INCREASING THE RANGE OF VEGETABLES GROWN IN WALES

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EXECUTIVE SUMMARY

1. Multiple retailers sell approximately 75% of fresh fruit and vegetables in the UK; this has now become the biggest potential market for locally grown produce.
2. Market research has suggested that Welsh customers are more likely to buy locally sourced material.
3. Most multiples have departments sourcing local produce and are keen to get involved with growers. These departments can be approached by direct contact or through road-shows and can give leads on produce that is required.
4. The organic food market in Britain is becoming more competitive. There was a 14% growth in the organic market in 2006. Growth came from new consumers as well as consumers buying organic fruit and vegetables more often.
5. SWOT analysis of the opportunities for developing vegetable supply chains indicates that although there are a number of weaknesses in the Welsh horticulture sector, and threats, there are nonetheless a range of opportunities in the current situation.
6. The main opportunities arise from the potential to expand production; possibilities for long term contracts; more flexibility among supermarket buyers; the existence of specialist local produce buyers; potential for local speciality crops, producer-groups, share farming, and the potential availability of technical assistance and new infrastructures for marketing.
7. In the organic sector the level of organic production is low with an inadequate area of organic production in the UK. Vegetable supply shortfalls are predicted as the market grows. Expansion of production is hampered by poor returns to growers.
8. There is historic evidence of a considerable decline in vegetable production in Wales. Despite the limitation of a low proportion of Grade 1 agricultural land, there is potential to increase levels of production in Wales should the demand for locally sourced produce continue.
9. Farms in lowland Wales are mainly in milk production or beef and sheep systems. Many dairy farms have withdrawn from milk production and there are now a substantial number of farmers who could consider alternative crop enterprises.
10. The decoupled Single Farm Scheme has changed the economics of livestock farming as the headage payments have been removed. Farmers are encouraged to introduce new enterprises.
11. The Single Payment is not payable on land growing field vegetables.
12. High value crops can make a significant impact on farm profitability but involve capital investment may involve a two / three year delay in producing a saleable crop.
13. Field vegetables can make a positive contribution to overall business profitability, but large areas will require a substantial consultancy support during the first two to three years.
14. Skills training and organisation of casual labour need to be part of any plans to introduce new crops.
15. Farmers will need long term contracts to be persuaded to enter into growing new crops.

16. Younger farmers should consider higher value crops to aid longer-term viability for their businesses.
17. Through CALU, on-going agronomic and financial advice should be made available to new growers, or those expanding into new lines.
18. Through CALU, a new network of demonstration holdings for trial work, workshops and to demonstrate the full potential for fruit and vegetable growing in Wales should be established

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1.0 INTRODUCTION

As part of a 2006 CALU Horticulture Inward Investment Project[1], ADAS interviewed a number of businesses in Wales. A recurring theme within these interviews was the desire to examine the viability of growing a wider range of vegetables to supply their multiple retail customers in Wales. Companies interviewed were currently fully occupied fulfilling existing contracts and had insufficient time or resources to expand, but felt strongly that there is a market opportunity.

One company pointed out that summer vegetables currently supplied to Welsh supermarkets are primarily grown in Lincolnshire[2]. If Wales grew these summer vegetables, there are likely to be higher growing costs. This posed the question, "is it commercially viable to grow these vegetables in Wales?"

This report was commissioned by CALU to assess the financial and practical viability of expanding the current range of vegetables grown in Wales and to examine possibilities for farmers to diversify into field vegetable production.

1.1 Objectives

- To assess the feasibility of Welsh farms and companies supplying a greater range of vegetable crops to complement those already being sold to the supermarkets.
- To examine the main barriers to developing vegetable production and marketing businesses in Wales.

1.2 Methods

This study involved a combination of consultations and desk-based activity.

Consultations were undertaken with representatives of the multiple retailers, Welsh Assembly Government and with growers and companies currently supplying multiple retailers. ADAS staff also took part in workshops organised on the theme of increasing the supply of Welsh fresh produce to supermarkets.

Business plans, farm budgets, gross margins and yield guides have been produced using ADAS data and computer models.

[1] CALU (2006) Investment Opportunities in the Welsh Horticultural Processing Sector. Centre for Alternative Land Use. University of Wales, Bangor. Henfaes Research Centre, Abergwyngregyn LL33 0LB

[2] See, 'Puffin Produce - Challenges facing a medium sized indigenous Welsh horticultural business' *Ibid* pp 54-55

2.0 OPPORTUNITIES FOR SUPPLYING THE MULTIPLE RETAIL SECTOR

2.1 Multiple retailers - Requirements and opportunities

Multiple retailers now sell some 75% of fresh fruit and vegetables; this has become the biggest potential market for locally grown produce. Recent and longer term issues such as “food miles”, local sourcing and demand for seasonal produce have led a revival in local produce and regional specialities.

In past years multiple retailers have tended to reduce the numbers of suppliers preferring to deal with fewer larger producers. There is evidence that this has now changed with the bulk of the multiples now seeking local seasonal suppliers, especially with some regional specialities.

This move is largely customer driven. Various loyalty schemes give an accurate picture of sales and these are highlighting the better response to local seasonal produce when available.

Multiples still need the back up of their audited supply protocols such as Assured Produce so suppliers need to take these requirements on board. Often a tie-up with an umbrella marketing group or co-operative can help fill this requirement. Usually some type of co-operative marketing and possibly production can help even out supply peaks.

As can be expected multiples are very focussed on the myriad of lines in their stores. Suppliers need to acquire new skills such as accurate crop prediction, so orders can be given and filled reliably. This can be a problem with seasonal supply as various promotions have to be planned in advance and if there is a seasonal or technical sales problem, market confidence can be lost.

There is some evidence that to obtain local produce, there are some compromises on the quality control systems that produce are usually subject to. This will give the multiples benefits in produce freshness but any abuse will seriously affect this potential market.

Most, if not all, of the multiples now have departments looking into local sourcing across the range and are keen to get involved with growers to source produce. These departments are approachable via direct contact or through roadshows and will give leads on produce that is required.

Any local angle is a good start. In Wales this could be traditional Welsh crops such as early potatoes and brassicas from the South, or crops that already have Welsh connections such as leeks and possibly daffodil flowers.

Market research has suggested that Welsh customers are more likely to buy locally sourced material. In fact interviews suggested that consumers in Wales, along with Cornwall and Scotland, are the most likely to seek out regional produce.

Multiples are extremely competitive with each other. They all like to have as wide a range as possible and also to be competitive on price. To some extent this is slightly relaxed on fresh product, but not on other lines such as bread and milk.

This competition will help drive sales as with most commodities demand is likely to outstrip supply. Whilst this is a healthy picture for the potential local

suppliers, it is important that systems are developed to produce crop to satisfy this market with reliable quantity and quality or the market could fizzle out.

These systems will include crop management and production issues, but also possibly newer areas such as crop continuity programmes and crop prediction. For a multiple, there is nothing worse than promised product either not turning up or not being of sufficient volume or quality.

2.1.1 The market for organic fruit and vegetables

The organic food market in Britain is likely to become even more competitive as the American chain "Whole Food Market" opens its first store with 80,000 square feet of floor space in London in June, 2007. This company has been extremely successful with nearly 300 stores; targeting green shopping and what is described as the "conscience struck consumer".

Market Researchers TNS reported growth of 14 per cent in the organic market in 2006, with legumes being the only sector experiencing decline (Waters, 2006). Tesco, the biggest multiple retailer, accounts for the largest share of organic fresh produce followed by Sainsburys and Waitrose. The biggest value growth in 2006 was from M&S, which increased 54 per cent compared to the same time a year ago. Growth is thought to come from new consumers as well as consumers buying organic fruit and vegetables more often (Waters, 2006).

According to the HDRA Research Department[3], at the retail level the price of organic horticultural crops has increased 1.9 per cent. However at the farm level there have been continued reports of downward price pressures and higher specifications, which were reported to be most severe in the pre-pack sector, and to originate from competition between supermarkets. Imports have also been reported to put pressure on prices. Low prices offered to growers supplying the pre-pack sector were reported to threaten the economic viability of organic vegetable production hence some growers were reluctant to invest in converting new land.

There is a potential shortage of UK organic vegetables which could result in possible increased reliance on imports as there are suggestions that UK land area has not increased sufficiently to fulfil market expansion demands. Currently 585ha are in conversion to organic vegetable production, however further organic vegetable production could be enabled through land transfers from other organic sectors[4].

[3] This section draws upon HDRA's contribution to a review of the market for organic fruit and vegetables in Wales, lead by the Organic Advisory Service, Elm Farm Organic. The report will be available from Organic Centre Wales in Spring 2007, www.organic.aber.ac.uk

[4]

3.0 OPPORTUNITIES FOR SUPPLY CHAIN DEVELOPMENT

3.1 Stakeholder Interviews

Interviews were undertaken with representatives of companies supplying multiple retailers and other outlets, and with officials of Welsh Assembly Government. Stakeholders identified weaknesses and threats, but the opportunities that currently exist to supply an under-supplied market for local and Welsh-branded fresh produce were the dominant theme.

In depth interviews were held with the following stakeholders:

➢ Respondent 1– Grower	Supplies Sainsburys directly with potatoes.
➢ Respondent 2 – Grower	Supplies two wholesalers with potatoes and runner beans.
➢ Respondent 3 - Grower	Supplies Tesco with tomatoes.
➢ Respondent 4 – Marketing Agent	Supplies 70 of the 330 ASDA retail outlets. Also supplies local restaurants.
➢ Respondent 5 - Consultant	Welsh Assembly Government Food and Market Development Division Manager.

A member of the project team also took part in the Tesco 'Meet the Buyer workshop" on 8th of March 2007 at the National Botanic Garden of Wales. The event was organised by the Welsh Assembly Government Food and Market Development Division and Tesco. Producers had an opportunity to display and a 5 minute consultation with the Tesco category buyer.

The Tesco message was, "We are on the look-out for exciting local produce for our stores. So, if you are a Welsh producer, bring along anything you make or grow yourself. Maybe we can help you grow it a bit more". Only two vegetable producers attended the event, out of a total of 120 producers.

One of the vegetable producers was *Really Welsh*[5]. Interviewed by the ADAS consultant, their representative said that the company knows what the supermarkets want and furthermore, they already have the right infrastructure to supply them. Really Welsh are seeking additional vegetable land in Wales to rent in order to expand the supply of this brand to the multiples.

[5] For more details of Really Welsh, www.reallywelsh.com

Currently, *Really Welsh* supply Tesco with mushrooms from Crai Organics. *Really Welsh* is looking to source vegetables from a farm in Mid Wales and have recently signed a contract with an organic grower in Powys who will supply them with Brussel sprouts.

At the moment *Really Welsh* only supply Waitrose and Tesco. The company has been approached by Marks and Spencer and Sainsburys but say that these supermarkets are still only a niche within Wales. "They have a small number of outlets, and do not cover the whole of Wales. Tesco provides us with the opportunity to go all over Wales."

According to a Datris report in 2004, there were 229 multiple retail outlets in Wales. Somerfield stores were the most numerous, followed by Tesco.

Table 1 Multiple Retail stores in Wales

Company	Number of stores in Wales
Somerfield	130
Tesco	41
Safeway (Acquired by Morrisons in March, 2004)	15
Asda	15
Marks and Spencer	14
Sainsburys	9
Morrisons	5

Source: Datris, 2004

3.1.1 Current situation and strengths of each interviewee

Respondent 1 is a grower supplying Sainsburys directly for the second year running. The grower reports **consistent demand** with increased demand at the beginning of the season and at weekends. Orders are placed the day before the date due for delivery. These orders are taken through a separate organisation but are delivered directly to Sainsburys' stores and do not go through a packhouse.

Respondent 2 grows potatoes and runner beans which are sold to two wholesalers.

Respondent 3 manages a large glasshouse unit in south Wales, growing a range of **specialist varieties** with no ordinary round tomato production. The business is part of a large multi-national marketing desk with three large UK based nurseries (these however, only add up to 3% of total turnover).

Respondent 4 is a soft fruit marketing desk with a **strong Welsh focus**, although based in Evesham. Fruit is supplied through **local depots** rather than directly to ASDA stores. An ASDA buyer places orders with local producers for delivery to the nearest depot.

Respondent 5 is one of four WAG FMDD consultants involved in a project sourcing more Welsh produce for multiple retailers. The project started in 2006 when ASDA wanted to **source more local produce**. A number of meetings have held between stakeholders, multiple retailers, WAG, wholesalers & growers. In North Wales the project is in contact with ASDA & Fenmarc (brand champion of ASDA). In South Wales, the project works with

Tesco and Emmets ('Really Welsh'). A 'meet the buyer' event (one of a series of Tesco Road shows) has been held at the National Botanic Garden of Wales near Carmarthen.

3.1.2 Weaknesses identified by interviewees

Respondent 1 reported some **technical / investment issues**. For example the business does not have the facilities to generate bar codes and so the labels with barcodes and 'sell by dates' are produced elsewhere. There were also problems with **unsold produce** - potatoes past their 'sell by date' are returned to the farm. Overall, supplying Sainsburys was regarded as 'fairly small trade' and chiefly justified by the convenience and publicity it generates for their farm shop.

Respondent 2 no longer supplies the multiple retailers and reported poor and stagnant **prices** for produce – the same as 15 years ago. The grower argues that multiple retailers have caused wholesalers to lose business and that now wholesalers only supply the catering sector & nursing homes. This grower believes that the market for local produce has declined.

Respondent 3 reported on **pressures from multiple retailers**. For example, both Tesco and ASDA want exclusive supply. Tesco require identifiable local product for promotion but pay low prices. No premium prices are offered for local product, though there can be a premium price for produce which scores well on flavour. The Co-op runs promotions. This means lower average prices for the consumer, with produce selling 3 times more than usual, but the price to the grower is one third of the normal price - so no gain for the producer.

Respondent 4 reported that **premium prices for local produce are low**, e.g. 30p for 6kg of soft fruit.

Respondent 5 reported that there is **no real skill base** for growing produce for supermarkets. Fenmarc provides a heavy skill packet to ensure supermarkets are supplied with quality produce.

3.1.3 Opportunities identified by interviewees

Respondent 1 reported that they have been approached by Sainsburys to **expand** and to supply other retail outlets in South Wales.

Respondent 2 reported that he would be prepared to increase the quantity of vegetables produced if he were offered a **permanent contract** with a wholesaler.

Respondent 3 reported that **a major theme with multiple retailers is local production from Wales**, Scotland and Cornwall. There **is consistent demand for Welsh tomatoes from markets**. Cardiff wholesale market, secondary wholesalers and restaurants, market traders and consumers all demand local produce. At present most interest is from Tesco and ASDA but Somerfield and the Co-op are also interested in supplies. Tesco used to rely on 4 main tomato suppliers but now **buyers are more flexible**. Tesco has a new **specialist buyer** for local produce and growers are able to supply any of one or more stores. The tomato nursery has also been asked to **supply an**

additional line - cucumbers. Potential cucumber sales are over £1 million and the supply shortfall could be made up from imports. The company intend to **build more glasshouses** or at least to modernise what they already have.

Respondent 4 reported that Tesco are looking at **specific local products** rather than a local supply of nationally available fruit. Sainsburys have departments specialising in sourcing local produce and are interested in **working with producers on a regular basis**. Crops sought include strawberries and raspberries as well as a **rapid growth in demand for blueberries, blackberries and cherries**.

Respondent 5 reported that **technical advice is available to growers**. Fenmarc can assist with **plans for growers (and ex dairy farmers) to work together in groups and with share farm arrangements**. CALU and Fenmarc can work together to grow crops to **demonstrate best practice**. Furthermore, Horticulture Network Wales is involved in setting up **clusters of market growers** throughout Wales. Fenmarc and Asda are also looking at putting in infrastructure, including a potato processing plant in Wrexham.

3.1.4 Threats identified by interviewees

Respondent 1 reported that Welsh early potatoes can face **import competition** from the overlap with Jersey Royals which are often sold at a promotional price.

Respondent 3 reported that poorer light levels in Wales mean 12-15% **lower yields** compared to other areas such as Sussex.

Respondent 5 stated that “wholesalers should not only depend on local growers because within the UK we always have the risk of **low production as a result of negative weather influences**, etc.”

Table 2 Supplying fruit and vegetables to multiple retailers - SWOT Summary

Strengths	**Weaknesses**
• Multiples sourcing local produce • Consistent demand • Range of produce available • Welsh branding • Existing network of local supplier depots	• Lack of specialist equipment • Low prices • Low premiums for local produce • Demands from supermarkets (promotions, etc) • Lack of skill base
Opportunities	**Threats**
• Expansion of production • Long term contracts • More flexibility among supermarket buyers • Specialist local produce buyers • Local speciality crops • Producer groups • Share farming • Technical assistance • New infrastructure	• Competition from imports • Lower yields compared top other UK regions • Negative influence of weather and other agronomic factors

3.2 Organic fruit and vegetable supply chains.

Between 2004 and 2005, sales of organic produce through the multiple retail sector increased by 31% to £1.2 billion. Fresh fruit and vegetables accounted for some 10% of this total. The proportion of imported fresh produce fell as several multiple retailers increased commitment to UK sourcing in 2005 (Soil Association, 2006).

The pre-pack sector dominates the organic market. In the supermarket sector 95 per cent of organic fruit and vegetables are sold in pre-packed form, compared to 60 per cent of conventional produce (Waters, 2006). The importance of packaging when supplying the multiple retailers needs to be factored in to any planning by organic growers wishing to supply this market.

As part of project on organic imports, Defra held a 'Brassica and potato supply chain workshop' for organic suppliers, supermarkets, certifying bodies and consultants. They noted a number of key issues for increasing UK production. Many of the issues are relevant to crops other than potatoes and brassicas.

Table 3 Key supply chain issues facing UK organic vegetable producers

Factors restricting organic production	Requirements necessary to increase organic production
• Total level of organic production is far too low –peaks and troughs time destabilise market.	• Critical mass of production needed to provide a buffer and to cover costs
• Inadequate organic production area in UK. Predicted shortfalls over the next 3-5 years of up to 15-20%, as the overall market grows	• Need for new organic growers – new conversions or livestock farmers diversifying into field vegetables
• Poor returns to grower, little or no profit	• Premium of 100%-300% needed
• Inherent risk in organic conversion – uncertain markets and returns are unattractive compared to larger volume security of conventional	• Risks need to be compensated for in farm-gate prices
• UK conversion period is longer and thus more costly than in other countries	• UK Conversion period could be reduced and/or the conversion support payments could be increased to reflect costs and risks
• Rotational restriction in standards of no more than one year in four of brassicas and potato limits returns and attractiveness of conversion	• This standard could be relaxed to two (or more) years in 4. This could increase profitability of organic rotations
• Single Farm Payment has reduced the availability of land for organic rental for organic potato & brassica production.	• Good land is particularly important for cauliflower, less for broccoli and not so important for cabbage.
• Organic seed availability will continue to present a problem particularly cauliflower.	• Particular problem for cauliflower. UK organic growers need to be encouraged to produce cauliflower.

Source: Adapted from Workshop notes, Defra Project OF 0349

In Wales, the first organic vegetables supplied to supermarkets were to the Co-op in Lampeter, Ceredigion in the early 1980s. When the Co-op changed its policy to having all fresh produce supplied centrally by the Rowe Group, local sourcing was discontinued. Subsequently, organic growers in Ceredigion supplied Waitrose with organic carrots, and this was developed with the setting up of the co-operative, *Organic Growers West Wales* and its marketing Agent, the packing company *Organic Farm Foods.* The closure *of Organic Farm Foods* packhouse in Lampeter in 1995 and the transfer of its packing operation to England, was a setback for growers in South and West Wales[6]. New opportunities are now emerging with *Fenmarc* and *Really Welsh* actively seeking Welsh organic vegetable suppliers.

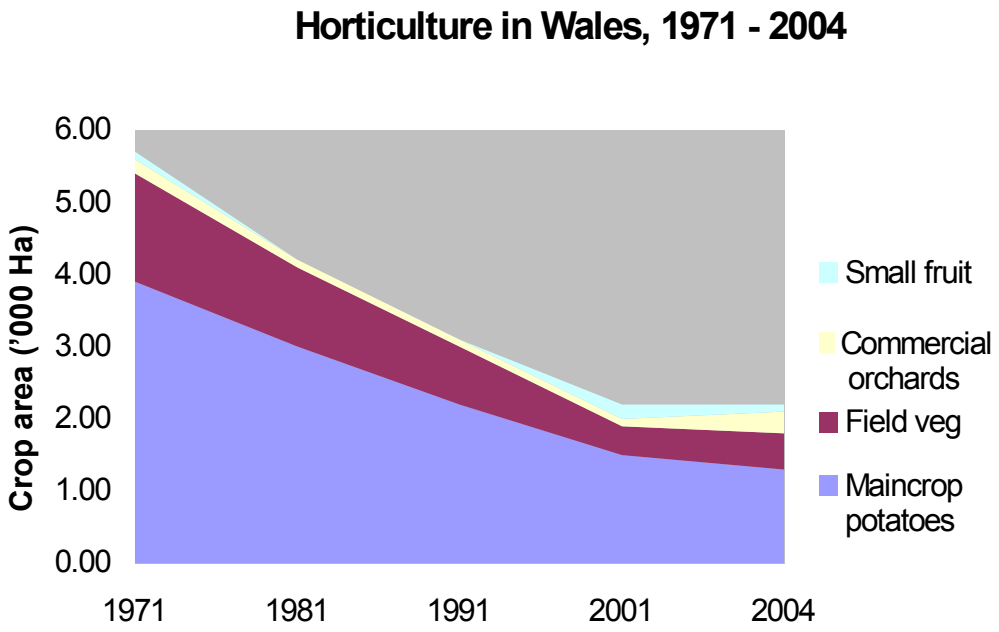
[6] In Wales, take-overs and consolidations have affected organic businesses such as *Rachel's Dairy* (now *Rachel's Organic*) and *Organic Farm Foods.* In the latter case this raised concerns at the potential loss of the wholesale business when vegetable packing at Lampeter ceased (see P. O'Brien, "Wholesale future 'is safe'" *Cambrian News* 11.08.2005). In April 2006 however, The *Organic Fresh Food Company*, a grower group buy-out of the former Organic Farm Foods (Wales), announced the continuation of the wholesale business in Lampeter. See, *Organic Market Wales* Bulletin No. 39, 13th April 2006.

3.3 Land Availability

3.3.1 Historical Trends

There has been a long-term decline in the quantity and range of vegetables and fruit grown in Wales. Thirty years ago, where conditions allowed, dairy and livestock raising farms grew potatoes, carrots, swedes and other staples[7]. Though used for the farm household, these crops also provided cash income when sold to local independent retailers. The decline in farm vegetable production is attributable to agricultural specialisation (driven by CAP subsidies) and supermarket dominance of the fresh produce retail market which has been paralleled by an associated decline of wholesale markets and the independent retail sector. More recently, oligopoly trading in the multiple retail sector affected the trading situation between growers, supply groups and supermarkets. Growers have claimed that crop requirements and prices have been moved against them. This led to some growers ceasing to grow field vegetable crops and moving on to other lines of production. However, there is some evidence of small increases in land in Wales used for field vegetables and orchard fruit since 2001. The overall picture is shown in Figure 1.

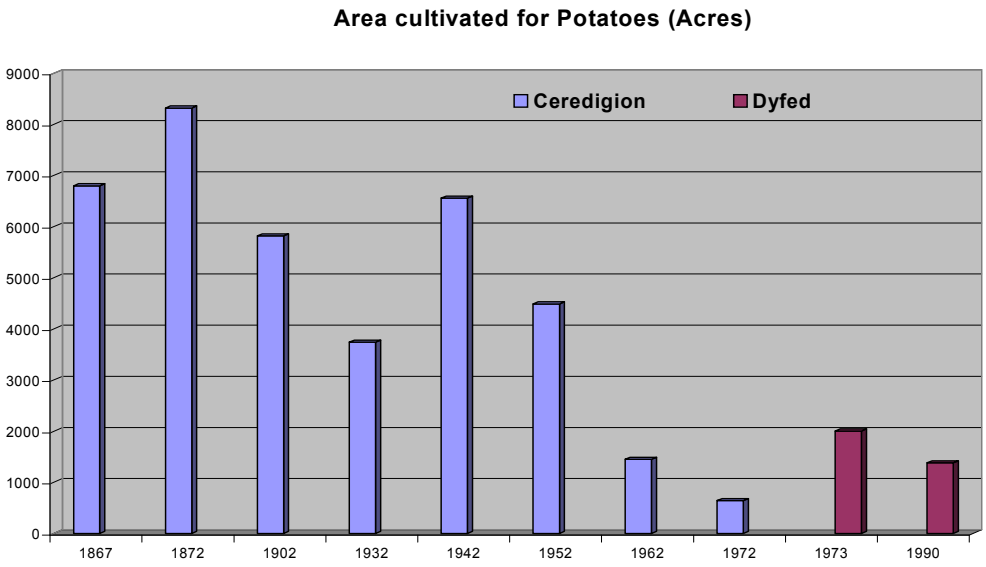
Figure 1 Horticultural trends in Wales, 1971 - 2004



[7] For account of the importance of arrangements for potato growing for the structure of local farming communities, see D. Jenkins (1976) *The Agricultural Community of South West Wales at the Turn of the Twentieth Century*. Cardiff. University of Wales Press.

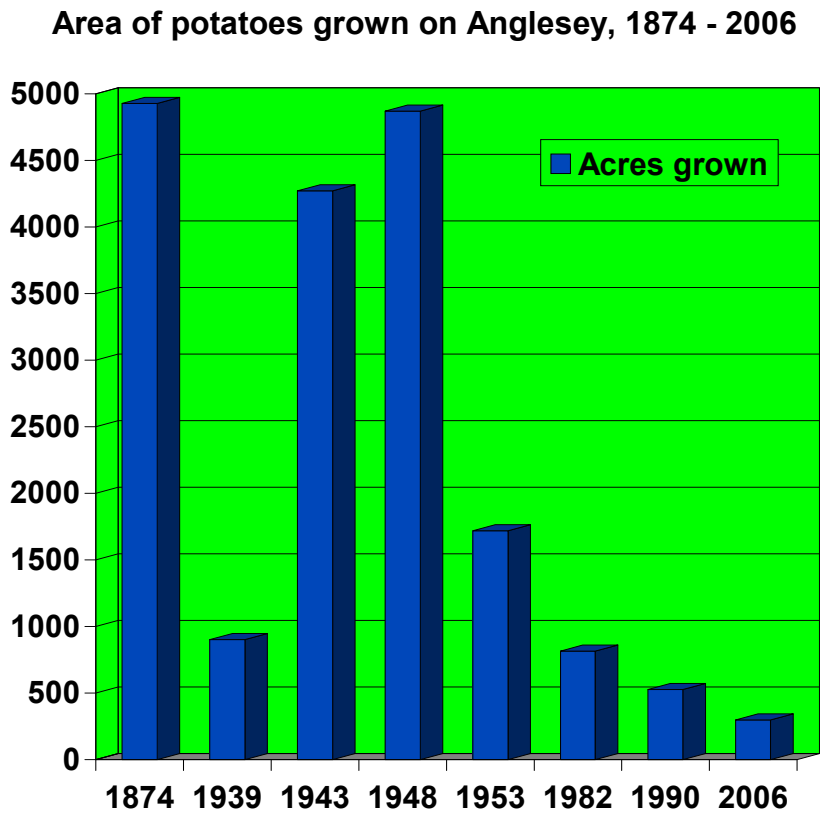
Figures 2a and 2b show the long-term decline in the land area used for potato growing in two areas of Wales over the past 150 years.

Figure 2a Land area cultivated for potatoes in Ceredigion



Source: Digest of Welsh Historical Statistics Vol 1 (1867-1972)

Figure 2b Land area cultivated for potatoes in Anglesey



Source: *ARC -The County of Anglesey Soils and Agriculture*

Figures for both Ceredigion and Anglesey show a steep decline in the area of potato cultivation over a 150 year period. However, in both counties there was a sizeable increase in the acreage of potatoes grown due to the national emergency caused by the Second World War (1939 – 1945) and its aftermath. By the 1950s and 1960s, the downward trend returned and subsequently accelerated again.

Although this is historic evidence of a decline in production, the figures also indicate potential levels of production, should the demand for locally sourced produce continue.

3.3.2 Current vegetable and fruit cultivation in Wales

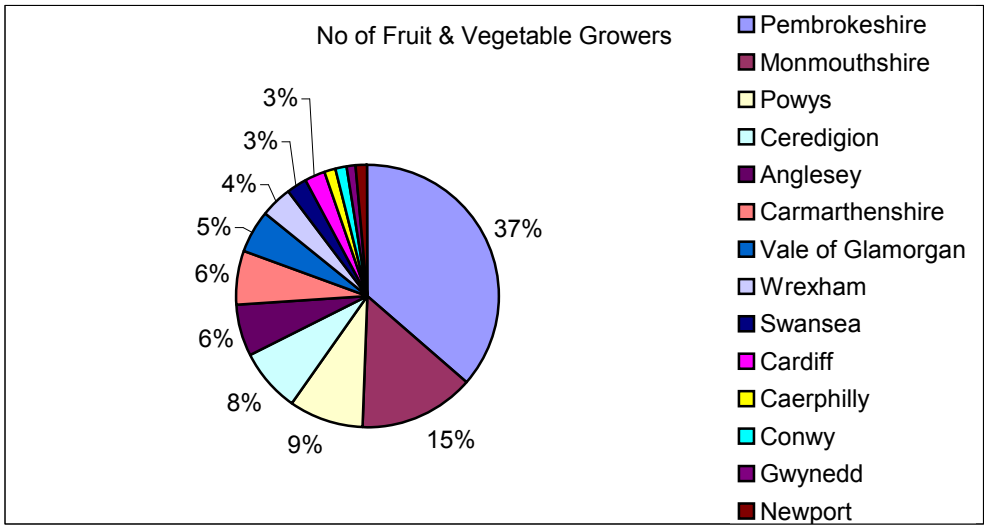
Horticulture is a very fragmented sector and reliable data are difficult to obtain. According to Welsh Assembly Government figures there were 418 horticulture holdings in Wales in 2004[8]. Inspection of data provided for the report on the potential for *Inward Investment in Horticulture Processing in Wales* (CALU, 2006) indicates that of a total of 675 horticultural holdings in Wales, 77 were fruit and vegetable growers. Furthermore, according to information provided to the Agri-Food Partnership Horticulture Strategy Group in 2003, there were 78 Horticulture Development Council (HDC) members in Wales[9]. It should be noted however, that smaller-scale and specialist growers do not appear in NAfWales statistics or HDC figures. Many of these growers are not IACS registered and/or their turnover is below the £25K pa that requires registration with the HDC.

Analysis of the details provided of the 77 fruit and vegetable growers in Wales illustrates the dominance of South and South-West Wales for current production. Of all vegetable and fruit growers, 37% were in Pembrokeshire.

[8] : www.statswales.wales.gov.uk/

[9] Under the terms of the Horticultural Development Council Order 1986 (as amended), every grower with sales of their own produce amounting to more than £25,000 a year is required to register with the Council. The rate of the levy is set annually, with the approval of the Minister, up to a maximum of 0.5% of net sales turnover. The total number of growers registered with the HDC in Great Britain is over 2,000.

Figure 3 Fruit and Vegetable Growers by Unitary Authority, 2006



Source: CALU, 2006

3.3.3 Potential Land Area for Fruit and Vegetable Production

The Agricultural Land Classification Classification (ALC) provides a method for assessing the quality of farmland. The ALC system classifies land into 5 grades, with Grade 3 subdivided into 3a and 3b[10]. Classification is based on long term physical limitations of land for agricultural use. Factors affecting the grade are

- Climate: temperature and rainfall; aspect, exposure and frost risk
- Site: gradient, microrelief and flood risk
- Soil characteristics: texture, structure, depth and stoniness; chemical properties which cannot be corrected.

The interactions between these factors are also important.

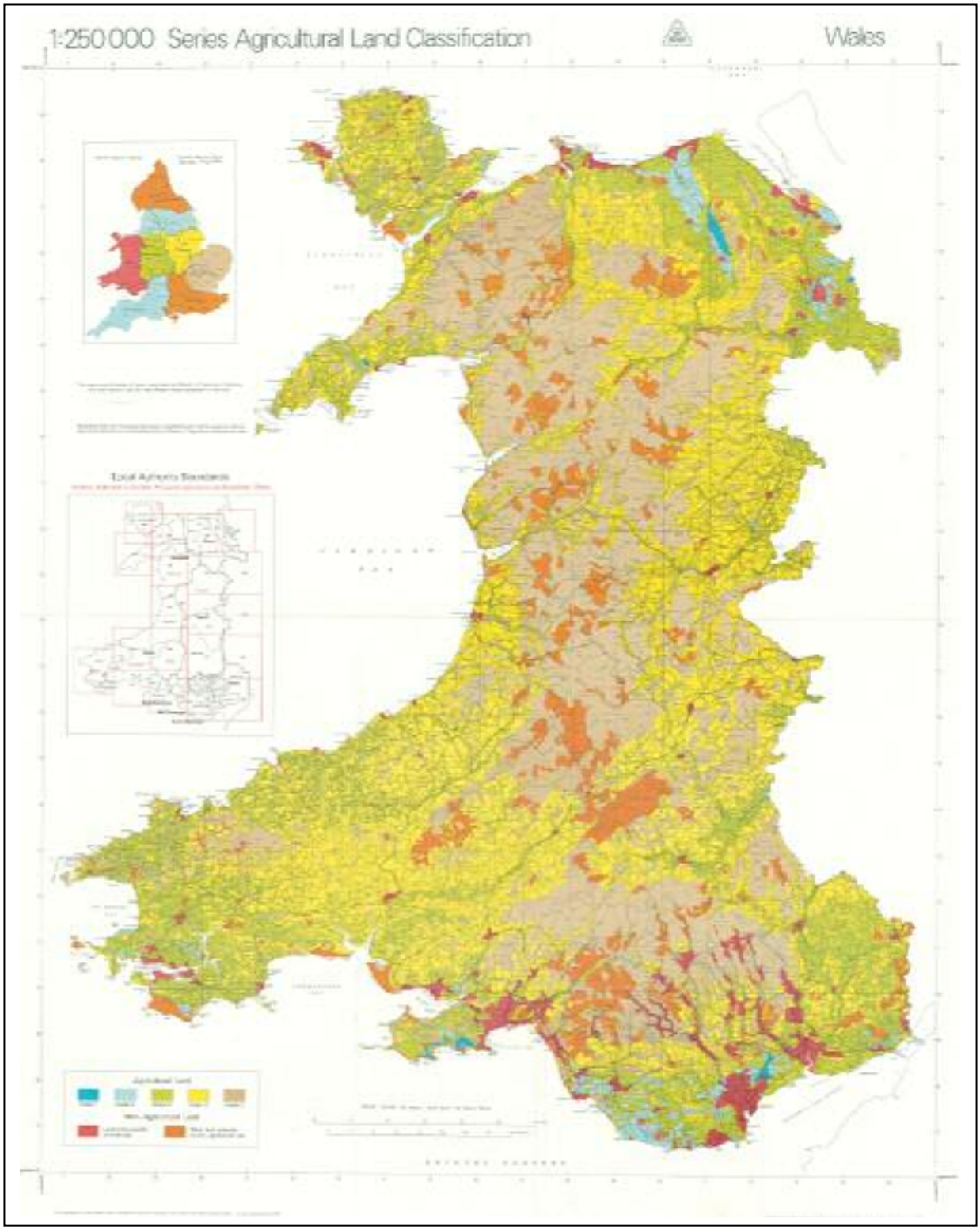
The ALC system is concerned with the inherent potential of land under a range of farming systems. The physical limitations of land have four main effects on the way land is farmed:

- The range of crops that can be grown
- Yields
- Consistency of yields
- Costs of obtaining the crop

Grade 1, 2 and 3a land is most flexible in response to inputs and can best deliver food crops. For maximum yields and minimum costs of production, field vegetables should ideally be grown on Grade1 land. The accompanying Agricultural Land Classification Map shows the location of this land in Wales.

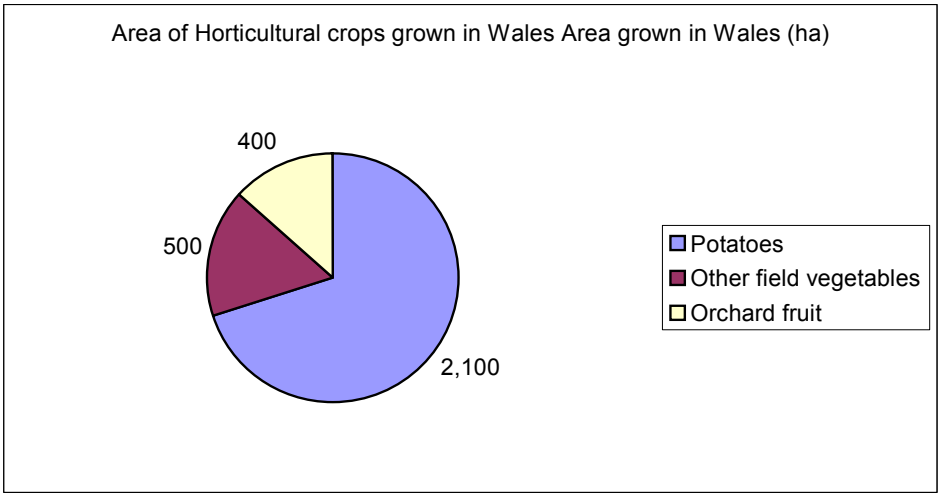
[10] For details of the system of grading, see, 'Agricultural Land Classification of England and Wales: revised guidelines and criteria for grading the quality of agricultural land'. Defra Publications, 1988. www.defra.gov.uk

Map 1 Agricultural Land Classification for Wales



There are 4,142ha of Grade 1 and 39,347ha of Grade 2 agricultural land in Wales (Plassman and Edwards Jones, 2007). Of this area, 2,100ha was used for maincrop potatoes in 2004; 500ha for other field vegetables and 400ha for apple and pear orchards.

Figure 4 Area of horticultural land use in Wales, 2004



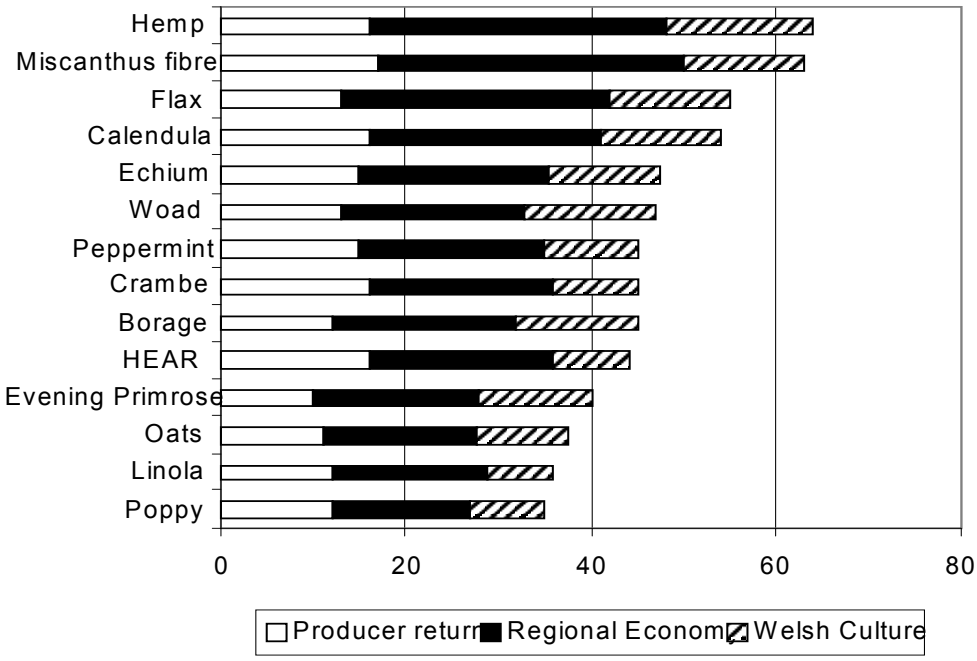
Source: www.statswales.wales.gov.uk/

3.3.4 Identifying land for horticultural production

In March 2003, a consortium led by the Central Science Laboratory reported on a study to identify the economic potential of plants and animals not currently fully exploited by the Welsh Agricultural sector (Turley et al, 2003).

Although the study did not consider common vegetable crops it identified a number of alternative plant species that could be grown commercially in Wales. The methods adopted used a scoring system based on returns to the producer sector, the regional economy and the potential to enhance Welsh agriculture and tourism. The results of this scoring for plant species is shown in Figure 5.

Figure 5 Top 10 'under-exploited' plant species in Wales



Source: Turley et al, 2003

The value of this project for the current study is less in the crops identified and more in the methodology employed. In order to prioritise plant species, Turley et al used agronomic/husbandry, soil and climatic information for Wales against which prospective species were screened:

I. Frost tolerance of each species and date of first and last frost (length of growing season – likelihood of problems with late harvesting);
II. Agroclimatic zones
III. Annual rainfall
IV. Soil type/suitability and period between start and end of soil moisture deficit (period of workability);
V. Altitude and topography.

GIS maps were obtained for these criteria to highlight the range of situations that pertain in Wales. The results were available on a searchable website, so that appropriate locations for growing each crop species in Wales could be located. This approach, although beyond the scope of the present study, could be adopted for a range of fruit and vegetable crops precisely to identify potential land areas.

3.3.5 Climate

One of the most limiting factors on vegetable crop production is frost. The most favoured coastal areas of Wales are virtually frost-free, but away from the coast the possibilities of not only winter frosts, but also late spring and early autumn air and ground frost can severely limit the range of crops that can be grown. Metereological Office frost maps based on 30-year means are provided in the appendices.

3.3.6 Climate change

The effects of climate change need to be factored in to the approach outlined above. Positive effects of climate change are likely to be that areas in Wales already suitable for vegetable growing may become more favoured as a result of greater warmth all year round. A wider diversity of crops and varieties may become viable in these areas. Some areas currently marginal for vegetable cropping may become more suitable; allowing all grass farms to include vegetable breaks into their rotations. Hot, dry summers may limit grass production making other crops more attractive.

Negative effects are likely to arise from waterlogging of land in autumn, winter and early spring, making harvesting and cultivation by machinery difficult. Hot, dry summer weather may require increased investment in irrigation equipment and cold stores. Over wintering of pests and weeds due to warmer winters may pose problems to growers, as will increased likelihood of fungal diseases.

Increased storms and high windspeeds will require high specifications for all protected cropping structures. Hot, dry and windy summers could see a greater role for horticultural shade houses in parts of Wales.

The effects of climate change on horticulture are already being seen as the range of current crops moves northwards and to higher altitudes and as growers select new crops and varieties. Some of the effects on particular crops suggested by a number of research studies are summarised in Table 4.

Table 4 Effects of climate change on selected horticultural crops

Crop	Climate change	Effect
Beetroot, carrots, onions, beans, legumes, marrows, courgettes, sweetcorn	Increased CO2 and temperatures	Increased fresh weight yield
Lettuce, salad crops	Increased temperatures	Reduced production time Increased head weight Earlier maturity
Cauliflower	Increased temperatures	Delayed curd initiation Increase in final number of leaves
Glasshouse / polytunnel crops	Increased temperatures	less energy input
Soft fruit	Increased temperatures	Increased yields – but increased need for irrigation
Potatoes	Increased temperatures	Increased yields – but increased need for irrigation Earlier crops

Source: Plassman and Edwards Jones (2007); Frost (2002)

4.0 BUSINESS PLANS AND GROSS MARGINS FOR INTRODUCING NEW CROPS ON LIVESTOCK AND DAIRY FARMS.

Traditionally farms in lowland Wales were mainly in milk production or beef and sheep systems with small areas in spring sown cereals for use on the farm. Many dairy farms have withdrawn from milk production in recent years, because of low milk prices and a need to update their milking premises. There are now a substantial number of farmers who could consider alternative crop enterprises providing conditions on the farm are right.

The introduction of the decoupled Single Farm Scheme has changed the economics of livestock farming as the headage payments have been removed. Gross margins per head and per hectare are now much smaller than in 2004 and previous years. Farmers are now encouraged to introduce new farming enterprises and maintain the Single Farm Payments providing that all cross compliance issues are adhered to. However, at present, the Single Payment is not payable on land growing field vegetables.

4.1 Budgets

Budget 1 (see Annex 1) is based on the smallest size recorded in the Farm Business Survey by the Institute of Rural Sciences Aberystwyth for lowland farms. This type of farm would be one of the target categories for the growing of vegetables and horticultural crops. These farms are found predominately around the fringes of Wales on land up to approximately 200m above sea level.

In business terms these farms are not viable units and are mostly supported by additional outside earnings from family members. The FBS data indicate a farm of 54 effective hectares carrying 16 suckler cows, 55 other cattle, 180 ewes and a field of corn. The budget indicates total farming gross margin of £33,476, fixed costs of £22,630 leaving a trading profit of £10,846. Achieving the farming gross margin shown does involve sustaining good levels of animal performance. The fixed costs are often widely variable depending on whether the farm is owner occupied or rented and if the business is heavily or lightly borrowed. The gross margin is approximately £620 per hectare, which is at the higher end of gross margins for cattle and sheep farming systems. The Single Payment Scheme often accounts for between 30% and 40 % of gross output.

Budget 2 is an example of growing 3 hectares of asparagus on the lowland beef and sheep farm indicates a trading profit of £19,253 from the third year after crop establishment. It is assumed that 15 fewer cattle would be fattened on the farm to release land for the additional crop. In capital investment terms a hectare of asparagus will cost the business nearly £5,000 in the first two years. Keeping 15 fewer finishing cattle would release up to £9,000. Growing a high value horticultural crop would have a very significant impact on farm profitability and longer-term business viability. This budget indicates a gross margin from asparagus of £3,160 per hectare. In this situation the new enterprise could be competing with possible earnings from outside the farm.

The business would have a reduced Single Payment; if the land used for the new crop was part of the claim in previous years.

Budget 3 is based on the midsize FBS category of lowland livestock farms. The average farm has 100 effective hectares and is stocked with 24 suckler cows, 60 finishing cattle, 475 breeding ewes together with 35 acres of cereals. The budget indicates a total gross margin of £54,918, fixed costs of £31,600 and a trading profit of £23,318. This size and type of farm business is more viable than the smaller farm category, but it still struggles to meet all the cash needs. This size and type of farm has the capacity to develop two or three additional enterprises with a proportional reduction in probably in the cattle finishing enterprise.

Budget 4 indicates an increase in trading profit to £30,877 from introducing three new field vegetable crops with two hectares each. The budget indicates that this introduction of the field vegetable crops has the potential to improve farming income. The three crops in this example were chosen because they give a spread of harvesting times. This level of cropping could be considered as the introductory year, when experience would be gained. For these new enterprises to make a longer-term impact on the business, areas grown would need to increase. The potential gross margins are much higher than can be achieved from cattle, sheep and cereal production.

Both leeks and brassica crops need to be grown in a rotation as various diseases can build up in mono-culture situations. This would lead to more grassland being ploughed up and possible additional reseeding costs. This type of cropping would also require a pool of casual labour mainly at harvesting times.

4.2 Conclusions

A high value crop such as asparagus can make a significant impact on farm profitability, but it does involve capital investment and there is a two / three year delay in producing a saleable crop.

Field vegetables can make a positive contribution to overall business profitability, but substantial areas need to be grown.

Farmers new to crop production will require a substantial consultancy support during the first two to three years.

Skills training and organisation of casual labour need to be part of any plans to grow new crops.

Farmers will need long term contracts to be persuaded to enter into growing new crops.

Younger farmers seeking a career in farming should consider higher value crops to aid longer-term viability for their businesses. At present market prices for livestock are not increasing at as high a rate as their costs. Support payments are also likely to fall in the next few years. The profitability of beef and sheep farms is falling as shown by the latest farm business survey data.

5.0 ACTION PLAN

The various components of this study after talking to the multiples plus existing suppliers reveal there is a strong potential market and it is likely to grow. Most enterprises are more likely to be successful if the market is found before starting out. This is better than producing a crop and then looking for outlets.

Approaches to multiples are likely to be met with some enthusiasm and direction will often be given. Growing crops for multiples may also mean other local markets such as hotels and restaurants are also accessible, along with local greengrocers and corner shops.

The business studies and models demonstrate the likely impact of adding vegetable crops to an existing farming programme. In most cases the profitability of the business can be enhanced. This can then be used to increase productivity on new enterprises for example by adding in mechanisation. There may also be funds to improve the quality of the existing farming and that may further help with improving profitability.

Before embarking on new lines however it is important to find out if the available facilities are good enough and also the impact on labour demands on the farm. In addition to a financial business plan, a technical plan will also be needed.

Within the technical plan the labour profiles will need looking at. For example strawberries and asparagus both look good in terms of gross margins but the season of May – 21st June in Asparagus and June –July for maincrop strawberries would give 3 weeks of labour overlap. Conversely, summer cabbage, autumn cauliflower and leeks would have a good labour requirement flow from July possibly through to April.

The technical plan must also consider basic parameters such as soil type and soil analyses will have to conducted to assess suitability and input requirements for potential new crops.

Although good drainage is a basic requirement, heavy soils are difficult for root crops plus any other crops that need to be harvested in the winter. The basics do have to be right before any big commitments are made. For example, there isn't a lot that can be done with mountain farms where there are no real substitutes for sheep. Consideration must also be given to shelter and aspect, as many vegetable crops are demanding in this respect, especially when early cropping is desired. Shelter can be added on all but the most exposed sites.

Fields for vegetable production need to be well drained. Often grassland will be deceptive as the pasture will create a good soil structure which will be drier than if the land was growing vegetables. If the farm is not used to arable and cultivation techniques then this is extra to learn.

Workshops and training may be needed to facilitate production.

Other influences are the personnel on the farm. Sometimes second generation farmers may have been away to college and are looking for ways to return to the farm. These recruits can often supply energy and knowledge

to get new enterprises underway. They also know how to seek out information technology and ask consultants and the trade for help.

New enterprises can be an outlet for their energy and skills and any increase in the farm profitability will help keep them on the farm plus work for spouses and partners.

This in turn helps to rebuild the rural communities and helps provide extra employment in the areas.

So the supply of local multiple outlets can have a positive impact on the farming community and produce the opposite effect these supermarkets have had in the past.

6.0 REFERENCES

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ANNEX 1. VEGETABLE YIELD GUIDE

Annex 1 – Guide to vegetable yields
The following are guidelines as a reliable average, which provide information on the areas needed to supply the various yields.

All yield figures are in tonnes/hectare unless stated.

Crop	**Suitability**	**Density (m2)***	**Yield (T/Ha)****
	1 = good 10 = poor		
Asparagus	1	2.5	3.75
Broad Bean	1	15	4.5
Beetroot	1	20	12.0
Dwarf Bean	3	20	6.5
Runner Bean	1	3.3	21.0
Brussels sprouts	5	3.0	17.5
Spring Cabbage	5	12.5	15.0
Summer Cabbage	5	7	41.0
Dutch white	5	2.5	50.1
Savoy	5	4.5	30.0
Calabrese	5	10	5.5
Cauliflower	5	3.5	20000 heads
Carrots	8	125	50.0
Courgettes	3	2	25.0
Leeks	3	15	28.5
Onion	7	50	45.0
Parsnips	3	20	20.0
Peas	5	75	8.0
Potatoes early	2	0.45 kg/seed	18.0
Rhubarb	1	1.4	35.0
Spinach	5	80	10.0
Swede	5	15	35.0
Sweetcorn	5	5	30000 cobs
Lettuce	5	10	80,000 heads
***Density** Usually in vegetable production, density within a large range doesn't have a big influence on yield but will have a significant bearing on the size of the individual product. This is where you need to know your market. Often farm shops report large vegetables are in good demand			
Suitability 1 is good, 10 is poor			
****Yields** are achievable not highest possible			

ANNEX 2. FARM BUDGETS

Budget 1

Farming Budget Summary, Small Lowland Farm

Crops							£
Spring Barley		4.00	Ha	@	363.70	£/Ha	1,455
					Total Crop Income		**£1,455**
Livestock							£
Finishing Cattle		55		@	57.40	£/Head	3,157
Lowland Sheep		180		@	42.26	£/Head	7,606
Suckler Cows		20		@	212.90	£/Head	4,258
					Total Livestock Income		**£15,021**
Less Forage Costs							£
Fertiliser	Fertiliser	1	Unit	@	2,400.00	£/Unit	2,400
Contract Silage Making	Silage making	1	Unit	@	1,500.00	£/Unit	1,500
Other	Seed/spray	1	Unit	@	500.00	£/Unit	500
					Less Total Forage Costs		**£4,400**
					Subtotal		**£12,076**
Other Income							£
Single Farm Payment	Single Payment Scheme	1	Unit	@	14,000.00	£/Unit	14,000
T Myn. DA 0-139ha	Tir Myn/ Environmental	1	Unit	@	1,400.00	£/Unit	1,400
Other	Miscellaneous	1	Unit	@	6,000.00	£/Unit	6,000
					Total Other Income		**£21,400**
					Total Farming Income		**£33,476**
Less Fixed Costs							£
Labour							580
Machinery Costs							6,000
Machinery Depreciation							5,600
Rent							1,500
Property Repairs							2,500
Utilities							1,000
Insurance							1,400
Professional Fees							850
Sundry Overheads							1,200
Bank Interest/Charges							2,000
					Less Total Fixed Costs		**£22,630**
					Total Farming Profit		**£10,846**

Detailed Farm Fixed Costs

Fixed Cost Type	Item	£
Labour		
	Casual	580.00
	Labour Subtotal	**£580.00**
Machinery Costs		
	Machinery	6000.00
	Machinery Costs Subtotal	**£6,000.00**
Machinery Depreciation		
	Depreciation	5600.00
	Machinery Depreciation Subtotal	**£5,600.00**
Rent		
	Rent	1500.00
	Rent Subtotal	**£1,500.00**
Property Repairs		
	Repairs	2500.00
	Property Repairs Subtotal	**£2,500.00**
Utilities		
	Rates	1000.00
	Utilities Subtotal	**£1,000.00**
Insurance		
	Insurance	1400.00
	Insurance Subtotal	**£1,400.00**
Professional Fees		
	Accountant	850.00
	Professional Fees Subtotal	**£850.00**
Sundry Overheads		
	Sundries	1200.00
	Sundry Overheads Subtotal	**£1,200.00**
Bank Interest/Charges		
	Bank charges and interest	2000.00
	Bank Interest/Charges Subtotal	**£2,000.00**
	Total Farming Fixed Costs	**£22,630.00**

Detailed Crop Gross Margins

Spring Barley

	Item	Quantity	£/Unit	£ Total
Outputs				
Crop Sales				
	Barley	6	85.00	510.00
Straw Sales				
	Straw	2.5	60.00	150.00
			Total Outputs	**£660.00**
Costs				
Fertiliser Costs				
	Potash	60	0.20	12.00
	Phosphate	60	0.29	17.40
	Nitrogen	100	0.37	37.00
Other Costs				
	Baling	1	18.00	18.00
	Combining	1	75.00	75.00
	Contract drilling	1	40.00	40.00
Seed Costs				
	Seed Purchase	145	0.22	31.90
Spray Costs				
	Fungicide	1	30.00	30.00
	Herbicide	1	35.00	35.00
			Total Costs	**£296.30**
			Gross Margin	**£363.70**

Detailed Livestock Gross Margins

Finishing Cattle

	Item	Quantity	£/Unit	£ Total
Outputs				
Main Sales				
	Finished Animal	1	680.00	680.00
Replacement				
	Stores Purchase (2%	1.02	-480.00	-489.60
			Total Outputs	**£190.40**
Costs				
Feed Costs				
	Concentrates	0.6	140.00	84.00
Other Costs				
	Sundries	1	16.00	16.00
	Bedding	0.4	60.00	24.00
Vet/Med Costs				
	Vet	1	9.00	9.00
			Total Costs	**£133.00**
			Gross Margin	**£57.40**

Lowland Sheep

	Item	Quantity	£/Unit	£ Total
Outputs				
Main Sales				
	Wool	1	1.00	1.00
	Lambs (170%)	1.7	42.00	71.40
Replacement				
	Cull Ram	0.006	28.00	0.17
	Replacement Ewes	0.2	-65.00	-13.00
	Cull	0.15	25.00	3.75
	Replacement Ram	0.007	-300.00	-2.10
			Total Outputs	**£61.22**
Costs				
Feed Costs				
	Concentrates Lambs	0.027	140.00	3.78
	Concentrates Ewes	0.037	140.00	5.18
Other Costs				
	Sundries	1	5.50	5.50
Vet/Med Costs				
	Vet	1	4.50	4.50
			Total Costs	**£18.96**
			Gross Margin	**£42.26**

Suckler Cows

	Item	Quantity	£/Unit	£ Total
Outputs				
Main Sales				
	Stores	0.93	480.00	446.40
Replacement				
	Bull Depreciation	1	-16.00	-16.00
	Replacement	0.16	-700.00	-112.00
	Cull Cow	0.17	350.00	59.50
			Total Outputs	**£377.90**
Costs				
Feed Costs				
	Concentrates	0.6	140.00	84.00
Other Costs				
	Sundries	1	15.00	15.00
	Bedding	0.6	60.00	36.00
Vet/Med Costs				
	Vet	1	30.00	30.00
			Total Costs	**£165.00**
			Gross Margin	**£212.90**

Budget 2

Farming Budget Summary with Asparagus

Crops							£
Asparagus		3.00	Ha	@	3,156.00	£/Ha	9,468
Spring Barley		4.00	Ha	@	363.70	£/Ha	1,455
					Total Crop Income		**£10,923**
Livestock							£
Finishing Cattle		40		@	57.40	£/Head	2,296
Lowland Sheep		180		@	42.26	£/Head	7,606
Suckler Cows		20		@	212.90	£/Head	4,258
					Total Livestock Income		**£14,160**
Less Forage Costs							£
Fertiliser	Fertiliser	1	Unit	@	2,300.00	£/Unit	2,300
Contract Silage Making	Silage making	1	Unit	@	1,300.00	£/Unit	1,300
Other	Seed/spray	1	Unit	@	500.00	£/Unit	500
					Less Total Forage Costs		**£4,100**
					Subtotal		**£20,983**
Other Income							£
Single Farm Payment	Single Payment Scheme	1	Unit	@	14,000.00	£/Unit	14,000
T Myn. DA 0-139ha	Tir Mynydd and Environmental	1	Unit	@	1,400.00	£/Unit	1,400
Other	Miscellaneous	1	Unit	@	6,000.00	£/Unit	6,000
					Total Other Income		**£21,400**
					Total Farming Income		**£42,383**
Less Fixed Costs							£
Labour							580
Machinery Costs							6,500
Machinery Depreciation							5,600
Rent							1,500
Property Repairs							2,500
Utilities							1,000
Insurance							1,400
Professional Fees							850
Sundry Overheads							1,200
Bank Interest/Charges							2,000
					Less Total Fixed Costs		**£23,130**
					Total Farming Profit		**£19,253**

Detailed Farm Fixed Costs

Fixed Cost Type	Item	£
Labour		
	Casual	580.00
	Labour Subtotal	**£580.00**
Machinery Costs		
	Machinery	6500.00
	Machinery Costs Subtotal	**£6,500.00**
Machinery Depreciation		
	Depreciation	5600.00
	Machinery Depreciation Subtotal	**£5,600.00**
Rent		
	Rent	1500.00
	Rent Subtotal	**£1,500.00**
Property Repairs		
	Repairs	2500.00
	Property Repairs Subtotal	**£2,500.00**
Utilities		
	Rates	1000.00
	Utilities Subtotal	**£1,000.00**
Insurance		
	Insurance	1400.00
	Insurance Subtotal	**£1,400.00**
Professional Fees		
	Accountant	850.00
	Professional Fees Subtotal	**£850.00**
Sundry Overheads		
	Sundries	1200.00
	Sundry Overheads Subtotal	**£1,200.00**
Bank Interest/Charges		
	Bank charges and interest	2000.00
	Bank Interest/Charges Subtotal	**£2,000.00**
	Total Farming Fixed Costs	**£23,130.00**

Detailed Crop Gross Margins

Asparagus

	Item	Quantity	£/Unit	£ Total
Outputs				
Crop Sales				
	Crop Sale	3750	2.60	9750.00
			Total Outputs	**£9,750.00**
Costs				
Casual Labour				
	Casual labour	780	6.50	5070.00
Fertiliser Costs				
	Nitrogen	75	0.37	27.75
	Phosphate	125	0.29	36.25
	Potash	200	0.20	40.00
Other Costs				
	Sundries	1	300.00	300.00
	Packaging & Carriage	1	500.00	500.00
Seed Costs				
	Establishment charge	1	470.00	470.00
Spray Costs				
	Spray Programme weeds	1	150.00	150.00
			Total Costs	**£6,594.00**
			Gross Margin	**£3,156.00**

Spring Barley

	Item	Quantity	£/Unit	£ Total
Outputs				
Crop Sales				
	Barley	6	85.00	510.00
Straw Sales				
	Straw	2.5	60.00	150.00
			Total Outputs	**£660.00**
Costs				
Fertiliser Costs				
	Nitrogen	100	0.37	37.00
	Phosphate	60	0.29	17.40
	Potash	60	0.20	12.00
Other Costs				
	Baling	1	18.00	18.00
	Contract drilling	1	40.00	40.00
	Combining	1	75.00	75.00
Seed Costs				
	Seed Purchase	145	0.22	31.90
Spray Costs				
	Herbicide	1	35.00	35.00
	Fungicide	1	30.00	30.00
			Total Costs	**£296.30**
			Gross Margin	**£363.70**

Detailed Livestock Gross Margins

Finishing Cattle

	Item	Quantity	£/Unit	£ Total
Outputs				
Main Sales				
	Finished Animal	1	680.00	680.00
Replacement				
	Stores Purchase (2%	1.02	-480.00	-489.60
			Total Outputs	**£190.40**
Costs				
Feed Costs				
	Concentrates	0.6	140.00	84.00
Other Costs				
	Sundries	1	16.00	16.00
	Bedding	0.4	60.00	24.00
Vet/Med Costs				
	Vet	1	9.00	9.00
			Total Costs	**£133.00**
			Gross Margin	**£57.40**

Lowland Sheep

	Item	Quantity	£/Unit	£ Total
Outputs				
Main Sales				
	Wool	1	1.00	1.00
	Lambs (170%)	1.7	42.00	71.40
Replacement				
	Cull Ram	0.006	28.00	0.17
	Replacement Ewes	0.2	-65.00	-13.00
	Cull	0.15	25.00	3.75
	Replacement Ram	0.007	-300.00	-2.10
			Total Outputs	**£61.22**
Costs				
Feed Costs				
	Concentrates Lambs	0.027	140.00	3.78
	Concentrates Ewes	0.037	140.00	5.18
Other Costs				
	Sundries	1	5.50	5.50
Vet/Med Costs				
	Vet	1	4.50	4.50
			Total Costs	**£18.96**
			Gross Margin	**£42.26**

Suckler Cows

	Item	Quantity	£/Unit	£ Total
Outputs				
Main Sales				
	Stores	0.93	480.00	446.40
Replacement				
	Bull Depreciation	1	-16.00	-16.00
	Replacement	0.16	-700.00	-112.00
	Cull Cow	0.17	350.00	59.50
			Total Outputs	**£377.90**
Costs				
Feed Costs				
	Concentrates	0.6	140.00	84.00
Other Costs				
	Sundries	1	15.00	15.00
	Bedding	0.6	60.00	36.00
Vet/Med Costs				
	Vet	1	30.00	30.00
			Total Costs	**£165.00**
			Gross Margin	**£212.90**

Budget 3

Farming Budget Summary Midsize Farm

Crops							£
Spring Barley		14.00	Ha	@	363.70	£/Ha	5,092
					Total Crop Income		**£5,092**
Livestock							£
Finishing Cattle		60		@	57.40	£/Head	3,444
Lowland Sheep		475		@	42.26	£/Head	20,073
Suckler Cows		24		@	212.90	£/Head	5,110
					Total Livestock Income		**£28,626**
Less Forage Costs							£
Fertiliser	Fertiliser	1	Unit	@	4,200.00	£/Unit	4,200
Contract Silage Making	Silage making	1	Unit	@	1,800.00	£/Unit	1,800
Other	Seed/spray	1	Unit	@	600.00	£/Unit	600
					Less Total Forage Costs		**£6,600**
					Subtotal		**£27,118**
Other Income							£
Single Farm Payment	Single Payment Scheme	1	Unit	@	21,000.00	£/Unit	21,000
T Myn. DA 0-139ha	Tir Mynydd and Environmental	1	Unit	@	2,800.00	£/Unit	2,800
Other	Miscellaneous	1	Unit	@	4,000.00	£/Unit	4,000
					Total Other Income		**£27,800**
					Total Farming Income		**£54,918**
Less Fixed Costs							£
Labour							1,750
Machinery Costs							7,500
Contractors							1,000
Machinery Depreciation							6,500
Rent							4,800
Property Repairs							2,500
Utilities							1,400
Insurance							1,800
Professional Fees							850
Sundry Overheads							1,500
Bank Interest/Charges							2,000
					Less Total Fixed Costs		**£31,600**
					Total Farming Profit		**£23,318**

Detailed Farm Fixed Costs

Fixed Cost Type	Item	£
Labour		
	Casual	1750.00
	Labour Subtotal	**£1,750.00**
Machinery Costs		
	Machinery	7500.00
	Machinery Costs Subtotal	**£7,500.00**
Contractors		
	Contract	1000.00
	Contractors Subtotal	**£1,000.00**
Machinery Depreciation		
	Depreciation	6500.00
	Machinery Depreciation Subtotal	**£6,500.00**
Rent		
	Rent	4800.00
	Rent Subtotal	**£4,800.00**
Property Repairs		
	Repairs	2500.00
	Property Repairs Subtotal	**£2,500.00**
Utilities		
	Rates	1400.00
	Utilities Subtotal	**£1,400.00**
Insurance		
	Insurance	1800.00
	Insurance Subtotal	**£1,800.00**
Professional Fees		
	Accountant	850.00
	Professional Fees Subtotal	**£850.00**
Sundry Overheads		
	Sundries	1500.00
	Sundry Overheads Subtotal	**£1,500.00**
Bank Interest/Charges		
	Bank charges and interest	2000.00
	Bank Interest/Charges Subtotal	**£2,000.00**
	Total Farming Fixed Costs	**£31,600.00**

Detailed Crop Gross Margins

Spring Barley

	Item	Quantity	£/Unit	£ Total
Outputs				
Crop Sales				
	Barley	6	85.00	510.00
Straw Sales				
	Straw	2.5	60.00	150.00
			Total Outputs	**£660.00**
Costs				
Fertiliser Costs				
	Potash	60	0.20	12.00
	Phosphate	60	0.29	17.40
	Nitrogen	100	0.37	37.00
Other Costs				
	Baling	1	18.00	18.00
	Combining	1	75.00	75.00
	Contract drilling	1	40.00	40.00
Seed Costs				
	Seed Purchase	145	0.22	31.90
Spray Costs				
	Fungicide	1	30.00	30.00
	Herbicide	1	35.00	35.00
			Total Costs	**£296.30**
			Gross Margin	**£363.70**

Detailed Livestock Gross Margins

Finishing Cattle

	Item	Quantity	£/Unit	£ Total
Outputs				
Main Sales				
	Finished Animal	1	680.00	680.00
Replacement				
	Stores Purchase (2%	1.02	-480.00	-489.60
			Total Outputs	**£190.40**
Costs				
Feed Costs				
	Concentrates	0.6	140.00	84.00
Other Costs				
	Sundries	1	16.00	16.00
	Bedding	0.4	60.00	24.00
Vet/Med Costs				
	Vet	1	9.00	9.00
			Total Costs	**£133.00**
			Gross Margin	**£57.40**

Lowland Sheep

	Item	Quantity	£/Unit	£ Total
Outputs				
Main Sales				
	Wool	1	1.00	1.00
	Lambs (170%)	1.7	42.00	71.40
Replacement				
	Cull Ram	0.006	28.00	0.17
	Replacement Ewes	0.2	-65.00	-13.00
	Cull	0.15	25.00	3.75
	Replacement Ram	0.007	-300.00	-2.10
			Total Outputs	**£61.22**
Costs				
Feed Costs				
	Concentrates Lambs	0.027	140.00	3.78
	Concentrates Ewes	0.037	140.00	5.18
Other Costs				
	Sundries	1	5.50	5.50
Vet/Med Costs				
	Vet	1	4.50	4.50
			Total Costs	**£18.96**
			Gross Margin	**£42.26**

Suckler Cows

	Item	Quantity	£/Unit	£ Total
Outputs				
Main Sales				
	Stores	0.93	480.00	446.40
Replacement				
	Bull Depreciation	1	-16.00	-16.00
	Replacement	0.16	-700.00	-112.00
	Cull Cow	0.17	350.00	59.50
			Total Outputs	**£377.90**
Costs				
Feed Costs				
	Concentrates	0.6	140.00	84.00
Other Costs				
	Sundries	1	15.00	15.00
	Bedding	0.6	60.00	36.00
Vet/Med Costs				
	Vet	1	30.00	30.00
			Total Costs	**£165.00**
			Gross Margin	**£212.90**

Budget 4

Farming Budget Summary

Crops							£
Cauliflower		2.00	Ha	@	2,142.00	£/Ha	4,284
Leeks		2.00	Ha	@	2,149.70	£/Ha	4,299
Spring Barley		14.00	Ha	@	363.70	£/Ha	5,092
Summer Cabbage		2.00	Ha	@	1,680.25	£/Ha	3,361
					Total Crop Income		**£17,036**
Livestock							£
Finishing Cattle		35		@	57.40	£/Head	2,009
Lowland Sheep		475		@	42.26	£/Head	20,073
Suckler Cows		24		@	212.90	£/Head	5,110
					Total Livestock Income		**£27,191**
Less Forage Costs							£
Fertiliser	Fertiliser	1	Unit	@	3,800.00	£/Unit	3,800
Contract Silage Making	Silage making	1	Unit	@	1,600.00	£/Unit	1,600
Other	Seed/spray	1	Unit	@	600.00	£/Unit	600
					Less Total Forage Costs		**£6,000**
					Subtotal		**£38,227**
Other Income							£
Single Farm Payment	Single Payment Scheme	1	Unit	@	19,700.00	£/Unit	19,700
T Myn. DA 0-139ha	Tir Mynydd and Environmental	1	Unit	@	2,800.00	£/Unit	2,800
Other	Miscellaneous	1	Unit	@	4,000.00	£/Unit	4,000
					Total Other Income		**£26,500**
					Total Farming Income		**£64,727**
Less Fixed Costs							£
Labour							2,500
Machinery Costs							8,500
Contractors							1,000
Machinery Depreciation							7,000
Rent							4,800
Property Repairs							2,500
Utilities							1,400
Insurance							1,800
Professional Fees							850
Sundry Overheads							1,500
Bank Interest/Charges							2,000
					Less Total Fixed Costs		**£33,850**
					Total Farming Profit		**£30,877**

Detailed Farm Fixed Costs

Fixed Cost Type	Item	£
Labour		
	Casual	2500.00
	Labour Subtotal	**£2,500.00**
Machinery Costs		
	Machinery	8500.00
	Machinery Costs Subtotal	**£8,500.00**
Contractors		
	Contract	1000.00
	Contractors Subtotal	**£1,000.00**
Machinery Depreciation		
	Depreciation	7000.00
	Machinery Depreciation Subtotal	**£7,000.00**
Rent		
	Rent	4800.00
	Rent Subtotal	**£4,800.00**
Property Repairs		
	Repairs	2500.00
	Property Repairs Subtotal	**£2,500.00**
Utilities		
	Rates	1400.00
	Utilities Subtotal	**£1,400.00**
Insurance		
	Insurance	1800.00
	Insurance Subtotal	**£1,800.00**
Professional Fees		
	Accountant	850.00
	Professional Fees Subtotal	**£850.00**
Sundry Overheads		
	Sundries	1500.00
	Sundry Overheads Subtotal	**£1,500.00**
Bank Interest/Charges		
	Bank charges and interest	2000.00
	Bank Interest/Charges Subtotal	**£2,000.00**
	Total Farming Fixed Costs	**£33,850.00**

Detailed Crop Gross Margins

Cauliflower

	Item	Quantity	£/Unit	£ Total
Outputs				
Crop Sales				
	Crop Sale	1800	3.60	6480.00
			Total Outputs	**£6,480.00**
Costs				
Casual Labour				
	Casual Labour	336	6.50	2184.00
Fertiliser Costs				
	Nitrogen	300	0.37	111.00
	Phosphate	100	0.29	29.00
	Potash	100	0.20	20.00
Other Costs				
	Marketing	1	1600.00	1600.00
Seed Costs				
	Plants	1	270.00	270.00
Spray Costs				
	Cauliflower Spray Program	1	124.00	124.00
			Total Costs	**£4,338.00**
			Gross Margin	**£2,142.00**

Leeks

	Item	Quantity	£/Unit	£ Total
Outputs				
Crop Sales				
	Crop Sale	4500	3.50	15750.00
			Total Outputs	**£15,750.00**
Costs				
Casual Labour				
	Casual labour	1300	6.50	8450.00
Contract Labour				
	Cultivations	1	69.00	69.00
	Fertilising	1	25.00	25.00
	Spraying	1	178.00	178.00
Fertiliser Costs				
	Nitrogen	200	0.37	74.00
	Phosphate	70	0.29	20.30
	Potash	170	0.20	34.00
Other Costs				
	Marketing, Packaging,	1	3500.00	3500.00
Seed Costs				
	Seed Purchase	1	600.00	600.00
Spray Costs				
	Leeks Spray Programme	1	650.00	650.00
			Total Costs	**£13,600.30**
			Gross Margin	**£2,149.70**

Spring Barley

	Item	Quantity	£/Unit	£ Total
Outputs				
Crop Sales				
	Barley	6	85.00	510.00
Straw Sales				
	Straw	2.5	60.00	150.00
			Total Outputs	**£660.00**
Costs				
Fertiliser Costs				
	Nitrogen	100	0.37	37.00
	Phosphate	60	0.29	17.40
	Potash	60	0.20	12.00
Other Costs				
	Baling	1	18.00	18.00
	Contract drilling	1	40.00	40.00
	Combining	1	75.00	75.00
Seed Costs				
	Seed Purchase	145	0.22	31.90
Spray Costs				
	Herbicide	1	35.00	35.00
	Fungicide	1	30.00	30.00
			Total Costs	**£296.30**
			Gross Margin	**£363.70**

Summer Cabbage

	Item	Quantity	£/Unit	£ Total
Outputs				
Crop Sales				
	Crop Sale	3200	1.90	6080.00
			Total Outputs	**£6,080.00**
Costs				
Casual Labour				
	Cutting	134	6.50	871.00
	Drilling/planting (hrs)	12	6.50	78.00
Contract Labour				
	Spraying	1	119.00	119.00
	Fertilising	1	24.00	24.00
	Cultivations	1	69.00	69.00
Fertiliser Costs				
	Nitrogen	150	0.37	55.50
	Phosphate	125	0.29	36.25
	Potash	250	0.20	50.00
Other Costs				
	Marketing,Packaging,	1	2200.00	2200.00
Seed Costs				
	Seed Purchase	1	633.00	633.00
Spray Costs				
	Cabbage Spray Programme	1	264.00	264.00
			Total Costs	**£4,399.75**
			Gross Margin	**£1,680.25**

Detailed Livestock Gross Margins

Finishing Cattle

	Item	Quantity	£/Unit	£ Total
Outputs				
Main Sales				
	Finished Animal	1	680.00	680.00
Replacement				
	Stores Purchase (2%	1.02	-480.00	-489.60
			Total Outputs	**£190.40**
Costs				
Feed Costs				
	Concentrates	0.6	140.00	84.00
Other Costs				
	Sundries	1	16.00	16.00
	Bedding	0.4	60.00	24.00
Vet/Med Costs				
	Vet	1	9.00	9.00
			Total Costs	**£133.00**
			Gross Margin	**£57.40**

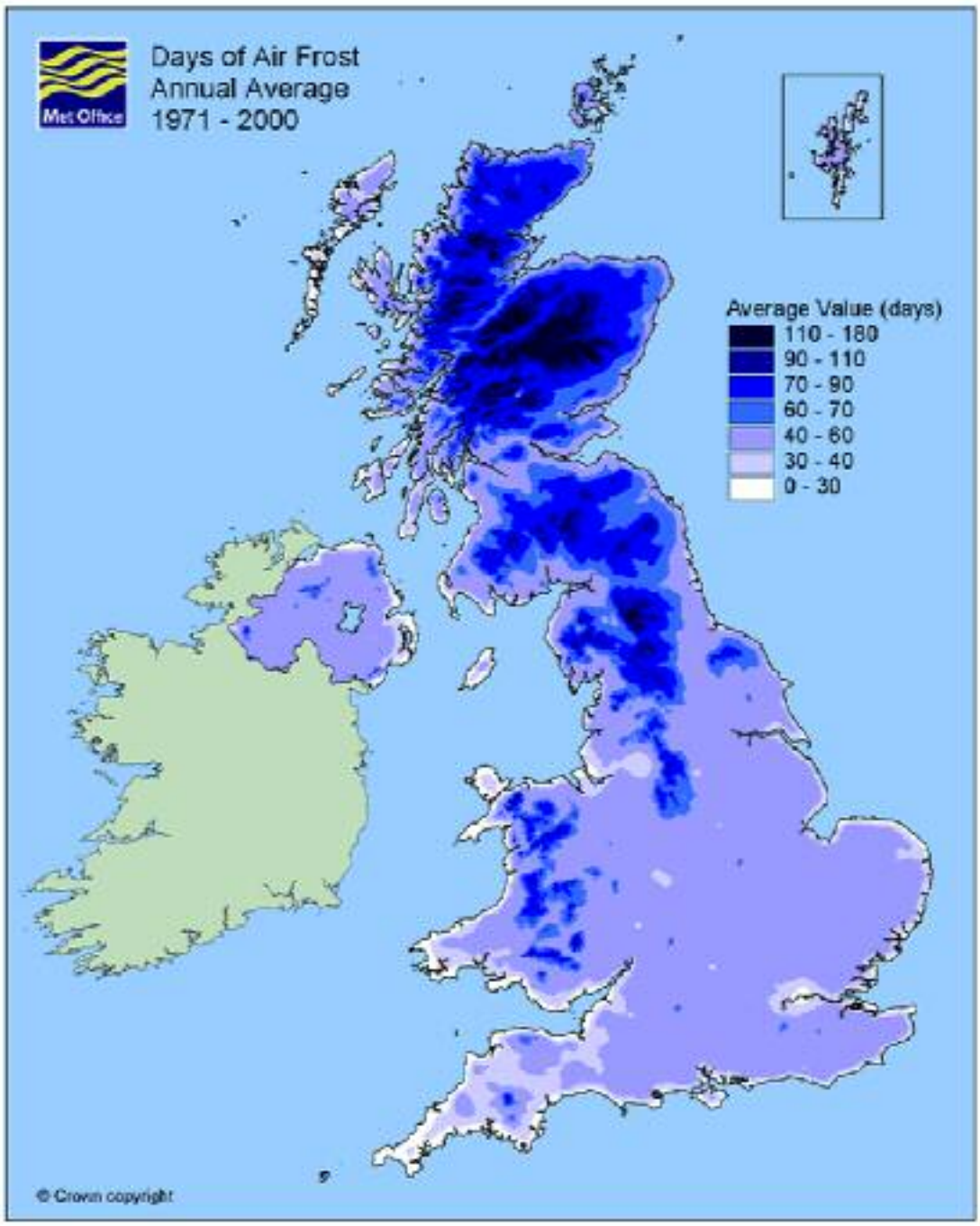
Lowland Sheep

	Item	Quantity	£/Unit	£ Total
Outputs				
Main Sales				
	Wool	1	1.00	1.00
	Lambs (170%)	1.7	42.00	71.40
Replacement				
	Cull Ram	0.006	28.00	0.17
	Replacement Ewes	0.2	-65.00	-13.00
	Cull	0.15	25.00	3.75
	Replacement Ram	0.007	-300.00	-2.10
			Total Outputs	**£61.22**
Costs				
Feed Costs				
	Concentrates Lambs	0.027	140.00	3.78
	Concentrates Ewes	0.037	140.00	5.18
Other Costs				
	Sundries	1	5.50	5.50
Vet/Med Costs				
	Vet	1	4.50	4.50
			Total Costs	**£18.96**
			Gross Margin	**£42.26**

Suckler Cows

	Item	Quantity	£/Unit	£ Total
Outputs				
Main Sales				
	Stores	0.93	480.00	446.40
Replacement				
	Bull Depreciation	1	-16.00	-16.00
	Replacement	0.16	-700.00	-112.00
	Cull Cow	0.17	350.00	59.50
			Total Outputs	**£377.90**
Costs				
Feed Costs				
	Concentrates	0.6	140.00	84.00
Other Costs				
	Sundries	1	15.00	15.00
	Bedding	0.6	60.00	36.00
Vet/Med Costs				
	Vet	1	30.00	30.00
			Total Costs	**£165.00**
			Gross Margin	**£212.90**

ANNEX 3. DAYS OF AIR FROST


Met Office
Days of Air Frost
Annual Average
1971 - 2000
Average Value (days)
110 - 180
90 - 110
70 - 90
60 - 70
40 - 60
30 - 40
0 - 30
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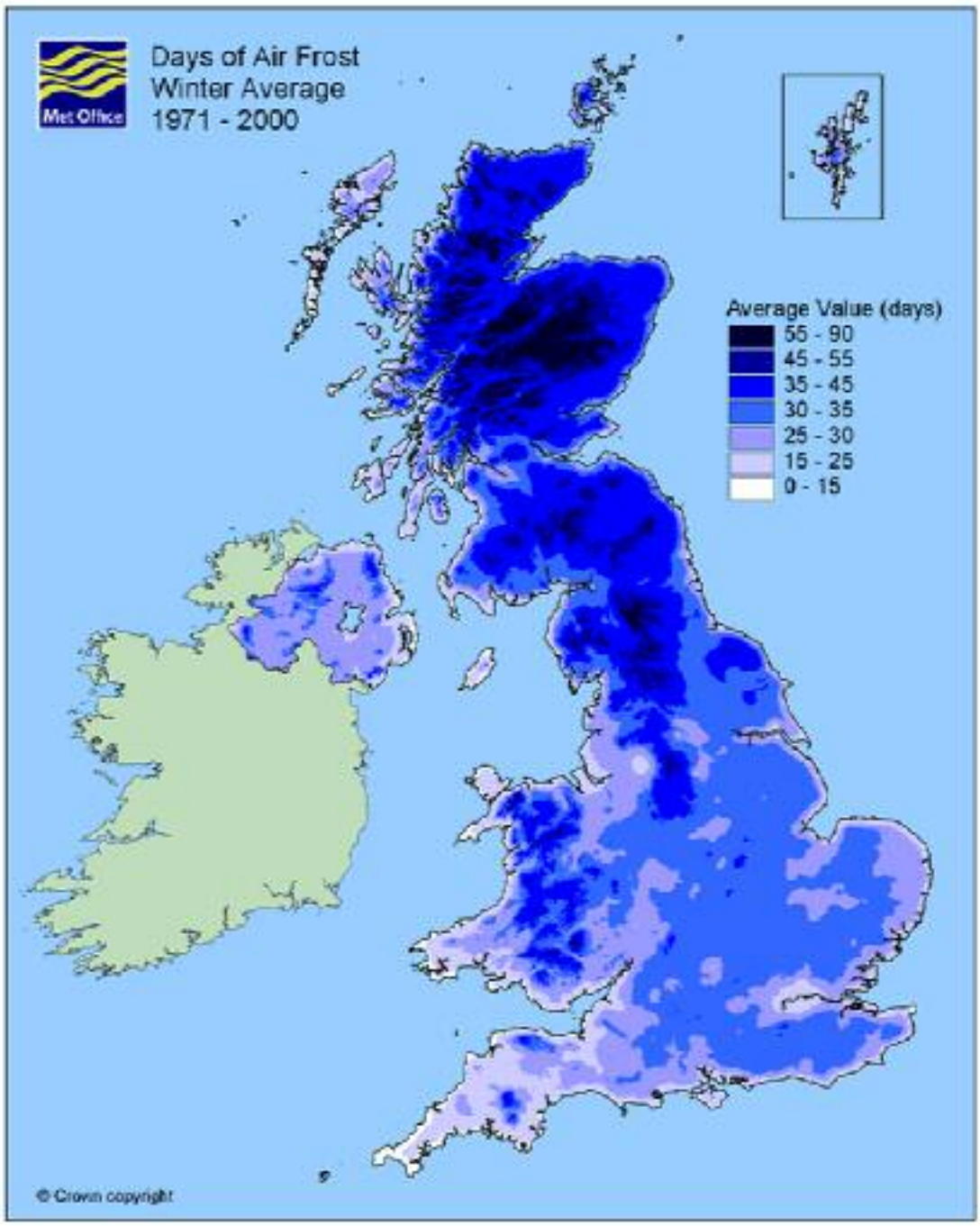
Met Office
Days of Air Frost
Winter Average
1971 - 2000
Average Value (days)
55 - 90
45 - 55
35 - 45
30 - 35
25 - 30
15 - 25
0 - 15
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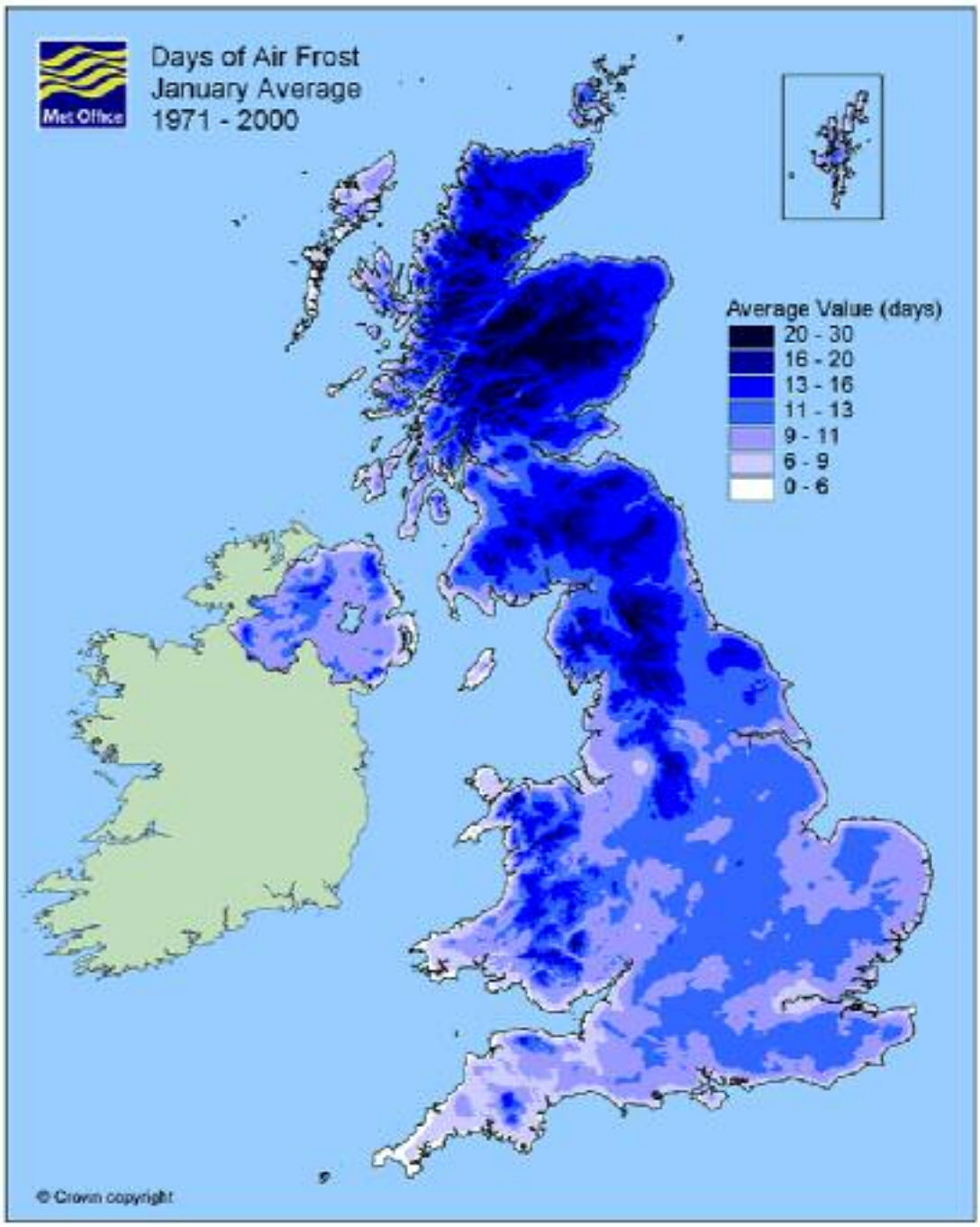
Met Office
Days of Air Frost
January Average
1971 - 2000
Average Value (days)
20 - 30
16 - 20
13 - 16
11 - 13
9 - 11
6 - 9
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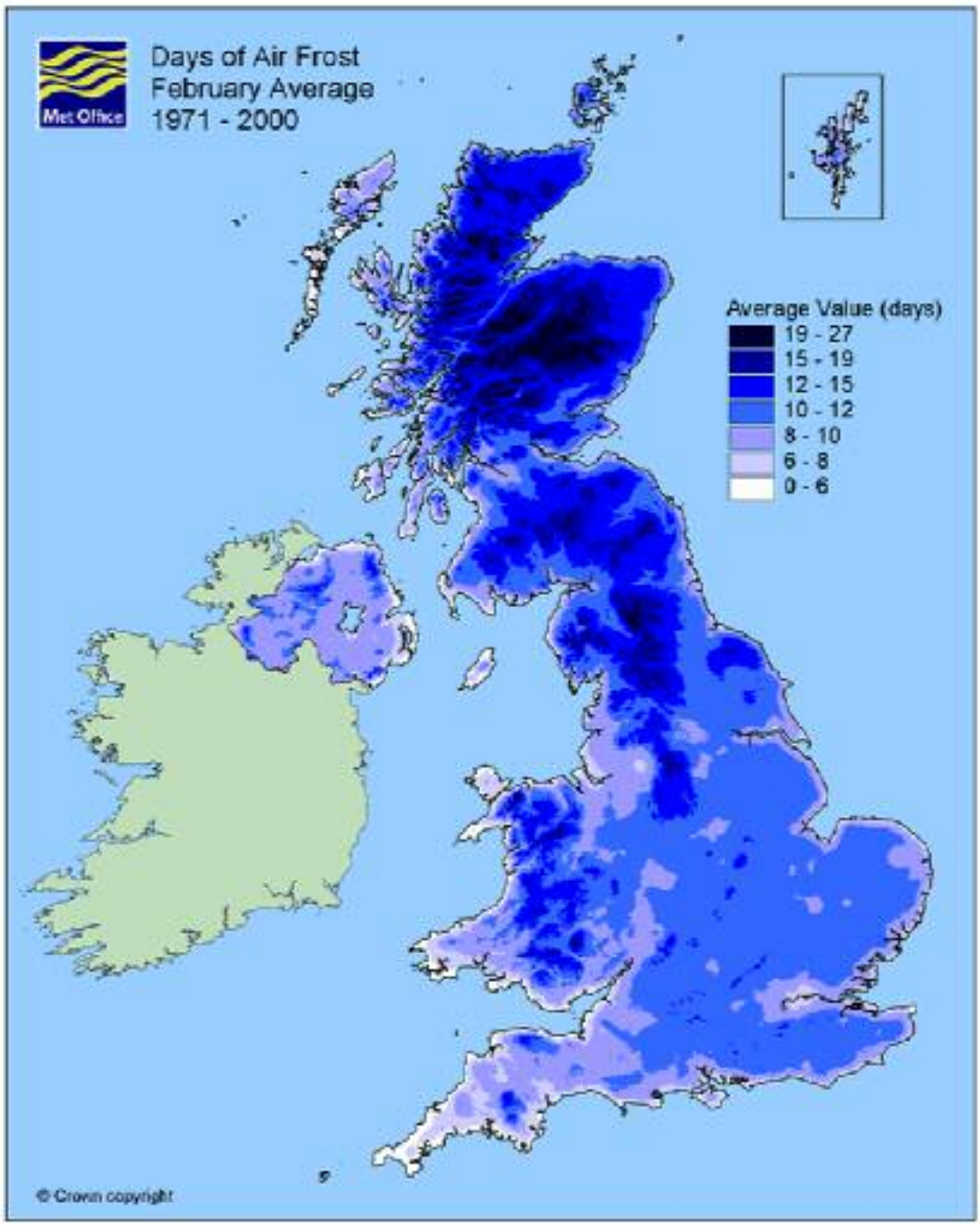
Met Office
Days of Air Frost
February Average
1971 - 2000
Average Value (days)
19 - 27
15 - 19
12 - 15
10 - 12
8 - 10
6 - 8
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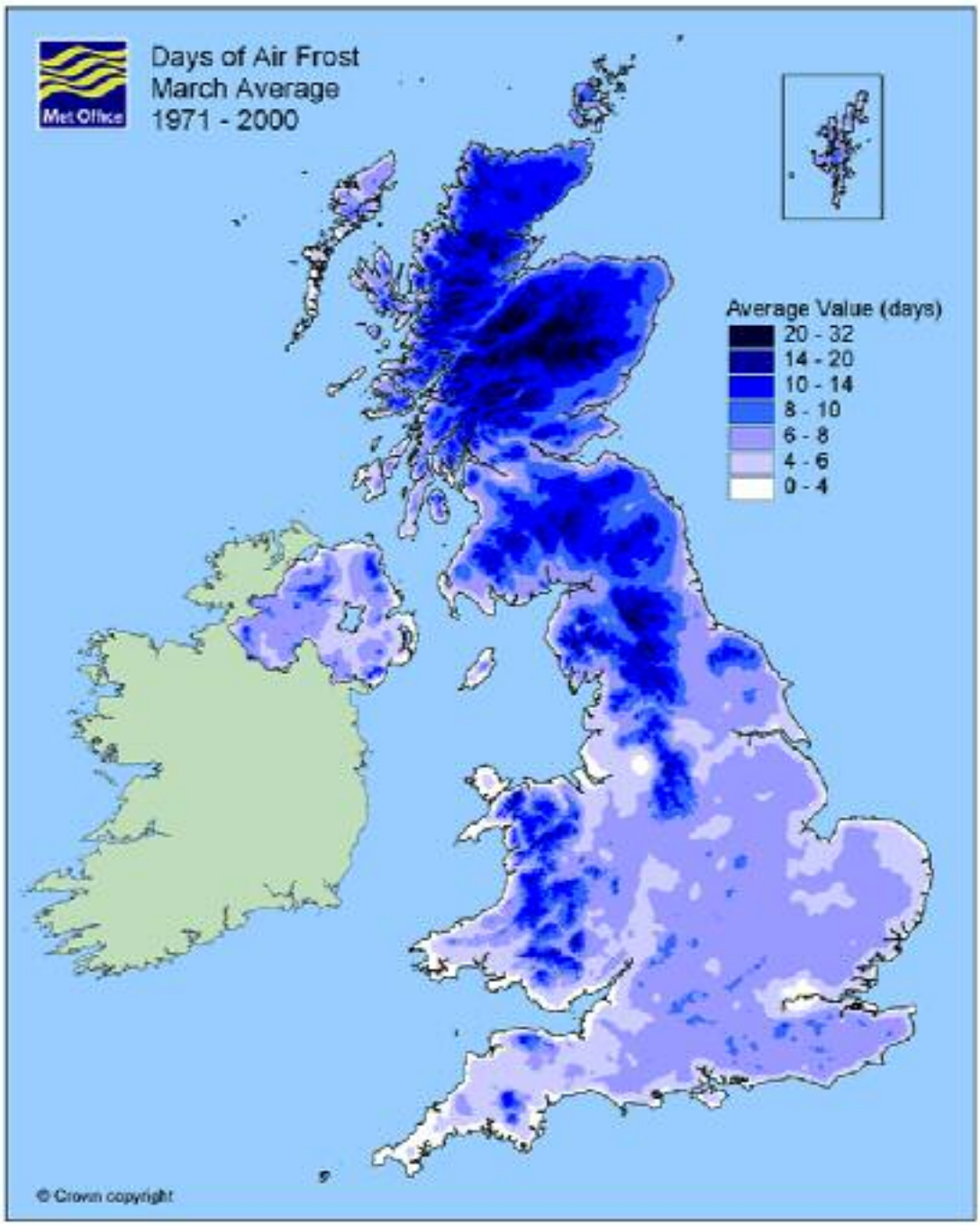
Met Office
Days of Air Frost
March Average
1971 - 2000
Average Value (days)
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14 - 20
10 - 14
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6 - 8
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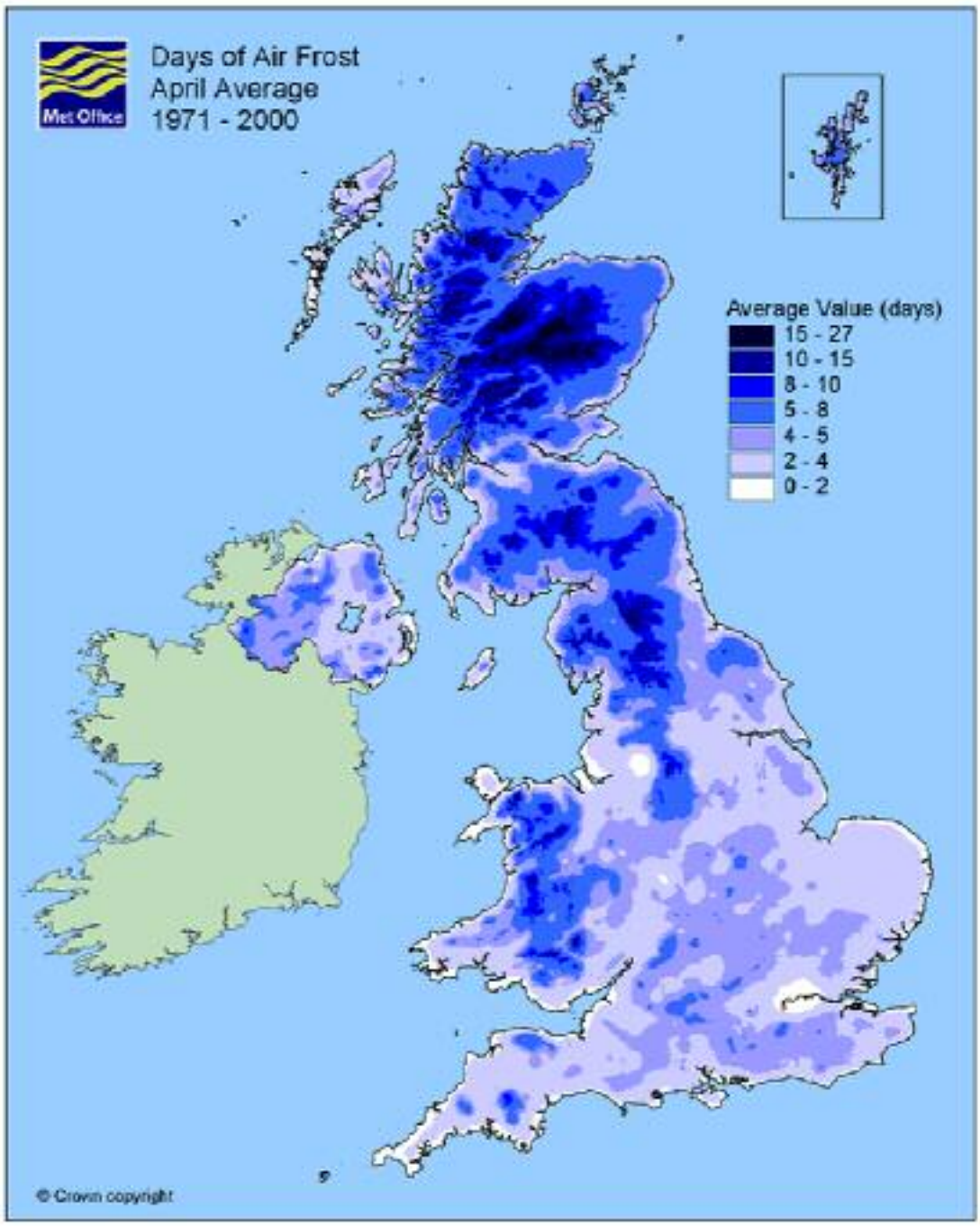
Met Office
Days of Air Frost
April Average
1971 - 2000
Average Value (days)
15 - 27
10 - 15
8 - 10
5 - 8
4 - 5
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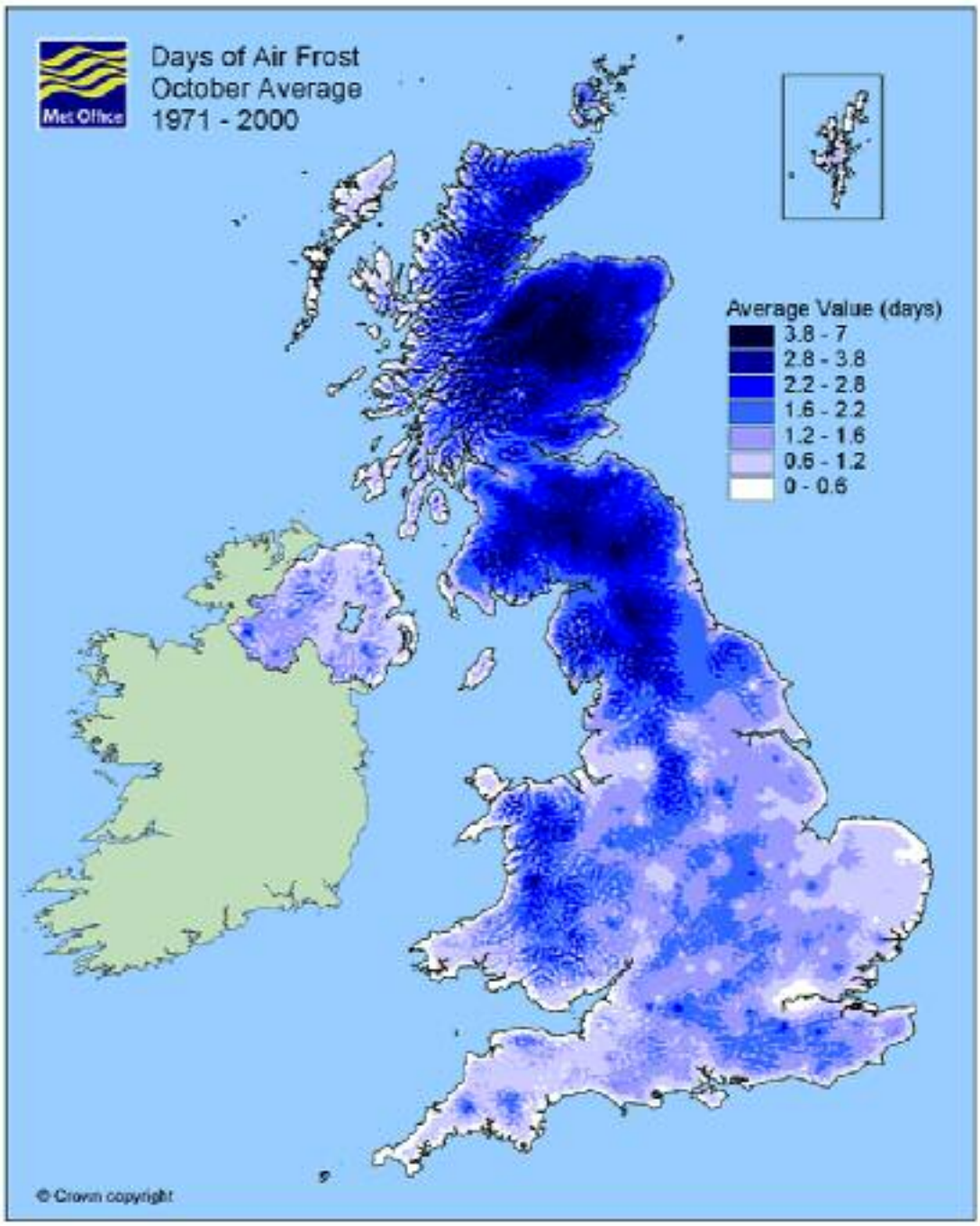
© Crown copyright


Met Office
Days of Air Frost
October Average
1971 - 2000
Average Value (days)
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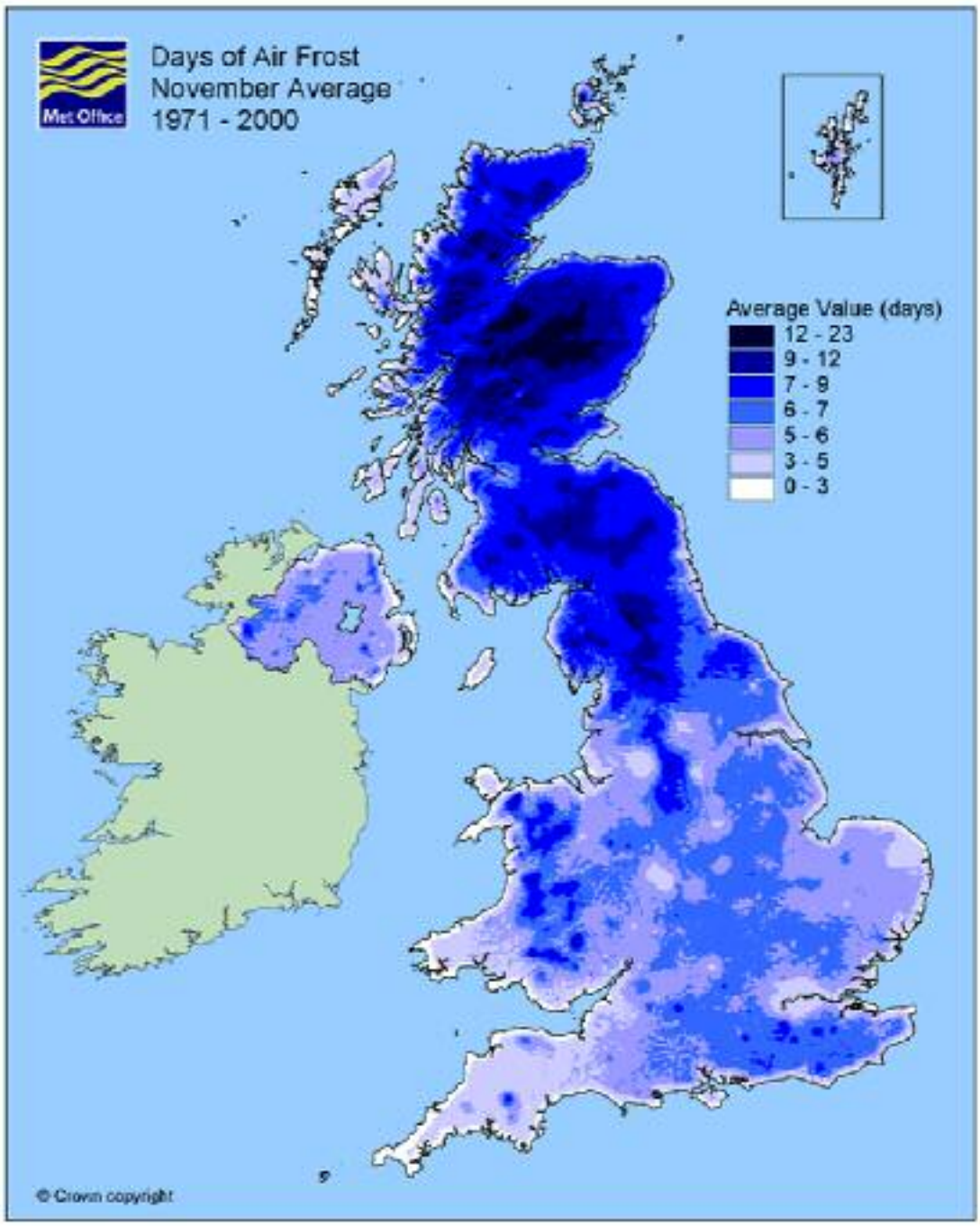
Met Office
Days of Air Frost
November Average
1971 - 2000
Average Value (days)
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9 - 12
7 - 9
6 - 7
5 - 6
3 - 5
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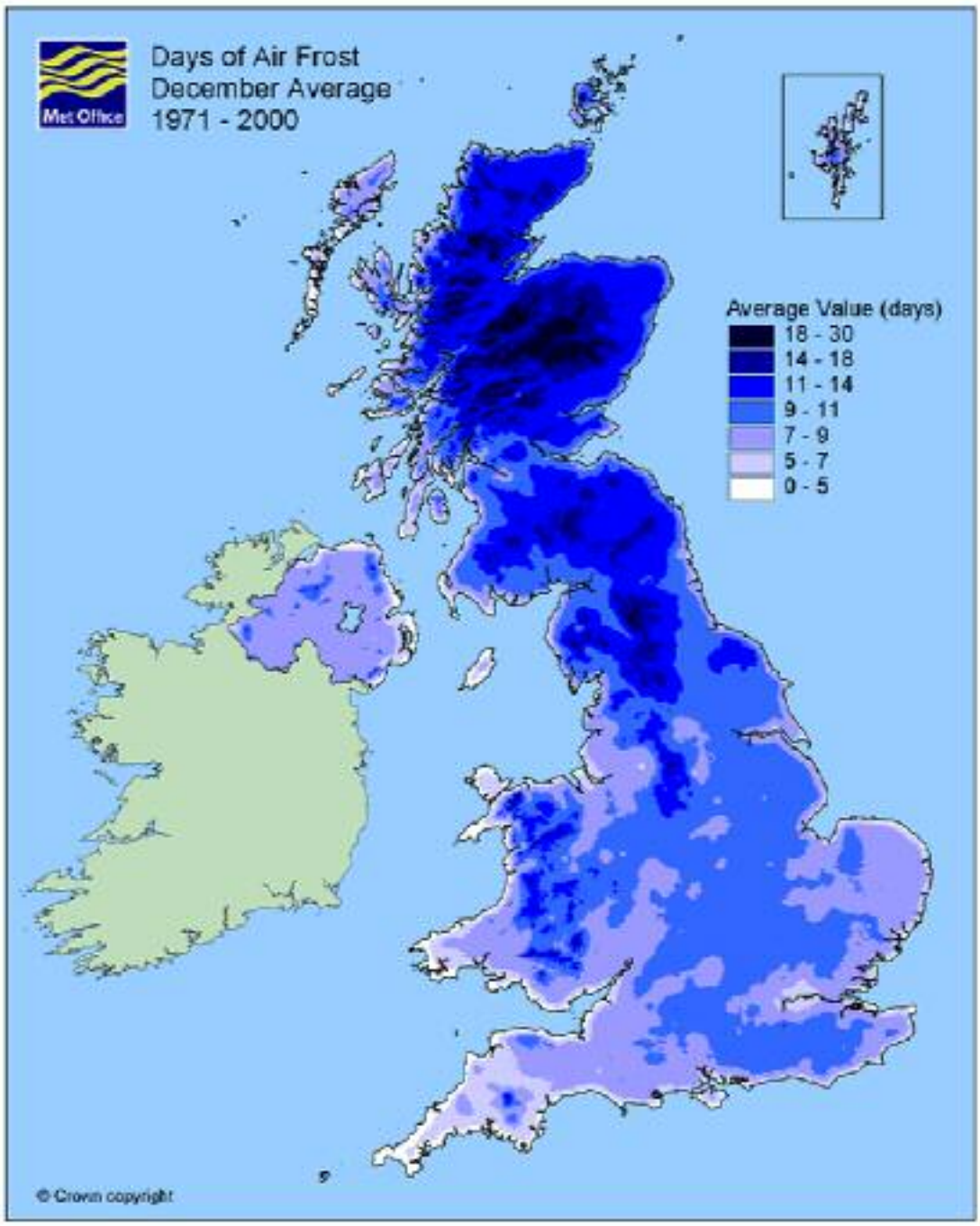
Met Office
Days of Air Frost
December Average
1971 - 2000
Average Value (days)
18 - 30
14 - 18
11 - 14
9 - 11
7 - 9
5 - 7
0 - 5
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