <i>100 litres/ha</i> |
| Spraying: | | |
| tractor mounted, 850 litre tank, 12 m boom, no bowser | 33.6 | 40.0 |
| tractor mounted, 800 litre tank + 600 litre on front, 18 m boom | 52.0 | 64.0 |
| tractor mounted, 800 litre tank + 600 litre on front, 18 m boom, with bowser | 60.8 | 72.0 |
| sprung LGP vehicle, 800 litres, 12 m boom, with bowser | 68.0 | 87.2 |
| self-propelled, 2,500 litres, 24 m boom, with bowser | 144.0 | 176.0 |
| Grain: | | |
| combine harvesting, drum width 1.05 m, typical cutter bar width 3-3.7 m | | 14.3 |
| combine harvesting, drum width 1.30 m, typical cutter bar width 6.6 m | | 26.9 |
| combine harvesting, drum width 1.6 m, typical cutter bar width 7.7 m | | 31.4 |
| combine harvesting, drum width 1.7 m, typical cutter bar width 9.12-11.97 m | | 42.8 |

| | | Typical rate of work (ha/8 h day) |
|---|--|--|
| Potatoes: | | |
| haulm pulverising: 1.8 m, 2 row | | 6.5 |
| harvesting: two row trailed, elevator discharge | | 3.5 |
| Turnip harvesting | | 1.6 |
| Silage making: | | |
| (i) 5 men, 75 kW + precision chop harvester, 3 trailers, buckrake | | |
| 800 m haul: | | 9.0 |
| 1,500 m haul: | | 7.4 |
| (ii) 6 men, 90 kW + precision chop harvester, 3 trailers, buckrake | | |
| 800 m haul: | | 16.0 |
| 1,500 m haul: | | 10.0 |
| (iii) 6 men, self propelled harvester, 4 trailers, buckrake (will usually involve a rake operator at some point to 'group' the smaller mower bouts into a single larger bout) | | 40.8 |
| (iv) 2 men, forage wagon, buckrake (depending on distance to pit) | | 15.0-20.0 |
| Grass: | | |
| mowing, disc, 2.4 m width of cut | | 15.4 |
| mowing, disc, 3.0 m width of cut | | 19.2 |
| mowing, disc, 9.0 m width of cut | | 46.1 |
| baling hay, conventional baler | | 6.4 |
| baling straw, conventional baler | | 9.6 |
| baling straw, round baler | | 16.0 |

Days available for field work

(e.g. ploughing, cultivating, drilling, root harvesting)

Calculated for Bush Estate, Midlothian, altitude 200 m.

| Month | Field work days for three soil types and two month probability levels | | | | | |
|-----------|---|-----|-------------|-----|------------|-----|
| | Light soil | | Medium soil | | Heavy soil | |
| | 50% | 75% | 50% | 75% | 50% | 75% |
| January | 25 | 24 | 22 | 18 | 20 | 12 |
| February | 25 | 23 | 21 | 17 | 19 | 12 |
| March | 25 | 24 | 21 | 18 | 20 | 15 |
| April | 27 | 25 | 22 | 19 | 24 | 17 |
| May | 28 | 26 | 25 | 22 | 26 | 20 |
| June | 28 | 26 | 27 | 24 | 27 | 24 |
| July | 29 | 27 | 28 | 26 | 28 | 26 |
| August | 28 | 26 | 27 | 25 | 27 | 24 |
| September | 27 | 25 | 25 | 23 | 24 | 20 |
| October | 26 | 23 | 23 | 19 | 22 | 17 |
| November | 26 | 22 | 23 | 18 | 23 | 17 |
| December | 26 | 23 | 22 | 18 | 23 | 14 |

Probability levels of 75% (18 years out of 24) and 50% (12 years out of 24) are shown in the table so that different risk levels can be compared. The 75% probability level is recommended for machinery and labour planning.

If machinery and labour are adequate for 18 years out of 24, other facilities such as contractors, overtime and casual labour can be used during the remaining years. Alternatively, the operation can be performed in wetter conditions.

Soils data used for the calculation of these figures are based on three drainage categories:

| | | |
|--------------|-------------------------------|----------------------|
| Light soils | Freely drained sandy loam | e.g. Darvel series |
| Medium soils | Moderately drained loamy clay | e.g. Macmerry series |
| Heavy soils | Imperfectly drained clay loam | e.g. Winton series |

Workday figures in the table are based on the daily fluctuations of soil moisture content, predicted from daily values of rainfall, sunshine hours and mean air temperature. A day is assumed to be a work day if the soil moisture content at 9 am is below the lower plastic limit and the total rainfall during the same day does not exceed 10 mm.

Meteorological data spanning 24 years has been used.

The following example uses the figures in the previous table to help calculate the work rate of a tractor.

Example: A tractor has to be purchased to plough 120 ha of heavy soil between mid-August and mid-September. What work rate will be required?

From the preceding table, at 75% probability, the number of days available on a heavy soil during the months of August and September are 24 and 20 respectively.

| | | | | |
|---|---|------|---|-----------|
| ▪ Therefore, days available second half of August | = | 24/2 | = | 12 |
| ▪ Therefore, days available first half of September | = | 20/2 | = | 10 |
| | | | | <u>22</u> |

Assuming an eight-hour working day, the total time available is 176 hr. In order to complete the work within the desired period the tractor should be capable of ploughing at least 0.68 ha/hr (calculated by dividing 120 ha by 176 hr).

Alternatively, if the lower probability of 50% is chosen for the same soil and area the tractor work rate would be calculated as:

| | | | | |
|--|---|------|---|-------------|
| ▪ Days available second half of August | = | 27/2 | = | 13.5 |
| ▪ Days available first half of September | = | 24/2 | = | 12.0 |
| | | | | <u>25.5</u> |

Assuming an eight-hour working day, the total time available is 204 hr. In order to complete the work within the desired period the tractor should be capable of ploughing at least 0.58 ha/hr (calculated by dividing 120 ha by 204 hr).

Typical field efficiencies

Field efficiency is a measure, as a percentage, of a machine's field capacity after taking into account for failures to utilise the full operating capacity. These failures result from items such as overlapping, turning and other routine time delays associated with the operation. Typical figures, shown in the following table, are expressed as a percentage.

| | | | |
|---------------------------------|-----|---------------------|-----|
| Ploughing | 90% | Grain only drilling | 75% |
| Power harrow + grain only drill | 60% | Combining | 85% |

Calculating workrate

$$\text{Workrate (ha/hr)} = \frac{\text{working width (m)} \times \text{forward speed (km/hr)} \times \text{field efficiency (\%)}}{10}$$

For example, a 9.1m combine travelling an average of 6km/hr has a work rate of 4.64 ha/hr as per the calculation below:

$$\text{Workrate (ha/hr)} = \frac{9.1 \text{ (m)} \times 6 \text{ (km/hr)} \times 85 \text{ (\%)}}{10} = 4.64 \text{ ha/hr}$$

Estimating Machinery Costs

Machinery costs on many farms can be a major contributor to high levels of fixed costs. Part of the reason for this is that often farmers do not have a clear idea of what their machinery is costing them. Consequently, to improve machinery management the first step is to establish current machinery costs.

To compare the cost of doing the job in-house against the rates charged by a local contractor, the actual machinery costs must be costed. This is a straightforward task for an operation like combining where one machine is involved. But for more complex operations, such as sowing or silage harvesting, the task is more difficult as only part of the tractor's duties are attributable to the operation. In such cases a wider assessment of the farm's annual machinery usage must also be undertaken.

Example calculation - cost estimate for purchasing and operating a combine harvester

To illustrate the principle behind estimating machinery costs this example has been shown on pages 398-399, showing the purchase of a combine harvester for £220,000 versus using contractors.

This method is based on estimating the annual fixed and operating costs of the machine given expected annual use and machine life. These

estimates can then be used in a partial budget for comparison with alternative policies such as the use of a contractor.

The following three tables provide the supporting information for the steps in the machinery calculation.

Table 1: Depreciation - average annual fall in value

| Frequency of renewal (years) | Complex (high depreciation rate) ¹ | Established (many moving parts) ² | Simple (few moving parts) ³ |
|------------------------------|---|--|--|
| 1 | 34.0% | 26.0% | 19.0% |
| 2 | 24.5% | 19.5% | 14.5% |
| 3 | 20.0% | 16.5% | 12.5% |
| 4 | 17.5% | 14.5% | 11.5% |
| 5 | 15.0% | 13.0% | 10.5% |
| 6 | 13.5% | 12.0% | 9.5% |
| 7 | 12.0% | 11.0% | 9.0% |
| 8 | 11.0% | 10.0% | 8.5% |
| 9 | 10.0% | 9.5% | 8.0% |
| 10 | 9.5% | 8.5% | 7.5% |

Typical frequency of renewal with heavy use
 Typical frequency of renewal average use
 Typical frequency of renewal with light use

- ¹ e.g. Potato Harvesters, Pea Viner
- ² e.g. Tractors, Combines, Balers, Forage Harvesters
- ³ e.g. Ploughs, Trailers

Table 2: Fuel consumption

Fuel is a significant cost for farming and rural businesses. Actual fuel consumption will vary depending on variables such as the power and size of machine used, depth of operation, correct calibration, appropriate maintenance of machinery, speed and care of operation. The table below gives an indication of the fuel cost of some farming operations based on red diesel costs of 58 p/l (Sept 2021).

| | Fuel consumption (l/hour) | Time taken for operation (hours/ha) | Diesel usage (l/ha) | Diesel cost (£/ha) |
|----------------------|---------------------------|-------------------------------------|---------------------|--------------------|
| Subsoiling | 18.9 | 1.11 | 21.00 | 12.18 |
| Ploughing (6 furrow) | 26.8 | 1.11 | 29.75 | 17.26 |
| Heavy Cultivation | 26.8 | 0.71 | 19.13 | 11.09 |
| Light Cultivation | 8.6 | 0.47 | 4.02 | 2.33 |
| Power harrow | 26.8 | 1.00 | 26.78 | 15.53 |
| Fertiliser spreading | 8.6 | 0.18 | 1.57 | 0.91 |
| Grain drilling 3m | 18.9 | 0.53 | 9.95 | 5.77 |

| | Fuel consumption (l/hour) | Time taken for operation (hours/ha) | Diesel usage (l/ha) | Diesel cost (£/ha) |
|---------------------------|--------------------------------------|--|--------------------------------|-------------------------------|
| Rolling 7.3m light | 8.6 | 0.33 | 2.88 | 1.67 |
| Potato Planting 2 row | 10.8 | 1.33 | 14.40 | 8.35 |
| Mowing 3m | 18.4 | 0.49 | 9.01 | 5.23 |
| Baling straw, round bales | 26.8 | 0.50 | 13.39 | 7.76 |
| Forage harvesting | 61.2 | 0.40 | 24.48 | 14.20 |
| Spraying 24m | 10.8 | 0.18 | 1.96 | 1.14 |
| Towing (trailer) | 16.2 | 0.40 | 6.48 | 3.76 |
| Combine harvesting 7.7m | 37.8 | 0.31 | 11.63 | 6.75 |
| Potato harvesting 2 row | 21.6 | 2.29 | 49.37 | 28.64 |

Table 3: Estimated annual cost of spares and repairs (as a percentage of purchase price at various levels of use)

| | Approximate Annual Use (Hours) | | | | |
|-----------------|---------------------------------------|------------|-------------|-------------|------------------------------|
| | 500 | 750 | 1000 | 1500 | + each additional 100 |
| Tractors | 5.0% | 6.7% | 8.0% | 10.5% | 5.0% |

| | Approximate Annual Use (Hours) | | | | |
|---|---------------------------------------|------------|------------|------------|------------------------------|
| | 50 | 100 | 150 | 200 | + each additional 100 |
| Harvesting machinery | | | | | |
| Combine harvesters, balers, potato harvesters | 1.5% | 2.5% | 3.5% | 4.5% | 2.0% |
| Other implements | | | | | |
| Ploughs, cultivators, toothed harrows, hoes | 4.5% | 8.0% | 11.0% | 14.0% | 6.0% |
| Rotary cultivators, mowers, pea cutter windrowers | 4.0% | 7.0% | 9.5% | 12.0% | 5.0% |
| Disc harrows, fertiliser spreaders, FYM spreaders, combine drills, potato planters (with fertiliser), sprayers, hedge cutters | 3.0% | 5.5% | 7.5% | 9.5% | 4.0% |
| Swath turners, tedders, side delivery rakes, unit drills, forage harvesters, semi-automatic potato planters | 2.5% | 4.5% | 6.5% | 8.5% | 4.0% |

| | Approximate Annual Use (Hours) | | | | |
|---|--------------------------------|------|------|------|-----------------------|
| | 50 | 100 | 150 | 200 | + each additional 100 |
| Corn drills, milking machines, hydraulic loaders | 2.0% | 4.0% | 5.5% | 7.0% | 3.0% |
| Grain driers, grain cleaners, rolls, hammer mills | 1.5% | 2.0% | 2.5% | 3.0% | 0.5% |

Example calculation - Purchase of combine harvester versus using contractors

| Cost element | Value | ref | Factor | Calculation |
|------------------------------|----------------------|-----|--------|---------------------------|
| Area harvested (ha) | 600 | A | - | - |
| Work rate (ha/hr) | 2.75 | B | - | - |
| Annual hours worked (hr) | 218 | C | - | A / B |
| Machine life (yr) | 6 | D | - | - |
| Purchase price (£) | 220,000 | E | - | - |
| F'cast 5yr selling price (£) | 26,400 | F | 12% | E*depreciation% (table 1) |
| Average value (£) | 123,200 | G | - | (E+F) / 2 |
| Depreciation (£) | 32,267 | H | - | (E-F) / D |
| Interest (£) | 6,160 | I | 5% | G*interest rate (%) |
| Insurance (£) | 1,848 | J | £15 | G*£ per £1k |
| Annual fixed costs (£) | <u>40,275</u> | K | - | H+I+J |
| Fuel use (l/ha) | 12 | L | - | (table 2) |
| Fuel cost (£) | 4,176 | M | £0.58 | A*L*fuel price (£/l) |
| Spares and repairs (£) | 9,900 | N | 4.5% | E*% (table 3) |
| Labour (£) | 2,727 | O | £12.50 | labour (£/hr)*(A/B) |
| Annual operation costs (£) | <u>16,803</u> | P | - | M+N+O |
| Annual cost (£) | <u>57,078</u> | Q | - | K+P |
| Annual cost (£/ha) | 95 | R | - | Q / A |
| Contractor charge (£/ha) | 98 | | | (incl. fuel) |

Based on these assumptions, owning a combine is cheaper (£95/ha) than average contractor's charges (£98/ha) but other factors must be considered:

- If the farmer increases the area harvested the overall cost of the combine increases to reflect higher fuel, repairs and depreciation costs. But this increase is spread over a much larger area and consequently reduces cost per ha.

- Work rate has a major effect on machinery cost. Many factors influence work rate efficiency, some of which are beyond the control of the farmer, while others can be improved upon.
- Contractor's charges are also highly variable depending on the above and other factors such as the level of local competition amongst contractors which can greatly affect charges.

For more information on payment terms involved in purchasing machinery see credit options on pages 523-525.

Machinery Contractors' Charges

Prices are indicative market rates taken from various contractors and machinery rings throughout Scotland with the costs of the driver (generally) included. Fuel is not normally included in contract charges. However, as prices and contractors arrangements (e.g. farm fuel used) vary considerably within areas, the prices listed below only serve as a guide and local information should be sourced for specific operations.

Costs of carrying out specific operations, i.e. arable stubble to stubble and preserved forage are illustrated on pages 46, 78-79 and 92.

| | Average price | Price range |
|------------------------------|---------------|---------------|
| Arable cultivation | | |
| Ploughing | £57.21 /ha | £45.71-£65.14 |
| with press | £7.02 /ha | £4.94-£9.12 |
| Discing | £41.28 /ha | £29.65-£57.55 |
| Power harrow | £53.57 /ha | £44.48-£70.05 |
| Min till cultivations | £45.94 /ha | £37.07-£63.13 |
| Cambridge roller | £13.97 /ha | £8.65-£19.35 |
| with paddles | £7.72 /ha | £5.56-£9.88 |
| Subsoiling | £67.17 /ha | £46.28-£91.18 |
| Topping - fallow | £30.81 /ha | £22.24-£38.18 |
| Rotovating | £68.07 /ha | £54.36-£77.22 |
| Grassland maintenance | | |
| Heavy flat roller | £23.45 /ha | £18.53-£27.82 |
| Topping - grass | £29.43 /ha | £22.49-£38.18 |
| Chain harrowing | £23.43 /ha | £8.65-£35.83 |
| Spring tine harrowing | £32.15 /ha | £24.71-£40.40 |
| Aeration | £23.06 /ha | £11.12-£29.65 |
| Sward lifting | £62.10 /ha | £50.66-£80.31 |
| Sowing | | |
| Grass seed - broadcast | £28.35 /ha | £22.98-£33.36 |
| Grass seed - with harrows | £32.81 /ha | £21.00-£37.24 |
| Grass seed - direct drilling | £56.42 /ha | £44.97-£76.60 |
| Grain (no fert.) | £38.19 /ha | £24.71-£51.37 |

| | Average price | Price range |
|---|---------------|-----------------|
| Oilseed rape (no fert.) | £58.49 /ha | £54.36-£66.89 |
| Turnips | £67.54 /ha | £44.48-£88.96 |
| Beet | £68.20 /ha | £54.36-£88.96 |
| One pass cultivation/drill (cereals, no fert.) | £56.64 /ha | £44.48-£64.25 |
| One pass cultivation/drill (OSR, no fert.) | £56.22 /ha | £54.36-£59.30 |
| with fertiliser | £5.56 /ha | £4.32-£7.41 |
| Maize (without plastic) | £64.77 /ha | £51.00-£88.96 |
| Maize (with plastic) | £142.50 /ha | - |
| Fertiliser spreading | | |
| Spinner | £10.66 /ha | £8.65-£13.84 |
| with variable rate | £3.84 /ha | £3.09-£4.84 |
| Liquid fertiliser (surface) | £14.16 /ha | £13.39-£16.06 |
| Irrigating (/25mm) | £160.62 /ha | £123.55-£197.68 |
| Manure and lime | | |
| Rotary - medium | £37.16 /hr | £30.00-£49.50 |
| Rear discharge - medium | £40.03 /hr | £34.00-£47.00 |
| Rear discharge - large | £47.31 /hr | £43.00-£54.10 |
| Slurry - medium | £35.30 /hr | £30.00-£40.00 |
| Slurry - large | £44.99 /hr | £37.00-£53.54 |
| Lime | £5.55 /t | £4.00-£7.58 |
| with gps | £2.50 /t | - |
| Umbilical - splash plate | £79.67 /hr | £70.00-£89.00 |
| - injection | £80.50 /hr | £78.20-£85.00 |
| with additional pumps | £39.22 /hr | £31.10-£46.50 |
| Spraying | | |
| Spraying | £13.66 /ha | £11.12-£17.99 |
| with gps | £2.50 /ha | - |
| Slug pellet application | £8.01 /ha | £6.18-£9.88 |
| Weed wiping | £45.00/hr | £35.00-£55.00 |
| Combinable harvesting | | |
| Cereals | £90.85 /ha | £76.60-£105.26 |
| with yield mapping | £4.94 /ha | - |
| with chopper | £8.11 /ha | £6.35-£10.38 |
| Oilseed rape - direct | £92.06 /ha | £76.60-£105.93 |
| Oilseed rape swathing | £48.45/ha | £43.86-£57.01 |
| Peas and beans | £100.59 /ha | £94.94-£106.25 |
| Crimping/bruising grain/pulses | £12.56 /t | £8.60-£18.00 |
| Straw chopping | £37.07 /ha | £34.59-£42.01 |
| Forage | | |
| Mower | £24.25 /ha | £21.00-£30.29 |
| Mower and conditioner | £30.36 /ha | £23.47-£34.59 |

| | Average price | Price range |
|--|---------------|-----------------|
| Tedding/raking | £16.22 /ha | £10.50-£19.77 |
| Precision chop - self-propelled | £64.63 /ha | £49.42-£80.31 |
| Cutting, raking, chopping and carting | £160.18/ha | £154.19-£166.62 |
| Forage box | £111.00 /hr | £107.20-£117.00 |
| Forage harvester (whole crop) | £102.79 /ha | £84.01-£125.45 |
| with processor | £13.59 /ha | - |
| Maize (including forager, 3 trailers and buckrake) | £171.50 /ha | £160.00-£179.54 |
| Baling and wrapping | | |
| Silage/hay - 4x4 | £2.58 /bale | £1.90-£3.35 |
| with chopper | £0.40 /bale | £0.30-£0.50 |
| Silage – 5x4x2.3 | £4.00 /bale | £3.70-£4.30 |
| Hay - small square | £0.59 /bale | £0.43-£0.78 |
| Straw - 4x4 | £2.43 /bale | £1.90-£3.35 |
| Straw - 4x5 | £3.05 /bale | £2.40-£3.59 |
| Straw - 8x4x2.3 | £4.32 /bale | £4.00-£4.40 |
| Straw - 8x4x4 | £6.90 /bale | £6.40-£7.80 |
| Straw - small square | £0.62 /bale | £0.43-£0.80 |
| Wrapping - round | £2.08 /bale | £1.30-£2.66 |
| incl. wrap (4 layers) | £4.22/bale | £3.60-£5.00 |
| incl. wrap (6 layers) | £5.34/bale | £4.60-£6.25 |
| Wrapping - square | £2.95 /bale | £2.40-£3.49 |
| incl. wrap (4 layers) | £5.72/bale | £4.90-£6.62 |
| Wrapping - tube-line, silage | £2.43 /bale | £1.75-£2.95 |
| Wrapping - tube-line, straw | £2.40 /bale | £1.75-£3.00 |
| Stacking | £0.49 /bale | £0.35-£0.60 |
| Ag bagging | £6.75 /t | - |
| Baling and wrapping incl. wrap (4 layers) | £7.03/bale | £6.25-£7.90 |
| Root and potato work | | |
| Deep plough | £68.55 /ha | £61.78-£76.50 |
| Deep ridge | £63.01 /ha | £40.77-£85.25 |
| Bed tilling | £143.73 /ha | £103.78-£222.39 |
| Destoning | £242.16 /ha | £177.91-£276.75 |
| Bed forming | £74.13 /ha | £34.59-£113.67 |
| Potato planting - without fertiliser | £123.76 /ha | £54.36-£222.39 |
| Potato planting - with fertiliser | £149.00 /ha | £81.54-£234.75 |
| Potato pulverising | £59.30 /ha | £39.54-£76.60 |
| Potato harvesting - excl. pickers | £477.01 /ha | £370.65-£694.99 |
| Turnip harvesting | £41.00 /hr | - |
| Tractor hire - including driver | | |
| 4 WD up to 100 hp | £28.08 /hr | £25.00-£33.50 |
| 4 WD 101 - 150 hp | £32.13 /hr | £26.00-£38.12 |
| 4 WD 151 - 220 hp | £36.94 /hr | £30.00-£43.00 |

| | Average price | Price range |
|---|----------------------|----------------|
| 4 WD 220 - 300 hp | £47.52 /hr | £34.00-£58.00 |
| 4 WD over 300 hp | £62.57 /hr | £38.00-£79.75 |
| Tracked | £56.33 /hr | £55.00-£57.65 |
| with loader | £4.00 /hr | - |
| with trailer | £7.00 /hr | - |
| 4 WD telehandler | £34.10 /hr | £27.00-£43.52 |
| JCB type excavator | £31.13 /hr | £28.00-£33.50 |
| Tracked excavator 15-25t | £37.88 /hr | £30.00-£43.89 |
| with rock pecker | £13.75 /hr | £12.50-£15.00 |
| Skidsteer | £77.50 /day | £60.00-£100.00 |
| Tractor with post chapper (+ man) | £38.83 /hr | £32.50-£46.00 |
| Labour | | |
| Casual | £11.00 /hr | £10.00-£12.00 |
| Experienced/skilled ¹ (weekdays) | £13.13 /hr | £12.00-£14.05 |
| Cereal/potato roguing | £13.50 /hr | £13.00-£15.00 |
| Secretarial | £17.25 /hr | £16.50-£18.00 |
| Livestock services | | |
| Sheep shearing - Blackface ² | £1.10 /hd | £1.00-£1.20 |
| - Crossbred ewe ² | £1.35 /hd | £1.10-£1.70 |
| - Tups ² | £2.50 /hd | £2.40-£2.80 |
| Rolling and packing wool | £0.20 /hd | - |
| Sheep dipping | £0.94 /hd | £0.25-£1.70 |
| Sheep showers | £0.98 /hd | - |
| Crutching sheep | £0.73 /hd | - |
| Scanning - sheep ² | £0.85 /hd | £0.65-£1.05 |
| Scanning - cattle ² | £2.05 /hd | - |
| Foot trimming - sheep | £1.05 /hd | - |
| Foot trimming - cows | £11.00 /hd | - |
| Foot trimming - bulls | £24.50 /hd | - |
| Haulage - sheep ³ | £2.30 /hd | £1.50-£35.00 |
| Haulage - cattle ³ | £20.00 /hd | £5.00-£70.00 |
| Automatic handler for sheep | £100 /day or £20 /hr | - |
| Miscellaneous | | |
| Strimming | £19.00 /hr | £18.00-£20.00 |
| Hedge cutter | £37.49 /hr | £28.00-£42.50 |
| Log splitter | £33.00 /hr | £31.00-£35.00 |
| Snow plough | £51.20 /hr | £46.50-£57.11 |
| Road brush | £32.50 /hr | £30.00-£35.00 |
| Feed mixing/processing (mobile) | £22.97 /t | £19.00-£30.00 |
| Haulage - forage (hay and straw) ² | £20.00 /t | £10.00-£35.00 |
| Haulage - concentrates ² | £20.00 /t | £10.00-£40.00 |

- 1 includes skilled relief milkers, stockmen, shepherds, sprayer operators and forklift/digger/HGV drivers.
- 2 for small flocks/herds a minimum fee of £100-150.
- 3 haulage charges are highly dependent on distance travelled, weight of load and options for a back load.

Grain Drying

All costs for drying include a price for handling and loading.

Grain

Reduction to 15% moisture content from:

| | | | | | | | |
|---------|---------|----------|----------|----------|----------|----------|----------|
| 16% | 17% | 18% | 19% | 20% | 21% | 22% | 23% |
| £7.90/t | £9.90/t | £11.90/t | £13.90/t | £15.90/t | £17.90/t | £19.90/t | £21.90/t |

Contractor's weight loss (including drying and cleaning):

| | | | | | | | | |
|-------------|-----|------|------|------|------|-------|-----|-----|
| From | 16% | 17% | 18% | 19% | 20% | 21% | 22% | 23% |
| Weight loss | 4% | 6.3% | 7.2% | 8.2% | 9.2% | 10.2% | 11% | 13% |

See page 47 for equivalent grain weights at varying moisture contents.

Oilseed rape

Reduction to 8% moisture content from:

| | | | | | | | |
|---------|----------|----------|---------|---------|---------|----------|----------|
| 10% | 11% | 12% | 14% | 16% | 18% | 20% | 22% |
| £9.90/t | £11.90/t | £13.90/t | £17.90t | £21.90t | £25.90t | £29.90/t | £33.90/t |

Contractor's weight loss (including drying and cleaning):

| | | | | | | | | |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|
| From | 10.5% | 11.5% | 12.5% | 14.5% | 16.5% | 18.5% | 20.5% | 22.5% |
| Weight loss | 3% | 4.5% | 6% | 9% | 12% | 15% | 18% | 21% |

Drainage

Drainage costs and work rates will vary considerably depending on specific site circumstances (current drainage system and terrain) and requirements. All drainage work should be fully discussed, inspected, designed and quoted (materials and labour split) prior to work commencing to prevent discrepancies at a later date.

Draining

| Operation | Price |
|--|------------------|
| 3t mini-digger + man + diesel | £20.00-£25.00/hr |
| 7 ½ ton JCB + man + diesel | £30.00-£35.00/hr |
| 15 ton tracked digger + man + diesel | £30.00-£37.50/hr |
| Typical work rate (32" depth) | 30 - 50m/hr |
| Trencher (+ man + diesel + handling gravel + pipe) | £2.75-£10.50/m |
| Typical work rate | 150 - 200m/hr |

| Operation | Price |
|--|---|
| Trenchless (+ man + diesel + handling gravel + pipe) | £2.50-£9.75/m |
| Typical work rate | 150 - 200m/hr |
| Tractor + gravel cart (incl. man + diesel) | £30.00-45.00/hr or £1.75-£2.75/ton handling charge |

Approximate draining costs on an area basis are shown below:

| Lateral spacing | Method | Materials | Price £/ha |
|------------------------|---------------|------------------------------------|-------------------|
| 7m | Digger | no gravel | 3,558 |
| 15m | Digger | purchased gravel | 6,105 |
| 15m | Digger | own gravel | 3,632 |
| 15m | Digger | twinwall plastic pipe & own gravel | 4,556 |
| 15m | Trenchless | purchased gravel | 3,400 |
| 20m | Digger | purchased gravel | 4,556 |
| 20m | Trenchless | purchased gravel | 2,223 |

Materials

| Material | Price |
|-----------------------------|---|
| Gravel | £14.00-£22.00/ton |
| Corrugated plastic pipe | 60mm (150m coil) £76.00 (or 51p/m) 80mm (100m coil) £65.00 (or 65p/m) 100mm (100m coil) £89.00 (or 89p/m) 160mm (35m coil) £92.00 (or 1.83p/m) |
| Twinwall plastic pipe | 100mm £9.60 (or £1.60/m) |
| (6m lengths incl. coupling) | 150mm £19.60 (or £3.26/m) 225mm £61.60 (or £6.93/m) |

Pipe requirements

| Lateral spacing | m/ha | m/acre |
|------------------------|-------------|---------------|
| 7m | 1,430 | 575 |
| 15m | 670 | 270 |
| 20m | 500 | 200 |

Gravel requirements (tonnes per 1 metre run)

| Width of trench | Depth of gravel (mm) | | | | |
|------------------------|-----------------------------|------------|------------|------------|------------|
| | 250 | 300 | 450 | 600 | 900 |
| 100mm | 0.05 | 0.06 | 0.09 | 0.12 | 0.18 |
| 125mm | 0.06 | 0.08 | 0.11 | 0.15 | 0.23 |
| 150mm | 0.08 | 0.09 | 0.14 | 0.18 | 0.27 |
| 225mm | 0.11 | 0.14 | 0.20 | 0.27 | 0.41 |
| 300mm | 0.15 | 0.18 | 0.27 | 0.36 | 0.54 |
| 450mm | 0.23 | 0.27 | 0.41 | 0.54 | 0.81 |
| 600mm | 0.30 | 0.36 | 0.54 | 0.72 | 1.08 |
| 750mm | 0.38 | 0.45 | 0.68 | 0.90 | 1.35 |

Secondary drainage treatments

| <i>Operation</i> | <i>£/hr</i> | <i>£/acre</i> |
|----------------------------|--------------|---------------|
| Subsoiling (1-3 acres/hr) | 65.00-115.00 | 22.00-39.00 |
| Molting (1-3 acres/hr) | 65.00-115.00 | 22.00-39.00 |
| Flat lifter (1-3 acres/hr) | 75.00-120.00 | 20.50-27.00 |
| Aerator (5-7 acres/hr) | 23.00-84.00 | 4.50-12.00 |

Drain jetting

| | <i>Price</i> |
|---|------------------|
| Drain jetter with tractor | £35.00-£54.00/hr |
| Drain jetter with tractor (incl. digger + tractor + bowser) | £700-£800/day |

Ditch cleaning

| | <i>Price</i> |
|-----------------------------|-------------------------------------|
| Ditch cleaning (20-125m/hr) | £1.75 - £2.25/m or £38.00-£48.00/hr |

Fencing

The costs in the following table will vary considerably depending on fence purpose, fence length, site difficulty (such as access, ground conditions, presence of rock, and number of turns) and, type and quality of materials.

| Net fences | £/m |
|--|------------|
| Mild steel netting, 2 mild steel plain wires, 1 mild steel barb wire assuming stobs every 2m, a strainer at either end, a turning post every 50m and 8 gripples every 200m | 4.17 |
| High tensile netting, 3 high tensile plain wires, 1 barb wire assuming stobs every 3m, a strainer at either end, a turning post every 50m and 8 gripples every 200m | 3.58 |
| High tensile steel netting, 2 high tensile plain wires, 1 high tensile barb wire assuming steepleless steel posts every 4.5m, a steepleless steel strainer with stay kit at either end, a steepleless steel turning post every 50m and 8 gripples every 200m | 4.49 |
| Plain wire fence | £/m |
| 8 hi tensile plain wire, 1 barb wire assuming stobs every 2m, a strainer at either end and a turning post every 50m | 3.74 |
| Scare fence | £/m |
| 2 barb wire assuming stobs every 5m, a strainer at either end and a turning post every 50m | 2.07 |
| Electric fences (energisers not included) | £/m |
| Hi tensile netting, 4 hi tensile plain wires assuming stobs every 3m, a strainer at either end, a turning post every 50m and 8 gripples every 200m | 3.81 |

| Electric fences (energisers not included) | £/m |
|--|------------|
| 8 hi tensile plain wires assuming stobs every 2m, a strainer at either end and a turning post every 50m | 4.13 |
| 2 hi tensile plain wires, assuming stobs every 5m, a strainer at either end and a turning post every 50m | 2.34 |

| Deer fence | £/m |
|---|------------|
| Deer netting, rabbit netting, 3 mild steel plain wires assuming stobs every 3m, a strainer at either end and a turning post every 50m | 7.23 |

| Post and rail fence | £/m |
|---|------------|
| 5 rails assuming stobs every 2m, a strainer at either end | 11.46 |

| Hedges | £/m |
|---------------|------------|
| Hedge laying | 15.00 |

There are regional and contractor variances on fence types. It is important to ensure the materials are chosen with purpose in mind, e.g. net fencing for sheep can differ from that suitable for cattle so as to help prevent loss of sheep ear tags. All fencing work should be fully discussed, inspected and quoted (materials and labour split) prior to work commencing to prevent discrepancies at a later date.

Labour costs for fencing will vary between £10.00-16.50/hr. Chapping costs are £25.00-38.00/hr and for strainers, £15/post. Dismantling existing fencing, site preparation and fence disposal are added charges.

Dry Stone Walling

| | |
|---------------------------------|------------------------|
| Excluding provision of material | £25-50 /m ² |
| Stone | £60-100 /t |

Regional and contractual variations will apply in terms of the price of dry stone walling, in part depending on ease of access to site, availability of stone and nature and size of the wall. In general terms the price quoted for labour will be based on a metre square rate and will include the building of both sides of the wall, where a free-standing structure is required. Prices will vary for retaining walls. It is good practice to discuss and inspect the work with the dry stone waller beforehand, which will help identify whether additional stone is required. As a rough guideline, 1t of stone will be required for every linear metre of a free-standing wall approximately 1.3m high. Specialist stones, such as throughbands, quoins or copes may need to be sourced separately.

The Dry Stone Walling Association (www.dswa.org.uk) has a list of current professional members available on its website.

Agricultural Vehicles on the Road

Below are some key points that should be adhered to when agricultural vehicles are to be used on the public road. Vehicles must be used for 'agricultural purposes' before it can be licenced as an agricultural vehicle.

Drivers licence – Usually a full car licence will include the 'F' category which is the tractor section. For some vehicles (combines etc) category 'B' will also be required. Vehicles fitted with tracks depending on the steering arrangement may require the 'H' category on the drivers licence. Farm ATV's can be registered as light agricultural vehicles and driven on the road provided they have the full road legal kit.

Drivers ages – After passing the 'tractor' test a 16 year old can drive an agricultural vehicle on the road provided it is mounted on wheels, is no wider than 2.45m and is not pulling a trailer exceeding a single or double axle close coupled design which is also below 2.45 m wide. Once over 17 years old they can then operate most agricultural machines apart from tracked machines which is over 21 years of age. You must sit a separate test, category H, for tracked vehicles. Drivers aged 17-20 will be restricted to a Maximum Authorised Mass (MAM) of no more than 3,500kg. Anyone wishing to tow a trailer behind a car, van or 4x4 and has passed their driving test after the 1st January 1997 is required to sit a separate B + E trailer test.

Speed limits – The majority of agricultural tractors may travel at 25mph. Some tractors are built to higher specifications and are permitted to travel at up to 40mph. The higher speed limit applies to tractors that have (among other requirements) all-wheel suspension, braking efficiency of 50%, pneumatic tyres, a speedometer and a horn. The exact requirements are contained in the Construction and Use Regulations 1986 (as amended). Wider tractors (falling into the special type agricultural vehicle category) have lower speed limits as follows:

- Vehicles 2.55m - 3.5m wide are limited to 20 mph.
- Vehicles 3.5m - 4.3m wide are limited to 12 mph.

For more information, see:

<https://www.gov.uk/government/publications/tractors-regulations-on-use/tractors-and-regulatory-requirements-a-brief-guide-september-2017>

Trailer brakes – If a vehicle is travelling up to 25mph then hydraulic brakes are sufficient. Over 25mph then progressive brakes should be fitted along with ABS and a failsafe system.

Vehicle weights – Depending on axle spread the maximum authorised mass (MAM) should not exceed 31,000kg (tractor and implements attached). The trailer on its own again depending on axle load limits should not exceed 18,290kg. The additional axle load on the rear axle of the tractor imposed from the trailer should not exceed 3,000kg.

Vehicle widths – Up to 3m wide no notification is required. 3.0m - 3.5m, the police have to be notified, max speed 20mph. 3.5m - 4.3m, notification to police, attendant vehicle and lights fitted in reduced visibility, max speed 12mph. Over 4.3m, notification to secretary of state, attendant vehicle and lights fitted in reduced visibility. In all cases any projections must be marked and lights fitted when required.

Pick up hook rings – Ensure the gap between the top of the hook and the upper part of the hitch does not exceed 10mm gap when locked. The minimum thickness of the trailer ring should be no less than 30mm.

Tyre condition – Up to 20mph the tyres have to be in a safe condition and roadworthy. Over 20mph and there can be no cuts exceeding 25mm in length, have a minimum of 1mm tread depth and no obvious damage or wear and tear.

Lights – All lights when fitted must be visible, working and correctly positioned. Amber beacons are only required on unrestricted dual carriageways unless used as a warning for wide vehicle etc. No rear facing white lights are allowed.

Registration plates – Plates fitted to towing vehicles must match the vehicle and the registered keeper of the vehicle.

Fuel – Red diesel is permitted only if the vehicle is registered as an agricultural vehicle and being used for an agricultural related purpose.

MOT testing – Most agricultural vehicles will be MOT test exempt but must still meet the construction and use regulations when on the public road.

Labour Legislation and Policy

National hourly wage rates – excluding agricultural workers

The mandatory National Living Wage (NLW) applies to workers aged 23 and above, whilst the National Minimum Wage (NMW) applies to apprentices and those under 23. The following table shows the NLW and the NMW hourly rates for age categories.

| Age | NMW and NLW hourly rates (£/hr) | | |
|--------------|---------------------------------|------|------|
| | 2021 | 2020 | 2019 |
| 23 + | 8.91 | 8.72 | 8.21 |
| 21-22 | 8.36 | 8.20 | 7.70 |
| 18-20 | 6.56 | 6.45 | 6.15 |
| 16-17 | 4.62 | 4.55 | 4.35 |
| Apprentice * | 4.30 | 4.15 | 3.90 |

* From 1st April 2021 the National Living Wage was extended to 23- and 24-year-olds.

** First year of apprenticeship, thereafter minimum wage or National Living Wage for their age applies.

Some employers are part of a voluntary scheme to pay an enhanced 'Real Living Wage', currently £9.50 per hour, payable from 18 years old.

Minimum hourly wage rates for agriculture

Scotland

The following table summarises the rate of pay figures as set in the Agricultural Wages (Scotland) Order (No.68) with effect from 1 April 2021.

| Agricultural minimum hourly wage (£/hr) - Scotland | |
|--|-------------|
| Minimum hourly rate of pay for all ages of workers ¹ | 8.91 |
| Minimum hourly rate of pay for workers who undertake an SCQF Level 4 or 5 or equivalent ² | 5.58 |
| Additional sum for workers with qualifications ³ | 1.32 |
| Overtime ⁴ | From: 13.37 |
| Dogs (£/dog/week - up to a max. of 4 dogs) | 6.57 |

- 1 Hourly rate applies to workers whether full time, part time, students etc. and no matter what type of work is done.
- 2 Minimum hourly rate of pay for SCQF or equivalent, payable in first year of apprenticeship after which the minimum hourly rate of pay as set for the year will apply.
- 3 For workers with a relevant qualification at SCQF6 or above (includes SVQ/NVQ Level 3, NC. HNC. HND), or those with a Certificate of Acquired Experience obtained before 31 December 1997.
- 4 Based on the minimum hourly rate of pay to which the worker is entitled multiplied by 1.5 - e.g. £8.91 x 1.5 = £13.37.

England

Agricultural workers in England must be paid at least the NMW (see page 408). Where an employment contract dated before 1 October 2013 exists and mentions the Agricultural Wages (England and Wales) Order 2012 the employee still has the right to be paid the agricultural minimum wage for the graded pay rate that they are entitled to. The agricultural minimum hourly wage rate for those above compulsory school age is £6.21 (Grade 1) after which the rates rise to £9.40 (Grade 6) in accordance with a graded scale relating to specific job definitions and qualifications.

Wales

Agricultural workers in Wales are paid according to the Agricultural Wages (Wales) Order 2020, with a variable rate depending on specific job definitions and qualifications. The draft Agricultural Wages Order 2021 is still under consideration and until it is approved, the 2020 order will remain in place. The webpage for Wales Agricultural Wages, listed at the bottom of this section, will be updated when the 2021 order is introduced.

Northern Ireland

In Northern Ireland from 1st April 2021 the minimum agricultural hourly pay rate, applicable for the first 40 weeks cumulative employment, is £6.95 (Grade 1) to £10.95 (Grade 6) in accordance with a graded scale

relating to specific job definitions and qualifications. Where at any time the NMW or NLW becomes higher than the agricultural hourly rate set out above, then the minimum rate shall be equal to the NMW or the NLW.

Estimated annual labour costs

The following example calculates the estimated annual labour costs to an employer based in Scotland. The earnings of the worker, based on the same assumptions, are also shown.

Assumptions:

- Employee in employment for over 26 weeks
- 39 hr/wk, 5 days/wk, 52 wk/yr less 30 days holidays
- Minimum hourly rate - £8.91
- 10 hr/wk overtime
- Employers National Insurance Contributions (NIC) @ 13.8%
- Employers liability insurance @ 1%
- Overtime rate - £13.37
- £12,570 personal allowance
- Annual minimum wage amount and annual overtime amount below include pay for 6 weeks holiday as if overtime is as regular as weekly then employees should be paid overtime as part of their holiday pay.

| Labour cost to employer | Annual | Weekly | Hourly |
|---|-------------------|----------------|---------------|
| Minimum wage for employee | £18,069.48 | £347.49 | £8.91 |
| Employers NIC | £2,493.59 | £47.95 | £1.23 |
| Employers liability insurance | £180.69 | £3.47 | £0.09 |
| | £20,743.76 | £398.92 | £10.23 |
| Overtime | £6,952.40 | | £13.37 |
| Employers NIC | £959.43 | | £1.85 |
| Employers liability insurance | £69.52 | | £0.13 |
| | £7,981.36 | £153.49 | £15.35 |
| Total labour cost incl. overtime | £28,725.12 | £552.41 | £12.41 |

| Employees earnings | Annual | Weekly | Hourly |
|-------------------------------------|-------------------|----------------|---------------|
| <i>Workers earnings (gross)</i> | £25,021.88 | £481.19 | £10.81 |
| <i>Less tax</i> | £2,470.23 | £47.50 | £1.07 |
| Workers earnings (after tax) | £22,551.65 | £433.69 | £9.75 |

For more information on National Insurance Contributions and Income Tax, see pages 528-530 and 543-544).

Pensions

Employers have a legal obligation to automatically enrol eligible employees into a workplace pension scheme and pay employers contributions. Depending on the circumstances of businesses, your auto-enrolment duties will begin on either the staging date given to you by the Pensions Regulator or the date that you first hire an employee. Those aged between 22 and state pension age and earn at least £10,000/year

must be automatically enrolled. Employers are also required to pay minimum contributions for these employees which is 3% of their earnings. If employees are aged between 16 and 74 and earn between £6,136 up to £10,000/year, they can request to be added to the workplace pension and if they do, employers must pay contributions. However, if workers are aged between 16 and 74 and earn less than £6,136/year then they do need to be enrolled if they ask but employers don't need to make any contributions.

Redundancy

An employee having worked for an employer for 2 years or more will normally be entitled to Statutory Redundancy Pay. The following table lays out the basis of calculating a redundancy pay amount:

| Employee Age | No. weeks pay for each full year worked |
|---------------------|--|
| under 22 years old | 0.5 |
| 22-41 years old | 1.0 |
| over 41 years old | 1.5 |

An upper limit on weekly pay is set at £544 per week for redundancy pays on or after 6 April 2021. The maximum statutory redundancy pay that can be received is £16,320. Different rates apply prior to 6 April 2021.

Length of service is capped at 20 years with service over this period having only the last 20 years of employment taken into account. Only complete years are counted.

There is no upper age limit for an employee receiving redundancy pay.

For example, a 50-year-old having worked for their employer for 25 years earning £650/week is made redundant on 7 April 2021. The employee would be entitled to 24.5 weeks pay (11 years @ 1.0 plus 9 years @ 1.5). This equates to a redundancy pay of £13,328.00.

Higher levels of redundancy pay can be agreed between employees and employers. Redundancy pay less than £30,000 is tax free.

You are not entitled to redundancy pay if your employer offers you suitable alternative work either within the organisation or in an associated company that you refuse without good reason.

Different upper limits on weekly pay apply in Northern Ireland.

Maternity/paternity

Maternity leave arrangements will differ according to specific job arrangements. Statutory leave is 52 weeks with the first 26 weeks as ordinary leave and the last 26 weeks as additional leave. You do not have to take 52 weeks but must take 2 weeks following the birth of the baby. The earliest time to start leave is 11 weeks before the expected birth of the baby.

Maternity pay is paid up to 39 weeks with 90% of average weekly earnings (before tax) for the first 6 weeks and - £151.97 or 90% of average weekly earnings (whichever is lower) for the next 33 weeks.

For paternity leave, the entitlement is, either, 1 or 2 weeks. This leave must be taken in one go, not odd days. Paternity pay is £151.97 or 90% of average weekly earnings (whichever is lower).

It is now possible to have Shared Parental Leave (SPL) and Statutory Shared Parental Pay (ShPP). You can share up to 50 weeks of leave and up to 37 weeks of pay between you.

Labour arrangements

When employing staff the following should be considered at the outset of employment:

- Holidays and holiday pay.
- Sick pay.
- Maternity and paternity arrangements and pay.
- Pension provision.
- Provision of appropriate PPE (personal protective equipment).
- Dog allowance (where necessary).
- Other benefits, e.g., accommodation, vehicles, bonuses, subsistence.
- Dismissal.
- Redundancy.

The options for labour on farm include casual/irregular workers, self-employed contractors, or hiring permanent staff/employees.

Self-employed contractors are generally hired to carry out a specific task, i.e. harvest work, shearing, fencing, rather than being available at all times to carry out general farm work. Contracting rates are summarised on pages 399-403. HMRC are looking carefully at self-employed contractors and considering where they should more properly be considered an **employee**. There can be serious financial consequences for the employer if a contractor is later deemed to be an employee, particularly if the correct tax has not been paid. Factors taken into consideration include the number of different businesses the contractor works for, whether they provide their own equipment, whether they can send someone else in their place, and the extent to which they can refuse work.

More formal arrangements with contractors exist that would see all or most of the physical farm labour being carried out by the contractor. In this case the contractor would also, in most circumstances, provide machinery and additional labour requirement. The farmer/landowner would provide the land, capital and fixed infrastructure. These arrangements include contract farming and share farming. The agreements can be devised to suit each circumstance specifically, but the main theme is that the farmer/landowner retains an active interest in the

business both from a management point of view and financially. For more details, see pages 457-461.

Other labour opportunities would involve hiring employees on a full-time or part-time basis and the following aspects should be considered as part of the decision-making process:

- Job requirements.
- Qualifications required/training provision.
- Provision of a house and vehicle.
- Payment terms (see minimum hourly wage rates on page 408-413).
- Employment contracts.
- Performance related employment incentives.
- Legality of a person being hired.
- Employment insurance.
- Health and safety.
- Registration with HM Revenue and Customs (HMRC).

Sources of information

Full and specific details of agricultural wage arrangements and conditions across the UK can be found at the following websites:

- UK Non- Agricultural: <https://www.gov.uk/national-minimum-wage-rates>
- Scottish Government (Agricultural): <https://www.gov.scot/publications/agricultural-wages-scotland-twenty-fifth-edition-guide-workers-employers/>
- England (Agricultural): <https://www.gov.uk/agricultural-workers-rights>
- Wales (Agricultural): <https://gov.wales/agricultural-wages>
- Northern Ireland (Agriculture): <https://www.daera-ni.gov.uk/articles/agricultural-wages-board-northern-ireland-awb>

Further information on labour suppliers, training, pensions, redundancy, and other statutory obligations can be found at the following websites:

- Gangmasters Licensing Authority (GLA): <http://www.gla.gov.uk/>
- LANTRA: <http://www.lantra.co.uk/>
- Department for Work and Pensions (DWP): www.dwp.gov.uk
- HM Revenue and Customs: <https://www.gov.uk/government/organisations/hm-revenue-customs>
- Advisory, Conciliation and Arbitration Service (ACAS) : <https://www.acas.org.uk/advice>

Health and Safety

Health and safety should be regarded as an essential part of farm business management. Along with the construction industry, agriculture has the worst safety record of any sector. The Health and Safety Executive (HSE) is responsible for ensuring compliance with legislation

and also provides a source of advice and guidance for businesses (see www.hse.gov.uk).

The Health and Safety at Work Act 1974 and the Management of Health and Safety at Work Regulations (MHSW) 2003 place duties on businesses and individuals to ensure that adequate provision is made for health and safety at work. Employers must ensure, so far as is reasonably practicable, the health, safety and welfare of employees and any others who may be affected by what they do.

Every business should have a health and safety policy. The policy should identify the aims for the employees' health and safety and outline the various responsibilities, systems and communication to ensure that health and safety objectives are fully met. This should be in writing if five or more people are employed. Guidance on this is available from the HSE (www.hse.gov.uk/pubns/indg275.pdf).

The MHSW Regulations place duties on employers and the self-employed to make a suitable and sufficient assessment of the risk to their own health and safety and that of others from the work they do. This includes employees, any casual workers, part-timers, trainees, customers or contractors. It will also include those who may be affected by work activities, e.g. neighbours, sales people and members of the public. The assessment can be conducted by the business itself, or can be contracted out to a specialist. The people carrying out the risk assessments must be competent, it is not essential to hold a qualification in health and safety. The HSE provide useful guidance on conducting a risk assessment – 5 Steps to Risk Assessment (www.hse.gov.uk/pubns/indg163.pdf). The 5 steps are:

1. Identify the Hazards.
2. Decide who might be harmed and how.
3. Evaluate the risks and decide on precautions.
4. Record your findings and implement them.
5. Review the risk assessment and update if necessary.

Health and safety within the business - there must be a clear chain of command on who is responsible for each area of work and equipment. The final responsibility generally lies with the business owner.

It is good practice to produce a written risk assessment and it is a statutory requirement if five or more people are employed by the business. The risk assessments must be communicated to staff and all relevant people.

A further assessment should be made for Control of Substances Hazardous to Health (COSHH). This is similar to a risk assessment but considers the risks from substances such as dust, gases, fumes, pesticides and zoonoses.

If an accident or near miss occurs it should be reported to the HSE in accordance with the Reporting of Injuries Diseases & Dangerous Occurrences Regs (RIDDOR).

When carrying out risk assessments for an agricultural related business be aware that one of the biggest causes of death in agriculture is falls from height. Given that most workers spend probably less than 1% of their time working at height this represents the most dangerous part of the year. Every business should examine what tasks are being carried out at height and try to eliminate these or find safer methods.

Many deaths and injuries are caused by transport and machinery. One of the most important pieces of relevant legislation is the Provision and Use of Work Equipment Regulations 1998 (PUWER) which states that:

- All equipment must be fit for purpose.
- All equipment must be properly maintained.
- All equipment must be properly commissioned.
- Equipment must be inspected after difficult conditions.
- Operators and maintenance mechanic must be sufficiently trained.
- Guards over all dangerous parts.
- Safety features all working.
- Lighting sufficient to operate machinery.

All staff have a legal obligation to co-operate with their employers and follow safe procedures.

Particular care should be taken to ensure the safety of children on farms, and the minimum ages for operating or travelling in certain vehicles and machines must be observed.

There are many other pieces of relevant legislation relating to health and safety at work that agricultural businesses should comply with. In some instances training and certification is required.

A useful source of information for farmers is the HSE publication "Farmwise" (<http://www.hse.gov.uk/pubns/books/hsg270.htm>) which provides practical advice and guidance on health and safety.

For specific health and safety on farm advice, contact SAC Consulting on 0131 603 7520. The NFU and independent safety consultants can also assist.

Land and Buildings

Introduction

This section gives detail on the main legislative, technical and finances related to land and buildings.

Land tenure remains a topical subject as implementation of the Land Reform Act (2016) continues. The detail that follows gives brief descriptions. Specialist legal advice should be sought for specific tenure related circumstances.

Building spaces guidance and costs are laid out to allow users to budget space requirements and capital requirements for existing and new buildings.

Property operating costs for different types of farms can be found in the Whole Farm Data section on page 467.

Land Tenure

There are four types of agricultural tenancy currently available for use in Scotland, although this will change with the ongoing implementation of the Land Reform (Scotland) Act 2016.

To establish what law applies to any agricultural tenancy, it is necessary to determine which type of tenancy is involved. There are currently three core pieces of legislation which govern agricultural tenancies in Scotland. These are:

- Agricultural Holdings (Scotland) Act 1991: ‘1991 Act’ tenancies (secure heritable tenancies)
- Agricultural Holdings (Scotland) Act 2003: Grazing or mowing leases, Short Limited Duration Tenancies (SLDT) and Limited Duration Tenancies (LDT)
- Land Reform (Scotland) Act 2016: Modern Limited Duration Tenancies (MLDT) and *Repairing Tenancies (this latter provision has not yet come into effect)*

Agricultural Holdings (Scotland) Act 1991

All agricultural tenancies entered into prior to 27th November 2003 are 1991 Act Tenancies.

Tenancies granted under this act give security of tenure to the tenant for unlimited successive generations (i.e. a secure tenancy). The act sets out how rents should be calculated; how improvements should be compensated; how fixed equipment should be maintained and how disputes should be settled.

In order to circumvent the security of tenure granted by a full 1991 Act Tenancy, “Limited Partnerships” were developed.

A 1991 Act Tenancy (with all the legislation that governs this type of tenancy applying) was created but granted not to an individual but rather a partnership comprising the landowner or 'Limited Partner', and farmer 'General Partner'. If the landowner dissolves the partnership, then the tenant technically no longer exists and by this means the tenancy is ended. These partnerships were normally agreed to last for a defined period (often 15-20 years) and thereafter on a year-to-year basis (tacit relocation). Once the initial term has run its course the tenancy can be ended by the landowner withdrawing from the partnership. This can be done by serving notice on the General Partner.

Agricultural Holdings (Scotland) Act 2003

The 2003 Act came into force on 27 November 2003.

Grazing or mowing tenancies (grass lets)

These are agricultural tenancies where the land is let for grazing or mowing only and for a specific period of the year not exceeding 364 days.

When a Grazing or Mowing Tenancy has ended, the land may only be let again for the same purpose to the same tenant provided one clear day has elapsed between tenancies.

If, with the landowner's agreement (actual or assumed), the tenant continues to occupy the land after the tenancy period has ended, the tenancy is automatically converted to a Short Limited Duration Tenancy (SLDT).

Short Limited Duration Tenancies (SLDT)

These are agricultural tenancies where the letting is for not more than 5 years. There are no statutory rent provisions for a SLDT. SLDT's cannot be assigned to 3rd parties, but relatives can succeed to the tenancy. Statutory rules on fixed equipment and compensation for improvements at the end of tenancy apply. If the tenant continues in occupation at the end of a 5-year SLDT then a Modern Limited Duration Tenancy (MLDT) is automatically created. Where this happened before 30 November 2017 a Limited Duration Tenancy (LDT) was created.

Limited Duration Tenancies (LDT)

These are agricultural tenancies commenced before 30 November 2017 where the letting is for a minimum term of 10 years - with no upper limit (older LDT's were for a minimum of 15 years).

To end an LDT a Notice to Quit needs to be served by the landlord. This is a 2-staged process over three years. If the LDT is not terminated by notice at the expiry of the lease, there is instead a cycle of continuations. The tenant may terminate an LDT at the expiry of the contractual term or the expiry of a continuation by written notice given not less than one year and not more than two years notice.

The rules regarding repairs, improvements and rent reviews for LDT's are similar to those for 1991 Act Tenancies. LDT's can be assigned to a third

party, subject to landlords' consent (landlords can only object on the grounds of the ability, finance or character of the assignee). Landlords can also pre-empt an assignment by matching the highest offer. A LDT also gives the tenant the ability to use land for a non-agricultural purpose (diversification). Since 30 November 2017 a new 'Modern Limited Duration Tenancy' has replaced the LDT (for new agreements – see below).

Changes to Agricultural Holdings (Scotland) Act 1991

The 2003 Act made the following changes to the 1991 Act:

- *Fixed Equipment* – Post Lease Agreements (PLA) can be removed by the tenant giving notice to the landlord following a rent review; writing-down agreements for tenants improvements are no longer valid (there is some debate to whether improvements fully written-down before 2003 are included in this); record of condition no longer required to be completed by a Recorder appointed by Government.
- *Rent* – Various instructions on how to set rents were included, for which recent court cases have provided legal interpretation.
- *Diversification* – now allowed on agricultural holdings. The landlord has the right to object. The tenant is able to appeal to the Land Court
- *Compensation for Vacant Possession* - compensation may be payable to a tenant where a tenant voluntarily gives up possession of a holding.
- *Assignment* – details in following sections.
- *Miscellaneous* – leases can no longer be terminated on grounds of non-residency; Consent from the Land Court is required on a Notice to Quit in most circumstances; the definition of good husbandry now extended to include conservation activities and diversification, as permitted under the 2003 Act.
- *Tenants Right to Buy* – provides a pre-emptive right of a tenant (under a 1991 act tenancy) to buy land tenanted by him if the landlord intends to sell i.e. the tenant has the right of first refusal, provided the tenant has registered his interest. Registration is required with the Register of Community Interests and needs to be renewed every 5 years.

Land Reform (Scotland) Act 2016

The Land Reform (Scotland) Act 2016 received Royal Assent on 22nd April 2016. Much of the detail is being dealt with through "Secondary Regulation", which is ongoing.

Modern LDT

A new tenancy has been created known as a Modern Limited Duration Tenancy (MLDT). The tenancy is for a minimum of 10 years and has many of the same features as an LDT. For new entrants (regulations have been made to define a "New Entrant") there is a clause where the tenancy may be broken after 5 years.

Assignment

A tenant has the right to assign the interest in the tenancy to any one of the persons mentioned in a new subsection of the 1991 Act: *any person who would, or would in any circumstances have been, entitled to succeed to the tenant's estate on intestacy by virtue of the Succession (Scotland) Act 1964*. The landlord's right to withhold consent, if there are reasonable grounds for doing so, continues to remain in force, unless the person to whom the assignment is being made is a near relative. The following list shows who qualifies as a near relative:

- A parent of the tenant.
- A spouse or civil partner of the tenant.
- A child of the tenant.
- A grandchild of the tenant.
- A brother or sister of the tenant.
- A spouse or civil partner of such a brother or sister.
- A child of a brother or sister of the tenant.
- A grandchild of a brother or sister of the tenant.
- A brother or sister of the tenant's spouse or civil partner.
- A spouse or civil partner of such a brother or sister.
- A child of such a brother or sister.
- A grandchild of such a brother or sister.

Where the assignee to a tenancy is a near relative the grounds upon which the landlord can object are restricted to the following:

- That the person is not of good character.
- That the person does not have sufficient resources to enable the person to farm the holding with reasonable efficiency.
- That the person has neither sufficient training in agriculture nor sufficient experience in the farming of land to enable the person to farm the holding with reasonable efficiency.

The provisions in relation to limited duration tenancies (LDT's) and Modern Limited Duration Tenancies (MLDT's) have been amended so that where the assignee is a near relative the grounds for objection are restricted to those mentioned above.

Succession

The succession provisions in relation to 1991 Act tenancies, repairing leases, LDT's and MLDT's are also made uniform.

The existing time limits to notify the landlord that a tenancy has been inherited remain in place. Where the lease permits a bequest of the tenant's interest, the tenancy must be accepted within 21 days of the death. In the case of intestate transfers, the deceased tenant's executors must transfer the tenancy to a suitable beneficiary within a year of the death. The beneficiary then has 21 days to notify the landlord that the acquisition has taken place. Where the successor, whether by bequest or on intestacy, is a near relative, the landlord has one month to object to the succession. However, the grounds of objection are limited to these to

those listed in the previous section (character, resources and experience).

The 2016 Act abolishes the ‘viable unit test’ in relation to the unit that is being inherited and it also removes the specific challenge that the successor is already in occupation of an independent viable unit elsewhere.

Landlord’s Improvements

Tenants now have the right to object to improvements proposed by their landlord. The landlord has the right of appeal to the Land Court.

Diversification

There are new rules regarding the ability of a landlord to object to a tenant’s diversification notice.

Amnesty for tenant’s improvements

The tenant’s improvements amnesty came into effect on 13 June 2017 and provided a 3-year window for tenants with 1991 Act Tenancies, SLDTs, LDTs and MLDTs. Due to COVID-19, the deadline was extended to 13 December 2020.

Relinquishment and assignation of 1991 Act Tenancies

This part of the Act was brought into force on 28th February 2021. It allows a tenant to assign their tenancy for value to a person “who is progressing in farming” or a “new entrant”. The landlord has a right of pre-emption. If a tenant wants to go down this route, they must offer to relinquish the tenancy to the landowner in the first instance (it is independently valued). If the landlord does not accept the tenants notice to relinquish, the tenant may then assign the tenancy.

The Scottish Land Commission has issued a guide to the relinquishment and assignation process, which can be accessed using the following link: <https://www.landcommission.gov.scot/our-work/tenant-farming/relinquishment-and-assignation>

Irritancy for non-payment of rent

Irritancy Notices (a notice to quit) cannot be served for non-payment of rent on SLDT, LDT, MLDT & Repairing Tenancies unless a demand for payment within 2 months has been issued in writing by the landlord. This is not the case for 1991 Act Tenancies. For 1991 Act Tenancies, if rent is not paid, an Incontestable Notice to Quit can be served by the landowner (no rent demand is required).

Land Reform (Scotland) Act 2016 reforms that have not commenced (at the time of writing)

Repairing Tenancies

A Repairing Tenancy has a minimum term of 35 years. The lease requires the tenant during the “repairing period” to improve the land into a state capable of being farmed. The repairing period will last 5 years, or

longer if agreement between landlord and tenant or it can be extended by the Land Court.

Tenants' rights to buy

The requirement for a 1991 Act Tenant to register a right to buy has been removed. Tenants will now have a pre-emptive right to buy if a landlord "proposes to transfer the land or any part of it to another person". Until this section becomes live, the requirement for tenants to register their right with the Registers of Scotland continues. For more information see: <https://www.ros.gov.uk/>

Sale where landlord in breach

This provision allows a tenant to apply to the Land Court for an "Order of Sale" if a landlord fails to comply with an order or award of the Land Court, regarding a material breach of the landlord's obligations in relation to the tenant. The "order of sale" gives the tenant the right to buy the land comprised in the lease through the tenant's pre-emptive right.

Rent review (1991 Act Tenancies)

The rent is to be a "fair rent", which is to be a move away from the "open market" rent which has operated over recent years. The "fair rent" is to take account of the productive capacity of the holding; the open market rent of any surplus residential accommodation provided by the landlord; and the open market rent of any fixed equipment provided by the landlord or any land forming part of the holding not used for agriculture.

In the absence of agreement on rents, either party may apply to the Land Court to determine the rent.

The Scottish Government has appointed a group to carry out rent modelling. The favoured model will then undergo "road-testing" prior to being implemented. In the interim period, the industry has agreed to hold rents to inflationary rises only, this is being overseen by the Tenant Farming Commissioner. This is a voluntary agreement, supported by the industry stakeholders.

Rent review (LDT's, Modern LDT's and Repairing Tenancies)

The rent is to be set under the same guidance as the 1991 Act Tenancies. If there is no rent review provision in the lease, or the lease stipulates upward or landlord only initiated rent reviews, the statutory alternative applies.

Tenanted agricultural land rental figures (Scotland)

The following tables show median rental values for agricultural land by farm type and by tenancy agreement in Scotland for 2018-2020.

Rents for farm type (all agreements excluding crofts and seasonal lets):

| | 2020 | | 2019 | | 2018 | |
|------------------------|------|------|------|------|------|------|
| | £/ha | £/ac | £/ha | £/ac | £/ha | £/ac |
| Cereals | 137 | 55 | 134 | 54 | 137 | 55 |
| General Cropping | 143 | 58 | 149 | 60 | 143 | 58 |
| Dairy | 144 | 58 | 129 | 52 | 92 | 37 |
| Cattle & Sheep non-LFA | 127 | 51 | 121 | 49 | 129 | 52 |
| Cattle & Sheep LFA | 47 | 19 | 51 | 21 | 52 | 21 |
| Mixed | 123 | 50 | 123 | 50 | 118 | 48 |
| Pigs & Poultry | 125 | 50 | 154 | 62 | 124 | 50 |

Rents for tenancy agreement types:

| | 2020 | | 2019 | | 2018 | |
|-------------------------|------|------|------|------|------|------|
| | £/ha | £/ac | £/ha | £/ac | £/ha | £/ac |
| Crofts/Small L'holdings | 3 | 1 | 3 | 1 | 3 | 1 |
| 1991 Act | | | | | | |
| <i>LFA</i> | 47 | 19 | 52 | 21 | 55 | 22 |
| <i>nLFA</i> | 141 | 57 | 138 | 56 | 136 | 55 |
| <i>P'ship</i> | 75 | 30 | 75 | 30 | 83 | 34 |
| SLDT | 110 | 45 | 104 | 42 | 108 | 44 |
| LDT | 90 | 36 | 104 | 42 | 97 | 39 |
| MLDT | 86 | 35 | 87 | 35 | 87 | 35 |
| Seasonal LFA | 113 | 46 | 115 | 47 | 118 | 48 |
| Seasonal nLFA | 161 | 65 | 150 | 61 | 151 | 61 |

It must be noted that there will be a wide variation in rental values within each category illustrated above. Variables will include topology of the land, remoteness, length of tenancy, age of tenancy, facilities (e.g., houses, farm-buildings and equipment) included, and the amount of land rented. More detail can be sourced from:

<https://www.gov.scot/publications/results-december-2020-agricultural-survey/>

Space Requirements for Livestock and Storage

The following space requirements are included here as a guide (minimum area required) only. For livestock, appropriate welfare codes and quality assurance regulations should be referred to in all cases.

Cattle space requirements

| <i>Liveweight (kg)</i> | Total floor area (m²/hd) | | | | | | |
|------------------------------|--|------------|------------|------------|------------|------------|------------|
| | 200 | 300 | 400 | 500 | 600 | 700 | 800 |
| Beef cattle - solid floors | 3.00 | 3.95 | 4.90 | 5.85 | 6.80 | 7.75 | 8.70 |
| Beef cattle - slatted courts | 1.10 | 1.50 | 1.80 | 2.10 | 2.30 | 2.50 | - |
| Cow and calf - straw * | - | - | - | 5.00 | 6.00 | 6.50 | 7.30 |
| Cow and calf - slats * | - | - | - | 2.50 | 2.75 | 3.00 | 3.25 |
| Dairy cows - solid floors | 3.00 | 3.95 | 4.90 | 5.85 | 6.80 | 7.75 | 8.70 |

*excluding creep area

| <i>Liveweight (kg)</i> | Total floor area (m²/hd) | | | | | |
|------------------------|--|-----------|------------|------------|------------|------------|
| | 60 | 85 | 140 | 200 | 250 | 400 |
| Calves - loose housed | 1.10 | 1.80 | 2.40 | 3.00 | - | - |

| <i>Liveweight (kg)</i> | Cubicle/pen dimensions (m) | | | | | | |
|------------------------|-----------------------------------|--------------|------------|------------|---------------------|------------|------------|
| | <i>Calve pens</i> | | | | <i>Cow cubicles</i> | | |
| | < 60 | 60-80 | 400 | 500 | 600 | 700 | 800 |
| Long | 1.50 | 1.80 | 2.05 | 2.35 | 2.40 | 2.50 | 2.55 |
| Wide | 0.75 | 1.00 | 1.05 | 1.12 | 1.15 | 1.18 | 1.20 |

| <i>Liveweight (kg)</i> | Trough/access length requirements (mm/hd) | | | | | | | |
|------------------------|--|------------|------------|------------|------------|------------|------------|------------|
| | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 |
| Simultaneous feeding | 350 | 400 | 500 | 550 | 600 | 670 | 700 | 870 |
| Ad-lib feeding | 150 | 150 | 150 | 190 | 240 | 280 | 320 | 340 |

Sheep space requirements

| | Total floor area (m²/hd) | | |
|------------------------|--|----------------------|----------------------|
| | Hoggs | Pregnant ewes | Ewes w/ lambs |
| Sheep - bedded courts | 0.75 - 0.90 | 1.00 - 1.40 | 1.80 - 2.20 |
| Sheep - slatted courts | 0.40 - 0.60 | 0.80 - 1.10 | 1.00 - 1.70 |

| | Trough/access length requirements (mm/hd) | |
|----------------------|--|-----------------------|
| | Hoggs (45-65kg) | Ewes (60-90kg) |
| Simultaneous feeding | 300 | 450 - 500 |
| Ad-lib feeding | 100 - 125 | 120 - 225 |

Pig space requirements

| <i>Liveweight (kg)</i> | Total floor area (m²/hd) | | | | | | |
|------------------------|--|--------------|--------------|--------------|--------------|---------------|----------------|
| | <10 | 10-20 | 20-30 | 30-50 | 50-85 | 85-110 | >110 |
| Group loose housed | 0.15 | 0.20 | 0.30 | 0.40 | 0.55 | 0.65 | 1.00 |

| Liveweight (kg) | Trough/access length requirements (mm/hd) | | | | | | |
|------------------------|--|-----------|-----------|-----------|-----------|-----------|------------|
| | 5 | 10 | 15 | 35 | 60 | 90 | 120 |
| Restricted feeding | 100 | 130 | 150 | 200 | 230 | 280 | 300 |

Poultry space requirements

| Laying Hens | | |
|--------------------|---------------------|---|
| Enriched Cages | Stocking density | 750 cm ² (approximately 13 birds/m ²) |
| | Nest/perch length | 150 mm/bird |
| | Feed trough length | 120 mm/bird |
| Barn or free range | Stocking density | 9 birds/m ² |
| | Minimum litter area | 0.025 m ² /bird |
| | Nest/perch length | 150 mm/bird |
| | Feed trough length | 100 mm/bird |
| | Nest space (only) | 120 birds/m ² |
| Free range | Range area | <2500 birds/ha |

| Broiler Chickens | | |
|-------------------------|--------------------------|-----------------------------|
| Conventional | Stocking density | <33 kg/m ² |
| | Possible with permission | >33 - <39 kg/m ² |
| Free range | Stocking density | 27.5 kg/m ² |
| | Range area | 1 m ² /bird |
| Organic fixed housing | Stocking density | 21 kg/m ² |
| | Range area | 4 m ² /bird |
| Organic mobile housing | Stocking density | 30 kg/m ² |
| | Range area | 2.5 m ² /bird |

Storage space requirements for crops, feeds and manures

| Product | Space requirement |
|---------------------------|------------------------------|
| Wheat - whole grain | 1.35 m ³ / t |
| Barley - whole grain | 1.45 m ³ / t |
| Oats - whole grain | 1.95 m ³ / t |
| Oilseed rape | 1.45 m ³ / t |
| Beans and peas (combined) | 1.16-1.19 m ³ / t |
| Distillers dark grains | 1.82 m ³ / t |
| Draff (highly variable) | 0.95-1.25 m ³ / t |
| Potatoes - bulk | 1.42-1.59 m ³ / t |
| Potatoes - boxes | 2.00-2.30 m ³ / t |
| Turnips/swedes | 1.80 m ³ / t |
| Farm yard manure | 1.1 m ³ / t |

Weight and dimensions of hay, straw and silage bales

The weight of baled forages can vary a lot depending on the material being baled, type of baler and packing density, so weighing a selection of

bales, if possible, is the best estimate. Allowance should also be made for spoilage. The following table can be used as a guide.

| Bale Type | Average weight (kg) | | |
|--------------------------------------|----------------------------|--------------|---------------|
| | Hay | Straw | Silage |
| Round: | | | |
| 1.20m x 1.20m | 220-250 | 200-220 | 400-750 |
| Rectangular: | | | |
| 0.36m x 0.40m x 0.80m | 19 | 16 | 36 |
| 0.40m x 0.46m x 0.90m | 26 | 19 | - |
| 0.80m x 0.90m x 2.50m - mini hesston | 290 | 250 | 350-650 |
| 1.20m x 1.30m x 2.50m - hesston | 860 | 600 | - |
| 1.20m x 0.70m x 2.50m - quadrant | 380 | 330 | 450-600 |
| 1.20m x 0.90m x 2.50m - 187 | 450 | 410 | 500 |

Silage density

To calculate the fresh weight of silage (tonnes) in pits (clamps) the following equation should be used:

$$\text{Silage (t FW)} = \text{pit volume (m}^3\text{)} \times \text{density (kg/m}^3\text{)}$$

The following table provides estimates for the density (kg/m³) for silages by considering the dry matter of the silage and the height of the pit. Grass, maize and wholecrop silages are of similar density.

| Silage dry matter (%) | Clamp height (m) | | | |
|------------------------------|-------------------------|------------|------------|------------|
| | 2.0 | 2.5 | 3.0 | 4.0 |
| 20 | 780 | 840 | 890 | 950 |
| 25 | 690 | 730 | 775 | 830 |
| 30 | 620 | 660 | 690 | 740 |
| 35 | 570 | 600 | 625 | 670 |
| 40+ | 520 | 550 | 570 | 610 |

Source: DairyCo.

Water storage requirements

Water requirement for livestock and crops on farm will depend on various factors including animal size, feed intake, feed DM content, stage of production, crop type, rainfall, ground conditions, environmental temperature and management practices.

Significant volumes of water can be used on farm amounting to high water charges if metered mains water is the only water supply. The main water usage on farms includes, livestock drinking, dairy machinery (plate coolers), machinery (plant) and yard washing, crop spraying and irrigation and domestic use. There is potential to reduce annual water charges by investigating other water sources. These include boreholes, reservoirs (lagoons) and rainwater harvesting. With increasing climate change concerns, such systems will improve business efficiencies with both economic and environmental benefits (for more information see the Carbon section on page 350).

There are pros and cons to alternative water sources and planning and preparation is important when investigating new systems. Monitoring water use and ensuring there are no 'leaks' in the system (wastage, e.g. broken pipes, entry into slurry systems) is a key starting point. For further information on water use and for saving water on farms, see the following resources:

- <https://ahdb.org.uk/water-supply-problems-a-guide-for-livestock-farms>
- <https://ahdb.org.uk/knowledge-library/protecting-the-water-supply-for-your-crops>
- <http://www.ukia.org/>

Simple water storage tanks up to 10,000 litres cost in the region of £1,000 while a rain water harvesting system will be up to £2,600 for a large tank. These costs are ex VAT and do not include delivery and installation. For costs for reservoirs/lagoons see page 437. For all the systems it is important to source specialist advice on storage requirements, regulation (local council, SEPA and quality assurance), design specifications (including water filters and treatment equipment) and installation.

The data below may be useful to help calculate water storage requirements on farm. All livestock figures are given as the volume of drinking water for one animal of the type described.

| Cattle | |
|------------------------------|-------------------|
| Dairy cow (in milk) | 75-125 litres/day |
| Dairy cow (dry) | 40-75 litres/day |
| Suckler cow (spring calving) | 14-40 litres/day |
| (autumn calving) | 40-70 litres/day |
| Calves | 5 litres/day |
| Store cattle | 15-50 litres/day |
| Finishing cattle | 25-75 litres/day |
| Bulls | 30-80 litres/day |

| Sheep | |
|---------------------------|----------------|
| Pregnant ewe | 3-6 litres/day |
| Rams | 3-6 litres/day |
| Intensively finished lamb | 2 litres/day |

| Pigs | |
|---------------------------------------|----------------------|
| Newly weaned | 1.0-1.5 litres/day |
| Up to 20kg | 1.0-2.0 litres/day |
| 20-40kg | 2.0-5.0 litres/day |
| Finishing pigs up to 100kg | 5.0-6.0 litres/day |
| Sows and gilts (pre-serve and in-pig) | 5.0-8.0 litres/day |
| Sows and gilts (in lactation) | 15.0-30.0 litres/day |
| Boars | 5.0-8.0 litres/day |

| <i>Poultry</i> | |
|-------------------------|----------------------|
| Pullets | 0.09 litres/day |
| Laying hens - caged | 0.19-0.20 litres/day |
| Laying hens - non caged | 0.19-0.22 litres/day |
| Broilers | 0.19-0.20 litres/day |
| Ducks | 1.22 litres/day |
| Turkeys | 0.45-0.71 litres/day |

| <i>Hose wash</i> | |
|---|-------------------------|
| High pressure hose - typical flow rate (pumped) | 1-2 m ³ /hr |
| Volume wash hose - typical flow rate (pumped) | 5-10 m ³ /hr |
| Mains fed tap (example) | 2.5 m ³ /hr |
| General parlour usage | 18-45 litres/cow |

| <i>Crop irrigation</i> | | |
|-------------------------------|-------------------|------------------------|
| Spray gun | to apply 25 mm of | 250 m ³ /ha |
| Spray boom | water per ha | 126 m ³ /ha |
| Drip tape | | 18 m ³ /ha |

Planning Permission and Building Warrant

In all cases of building work or change of use, it is advisable to consult with the local planning authority or take professional advice before development progresses.

As a rule, planning permission is required for all new developments and extensions including buildings, engineering, mining and other operations in, on, over or under land and for change of use of buildings or land.

Under the planning legislation, certain developments including proposed agricultural or forestry building works, demolition, freestanding domestic micro-wind turbines and domestic air-source heat pumps are considered permitted development. A developer must notify the planning authority of proposals using a Prior Notification form to determine whether prior approval in the form of a planning application is or is not required before exercising these rights.

Recent changes to the planning legalisation which came into force on the 1st April 2021, significantly increases the size limit for agricultural buildings erected or extended (see requirements below) and also allows for the conversion of existing agricultural and forestry buildings to:

- Up to 5 dwellings (houses or flats), none of which may exceed 150m²
- Up to 500m² flexible commercial space

Scottish Planning Policy sets out the following requirements and fee structures:

Prior Notification and Prior Approval

You should apply for prior notification and prior approval if any of the following apply:

- a) build or significantly alter/extend agricultural or forestry buildings. A significant alteration or extension is one which would result in:
 - the cubic content of the original building being increased by more than 20%, or
 - the height of the building exceeding the height of the original building
- b) form or alter a private way
- c) carry out excavation or engineering operations in relation to a farm or forestry undertaking

Application Fee is £78. The planning authority has 28 working days from receipt of application to respond and may request for a full planning application to be made if it considers that the development is likely to have a significant impact on the surroundings.

Prior Notification and Approval in relation to Agricultural and Forestry Private Ways

A developer should also apply for prior notification and prior approval to the relevant planning authority for the formation, or alteration, of agricultural or forestry private ways. No fee is applicable.

Planning Permission

Planning permission is always required if any of the following apply to the proposed development:

- a) carried out on farm holdings of less than 0.4 ha
- b) the construction, alteration or extension of a building (excluding permitted development)
- c) any buildings or works not designed for the purpose of agriculture
- d) the construction, extension or alteration of any building or structure or plant over:
 - i. 1000m² in area unless within National Parks or National Scenic Areas (this is calculated by adding the area of the proposed development and the area of any development within the unit that is to occur or has occurred within the preceding 2 years and would be within 90m of the proposed development), or
 - ii. 12m in height, or
 - iii. 3m in height where the building is within 3 km of an aerodrome
- e) within 25m of a metalled trunk or classified road
- f) the construction or carrying out of any works to a building used, or to be used, for housing intensive livestock or for storage of slurry or sewage sludge where that building is within 400m of a protected building (a building normally occupied by people but buildings which form part of a working farm or certain specialist industrial buildings).

Planning fees, effective from 1st April 2018, are outlined below:

| Dwellinghouses | |
|--|--|
| Planning permission in principle | |
| - dwellinghouse | £401 each (maximum 50 dwellinghouses) |
| Detailed planning permission | |
| - dwellinghouse | £401 each (maximum £20,050) |
| - enlargements, improvements or alterations to an existing dwelling house or flat and development within the cartilage of an existing dwelling house | £202 |
| - erection or extension of buildings (other than dwelling houses or plant and machinery) | |
| - not exceeding 40m ² | £202 |
| - 40-75m ² | £401 |
| - 75-3,750 m ² | £401 for each 75 m ² (maximum £20,050) |
| - exceeds 3,750m ² | £200 for each 75 m ² (maximum £125,000) |
| - ancillary buildings, fences, walls, roads, carparks etc. | £202 |

| Agricultural buildings | |
|--|------------------------------------|
| Planning permission in principle | |
| - agricultural building (excluding glasshouses) based on area covered by development | £401 per 0.1 ha (maximum £10,028) |
| Detailed planning permission | |
| - buildings up to 465 m ² floor area | £78 |
| - buildings 466 – 540 m ² floor area | £401 |
| - each additional 75 m ² floor area > 540 m ² | £401 (maximum £20,055) |
| - erection, alteration or replacement of plant or machinery | |
| - not exceeding 5ha | £401 per 0.1 ha (maximum £20,055) |
| - in excess of 5ha | £200 per 0.1 ha (maximum £125,000) |
| - glasshouses used for agricultural purposes | |
| - ground area up to 465m ² | £78 |
| - ground area exceeding 465m ² | £2,321 |
| - change of use | £401 |

| Land | |
|---|---|
| Winning, working or storage of minerals and waste disposal | |
| - site area not exceeding 15ha | £202 per 0.1 ha (maximum £30,240) |
| - site area exceeds 15ha | £30,240 plus £100 for each 0.1ha (maximum £125,000) |
| Winning and working of peat | £202 per 0.1 ha (maximum £3,024) |
| Vehicular access, car parks, service roads for existing uses | £202 |
| Other engineering or operations on land e.g. installation of floodlights, car parks, roads etc. not serving existing uses | £202 per 0.1 ha (maximum £2,016 for 1 ha or more) |

Building Warrant

A building warrant is a legal permit to protect people's health, safety and welfare. The requirements are set by the Building (Scotland) Regulations 2004. A building warrant is required before commencing most types of building and alteration work.

All agricultural buildings on agricultural land in Scotland are exempt from the need for a building warrant except for the following:

- Buildings used to any extent for retail purposes (including storage of goods or exhibiting).
- Buildings over 280m² in area.
- Buildings within 6m or the equivalent of its height (whichever is less) of a boundary.
- A dwelling, residential building, office, canteen, or visitor centre.
- A dungstead, slurry or farm effluent tank.

Some non-agricultural buildings and extensions such as small garages and porches do not require a building warrant (refer to the Scottish Governments Non-Domestic Technical Handbook 2020 for further guidance, see:

<http://www.scotland.gov.uk/Topics/Built-Environment/Building/Building-standards/publications/pubtech>

In general terms, there is no building warrant requirement for agricultural buildings in England and Wales. There is a responsibility to check whether the development is compliant with building regulations which falls under Building Control Bodies. For further information, refer to online guidance found in: www.planningportal.gov.uk.

Fees payable with applications for building warrants depend on the estimated cost of the building. As from 1 April 2019, the fees are:

| Building cost (£) | Fee |
|---|---|
| Up to 5,000 | £150 |
| 5,001-20,000 | £169 + £19 per every £500 thereafter |
| 20,001-100,000 | £593 + £63 per every £10,000 thereafter |
| 100,001-500,000 | £1,137 + £103 per every £50,000 thereafter |
| 500,001-1,000,000 | £3,272 + £178 per every £50,000 thereafter |
| 1,000,001+ | £5,127 + £253 for every additional £100,000 or part thereof |
| Amendment of warrant (if additional cost is less than original or increases by no more than £5,000) | £100 |
| Extension to warrant | £100 |
| Conversion only | £150 |
| Demolition only | £150 |
| Amendment of warrant for demolition or conversion only | £100 |
| Application for late building warrant (where work has already started) | 200% of the fees above |
| Application for late building warrant (demolitions only) | £200 |
| Submission of a completion certificate (where | 300% of the fees above |

| Building cost (£) | Fee |
|---|------------|
| no building warrant has been obtained) | |
| Submission of completion certificate (demolitions or conversion only) | £300 |

It is worth considering that the fees above may be reduced where certificates from approved certifiers of design and construction are presented with a warrant application. Discount for each certificate that covers the whole of any section of the functional standards i.e. SER, BRE, RIAS and is provided with the warrant application:

| Value of Work | Fee |
|----------------------|------------|
| Up to £5,000 | £30 |
| £5,001 - £9,000 | £40 |
| £9,001 - £15,000 | £50 |
| £15,001 - £20,000 | £60 |
| £20,001 - £50,000 | £80 |
| £50,001 - £100,000 | £100 |
| Over £100,001 | 10% |

1% for each certificate covering a single item in any such section, all subject to a maximum discount of 60%.

Discount where certificate is provided with the completion certificate:

3% for each certificate covering an approved scheme i.e. electrical installation scheme or drainage, heating and plumbing scheme.

| Value of Work | Fee |
|----------------------|------------|
| Up to £10,000 | £15 |
| £10,001 - £15,000 | £20 |
| £15,001 - £20,000 | £25 |
| £20,001 - £50,000 | £30 |
| £50,001 - £100,000 | £35 |
| Over £100,001 | 3% |

20% for a single certificate covering the construction of the entire building, all subject to a maximum discount of 20%.

When your local authority grants your building warrant you will be issued with a Construction Compliance and Notification Plan (CCNP) which will provide details of when you need to get in touch with your local Building Standards department and if inspections at the different stages of work are required.

Wayleaves and Easements

What is a Wayleave?

- In general terms, it is a contractual licence which gives operators the right to install, use and maintain its equipment and the owner/

occupier is compensated by annual payments to cover the financial impact of having equipment on their land.

- A Wayleave is a temporary right for the operators to use a portion of land, including the right of ingress and egress across the property/land to reach the parcel of land.
- A Wayleave does not automatically transfer to a new owner or occupier.
- Landowners/occupiers are restricted from building or growing anything which may adversely impede access to the installed equipment and it may mean the parcel of land is not eligible for BPS (Basic Payment Scheme).
- It is recommended to seek advice from an experienced professional to negotiate and agree the payment rates. Landowners/occupiers affected should be paid for the losses incurred when any operations are carried out on their land including construction or ongoing maintenance, typical losses include loss of crops; reinstatement costs; general disturbance and damage; and extra costs incurred working around the site.

What is Deed of Servitude?

- A Deed of Servitude (or Servitude for short) is a legally binding agreement between the landowner and the utility provider which provides operators rights over land which they do not own, providing greater security than a temporary Wayleave for the operator.
- A single capital payment is paid to the owner/occupier providing permanent access.
- Once granted a Servitude cannot be rescinded by the landowner/occupier.
- A Servitude can be registered in the Title Deeds at the Land Registry.
- It is worthwhile considering timescales in negotiating a Servitude which may affect your works.
- Different utilities have varying requirements when it comes to Servitude areas and rights. For example, underground cables within arable land do not prevent all normal agricultural activities taking place above, however there are restrictions on buildings within the servitude area. Gas pipes have wider areas of restricted development. These restrictions may mean the parcel of land is not eligible for BPS (Basic Payment Scheme).
- It is recommended to seek advice from an experienced agricultural professional who can advise on the implications of the easement in terms of farming operations to help negotiate and agree capital payment.
- Landowners can ask for previously agreed Wayleave agreements to be replaced with a one-off payment by processing a Servitude, but not the reverse.

Guide to Building Costs

This section gives estimated costs for buildings erected by contractors to BS 5502. Costs are gross before deduction of any grant that may be payable. In practice, builders' estimates vary according to:

- site location, conditions and access
- area of the country
- specification and standard of finish of the building
- how familiar the contractor is with the type of work?
- the contractor's current workload
- changes in component and material prices - there is considerable fluctuation in some component and material prices at present due to uncertainty over Brexit and import/export tariffs. Suppliers may only be willing to hold quotes for a short period of time.

Considerable savings can be made by 'do-it-yourself' work using farm staff or, in some cases, by using second-hand materials.

Building prices quoted by suppliers for 'Kits' or 'Packages' may refer to the superstructure only. This may account for only 40-60% of the total cost when substructure, services and site works are included. The 'kit' costs may amount to an even lower proportion of the total cost, in highly specialist buildings.

Much farm building work includes conversion or alteration work to existing buildings. Costs for this are very difficult to estimate. The only way is to get builders' estimates on well-detailed drawings. A detailed appraisal of site conditions, services and existing building(s), together with a viable and appropriate specification, should be used as the basis for a reasonable estimate.

Costs below have been based on individual component costs and presented to give a guide based on a unit area. The costs include allowance for 'foundation' work but do not take account of possible variation and difficulties in site conditions (e.g. excavation or 'make up', consolidation and haulage). Costs for equipment are based on suppliers' list prices and all costs are exclusive of VAT.

General buildings

Dutch barn

- Steel portal frame structure (4.8 m to eaves)
 - Box profile steel roof sheeting
 - Box profile steel cladding - one gable and one side
 - Blinded hardcore floor
- £91 /m²

Storage building

- Steel portal frame structure
 - Concrete panel or concrete blockwork walls
 - Box profile steel roof; side and gable cladding
 - Concrete floor
- £151 /m²

Cattle and sheep housing

| | |
|---|------------------------|
| Straw bedded court; central feed pass | |
| ▪ Steel portal frame structure | |
| ▪ Concrete panel or concrete blockwork walls | |
| ▪ Ventilated box profile steel or timber space-boarding on sides and gables | |
| ▪ Concrete floor | £173 /m ² |
| Slatted cattle court (shed 10m wide) | |
| ▪ Reinforced concrete slurry tank (to 3.0 m depth) | |
| ▪ Concrete panel or concrete blockwork walls | |
| ▪ Ventilated box profile steel or timber space-boarding on sides and gables | |
| ▪ Reinforced concrete panel slats | £590 /m ² |
| Calf hutches | £115-260 /calf |
| Polytunnels (ideal for sheep and young calves) | £10-16 /m ² |

Slurry storage

| | |
|--|-------------------------|
| Above ground circular storage (steel and concrete) | |
| ▪ Stores less than 1,000m ³ | £65 /m ³ |
| ▪ Stores 1,500m to 2,500m ³ | £50 /m ³ |
| ▪ Stores above 2,500m ³ | £45 /m ³ |
| Above/below ground rectangular concrete stores | £80-130 /m ³ |
| Lagoons (not including earth lined) | |
| ▪ Total installed storage including fencing and gating but not slurry handling equipment | £12-20 /m ³ |

Silage clamps

| | |
|---|-------------|
| Earth walls | |
| ▪ 3.0 m high, 1,000 t capacity, 1,400 m ³ | |
| ▪ Reinforced concrete floor with effluent collection system and tank | |
| <i>(In England and Wales, earth walled clamps are not permitted.)</i> | £50 /t |
| Pre-cast concrete panel walls | |
| ▪ 3.0 m high, 1,000 t capacity, 1,400 m ³ | |
| ▪ Reinforced concrete floor with effluent collection system and tank | £90-120 /t |
| Cast in situ reinforced concrete walls | |
| ▪ 3.0 m high, 1,000 t capacity, 1,400 m ³ | |
| ▪ Reinforced concrete floor with effluent collection system | £90-130 /t |
| Roofed silage clamp | |
| ▪ as above | £125-160 /t |

Grain storage

- 1,000/1,200 t capacity
 - Steel portal frame structure
 - 3.0 m high precast concrete panel wall
 - Box profile steel roof, side and gable cladding
 - Reinforced concrete floor
 - Excludes ducts or grain handling equipment
- £161 /m²

Potato storage

- 1,000/1,200 t capacity, box storage system
 - Steel portal frame structure
 - Insulated box profile steel composite panel roof and wall cladding; reinforced concrete floor
 - Environmental control equipment, fans etc.
 - Excludes power connection costs which can be substantial
- £320-400 /m²

Pollution and the Environment

Introduction

Scotland has a strong environmental brand, promoting wild open spaces, clean air, and clear abundant waters. However, these environmental assets can be easily degraded through unintended actions or poor management of routine operations. A range of legislative requirements are in place across all sectors to help reduce pollution risk and protect and enhance our environment.

Environmental legislation covers most farming activities. A useful starting point for all businesses is NetRegs (www.netregs.org.uk), an initiative to help small businesses reduce pollution risks and improve their environmental performance. NetRegs has a section specific to agriculture providing free, clear guidance on environmental legislation.

This section summarises some of the main impacts on air, water and land quality from agricultural practices and provides links for further information.

Protecting air quality

Scotland's air quality has notably improved over the last few decades, with monitoring data showing that our air now is cleaner than at any time since the start of the industrial revolution. That said, a renewed focus is being placed on air quality as more is being understood about its impact on human health, climate change and the wider environment. Ammonia, dust, odour and smoke can all cause issues leading to reduced air quality and negative environmental impacts. There is growing acknowledgement of the role that ammonia plays in climate change; for more information on gases contributing to climate change, see Carbon section, page 349-361.

Ammonia

Agricultural practices account for around 90% of ammonia emissions in Scotland. Ammonia can lead to plant damage and changes to sensitive surrounding habitats. Ammonia may create an odour nuisance impacting on farming neighbours, to a wider source of concern for human health in urban settings when mixed with other pollutants from industrial processes and vehicle pollution, resulting in tiny particles that can damage the lungs and enter the bloodstream.

Ammonia is a gaseous form of nitrogen, contributing to the formation of nitrous oxides driving climate change. Loss of ammonia, for example from livestock housing, slurry and manure management and application, and use of inorganic fertilisers, could lead to nitrogen oxide deposition many miles from the source and impact on sensitive habitats which require nutrient-poor conditions to survive e.g., heathlands and bogs.

There are several mitigation measures farmers can consider to help reduce ammonia emissions, for example the use of protected urea, low

trajectory slurry spreading techniques, appropriate manure management in livestock buildings and inclusion of nitrogen fixers such as clover in grass swards.

Large intensive pig and poultry units above certain capacities are classed as industrial installations and are already regulated under the Industrial Emissions Directive and the Pollution Prevention and Control (Scotland) Regulations in terms of their ammonia management.

Production of dust and odours

Odour and dust concentrations are not necessarily related, however activities that produce dust and odour could all constitute a 'nuisance' and have a negative impact on health and amenity, which could lead to legal action, a fine, or notice from your local council to restrict or stop business activities.

Good site management and maintaining high standards of cleanliness on farm will help to minimise odour and dust. Aside from measures to prevent creation of polluting particles at source, planting shelterbelts of trees and shrubs can be effective at screening out low levels of dust and odour.

For businesses already regulated under the Pollution Prevention and Control (PPC) regime, the permit will include relevant emissions controls covering dust and odour, including Best Available Techniques (BAT).

There is growing concern around the impact of very small dust particles on human health. Particles of this size are subject to Air Quality Standards (Scotland) Regulations 2010 that are based on the current understanding of health effects and exposure to air pollutants. In addition to air quality standards, Scotland has aspirational air quality objectives which are set out in the Air Quality (Scotland) Regulations 2000 (as amended).

Burning

Since January 2019, burning on-farm waste is no longer an acceptable practice for most materials, with only a few exemptions remaining for woody/plant debris or untreated wood produced on site. Reuse, recover, recycle, or correct disposal are now the preferred options.

Scotland's Farm Advisory Service have produced a Technical Note on minimising plastic waste on farms at www.fas.scot/publication/technical-note-tn724-minimising-plastic-waste-on-farms/ and there is additional information for farmers and land managers at www.sepa.org.uk/regulations/waste/agricultural-waste/burning-on-farm-waste/

For those that have secured an exemption to burn materials on site, the process should not produce any dark smoke; the NetRegs website notes that "*you cannot use a defence of lack of visual evidence, if you burn materials at night for example. Evidence of burnt materials that could*

cause dark smoke, such as steel reinforcement from tyres, or plastic residues is sufficient". For more detail on exemptions around burning waste, visit the NetRegs site at www.netregs.org.uk/environmental-topics/waste/burning-waste-what-you-need-to-know/exemptions-for-burning-waste/

Muirburn operations can also have a negative impact on air quality. The Muirburn Code, updated in 2017, outlines what measures are required under both good practice and legislation. For more details regarding safe Muirburn practices, see www.fas.scot/environment/biodiversity/muirburn-code/. Cutting or swiping could be a practical alternative to burning for consideration on some sites.

For more information on issues and legislation around air pollution, see www.netregs.org.uk.

Protecting soil quality

From growing food to sequestering carbon and natural flood management, soil provides us with a whole raft of benefits.

The main pressures on soils are the impacts of climate change and changes in land use and land management. Poor soil management practices can increase the loss of organic matter, change soil biodiversity, and increase erosion risk. Increased urban development such as roads and housing can reduce the land area available to deliver the important services that a well-managed topsoil can provide.

For farmers and land managers, the booklet 'Valuing Your Soils' is an excellent resource providing cases studies and information on practical measures other farmers have taken to improve and protect farm soils, plus field sheets on how to do a visual evaluation of soil structure (VESS). You can download a copy at www.farmingandwaterscotland.org/downloads/valuing-your-soils-booklet-pdf/

In addition, the Scotland's Soils website provides useful information, including the National Soil Map of Scotland and a range of resources for land managers and developers at <https://soils.environment.gov.scot/>.

Several resources around soil protection and management are available through Scotland's Farm Advisory Service website, including information on soil biodiversity, soil structure, nutrient budgeting and soil pH. See www.fas.scot/crops-soils/soils/ for more details.

Protecting water quality

Scotland's water quality is generally good, with huge improvements having been made over the last 50 years primarily due to the introduction

of controls and regulation on point source discharges such as treatment plants and factories. As a result, diffuse pollution from agricultural sources is now recognised as the largest source of pollution affecting Scotland's waters.

Diffuse pollution is the release of potential pollutants from a range of activities that, individually, will have only a small effect on the water environment but, at the scale of a catchment, can have a significant cumulative effect. Examples of rural diffuse pollution risks include loss of fertilisers through run-off or poor application techniques, and livestock access to and significant poaching around watercourses, leading to erosion, soil loss, and contamination of water with faecal bacteria.

The Water Environment (Controlled Activities) (Scotland) Regulations 2011, more commonly known as the Controlled Activities Regulations (CAR), apply regulatory controls over activities which may affect Scotland's rivers, lochs, transitional waters (estuaries), coastal waters groundwater, and groundwater dependant wetlands. There is a section focused on reducing diffuse pollution risks from land management activities which include forestry, agricultural and amenity uses.

The measures under CAR have been designed to be proportionate to risk; there are three tiers of authorisation:

- **General Binding Rules (GBRs)** - provide statutory controls over low-risk activities. For land managers, the Diffuse Pollution GBRs (DP GBRs) include minimum working distances for activities bordering watercourses, such as, application of manures and slurry or in-field cultivation practices. Compliance with the GBR rules act as authorisation to carry out the activity; You don't need to contact SEPA before conducting activities controlled by GBRs, but you must understand and follow the rules.
- **Registration** - covers low risk activities which cumulatively pose a risk to the water environment. An example of an activity requiring a registration would be abstracting between 10 to 50m³ water in any 24hrs from the water environment. A one-off fixed registration fee is payable.
- **Licence** – required for site-specific controls, particularly if constraints upon the activity are to be imposed. For example, the construction and operation of a borehole which will be or is intended to be greater than 200m in depth will require a licence from SEPA with a fee which may be payable on an annual basis, depending on the activity.

For further information, please see the CAR Practical Guide at www.sepa.org.uk/media/34761/car_a_practical_guide.pdf

The DP GBRs are the focus of a 'Know the Rules' pocket size guide and 'Mind the Gap' tractor sticker, detailing minimum working distances from watercourses. Both are available free of charge via

www.farmingandwaterscotland.org, which also contains a range of practical information for farmers to protect and improve water quality on the farm. You can find Farming and Water Scotland on Facebook or follow on Twitter @FarmWaterScot .



Further information

Further guidance on funding, environmental policies, statutory requirements and good practice guides are available at the following websites:

- Diffuse Pollution Priority Catchments: www.sepa.org.uk/environment/water/river-basin-management-planning/actions-to-deliver-rbmp/priority-catchments/
- Farming and Water Scotland; information to protect water quality and reduce pollution risks from routine practices: www.farmingandwaterscotland.org
- FAS Technical Notes: wide range of information aimed at farmers and their advisers. Contains a suite of Technical Notes focused on nutrient management www.fas.scot/publication/technical-notes/
- Pollution Prevention and Control (PPC) Regulations. Large pig and poultry units are covered by the PPC Regulations: www.sepa.org.uk/regulations/pollution-prevention-and-control/
- PLANET Scotland, free nutrient management computer software: www.planet4farmers.co.uk
- SEPA Scottish Environment Protection Agency www.sepa.org.uk

Pollution accidents or incidents should be directed to SEPA's 24/7 pollution hotline: 0800 80 70 60.

New Entrants

Introduction

This section provides some vital information for those looking to get started in farming including starting an agricultural business, business planning, financial planning, farming opportunities and including joint ventures. There are also links and signposts to further information resources and initiatives.

Starting Up an Agricultural Business

There are various and specific rules and regulations that must be adhered to when managing land and keeping livestock. The following information provides key points of contact and measures that need to be considered when starting up an agricultural business at any level.

Business registration

A new agricultural business should be registered with the Scottish Government Rural Payments and Inspections Division (SGRPID). This can be done online (<https://www.ruralpayments.org>), by completing a registering a business form (PF01 – https://www.ruralpayments.org/media/resources/pf01registering_your_business_120416-v6.pdf) or by contacting the local SGRPID office (<https://www.ruralpayments.org/publicsite/futures/topics/contact-us/>). To register a business the following information is required:

- Business details (name, start date, business type).
- Responsible person (name, address, contact information).
- Other personnel involved in the business (if more than three additional members need to complete a PF02 – https://www.ruralpayments.org/media/resources/PF02_ABM_220316-v3.pdf).
- Intention to keep livestock (types of livestock).
- Land associated with the business.
- Feed business details - for council/trading standards purposes. Register with Food Standards Scotland.

If applying for funding, a PF03 registering your bank details form – Sterling, will also need to be completed:

(https://www.ruralpayments.org/media/resources/pf03_bacs_sterling_170416_v2.pdf). All Scottish Government payments are now given in Sterling.

If the land has not previously been registered for agricultural use before, this will have to be done using a PF06 Land Maintenance Form (LMF) (https://www.ruralpayments.org/media/resources/pf06_lmf_110416-v1.pdf).

On completion and submission of the above information, the business will be allocated a unique Business Reference Number (BRN).

The land associated with the business will either have or be allocated a Main Location Code (MLC) which is a unique identification which encompasses numbers associated with the county, parish and holding (CPH) location of the land. Both the BRN and MLC are important identifiers when corresponding with various regulatory bodies.

If you have croft land you are required to notify the Crofting Commission (www.crofting.scotland.gov.uk) of the change in landowner/tenant. You also have to inform the crofting register of Scotland (www.crofts.ros.gov.uk).

Registering to keep livestock

When keeping livestock or if intending to keep livestock, the business must also register with the Animal and Plant Health Agency (APHA) (<https://www.gov.uk/government/organisations/animal-and-plant-health-agency>). This requires details about the keeper, the business, the type of animals and the land. The MLC of the business is required when registering with APHA, so the above SGRPID registration process needs to have been completed first. Registering with APHA allows for a unique flock/herd mark to be allocated. The flock/herd mark is required, by law, for animal identification and traceability. For more information on livestock traceability see pages 119-123.

Other registrations

Registering for tax, national insurance, PAYE, VAT with HM Revenue & Customs will also need to be considered. Advice from an accountant should be sought while some information can be found in the Taxation section, page 527, or at: www.hmrc.gov.uk/courses/syob/farm/index.htm Building a key network of advisors is essential including a banker, accountant and solicitor to aid with setting up your business. Invest time to source these individuals and work on building a good relationship with them. They have the potential to really benefit your business and will assist in matters that can save money, aid investments and decision making.

Registering with industry bodies such as quality assurance schemes, health schemes for livestock or farmers associations should be considered as part of good farming practice as well as helping to keep informed of regulation.

Compliance measures

Farmers and land managers must comply with various regulatory measures which are related to the environment, public health, animal health and welfare and plant health. There are two main measures of cross compliance which include Statutory Management Requirements (SMRs) and Good Agricultural and Environmental Conditions (GAECs). Linked to these requirements, the following records should be held and/or submitted:

- Integrated Administration and Control System (IACS) Single Application Form (SAF)
- Nitrate Vulnerable Zone (NVZ) records
- Livestock registers
- Spray records
- Livestock medicine records
- Sheep annual inventory
- Agricultural survey and census returns

In addition and depending on the nature of the business, there may be other statutory requirements to consider including:

- HMRC - business annual taxation accounts, personal tax returns, VAT returns
- Employment - national insurance (NI), pay as you earn (PAYE), pensions
- Insurance - personal, employers, public
- Health and safety
- Quality assurance

Record keeping

Land managers and/or keepers of livestock are encouraged to keep records to, not only comply with regulation, but for management purposes to help monitor and improve business performance.

Additional records you may need to keep as a livestock keeper/land manager are:

- Nutrient management plan
- Farm waste management plan
- Crop records
- Livestock feed use records
- Property repairs inventory
- SEPA licences e.g. sheep dipping, waste disposal, water abstraction/irrigation
- Enterprise financial records
- Pest control

Business Planning

The most common reason for developing a business plan is to detail the financial viability of a business. For new entrants, business plans are commonly required when tendering for tenancies and/or seeking finance from a bank or an investment partner. Developing a business plan provides a potential landlord or lender with the knowledge that operational, personnel, marketing and financial aspects of the business have been considered thoroughly to make the business succeed.

A comprehensive business plan will address the financial viability of the proposed business, as well as describing how the other aspects of the

business will operate. The financial section of a business plan should document current and expected income and expenses, along with the ability to repay any debts such as borrowings. To make the business plan more robust, a “plan B” or contingency scenario can be added, showing that the business is adaptable, and resilience has been built in e.g., if purchased feed increases by 10% in the year or if lambing percentage is 5% lower.

New entrants, or even well-established farmers proposing a new enterprise, will find preparing and presenting a business plan very beneficial, as they communicate their ideas to lenders. Farmers now face the commercial reality of having to sell their produce into a market place that is linked into world supply and demand trends.

Uncertainty will always be a feature of farming businesses. There are simply too many factors that are out with control of the business e.g. weather, supply and demand, world markets, etc. With this in mind, factoring sensitivity into the financial aspects of the business will show initiative. The impact of weather on livestock and crop yields and performance and the price of inputs and outputs are obvious factors to make note of.

A business plan should contain the following:

- A robust executive summary, summarising all of the key points of the plan and the individuals involved. This will be the first thing a potential landlord or funder will see and will create their first impression. Remember they are investing in you, and they want to know who you are at the start, what your skills are, your background, etc
- An overview of the business - a description of the farm (land and buildings) and the enterprises practiced/planned.
- Information about the management team and staff – ownership, skills, experience, capabilities.
- Business objectives - short and long-term.
- Financial position and forecasts - likely profitability when fully established (worthwhileness) and annual budgets detailing expected cash flow for a 1-3 year period, profitability, and changes in equity in the years taken to establish the business (feasibility). A lender will also require a clear statement of capital provided at the outset alongside funding required.
- Marketing and sales strategy - planned approach of marketing and selling your chosen product(s).
- SWOT analysis - Strengths, Weaknesses, Opportunities and Threats that show an awareness of internal, external, personal, physical or financial influences and risks on the business.

If you have a particular unique point of your business or proposal, this should be highlighted.

Financial Planning

Financial analysis and planning is a key aspect of any agricultural business no matter what size. The finances help to provide an overview of what has happened over the period of analysis or when budgeting what is going to happen.

The key points to consider are:

- Profit (loss) - this is used to express annual financial performance as part of the profit and loss account at one point in the financial year showing trading output (adjusted for valuations) less inputs (adjusted for valuation changes). The profit before depreciation is available to cover drawings, tax, and capital investment (the “cash needs” of the business).
- Capital - the net worth is shown on the balance sheet giving a snapshot of the assets and the liabilities of the business at one point in the financial year. Assets should be based on market values to provide a true estimate of net worth.
- Cash - cashflow gives a clear indication, on an ongoing basis throughout the year, of the business bank account and, unlike the profit statement, includes VAT and is not adjusted for valuation changes, debtors, creditors, personal and capital transactions.

Whole farm budgeting

Taking into account farm enterprise information (either historical or predicted using the Farm Management Handbook), a business can benchmark both technically and financially. This information in conjunction with the financial descriptions for profit, capital and cash should help a business to prepare a whole farm budget.

A whole farm budget acts as a model of the business predicting income and expenditure over a period (usually the 12 months of the financial year of the business) and this can be monitored against actual income/expenditure during the year. This information allows the business to analyse performance and to make decisions about future strategies.

Some basic budgeting features are shown in the following text. Any figures that are presented in a budget must be supported by clear assumptions adjusted for sensitivities where applicable.

Profit (loss)

The trading profit and loss account of a business is often expressed in the following format:

OUTPUT
less
VARIABLE COSTS
equals

GROSS MARGIN
less
FIXED COSTS
equals
NET PROFIT/LOSS

Monetary values under the above headings do not necessarily represent all or exact cash transactions through the bank. The profit and loss account also includes adjustments for valuations, debtors, creditors, depreciation, personal income or expense, and capital transactions. Further definitions can be found on pages 1 and 2 while financial data for particular farm types can be found in the Whole Farm Data section on page 467.

Capital

The capital position of the business is shown by the balance sheet in the following format:

ASSETS
(e.g. land/buildings/machinery valuations, cash at hand, stocks, debtors)
less
LIABILITIES
Long/medium term and Current
(e.g. loans/mortgages, overdraft, hire purchase, other creditors)
equals
NET WORTH or OWNER EQUITY

The net worth of the business is essentially the value of assets available to the business after all liabilities have been cleared. When the net worth is valued against the total assets as a percentage, the resultant figure gives a clear indication of the business' capital position.

Cash

It is vital to know the cash position of the business as this relates to the bank balance. The cashflow considers the cash values of sales and expenses that would appear in the profit and loss account. In addition, the cashflow also takes into account cash items such as personal drawings, tax payments, and capital repayments for loans and hire purchases. The opportunity to save for future reinvestment can be identified by taking account of the cash needs of the business.

Financial targets and benchmarks

As well as technical enterprise performance targets/benchmarks, such as yield and lambing/calving percentages, a farm business will have financial targets/benchmarks that it should consider while analysing performance or planning.

Analysis of the profit and loss account is an ideal starting point to prepare business figures to allow comparison to industry benchmarks. Businesses should analyse and present their accounts in a similar format to that presented below allowing an easy comparison. The whole figures under each analysis heading, e.g., variable costs, can then be converted to a Gross Output Analysis (GOA) which takes output at 100% and each analysis heading is divided by the output and multiplied by 100 to get a percentage. Current GOA targets are:

| | Dairy | General (excl. pigs and poultry) |
|----------------|--------------|---|
| Output | 100% | 100% |
| Variable costs | < 40% | < 30% |
| Gross margin | > 60% | > 70% |
| Fixed costs | < 30% | < 45% |
| Profit | > 30% | > 25% |

Pig and poultry farms are similar to dairy farms in that they typically generate high output, high variable costs (because of feed costs) and relatively low fixed costs owing to high output or turnover.

The Whole Farm Data figures on pages 472-487 are industry figures based on real farms thus provide an ideal starting point for benchmarking. A business should consider the average to high performing categories as the main goal. Nevertheless, due to the nature of farming and the varying characteristics (e.g. geography, land quality, local climate, type of stock, etc.) that influence performance, a flexible approach should be taken when benchmarking. Once a farm is up and running and has its own data, benchmarking internally will provide additional information to help assess performance.

Other benchmarks used to ascertain business performance and sustainability are related to the capital aspects of the business such as percentage owned/owner equity. This is calculated using the net worth of the business divided by the total assets, giving a measure of the proportion of the business owned by the proprietor. Target levels are:

- owner occupier > 60%
- tenant > 50%

Lenders, such as banks and mortgage companies, will consider, in addition to those described above, several other factors and benchmarks when analysing business performance and assessing ability to service loan funding.

Business Structure

The most appropriate business structure for a new rural business depends on the plans for the business, the people involved and issue of land tenure. This will result in different legal and taxation implications, meaning professional advice is recommended from the outset.

There are three common types of business structure:

- Sole trader - This is the simplest form of business since it can be established without legal formality. However, the business of a sole trader is not distinguished from the proprietor's personal affairs.
- Partnership - A partnership is similar in nature to a sole trader but because more people are involved it is advisable to draw up a written agreement and for all partners to be aware of the terms of the partnership. As for a sole trader, the business and personal affairs of the partners are not legally separate. A further possibility is to use what is known as a Limited Liability Partnership (LLP).
- Company - The business affairs are separate from the personal affairs of the owners, but this entails compliance with greater regulations.
- The appropriate structure will depend on a number of factors, including consideration of taxation implications, the legal entity, ownership and liability. An accountant can advise the best set up for your business.

Farming Opportunities

Availability of land is often mentioned as the main hurdle for new entrants entering agriculture as well as finance and sourcing capital.

Purchase

Land purchase requires capital to buy, a deposit or security of a guarantor which often makes it restricting for new entrants. The value of land has shown an increasing trend over the last number of years, the data below compares 2009 to 2019 land values for various types of land in Scotland (data: Knight Frank).

| | 2009 | 2019 | Difference |
|-------------------|----------|--------|------------|
| | Per acre | | |
| Good arable | £5,250 | £9,075 | £3,825 |
| Average arable | £4,250 | £5,004 | £754 |
| Arable / Grass | £3,500 | £3,571 | £71 |
| Permanent Pasture | £2,100 | £2,650 | £550 |
| Hill | £475 | £797 | £322 |

The value of land will depend on the land grade, the location, access, neighbours, and available alternative uses.

When looking to purchase it is essential to understand how borrowing money works, for example how much will the lender provide, how much deposit is required, what value of the property will be lent against, etc.

There are several other costs to think about when purchasing and should be budgeted for in a business plan. These include land and building transition tax (LBTT), legal fees, valuation fees, advisor fees. Land and building transition tax (LBTT) is complex and there are numerous different scenarios for each purchase, more details can be found at <https://www.gov.scot/policies/taxes/land-and-buildings-transaction-tax/>.

When sourcing a lawyer to assist with buying land, source an agricultural specialist, as there will be Basic Payment, access rights, etc to possibly negotiate. It is extremely important to involve a legal expert to prevent problems, such as issues on the title. The lender may ask for an independent valuation of the land and property, meaning a valuation fee may be applied, in addition to the bank fees.

Once purchased, the land and property will become an asset to the business. Every opportunity should be evaluated to maximise the output and to increase the value of the asset e.g., diversification, grants, adding value, renewables.

There are numerous other routes to occupying land if purchasing is not a feasible option. The various routes are described below.

Tenancies

This is the most common route for new entrants to access land. It involves a landowner letting an area of land (often including sheds and a dwelling house) to a tenant for an agreed period of time and rent. The types of tenancies available include the following:

- Short Limited Duration Tenancy (SLDT)
- Modern Limited Duration Tenancy (MLDT)
- Seasonal Grazing or mowing tenancies

These are described in detail on pages 418-423.

Joint ventures

Farmland tends to have a high asset value relative to its income earning potential. Land purchase can, therefore, be a substantial financial barrier to entry for aspiring farmers and expanding businesses alike.

There are various mechanisms currently available to facilitate a step onto the farming ladder including a range of rental arrangements and joint ventures. Traditional formal tenure arrangements (see pages 418-423) are covered by Scottish legislation, but there is growing popularity in joint ventures as an alternative route to entry. These include:

- Contract farming
- Share farming
- Business equity partnerships

A joint venture can be considered to be some form of co-operation, formed in a legal manner, between two or more parties to form a business relationship, other than as landlord and tenant. There are various benefits and reasons for the creation of these collaborative agreements including sharing risk, improving return on capital through combined resources and expertise and accelerated growth. They can also avoid the need to create a formal farm tenancy. Examples of common circumstances in which joint ventures can be beneficial include:

- Land coming back in-hand after being let out. The owner may be inexperienced but wishes to retain vacant possession.
- The farm may not be large enough to be a viable holding on its own.
- The farmer may wish to release equity.
- To obtain economies of scale through splitting the cost of farming with others.
- The business may be in need of large capital investment.
- The owner may want to retire, not having a natural successor, but not ready to sell.
- There may be a substantial tax advantage.

Genuine joint venture agreements work well but must be more than a written document. In practice, it is important for both parties to abide by the governing rules in order to retain the advantages (including tax benefits) and avoid it being construed as an alternative legal entity such as a tenancy, partnership, or employer/employee relationship. The foundation to success with joint venture farming is finding the right mix of people, regular communication and use of an independent advisor.

Contract farming

A standard Contract Farming Agreement (CFA) is the terms of understanding between two parties. That is, a landowner/occupier (known as the “farmer”) who has engaged the services of another (known as the “contractor”) to undertake farming operations over a fixed period (typically 3 to 5 years) on pre-arranged terms – it may be more simply understood as farming with contractors.

The farmer normally provides the land, buildings, fixed equipment (if required or agreed), a dedicated bank account, pay the required bills, finance to administer the agreement, and any farm knowledge. For this, they will receive what is commonly termed a basic retention/fee. This is agreed with the contractor in advance of the start of the agreement.

The contractor provides the labour, machinery (including its incurred costs) and management expertise. The contractor could be a neighbouring farmer, large farming company or traditional contractor. For this, they receive a basic contractor’s fee (usually quarterly or half-yearly).

Either party, via a separate livestock hire agreement, can supply breeding livestock (if applicable). Both parties agree farming policy and the share

of any divisible surplus in advance and meet regularly throughout the duration of the agreement to make management decisions and monitor progress.

For working examples of real contract farming case studies see <https://www.fas.scot/inspirational-stories/>

Share farming

Share farming is an arrangement between two independent businesses. It is often confused with contract farming but there are some differences, for example:

- They are two entirely separate businesses working the same land.
- As separate businesses they share the value of the farms output (typically sales) rather than a fee plus share of net profit.

There is no standard share farming agreement. The details are a matter for the parties involved but each party needs to bring complementary resources and skill sets. The share farming structure is not as popular as contract farming in the UK but is commonplace in New Zealand. It is possible to start as a share farmer with only a small share then progressively build equity share (within the terms of the agreement) until owning most or all of the stock and/or equipment. There are three conceivable paths for the agreement:

1. It may be a step towards farm succession.
2. If agreed, share farmer equity in livestock could be increased on renewal of the agreement.
3. Terminate the agreement:
 - a. allowing the share owner to follow an alternative plan.
 - b. to allow the share farmer to buy into another or larger farm.
 - c. liquidate to enable the share farmer to purchase their own farm and likely become a share owner.

Typically, the share owner/occupier provides the land, buildings, fixed equipment, fixed machinery, major maintenance of buildings and expertise along with paying a certain percentage of certain input costs. The share farmer/operator will provide the working machinery, moveable equipment, and technical ability and pay the balancing cost of inputs. Livestock are usually held in undivided shares. Output and certain input costs (direct costs) are split using pre-agreed allocations.

Equity partnerships

An equity partnership is an alternative way to invest in farming for those who are unable to finance a farm tenancy or ownership as an individual. It can also be an opportunity for outside investors and for existing farmers to grow their business. It may also benefit those wanting to release capital from land for alternative investments or allow partial retirement as part of a structured succession, particularly with non-family members.

An equity partnership is most likely formed as a company, with potentially multiple investors. These shareholders will pool their capital (equity), and possibly skills or resources, in the aim of generating higher investment growth. The company will identify and assess an investment option, purchase the land, livestock plus necessary machinery and plant. This is funded through shareholder equity and bank debt, borrowed by the company.

There are various structures and the most appropriate will depend on the type of investor. Often one of the partners is employed as the farm manager, known as an equity manager. The board of directors will run governance. Each partner normally appoints one director to the board. This works well provided directors have the necessary and complementary skills. This responsibility or process can be contracted out, particularly where investor(s) are time limited, remote from the operation or opt to be a 'sleeping partner'.

For all joint ventures, clarity of the mechanics of the systems and all associated advantages and disadvantages to the parties involved must be made prior to delving into such agreements. Investment in advice from legal and financial specialists is highly recommended.

Finance

Sourcing finance to develop and grow a fledgling business can be challenging. There are various lenders who are especially supportive of new entrant businesses. It is essential that the business has a track record and credit history, setting up a bank account as soon as possible facilitates this. The lender will require a business plan and cash flows, demonstrating what the immediate and future plans are for the business as well as the cash requirements. The funding sought should match the requirements of the business, for short term working capital for seed, fertiliser, feed, etc. an overdraft should be requested, whereas capital for more permanent structures or machinery asset finance or loan funding should be investigated.

Finance can be sourced through various means including, overdraft, short and long term loans and hire purchase agreements (see pages 523-525). Finance can often be negotiated, e.g. longer payment terms for purchasing seed and fertiliser and market finance for purchasing livestock. Some livestock markets have special terms which favour new entrants.

Finance comes with an interest rate, which is a charge for borrowing the money. This is calculated as a percentage of your borrowings, so if you borrow £10,000 and the interest rate is 3% you repay £10,300. The interest rate is calculated on the bank rate along with other factors. The bank rate is also called the Bank of England Base Rate. If the bank rate

risers, then normally banks increase their interest rates on borrowing (and saving).

The capital demand of a business can be minimised to reduce the reliance on borrowing. Such methods would include using machinery rings to hire in equipment when it is required, rather than purchasing. In return labour can be hired out to offset the payment.

New Entrants Initiatives

Scottish Land Matching Service (SLMS)

This was launched in October 2019 in response to growing industry concern at the lack of opportunities for new entrants entering the industry. This has been due to the hurdles associated with access to land and finance e.g. availability of land for tenancies, the high value of land and lack of capital funding.

The aim of the SLMS is to restructure our industry by encouraging young people into farming and bringing new skills, new thinking and the next generation into agriculture. Joint Ventures are operational structures that allow for young people to start or develop a farming business; they also allow an existing farmer to further develop their business and/or reduce their day to day role on the farm. This is open to all and matches people looking for, and offering, opportunities and providing a service to facilitate workable arrangements.

The service has a website where both people seeking opportunities and available opportunities are shown. Both parties can register their interest in the service through six simple steps:

- 1) Register online and specify what you are looking for.
- 2) Your basic requirements will be added to the database, please note - no personal information will be displayed.
- 3) The service will contact you to arrange a confidential discussion.
- 4) If there are any potential matches on the database, the service will facilitate an introduction and a discussion.
- 5) If the initial discussion is successful and both parties wish to pursue, the service will facilitate further discussions to aid in developing the best agreement for all parties.
- 6) Once an agreement is secured, the service will continue to be a source of free and independent advice as the venture and relationship develops.

For more details and to register either an opportunity or as a seeker, visit the SLMS website at <https://slms.scot/>

Farm Advisory Service – New Entrants to Farming Programme

The SRDP Farm Advisory Service (FAS) has a dedicated theme for new entrants to agriculture. The FAS provides information and resources aimed specifically at new entrants to farming across Scotland. These

resources include inspirational stories, fact sheets, guidance notes, newsletters, an annual new entrant gathering, and regional new entrant meetings across Scotland. For more information visit the FAS website at <https://www.fas.scot/rural-business/new-entrants/>

In addition to the above there is grant support for one-to-one mentoring and specialist advice is available from experienced peers. For more details see <https://www.fas.scot/mentoring-new-farmers-crofters/>

Forestry and Land Scotland

Forestry and Land Scotland (FLS) is the executive agency of the Scottish Government responsible for managing forests and land on the National Forest Estate (NFE). One of the priorities within Scotland's Forestry Strategy is to 'expand the area of forests and woodlands, recognising wider land-use objectives' which requires an integrated approach to land-use policy that seeks to maximise the synergies and reduce the potential conflicts between different land uses. One objective of the Starter Farms & Starter Units is to integrate farming and forestry on the NFE by developing these opportunities for new entrants to agriculture.

There are currently ten starter farms on the NFE, from Caithness in the North to Dalbeattie in the South. The units vary in size, type, and land quality, but the model includes farms covering approximately 110 acres of agricultural land. These are leased out on 10-year LDT/MLDT agreements to the new entrants. The applicants undergo a rigorous competitive application process including completing a business plan with cash flow projections, and a series of questions on other topics including motivation, income plans, health and safety, training, and farming policy. Shortlisted candidates are then called for interview and will face a panel of 5-6 people including a local FES employee, farmer and a Scottish Government representative.

There are also numerous Starter Units. The Starter Units provide agricultural grazing opportunities to new entrants. There is generally no house or buildings associated with them. The resources and conditions vary with each site and will have a focus of enhancing the Scottish Government's environmental objectives.

More details on these initiatives can be found at:

<https://forestryandland.gov.scot/business-and-services/starter-farms>

NFU Scotland

NFU Scotland's Next Generation Committee is comprised of a diverse range of young farmers, new entrant farmers and crofters who meet regularly to discuss opportunities and challenges faced by their peers and work to influence positive change and speak with one voice. For more information visit <https://www.nfus.org.uk/policy/new-generation.aspx>

Scottish Government assistance

The Scottish Government is extremely supportive in encouraging the next generation to farming, and to overcome barriers.

New entrants to agriculture and young farmers can apply to the National Reserve for allocation of entitlements for the basic payment scheme. This can be done while submitting a single application form online, the deadline is 15th May on the year of application. To be eligible, new entrants must have started agricultural activity in 2013 or later and not have had agricultural activity in their own name in the five years preceding the start of the activity. To qualify as a young farmer, you must be under 41 years of age on the 31st December on the year of application and be setting up as head of the agricultural holding for the first time. Documentary evidence of date of birth and proof of status as head of business or having control of the partnership/legal person will also be required at time of first application.

Further details can be found at:

<https://www.ruralpayments.org/publicsite/futures/topics/all-schemes/national-reserve/national-reserve-full-scheme-guidance/>

New entrants to agriculture and young farmers applying for BPS are also eligible for the Young Farmer Payment, which is based on a maximum of 90 eligible hectares and paid at 25% of the average value of payment entitlements held for the scheme year concerned. This is available to applicants under 41 years old on 31st December in the first year they apply for BPS and lasts 5 years from the date the new entrant/young farmer took control of the business. Applications can be completed while submitting a single application form online by 15th May each year.

The Scottish Government has formed a working group to develop and coordinate Farming Opportunities for New Entrants (FONE) aimed at identifying publicly and privately owned land that could be released for new entrants to farming.

For more details see:

<https://www.gov.scot/groups/farming-opportunities-for-new-entrants-fone/>

Whole Farm Data

Introduction

This section provides whole farm benchmarking data for typical farm types in England and Scotland.

Benchmarking is a valuable tool to appraise the financial performance of a business year on year, or in relation to the wider industry. In addition, the benchmarks in the following pages, particularly the fixed costs, when used in conjunction with the livestock and crop gross margin budgets shown earlier in the Farm Management Handbook are useful to budget potential future business plans.

Source of Contents for 2021

The data for England and Scotland has been produced using information from the Farm Business Survey 2019/2020 (conducted by six University Research Centres in England) and the Farm Accounts Survey 2019/2020 (conducted by SRUC in Scotland).

Data has been sourced from the publications listed below:

- Farm Accounts in England 2019/2020, February 2021
- Scottish farm business income: annual estimates 2019-2020, March 2021

Full information can be found at:

- <https://www.gov.uk/government/statistics/farm-accounts-in-england>
- [https://www.fas.scot/whole-farm-benchmarks /](https://www.fas.scot/whole-farm-benchmarks/)

England

The Farm Business Survey (FBS) is an annual survey providing information on the financial position and physical and economic performance of commercial farm businesses in England. It covers all types of farming in all regions of England and includes owner occupied, tenanted and mixed tenure farms. FBS only includes farm businesses with a standard output of at least 25,000 Euros, based on activity recorded in the previous June Survey of Agriculture and Horticulture.

Farms are allocated to performance bands according to the output and input values for farm type. The performance bands reported represent the top 25 per cent (higher) and bottom 25 per cent (lower) against the average for the farm type.

English data is expressed as Farm Business Income (FBI). FBI reflects actual incomes of farm businesses and is, in most cases, very similar to net profit. FBI is the gross margin less the sum of the fixed costs, less BPS and net margin from diversification enterprises that use farm resources.

The tables present the data on a £ per farm basis. In addition, FBI has been presented as £/ha or £/100 ewes.

Scotland

The benchmark data for Scotland is shown in the following tables for the upper 25% performing farms per farm type.

The Scottish data is shown as a profit figure. This is based on management principles rather than those used for tax accountancy purposes.

The data is represented on a £ per farm, £ per 100 ewe equivalents, £ per adjusted hectare, and % per output basis.

Average benchmarks for each farm type as well as more detailed physical and technical data are published on the FAS website, see link on page 468.

Description of Farm Types

The farm types are characterised with reference to EC typology.

The data for the farm types in England is measured and represented by Standard Output (SO). The data for farm types in Scotland, shown in the following pages, are distinguished by standard gross margin (SGM).

Note: Scottish data excludes specialist pig, specialist poultry and horticulture. English data excludes specialist sheep and specialist beef.

England farm types

LFA grazing livestock farms: Farms with 50% or more of total area in the Less Favoured Area (both Disadvantaged and Severely Disadvantaged) and with more than two-thirds of the total SO coming from sheep and beef cattle together.

Lowland grazing livestock farms: Farms with less than 50% of total area in the less favoured area and with more than two-thirds of the total SO coming from sheep and beef cattle together.

Dairy farms: Farms where the dairy enterprise, including followers, accounts for over two-thirds of the total SO.

Cereal farms: Farms where cereals, oilseeds, peas, and beans harvested dry account for more than two-thirds of the total SO.

General cropping farms: Farms with over two-thirds of the total SO coming from arable crops (including field scale vegetables) or a mixture of arable and horticulture crops; and where arable crops account for more than one third of total SO and no other group account for more than one third.

Specialist Pig farms: Farms on which pigs account for over two-thirds of the total SO.

Specialist Poultry farms: Farms on which poultry account for over two-thirds of the total SO.

Horticulture farms: Other farms where over two-thirds of the total SO comes from fruit, hardy nursery stock, glasshouse flowers and vegetables, market-garden-scale vegetables and outdoor bulbs and flowers.

Mixed farms: Farms where crops account for one-third, but less than two-thirds of the total SO and livestock accounts for one-third but less than two-thirds of total SO. It includes holdings with mixtures of cattle, sheep, pigs and poultry and holdings where one or other of these groups is dominant.

Scotland farm types

Specialist sheep (mainly hard hill): Farms in the less favoured areas with more than two-thirds of the total Standard output coming from sheep.

Specialist beef (LFA): Farms in the less favoured areas with more than two-thirds of the total standard output coming from beef cattle.

Cattle and sheep (LFA): Farms in the less favoured areas with more than two-thirds of the total standard output coming from beef cattle and sheep together.

Dairy: Farms where more than two-thirds of the total standard output comes from dairy cows.

Specialist cereals: Farms where more than two-thirds of the total standard output comes from cereals and oilseeds.

General cropping: Farms where more than two-thirds of the total standard output comes from all crops.

Mixed: Farms where no enterprise contributes more than two-thirds of the total standard output.

Definition of Terms

Enterprise output

Returns for an enterprise plus the value of transfers out and the value of produce used or consumed for which no cash is receivable (by the business) less expenditure on, and the value of transfers in of livestock.

Agri-environmental payments have been detailed in the English data however this was not available for Scotland. Subsidy output and diversification surplus is shown separately from enterprise output.

Variable costs

Those costs, which can both be readily allocated to a specific enterprise and will vary in approximately direct proportion to changes in the scale of that enterprise. Examples of variable costs are:

- Seeds, fertilisers, and lime
- Sprays and sundry crop expenses
- Concentrate feeding stuffs (purchased or home-grown)
- Sundry livestock expenses (vet, medicine, tags etc). Purchases of livestock are not treated as variable costs but deducted in the calculation of the appropriate enterprise outputs.

Gross margin

The Gross Margin is the Total Farm Output less the sum of Variable Costs of the business enterprises'.

Fixed costs

Examples of fixed costs include:

- Labour - regular and casual labour.
- Power and machinery - repairs, fuel (including drying fuel), oil, electricity, contracting, crop and livestock haulage, machinery leasing and hire.
- Overheads - property repairs, rates, insurance, and miscellaneous (e.g. office expenses).
- Depreciation * - machinery and property depreciation
- Rent and finance - interest (bank, HP, and loans) and rent (excluding keep)

* *Machinery depreciation is calculated on a replacement cost basis. Rates of depreciation are intended to reflect the degree of deterioration of the asset.*

England - LFA Grazing Livestock Farms

| | Lower £/farm | Average £/farm | Higher £/farm |
|---|-----------------|-------------------|------------------|
| OUTPUT | | | |
| Crops | 1,300 | 6,300 | 3,900 |
| Livestock | 32,500 | 65,100 | 77,300 |
| Agri-environment | 3,300 | 9,100 | 28,100 |
| Other | 1,333 | 3,600 | 3,750 |
| | <u>38,433</u> | <u>84,100</u> | <u>113,050</u> |
| VARIABLE COSTS | | | |
| Crop Specific Costs | 3,400 | 6,400 | 6,000 |
| Livestock Specific Costs | 21,000 | 30,900 | 33,800 |
| Contract costs | 3,000 | 5,000 | 5,000 |
| Casual labour | 600 | 2,500 | 3,600 |
| Sundry costs | 2 | 104 | 109 |
| | <u>28,002</u> | <u>44,904</u> | <u>48,509</u> |
| GROSS MARGIN | <u>10,431</u> | <u>39,196</u> | <u>64,541</u> |
| FIXED COSTS | | | |
| Labour | 300 | 2,910 | 3,800 |
| Power and machinery | 12,429 | 17,868 | 21,900 |
| Overheads | 17,600 | 24,100 | 29,400 |
| | <u>30,329</u> | <u>44,878</u> | <u>55,100</u> |
| FARM BUSINESS INCOME <i>(excl. BPS and diversification)</i> | <u>- 19,898</u> | <u>- 5,682</u> | <u>9,441</u> |
| BPS | 10,700 | 22,500 | 46,000 |
| Diversification surplus | 300 | 3,200 | 3,700 |
| | <u>- 8,898</u> | <u>20,018</u> | <u>59,141</u> |
| FARM BUSINESS INCOME | <u>- 8,898</u> | <u>20,018</u> | <u>59,141</u> |
| Farm Business Income £/ha | <u>- 129</u> | <u>139</u> | <u>184</u> |
| No. of farms in sample | 30 | 111 | 61 |
| Average farm size (ha) | 69 | 144 | 321 |
| No. of ewes | 222 | 382 | 584 |
| No. of breeding cows | 16 | 27 | 28 |

England - Lowland Grazing Livestock Farms

| | Lower £/farm | Average £/farm | Higher £/farm |
|---|-----------------|-------------------|------------------|
| OUTPUT | | | |
| Crops | 2,000 | 8,500 | 20,500 |
| Livestock | 26,400 | 46,400 | 92,100 |
| Agri-environment | 1,100 | 3,400 | 11,400 |
| Other | 2,000 | 3,900 | 6,300 |
| | <u>31,500</u> | <u>62,200</u> | <u>130,300</u> |
| VARIABLE COSTS | | | |
| Crop Specific Costs | 3,900 | 6,800 | 9,800 |
| Livestock Specific Costs | 13,800 | 21,600 | 39,000 |
| Contract costs | 5,400 | 5,100 | 9,000 |
| Casual labour | 500 | 1,000 | 2,200 |
| Sundry costs | 33 | 200 | 103 |
| | <u>23,633</u> | <u>34,700</u> | <u>60,103</u> |
| GROSS MARGIN | <u>7,867</u> | <u>27,500</u> | <u>70,197</u> |
| FIXED COSTS | | | |
| Labour | 3,200 | 2,500 | 9,500 |
| Power and machinery | 15,931 | 15,643 | 25,085 |
| Overheads | 18,772 | 20,400 | 33,800 |
| | <u>37,903</u> | <u>38,543</u> | <u>68,385</u> |
| FARM BUSINESS INCOME <i>(excl. BPS and diversification)</i> | <u>- 30,036</u> | <u>- 11,043</u> | <u>1,812</u> |
| BPS | 8,000 | 13,800 | 27,400 |
| Diversification surplus | 200 | 3,700 | 16,000 |
| FARM BUSINESS INCOME | <u>- 21,836</u> | <u>6,457</u> | <u>45,212</u> |
| Farm Business Income £/ha | <u>- 412</u> | <u>82</u> | <u>284</u> |
| No. of farms in sample | 42 | 136 | 102 |
| Average farm size (ha) | 53 | 79 | 159 |
| No. of ewes | 40 | 126 | 239 |
| No. of breeding cows | 23 | 21 | 25 |

England - Dairy Farms

| | Lower £/farm | Average £/farm | Higher £/farm |
|---|-----------------|-------------------|------------------|
| OUTPUT | | | |
| Crops | 14,100 | 25,900 | 52,900 |
| Livestock | 308,800 | 608,400 | 593,500 |
| Agri-environment | 1,600 | 5,400 | 5,700 |
| Other | 5,900 | 14,600 | 6,700 |
| | <u>330,400</u> | <u>654,300</u> | <u>658,800</u> |
| VARIABLE COSTS | | | |
| Crop Specific Costs | 21,000 | 38,600 | 42,300 |
| Livestock Specific Costs | 157,600 | 273,100 | 213,000 |
| Contract costs | 21,900 | 33,300 | 37,700 |
| Casual labour | 4,300 | 8,900 | 5,900 |
| Sundry costs | 2 | 532 | 106 |
| | <u>204,802</u> | <u>354,432</u> | <u>299,006</u> |
| GROSS MARGIN | <u>125,598</u> | <u>299,868</u> | <u>359,794</u> |
| FIXED COSTS | | | |
| Labour | 26,400 | 63,100 | 49,400 |
| Power and machinery | 54,105 | 77,730 | 66,423 |
| Overheads | 79,635 | 121,588 | 96,600 |
| | <u>160,140</u> | <u>262,418</u> | <u>212,423</u> |
| FARM BUSINESS INCOME <i>(excl. BPS and diversification)</i> | <u>- 34,541</u> | <u>37,450</u> | <u>147,371</u> |
| BPS | 20,900 | 32,300 | 34,700 |
| Diversification surplus | 3,600 | 5,200 | 15,400 |
| FARM BUSINESS INCOME | <u>- 10,041</u> | <u>74,950</u> | <u>197,471</u> |
| Farm Business Income £/ha | <u>- 87</u> | <u>419</u> | <u>1,085</u> |
| No. of farms in sample | 66 | 109 | 53 |
| Average farm size (ha) | 116 | 179 | 182 |
| No. dairy cows | 128 | 210 | 216 |

England - Cereal Farms

| | Lower £/farm | Average £/farm | Higher £/farm |
|---|-----------------|-------------------|------------------|
| OUTPUT | | | |
| Crops | 89,900 | 222,000 | 229,100 |
| Livestock | 5,100 | 8,400 | 4,400 |
| Agri-environment | 2,100 | 5,900 | 7,000 |
| Other | 6,800 | 29,906 | 24,053 |
| | <u>103,900</u> | <u>266,206</u> | <u>264,553</u> |
| VARIABLE COSTS | | | |
| Crops specific costs | 43,500 | 89,700 | 81,700 |
| Livestock specific costs | 4,500 | 4,800 | 2,600 |
| Contract costs | 8,100 | 20,900 | 24,500 |
| Casual labour | 1,200 | 2,500 | 2,200 |
| Sundry costs | 700 | 900 | 1,700 |
| | <u>58,000</u> | <u>118,800</u> | <u>112,700</u> |
| GROSS MARGIN | <u>45,900</u> | <u>147,406</u> | <u>151,853</u> |
| FIXED COSTS | | | |
| Labour | 6,412 | 17,568 | 12,288 |
| Power and machinery | 34,437 | 49,809 | 39,516 |
| Overheads | 37,800 | 77,700 | 52,200 |
| | <u>78,649</u> | <u>145,077</u> | <u>104,004</u> |
| FARM BUSINESS INCOME <i>(excl. BPS and diversification)</i> | <u>- 32,749</u> | <u>2,329</u> | <u>47,849</u> |
| BPS | 20,700 | 43,200 | 45,200 |
| Diversification surplus | 700 | 16,400 | 44,300 |
| | <u>- 11,349</u> | <u>61,929</u> | <u>137,349</u> |
| FARM BUSINESS INCOME | <u>- 11,349</u> | <u>61,929</u> | <u>137,349</u> |
| Farm Business Income £/ha | <u>-98</u> | <u>273</u> | <u>613</u> |
| No. of farms in sample | 64 | 181 | 98 |
| Average farm size (ha) | 116 | 227 | 224 |
| Cereals (ha) | 75 | 148 | 151 |

England - General Cropping Farms

| | Lower £/farm | Average £/farm | Higher £/farm |
|---|-----------------|-------------------|------------------|
| OUTPUT | | | |
| Crop | 159,500 | 424,400 | 426,000 |
| Livestock | 9,500 | 12,900 | 9,400 |
| Agri-environment | 2,600 | 4,400 | 18,200 |
| Other | 13,800 | 14,592 | 36,412 |
| | <u>185,400</u> | <u>456,292</u> | <u>490,012</u> |
| VARIABLE COSTS | | | |
| Crop specific costs | 70,900 | 151,100 | 145,400 |
| Livestock specific costs | 7,900 | 6,900 | 6,500 |
| Contract costs | 19,600 | 27,700 | 47,200 |
| Casual labour | 8,800 | 34,000 | 7,200 |
| Sundry costs | 322 | 100 | 3,200 |
| | <u>107,522</u> | <u>219,800</u> | <u>209,500</u> |
| GROSS MARGIN | <u>77,878</u> | <u>236,492</u> | <u>280,512</u> |
| FIXED COSTS | | | |
| Labour | 17,208 | 42,700 | 30,400 |
| Power and machinery | 44,118 | 77,334 | 67,800 |
| Overheads | 54,854 | 95,400 | 100,400 |
| | <u>116,180</u> | <u>215,434</u> | <u>198,600</u> |
| FARM BUSINESS INCOME <i>(excl. BPS and diversification)</i> | <u>- 38,302</u> | <u>21,058</u> | <u>81,912</u> |
| BPS | 21,200 | 40,000 | 71,300 |
| Diversification surplus | 6,700 | 16,600 | 35,400 |
| | <u>- 10,402</u> | <u>77,658</u> | <u>188,612</u> |
| FARM BUSINESS INCOME | <u>- 10,402</u> | <u>77,658</u> | <u>188,612</u> |
| Farm Business Income £/ha | <u>- 84</u> | <u>339</u> | <u>520</u> |
| No. of farms in sample | 23 | 72 | 38 |
| Average farm size (ha) | 124 | 229 | 363 |
| Cereals (ha) | 52 | 112 | 160 |
| Potatoes (ha) | 5 | 12 | 10 |
| Other crops (ha) | 34 | 63 | 93 |

England - Specialist Pig Farms

| | Lower £/farm | Average £/farm | Higher £/farm |
|---|-----------------|-------------------|------------------|
| OUTPUT | | | |
| Crops | - | 67,700 | 76,200 |
| Livestock specific costs | - | 633,400 | 475,700 |
| Agri-environment | - | 4,900 | 2,600 |
| Other | - | 7,250 | 45,000 |
| | - | 713,250 | 599,500 |
| VARIABLE COSTS | | | |
| Crop specific costs | - | 24,300 | 24,800 |
| Livestock specific costs | - | 419,700 | 208,400 |
| Contract costs | - | 20,000 | 8,600 |
| Casual labour | - | 1,000 | 3,900 |
| Sundry costs | - | 127 | 8,848 |
| | - | 465,127 | 254,548 |
| GROSS MARGIN | - | 248,123 | 344,952 |
| FIXED COSTS | | | |
| Labour | - | 78,500 | 65,600 |
| Power and machinery | - | 63,081 | 78,914 |
| Overheads | - | 114,100 | 100,600 |
| | - | 255,681 | 245,114 |
| FARM BUSINESS INCOME <i>(excl. BPS and diversification)</i> | - | - 7,558 | 99,838 |
| BPS | - | 17,100 | 18,200 |
| Diversification surplus | - | 8,000 | 11,900 |
| FARM BUSINESS INCOME | - | 17,542 | 129,938 |
| Farm Business Income £/ha | - | 170 | 1,274 |
| No. of farms in sample | - | 33 | 26 |
| Average farm size (ha) | - | 103 | 102 |
| No. of sows | - | 258 | 151 |
| No. of other pigs | - | 3,173 | 4,038 |

England - Specialist Poultry Farms

| | Lower £/farm | Average £/farm | Higher £/farm |
|---|-----------------|-------------------|------------------|
| OUTPUT | | | |
| Crop | 12,100 | 25,800 | 108,400 |
| Livestock | 201,800 | 1,036,200 | 896,000 |
| Agri-environment | 4,300 | 800 | 3,000 |
| Other | 4,500 | 6,900 | 3,000 |
| | <u>222,700</u> | <u>1,069,700</u> | <u>1,010,400</u> |
| VARIABLE COSTS | | | |
| Crop Specific Costs | 5,900 | 8,300 | 40,400 |
| Livestock Specific Costs | 144,200 | 729,600 | 492,800 |
| Contract costs | 3,200 | 15,500 | 23,700 |
| Casual labour | 3,500 | 8,200 | 4,400 |
| Sundry costs | 4 | 49 | 5 |
| | <u>156,804</u> | <u>761,649</u> | <u>561,305</u> |
| GROSS MARGIN | <u>65,896</u> | <u>308,052</u> | <u>449,095</u> |
| FIXED COSTS | | | |
| Labour | 10,100 | 72,600 | 68,206 |
| Power and machinery | 23,936 | 50,869 | 59,354 |
| Overheads | 60,270 | 174,144 | 131,270 |
| | <u>94,306</u> | <u>297,613</u> | <u>258,830</u> |
| FARM BUSINESS INCOME <i>(excl. BPS and diversification)</i> | <u>- 28,410</u> | <u>10,439</u> | <u>190,265</u> |
| BPS | 6,700 | 6,400 | 21,600 |
| Diversification surplus | 900 | 34,800 | 49,100 |
| FARM BUSINESS INCOME | <u>- 20,810</u> | <u>51,639</u> | <u>260,965</u> |
| Farm Business Income £/ha | <u>- 484</u> | <u>759</u> | <u>2,509</u> |
| No. of farms in sample | 19 | 57 | 31 |
| Average farm size (ha) | 43 | 68 | 104 |
| No. hens and pullets in lay | 9,146 | 32,032 | 5,892 |
| Other poultry | 6,099 | 87,102 | 63,005 |

England - Horticulture Farms

| | Lower £/farm | Average £/farm | Higher £/farm |
|---|-----------------|-------------------|------------------|
| OUTPUT | | | |
| Crop | 53,100 | 557,500 | 522,700 |
| Livestock | 49 | 1,100 | 200 |
| Agri-environment | 600 | 1,800 | 600 |
| Other | 1,800 | 12,500 | 11,300 |
| | <u>55,549</u> | <u>572,900</u> | <u>534,800</u> |
| VARIABLE COSTS | | | |
| Crop Specific Costs | 20,700 | 256,400 | 150,700 |
| Livestock Specific Costs | 100 | 700 | 200 |
| Contract costs | 1,800 | 14,300 | 8,600 |
| Casual labour | 7,000 | 97,000 | 40,000 |
| Sundry costs | 200 | 201 | 4 |
| | <u>29,800</u> | <u>368,601</u> | <u>199,504</u> |
| GROSS MARGIN | <u>25,749</u> | <u>204,299</u> | <u>335,297</u> |
| FIXED COSTS | | | |
| Labour | 10,300 | 101,700 | 114,003 |
| Power and machinery | 10,682 | 38,707 | 50,730 |
| Overheads | 15,176 | 68,919 | 72,997 |
| | <u>36,158</u> | <u>209,326</u> | <u>237,730</u> |
| FARM BUSINESS INCOME <i>(excl. BPS and diversification)</i> | <u>- 10,409</u> | <u>- 5,027</u> | <u>97,566</u> |
| BPS | 1,800 | 5,200 | 3,500 |
| Diversification surplus | 6,000 | 23,300 | 21,500 |
| FARM BUSINESS INCOME | <u>- 2,609</u> | <u>23,473</u> | <u>122,566</u> |
| Farm Business Income £/ha | <u>- 174</u> | <u>690</u> | <u>4,714</u> |
| No. of farms in sample | 30 | 77 | 44 |
| Average farm size (ha) | 15 | 34 | 26 |

England - Mixed Farms

| | Lower £/farm | Average £/farm | Higher £/farm |
|---|-----------------|-------------------|------------------|
| OUTPUT | | | |
| Crops | 52,700 | 111,200 | 174,200 |
| Livestock | 54,000 | 141,700 | 99,800 |
| Agri-environment | 3,300 | 5,700 | 18,900 |
| Other | 6,240 | 15,400 | 19,900 |
| | <u>116,240</u> | <u>274,000</u> | <u>312,800</u> |
| VARIABLE COSTS | | | |
| Crop specific costs | 28,200 | 48,500 | 66,200 |
| Livestock specific costs | 35,100 | 91,000 | 48,500 |
| Contract costs | 9,400 | 15,400 | 22,600 |
| Casual labour | 1,800 | 3,400 | 4,000 |
| Sundry costs | 41 | 500 | 300 |
| | <u>74,541</u> | <u>158,800</u> | <u>141,600</u> |
| GROSS MARGIN | <u>41,699</u> | <u>115,200</u> | <u>171,200</u> |
| FIXED COSTS | | | |
| Labour | 14,000 | 24,818 | 23,500 |
| Power and machinery | 33,582 | 51,078 | 65,100 |
| Overheads | 35,400 | 71,300 | 66,000 |
| | <u>82,982</u> | <u>147,196</u> | <u>154,600</u> |
| FARM BUSINESS INCOME <i>(excl. BPS and diversification)</i> | <u>- 41,283</u> | <u>- 31,996</u> | <u>16,600</u> |
| BPS | 19,300 | 30,800 | 49,500 |
| Diversification surplus | 5,900 | 16,700 | 33,200 |
| FARM BUSINESS INCOME | <u>- 16,083</u> | <u>15,504</u> | <u>99,300</u> |
| Farm Business Income £/ha | <u>- 144</u> | <u>94</u> | <u>391</u> |
| No. of farms in sample | 31 | 84 | 50 |
| Average farm size (ha) | 112 | 165 | 254 |
| No. of ewes | 84 | 119 | 192 |
| No. of breeding cows | 16 | 13 | 22 |
| No. of dairy cows | 7 | 7 | 0 |
| No. of sows | 4 | 7 | 4 |
| Cereals (ha) | 39 | 72 | 100 |

Scotland - Specialist Sheep (LFA) Farms

| | | Upper 25% | |
|-------------------------|---------------|------------|------------|
| | £/farm | £/adj. ha | % output |
| OUTPUT | | | |
| Livestock | 30,880 | 252 | 38 |
| Crops | 965 | 8 | 1 |
| Subsidies | 40,041 | 327 | 49 |
| Diversification surplus | 1,385 | 11 | 2 |
| Other | 8,439 | 69 | 10 |
| | <u>81,710</u> | <u>668</u> | <u>100</u> |
| VARIABLE COSTS | | | |
| Livestock expenses | 22,044 | 180 | 27 |
| Crop expenses | 2,000 | 16 | 2 |
| | <u>24,044</u> | <u>196</u> | <u>30</u> |
| GROSS MARGIN | <u>57,666</u> | <u>471</u> | <u>70</u> |
| FIXED COSTS | | | |
| Labour | 10,271 | 84 | 13 |
| Power and machinery | 6,807 | 56 | 8 |
| Overheads | 7,885 | 64 | 10 |
| Depreciation | 9,262 | 76 | 11 |
| Rent and finance | 624 | 5 | 1 |
| | <u>34,849</u> | <u>285</u> | <u>43</u> |
| FARM PROFIT | <u>22,817</u> | <u>186</u> | <u>27</u> |
| No. of farms in sample | 7 | | |
| Average farm size (ha) | 122 | | |
| No. of ewes | 709 | | |
| No. of breeding cows | 2 | | |

Scotland - Specialist Beef (LFA) Farms

| | £/farm | Upper 25% £/adj. ha | % output |
|-------------------------|----------------|------------------------|------------|
| OUTPUT | | | |
| Livestock | 65,253 | 614 | 49 |
| Crops | 12,203 | 115 | 9 |
| Subsidies | 36,427 | 343 | 27 |
| Diversification surplus | 2,768 | 26 | 2 |
| Other | 16,601 | 156 | 12 |
| | <u>133,252</u> | <u>1,254</u> | <u>100</u> |
| VARIABLE COSTS | | | |
| Livestock expenses | 24,807 | 233 | 19 |
| Crop expenses | 15,154 | 143 | 11 |
| | <u>39,961</u> | <u>376</u> | <u>30</u> |
| GROSS MARGIN | <u>93,291</u> | <u>878</u> | <u>69</u> |
| FIXED COSTS | | | |
| Labour | 2,231 | 21 | 2 |
| Power and machinery | 19,136 | 180 | 14 |
| Overheads | 14,328 | 135 | 11 |
| Depreciation | 24,191 | 228 | 18 |
| Rent and finance | 4,734 | 45 | 4 |
| | <u>64,620</u> | <u>608</u> | <u>48</u> |
| FARM PROFIT | <u>28,671</u> | <u>270</u> | <u>20</u> |
| No. of farms in sample | 24 | | |
| Average farm size (ha) | 106 | | |
| No. of ewes | 60 | | |
| No. of breeding cows | 68 | | |

Scotland - Cattle and Sheep (LFA) Farms

| | | Upper 25% | |
|-------------------------|----------------|------------|------------|
| | £/farm | £/adj. ha | % output |
| OUTPUT | | | |
| Livestock | 54,459 | 391 | 46 |
| Crops | 1,535 | 11 | 1 |
| Subsidies | 41,093 | 295 | 35 |
| Diversification surplus | 1,417 | 10 | 1 |
| Other | 19,154 | 138 | 16 |
| | <u>117,658</u> | <u>845</u> | <u>100</u> |
| VARIABLE COSTS | | | |
| Livestock expenses | 24,767 | 178 | 23 |
| Crop expenses | 7,009 | 50 | 7 |
| | <u>31,776</u> | <u>228</u> | <u>30</u> |
| GROSS MARGIN | | | |
| | <u>85,882</u> | <u>617</u> | <u>70</u> |
| FIXED COSTS | | | |
| Labour | 5,582 | 40 | 5 |
| Power and machinery | 17,529 | 126 | 15 |
| Overheads | 12,549 | 90 | 11 |
| Depreciation | 17,583 | 126 | 15 |
| Rent and finance | 3,556 | 26 | 3 |
| | <u>56,799</u> | <u>408</u> | <u>49</u> |
| FARM PROFIT | | | |
| | <u>29,083</u> | <u>209</u> | <u>21</u> |
| No. of farms in sample | 13 | | |
| Average farm size (ha) | 139 | | |
| No. of ewes | 357 | | |
| No. of breeding cows | 36 | | |
| No. of other cattle | 43 | | |

Scotland - Dairy Farms

| | £/farm | Upper 25% £/adj. ha | % output |
|---------------------------------|----------------|------------------------|------------|
| OUTPUT | | | |
| Livestock | 605,496 | 2,677 | 90 |
| Crops | 11,556 | 51 | 2 |
| Subsidies | 41,977 | 186 | 6 |
| Diversification surplus | 5,551 | 25 | 1 |
| Other | 9,360 | 41 | 1 |
| | <u>673,940</u> | <u>2,979</u> | <u>100</u> |
| VARIABLE COSTS | | | |
| Livestock expenses | 263,056 | 1,163 | 39 |
| Crop expenses | 35,070 | 155 | 5 |
| | <u>298,126</u> | <u>1,318</u> | <u>44</u> |
| GROSS MARGIN | <u>375,814</u> | <u>1,661</u> | <u>56</u> |
| FIXED COSTS | | | |
| Labour | 67,506 | 298 | 10 |
| Power and machinery | 86,492 | 382 | 13 |
| Overheads | 32,404 | 143 | 5 |
| Depreciation | 70,250 | 311 | 10 |
| Rent and finance | 27,926 | 123 | 4 |
| | <u>284,578</u> | <u>1,258</u> | <u>42</u> |
| FARM PROFIT | <u>91,236</u> | <u>403</u> | <u>14</u> |
| No. of farms in sample | 11 | | |
| Average farm size (ha) | 226 | | |
| No. of dairy cows | 229 | | |
| Output yield per dairy cow (lt) | 7,678 | | |
| Revenue value (ppl) | 29.31 | | |

Scotland - Specialist Cereal Farms

| | | Upper 25% | |
|-------------------------|----------------|--------------|------------|
| | £/farm | £/adj. ha | % output |
| OUTPUT | | | |
| Livestock | 4,448 | 31 | 2 |
| Crops | 156,922 | 1,079 | 71 |
| Subsidies | 30,669 | 211 | 14 |
| Diversification surplus | 9,497 | 65 | 4 |
| Other | 19,147 | 132 | 9 |
| | <u>220,683</u> | <u>1,518</u> | <u>100</u> |
| VARIABLE COSTS | | | |
| Livestock expenses | 1,915 | 13 | 1 |
| Crop expenses | 56,399 | 388 | 26 |
| | <u>58,314</u> | <u>401</u> | <u>26</u> |
| GROSS MARGIN | <u>162,369</u> | <u>1,117</u> | <u>74</u> |
| FIXED COSTS | | | |
| Labour | 2,826 | 19 | 1 |
| Power and machinery | 31,503 | 217 | 14 |
| Overheads | 20,623 | 142 | 9 |
| Depreciation | 33,753 | 232 | 15 |
| Rent and finance | 3,408 | 23 | 2 |
| | <u>92,113</u> | <u>634</u> | <u>41</u> |
| FARM PROFIT | <u>70,256</u> | <u>483</u> | <u>33</u> |
| No. of farms in sample | 16 | | |
| Average farm size (ha) | 145 | | |
| Cereals (ha) | 104 | | |

Scotland - General Cropping Farms

| | £/farm | All sizes £/adj. ha | % output |
|-------------------------|----------------|------------------------|------------|
| OUTPUT | | | |
| Livestock | 0 | 0 | 0 |
| Crops | 220,153 | 1,373 | 74 |
| Subsidies | 33,286 | 208 | 11 |
| Diversification surplus | 13,791 | 86 | 5 |
| Other | 30,615 | 191 | 10 |
| | <u>297,845</u> | <u>1,857</u> | <u>100</u> |
| VARIABLE COSTS | | | |
| Livestock expenses | 0 | 0 | 0 |
| Crop expenses | 70,364 | 439 | 24 |
| | <u>70,364</u> | <u>439</u> | <u>24</u> |
| GROSS MARGIN | | | |
| | <u>227,481</u> | <u>1,418</u> | <u>76</u> |
| FIXED COSTS | | | |
| Labour | 3,111 | 19 | 1 |
| Power and machinery | 52,639 | 328 | 18 |
| Overheads | 29,157 | 182 | 10 |
| Depreciation | 40,185 | 251 | 13 |
| Rent and finance | 8,718 | 54 | 3 |
| | <u>133,810</u> | <u>834</u> | <u>45</u> |
| FARM PROFIT | | | |
| | <u>93,671</u> | <u>584</u> | <u>31</u> |
| No. of farms in sample | 6 | | |
| Average farm size (ha) | 160 | | |
| Cereals (ha) | 83 | | |
| Potatoes (ha) | 9 | | |
| Other crops (ha) | 7 | | |

Scotland - Mixed Farms

| | | Upper 25% | |
|-------------------------|----------------|--------------|------------|
| | £/farm | £/adj. ha | % output |
| OUTPUT | | | |
| Livestock | 95,856 | 688 | 43 |
| Crops | 75,062 | 539 | 34 |
| Subsidies | 34,695 | 249 | 16 |
| Diversification surplus | 6,040 | 43 | 3 |
| Other | 10,495 | 75 | 5 |
| | <u>222,148</u> | <u>1,595</u> | <u>100</u> |
| VARIABLE COSTS | | | |
| Livestock expenses | 43,806 | 314 | 20 |
| Crop expenses | 37,270 | 268 | 17 |
| | <u>81,076</u> | <u>582</u> | <u>36</u> |
| GROSS MARGIN | <u>141,072</u> | <u>1,013</u> | <u>64</u> |
| FIXED COSTS | | | |
| Labour | 8,050 | 58 | 4 |
| Power and machinery | 27,758 | 199 | 12 |
| Overheads | 20,187 | 145 | 9 |
| Depreciation | 29,818 | 214 | 13 |
| Rent and finance | 6,355 | 46 | 3 |
| | <u>92,168</u> | <u>662</u> | <u>41</u> |
| FARM PROFIT | <u>48,904</u> | <u>351</u> | <u>23</u> |
| No. of farms in sample | 23 | | |
| Average farm size (ha) | 139 | | |
| No. of ewes | 119 | | |
| No. of breeding cows | 38 | | |
| No. of other cattle | 125 | | |
| Cereals (ha) | 47 | | |

Rural Aid Schemes

Introduction

Following the UK's departure from the EU, support schemes will be funded by the UK Government rather than being funded by the EU. The UK Government has pledged to keep subsidies at the same level until 2022 or the end of the current parliament if this comes sooner.

Over the next few years, UK administrations will implement transition periods whereby current direct payments will be phased out and new policies and support frameworks are put in place. The Agriculture Bill will provide the legislative framework for replacing agricultural support schemes in England, with some provisions applying to Wales and Northern Ireland; Scotland has introduced its own legislation. The following sections provide an overview of the current schemes for each UK administration, with an indication of potential changes for the future. Relevant government websites should be viewed for more detailed information and up-to-date guidance.

Scotland

As part of the eligibility for some rural aid schemes livestock units are used by the Scottish Government to calculate stocking densities, these are as follows:

| Type of stock | Livestock units (per head) |
|---|----------------------------|
| Beef cows (including suckling calves) | 1.0 |
| Dairy cows used for milk production | 1.0 |
| Other cattle (24 months and over) | 1.0 |
| Other cattle (6-24 months) | 0.6 |
| Ewes and gimmers (including suckling lambs) | 0.15 |
| Ewe hogs | 0.15 |
| Other sheep | 0.15 |
| Goats (over 6 months old) | 0.15 |
| Alpacas (over 6 months old) | 0.30 |
| Farmed deer - stags (over 27 months) | 0.40 |
| Farmed deer - hinds, including suckling calves (over 27 months) | 0.30 |
| Farmed deer - juveniles (6-27 months) | 0.20 |

The calculations of stocking densities using these figures should be carried out with the same methodology as is detailed on page 118.

Single Application Form

The Single Application Form (SAF) is the form that must be completed in order to claim payments under the following schemes:

- Basic Payment Scheme, including Greening and Young Farmer payments
- Scottish Suckler Beef Support Scheme (Mainland and Islands)
- Scottish Upland Sheep Support Scheme
- Less Favoured Area Support Scheme (LFASS)

- Agri-Environment Climate Scheme – annual recurrent options
- Forestry Grant Scheme – annual maintenance and management grants
- Beef Efficiency Scheme
- Rural Development Contracts – Rural Priorities annual recurrent options

The SAF can be submitted online via Rural Payments and Services or by submitting a signed paper application to the local RPID area office. The deadline for submitting applications is 15 May each year.

The SAF is a declaration of all the permanent and seasonal agricultural and non-agricultural land parcels farmed. Information declared includes:

- Areas of crops grown, on an individual land parcel basis, used to claim the Basic Payment Scheme and LFASS.
- EFA options and areas used to meet greening requirements.
- Agri-Environment Climate Scheme, Forestry Grant Scheme and Rural Development Contracts options and areas.
- Livestock numbers on the holding on 1 March.

Within the SAF, there is also the option to claim for Young Farmer Payment, LFASS, National Reserve and the Beef Efficiency Scheme.

The Scottish Government introduced legislation in November 2019 which proposes to keep farm support approaches broadly the same until 2024 i.e. during their transition period. Within this period, they have however proposed to streamline the process of applying for payments and will also be operating some Pilot schemes.

Direct Payments

Direct Payment schemes implemented in Scotland in the 2021 scheme year include the Basic Payment Scheme (BPS), Young Farmer Scheme, National Reserve and Voluntary Coupled Support (i.e. Scottish Suckler Beef Support Scheme (Mainland and Islands) and Scottish Upland Sheep Support Scheme).

Basic Payment Scheme

To take part in the BPS and receive funding farmers and crofters need to:

- Be an active farmer and be involved in agricultural activity.
- Hold BPS entitlements.
- Submit a claim via a Single Application Form (SAF).
- Farm a minimum of three hectares of eligible land and have this land at their disposal on 15 May of the claim year.
- Have one eligible hectare of land for each BPS entitlement.
- Comply with Greening and a range of Statutory Management Requirements (SMRs) and standards on Good Agricultural and Environmental Condition (GAEC) i.e. Cross Compliance.
- Keep comprehensive, accurate, and up-to-date records.

Active farming

Applicants to the BPS must meet the definition of a ‘farmer’ i.e. be a natural or legal person (or a group of natural or legal persons) whose holding (production units) are situated within Scotland. They must also exercise an agricultural activity, for example the production, rearing or growing of agricultural products including harvesting, milking, breeding animals and keeping animals for farming purposes.

If the farmer or crofter has land that is naturally kept in a state suitable for cultivation and grazing there are rules on exercising a minimum activity which must also be met, see page 493.

Entitlements

Based on the areas of eligible land claimed on the 2015 SAF, BPS Regions 1, 2 and 3 entitlements were allocated to eligible farmers and crofters. For Payment Regions 2 and 3 farmers were allocated 10% fewer entitlements than the area of land declared, this is due to a reduction co-efficient having been applied. Further information about the Payment Regions can be found in the following section.

All BPS entitlements must be used in at least one year out of two.

Eligible New Entrants to farming can apply to the National Reserve for entitlements; other farmers and crofters can obtain entitlements by purchasing, leasing, inheriting them or due to whole holding transfers, business splits or mergers. Entitlements can be transferred by sale or lease, with or without land to another active farmer.

Payment regions and rates

Land parcels in Scotland are allocated to one of three payment regions:

| Payment Region | Land use category |
|-----------------------|---|
| 1 | Arable, temporary and permanent grass |
| 2 | Rough grazing designated as LFA grazing category B, C or D and non-LFA rough grazing land |
| 3 | Rough grazing designated as LFA grazing category A |

Farmers and crofters receive the same Basic Payment (BP) entitlement value per payment region.

The Greening payment rates remain the same for all farmers and crofters depending on the payment region.

The actual entitlement value for each year will be worked out once the total number of hectares of eligible land claimed for in each payment region is known and the overall budget for that period will be divided up according to the hectares claimed. Estimated payment rates for 2020 are shown in the following table.

| Payment Region | 2020 BPS rate (€/ha) | 2020 Greening rate (€/ha) | 2020 Combined rate (£/ha)* |
|----------------|----------------------|---------------------------|----------------------------|
| 1 | 163.75 | 84.61 | 221.27 |
| 2 | 35.99 | 14.29 | 44.79 |
| 3 | 10.41 | 4.77 | 13.52 |

* based on euro/sterling exchange rate of €1 = £0.89

2021 BPS and greening payments will be made in sterling.

Minimum activity

The minimum agricultural activities farmers or crofters must undertake to make the land eligible for the BPS is related to the Payment Region(s) applicable to the land, as follows:

Payment Region 1:

- Where agricultural production activities are undertaken these can include the production, rearing or growing of agricultural products including harvesting, milking, breeding animals and keeping animals for farming purposes.
- Where no agricultural production activities are undertaken, the land must be maintained in a state suitable for grazing or cultivation, i.e. take action to control injurious weeds and maintain access for livestock or machinery. On permanent grassland, demonstrate the maintenance of existing stock-proof boundaries and water sources for livestock; whilst on arable land, take action to prevent encroachment of scrub.

Payment Regions 2 and 3:

- The normal minimum agricultural activity is to undertake an average level of stocking of 0.05LU/ha on all hectares for 183 days in each scheme year, or where justified, a lower minimum stocking density, in terms of numbers or period, that is in line with the carrying capacity of the land or as a result of an environmental management agreement may be acceptable.
- As an alternative to minimum stocking levels, an annual Environmental Assessment can be carried out.

Capping

Capping is the reduction of payments above a certain level. All Basic Payment Scheme and Voluntary Coupled Support Scheme payments are capped at €600,000; payments over €150,000 will be reduced by 5%.

The Scottish Government has the option to make amendments to capping and are considering making changes during the transition period.

Greening

Permanent grassland - the area of permanent grassland must be maintained, i.e. the ratio of permanent grassland compared to the total agricultural area declared must not decrease by more than 5%; this is managed at a national level. At the individual farm level, Environmentally Sensitive Grassland Areas must not be converted to arable production. Applicants must prepare a Nitrogen Fertiliser and Lime Plan detailing how much inorganic nitrogen fertiliser and lime that is intended to be applied to land parcels that contain permanent grassland (PGRS) or open grazed woodland (WDG). Parcels that also contain areas of arable and/or rough grazing do not need to be included. The plan must be prepared by 9 June each year, retained on the farm and made available on request to any inspector as part of the land inspection or validation of the SAF.

Ecological Focus Areas (EFAs) - businesses with more than 15 hectares of arable land which do not qualify for an exemption need to ensure that 5% of this land is managed as EFA. Exemptions are as follows:

- Land certified as organic or in organic conversion.
- Businesses where more than 75% of the arable land is used to grow temporary grass, herbaceous forage, leguminous crops, or fallow.
- Businesses where more than 75% of eligible agricultural area is permanent or temporary grass or herbaceous forage.

There are seven EFA options that can be used in Scotland to contribute to farmer's or crofter's EFA commitments. Each option must be located on, adjacent to, or within five metres of arable land and are weighted according to the level of environmental benefit they deliver, see the following table.

| EFA option | Location | Weighting factor | EFA area |
|-------------------------------------|-----------------|---|---------------------|
| Fallow land | (/ha) | On arable land | 1 1ha |
| | | On, adjacent to, or within 5m of arable land | 1.5 1.5ha |
| Margins | (/ha) | or contiguous to a claimed EFA option | |
| Nitrogen-fixing crops | (/ha) | On arable land | 0.7 0.7ha |
| Catch crop | (/ha) | On arable land | 0.3 0.3ha |
| Green cover | (/ha) | On arable land | 0.3 0.3ha |
| Agro-forestry land | (/ha) | Eligible land | 1 1ha |
| Hedges – right to claim whole hedge | (/1m) | On, adjacent to or within 5m of arable land or contiguous to a claimed EFA option | 10 10m ² |
| Hedges – right to claim half hedge | (/1m) | On, adjacent to or within 5m of arable land or contiguous to a claimed EFA option | 5 5m ² |

Full details on Scottish greening measures and requirements can be found at the following webpage: <https://www.ruralpayments.org/topics/all-schemes/basic-payment-scheme/>

Young Farmer Payment

For the 2021 scheme year, young farmers are entitled to a top-up payment of 25% of the average value of BP entitlements.

To qualify the applicant must be:

- A sole trader or head of the farm business and be less than 41 years of age on 31 December of the first year they apply to the BPS. For businesses where the young farmer is head of the business, this means that the applicant is the main shareholder/partner in the business, takes the majority share of any profits and makes the key business decisions.

The Young Farmer payment is applied for on the SAF and evidence of eligibility also needs to be submitted i.e. date of birth, % share of business profits. The payment is limited to 90 hectares.

National Reserve

The National Reserve is used to allocate BPS entitlements to eligible:

- Young farmers - farmers or crofters who are less than 41 years of age on 31 December in the year of application and are setting up for the first time an agricultural holding as head of the holding.
- New entrants - farmers or crofters who started their farming activity in 2013 or later, who have not had any agricultural activity in their own name or at their own risk in the five years before the start of their current farming action.

There is no paper application for the National Reserve; applications are completed online at the same time as the SAF. Successful applicants to the National Reserve in 2015, or subsequent years, were not able to apply for any more BPS entitlements from the 2021 National Reserve.

BPS entitlements awarded from the National Reserve must, over a two-year period, be used in at least one year.

Voluntary Coupled Support (VCS)

The Scottish Government use coupled payments to support the beef and sheep sectors. To claim for coupled payments applicants must complete a SAF each year; the Main Location Code used in the coupled payments claim forms must be the same as the one on the SAF.

Scottish Suckler Beef Support Scheme - Mainland and Islands (SSBSS)

Payments are made on owned or leased homebred calves that are at least 75% beef bred. The calves must be born on or after 2 December in the year before the claim is made and remain on the holding of birth for at least 30 days. The payment rates for the 2020 scheme year were as follows:

| | £/calf | |
|------|-----------------|----------------|
| | Mainland | Islands |
| 2020 | 100.72 | 145.13 |

Claims can be made online or by post until 31 December each year.

Scottish Upland Sheep Support Scheme (SUSSS)

To qualify for the scheme, 80% or more of the agricultural land must be in Payment Region 3 and less than 200ha of the agricultural land must be in Payment Region 1. Payments are made on homebred ewe hoggs that are retained on the holding (including away wintering) from 17 October in the year claimed to 31 March the following year. Ewe hoggs must be less than 12 months old at the start of the retention period. The payment rate for the 2020 scheme year was as follows:

| | £/hogg |
|-------|---------------|
| 2020* | 62.00 |

* based on euro/sterling exchange rate of 0.89

Claims can be made online or by post between 1 September and 16 October each year.

Rural Development Programme

The Scottish Rural Development Programme (SRDP) will continue to be used to enhance the rural economy, support agricultural businesses, protect and improve the natural environment, address the impact of climate change, and support rural communities.

Current schemes under the SRDP are detailed in the following pages. Full details of the schemes, including further information on payments rates and application deadlines can be found at: <https://www.ruralpayments.org/topics/all-schemes/>

Less Favoured Area Support Scheme (LFASS)

This scheme provides essential support to fragile farming businesses in remote and constrained rural areas. Payment rates for the 2020 scheme year were 40% of the 2018 payment rates. When payment rates are reduced to 40%, one rate (of £13.64) falls below €25/hectare. To meet the Rural Development Regulation minimum payment rate, this was increased to £20.83 (€25). Convergence money was used to top up the 2020 payment so that it was back up to 2018 levels. It is unlikely that there will be any changes to how the 2021 LFASS payment is paid in 2022.

LFASS is an area-based scheme claimed for on the SAF at the same time as claiming for the BPS and is paid to applicants who actively farm forage land in the LFA area which has been given a grazing category. The main eligibility criteria include:

- Declaring at least three hectares of eligible land on the SAF.
- Actively farming land declared on the SAF for at least 183 days or periods totalling 183 days in the year of claim. To count as forage this land must be available and accessible for use for maintaining livestock or producing a forage crop for at least seven months including 15 May.

The LFASS payment is calculated by adjusting the eligible (claimed) land from the SAF to work out a payable area. This payable area is then multiplied by the payment rate(s) for farmers and crofters fragility area.

Grazing categories are set based on historical stocking densities for the land being claimed and are fixed. The categories are:

| Category | Stocking density (LU/ha) | Hectare value | Minimum stocking density (LU/ha) | Maximum stocking density (LU/ha) |
|----------|--------------------------|---------------|----------------------------------|----------------------------------|
| A | up to 0.19 | 0.167 | 0.09 | 1.4 |
| B | 0.20 - 0.39 | 0.333 | 0.15 | 1.4 |
| C | 0.40 - 0.59 | 0.667 | 0.30 | 1.4 |
| D | 0.60 or more | 0.800 | 0.45 | 1.4 |

An enterprise mix multiplier is used as a way of recognising the environmental benefits of a mixed stocking regime. Hectares claimed are multiplied by 1.35 if at least 10% but less than 50% of livestock units are cattle or 1.7 if 50% or more of livestock units are cattle. This multiplier rate also remains fixed.

LFASS payment rates are designated based on land category as well as grazing categories. Provisional rates for 2021 are shown in the following table:

| Land category | Standard ¹ | Fragile ² | Very fragile ³ |
|--|----------------------------------|----------------------|---------------------------|
| | payment per adjusted hectare (£) | | |
| More disadvantaged land (grazing categories A and B) | 52.16 | 62.10 | 71.35 |
| Less disadvantaged land (grazing categories C and D) | 34.12 | 54.51 | 63.00 |

¹ Standard areas on the mainland with lower transport costs

² Fragile areas on the mainland where there is disadvantage resulting from higher transport costs

³ Very fragile areas on islands

An example calculation is shown below for illustrative purposes.

Assumptions:

- Farm in Standard area
- Less disadvantaged land, grazing category D

- 600ha eligible land declared on SAF
- Historic stocking density 0.5 LU/ha, 100% cattle

| | | |
|------------------------------------|---|------------|
| eligible hectares from SAF | | 600 ha |
| x hectare value for Cat D | x | 0.80 |
| = adjusted hectares | = | 480 ha |
| x the enterprise uplift | x | 1.7 |
| = payable hectares | = | 816 ha |
| x standard less disadvantaged rate | x | 34.12 |
| = final payment pre deductions | = | £26,242.56 |

For further detail see full scheme guidance at:

<https://www.ruralpayments.org/topics/all-schemes/lfass/>

Agri-Environment Climate Scheme

The 2021 application round was restricted to organic conversion, organic maintenance, management of designated sites, management for priority bird species out with designated sites i.e., corncrakes, corn bunting, farmland waders from established grassland wader projects and improving public access.

Details of the Management and Capital options and payment rates can be found at:

<https://www.ruralpayments.org/topics/all-schemes/agri-environment-climate-scheme/management-options-and-capital-items/>

Sustainable Agriculture Capital Grant Scheme (SACGS)

A new pilot scheme was available to farmers and crofters for a five-week period during the early autumn of 2020. The scheme offered funding of up to £20,000 for the purchase of specific items of agricultural equipment to support the reduction of Greenhouse Gas (GHG) emissions. It is expected that there will be further pilot schemes similar to the SACGS.

Forestry Grant Scheme (FGS)

Funding is available for woodland creation, agroforestry, tree health, woodland improvement, sustainable management of forests, harvesting, and processing of forest products, forest infrastructure and co-operation (see Forestry and Farm Woodlands section on page 325 for more details).

Crofting Agricultural Grant Scheme

This scheme provides grants for crofters to make improvements to their crofts and help to sustain their businesses. Funds can be used for capital projects, such as the construction or improvement of agricultural buildings and for the establishment of Common Grazings Committees. Funding for eligible capital projects can cover all aspects of the project, including the cost of materials, transportation of materials, costs of contractors and own labour. See pages 278-279 for more detail.

Croft House Grant Scheme

This scheme provides grants for crofters to improve and maintain the standards of crofter housing, with the aim of attracting and retaining people within the crofting areas of Scotland. Funding can be used for the construction of a new house and the rebuilding and improvement of an existing house. See pages 279-281 for more detail.

Small Farms Support Scheme

This scheme provides support to eligible farmers or crofters for investments related to development, modernisation or adaptation of small farms, i.e. holdings that have between 3 and 30ha of eligible agricultural area. Funds can be used to erect or improve agricultural buildings, provision of slurry stores, field drainage, handling facilities, shelter belts, electrical equipment and for access. See page 279 for more detail.

Food Processing, Marketing and Co-operation Scheme

This scheme provides grant support to suppliers and producers to contribute to the government's overall vision for food and drink in Scotland, which is to be a Good Food Nation. Through this scheme, applicants can apply for start-up grants for a new food processing business or development grants for an existing food processing business. Capital projects include the development and creation of food processing facilities, including buildings and equipment; and non-capital projects include marketing, running of co-operative ventures and improving supply-chain efficiency.

SRDP Farm Advisory Service

The Farm Advisory Service (FAS) provides one-to-one and one-to-many advice and support, aimed at increasing the profitability and sustainability of farms and crofts.

The one-to-one component comprises of:

- Integrated land Management Plans (ILMPs) and specialist advice
- Mentoring of new entrants
- Carbon audits

Funding of 80% (up to a maximum of £1,200) is available to help cover the costs of the preparation of an ILMP. Additional funds of up to £2,000 are also available for two specialist advice plans and up to £500 for the preparation of a carbon audit.

The one-to-many component of the FAS delivers innovative and integrated advice to crofters and farmers via:

- Scotland wide events i.e. workshops, network farm meetings, conferences and training courses.
- Publications i.e. technical notes, newsletters.
- Crofts and small farms subscription service.
- A national advice line which operates between 9am and 5pm Monday to Friday (Tel: 0300 323 0161).

Women in Agriculture

The Scottish Government has committed £300,000 per year for three years to support women by implementing the recommendations of the Women in Agriculture Taskforce. The recommendations, contained in the Final Report of the Women in Agriculture Taskforce, are a series of practical actions to bring about cultural change within the agricultural industry. Women in Scottish agriculture can access financial support directly for practical skills training, by applying to the Women in Agriculture Practical Training Fund administered by Lantra. Further information can be found at: <https://www.scotland.lantra.co.uk/women-agriculture-practical-training-fund>

LEADER

LEADER supports multi-sectoral community-based development. It helps individuals, communities and businesses to come together to design and implement Local Development Strategies. These strategies include actions focussed on climate change, enhancement of rural services and facilities (including transport initiatives), enhancement of natural/cultural heritage, tourism and leisure, and food and drink initiatives (for example, short supply chains, community food). The funding is focussed on objectives specific to local areas as set out in a Local Action Group strategy. It is expected that another round of LEADER funding will be available.

England

Direct Payments

Direct Payment Schemes implemented in the 2021 scheme year in England include the Basic Payment Scheme (BPS), Young Farmer Scheme and the National Reserve.

From 2021 BPS funding will be phased out over a seven-year transition period, with payments being reduced progressively. Reductions over the next four years are shown in the table below.

| Payment Band | 2021 | 2022 | 2023 | 2024 |
|---------------------|-------------|-------------|-------------|-------------|
| Up to £30,000 | 5% | 20% | 35% | 50% |
| £30,000 - £50,000 | 10% | 25% | 40% | 55% |
| £50,000 - £150,000 | 20% | 35% | 50% | 65% |
| More than £150,000 | 25% | 40% | 55% | 70% |

Funds from the reduced payments will be invested back into new schemes to support farming and the countryside, such as the Countryside Stewardship Scheme.

The current system will be replaced by Environment Land Management (ELM) schemes, which will be available from 2024. The new ELM scheme will be developed and tested through a three-year national pilot scheme starting in 2021.

Basic Payment Scheme

To apply to the BPS and receive funding eligible farmers need to:

- Submit a BPS application either online using the Rural Payments service or on paper using a BP5 application form by 15 May. Supporting documentation can be submitted until 11 June.
- Have at least five hectares of eligible land at their disposal on 15 May of the claim year.
- Declare one eligible hectare of land for each BPS entitlement.
- Qualify as an 'active farmer'.
- Follow Cross Compliance rules.

Entitlements

From 2021 onwards there is no longer the need for entitlements to be used once every two years, therefore there is not the need to sell or lease entitlements out to avoid losing them. Entitlements can be transferred by sale or gift, by lease or sub lease, through inheritance or as part of a business merger or split. New and young farmers who do not have BPS entitlements can apply to the National Reserve for new entitlements or lease or purchase entitlements.

Payment regions and rates

England has three payment regions:

| Payment Region | Land use category |
|-----------------------|--|
| 1 | Non-Severely Disadvantaged Area (NSDA) |
| 2 | Severely Disadvantaged Area (SDA) |
| 3 | SDA Moorland |

English Basic Payment (BP) entitlement values for 2020 are illustrated below; actual payment rates for 2021 will be worked out once the total number of hectares of eligible land claimed for in each region is known. 2021 BPS payments will be made in sterling.

| Payment Region | BPS (€/ha) | Greening (€/ha) | Total Entitlement Payment (€/ha) | Payment (£/ha)* |
|-----------------------|-------------------|------------------------|---|------------------------|
| 1 | 182.70 | 79.07 | 261.77 | 233.22 |
| 2 | 181.34 | 78.58 | 259.92 | 231.57 |
| 3 | 49.76 | 22.02 | 71.78 | 63.95 |

* based on euro/sterling exchange rate of €1 = £0.89

Activity

To be eligible for the BPS farmers must undertake at least one of the following on their holding:

- Produce, rear, or grow agricultural products – including harvesting, milking, breeding animals and keeping animals for farming purposes.
- Keep some land in a state suitable for grazing or cultivation by keeping it clear of any scrub that cannot be grazed.

Greening

From the 2021 scheme year the greening requirements, crop diversification, Ecological Focus Areas and the permanent grassland rules for the BPS will be removed. The greening money will be added to BPS entitlements to become part of the main BPS payment.

As in previous years, you must not plough or convert permanent grassland if it is in a Natura 2000 site. For any other permanent grassland, you must get a screening decision from Natural England before you plough up or improve land which hasn't been cultivated for 15 years, or which is uncultivated or semi-natural grassland (or another semi-natural area). If you are in a Countryside Stewardship (CS) or Environmental Stewardship (ES) agreement you will also have to meet the rules for permanent grassland for those schemes

Young Farmer Scheme

Young farmers can apply for a top-up payment, equivalent to 17.5% of their entitlement values, limited to 90 hectares. To qualify for the payment, young farmers need to show that they:

- Are at least 18 years of age when they make their BPS application but not older than 40 years of age when the first successful BPS application was made.
- Are in 'control' of the farm business that is applying for the BPS.
- Set up or took 'control' of their business for the first time during the five years preceding their first BPS application.

Young farmers can apply for the payment each year via their BPS application, for a maximum of five years starting from the year in which they first claimed the Young Farmer Payment, provided that the first application was made within five years of them starting or taking control of their business.

To qualify as in 'control' of the farm business, the young farmers must have more than 50% of the shares and votes in the business.

National Reserve

The National Reserve will be used to allocate BPS entitlements to eligible:

- Young farmers - defined under the Young Farmer Scheme.
- New farmers - farmers who started an agricultural activity in 2013 or later and have not carried out or been in control of carrying out

'agricultural activity' in the five years before the start of their current activity. In addition, new farmers need to show that they are at least 18 years old when they make their BPS application and are in 'control' of the business.

Further details of the Basic Payment Scheme, including Young Farmer Scheme and the National Reserve can be found at:

<https://www.gov.uk/guidance/basic-payment-scheme-rules-for-2021>

Rural Development Programme

The Rural Development Programme for England (RDPE) will continue to provide funding for communities, businesses and people across the country to support the Programme's economic and environmental priorities.

A summary of Countryside Stewardship is included below, further details of this scheme can be found at:

<https://www.gov.uk/environment/countryside-stewardship>

Countryside Stewardship

The Countryside Stewardship provides income to farmers and land managers who deliver environmental benefits on their land, including habitats for wildlife, pollinator plots and increased biodiversity.

Mid-Tier

The Mid-Tier provides funding for a range of options and capital items that will deliver a broad range of environmental benefits, for example protect and enhance the natural environment in particular, the diversity of wildlife and water quality.

Higher Tier

The Higher Tier provides funding for more complex land in environmentally significant sites, commons or woodlands which requires support from Natural England or the Forestry Commission.

Wildlife Offers

Wildlife Offers provide a simpler set of options to help improve wildlife on applicant's farms. Offers are split into different packages depending on farm types - arable, lowland grazing, upland, and mixed farming. The scheme is non-competitive and is designed to help guide farmers to the most straightforward options for their farm type.

Woodland Creation and Maintenance

The Woodland Creation and Maintenance grant is made up of a capital grant under which applicants can apply for support to create a woodland within the first two years, followed by a maintenance grant to maintain it for the following 10 years.

Capital Grants

The Countryside Stewardship Capital Grants brings the Water Quality and Hedgerows, and Boundaries grants together. Capital items covers boundaries, trees and orchards, water quality and air quality.

Hedgerows and Boundaries

This capital grant provides funds for farmers to restore existing farm boundaries and hedgerows on their land.

Facilitation Fund

This fund supports individuals and organisations working with local groups of farmers and land managers, to co-ordinate their environmental land management.

The Environmental Land Management system (ELMs) will also replace Countryside Stewardship funding. Applicants who have signed up to Countryside Stewardship funding who secure a place in ELM pilots from 2021 or wish to enter the scheme when it is fully rolled out from 2024, will be able to leave their agreements at agreed exit points, without penalty.

Wales

Direct Payments

Direct Payment schemes implemented in Wales for the 2021 scheme year are the Basic Payment Scheme (BPS), Redistributive Payment Scheme, Young Farmer Scheme and the National Reserve.

For the 2021 scheme year the BPS will continue unchanged. After 2021, in a multi-year transition, the BPS will be replaced by a new Sustainable Farming Scheme, whereby farmers will be paid to deliver environmental outcomes, such as reversing biodiversity decline, meeting carbon budgets, and hitting clean air targets.

Basic Payment Scheme

To apply to the BPS and receive funding farmers need to:

- Submit an on-line Single Application Form before the 15 May deadline; BPS supporting documents must be submitted by the 31 December 2021.
- Have at least five hectares of eligible land at their disposal on 15 May of the claim year.
- Have one eligible hectare of land for each BPS entitlement.
- Be an 'active farmer'.
- Follow Cross Compliance rules.

Entitlements

BPS entitlements can be transferred by sale or lease but only to another 'active' farmer. All BPS entitlements must be used in at least one year out of two.

New entrants and young farmers who do not have BPS entitlements are able to apply to the National Reserve, or lease, or purchase entitlements.

Payment regions and rates

Wales has a single payment region. Indicative BPS payments for 2021 are as follows:

| Payment Region | Land use category | Estimated Payment (£/ha)* |
|-----------------------|--------------------------|----------------------------------|
| 1 | n/a - single region | |
| | first 54ha | 159.18 |
| | over 54ha | 67.21 |

Activity

To be eligible for the BPS farmers must exercise agricultural activity by one or more of the following:

- Producing, rearing or growing agricultural products including harvesting, milking, breeding animals and keeping animals for farming purposes.
- Maintain an agricultural area in a state which makes it suitable for grazing or cultivation without preparatory action going beyond usual agricultural methods and machineries i.e., control of non-native invasive weeds and scrub.
- Carry out 'minimum activity' in areas that are 'naturally' kept in a suitable state for grazing or cultivation i.e., on saltmarsh and coastal sand dunes either adhere to an average annual stocking density of 0.01-0.05 LU/ha or control non-native invasive weeds and scrub.

If applicants do not declare livestock, arable crops or permanent crops on their SAF, supporting documentation e.g. animal movement records, invoices for hedge cutting, hedge laying or maintenance, or silage contracts must be submitted to prove they meet the requirements above and are carrying out an agricultural activity

Capping

BPS payments are capped as illustrated in the table below:

| Annual BPS payment (€) | Capping (%) |
|-------------------------------|--------------------|
| 150,000 - 200,000 | 15 |
| 200,000 - 250,000 | 30 |
| 250,000 - 300,000 | 55 |
| 300,000 + | 100 |

Greening payments and payments under the Young Farmers Scheme will not be subject to capping. Wage related costs will not be deducted prior to calculating the deduction.

Greening

From 2021 the Greening requirement has been removed. The Greening budget has been moved into the BPS entitlement budget and the

entitlement values will be increased to take account of the change in budget. Environmentally Sensitive Permanent Grass (ESPG) is now protected as part of Cross Compliance.

Redistributive Payment

A 'top-up' payment covering the first 54 hectares is made to eligible farmers.

Young Farmer Scheme

Qualifying young farmers receive a Young Farmer payment on up to 25 hectares. The payment is available to sole traders and members of partnerships or limited companies who are no more than 40 years of age in the first year they applied to the BPS and:

- Are setting up for the first time as head of the holding, or
- Have taken control (i.e. set up a new business or taken over an existing business) of a Partnership or Limited Company during the five years before submitting their first BPS application.

National Reserve

The National Reserve is available to ensure new entrants to agriculture and young farmers receive entitlements.

To qualify as a New Entrant, farmers:

- Cannot have had any agricultural activity in their own name or at their own risk in the five years before the start of their current agricultural activity.
- Must have started their current agricultural activity in 2019 or a later year.

To qualify as a Young Farmer, farmers must be:

- 40 years of age or less in 2021 (and at least 18 years old for partnerships or sole traders or 16 years old for a Limited Company).
- Setting up for the first time as head of holding or have control of a Partnership or Limited Company for the first time on 1 January 2015 or later. This could be setting up a new business or taking over an existing business.

Full details of Pillar I schemes can be found at:

<https://gov.wales/single-application-form-saf-2021-rules-booklet>

Rural Development Programme

The Welsh Government Rural Communities - Rural Development Programme will continue to focus on: Competitiveness (on farm and through the supply-chain), the Environment (agri-environmental work, woodland, renewable energy) and communities.

Summaries of Glastir, Sustainable Production Grant, Farm Business Grant and Co-operation, Supply Chain Development Scheme are included below, further details of these schemes, including details of other schemes can be found at: <https://gov.wales/rural-grants-payments>

Glastir

Glastir is the Welsh Government's main sustainable land management scheme and includes provisions for capital works supporting sustainable uplands, woodland management, creation and restoration, hedgerow planting, targeted environmental intervention, organic conversion and maintenance, and effective engagement with land managers. Schemes include Woodland Creation, Woodland Restoration, Small Grants Carbon, Small Grants Landscape and Pollinators.

Sustainable Production

The Sustainable Production Grant Financial provides a maximum 40% contribution towards capital investments in equipment and machinery that have been pre-identified to support farmers to address nutrient management and safeguarding and improving water, soil and air quality by reducing pollution. The maximum grant award is £50,000.

Farm Business Grant

The Farm Business Grant (FBG) helps farmers to improve the economic and environmental performance of their agricultural holdings. Up to a maximum of £12,000 per business is available towards capital investments in equipment and machinery that have been identified as having clear and quantifiable benefits to the farm business.

Co-operation and Supply Chain Development Scheme

There are two schemes, a food COVID-19 recovery plan, and pilot action for green growth and circular economy. The COVID-19 recovery plan offers support to the food and drinks sector during the COVID-19 recovery phase and under-represented industries aiming to utilise the natural harvest. The green growth and circular economy scheme provides support for the re-purposing of community cohesion activities through fostering innovation, pilot activities, optimising digitalisation.

Rural Business Investment

The two schemes, a Non Agri and a food scheme offer support for the creation and development of non-agricultural micro and small enterprises and will contribute to the overarching Food Strategy Action Plan - Towards Sustainable Growth

Northern Ireland

Direct Payments

Direct Payments implemented in Northern Ireland for the 2021 scheme year are the Basic Payment Scheme (BPS), Young Farmer Scheme, National Reserve and the Protein Crops Scheme.

The current support system is expected to continue until 2022, after this time it will be progressively phased out and replaced with environmental based land management schemes.

Basic Payment Scheme

To take part in the BPS and receive funding farmers need to:

- Submit a BPS application via the online Single Application and Maps Service before 15 May deadline.
- Have at least three hectares of eligible land at their disposal on 15 May of the claim year.
- Have one eligible hectare of land for each BPS entitlement.
- Be an 'active farmer'.
- Follow Cross Compliance rules.

Entitlements

BPS entitlements must be activated in at least one year out of two.

BPS entitlements can be transferred between farmers by sale, gift, lease, inheritance or from the result of a business merger or split.

Payment regions and rates

A single region Pillar I support model is implemented in Northern Ireland. All BPS entitlements will converge towards a regional average entitlement value in equal steps, achieving a flat rate payment by 2021. Indicative BPS payment for 2021 is estimated as follows:

| Payment Region | Land use category | Estimated Payment | |
|----------------|--------------------|-------------------|---------|
| | | (€/ha) | (£/ha)* |
| 1 | n/a -single region | 330.42 | 294.07 |

* based on euro/sterling exchange rate of €1 = £0.89

Actual payment rates for 2021 will be worked out once the total number of hectares of eligible land claimed for in 2021 is known.

Activity

To be eligible for the BPS farmers must exercise agricultural activity by:

- Producing, rearing or growing agricultural products, including harvesting, milking, breeding animals, and keeping animals for farming purposes.
- Maintaining an agricultural area in a state which makes it suitable for grazing or cultivation.

Capping

The BPS payment, excluding YFP, will be capped at £190,000 from the 2021 scheme year. The change from the previous capping level of €150,000 takes account of the increase in the unit value of entitlements due to the removal of the Greening Payment and the conversion to Sterling.

Greening Payment

Greening requirements, with the exception of the ban on ploughing or conversion of Environmentally Sensitive Permanent Grassland (ESPG),

have been removed from the 2021 scheme. ESPG will now fall under BPS scheme rules.

Young Farmer Payment Scheme

Young farmers receive a top-up payment based on 25% of the total direct payments regional average per hectare limited to 90ha. To qualify the farmers must:

- Be no more than 40 years of age in the year of submission of their first BPS application.
- Be setting up for the first time an agricultural holding as head of the holding, or who have already set up such a holding during the five years preceding the first successful application to the Young Farmer Payment scheme.
- Hold a Level II qualification in agriculture (or related subject containing at least a farm business management module).

From the 2022 scheme year, farm businesses and/or young farmers who have previously submitted three applications for the Young Farmers' Payment which have been rejected will no longer be eligible for this payment.

Regional Reserve

A Regional Reserve is used to allocate entitlements to new entrants and young farmers and to those who were prevented from being allocated payment entitlements because of force majeure or exceptional circumstances.

From the 2022 scheme year, farm businesses and/or young farmers who have previously submitted three applications for the Regional Reserve which have been rejected will no longer be eligible for an allocation from the Regional Reserve.

Protein Crops Scheme

The Protein Crops Scheme (PCS) is an additional payment to farmers for growing beans, peas, and sweet lupins. The payment rate is £330/ha.

Businesses do not have to claim the BPS to be eligible, however land used to grow protein crops may be claimed for both BPS and PCS.

Initially this scheme will be piloted in the 2021 and 2022 scheme years and will be reviewed at the end of the 2022 scheme year.

Full details of Pillar I schemes can be found at:

<https://www.daera-ni.gov.uk/articles/area-based-schemes-2021-guidance-and-forms>

Rural Development Programme

The Rural Development Programme for Northern Ireland continues to improve the competitiveness of the agriculture, forest, and food industries, improve the sustainable management of the region's natural resources and develop and improve rural areas.

Summaries of the Environmental Farming Scheme and Forestry Grant Schemes are included below. Further details of these schemes, including details of other schemes can be found at: <https://www.daera-ni.gov.uk/topics/grants-and-funding>

Environmental Farming Scheme

The Environment Farming Scheme (EFS) supports farmers and land managers to carry out environmentally beneficial farming practices on agricultural land. The EFS is made up of three levels:

- A Higher-Level Scheme, primarily aimed at site specific environmental improvements at strategically important sites and for priority habitats and species.
- A Wider Level Scheme aimed at delivering benefits across the wider countryside outside of environmentally designated areas. Stand-alone wider options include establishing native woodlands less than 5ha, organic farming (Conversion and Management) and Traditional Native Breed (Irish Moiled Cattle).
- A Group Level Scheme to support co-operative work by farmers in specific areas, such as river catchments, or commonages; this scheme is in a pilot stage.

Forestry Grant Schemes

The Small Woodland Grant Scheme, Forest Expansion Scheme, Forest Protection Scheme, and the Woodland Investment Grant provide support for the expansion or creation of woodland or forestry, preventing and restoring pest and disease damage to forests and improving resilience and environmental value of woodlands.

Cross Compliance

To receive support payments Statutory Management Requirements (SMRs) and Good Agricultural and Environmental Condition (GAEC) standards must be met; together they are known as “Cross Compliance”.

Under the current regulations the following SMRs apply in **Scotland**:

Environment and climate change

- SMR 1** Nitrate Vulnerable Zones
- SMR 2** Conservation of wild birds
- SMR 3** Conservation of flora and fauna

Public health, animal health and plant health

- SMR 4** Food and feed law
- SMR 5** Restrictions on the use of substances having hormonal or thyrostatic action and beta-agonists in farm animals
- SMR 6** Pig identification and registration
- SMR 7** Cattle identification and registration
- SMR 8** Sheep and goat identification
- SMR 9** Prevention and control of transmissible spongiform encephalopathies (TSEs)
- SMR 10** Restriction on the use of plant protection products

Animal welfare

- SMR 11** Welfare of calves
- SMR 12** Welfare of pigs
- SMR 13** Welfare of farmed animals

The GAEC requirements are as follows:

- GAEC 1** Buffer strips along watercourses
- GAEC 2** Abstraction of water for irrigation
- GAEC 3** Protection of groundwater against pollution
- GAEC 4** Minimum soil cover
- GAEC 5** Minimum land management reflecting site specific condition to limit erosion
- GAEC 6** Maintenance of soil organic matter
- GAEC 7** Retention of landscape features

See page 552 for specific details on some of these GAEC requirements.

Rules in England, Wales and Northern Ireland may differ. To ensure compliance with current SMRs and GAEC in each region, further information can be found at:

Scotland:

<https://www.ruralpayments.org/publicsite/futures/topics/inspections/all-inspections/cross-compliance>

England:

<https://www.gov.uk/guidance/cross-compliance-2021>

Wales:

<https://gov.wales/cross-compliance-2021>

Northern Ireland:

<https://www.daera-ni.gov.uk/publications/cross-compliance-2021>

Credit

Amortisation Table

The table below can be used to estimate the annual charge to service the repayment of loan capital and interest per £1,000 borrowed.

| Years | Percentage rate of interest | | | | | | | | |
|-------|-----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 1 | 1,020 | 1,030 | 1,040 | 1,050 | 1,060 | 1,070 | 1,080 | 1,090 | 1,100 |
| 2 | 515 | 523 | 530 | 538 | 545 | 553 | 561 | 568 | 576 |
| 3 | 347 | 354 | 360 | 367 | 374 | 381 | 388 | 395 | 402 |
| 4 | 263 | 269 | 275 | 282 | 289 | 295 | 302 | 309 | 315 |
| 5 | 212 | 218 | 225 | 231 | 237 | 244 | 250 | 257 | 264 |
| 6 | 179 | 185 | 191 | 197 | 203 | 210 | 216 | 223 | 230 |
| 7 | 155 | 161 | 167 | 173 | 179 | 186 | 192 | 199 | 205 |
| 8 | 137 | 142 | 149 | 155 | 161 | 167 | 174 | 181 | 187 |
| 9 | 123 | 128 | 134 | 141 | 147 | 153 | 160 | 167 | 174 |
| 10 | 111 | 117 | 123 | 130 | 136 | 142 | 149 | 156 | 163 |
| 11 | 102 | 108 | 114 | 120 | 127 | 133 | 140 | 147 | 154 |
| 12 | 95 | 100 | 107 | 113 | 119 | 126 | 133 | 140 | 147 |
| 13 | 88 | 94 | 100 | 106 | 113 | 120 | 127 | 134 | 141 |
| 14 | 83 | 89 | 95 | 101 | 108 | 114 | 121 | 128 | 136 |
| 15 | 78 | 84 | 90 | 96 | 103 | 110 | 117 | 124 | 131 |
| 20 | 61 | 67 | 74 | 80 | 87 | 94 | 102 | 110 | 117 |
| 25 | 51 | 57 | 64 | 71 | 78 | 86 | 94 | 102 | 110 |
| 30 | 45 | 51 | 58 | 65 | 73 | 81 | 89 | 97 | 106 |
| 40 | 37 | 43 | 51 | 58 | 66 | 75 | 84 | 93 | 102 |

Example:

The annual charge to service the interest and capital repayments on £8,000 repayable over 10 years at 5% would be £130 x 8 = £1,040. The payment at 6% would be £136 x 8 = £1,088.

The annual charge is given by:

$$C \times \left(\frac{r(1+r)^n}{(1+r)^n - 1} \right)$$

where: C = capital investment
 r = rate of interest (to 2 decimal places)
 n = years of repayment

Sinking Fund Table

The following table can be used to estimate the capital accruing to a regular annual investment of £100.

| Years | Percentage rate of interest | | | | | | | | |
|-------|-----------------------------|-------|-------|-------|-------|-------|--------|--------|--------|
| | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 12 |
| 1 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2 | 202 | 203 | 204 | 205 | 206 | 207 | 208 | 210 | 212 |
| 3 | 306 | 309 | 312 | 315 | 318 | 321 | 325 | 331 | 337 |
| 4 | 412 | 418 | 425 | 431 | 437 | 444 | 451 | 464 | 478 |
| 5 | 520 | 531 | 542 | 553 | 564 | 575 | 587 | 611 | 635 |
| 6 | 631 | 647 | 663 | 680 | 698 | 715 | 734 | 772 | 812 |
| 7 | 743 | 766 | 790 | 814 | 839 | 865 | 892 | 949 | 1,009 |
| 8 | 858 | 889 | 921 | 955 | 990 | 1,026 | 1,064 | 1,144 | 1,230 |
| 9 | 975 | 1,016 | 1,058 | 1,103 | 1,149 | 1,198 | 1,249 | 1,358 | 1,478 |
| 10 | 1,095 | 1,146 | 1,201 | 1,258 | 1,318 | 1,382 | 1,449 | 1,594 | 1,755 |
| 11 | 1,217 | 1,281 | 1,349 | 1,421 | 1,497 | 1,578 | 1,665 | 1,853 | 2,065 |
| 12 | 1,341 | 1,419 | 1,503 | 1,592 | 1,687 | 1,789 | 1,898 | 2,138 | 2,413 |
| 13 | 1,468 | 1,562 | 1,663 | 1,771 | 1,888 | 2,014 | 2,150 | 2,452 | 2,803 |
| 14 | 1,597 | 1,709 | 1,829 | 1,960 | 2,102 | 2,255 | 2,421 | 2,797 | 3,239 |
| 15 | 1,729 | 1,860 | 2,002 | 2,158 | 2,328 | 2,513 | 2,715 | 3,177 | 3,728 |
| 20 | 2,430 | 2,687 | 2,978 | 3,307 | 3,679 | 4,100 | 4,576 | 5,727 | 7,205 |
| 25 | 3,203 | 3,646 | 4,165 | 4,773 | 5,486 | 6,325 | 7,311 | 9,835 | 13,333 |
| 30 | 4,057 | 4,758 | 5,608 | 6,644 | 7,906 | 9,446 | 11,328 | 16,449 | 24,133 |

Example:

The capital accruing after 10 years to the regular annual investment of £600 at 5% would be £1,258 x 6 = £7,548. At 6%, the capital accrued would be £1,318 x 6 = £7,908.

The terminal sum is given by:

$$d \times \left(\frac{(1 + r)^n - 1}{r} \right)$$

where: d = regular annual investment
 r = rate of interest (to 2 decimal places)
 n = years of repayment

Approximate Annual Percentage Rates of Annual Nominal Rates

As an aid to assessing finance deals, the following table estimates the equivalent annual percentage interest rates (APR's) for a range of nominal annual rates (e.g. 2% above base rate of 1% = 3%) and various charging regimes.

| Annual nominal rate (%) | Approximate annual percentage rate equivalent (%) | | |
|-------------------------|---|--------------------|----------------------|
| | Monthly charging | Quarterly charging | Half-yearly charging |
| 2 | 2.0 | 2.0 | 2.0 |
| 3 | 3.0 | 3.0 | 3.0 |
| 4 | 4.1 | 4.1 | 4.0 |
| 5 | 5.1 | 5.1 | 5.1 |
| 6 | 6.2 | 6.1 | 6.1 |
| 7 | 7.2 | 7.2 | 7.1 |
| 8 | 8.3 | 8.2 | 8.2 |
| 9 | 9.4 | 9.3 | 9.2 |
| 10 | 10.5 | 10.4 | 10.3 |
| 11 | 11.6 | 11.5 | 11.3 |
| 12 | 12.7 | 12.6 | 12.4 |
| 13 | 13.8 | 13.6 | 13.4 |
| 14 | 14.9 | 14.8 | 14.5 |
| 15 | 16.1 | 15.9 | 15.6 |

Example:

A nominal interest rate of 5% with monthly charging gives an approximate annual percentage rate of 5.1%. A nominal rate of 6%, gives an annual percentage rate (APR) of 6.2%.

The approximate annual percentage rate is given by:

$$\left[\left(1 + \frac{n}{p} \right)^p - 1 \right] \times 100$$

where: n = nominal interest rate (expressed as a decimal)
p = number of instalments per year

Approximate Annual Percentage Rates of Annual Flat Rates

Where interest on finance is quoted as flat rate on the original amount borrowed, the following table can be used to estimate the equivalent annual percentage rate (APR) for equal monthly repayments of interest and capital.

| Annual flat rate (%) | Approximate annual percentage rate equivalent (%) for loans over: | | | |
|----------------------|---|---------|----------|----------|
| | 1 year | 5 years | 10 years | 15 years |
| 4 | 7.5 | 7.6 | 7.3 | 7.0 |
| 5 | 9.4 | 9.5 | 9.0 | 8.6 |
| 6 | 11.4 | 11.4 | 10.7 | 10.1 |
| 7 | 13.4 | 13.2 | 12.3 | 11.6 |
| 8 | 15.4 | 15.0 | 13.9 | 13.0 |
| 9 | 17.4 | 16.8 | 15.5 | 14.4 |
| 10 | 19.5 | 18.7 | 17.0 | 15.8 |
| 11 | 21.6 | 20.5 | 18.6 | 17.2 |
| 12 | 23.6 | 22.3 | 20.1 | 18.6 |

Example:

The APR for a loan at an annual flat rate of 6% repaid by monthly instalments over 5 years will be 11.4%.

Compounding Table

This table estimates the future monetary value of £100 after n years at various interest rates.

| Years | Percentage rate of interest | | | | | | | | | |
|-------|-----------------------------|-----|-----|-----|-----|-------|-------|-------|-------|-------|
| | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 12 | 14 | 16 |
| 1 | 103 | 104 | 105 | 106 | 107 | 108 | 110 | 112 | 114 | 116 |
| 2 | 106 | 108 | 110 | 112 | 114 | 117 | 121 | 125 | 130 | 135 |
| 3 | 109 | 112 | 116 | 119 | 123 | 126 | 133 | 140 | 148 | 156 |
| 4 | 113 | 117 | 122 | 126 | 131 | 136 | 146 | 157 | 169 | 181 |
| 5 | 116 | 122 | 128 | 134 | 140 | 147 | 161 | 176 | 193 | 210 |
| 6 | 119 | 127 | 134 | 142 | 150 | 159 | 177 | 197 | 219 | 244 |
| 7 | 123 | 132 | 141 | 150 | 161 | 171 | 195 | 221 | 250 | 283 |
| 8 | 127 | 137 | 148 | 159 | 172 | 185 | 214 | 248 | 285 | 328 |
| 9 | 130 | 142 | 155 | 169 | 184 | 200 | 236 | 277 | 325 | 380 |
| 10 | 134 | 148 | 163 | 179 | 197 | 216 | 259 | 311 | 371 | 441 |
| 11 | 138 | 154 | 171 | 190 | 210 | 233 | 285 | 348 | 423 | 512 |
| 12 | 143 | 160 | 180 | 201 | 225 | 252 | 314 | 390 | 482 | 594 |
| 13 | 147 | 167 | 189 | 213 | 241 | 272 | 345 | 436 | 549 | 689 |
| 14 | 151 | 173 | 198 | 226 | 258 | 294 | 380 | 489 | 626 | 799 |
| 15 | 156 | 180 | 208 | 240 | 276 | 317 | 418 | 547 | 714 | 927 |
| 20 | 181 | 219 | 265 | 321 | 387 | 466 | 673 | 965 | 1,374 | 1,946 |
| 25 | 209 | 267 | 339 | 429 | 543 | 685 | 1,083 | 1,700 | 2,646 | 4,087 |
| 30 | 243 | 324 | 432 | 574 | 761 | 1,006 | 1,745 | 2,996 | 5,095 | 8,585 |

Example:

The value of £1,200 at 5% after 8 years would be £148 x 12 = £1,776. At 6%, it would be £159 x 12 = £1,908.

The compounding factor is given by: $(1 + r)^n$

where: r = rate of interest (expressed as a decimal)
 n = number of years

Annuity Tables

Discount factors for calculating the present value of future cash flows where cash flows are **regular**.

| Years | Percentage | | | | | | | | | | | |
|-------|------------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | 0.99 | 0.98 | 0.97 | 0.96 | 0.95 | 0.94 | 0.94 | 0.93 | 0.92 | 0.91 | 0.90 | 0.89 |
| 2 | 1.97 | 1.94 | 1.91 | 1.89 | 1.86 | 1.83 | 1.81 | 1.78 | 1.76 | 1.74 | 1.71 | 1.69 |
| 3 | 2.94 | 2.88 | 2.83 | 2.78 | 2.72 | 2.67 | 2.62 | 2.58 | 2.53 | 2.49 | 2.44 | 2.40 |
| 4 | 3.90 | 3.81 | 3.72 | 3.63 | 3.55 | 3.47 | 3.39 | 3.31 | 3.24 | 3.17 | 3.10 | 3.04 |
| 5 | 4.85 | 4.71 | 4.58 | 4.45 | 4.33 | 4.21 | 4.10 | 3.99 | 3.89 | 3.79 | 3.70 | 3.61 |
| 6 | 5.80 | 5.60 | 5.42 | 5.24 | 5.08 | 4.92 | 4.77 | 4.62 | 4.49 | 4.36 | 4.23 | 4.11 |
| 7 | 6.73 | 6.47 | 6.23 | 6.00 | 5.79 | 5.58 | 5.39 | 5.21 | 5.03 | 4.87 | 4.71 | 4.56 |
| 8 | 7.65 | 7.33 | 7.02 | 6.73 | 6.46 | 6.21 | 5.97 | 5.75 | 5.53 | 5.34 | 5.15 | 4.97 |
| 9 | 8.57 | 8.16 | 7.79 | 7.44 | 7.11 | 6.80 | 6.52 | 6.25 | 6.00 | 5.76 | 5.54 | 5.33 |
| 10 | 9.47 | 8.98 | 8.53 | 8.11 | 7.72 | 7.36 | 7.02 | 6.71 | 6.42 | 6.15 | 5.89 | 5.65 |
| 11 | 10.37 | 9.79 | 9.25 | 8.76 | 8.31 | 7.89 | 7.50 | 7.14 | 6.81 | 6.50 | 6.21 | 5.94 |
| 12 | 11.26 | 10.58 | 9.95 | 9.36 | 8.86 | 8.38 | 7.94 | 7.54 | 7.16 | 6.81 | 6.49 | 6.19 |
| 13 | 12.13 | 11.35 | 10.64 | 9.99 | 9.39 | 8.85 | 8.36 | 7.90 | 7.49 | 7.10 | 6.75 | 6.42 |
| 14 | 13.00 | 12.11 | 11.30 | 10.56 | 9.90 | 9.30 | 8.75 | 8.24 | 7.79 | 7.37 | 6.98 | 6.63 |
| 15 | 13.87 | 12.85 | 11.94 | 11.12 | 10.38 | 9.71 | 9.11 | 8.56 | 8.06 | 7.61 | 7.19 | 6.81 |
| 20 | 18.05 | 16.35 | 14.88 | 13.59 | 12.46 | 11.47 | 10.59 | 9.82 | 9.13 | 8.51 | 7.96 | 7.47 |
| 25 | 22.02 | 19.52 | 17.41 | 15.62 | 14.09 | 12.78 | 11.65 | 10.67 | 9.82 | 9.08 | 8.42 | 7.84 |
| 30 | 25.81 | 22.40 | 19.60 | 17.29 | 15.37 | 13.76 | 12.41 | 11.26 | 10.27 | 9.43 | 8.69 | 8.06 |

| Years | Percentage | | | | | | | | | | | |
|-------|------------|------|------|------|------|------|------|------|------|------|------|------|
| | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 25 | 30 | 35 | 40 |
| 1 | 0.89 | 0.88 | 0.87 | 0.86 | 0.85 | 0.85 | 0.84 | 0.83 | 0.80 | 0.77 | 0.74 | 0.71 |
| 2 | 1.67 | 1.65 | 1.63 | 1.61 | 1.59 | 1.57 | 1.55 | 1.53 | 1.44 | 1.36 | 1.29 | 1.22 |
| 3 | 2.36 | 2.32 | 2.28 | 2.25 | 2.21 | 2.17 | 2.14 | 2.11 | 1.95 | 1.82 | 1.70 | 1.59 |
| 4 | 2.97 | 2.91 | 2.86 | 2.80 | 2.74 | 2.69 | 2.64 | 2.59 | 2.36 | 2.17 | 2.00 | 1.85 |
| 5 | 3.52 | 3.43 | 3.35 | 3.27 | 3.20 | 3.13 | 3.06 | 2.99 | 2.69 | 2.44 | 2.22 | 2.04 |
| 6 | 4.00 | 3.89 | 3.78 | 3.68 | 3.59 | 3.50 | 3.41 | 3.33 | 2.95 | 2.64 | 2.39 | 2.17 |
| 7 | 4.42 | 4.29 | 4.16 | 4.04 | 3.92 | 3.81 | 3.71 | 3.60 | 3.16 | 2.80 | 2.51 | 2.26 |
| 8 | 4.80 | 4.64 | 4.49 | 4.34 | 4.21 | 4.08 | 3.95 | 3.84 | 3.33 | 2.92 | 2.60 | 2.33 |
| 9 | 5.13 | 4.95 | 4.77 | 4.61 | 4.45 | 4.30 | 4.16 | 4.03 | 3.46 | 3.02 | 2.67 | 2.38 |
| 10 | 5.43 | 5.22 | 5.02 | 4.83 | 4.66 | 4.49 | 4.34 | 4.19 | 3.57 | 3.09 | 2.72 | 2.41 |
| 11 | 5.69 | 5.45 | 5.23 | 5.03 | 4.84 | 4.66 | 4.49 | 4.33 | 3.66 | 3.15 | 2.75 | 2.44 |
| 12 | 5.92 | 5.66 | 5.42 | 5.20 | 4.99 | 4.79 | 4.61 | 4.44 | 3.73 | 3.19 | 2.78 | 2.46 |
| 13 | 6.12 | 5.84 | 5.58 | 5.34 | 5.12 | 4.91 | 4.71 | 4.53 | 3.78 | 3.22 | 2.80 | 2.47 |
| 14 | 6.30 | 6.00 | 5.72 | 5.47 | 5.23 | 5.01 | 4.80 | 4.61 | 3.82 | 3.25 | 2.81 | 2.48 |
| 15 | 6.46 | 6.14 | 5.85 | 5.58 | 5.32 | 5.09 | 4.88 | 4.68 | 3.86 | 3.27 | 2.83 | 2.48 |
| 20 | 7.02 | 6.62 | 6.26 | 5.93 | 5.63 | 5.35 | 5.10 | 4.87 | 3.95 | 3.32 | 2.85 | 2.50 |
| 25 | 7.33 | 6.87 | 6.46 | 6.10 | 5.77 | 5.47 | 5.20 | 4.95 | 3.98 | 3.33 | 2.86 | 2.50 |
| 30 | 7.50 | 7.00 | 6.57 | 6.18 | 5.83 | 5.52 | 5.23 | 4.98 | 4.00 | 3.33 | 2.86 | 2.50 |

Example:

The present value of £350 received each year for 6 years at 5% discount rate is £350 x 5.08 = £1,778. At 6%, the present value is £350 x 4.92 = £1,722.

The discount factor is given by:

$$\frac{1 - (1 + r)^{-n}}{r} \quad \text{where: } r = \text{rate of discount}$$

$$n = \text{number of years}$$

Discount Tables

Discount factors for calculating the present value of future cash flows where cash flows are **irregular**.

| Years | Percentage | | | | | | | | | | | |
|-------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | 0.990 | 0.980 | 0.971 | 0.962 | 0.952 | 0.943 | 0.935 | 0.926 | 0.917 | 0.909 | 0.901 | 0.893 |
| 2 | 0.980 | 0.961 | 0.943 | 0.925 | 0.907 | 0.890 | 0.873 | 0.857 | 0.842 | 0.826 | 0.812 | 0.797 |
| 3 | 0.971 | 0.942 | 0.915 | 0.889 | 0.864 | 0.840 | 0.816 | 0.794 | 0.772 | 0.751 | 0.731 | 0.712 |
| 4 | 0.961 | 0.924 | 0.888 | 0.855 | 0.823 | 0.792 | 0.763 | 0.735 | 0.708 | 0.683 | 0.659 | 0.636 |
| 5 | 0.951 | 0.906 | 0.863 | 0.822 | 0.784 | 0.747 | 0.713 | 0.681 | 0.650 | 0.621 | 0.593 | 0.567 |
| 6 | 0.942 | 0.888 | 0.837 | 0.790 | 0.746 | 0.705 | 0.666 | 0.630 | 0.596 | 0.564 | 0.535 | 0.507 |
| 7 | 0.933 | 0.871 | 0.813 | 0.760 | 0.711 | 0.665 | 0.623 | 0.583 | 0.547 | 0.513 | 0.482 | 0.452 |
| 8 | 0.923 | 0.853 | 0.789 | 0.731 | 0.677 | 0.627 | 0.582 | 0.540 | 0.502 | 0.467 | 0.434 | 0.404 |
| 9 | 0.914 | 0.837 | 0.766 | 0.703 | 0.645 | 0.592 | 0.544 | 0.500 | 0.460 | 0.424 | 0.391 | 0.361 |
| 10 | 0.905 | 0.820 | 0.744 | 0.676 | 0.614 | 0.558 | 0.508 | 0.463 | 0.422 | 0.386 | 0.352 | 0.322 |
| 11 | 0.896 | 0.804 | 0.722 | 0.650 | 0.585 | 0.527 | 0.475 | 0.429 | 0.388 | 0.350 | 0.317 | 0.287 |
| 12 | 0.887 | 0.788 | 0.701 | 0.625 | 0.557 | 0.497 | 0.444 | 0.397 | 0.356 | 0.319 | 0.286 | 0.257 |
| 13 | 0.879 | 0.773 | 0.681 | 0.601 | 0.530 | 0.469 | 0.415 | 0.368 | 0.326 | 0.290 | 0.258 | 0.229 |
| 14 | 0.870 | 0.758 | 0.661 | 0.577 | 0.505 | 0.442 | 0.388 | 0.340 | 0.299 | 0.263 | 0.232 | 0.205 |
| 15 | 0.861 | 0.743 | 0.642 | 0.555 | 0.481 | 0.417 | 0.362 | 0.315 | 0.275 | 0.239 | 0.209 | 0.183 |
| 20 | 0.820 | 0.673 | 0.554 | 0.456 | 0.377 | 0.312 | 0.258 | 0.215 | 0.178 | 0.149 | 0.124 | 0.104 |
| 25 | 0.780 | 0.610 | 0.478 | 0.375 | 0.295 | 0.233 | 0.184 | 0.146 | 0.116 | 0.092 | 0.074 | 0.059 |

| Years | Percentage | | | | | | | | | | | |
|-------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 25 | 30 | 35 | 40 |
| 1 | 0.885 | 0.877 | 0.870 | 0.862 | 0.855 | 0.847 | 0.840 | 0.833 | 0.800 | 0.769 | 0.741 | 0.714 |
| 2 | 0.783 | 0.769 | 0.756 | 0.743 | 0.731 | 0.718 | 0.706 | 0.694 | 0.640 | 0.592 | 0.549 | 0.510 |
| 3 | 0.693 | 0.675 | 0.658 | 0.641 | 0.624 | 0.609 | 0.593 | 0.579 | 0.512 | 0.455 | 0.406 | 0.364 |
| 4 | 0.613 | 0.592 | 0.572 | 0.552 | 0.534 | 0.516 | 0.499 | 0.482 | 0.410 | 0.350 | 0.301 | 0.260 |
| 5 | 0.543 | 0.519 | 0.497 | 0.476 | 0.456 | 0.437 | 0.419 | 0.402 | 0.328 | 0.269 | 0.223 | 0.186 |
| 6 | 0.480 | 0.456 | 0.432 | 0.410 | 0.390 | 0.370 | 0.352 | 0.335 | 0.262 | 0.207 | 0.165 | 0.133 |
| 7 | 0.425 | 0.400 | 0.376 | 0.354 | 0.333 | 0.314 | 0.296 | 0.279 | 0.210 | 0.159 | 0.122 | 0.095 |
| 8 | 0.376 | 0.351 | 0.327 | 0.305 | 0.285 | 0.266 | 0.249 | 0.233 | 0.168 | 0.123 | 0.091 | 0.068 |
| 9 | 0.333 | 0.308 | 0.284 | 0.263 | 0.243 | 0.225 | 0.209 | 0.194 | 0.134 | 0.094 | 0.067 | 0.048 |
| 10 | 0.295 | 0.270 | 0.247 | 0.227 | 0.208 | 0.191 | 0.176 | 0.162 | 0.107 | 0.073 | 0.050 | 0.035 |
| 11 | 0.261 | 0.237 | 0.215 | 0.195 | 0.178 | 0.162 | 0.148 | 0.135 | 0.086 | 0.056 | 0.037 | 0.025 |
| 12 | 0.231 | 0.208 | 0.187 | 0.168 | 0.152 | 0.137 | 0.124 | 0.112 | 0.069 | 0.043 | 0.027 | 0.018 |
| 13 | 0.204 | 0.182 | 0.163 | 0.145 | 0.130 | 0.116 | 0.104 | 0.093 | 0.055 | 0.033 | 0.020 | 0.013 |
| 14 | 0.181 | 0.160 | 0.141 | 0.125 | 0.111 | 0.099 | 0.088 | 0.078 | 0.044 | 0.025 | 0.015 | 0.009 |
| 15 | 0.160 | 0.140 | 0.123 | 0.108 | 0.095 | 0.084 | 0.074 | 0.065 | 0.035 | 0.020 | 0.011 | 0.006 |
| 20 | 0.087 | 0.073 | 0.061 | 0.051 | 0.043 | 0.037 | 0.031 | 0.026 | 0.012 | 0.005 | 0.002 | 0.001 |
| 25 | 0.047 | 0.038 | 0.030 | 0.024 | 0.020 | 0.016 | 0.013 | 0.010 | 0.004 | 0.001 | 0.001 | 0.000 |

Example: To find the present value of the following cash flows at 5% discount rate of interest.

| Year | Cash flow (£) | Discount factor | Present value (£) | |
|------|---------------|-----------------|-------------------|--|
| 1 | 250 | 0.952 | 238 | The Present Value of this series of cash flows is £995 |
| 2 | 300 | 0.907 | 272 | |
| 3 | 180 | 0.864 | 155 | |
| 4 | 400 | 0.823 | 329 | |

The discount factor is given by

$$\frac{1}{(1 + r)^n}$$

where: r = rate of discount
 n = number of years

Long-Term Loans

Long-term finance might be obtained from banks, mortgage providers, insurance companies, finance companies, solicitors, or by private arrangement. These loans are generally secured against the value of existing property and other business assets.

Long-term loans tend to be used for purchasing fixed assets and are structured as an agricultural mortgage or secured loans typically extending between 5 and 25 years at fixed and/or variable interest. Interest payments can be arranged to tie in with cashflow but would usually be charged monthly or quarterly, however, there are alternative options e.g. of paying interest in half-yearly or annual instalments although this tends to be more expensive. Interest only periods are potentially available prior to moving to capital repayments. Frequency of capital repayments will be subject to negotiation with the lender. Capital repayments are generally packaged together with accrued interest in monthly payments. It may be agreeable with the lender to defer capital repayment or repay a lump sum on a fixed date each year.

It is necessary for the business borrowing the money to be deemed financially secure and demonstrate the ability to service the loan. This will be determined based on past financial performance, an updated balance sheet, cash flow budgets and perceived risk of the proposed venture.

Long-term loans can typically pass from generation to generation. In other words a loan is not repayable on the death of a borrower and cannot be recalled for the term of the loan provided that obligations continue to be met.

Medium-Term and Short-Term Credit

Banks

Banks, the primary source of medium and short-term capital, may agree to grant farmers an overdraft to meet business financial requirements.

Overdrafts are reviewed annually; the interest rate, subject to the security available, is competitive, and interest is charged daily only on the daily balance outstanding. Generally, an arrangement fee will be charged and, in some cases, a renewal fee.

In terms of medium term loans, 10-year term loans are most common. Interest is related to commercial and market factors but have historically been lower than overdraft rates (particularly if adjusted for any overdraft rearrangement fees).

Merchants and tradesmen

A popular form of short-term financing. Finance is often in the form of credit allowed by merchants, auctioneers, tradesmen and dealers over a

wide range of commodities and farm requisites, including livestock and implements. Rates of interest vary widely and can be relatively cheap over one or two months, but can rise to as high as 4% per month on accounts outstanding for several months.

Mart credit

Farmers buying livestock can obtain up to 12 months credit. Interest rates quoted vary depending on term and amount borrowed. Other arrangements are possible whereby a farmer may borrow capital from a mart for finishing stock purchased from the mart. Interest will be charged on the stock during the finishing period which is then deducted from the sale price achieved for the stock. The stock remains the property of the mart and must be resold through the mart or to an associated abattoir/meat processing company.

Hire purchase

Hire purchase is currently the most popular form of finance used by UK farmers. This type of finance covers identifiable products such as plant and machinery, and livestock. It offers 100% ownership at the end of the repayment period.

Credit is supplied by a finance company but the arrangements are often carried out through the dealer who made the sale. Repayment periods are usually from two to four years with payment by standing order. Payments are for capital and interest and are usually offered on a fixed rate basis. However, this form of finance can be more expensive than an overdraft, because the lender is offering less security.

Contract hire and leasing

Leasing is usually used for equipment or vehicles. Breeding livestock can also be leased. However, leasing costs can vary considerably and the details of a contract should be studied carefully before entering into an agreement. The tax aspects should be discussed with an accountant. Two types of leasing exist:

Finance Lease - Offers use of an asset for an agreed period without ownership. Payments are normally fixed for a defined period of time (usually 2 to 5 years). After this period, the farmer can either continue to use the equipment at a nominal rent (which can vary from nothing to 1.5% of capital cost), or, with the finance company's permission, sell the equipment. Dependent on arrangements, the farmer may obtain 90% to 100% of the sale value to be used as a refund or a down-payment.

Operating Lease - Appropriate for the use of equipment for less than its full economic life. The farmer takes the risk of the equipment becoming obsolete and is responsible for all repairs, maintenance and insurance. The residual value of the asset is usually set at the outset, based on the estimated use throughout the term. In most cases, this is more expensive than a finance lease.

The advantages of leasing schemes (machinery and livestock) depend on the individual's circumstances. Leasing is a complex subject and it is advisable to seek professional advice to assess the best financial alternative.

Taxation

Introduction

This section is designed to provide background information on how tax may affect the farm business and contains a summary of how the system operates. Tax is an increasingly complex subject and there are thirteen tax rates that could apply to income and capital gains of a Scottish Taxpayer.

The tax year which started on 6 April 2018 was the first year in which the Scottish Government's devolved powers were used to any significant impact. Before then, despite some tinkering with rate bands, the Scottish Rate of Income Tax (SRIT) had been kept the same as the rest of the UK (RUK). Now we have five specific rates/bands imposed by the Scottish Government and the table shown on page 548 illustrates the complexities involved.

Although every effort has been made to provide accurate details, no responsibility can be taken for any omissions that may have occurred in the treatment of this specialised field.

The Taxation section of the Handbook has been updated by Chiene + Tait LLP. Chiene + Tait is an independent accountancy firm which offers an extensive range of personal, business and advisory services to a wide range of clients and has a significant agricultural practice. If you would like to discuss the range of services provided by Chiene + Tait please contact Michelle Fallon or Lisa Travers (0131 558 5800) in Edinburgh, or Jackie Fraser (01463 251730) in Inverness.

Income Tax

Income tax is calculated by applying the appropriate rates to taxable income. The amount of a person's income chargeable to tax in any year is calculated according to the specific rules applicable to the various types of income. Farming profits are assessed as trading income.

The net profit in the accounts usually requires an adjustment because some costs may appear in the accounts which are not allowable for tax purposes (e.g. depreciation) and some income may not be subject to income tax at all, or not taxed as trading income.

Amounts received under the Self Employment Income Support Scheme (SEISS), that was implemented in response to the COVID-19 crisis, count as taxable turnover when determining amounts liable to income tax (and class 4 national insurance contributions). These payments are taxable on a receipts basis and therefore are taxable in the tax year they are received. They should not be accrued across accounting periods.

All taxpayers are entitled to £1,000 allowances for both property income and trading income. This means that the first £1,000 gross of most sources of property income and/or trading income is exempt from income

tax. If gross income exceeds £1,000, then the taxpayer can either deduct the £1,000 allowance or deduct allowable expenses.

Main Income Tax reliefs

| Allowed at top rate of tax | 2021/22 | 2020/21 |
|---|----------------|----------------|
| Personal Allowance ¹ | £12,570 | £12,500 |
| Blind Person's Allowance | £2,520 | £2,500 |
| Marriage Allowance ² | £1,260 | £1,250 |
| Dividend Tax Allowance (DTA) ³ | £2,000 | £2,000 |
| Personal Savings Allowance (PSA) ⁴ | | |
| - Basic Rate Taxpayer | £1,000 | £1,000 |
| - Higher Rate Taxpayer | £500 | £500 |

| Allowed only at 10% | | |
|---|---------|---------|
| Married Couple's Allowance (MCA) ⁵ | £9,125 | £9,075 |
| Income limit for age-related allowances | £30,400 | £30,200 |

- 1 The personal allowance is withdrawn at £1 for every £2 by which total income exceeds £100,000 such that allowances become nil at income of £125,000.
- 2 Up to 10% of the personal allowance can be transferred to a spouse who is no more than a basic rate taxpayer. Not available if the married couple's allowance is being claimed.
- 3 The DTA taxes the first £2,000 of dividend income at 0%.
- 4 The PSA operates as a nil rate band for interest income.
- 5 Only available if born before 6th April 1935.

UK Income Tax bands and rates

| | 2021/22 | 2020/21 |
|----------------------|--------------------|--------------------|
| Basic rate band | £37,700 | £37,500 |
| Higher rate band | £37,701 - £150,000 | £37,501 - £150,000 |
| Additional rate band | over £150,000 | over £150,000 |

The tax rates differ for General income (G - salary, pensions, business profits, rent), Savings income (S - interest) and Dividend income (D).

| | 2021/22 | | | 2020/21 | | |
|-----------------|----------------|----------|-------|----------------|----------|-------|
| | G | S | | G | S | |
| Basic rate | 20% | 20% | 7.5% | 20% | 20% | 7.5% |
| Higher rate | 40% | 40% | 32.5% | 40% | 40% | 32.5% |
| Additional rate | 45% | 45% | 38.1% | 45% | 45% | 38.1% |

Scottish Rate of Income Tax (SRIT)

Since April 2017, the Scottish Parliament has had the authority to vary the rate bands as well as the actual tax rates. The SRIT will apply to General Income belonging to a "Scottish Taxpayer" regardless of where that income arises. The rules for defining a "Scottish Taxpayer" can be

complicated but will broadly apply where the individual's main family home is in Scotland.

From 2017/18 onwards, a Scottish Taxpayer who has General income (salary, pensions, business profits, rents) as well as Savings income and Dividend income will need to consider both the UK tax rates and tax bands and the Scottish tax rates and tax bands in order to work out their income tax liability.

For 2021/22 the Scottish rates of income tax and tax bands are as follows:

| | Tax Band | 2021/22 |
|-------------------|--------------------|----------------|
| Starter Rate | £12,570 - £14,666 | 19% |
| Basic Rate | £14,667 - £25,295 | 20% |
| Intermediate Rate | £25,296 - £43,661 | 21% |
| Higher Rate | £43,663 - £150,000 | 41% |
| Top Rate | Over £150,000 | 46% |

Important investment annual limits

| | 2021/22 | 2020/21 |
|---|----------------|----------------|
| Individual Savings Account (ISA) | £20,000 | £20,000 |
| Junior ISA ¹ | £9,000 | £9,000 |
| Enterprise Investment Scheme (EIS) ² | £2,000,000 | £2,000,000 |
| Venture Capital Trust (VCT) ² | £200,000 | £200,000 |
| Seed Enterprise Investment Scheme (SEIS) ³ | £100,000 | £100,000 |

¹ Available from 20 November 2011 to all UK resident children who do not have a Child Trust Fund account. From 6 April 2015 it has been possible to transfer a Child Trust Fund to a Junior ISA.

² Income Tax relief at 30% for both EIS and VCT

³ Income Tax relief at 50% for SEIS

Full details of the rates of income tax and the main allowances can be found on the HM Revenue and Customs (HMRC) website at www.gov.uk.

Property Rental Income

Since 6 April 2017 tax relief on finance costs for rental businesses with residential property has been restricted. Until 5 April 2017, any finance costs incurred annually were offset against rental income when calculating taxable profits. For the 2020/21 tax year onwards, taxpayers can only treat finance costs as a tax reducer at the basic rate of tax.

Tax Credits

The system of tax credits is a method by which financial support is given to those in work, or with children, on low incomes. Tax credits comprise

working tax credits and child tax credits. The term tax credit is a misnomer: tax credits are a form of financial support, and they are administered by HMRC. The financial support (itself tax-free) consists of payments to claimants, and not offsets against tax liabilities. The income tax system treats members of a family independently. By contrast, tax credits are based, where appropriate, on the circumstances of couples living together, whether married or not. The Universal Credit is a new benefit and over the next few years, it is expected that it will gradually replace tax credits, as well as some other social security benefits.

Further information on tax credits can be found on the tax credit website at www.gov.uk.

Pensions

It is recognised that state pensions do not provide an adequate income in old age and it is for this reason that individuals may wish to contribute to pensions other than under the state pension scheme. Pension contributions attract tax relief up to set limits and the contributions are accumulated in a fund that is free of income tax and capital gains tax.

The rules for tax relief on pension contributions have undergone significant changes over the years with a view to simplification. Complications remain with rules for the carry forward of unused relief and advice should be taken on the tax implications before a pension contribution is made. Broadly, however, anyone can contribute up to £3,600 (gross) each year, regardless of earnings. Pension payments are made net of basic rate tax relief so the individual would pay £2,880 and the government would add £720 to the pension fund to bring the total up to the £3,600 figure. Higher rate tax relief if applicable is then given through the individual's self-assessment tax return or PAYE code. For 2021/22, the maximum tax-efficient contribution will generally be £40,000 (gross) or 100% of current earnings unless there is unused pension relief available to carry forward from the previous tax years. With effect from 6 April 2020 the maximum contribution is tapered where 'adjusted income' (i.e. including pension contributions) is more than £240,000. The reduction is £1 for every £2 of income over £240,000 and the minimum allowance will be £4,000.

There is also a lifetime limit to the value an individual can contribute to a pension fund tax efficiently. For 2021/22, the "lifetime allowance" is £1,073,100.

Occupational schemes are available to employees who have an employer offering such a scheme and the Pensions Act 2008 included provisions requiring employers to set up pension arrangements for all employees. The rules for compulsory work pensions include a government "auto-enrolment" scheme called the National Employment Savings Trust (NEST). There are now alternative private pension

providers offering auto-enrolment scheme options in addition to the government NEST scheme. The implementation date for compulsory pensions is phased according to the number of employees. Staging dates started in the final quarter of 2012 for the largest employers and all existing employers should now be complying.

From 6 April 2015, those with a money purchase pension (i.e. not final salary schemes) will be able to have unrestricted access to the full value of their pension fund. Any withdrawals above the level of the tax-free amount (currently 25%) will be taxed at the individual's marginal rate of income tax. To prevent recycling funds into another pension to increase the tax relief available, a Money Purchase Annual Allowance (MPAA) was introduced. Until 5 April 2017 the MPAA was £10,000, however, with effect from 6 April 2017 it has been £4,000.

Recent tax changes have resulted in pensions becoming increasingly beneficial for inheritance tax planning matters.

Capital Allowances

| <i>Main capital allowances - plant and machinery</i> | <i>Allowance %</i> |
|---|---------------------------|
| Annual Investment allowance: £1,000,000 (from 1 Jan 2019 to 31 December 2021) | 100 |
| Certain energy and water efficient equipment, cars with zero emissions | 100 |
| Writing down allowance: general pool | 18 |
| Writing down allowance: special rate pool* | 6 |

* The special rate pool includes long life assets, integral plant in buildings, thermal insulation, solar shading and cars with CO₂ emissions over 110g/km.

In the accounts it is normal practice to write-off part of the cost of plant, machinery, vehicles and buildings as depreciation each year. In calculating taxable income, this depreciation is added back to profit, and capital allowances are deducted.

Since 6 April 2008, it has been possible to claim the 100% Annual Investment Allowance (AIA) for plant and machinery (excluding cars). On 1 January 2019, the AIA increased to £1,000,000 and will remain at this level until 31 December 2021. After 31 December 2021 the AIA decreases to £200,000. The AIA is available to partnerships made up of individuals but it is not available to 'mixed partnerships', i.e. partnerships that include a company or a trust.

Capital allowances for new cars are related to the CO₂ rating of the car. New electric cars or cars with zero emissions enjoy a 100% first year allowance. Cars with a rating up to 110g/km will go into the general pool and receive 18% allowances (restricted to £3,000 per annum if the car

cost more than £3,000). Cars with higher ratings will go into the special rate pool and only receive 6% allowances.

Capital allowances can no longer be claimed for expenditure on agricultural buildings or works.

Expenditure on integral features of a building such as electrical and lighting systems, cold water and water heating systems and expenditure on solar panels qualifies for special rate allowances at 6%.

A 'Structures and Building Allowance' ('SBA') is available at a rate of 3% per annum on a straight-line basis for qualifying expenditure on the construction of qualifying commercial property.

Farmers should review their expenditure on buildings to ensure that any expenditure which may qualify for plant and machinery or integral features allowances are identified. It is also important to review the timing of capital expenditure to maximise allowances.

Losses

When an individual makes a trading loss for a tax year, the loss can be relieved against any other income of the same tax year, against any other income of the previous tax year, against capital gains of either year or by carry forward against future trading profits from the same trade. There are also special loss relief rules for losses made in the early years of a business and the last twelve months before the cessation of trade.

However, from 6 April 2013, the amount of *income tax* loss relief available to an individual in a tax year in respect of a trade loss is capped at the greater of £50,000 or 25% of income.

In addition, the amount of loss relief that a sole trader or partner may claim against general income has been limited to £25,000 if the loss is from *non-active trades*. An individual is deemed to be non-active if they spend an average of less than 10 hours per week personally engaged in the trade's activities. The existing rules for restricting tax relief for losses incurred for more than five consecutive tax years under the "hobby farming" provisions also still apply.

Special Rules: Losses arising in 2020/21 and 2021/22

For businesses that had previously made a profit but have made a loss in either of the 2020/21 or 2021/22 tax years, the loss can be carried back and set against profits from the same trade in the previous three tax years, applying to the latest years first.

However, this is subject to a cap of:

- for a loss for 2020-21, £2,000,000 for 2018-19 and 2017-18; and
- for a loss for 2021-22, £2,000,000 for 2019-20 and 2018-19

For companies, trading losses can be offset against other profits in the same group or carried forward indefinitely and are available for offset against profits of the same trade.

Relief for Fluctuating Profits (Averaging)

Relief for fluctuating profits (averaging) is available to any individual or partnership carrying on a trade of farming or market gardening. Prior to April 2016, it was possible to average two consecutive years of assessment where the profits of one year are at least 30% below the profits of the other. From April 2016, it has been possible to choose to average over a five-year period.

Averaging claims can result in significant savings of tax and national insurance contributions. Averaging is a valuable relief for farmers, particularly now that income tax rates can be as high as 46%.

Herd Basis of Livestock Valuation

Under the herd basis of livestock valuation, fluctuations in the value of production animals are not taken into account in computing profits, nor is the cost of the original herd or flock deductible. The values of the original production stock numbers are held constant throughout the period that the herd is in existence.

An election to adopt the herd basis of livestock valuation can normally only be made at a time when a production herd is first kept and provided that a herd of that class has not been kept in the preceding five years. Once made, an election is irrevocable and will come to an end only on ceasing to keep a production herd of the particular class for a period of five years or on a change of business structure, e.g. when a sole trader introduces a partner to the business. The time limit for making an election to adopt the herd basis of valuation is two years after the end of the first tax year affected by the purchase of the herd.

The advantage of the herd basis is the exclusion from taxable profit of changes in value of production animals. In addition, when a whole herd or a substantial part of it (over 20%) is sold without replacement, any difference between sale value and book value is not taxable for income tax or capital gains tax purposes.

Self-Assessment Procedures

Every personal tax return carries a self-assessment section in which the taxpayer is normally expected to calculate his or her own income tax and capital gains tax liability. The submission deadline for paper tax returns is 31 October following the end of the tax year. The submission deadline

for tax returns delivered electronically is 31 January following the end of the tax year. Penalties are imposed for the late submissions of tax returns.

Tax liabilities are settled via two interim payments on account and a final balancing payment. The two interim payments on account are payable on 31 January during the tax year and 31 July following the end of the tax year. The balance of any income tax due and the full amount of any capital gains tax due is payable on 31 January following the end of the tax year. Interest and surcharges will be due on tax paid late.

Records of personal income, such as bank interest and dividend income should be retained for a period of one year and ten months following the year of assessment to which they relate unless the taxpayer also has a business or let property in which case all records must be kept for five years and ten months.

Corporation Tax Procedures

Companies have 12 months from the end of the accounting period to file their tax return. For most companies, tax payments are due nine months and 1 day after the end of the accounting period and large companies pay tax in instalments.

Corporation Tax Rates

Year to 31 March 2022

| | |
|-----------|-----|
| Main rate | 19% |
|-----------|-----|

From 1 April 2023, the Corporation Tax main rate for non-ring-fenced profits will be increased to 25% applying to profits over £250,000. A small profits rate (SPR) will also be introduced for companies with profits of £50,000 or less so that they will continue to pay Corporation Tax at 19%. Companies with profits between £50,000 and £250,000 will pay tax at the main rate reduced by a marginal relief providing a gradual increase in the effective Corporation Tax rate.

If the farm trade is carried on through the medium of a company, corporation tax on the profits has to be paid by the company. Corporation tax is charged on the trading profits, capital gains and other income of an accounting period. Directors' salaries and fees are a charge against profit. Capital allowances are deducted where expenditure is incurred on the acquisition of qualifying plant and machinery.

Annual Tax on Enveloped Dwellings

From 1 April 2013 an annual tax charge has been imposed on certain “non-natural persons” (broadly, companies, partnerships with a corporate partner and collective investment schemes) which hold UK residential dwellings. From 1 April 2016 properties valued at more than £500,000 on specific valuation dates are subject to the charge. For 2021/22 the charge is determined as follows:

| Property Value | Annual Tax Charge |
|---------------------------|--------------------------|
| £500,000 - £1,000,000 | £3,700 |
| £1,000,001 - £2,000,000 | £7,500 |
| £2,000,001 - £5,000,000 | £25,300 |
| £5,000,001 - £10,000,000 | £59,100 |
| £10,000,001 - £20,000,000 | £118,600 |
| More than £20,000,000 | £237,400 |

A capital gains tax charge may also arise on disposal of such properties and a 15% SDLT or LBTT charge may arise on the acquisition of such properties (see below for further details).

Capital Gains Tax

The annual exempt amount for 2021/22 for individuals is £12,300, and for most trustees is £6,150. The Capital Gains Tax (CGT) rates for 2021/22 are 10% (for the element within the basic rate band) and 20%. Gains on residential property attract the higher 18%/28% rates.

CGT is a tax on the increase in value of certain property which is sold or given away in a lifetime. It applies to the sale or gift of assets such as land, shares, or other capital assets. CGT does not apply to transfers of cash or the disposal of trading stock. Lifetime gifts between spouses do not give rise to a chargeable gain.

Capital losses are set against other capital gains of the same year or carried forward to reduce gains in excess of the annual exemption in future years. Capital losses cannot be carried back unless they arise in the year of death.

From, 1 April 2013, CGT is payable at 28% in respect of any gain arising from the disposal of residential property owned by UK resident or non-UK resident “non-natural persons”.

From 6 April 2015, CGT is payable on the disposal of UK residential property by non-resident individuals. On sale, there are two options. The property value can be rebased at 5 April 2015 and the chargeable gain arising on disposal will be the difference between the 5 April 2015 valuation and the value at date of sale. Alternatively, the gain arising over the whole period of ownership can be calculated and apportioned,

with only the element of the gain arising after 6 April 2015 being liable to capital gains tax.

From 6 April 2020, there is a new reporting and payment requirement for a UK resident individual who disposes of a residential property and the disposal gives rise to a charge to capital gains tax, i.e. the gain is not covered by a relief (such as main residence relief), losses or the annual exemption. The individual is required to make a return in respect of the disposal to HM Revenue & Customs within 30 days, and at the same time make a payment on account of capital gains tax.

Business Asset Disposal Relief was known as Entrepreneurs' Relief before 6 April 2020.

Business Asset Disposal Relief applies to disposals of a sole trade or interest in a partnership trade or shares in a trading company where the shareholder owns at least 5% of the ordinary share capital **and** has at least 5% of the voting rights **and** is entitled to 5% of the profits on winding up and is an officer or employee of the company. There is a requirement to meet the qualifying criteria for a minimum period of 24 months (previously the minimum ownership period was 12 months). Qualifying gains are taxed at 10% up to a lifetime maximum of £1m.

Principal Private Residence Relief (PPR) will generally exempt the gain arising on the sale of the farmhouse and up to half a hectare of grounds. The relief will be restricted if any part of the residence is used solely for business purposes. Where a property had been occupied as the owner's only or main residence, the last 9 months of ownership will qualify for PPR even if the property was no longer occupied.

Gift Relief is available on the gift of assets used in a trade carried on by the transferor, agricultural property (including tenanted land) or shares in an unquoted company. The capital gain is calculated as normal but does not become chargeable if both the transferor and the transferee agree to "hold over" the gain. If an election is made, the transferee will be deemed to acquire the asset at its open market value less the gain held over. In this way the tax charge is deferred until the transferee sells the asset at arm's length. Gift relief is restricted if there has been any non-business use of the asset. Previously only agricultural land in the UK qualified for relief, however, from 22 April 2009 land anywhere in the European Economic Area can qualify.

Roll Over Relief can be claimed when a capital asset which has been used for trade purposes (e.g. a building) is sold at a gain and the whole of the sales proceeds are invested in other qualifying assets to be used for trade purposes. The value of the new asset is deemed to be reduced by the amount of the gain arising on the sale of the first asset. The sale proceeds must be reinvested in the period commencing twelve months before and three years after the sale of the original asset. If the entire

proceeds of the sale are not reinvested, only partial roll-over relief is available.

Inheritance Tax

| | |
|---------------------------------------|------------------|
| Nil Rate Band (NRB) | £325,000 |
| Rate above NRB | 40% ¹ |
| Lifetime transfers to certain trusts | 20% |
| Annual exemption for lifetime gifts | £3,000 |
| Small gifts - annual amount per donee | £250 |

¹ There is a reduced rate of 36% for an estate leaving 10% or more to charity on or after 6 April 2012

Tapering relief applies to reduce the tax on transfers within 7 years of death. The reduction in tax is 20% for survivorship of 3-4 years, 40% for 4-5, 60% for 5-6 and 80% for 6-7 years.

It should be noted that it is now possible for a nil rate band which is unused on a person's death to be transferred to the estate of their spouse or civil partner. Chargeable transfers at death are subject to IHT, but there is no IHT charged on lifetime gifts to individuals. Such transfers are known as potentially exempt transfers (PETs). Where the donor dies within seven years of making a PET, the transfer is taxed on its value at the date of the gift, using the death rate scale applicable at the date of death.

An additional tax-free band worth £175,000 per individual (£350,000 per married couple) applies from April 2020 in respect of the transfer of an individual's main home on death. The £350,000 allowance applies where the property is passed between spouses on first death and then on to children or grandchildren.

The combination of this new allowance and the existing IHT Nil Rate Band of £325,000 per individual means that a married couple now has a combined NRB of £1million. However, this new allowance is only available in full where the value of the deceased estate is under £2million. In deceased estates with a value of over £2million, the allowance is reduced by £1 for every £2 over £2million. This means that deceased estates with a value of more than £2.35million will not benefit from the allowance.

Several transfers are left out of account in arriving at the cumulative total on which a person is chargeable. These include transfers between spouses, lifetime transfers made in a year up to a value of £3,000 and transfers to charities.

Wide ranging changes to IHT were announced in 2006 which have had a significant impact on UK estate planning using trusts. As a result of the scope and complexity of these trust rules it is not possible to consider the

detail here. Farmers would be advised to consult their tax advisers to review the terms of existing trusts and their wills.

Agricultural and business property relief can in some circumstances reduce the value of the chargeable transfer to Nil.

Agricultural Property Relief (APR)

| <i>Nature of property</i> | <i>Rate of Relief</i> |
|---|------------------------------|
| Vacant possession or right to obtain vacant possession within 12 months | 100% |
| Agricultural land let after 1 September 1995 | 100% |
| Any other circumstances * | 50% |

* The 100% relief can apply in certain circumstances where land has been owned and let since before 10 March 1981 and by Extra Statutory Concession F17.

Agricultural Property Relief (APR) only applies to the agricultural value of farmland. Where the farm has additional development value this may qualify for Business Property Relief (BPR).

Agricultural property includes “such cottages, farm buildings and farmhouses, together with the land occupied with them, as are of a character appropriate to the property”. To qualify for APR, the transferor must either have farmed the agricultural property for two years before the transfer or have owned it for seven years before the transfer, during the whole of which time it has been occupied for the purposes of agriculture. As with gift relief, land anywhere within the EEA will qualify.

In order to obtain APR for a farmhouse it is necessary to show that the farmhouse is of a character and size appropriate to the property and the requirements of the farming activities conducted on the agricultural land. Relief may therefore be denied where the farmhouse is excessively large in relation to the farm. The definition of farmhouses and other agricultural property has been considered in a number of cases. HMRC will review APR claims more or less as a matter of course and specialist advice may be needed now, i.e. on a proactive basis, or in the event of an HMRC challenge.

Business Property Relief (BPR)

| <i>Nature of property</i> | <i>Rate of Relief</i> |
|--|------------------------------|
| Business or interest in a business | 100% |
| Controlling shareholding in quoted company | 50% |
| Shareholding in unquoted company | 100% |
| Controlling holding in unquoted securities | 100% |
| Settled property used in the business of a life tenant | 100%/50%* |
| Land, buildings, plant used in company or partnership | 50% |

* 100% relief is available where the property is transferred with the

business on death otherwise the 50% rate applies.

BPR is a relief against IHT on business assets, including a tenant's capital items such as machinery and livestock. To qualify for BPR, the property should have been owned by the claimant for two years before the transfer (or it must have replaced other qualifying assets owned for at least two out of the five years before the transfer). BPR is not available if the business or company is one of "wholly or mainly" dealing in securities, stocks or shares, land or buildings or in the making or holding of investments. Some business activities are borderline and particular care will be needed for mixed estates comprising farming and letting activities.

Value Added Tax

Value added tax (VAT) is an indirect tax on sales of goods and services. In general, a taxable business pays VAT on its purchases (input tax) and charges VAT on its sales (output tax). Taxable businesses are required to pass on the output tax to HMRC and may reclaim input tax. From 1 April 2021 businesses with an annual turnover of taxable goods and services of more than £85,000 are required to register for VAT. Businesses with a turnover of less than £83,000 may elect to deregister. It is also possible to voluntarily register for VAT where turnover is below £85,000 if this is seen to be beneficial. Once registered VAT returns are normally submitted to HMRC quarterly (although it is possible to apply for monthly VAT returns subject to certain conditions - see below).

| | |
|--|-------------------|
| Standard rate (1/6 of VAT-inclusive price) | 20.0% |
| Registration level from 1 April 2021 | £85,000 per annum |
| Deregistration level from 1 April 2021 | £83,000 per annum |

There are three rates of VAT applicable to taxable income: a standard rate, a reduced rate of 5% and a 0% rate. The standard rate is currently 20% and has been at this level since 4 January 2011.

Some income streams are not taxable, and are exempt from VAT. This can include supplies made in connection with land, i.e. renting or selling land or property. It is possible to 'opt to tax' land or property so that you can make the lease, licence or sale taxable. This is beneficial if there is input VAT to claim on expenditure connected with the property. The option to tax does not apply to residential accommodation.

Since farm businesses often have zero rated taxable income they can often be in a position where VAT being reclaimed from HMRC exceeds output VAT paid. In such situations, it is advisable to apply to HMRC to submit monthly rather than quarterly returns to aid cashflow. This can be done online.

Farmers may deregister for VAT and elect to use the "flat rate" farmers' scheme. A "flat rate" farmer cannot reclaim VAT on inputs, but charges and retains a flat rate addition of 4% on designated farming activities.

This applies even if some of the goods would otherwise be zero rated. If the farmer is involved in other non-farming activities (e.g. bed and breakfast) which have a turnover above the VAT threshold, the flat rate scheme may not be available.

The temporary reduction of the rate of VAT in the hospitality sector to 5% has been extended to 30 September 2021. From 1 October 2021 the reduced rate for these supplies will be replaced by the introduction of a new reduced rate of VAT of 12.5% which will remain in effect until 31 March 2022 before returning to 20% from 1 April 2022. The hospitality sector includes food and drink from bars, restaurants etc, as well as supplies of holiday accommodation.

The following is a brief summary of the VAT rates as they apply to typical farming activities and expenditure.

VAT - exempt Items

Banking

Certain subscriptions

Cottage rents other than for holiday purposes

Granting of credit and loans

Instalment credit finance charges on a hire-purchase

Insurances

Land let for growing grain, etc*

Postal services

Purchase or sale of land and existing buildings*

Rent*

Easements, Wayleaves, Servitudes, Rights of Way*

* The grant of a lease, licence or sale of land and property is exempt from VAT. Therefore, the above activities marked with a * are exempt from VAT unless an option to tax is in place. If an option to tax is in place these supplies are standard rated.

VAT - standard rated goods and services

Accountants' fees

Artificial insemination

Binder twine

Business activities of a Government Department

Camping facilities and car parks

Charges for storage of goods in enclosed spaces

Commission

Consultants' fees

Contract work for which a payment is in cash or kind

Cottage rents if let as holiday accommodation

Domestic fuel (special rate of 5% - provided supplied for "qualifying use")

Farmyard manure

Fencing and drainage

Fertilisers

Fishing and shooting rights

Fuel - petrol, diesel, and other heavy oil (for road use)
Grazing wintering and land let (with care of animals)
Haulage
Hire of machine or implement
Horses and ponies
Leasing charges
Machinery and vehicle repairs
MLC recording fees
New or second-hand machinery
Non-edible horticultural products
Non-residential construction
Property repairs
Quota sales and leases
Room lettings where catering is included
Sheep dogs
Soil and silage sampling charges
Sprays
Subscriptions, if association VAT registered
Telephone accounts
Tourist accommodation and meals
Trees and hedgerow timber
Paint
Pet foods
Veterinary services and medicines
Wood
Wool

VAT - zero rated goods and services

Animal feeding stuffs
Bees
Crops
Eggs
Sale of new residential buildings
Construction services in relation to a new dwelling
Grazing and wintering (no service included)
Livestock but excluding working animals
Milk
Newspapers, books and periodicals (including online since 1 May 2020)
Seeds of food and seed plants
Trees and bushes if used for production of edible fruit

Outside the scope of VAT

Grants
Compensation
Insurance Claims
Dilapidation payments

Car fuel scale charges

Other than farm vehicles, where fuel is purchased for vehicles which are used for private and business purposes, VAT is only partially recoverable. To make things simpler businesses can use the VAT Fuel Scale Charge. When using this system the business reclaims all VAT incurred on fuel and then accounts for the private use using the fuel scale charge. Alternatively, the business can elect to not recover any VAT incurred on fuel.

The VAT road fuel scale charges are based on the emissions rating of the vehicle and were updated with effect from 1 May 2020. These figures should be used only from the start of the next VAT accounting period beginning on or after that date. These figures along with previous years can be found on the HMRC website at <https://www.gov.uk/government/publications/vat-road-fuel-scale-charges-table>

Basic Payment Scheme Entitlements

The receipt of BPS from the EU is outside the scope of VAT.

The sale or lease of BPS entitlements by a VAT registered business is treated as a supply. This means that the purchase price would be subject to VAT at the standard rate and farmers would be looking to recover this input VAT.

Brexit

The UK's transition period with the European Union came to an end on 31 December 2020.

Businesses that currently trade with EU suppliers and customers should consider their position following exit from the EU. Measures can be taken such as applying for AEO ("Authorised Economic Operator") status and duty deferment schemes to better facilitate trade.

National Insurance Contributions (NICs)

| <i>Class 1 (employees)</i> | <i>Main rate</i> |
|------------------------------------|-------------------------|
| <i>Employee contributions</i> | |
| - on earnings £184.00 - £967.00 pw | 12.0% |
| - on earnings above £967.00 pw | 2.0% |
| <i>Employer contributions</i> | |
| - on all earnings above £170.00 pw | 13.8% |

Employer contributions (at 13.8%) are also due on most benefits in kind and on tax paid on an employee's behalf under a PAYE settlement agreement.

| | |
|---|--------|
| Class 2 (self-employed) | |
| Flat rate per week | £3.05 |
| Small earnings exception: profits per annum | £6,515 |

| | |
|----------------------------|--------|
| Class 3 (voluntary) | |
| Flat rate per week | £15.40 |

| | |
|--------------------------------|------|
| Class 4 (self-employed) | |
| On profits £9,568 - £50,270 | 9.0% |
| On profits over £50,270 | 2.0% |

From 6 April 2014, every business or charity in the UK is entitled to benefit from an “allowance” in respect of their employer Class 1 NIC liability. This “allowance” remains at £4,000.

Self-employed individuals will pay both Class 2 and Class 4 NICs and these will be collected through the Self-Assessment tax return. No NIC is levied if the individual is over state pension age.

Stamp Duty (SD)

| | |
|--|---------------------------------|
| | % of Total Consideration |
| Shares and marketable securities (nil if value up to £1,000) | 0.5% |

Stamp Duty Land Tax (SDLT)/Land Building Transaction Tax (LBTT) in Scotland

SDLT/LBTT imposes a charge on land transactions. LBTT applies in Scotland only. SDLT applies in England and Northern Ireland. The tax is calculated as a percentage of chargeable consideration with different amounts applicable to residential and non-residential transactions. The person liable to pay the tax is the purchaser. In general, the tax must be paid at the same time the return is made. Interest is charged on late paid tax, and also on late paid penalties.

| | Commercial Property | |
|---------------------------|----------------------------|------------------------------|
| LBTT | | SDLT |
| Up to £150,000 | 0% | Up to £150,000 0% |
| Over £150,000 to £250,000 | 1% | Over £150,000 to £250,000 2% |
| Over £250,000 | 5% | Over £250,000 5% |

| Residential Property (First Property) | | | |
|--|-----|-----------------------------------|-----|
| LBTT | | SDLT | |
| Rates to 31 March 2021 | | Rates to 30 September 2021 | |
| Up to £250,000 | 0% | Up to £250,000 | 0% |
| Over £250,000 to £325,000 | 5% | Over £250,000 to £925,000 | 5% |
| Over £325,000 to £750,000 | 10% | Over £925,000 to £1.5m | 10% |
| Above £750,000 | 12% | Above £1.5m | 12% |

A supplement applies for both SDLT and LBTT purposes where a second residential property is purchased by an individual for more than £40,000. The rate is 3% for SDLT purposes and 4% for LBTT purposes (increased from 3% from 25 January 2019). The 3% supplement also applies for LBTT purposes when certain “non-natural persons” (broadly, companies, partnerships, collective investment schemes) purchase a residential property, even if it is their first and only residential property.

From 21 March 2012 a 15% rate of SDLT applies to certain “non-natural persons” acquiring residential property where the purchase price exceeds a set level. From 20 March 2016 the 15% rate applies to properties where the cost exceeds £500,000 subject to relief in certain specific circumstances.

Single Farm Payment Scheme/Basic Payment Scheme

The European Union Common Agricultural Policy has introduced new reforms across all EU member states. From 1 January 2015, the Single Farm Payment Scheme (SFPS) which has been in existence since January 2005 has been replaced with the Basic Payment Scheme (BPS). The Milk Quota system has also been abolished with effect from 31 March 2015.

The BPS is a regional area-based scheme. BPS receipts will be liable to income tax or corporation tax (if paid to a company) and should be included in the taxable trading income in the relevant accounting period.

For more information on the BPS, see pages 489-512.

Commercial Woodlands

Commercial woodlands enjoy a tax favoured status.

For income tax purposes, sales of timber from commercial woodland can be outside the scope of income tax. However, in circumstances where land is predominantly occupied for another purpose, receipts from the sale of timber may fall outside the exemption. For example, receipts from the sale of trees planted on a farm should be included as part of farming

profits. An owner of commercial woodlands who simply lets the land will receive income in the form of rent and this would be classed as profits from a rental business.

In relation to capital gains tax, profits from the sale of trees are exempt, but there may be a charge to capital gains tax on a profit on the sale of land (i.e. the solum). Furthermore, the occupation of commercial woodlands is a qualifying activity for roll-over and hold-over reliefs.

Inheritance tax exemption is potentially available through 100% Business Property Relief once a two-year period of ownership of commercial woodlands has been established. Agricultural Property Relief would potentially be available on woodlands whose occupation is ancillary to the agricultural land. An example of this would be a woodland shelter belt.

For more information see the Forestry and Farm Woodlands section on page 325.

Anti-Avoidance

The “General Anti-Abuse Rule” (“GAAR”) came into force with the enactment of the Finance Act 2013 on 17 July 2013. The rule counteracts abusive tax avoidance schemes and applies to income tax, national insurance contributions, corporation tax, capital gains tax, inheritance tax, petroleum revenue tax and stamp duty land tax.

The measure supports the Government's objective of promoting fairness in the tax system by deterring taxpayers from entering into abusive schemes that might succeed under current law. The GAAR provides that tax advantages arising from such arrangements are counteracted on a just and reasonable basis.

The UK GAAR legislation has a 'safety net' arrangement in that there is a requirement for HM Revenue & Customs to seek opinion from an independent panel before invoking the GAAR legislation. There is now a separate Scottish GAAR which initially will only apply to the two devolved taxes (Land and Buildings transaction tax (LBTT) and Scottish landfill tax). The Scottish GAAR has no requirement to bring in an independent perspective and, therefore, gives much more power to Revenue Scotland. It is intended that the Scottish GAAR will extend to all devolved taxes in the future.

Making Tax Digital

In the March 2015 Budget, the Government announced its vision for a new digital tax administration and there was much publicity about this being the death of the annual self-assessment tax return. The

transformation of the tax system, to be fully in place by April 2020, was hailed by HMRC as being simpler, more effective, and more efficient.

Under Making Tax Digital (MTD) there will be a requirement to keep accounting records in a digital format and to submit income details, expenditure details and tax computations to HMRC using MTD compatible software on at least a quarterly basis. The new system will have a fundamental impact on record-keeping and businesses/landlords will be required to use digital tools such as cloud software or apps, which will have the ability to upload information to HMRC. Each taxpayer will have an online 'digital account' where they will be able to view their payments.

The intended timetable for MTD has changed and in July 2017 HMRC confirmed that MTD reporting will not start until April 2019, and then only for VAT purposes. Self-employed businesses and landlords with annual business or property income above £10,000 will need to follow the rules for MTD for Income Tax from their next accounting period starting on or after 6 April 2023. Businesses with a turnover below £85,000 will have the option to provide digital records voluntarily via MTD.

Eventually all businesses and organisations will have to comply with MTD. Quarterly MTD returns will replace the annual corporation tax return and the business pages of self-assessment tax returns. A quarterly return will need to be made for each tax a business pays. Therefore, there will eventually be a requirement to submit a quarterly VAT return, as well as a quarterly corporation tax or income tax return.

Summary of Income Tax and Capital Gains Tax Rates

| | |
|-------|---|
| 7.5% | Basic Rate for Dividend Income |
| 10% | Capital Gains Tax Rate for gains attracting Entrepreneurs Relief |
| 10% | Capital Gains Tax Rate for gains up to Basic Rate limit |
| 18% | Capital Gains Tax Rate for gains on Residential Property up to Basic Rate limit |
| 19% | Starter Rate for Scottish NSND (non-savings/non-dividend) Income |
| 20% | Capital Gains Tax Rate for gains above Basic Rate limit |
| 20% | Basic Rate for Scottish NSND Income |
| 20% | Basic Rate for RUK NSND income |
| 20% | Basic Rate for Savings Income |
| 21% | Intermediate Rate for Scottish NSND Income |
| 28% | Capital Gains Tax Rate for gains on Residential Property above Basic Rate limit |
| 32.5% | Higher Rate for Dividend Income |
| 38.1% | Top Rate for Dividend Income |
| 40% | Higher Rate for RUK NSND Income |
| 40% | Higher Rate for Savings Income |
| 41% | Higher Rate for Scottish NSND Income |
| 45% | Top Rate for RUK NSND Income |
| 45% | Top Rate for Savings Income |
| 46% | Top Rate for Scottish NSND Income |

Notes

The Scottish Rate of Income Tax (SRIT) only applies to certain types of income. This is non-savings/non-dividend income (NSND) which is broadly salaries, self-employment profits, pension income and rental income.

| | |
|--|---|
| | Rates applying to NSND for Scottish Taxpayers. |
| | Rates applying to NSND for the rest of the UK (RUK). |
| | Rates for other income sources such as dividends and bank, etc. interest are taxed at the same rate throughout the UK. Capital gains are also taxed at the same rate throughout the UK. |

Miscellaneous

Summary of Farm Management Practices (including useful dates and timings)

Good Agricultural and Environmental Conditions (GAEC) - Scotland

Buffer strips (GAEC 1)

- no cultivations and application of pesticides within 1 Jan - 31 Dec
2m of the top of the bank of watercourses

Water abstraction (GAEC 2)

- submit annual data return by 31 Dec

Muirburn (GAEC 6)

- permitted between and inclusive 1 Oct - 15 Apr
(or 30 Apr with the landowner's permission)

Hedges and trees (GAEC 7)

- no trimming between and inclusive 1 Mar - 31 Aug
(or 31 Jul if hedge/tree in field to be sown with WOSR or TGRS)
- no cultivations and application of fertilisers and 1 Jan - 31 Dec
pesticides within 2m from the centre line of hedges

Greening

Permanent grassland

Nitrogen fertiliser and lime plan prepared by 9 Jun

Ecological Focus Areas (EFAs)

EFA fallow period 15 Jan - 15 Jul

Establish EFA green cover by 1 Nov

Maintain EFA green cover until 31 Dec

Establish EFA catch crop in 'spring'

Maintain EFA catch crop until 31 Dec

Harvest of EFA nitrogen fixing crops after 1 Aug

Cut or graze EFA margins (buffers; cut only, not graze) after 15 Jul

EFA map submit by 15 May

Diffuse Pollution General Binding Rules (DP GBRs) - Scotland

Minimum legal working distances from watercourses:

Within 2m of a watercourse

- no application of inorganic fertiliser
- no application of pesticides
- no cultivation (from top of bank)

Within 5m of a watercourse

- prevent significant poaching

Within 5m of spring, well or borehole

- no fertiliser application
- no cultivation
- no livestock

Within 10m of a watercourse

- no slurry or manure application
- no storage of fertiliser (including temporary field middens)
- no livestock feeders

Within 50m of spring, well or borehole

- no storage of fertilisers (including temporary field middens)
- no slurry or manure application

NVZ - Scotland (SMR 1)

NVZ fertiliser and manure management plan prepared before 1 Mar

NVZ closed periods (organic manures with a high available N content):

| | Grassland | Other land |
|------------------------|------------------|-------------------|
| Shallow or sandy soils | 1 Sep - 31 Dec | 1 Aug - 31 Dec |
| All other soil types | 15 Oct - 31 Jan | 1 Oct - 31 Jan |

NVZ closed periods (manufactured nitrogen fertiliser):

| | Grassland | Other land |
|--|------------------|-------------------|
| Moray, Aberdeenshire, Banff & Buchan NVZ | 15 Sep - 20 Feb | 1 Sep - 20 Feb |
| All other Scottish NVZ areas | 15 Sep - 15 Feb | 1 Sep - 15 Feb |

NVZ - England, Wales and Northern Ireland

NVZ closed periods (organic manures with a high available N content):

| | Grassland | Other land |
|------------------------|------------------|-----------------------|
| Shallow or sandy soils | 1 Sep - 31 Dec | 1 Aug - 31 Dec |
| All other soil types | 15 Oct - 31 Jan* | 1 Oct - 31 Jan* |
| | | *(15 Oct - 31 Jan NI) |

NVZ closed periods (manufactured nitrogen fertiliser):

| | Grassland | Other land |
|-------------------|------------------|-------------------|
| England and Wales | 15 Sep - 15 Jan | 1 Sep - 15 Jan |
| Northern Ireland | 15 Sep - 31 Jan | 15 Sep - 31 Jan |

Business Management

Tax Return

- paper forms submit by 31 Oct
- online submit by 31 Jan

IACS forms (Scotland) submit by 15 May

AECS annual management options claim submit by 15 May

Scottish Suckler Beef Support Scheme claim submit by 31 Dec

Scottish Upland Sheep Support Scheme claim submit 1 Sep - 30 Nov

| | |
|--|-------------------------|
| Agricultural and horticultural census (Scotland) at 1 st Monday in June | complete within 14 days |
| Agricultural survey (Scotland) at 1 st Monday in December (DAS) | complete within 14 days |

Livestock Management

Physiological values and breeding cycles for livestock:

| | <i>Cow</i> | <i>Ewe</i> | <i>Red Deer</i> | <i>Sow</i> | <i>Poultry</i> |
|-----------------------|------------|------------|-----------------|------------|----------------|
| Gestation (days) | | | | | |
| - mean | 285 | 150 | 231 | 114 | 21 |
| - range | 269-299 | 140-160 | 226-238 | 109-125 | - |
| Oestrus period (days) | | | | | |
| - mean | 21 | 16 | 19 | 21 | - |
| - range | 18-24 | 14-20 | 17-21 | 19-23 | 16-24 |

Cattle (Scotland SMR 7):

| | |
|--|-----------------------------|
| Tagging calves (after birth): | |
| ▪ beef | within 20 days |
| ▪ dairy - one tag | within 36 hours |
| ▪ dairy - second tag | within 20 days |
| Replace illegible or lost tags | within 28 days of discovery |
| Registering calves with BCMS | within 7 days of tagging |
| Cattle deaths to be reported to BCMS | within 7 days |
| Cattle movements to be reported to BCMS | within 3 days |
| Cattle within business movements reported to ScotEID | within 48 hours |
| Retention of cattle records | at least 10 years |

Sheep and goats (Scotland SMR 8):

| | |
|--|---|
| Identify all animals (after birth): | |
| ▪ intensive systems | within 6 months |
| ▪ extensive systems | within 9 months |
| | (or before they leave the holding whichever is soonest) |
| All animals double tagged (one tag must be EID) from 12 months of age | |
| Replace illegible or lost tags | within 28 days of discovery |
| Record details of identification, illegible or lost tags and movements | within 48 hours |
| Movements sent to SAMU | within 3 days |
| Retention of sheep records | at least 3 years |
| Annual inventory for animals kept (SGAI) | at 1 Dec |

Pigs (Scotland SMR 6):

| | |
|---------------------------------|--|
| Register with local APHA office | within 30 days of the date pigs are first kept |
| Notify APHA changes of details | within 30 days of the change |
| Notify off movements to ScotEID | before or on the day of the movement |
| Notify on movements to ScotEID | within 3 days of arrival |
| Record on and off movements | within 48 hours of the movement date |

Shooting open seasons for birds *

| | England, Scotland & Wales | Northern Ireland |
|----------------------------|--------------------------------------|-------------------------|
| Pheasant | 1 Oct - 1 Feb | 1 Oct - 31 Jan |
| Partridge | 1 Sep - 1 Feb | 1 Sep - 31 Jan |
| Grouse | 12 Aug - 10 Dec | 12 Aug - 30 Nov |
| Ptarmigan (Scotland only) | 12 Aug - 10 Dec | - |
| Common snipe | 12 Aug - 31 Jan | 1 Sep - 31 Jan |
| Woodcock (except Scotland) | 1 Oct - 31 Jan | 1 Oct - 31 Jan |
| Woodcock (Scotland) | 1 Sep - 31 Jan | - |
| Wild duck and geese: | | |
| - below high water mark | 1 Sep - 20 Feb | 1 Sep - 31 Jan |
| - elsewhere | 1 Sep - 31 Jan | 1 Sep - 31 Jan |

Shooting open seasons for ground game *

| | England, Wales & Northern Ireland | Scotland |
|---------------------|--|-------------------|
| Brown hare (not NI) | 1 Jan - 31 Dec | 1 Oct - 31 Jan |
| Brown hare (NI) | 12 Aug - 31 Jan | - |
| Mountain hare | - | 1 Aug - 28/29 Feb |
| Rabbit (not NI) | 1 Jan - 31 Dec | 1 Jan - 31 Dec |

Shooting open seasons for deer *

| | England, Wales & Northern Ireland | Scotland |
|-------------------------------|--|-----------------|
| Red deer: | | |
| - stags | 1 Aug - 30 Apr | 1 Jul - 20 Oct |
| - hinds | 1 Nov - 31 Mar | 21 Oct - 15 Feb |
| Sika deer & red/sika hybrids: | | |
| - stags | 1 Aug - 30 Apr | 1 Jul - 20 Oct |
| - hinds | 1 Nov - 31 Mar | 21 Oct - 15 Feb |
| Fallow deer: | | |
| - bucks | 1 Aug - 30 Apr | 1 Aug - 30 Apr |
| - does | 1 Nov - 31 Mar | 21 Oct - 15 Feb |
| Roe deer (not NI): | | |
| - bucks | 1 Apr - 31 Oct | 1 Apr - 20 Oct |
| - does | 1 Nov - 31 Mar | 21 Oct - 31 Mar |

* all dates inclusive

Imperial-Metric Conversion

Conversion factors

| | Imperial | A | Metric | B |
|--------------------|-------------------|----------|------------------|-----------|
| Length | inch | 25.4 | mm | 0.03937 |
| | foot | 0.3048 | m | 3.281 |
| | yard | 0.9144 | m | 1.094 |
| | chain | 20.12 | m | 0.04971 |
| | mile | 1.609 | km | 0.6214 |
| Area | acre | 0.4047 | ha | 2.471 |
| | ft ² | 0.0929 | m ² | 10.76 |
| | yd ² | 0.8361 | m ² | 1.196 |
| Volume | ft ³ | 0.02832 | m ³ | 35.31 |
| | yd ³ | 0.7646 | m ³ | 1.308 |
| | pint | 0.5682 | litre | 1.76 |
| | gal | 4.546 | litre | 0.22 |
| | gal | 0.004546 | m ³ | 219.969 |
| | fl oz | 28.41 | ml | 0.0352 |
| Weight | oz | 28.35 | g | 0.03527 |
| | lb | 0.4536 | kg | 2.205 |
| | cwt | 50.8 | kg | 0.01968 |
| | ton | 1.016 | t | 0.9842 |
| Energy | therm | 105.5 | MJ | 0.009478 |
| | kWh | 3.6 | MJ | 0.2778 |
| | btu | 1.055 | KJ | 0.9478 |
| | hp | 745.7 | W | 0.001341 |
| Temperature | °F | (°F-32) | °C | (°Cx1.8) |
| | | x0.5556 | | +32 |
| Rate of use | lb/ac | 1.121 | kg/ha | 0.8922 |
| | cwt/ac | 125.5 | kg/ha | 0.007966 |
| | ton/ac | 2511 | kg/ha | 0.0003983 |
| | lb/gal | 99.78 | g/litre | 0.01002 |
| | gal/ac | 11.23 | litre/ha | 0.08902 |
| Unit cost | units (fert)/ac | 1.25 | kg/ha | 0.8 |
| | £/ft ² | 10.76 | £/m ² | 0.0929 |
| | £/yd ² | 1.196 | £/m ² | 0.8361 |
| | £/ac | 2.471 | £/ha | 0.4047 |
| | £/yd ³ | 1.308 | £/m ³ | 0.7646 |
| | £/gal | 0.220 | £/litre | 4.546 |
| | £/ton | 0.9842 | £/t | 1.016 |
| | £/cwt | 0.01968 | £/kg | 50.8 |
| | £/lb | 2.205 | £/kg | 0.4536 |

Note: Imperial unit x A = Metric unit
Metric unit x B = Imperial unit

| | Imperial | Metric |
|-----------------------------|---|---|
| Length | foot = 12 inches yard = 3 feet mile = 1,760 yards | cm = 10 mm m = 100 cm km = 1,000 m |
| Area | ft ² = 144 inches ² yd ² = 9 ft ² acre = 4,840 yd ² mile ² = 640 acres | m ² = 10,000 cm ² km ² = 1,000,000 m ² km ² = 100 ha ha = 10,000 m ² |
| Volume | pint = 20 fluid ounces gallon = 8 pints fluid ounce = 1.734 inches ³ pint = 34.6774 inches ³ gallon = 277.42 inches ³ foot ³ = 1,728 inches ³ yard ³ = 46,656 inches ³ | litre = 1,000 ml cm ³ = 1,000 mm ³ m ³ = 1,000,000 cm ³ |
| Weight | lb = 16 oz stone = 14 lb cwt = 112 lb ton = 2,240 lb | kg = 1,000 g tonne = 1,000 kg |
| Milk | 1 litre = 1.03 kg | 1 kg = 0.971 litre |
| Irrigation | 1 inch/acre = 102.75 m ³ | 25 mm/ha = 250 m ³ |
| Energy | hp = 550 ft lb force/sec | hp = 75 m kg force /sec |
| Velocity | mph = 1.609 km/hr | km/hr = 0.6214 mph m/sec = 3.281 ft/sec |
| Volume | ft ³ /second = 0.02832 m ³ /sec | m ³ /sec = 35.31 ft ³ /sec |
| Flow rate | gallon/min = 0.07577 litres/sec | litre/sec = 13.2 gallons/min |
| Specific volume rate | ft ³ /ton min = 0.02787 m ³ /t min | m ³ /t min = 35.88 ft ³ /ton min |
| Mass flow rate | ton/hr = 0.2822 kg/sec | kg/sec = 3.543 ton/hr |

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