



A farmer's guide to

Organic upland Beef and Sheep production

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Cronfa Amaethyddol Ewrop ar gyfer Datblygu Gwledig:
Ewrop yn Buddsoddi mewn Ardaloedd Gwledig



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Foreword

Wales has a high reputation for the quality of its livestock. Welsh lamb and beef were the first, and so far the only, food products from Wales to gain Protected Geographical Indication (PGI) status. PGI registration is recognition that the region of origin gives the product special characteristics.

As increasing areas of Welsh agricultural land are managed organically, more hill and upland beef and sheep producers are adopting organic farming. The 2008 Producer Survey from Organic Centre Wales confirms that the area of land under organic management now exceeds 110,000 ha, equivalent to 8% of Welsh agricultural land. The survey indicated that there are around 480 organic beef and 500 organic sheep enterprises in Wales, which is higher than previous estimates, and reflects the considerable number of upland farms entering conversion.

For hill and upland livestock farmers, organic conversion presents a number of challenges. Compared to mixed lowland farms they have limited areas of improved grassland for grazing and forage conservation, and they rarely have the possibility to grow cereals and fodder crops. Furthermore, unlike earlier converters, current entrants to organic farming are required to feed a 100% organic diet to their organic livestock. Success in the upland situation requires careful organic management planning not only for good livestock performance and health, but also on a sound financial basis.

The organic unit at ADAS Pwllpeiran was set up in 1993 to see if organic farming methods could be adopted by hill livestock farms. It was one of the first organic beef and sheep hill farms in Wales. The unit has limited improved grassland and it is also in a whole-farm ESA agreement. This technical guide presents information from the experience gained in this long-term trial of the practicalities of organic beef and sheep production in upland Wales.

A number of studies of the impacts of organic farming in Wales have been undertaken by Organic Centre Wales and its partners with funding from the Welsh Assembly Government and the Countryside Council for Wales. Currently a Defra-funded project is being undertaken by IBERS and ADAS to study more specifically the benefits of organic farming in the hills and uplands. The studies have identified a range of environmental, biodiversity and socio-economic benefits associated with the adoption of organic farming, but it is also clear that agri-environment schemes such as ESAs, Tir Gofal and Tir Cynnal complement organic farming systems and are an important additional source of income, particularly in the uplands. This guide also provides information on the financial performance of organic upland farms, drawing upon the latest results from a long-term Defra study.

To complete the guide there are case studies of three organic Welsh livestock farms. Two of these are well-established enterprises; the third is a more recent conversion to organic upland beef and sheep production in Wales.

1 The experience of ADAS Pwllpeiran

1.1 Background

Pwllpeiran is a 1300 ha ADAS research farm located in the Cambrian Mountains Environmentally Sensitive Area (ESA) of mid-Wales. The upland organic unit at ADAS Pwllpeiran was set up in 1993 to examine the feasibility of organic beef and sheep production in a hill situation with limited improved grassland. The organic unit currently comprises 245 ha of the total area of the farm. The initial 111 ha organic unit achieved full organic status in 1995 and a further 134 ha was added in 2004.

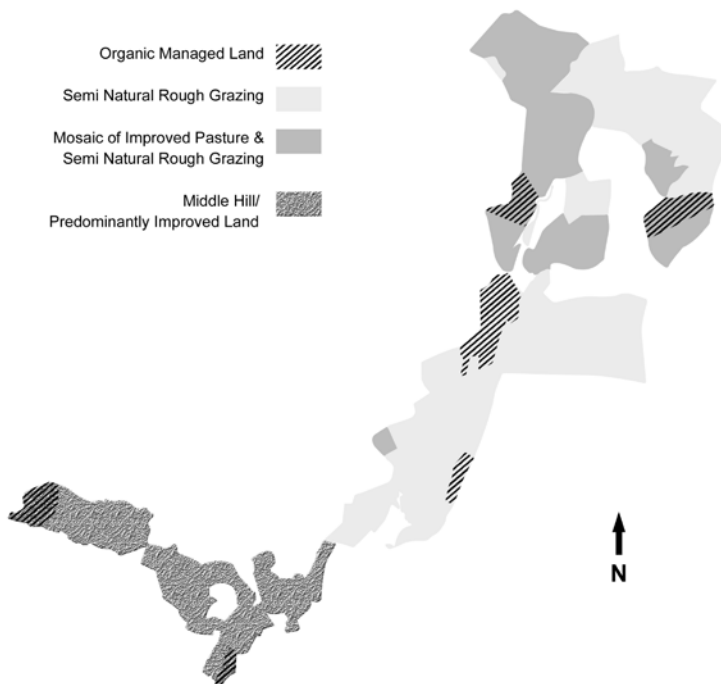
The organic unit comprises a series of separate enclosures spread out over the farm, including fields (both grazing and conservation), mountain re-seeds and semi-natural rough grazings (SNRG). The enclosures were originally selected so that the land type in the organic unit would be representative of the land types of the holding as a whole, and that this would allow comparisons to be made.

The main enterprises on the organic unit are beef and sheep production. There is a suckler herd of Welsh Black cows and a breeding flock of Hardy Speckled Face ewes and Texel crosses. The ewes were originally mated with Welsh Hill Speckle-face rams, but in recent years a proportion of the flock have been mated with Texel rams. Female offspring from the Texel cross have been retained for breeding within the organic unit.

Climatic conditions on the farm are characterised by an annual average rainfall of 1700 mm on the lower land (300-400 m) and 2100 mm on the hill pastures (550 m).

From 1994 to 2001 as part of the EAGGF Objective 5b 'Developing Organic Farming in the Uplands' project, annual reports evaluated the organic unit in terms of grassland management, animal health and performance. These reports also compared the financial performance of the organic unit with the conventional farming enterprise on a gross margin per hectare basis. In each of these years, the organic unit out-performed the conventional holding (Frost, 2001; Frost et al., 2002). Subsequently the organic unit has focused on grassland management, breeding and feeding and internal parasite control – first as part of the Organic Demonstration Farm Network for Wales and then as a Farming Connect Organic Development Farm.

ADAS Pwllpeiran – land types and organic enclosures



1.2 Grassland management

As Pwllpeiran has a Cambrian Mountains Environmentally Sensitive Area (CMESA) agreement, the areas of semi natural vegetation in the organic unit are managed to CMESA prescriptions. The farm receives payment for grazing prescriptions on areas of semi-natural rough grazing containing heather, and payments are also received for management of the mountain 'mosaics' of semi natural rough grazing and re-seeded land. Fields used for forage conservation have also qualified for 'reversion to hay meadow' management payments. Table 1 sets out the land categories in the unit when organic conversion started in 1993 plus the additional land added in 2004.

Table 1 ADAS Pwllpeiran Organic Unit: land categories

Phase	Land type	ha
1 (1993)	Fields (previously improved grassland)	24.5
	(suitable for forage conservation)	(9.1)
	Mountain re-seeds (mosaics of SNRG and grassland)	39.9
2 (2004)	Semi-natural rough grazing (<i>Calluna</i> dominated)	47.1
	Semi-natural rough grazing (<i>Molinia</i> dominated)	134
	Total	245

The improved fields on the lower land lie between 300 m and 400 m and are on mineral soils. Two of the four fields were re-seeded at approximately six-year intervals prior to conversion and these are now the main forage conservation fields. The 1994 conversion plan suggested that re-seeding of these pastures may be necessary every 6-8 years. In order to maximise grant payments under the ESA agreement, two fields (Cae Felin and Far Brignant) were entered into hay meadow conversion agreements which exclude nutrient application or pasture renovation. Also under ESA prescriptions, hay cutting is delayed until at least 15th July.

One field, Cae Felin – the main source of forage conservation for the organic unit – was re-seeded in 2001 due to increasing weed infestation and declining forage yields. The ESA prescription may have contributed to the weed problem as the delay in cutting allows plants to seed. Cae Felin was removed from the ESA hay meadow conversion prescriptions, and re-seeded. In addition the field was limed and FYM was applied at 1.5 t/ha (7.0 t/acre). Re-seeding provided the opportunity for a field-scale re-seeding trial to evaluate grass-clover mixtures for their ability to out-compete grassland weeds and to produce a productive ley for grazing and forage conservation. Each mixture had a weed-controlling effect but a mix comprising hybrid ryegrasses and red and white clover resulted in the best combination of ley establishment, weed control and forage production. The trials also demonstrated the longer term value of red clover in the uplands, and its longevity was particularly noticeable. At higher altitudes and with lower air and soil temperatures, it is possible that the longevity of red clover is associated with lower incidence of clover rot and stem eelworm (Frost et al., 2003).

Management of the SNRG and hill mosaics to ESA prescriptions restricts stocking to a maximum rate of 1.24 sheep/ha/day from 15 April to 15 October. In practice, single bearing ewes are grazed with their lambs on hill mosaics from May until weaning. Cows and calves currently graze the 134 ha *Molinia*-dominated Nanty hill (which completed organic conversion in 2004) from June through to September but have previously alternated areas of the SNRG and hill mosaics with the sheep.

Soil fertility levels, particularly on the improved land, have declined since organic conversion. This is partly due to the limited nutrients that are applied and partly due to the high rainfall. Without importing nutrients, swards will move from improved to semi-improved condition with reductions in herbage production and subsequent stock carrying capacity. The limited quantity of farm yard manure (FYM) is generally inadequate to supply

the nutrients required for silage fields alone. These are the critical areas for the unit because if inadequate stocks of conserved forage are made, expensive bought-in forage would be required. Their aftermath grazing also provides a nutritional boost for finishing stock. Currently (summer 2008) the improved fields are infested with dock (primarily broad-leaved dock, *Rumex obtusifolius*) and the level of infestation will be addressed by re-seeding. There is also an increase in thistles (*Cirsium arvense*) and rushes (*Juncus* spp) on semi-improved mountain swards. Rush and thistle control is achieved by regular topping in July. Failure to maintain annual topping results in further spread of these invasive weeds¹.

Soil analysis in the improved fields used for forage conversion indicates that pH has remained close to the optimum pH 6 since organic conversion. In Cae Felin (the main conservation enclosure), pH ranged from 5.7 to 6.2. An application of 0.6 t/ha (1.4 t/acre) ground magnesium limestone was applied in 2002 when the field was re-seeded. Brignant was limed just prior to conversion and its pH has dropped slowly from 6.8 in 1996 to a current level of 5.5. In the mountain mosaics, Parc y Llyn has maintained a reasonably high pH varying from pH 5.7 to 6.5 and Llechwedd Brith has a slightly lower but still adequate pH varying from 5.3 to 6.0. Mountain mosaic pastures would usually be expected to have pH of around 5.4.

Since organic conversion, phosphate (P) levels have gradually declined and are now around 10 mg/l less than at the start of conversion, ranging from 5 to 7 mg/l. Magnesium (Mg) levels have also generally decreased since conversion, although application of magnesium limestone are used to help maintain levels. Potash (K) levels have fluctuated in the forage fields since conversion. This is partly due to the off-take of silage and the irregular application of FYM from year to year.

Table 2 Nutrient status of the organic fields at Pwllpeiran.

Sample ID	P mg/l	Index	K mg/l	Index	Mg mg/l	Index	pH
Cae Felin	31	3	218	2+	109	3	5.9
Llechwedd Brith Organic	8	0	64	1	220	4	5.8
Parcllyn Organic	8	0	61	1	168	3	5.7
Brignant North	7	0	111	1	105	3	5.6
Brignant South	8	0	120	1	119	3	5.4
Cae Bach Brignant	13	1	85	1	101	3	5.5

Most of the manure from the organic cattle pens and lambing sheds is spread on the fields used for forage conservation, as this is where the nutrient off-take is greatest. Of the improved grassland, 23.8 ha is kept for silage and round bale silage is made at around 30% dry matter (DM) in July. At the original stocking rate it was calculated that the organic unit would be self sufficient for silage at 3 t DM/ha. The average silage yield each year has varied around this level ranging from 2.8 to 4.0 t DM/ha. The variation in silage yield reflects the cyclical changes in clover content in the swards. Following high silage yields in 1996 (3.8 t DM/ha) sheep numbers were increased. By 2000 however, there was insufficient forage at 2.9 t DM/ha and sheep numbers had to be reduced. In winter 2000/01 non-organic hay and conversion silage were bought in, as farm stocks were insufficient. Following re-seeding of Cae Felin in 2001 – when the enclosure was removed from the reversion to hay meadow ESA agreement – silage output improved to 3.9 t DM/ha.

¹ For information on weeds and their control in organic systems, see <http://www.gardenorganic.org.uk/organicweeds/index.php>

Table 3 Pwllpeiran Organic Unit – typical grass silage analysis

	Organic silage composition
Dry Matter g/kg	431
<i>Energy</i>	
D Value	59%
Metabolisable Energy (ME) MJ/kg DM	9.5
<i>Fibre</i>	
Neutral Detergent Fibre (NDF) g/kg DM	606
Acid Detergent Fibre (ADF) g/kg DM	417
Ash g/kg DM	81
<i>Protein</i>	
Crude Protein (CP) g/kg DM	136

Following an increasing problem with cobalt deficiency in lambs and low trace elements in soil analysis, a blend of trace elements (“Grasstrac” manufactured by Phosyn), was applied to mountain enclosures in 2000, to Cae Felin and Far Brignant in 2001, and to Brignant in 2002. “Grasstrac” was applied at a rate of 50 kg/ha following approval from the organic certifying body, SACert. This treatment aimed to address the issues of low clover content and copper, cobalt and selenium deficiencies. Soil analysis, forage analysis and blood tests were carried out to confirm these deficiencies. Grasstrac contains 2.3% copper, 0.1% cobalt, 0.03% selenium, 1.1% zinc, 0.1% iodine, and 33% sodium.

Without inorganic N inputs, clover needs to make up 20%-25% of a sward to ensure nitrogen fixation is sufficient to contribute 150Kg N/ha in upland swards. Generally, clover content showed an initial increase within the improved grassland in the organic unit following conversion. There was a sudden, marked decrease in clover content in 1999, but in 2000, clover content started to recover and by 2001 was 16%-20% in the silage fields. It has proven difficult to maintain clover levels on the mountain pastures with the lower pH, P and K levels and contents have struggled to remain at 5%.

Following conversion, an overall increase in plant species was recorded in the improved grassland and mountain re-seeds. Surveys of the Brignant organic fields showed that on the organic land in 1993 there were 14 plant species recorded in the re-seeded fields and 19 species in the permanent pasture; by 1995 the numbers of plant species recorded had risen to 23 and 35 respectively.

1.3 Management and performance of the suckler herd

The organic cattle herd comprises ten suckler cows with two replacement heifers. The cattle are bred pure and calve during March to May. The males are castrated and sold as store cattle, while the heifers are either sold for breeding or retained on the unit as replacements. Heifers are bulled as two-year-olds, calving down as three-year-olds. All the cattle are housed from November.

Both the organic and conventional herds are part of the Welsh Black Cattle Society (WBCS) Herd Health Scheme. They are tested for Johne’s, Bovine Virus Diarrhoea (BVD), Infectious Bovine Rhinotracheitis (IBR) and Leptospirosis. The herd is free of Johne’s, BVD and IBR. A vaccination programme is in place for Leptospirosis and a Leptavoid vaccine is used. The conventional herd at Pwllpeiran had been suffering major reproductive problems, with the proportion of barren cows averaging 21% and calf mortality averaging 12%. The herd health scheme reviewed management practices and a management plan was put in place. Conception rates improved as did the number of calf live births. The plan is regularly reviewed with a vet.

It needs to be stressed, however, that similar problems were not found in the smaller organic herd at Pwllpeiran. The organic cattle have a high conception rate averaging 92.5%. There are rarely more than two barrens and twins are often born. The conception rate has reached 110%. Calf mortality is low, mainly occurring at or before calving.

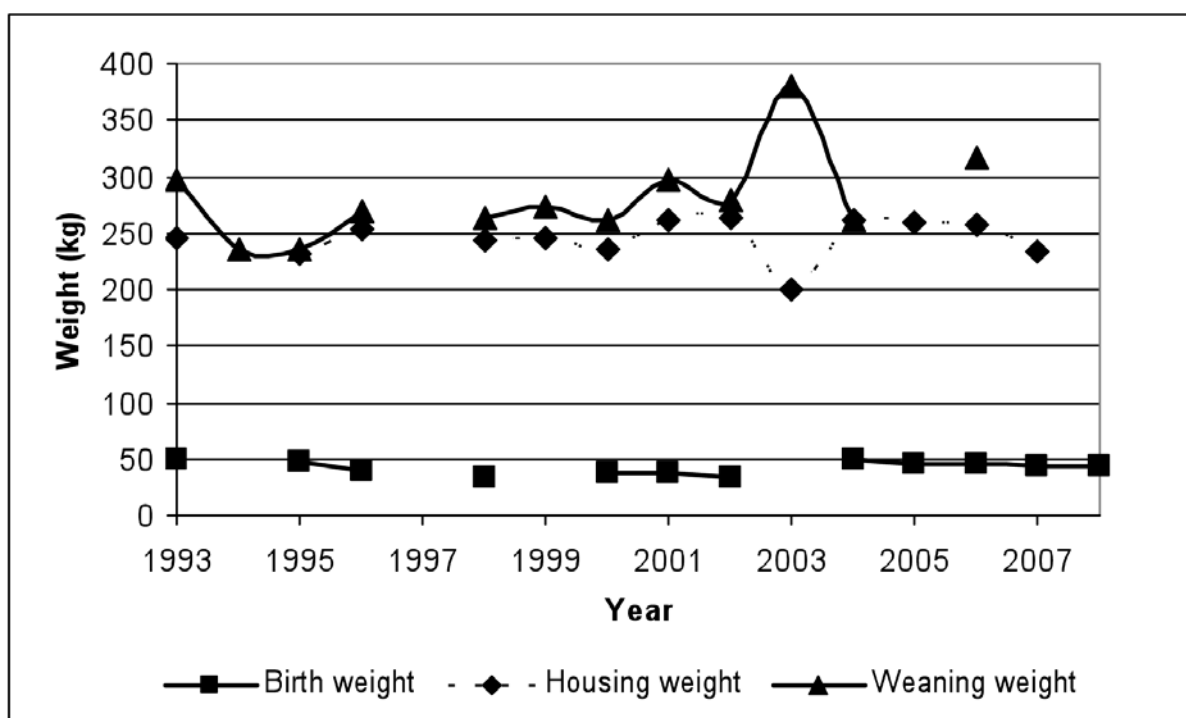
The initial aim of the herd health scheme was to eliminate Johne's disease within the national Welsh Black herd. Johne's disease had been a problem in the Pwllpeiran herd in the late 1970s and early 1980s, prior to organic conversion.

Leptospirosis was identified in the conventional herd as part of the on-going health scheme testing. It was decided to vaccinate because of the nature of the disease: cattle only test positive for a short time after infection and many other *Leptospira* organisms can cause a positive result. Although Leptospirosis was identified in the conventional herd, after discussions with the herd health scheme veterinary surgeon it was decided to vaccinate the organic herd as well.

The herd was certified free of BVD during November 2003. There is currently a plan in process to eliminate IBR from the herds. IBR does not affect the herd performance economically to the same degree as other diseases and so has not been given equivalent priority.

The average birth weight of the organic calves is 42 kg. Over the years, the average birth weight has varied from 33 kg to 50 kg. The 200-day weight has varied from 235.5 kg to 260.0 kg with an average of 245.4 kg. The 200-day weight does not follow a similar pattern to the birth weight but reflects grass availability. The average 300-day weight over the years is 280.6 kg and this has varied by 60 kg. The 300-day weight tends to follow a similar pattern to the 200-day weight. The average daily live weight gain from birth to 200 days is 1.0 kg. The herd at Pwllpeiran is spring calving which has many advantages for organic beef production: it minimizes conserved forage requirements and avoids the potential health problems which arise from housing young calves in winter. Calving is generally in April. Calves are weaned in late January and are mostly sold as stores.

Figure 1 Pwllpeiran Organic Unit: calf weights at birth, housing and weaning, 1993 – 2007



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The organic cows and calves are housed in the autumn, the precise date depending on weather conditions. At housing, both the organic cows and calves receive a 'pour-on' for the control of ectoparasites. As cattle are in the minority on the organic unit, internal parasites have not been a problem and drenching is unnecessary. If fluke eggs are found, cattle are treated with a flukicide. Mineral deficiencies have been identified on the unit, and a grass nutrient enhancer has been used to alleviate mineral deficiencies as described above. Soil tests have revealed copper deficiencies which can potentially affect cows' fertility, though there have been no issues with cow fertility within the organic unit. When blood tests have signalled copper deficiency, the herd has been treated with a copper bolus and injections with approval from the certifying body.

Organic livestock farming is focused on producing animals from a predominately forage-based system, with an emphasis on maintaining animal health through improved welfare and a reduction in the use of routine, conventional veterinary treatments. A number of breeds used in conventional farming could be considered as 'high maintenance' animals requiring regular, prophylactic veterinary treatments and high energy concentrated feeds to meet their potential. Such breeds may be unable to fulfil their potential performance under an organic system.

It may therefore be better in organic production to use local breeds that are genetically adapted to their environment (van Diepen et al, 2007). The Welsh Black is well suited to upland organic systems. The breed is hardy and easy calving; it is genetically suited to a grass-based system and can maintain itself on the coarse and less palatable vegetation, typically found in mountain pastures. The organic cattle in the Pwllpeiran herd have maintained condition and weight since organic conversion.

In 2001 the Pwllpeiran organic herd entered the Signet Beef Breeder scheme as part of the Welsh Black Cattle Society herd improvement scheme. The EBVs for the breeding suckler cows show an indication of improving beef value.



1.4 Management and performance of the sheep flock

It was decided in 1993 to select Hardy Speckled Face ewes for the organic unit. This breed is well-adapted to wet upland conditions and has the potential to produce a larger lamb for the market than the Welsh Mountain.

The number of ewes on the organic unit has generally been around 160. The sheep stocking rates were increased 22% in 1998 due to earlier indications that the unit could support more. Large quantities of silage were made in previous years, but then as stocking rates increased there was not enough produced and silage had to be

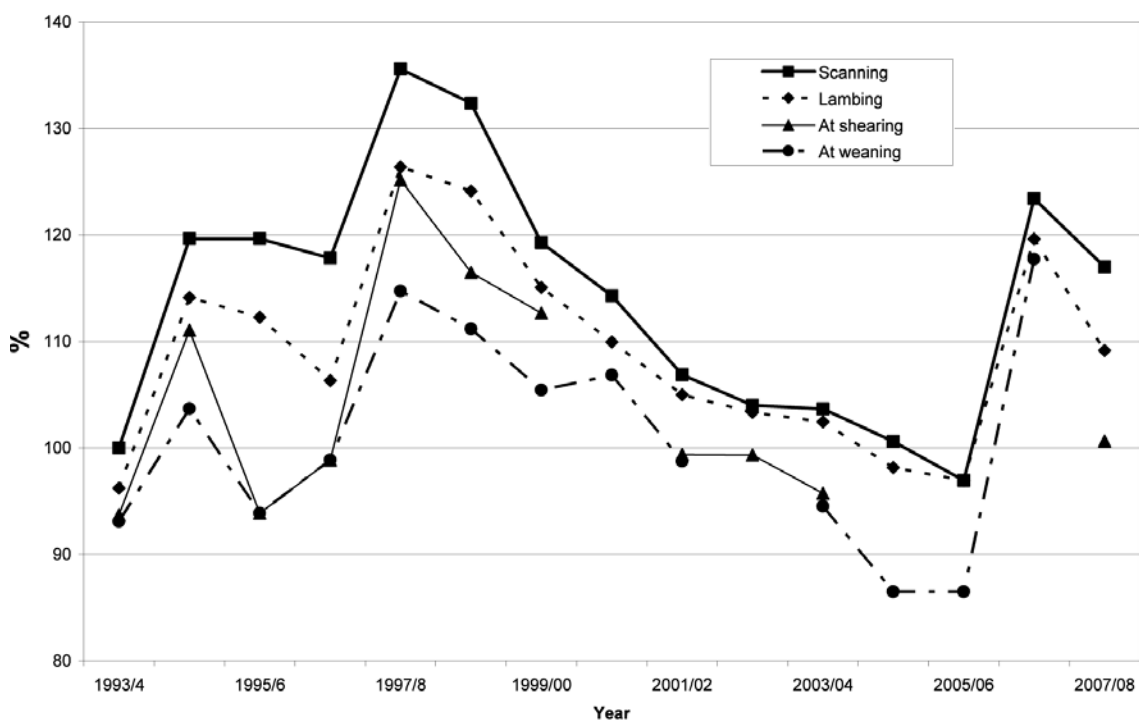
bought in. Autumn grazing was also in short supply for flushing ewes and finishing lambs which prevented cattle being kept at grass later to conserve silage stocks. Therefore stocking rates have been returned to 160 ewes.

Ewes are pregnancy-scanned in late January and housed from mid February until after lambing. Lambing starts in the second week of April, three weeks later than the conventional flock. Late lambing means that there is more grass available to the ewe, enabling lambs to suckle more and graze less, at the time when the *Nematodirus* hatch occurs. There is still some exposure to infestation, but this is believed to stimulate development of lambs' natural immunity.

To reduce further the problems associated with internal parasites, a number of management strategies are in place at Pwllpeiran. These include lambing policies, grazing management and the adoption of faecal egg counting. A safe grazing strategy has been put in place which utilises mixed grazing with the rotation of sheep and cattle in order to reduce the worm (nematode) challenge. Regular Faecal Egg Counts (FECs) are undertaken. This strategy means that anthelmintics are only used when required, and reduces the selection pressure for anthelmintic resistant worms. Trials at the Pwllpeiran organic unit have also been undertaken to assess the value of diatomaceous earth in the control of intestinal parasites (McLean et al., 2005).

A scanning percentage of 114% is currently the average. This has varied from 97% to 136% (Figure 2). The lambing percentage of the organic flock at Pwllpeiran initially decreased after organic conversion and is lower than for the conventional flock, but has increased in the last couple of years. The reduced lambing percentage could be due to the effect of reduced veterinary input and increase in subclinical disease, or to deficiencies. Lamb losses are generally low. The number of lambs that are lost between birth and weaning varies greatly from year to year and is very weather-dependent. Some losses from predators, such as foxes and badgers, invariably occur. Other losses occur from isolated cases of joint ill and coccidiosis. On average the organic unit weaning rate is 110%, but varies from 87% to 121%. Generally only around 9% of the ewes are barren, 24% carry twins and 65% carry singles. Rarely are there any triplets born in the organic flock.

Figure 2 Pwllpeiran Organic Unit – lambing percentage, 1993/4 – 2007/8



Single-rearing ewes graze the mountain pastures and twin-rearing ewes are grazed on improved land. Lambs are weaned in the first week of September. A percentage of ewe lambs are retained as replacement breeding stock, usually around 50 hogs, which are away-wintered from the end of October and return in April. This is normal practice on hill farms to ensure well grown replacements. The Pwllpeiran experience underlines the importance of selecting suitable organic lowland farms for away-wintering in order to achieve satisfactory daily liveweight gains.

Vaccination against clostridial disease and *Pasteurella* has continued due to a known on-farm problem. Ewes are vaccinated with Heptavac P+ in February, while the ewe lambs are vaccinated with Heptavac P+ in September and November.

The organic unit has had a relatively high number of barren ewes and the number of twins has generally declined in the flock. This decrease in lamb numbers has probably contributed to the increasing lamb weaning weight seen in recent years. Lamb birth weights and weaning weights have fluctuated from year to year. Birth weights varied from 2.7 kg to 4.7 kg, and weaning weights varied from 20.6 kg to 32.7 kg. On average, male singles are 0.24 kg heavier than female singles at birth. Singles are on average 0.90 kg heavier than twins born. The difference between singles and twins and between males and females is less obvious at weaning, and there are differences from year to year reflecting grass availability. Males were generally 1.97 kg heavier than females at weaning, and singles were generally 3.52 kg heavier than twins at weaning.

Birth and weaning weights can be adversely affected by higher lambing percentages. Lower percentages at weaning may also lead to a higher subsequent lambing percentage. Lower ewe weights and condition score at tupping can result in lower birth weights and for this reason it is essential that ewes are allowed to regain body condition prior to remating. This is particularly important when grazing during summer has been limited and where the ewe's body reserves have been used to maintain lamb growth. Ewe liveweights have generally decreased since organic conversion, and the condition scores have decreased slightly at certain times of the year. The heavier liveweights and higher condition scores mostly coincide with good grass production, silage yields and clover content.



Lamb daily liveweight gains follow a more consistent pattern, generally varying from 0.16 kg to 0.22 kg per day. The daily liveweight gain for singles is on average 0.03 kg greater than for twins. Males generally have a greater daily liveweight gain than females. The daily liveweight gain reflects the number of lambs and the

climatic conditions each year. Ewe liveweights and condition scores at weaning also correlated with daily liveweight gains of lambs, but this is influenced by lamb numbers and herbage availability. On occasions, low ewe condition scores at weaning have been recorded with low daily liveweight gain of lambs, but this is not always the case. In other years, ewes have achieved good condition scores at weaning but lambs have still recorded disappointing weight gains.

This suggests that grass availability early in the season may be a major influence on lamb performance. Subsequent good grass growth during the summer may help ewe condition, whereas lambs are less able to compensate. In recent years, daily liveweight gain has been increasing and so has the number of singles born compared to twins. The organic flock has, during this time, started to retain a number of Texel cross ewe lambs as flock replacements and these trends are likely to be a result of this.

Of the total lamb crop, 26-35% are retained as replacements to maintain the breeding flock. Lamb marketing has been driven by market forces each year. Some years a large proportion of the organic lambs are sold finished direct to the abattoir between September and November. The majority of the finished lambs were O3L grade, although some years there were more R3L particularly for Texel cross lambs. The grades and prices have improved in recent years, in particular for the 2007 lamb crop. This was mainly due to the high lamb prices in early 2008 when the majority of the finished organic lambs are sold: 51 were sold in October 2007, 49 in February 2008 and 31 in early March 2008.

The average deadweight of Pwllpeiran organic lambs over the years is 14.82 kg. The 2007 crop averaged 17.98 kg, selling at £49. In earlier years of the organic unit at Pwllpeiran, finished lambs were averaging £30 and premiums for organic lambs were hard to obtain. In recent years premiums on finished organic lambs have improved, and they have fetched up to 75p per kg more than conventional lambs in 2007.

In order to minimise late autumn and winter grazing on the organic unit, to avoid the cost of supplementary feeding to finish lambs and when a significant premium for finished organic lambs has been absent, it has sometimes been decided to sell some of the lamb crop as stores. In earlier years of the organic unit this sometimes proved more profitable. Some remaining lambs are also notionally sold to the conventional unit for finishing, due to the high costs of organic concentrates.



1.5 Beef and sheep feeding regimes

The organic cattle at Pwllpeiran are fed big bale silage plus approved concentrates through the winter period. Sheep are also fed grass silage but are supplemented with organic concentrates before and during the lambing period. One of the future challenges of the organic unit is to reduce concentrates and improve home-grown crops. Since the requirement for 100% organic feed and increasing feed prices, supplementation has become an increasing issue. A trial for finishing lambs on alternative forage crops was established to investigate low-cost finishing systems. The potential of six crops was investigated: white mustard, Nemat (a variety of rocket), crimson clover, sweet clover, and the mustard (Cruciferae) varieties Caliente 119 and Caliente 99. Mustard crops have traditionally been used in parts of the UK as sheep fodder crops.

Each crop was sowed in solid strips and each block had grass headlands. The lambs grazing the clover treatment had the greatest liveweight gain (average of 110 g/day). The study suggests that fertility-building crops such as clover and mustard can be utilised as grazed forage crops. However it may be more appropriate to sow the crops as a mixed crop for grazing rather than as monoculture. This would also increase any environmental benefits such as an increase in biodiversity. A number of plant secondary compounds have been shown to have some anthelmintic properties when included in animal diets. In this trial, faecal egg counts were reduced but as faecal egg counts were based on mob samples it was not possible to determine if there was an effect of forage type on parasite burdens (McLean 2007).

1.6 Summary and conclusions

The experience of the organic unit at Pwllpeiran shows that it is feasible to produce organic beef and sheep production in the hills and uplands, despite the absence of land suitable for home-produced cereal crops. It also demonstrates however that there are a number of important issues to address when converting an upland livestock farm. Stocking rates, stocking balance (ratio of cattle to sheep), suitability of farm buildings and other infrastructure questions all need to be considered in depth. Grassland management is a key factor.

Although the additional income from another agri-environment scheme may add to the farm's cash flow, it is important that scheme prescriptions do not jeopardise the ability of the farm to produce sufficient grazing and forage for the level of stocking required. Choice of livestock breed is important. Traditional breeds may be best suited to forage-based diets in the organic hill situation, but this has to be balanced with marketing considerations. The advice of organic producer and marketing groups can be helpful in this regard. For livestock performance, good record keeping and a livestock health plan provide the monitoring necessary to ensure that any issues arising from soil mineral and nutrient deficiencies or from parasite burdens can be addressed by timely interventions.

With increasing numbers of hill and upland farmers converting to organic production, more experience and knowledge is being acquired. Organic Centre Wales (OCW) organises regular events through Farming Connect which provide opportunities to keep abreast of new developments. Look out also for the OCW annual producers' conference and their publications and e-bulletins, *Organic Wales Bulletin* and *Organic Market Wales*. Subsidised consultancy visits are also available through Farming Connect.

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2 The financial performance of organic upland farms

2.1 Background

Traditionally, upland livestock farming has relied heavily on subsidy payments linked to the number of breeding livestock on the holding. The introduction of the Single Payment Scheme (SPS) however, decoupled support payments from livestock numbers, allowing upland cattle and sheep farmers to reduce their stock numbers to more sustainable levels. This has encouraged upland farmers to consider converting to an organic system, as their subsidy income is no longer reduced by the typical requirement to reduce stock numbers under organic farm management. Furthermore the Organic Farming Scheme has helped to compensate for the reduction in stock, and provides support during the conversion process. Agri-environment schemes such as Tir Gofal and Tir Cynnal complement organic farming systems and are an additional source of farm income, particularly in the uplands, when other choices may be limited due to topography and climate.

Market prospects for organic livestock were strong, with continued growth in the organic sector reported in 2007², however the credit crunch has affected organic markets in 2008/09, with lower organic retail sales. Organic beef and lamb sales in the UK continued to grow in 2006, up by 40% to £45 million, and it is estimated that 31,000 beef animals and 291,000 organic lambs were slaughtered in 2006. The percentage of UK organic beef sold through the multiple retailers remained stable at 83%, while the percentage of organic lamb sourced from within the UK increased to 98%. The latest market price data show that in autumn 2008 organic beef and lamb were trading at around 300 p/kg dw. (Soil Association market data). The credit crunch is impacting on demand for organic meat, with lower differentials between organic and conventional prices (almost none in the case of beef), so it is likely that the relatively favourable picture for the last two years will look less good in 2008/9.

The financial performance of organic upland livestock farms has been studied over a number of years as part of a Defra-funded project, and the latest results for 2006/07 are discussed in the following pages. Where possible these data are compared with the previous years and/or comparable conventional data. Whole farm income, gross margin and cost of production data have also been derived in order to give an overview of the economics of organic farming in the upland areas of Wales during 2005/06 and 2006/07.

2.2 Whole farm incomes

Sixteen organic LFA cattle and sheep farms were monitored during the periods 2005/06 and 2006/07³, using Farm Business Survey methodology. Eleven of these farms were located in Wales, one in central eastern England, and the remaining four in northern England.

Each organic farm was matched with a number of conventional farms with similar resources (farm size, economic size unit, region, LFA status and farm type), in order to produce two comparable samples, one organic and one conventional.

2 Soil Association (2007), Organic Market Report. Soil Association, Bristol.

3 Jackson, A.J., Moakes, S.R. and Lampkin, N.H. (2008), Organic Farm Incomes in England and Wales 2006/07. Report for Defra contract ref. OF0373. IBERS, Aberystwyth University

Table 1 Average net farm incomes (£/ha) for organic and conventional upland (LFA) cattle and sheep farms (£/ha), 2005/06 and 2006/07

<i>Values (£/ha)</i>	2006/07		2005/06	
	Organic	Conventional	Organic	Conventional
Number in survey	16	84	16	84
Cattle (livestock units)	69.1	71.1	72.2	74.4
Sheep (livestock units)	60.2	79.3	60.2	80.8
Cereals (ha)	2.7	1.1	2.8	1.1
Forage (eff. ha)	129.4	133.7	126.8	133.4
Stocking rate (LU/eff. ha)	1.0	1.2	1.1	1.2
Size (eff. ha)	126.4	128.7	125.9	127.4
Cattle output	197	175	175	163
Sheep output	190	251	170	256
Other output	116	72	140	59
Organic payments	24	0	30	0
Other agri-enviro payments	109	70	104	70
Single farm payment	207	218	232	223
<i>Total outputs</i>	844	786	851	772
Feeds	81	122	65	113
Other livestock costs	73	74	80	68
Crop costs	20	59	28	54
Whole farm margin	669	531	678	537
Labour and contract	70	24	106	29
Machinery	90	85	79	85
Other fixed costs	335	329	302	296
<i>Total inputs</i>	669	693	660	646
Net farm income	174	93	191	127

Source: Jackson, Moakes & Lampkin, 2008

Comparing the two samples, average farm size was 2% smaller for the organic than the conventional farms, while business size was 13% greater on the conventional farms. Key system differences include lower stocking levels for the organic farms at 1.0 LU/ha compared to 1.2 LU/ha for the conventional farms. The lower stocking rate for the organic farms translates into lower stock numbers carried per farm despite the larger farm size, though stock numbers fell faster on the conventional farms. The organic sample carried 14% less stock than the conventional farms, compared with 18% less in 2005/06. The ratio of cattle and sheep on organic farms was 53 : 47, compared with 47 : 53 on conventional farms. Annual Labour Use (ALU) was similar at 1.8 ALU/farm for the organic and 1.9 ALU/farm for conventional farms.

Compared with 2005/06, in 2006/07 total output decreased by less than 1% to £844/ha for the organic farm sample and increased by 2% to £786/ha for the conventional farms. Livestock outputs increased for organic farms but remained similar for conventional units. Prices rose for all organic ruminant stock categories in 2006/07: finished cattle by 15% and finished lambs by 10%. Conventional livestock prices were more variable, with an increased finished cattle price, but a slight decrease in finished lamb price. Overall, organic stock made higher prices than the conventional livestock for both years; however, store cattle and ewe prices were higher for the conventional stock.

The organic farms received higher agri-environmental payments (including Tir Mynydd, Tir Gofal and Tir Cynnal) than the conventional farms, and both were very similar to the previous year. They represented 16% of total output (£133/ha) for the organic farms in 2006/07, and 9% (£70/ha) for conventional farms.

Overall organic inputs rose by 1.5% to £669/ha in 2006/07 compared to the previous year, and conventional inputs rose by 7.3% to £693. Crop inputs on the conventional farms were significantly higher than on the organic farms, reflecting in part the lower use of fertilisers and sprays by the organic businesses. The main changes in the organic sample between years were an increase in rent, and a significant reduction in labour costs.



Overall, net farm income (NFI) fell over the two years by 27% to £93/ha for the conventional farms and by 9% to £174/ha for the organic farms. In terms of returns on tenant's capital, the organic farms showed a positive return of 6.1%, falling slightly from 7% in 2005/06, while the conventional farms showed a return of -3.7%, falling from -0.8% for 2005/06. Returns to total labour units used were £14,278/ALU for the organic farms and £6,143/ALU for the conventional farms.

2.3 Livestock gross margins

The gross margins in Table 2 below show organic sheep production split into two productivity categories, and highlight the variability in production level within the LFA area. The lower productivity typically represents hill sheep production; higher productivity represents upland sheep production. The conventional data is shown for comparison purposes and includes both hill and upland flock data.

Total output was considerably greater for the organic higher productivity sample, and 2006/07 showed a further increase of 21% to £67 per ewe, the lower productivity sample up by 12%. The costs show similar differences, being twice as high for the higher productivity sample. Variable costs are at a similar level to conventional, though forage costs are considerably higher for conventional, reflecting the increased use of fertiliser and other inputs on grassland. Overall, gross margin per ewe is higher for organic systems, and has shown a significant increase between years in 2006/07. Assuming stocking rates of 1.0 and 1.2 livestock units per hectare, (LU/ha) for organic and conventional samples respectively, both organic margins per hectare have increased, and are now similar or significantly higher than the conventional, despite a lower stocking rate.

Table 2 Organic and conventional upland (LFA) sheep gross margins, 2005/06 and 2006/07

Type of production	Organic*				Conventional**	
	Lower		Higher		LFA Sheep	
Year	2006/07	2005/06	2006/07	2005/06	2006/07	2005/06
Productivity level	Lower		Higher		LFA Sheep	
Number of flocks	11	12	19	17	159	325
Average farm area (eff. ha)	153	127	235	172	126	125
Average flock size (ewes/ewe lambs)	601	507	878	612	705	695
Finished lambs sold per ewe	0.7	0.6	1.1	1.0	1.0	1.0
<i>Values (£/ewe)</i>						
Lamb sales	Finished		Store		LFA Sheep	
	29.2	25.8	57.8	46.2	43.9	42.1
	1.6	3.4	3.3	3.2	1.2	1.4
Other sales, net of purchases	1.6	-0.3	6.1	6.1	1.6	2.1
Total output	32.4	28.9	67.2	55.5	46.8	45.6
Feedstuffs	7.8	9.8	12.8	23.4	11.8	10.1
Other inputs	4.5	8.7	12.6	16.6	7.7	7.5
Total variable costs	12.3	18.5	25.4	40.0	19.5	17.6
Gross margin	20.1	10.4	41.8	15.5	27.2	28.1
Forage costs	1.5	1.4	1.7	2.2	8.8	8.9
Gross margin including forage costs	18.6	9.0	40.1	13.3	18.4	19.2
Gross margin incl. forage (£/ha)	155	75	334	111	184	192

* Source: Jackson, Moakes & Lampkin, 2008

** Conventional data source: Farm Business Survey, Wales

Table 3 shows gross margin data for two organic cattle production systems. Conventional upland (LFA) suckler cow data are included to allow comparison with the organic store cattle figures.

The average organic cattle business is larger than the conventional comparison, but with a similar herd size. Total output from the organic sample is significantly higher than the conventional, reflecting higher sale prices per head. Variable costs are slightly higher for the organic systems, though forage costs are considerably less, reflecting the lower grassland inputs of the organic systems.

Table 3 Organic and conventional upland (LFA) beef gross margins, 2005/06 and 2006/07

Type of production	Organic*				Conventional**		
	Finishing		Stores		LFA Suckler Cows		
Year	2006/07	2005/06	2006/07	2005/06	2006/07	2005/06	
Number of herds	14	13	10	8	217	224	
Average farm area (eff. ha)	200	155	194	160	123	125	
Average herd size (breeding cows)	59	41	37	33	48	47	
<i>Values (£/cow)</i>							
Cattle sales	Finished	581.0	613.0	162.0	30.0	194.6	176.785
	Store	106.0	115.0	487.0	375.0	353.3	308.35
Other sales, net of purchases		126.0	-79.0	-103.0	-48.0	-86.38	-59.83
Total output		813.0	649.0	546.0	357.0	461.445	425.305
Feedstuffs		157.0	136.0	105.0	45.0	125.88	105.875
Other inputs		140.0	96.0	121.0	93.0	84.39	86.13
Total variable costs		297.0	232.0	226.0	138.0	210.3	192.0
Gross margin		516.0	417.0	320.0	219.0	251.2	233.3
Forage costs		33.0	22.0	23.0	38.0	117.1	117.3
Gross margin including forage costs		483.0	395.0	297.0	181.0	134.1	116.0
Gross margin incl. forage (£/ha)		644.0	526.7	396.0	241.3	214.5	185.6

* Source: Jackson, Moakes & Lampkin, 2008

** Conventional data source: Farm Business Survey, Wales

Overall, both the organic systems show a gross margin far superior to that of the conventional and 2006/07 shows a further widening of this divide. Additionally, the organic gross margins per hectare are also much higher than conventional, despite the lower assumed stocking rate of 1.0 LU/ha for organic and 1.2 for conventional, reflecting higher output and lower forage costs.

2.4 Costs of production

The cost of producing a kilogram of beef and lamb is an important consideration for the financial performance of organic upland farms. Through the Defra-funded Organic Farm Incomes project, it is possible to show cost of production data for organic lamb, suckler stores and finished beef produced in upland areas, including variable, forage and fixed costs, as well as imputed costs of production including unpaid labour (farmer/spouse/other), imputed rent (rental equivalent) and interest on tenant's capital (the interest on capital items such as livestock, machinery and buildings).

Benchmarking data collected for 38 Welsh organic farms by the Welsh Farm Business Survey based at IBERS, Aberystwyth University (Table 4), show that Welsh organic farms were generally producing better returns than conventional farms in 2007/8, before the credit crunch started to impact on the organic market. Output was higher or similar in all cases, with lower or similar variable costs. Where organic yields per ha were lower, overhead costs per kg were higher, as were the value of own resources used and support payments. Despite this, overall net returns per litre or kg were higher, although this does not necessarily translate to better per ha performance.

Organic finished beef production showed a net margin of 4p/kg dw compared with -38p/kg for conventional beef. Variable costs were almost identical, higher organic overheads per kg (mainly due to lower yield per ha) being more than offset by the greater output value. In contrast, the net margin for organic breeding beef at -118p/kg lw was lower than conventional beef at -69p/kg, mainly due to lower output per hectare. Organic variable costs were lower than conventional, as was output, but organic fixed costs were higher per kilogram. When support payments were included in the net margin however there was little difference between the two systems, with organic at 47p/kg and conventional at 57p/kg.

Both organic and conventional lamb net margins were negative, at -44p/kg dw and -71p/kg dw respectively. Organic output was higher as a result of higher prices, while variable costs were lower and overheads higher. The organic net margin including support payments was 77p/kg or £200/ha, while conventional remained negative at -43p/kg or -£110/ha.

It can be seen from all three systems that the red meat sector relies extensively on support payments, and that the costs of production far exceed the financial return achieved from the market. In addition, the credit crunch is impacting on demand for organic milk and meat, with lower differentials between organic and conventional prices (almost none in the case of beef), so it is likely that this relatively favourable picture for last year will look less good in 2008/9.



Table 4 Average costs of organic production for lamb, suckler store and trading beef 2007/08 and 2006/07

Year	Breeding beef (liveweight)				Trading beef (deadweight)				Lamb (deadweight)			
	2006/7		2007/8		2006/7		2007/8		2006/7		2007/8	
Production system	Org	Con	Org	Con	Org	Con	Org	Con	Org	Con	Org	Con
Holdings (n)	22	47	21	51	25	26	19	19	19	73	24	107
Yield/ha	259	268	229	284	96	217	155	241	169	228	200	237
Price/litre/kg	107	107	118	110	3.22	2.12	3.17	2.17	2.92	2.28	2.66	2.19
Total output	118	122	122	126	340	241	395	274	293	237	271	227
Feeds	15	15	14	16	71	52	74	67	43	54	38	55
Veterinary and medicines	10	10	9	10	3	6	5	8	12	14	14	17
Forage	25	30	24	30	26	48	31	46	21	34	24	37
Other variable costs	26	16	22	13	41	33	37	29	23	21	24	22
Herd replacement	17	14	7	17	-	-	-	-	39	28	39	26
<i>Total variable costs</i>	93	85	75	87	141	139	147	150	138	151	139	157
Gross margin	25	37	47	40	199	102	248	124	155	86	132	70
Labour	9	8	6.1	9.4	12	16	14	15	13	9	12	8
Power and machinery	65	46	68	45	102	68	104	73	75	59	72	61
Land and buildings	30	18	29	21	39	28	36	26	29	23	27	22
General farm costs	40	20	36	19	53	31	49	34	38	25	34	26
Rent and finance	24	11	25	14	43	21	41	14	42	22	31	24
<i>Total fixed costs</i>	168	103	164	108	249	164	244	162	197	138	176	141
Total costs	261	188	240	195	390	303	391	312	335	289	315	298
Net margin	-143	-66	-118	-69	-50	-62	4	-38	-42	-52	-44	-71
Net margin per ha	-370	-177	-269	-196	-48	-135	6	-92	-71	-119	-88	-168
Value of farm family's own resources	337	266	291	238	584	320	461	295	312	217	258	194
Net margin incl. own resources	-480	-332	-409	-307	-634	-382	-457	-333	-354	-269	-302	-265
Tir Mynydd, agri-environment	134	63	131	100	268	46	178	64	133	53	108	54
Organic farming support	58	0	49	0	118	0	69	0	56	0	35	0
Single farm payment	278	255	275	264	551	298	412	316	246	163	236	168
Net margin incl. support payments	-10	-14	47	57	303	-38	202	47	81	-53	77	-43

Sources: Jackson, Moakes & Lampkin (2008), and Farm Business Survey, Aberystwyth University

2.5 Conclusions

The various financial analyses in this report all show that organic upland beef and sheep production results in a superior financial performance to comparable conventional businesses. The latest figures from the Defra-funded Organic Farm Incomes study show that net farm income (NFI) for organic upland beef and sheep businesses, at £174/ha, is substantially higher than for comparable conventional businesses, at £93/ha. Output tends to be higher on organic businesses, which have lower forage costs, but variable costs can also be higher.

The optimistic picture of organic upland farming must however be tempered by the credit crunch, impacting on demand for organic meat, with lower differentials between organic and conventional prices. Therefore it is likely that the relatively favourable picture for the last two years will look less good in 2008/9.

Organic holdings appear to be more profitable, but it must be noted that a higher proportion of their income is sourced not only from the Organic Farming Scheme, but also from agri-environment payments such as Tir Cynnal and Tir Gofal. Organic farming systems combine easily with the requirements of these agri-environment schemes, and to achieve maximum returns under organic farming they should be adopted.

Analysis of the costs of production, or benchmarking, makes it clear that the sale price achieved for beef and sheep is still considerably below the total cost of production. Benchmarking continues to be an excellent resource in assessing the true costs of production, and highlights the need for further market development to ensure maximum returns from the marketplace.

2.6 Abbreviations

Defra: Department for Environment, Food and Rural Affairs

dw: Dead weight

FBS: Farm Business Survey

LU/ha: Livestock units per hectare

NFI: Net farm income

The full Organic Farm Income reports are available on the Defra website:

<https://statistics.defra.gov.uk/esg/reports/OrganicIncomes200607.pdf>

https://statistics.defra.gov.uk/esg/reports/OrganicIncomes200607_supplement.pdf

Farm Business Survey data are available at:

<http://www.aber.ac.uk/en/ibers/enterprise-kt/fbs/>

3 Case Studies

3.1 BLAEN Y NANT

3.1.1 Farm profile

Location: Bethesda, Gwynedd.

Farm Size: 302 ha in the mountains of Snowdonia National Park; in addition, approximately 64 ha of arable lowland is rented.

Livestock: 300 Welsh Mountain sheep with followers; a pedigree herd of 24-25 Welsh Black cattle with followers.



Blaen y Nant in Snowdonia lies at the head of a glacial valley, rising from small fields on the valley floor (300 m) to the highest point (920 m). The average rainfall in the area is 100 inches. The farm, owned by the National Trust, has been held by Gwyn Thomas since 1996 and conversion to organic status was completed in 1997. The farm is registered with the Soil Association and has been in the Tir Gofal scheme for five years. The farm is also designated a Site of Special Scientific Interest. Dry stone walls and hedges were restored under Tir Gofal and the farm is also in the Tir Mynydd scheme.

3.1.2 Cropping and feeding strategy

Ninety-nine per cent of the land area at Blaen y Nant is semi-natural vegetation and the remainder (5 ha) is cultivated. The cultivated area provides turnips/swede and grass/clover for silage. The rotation followed is: 1 year turnip (or swede); 2-3 year ryegrass/red clover; and 7 years ryegrass/white clover/timothy/fescue/wild herbs. Silage is cut once per year and the aftermath is grazed by the lambs and sheep.

A further 64 ha of arable lowland are rented in and provide extra silage. This area also hosts the majority of animals during the off-farm wintering period (15 cattle stay on farm). The same crop rotation is applied to the rented land. During the summer period the sheep and cattle graze extensively on the semi-natural vegetation and they are fed silage during the winter.

Clover rich pastures plus sheep and cattle FYM provide nutrients for the soil. Lime is applied occasionally, as necessary. There are some problems with rushes on the farm and these are controlled by grazing with Shetland ponies.

3.1.3 Livestock performance

The flock comprises Welsh Mountain ewes which are put to bought-in Bluefaced Leicester rams to produce Mules; the Bluefaced Leicester is chosen for its composition and fat percentage. Lambing percentage at Blaen y Nant increased, with more twins born, when the change was made to off-farm wintering at a lowland farm. Lambs are weaned at 4.5 months and all lambs are sold as finished; they are sold at 6.5-7 months old, at an average of 17 kg dw.

The herd comprises Welsh Black cattle. All cows are bred to a Welsh Black bull which has been bought in to ensure pure bred calves. In the last eight years, two Welsh Black bulls have been purchased. The calves are weaned at nine months and calf mortality is low, at less than 5%. Spring calving has been replaced by an autumn calving regime. The beef cattle are finished on grass and sold after 26-30 months; bullocks weigh 520-620 kg when slaughtered and the heifers slightly less.

3.1.4 Livestock health and fertility

There are few health and fertility problems with the cattle. However, the herd has not been treated for external and internal parasites during the past ten years and no problems with mineral deficiencies have been noted. As the herd is autumn calving, the cows calve over a six-week period between September and mid October.

The flock lambs in March over a period of one month and the lambing percentage is 130-140%. Reduced flock size, the provision of silage during off-farm wintering and rotational grazing during the winter months have helped to increase this percentage. Good husbandry has resulted in few problems with diseases in the sheep flock and no vaccinations have been applied for ten years.

3.1.5 Nutrient budgets

Although no soil testing has been undertaken, according to Gwyn Thomas there are no problems associated with low N, P and K status. Soil fertility on the lower fields is maintained by the application of FYM and by N-fixing clover in the swards.

3.1.6 Marketing

The majority of sales occur between August and December when all animals are finished off grass. The beef is mainly marketed direct to a small group of customers (5-6 cattle per year). Surplus beef is sold via a producer in Anglesey who sells the meat at farmers' markets. The lambs are sold to a multiple retailer (Tesco).

3.1.7 Key challenges

The farm receives agri-environment scheme support which contributes to farm income. Diversification, in terms of tourism and added value activities such as direct marketing, is necessary for the financial viability of the farm. Gwyn Thomas cautions producers interested in converting to organic beef and sheep production: "don't do it for the wrong reasons because it is not easy to make a living".

3.2 CANNON FARM

3.2.1 Farm profile

Location: Cannon, Llanerfyl, Welshpool, Powys.

Cannon Farm has a number of land types including blanket bog and upland heath. It is located in a high rainfall area, averaging 75 inches / 1905mm per year. Conversion started in 1991 and the farm is certified by the Soil Association. It is also in the Tir Gofal scheme through which the farmer, Nigel Elgar, has fenced 700 metres of land in order to create a streamside corridor to provide a secure resting place for passing otters.

Farm Size: 215 ha unimproved hill, 114 ha improved pasture and 11.6 ha semi-improved hay meadow; in addition, 31 ha of rented land and 30 ha of shelterbelts, roads and buildings.

Labour: No full-time labour, just some casual and contract labour.

Livestock: 20 Highland cows plus followers, 23 Welsh Black cows plus followers, 500 Hardy Welsh Hill Speckled Face breeding ewes and 120 replacement ewe lambs.

3.2.2 Grassland Management

Sixty-six per cent of the land area is unimproved grassland. Rushes and bracken are a problem on the grassland and the sward is topped twice a year to control rushes. However Tir Gofal scheme prescriptions, which restrict grazing density to 0.05 LU/ha on Blanket Bog, mean that the bracken is difficult to control by grazing management.

The clover content of the sward in silage fields has increased as a result of the late shutting-up of fields. This has reduced the competition to clover in early spring from other grass varieties by keeping them tightly grazed resulting in better quality silage.

Whereas arable land was previously rented in, this has been given up and straight oats are bought in as stock feed.

3.2.3 Herd performance

There are two herds of cattle on the farm: a herd with 23 Welsh Black cows and a fold with 20 Highland cattle being put to the bull. Both Welsh Black and Highland bulls are kept on the farm, but there have been some changes in the use of bulls over the years. Originally, a Welsh Black bull was used on the Welsh Black herd, then the decision was made to change to a Limousin bull, with better conformation but a more difficult temperament. Now, however, a Welsh Black bull is again used because they are better adapted to the system, and because of the herd health scheme measures to prevent Johne's disease in the Welsh Black herd which have been adopted.

The herd has been predominantly spring calving and the choice has been made to continue with purely spring calving due to the lower labour and housing requirements. Welsh Black cattle are now sold at 18 months old.

The Highland cattle have been introduced to manage moorland grazing and for an area managed specifically to encourage Black Grouse populations in partnership with RSPB Cymru.



3.2.4 Flock performance

All 500 Speckled Face sheep either have electronic identification as boluses or tags. All lambs are tagged at birth, and the flock is in a Sire Reference scheme. Since entering the scheme, only high index rams are used and average lamb weights have increased. High index Meatlinc rams are used for cross breeding.

3.2.5 Herd health and fertility

Calving occurs over a six-week period to concentrate the labour requirement. Welsh Black cattle have had problems with Johne's disease and, consequently, at Cannon Farm they are now tested and culled if necessary. No vaccines are used for the cattle.

Welsh Black cattle (but not the Highland cattle) have had selenium and copper deficiencies and receive an organic permitted bolus. Both the Highland cattle and Welsh Blacks need treatment to control fluke and are occasionally treated for lice.

3.2.6 Flock health and fertility

At tupping, 300 of the ewes are put to Hardy Speckle Face rams and 200 are put to a Meatlinc rams. Speckle Faced rams are removed after 3 weeks tupping and Meatlinc sweeper rams follow on. The bulk of lambing takes place over a three-week period between the end of March and mid-April. The lambing percentage at scanning is around 130%. All barren ewes are sold after scanning. The only vaccine used on the flock is Toxovax to prevent Toxoplasmosis. There is some selenium deficiency and the sheep are drenched prior to tupping and lambing. The sheep can also have problems with foot-rot when housed and they are treated at housing with a footbath and trimming if necessary. They are also drenched against liver fluke. According to Nigel Elgar, sheep scab is a serious problem in the area and in the past SP dips have been used for both scab and lice. Now, "The emphasis is on bio security and preventing scab coming on to the farm. If we had an outbreak of scab then we would have to seek a derogation to use an Ivermectin injection on the breeding stock and probably have to dip the lambs in OP and sell conventionally", says Nigel.

3.2.7 Nutrient budgets

The main problems are on the land used for silage. On average, soil tests are conducted every two years and the main problem is low potassium levels. FYM is applied along with permitted sources of potassium. Ground limestone and Gafsa rock phosphate are also applied when necessary.

3.2.8 Marketing

All produce is sold through Graig Producers, an organic meat marketing group which involves around 340 organic farmers across Wales and the borders and 700 nationally, who work together to market their produce.

3.2.9 Key challenges

Key challenges at Cannon Farm:

- Vulnerability to changes in government support for hill farming which all farms of this type rely on.
- Climate change. There has been an increase in average rainfall of 10 inches (254 mm) at Cannon Farm over the last 20 years, with milder winters and wetter summers causing challenges to the way the land and stock are managed.
- The overall success of marketing groups such as Graig Producers in protecting the interest of organic farmers is potentially undermined by farmers who are focused on their own short term interests rather than collectively working together.

3.3 CAPPELE FARM**3.3.1 Farm profile**

Location: Cerrigydrudion, Conwy

Farm size: 240 ha, of which 87 ha are owned and the remainder rented from the Mainwaring Estate.

Livestock: 750 Talybont-type Welsh Mountain ewes and 80 cows, the majority Stabiliser™ with a few Limousin cross base cows .

Cappele Farm is sheltered from the west by the hills at Gellioedd and has the fertile soils typical of parts of Cerrigydrudion. Barley and peas are grown for arable silage, together with swedes, at over 420 m above sea level as part of the farm's Tir Gofal agreement. All the land is in the Less Favoured Area and is classified as Severely Disadvantaged, ranging from 300 to 490 m above sea level.

The farm began organic conversion in January 2008 and is certified by the Soil Association. The conversion is proceeding in two phases, first the land and then the livestock.

Key reasons to convert included the cost savings from not using fertilizer, and the suitability of an organic system for maintaining high herd health status. The family was also keen to market organic products direct to the consumer.

3.3.2 Cropping and feeding strategy

Most of the farm is under grass, and winter forage is based on good quality clamp silage supplemented with home-grown crimped grain. As far as possible, stock are reared from the farm's own resources. The challenge is to improve the grassland where appropriate, and to care for the significant areas of semi-improved and unimproved habitat which make up nearly 40% of the land area.

3.3.3 Livestock performance

The Williams family were not happy with the quality of bought in continental x suckler cow replacements and decided to breed their own. They now run a multiplier herd of Stabiliser™ suckler cows as part of the Stabiliser Cattle Company network of multipliers. The closed herd of purebred Stabiliser™ cows allows sales of breeding stock of high herd health status. Ease of calving with the Stabiliser™ is a major plus point.

Of the 750 Talybont-type Welsh mountain ewes in the Williams' flock, half are bred pure and the rest crossed with Inverdale rams for selling on as replacements through Innovis. The only sheep bought in are rams, which are dosed and isolated before tupping ewes in early November. Teaser rams have recently been introduced to shorten the lambing period.

3.3.4 Nutrient budgets

Soils are regularly tested at Cappele, particularly in areas for improvement or cropping. Cubicle housing and a modern slurry lagoon means that much of the animal manures are in the form of slurry which is spread by the farm's trailing shoe, minimising N losses. Applications are based on crop need and soil test results, and the equipment is also used by a contracting business which runs alongside the farm.

3.3.5 Marketing

All the steers are sold as stores (10-12 mths old at average of 395 kg) in Yorkshire to be finished through the Givendale Prime™ branding initiative. In the long term the family hope to start selling organic beef and lamb directly to the public. Consumer familiarity with the Soil Association logo and trust in the brand will be central to the success of this.

3.3.6 Key challenges

The key challenges now will be to extend the grazing season so that they can feed livestock economically from the farm's resources, and to design a suitable rotation for the ploughed areas. Increasing and maintaining clover content and minimising the ingress of weeds, particularly docks, will be key to finding the optimum stocking rate now that soluble fertiliser is withdrawn from the system. Developing a market for the finished lamb will also be important.

