

Livestock breeds and Organic farming systems

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EXECUTIVE SUMMARY

Organic livestock farming has grown in Wales in recent years. It is focused on producing animals from a predominantly forage-based system, with an emphasis on maintaining animal health through improved welfare and a reduction in the use of routine, conventional veterinary treatments. Breeding and feeding are important factors of the health and welfare of farm animals in organic systems. The guidelines of EU regulation (EC) 1804/1999 address the issue of sourcing of (breeding) stock. Moreover, only activities such as the use of genetically modified organisms (GMOs) and embryo transfer are excluded, and few provisions are included that concern breeding.

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.

A number of breeding strategies are outlined briefly, including traits that are important for organic production systems. Sire reference schemes have been introduced on organic farms in recent years.

There is an increase in conservation grazing. Some breeds adapt well to these systems; especially local/native breeds since they utilise lower quality feed, are more resilient to climatic stress, and are more resistant to local parasites and diseases.

Several actions are being, and have been, undertaken to maintain breed diversity. However, the need for a genetic pool of breeding stock from which to select is not reflected in the national strategies for livestock production. A Countryside Council for Wales (CCW) report (Yarwood and Evans, 2002) identified 18 breeds of sheep and 3 breeds of cattle associated with Wales.

Several surveys have shown that, on organic farms, the Suffolk, Lleyn and the Texel are the main sheep breeds. The most popular beef breeds on organic farms are Welsh Black, Charolais crossbreed, Limousin, South Devon crossbreed, Aberdeen Angus and Hereford crossbreed. On organic farms,

more native breeds seem to be used than on conventional farms. A few of these breeds are further discussed.

Consumer demand is a significant driver of policy and standards, and value for money is still a major factor in determining consumer buying behaviour. The demand for lean meat and for homogeneity of both fresh and processed products, particularly in the major supermarkets, impacts on breeding policies.

Research has shown that Welsh consumers prefer organic Welsh meat and milk. Economic viability of beef, sheep and milk production depends, in many cases, on subsidies.

An increasing number of breed societies in Wales and the UK have become involved in promoting their breed as a brand. However, a recent Welsh survey showed that 13% of organically-produced lambs were still being sold as non-organic due to finishing specifications (41%), a lack of organic market outlets (54%) and other reasons (4%), such as a lack of organic abattoirs (OCW, 2006).

As market requirements are standardised and allow for little differentiation, some traditional and rare breeds face marketing difficulties. Furthermore, loss of small-scale abattoirs can reduce the ability for differentiation of breeds to enter niche markets. Large-scale abattoirs use standardised methods, which do not allow for differentiation. As mentioned in a report from DEFRA (2006), the national strategies for livestock production do not reflect the need for a genetic pool of breeding stock.

Although breeding has to focus on what the market wants (mass or niche market), other factors also have to be taken into account. The choice of breeds/breeding used in the organic livestock sector needs to ensure the profitability of the farm, safeguard animal health and welfare, focus on conserving genetic diversity, and promote human health.

The various breeds outlined in the report show various benefits. It is important to conserve, develop and utilise local breeds that are genetically adapted to their environment.

1. INTRODUCTION

Organic livestock production focuses on producing animals from a predominantly forage-based system, with an emphasis on maintaining animal health through improved welfare and a reduction in the use of routine, conventional veterinary treatments. Many of the 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.

With the increase in organic livestock production in Europe, the UK and Wales, it is important to continue developing the quality of production and end product.

Breeding and feeding are important factors in the health and welfare of farm animals in organic systems.

The emphasis in organic livestock production standards is on:

- Maintaining closed herds and flocks; i.e. breeding replacements on the farm, so as to minimise the risk of importing diseases from elsewhere and in order to develop stock that are adapted to the specific farm conditions
- Use of organically-produced livestock feed
- Avoiding the unnecessary use of veterinary medicines and pesticides in order to reduce possible adverse health impacts
- Providing animals with the conditions and opportunities of life that accord with their physiological needs, natural behaviour and general well-being
- Allowing animals to adapt to local conditions
- Maintaining/cultivating genetic diversity

EU regulation 1804/1999 for organic production states that:

- Use of Artificial Insemination (AI) is permitted whereas Embryo Transfer (ET) is not allowed
- Breeds or strains of animals shall be selected to avoid specific diseases or health problems associated with some breeds or strains used in intensive

production (e.g. porcine stress syndrome, sudden death, spontaneous abortion, difficult births requiring caesarean operations, etc.)¹

- There is a derogation for sourcing breeding stock. Organic farmers are allowed to bring in animals from non-organic sources as part of the 10% non-organic livestock replacement allowance (20% in the case of some sheep flocks)

Moreover, organic standards allow producers to bring in males for breeding from non-organic farms provided that they are maintained according to organic standards (see for example, Soil Association, 2006). They are, however, subject to disease status checks.

The aim of this report is to review a number of breeds and genetic resources in Wales and the UK, the performance of various breeds and the market potential for their organic milk and meat products.

¹ see: <http://europa.eu.int>

2. ORGANIC BREEDING IN PRACTICE

2.1 Organic farming and breeding

There is a wide range of organic farming enterprises. There are farms that focus on scale economies and maximum production efficiency per animal or per hectare. Other farms focus on product quality, self-sufficiency, direct marketing/niche market, etc. These different types of farms may require livestock breeds with different characteristics.

At present, organic farmers worldwide keep livestock according to circumstances where breed selection has been based on information from conventional production systems. Such livestock may not be optimally adapted to an organic, low-input farming system (Weigel et al., 2001). 'Genotype x environment' interactions are important, especially when animals are reared under specific environmental conditions (such as organic production or conservation use). When animals are genetically adapted to specific/extreme conditions, they will be more productive and production costs will be lower (Simm et al., 2004). Furthermore, selecting breeds suitable to the local environment will also safeguard animal health and welfare.

Production in intensive systems is associated with high-energy concentrate feeding and regular, prophylactic veterinary treatments and the use of exotic livestock breeds. Livestock breeds have been developed for use under these circumstances. Organic forage-based livestock systems may require different breeds. Highly productive dairy cows, for example, may suffer physiological problems under organic conditions, as they need concentrates.

2.2 Breeding strategies

Three main strategies used to improve breeds are (Simm, 1998):

- Selection between breeds
- Crossbreeding
- Selection within breed

All three strategies are important and can function given an appropriately designed breeding programme. Genetic improvement within a breed is the

most difficult and slowest strategy but it is likely to have the best long-term potential.

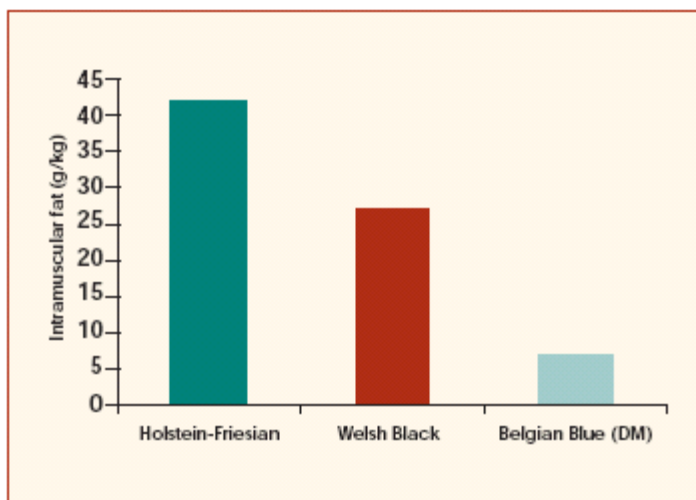
According to a DEFRA survey (2003), the number of purebred animals equals the number of crossbred animals in the UK.

2.2.1 Selection between breeds

Research has shown the value of a number of breeds for optimising both production systems and the quality needed by the market. There are distinct differences in quality of the meat and milk of different breeds and there are suggestions that the health value of meat and milk products may vary with breed type.

Livestock breeds may also differ in fat composition. As illustrated in Figure 1, Institute of Grassland and Environmental Research (IGER) compared Holstein-Friesian (dairy) with Welsh Black (traditional beef) cattle and found that total muscle fatty acids were higher in Holstein-Friesians than Welsh Blacks. The content of the beneficial PUFA, EPA, was 20% higher in Welsh Blacks. (Scollan, 2003)

Figure 1: Intra-muscular fat concentration of beef for a number of breeds



Source: Scollan, N. (2003)

Other research suggests that feed has an equal impact on the quality of the end product and that meat and milk from animals fed a grass-based diet may

have lower saturated fats and cholesterol. Fraser et al. (2006) have shown that the vitamin E content of meat is higher in animals finished on semi-natural rough grazing (SNRG) compared with improved pastures. Vitamin E plays an important role in the colour and stability of meat and is an important factor in shelf life and display.

It is also argued from culinary and anecdotal evidence that the meat quality of some breeds differs according to the length of time it is hung and that meat quality increases with the period allowed for hanging.

2.2.2 Selection within breeds

Genetic improvement within breed provides several options. For sheep, one of these is the Sire Reference Scheme (SRS). In these schemes, Estimated Breeding Values (EBV) are produced by recording the sire and dam of each lamb born, weighing the lambs at 8 weeks of age, and weighing and producing an ultrasonic scan of the loin area at 21 weeks. The EBV gives an indication of genetic merit. Recording across a number of flocks provides an indicative value for individual sires and dams. Several organic farmers (for example Nigel Elgar, an organic beef and sheep producer: www.cannonfarm.co.uk), use the Sire Reference Scheme to select the best animals within a certain breed in order to improve their flocks.

2.3 Breeding: the view of producers

A survey undertaken for an inward investment study sponsored by the Welsh Development Agency (WDA), suggested that 60% of the approximately 350 organic beef farms in Wales produce breeding stock. Of this stock, 77% is retained on farm. Furthermore, nearly 80% of the approximately 385 organic lamb producers in Wales produce breeding stock. They retain 71% on farm (OCW, 2006).

DEFRA (2003) suggest that the number of purebred animals equals the number of crossbred animals in the UK. There is no specific information about this division in the organic sector. However, a number of surveys and

workshops² have demonstrated the traits that organic producers recognise as important for organic breeding and choice of breed (Organic Studies Centre, 2002). These are summarised in Table 1:

Table 1: Summary of livestock breed traits rated highly by organic farmers

Sheep	Beef	Dairy
Ease of lambing	Ease of calving	Ease of calving
Scab	Forage conversion	Forage conversion
Foot rot and worm resistance	Lameness and mastitis	Lameness and mastitis
Suitability for conservation grazing	Suitability for conservation grazing	Marketability of milk and calves
	Marketability of meat	Good feet and legs
	Finishing before 24-30 months	Longevity
		Udder
		Temperament

Source: Organic Studies Centre (2002)

Furthermore, a survey undertaken by the Scottish Agricultural College provided a list of traits important for organic dairy producers. The traits related primarily to health, fertility and longevity (SAC,2006).

Table 2 shows the results of this survey, and of two surveys conducted in other European countries: one amongst organic dairy producers in the Netherlands (Nauta et al., 2006) and the other in Switzerland (Haas, 2004).

² These include technical workshops held regularly at the annual conferences of the Soil Association, and the workshop held at ADAS Pwllpeiran as part of this current project.

Table 2: Overview of the most important traits for organic dairy breeding

Rank	FIBL (Switzerland)	SAC (Scotland)	LBI (Netherlands)
1	Fertility	General disease resistance	Fertility
2	Cell count	Mastitis resistance	Udder health
3	Longevity	Longevity	Long productive life
4	Milk from forage	Somatic cell count (sub-clinical mastitis resistance)	Good milk yield/lactation
5	Protein and fat content	Female fertility	Protein and fat content
6	Udder health	Forage intake capacity	Conformation udder
7		Feet and leg strength	Quality of legs
8		Susceptibility to lameness	
9		Resistance to parasite infestation	
10		Robustness/hardiness	

Source: Haas (2004), Nauta et al. (2006) and SAC (2006)

2.4 Breeds used for conservation grazing

There is an increase in the use of animals for conservation grazing. In several places in the UK and especially in Wales, grazing livestock are an integral part of agri-environmental schemes and the conservation of Sites of Special Scientific Interest (SSSIs). Animals, in particular cattle and ponies, can have a considerable impact on the vegetation through, for example, trampling bracken and low scrub, breaking up mats of dead litter and creating pathways through tall, dense vegetation. Breeds adapted to high input-high output systems are not always suitable for grazing poor quality vegetation. They are too selective and do not favour the herbage found on many agri-environment sites and SSSIs (English Nature, 2002). Breeds that developed appropriate characteristics in parallel with habitats are now appreciated for their conservation value, landscape management and vegetation control (GAP, 2001).

The Grazing Animal Project (GAP) was created in 1997 to stimulate the development of conservation grazing in the UK. The Project was the result of a combination of two initiatives: 'The Forum for the Application of Conservation Techniques' (FACT) and a 'grazing forum' workshop on 'The Use of Rare Breeds in Conservation'. In 2001, the GAP published a breed profiles handbook which helps managers and advisers, involved in

determining and implementing grazing prescriptions on sites being managed for wildlife, identify and select grazing animals appropriate for use in specific nature conservation situations in the UK; in addition, a husbandry handbook is also available (www.grazinganimalsproject.org).

2.5 Local/native breeds

There is an increase in the number of animals used in conservation grazing. Some breeds adapt well to these systems; especially local/native breeds since they utilise lower quality feed, are more resilient to climatic stress and are more resistant to local parasites and diseases.

Livestock used in both conservation grazing and in organic production may benefit from using local breeds that are genetically adapted to their environment. A number of commentators, such as Yarwood and Evans (2002), note that many local breeds:

Utilise lower quality feed;

- Are more resilient to climatic stress
- Are more resistant to local parasites and diseases
- Ensure healthy and stress-free animals

BUT they also:

- Support food, agricultural and cultural diversity
- Represent a unique genetic resource for improving health and performance traits in future
- Can help achieve local food security objectives

3. LIVESTOCK BREEDS AND FARM GENETIC RESOURCES

Paradoxically, while the consumption of meat and milk is rising, farm animal biodiversity is at risk. The threats to breed diversity are many and include disease, natural disasters and socio-economic changes such as the decline of traditional farming. Appreciation of native breeds for use in organic systems and conservation grazing is important and may stop/reduce the mass extinction of breeds. The unique characteristics of the native breeds can help farmers meet future challenges.

3.1 Managing breed diversity

3.1.1 World and Europe

Fifteen species now account for 90% of farm livestock worldwide. The UN Food and Agriculture Organisation (FAO) reports that 300 of 6,000 breeds identified by the FAO have become extinct in the past 15 years (Cardellino, 2002). The rate of extinction for poultry breeds is between 1 and 2 per week. Several actions have been undertaken to maintain breed diversity and some of these are mentioned below. The Australian Rare Breed Trust (2006) reports that the top 5 sires in Australian Holsteins are now US-bred and together constitute 30% of the Australian Holstein gene pool. Although not rare, genetic variability within the Holstein breed has diminished to the point where relatively few sires account for 70-80% of the gene pool (Chambers, 2005).

The FAO has reported on the state of the world's animal genetic resources whereby all countries were requested to write a country report in which they set out their strategies for maintaining animal genetic resources (DEFRA, 2002). In 2007, the 'First Report on the State of the World's Animal Genetic Resources' will be published by the FAO as a part of its Global Strategy.

Within Europe, a wide range of concerted initiatives support the global conservation efforts being implemented. For example, breed societies are supporting the preservation of rare and traditional livestock breeds. However, from the 1950s onwards, a great deal of genetic diversity was lost as a result of Artificial Insemination and Embryo Transfer. Furthermore, demand from leading retailers and abattoirs for homogenous quality and EU Classification

legislation do not favour genetic diversity. EU Classification is based on fat class and conformation (see Hybu Cig Cymru, 2006) and is used for both conventional and organic products. The legislation can result in difficulties when marketing native and rare breeds because they cannot achieve these general market requirements.

3.1.2 UK perspective

Many actions undertaken in the UK have a positive influence on breed diversity. In 2002, the UK produced its country report on Farm Animal Genetic Resources (DEFRA, 2002), as the UK's official contribution to the FAO report mentioned above. The UK report identified some major gaps in the UK's management of Farm Animal Genetic Resources (FAnGR), and strongly recommended that there should be (i) a National Action Plan for FAnGR and (ii) a National Steering Committee on FAnGR for formulating the Plan and driving it forward. In November 2006, DEFRA published the UK National Action Plan on Farm Animal Genetic Resources (DEFRA, 2006). Amongst other issues, this states the following:

- “The prioritisation of **native breeds** for conservation should continue as at present, but **exotic breeds** in the UK which are extinct in their country of origin and severely endangered globally, or which make an important economic contribution to UK agriculture, may also need conservation action. More work is needed to identify exotic FAnGR that fall into these categories.”
- “The UK National Co-ordinator for FAnGR should: Liaise with policy makers to ensure that **payments supporting endangered native breeds** provided for under agri-environmental measures in the new EAFRD regulation are incorporated into new rural development plans.”
- “When the new EU **Avian Influenza Directive** is implemented in the UK, the special provisions to protect rare poultry breeds should be transposed into UK legislation. This will require an improved data set on UK poultry breeding holdings.”

- “The existing UK National Breed Database should be upgraded into a web-based UK National Breed Inventory using the European Farm Animal Biodiversity Information System (EFABIS), as appropriate, to ensure compatibility with and links to European and UN Food and Agriculture Organisation (FAO) Domestic Animal Diversity Information System (DAD-IS) databases.”

The creation of a National Organic Livestock Database (NOLD) also has a positive impact on animal genetic resources. The Soil Association’s Producer Services established the National Organic Livestock Database (NOLD) in August 2001 in order to assist producers to source organic replacement of specific breeds. Producers can post a request for livestock or offer livestock for sale on the database (www.soilassociation.org).

Furthermore, the creation of the Rare Breeds Survival Trust (RBST), formed in 1973 as an organisation involved in preserving traditional breeds, has a positive impact. In the UK, no breed of farm animal has been lost since 1973. RBST monitors all native British breeds to ensure that they survive. Their work includes the development and maintenance of UK’s semen bank, which currently contains 1,200 bulls of a wide range of breeds; the RBST succeeded in ensuring survival of the Longhorn breed (RSBT, 2006)

English Nature, which now forms part of the current Natural England, has developed the Traditional Breeds Incentive (TBI) to support farmers who keep native hardy breeds of livestock (such as Welsh Black, Beef Shorthorn, British White and Longhorn) for grazing SSSIs on, or in conjunction with, their main holdings. The payments are based on the area of the entire holding and incorporate all factors of the farm’s management (English Nature, 2004)

Although there are many positive actions for conserving farm animal genetic resources, pressure exists on rare breeds from increased legislation, lack of public awareness and the rapid loss of genetic diversity. Local and rare breeds and those used in the organic sector might be vulnerable to a loss of genetic variability as a result of proposals from the National Scrapie Plan (NSP) and breed improvement programmes. Susceptible breeds, or distinct genetic resources within breeds, may be screened out (www.defra.gov.uk).

To prevent this from happening, in 2004 DEFRA selected ARK Consortium Ltd. as a service provider for the Semen Archive, to store genetic material from scrapie susceptible rams that are being bred out of the national flock. DEFRA reports that “the archive is being established following industry concerns regarding the removal of scrapie susceptible genes from the sheep population as a result of the NSP for Great Britain and the Northern Ireland Scrapie Plan. Industry is concerned that breeding for scrapie resistance could have adverse affects on biodiversity in some breeds. The establishment of the archive will mean that genotypes removed from the national flock can be reintroduced later if required” (www.defra.gov.uk).

Several actions have been undertaken to maintain breed diversity. However, few livestock subsidies relating to preserving animal genetics continue to exist. One of the few schemes is the Kerry Cattle Scheme, applied in the Republic of Ireland (www.icbf.com).

DEFRA (2006) argues that there is a need for a genetic pool of breeding stock from which to select desirable traits and this is not reflected in the national strategies for livestock production.

3.2 Genetic pool in UK/Wales

The CCW report (Yarwood and Evans, 2002) identified 18 breeds of sheep and 3 breeds of cattle associated with Wales. It noted that, in the 20th century, Glamorgan cattle and Rhiw sheep became extinct, and that the Foot and Mouth epidemic of 2001 contributed greatly to substantial losses among some regionalised livestock breeds when, for example, 40% of the Herdwick flock was lost. Table 3 shows the currently rare or endangered breeds, as recognised by the Rare Breed Survival Trust.

Table 3: rare and endangered breeds

	Critical	Endangered	Vulnerable	At Risk	Traditional
Cattle	Chillingham; Northern Dairy Shorthorn; <u>Vaynol</u> ; Whitebred Shorthorn	Irish Moiled; Shetland	Gloucester; White Park	Beef Shorthorn; Red Poll	Belted Galloway; British White
Sheep	Boreray; North Ronaldsay	Castlemilk Moorit; Leicester Longwool; Teeswater	Cotswold; Dorset Down; <u>Hill</u> <u>Radnor</u> ; Lincoln Longwool; Norfolk Horn; Soay; Whitefaced Woodland	<u>Balwen</u> ; Devon and Cornwall Longwool; Dorset Horn; Manx Loaghtan; Oxford Down; Portland; Shropshire; Wensleydale; White Face Dartmoor	Greyface Dartmoor; Hebridean; <u>Llanwenog</u> ; Ryeland; Southdown

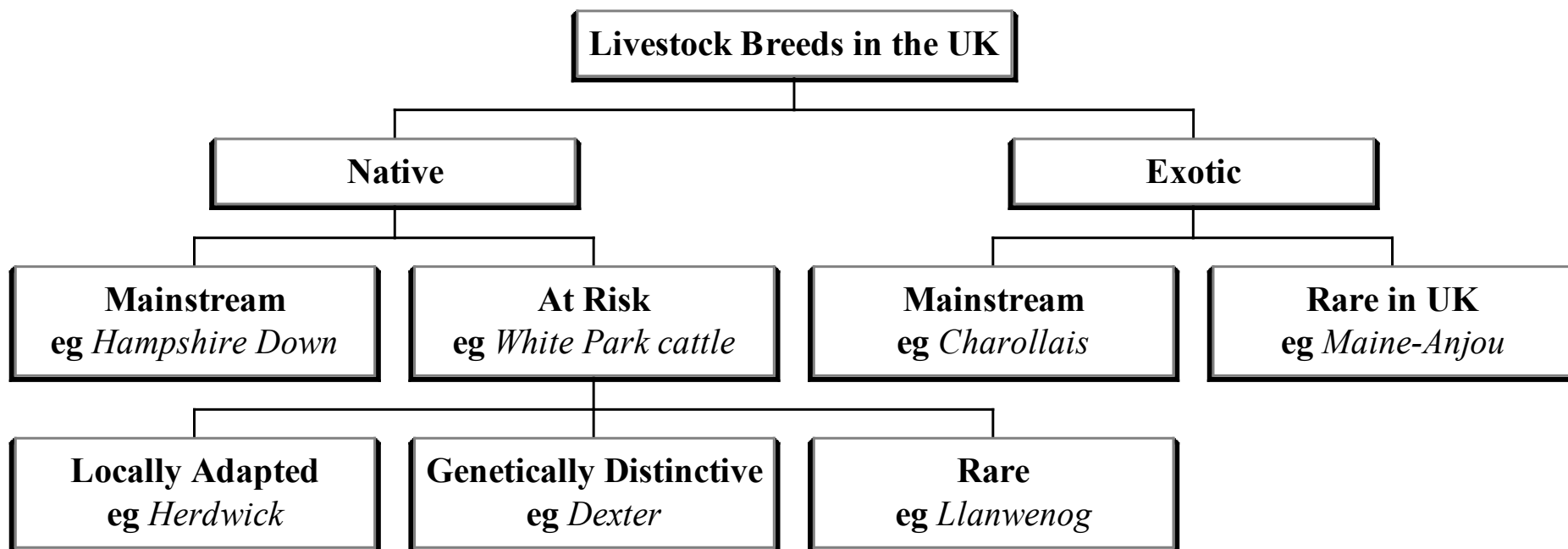
Underlined are Welsh breeds

Source: RBST (2006)

In its report, CCW proposes that it is important to monitor numbers and locations of Welsh breeds and to try and identify why farmers keep certain breeds (Yarwood and Evans, 2002). According to the report, a clear role exists for traditional Welsh livestock in Welsh agri-environment schemes. Moreover, the breeds are an important component of the Welsh landscape and culture.

DEFRA's report (2002) uses fewer classes than the RBST. It distinguishes between 'mainstream' and 'at risk' breeds (see diagram below). Mainstream breeds, both native and exotic according to DEFRA, are mainly used in intensive systems where the primary objective has been to increase productivity and efficiency of production and where products are aimed at the mass market. 'At risk' breeds, on the other hand, are mainly used in extensive low-input systems and the products are sold into niche markets, through direct sales, farm shops or specialist marketing schemes (DEFRA, 2002). The figure below shows the priorities for conservation as mentioned in the UK country report.

Figure 2: UK Country Report – Priorities for Conservation



3.3 Breeds in the various sectors

A survey of 10 long-established organic farms in Wales and a survey by the Organic Studies Centre in Cornwall suggest that the Suffolk, Lleyn and the Texel are the main sheep breeds on organic farms. Similarly, the main beef breeds are Welsh Black, Charolais cross, Limousin, South Devon cross, Aberdeen Angus and Hereford cross. On organic farms there was a trend towards the use of more native breeds.

Table 4: Overview of the main breeds on organic farms in Wales* and Cornwall**

Sheep breeds Welsh organic farms	Sheep breeds Cornish organic farms	Cattle breeds Welsh organic farms	Cattle breeds Cornish organic farms
Suffolk X (4)	Suffolk X, Suffolk X Mule (5)	Charolais X (3)	Aberdeen Angus (10)
Lleyn (3)	Dorset (4)	Welsh Black (3)	South Devon (10)
Texel X (3)	Devon and Cornwall Longwool (3)	Welsh Black X (2)	North Devon (8)
Welsh Mountain (2)	Dorset X; Dorset Suffolk (3)	Limousin X (2)	Hereford X, Hereford Charolais, Hereford Friesian (7)
Welsh Black Mountain (1)	Suffolk (3)	South Devon X (2)	Angus X (5)
Beulah (1)	Charolais X Poll Dorset; Texel (2)	Hereford X, Hereford Friesian (2)	Charolais X (4)
Dorset (1)	Lleyn (2)	Hereford old breed (1)	Limousin (3)
	Mules (2)	Aberdeen Angus (1)	Limousin X (3)
		Friesian (1)	Simmental (3)
		Angus X (1)	Welsh Black (3)
			Belted and Plain Galloway (3)

Source: * Frost and Ardeshir (2004); ** Organic Studies Centre (2002)

Table 5: Overview of the main breeds on organic farms in Wales*

Welsh organic producers	Dairy breeds
Nick Rebbeck Sancler Rachel's Dairy Trioni	Ayreshire Maas Rijn Ijssel (MRY) Guernsey British Friesian NZ Friesian Jersey crossbreed

Source: www.rachelsorganic.co.uk; Rebbeck (2006); Trioni (2006); Sancler (2006)

Large producer groups such as Graig Farm use predominantly native breeds: Welsh Black and Hereford beef cattle and Welsh Mountain sheep in their production systems. Graig Farm producers state that they are best suited to local conditions and suggest that the breeds are well-adapted to the often harsh environmental conditions found in the Welsh hills. They also suggest that other breeds of sheep would not survive. "The animals are born and bred on organic upland farms in Wales, and mature slowly on their diet of grasses and herbs of the uplands, and maybe home-produced silage later on" (<http://www.graigfarm.co.uk>).

3.3.1 Dairy sector

According to DEFRA (2002), the dairy industry in the UK is dominated by the Holstein breed. They argue that the Holstein dominance is so great that the next three most popular breeds (Jersey, Ayrshire and Guernsey) comprise merely 4.5% of the purebred population.

DEFRA (2006) reports that, the Holstein being the predominant dairy breed, most Holstein cows have many ancestors in common only a few generations back. Inbreeding is occurring in many countries and DEFRA uses this example to illustrate that care needs to be taken of genetic resources.

The table above suggests that the organic dairy sector in Wales uses a number of breeds. In the Netherlands, the survey undertaken by Nauta et al. (2006) showed that different production and marketing strategies demand

different breeds; organic dairy farmers use different breeds to those managing multi-functional demand. Nauta et al. showed that 29% of Dutch farmers specialising in milk production use purebred Holstein cows and 51% use crosses with more robust breeds, such as Browns Swiss, Montbéliarde and Maas-Rijn-Ijssel cattle (a dual-purpose breed). Fifty seven per cent of multifunctional farms choose crossbreeding whilst 30% choose native Dutch breeds, such as Maas-Rijn-Ijssel, Groninger White Face cattle and Dutch Friesians (FH). Only 2% of the multifunctional farms use Holsteins.

Shorthorn breed

The Shorthorn is a dual-purpose breed. This is an important characteristic in organic dairy production systems. The Shorthorn originates from the North East coast of England which, although fertile, can be a harsh environment and provides the breed with its hardiness, the ability to convert forage to milk and excellent conformation, leading to longevity.

Box 1: Reasons given by organic producers for using the Shorthorn breed

“The black and white cows simply are not suited to an organic system”, explains Karl Barton, organic farm manager. According to Mr. Barton:

- Shorthorns are very efficient at converting grass into milk.
- Furthermore, they are excellent dual-purpose animals: their bull calves make excellent beef animals.
- Red and white cows like the Shorthorns are very hardy and enjoy grazing, whatever the weather; *“however, the breed is not a good protein converter and has a high butter fat content”*.
- Other positive characteristics of the Shorthorn include its fertility and ease of handling.

Source: SA (2005)

Table 6 below shows the production characteristics of other breeds.

Table 6: Production characteristics of a number of dairy breeds

Dairy breed	Production characteristics
Maas-Rijn-Ijssel (MRI)	<ul style="list-style-type: none">• Dual purpose• Stocky• Good milk from forage
Guernsey	<ul style="list-style-type: none">• Docile• High fat content• Difficult to market calves
Jersey	<ul style="list-style-type: none">• Similar milk solids %age as HF, but more efficient• Small cow, less soil compaction• High occurrence of milk fever• Good milk from forage• Effective grazer of coarse vegetation• Good grazer on sensitive swards or wet sites
Holstein Friesian	<ul style="list-style-type: none">• Bred for production on concentrates• High milk yield• Difficult to market calves
Ayrshire	<ul style="list-style-type: none">• High milk production• Milk with high butterfat content• Hardy• Difficult to fatten and market calves

Source: Van Diepen and Frost (unpublished)

According to former organic dairy farmer Nick Rebbeck a number of UK organic producers use Jersey or Holstein Friesian dairy cows although other breeds might fit better in organic livestock systems. However, the marketing of male calves is an on-going difficulty for both organic and conventional producers.

3.3.2 Beef production sector

Three exotic breeds, the Limousin, Charolais and Belgian Blue (heavy usage through AI) and one native breed (Aberdeen Angus) lead the beef industry in

the UK. According to the RBST, native cattle breeds used to be more important than continental breeds but now the situation seems to have changed (RBST, 2006).

However, as suggested above, a wider range of native breeds are used within the organic beef sector, and two of the breeds used in organic production systems in Wales are further discussed below.

Welsh Black cattle

According to CCW, the Welsh Black is one of the oldest breeds in Wales and in Britain (Yarwood and Evans, 2002). Welsh Black cattle are good for use in organic livestock systems because they have a good forage conversion, are suitable for conservation grazing (GAP, 2001) and produce a good quality beef.

Box 2 gives a number of the reasons put forward by organic producers for using this breed.

Box 2: Reasons given by organic producers for using Welsh Black cattle

Producer A: *“Welsh Black cattle are very hardy; they are popular for use in the higher and more exposed parts of the country. Besides that – it has a good mothering ability”*

Producer B: *“Welsh Black is well-suited to the uplands of Wales and organic systems of farming; it thrives throughout Wales and produces top quality beef; the beef is fine-grained, deep in colour and not unlike venison in texture”*

Source: www.cambrianorganics.com, www.graigfarm.co.uk

Hereford breed

In the first part of the 18th century, Hereford cattle were developed as a dual-purpose breed. Animals younger than 6 years were used for ploughing and then slaughtered for beef. The breed was subsequently improved for beef quality. According to producers, the breed makes good use of forage and is easy to fatten, even off unimproved pastures in the summer months. Moreover, it has a good quality carcass. According to Graig Farm, the Hereford breed has always been valued for its ability to mature on a grass-only diet. They suggest that this ability has resulted in the spread of the

Hereford throughout the world; they also mention that its meat quality is well known.

Hereford cattle are advantageous for use in organic livestock systems because they have good forage conversion and are suitable for conservation grazing. They produce good quality beef, calve easily and are docile..

As suggested in Section 2.3, traits such as conversion of forage and meat quality are important traits for the organic sector. The table below provides production characteristics for other breeds used in, and appropriate for, organic production systems.

Table 7: Production characteristics of a number of cattle breeds

Cattle breed	Production characteristics
Angus/Aberdeen Angus	<ul style="list-style-type: none"> • Healthy • Hardy • Finishes well on (improved) grass • Traditional Angus is hard to source
North Devon	<ul style="list-style-type: none"> • Hardy • Can finish off grass • Small animal; good in wet areas • Easy calving • Cows almost too fat • Traditional breed; good for direct marketing
South Devon	<ul style="list-style-type: none"> • Hardy • Good for low-input systems • Heifers finish in 20-22 months • BUT difficult to finish off grass under 30 months
Longhorn	<ul style="list-style-type: none"> • Can finish off grass, • Quiet, easy to handle • Slow maturing; finishes off grass at 4 years. Additional feed 6-8 weeks prior to slaughter can allow steers to be finished between 24-30 months
British White	<ul style="list-style-type: none"> • Easy calving

Source: Organic Studies Centre (2002); GAP (2001)

3.3.3 Sheep sector

The national sheep flock relies heavily on 7 breeds of which five are native: Scottish Blackface, Welsh Mountain, Swaledale, Blueface Leicester and Suffolk. There are two exotic breeds: British Texel and Charolais (DEFRA, 2003). A study by Hybu Cig Cymru (HCC) shows that Welsh Mountain sheep contribute to 37% of the Welsh flock (HCC, 2006).

Over the past thirty years, crossbred ewe numbers have increased: from 32% in 1971 to 50% in 2003. Many breeds from continental Europe were imported during this period. In 2003, the Texel was the main ram breed in the UK and was also the largest lowland purebred ewe breed (DEFRA, 2003). Breeds used in organic production systems in Wales are further discussed below.

Lleyn breed

According to CCW, isolation of the Lleyn breed from major markets threatened its survival. In 1970, it was almost considered as a rare breed (Yarwood and Evans, 2002). Box 3 describes the motives of a number of organic farmers for using this breed.

Box 3: Motives of organic producers using the Lleyn breed

Producer C uses the Lleyn for its appearance, because it enables him to breed his own replacements and because it is a smaller breed. He mentions that they have had a range of breeds and crosses, but prefer the Lleyn within their organic system.

Producer D uses the Lleyn breed because *“it is a very milky ewe capable of producing and rearing early lambs that go on to grow well”*. He also mentions that *“the Lleyn is not a hill ewe such as the Welsh Mountain sheep, but is still a hardy animal. We are now running some Lleyens on higher ground than our Welsh Mountain sheep”*. He wants to change to a pure Lleyn flock without crossbreeds because *“this will give me the dual advantage of using a good commercial sheep and opens the way to further develop sales of pedigree Lleyn sheep”*

Producer E feels that *“Lleyn have a quiet temperament and are a pleasure to shepherd; they're great foragers and seem to prefer the outdoors. Besides that they present no real problems at lambing. We have a high lambing percentage of 185% from ewes put to the ram”*. According to him: *“The Lleyn lambs are extremely lively and start sucking without assistance. The mothers demonstrate true motherability”*. This enables Producer E to reduce his inputs and reduce his labour by 30%. He also mentions that Lleyn sheep *“are foot rot resistant”*.

Source: www.lleynsheep.com

The motives that these three farmers mention (in Box 3) are very similar to the characteristics/traits desired by farmers, indicated in Section 2.3. This suggests that the Lleyn ewe is an appropriate breed for use in organic systems. The table below gives a number of production characteristics of other breeds used in and appropriate for, organic livestock production systems.

Table 8: Production characteristics of a number of sheep breeds

Sheep breeds	Production characteristics
Roussin	<ul style="list-style-type: none">• Good in organic systems• Difficulties getting Roussin replacements
Dorset	<ul style="list-style-type: none">• Fattens quickly
Suffolk	<ul style="list-style-type: none">• Rams are highly rated as terminal sires for producing lambs for slaughter• Suffolk cross lambs are fast to mature
Welsh Mountain	<ul style="list-style-type: none">• Welsh Mountain ewes X Longwool rams X (again) with a terminal sire breed produce a fat lamb for slaughter.
Jacob*	<ul style="list-style-type: none">• Lambs are slow to finish
Black Welsh Mountain*	<ul style="list-style-type: none">• Low maintenance breed in terms of husbandry although generally prefers quite good grazing• Small and quite hardy despite a delicate appearance• Extremely good, hard, slow-growing hooves• Foot-rot resistant; even on the wettest of grounds• Physically easy to keep and handle with few husbandry requirements• Can have some problems during lambing: if ewes have too rich a diet, big lambs are produced which can cause birthing difficulties. Lambs are normally born as twins and are small
Beulah*	<ul style="list-style-type: none">• Good for conservation grazing. Shown to be a valuable tool in reducing the invasion of scrub on grasslands of conservation importance

Source: Organic Studies Centre (2002); GAP (2001)

4. MARKET TRENDS AND POTENTIAL

4.1 General

Meat is central to the British diet with about 1 million tonnes of beef and veal and 500,000 tonnes of mutton and lamb consumed in the UK in 2003 (HCC, 2005). Organic meat consumption is increasing. According to the Soil Association (2006)

- In 2005, the farm gate value of organic meat and poultry was estimated at £129 million, an increase of 59% since 2004
- 8.9 million organic table birds were slaughtered according to estimates, an increase of 55% since 2004
- 27,358 organic beef cattle were slaughtered with an estimated farm gate value of £19.7 million, an increase of 44%
- 205,236 lambs were slaughtered with an estimated farm gate value of £12.3 million, a 29% increase

During 2005, demand for UK organic beef increased as part of this increased consumption but also because, at the end of the year, the major retailer, Tesco, decided to source beef from the UK rather than imported organic beef. With the ending of the over 30 months scheme (OTMS), older animals can again enter the food chain (SA, 2006). According to HCC, the UK imported less beef in the period before the ending of this scheme and imports decreased by 16%.

In 2004, the value of total organic meat sold in the UK was estimated at £72.3 million. The three major outlets for the organic meat were Tesco (28.7% of total), Sainsbury (27.5%) and Waitrose (25.6%). Independent retail shops sold 0.1% of the total and others (such as direct sales), 3.1%. The table below indicates the sales of different types of meat.

Table 9: Sales of organic meat

	(000) £	Ton
Fresh beef	16,990	2,114
Fresh poultry	15,622	2,372
Defined chilled meat and veg. Products	11,845	6,885
Fresh lamb	8,935	1,016
Bacon rashers	5,288	418
Cooked and sliced meats	4,784	213
Fresh pork	4,509	619
Fresh sausages	3,313	430
Fresh and chilled poultry products	879	84
P/P fresh meat and pastry	182	46

Source: TNS (2005)

In Wales, more mutton and lamb per head is consumed than in England and Scotland but the consumption of beef and veal is less than in both England and Scotland (HCC, 2005).

Table 10: Meat consumption in the UK (kg per person per annum)

	Meat consumption Wales	Meat consumption England	Meat consumption Scotland
Beef and veal	5.3	6.0	7.3
Mutton and lamb	3.1	2.8	1.3

Source: HCC (2005)

According to HCC (2005), in Wales and West region the percentage of ready meals increased consumed from 10% in 1999 to 13% in 2004. At the same time, the market share of beef frozen ready meals increased to 6%. Over the same time period the demand for both fresh and frozen beef and veal increased by 9% in Wales (HCC, 2005).

Taylor Nelson Sofres (TNS, 2005) report that the total expenditure of individual households in Wales on meat and meat products was £254.28 per year for 2003/4. They suggest that Welsh consumers prefer to buy organic food from Wales (80%) and that, elsewhere in the UK, there is reasonable interest in Welsh produce. While consumer attitudes towards Welsh food are positive, consumers outside Wales seem to give more importance to UK organic food (TNS, 2005).

Consumer demand is a significant driver of policy and standards, and value for money is still a major factor in determining consumer-buying behaviour. The demand for lean meat and homogeneity of both fresh and processed products, particularly in the major supermarkets can impact on breeding policies for livestock farmers (DEFRA, 2002).

4.2 Financial data for beef, sheep and milk production.

The research conducted by TNS suggests that there is a market for (organic) Welsh meat. Furthermore, it is important to consider the economical viability of the production systems to evaluate whether, and how, the costs of production are covered by the market price.

The table below gives an overview of the gross margin data of a number of enterprise types.

Table 11: Average profit (before rent and finance) of various farm types

	Hill cattle and sheep farms	Upland cattle and sheep farms		Lowland cattle and sheep farms		Hill and upland dairy farms		Lowland dairy farms	
		Conv.	Organic	Conv.	Organic	Conv.	Organic	Conv.	Organic
Livestock	52,915	51,612	22,060	31,297	27,006	141,312	83,491	176,848	108,060
Livestock subsidies	32,403	24,910	12,943	14,554	13,569	11,715 (including DP, SAP, BSP, SP and AAP)	4,630	12,377	1,360
Cropping	1,154	3,815	391	5,030	3,945	1,733	1,741	4,074	8,404
Cropping subsidies	174	578	209	1,100	1,512				6,520
Miscellaneous	3,754	6,543	6,746	4,599	6,894	2,721	6,889	6,063	6,467
Agri-environment payments	9,944	4,879	7,621	2,114	9,366	2,732	2,837	1,720	4,523
Output	100,344	92,337	49,970	58,694	62,293	160,213	99,588	201,082	135,333
Variable costs	36,422	30,684	11,126	19,640	10,718	68,217	27,771	83,066	39,306
Fixed costs	32,924	30,329	18,729	21,086	25,384	49,075	39,485	65,801	51,172
Profit before rent and finance	30,998	31,324	20,116	17,968	26,190	42,921	32,332	52,215	45,887

Source: Soil Association Market report (2006); Farm Business Survey Wales (IRS, 2005)

According to the Farm Business Survey (FBS) for 2004/2005, from which the data in the table above are derived, the introduction of the Single Payment Scheme (SPS) had a significant impact on the viability of individual enterprises. It reports a significant decrease in the profitability of beef and sheep enterprises and reveals that suckler cow enterprises derive almost 40% of enterprise output from direct support payment (IRS, 2005). A study of the economic also shows that a large percentage of the revenue of livestock production attributes of Less Favoured Area (LFA) farmers (Davies, McLean & Fraser, 2006) systems in Wales is derived from support payments, accounting for up to 70% of the gross margin.

Research conducted by HCC (Gwlad, July 2006) shows that there is a large difference in the ability of sheep farmers to cover production costs from market returns (excluding subsidies received). For the top third, market returns covered 113% of costs while, for the bottom third, these returns covered merely 64%. These findings are derived from the FBS for the financial year 2005/06.

In some European countries, but not Britain, producers were receiving headage payments of 100€/grazing livestock unit for using endangered breeds (EU regulation: EC 2078/92). However, following the implementation of Common Agricultural Policy (CAP) reform, these payments are no longer available.

In the UK, a number of incentives for farmers using rare breeds are incorporated into agri-environment schemes. In England, farmers receive the Traditional Breed Incentive (TBI) from English Nature. In Wales, the Tir Gofal Scheme gives extra points for Welsh Black cattle, giving a better chance of receiving this agri-environmental payment.

Currently, the financial situation of farm enterprises is subject to considerable change. According to DEFRA (2002), no national initiatives have been introduced as a result of UK Government legislation to specifically support endangered breeds. However, some payments via agri-environment schemes are in place, as mentioned above. Initiatives that do exist have been funded

and implemented through the work of individuals, research institutes, breed societies and NGOs, for example (DEFRA, 2006):

- The National Trust is encouraging their tenants to use native breeds though organising promotional and marketing material and events;
- Natural England promotes the use of native breeds via grazing conservation projects (e.g. the [Limestone Country Project](#));
- The [Wiltshire Interactive Grazing Initiative \(WIGI\)](#), a partnership project between English Nature, RSPB and Wiltshire Wildlife, uses White Park cattle for conservation grazing (DEFRA, 2006).

4.3 Marketing of native/rare breeds

The following paragraphs describe a number of marketing initiatives undertaken by a range of organisations.

4.3.1 Marketing initiatives

An increasing number of breed societies and leading supermarkets in Wales and the UK have become involved in promoting breeds as a brand. According to GAP (2003), the Aberdeen Angus Breed Society has been very successful in establishing a differentiated beef product with a premium price. GAP also point to the following examples of breed society initiatives:

- Langdale and Coniston Herdwick Meat Producers Group
- Gloucester Cattle Society
- Sussex Cattle Society
- Real Hereford Beef Society
- Devon Cattle Breeders
- Rough Fell Sheep
- Welsh Black Society

The Welsh Black Society seems to be the only breed society with a specific focus on organic livestock production. A Welsh Black Organic Club was formed in 2002 with government funding. The Club assists organic breeders

and organises sales of the organic breed through the Society's pedigree breed and store sales. Organic cattle are bred from the same blood lines as conventionally-reared cattle (www.welshblackcattlesociety.org).

DEFRA (2006) mentions the following marketing initiatives:

The RBST Traditional Breeds Meat Marketing Company Ltd. involves local production, processing and marketing, through a network of producers, finishers, abattoirs and butchers; the Gloucestershire Old Spot has been one of the successes of this scheme.

- The British Pig Association's Pedigree Pork Initiative promotes the sale of pig products from small herds of pedigree pigs, produced by local farmers; Pedigree Pork is available from selected local butchers, farmers markets, farm shops and by mail order
- A few of the leading supermarkets have also established marketing schemes for specific breeds (GAP, 2003)
- Waitrose works together with the Hereford Cattle Society in supplying meat from pure and cross-bred Herefords to selected outlets (www.waitrose.com)
- Waitrose has also established the Aberdeen Angus Beef Scheme; all producers registered have a contract
- Marks and Spencer have established a similar scheme for Shorthorn Beef (www2.marksandspencer.com)
- The Brecknock Hill Cheviot breeders have also established an important branded, marketing, contract with Marks and Spencer

In addition, there are also a number of regional initiatives implemented via producer (marketing) groups, such as Graig Farm and Cambrian Organics.

4.3.2 Marketing attributes of a number of breeds

As mentioned earlier (Section 3.3), Suffolk, Lleyn and Texel are the most common sheep breeds on organic farms. Welsh Black, Charolais cross, Limousin, South Devon cross, Aberdeen Angus and Hereford cross are the

main beef breeds. The two tables given at the end of this section of the report summarise the marketing attributes of these and other breeds.

According to both Graig Farm Organics and Cambrian Hills Organics (two large producer groups), there was good demand for both organic beef and lamb throughout 2004 and prices were reasonable, although with some seasonal variation. However, a significant proportion of lamb and beef was sold into the conventional market. Some hill farmers who are unable to meet the weights required from buyers (or have too long a withdrawal period) have to sell their lambs to conventional farms as stores for finishing. A recent survey showed that 13% of organically-produced lambs were still being sold as non-organic due to finishing specifications (41%), lack of organic market outlets (54%) and other reasons (4%), such as lack of organic abattoirs (OCW, 2006).

It is clear that there are market opportunities for marketing and selling native/rare breeds; consumers are interested in buying organic Welsh meat and milk, and a number of marketing initiatives already exist. However, there are still problems in processing and marketing rare and native breeds.

Table 12: Marketing attributes of beef breeds

Beef breed	<i>Marketing attributes</i>
Hereford	A traditional and popular meat breed with good marketing potential, <ul style="list-style-type: none">• Produces a quality carcass.• Branding scheme (<i>Hereford Beef Scheme</i>) was started in 1999, putting labelled, pre-packed meat on the shelves in 17 Waitrose stores, with plans to extend. One year later, there has been a trebling of throughput of animals per week.
Aberdeen Angus	A highly popular commercial breed, recognised for its high quality meat, <ul style="list-style-type: none">• Purebred Angus beef fetches a premium.• Produces well-marbled, fine textured meat.• Medium frame gives cuts of meat that are a popular size with butchers.
North Devon	A high quality beef breed, producing much sought-after meat. (The Breed Society is aiming to obtain a European Union 'Certificate of Specific Characteristic' to aid in the marketing of the meat)
South Devon	A commercially viable breed
Longhorn	A breed with good commercial opportunities, particularly within niche markets. However, some livestock markets will not be able to handle the breed if horned. May need to seek specialist niche markets.
Welsh Black	Best for processing A commercially viable breed, <ul style="list-style-type: none">• A beef marketing scheme exists for the breed, with an average 20p/kg premium.• Beef is fine-grained, deep in colour and not unlike venison in texture.

Source: GAP (2001)

Table 13: Production and marketing attributes of sheep breeds

Sheep breeds	Marketing attributes
Suffolk	A commercial lowland breed, <ul style="list-style-type: none"> • Large, lean, commercially desirable carcass. • Give flavour to meat
Charolais X Welsh Mountain	An important breed in the breeding programme for the production of commercial meat, <ul style="list-style-type: none"> • Good flavour meat suitable for the commercial market, although niche marketing is also a possibility.
Jacob	A breed with opportunities for developing niche markets in meat and wool, <ul style="list-style-type: none"> • Dark, lean meat; the cuts do not have the right characteristics for the commercial market (long, bony leg joints). • Sale of multi-coloured fleece for weaving, e.g. sale of wool as a local product in National Trust Shop in Arlington.
Black Mountain	Welsh A breed with opportunities for specialist niche marketing, <ul style="list-style-type: none"> • <i>Wool</i> exempt from British Wool Marketing Board regulations; however, fleece is very short and thus of limited use. • <i>Meat</i> – as with other primitive breeds, carcass is small and lean. It is different in texture; a cross between lamb and venison and, as such, has a specialist niche market both through the RBST meat marketing scheme and via farmers markets.
Beulah	A popular commercial breed, <ul style="list-style-type: none"> • <i>Meat</i> – produces a lean, marketable carcass.

Source: GAP (2001)

5. CONCLUSIONS

Organic livestock production requires the use of a number of breeds, with selection of breed and crossbreeding being the main strategies for improving product quality. The selection of animals via sire referencing is used by organic livestock producers. While conventional livestock production looks mainly at a limited number of traits such as conformation and fat and milk yield, organic livestock production is shown to consider a broader range of attributes, including forage conversion, ease of calving and general disease resistance.

Traditional breeds are able to contribute to the extensification, diversification and environmental conservation objectives now required by both organic producers and rural development policy. Such breeds are assumed to be better adapted to the situation in the uplands and hills of Wales; they are less selective grazers and thereby favour herbage.

Breed associations, producers and, sometimes, government have carried out a number of actions to save the remaining genetic resources. However, the homogenisation of the livestock sector, resulting from strict regulations and market requirements, will greatly impact on genetic biodiversity.

Several surveys have shown that the organic dairy, beef and sheep sectors use a wide range of breeds, which will reflect the breeds used prior to conversion. Although some researchers (Nauta et al., 2006) suggest that the diversity of breeds farmed is a result of the range of organic production and marketing strategies.

Consumers are interested in buying organic food from Wales. A number of breeds, such as Welsh Blacks, Hereford cattle, the Lleyn breed and Welsh Mountain sheep show good marketable milk and meat. However, the economic viability of organic livestock farming seems to depend heavily on subsidies. Furthermore, market requirements are standardised and allow for little differentiation, and some traditional and rare breeds have difficulty meeting these requirements. Loss of small-scale abattoirs will further limit the ability of such breeds to enter (niche) markets. Large-scale abattoirs use standardised methods which do not allow for differentiation. Current national

strategies for livestock production do not reflect the need for a genetic pool of breeding stock (DEFRA, 2006).

While breeding must focus on what the market wants (whether it be mass or niche market), other factors also have to be taken into account. The choice of breeds and breeding strategies used in the organic livestock sector needs to ensure farm profitability, safeguard animal health and welfare, focus on conserving genetic diversity and promote human health.

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